

W. H. Johnson

THE
ENTOMOLOGIST'S ANNUAL

FOR

MDCCCLXI.

1861

WITH A COLOURED PLATE.



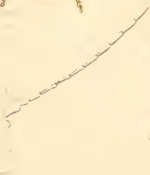
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JOHN VAN VOORST, PATERNOSTER ROW.

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[*Half-a-Crown.*





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“It is a strange thing that, in sea voyages, where there is nothing to be seen but sky and sea, men should make diaries; but in land-travel, wherein so much is to be observed, for the most part they omit it—let diaries, therefore, be brought in use.”

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P R E F A C E.



THIS year we omit the list of British Entomologists—it occupies too much space to be repeated each year.

The census of these islands is taken decennially—should it not suffice, if the *Census Entomologicus* be taken triennially?

In the present volume we bring Dr. Hagen's paper on the British *Phryganidæ* to a close. Mr. M'Lachlan has already turned his attention to the study of that group of insects, and has written a few pages on the best mode of prosecuting that study; we trust that he will soon have followers in this pursuit.

Dr. Hagen's notions of the evil propensities of a *Psocus* are very different to our own; certainly we do not like to see them on our setting-boards, for, if they are too frequent there, disastrous results are sure to follow—either antennæ are tenderly devoured, or a pathway is created between the base of the wing and the body of the insect, and, on attempting to remove it, we lift up the thorax and abdomen, leaving the wings prostrate on the setting-board.

Mr. Smith's observations on the *Hymenoptera* need no recommendation from us.

Much attention having been recently paid to the *Hemiptera* in this country, we have, in order to foster a taste for the study of those insects, compiled a Catalogue of the British

Heteroptera; we hope all those who are working at this tribe of insects will kindly announce in the pages of the "Intelligencer" any novelties they may meet with.

Mr. Janson has kindly contributed his usual supply of Coleopterological pabulum. Each year we fondly hope that the time *is* coming for a New Manual of British Beetles; our lists of novelties afford valuable materials towards that great *desideratum*, but still it lingers, and we are not yet able even to announce it as *in the press*.

We have this year given an Index to the new British *Lepidoptera* noticed in former volumes of the Annual, and it would, no doubt, be very serviceable had we a similar Index to the new *Coleoptera*.

Mr. Harpur Crewe's notes on the larvæ of the genus *Eupitheciæ* will be found very useful to all those who are working at that puzzling group of moths. It is only by rearing long series of these insects from the egg that the range of variation of the larvæ and of the perfect insects can be satisfactorily established.

H. T. STANTON.

MOUNTSFIELD, LEWISHAM,

December 10th, 1860.

CONTENTS.

	PAGE
NEUROPTERA.	
Synopsis of the British Phryganidæ. By DR. HAGEN ..	1
<i>(Continued from the Annual for 1860.)</i>	
Synopsis of the British Psocidæ. By DR. HAGEN	17
Some Suggestions for the successful Pursuit of the Study of the Phryganidæ, with a Description of a New British Species. By R. M'LACHLAN	52
HYMENOPTERA. By FREDERICK SMITH.	
Observations on the effects of the late unfavourable Season on Hymenopterous Insects; Notes on the Economy of certain Species, on the Capture of others of extreme Rarity and on Species new to the British Fauna	33
HEMIPTERA. By the EDITOR.	
A List of British Hemiptera	47
COLEOPTERA. By E. W. JANSON, Sec. Ent. Soc.	
New British Species noticed in 1860	59
LEPIDOPTERA.	
New British Species in 1860. By the EDITOR	82
Rare British Species captured in 1860	93
Observations on British Tineina	103
Answers to Enigmas	114
Enigmas still unanswered	114
New Enigmas for Solution	116
Natural History of the Tineina	119
Index to the New Lepidoptera in former volumes of the Annual	122
Notes on Eupithecia Larvæ. By the REV. H. H. CREWE, M.A.	126
NEW WORKS ON ENTOMOLOGY	147

EXPLANATION OF PLATE.



- Fig. 1. *Noctua flammatra*, Fabricius, see Ent. Annual for 1860, p. 131.
2. *Nomada armata*, Schäffer, see page 45.
3. *Nola Albulalis*, Hübner, see page 86.
4. *Ophiodes Lunar*, W. V., see page 99.
5. *Crepidodera Atropæ*, Foudras, var. see page 80.
6. *Ptinella limbata*, Heer, see page 64.
7. *Brachonyx indigena*, Herbst, see page 73.
8. Head of *Prosopis dilatatus*, a scape of antenna of ditto, see p. 44.
8.* „ „ *variegatus*, „ „ „ „
9. Antenna and thorax of *Donacia sericea*, see page 77.
9.* „ „ „ *Comari*, „

NEUROPTERA.

SYNOPSIS OF THE BRITISH PHRYGANIDÆ.

BY DR. HAGEN.

[Continued from the Annual for 1860, p. 85.]

Sub-Family 7. HYDROPSYCHIDES.

I. SPURS 3, 4, 4.

A. INTERMEDIATE LEGS OF THE FEMALES NOT DILATED.

Genus PLECTROCNEMIA, Stephens.

ANTENNÆ stout, as long as or but little shorter than the wings; ocelli wanting; maxillary palpi long, the two basal joints very short, the two following long, the last thong-shaped, as long as the others united; head very strongly pubescent; thorax with two knob-like protuberances; legs long, stout; spurs 3, 4, 4; intermediate legs of the females not dilated; wings large, narrow, with parabolic apex; before the apex of wings two, behind these three forks; discoidal cell closed; transverse veins rather numerous (about 7), slenderer than the longitudinal veins. Males: app. sup. two ovate, short, somewhat acuminate lobes; app. inf. close together, two long, slender, upwardly bent and much attenuated lobes; app. intermed. two broad, short lobes, with narrow bases; penis-cover narrow, boat-shaped, situate be-

neath an acute projection of the last dorsal segment; penis cylindrical, with its apex cleft, and spoon-shaped sheaths. Females: apex of abdomen obtusely truncate, with two widely separated narrow ovipositor valves.

Case fixed.

87. *P. conspersus*, Curt. Phil. M. 213; *P. senex*, Steph. Ill. 168, 1; Pict.

Ashy grey, maculated with brown; antennæ fawn-coloured, with darker annulations; palpi and legs fawn-coloured; head and thorax laterally with dark brown, the disc with long silvery white pubescence; abdomen black above, fawn-coloured beneath; anterior wings ashy-grey, spotted with brown; round the apical margin a somewhat regular row of alternating spots, the disc with larger irregular spots, sometimes in the form of two oblique interrupted bands; posterior wings ashy-grey, with fawn-coloured veins; fringes whitish.

Length 7 lin.; exp. 12 lin.

Hab. Rare near London, commoner in Devonshire in July.

The size, the peculiarly robust form, the strong silvery white pubescence, in conjunction with the undilated intermediate legs of the female, preclude this species from being confounded with any other.

B. INTERMEDIATE LEGS OF THE FEMALES DILATED.

Genus *POLYCENTROPUS*, Curtis.

The characters of this genus are almost entirely those of the preceding; the antennæ, however, are stouter and shorter; the apex of the wings more rounded; the last joint of the

palpi shorter; the intermediate legs of the females strongly dilated.

Case fixed.

In habit and colouring the species pertaining to this genus are so peculiar that it is impossible to mistake them. I am constrained, until fresh reliable characters are adduced, to unite the genus *Cyrnus*, Steph., with *Polycentropus*, since I have not succeeded in recognizing the differences of neuration upon which Stephens has founded the genus *Cyrnus*. Of the four described species *C. pulchellus* is a veritable *Polycentropus*, and *unipunctatus* only an abraded specimen of the same species. *C. urbanus* belongs to the genus *Anticyra* (with 2, 4, 4 spurs); the type of the fourth species, *C. unicolor*, apparently likewise an *Anticyra*, is no longer to be found.

88. P. IRRORATUS, Curt. B. E. pl. 544; Steph. Ill. 178, 7;
H. flavomaculata, Pict.

Brown; antennæ annulated with yellow; palpi and legs fawn-coloured; head and thorax black-brown, with a thick long golden yellow pubescence; abdomen black-brown, fawn-coloured beneath; anterior wings pale brown, thickly spotted with golden yellow; the apex and posterior margin with a regular row of yellow spots at the anterior margin, being more widely separated, several larger dark patches are apparent; posterior wings brown-grey, with the edges brown.

Male. App. intermed. claw-shaped, divergent, prominent; app. sup. and inf. flat, quadrate.

Hab. London, in June; more frequently in the north of England; Scotland; Isle of Arran at the end of August; Cartland Craigs in September.

89. *P. MULTIGUTTATUS*, Curt. B. E. pl. 544; Steph. Ill. 178, 8.

Dark brown; antennæ yellow, annulated with brown; palpi brownish; apical joint yellow; head and thorax dark brown, with a dense yellow pubescence; legs brownish-yellow, posterior legs brown externally; abdomen fawn-coloured or black-brown; anterior wings dark brown, thickly maculated with golden yellow; thyridium and posterior transverse veins whitish, the spots at the apical margin regularly alternate; anterior and posterior margins with larger brown spots; posterior wings black-grey, edges blackish.

Male. App. intermed. long, hook-shaped, crossing each other; app. sup. long, leaf-like.

Length 5 lin.; exp. 8 lin.

Hab. London, end of July; Scotland, July, August; not rare.

90. *P. PYRRHOCERAS*, Steph. Ill. 177, 3.

Brownish; antennæ yellow, broadly annulated with brown; palpi dark brown; head and thorax brown, with a dense yellow pubescence; legs fawn-coloured, darker externally; abdomen brown, beneath fawn-coloured; anterior wings pale brown, very thickly but not very conspicuously spotted; posterior wings grey, with grey edges.

Male. App. intermed. approximate, hook-shaped, bent under; app. sup. leaf-like, long, slightly narrowed towards the apex.

Length 4 lin.; exp. 7 lin.

Hab. London, in June; not common.

91. *P. TRIMACULATUS*, Curt. Phil. M. 213; B. E. pl. 544; Steph. Ill. 178, 6; *P. subpunctatus*, Steph. Ill. 176, 1.

Brownish; antennæ yellow, broadly annulated with brown; palpi brownish; head and thorax brown, with a dense yellow pubescence; underside of abdomen and legs fawn-coloured; anterior wings pale brown, sparingly maculated with yellow, spots more numerous in the vicinity of the margin, with three more conspicuous spots at the posterior angle; posterior wings grey, with grey edges.

Male. App. intermed. short, slender, straight; app. super. short, broad, leaf-like, obtusely acuminate.

Length $3\frac{1}{2}$ lin; exp. 6 lin.

Hab. Hertford; Norfolk, June, July.

92. *P. PULCHELLUS*, Steph. Ill. 175, 2; *Cyrnus unipunctatus*, Steph. Ill. 175, 1.

Dark brown; antennæ yellow, broadly annulated with brown; palpi dark brown; head and thorax black-brown, with a dense golden yellow pubescence; legs fawn-coloured, brownish externally; abdomen black-brown; anterior wings dark brown, thickly maculated with golden yellow, especially in the middle, on the anterior margin are several larger yellow spots; posterior wings grey, with grey edges.

Male. App. intermed. short, stunted; app. sup. very small, triangular.

Length $3\frac{1}{2}$ lin.; exp. 6 lin.

Hab. Devonshire, New Forest, June, July; Hertford, Ripley.

93. *P. CONCINNUS*, Steph. Ill. 178, 5; *P. fuliginosus*, Steph. Ill. 177, 4.

Grey-yellow; antennæ yellow, annulations scarcely darker; palpi yellow; legs yellow, the tibiæ and

tarsi of the anterior legs with brownish annulations; abdomen fawn-coloured; anterior wings brownish, with numerous yellow-grey spots, some of which are confluent, the basal spots less conspicuous, a larger darker spot near the pterostigma; posterior wings pale grey.

Male. App. intermed. flat; app. inf. long, the apex pectinated within.

Length $3\frac{1}{2}$ lin.; exp. 6—7 lin.

Hab. London, Ripley, July.

94. *P. PICICORNIS*, Steph. Ill. 177, 2.

Blackish; antennæ blackish, annulated with yellow; palpi blackish; head and thorax black, with a yellow pubescence; legs fawn-coloured, thighs blackish; abdomen black; anterior wings brown, with large yellow spots, which are partially confluent on the anterior margin, in the middle, and towards the apex; posterior wings brown, with brown edges.

Male. App. intermed. short, robust, straight.

Length 4 lin.; exp. $6\frac{1}{2}$ lin.

Hab. Devonshire, June.

95. *P. BIMACULATUS*, Linn.; *P. Tigurini*, Fabr.; *P. memorabilis*, Curt. collect.; *A. robusta*, Walk. Catal. 122, 5.

Fawn-coloured; antennæ yellow, with scarcely discernible yellow annulations; palpi and legs yellow; head and thorax brown, with a dense fawn-coloured pubescence; anterior wings grey brown, with an interrupted fawn-coloured annulus in the centre; posterior wings grey; all the wings edged with white.

Length $3\frac{1}{2}$ — $4\frac{1}{2}$ lin.; exp. 6—8 lin.

Hab. England, coll. Curtis.

II. SPURS, 2, 4, 4.

A. WITH THREE WHITE OCELLI.

Genus PHILOPOTAMUS, Leach.

Antennæ stout, shorter than the wings, basal articulation more robust and longer than the others; head large, with three white ocelli; maxillary palpi very long, slender, the two basal joints somewhat stouter, short, the third joint almost as long again as the two first united, flat, fourth joint a little shorter, apical joint thong-shaped, nearly as long as the others; thorax smooth; wings rather narrow, with the apex elliptical; posterior wings somewhat shorter, before the apex two and behind it three forks, discoidal cell closed. Legs long, with 2, 4, 4 spurs; intermediate legs of the females not dilated; male, app. sup. short, flat; app. infer. long, spoon-shaped, bi-articulate, apical joint double, dorsal plate beak-shaped; app. intermed. two corneous bristles; penis cylindrical, bent; female with the apex of abdomen obtuse, ovipositor-valves triangularly divided.

Case fixed, constructed of pebbles.

* The first apical cell of the anterior wings does not reach the anastomosis.

96. *P. VARIEGATUS*, Scop., Steph. Ill. 169, 1.

Black; antennæ yellow, not annulated; legs fawn-coloured; anterior wings brown, with numerous round yellow spots; posterior wings grey, sometimes with the edges alternately yellow.

Male. App. sup. short, broad, spoon-shaped; app. inf., the upper portion of the apical joint bent under like a hook, with several erect black bristles within; dorsal plate beak-shaped, the apex laterally compressed; penis terminating in a thin point.

Length 9 lin.; exp. 14—16 lin.

Hab. Devonshire in June, not common.

97. *P. MONTANUS*, Don., Steph. Ill. 170, 3; *P. variegatus*, Rbr.

Black; antennæ dark brown, annulations yellowish, sometimes nearly uniform red-brown; legs fawn-coloured; wings brown, with yellow spots; posterior wings with a yellow spot at the pleurostigma.

Male. App. inf., the upper portion of the apical joint strongly bent upwards, within a border of dense prostrate black bristles.

Length 5—6 lin.; exp. 9—11 lin.

Hab. Devonshire, in July; South Wales; Ireland.

** The first apical cell of the anterior wings reaches the anastomosis.

98. *P. SCOPULORUM*, Leach; Steph. Ill. 169, 1; *P. tigrinus*, Brauer; *P. montana*, Pict.

Black; antennæ yellow, with grey annulations; legs fawn-coloured; anterior wings brown, strongly maculated with yellow; posterior wings grey, with yellow spots on the anterior margin.

Male. App. inf., the upper portion of the apical joint as in *P. variegatus*, wider at the apex, dorsal plate beak-shaped, with a broad flat end; penis with a stout corneous hook at the tip beneath.

Length 6—8 lin.; exp. 9—15 lin.

Hab. Mountains of England, Scotland and Ireland, in June.

Obs. When I investigated the Stephensian type I was not thoroughly acquainted with the distinctive characters of the three species. I looked upon them all as *P. variegatus*; for, contrary to the descriptions, the antennæ of the types of all three species are annulated with brown. At the present moment I have no English examples to refer to, but the

species nevertheless resolve themselves, according to Stephens' descriptions, as indicated, and I consider it not impossible that my interpretation is correct. It requires, however, to be confirmed by an examination of English examples.

B. OCELLI WANTING.

† MESOTHORAX WITH TWO KNOB-LIKE PROTUBERANCES. ANTENNÆ SHORT, STOUT.

* THIRD JOINT OF MAXILLARY PALPI LONGER THAN THE SECOND AND FOURTH ; INTERMEDIATE LEGS OF THE FEMALES NOT DILATED.

Genus TINODES, Leach.

Antennæ moderately robust, shorter than the wings, basal joint but little stouter than the rest ; head small, ocelli wanting ; maxillary palpi long, basal joint short, third joint long, second and fourth shorter, about equal in length, apical joint thong-shaped, as long as the third and fourth together ; wings long, narrow, apex wider, elliptical, at the base of the anterior wings of both sexes a round, bald, impressed space ; before the tip a fork and a branch, behind the tip three forks ; four transverse veins at the apex ; discoidal cell small, closed ; legs long, spurs 2, 4, 4 ; intermediate legs of the females not dilated ; male, app. sup. two long, narrow blades ; app. inf. bi-articulate, the terminal joint simple, striate ; app. intermed. two long narrow blades ; dorsal plate small, acute ; beneath it a boat-shaped penis cover ; penis small, lanceolate ; female, the abdomen terminates in a long triangular or acuminate ovipositor directed upwards.

Obs. Stephens' sect. B., in which the legs of the females are dilated, is to be cancelled, the species enumerated by him do not belong here. *T. obscurus* is a female *Glossoma fimbriata*, *T. pusilla* is an *Anticyra*.

99. *T. LURIDUS*, Curt., Steph. Ill. 163, 4; *Phil. longipennis*, Ramb.

Fawn-coloured; antennæ and palpi brownish; head and thorax with fawn-coloured pubescence; legs and abdomen fawn-coloured; wings hyaline, sparingly clothed with fawn-coloured down; veins brown.

Male. App. inf. with oblong obtuse tips.

Length $4\frac{1}{2}$ lin.; exp. $8\frac{1}{2}$ —9 lin.

Hab. Common near London in June, Hertford.

100. *T. PALLESCENS*, Steph. Ill. 162, 1; *T. flaviceps*, Steph. Ill. 163, 2; *T. xanthoceras*, Steph. Ill. 164, 3; *T. pallipes*, Steph. Ill. 164, 5.

Fawn-coloured; antennæ fawn-coloured; palpi brownish; head and thorax with fawn-coloured pubescence; legs fawn-coloured, brownish beneath; abdomen black; wings hyaline, sparingly clothed with brownish fawn-coloured down, veins brownish yellow.

Male, app. inf. with triangular acute terminal joints.

Length 4 lin.; exp. 6—8 lin.

Hab. Near London in June and July.

Obs. When I investigated the Stephensian types I could not succeed in separating specifically the four species cited; their identity, requires, however, re-confirmation.

101. *T. ANNULICORNIS*, Steph. Ill. 164, 6.

Ochreous; palpi brownish; antennæ brown, with narrow whitish annulations; thorax and base of abdomen above brownish, the apex fawn-coloured; wings nearly glabrous, pale brown, with a few golden hairs; veins brownish; legs ochreous yellow.

Length $4\frac{1}{2}$ lin.; exp. 8 lin.

Hab. Near London in June, not common.

Obs. I have not now this species before me: when investigating the types I satisfied myself that it was distinct from the foregoing species, very similar but smaller, &c.; the latter is contrary to the length given by Stephens.

Obs. *T. albipunctatus*, Steph., pertains to *Hydropsyche*.

* * SECOND, THIRD AND FOURTH JOINTS OF THE MAXILLARY PALPI OF EQUAL LENGTH; INTERMEDIATE LEGS OF THE FEMALES DILATED.

Genus PSYCHOMIA, Latr.

(*Anticyra*, Curtis.)

Antennæ robust, scarcely longer than the abdomen, gradually narrowed towards the apex, the two basal joints rather stouter; head small; ocelli wanting; maxillary palpi stout, longer than the head, first joint short, the three following longer, of equal size, the fifth thong-shaped, shorter than the two preceding united; wings very long and narrow, with elliptical tips; before the apex a fork and a branch, behind the apex three forks; posterior wings shorter and more acute, the apical half of the anterior margin strongly emarginate; legs long, spurs 2, 4, 4, the intermediate legs of the female dilated; male with the appendices forcipate, long; female, the abdomen terminates in a short upwardly directed point.

Case?

102. *P. PHÆOPA*, Steph. Ill. 159, 1 (♂); *A. subochracea*, Steph. Ill. 160, 3 (♀); *T. pusilla*, Steph. Ill. 164, 9; ? *P. urbanus*, Steph. Ill. 175, 3.

Ochre-yellow; head and thorax densely pubescent; antennæ robust, pale yellow, scarcely annulated; legs pale yellow; wings narrow, pale yellow, with long fringes; anterior wings with a dense golden pubescence.

Male, app. sup. and inf. of equal length, straight, curved at the tips.

Length 3 lin.; exp. $5\frac{1}{2}$ lin.

Hab. Near Ripley in June, London.

103. *P. CILIARIS*, Steph. Ill. 160, 4 (♂); *A. gracilipes*, Steph. Ill. 159, 2 (♀); ? *P. unicolor*, Steph. Ill. 176, 4.

Ochre-yellow; head and thorax with a dense brownish yellow pubescence; antennæ robust, annulated with dark brown; legs fawn-coloured; wings narrow, acute, yellow, with long fringes; anterior wings with a brownish yellow pubescence.

Male, app. sup. long, straight, curved at the tips; app. inf. wanting.

Length $2\frac{1}{2}$ —3 lin.; exp. $4\frac{1}{2}$ — $5\frac{1}{2}$ lin.

Hab. Hertford, June.

Obs. The species of this genus are but very imperfectly known, and require an accurate investigation of living examples; what I can offer respecting them is very incomplete; England probably possesses more species, but it appears to me that those given above are correctly separated.

† † MESOTHORAX WITHOUT KNOB-LIKE PROTUBERANCES; ANTENNÆ LONG, SLENDER.

Genus HYDROPSYCHE, Pictet.

Antennæ long, slender, the basal joint stouter; head large, destitute of ocelli; maxillary palpi very long, the first joint very short, the second long, the third and fourth a trifle shorter, the fifth longest, thong-shaped; thorax smooth, without knob-like protuberances; anterior wings dilated at the apex and obliquely truncate; posterior wings conspicuously shorter; before the apex two, behind it three

terminal forks, discoidal cell closed; legs long, spurs 2, 4, 4; intermediate legs of the females dilated; male, app. sup. connate, forming a sheath; app. inf. long, slender, bi-articulate; penis thickened at the apex; female, two contiguous, large, quadrate, sheath-valves.

Case fixed.

a. Antennæ a trifle shorter than the wings, without oblique black lines; the third joint of the maxillary palpi longer than the fourth, broad, its inner edge sharp, the fifth barely as long as the four first united; the apical portion of the anterior margin of the posterior wings emarginate.

104. *H. LEPIDA*, Pict.; *T. albipunctatus*, Steph. Ill. 164, 7; *H. varia*, Rbr.

Pale grey-yellow; antennæ brown, the base annulated with yellow; head and thorax slaty-grey, with a dense yellow pubescence above; abdomen above slaty-grey, beneath yellowish; legs yellow; anterior wings grey-yellow, on the anterior and posterior margin several yellowish-white shining patches, along the apex alternate white and brown spots, edge whitish; posterior wings grey, veins yellowish.

Length $3\frac{1}{2}$ lin.; exp. $6\frac{1}{2}$ lin.

Hab. Near London, June, rare.

105. *H. ANGUSTATA*, Pict.; Steph. Ill. 174, 9; *H. ventralis*, Curt. B. E. pl. 601.

Ochreous; antennæ yellow, annulated with brown at the base; head black; mouth yellow; thorax and abdomen above blackish; anterior wings brownish yellow, with yellow pubescence, and a dark spot on the anterior and posterior margin; wings very narrow.

Length $3\frac{1}{2}$ lin. ; exp. $6\frac{1}{2}$ —7 lin.

Hab. The Hermitage garden, near London, July ; Loch Derg.

Obs. In the collection of the British Museum two specimens of *Rhyacoph. dorsalis* stood as *H. angustata*, Steph. ; but as two specimens of *angustata* were there unlabelled, a transposition has probably taken place.

At present I can separate the two species (104 and 105) by the narrow wings only of the latter ; I have no examples in good condition.

b. Antennæ as long or longer than the wings, the basal moiety with a black oblique line on each joint ; the third joint of the maxillary palpi shorter than the fourth, triangular, the fifth longer than all the rest united ; posterior wings not emarginate at the apex.

* Penis with a hook on each side before the thickened apex.

106. *H. PELLUCIDULA*, Curt. Phil. M. iv. 213 ; Steph. Ill. 172, 4 ; *H. variabilis*, Pict.

I am unable at present to separate *H. hibernica*, Steph. Ill. 173, 5 (*H. læta*, P. ?) ; *H. guttula* and *lanceolata*, Steph. Ill. 172, 3 and 174, 6 (*H. cinerea*, P. ?) ; *H. tenuicornis*, Steph. Ill. 171, 2.

Yellow-grey ; head pitchy-brown, with fawn-coloured pubescence ; antennæ as long as the wings, yellowish, with the apex darker ; palpi brownish ; thorax pitchy-brown, with fawn-coloured pubescence ; legs fawn-coloured, base of thighs darker ; abdomen brownish-yellow, append. yellowish ; the basal joint of the app. inf. brownish, straight, with club-shaped tip, apical

joint curved, not half as long; penis yellow, on each side before the dilated apex with a sharp hook; wings grey-yellow, with light grey-brown spots, on the hinder margin two large yellow spots; posterior wings yellow-grey.

Length 8 lin.; exp. 13—15½ lin.

Hab. London, in June and July; Devonshire, Scotland.

The colour of the wings varies from a nearly uniform yellow to dark brown, maculated with yellow or white. A careful investigation of the appendices in living examples can alone determine whether distinct species and how many are here united.

** Penis with thickened apex without hooks.

107. *H. FULVIPES*, Curt. B. E. pl. 601; Steph. Ill. 174, 8. Black; head with grey pubescence; antennæ as long as the wings, fawn-coloured, annulated with brown; thorax with grey pubescence; legs fawn-coloured, thighs brown; wings light brown, with indistinct yellow spots, veins darker; posterior wings paler; penis black.

Length 7 lin.; exp. 13—14 lin.

Hab. Near London, July; Carlisle; Devonshire; Dorsetshire; not common.

108. *H. ATOMARIA*, Steph. Ill. 171, 1.

Yellow-grey; head pitchy-brown, with white pubescence; antennæ longer than the wings, fawn-coloured, with brown annulations; thorax with a white pubescence; legs fawn-coloured; wings light grey, maculated with yellow and black-brown; posterior wings grey; penis yellow.

Length 5—6 lin. ; exp. 9—11 lin.

Hab. Near London, June and July ; Devonshire ; Scotland.

Obs. In lieu of the 188 species of *Phryganidæ* given by Stephens 108 only are here described. The remainder are some of them synonymes, some of them the other sex ; still I consider it very probable that some of the reductions made by me will prove erroneous. However, a comparison with the fauna of other countries makes it very probable that the number of species indigenous to Britain is greater than that given by Stephens. Certain it is that at present the smaller proportion only of the species which exist is known. What a vast field lies open for those Entomologists who have eyes for other creatures save beetles and butterflies !

NEUROPTERA.



SYNOPSIS OF THE BRITISH PSOCIDÆ.

BY DR. HAGEN.

THE *Psocidæ* are remarkable for their minuteness and agility; they are among the smallest insects known. The chief characters are: head large, almost triangular, placed nearly perpendicularly; reticulate eyes, round, large; ocelli wanting in some, small, three in number, close together in the centre of the crown; antennæ slender, long, sometimes much longer than the animal; the two basal joints generally more robust; the remainder form a multi-articulate (11 to 25) bristle; labrum large, convex, with conspicuous parachila within; mandibles corneous, strong, with the apex curved; maxillæ membranous, the inner lobe, however, corneous, with a straight sharp edge notched at the tip; outer lobe thicker and larger; palpi quadri-articulate, the last joint knob-like, projecting beyond the mouth; labium small, on each side with a rudimentary labial palpus; on the labium reposes the much swollen laterally corneous tongue (hypopharynx); prothorax very short and small; meso- and meta-thorax larger, quadrate; legs short, the posterior sometimes with thickened thighs, leaping legs; tarsi two or three-jointed; abdomen ovate; the generative organs of the male presenting a very complex apparatus of hooks, of the female a sort of oviduct; wings seldom entirely wanting, the

anterior wings sometimes indicated by short corneous scales; the majority have four membranous wings, the anterior larger, dilated towards the rounded apex, extending beyond the abdomen; veins with few branches; the subcosta forms a pterostigma, the radius forked, its branches usually again divided, and united in the middle of the wing by a few transverse veins.

The *Psocidæ* have an incomplete metamorphosis; the larvæ and pupæ resemble the perfect insects, but the ocelli are wanting, and in lieu of wings they have more or less developed sheaths. As in *Termites* (cf. Linnea, xii. p. 18), a peculiar form of pupa appears likewise to exist, in which the development of the wing-sheaths is strangely arrested compared with that of the other parts of the animal. These creatures are not rare, and live in company with the imago and pupæ with long wing-sheaths. Mr. Westwood has figured one of these creatures, *Introd.* ii. fig. 59, 13; the office of these pupæ, like those of *Termites*, is unknown. Certain perfectly-developed individuals have likewise short and rudimentary wings, and it may be conjectured that they are produced from short winged pupæ; but this has not been observed. Westwood has united these creatures in the genus *Lachesilla*.

The *Psocidæ* very frequently exhibit sexual differences; in the males the reticulate eyes are larger, often globose, prominent, and placed closer together, the forehead narrower; the antennæ are stouter, and the pubescence obviously longer; the whole body is smaller. Sexual differences in neurulation, indicated by Mr. Westwood, *l. c.* p. 19, seem to me very doubtful, and I think that the creatures which Mr. Westwood obligingly showed me pertain to different species. But this is merely an opinion, which, opposed to the assertion of

so experienced and able an observer, demands strong evidence to substantiate.

The wings of the *Psocidæ* are membranous and glabrous; there is, however, a genus, *Amphientomum*, Pictet, in which the anterior wings and body are thickly covered with partially metallic scales as in *Lepidoptera*, so that they resemble *Nepticulæ*. The species of this remarkable genus are found, some of them fossilized in amber, others still extant in Ceylon.

The economy of the *Psocidæ* is in many respects similar to that of their allies the *Termites*. The larvæ live gregariously on plants, trees or in rotten wood.

The imago occurs associated, often in considerable, sometimes in countless, numbers, and in these cases the females greatly preponderate. I have observed neglected heaps of chaff to consist almost entirely of *Psoci*. The *Psoci* subsist upon dry vegetable and animal refuse, without, however, committing any real injury. According to my experience the damage they inflict in collections of insects, even to the most delicate creatures, is but insignificant.

The females lay their eggs on the underside of the leaves generally, but few in number together, and cover them with a tissue, so that they form flat, round, silvery-white spots. The spinning organ is very probably situate in the thick swollen hypopharynx, and not, as has been asserted, in the labrum; at least, I have not succeeded in detecting anything like a spinning organ in the latter.

Whether in copulation the male is placed beneath the female (as the form of the sexual organs renders it likely) I cannot decide; I believe that I have noticed something of the kind, but can find no memorandum on the subject. After copulation several species remain united, as observed by De Geer, in opposite line, like nocturnal *Lepidoptera*.

Not unfrequently the excrements are found adhering, in the shape of little black lumps, to the wings; these were formerly erroneously supposed to be eggs. In certain respects some of the species live parasitically in the productions of various species of *Cynips*; thus I have reared *Psoci* from the well known bedeguar of the willow, and from the galls of *Teras terminalis*. Several species of *Clothilla* are myrmecophilous.

The number of species of *Psocidæ* is apparently very great, although scarcely more than a hundred are described; too little regard has been paid to the diminutive creatures. Mr. Nietner found about thirty species in the immediate vicinity of his residence at Rambodde, in Ceylon, and it is to be presumed that a considerable number of species are everywhere to be taken; more especially as the *Psocidæ* endure every climate, and have been detected in Greenland as well as beneath the equator, and different plants, as in *Aphis*, harbour distinct species. Even the European species are imperfectly known; I have described upwards of thirty species from America; from other parts of the world few are known. I possess more than eighty species.

The determination of the species is necessarily rendered difficult by their shrivelling up after death, and the variations in colour of the living creatures. The best characters are derived from the form of the head and antennæ, the proportions of the eyes, the wings and their veins, especially the form of the pterostigma and the posterior marginal cell, and lastly the colour and markings of the head and wings. The sexual organs will also probably afford good characters, but hitherto these parts have not been very carefully investigated.

The family *Psocidæ* is a pre-eminently worthy subject for a monograph, and besides numerous new species will present

many interesting problems for solution. The extra-European species, particularly those from the tropics, have sometimes very peculiar and wonderful forms and proportions, and a rich store of variable colour.

Of the forty-four described English species, the half are either synonyms or only the other sex. When closely collected a considerably larger number of species will undoubtedly be pointed out.

I. OCELLI WANTING.

A. WINGS WANTING.

Genus ATROPOS, Leach.

Eyes slightly prominent; ocelli wanting; antennæ with about fifteen joints, the two basal joints more robust; thorax flat; wings wanting; posterior thighs much thickened; tarsi tri-articulate.

The repeatedly expressed opinion, that these creatures are only larvæ, is refuted by Nitzsch's observations that the internal sexual organs are fully developed.

1. A. PULSATORIA, L., Steph. Ill. 128, 1.

Pale yellowish; head darker, mouth reddish, eyes yellowish.

Length $\frac{1}{2}$ — $\frac{3}{4}$ lin.

Hab. Common in old books and neglected cases of insects.

This species is known by the name of the death-watch, but the sounds proceed from the larvæ of *Anobium*.

B. IN PLACE OF ANTERIOR WINGS TWO SHORT LEATHERY SCALES.

Genus CLOTHILLA, Westwood.

Eyes slightly prominent; ocelli wanting; antennæ con-

sisting of about twenty-seven joints, the two basal joints more robust; thorax flat; in the place of the anterior wings two small leather-like scales, without veins, fringed on the margin; legs not thickened; tarsi tri-articulate.

Von Heyden describes this genus under the name of *Lepinotus*.

2. *C. STUDIOSA*, Westw. Trans. Ent. Soc. iv. 71; Mag. N. H. 480.

Whitish yellow; eyes brownish; antennæ brown; labrum whitish; notch of the abdomen brown; legs whitish.

Length 1 lin.

Hab. In houses in old books and neglected cases of insects. In dead specimens the scales easily fall off.

II. OCELLI PRESENT.

A. WINGS RUDIMENTARY.

Genus *LACHESIS*, Westwood.

Eyes very prominent; three small ocelli on the crown; antennæ thirteen-jointed, the two basal joints more robust; the male with four wings, shorter than the abdomen; female without wings; tarsi bi-articulate.

3. *L. FATIDICA*, Westw. Introd. ii. 18, fig. 59, 16; Steph. Ill. 129, 2.

Yellowish; eyes brown; antennæ and mouth pale.

Length $\frac{3}{4}$ —1 lin.

Hab. In old papers and neglected cases of insects.

Obs. I am not accurately acquainted with this genus and species; several specimens in my collection, which agree with Westwood's description, lead me to suppose that they are

possibly only a peculiar form of some species of *Psocus*, in which the wings are undeveloped, and to which I have alluded in my introductory remarks; in Stephens's collection, there stand under this species a pupa and a larva of a species which cannot be more clearly identified.

B. WINGS DEVELOPED, LONGER THAN THE ABDOMEN.

Genus *PSOCUS*, Latr.

Eyes very prominent, larger and more approximate in the male than in the female; three small ocelli on the crown; antennæ 13-jointed, the two large joints more robust; tarsi tri- or bi-articulate; wings developed, longer than the abdomen.

a. Tarsi tri-articulate.

Discoidal cell open; posterior marginal cell elliptical, free.

4. *Ps. IMMUNIS*, Steph. Ill. 121, 16 (♀); *Ps. longicornis*, Steph. Ill. 121, 15 (♂); *Ps. vitripennis*, Curt. B. E. 648, 28; *Ps. naso*, Ramb.

Black; eyes very widely separated; head black, with yellow spots; forehead yellow, with black streaks; antennæ as long as the wings, the basal joints yellowish; thorax and abdomen black, spotted with yellow; legs pale yellow, apex of tibiæ and tarsi blackish; wings hyaline, not spotted; veins brown; pterostigma elongate-ovate, narrow, brown.

Female more strongly spotted with yellow; antennæ more broadly yellow at the base, pterostigma pale.

Length 3 lin.; exp. 5 lin.

Hab. Near London, Suffolk, Clifton, Bristol, June and July, common.

5. *Ps. QUADRIMACULATUS*, Steph. Ill. 124, 26.

Buff; eyes slightly prominent; head buff; blackish round the ocelli; forehead with indistinct brown streaks; antennæ short, yellowish, darker towards the apex; thorax and abdomen brown, spotted with yellow; legs yellowish; wings hyaline, dull grey; veins brownish; pterostigma ovate, short and rather wide, brownish; before the middle of the wing a dull, obsolete and interrupted brown transverse band, and a similar spot in the posterior marginal cell.

Length 2 lin.; exp. 3 lin.

Hab. London, not scarce in the summer.

This species is figured by Westwood; *Introd.* ii. fig. 59, 8.

b. Tarsi bi-articulate.

* *Pterostigma united with the fork-branch, running beneath it by a transverse vein.*

6. *Ps. SUBOCELLATUS*, Steph. Ill. 124, 29; *Ps. quadripunctatus*, Steph. Ill. 125, 33; *Ps. costalis*, Steph. Ill. 126, 35.

Red-brown, shining; head red-brown, blackish in front; antennæ short, stout, yellowish; thorax red-brown; abdomen yellowish; legs pale, tarsi darker; wings hyaline; anterior wings with four black spots near the base, two on the posterior margin, two before it; towards the apex with three brown bands, the two outer ones united at the posterior margin; pterostigma triangular.

Length 2 lin.; exp. 3 lin.

Hab. Common near London in June and July, Suffolk, Dover, Hertford, Ripley.

7. *Ps. IMMACULATUS*, Steph. Ill. 125, 30; *Ps. rufescens*, Steph. Ill. 125, 31 (immature); *Ps. flavescens*, Steph. Ill. 125, 32; *Ps. nervosus*, Steph. Ill. 126, 36; *Ps. venosus*, Steph. Ill. 121, 17; *Ps. strigosus*, Brauer, Neur. Austr. 33.

Yellow-brown; head yellow, in the middle, near the eyes, and towards the mouth, dark brown; antennæ long, black, the basal joints yellow; thorax black-brown; abdomen yellow; legs yellow, tarsi darker; wings hyaline, veins yellowish; pterostigma long, narrow, whitish yellow.

Length $2\frac{1}{2}$ —3 lin.; exp. 4—5 lin.

Hab. Near London, Ripley, Hertford, Suffolk, June and July.

** *Pterostigma* not united with the fork-branch.

† *Discoidal cell* open.

‡ *Posterior marginal cell* wanting.

8. *Ps. PHLEOPTERUS*, Steph. Ill. 127, 39; *Ps. nigricornis*, Steph. Ill. 126, 38.

Red-brown; head and antennæ black; legs brownish, tarsi darker; wings ash-grey, veins brown; pterostigma somewhat darker, narrow, slightly rounded.

Length 2 lin.; exp. 3 lin.

Hab. Near London, Hertford, June.

9. *Ps. PUPILLATUS*, Walk. Catal. 493, 40.

Pitch-black; antennæ shorter than the wings, their base fawn-coloured; legs pale brown, tarsi darker; anterior wings grey, in each cell large brown spots, some with white margins, some with white centres;

pterostigma narrow, widened towards the apex, rounded, the internal angle with a black spot.

Length $1\frac{1}{2}$ lin. ; exp. $2\frac{1}{4}$ lin.

Hab. England.

10. *Ps. HYALINUS*, Steph. Ill. 123, 23.

Pitch-brown, paler towards the mouth ; abdomen yellow above at the base, beneath reddish ; legs pale, tarsi darker ; wings pale grey, veins brown ; pterostigma narrow, slightly rounded, rather darker.

Length 2 lin. ; exp. 3 lin.

Hab. Near London, June.

Obs. On comparing the types, I noted down that *Ps. bipunctatus*, Steph. Ill. 123, 24, and *Ps. sexpunctatus*, Steph. Ill. 123, 25, are only more fully coloured specimens of *Ps. hyalinus*. I now find that the species which I have labelled in my collection, from a comparison with the type, as *Ps. hyalinus*, is scarcely to be distinguished from *Ps. phæopterus* (male) ; the two other species will likewise belong to it. I must, however, observe that I have never met with examples of *Ps. phæopterus* with spotted wings, and that the correctness of my determination appears therefore doubtful.

‡ ‡ *Posterior marginal cell present* (*Cæcilius*, Curtis).

11. *Ps. FLAVICEPS*, Steph. Ill. 124, 28 ; *Ps. striatulus*, Steph. Ill. 124, 27 ; *Ps. irroratus*, Curt. B. E., pl. 648, 27.

Yellow ; head spotted with brown ; forehead striped with brown ; thorax brown ; abdomen brown, laterally yellow ; antennæ yellow, short, slightly pubescent ; legs yellow, tarsi darker ; anterior wings hyaline, in

each cell a brownish spot, at the apical margin the spots form a circular line; pterostigma much dilated towards the apex, rounded, brown, hyaline in the middle; veins brown, conspicuously pubescent; posterior marginal cell semicircular.

Length 2 lin.; exp. 3 lin.

Hab. Near London in the summer, not scarce.

12. *Ps. VITTATUS*, Dalm., Steph. Ill. 122, 18; *Ps. fenestratus*, Curtis, B. E. pl. 648.

Black-brown, shining; antennæ and legs pale yellow; anterior wings hyaline, with a broad brown longitudinal band, which, in the apical moiety, does not touch the anterior and posterior margin; pterostigma much dilated towards the apex, brownish; veins black-brown; posterior wings grey, the apex of the anterior margin hyaline; posterior marginal cell almost elliptical.

Length 2 lin.; exp. $3\frac{1}{2}$ lin.

Hab. Common near Dover in the summer, Ripley, Hertford, Dorset.

13. *Ps. FLAVIDUS*, Steph. Ill. 122, 20; *Ps. ochropterus*, Steph. Ill. 122, 19; *Ps. flavicans*, Steph. Ill. 123, 21; *Ps. obsoletus*, Steph. Ill. 123, 22 (immature); *Ps. strigosus*, Curt. B. E. pl. 648, 26.

Yellow-red; crown and thorax above brown; antennæ yellow, the basal joints and the apex brownish; legs yellow, tarsi darker; anterior wings hyaline, yellowish; all the veins, except at the anterior margin and at the base, edged with brown; pterostigma long,

narrow, flatly rounded, yellowish; posterior marginal cell short, elliptic; posterior wings white yellow.

Length 2 lin.; exp. 3 lin.

Hab. Near Ripley, in July, in Suffolk, near London, Hertford.

Obs. The type of *Ps. subpunctatus*, Steph. Ill. 126, 34, is almost entirely destroyed. I am unable to determine the specimen; it is perhaps referrible to *Ps. flavidus*.

14. *Ps. ABDOMINALIS*, Steph. Ill. 127, 41; *Ps. nigricans*, Steph. Ill. 127, 40; *Ps. domesticus*, Burm.

Brownish-black; head red-brown; antennæ paler, pubescent; legs pale brownish; abdomen annulated with brown; wings hyaline; veins brown; pterostigma much dilated towards the apex, rounded; in the inner angle a black spot; posterior marginal cell small, elliptical.

Length $1\frac{1}{2}$ lin.; exp. 2 lin.

Hab. Near London in the summer, Suffolk.

Obs. I am unable to determine *Ps. dubius*, Steph. Ill. 127, 42; the type very nearly resembles *Ps. abdominalis*, but still smaller, the pterostigma more flatly rounded; it is perhaps referrible to *Ps. abdominalis*.

†† *Discoidal cell closed.*

15. *Ps. LINEATUS*, Latr., Steph. Ill. 119, 8; *Ps. longicornis*, F., Rbr.

Loam colour; forehead striped with brown; crown maculated with brown; palpi loam colour, terminal joint black-brown; antennæ very long, pubescent, black, second joint loam colour (♂), or not pube-

scent, black, the base loam colour (♀); thorax brown, with the margins loam colour; abdomen black, with transverse yellow bands; legs loam colour, apex of tibiæ and tarsi black-brown; wings hyaline; veins brown, at the base loam colour; marginal vein brown, interrupted with white below the pterostigma; pterostigma obtusely triangular, white-yellow, at the apex a large brown spot, at the base an indistinct brown, transverse band, less evident or wanting in the male; towards the apex three brown spots.

Length 3—4 lin.; exp. 5—7 lin.

Hab. Common near London, Suffolk.

16. *Ps. NEBULOSA*, Steph. Ill. 119, 9 (♀); *Ps. similis*, Steph. Ill. 120, 10 (♂); *Ps. variegatus*, Curt.; *Ps. affinis*, Rbr.; *Ps. infuscatus*, Rbr.

Loam colour; forehead striped with brown; crown without spots; antennæ (♂) rather longer than the wings, blackish, pubescent, basal joints yellowish (♀), not pubescent, the three basal joints yellowish; palpi brown; thorax pitchy brown, the margins loam colour; legs loam colour, tibiæ and tarsi brown; abdomen brown-black, loam colour or yellow at the sides and beneath; wings grey-brown, with a coppery tinge, unicolorous (♂) or somewhat paler, with confluent brown spots, which towards the apex follow the veins like rays, under the pterostigma a paler transverse band (♀); veins brown; pterostigma triangular, elongate, nearly rectangular, brown; posterior wings paler, grey.

Length 3—4 lin.; exp. 4½—6 lin.

Hab. Common near London, in June and July, Suffolk.

17. *Ps. VARIEGATUS*, Latr., Steph. Ill. 118, 5 (♂); *Ps. pilicornis*, Steph. Ill. 117, 1 (♂); *Ps. picicornis*, Steph. Ill. 118, 2 (♀); *Ps. fasciatus*, Steph. Ill. 118, 3 (♀); *Ps. atomarius*, Steph. Ill. 118, 5 (♀).

Yellow; forehead striped with brown; antennæ yellowish, of the ♂ with a long pubescence, basal joints darker; thorax yellow; abdomen yellow above, with a black longitudinal line, beneath blackish; legs brownish; anterior wings brown, thickly spotted with white; veins brown, whitish in the middle; the veins here and there margined with brown, at their apex a brown spot; pterostigma triangular, yellow within.

Length $2\frac{1}{2}$ —3 lin.; exp. $3\frac{1}{2}$ —4 lin.

Hab. Common near London, in the summer, Suffolk.

18. *Ps. SUBFASCIATUS*, Steph. Ill. 119, 7 (♀); *Ps. maculatus*, Steph. Ill. 119, 6 (♂).

Loam colour; crown yellow, maculated with brown; forehead brown, with darker stripes; antennæ brownish, pubescent; thorax loam colour, spotted with brown; abdomen brown; legs brownish, tarsi darker; anterior wings hyaline, with a broad, much interrupted, transverse band, which is broken up into numerous patches; apical margin grey; in each of the cells at the apical margin a brown spot within a circle; pterostigma large, triangular, brown at both ends, whitish in the middle; veins mostly brown.

Length 3 lin.; exp. $4\frac{1}{2}$ lin.

Hab. Near London, in June.

19. *Ps. BIFASCIATUS*, Steph. Ill. 120, 11; *Ps. contami-*

natus, Steph. Ill. 120, 12; *Ps. megastigmus*, Steph. Ill. 120, 13.

Brown; forehead striped with black; crown spotted with black; antennæ black; thorax and abdomen brown; legs brown, tarsi blackish; wings hyaline, with two confluent, brown, transverse bands before the middle; pterostigma large, triangular, with a brown spot; veins brown.

Length $2\frac{1}{2}$ lin.; exp. 4 lin.

Hab. Common near London, in June, Suffolk.

20. *Ps. MACULIPENNIS*, Steph. Ill. 126, 37.

Yellow; crown yellow, black in the centre; forehead striped with black; antennæ brownish; thorax and abdomen yellow, with black spots; legs brownish, tarsi darker; anterior wings hyaline, with large, confluent, brown spots at the base; pterostigma large, triangular, white, brown externally, near it on the posterior margin a large brown spot; veins mostly brown.

Length $1\frac{3}{4}$ lin.; exp. $3\frac{1}{2}$ lin.

Hab. Near London, in July.

21. *Ps. SUBNEBULOSUS*, Steph. Ill. 121, 14.

Ochre yellow; crown with a black spot in the centre; thorax maculated with black; antennæ and legs pale; abdomen black at the tip; wings hyaline, spotted with brown; veins and pterostigma dark brown.

Length $1\frac{1}{4}$ lin.; exp. 2 lin.

Hab. Near Hertford, in June.

Obs. I cannot determine this species accurately, the type

was distinct from the previously described species, but I cannot find the notes which I made respecting it.

22. *Ps. MORIO*, Curt. B. E. pl. 648.

Brown; crown spotted with black; forehead striped with black; antennæ brown, pubescent; thorax brown; abdomen brown-black, with the apex yellow; legs brownish; basal half of wings brown, with a coppery hue, apical half grey; pterostigma large, triangular, black-brown; veins brown; posterior wings grey.

Length $1\frac{1}{4}$ lin.; exp. 2 lin.

Hab. Thetford, in July.

HYMENOPTERA.



OBSERVATIONS ON THE EFFECTS OF THE LATE UNFAVOURABLE SEASON ON HYMENOPTEROUS INSECTS; NOTES ON THE ECONOMY OF CERTAIN SPECIES, ON THE CAPTURE OF OTHERS OF EXTREME RARITY, AND ON SPECIES NEW TO THE BRITISH FAUNA.

By FREDERICK SMITH.

ANY record of the Entomological season of 1860, which omitted a notice of the almost unprecedented scarcity of insects generally, would, in my opinion, omit a most important phase in its history. The continuous cold, wet and ungenial weather, which has so generally prevailed throughout the season, has had a most essential influence on the insect tribes; their scarcity, or abundance, being immediately dependent upon the character of the weather, is a fact well known to every experienced Entomologist. There is probably no tribe of insects more influenced by atmospheric changes, during the progress of their transformations, than the aculeate *Hymenoptera*, many species being rarely seen except during summers of long-continued dry hot weather; some few apparently requiring an unusually high degree of temperature for their development. Having arrived at the close of a year during which we have scarcely enjoyed a day either of summer or autumnal weather, properly so called, is it not

highly desirable that the results should be recorded in an Entomological Annual?

There are, undoubtedly, few living Entomologists who have experienced a season equally unfavourable for their pursuits, and, for my own part, I have no recollection of anything even approaching its parallel. Under these circumstances, I applied to an old and valued Entomological correspondent, Colonel Newman; the following is an extract from his reply—"The year 1816 was even worse than the present; May was excessively cold and dry, with frosts throughout: it was succeeded by four months of almost continued rain, which came from all points of the compass; the temperature was full five degrees lower on the average than that of the present season; the *Bombi* were nearly all destroyed, and how any remained to perpetuate the race I could not then conceive."

Of the social species of *Hymenoptera*, those belonging to the genera *Bombus* and *Vespa*, so great a scarcity has certainly never occurred, in my own experience, as during the past season; of these insects, which usually abound during the autumnal months, very few have been observed; even the wasps, which generally force themselves upon our notice, I may almost say, have not been seen at all. Dr. Bree, in a communication to the "Weekly Intelligencer," dated September 15th, says, "up to this date—not a single wasp;" up to the same period I had only seen a single female in the month of May, and one worker about the end of August; subsequently I saw a second worker at Weybridge on the 4th of October, a period when these insects are generally seen in great numbers; these are all the wasps that I have seen, and that during a season when I was unusually anxious to obtain some nests of these insects.

Of some species of humble bees, I did not observe a single

female during the past autumn, and consequently anticipate a great scarcity of these insects next season. On the 16th of September I found a nest of *Bombus muscorum*, in which the larvæ had nearly all changed to pupæ, and had perished in that condition, in consequence of the long-continued wet and cold; this I fear has been the case with a large majority of the moss-building bees.

A similar scarcity of the solitary species of bees has also been occasioned by the late remarkably unfavourable season; in the case of these insects, however, I do not anticipate any perceptible diminution in numbers next year, should the weather prove suitable for their development. During the past season the temperature was too low to induce the change in these insects from the larva to the pupa state; consequently, the greater portion are, and will continue, in the larva state until next season.

In the month of June last I obtained a large number of pupæ of a species of *Colletes*; these, in the usual progress of development, would appear in the perfect condition about the middle of July; a few came forth in August, but the majority still remain in the larva state.

Another tribe of the *Aculeata*, the *Fossores*, require a higher degree of temperature than the *Apidæ* to induce the changes necessary for their appearance; these insects revel in the hottest sunshine, many indeed being only found when unusually high degrees of temperature occur; during the past season, these insects have scarcely appeared at all in situations where I have usually met with them in the greatest profusion.

I have no doubt of a similar scarcity having been observed in other orders of insects, and that in addition to the questions—what has become of the wasps? what has become of the house-flies? it has also been asked, what has become of

the butterflies? It therefore appeared to me highly desirable that a record of some of the phenomena of the past season, as exhibited in the insect world, should form a portion of the annual *résumé* of the order *Hymenoptera*.

Having given a sketch of some of the effects of the past ungenial season on wild bees, wasps, &c., I am enabled to make my record much more complete, than I otherwise could have done, through the kindness of Mr. Tegetmeier, the well-known observer of bees, his remarks are as follows:—

“ The season of 1860 has been more unfavourable in its effects on the hive-bee than any that has occurred for sixteen or eighteen years. In the early part of the season, the number of swarms that were thrown off was about the usual average, but the absence of food caused many of them to return to the old hives even after the lapse of several days; on examination, the hive deserted by the swarm was usually found to contain a small piece of perfectly empty comb, the wax forming it being probably secreted from the honey carried off by the bees on leaving their old residence.

“ The secretion of honey in the tubes and nectaries of flowers depends upon atmospheric influences not well ascertained, as on one fine warm day the bees will be inactive, there being no honey to collect; and on another, of apparently precisely similar character, the secretion of honey will be profuse, and the bees consequently out in large numbers.

“ It is, however, certain, that cold ungenial seasons, attended with much rain, are extremely unfavourable to the formation of honey, and it is to these causes we must attribute the almost total failure of the honey harvest this year. Very few stocks will be found to have sufficient food to enable them to live through the winter, and surplus stores, or top boxes of honey, have not been obtained, except in one or two of the more favoured localities in the kingdom; where, from

the juxtaposition of heather and cultivated land, abounding in white clover, the honey-gathering season extends over the greater part of the year.

“The successful introduction of the *Apis Ligustica*, of Spinola, or *Apis Ligurienne*, of Latreille, is to be recorded. Several stocks are now doing well in various parts of the kingdom; the species promises to be a valuable addition to our somewhat meagre list of domesticated animals.

“Within the last few years, a great impetus has been given to practical bee-keeping, on a profitable scale, by the introduction of hives, in which each comb is contained in a separate frame, which can be removed at pleasure; this plan places the hive under perfect control, as combs can be removed for deprivation of honey, for the artificial breeding of queens, for strengthening weak stocks, or any other purpose that may be required.”

The employment of these hives has been much advocated by Dzierzon in Germany, Langstroth in America, and by Mr. Tegetmeier, the Secretary of the Apiarian Society in England.

Another effect produced by the late summerless year has been a great diminution of the brilliancy of colouring in many species. I have observed of the largest species of British *Andrenidæ*, the *Andrena Hattorfiana*, that in fine hot summers the highly-coloured examples have been the most numerous; this species is black, with the abdomen more or less red, or sometimes it is entirely black. In 1857 I captured thirty specimens of this fine insect, rather more than half of them were highly coloured examples; last season I took seventeen, only three of which exhibited any trace of the red colouring on the abdomen. Another species of the same genus, *A. Cetti*, has usually the greater portion of the abdomen red, dark coloured examples being of rare occur-

rence; of forty specimens taken in August last, only eight or nine exhibit the usual bright coloration; others have only a faint tinge of red along the apical margins of the segments. I have observed a similar dulness in the colouring of Hymenopterous insects generally, and, from the observations of previous seasons, am induced to attribute the effect entirely to the want of the proper degree of heat necessary to bring out the usual brilliancy of these insects.

I must now refer to the concluding paragraph of the remarks on *Hymenoptera* in the Annual of last year; after having particularly noticed Dr. Ormerod's paper on two species of wasps, in which the deposition of fertile eggs by workers was apparently confirmed, I observed, that since those remarks were sent to the press a paper by Mr. S. Stone had been read at a meeting of the Entomological Society, in which the deposition of fertile eggs by worker wasps received further confirmation; but, as in Dr. Ormerod's paper, it appeared that not only workers were developed from such eggs, but that it was left undecided whether males also were produced from them, I was of opinion that the subject required much further, and even more careful, observation. Notwithstanding the interesting entomological enigma involved in the unsatisfactory state of the case, the subject by no means excited the interest which might have been expected.

The very fact of opposite results having presented themselves, in the development of wasps, to those so clearly established by Dr. Siebold in the case of the hive-bee, appeared to me a circumstance of such surpassing interest that I instantly determined, if possible, to investigate the subject with every possible care during the following season; it has not however fallen to my lot to discover one solitary fact.

It is however gratifying to find that the investigation of

this highly interesting subject has fallen into the hands of a most able and careful observer, Mr. S. Stone; this gentleman published the result of his observations in the November part of the Zoologist, which must have been read with great interest by every Entomologist. In Mr. Stone's paper the deposition of fertile eggs by worker wasps is verified and placed beyond a doubt. Here then is an Entomological enigma, apparently requiring the patient investigation of a Siebold or Leuckart to unravel it; Siebold has shown, that without impregnation, the eggs of the hive-bee can only produce male brood; but, in the case of the wasp, Mr. Stone has clearly proved that worker wasps, which could not possibly have been impregnated, deposit eggs that produce females, that is; worker wasps; we can offer no explanation of such a remarkable phenomenon, conjecture is at a loss even to propose one.

If further investigation should show that in every vespiary a certain number of wasps always deposit eggs, then may we not regard it as a beautiful provision in nature, for increasing the number of labourers, precisely at a time when additional hands appear to be required to meet the increasing necessities of the community.

All difficulty would be cleared away if we knew that worker wasps were frequently impregnated, and that they also hibernated during the winter; but after a close observation of these insects, extending over twenty years, not a solitary instance of such an occurrence has either been observed, or come to our knowledge; whereas, in the case of female wasps, such observations have been numberless. I have repeatedly taken spring nests of wasps, in which not a single individual had been reared to maturity, and have invariably found the queen, or foundress-wasp, the sole tenant of the nest; we trust during the coming season, should it

prove favourable for our purposes, to have an opportunity of investigating some of the mysteries of the vespiary.

There is another phase connected with the deposition of eggs by worker wasps, which I hope will ere long be fully investigated; that is, whether eggs deposited by workers ever produced more than one sex, workers,—and also males. In Dr. Ormerod's paper on wasps such a statement certainly is not positively made, probably it may not be intentionally implied, still, as both workers and males were developed from a nest, long after it had been deprived of its queen, and as it is not by any means satisfactorily shown, whether the eggs which produced the males were deposited by the queen, or by the workers, it would be a point of great interest, satisfactorily to decide this important question; again, it would also be a highly important physiological inquiry to ascertain, whether workers, produced from worker eggs, are also fertile. I am of opinion, that we are at present only on the threshold of the way leading to the discovery of the history of the *Vespidæ*.

OBSERVATIONS ON PARASITIC HYMENOPTERA.

In the month of June I obtained nearly a hundred nests of the interesting little Arachnide, *Agelena brunnea*, my object being to ascertain what species of *Ichneumonidæ* were parasitic upon the spider. The first insect which I obtained was *Hemeteles formosus*; and shortly afterwards, both sexes of *Pezomachus fasciatus*; I had never previously obtained a male of any species of that genus. The males of the genus *Pezomachus* are extremely rare in collections, nearly all of them are winged insects, the females on the contrary are apterous; or, having in one or two species rudimentary wings;

the only apterous males that I have seen are those of *P. agilis* and *P. instabilis*. I have little doubt of many male *Pezomachi* being included amongst the species of the genus *Hemeteles*, the neuration of the wings of the two genera being nearly identical. Ratzeburg mentions the male of *Pezomachus fasciatus* having been bred from spider's eggs, but I believe it has not been obtained in this country by any one previously. It is a fact worthy of recording, that in June, 1858, I collected an equal number of the spider's nests, but did not succeed in getting a single male of the parasite, although thirty females were developed.

Pezomachus vulpinus and *P. micropterus* were both found in the nest of *Formica rufa*, not reared from cocoons; it is therefore undecided whether they were parasitic on the ant, or merely stragglers in the nest.

Species of the genus *Pezomachus* are occasionally parasitic upon the larvæ of Lepidopterous insects; an apparently new species was bred by Mr. Scott from *Coleophora saturatella*; and I reared myself, during the past season, the *Pezomachus agilis* from the larva of a species of *Noctua*.

In July last I bred the Chalcididous parasite, *Monodontomerus dentipes*, from the cells of *Anthophora acervorum*, and also from those of *Colletes Daviesana*; on several previous occasions I reared them from the cells of *Osmia rufa*; this is another instance corroborative of the opinion, that an Ichneumon by no means confines its attack to a particular species.

In addition to the above parasite I also bred *Chrysis ignita* from the cells of *Colletes Daviesana*, having previously obtained it from the nest of *Odynerus spinipes*, *Osmia rufa* and *Vespa rufa*. I also bred *Epeolus variegatus* from the cells of *Colletes*.

Cœlioxys simplex has been reared from cells of the leaf-cutting bee *Megachile ligniseca*, by Mr. B. Newcomb.

Although not perhaps strictly belonging to the parasitic class of insects, still, being apparently always found in company with others, I may here record the capture of *Myrmica lippula* in the nest of *Formica fuliginosa*, by Mr. Edwin Shepherd; Mr. Janson, as well as myself, has also previously found these ants in company.

CAPTURES OF NEW AND RARE SPECIES.

Lyda erythrocephala (Fam. *Tenthredinidæ*). A male and female of this extremely rare species were taken by Charles Turner at Loch Rannoch, Perthshire.

Dolerus dubius (Fam. *Tenthredinidæ*). A female of this rare insect was taken in the area of my own house at Islington.

Ponera contracta (Fam. *Formicidæ*). Three or four examples of this scarce ant were taken at Brighton.

Ponera punctatissima, Roger. This species, which is new to the British fauna, was I believe first taken in this country by the late Mr. Henry Squire, who found several in a bake-house near Burton Crescent, London; Mr. J. Stokes captured it again this year; several specimens were also taken by the late Mrs. Varley, in the kitchen of her house, in Robert Street, Hampstead Road. The description of the species appeared in "Beiträge zur Kenntniss der Ameisenfauna der Mittelmeerländer, von Dr. Roger." The insect is found in houses in Germany; I received a series of specimens from Dr. Roger. Whether the species, like *Myrmica molesta*, is an importation, I am not prepared to say; if so, it may probably become equally unwelcome and annoying in houses throughout the country. The species closely resembles *Ponera contracta*, but is much more

delicately punctured on the head and thorax, and is shining, and covered with a fine glittering silky pubescence; Dr. Roger says the maxillary palpi are one-jointed, in *P. contracta* they consist of two joints.

Aporus unicolor (Fam. *Pompilidæ*). A specimen of the female, of this extremely rare species, was taken in August, by Mr. B. Newcomb at Dartford in Kent.

Miscophus maritimus (Fam. *Larridæ*). I captured a female of this rare insect at Deal in August last.

Cerceris labiata (Fam. *Philanthidæ*). Taken at Dartford by Mr. B. Newcomb, who observed that it stored up various species of *Curculionidæ* for the food of its larvæ.

Cerceris emarginata. In my remarks upon the species of this genus, in the monograph of the fossorial *Hymenoptera*, page 189, I remarked, "Five species have been discovered in this country, and a sixth may probably be added, the *Philanthus emarginatus* of Panzer; four specimens are in the collection of British *Hymenoptera* in the British Museum, but there is a want of certainty as to the locality from whence they came." Since the publication of these remarks, I have discovered, in a register in the Museum, a list of insects captured in Devonshire by Dr. Leach, and presented by him to the national collection; these insects have numbers attached which agree with those of the register; this circumstance would alone appear sufficient to warrant their introduction into the British list, but all doubt of the propriety of such a step, is removed by the fact of my having captured a female in August last, at Kingsdown near Deal.

Prosopis variegatus (Fam. *Andrenidæ*). Having recently received males of this species from Dr. Sichel, of Paris, that sex having been only recently discovered, it has been thought desirable to give some illustrations of the differences

between the male of this species and that of *P. dilatatus*, which it greatly resembles; the prominent differences will be found in the figures of the heads of these species given in the plate that accompanies this volume. (See Figures 8 and 8*.) The male is black and closely punctured, with a fine silky-white pubescence; the face, anterior half of the scape, a line on the mandibles and also on the collar, the latter interrupted, or much attenuated in the middle; the tubercles, a spot before the tegulæ, and a triangular one on each side at the base of the scutellum, white; the anterior tibiæ in front, and the base of the intermediate and posterior pairs, white; the anterior tarsi and the claw-joints of the intermediate and posterior pairs, rufo-testaceous. The flagellum of the antennæ fulvous beneath; the extreme lateral portion of the apical margin of the basal segment of the abdomen with an oblong patch of white pubescence. The female has the basal segment of the abdomen red.

Andrena Hattorfiana (Fam. *Andrenidæ*). I took a number of examples of this very local species at Kingsdown in August last.

Andrena Cetti. This local insect occurred plentifully at Kingsdown; Mr. S. Tibbs discovered a new locality for it near Croydon, and Mr. B. Newcomb took it at Dartford.

Andrena simillima. Both sexes were taken by myself between Kingsdown and St. Margaret's Bay, on the flowers of the blackberry.

Nomada armata (Fam. *Cuculinæ*). I captured five specimens of the female of this hitherto extremely rare species at Kingsdown in the month of August last; the only examples which had been previously taken, were three by Dr. Leach in Devonshire; one by Mr. S. Stevens in the same county; three by Mr. Dossetor in Wales, and one or two have oc-

curred near Exeter. Of this, our finest British *Nomada*, a figure is given in this volume. (See Figure 2.)

Nomada atrata. Two examples of this very rare species were taken by Mr. S. Tibbs near Croydon in August last.

Megachile maritima (Fam. *Dasygastræ*). This local species also occurred near Croydon, and was taken by Mr. S. Tibbs.

H E M I P T E R A.



(BY THE EDITOR.)

DURING the past season considerable attention has been paid by several of our Coleopterists to the Bug-family, and we had fondly hoped that some of those who have been working at the Hemipterous order of insects would have contributed a few pages on the group; but it was not so ordained.

Mr. Walker has lately brought out a List of the British *Hemiptera* and *Homoptera*. The last-named sub-order has not hitherto received nearly as much attention in this country as the true *Heteroptera*.

The Catalogue of the *Hemiptera* of the whole world by Anton Dohrn is well known to and appreciated by most of our readers. We have carefully gone through that Catalogue, and collated it with Walker's List, and the following is the result of our labours, viz.:—

A list of the British *Heteroptera* arranged according to Dohrn, the species being accepted as British on the authority of Walker. This list will no doubt prove serviceable to many of our readers.

We have elsewhere remarked that the land bugs outnumber the water bugs nearly in the proportion of 10 to 1.

A LIST OF BRITISH HEMIPTERA.

GEOCORES.

SCUTATA.

SCUTELLEROIDES.

Eurygastridæ.

- Eurygaster maurus*, *J.*
 „ *obliquus*, *Leach.*
 „ *hottentottus*, *Fab.*

Podopidæ.

- Podops inunctus*, *Fab.*

Odontoscelidæ.

- Odontoscelis fuliginosa*, *L.*
Corimelæna scarabæoides, *L.*

Plataspidæ.

- Coptosoma globus*, *Fab.*

Asopidæ.

- Picromerus bidens*, *L.*

- Arma custos*, *Fab.*

- „ *lurida*, *Fab.*

- Zicrona cærulea*, *L.*

Cydnidæ.

- Sehirus dubius*, *Scop.*

- „ *morio*, *L.*

- „ *albomarginatus*, *Fab.*

- „ *bicolor*, *L.*

- „ *biguttatus*, *L.*

Sciocoridæ.

- Sciocoris umbrinus*, *Wolff.*

Pentatomidæ.

- Ælia acuminata*, *L.*

- „ *neglecta*, *Dallas.*

- „ *inflexa*, *Wolff.*

- Eysarcoris melanocephalus*, *Fab.*

- „ *pusillus*, *Panzer.*

- „ *perlatus*, *Fab.*

- Pentatoma Verbasci*, *De Geer.*

- „ *baccarum*, *L.*

- „ *Lynx*, *Fab.*

- „ *dissimilis*, *Fab.*

- „ *juniperina*, *L.*

- Strachia ornata*, *L.*

- „ *oleracea*, *L.*

- Tropicoris rufipes*, *L.*

- Rhaphigaster griseus*, *Fab.*

- Acanthosoma hæmorrhoidale*, *L.*

- „ *dentatum*, *De*

Geer.

- „ *litratum*, *Fab.*

- „ *griseum*, *L.*

SUPERICORNIA.

Alydidæ.

- Alydus calcaratus*, *L.*

Stenocephalidæ.

- Stenocephalus agilis*, *Scop.*

Coreidæ.

- Chorosoma miriformis*, *Fallen.*

- „ *Schillingii*, *Schum-
mel.*

- Neides tipularius*, *L.*

- „ *clavipes*, *Fab.*

- „ *minor*, *H.-Schf.*

- Metacanthus punctipes*, *Germar.*

- Gonocerus venator*, *Fab.*

- Verlusia rhombea*, *L.*

Coreus scapha, *Fab.*
 Syromastes marginatus, *L.*
 Dasycoris denticulatus, *Scop.*

Rhopalidæ.

Atractus nubilus, *Fallen.*
 „ spinipes, *Fallen.*
 „ lituratus, *Curtis.*
 Rhopalus crassicornis, *L.*
 „ tigrinus, *Schill.*
 „ magnicornis, *Fab.*
 „ capitatus, *Fab.*
 „ maculatus, *H.-Schf.*
 „ pratensis, *Fallen.*
 „ Hyoscyami, *L.*

INFERICORNIA.

Lygæidæ.

Lygæus equestris, *L.*
 „ familiaris, *Fab.*
 „ punctum, *Fab.*
 Nysius Thymi, *Wolff.*
 Henestaris Genei, *Spinola.*
 Heterogaster Urticæ, *Fab.*
 Aphanus rusticus, *Fall.*
 „ pallipes, *H.-Schf.*
 „ sabulosus, *Schilling.*

Rhyparochromus—

„ carbonarius, *Rossi.*
 „ Rolandri, *L.*
 „ pini, *L.*
 „ quadratus, *F.*
 „ vulgaris, *Schilling.*
 „ pedestris, *Panzer.*
 „ marginepunctatus, *Wolff.*
 „ varius, *Wolff.*
 „ sylvaticus, *Fab.*

Rhyparochromus—

„ curtulus, *Costa.*
 „ nebulosus, *Fallen.*
 „ antennatus, *Schilling.*
 „ brevipennis, *Schilling.*
 „ agrestis, *Fallen.*
 „ chiragra, *Fab.*
 „ decoratus, *Hahn.*
 „ sylvestris, *Panzer.*
 „ erraticus, *Fab.*
 „ pictus, *Schilling.*
 „ luscus, *Fab.*
 „ contractus, *H.-Schf.*
 „ luniger, *Schilling.*
 „ maculipennis, *Curtis.*
 „ nubilus, *Fallen.*
 „ hemipterus, *Schilling.*
 Pstatygaster ferrugineus, *L.*
 Cymus claviculus, *Fallen.*
 „ glandicolor, *Hahn.*
 „ Resedæ, *Panzer.*

Dipsocoridæ.

Dipsocoris alienus, *H.-Schf.*

Anthocoridæ.

Anthocoris nemoralis, *Fab.*
 „ nemorum, *L.*
 „ obscurus, *Hahn.*
 „ minutus, *L.*
 „ exilis, *Fallen.*
 Xylocoris ater, *Dufour.*
 „ domesticus, *Hahn.*

CECIGENÆ.

Microphysidæ.

Microphysa pselaphoides, *Burm.*

Pyrrhocoridae.

Pyrrhocoris apterus, L.

BICELLULI.

Miridae.

Miris erraticus, L.

„ *longicornis*, *Fallen.*

„ *ruficornis*, *Fallen.*

„ *calcaratus*, *Fallen.*

„ *laevigatus*, L.

„ *virens*, L.

„ *holsatus*, *Fab.*

Lopus dolabratus, L.

„ *ferrugatus*, *Fallen.*

„ *tunicatus*, *Fab.*

„ *gothicus*, L.

Capsidae.

Phytocoris Populi, *Fab.*

„ *Tiliæ*, *Fab.*

„ *Ulmi*, L.

Cyllecoris collaris, *Fallen.*

„ *pallidus*, *H.-Schf.*

„ *histrionicus*, L.

„ *angulatus*, *Fallen.*

„ *Märkeli*, *H.-Schf.*

„ *decoratus*, *Meyer.*

„ *flavomaculatus*, *Fab.*

„ *flavonotatus*, *Bohe-*
man.

„ *annulatus*, *Wolff.*

„ *alienus*, *H.-Schf.*

Deræcoris tricolor, *Fab.*

„ *pilosus*, *Boheman.*

„ *ater*, L.

„ *rufipennis*, *Fallen.*

„ *striatellus*, *Fab.*

Deræcoris Chenopodii, *Fallen.*

„ *pabulinus*, L.

„ *ferrugatus*, *Fab.*

„ *lateralis*, *Fallen.*

„ *rubricatus*, *Fallen.*

„ *binotatus*, *Fab.*

„ *scriptus*, *Fab.*

„ *bipunctatus*, *Fab.*

„ *unifasciatus*, *Fab.*

„ *pratensis*, L.

„ *campestris*, L.

„ *Kalmii*, L.

„ *Falleni*, *Hahn.*

„ *punctulatus*, *Fallen.*

„ *Pastinacæ*, *Fallen.*

„ *tripustulatus*, *Fab.*

„ *contaminatus*, *Fallen.*

„ *limbatus*, *Fallen.*

„ *holosericeus*, *Hahn.*

„ *Gyllenhali*, *Fallen.*

Monalocoris Filicis, L.

Leptomerochoris—

„ *rufifrons*, *Fallen.*

„ *clavatus*, L.

„ *thoracicus*, *Fallen.*

„ *chorizans*, *Fab.*

„ *melanocephalus*, L.

„ *Coryli*, L.

„ *Avellanæ*, *Meyer.*

„ *Caricis*, *Fallen.*

„ *ambulans*, *H.-Schf.*

„ *decolor*, *Fallen.*

„ *icterocephalus*, *Hahn.*

„ *nassatus*, *Fab.*

„ *molliculus*, *Fallen.*

„ *Tanaceti*, *Fallen.*

Leptomerocoris—

- „ seladonicus, *Fallen.*
 „ Thunbergi, *Fallen.*
 „ mutabilis, *Fallen.*
 „ brevis, *Panzer.*
 „ unicolor, *Hahn.*
 „ leucocephalus, *L.*

Eurymerocoris—

- „ furcatus, *H.-Schf.*
 „ roseus, *Fallen.*
 „ salicellus, *H.-Schf.*
 „ viridulus, *Fallen.*
 „ arbustorum, *Fab.*
 „ arenarius, *Hahn.*
 „ pulicarius, *Fallen.*
 „ pallicornis, *Fab.*

MEMBRANACEI.

Zosmenidæ.

Zosmenus anticus, *Steph.*

Piesmidæ.

Agramma læta, *Fallen.*

Tingidæ.

Orthosteira—

- „ *Cassidea*, *Fallen.*
 „ *brunnea*, *Germar.*
 „ *cervina*, *Germar.*
 „ *macrophthalma*, *Fieber.*
 „ *obscura*, *H.-Schf.*

Monanthia ampliata, *Fieber.*

- „ *Cardui*, *L.*
 „ *nigrina*, *Fallen.*
 „ *grisea*, *Germar.*
 „ *capucina*, *Germar.*
 „ *costata*, *Fab.*
 „ *Humuli*, *Fab.*

Dictyonota crassicornis, *Fallen.*

- „ *erythrophthalma*,
Germar.

Lacometopus clavicornis, *L.*

Derephysia foliacea, *Fallen.*

- „ *cristata*, *Panzer.*

Tingis Pyri, *Geoff.*

- „ *spinifrons*, *Fallen.*

CORTICICOLÆ.

Brachyrhynchidæ.

Aneurus lævis, *Fab.*

Aradidæ.

Aradus corticalis, *L.*

- „ *Betulæ*, *L.*

Piestosoma depressum, *Fab.*

LECTICOLÆ.

Acanthidæ.

Acanthia lectularia, *L.*

NUDIROSTRI.

Harpactoridæ.

Harpactor pedestris, *Wolff.*

Reduviidæ.

Reduvius personatus, *L.*

Piratidæ.

Prostemma guttula, *Fab.*

Nabidæ.

Nabus ferus, *L.*

- „ *brevipennis*, *Hahn.*

- „ *apterus*, *Fab.*

- „ *fuminervis*, *Dahlb.*

- „ *dorsatus*, *Dahlb.*

- „ *lineatus*, *Dahlb.*

Saldidæ.

- Salda littoralis*, L.
 „ *riparia*, *Fallen.*
 „ *saltatoria*, *Fallen.*
 „ *elegantula*, *Fallen.*
 „ *lateralis*, *Fallen.*
 „ *marginalis*, *Fallen.*
 „ *pilosa*, *Fallen.*
 „ *bicolor*, *Curtis.*
 „ *dimidiata*, *Curtis.*
 „ *stellata*, *Curtis.*

Emesidæ.

- Ploiaria vagabunda*, L.
 „ *culiciformis*, *De Geer.*

PLOTERES.

Hydrometridæ.

- Hydrometra Stagnorum*, *Fab.*

GERRIDÆ.

- Gerris paludum*, *Fab.*
 „ *thoracica*, *Schummel.*
 „ *lacustris*, L.
 „ *apicalis*, *Curtis.*

Veliidæ.

- Velia rivulorum*, *Fab.*
Hydroëssa reticulata, *Burm.*

PEDIRAPTI.

Naucoridæ.

- Aphelochira æstivalis*, *Fab.*
Naucoris cimicoides, L.

Nepidæ.

- Nepa cinerea*, L.
Ranatra linearis, L.

PEDIREMI.

Corixidæ.

- Corixa Geoffroyi*, *Leach.*
 „ *striata*, L.
 „ *fossarum*, *Leach.*
 „ *limitata*, *Fieber.*
 „ *coleoptrata*, *Fab.*
 „ *lateralis*, *Leach.*
 „ *dorsalis*, *Leach.*
 „ *affinis*, *Leach.*
Sigara minutissima, L.

Notonectidæ.

- Plea minutissima*, *Fab.*
Notonecta glauca, L.
 „ *lutea*, *Müller.*
 „ *maculata*, *Fab.*

This completes the list of our HETEROPTERA; the HOMOPTERA must be reserved for another year.

NEUROPTERA.



SOME SUGGESTIONS FOR THE SUCCESSFUL PURSUIT OF
THE STUDY OF THE PHRYGANIDÆ, WITH A DESCRIPTION
OF A NEW BRITISH SPECIES.

BY R. M'LACHLAN.

IN the "Entomologists' Weekly Intelligencer," No. 178 (1860), page 169, I inserted a short notice to the effect that I should be glad if Entomologists would catch and send me any *Phryganidæ* that they might meet with in the ensuing season. To that notice I did not receive a single reply, and can only account for it in this way, that either an universal apathy exists respecting these interesting insects, or that Entomologists regarded my notice as the corn sown in the stony places, springing up to-day and withering to-morrow,—the spurt of the moment from some unstable adventurer, to be forgotten in a week. I trust that the latter is the case, and that, on my assurances that I really am attending to the group, I shall not be forgotten next season, when a "horrid caddis fly" is captured after an exciting chase, instead of the hoped-for moth.

We have now a clear starting-point. Stephens' numerous so-called species are duly arranged under their respective heads; and though the pruning process has been rather severe, let us hope that the result will be the more vigorous and healthy development of fruit. England has been called

the "cradle" of the study of these insects; may our diffidence of late years not cause that honour to pass from us as a thing forgotten. A vast field is open for investigation in their habits, and their preparatory states are on the whole little known. Why should we not, from the inspection of the case of the larva of one of these creatures, be able to say at once to what species it pertains, with as much ease as a Micro-Lepidopterist can pronounce on the case of a *Coleophora* larva? Then there is their geographical distribution. In the old works, "London District," "Ripley," "Hertford," "Devonshire," &c., constantly and repeatedly occur as localities, solely because these happened to be the hunting-grounds of Stephens, Curtis and Leach; and the rest of the country was then, and is now, almost unexplored. Our described species (not reckoning the varieties of Stephens, &c.) do not exceed 110, and I think I am not too sanguine in saying that a few years will increase that number to 150, with the greater part of the additions new to science. The angler knows well that certain streams produce this or that particular kind of fish, and that a distance of a mile or two will afford quite different sport; so I should imagine that certain species of *Phryganidæ* will follow the course of streams, and this especially in the *Isopalpi*, which seldom fly far from the water in which they existed in their larva and pupa states. Some species are known to have a wide range over the Continent of Europe, and even to the other side of the Atlantic;* but other species, from some cause of which we are at present ignorant, may apparently be restricted to spots a few miles in extent, or occur only in isolated places, widely removed from each other.

* *Limnophilus griseus* has been received without any apparent alteration from Haiti. Vide Transactions of the Entomological Society of London, New Series, vol. 5, page 176.

Hoping that some one besides myself will be induced in the next season to take an interest in the study of these Caddis flies, I will give a few hints as to collecting and setting them. I can add little to the instructions given by Dr. Hagen in the "Annual" for 1859, and must in part tread in his steps.

To commence. The localities suitable for *Lepidoptera* will as a rule also be found productive of *Phryganidæ*. The larger species, *Limnophilides*, &c., frequent various localities, and are far less restricted to the immediate neighbourhood of water than the others, though from their habit of breeding in standing waters, the place of their birth may be much nearer than is often suspected. They may be constantly beaten out of fir and other trees in woods, and on the slightest application of the beating-stick, the large muscular species of *Limnophilus*, *Stenophylax*, &c., will rush out with an exceedingly dashing and vigorous flight, often eluding pursuit from their habit of getting among the brushwood. As an instance of their occurrence, at apparently a great distance from places where they could have bred, I may mention that this summer I found several specimens of the most delicate species of *Limnophilus*, the little *L. vittatus*, in a spot where a small landslip had occurred in the chalk cliff to the westward of Freshwater Gate, in the Isle of Wight, over 300 feet almost perpendicular from the sea. Here amongst the luxuriant thistles, *Parietaria*, &c., that had sprung up in this space of a few yards, they seemed quite at home (two pairs *in copula*), though the nearest fresh-water was fully a mile distant. Palings often afford a resting-place, where they may be easily captured. Sugar also has its charms, and they may frequently be seen enjoying the seductive sweets with all the gusto of a *Noctua*. Lastly, I would mention suburban gas lamps, at which cer-

tain species often swarm. I took the common *Anabolia nervosa* in this way as late as the end of October.

The remaining families, *Rhyacophilides*, *Leptocerides*, *Hydropsychides*, &c., have almost similar habits one with another. They, contrary to the habits of the large *Limnophilides*, &c., as a rule shun the vicinity of standing waters, and delight in the banks of rivers and of swiftly flowing streams, and may be found during the day at rest among the coarse herbage and alders, the smaller species often hiding in the crannies of the bark of willows, &c., but at dusk they take wing and fly in swarms, with a dancing motion, close to the water: the long-horned *Leptocerides* having very much the appearance and habits of *Adela* and *Nemophora*, and many of them are quite as handsome.

Having briefly pointed out the places in which these insects may be caught, I will say a few words on the manner of capture. Sweeping the banks of streams in the day-time is a very productive method of securing them; and beating also, in the ordinary way, as for *Lepidoptera*, will well repay the trouble. In the evening they may, of course, be caught on the wing. When in the net, they are best pill-boxed, taking care to have large-sized ones for the long-horned species, and the greater part will travel safely until the collector reaches home. Dr. Hagen advises pinning at once, but I have a strong objection to pin anything save a *Bombyx*, until one can do it carefully and neatly at home. Chloroform and oxalic acid will soon kill the larger species; for the smaller, nothing is better than the fumes of sulphur from lucifer matches in a jar with ground edge and plate-glass cover.

As to the setting: the ordinary rounded manner of setting *Lepidoptera* is equally applicable to *Phryganidæ*, but with this difference, that whereas a refractory leg is often removed in the former, in the latter the leg spurs furnishing th-

generic characters, they must be carefully arranged under the body and on no account taken off. I lately received a nice collection of the larger species for examination, but as the collector had carefully denuded the intermediate pair of legs in most of them, their value was greatly reduced. As a rule they will require to be kept on the board longer than *Lepidoptera*, being more full of juices. In concluding this part of my subject, I would remark, that "what is worth doing at all is worth doing well;" a nicely set specimen is much easier to determine than an ill-set one with the wings awry, and probably the antennæ and legs broken; and besides setting so much enhances the beauty of the specimen.

I fear I have been thought tedious and prosy, in the length of the foregoing remarks; my excuse is, that they are intended for those who have never paid the slightest attention to any but *Lepidoptera*: from such I hope to receive material assistance in specimens and notices of habit, and I shall be happy to assist any gentleman in determining the names of such as he may have collected. As an encouragement I may add, that I have now by me at least five species not hitherto included in the British list; of these I can at present only determine one with any certainty.

To my fellow-lepidopterists, and to those who pay their attention exclusively to the macros, I can especially recommend the study of the *Phryganidæ*, as tending to rectify those habits of careless and superficial examination, which have gained for us the reputation of being the least scientific among Entomologists.

In conclusion, I hope that next season will throw additional light on the vexed question, the true location of *Acentropus niveus*. In the "Annual" for 1858, Mr. Stainton commences a paragraph thus:—"this insect having been finally handed over by the Neuropterists to the Lepidopterists,

&c.” In strange contradiction to this, a few months later there appears a second edition of Mr. Doubleday’s “Synonymic List,” in which we search in vain for the insect. For my own part I must think that the day has not yet come for its final location among the *Lepidoptera*, but it assuredly will have the effect of separating the *Trichoptera* still further from that heterogeneous, ill-assorted group, the *Neuroptera*, with which many Entomologists still persist in associating them.

I beg especially to record my thanks to Messrs. Parfitt, Rye and Winter of Aldeby, for the gift and loan of specimens in this group, and to several other gentlemen for their kind promises of assistance.

DESCRIPTION OF A SPECIES OF *LIMNOPHILUS* NEW TO BRITAIN.

Limnophilus borealis, Zett.

Testaceus. Alis anticis nitidissimis, pallide ochraceis; maculâ fenestratâ et regione anastomosis hyalinis; maculâ ad angulum analem fuscâ; stigmatè obliquo, saturate piceo-brunneo, posticis sub-hyalinis apice flavido.

Long. corp. $7\frac{1}{2}$ lin.

Exp. alar. 1 unc. 3 lin.

Phryganea borealis, Zetterstedt, Insect. Lap. 1062, 7.

Chætotauius borealis, Kolenati, Sp. et Gen. Trichop. 42, 2.

Limnephilus borealis, Walker, Brit. Mus. Cat. Neurop.

Pt. 1, 20, 8.

Testaceous: antennæ with slightly paler wings; legs paler. Anterior wings very shining, pale ochreous-yellow, slightly

darker on the dorsal margin, fenestrated spot and a large space about the anastomosis hyaline, the veins of the anastomosis darker than the others; pterostigma very dark pitchy-brown, longer than broad, and placed *obliquely*; a large fuscous blotch extends *obliquely from the lower part of the anastomosis to the anal angle*; in the tip of the wing is a faint fuscous cloud; posterior wings nearly colourless, with the apex, costal edge and a slight indication of a pterostigma, yellowish.

This species is allied to *L. stigma*, Curtis, but is a less robust insect, and the anterior wings are far more shining, and the former never has the remarkable blotch at the anal angle. Identified from a ♀ specimen sent under this name to the British Museum by Dr. Hagen, taken by that gentleman at Königsberg; but I feel bound to say, that neither that specimen or mine appears to agree with Zetterstedt's description, and I should not be surprised if it prove to be a distinct species.

I found a specimen, also a ♀, in a collection of these insects sent for my determination by Mr. Winter, taken by him at Ranworth, which I exhibited at the November Meeting of the Entomological Society of London.

COLEOPTERA.

NEW BRITISH SPECIES NOTICED IN 1860.

BY E. W. JANSON, Sec. Ent. Soc.

1. *BRADYCELLUS HARPALINUS*, Dej.; E. W. Janson, Proc. Ent. Soc. 5 Nov. 1860.

Acupalpus harpalinus, Dej. Spec. Gen. iv. 471, 27 (1829), Icon. d. Coléop. d'Europe, iv. 274, 18, T. 201, f. 6 (1834); Heer, Faun. Col. Helv. i. 118, 2 (1838).

Bradycellus fulvus ex parte, Dawson, Geod. Brit. 163, 3 (1854).

Bradycellus fulvus, Fairm. et Laboulb. Faune Ent. Franç. Coléop. i. 143, 8 (1854); Duval et Mign. Gen. Col. Eur. Carab. T. 16, f. 76 (1855).

Bradycellus harpalinus, Redtb. Faun. Austr. Ed. i. 103 (1849), Ed. ii. 65 (1857); Schaum, Naturgesch. d. Ins. Deutschl. i. i. 627, 4 (1860).

Distinguished from *Brad. Verbasci*, Duft. (*Acupalpus rufulus*, Dej.), Schaum, Ent. Annual for 1860, 125, by its usually smaller size and darker colour, and the obtuse, nearly rounded, posterior angles of its thorax.

I sent individuals of this species to Dr. Schaum of Berlin; he informs me that it is the *Acupalpus harpalinus*, Dej., and the *Bradycellus harpalinus* of his description, Naturgesch. Ins. Deutschl. l. c.

Not uncommon in many places round London, frequently associated with its near allies, *B. verbasci*, Duft., and *B. distinctus*, Dej.

2. *BEMBIDIUM NIGRICORNIS?* Gyll.; Waterhouse, Proc. Ent. Soc. 6 Feb. 1860, Zool. 6936 (1860).

The *Bembidium nigricorne*, Gyll. [Ins. Suec. iv. 402, 5—6 (1827)], hitherto known as an inhabitant of high northern European latitudes alone, has been carefully described not only by Gyllenhal, but by Dejean, Sahlberg, Zetterstedt, Schiödte and Duval, and the points in which it differs from its near ally, *B. lampros*, Hbst., distinctly pointed out by these authors. Unfortunately I do not possess either an indigenous or foreign example of this species; the following translation, however, of the description given by M. Jacquelin-Duval in his justly celebrated monograph of the European Bembidiidæ, “De Bembidiis Europæis,” published in the ninth and tenth volumes of the second series of the “Annales de la Société Entomologique de France,” may perhaps be acceptable to some of our Coleopterists.

“Above brassy. Palpi brown. Antennæ entirely black, their first joint slightly brassy. Frontal sulci less marked than in *B. lampros*, the interval which separates them wider, with two slight short ridges posteriorly near the eyes. Prothorax of very peculiar form, wide, very short, very little constricted behind, appearing almost rounded in the middle at the sides, as in group 14; * transverse impressions but little marked, central longitudinal line slight, base nearly straightly truncate, presenting above a few small punctures or rugosities, foveæ at the posterior angles round and deep, a little shorter than in *lampros*, posterior angles obtuse and but slightly salient; elytra as in the preceding (*lampros*) not

* *Philochthus* and *Ocys* of English collections.

very strongly striate-punctate, seventh stria absent. Legs ferruginous-red, slightly brownish on the thighs, which have a faint æneous tint."—*Jacq. Duval, lib. cit.* ix. 507, 22 (1851).

3. *HAPLOGLOSSA RUFIPENNIS*, Kraatz; E. W. Janson, Proc. Ent. Soc. 6 Feb. 1860, Zool. 6937 (1860); H. S. Gorham, Proc. Ent. Soc. 4 June, 1860, Zool. 7094 (1860).

Haploglossa rufipennis, Kraatz, Naturgesch. d. Ins. Deutschl. ii. 81, 3 (1856).

Very nearly allied to *H. pulla*, Gyll., but differing in its more parallel form, closer and much finer punctuation, and the colour of its elytra, which are rufo-testaceous, with a dark triangular patch in the region of the scutellum and at the outer posterior angles.

Found by Mr. Wollaston, in sand-pits, on Reigate common on the 26th June, 1857; by myself, in the same locality, by brushing, on the 6th July, 1859; and more recently by Mr. Gorham, in sand-pits near Addington, Surrey.

4. *HOMALOTA SUBTERRANEA*, Mulsant; E. W. Janson, Proc. Ent. Soc. 2 July, 1860, Zool. 7152 (1860).

Homalota subterranea, Mulsant et Rey, Opusc. Ent. ii. 40, 4 (1853); Kraatz, Naturgesch. d. Ins. Deutschl. ii. 291, 99 (1856).

Head pitchy-black; thorax rufo-testaceous; elytra and abdomen reddish-brown, of the latter the fourth and fifth segments and the base of the sixth pitchy-black; antennæ brown, their base and the legs rufo-testaceous.

Length $1\frac{1}{3}$ lin.

Nearly allied to *H. hospita*, Maerk., but considerably smaller and relatively narrower; abdomen with segments 2—5 minutely and sparsely punctate, the sixth nearly smooth.

I captured a single male individual of this pretty and well

marked species near Mickleham, Surrey, on the 23rd of June last, in a nest of *Formica flava*, beneath a flint.

MM. Mulsant and Rey state that it occurs "at Hyères, in April, beneath stones, in the company of ants." Dr. Kraatz informs us that it is found "near Berlin and in Schleswig under damp fallen leaves."

5. MYCETOPORUS ANGULARIS, Mulsant; E. W. Janson, Proc. Ent. Soc., 5th Nov. 1860.

Mycetoporus angularis, Mulsant et Rey, Opusc. Ent. ii. 69, 4 (1853); Fairm. et Laboulb. Faune Ent. Franç. Coléop. i. 493, 4 (1856); Kraatz, Naturgesch. d. Ins. Deutschl. ii. 458, 3 (1857).

In its broad depressed form resembling *M. lucidus*, but considerably smaller, the elytra with a single discoidal row of punctures only.

I am indebted to Mr. Brewer for three specimens of this insect, recently taken by him near Reigate, Surrey, and which he informs me were named for him by Dr. Power "*M. angularis*," and with the descriptions of which species they appear to me to coincide, save in colour, having the posterior angles only of the thorax, and the apical margin alone of the sixth abdominal segment, rufo-testaceous; whereas *M. angularis* is described as having the lateral and posterior margins of the thorax, and the entire sixth segment of the abdomen, of that colour, but to these discrepancies little importance need be attached, as the majority of the species of this genus are subject to considerable variation in respect to colour.

It would appear that Dr. Power possessed, and had recognized, this species previous to the communication of Mr. Brewer's specimens, and I am informed that Messrs. Douglas and Waterhouse also have examples.

6. *QUEDIUS TRUNCICOLA*, Fairm.; E. W. Janson, Proc. Ent. Soc. 6 Feb. 1860, Zool. 6937 (1860).

Quedius truncicola, Fairm. et Laboulb. Faune Ent. Franç. Col. i. 538, 14 (1856).

Quedius fulgidus, F. var. 3, Eric.

Very closely allied to *Q. fulgidus*, F., from which it differs in having the scutellum very sparingly punctured, and the abdomen ferruginous red, the two basal segments with a blackish tint. M. Fairmaire describes the antennæ as having the joints more elongate and the sixth abdominal segment of the male more strongly emarginate than in *Q. fulgidus*, but I am unable to detect in my specimens any difference in these respects.

I have hitherto seen two examples only presenting the peculiarities above mentioned, both of which I found under bark of elm; one at Tottenham on the 29th of October, 1848, the other near Hampstead on the 18th of January of the present year.

7. *PTENIDIUM PICIPES*, Matthews, Zool. 7067 (1860).

Resembles *P. punctatum*, Gyll., in its deeply, remotely punctate upper surface, but differs conspicuously in its ovate convex form, and in having the disc of the thorax punctate without a smooth longitudinal space.

Taken by the Rev. A. Matthews near Gumley, Leicestershire, in the early spring, in moss, and to his kindness I am indebted for the species.

8. *PTILIUM BREVICOLLE*, Matthews, Zool. 7066 (1860).

Readily distinguished from its congeners by its large head, short thorax, and rough punctuation.

Described by the Rev. A. Matthews from a single example taken by him some years back near Weston, Oxfordshire.

9. *PTILIUM SAXONICUM*, Gillm.; Rev. A. Matthews, Zool. 7067 (1860).

Trichopteryx Saxonica, Gillm. in Sturm's Deutschl. Fauna, Ins. xvii. 81, 4, T. 7, f. 4 (1845).

One pair taken by the Rev. A. Matthews, near Gumley, Leicestershire, in June.

10. PTINELLA LIMBATA, Heer; Rev. A. Matthews, Zool. 7064 (1860).

Trichopteryx limbata, Heer, Faun. Col. Helv. i. 376, 8 (1841); Gillmeister in Sturm's Deutschl. Fauna, Ins. xvii. 59, 1, T. 5, f. 1 (1845).

Trichopteryx testacea, Heer, Faun. Col. Helv. i. 376, 9 (1841).

Ptilium testaceum, Eric. Naturg. d. Ins. Deutschl. iii. 31, 12 (1845).

Found by the Revs. A. and H. Matthews in the Midland Counties, and by myself in Surrey (Fig. 6).

11. PTINELLA APTERA, Gillm.; Rev. A. Matthews, Zool. 7064 (1860).

Ptilium apterum, Guérin, Revue Zool. 90 (1839), 69 (1844); Eric. Naturg. d. Ins. Deutschl. iii. 32, 13 (May, 1845).

Trichopteryx aptera, Gillm. in Sturm's Deutschl. Fauna, Ins. xvii. 63, 4, T. 5, f. 4 (August, 1845).

Discovered by the Revs. A. and H. Matthews in the Midland Counties.

It may not, perhaps, be deemed irrelevant here to call attention to the important discovery by Mr. Matthews of well-developed eyes in the present and other species of this genus hitherto regarded as destitute of vision, and to transcribe from the pages of the "Zoologist" that gentleman's remarks on the subject.

"It always appeared to me somewhat incomprehensible how an animal, unendued with sight, could not only move with such surprising rapidity in any purposed direction, but

also avoid the obstacles it met with in its path, as I have often seen these insects do. But the mystery is now solved; the many species comprised in the blind section of this genus, the 'sans yeux' of the 'Faune Française,' in reality possess as perfect visual organs as fall to the lot of any existing beetle—the only peculiarity of these organs being the fact that they are concolorous with the other parts of the head, and situated mainly on its lower surface, a small portion only being visible from above."—*Rev. A. Matthews, Zool. 7064* (June, 1860).

12. *PTINELLA ANGUSTULA*, Gillm. (*nec* Janson in Ent. Annual for 1860, No. 21); *Rev. A. Matthews, Zool. 7064* (1860).

Trichopteryx angustula, Gillm. in Sturm's *Deutschl. Fauna*, Ins. xvii. 66, 6, T. 5, f. 6 (1845).

Found by the Revs. A. and H. Matthews in the Midland Counties, and by myself in Surrey. Like its congeners it is to be sought for beneath the bark of dead trees.

In reference to the insect exhibited by me at the Meeting of the Entomological Society on the 4th of April, 1859, and enumerated in last year's Annual under the name of *Ptinella angustula*, Mr. Matthews states: "While staying in Paris for a short time in February last, I had the opportunity, through the kindness of MM. Allard and Fairmaire, of examining some of the French collections of *Trichopterygidae*, and discovered that the species first taken by Mr. Janson, and subsequently by my brother, the Rev. H. Matthews, and myself, was not the true *angustula* of Gillmeister, but one which has been lately found near Paris by MM. Reiche, Fairmaire and others, and described by M. Fairmaire under the name of *denticollis*."—*Rev. A. Matthews, Zool. 7064* (1860).

1861.

13. *CYCHRAMUS FUNGICOLA*, Heer, Waterhouse. Proc. Ent. Soc. 6th Aug. 1860, Zool. 7162 (1860).

Cychramus fungicola, Heer, Faun. Col. Helv. i. 408, 4 (1841); Eric. Naturg. d. Ins. Deutschl. iii. 214, 2 (1845).

Nitidula quadripunctata, var. *b.*, Gyll. Ins. Suec. iv. 300, 22 (1827).

The close resemblance which this insect bears to *C. luteus*, F., has probably led to its being mixed up with it in many of our collections. Gyllenhal says of it, "*N. lutea ut ovum ovo simillima.*" It would appear, however, to be really specifically distinct, for while *C. luteus* is rendered opaque by the dense pubescence which covers its whole upper surface, the present insect, owing to its more scanty but longer pubescence, is slightly shining, and its form is more oblong and convex. From its specific designation it might be inferred that fungi were the special or at all events usual pabulum of this species, but such is certainly not the case, as it occurs associated with *C. luteus* both in flowers and fungi. At Colney Hatch, early in July last, I found both species in the utmost profusion in the flowers of the common honeysuckle: of a dozen specimens taken indiscriminately seven proved to be *C. fungicola*.

14. *LATHRIDIUS CARINATUS*, Gyll.; Waterhouse, Trans. Ent. Soc. Ser. 2, v. 175, 7 (1859).

Latridius carinatus, Gyll. Ins. Suec. iv. 137, 17 (1827); Mannerheim in Germar's Zeitschr. f. d. Entom. v. 78, 13 (1844).

Easily distinguished from the ascertained British species by its laterally incised prothorax and the obscure longitudinal ridges on that segment.

Taken by Mr. Wollaston, eighteen years back, on the outer walls of a newly erected house at Spridlington, near

Lincoln, and recently by Mr. Waterhouse in the Crystal Palace at Sydenham.

Two specimens kindly given me by Mr. Wollaston, and which have been referred by M. Motschulsky to the *L. incisus*, Mannerh., appear to me to coincide better with the latter's description of *L. carinatus*; in *L. excisus* the thorax, it would appear, is shorter, the elytra longer (more than thrice as long as the thorax), and the longitudinal ridges on the thorax very divergent.

15. *HETERO CERUS RECTUS*, Waterhouse, Trans. Ent. Soc. Ser. 2, v. 168 (1859).

“*H. fossor*, v. Kiesenw. var?”

The differences which Mr. Waterhouse thinks will be found to exist between his insect and *H. fossor*, v. Kiesenw., when specimens of the same sex are compared, are so slight, that it appears to me it would have been more prudent to postpone the imposition of a new name until a comparison had been made.

“Ten specimens from North Wales?”

I believe these examples are supposed to have been taken by the Rev. F. W. Hope.

16. *HETERO CERUS FUSCULUS*, v. Kiesenw.; Waterhouse, Trans. Ent. Soc. Ser. 2, v. 166 (1859).

Heterocerus fuscus, v. Kiesenw. in Germar's Zeitschr. f. d. Entom. iv. 220, 17, T. 3, f. 11 (1843); Eric. Naturg. d. Ins. Deutschl. iii. 549, 9 (1847).

In its elongate depressed form and the disposition of the markings on the elytra very similar to *Het. lævigatus*, Panz. [Faun. Ins. Germ. Fas. 23, f. 13 (1794)], but its smaller size, dull pubescence, more strongly punctured elytra and darker coloured legs, apart from other less obvious differences, will suffice to distinguish it.

17. *Trox hispidus*, Laich.; Waterhouse, Proc. Ent. Soc. 6 Aug. 1860, Zool. 7163 (1860).

Trox hispidus, Laicharting, Verzeichn. Tyrol. Ins. i. 30, 2 (1781); Eric. Naturg. d. Ins. Deutschl. iii. 928, 2 (1848).

Of the size of the largest specimens of *Trox sabulosus*, and very similar to it in form and sculpture: differs in having the striæ on the elytra finely punctured, and the rows of tubercles on the interstices alternately large and small.

Locality unknown.

18. *Rhagonycha elongata*, Fallen; E. W. Janson, Proc. Ent. Soc. 6 Aug. 1860, Zool. 7161 (1860).

Cantharis elongata, Fallen, Mon. Canth. I. ii. 8 (1807); Gyll. Ins. Suec. i. 335, 8 (1808).

Nearly allied to *R. paludosa*, Fall., but larger and proportionally narrower; the prothorax subquadrate, its posterior angles prominent, base of antennæ, apex of femora and base of tibiæ testaceous.

Found, according to Gyllenhal and Sahlberg, in Sweden and Finland "*in frondibus abietis*," and in Lapland, according to Zetterstedt, "*in Betuletis*."

Taken in Perthshire by Turner.

19. *Dorcatoma chrysmelina*, Sturm; Waterhouse, Proc. Ent. Soc. 3 Sept. 1860, Zool. 7221 (1860).

Dorcatoma chrysmelina, Sturm, Deutschl. Fauna, Ins. xii. 7, 2, T. 244, f. a. A. B. (1837); Redtenb. Faun. Austr. Ed. 2, 562 (1858).

Dorcatoma Dresdense, Illiger, Kaef. Preus. 334 (1798); Fab. Syst. El. i. 330 (1801); Ent. Hefte, ii. 96, T. 3, f. 10 a (1803), *nec* Herbst.

Nearly allied to *D. flavicornis*, Fab., first indicated by me as an inhabitant of Britain and figured on the plate of this Annual for 1858, fig. 7, but narrower, the punctuation

closer, and the antennæ with the antepenultimate articulation acutely produced within, its apex deeply emarginate; the penultimate likewise deeply notched at its apex, the terminal slender.

Messrs. Turner and Waterhouse have no claim either to the discovery or first identification of this species.

On the 21st of June, 1849, I accompanied Mr. F. Smith to an old oak in a hedge-row near Peckham, Surrey, in which Mr. Ingall and himself had taken this insect, and where I succeeded in obtaining several examples, which I referred, as soon as they were set, to the *D. chrysomelina* of Sturm, which appellation they have ever since borne in my collection.

It will be seen by the references above given that this insect was mistaken by Fabricius and others for the *Dresdense* of Herbst, and it appears to me that Stephens' description of *D. Dresdensis*, Illustr. Mand. iii. 337, i. (1830)—his diagnosis is copied *verbatim* from the "Entomologische Hefte"—applies to the species under consideration and not to the true *Dresdense*, which is a much larger insect, of an elongate quadrate form, with the thorax much narrowed anteriorly, and of which no indigenous example has ever come under my notice. The exponent of *D. Dresdensis* in the Stephensian cabinet is a mere fragment, on a very suspicious looking pin, *sans* head, *sans* legs, in fact *sans* everything.

20. RHOPALODONTUS PERFORATUS, Gyll.; E. W. Janson, Proc. Ent. Soc. 6 Aug. 1860, Zool. 7161 (1860).

Cis perforatus, Gyll. Ins. Suec. iii. 385, 7 (1813).

Rhopalodontus perforatus, Mellié, Annales d. l. Soc. Ent. de France, Ser. 2, vi. 234, T. 9, f. 23 (1848).

The genus *Rhopalodontus* was erected by the late M. Mellié (*l. c.* 233) for the reception of the present insect, which differs from *Cis* in having the tibiæ dilated and fur-

nished with a series of acute spines at their apices, the second joint of the antennæ more elongate, and the third shorter; it constitutes the connecting link between *Xylographus* and *Cis*, and in habit very closely resembles the members of the first of these genera.

Its exceedingly coarsely-punctured elytra and long pubescence, and the distinctions above pointed out, will at once lead to its recognition; on the characters which separate it from *Xylographus*, I need not here enter, as the sole European representative of that genus (*X. bostrichoides*, Dufour), being a native of southern Europe and northern Africa, is not likely to occur in Britain.

The discovery in Britain of this interesting little insect is due to the late James Foxcroft, who reared it from boleti gathered by him from old birch trees in the Black Forest, near Rannoch, Perthshire.

21. *CIS MICANS*, Herbst; Waterhouse, Trans. Ent. Soc. Ser. 2, v. 204, 3 (1860).

Anobium micans, Hbst. Naturg. Kaef. v. 10, 64, T. 47, f. 11, K. (1789); Panz. Faun. Ins. Germ. Fas. 10, f. 8 (1793).

Cis micans, Gyll. Ins. Suec. iii. 379, 2 (1813); Mellié, Annales d. l. Soc. Ent. de France, Ser. 2, vi. 255, 12, T. 2, f. 14 (1848).

Distinguished from *C. Boleti*, Scop., and *C. setiger*, Mellié (*C. villosulus*, Waterh.), by its smaller size, smooth and posteriorly margined thorax, and the fine rugulose punctuation of its elytra, and from *C. hispidus*, Payk., by its superior size, and relatively broader form, the fuscous club of its antennæ, and the absence of striæ of punctures on its elytra.

“Hawkhurst, Kent.”

Not uncommon in many places near London.

22. *CIS ALNI*, Gyll.; Waterhouse, Trans. Ent. Soc. Ser. 2, v. 206, 8 (1860).

Cis Alni, Gyll. Ins. Suec. iii. 386, 8 (1813); Mellié, Annales d. l. Soc. Ent. de France, Ser. 2, vi. 338, 45, T. 3, f. 18 (1848).

Its elongate form, shining surface, the parallel widely-margined sides and salient anterior angles of its thorax, and short scanty pubescence, serve at once to distinguish it from all of its congeners hitherto registered as British. "Hawkhurst, Kent." I am informed that Dr. Power has reared it copiously from boleti gathered by him in Hampshire. Mr. Brewer has met with it near Reigate, Surrey.

23. *CIS FESTIVUS*, Panz.; Waterhouse, Trans. Ent. Soc. Ser. 2, v. 205, 6 (1860).

Anobium festivum, Panz. Faun. Ins. Germ. Fas. 6, f. 7 (1793).

Cis festivus, Gyll. Ins. Suec. iii. 381, 4 (1813); Mellié, Annales d. l. Soc. Ent. de France, Ser. 2, vi. T. 3, f. 34 (1848).

Nearly allied to *C. oblongus*, Mellié (*pigmæus*, Waterh.), from which, however, its shorter, more ovate form, ferruginous hue, and coarse sculpture, will serve readily to distinguish it.

I have taken specimens at Colney Hatch, Hampstead, and in various other places near London, in the autumn and winter; rare.

24. *CIS FUSCATUS*, Mellié; Waterhouse, Trans. Ent. Soc. Ser. 2, v. 205, 7 (1860).

Cis fuscatus, Mellié, Annales d. l. Soc. Ent. de France, Ser. 2, vi. 352, 55, T. 4, f. 1 (1848).

Its narrow form and small size ($\frac{5}{8}$ — $\frac{3}{4}$ lin.) at once distinguish this species from all of its ascertained indigenous congeners.

I have repeatedly captured this insect, but always very sparingly, in the neighbourhood of London.

25. *ENNEARTHRON CORNUTUM*, Gyll.; Waterhouse, Trans. Ent. Soc. Ser. 2, 208 (1860).

Cis cornutus, Gyll. Ins. Suec. iv. 626, 3—4 (1827).

Ennearthron cornutum, Mellié, Annales d. l. Soc. Ent. de France, Ser. 2, vi. 362, 1, T. 4, f. 12 (1848).

Readily distinguished from *E. affine*, Gyll., by its superior size, rufo-testaceous hue, and by the tuberculated thorax of the males.

“Hawkhurst, Kent.”

Apparently rare; Mr. Dossetor captured several examples, during the past summer, in the New Forest.

26. *ANTHICUS BIMACULATUS*, Illiger; E. W. Janson, Proc. Ent. Soc. 6 Feb. 1860, Zool. 6937 (1860).

Notoxus bimaculatus, Illiger, Magaz. d. Insektenk. i. 80 (1802).

Anthicus bimaculatus, Gyll. Ins. Suec. ii. 499, 9 (1810); Schmidt, Ent. Zeit. Stett. iii. 125, 2 (1842); de Laferté, Mon. Anth. 147, 49 (1848); Redtenb. Faun. Austr. Ed. ii. 640 (1858).

Conspicuous amongst all the species of the genus hitherto ascertained as indigenous to Britain by its larger size, pallid hue and obovate convex elytra.

A single specimen, given me by Mr. Joseph Chappel, of Pendleton, near Manchester, by whom it was taken, in the summer of 1859, on the Lancashire coast, is the only British example which I have yet seen; it differs from the normal form, that first described by Illiger, in having the black dorsal spot on each elytron, a little behind the middle, nearly obliterated, and in this respect appears to confirm the Marquis de Laferté's observation—“que les individus du bord

de l'Océan sont plus pales que ceux des contrées orientales de l'Europe."

27. *BRACHONYX INDIGENA*, Herbst; E. W. Janson, Proc. Ent. Soc. 6 Aug. 1860, Zool. 7161 (1860).

Curculio indigena, Herbst, Natursyst. Kaef. vi. 170, 130, T. 71, f. 12 (1793).

Rhynchænus indigena, Gyll. Ins. Suec. iii. 71, 7 (1813).

Brachonyx indigena, Schoenh. Curc. disp. meth. 232, 132 (1826), Gen. et Spec. Curc. iii. i. 329, 214 (1836); Guérin, Iconogr. Ins. Col. 145, T. 38, f. 3 (1833?); Ratzeb. Forst. Ins. i. 126, 21, T. 5, f. 9 (1837); Duval et Mign. Gen. Col. Eur. Curc. T. 19, f. 8, 9 (1855).

The genus *Brachonyx*, of which the insect now under consideration is the sole known representative, differs from *Anthonomus*, which it approximates in habit, in having the thorax conspicuously longer than wide, the antennæ inserted rather behind the middle of the rostrum, the scutellum small and nearly orbicular, the femora unarmed, and the tarsi robust, their third joint especially very wide, the lobes large and divergent, the claw-joint exceedingly short, scarcely projecting beyond the lobes of the preceding.

Ratzeburg, in his great work above cited, has described, and Hugo Troschel has delineated, the economy of this species. The female beetle deposits her eggs in the month of May in the young fir fronds, in which the larvæ feed until July, at which period, having attained their full growth, they assume the pupa state, and in August the perfect insect emerges.

Common on firs in Sweden, Finland, Lapland, Northern Germany, and the mountainous districts of Central Europe.

Three specimens, taken by Turner in Perthshire, are said by him to have been beaten out of birch.

28. *CEUTORHYNCHUS SYRITES*, Germ. ; Waterhouse, Proc. Ent. Soc. 6 Aug. 1860, Zool. 7162 (1860).

Ceutorhynchus Syrites, Germar, Col. Spec. nov. 232, 358 (1824); Gyll. Ins. Suec. iv. 577, 63—64 (1827).

Allied to *C. assimilis*, F., but black, without any brassy tint, more robust, the thorax at its base nearly twice as broad as long, the sides more rounded, the dorsal channel less apparent, the lateral linear tubercle less evident, the punctuation coarser; the elytra broader, the scale-like pubescence with which the interstices are clothed longer, denser on the basal third of the first interstice, the tubercles at and near the apex larger.

The *C. inaffectatus*, Schoenh., with which the present species has likewise been confounded, is a larger insect, more nearly resembling *C. assimilis* in form, but having the four posterior femora distinctly, the anterior obsolete, dentate.

“Found by sweeping in the field opposite the inn at Birch Wood Corner on the 11th of July, and at Erith on the 26th of June.”

29. *CEUTORHYNCHUS TARSALIS*, Schoenh. ; Waterhouse, Proc. Ent. Soc. 6 Aug. 1860, Zool. 7163 (1860).

Ceutorhynchus tarsalis, Schoenh. Gen. et Spec. Curc. viii. ii. 167, 142 (1845); Redtenb. Faun. Austr. Ed. ii. 807 (1858).

“At Erith on June 26th, by sweeping.”

Some of our readers will doubtless be pleased to learn that the third part of M. Jacquelin-Duval's “Glanures Entomologiques” will contain a monograph of the European *Ceutorhynchi* from the pen of this talented Entomologist.

30. *BAGÖUS NODULOSUS*, Schoenh. ; E. C. Rye, Zool. 7266 (1860).

Bagöus nodulosus? Schoenh. Gen. et Spec. Curc. iii. 538, 3 (1836).

At the September Meeting of the Entomological Society "Mr. Rye exhibited a *Bagöus* apparently distinct from the recorded British species, taken at Hammersmith." Vide Proc. Ent. Soc. 3 Sept. 1860, Zool. 7222 (1860). This is probably the insect he now refers to the *Bagöus nodulosus* of Schoenherr.

The *Bagöus nodulosus* of Schoenherr is one of the largest of the known European species, being $2\frac{3}{4}$ lines in length.

Mr. Rye states that *B. binodulus* has the elytra with the interstices "merely punctured" and that it has "on each elytron four knobs";—now in the true *B. binodulus* the interstices of the elytra are *not* "merely punctured," they are very thickly faintly coriaceous, "*creberrime subtilissime coriaceis*;" nor has it "four knobs" on each elytron, but only *two*, exclusive of the humeral callus, the second interstice bearing an acute tubercle a little behind the middle, the fourth a similar tubercle close to the apex. He likewise states that in *B. nodulosus* each elytron has "only two" knobs,—but in the veritable *B. nodulosus* the fourth interstice alone terminates far within the apex in an elevated tubercle, "*quarto a sutura longe intra apicem in callum elevatum terminante.*"

31. *HYLASTES CUNICULARIUS* (Knoch), Eric. ; E. W. Janson, Proc. Ent. Soc. 5 Nov. 1860.

Hylastes cunicularius, Eric. Archiv. f. Naturgesch. ii. 49, 3 (1836); Ratzeb. Forst. Ins. i. 180, 3, T. 7, f. 7 (1837).

Although this species bears on a cursory inspection a very close resemblance to *H. ater*, an attentive examination will afford the following constant distinctions: its form is more

robust, its thorax is less cylindrical and more densely punctate, sub-opaque, and its elytra are broader and their sculpture is coarser and deeper.

The first indigenous specimen of this insect which came under my notice was given me by Mr. E. W. Robinson, who took it beneath bark of fir, near Guildford, Surrey, on the 21st of May, 1858, and I have since found it under similar circumstances in the same county. In Mr. Wollaston's collection is an example taken by him some years since at the "Devil's Dyke," and I have seen individuals in several of the metropolitan collections confounded with *H. ater*.

32. *CRYPHALUS FAGI*, F. ; E. W. Janson, Proc. Ent. Soc. 6 Feb. 1860, Zool. 6937 (1860); H. S. Gorham, Zool. 6905 (1860).

Apate Fagi, Fab. Ent. Syst. Supp. 157, 16 (1798); Syst. El. ii. 383, 16 (1801).

Cryphalus Fagi, Eric. Archiv. f. Naturgesch. ii. 62 (1836).

The narrow subcylindrical form, long elytra, prominent tubercles or processes on the anterior portion of the thorax, and red legs and antennæ, distinguish this species.

I found an example near Hampstead on the 31st July, 1859, among refuse of a faggot-stack, and Mr. Gorham subsequently captured it in some plenty in bark of beech near Westerham, Kent.

33. *CRYPHALUS ABIETIS*, Ratzeb. ; E. W. Janson, Proc. Ent. Soc. 6 Feb. 1860, Zool. 6937 (1860).

Cryphalus Abietis, Ratzeb. Forst. Ins. i. 163, 10, T. 13, f. 17 (1837).

Readily recognized by the tubercles on the anterior portion of the thorax being few in number and irregular in their distribution (not in concentric rows), the regular series of

punctures and the short pubescence of the elytra. The legs and antennæ are red, the club of the latter pitchy black. Discovered by the Rev. A. Matthews beneath bark of firs near Gumley, Leicestershire, and to whose liberality I am indebted for the species.

34. *DONACIA COMARI* (Ahr.), Suffrian; E. W. Janson, Proc. Ent. Soc. 3 Sept. 1860, Zool. 7221 (1860); Proc. Ent. Soc. 1 Oct. 1860, Zool. 7269 (1860).

Donacia sericea, Ahrens *olim*, in Neue Schrift. d. naturf. Gesellsch. zu Halle, I. iii. 29, 12 (1810); Kunze, *ibid.* II. iv. 27 (1818), *nec* Linn.

Donacia Comari (Ahrens *in litteris*), Suffrian, Ent. Zeit. Stett. vii. 84 (1846).

Donacia montana, Dahl. *in litt.*

Allied to *D. sericea*, L. (*proteus*, Steph.), but readily distinguished by the structure of its antennæ and thorax and its parallel elytra.

In *D. Comari* the antennæ are comparatively short and stout, the third joint but little longer than the second and very little shorter than the fourth, the anterior angles of the thorax are rounded and deflexed, and the callus is confounded anteriorly with the margin. Fig 9*.

In *D. sericea*, L., the antennæ are long and slender, the third joint is fully half as long again as the second and nearly as much shorter than the fourth; the anterior angles of the thorax are acute and reflexed, and the callus is clearly defined anteriorly. Fig. 9.

Discovered by the late James Foxcroft in Perthshire in May, 1854.

35. *CRIOCERIS DODECASTIGMA*, Suffr.; Waterhouse, Proc. Ent. Soc. 6 Aug. 1860, Zool. 7163 (1860).

Lema dodecastigma (Ziegler), Suffr. Ent. Zeit. Stett.

ii. 40, 3 (1841); Redtenb. Faun. Austr. Ed. i. 517 (1849).

Crioceris dodecastigma, Lacord. Mon. Phytoph. i. 582, 34 (1845); Redtenb. Faun. Austr. Ed. ii. 887 (1858).

Mr. Waterhouse attributes to Panzer the imposition of this specific title, but I can find no insect thus designated in any of Panzer's works, nor do any of the writers who have treated on the insect now under consideration make the slightest allusion to that author.

In comparing his insect with *C. duodecim-punctata*, Mr. Waterhouse says that it is distinguished therefrom "by the legs and under parts of the body being black instead of red. The orbit of the eye is also entirely black, and the antennæ are less stout, &c."

The difference in the colour of the legs and underside of the body few Entomologists will be disposed to accept as a specific diagnostic; the black orbit, as Suffrian remarks, is frequently slightly apparent in *C. duodecim-punctata*, and as regards the proportions of the antennæ, the only structural character given by Mr. Waterhouse, Suffrian, the original describer of the supposed species, distinctly informs us that in *C. 12-punctata* the eyes, antennæ, forehead, thorax and elytra are *precisely* as in *dodecastigma*. Lacordaire states that he has seen every intermediate grade between the typical *12-punctata* and *dodecastigma*, and that the only character by which the two can be separated is the black colour of the anterior portion of the head and orbits of the eyes in the latter. He adds: *M. Perroud, Entomologiste de Bordeaux, m'a dit qu'elle se trouvait communément aux environs de cette ville sur l'asperge, en compagnie du 12-punctata, et que tous d'eux s'accouplaient indistinctement.*" It is given in the last edition of the

Berlin "Catalogus Coleopterorum Europæ" as a variety
C. 12-punctata.

Locality unknown.

33. CREPIDODERA ATROPÆ, Foudras.

Epitrix Atropæ (Maerkel), Foudras in Mulsant's Hist. Nat. des Coléopt. de France, Altisides, 311, 3 (March, 1860); E. W. Janson, Proc. Ent. Soc. 1 Oct. 1860, Zool. 7267 (1860).

Crepidodera Atropæ, Allard, Annales d. l. Soc. Ent. de France, Ser. 3, viii. 66, 21 (June, 1860).

Haltica Atropæ, Maerkel in *litteris* (1856); Rev. H. Clark, Zool. 7266 (1860).

Haltica pubescens, var. *a* and *b*, Ent. Hefte, ii. 37, 17, t. 2, f. 11 (1803).

The members of the genus *Epitrix*, proposed by the late M. Foudras in the extraordinary work above cited, for the reception of the *Altica pubescens*, Ent. Hefte (excluding vars. *a* and *b*), the *E. intermedia*, Foudras, and the present species, are distinguished by their pubescent elytra, and certain minute structural peculiarities of the generative organs, which can scarcely be accepted as of *generic* value.

M. Allard observes that the present insect "is perhaps only a variety of *pubescens*," and, further, that "it differs only in its more diminutive size and the light spots on its elytra, of which the pubescence is also a little less dense."

A careful comparison, however, convinces me that the two insects are specifically distinct, and, setting aside the discrepancies in the form of the ædeagus pointed out by M. Foudras, and which I hold to be *per se* conclusive evidence on the point, I will direct attention to certain less recondite differences.

C. Atropæ is a smaller insect than *C. pubescens*,—both

are variable in size, but the largest specimens of the former scarcely attain the magnitude of the smallest individuals of the latter.

The usual phase of *C. Atropæ* is black, with four rufo-testaceous spots, two on each elytron, one near the base, the other near the apex. These spots vary considerably in size, occasionally invading nearly the whole elytron, as in the individual represented by figure 5 of our plate; in some specimens the basal spot is entirely obliterated, but no example has yet come under my notice in which the apical spot is not present.

The normal phase of *C. pubescens* is uniform black: a party-coloured variety, however, sometimes occurs, of which I have two indigenous examples before me, but in these the head, thorax and elytra are of a deep red brown, the suture and external margins of the latter alone black.

In *C. Atropæ* the thorax is relatively narrower, its sides more parallel, the callus at the anterior angles is shorter and more prominent, the spaces between the punctures are smooth and glossy (in *C. pubescens* they are covered with a fine reticulation which renders them dull), and the basal transverse impression is shallower, narrower, and ill defined; the elytra are more ovate, the shoulders being less prominent, and, finally, the punctuation throughout is conspicuously finer.

The present species was first identified by Mr. Wollaston on two specimens taken near Arundel, Sussex, on *Atropa belladonna*, by Mr. John Gray. It was shortly afterwards captured in the same locality by the gentleman first-named and the Rev. Hamlet Clark, and subsequently by Mr. S. Stevens, and to these gentlemen I am indebted for the series of examples, a careful examination of which has afforded

me the apparently constant specific differences above pointed out. Mr. Brewer also has more recently taken the insect, but very sparingly, near Reigate, Surrey, and to his consideration I owe the interesting variety figured on our plate.

2, ALMA ROAD, HIGHGATE HILL,

November 10th, 1860.

LEPIDOPTERA.



NEW BRITISH SPECIES IN 1860.

(BY THE EDITOR.)

THE unusually cold and wet season we have experienced has not been favourable to the development of insects; and, as might naturally have been expected, our list of novelties is very meagre.

Polyommatus Bætica has not succeeded in effecting a settlement on our southern coast, and indeed many of the regular southern species have been scarce.

Colias Edusa and *Hyale* have hardly been seen, and even *Apatura Iris* has not been chronicled amongst the captures of the season.

Attention has been again called to the various forms which *Procris Statices* assumes in different localities, but still we do not feel at liberty to state that any *new species* of that genus have been added to our lists. Further series of specimens from various localities are necessary—it may be that in an insect so local and so gregarious as a *Procris*, each little tribe or colony will be found to differ more or less from other tribes or colonies of the same species.

The following is our meagre list of novelties :—

SPHINGINA.

Trochilium Philanthiforme.

NOCTUINA.

Nonagria Bondii.

Dianthœcia Capsophila.

PYRALIDINA.

Nola Albulalis.

TINEINA.

Gelechia intaminatella.

„ ? osseellâ.

Acrolepia Marcidella.

Coleophora Melilotella.

„ Ardeæpennella.

„ Artemisiella.

„ bicolorella.

Cosmopteryx orichalcea.

Nepticula Sorbi.

TROCHILIUM PHILANTHIFORME, Laspeyres.

At the Meeting of the Entomological Society of London on Monday, August 6th, Mr. George King exhibited a series of specimens of a new *Trochilium* which he had met with near Torquay; with them were also two specimens which he had taken in Cornwall. These specimens have been reputed to belong to *T. Philanthiforme*, but whether this be truly the correct name of the insect has not yet been satisfactorily ascertained.

Dr. Battersby wrote to the *Intelligencer* (vol. viii. p. 139), to say that his “son was with Mr. King when the insect was taken, and that he had repeated opportunities of seeing it, both on the wing and alive, in Mr. King’s net.”

Mr. Reading also met with the insect (see *Int.* vol. viii. p. 192). “I captured a female specimen at the beginning of June this year, and the cause of delay in making my capture known was owing to illness and a wish to identify the species, if European; this last idea has not yet been clearly carried out. I took my specimen on the cliffs at

Whitsands Bay, Cornwall. It will probably occur from Berry Head to the Land's End."

Philanthiforme occurs in Hungary and in the north of Germany; it is a variable insect, and the larva is unknown. Staudinger states that it occurs near Berlin "from the middle of June to the beginning of August, principally amongst heather, but also in localities where that plant does not grow."

NONAGRIA BONDII, Knaggs.

At the October Meeting of the Entomological Society, Dr. Knaggs exhibited a series of a new species of *Nonagria* allied to *Concolor*; for this he proposed the name of *Bondii*: these were taken at Folkestone in July.

The differences between this insect and *N. concolor* were well pointed out in the notes which Dr. Knaggs read before the Entomological Society; from these we extract the following:—

"In addition to the larger size of *N. Bondii*, and the difference in colour, the fore wings being constantly paler, and the hind wings darker in *N. Bondii* than in *N. concolor*, there are other distinguishing characters.

"For instance, the costa of the fore wing in *N. concolor* presents from the base to the middle a convex curve, and for the rest is straight, or, if anything, even slightly concave, while in *N. Bondii* there is a gradual convex curve from the base to the apex; if there is any straightness or approach to concavity, it is on the basal side of the middle of the costa.

"Again, the hind margin of the fore wings is considerably more angulated in *N. concolor* than in *N. Bondii*; in the latter the curve is much less abrupt, gradual, and, in some cases, inappreciable.

“The costa and inner margin are also more parallel in *N. concolor*, and there is consequently less breadth of the fore wings from the costa to the anal angle; and the breadth at the insertion seems also greater in proportion in *N. concolor* than in *N. Bondii*.

“The hind wings are much more oval in *N. Bondii*, and are devoid of a concave notch a little below the costa, which is constant in *N. concolor*. The general appearance of *N. Bondii* is much more slender than that of *N. concolor*, especially as regards the proportionate size of the thorax.

“With respect to markings, there is a constant dotted line more or less distinct at the insertion of the cilia in the fore wings of *N. concolor*, totally wanting in *N. Bondii*. On the other hand, there is a constant shade in the centre of the hind wings in *N. Bondii*, which is absent in *N. concolor*; and while the under surface of the fore wings is dark sooty-grey in *N. Bondii*, it is pale brownish-grey in *N. concolor*.

“The antennæ are much longer, the legs are darker, larger and much less hairy in *N. Bondii* than in *N. concolor*.

“The palpi of *N. concolor* are larger, stouter and much more thickly clothed with scales than in *N. Bondii*, although the latter is the larger insect,” &c., &c.—See Zoologist, p. 7270.

Entomologists generally must feel much indebted to Dr. Knaggs for the pains he has taken to point out the distinctions between these species. It may have been that Dr. Knaggs was incited so to do by a high authority reporting his insect merely *Concolor*, but if so, we have here an instance of what we frequently find, that the want of some expected support induces people to lean on their own resources, and the educational process of *self-help* thus set in action renders them more useful members of society.

DIANTHÆCIA CAPSOPHILA, Boisduval.

Several specimens of this *Noctua* were taken at a lighthouse in Ireland in July.

This species is intermediate between *D. Carpophaga* and *D. Capsincola*. Guenée remarks that it may easily be confounded with dark specimens of *D. Carpophaga*.

It is a scarce continental insect.

NOLA ALBULALIS, Hübner.

(Fig. 3.)

Of this species four specimens were captured in July, 1859, in the neighbourhood of Chatham; Dr. Allchin took three, and Mr. Chaney took one.

Dr. Allchin's captures were recorded in the *Intelligencer*, vol. vi. p. 188, under the name of *Nola Centonalis*.

In July last Dr. Allchin took another specimen at the same locality, after three days' hard work for it.

It is distinguished from most of its congeners by the broad and blunt anterior wings.

Little is known of the habits of this insect; Treitschke says the larva probably feeds on water-mint (*Mentha aquatica*), but what foundation he may have had for such an assertion it is impossible to conjecture.

The perfect insect, Dr. Allchin observes, is very sluggish, and is moved with difficulty.

This species occurs sparingly in Austria, Hungary and Saxony, and a single specimen (which was figured by Duponchel) has occurred in the east of France.

GELECHIA INTAMINATELLA, Stainton.

This insect is thus noticed in the *Intelligencer*, vol. vii. p. 140:—

“*Gelechia intaminatella*, a new species. Mr. Eales, of

Darlington, lately sent me, for examination, a *Gelechia* which he was unable to determine. The insect in question appears to be altogether new; it has relations with *Desertella* and *Senectella*, but is essentially distinguished by the total absence of spot or marking.

“Mr. Eales met with it on the bank of the railway, about two miles from Darlington. I would propose for it the name of *Intaminatella*.”—H. T. STAINTON, *January 25th*, 1860.

There is not much that can be added to the above; the anterior wings are more pointed than in *G. Desertella*, and they have a more irrorated appearance than in any of the allied species, but there is no vestige of a paler hinder fascia, nor of the discoidal spots.

GELECHIA? OSSELLA, n. sp.

Last year Mr. Wilkinson, of Scarborough, sent me some insects for examination; amongst them was one which I could not name, and, as it does not appear to be anywhere described, I have suggested the above designation. But it is not a true *Gelechia*, as the palpi are short and rather drooping, but it has trapezoidal hind wings, and hence it accords with no known genus. It is an inconspicuous insect, and might readily be mistaken, at a casual glance, for *Elachista rufocinerea*.

Mr. Wilkinson found them freely on the wing, in the hot sunshine, the first week in June, in Yedmandale and Forge Valley, near Scarborough.

The anterior wings are bone-coloured, with a faint ochreous tinge, and indistinctly clouded with greyish along the costa and hind margin. The posterior wings are grey.

Exp. al. $5\frac{1}{2}$ lin.

It is possible that bred specimens of this insect may furnish more tangible characters than can be obtained from these caught specimens.

ACROLEPIA MARCIDELLA, Curtis.

Described by Curtis in the Annals of Natural History, 1850, p. 120. Mr. Curtis remarks, "A pair of this moth was given to me by Mr. Robertson, I think; the specimens have a worn or faded appearance." I am sorry to say that this last-named character still prevails in all the specimens which I have seen, but still the insect does not seem to accord with any of the known species of the genus, British or Continental, and probably by calling attention to the existence of the insect it may be more sought for and better specimens may result. Mr. Bond has a specimen, and I understand Mr. Mitford has recently taken the insect.

COLEOPHORA MELILOTELLA, Scott.

This insect has been described by Mr. Scott in an unpublished paper read before the Entomological Society of London. It was noticed also in the *Intelligencer*, vol. viii. p. 108.

This is the solution of Enigma No. 74.

The perfect insect closely resembles *Frischella*, and is intermediate between that species and *Deauratella*. The case of the larva is very different from that of the larva of *Frischella*; the case of this last-named species is long and curved, and black, being formed of silk; it resembles most the case of the larva of *Conspicuellla*.

The case of the larva of *Melilotella*, as observed last year, *Entomologist's Annual*, 1860, p. 150, "is made of the seed husk of the *Melilotus officinalis*; at first only a single seed is used, then two are clumsily attached together, ultimately they are so blended as to form a symmetrical cylindrical case." Only very few specimens of *C. Melilotella* were bred, most of the larvæ remaining unchanged, no doubt in hopes of better weather another year.

Mr. Allis visited the locality when the perfect insects were bred, and succeeded in taking a nice series.

COLEOPHORA ARDEÆPENNELLA, Scott.

This insect has also been described by Mr. Scott in an unpublished paper read before the Entomological Society of London. It is also noticed in the *Intelligencer*, vol. viii. p. 133.

The perfect insect very closely resembles *C. Ibipennella*; and the case resembles in form the case of that species, but its position is different, the case being erect and not prostrate; it is not uncommon on oak at Darenth and Dulwich Woods.

COLEOPHORA ARTEMISIELLA, Scott.

This insect has likewise been described by Mr. Scott in an unpublished paper read before the Entomological Society of London. It is also noticed in the *Intelligencer*, vol. viii. p. 133.

It is the solution of Enigma No. 75; the larvæ feeding on *Artemisia maritima* in August, in an elongate, soft, ochreous-grey-green case.

The perfect insect belongs to the most difficult section of the genus; Mr. Allis, who visited the locality and met with the perfect insect, remarks, that it has a *mealy* look like the food-plant.

COLEOPHORA BICOLORELLA, Stainton.

The insect for which I have proposed this name is allied to *Fuscedinella*. It is an *alder* feeder; the statement at p. 149 of the *Intelligencer*, vol. viii., that it fed on elm, being erroneous. It is very difficult to indicate any good, decided character by which the perfect insect may be recognised, but the case is very peculiar; "it is something in the style of the

case of *Viminetella*, and distinctly of two colours, but it is much stumpier and stouter than any *Viminetella* case I ever met with." Mr. Sayer met with the larvæ in some plenty near Hackney, and liberally supplied me with the insect.

I have also found the case on alders at Lewisham when I have been searching for *Stathmopoda Pedella*.

Mr. Scott has proposed the name *Politella* for a nut-feeding *Coleophora* described by him in the unpublished paper (before alluded to), which was read before the Entomological Society of London in August last; further investigations are necessary to establish the identity or the distinctness of *Politella* and *Bicolorella*.

COSMOPTERYX ORICHALCEA, n. sp.

I propose the above name for the new *Cosmopteryx* taken by Mr. Thomas Brown, some years ago, in the open fen near Cambridge (Int. viii. p. 190), and taken also by Mr. Farren in the New Forest last year (Int. viii. p. 195). There are three specimens in the British collection of the British Museum.

In the *Intelligencer*, vol. viii. pp. 197—199, I called attention to the various closely allied species of the genus *Cosmopteryx*, observing that the four known species might be thus tabulated.

Schmidiella. Extreme base of the f. w. black; apical streak uninterrupted.

Eximia. Extreme base of the f. w. black; apical streak interrupted, forming two spots.

Druryella, Z. Entire base brassy, apical streak uninterrupted.

Orichalcea, n. sp. Entire base brassy, apical streak interrupted, forming two spots.

The insect bred by Herr Hofmann from the *Hierochloe Australis* has the apical streak uninterrupted; it is therefore the *Druryella* of Zeller, and not identical with Mr. Brown's *Orichalcea*.

Neither *Schmidiella* nor *Druryella* have yet been found in this country, though it is very possible they may occur here.

NEPTICULA SORBI, n. sp.

I propose this name for the blotch-making *Nepticula* of the mountain ash (*Sorbus aucuparia*), which has been bred rather freely by Mr. Wilkinson of Scarborough. The larva cannot be at all confounded with the larva of *Nep. Aucupariæ*, since that makes a distinct regular gallery, whilst the mine of *N. Sorbi* forms a very decided blotch of irregular form. The perfect insects differ vastly, *Aucupariæ* being a unicolorous, and *Sorbi* a fasciated species. *Sorbi* has most resemblance to *N. Floslactella*, and to *N. Salicis*, but the fascia is broader, perfectly straight and not so yellowish; the anterior wings are also rather more elongate, and the basal portion is of a uniform dull grey.

In the 1st volume of the Natural History of the Tineina, in the description of *Nepticula Floslactella*, p. 108, the present species is thus alluded to: "a probable third species in this section differs by the anterior wings being longer, and the pale fascia more nearly perpendicular." It is satisfactory to find that a species thus dimly indicated by the imago obtains such decided corroboration by the discovery of the larva.

I was about to announce the occurrence of—

NEPTICULA TORMENTILLELLA, Herrich-Schäffer; and
NEPTICULA ULMIVORA, Mühlig.

I bred one specimen of a *Nepticula* from larvæ found in

the leaves of *Potentilla Tormentilla* amongst the heather on Birnam Hill, Dunkeld, in September, 1859, and I had assumed, without hesitation, this would have been the *Tormentillella* of Herrich-Schäffer, but it is totally different. Herrich-Schäffer's insect has the anterior wings metallic-greenish at the base, the fascia silvery, slender and slightly curved; my specimen has the base of the anterior wings brownish, the fascia is pale golden, rather broad, and nearly straight. It would be unsafe to found a species on this single specimen, but it is not improbable that more than one species may feed upon the *Potentilla Tormentilla*.

Of *Nepticula Ulmivora* no specimens have been yet bred in this country, and therefore it would be hazardous to assume with *certainty* that the larvæ which we take for those of that species are really referable to it. These larvæ have been collected by Mr. M'Lachlan and myself, between Norwood and Addington.

LEPIDOPTERA.

RARE BRITISH SPECIES CAPTURED IN 1860.



GONEPTERYX RHAMNI; the occurrence of a specimen of one of the *Cleopatra* variety of this insect was announced in the *Intelligencer*, vol. viii. p. 171. "It was captured by John Fullerton, Esq., in his grounds at Thrybergh Park, near Rotherham, June 27th, 1860. The forewings are much more suffused with orange than those of the specimen which Mr. Curtis figured could have been, and the specimen resembles exactly the Italian specimen of *Cleopatra* in Mr. Hope's collection."

COLIAS HYALE; few indeed have been the specimens of either of the Clouded Yellows, which have been seen at large this year. Mr. Hind has however (*Int.* ix. p. 26), recorded the occurrence of two specimens of *C. Hyale* on the 21st August at Worthing.

POLYOMMATUS ACIS; a specimen of this insect occurred at Epworth, near Bawtry, in the same field where one was taken last season (*Int.* viii. p. 139).

SPHINX CONVULVULI; the captures of five specimens of this insect have been recorded: viz., one on the 24th August at Brantingham, near Brough, taken at rest on a door; one on the 31st August, flying over petunias at Sutton-on-Derwent, York; one on the 13th September at Brantingham, near Brough, in a conservatory, whither it had been attracted by the petunias; one on the 15th September at Fording-

bridge, Hants, and one at Yarm, Yorkshire, taken at rest in an old summer-house (Int. viii. pp. 178, 195 and 202).

This last specimen laid a few eggs.

At the October Meeting of the Entomological Society of London, "Mr. Syme exhibited a female specimen of *Sphinx Convolvuli*, which had emerged from the pupa on the 15th September. It had been produced from a larva found in a potato field at Deal in the autumn of last year, and had remained nearly a year in the pupa state" (Zoologist, 7269). Mr. Syme had dissected the specimen and exhibited the eggs, which were in a very undeveloped state, evidently implying, that had that specimen been at large, the process of oviposition would not have taken place till after hybernation.

Some surprise has often been expressed that the larva of *Sphinx Convolvuli* is so seldom observed; of *Sphinx Ligustri*, we see the larva far more frequently than the perfect insect, but the converse is the case with *S. Convolvuli*. Mr. D'Orville has observed in the Zoologist, p. 6818, "that on the 14th of October, 1859, he obtained a nearly full-grown larva of *S. Convolvuli*; it was dug up in a potatoe field, and *was so covered with wet dirt*, that he infers it conceals itself under ground by day and feeds by night."

SPHINX PINASTRI; at the February Meeting of the Entomological Society of London, Mr. Sealy exhibited a specimen of *Sphinx Pinastri*, which he had been assured was captured by a young Entomologist the previous summer at Romsey, Hants; the specimen was taken whilst flying round a fir tree. Mr. Sealy was asked whether there was any likelihood of the specimen exhibited being a foreign example, which had been inadvertently placed amongst insects from the locality mentioned; to this Mr. Sealy replied, that the brother of the reputed captor had some time previously visited Switzerland and there taken a few insects, but he was assured that the *S. Pinastri* was not one of the Swiss captures.

At the ensuing Meeting of the Entomological Society of London, Mr. Dunning read a letter from C. Maurice, Esq., in which the writer asserted positively that the *S. Pinastris* in question was caught by him at Romsey. A letter was also read from S. H. Maurice, Esq., the brother who had visited Switzerland; in this letter the writer stated, that he felt certain the *Sphinx* in question was not one of his Swiss captures, but was caught by his brother at Romsey after his return from Switzerland.

No specimens of the insect have occurred this year in the same locality—but what could we expect considering the season!

DEILEPHILA LIVORNICA; about twenty specimens of this insect have been recorded as occurring in the month of May last: viz., one specimen taken at Brighton, May 12th (Zoologist, 7059 and 7107); one specimen caught near Exeter, May 13th, set out by the Rev. J. Hellins, and belonging to Mr. Potter (Int. viii. pp. 51 and 123); three specimens taken on the 13th May by Mr. Stewart at Torquay, hovering over the flowers of the white narcissus (Int. viii. p. 51); on the evening of May 14th a specimen was taken at Torquay by the son of Mr. George King (Int. viii. p. 58); the following morning, the 15th, Mr. Swaysland took one in his garden, just outside the town of Brighton (Zoologist, 7059 and 7107), and the same evening Mr. George King took another specimen at Torquay (Int. viii. p. 58); on the 17th another specimen occurred at Brighton (Zoologist, 7107); on the 19th a specimen was captured at St. Leonard's-on-Sea (Int. viii. p. 67); on the 20th a worn specimen was found asleep in a garden at Lewisham (Int. viii. p. 58), and one very much worn was taken hovering over flowers on the downs, Freshwater, Isle of Wight (Zoologist, 7107); the following day, the 21st, a specimen was beaten out of an "Arbor-vitæ" at

Bembridge, Isle of Wight (Zoologist, 7107), and another specimen was caught at St. Leonard's-on-Sea (Int. viii. p. 67); two others were seen hovering over flowers near Brighton, and one other was taken, but pulled to pieces by a child, between the 17th and 26th May (Zoologist, 7107); lastly, five other specimens were captured at Exeter, in the nursery of Messrs. Veitch and Son (Int. viii. p. 123).

The simultaneous appearance at such distant localities, and the occurrence of all the specimens (except that taken at Lewisham) on the coast, are suggestive facts!

CHÆROCAMPA NERII; the following notice by Mr. W. Costick of the larva of this species occurring near Eastbourne appeared in the *Intelligencer*, vii. p. 140: "I had two caterpillars of the Oleander Hawk-moth (*C. Nerii*) in my larva box last year, which I found in the suburbs. They fed very well until the very sudden change of weather in the early part of November, at which time they became sluggish and ultimately died, owing, I think, to the want of a proper place to keep them in. One was brought to me on the 12th and the other on the 18th October. At first I was inclined to think they were *Acherontia Atropos*, the larva of which you say is sometimes, though rarely, found of a brownish olive; but on closer inspection I found the difference, by the anal horn and by the larva being of a lighter green, with two large ocellated spots. They were found in a field of potatoes in which periwinkle grows, upon which they fed very eagerly just before they died, and also upon the oleander at times, but when found they were feeding on potato."

CHÆROCAMPA CELERIO; the capture of five specimens this autumn has been recorded, one at Matlock, on the 20th September, "fluttering in the long grass and herbage beneath a clump of fir-trees, about 6, p.m., having evidently just emerged from the pupa state" (Int. ix. p. 10); one at

Nottingham, on the 22nd September, which was found in a factory in the town (Int. ix. p. 3): one at Wakefield, on the 27th September, which was exhibited alive at a meeting of the Wakefield Naturalists' Society (Int. ix. p. 3); one at Darlington, on the 30th September, found on a window ledge (Int. ix. p. 10), and one at Beccles, which flew into a chemist's shop, attracted by the light (Int. ix. p. 26).

The contrast of the local distribution of these insects with the specimens of *Deilephila Livornica* in May is very singular.

CERURA BICUSPIS; the occurrence of five specimens of this insect has been recorded in the columns of the *Intelligencer*. On Thursday, May 10th, Mr. Allis bred a fine male from a pupa found near York the previous summer (Int. viii. p. 51); early in June a fine female was taken on an alder near Preston by Mr. Pugh (Int. viii. p. 82); shortly afterwards Mr. Hodgkinson found two specimens on alder trees near Preston; "I took them when just emerged from pupæ, in fact sitting just over the pupa cases, on alders" (Int. viii. p. 91); on the 20th of June, Mr. Meldrum, of Ripon, taking shelter from a torrent of rain amongst some alders, found "a beautiful specimen of a male *Bicuspis* sitting on the trunk of one of the alders immediately above the pupa case" (Int. ix. p. 107).

GASTROPACHA ILICIFOLIA; another locality has been found for the insect, Mr. Lickley having found a pupa on the moors near Ripon (Int. viii. p. 51).

ACRONYCTA ALNI; several specimens of this insect have occurred, the perfect insects in June and the larvæ in August and September. One at York, June 6th (Int. viii. p. 83); two at the Holme Bush, Sussex, on the 6th and 12th of June (*Zoologist*, 7108); one at Wakefield (Int. viii. p. 107), and one at Brantingham, near Brough (Int. viii. p. 195).

LEUCANIA PUTRESCENS; of this insect, which was added to our lists last year, Mr. Stewart has recorded the capture of three specimens near Torquay at the end of August (Int. viii. p. 178); other specimens have occurred in the neighbourhood of Teignmouth.

LEUCANIA VITELLINA; a specimen taken in the Isle of Wight was exhibited by Mr. Bond at the October Meeting of the Entomological Society of London (Zoologist, p. 7269).

XYLOPHASIA SCOLOPACINA; we had formerly expressed surprise at the occurrence of this insect in North Devon; one has now been captured at Lewisham by Messrs. C. and J. Fenn (Int. ix. p. 60).

ACOSMETRA CALIGINOSA; at the March Meeting of the Entomological Society of London, "Dr. Wallace exhibited two specimens of *A. caliginosa* taken by Mr. Grimstead in a wood near Ryde, Isle of Wight; he observed that the species had hitherto only been captured in this country in the New Forest" (Zoologist, 6940).

CIRRÆDIA XERAMPHELINA; several specimens of this insect have been taken at light near York (Int. ix. p. 20), and Mr. Jeffrey has bred the insect from a larva he found on the 3rd of June concealed in the crevices on the trunk of an ash tree (Int. viii. p. 187).

HELIOTHIS ARMIGERA; the capture of two specimens at Herne Bay is recorded in the Intelligencer (vol. viii. p. 172).

AGROPHILA SULPHURALIS; this insect has again turned up in Norfolk, where ten specimens were captured "in the last week of July and the first week of August, in very good condition, flying over a hedge of Scotch fir" (Int. ix. p. 35).

ERASTRIA VENUSTULA; the following notices of the capture of this insect have appeared. "Though professedly a Micro-Lepidopterist, I do not hesitate to take any rarity that falls in my way; therefore, being at Loughton on the 16th

June, and falling in with a few specimens of *Erastria Venustula*, I thought it no sin to box them. One of them, a male specimen, is a perfect gem, being clouded about the base of the wing with the most delicate pink imaginable. Like other *Noctuidæ*, it flies for a short time before dark, and has a habit of dropping when alarmed. One of my specimens served me thus, and, getting amongst the short herbage, defied all my attempts to discover it. However, I carefully noted the spot where it disappeared, and, lighting my pipe, 'blew a cloud' into the grass, &c., and in a minute had the satisfaction of observing it issue from its retreat in the very place where I had been searching." C. MILLER (Int. viii. p. 99). "Having visited Loughton in search of this insect I was so fortunate as to capture a few." THOMAS EEDLE (Int. viii. p. 99). "On the 14th June I had the pleasure of capturing a female of this species; it has fortunately laid me some eggs, which have since hatched. Since then I have taken several more." J. BRYANT (Int. viii. p. 107). "Then, at half-past eight, *Venustula* made its appearance, flying in pairs, one *after* the other" (Int. viii. p. 143). "This beautiful little *Tortrix*-like *Noctua* has again appeared in Epping Forest. At first, either damaged or retarded by excessive wet, it occurred only sparingly, but the numbers gradually increased until the 24th of June, when they appear to have reached their zenith, one collector alone having taken about a hundred."—EDWARD NEWMAN (Zoologist, 7108).

OPHIODES LUNARIS; a fine specimen of this insect was taken at sugar at West Wickham Wood, May 27th, by Mr. Smith of Walworth (Int. viii. p. 91; Zoologist, 7108). This is only the second specimen that has occurred in Britain; the insect is not rare in oak woods in Belgium, and will probably soon be turned up in greater numbers in some parts of

the South of England; a figure of the insect will be seen on our frontispiece (fig. 4).

BOLETOBIA FULIGINARIA; the occurrence of a specimen of this insect in Worcestershire has been recorded (Int. viii. p. 3); it was taken some years ago at Croome, near the seat of the Earl of Coventry.

EPHYRA ORBICULARIA; a singular hybrid, between this species and *E. trilinearia*, was exhibited by Mr. Henry Cooke, of Brighton, at the Meeting of the Entomological Society of London in May last. It had been obtained in the following manner—"He had bred a considerable number of *Ephyra trilinearia* and *E. orbicularia*, and had repeatedly endeavoured to pair the opposite sexes of these species, but only succeeded in one instance in doing so, the insects being a male *E. orbicularia* and female *E. trilinearia*. The female deposited eight eggs, all of which hatched, and the larvæ in due course were full grown, at which time they presented great dissimilarity in appearance, two or three exactly resembling the larvæ of *E. trilinearia*, while others were precisely like those of *E. orbicularia*, the remainder differing much from those of either parent. Although all of them seemed to enter the pupa state in the most satisfactory manner, yet only the one moth exhibited, and that somewhat crippled in the posterior wings, was produced." "This insect bore no resemblance whatever to *Tritinearia*; indeed it seemed far more like *Porata* and *Punctaria* than either of its parents:" "the colour and markings approaching nearer to *Porata*, the central fascia common to all, the wings being broad and well defined." "Had it been taken at large it would have caused considerable discussion, amongst our greatest savans." (Zoologist, 7070; Intelligencer, viii. p. 47).

ACIDALIA RUBRICATA; two specimens of the insect taken

this season, near Brandon, in Suffolk, were exhibited by Mr. Waring at the August Meeting of the Entomological Society of London (Zoologist, 7161).

ACIDALIA CONTIGUARIA; of this insect (figured in the Entomologist's Annual for 1856 under the name of *Dosithea Eburnata*) a specimen was taken on the 8th of August last by Mr. Thomas Hague. It was sitting on the wall on Bangor New Road, about half way between Conway and the large rock that projects out into the Irish Sea, opposite Puffin Island (Intelligencer, ix. p. 3).

LITHOSTEGE NIVEARIA; a beautiful female of this species taken at Brandon, in Suffolk, this season, was exhibited by Mr. Waring at the August Meeting of the Entomological Society of London (Zoologist, 7161).

HERMINIA DERIVALIS; Mr. Healy has recorded the capture, June 12th, 1859, of a specimen of this insect; it was beat out of a beech tree in Epping Forest, near the King's Oak (Intelligencer, vii. p. 188).

SOPHRONIA EMORTUALIS; on the 12th of July last the Rev. Mr. Birks took a fine female of this species (Int. ix. p. 28).

AGROTERA NEMORALIS; Mr. Porter took a specimen of this insect in May last at Woodsdale, near Battle (Int. viii. p. 91).

DIASEMIA LITERALIS; Mr. Reading has met with this insect near Plymouth. Mr. Reading writes in the Intelligencer (vol. ix. p. 18): "This species has occurred near Plymouth this year at two very distinct periods, viz. in June and September, which makes it appear as though the species were double-brooded, but not having visited the place where it appeared in the intermediate months, I have no further proof of its double-broodedness than the seeing and capturing it at the times mentioned. I took about two dozen

specimens." "The idea of its being attached to ponds is certainly wrong, at least in the imago state, and I think it can hardly be so in any state, seeing there is no water in the neighbourhood of its habitat. The habit of this insect is rather that of the *Pyraustæ*, flitting about in short flights in sunshine and not easily approached in shade. The locality for it is a high sloping down, where the furze and fern are the principal occupants of vegetable growth, but there are also the usual plants that cover a Devonshire down, heath or moor—there are clumps of heath and thyme. I can safely advise those who may wish to take the species to look for it in a *dry place*" (Int. ix. p. 18).

SPILODES PALEALIS; has occurred at Brighton (Int. viii. p. 171); "at Herne Bay it is very common on the East Cliff, where there is a profusion of *Peucedanum* and *Daucus Carota*" (Int. viii. p. 172).

EUDOREA PHÆOLEUCA; three specimens of this insect were captured at Ranworth by Mr. Winter (Int. ix. p. 3).

EPHESTIA SEMIRUFA; Mr. Scott has announced the capture of this insect (Int. viii. p. 147), and exhibited specimens at the August Meeting of the Entomological Society of London (Zoologist, p. 162).

CHILO PALUPELLUS; specimens of this insect were taken at Ranworth by Mr. Winter (Int. ix. p. 3).

CHRODIS AUDOUINANA; this has been taken at Loughton by Mr. Biggs (Int. viii. p. 83), and at Darenth Wood by Mr. McLachlan (Zoologist, 7152).

OBSERVATIONS ON BRITISH TINEINA.

(SUPPLEMENTARY to the INSECTA BRITANNICA—LEPIDOPTERA, TINEINA; and to the ENTOMOLOGIST'S COMPANION, 2nd Edition.*)



Talceporia pseudobombycella (I. B., p. 18). The carnivorous propensities of the larva of this species have been observed by Mr. Healy; one larva devoured four females of *Diplodoma marginepunctella* and a dead *Micropteryx purplella*; another ate two house-flies and a perfect insect of its own species (Int. viii. pp. 44 and 156).

Diplodoma marginepunctella (I. B., p. 20). Of a larva of this species, Mr. Healy observes in August, "I have in my possession a larva of the above species, which I found at West Wickham last May, and, since I had it, it has eaten one *Tortrix*, several common house-flies, and some few *Micros*. I have never given it any green food, but kept it solely on insects, which it has greedily devoured" (Int. viii. p. 156). Mr. Edleston has also continued his observations on the habits of this insect—"keeping the larvæ in a glass jar, giving them bruised beetles, earwigs, &c., for their carnivorous propensities, and a sprig of hawthorn for their

* We are sorry to say, that this Edition is now quite exhausted, and that we shall therefore soon be under the necessity of preparing a revised Edition; this, however, will be a work of time, which we cannot undertake just at present.

vegetable diet; they continued to feed till November, when, taking up their positions, they remained as fixtures. When spring returned, I expected to see them on the move, but, observing no signs, concluded they were in the pupa state. At the end of June two males and two females appeared; in getting them out of the jar I was astonished to see one of the largest cases moving about—a fellow I had noticed for months attached to the glass, with his head downwards. Placing some hawthorn in the jar had the effect of soon starting several cases on the move; the larvæ eating hawthorn voraciously, it is quite evident a number of them intend living another year. Lately I observed one of the larvæ feeding on the abdomen of an old dried *Noctua*, and another busy at work on the thorax of *Arctia Villica*," &c., &c. (Int. viii. p. 149).

Tinea Caprimulgella (I. B., p. 32). Mr. Scott took a specimen of this insect, at the end of July, on the trunk of a tree in Blackheath Park (Int. viii. p. 147).

Adela viridella (I. B., p. 50). In the recent *Semestre* of the "Annales de la Société Entomologique Belge," is a notice by Monsieur Léon Becker of the transformations of this insect, under the name of *Adela Reaumurella*. From this I make the following extracts:—

"On the 9th April, 1860, M. Ode and I went for an excursion to the wood of 'la Cambre,' in order to investigate the accumulated dried leaves in the copses there. At the foot of the beeches and hazels which grow there we soon discovered a great number of flat, oval cases. Some years previously we had observed, in this spot, swarms of the beautiful and elegant *Adela Reaumurella*, and, thinking that these curious cases might belong to the larva of that species, we collected them in great numbers. Our expectations were realized, and on the 16th April a male specimen was bred.

The transformations of the species of this group being still much enveloped in doubt and obscurity, I have carefully studied and delineated all that seemed likely to be serviceable in enabling one to recognize with facility the different stages of this *Adela*.

“The case appears to be cut out of the dead and dried leaves of the beech; it is open at both ends and slightly fastened at the sides; it is composed of pieces of leaves placed one upon the other, and half-opens like the shells of some bivalves. It is very large in proportion to the size of the larva. As I have only hitherto observed these cases in spring, after hybernation, it would be very interesting to learn the habits of the young larvæ. These larvæ hibernate when full grown, but they eat a little for a few days, and easily climb up the stout branches to reach the buds; they prefer those of the beech and hazel.

“Preparatory to assuming the pupa state, the larva spins a solid cocoon in the interior of its case; the case then becomes rounder, and by this difference of form one can easily distinguish whether the case contains a larva or a chrysalis.”

The whole of the details are too long for extraction here (see *Ann. Ent. Soc. Belge*, iv. pp. 95—99, *Planche II.*).

At the time the above paper was read, Dr. Breyer, who has also devoted his attention to this group, observed,—

“I can fully confirm, with my own experience, the observations of M. Becker. I know these bivalve-cases, and have collected a considerable number of different forms since the beginning of the year. The simple bivalves, that is, those in which each valve is cut directly out of a dead leaf, belong to the genus *Incurvaria*. The compound bivalves, that is, those in which each valve is formed of a series of pieces added one after the other, indicate the genera *Nemophora* and *Adela*. But these statements yet require to be carefully

verified throughout the respective genera, as I have only bred *Muscaella*, *Swammerdamella*, *Reaumurella* and *Degeerella*; this last-named species has nothing to do with Anemones, as had been reported by various authors; it may be found near that plant, as well as near any other," &c., &c.

As the case of *Adela viridella* has already been found here (Int. viii. p. 101), the above remarks may lead to its detection in greater plenty.

Adela Cuprella (I. B., p. 51). Where this insect occurs, I would suggest that the seeds of the willows should be collected in some quantity, and then allowed to develop their insect contents; we might thus obtain the larva of *Adela Cuprella*.

Nemotois Scabiosellus (I. B., p. 52). The discovery of the larva of this species has been already fully recorded in the *Intelligencer* (vol. viii. p. 182); the following epitome must suffice here, "The food plant is *Scabiosa arvensis*; the flowers and seeds are the first abodes of the larvæ; the eggs are laid in the fructification of the *Scabiosa* flowers, each inclosed in a seed capsule. When the interior of the seed has been eaten out by the larva, it immediately uses the husk as a case, having gnawed a hole at the lower truncate end of the husk: at this age the larva attacks other seeds, boring into them and eating out the cases. The larger larvæ construct their cases of pieces of dried leaves."

It is very difficult to *find* these seed-feeding larvæ, they are to all intents and purposes invisible; an inhabited seed cannot at first be distinguished from one purely vegetable.

In the *Intelligencer* I observed, that "to obtain these seed-feeding larvæ it would be desirable to place on a sheet of white paper some scores of seeds, and then to watch them attentively for five or ten minutes, as probably in that interval the larvæ would cautiously protrude their heads from

the inhabited seeds; but in order that they may do this, the observer must be very quiet, as these larvæ are so excessively timorous that the least noise or movement is sufficient to alarm them, and would prevent them venturing out.

Nemotois cupriacellus (I. B., p. 52). At the August Meeting of the Entomological Society of London, Mr. Mitford exhibited some *males* of this species; they were taken along with, and some of them *in copulâ* with, the veritable female *Cupriacellus*. They appear extremely similar to *N. Minimellus*. Mr. Mitford observed the females depositing their eggs in the flowers of the scabions at Hampstead (Int. viii. p. 157, and Zoologist, 7162).

In September last, incited by Dr. Hofmann's discovery of the larvæ of *N. Scabiosellus*, Mr. Healy went to Epping Forest in search of the larvæ of *N. cupriacellus*, visiting a spot where the imago had been plentiful the preceding year. He collected a number of flower-heads of *Scabiosa succisa*, which grew in plenty there. These heads were placed on white paper and watched, but no movement was perceived. They were then put into jam pots with glass covers, in the expectation that if any of the seeds were tenanted the larvæ would crawl up towards the glass cover for fresh air. The contents of the jam pots were then watched incessantly, but no larvæ were seen and no movement was perceived. When Mr. Healy had despaired of obtaining any larvæ in this way, and the seed-heads having become decayed he was about to throw them away and clean out the pots, he perceived four cases sticking to the inside of one of the pots, about a quarter of an inch above the decayed seed-heads, and then observed a case move. His eyes being educated by the sight of these, he commenced a careful search amongst the heads, and in less than ten minutes had collected thirty tenanted cases (Int. ix. p. 12). Whether

these larvæ will prove to be *N. cupriacellus* or *N. Minimellus* remains to be seen.

Hyponomeuta vigintipunctatus (I. B., p. 59). This insect has occurred at Witham in Essex (Int. viii. p. 115), and in Sussex (Int. viii. p. 179).

Exæretia Allisella (I. B., p. 82). In May last I received some larvæ from Mr. Gregson which were reputed to be this species, and subsequently I bred a specimen from them, which proved the correctness of the conjecture. The larva bores in the stem of the Mugwort (*Artemisia vulgaris*). Mr. Cooper found it on the 2nd of May: observing one of the young shoots of the *Artemisia* in quite a drooping state, he suspected the cause, took out his knife, cut the stem and the small bore off, and soon discovered the larvæ. A week later the damaged shoots were completely hid by their more vigorous fellows, and no one could have found them from any visible evidence of the plant without being told (Int. viii. p. 118, and Zoologist, 7154).

Depressaria Bipunctosa (Ent. Ann. 1858, p. 89). Mr. M'Lachlan visited the Isle of Wight in the month of August, and obtained several specimens of this insect, which he exhibited at the September Meeting of the Entomological Society of London (Zoologist, 7222). Herr Lederer, of Vienna, is reported to have bred this insect (Int. viii. p. 156).

Depressaria Granulosella (I. B., p. 94). In some very interesting remarks "On the *Micro-Lepidoptera* of which the Transformations are unknown," by Mr. C. Miller (Zoologist, pp. 7005—7012), we read respecting *D. Granulosella*, "I once bred a specimen of this from larvæ collected in July, at Deal, from a dwarf umbelliferous flower."

Depressaria Ultimella (I. B., p. 98). Of this insect, Mr. Gorham has remarked, in the Zoologist (p. 6905), "I bred a specimen early in June from a larva found feeding

on the flowers of *Conium maculatum*, near Freshwater, Isle of Wight, last May; the larvæ were gaily coloured, and, judging from descriptions, must resemble those of *Depressaria nervosa*.

Gelechia fumatella (I. B., p. 108). On the 1st of June Mr. Gregson took six specimens of this insect whilst searching on the sand-hills for the larvæ of *Lasiocampa Trifolii*.

Mr. Gregson asks, "is it double-brooded, as these were worn, and it is a July insect with us?" (Int. viii. p. 75).

Gelechia instabilella (I. B., p. 126). At the September Meeting of the Entomological Society of London, Mr. M'Lachlan exhibited "a long series of a *Gelechia* allied to *G. instabilella* and *G. ocellatella*, but which he considered distinct from either" (Zoologist, 7222).

These insects seem almost intermediate between *G. instabilella* and *G. obsoletella*, but want the pale blotch at the base of the abdomen in the latter species; unfortunately the limits of variation of *G. instabilella* are not yet well defined.

Gelechia Sircomella (I. B., p. 132). A specimen which appears referable to this species was bred by Mr. C. S. Gregson from the shoots of *Cerastium vulgatum* (Int. viii. p. 166).

Harpella Bracteella (Ent. Ann. 1859, p. 152). Mr. Scott took a specimen of this in Monmouthshire in July. The locality for it is Crumlyn, in the little lane across the bridge, and opposite the station (Int. viii. p. 131).

Ecophora flavifrontella (I. B., p. 161). In the 4th volume of the "Annales de la Société Entomologique Belge," Monsieur Fologne has given a notice of the larva of this species (p. 102), which is still little known, though the perfect insect is pretty generally distributed, and far from uncommon. "The larva of *Flavifrontella* lives in a case formed of an elliptical piece of dead beech leaf, folded lengthways and

closed by a silky suture. I find these cases in May on the trunks of beech trees, which I suppose they ascend in the evening, remaining concealed during the day amongst the withered leaves. I have reared them by feeding them with beech leaves and lichens, but I cannot say with certainty what is their ordinary food."

Ecophora unitella (I. B., p. 161), *arietella*, Z. This is the solution of Enigma No. 73. I have had several specimens of the larvæ this year, some collected by Mr. Scott in this neighbourhood, some by M. Fologne, near Brussels; the perfect insects have always been this species. It is now manifest that the larva which we had previously referred to this insect really belonged elsewhere, and the larva of *Unitella* must have been feeding on the same pea-sticks with it, unknown to Mr. Wing. How easily errors will arise and how difficult to get rid of them when once they obtain currency! Monsieur Léon Becker has given a notice of the larva of this insect in the 4th volume of the "Annales de la Société Entomologique Belge," p. 106.

Butalis Incongruella (I. B., p. 167). Mr. Wilkinson of Scarborough obtained eggs of this species and has thence reared the larvæ. They fed upon heath (*Calluna* and *Erica*). Their motions were very curious and quite different to those of a *Coleophora* larva, more than half the body being exerted from the case, and the case then drawn after them just as we see in the larvæ of the Long Horns. Mr. Scott found some larvæ of this insect at the beginning of September on a fence at Cannoch Chance (Int. viii. p. 193,—under the heading 'Pin-Making').

Gracilaria Imperialella (I. B., p. 201). The capture of a specimen of this insect by the Rev. Mr. Horton has been recorded in the *Intelligencer* (vol. ix. p. 43). It was taken near Worcester, May 30th, by sweeping the grass by the side

of a path in a wood in rather a damp place. A single specimen has also occurred in Belgium; it was taken near Namur, June 1st.

Coleophora badiipennella (I. B., p. 224). In the beginning of June last I received several larvæ of this species from Mr. Sayer; they were found on *elm*; the cases were all similar, very short and with the mouth turned abruptly downwards, so that it would not be easy to confound them either with the cases of *Fuscedinella* or of *Limosipennella* (Int. viii. p. 76).

Coleophora Olivaceella (I. B., p. 223). In February last I received a number of larvæ of this insect from M. Fologne of Brussels, and at once recognised them as a larva I had found plentiful in the autumn of 1857 between Beckenham and West Wickham, and which I had then mistaken for a variety of the case of *Coleophora solitariella*. The distinctions are now so great that one is lost in amazement at one's former blindness and stupidity. The case of *Olivaceella* is cylindrical, ochreous brown, with the mouth turned slightly downwards and with a distinct ventral keel; the larva feeds on *Stellaria Holostea*, and it is consequently often found in company with the whitish keelless case of *C. Solitariella*. Mr. M'Lachlan called my attention to the fact that, owing the curve of the mouth of the case of *Olivaceella*, the feeding larva reposes nearly prostrate on the surface of the leaf, whereas a feeding larva of *Solitariella* is almost erect, making at least an angle of 60° with the leaf (Int. vii. pp. 180 and 198; Int. viii. p. 60). A long and interesting notice of this species will be found in the 4th volume of the "Annales de la Société Entomologique Belge," by MM. Fologne and J. D'Udekem (pp. 76—84).

Coleophora palliatella (I. B., p. 215). Mr. M'Lachlan has recorded a remarkable instance of this insect "assembling." They came in numbers from all quarters and

clustered about a tuft of *Aira Cæspitosa* till every blade of grass was alive with them (Int. viii. p. 188).

Coleophora Conspicuellæ (I. B., p. 213). Many larvæ of this species were found in Headley Lane at the end of May (Int. viii. p. 67), but few of the perfect insects appeared till August was well advanced.

Coleophora binotapennella (I. B., p. 212). Mr. Scott bred specimens of this insect in July from larvæ found *two years ago* at Brighton.

Coleophora Saturatella (I. B., 216). This insect has suddenly become one of the commonest of the genus. In various localities the larvæ have been collected *in great plenty*; they feed on the leaves of broom in the month of May, causing brownish blotches in the leaves. The larvæ appear to attach to their cases the skins of all the broom leaves they have ever eaten (Int. viii. pp. 60 and 68).

Stathmopoda Pedella (I. B., p. 228). At the August Meeting of the Entomological Society of London the President exhibited specimens of this insect, which had hitherto been so rare in this country that only two or three examples were known. He had found it in some plenty in July, on the foliage of alder trees along the banks of the Ravensbourne at Lewisham; other persons had also taken it there, so that upwards of 200 specimens had been captured. The occurrence of this insect in numbers so near London and in our own parish is certainly startling. This insect was named *Pedella* by Linnæus, from its peculiar posture in repose: "Pedes postici horizontaliter extensi, spinosi," and "Pedibus posticis transverse extensis." The hind legs of *Stathmopoda pedella*, instead of being allowed to remain in what we should call their natural position, are doubled under and stuck out sideways, projecting nearly at right angles on each side between the anterior and middle legs. The moth then walks on all fours, with its gaily-coloured hind legs stuck

out sideways, as if for show; if it should want a little extra leg-power to overcome some obstacle, down comes first one leg and then the other, and it walks for a few steps on all six legs, and then the hind legs revert to what is really their natural position (Int. viii. p. 121).

Laverna decorella (I. B., p. 239). Professor Frey has bred this species from *Epilobium hirsutum* (Linnæa Entomologica, xiv. p. 190). Mr. Thomas Brown, of Cambridge, has bred it from *Lythrum salicaria* (Int. viii. p. 156).

Elachista Magnificella (I. B., p. 251). Mr. Scott met with the larva of this insect in South Wales (Int. viii. p. 157).

Elachista Paludum (*Caricis*, Ent. Ann. 1859, p. 155). Mr. Winter met with the larva of this insect near Beccles in July. All the specimens bred preserve their distinctive characters (Int. viii. p. 149 and ix. p. 3).

Cemiosstoma Wailesella (Ent. Ann. 1859, p. 156). This insect has occurred in some plenty in the neighbourhood of Liverpool.

Nepticula Sericopeza (I. B., p. 301). Dr. Wocke has discovered the larva of this little rarity; it mines the leaves of *Populus tremula* in October and November; the mine is very similar to that of *N. argyropeza*.

Nepticula Angulifasciella (I. B., p. 304). M. Fologne found at Brussels last autumn a *Nepticula* larva in bramble leaves which was decidedly not *Aurella*; he sent me some: I was unable to distinguish them from the larvæ of *Angulifasciella*. Dr. Brackenridge Clemens has bred what appears to be that species from larvæ found in bramble leaves in Pennsylvania (Int. viii. p. 132). Neither did I or M. Fologne succeed in rearing the perfect insect; this autumn, however, he has again met with the larva, but Dr. Clemens has not been equally fortunate.

ANSWERS TO ENIGMAS.



37. Ent. Ann. 1858, p. 115. I found two larvæ of this on a small birch tree in May, and bred only obscure *Fuscedinella* or *Bicolorella*-like specimens. Is it a form of *Bicolorella*, feeding on birch?

65. *Nepticula Helianthemella* (see Int. viii. p. 176).

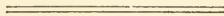
73. *Æcophora Unitella* (see ante, p. 110).

74. *Coleophora Melilotella* (see ante, p. 88).

75. *Coleophora Artemisiella* (see ante, p. 89).

78. Mr. Gregson sent me a specimen of *Coleophora Annulatella* as having been bred from the larvæ referred to last year. But I am strongly disposed to think some error has crept in here.

80. *Cosmopteryx Druryella* of Zeller; the bred specimens having a bronzy base and an *uninterrupted* apical streak.



ENIGMAS STILL UNANSWERED.



11. "An *Elachista* larva, found by Mr. Scott, at the end of April, 1854, mining the leaves of *Scirpus lacustris*."

20. "A *Depressaria* larva, found by Mr. Boyd, May 2nd, 1855 (it was then young), feeding on a leaf of parsnip (*Pastinaca sativa*) under a turned-down corner; this was expected to be *Depressaria Douglasella*."

26. "A *Nepticula* larva, mining the leaves of birch; the mine has some resemblance to that of *N. luteella*, but the central track of excrement is broader, not so mathematically linear."

27. "A *Gelechia*? larva, feeding in the heads of yarrow (*Achillea millefolium*)."

33. "A brown *Gelechia*-like larva, found amongst moss by Mr. Douglas, in March, 1857."

38. "A *Lithocolletis* larva, mining the upper side of beech leaves."

46. "A pretty red-spotted yellow larva, mining a leaf of *Carex riparia*, found at Hackney, March 29th, 1858."

47. "A *Gelechia*? larva, mining down the stems (near the root) of *Carex paludosa*, collected at Wicken Fen, near Cambridge, April 30th, 1858."

48. "A larva mining in the stems of the shoots of *Rhamnus Frangula*, near Guildford, causing the leaves to droop; collected May 21st, 1858."

49. "A grotesquely minute, pistol-form *Coleophora* case, collected by Mr. Gregson, on *Salix fusca*, at the end of May."

50. "A *Tortrix*? larva, mining down the stems of *Centaurea nigra*, and ejecting its 'frass' from a hole in the side of the stem; collected by Mr. Boyd, at Probus in Cornwall, June 19th, 1858." (See Int. iv. p. 151).

57. "A *Gelechia*? larva, feeding inside the flowers of *Campanula persicifolia*, collected at Erlangen, at the end of June."

71. "A brown *Gelechia*? larva found by Mr. Scott at the beginning of August, 1859, feeding in the heads of *Statice armeria*."

72. "A greyish-white *Coleophora*? larva, found by Mr.

Boyd, burrowing in the bark of apple trees, at the beginning of May, 1859; it constructs a gallery of 'frass.'"

76. "A *Coleophora* larva, found by Herr Hofmann, the beginning of October, on oak and hazel near Ratisbon. The case of the larva is most extraordinary; the cases I have seen are all rather small, but they possess large alary appendages, attached to a slender central tube; viewed from above the case is almost broader than long; the wings of this case are black, the body, or rather the tail portion, is brown, the anterior part of the tube being darker."

77. "A *Coleophora* larva, found by Mr. Edleston, early in April, on the seeds of the *Luzula campestris*. Theoretically, this ought to have been *C. murinipennella*, but the case was different, being cylindrical, greyish-ochreous, with the mouth turned round, indeed the case was very similar to that of *C. argentula*."

79. "A mining larva, collected by Herr Schmid, at the end of October, 1859, in the leaves of *Lysimachia vulgaris*; the mine is slightly puckered, but yet reminds one considerably of the mine which *Stephensia Brunnichella* constructs in the leaves of *Clinopodium*."

NEW ENIGMAS FOR SOLUTION.

81. A case of one of the long-horn larvæ was found by Mr. Douglas near Lee; it was "found among grass on a bank," near the end of May. It does not accord precisely with any *Adela*, &c. case I know. It was formed by successive additions round a brown oval nucleus, being however

attenuated in the middle. The perfect insect was not reared.

82. An *Incurvaria* larva, found at Ratisbon by Dr. Hofmann, on hazel, in June. This larva was so like that of *I. Pectinea*, that I could not distinguish it. Dr. Hofmann wrote concerning it as follows:—"Last June we sent you three living *Incurvaria* larvæ from hazel, which unfortunately got lost on the road; from the three cases we retained here, we have bred this May two specimens (♂ and ♀) of an *Incurvaria*, which Dr. Herrich-Schäffer pronounces a new species. It comes nearest to *Oehlmanniella*, but differs in the ♂ by the unannulated dark brown antennæ, and by the black anal tuft. The ♀ is strikingly different, and is almost like a *Zinckenii*" (*Pectinea*).

83. A larva (*Cosmopteryx*?) mining in the leaves of *Orobus niger*, found by Herr Ernst Hofmann, near Ratisbon, at the end of July. The larva loosens the lower epidermis of the entire leaf, and each eats much of the parenchyma; the leaf is slightly curved and quite bladder-like; the loosened lower skin is very white. The larva spins a pale ochreous cocoon *outside* the leaf, but attached to the white loosened skin of the underside, where it is hardly perceptible (Int. viii. p. 150).

84. A *Coleophora* larva, found at Wavendon by the Rev. Henry Burney, at the end of August. It feeds on the seeds of *Stellaria graminea*, the cylindrical whitish case being attached to the capsule and the larva boring into the interior. In captivity they eat readily the *Stellaria media*. When the case is protruding from the calyx of an unripe capsule, it looks excessively like a dried flower of the plant, and would thus readily escape observation (Int. viii. p. 189).

85. A *Coleophora* larva, feeding on the leaves of *Aster Amellus* in September and October, found near Frankfort-

on-the-Main and at Ratisbon. Herr Hofmann has bred specimens of this insect, but I have not been yet able to refer it to any described species.

86. A *Gelechia*? larva, found near Ratisbon by Herr Hofmann, feeding in the heads of *Linosyris vulgaris* (*Chrysocoma*), and devouring the seeds and fructification of that plant, which is nearly allied to *Solidago virgaurea*.

87. A *Gelechia* larva (supposed to be that of *Ericetella*), found by Mr. Wilkinson of Scarborough, at the end of September, feeding in the flowers of the heath.

88. A *Nepticula* larva in birch leaves, found by Mr. Healy, Mr. M'Lachlan and others, in October. The mine is contorted, with a thread of black excrement; a peculiarity of the mine is that when the larva is young, it does *not eat the whole thickness* of the leaf, so that the first portion of the mine remains green.

89. A larva (*Parasia*?), found by Herr Hofmann, near Ratisbon, in October, feeding on the seeds of *Anthemis Tinctoria*, boring through them just as the larva of *Parasia Lappella* does in the seeds of the burdock.

90. A *Nepticula* larva in the leaves of *Agrimonia Eupatoria*, found by Mr. Healy in October, near Croydon. The mine of this eventually forms a complete blotch. This is the third species which feeds in the *Agrimonia*, and possibly there are yet others.

NATURAL HISTORY OF THE TINEINA.

◆

THE weather during the season of 1860 has not been favourable to larva hunting; in Belgium, Germany and Switzerland, as here, wet days have been of too frequent occurrence, and hence there have been fewer opportunities than usual for Micro-hunters to lie prostrate in the herbage.

Yet we have contrived to describe 38 larvæ, and to have 34 figured.

I annex, as in former Annuals, a Table showing the amount of assistance received since the last report.

		Discovered.	Bred.	Sent.	Known before.
Tinea Corticella	Schmid .....	..	..	..	·25
„ Parasitella	Scott .....	..	·25	·25	
Lampronia quadripunctella	Mühlig .....	..	..	..	·25
Incurvaria Körneriella	Hofmann.....	..	..	..	·25
Nemophora Schwarzziella	Mühlig	·50	·25	·25	
Nemotois Scabiosellus.....	Hofmann.....	·50	·25	·25	
„ Cupriacellus?	Healy	·50	..	·25	
„ Dumerilellus?	Hofmann.....	·50	..	·25	
Plutella Annulatella	Wailes.....	..	..	..	·25
Exæretia Allisella	Cooper.....	·50	..	·25	
	C. S. Gregson.	..	·25	..	
Pleurota bicostella	Wilkinson ..	·50	·25	·25	
Cecophora Unitella	Scott .....	..	..	..	·25
	Fologne .....	..	..	..	·25

		Discovered.	Bred.	Sent.	Known before.
Butalis Knochella	Schmid	·50	·25	·25	
„ incongruella	Wilkinson ..	·50	·25	·25	
	Scott .....	..	..	..	·25
Gracilia Hemidactylella	Frey.....	..	..	..	·25
„ limosella	Hofmann....	..	..	..	·25
Coriscium cuculipennellum	Schmid .....	..	..	..	·25
Ornix Guttea	Hofmann....	..	..	..	·25
Coleophora badiipennella	Sayer .....	..	..	..	·25
„ olivaceella.....	Fologne	·50	·25	·25	
„ Melilotella	Scott	·50	·25	·25	
	Mühlig .....	..	..	..	·25
„ saturatella.....	M'Lachlan ..	..	..	..	·25
„ Artemisiella	Scott	·50	·25	·25	
Cosmopteryx Druryella, Z.....	Hofmann....	·50	·25	·25	
Lithocolletis Amyotella	Wilkinson ..	·50	·25	·25	
Nepticula Aucupariæ	Edleston ....	..	..	..	·25
„ Helianthemi	Hofmann....	·50	·25	·25	

Naturally those larvæ which have not been specifically determined (not having yet been bred) are not enumerated in the above Report. They stand over till the appearance of the imago will enable us to pronounce on their identity.

The summary of the above Table yields the following results :—

Hofmann	4·50	Healy	·75
Scott	} 3·	Edleston	} ·25
Wilkinson			
Schmid	} 1·50	Frey	
Mühlig			
Fologne	1·25	Gregson	
Cooper	·75	M'Lachlan	
		Sayer	
		Wailles	

The total awards to this time being—

MÜHLIG 22·50
 HOFMANN 22·25
 FREY 20·75

—
 Schmid 17·75
 Wilkinson 15·50
 Scott 13·75
 Boyd 8·25
 Douglas 4·75
 Gregson 4·50
 Edleston 4·
 Zeller 3·25
 Wailes 3·25
 Bond }
 Parfitt } 2·75
 Grabow }
 Millière } 2·
 Harding, H. J. 1·75
 Brockholes }
 Brown, T. }
 Fologne } 1·25
 Law }
 Logan }
 Vaughan }

Winter, W..... 1·25
 Bruand }
 Hellins }
 v. Heyden } 1·
 Machin }
 Miller }
 Sang }
 Boll }
 Cooper }
 Healey } ·75
 Simmons..... }
 Crump }
 M'Lachlan } ·50
 Staudinger }
 Beaumont }
 Chappell }
 Drane }
 Fletcher }
 Harding, G. .. } ·25
 Lederer }
 Newnham }
 Sayer }
 Shield..... }
 Wildman }

INDEX TO THE NEW LEPIDOPTERA IN FORMER VOLUMES OF THE ANNUAL.

FOR the convenience of reference I had prepared for my own use a tabular view of the new *Lepidoptera* in the six previous volumes of the Annual.

I fancy it may be found generally useful.

As the novelties are not always figured in the volume in which they are first announced, I have also referred to the figures.

Of those species which have undergone a change of name since their first announcement in the Annual, the name used in the Annual is placed underneath in italics. The references of the pages in the Annual of 1855 are to the second edition. Those who have only the first edition of that volume must deduct 22 from the pages cited.

	1855	1856	1857	1858	1859	1860
SPHINGINA.						
<i>Androcera</i> Minos, E. A. 1855, fig. 1	62	..	..	..	..	..
<i>Trochilium chrysidiforme</i> , E. A. 1856, fig. 1	..	28	..	..	..	..
<i>Trochilium Scoliaeforme</i> , E. A. 1857, fig. 4	..	27	..	..	..	..
BOMBYCINA.						
<i>Notodonta bicolora</i> , E. A. 1859, fig. 4	..	..	..	..	146	..
<i>Petasia nubeculosa</i>	63	..	..	..	..	..
<i>Clostera Anachoreta</i> , E. A. 1860, fig. 1	..	..	..	..	..	128
NOCTUINA.						
<i>Bryophila</i> Algæ	..	..	..	..	..	129
<i>Leucania Vitellina</i>	..	..	95	..	..	..
" <i>extranea</i> , E. A. 1860, fig. 2	..	..	..	..	..	129
" <i>putrescens</i>	..	..	..	..	..	130
<i>Miana expolita</i>	63	..	..	..	..	..

	1855	1856	1857	1858	1859	1860
NOCTUINA—continued.						
Agrotis Ashworthii, E. A. 1855, fig. 2 } (<i>Spælotis Vallesiaca</i>) }	63	..	..	..	..	..
Noctua flammatra	150
Phlogophora empyrea, E. A. 1855, fig. 2	30	..	..	..	..
Hadena peregrina	147	..
Acontia Solaris, E. A. 1860, fig. 5	131
Micra parva, E. A. 1859, fig. 1	147	..
Catephia Alchymista, E. A. 1860, fig. 3	145	..
GEOMETRINA.						
Acidalia contiguaria, E. A. 1855, fig. 4 } (<i>Dosithea eburnata</i>) }	..	31	..	..	..	..
„ Herbariata	31	..	..	..	..
(<i>Dosithea circuitaria</i>) }	..	31	..	..	..	..
Aspilates Saccharia	87	..	..
Eupithecia Helveticaria	87	..	..
Eubolia mæniata, E. A. 1855, fig. 3 ..	64	..	..	..	..	..
PYRALIDINA.						
Sophonria emortualis	132
Diasemia Ramburialis, E. A. 1859, fig. 3	149	..
Margarodes Unionalis, E. A. 1860, fig. 4	133
Scopula decrepitalis	32	..	..	..	..
(<i>Botys decrepitalis</i>) }	..	32	..	..	..	..
Nola Centonalis	149	..
Eudorea atomalis	64	..	..	..	..	..
„ gracilalis	65	..	..	..	..	..
Acrobasis rubrotibiella	149	..
Nyclegretes achatinella	99	..	..	..
Crambus Cassentiniellus	65	..	..	..	..	..
Chilo Paludellus, E. A. 1856, fig. 5 } (<i>C. obtusellus</i>) }	..	33	..	..	..	..
TORTRICINA.						
Lozotænia latiorana	100	..	..	..
(<i>Tortrix latiorana</i>) }	100	..	..	..
Catoptria parvulana	150	..
Dicrorampha Tanacetii	101	..	..	..
Pœcilochroma Hawkerana, E. A. } 1857, fig. 5	33	..	..	..	..
(<i>Mixrodia Hawkerana</i>) }	..	33	..	..	..	..
Retinia Resinella	65	..	..	..	..	..
„ Duplana	34	..	..	..	..
Cnephasia cinctana, E. A. 1858, fig. 4 } (<i>Sciaphila cinctana</i>) }	88	..	..
Argyrolepia maritimana	34	..	..	..	..

	1855	1856	1857	1858	1859	1860
TINEINA.						
<i>Tinea Fuscescentella</i>	134
„ <i>dubiella</i>	133
„ <i>merdella</i>	102	..	..	..
<i>Depressaria bipunctosa</i>	89	..	..
„ <i>Rhodochrella</i>	134
„ <i>Libanotidella</i>	103	..	..	..
<i>Gelechia Viscariella</i>	65	..	..	..	..	..
„ <i>leucomelanella</i>	150	..
„ <i>ocellatella</i>	151	..
„ <i>albipalpella</i>	90	..	..
„ <i>arundinetella</i>	91	..	..
„ <i>subdecurtella</i>	152	..
<i>Cleodora striatella</i> , E. A. 1856, fig. 6	..	36	..	..	..	..
<i>Ypsolophus Juniperellus</i>	66	..	..	..	..	..
<i>Harpella Bracteella</i> , E. A. 1859, fig. 2	152	..
<i>Röslerstammia Pronubella</i> , E. A. } 1856, fig. 8 }	67	..	..	..	..	..
<i>Glyphipteryx Cladiella</i>	153	..
„ <i>Schœnicolella</i>	153	..
<i>Coleophora limosipennella</i>	67	..	..	..	..	..
„ <i>Vitisella</i>	106	..	..	..
„ <i>siccifolia</i>	37	..	..	..	..
„ <i>chalcogrammella</i> , E. A. } 1858, fig. 3 }	93	..	..
<i>Coleophora ibipennella</i>	92	..	..
„ <i>Genistæ</i>	104	..	..	..
„ <i>Inflatæ</i>	105	..	..	..
„ <i>apicella</i>	93	..	..
„ <i>Virgaureæ</i>	105	..	..	..
„ <i>squamosella</i>	37	..	..	..	..
„ <i>salinella</i>	154	..
<i>Goniodoma auroguttella</i> , E. A. 1855 } fig. 4 }	68	..	..	..	..	..
<i>Laverna Conturbatella</i> , E. A. 1857, } fig. 2 }	107	..	..	..
<i>Laverna Raschkiella</i> , E. A. 1857, } fig. 3 }	108	..	..	..
<i>Asychna profugella</i>	38	..	..	..	..
<i>Elachista flavicomella</i>	39	..	..	..	..
„ <i>Gregsoni</i>	70	..	..	..	..	..
„ <i>stabilella</i>	154	..
„ <i>perplexella</i>	155	..
„ <i>Poæ</i>	69	..	..	..	..	..

	1855	1856	1857	1858	1859	1860
TINEINA—continued.						
Elachista Cingillella.....	78	..	..	..	155	..
„ tæniatella	109	..	..	..
„ paludum (<i>Caricis</i>)	155	..
Tischeria angusticollella	94	..	..
Lithocolletis Bremiella, E. A. 1856, } fig. 7	40	..	..	..	..
Lithocolletis Cavella	71	..	..	..	..	..
„ Vacciniella	70	..	..	..	..	..
„ torminella	109	..	..	..
Cemiostoma Wailesella	156	..
„ Lotella	156	..
Opostega spatulella	135
Nepticula Tiliæ	136
„ Pomella	157	..
„ Cryptella	41	..	..	..	..
„ Weaveri, E. A. 1855, fig. 5	71	..	..	..	..	..
„ Myrtillella	95	..	..
„ luteella	110	..	..	..
„ arcuata	97	..	..
„ atricollis	112	..	..	..
„ Poterii	96	..	..
„ Betulicola	42	..	..	..	..
„ Castanella	135
„ Glutinosæ	96	..	..
„ Prunetorum	72	..	..	..	..	..
„ Regiella	110	..	..	..
„ continuella	42	..	..	..	..
„ Alnetella	43	..	..	..	..
PTEROPHORINA.						
Pterophorus Zetterstedtii	44	..	..	..	..
„ plagiodactylus	45	..	..	..	..
„ Loewii	97	..	..

LEPIDOPTERA.



NOTES ON EUPITHECIA LARVÆ.

(*Reprinted, with slight Alterations, from the Zoologist.*)

BY THE REV. H. HARPUR CREWE, M.A.

IN the past two years a number of descriptions of larvæ of the genus *Eupithecia* have appeared at intervals in the pages of the *Zoologist*.

These it has been thought desirable to collect and arrange in a systematic manner, as being more likely to be generally useful to Lepidopterists than in their previous scattered positions.

The following is the list of species, of which the larvæ are here described:—

Venosata.	Subnotata.
Linariata.	Vulgata.
Centaureata.	Expallidata.
Subfulvata.	Absynthiata.
Subumbrata.	Minutata.
Haworthiata.	Assimilata.
Helveticaria.	Tenuiata.
Satyrata.	Abbreviata.
Castigata.	Exiguata.
Pimpinellata.	Sobrinata.
Denotata.	Pumilata.
Innotata.	Coronata.
Nanata.	Rectangulata.

GENERAL REMARKS.

The following descriptions have been taken during the last two years and a half from living larvæ in my own possession ; and with the exception of *Pumilata*, the larvæ of which have been reared from eggs kindly sent me by Mr. Hellins of Exeter, and from a ♀ taken by myself in the Isle of Wight, I have taken every species with my own hands. In some of the earlier descriptions reprinted from the Zoologist I am conscious of many defects in word-painting, a work which requires long practice to ensure anything like perfection. These faults I must trust to the indulgence of my readers to overlook. If the publication of these imperfect observations shall be the means of stirring up other Entomologists to a more diligent search after the larvæ, and a closer study of the habits of this most interesting genus, I shall consider myself more than amply repaid for any trouble I have taken. I am persuaded that much yet remains to be done. I have, in addition to those below described, discovered and taken descriptions of the larva, and bred the perfect insect of two species new to the British lists. These descriptions would have long since been given to the public, had it not been for various unfortunate delays, and the difficulty of procuring specimens of all the continental species for comparison. I hope, however, ere long, to satisfy the impatience of my readers. It seems probable, also, that we have two distinct British species confounded under the name of *Subumbrata*, the insect I bred here being apparently different from the continental *Subumbrata*, and the species taken in Cambridgeshire and elsewhere. I hope, during the ensuing summer, with the assistance of those gentlemen who are in the habit of taking this insect, to set this point at rest. I am also inclined to think that another British species exists, intermediate between

Absynthiata and *Minutata*, the larva feeding upon flowers of *Yarrow* and *Golden Rod*—*Achillea millefolium* and *Solidago virgaurea*; but I have not yet examined a sufficient number of larvæ, or bred the requisite number of moths, to warrant a definite conclusion.* May I appeal to all the readers of the *Annual*, *Zoologist* and *Intelligencer*, who take an interest in this genus, to join with me during the ensuing season in doing our best to find, breed and describe all the remaining undescribed larvæ? There is nothing like “a long pull, a strong pull, and a pull altogether;” and I see no reason why, if we unite with a hearty goodwill, we should not by this time next year have published descriptions of the whole British genus, with the exception, perhaps, of *Pernotata*.

The females when caught will almost always lay eggs freely, if a sprig of the food plant, or indeed any plant, be introduced into the box. The insects also when bred in confinement will generally pair, if placed in a largish box covered with gauze. By this means, during the past summer, I succeeded in getting impregnated eggs of *Absynthiata*, *Assimilata*, *Expallidata*, *Minutata* and *Sobrinata*. The young larvæ are in a fine season not hard to rear. This summer almost all the broods died off half or nearly full fed; but as the same fate befell the majority of my other larvæ reared from eggs, I attribute it mainly to the extraordinary damp, wet season, and the almost entire absence of sunshine.

Floreat Eupithecia!

H. HARPUR CREWE,

DRAYTON-BEAUCHAMP RECTORY, NEAR TRING,

November 24th, 1860.

* *E. Haworthiata* of our British lists appears to be identical with *E. isogrammata* of Treitschke and H.-Schäffer.

Eupithecia venosata. This larva is by no means uncommon, though the perfect insect is seldom seen. It is also very easy to rear. It is short, thick and stumpy. Back dull leaden-grey, sparingly studded with minute white spots and short hairs. Belly and sides dirty greenish-white. Head black. It feeds inside the seed capsules of the bladder campion (*Silene inflata*) and the common red Lychnis (*Lychnis dioica*), and is full fed from the middle to the end of July. When ready to assume the pupa state it comes out of the capsule and enters the earth, where it spins a very slight cocoon, and turns to a bright-red chrysalis. It is very subject to the attacks of ichneumons. The perfect insect appears from the beginning to the end of May. When quite young, the larva is black.

Eupithecia Linariata. Short and stumpy, slightly tapering towards the head. When young bright yellow, with blackish dorsal spots. When full fed yellowish-green, with a series of large dull olive or rust-coloured dorsal spots or bars, running the whole length, and bordered on either side by a dusky olive line. Head nearly black. Belly dusky. Spiracles black. Body sprinkled with short whitish hairs, and here and there studded with black tubercles. The dorsal markings are frequently very indistinct, and sometimes wanting altogether, and the larva is then one uniform yellowish-green. Feeds in August and September on the flowers and seeds of the common wild snapdragon (*Linaria vulgaris*). It is uncertain in its appearance, being one year exceedingly abundant, and the next very scarce. The pupa, which is enclosed in an earthen cocoon, has the abdomen reddish-yellow, tip blood red, thorax and wing-cases olive. The perfect insect appears in May. In very hot seasons it is sometimes double-brooded.

Eupithecia Centaureata. Long, rather slender, and
1861.

tapering towards the head. Has a slightly wrinkled appearance. This larva is almost as variable as *E. Absynthiata*, and so dissimilar are some of the varieties that I am not surprised at many a tyro being "awfully puzzled." The following are those most commonly met with:—Var. 1. Bright yellowish or bluish-green, with a number of dorsal and subdorsal spots and lines of a darker shade; the dorsal markings very often forming a series of disjointed lozenge-shaped spots. Var. 2. Uniform yellow, yellowish or bluish-green, without any spots or markings whatever. Var. 3. Greenish, or pinkish-white, with a chain of deep red, trident-shaped dorsal spots, connected together by the central prong, and becoming confluent towards the head. Belly whitish, with a short red line or spot in the centre of several of the segments. The larva feeds in August and September, upon the flowers of *Senecio jacobæa* and *S. erucifolius*, *Solidago virgaurea*, *Achillea millefolium*, *Eupatorium cannabinum*, *Pimpinella magna*, and *P. saxifraga*, *Silvaus pratensis*, *Campanula glomerata*, and *Scabiosa Columbaria*.

Vars. 1 and 2 I have almost invariably found upon the three first named plants, whilst those on the other flowers were Var. 3. This latter variety strongly resembles the pink form of *E. nanata*. The pupa is enclosed in an earthen cocoon. There are two varieties, the common one, scarcely, if at all, distinguishable from that of *E. Absynthiata*; the other a uniform pale red. The perfect insect appears more or less from May to August.

Eupithecia subfulcata. Long, tapering but slightly towards the head. Reddish brown, with a series of dusky olive oval dorsal spots, confluent towards the head and tail, and connected and intersected by a central dorsal line, paler in colour than the spots. Spiracular line white. Subdorsal lines black, interrupted. Back thickly studded with minute white tubercles, and less thickly with whitish hairs. Belly

whitish, with a central purplish line running the whole length. Feeds in September and October on the flowers and seeds of yarrow (*Achillea millefolium*). Pupa enclosed in an earthen cocoon; uniform orange-red, thorax and wing-cases paler than abdomen. Tip of latter blood-red. Long, rather slender and tapering. Abdominal divisions deep red. Wing-cases much furrowed. The perfect insect appears in June and July. I prefer retaining the name *E. subfulvata*, as the foregoing description was taken from larvæ reared from eggs of the so-called variety of *E. succenturiata*. I shall continue to believe that the two insects are distinct species till some person breeds one from the egg of the other. I never heard that this has been done. The exhibition of a long series of varieties running one into the other proves nothing at all. It has never been my good fortune to be in a locality where *E. succenturiata* occurred, so that I have never been able to try the experiment. I shall feel deeply indebted to any gentleman who is in the habit of taking this insect, if he will send me a few eggs or a living female.

Eupithecia subumbrata. Var. 1. Very long and slender, tapering very much towards the head. Ground-colour dull yellowish-green. Central dorsal line broad, dark green, narrower at the segmental divisions. Sub-dorsal lines dusky, very narrow and indistinct. Dorsal segmental divisions orange. Ventral ditto yellow. Spiracular line dusky green. On each side of the head and anal segment a yellowish line.

Var. 2. Ground-colour dirty greenish-brown. Central dorsal line dusky olive. Sub-dorsal lines ditto, narrow. Posterior segments reddish. In other respects resembles Var. 1.

This singular long thin larva, I have been in the habit of taking at intervals for some years past in Buckinghamshire.

It feeds upon the same plants and in the same localities as *Eupithecia satyrata*, preferring perhaps *Apargia hispida* and *Crepis taraxifolia*. It is full fed at the end of August and throughout September. The pupa, enclosed in an earthen cocoon, has the thorax and wing-cases dark green. Abdomen ochreous, tip dusky red. The perfect insect appears in June.

Eupithecia Haworthiata. This larva seems to be little known, and has not, I think, been described. I have, however, taken it in plenty, wherever its food plant, *Clematis vitalba*, occurs. It is very short and stumpy, the ground-colour pale bluish or yellowish-green, with three horizontal dorsal stripes of a darker shade; these stripes are often very indistinct, and sometimes altogether wanting. The head is dusky, spotted with olive, and the body sparingly studded with minute black dots. It is full fed from the middle of July to the middle of August. It feeds inside the unopened flower-buds of *Clematis vitalba*, commonly known as the "traveller's joy." When nearly full, it frequently feeds among the stamens of the expanded flower, and may then be beaten into an umbrella; it also feeds on the common white garden *Clematis*. The presence of the larva may generally be detected by the blackened appearance of the flower-buds. When it has eaten up the inside of one bud, it comes out and bores into a fresh one; I have frequently seen a larva busily engaged in this operation. In shape and general appearance it is closely allied to the larva of *Eupithecia tenuiata*. The pupa is enclosed in a very tightly-spun earthen cocoon. The thorax and wing-cases are green, and the abdomen red. The perfect insect appears in June and the beginning of July, and is abundant among *Clematis vitalba*; it flies about with extreme rapidity in the hot sunshine, and it is almost invariably wasted when caught; when fresh, the upper part of the abdomen is orange.

The larva feeds very rapidly.

Eupithecia helveticaria. Short and stumpy, the same thickness from tip to tail. Back and belly bright green. Central dorsal line dark green. Sub-dorsal lines pale yellow. Spiracular line yellow, waved. Anal tip of central dorsal line purplish. Head slightly bifid, dusky, curved inwards. Central ventral line pale yellow. Spaces between the sub-dorsal and spiracular lines darker green than back and belly. Feeds on the common juniper (*Juniperus communis*). Full fed throughout September. Resembles in many respects the larva of *E. sobrinata*. - For the larvæ from which the foregoing description is taken, I am indebted to the kindness of Mr. Andrew Wilson of Edinburgh. The pupa, which is enclosed in an earthen cocoon, has the thorax and abdomen bright green, the latter sometimes yellowish. Wing-cases much darker, very transparent. Central dorsal line dark green. Abdominal divisions and frequently the border of wing-cases reddish. Tip of abdomen blood-red. Underside of ditto yellowish.

Eupithecia satyrata. Var. 1. Ground-colour pale yellowish green. Segmental divisions pale yellow. Central dorsal line dusky green. Down the centre of the back a series of Y-shaped dusky green blotches, edged with purplish-brown, and becoming confluent or merged in the central line on the anterior and posterior segments. Sub-dorsal lines very slender and indistinct, dusky green. Spiracular line yellow. Between the sub-dorsal and spiracular lines a row of small slanting purplish blotches. Back studded with very minute yellowish tubercles.

Var. 2. Back greenish-white. Central dorsal line pinkish or rose-colour. Sub-dorsal lines ditto. Down the centre of the back a series of large rose-coloured and rusty red goblet-shaped blotches, becoming faint or merged in the central line

on the anterior and posterior segments. Spiracular line waved, rose-colour. Sub-dorsal and spiracular lines connected by a number of slanting rose-coloured streaks. Belly pale sea-green or greenish-white, with a central white line. Back studded with numerous small white tubercles.

Var. 3. Whole of the back suffused with rose-colour. Sub-dorsal lines yellowish. Dorsal blotches edged with yellow. Spiracular line interrupted with yellow patches. Belly greenish-white. Ventral segmental divisions white.

This larva tapers considerably towards the head; it is very local, but occurs in some plenty in some parts of Buckinghamshire, where however it is confined to the open spaces between and near the beech woods. It feeds upon the petals of almost any flower which happens to grow in the locality, *e. g.*, *Centaurea nigra*, *Knautia arvensis*, *Gentiana Amarella* and *G. campestris*, *Apargia hispida*, *Origanum vulgare*, *Prunella vulgaris*, *Galium mollugo*, &c., preferring the two first named. It is full fed in September. The pupa, which is enclosed in an earthen cocoon, has the thorax and wing-cases golden yellow, suffused with red. Abdominal divisions and tip red. The perfect insect appears in June.

Eupithecia castigata. Long, slender and tapering. Ground-colour pale or dusky olive or reddish-brown, with a chain of dusky lozenge-shaped dorsal spots, becoming confluent on the anterior and posterior segments. Segmental divisions reddish. Body thickly studded with minute white tubercles, and clothed more sparingly with short bristly hairs. Belly with a central blackish or purplish line running from tip to tail. Feeds promiscuously upon almost every tree, shrub and flower in August and September.

In almost every particular closely resembles the larva of *E. vulgata*. Pupa enclosed in an earthen cocoon. Ab-

domen slender and tapering, reddish or greenish-yellow. Thorax and wing-cases yellow; the latter more or less suffused with green.

Eupithecia pimpinellata. I am inclined to suspect that this insect has been wrongly named. I have constantly and most closely examined both flowers and seeds of *Pimpinella magna* and *P. saxifraga*, but could never detect the slightest trace of the larva. I have repeatedly beaten it from the flowers of the golden rod (*Solidago virgaurea*), and from that plant alone, though both species of *Pimpinella* are common in the locality. The larva is fulvous, with a series of black dorsal triangular spots, becoming confluent towards the head, and faint or altogether evanescent on the caudal segment. On either side a row of conspicuous, slanting whitish or yellowish stripes, forming a sort of margin to the dorsal spots. Belly dusky, reddish in the centre, and having a dusky central line running the whole length. Body studded with various sized white tubercles, and thinly clothed with short hairs. Feeds upon the flowers of *Solidago virgaurea*, in August and September. I have found it by no means rare in the Kentish Woods, where the underwood is from one to two years' growth, and the golden rod has room to grow and flower freely. In confinement the larva will feed freely on *Senecio Jacobæa* and *S. palustris*. The pupa, which is enclosed in a slightly spun earthen cocoon, is very distinct from all the rest of the family. The thorax is yellowish-green, with a very accurately and distinctly defined border, and looks almost as if set in a frame. When examined with a glass, some singular dark spots and markings are seen, which give it very much the appearance of a skull. The abdomen is yellowish-red, with two indistinct, interrupted dorsal, and two more distinct sub-dorsal dusky lines. Wing-cases yellowish-olive, streaked with dusky

markings, and having the nervures very prominent. The perfect insect appears in May and the beginning of June. The larva is rather slender, and tapers towards the head; in general appearance it resembles *E. castigata* and *E. vulgata*.

Eupithecia denotata. This larva, in size and general appearance, closely resembles that of *E. innotata*. It is long, rather slender and tapering towards the head. There are two varieties: Var. 1 is green, with three purple dorsal lines, the centre one broad and distinct, expanding considerably on the anal segment, the two side ones very indistinct. Head and prolegs purple. Segmental divisions and spiracular line yellowish. Belly green. Back studded with a few minute white tubercles, interspersed here and there with a black one. Var. 2 is of a uniform purple, with two lines of a deeper shade on each side of the back. It feeds, as far as my experience goes, exclusively on the flowers and seeds of the lesser Burnet saxifrage (*Pimpinella saxifraga*), and is full fed throughout the month of September, and occasionally at the beginning of October. It prefers the hedge sides and banks. It is fearfully infested with ichneumons, not above one in ten escaping. The pupa is enclosed in an earthen cocoon: there are two varieties; the one yellowish-green, the other red. The perfect insect appears at the end of June and in July.

The larva is by no means rare in the eastern counties; I have also taken it in Derbyshire.

Eupithecia innotata. This larva has, I think erroneously, been said to feed upon various low growing plants; I have been acquainted with it for some years past, and never beat it from anything but ash. It is long, smooth, rather slender and tapering towards the head. The ground-colour is a uniform dark green, with a waved yellowish spiracular line.

The segmental divisions are yellow, and on the anal appendage is a dark purplish spot. The belly is whitish and wrinkled, with a dark green central line running the whole length. A variety occurs in which the central dorsal line is wanting, and its place is supplied by a series of dusky triangular markings, becoming very faint or altogether evanescent on the anterior and posterior segments; on each side is a row of slanting yellowish stripes, tinged with pink. It feeds upon ash, and appears to prefer the tall suckers in hedgerows. It is widely dispersed, but nowhere common. It is full fed from the end of August to the middle of September. The pupa is long, rather slender and tapering. The thorax and wing-cases are dark olive; the abdomen still darker, almost black, tinged underneath with red. It is enclosed in a slight earthen cocoon, at the foot, or under moss, on the trunk of the tree. My friend Mr. Greene has already given the Entomological world directions how to find it. The perfect insect appears in June and July.

Eupithecia nanata. Long and very slender, tapering towards the head. Ground-colour white, or greenish-white, with a chain of pear-shaped red dorsal spots, bordered on either side by an interrupted line of the same colour, and becoming confluent on the capital and anal segments. Sides spotted with red. Belly with a central red line running the whole length. Body clothed with a few very short hairs. A very pretty variety of this larva has the ground-colour bright green, with a series of tooth or pear-shaped white dorsal spots, intersected by a central horizontal dark green line, becoming purple at the anal tip. Spiracular line white, broken. Back sprinkled with a few short black hairs. Feeds on the flowers of *Calluna vulgaris*, in August and September. Pupa enclosed in an earthen cocoon. Thorax and wing-cases yellow. Abdomen deeply suffused with red.

Thorax considerably elevated. The pupa of the green variety is suffused all over with green.

Eupithecia subnotata. Ground-colour dull yellowish-green, pale green or reddish-grey, with a chain of dull olive lozenge-shaped dorsal spots, becoming confluent towards the head and tail, and often bordered by an indistinct olive line. The spots and lines sometimes very faint. Segmental divisions yellowish or reddish. Spiracular line yellowish. The whole body very rough, thickly studded with minute white tubercles and black spots, and sprinkled here and there with short stumpy hairs. Belly pale green, with an interrupted line running the whole length. Feeds on the seeds and flowers of various species of *Atriplex* and *Chenopodium*, in August and September. It seems to prefer the banks of tidal rivers; I have taken it in profusion on the banks of the Orwell and the Stour, near Ipswich, but have also met with it in some plenty in waste ground near Bexley; it is not so easy to rear as others of the family, and often pines in confinement. The pupa, which is enclosed in an earthen cocoon, has the wing-cases dark green. Thorax and abdomen yellowish, the latter not so tapering as many of the other *Eupitheciæ*. The perfect insect appears in June and July.

Eupithecia vulgata. Common as this insect is everywhere, the larva seems to be but little known; I have never myself beaten it, but have several times reared it from the eggs. It so closely resembles that of *E. castigata*, that it requires a very practised eye to distinguish it. It is slender and tapers towards the head. Its general colour is reddish-brown or dusky olive, along the centre of the back a chain of dirty greenish, lozenge-shaped spots, becoming confluent at the capital and anal segments. Spiracular line waved, yellowish, occasionally interrupted with black. Segmental

divisions orange. The whole body studded with minute white tubercles, and sparingly clothed with short whitish hairs. Feeds on white-thorn; full fed the middle of July. The pupa is enclosed in an earthen cocoon; it is slender and delicate. Head, thorax and wing-cases olive. Abdomen reddish, sharply pointed.

Eupithecia expallidata. I subjoin descriptions of the different varieties of this most beautiful and hitherto almost unknown larva.

Var. 1. Ground-colour pale canary colour. Central dorsal line pale brown. Down the centre of the back a chain of large, deep rich brown, tooth-shaped spots, united at the points, and bordered on either side by an almost black sub-dorsal line. Dorsal spots becoming faint and confluent in the central dorsal line on the anterior and posterior segments, almost obliterated on the latter. Below the sub-dorsal lines a narrow rich brown line and a row of slanting stripes of the same colour. Spiracular line yellowish. Belly suffused on either side with brown, and having a central line of the same colour running the whole length. Body minutely studded with yellow tubercles and very short hairs. Has a wrinkled appearance.

Var. 2. Ground-colour grey or yellowish-green. Dorsal spots brown, perfect lozenge-shaped, ceasing on the posterior segments. Sub-dorsal lines deeper brown than the dorsal spots, interrupted at the segmental divisions. Spiracular line yellowish, bordered on the lower side with brown.

Var. 3. Ground-colour various shades of green. All the markings, except the sub-dorsal lines, faint or altogether wanting.

Var. 4. Whole body, with the exception of the posterior dorsal segments, suffused with deep rich chocolate brown.

Posterior dorsal segments canary-yellow, with a central pale brown line. On every dorsal segment two yellow spots. On each side two yellow waved lines, enclosing a brown line. Feeds in September and throughout October, on the flowers of the golden rod (*Solidago virgaurea*). In confinement, it will eat various species of Michaelmas daisy. It has also, I believe, been beaten from the flowers of rag-wort, but I have not myself met with it on anything but *Solidago virgaurea*. The pupa, which is enclosed in an earthen cocoon, is large and thick, and has the thorax and abdomen yellow, the latter deeply suffused with blood-red. Wing-cases more or less tinged with green. The perfect insect appears from the middle of June to the end of July.

Eupithecia Absynthiata. It would be impossible to give an accurate description of the almost endless varieties of this most variable larva; they run so closely into each other that it would be an almost herculean task to separate them. The ground-colour is either yellowish-green, deep rose colour, or dirty reddish-brown, with a series of reddish lozenge-shaped spots down the centre of the back, generally becoming faint or confluent towards the head and tail. In the green variety these spots are often entirely wanting; on each side a number of narrow slanting yellow stripes, forming a sort of border to the dorsal spots. Spiracular line waved, yellow. Body wrinkled, thickly studded with minute white tubercles, and somewhat more sparingly with short white hairs. Segmental divisions yellow. Thick and stumpy, tapering but little. Feeds from the end of August to the beginning of November, upon the flowers of common yellow and hoary-leaved rag-wort (*Senecio jacobæa* and *S. erucifolius*), the hemp agrimony (*Eupatorium cannabinum*), the mugwort (*Artemisia vulgaris*), yarrow (*Achillea millefolium*), golden rod (*Solidago virgaurea*), &c. The pupa, which is

enclosed in a tightly-spun earthen cocoon, has the wing-cases bright green, the nervures very prominent; thorax yellowish-green; abdomen reddish-yellowish, with a dark green dorsal line. The perfect insect appears in June and July.

Eupithecia minutata. Short, thick and stumpy. Ground-colour dull pink or flesh tint, with a series of dusky Y-shaped dorsal spots, connected by a central pink line, and becoming faint on the anterior, and almost obliterated on the posterior segments. Each dorsal segment studded with four yellowish tubercles. Spiracular line yellowish, interrupted at intervals by dusky blotches. Head dusky olive, marked with black. Belly dusky or pinkish-white. Back thickly studded with small white, and a few black tubercles, and sprinkled here and there with short hairs.* Feeds on the flowers of *Calluna vulgaris* in August and September, and is by no means uncommon where that plant occurs in plenty. Pupa enclosed in an earthen cocoon. Short and thick. Thorax and wing-cases golden yellow; abdomen yellow, generally suffused with red. Wing-cases very transparent. Tip of abdomen blood-red.

Eupithecia assimilata. Slender, tapering slightly towards the head. Var. 1. Ground-colour yellowish-green. Segmental divisions yellow. Central dorsal line dark green. Sub-dorsal ones dark green, very indistinct. The latter occasionally studded at intervals with black spots. Body thickly sprinkled with small yellowish-green tubercles and thinly strewed with short whitish hairs. Strongly resembles a young larva of *E. cervinaria*. Turns pinkish when ready to spin up.

* During the past summer, 1860, I reared a small brood from eggs on flowers of *Achillea millefolium*; besides the typical form just described, there were several gay-coloured varieties resembling Vars. 1 and 2 of *E. satyrata*, and Var. 2 of *E. coronata*. I also reared four or five larvæ from eggs on flowers of *Anthriscus sylvestris*; these were also variable in colour.

Var. 2. When young uniform pale green. After the last moult assumes a series of brown dorsal spots, united by a central line of the same colour. Ground-colour dirty yellowish-green. Sub-dorsal lines dusky. Dorsal spots merged in the central line on the anterior and posterior segments. Sides suffused with dusky reddish-brown, and traversed by slender waved lines of the same colour. Head greenish, marked with black. Belly greenish. Body covered with small white tubercles, and sprinkled with a few short white hairs. The brown suffusion is sometimes wanting, leaving the larva an uniform bright green, with a single chain of brown dorsal lozenges.

Var. 3. Ground-colour after last moult pinkish. Back and belly tinged with green. Central dorsal line dark green, bordered on each of the middle segments by a black dot. Segmental divisions reddish. In other respects resembling Var. 2. Feeds on *black currant* and *wild hops*, occasionally on *red currant*. Full fed from September to beginning of November. Pupa yellowish-green in an earthen cocoon. Perfect insect appears in June.

Eupithecia tenuiata. Short and stumpy. Ground-colour dirty yellowish-green. Sides and centre of back slightly tinged with rose colour. Down the centre of the back a row of very indistinct dusky spots, becoming confluent in a black line at the anal segment, and bordered by an interrupted black line. On each side a row of slanting tubercular flesh-coloured stripes. Head and fore feet black. Feeds on the catkins of *sallow* in spring. Full fed the end of March and beginning of April. In appearance it much resembles the larva of *Eupithecia Haworthiata*. I am indebted to the kindness of Mr. Doubleday for the larva from which the foregoing description was taken.

The larva of this insect, when full fed, comes out of the sallow catkins, and spins a slight cocoon among earth, roots of grass or moss. The pupa is pale golden yellow. Abdominal divisions dusky. Thorax and wing-cases having a slight greenish tinge. Eyes prominent, blackish. Abdomen short and curtailed.

Eupithecia abbreviata. Slender, hairy, tapering towards the head. Ground-colour pale yellowish-red. Central dorsal line pale olive. Down the centre of the back a series of pale olive, V-shaped spots, sometimes bordered with yellow. Spiracular line yellowish. Segmental divisions red. Central ventral line yellowish, sometimes altogether wanting. Dorsal spots frequently merged in a broad central line. The whole of the markings on this larva vary much in intensity of colouring, but are usually faint and indistinct. Feeds on oak. Full fed the beginning of July. Pupa enclosed in a slight earthen cocoon; bright red; thorax and wing-cases paler than abdomen; base of wing-cases dusky; abdominal divisions and tip deep red. Perfect insect appears at the end of April and in May.

Eupithecia exiguata. This larva somewhat resembles that of the little blue emerald (*Iodis lactearia*), and appears at the same time. It is long, slender and tapering. Ground-colour dark green, with a central row of small dull red lozenge-shaped dorsal spots, connected by a central dorsal line of the same colour. Spiracular line red, bordered with yellow. Segmental divisions yellowish. The dorsal blotches are often wanting on the anterior segments, and their place supplied by a greenish line. In the centre of each dorsal blotch a small yellow spot. Feeds in September and October, on barberry, white-thorn, black currant, ash, alder sallow, blackthorn, snow-berry and dogwood. Pupa enclosed in an earthen cocoon; long, slender and tapering. Wing-cases dark olive-green. Thorax and abdomen dusky

olive. Abdominal divisions very conspicuously yellow. Perfect insect appears from May to July.

Eupithecia sobrinata. This larva is rather variable in appearance. The ground-colour is either dark green or yellowish-red, with a series of rust-coloured dorsal blotches, intersected by a central dorsal dark green horizontal line, and bordered on either side by a yellowish one. These blotches generally disappear on the posterior segments, and are sometimes wanting altogether. Spiracular line waved, pale yellow, or whitish. Belly with a whitish central horizontal line. Feeds on juniper. I have found it tolerably common on old trees in gardens and shrubberies in Derbyshire. It is full fed at the end of May and in the beginning of June, and the perfect insect appears in July. Pupa enclosed in an earthen cocoon or in a slight web amongst the stalks. Head, thorax and wing-cases dark green; abdomen yellowish.

Eupithecia pumilata. Short and stumpy, tapering slightly towards the head. Ground-colour pale yellowish-olive, reddish-olive or rusty red. Central dorsal line dusky olive, almost black. Down the centre of the back a chain of dusky arrow-shaped spots, more or less distinct, and becoming merged in the dorsal line on the anterior and posterior segments. On each side a broad ribbon-like stripe, yellowish in the middle, dusky at the edges. The dorsal spots bordered interruptedly with yellow. Spiracular line yellowish. The larvæ from which the foregoing description was taken, were reared from eggs sent me by Mr. Hellins, at the end of May, and fed on flowers of *Anthriscus sylvestris*. They were full fed at the end of June, and the first perfect insect appeared July 16th. Mr. Hellins tells me he has reared the larva on flowers of *Clematis*.* The pupa, which is enclosed in a

* A variety occurs which has the ground-colour yellowish-green, almost primrose-yellow. Central dorsal line olive, intersecting and uniting a series of pear-shaped spots of the same colour, becoming

slight earthen cocoon, has the thorax and wing-cases pale yellow; abdomen short, yellow; tip red, divisions slightly so. The perfect insect appears in April and May, and again in July and August.

Eupithecia coronata. This larva is, I think, the prettiest of all the genus. It is excessively variable in colour, so much so that it was not till I had repeatedly bred the insect that I could believe that such different looking larvæ could produce the same moth. The following are some of the principal varieties:—

Var. 1. Ground-colour yellowish-green, with three reddish dorsal lines, the centre one interrupted, and sometimes enlarged into a chain of lozenge-shaped spots, the two side ones very indistinct. Body, when closely examined, very slightly hairy.

Var. 2. Ground-colour one uniform sea-green. The dorsal lines and spots wholly, or almost entirely, wanting.

Var. 3. Ground-colour greenish-yellow, with a series of rusty, lozenge-shaped dorsal spots or bars. The sides and belly more or less suffused with rust-colour. Segmental divisions bright yellow.

Var. 4. Ground-colour bright yellow, with a series of broad, dull, red dorsal bars, intersected and bordered by lines of the same colour. Sides and belly thickly clouded with red. This larva is somewhat different in gait and shape from those of all the other *Eupitheciæ*, and resembles that of *H. rupicapraria*. Its favourite food is the petals of *Clematis Vitalba*, from which plant it may be beaten in some

merged in the central line on the anterior and posterior segments. Subdorsal lines olive; two on each side. Belly pale dirty-green, dusky at the edges. The spots and lines vary much in intensity of colouring, and are sometimes almost entirely wanting, leaving the larva a uniform pale yellowish-green.

plenty from the middle of July till the middle of August. I have also beaten it from the flowers of the hemp agrimony (*Eupatorium cannabinum*), the golden rod (*Solidago virgaurea*), and the wood Angelica (*Angelica sylvestris*). The pupa, which is enclosed in a rather closely spun earthen cocoon, has the abdomen very much curtailed and sharply pointed, the eyes black and very prominent, the thorax and wing-cases spotted with black, the latter much ribbed. The spots do not appear for a week or two after the caterpillar has turned, and till then the pupa is a uniform pale yellowish-red colour. The perfect insect appears from April to July. In confinement I have occasionally had the earlier fed July larva produce the perfect insect in August.

Eupithecia rectangularata. Short, thick and stumpy. Ground-colour very pale yellowish-green, darker when young. Central dorsal line varying much in breadth and intensity of colouring, sometimes rusty red, sometimes dark green, frequently very indistinct and sometimes wanting altogether. Segmental divisions reddish. Spiracular line rather darker than ground-colour. Whole body very transparent. Circulation very visible under central dorsal line. Back sprinkled with a few very short hairs. Dorsal stripe, when young, broad, distinct and rusty red. Feeds in April and May on the blossoms of apple and wild crab. Full fed the middle of the latter month. I took a number of these larvæ, this spring, in Suffolk. I noticed that those which fed upon wild crab were much brighter and darker-coloured than those upon the apple blossoms in the gardens. In habits and shape this larva strongly resembles that of *E. Haworthiata*. The pupa is enclosed in a slight earthen cocoon. The thorax and wing-cases are yellow, suffused with olive. Abdomen tapering, lower divisions and tip blood red. The perfect insect appears in about a fortnight.

NEW WORKS ON ENTOMOLOGY.

FARM INSECTS ; being the Natural History and Economy of the Insects injurious to the Field Crops of Great and Ireland, and also those which infest Barns and Granaries, with Suggestions for their Destruction. By JOHN CURTIS, F.L.S. Price 30s. BLACKIE AND SON.

In this handsome volume of 528 pages, with 16 coloured plates and numerous wood engravings, Mr. Curtis has given, in a collected form, the mass of information on insects injurious to agriculture, which had already appeared from his pen in the "Journal of the Agricultural Society" and in the "Gardener's Chronicle."

Mr. Curtis observes in the Introduction—"I commence with the turnip crop, investigating the several species which live upon the leaves, those which inhabit the flowers, such as devour the seed, and those which injure and destroy the roots. I then pass on to the cereals, and investigate the history of the insects which cause abortion either by inroads on the flowers, or by reducing the supply of sap to the germen; of those which attack the foliage, and of such as cause the roots to perish. I next proceed to the barn and granary and describe the beetles and moths, together with their larvæ, which subsist upon stored grain. I then enter the pea and bean fields, where we are sure to find abundance of depredators. Mangel-wurzel and carrots next occupy my attention; and thence I proceed to examine the potato crops, which afford a wide field for inquiry among the beetles, bugs, &c., which live on their haulm, as well as the larvæ of various beetles, gnats, flies, &c., which injure the tuber itself." The volume concludes with "an examination of the insects injurious to clover crops and pasture lands."

The author observes, in his concluding paragraph, that his object has been "to make the farmer acquainted with the habits of his insect enemies, and to enable him to recognize them under their different aspects of egg, caterpillar, pupa and perfect insect."

THE LEPIDOPTERIST'S INDICATOR: An Alphabetically arranged Guide to the Species of British Lepidoptera, with Special reference to Doubleday's last List; Stainton's "Manual;" Wood's "Index Entomologicus," &c. By B. BRADNEY BOCKETT, M.A., Vicar of Epsom, Surrey. Price 1s. London: E. NEWMAN, 9, Devonshire Street, Bishopsgate.

The title of this little *brochure* sufficiently explains its nature.

THE LEPIDOPTERIST'S CALENDAR, giving the Time of Appearance of the British Lepidoptera, as far as they are known, in the Imago, Larva and Pupa States; with a classified Arrangement of the Larvæ Food. By JOSEPH MERRIN. Price 1s. 6d.; cloth boards, 2s. London: E. NEWMAN, 9, Devonshire Street, Bishopsgate.

The nature of the contents of this handy little volume are also sufficiently indicated by the title.

BRITISH BUTTERFLIES: Figures and Descriptions of every Native Species, with an Account of Butterfly Development, Structure, Habits, Localities, Mode of Capture and Preservation, &c. By W. S. COLEMAN. With Plain Plates, price 1s.; with Coloured Plates, price 3s. 6d. London: ROUTLEDGE, WARNE AND ROUTLEDGE.

Wonderfully got up considering the price, and the letter-press well put together. When we reflect on the similar works published thirty years ago, we are astounded at the improvement that is manifested. Still we hope that the butterfly-hunters will not have their pursuit made too easy.

THE NATURAL HISTORY OF THE TINEINA. Vol. V., containing COLEOPHORA, Part 2. With 8 Coloured Plates. Price 12s. 6d. London: JOHN VAN VOORST, Paternoster Row.

This volume, like its predecessor, contains the biographies of 24 species of the interesting genus COLEOPHORA.

A CATALOGUE OF THE LEPIDOPTEROUS INSECTS in the Museum of the Natural History at the East India House. By THOS. HORSFIELD, M. and Ph. D., F.R.S., Keeper of the Museum, and FREDERIC MOORE, Assistant. Vol. II. London: W. H. ALLEN & Co., 7, Leadenhall Street.

Of the first volume of this work, which appeared at the close of 1857, containing the Diurnal Lepidoptera and the Sphinges, Dr. Herrich-Schäffer has remarked—"This work is indispensable to those who are occupied with Exotic Lepidoptera or with systematic Entomology."

The second volume, which has now appeared, contains the Bombyces.

"The BOMBYCES," we read, "form a distinct tribe, equal in rank to the PAPILIONES and SPHINGES, and are related to the latter by the genera *Ægeria*, *Zygæna* and *Eusemia*, and to the NOCTUIDÆ by *Hepialus*."

No group of insects is more difficult to arrange systematically than the Bombyces; in no group do we meet with so many aberrant and abnormal forms. Dr. Horsfield remarks—"It is manifest to all Entomologists that the transformations in this tribe have, as yet, been very imperfectly observed and recorded; most of those of African, Australian and American Lepidoptera are a desideratum to science, although those of Europe have been largely illustrated by Hübner. The final subdivision of this tribe, formed on the metamorphosis of the several species, remains for some future Entomologist, who may undertake the examination and arrangement of this tribe with the views applied by Vigors to Birds, and by De Haan to Crustacea."

THE JOURNAL OF ENTOMOLOGY, Descriptive and Geographical. Parts 1 and 2. London: TAYLOR AND FRANCIS, Red Lion Court.

It is difficult to conceive why the supporters of this Journal should have turned their backs on the Transactions of the Entomological Society, where the papers which have appeared in the Journal of Entomology would have been so welcome—they say it "has been projected to supply the want of an Entomological periodical devoted to the descriptions of new species and to the geographical distribution of insects generally. It is intended to

figure the new or little known forms so far as possible; and with regard to the latter, local lists and monographs will be one of its principal features.

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Did the writer of these lines ever see the Transactions of the Entomological Society of London?

We believe there is no ill-feeling on the part of the originators of this Journal to the Entomological Society, and if such be the case we hope, in a few months, the pabulum which sustains this opposition Journal will again relapse into its more legitimate channel.

LACORDAIRE, Genera des Coléoptères, Tome V^{ème}, Pp. 750. Paris: RORET, Rue Hautefeuille 12.

This volume contains the Tenebrionidæ, Cistelidæ, Nilionidæ, Pythidæ, Melandryidæ, Lagriidæ, Pedilidæ, Anthicidæ, Pyrochroidæ, Mordellidæ, Rhipiphoridæ, Stylopidæ, Meloidæ and Cœderidæ.

MONOGRAPHIE DES ELATERIDES. Par E. CANDEZE. Tome III. Pp. 512. Liège: H. DESSAIN, Rue Trappé.

The first volume of this work appeared in 1857, running to 400 pages: the second volume, in 1859, consists of 342 pages.

LINNÆA ENTOMOLOGICA. Vol. XIV. Leipzig: FLEISCHER.

The present volume contains a corrected catalogue of the Asiatic *Cryptocephali* by Dr. Suffrian; a Monograph of the *Termites* by Dr. Hagen; the species of the genus *Lissomus* of Dalman by Dr. Gerstäcker; on *LAVERNA*, a genus of *Elachistidæ*, by Professor Frey; a monographic attempt at the family *Emesina*, by Anton. Dohrn; on the Bibliography of North American Entomology, by W. Sharswood; and descriptions of some new Chilian Lepidoptera, by Dr. Philippi.

The assortment shown in the above “contents” is more varied than usual.

STETTINER ENTOMOLOGISCHE ZEITUNG.

21st Jahrgang, 1860. Stettin.

This contains about the usual amount of interesting scientific matters, and its pages are further enlivened by personal squabbles between living Entomologists. Science would be dry work without a *little* sauce.

NOUVEAU GUIDE DE L'AMATEUR D'INSECTES : comprenant les Généralités sur leur Division en Ordres ; l'Indication des Ustensiles et les meilleurs Procédés pour leur faire la Chasse ; les Epoques et les Conditions les plus favorables à cette Chasse ; la manière de les préparer et de les conserver en Collections. Par plusieurs Membres de la Société Entomologique de France. Paris : DEYROLLE, Rue de la Monnaie 19.

The contributors in this little volume are as follows:—

M. Léon Fairmaire on Coleoptera.

M. Louis Brisout de Barneville on Orthoptera.

Dr. Signoret on Hemiptera.

M. De Selys Longchamp on Neuroptera.

Dr. Sichel on Hymenoptera.

M. Bellier de la Chavignerie and the late M. Pierret on the Macro-Lepidoptera.

M. Stainton and M. Fologne on the Micro-Lepidoptera.

M. Bigot on Diptera.

It is thus a very complete work, going through all the orders.

CORRESPONDENZBLATT für Sammler von Insecten, insbesondere von Schmetterlingen. I. Jahrgang, Nro. 1—12. Regensburg: G. J. MANZ. 1860.

Under this title Dr. Herrich-Schäffer has produced a monthly periodical, which contains notices of new insects, casual observations, notices of books, notices of insects for exchange, answers to correspondents, &c., &c.

The price to subscribers is one German florin per annum ; *i. e.* for 12 numbers. The price to this country, post free, is of course rather more, but a thaler note will be taken as payment for 15 numbers to be forwarded to England.

BESCHREIBUNG neuer oder wenig bekannter Blattwespen aus dem Gebiete der preussischen Fauna. By Dr. G. ZADDACH. Königsberg. 1859.

ANMAERKNINGAR och Tillägg till Finlands Småfjäril-fauna af J. M. J. af TENGSTRÖM. Helsingfors: Finska Litteratur-sällskapets Tryckeri. 1859.

This is a valuable contribution to the Micro-Lepidopterological literature of Northern Europe, and we trust will tend to foster the study of these insects in the Scandinavian peninsula.

DIE PFLANZEN UND RAUPEN DEUTSCHLANDS. Versuch einer lepidopterologischen Botanik von O. Wilde. Erster Theil: Systematische Beschreibung der Pflanzen unter Angabe der an denselben lebenden Raupen. Berlin: E. S. MITTLER UND SOHN. 1860.

We have not space here to notice this little volume as fully as it deserves; but we can heartily recommend it to all who take an interest in the subject of Entomological botany.

At a glance one can see both errors and omissions, but in so vast a field as that here comprehended errors so easily creep in—the author could not be supposed to record all the facts from his own observations, and in compiling from the observations of others (some perhaps little trustworthy) errors are unavoidable.

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WEEKLY INTELLIGENCER,

(A WEEKLY JOURNAL DEVOTED TO ENTOMOLOGY.)

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THE
ENTOMOLOGIST'S ANNUAL

FOR

MDCCCLXII.

1862

WITH A COLOURED PLATE.



LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.

MDCCCLXII.

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THE
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“Some do not work at all—are utterly lazy. Some do their share grudgingly and unwillingly, without giving it their energies; and some are always grinding.”

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P R E F A C E.



THE list of British Entomologists is again omitted, but yet the Volume overflows.

If, as we last year suggested, the list of Entomologists be given once in *three* years, the season for it will recur next Christmas.

Dr. Hagen, during his stay in London, wrote a short paper on Fossil Insects, which, as the subject is one but little studied by Entomologists in general, we have given a prominent position in the present Volume. Unfortunately, whilst Dr. Hagen was here he had not means of referring to all his notes on the subject, and hence one or two important errors have crept in, which will be found noticed in the Errata, Dr. Hagen having fortunately detected them after he reached home, and pointed them out to us just before the publication of the Volume.

For reasons to which it is unnecessary to refer more particularly, we have omitted our list of New British Coleoptera in 1861; but our Index to the New British Coleoptera in former Volumes has been kindly furnished by Mr. W. F. Kirby.

Mr. McLachlan's contribution of "Notes on British Trichoptera" will be read with interest by all those who regret, like ourselves, that so many orders should have suf-

ferred hitherto from an almost universal neglect. It is very cheering to find that, when an energetic worker steps forward and shows plainly that he *means* work, assistance comes forward from various unsuspected quarters.

Mr. Scott's notes "On Hemiptera" will, we trust, be found also to touch a responsive chord, and lead to increased study of those elegant but fragile insects. As a writer lately observed in the "Saturday Review," "we must work trusting that some one of the thousand seeds we sow will take root; and often good comes where we least rely on it."

Mr. Smith has kindly furnished, as on previous occasions, some notes on Hymenoptera, observed during the past season; and has given, in addition, a very complete little Monograph of the Family of the ruby-tailed flies (*Chrysididæ*).

Mr. Harpur Crewe has furnished some more notes on the larvæ of the genus *Eupithecia*, and has indicated those which are yet unknown to him, and the most likely modes of obtaining them; we have no doubt he will readily obtain the co-operation which his persevering labours in this field so richly deserve. †

We have incorporated, in our observations on Tineina, both those which relate to British and to Continental species; the result will be more acceptable abroad, and it will certainly not be of diminished utility here. We have to express our hearty thanks to our various Correspondents, who have furnished us with so rich a harvest of observations. The discovery of the larva of the singular genus *Micropteryx* affords an amusing illustration of our aptness to look *over* the very object for which we are searching. The credit of first rearing one of this genus is due to Herr Kaltenbach,

of Aix-la-Chapelle ; but we have not yet been able to ascertain with accuracy the name of the species reared by him.

The decease of "The Entomologist's Weekly Intelligencer" is probably now well known to most of our readers ; we had fully intended a short obituary notice of that Journal, but unfortunately our space was all pre-occupied more rapidly than we had anticipated, and hence we found it impossible to carry out our wishes. Perhaps we may manage it next year.

H. T. STANTON.

MOUNTSFIELD, LEWISHAM,
December 23rd, 1861.

EXPLANATION OF PLATE.



- Fig. 1. *Nonagria Elymi*, Treitschke, see page 108.
2. *Leucania putrescens*, Hübner, see page 116, and Entomologist's Annual, 1860, page 130.
3. *Xylina conformis*, Wiener Verzeichniss, see page 108.
4. *Myrmica lævigata*, Smith, female, see page 70.
5. *Philopotamus Scoticus*, new species, see page 34.
6. *Metatropis rufescens*, Herrich-Schäffer, see page 156.
7. *Myrmica lævigata*, worker major, see page 70.
8. " " worker minor, see page 70.
-

ERRATA.



- Page 1, lines 5 and 4 from bottom, for 1,000 read 600.
Page 1, line 3 from bottom, for 600 read 400.
Page 6, line 7 from bottom, for $4\frac{1}{2}$ inches read $7\frac{1}{2}$ inches.
Page 7, line 7, for $4\frac{1}{2}$ —5 inches read $7\frac{1}{2}$ —8 inches.

CONTENTS.

	PAGE
FOSSIL ENTOMOLOGY.	
A Comparison of the Fossil Insects of England and Bavaria. By DR. HAGEN	1
COLEOPTERA.	
Index to the new British Coleoptera enumerated in the Entomologist's Annual, 1856—1861. By W. F. KIRBY.	11
TRICHOPTERA.	
Notes on British Trichoptera, with Descriptions of New Species, &c. By R. M'LACHLAN	21
LEPIDOPTERA.	
Notes on Eupithecia Larvæ. By the REV. H. H. CREWE, M.A.	38
A Chapter on Zygæna Minos. By the EDITOR	50
New British Species in 1861. By the EDITOR	105
Rare British Species captured in 1861	115
Observations on British and Continental Tineina	119
Answers to Enigmas	141
Enigmas still unanswered	141
New Enigmas for Solution	145
Natural History of the Tineina	147
HYMENOPTERA.	
Notes on Hymenoptera observed during the past Season; some Observations on Hymenopterous Parasites, and a Monograph of the Family <i>Chrysididæ</i> . By FREDERICK SMITH	69
HEMIPTERA.	
On Hemiptera, commonly called Bugs. By JOHN SCOTT ..	150
NEW WORKS ON ENTOMOLOGY	158

A COMPARISON OF THE FOSSIL INSECTS OF ENGLAND AND BAVARIA.

BY DR. HAGEN.

*(Read before the Geological Section of the British Association at Manchester,
September, 1861.)*

I AM desirous of making a few remarks on the Fossil Insects of the Lias and Wealden, as far as they have been described and figured. Formerly the fossiliferous strata of Solenhofen and Eichstadt in Bavaria were considered analogous to the English secondary strata; later investigations have, however, established that the English strata are considerably older. The specimens that have hitherto been described and figured from the Bavarian strata are not sufficiently numerous to enable us to form a judgment on the Fauna of those strata. I must especially call attention to the fact that the species described by Germar in the *Acta Academiæ Leopold.*, to which hitherto reference has always been made, are described from specimens, the outline of which has been artistically painted and completed. I have often examined the types carefully and can certainly maintain that this account of them is correct.

The Royal Collection in the Academy of Munich and the collection of Dr. Crantz of Bonn contain together about one thousand stones with insects, and, even deducting the double stones, this represents at least six hundred specimens.

A few weeks back I had an opportunity of studying very carefully the collection at Munich, and was much surprised

at the splendid preservation of many of the specimens. One-third of the entire collection is *Libellulæ*, another third consists of *Orthoptera* and *Hemiptera*, especially gigantic species of *Belostoma*, *Pygolumpos* and *Nepa* the remaining third consists of *Coleoptera*, *Hymenoptera* and *Diptera*.

On comparing the insects of Solenhofen and Eichstadt with those of England, there appears in the first place a difference which may possibly admit of interesting inferences: the insects of the Bavarian strata are almost universally preserved entire; wings, legs, head and antennæ are in their proper places; most of the *Libellulæ* have their wings expanded. He who has noticed, on the sandy shores of the Baltic, how depositions of insects are now taking place, will admit that the insects of the Solenhofen strata were already dead when deposited.

The insects would be, as now, driven by the wind into the sea, thrown on the shore dead or dying, and there gradually covered with sand by the rippling waves. That this process took place extremely gradually and slowly in the Solenhofen strata is evident also from another circumstance; for we frequently find the cavities of insects, the head, thorax and body, filled up with regular crystals of calcareous spar. Hence the pressure of the stratum overlying the insects must have been very slight, when such delicate parts as the abdominal segments of a dragon-fly could oppose resistance for a sufficient length of time to admit of the formation of crystals.

Naturally there do occur, here and there, in the Solenhofen strata impressions of insects obtained in a different way, which admit of the idea of a very heavy pressure from the superincumbent strata, yet these specimens are scarce and form only a small proportion of the entire number.

In direct contrast to what is above stated, the fossil strata of England very rarely contain entire insects; generally there are only some parts of the wings, abdomen and thorax, and these besides are generally imperfect.

Hence it appears to me worthy of consideration, to ascertain by an investigation of the fossils remaining in the English strata, whether their position and state of preservation admits of the inference that their deposition took place without disturbance, and not rather that by storm or by other commotions the fragments were tossed about for a long time before they found a resting-place.

There is the less to be said against this conjecture, that the wings of insects (which form by far the largest portion of the Entomological fossils in the English strata) are almost indestructible in water. I have kept the wings of dragon-flies in water for years, without observing the slightest change in their texture. The preponderance of wings of *Coleoptera* in the English strata also confirms my view, as from their consistence they are better capable of resisting such violence than the wings of other insects, whereas in the Solenhofen strata on the other hand there are even vertebrata, which confirm the idea of a leisurely and tranquil deposit. For instance, one rarely finds a Pterodactyl of which all the parts are not near together.

A more precise study of the fossil insects of Bavaria, and a comparison with those of England, enables me to draw two conclusions.

Firstly, that the two Fauna are extremely closely allied, and that possibly some species occur in both formations. It will at any rate require very strong arguments to prove the distinctness of some species.

Secondly, that the Fauna of the English and Bavarian strata is not only quite distinct from the existing Fauna, but

also from those of Aix, of the Rhenish peat-deposit, of Cœningen and Radoboj; and from that of amber, differing not only in species but in genera.

It had so often been announced that the mass of the Solenhofen fossil *Libellulæ* were of the genus *Æschna*, that I was hence the more surprised, amongst all the numerous specimens I examined, to see only a single ill-preserved specimen of an *Æschna*; nearly all the remaining specimens being *Gomphidæ* or *Calopterygidæ*. Amongst the numerous Solenhofen insects there is this remarkable circumstance, that at a first glance an insect seems in general appearance to accord precisely with some existing genus, but, on a closer examination, we find such distinctive characteristics and so many of them that the insect cannot possibly be placed in the genus to which it, at first sight, seemed referable. As far as I can at present perceive, almost all the Solenhofen insects will necessitate the construction of new genera, which, however, will often furnish connecting links between some of our existing genera.

If we turn our attention to the *Odonata*, which form so large a portion of the insect Fauna of the Bavarian strata, and pieces of the wings of which seem also not uncommon in the English strata, we find a remarkable and apparently inexplicable contrast between the Fauna of the English secondary strata and the Fauna of Cœningen and Radoboj. Whilst here, as also in the Rhenish peat, larvæ and pupæ of *Libellulæ* are found in great numbers, many often lying together, the perfect insects being proportionally scarce; in the Solenhofen and Eichstadt deposits *Libellulæ* are precisely the most plentiful specimens (forming one-third of all the insects), and on the other hand up to the present time not a single larva or pupa has been found.

In the Rhenish peat the circumstance is interesting that we find in it pupa skins and larvæ; as is well known the *Libellulæ* make their appearance above the water in which the larvæ reside.

The absence of larvæ in the Solenhofen strata admits, however, of easy explanation if we suppose that the waters, on whose shores the Solenhofen strata were deposited, were salt. Just as at the present day numerous *Odonata* are buried in the sand on the shores of the Baltic, although their larvæ do not live in that sea. The deposits of Æningen and Radoboj we must on the other hand conclude were made in fresh water.

The comparative richness of a collection which, like that at Munich, has been made without any special predilection for any particular class of animals, furnishes an approximatively correct idea of the Fauna of such strata.

Out of 450 insects (omitting the duplicate impressions) 150 are *Neuroptera* in the Linnean sense, and out of these 136 are *Odonata*. Of those not *Odonata* six only (comprising four species) belong to the *Neuroptera* as restricted by Erichson, namely, one species of *Corydalidæ*, one *Chrysopa*, a large *Apochrysa* and a beautiful *Nymphes*. The last two genera, which do not seem very remote from *Chrysopa*, are now found only in the Southern Hemisphere. *Nymphes* is peculiarly an Australian genus; the presence of this genus in the Solenhofen Fauna is hence very interesting, and still more so as a species of *Nymphes* occurs in the amber of Eastern Prussia.

All besides these six specimens mentioned belong to insects which are now usually referred to *Orthoptera*. If to these we add the numerous *Locustæ* and *Blattæ*, nearly one-half of all the insects will consist of *Orthoptera*.

Returning again to the *Odonata*, we find that of the *Libellulina* there are 4 species 14 specimens.

<i>Æschnina</i>	„	1	„	1	„
<i>Gomphina</i>	„	7	„	62	„
<i>Calopterygina</i>	„	11	„	53	„
<i>Agrionina</i>	„	4	„	6	„

It is hence certain that the *Gomphina* and *Calopterygina* have been much the richest both in individuals and in species. This proportion is not surprising to those who have attended particularly to these families of insects. For these very families exhibit such curious forms, between which the intermediate species are wanting, that it was rightly suspected the missing links would be found in the Fossil Fauna.

The *Gomphidæ* of Solenhofen principally belong to species which come near the genera *Petalia*, *Phenes*, and *Petalura*, thus to genera of which at the present day a few species occur in Chili and Australia, and differ strikingly in many respects from all other genera.

It is of importance to notice that the specimens of *Gomphidæ* from the English strata (Brodie, Foss. Ins. Pl. 5, fig. 7, Pl. 10, fig. 3, and Westwood, Quart. Jour. Proc. Geol. Soc. 1854, vol. x., Pl. 15, fig. 3) come very near both in form and size to the most plentiful of the Solenhofen species, *Petalia longialata*, at least as far as can be judged from the fragments. The Fossil *Gomphina* of Solenhofen are generally very large, and some are truly gigantic—4 inches in length, with an expanse of wings of $4\frac{1}{2}$ inches.

The *Calopterygina* of Solenhofen are divisible into two groups; one, containing four species, comes nearest to the genera of the group *Euphæa*, yet the species cannot be located in any existing genera; the second forms the singular *Heterophlebia* of Westwood; the most frequent Solenhofen species, *H. eximia*, comes so near the English species

H. dislocata, that to establish their difference requires a careful scrutiny, and I have not had an opportunity of personally examining the English species. Of the remaining five species which I refer to the group *Heterophlebia*, four belong to new genera, which must be placed in that group. Two of these belong to the largest *Odonata* yet known, having an expanse of wing of $4\frac{1}{2}$ —5 inches, and bodies $3\frac{3}{4}$ —4 inches in length. Their elongate pterostigma reminds one strongly of *Petalura*, whilst the club-like dilated abdomen in both the other species affords a repetition of the form of *Ictinus*. Of the English specimens already noticed the wings figured in Brodie's Fossil Insects, Pl. 10, fig. 4, resemble the wings of the above-mentioned Solenhofen species. I mean that it belongs to the group *Heterophlebia*, the genera forming connecting links between *Calopterygina* and *Gomphina*.

The true *Libellulina* are only very feebly represented in the Solenhofen strata by four species: fortunately one specimen is in sufficiently good preservation to admit of the comparison with an English specimen, namely, with that of which the basal portion of a posterior wing is figured by Brodie (Pl. 5, fig. 10; Westwood, Pl. 15, fig. 5). The fine neuration and the extraordinary multitude of cells reminds one of the genus *Polyneura*. But if we examine more closely we shall find a form of neuration which has no representative in the greater number of existing species; that is, the triangle of the posterior wings is formed exactly like the triangle of the anterior wings, the post-costa being united with the upper angle of the triangle, whereas otherwise it always runs to the lower angle. This form is so abnormal, that in the entire family of the *Odonata* I know of nothing to which it can be compared. Here also the English species seems to come very near to that from Solenhofen.

The remaining families which do not belong to the *Odonata* have hitherto met with few representatives in England as in Solenhofen. In the *Termites* there occurs in England the smallest species yet known (Brodie, Pl. 2, fig. 6), in Solenhofen the largest, with an expanse of wings of two inches, and one species of medium size.

Fossil *Perlidae* are not found in either Fauna. Some specimens from Solenhofen I consider as *Ephemera*; they should belong to about four species. The form anduration of the wings is, however, extraordinarily different from existing species, yet they seem to come nearest to the true genus *Ephemera*. In one species we meet with the remarkable fact that the posterior wings are as large as the anterior, a similarity nowhere found in existing species.

Of the families which belong to *Neuroptera* (more restrictedly viewed) the *Panorpidæ* have not yet been found in either Fauna. The *Hemerobidæ* are only represented in the Solenhofen Fauna by several specimens, referable to three species. A very large *Apochrysa* (it should not be overlooked that the remains of some *Hemerobius* wings found in England (Brodie, Pl. 6, fig. 22) should also be referred to *Apochrysa*), a *Chrysopa*, and lastly a very well preserved *Nymphes*, a genus now peculiarly Australian.

In the family *Sialidæ*, the Solenhofen Fauna possesses specimens of a *Corydalis*, and in England also a well-preserved anterior wing of a *Corydalis* has been found. I have seen the original at the British Museum: it is in extraordinarily good preservation. (I believe it has been figured by Mantell, but I know not where.) The English species is of the same size with that from Solenhofen; they have however not been sufficiently examined to establish their difference. To the best of my recollection theuration of the English species is very similar to that of existing species.

Of *Phryganidæ* fragments have only hitherto been found in the English strata: I refer here some of the species placed in the genus *Orthophlebia* (thus Brodie, Pl. 2, fig. 7; Pl. 5, fig. 12; Pl. 8, figs. 7, 8, 9; Pl. 10, figs. 9—12; Pl. 9, fig. 16, 17, and Westwood, Pl. 15, fig. 14* and ☉).

All these, excepting the last, belong to the *Rhyacophilidæ*; the last mentioned is however evidently a *Heteropalpus*, and reminds one, by its neuration, of the *Sericostomidæ*.

The beautiful preservation of one Solenhofen insect admits of a satisfactory explanation of a number of wings found in the English strata which have hitherto been reputed Neuropterous; I allude to the delicate little grasshopper *Locusta amanda* of Hagen.

The wing from Durdlestone Bay (Westwood, Pl. 15, fig. 17) is in form and size so similar to the Solenhofen *Locusta*, that a very close investigation will be necessary to prove it distinct. The Solenhofen species is wonderfully preserved, and by the stout jumping feet, the ovipositor of the female and the long and thin antennæ, is evidently one of the *Locustina*. The tibiæ of the hinder legs have externally just before the ends a leaf-like process, to which, as far as I am aware, there is nothing analogous in existing species. And if the wing represented by Westwood (Pl. 15, fig. 17) is truly a *Locusta*, then other specimens (Pl. 15, fig. 16; Pl. 17, fig. 12; Pl. 17, fig. 7 (a fragment); Pl. 18, fig. 26, 37, 39, and in Brodie, Pl. 5, figs. 13, 21, Pl. 8, figs. 6, 14, 3, 11; Pl. 10, figs. 5, 14) also belong to similar species of *Locustina*.

The Solenhofen strata contain a number of other species of *Orthoptera*. I was particularly interested in a species of gigantic size, the more especially as the fine neuration throughout reminds me of the fragment figured by Westwood (Pl. 17, fig. 21).

The *Blattina* are on the whole scarcer in the Solenhofen strata than in the English; and besides, I have not examined the specimens so carefully as to be able to express an opinion on them here. To this group belong Westwood's figures, 19, 20, 22, 23, 24, 26, on Pl. 15; Pl. 17, figs. 10, 13; Pl. 18, figs. 22, 25, 28, 34, 35, 43, and in Brodie's work, Pl. 5, figs. 1, 2, 3, 4, 14, 16, 20; Pl. 8, figs. 12, 13.

With reference to two wings which Westwood deemed Orthopterous (Pl. 18, fig. 24 and 42, *Sialium sipylus*) I do not feel quite certain. They have so many points of resemblance to *Hemerobius*, especially to *Nymphes*, that it appears to me not improbable they may belong to the *Neuroptera*. A third specimen (Pl. 17, fig. 16), *Raphium Brephos*, differs too essentially in its neuration from the *Raphidia* to be referred there without hesitation. In the Solenhofen strata the *Hemiptera* are represented by gigantic *Pygostylus* and other species; but I am unable here or in the *Coleoptera*, *Hymenoptera* and *Diptera* to make a comparison with the English strata.

The principal result of my present investigations has been that the Fauna of the English secondary strata seems allied to the Bavarian in many respects, and that some species are so very similar that a very close comparison is necessary to establish their distinctness. That comparison must be made by English naturalists, as I have had no opportunity of seeing the fossil insects of England.

INDEX TO THE NEW BRITISH COLEOPTERA
 ENUMERATED IN THE ENTOMOLOGIST'S
 ANNUAL, 1856—1861.

BY W. F. KIRBY.



IN accordance with the suggestion in the preface to the Entomologist's Annual for 1861, I have occupied myself in drawing up this Index. I am no great Coleopterist, but I hope perseverance will make up for my deficiencies in other respects. I have collated almost every species with Mr. Waterhouse's and the Stettin Catalogues. I have adopted the nomenclature of the former. The figures under the various years always refer to the consecutive number of any species in Mr. Janson's paper for that year; except in a few of the *Geodephaga* marked (*), where the reference is to the pages of the Annual. When I have used a name different from that employed by Mr. Janson, I have placed the Annual name underneath in *italics*. I thought it needless to include 1855 in my Index; for 227 species being therein enumerated, the notices are necessarily so short and conspicuous, that they strike the eye at once. I may mention that I did not find my task so difficult as I expected, nor, except the collation of synonymes, by any means unpleasant. Dean Trench, in his little book on the Study of Words (pp. 3, 4), mentions a scholar who found compiling a Greek lexicon, so far from being a drudgery, a very delightful occupation. To compare small things with great, I have experienced a somewhat similar feeling in drawing up the present Index. I mention this for the encouragement of those who are afraid of this unattractive kind of work, whether connected with Entomology or any other subject.

	1856	1857	1858	1859	1860	1861
*Zuphium olens	49	..	..	..
*Dyschirius elongatulus	72	..	..	..	..	..
Notiophilus substriatus	1	..	..
*Nebria nivalis	143	..	..
*Chlænienus Schrankii	51	..	..	..
* „ Maillei	61	..	..	..	..
*Patrobis Lapponicus	144	..	..
Anchomenus versutus	2	..
„ gracilipes	1	..
*Amara infima	64	..	..	..	..
* „ rufocincta	65	..	..	..	..
Harpalus servus, E. A. 1859, fig. 6...	2	..	..
* „ calceatus	66	..	..	..	..
Bradycellus harpalinus	1
*Bembidium Sturmii	67	..	..	..	..
„ nigricornis	2
Dytiscus Lapponicus	1	..	..	..	..	..
Agabus pulchellus	1	..	..	..	..
Hydroporus melanarius	2	..	..	..	..	..
„ elongatulus	3	..	..	..	..	..
Gyrinus celox	4	..	..	..	..	..
Eolitochara lucida	1	..	..	..
„ lunulata	9	..	..
„ bella	2	..	..	..
Phytosus nigriventris	3	..	..	..
Silusa rubiginosa	4	..	..	..
Ocalea rivularis	5	..	..	..
„ badia	6	..	..	..
Leptusa fumida	7	..	..	..
„ ruficollis	8	..	..	..
Thiasophila angulata	17	..	..	..	..
„ inquilina	9	..	..	..
Euryusa laticollis	30	..	..
„ Kirbyi, E. A. 1858, fig. 8....	10	..	..	..
Homœusa acuminata	18	..	..	..	..
Haploglossa gentilis	5	..
Aleochara mycetophaga	11	..	..	..
„ bisignata	23	..	..
Dinarda dentata	12	..	..	..
Atemeles paradoxus	19	..	..	..	..
Myrmedonia cognata	6	..	..	..	..
„ laticollis	7	..	..	..	..
„ lugens	8	..	..	..	..

	1856	1857	1858	1859	1860	1861
<i>Ilyobates propinqua</i>	13	..	..	..
„ <i>forticornis</i>	14	..	..	..
<i>Callicerus rigidicornis</i>	15	..	..	..
<i>Calodera nigrita</i>	16	..	..	..
„ <i>riparia</i>	10	..	..
„ <i>æthiops</i>	17	..	..	..
„ <i>umbrosa</i>	18	..	..	..
<i>Ischnopoda rubicunda</i>	11	..	..
<i>Tachyusa scitula</i>	19	..	..	..
„ <i>sulcata</i>	20	..	..	..
„ <i>concolor</i>	6	..
<i>Ocyusa picina</i>	18	..	..
(<i>Ocyusa ruficornis</i>)
<i>Oxypoda spectabilis</i>	7	..
„ <i>vittata</i>	14	..	..	..	..
„ <i>nigrina</i>	20	..	..
„ <i>nigrofusca</i>	21	..	..
„ <i>exigua</i>	21	..	..	..
„ <i>exoleta</i>	22	..	..	..
„ <i>hæmorrhœa</i>	15	..	..	..	..
„ <i>formiceticola</i>	16	..	..	..	..
„ <i>rufula</i>	19	..	..
„ <i>aterrima</i>	22	..	..
<i>Homalota currax</i>	23	..	..	..
„ <i>debilicornis</i>	24	..	..	..
„ <i>fragilicornis</i>	25	..	..	..
„ <i>pagana</i>	26	..	..	..
„ <i>nitidula</i>	27	..	..	..
„ <i>imbecilla</i>	12	..	..
„ <i>languida</i>	28	..	..	..
„ <i>cambrica</i>	5	..	..	..	..
„ <i>hygrotopora</i>	29	..	..	..
„ <i>luridipennis</i>	30	..	..	..
„ <i>fragilis</i>	31	..	..	..
„ <i>labilis</i>	32	..	..	..
„ <i>fallax</i>	33	..	..	..
„ <i>monticola</i>	34	..	..	..
„ <i>excellens</i>	35	..	..	..
„ <i>nigella</i>	36	..	..	..
„ <i>æquata</i>	37	..	..	..
„ <i>pilosa</i>	38	..	..	..
„ <i>debilis</i>	39	..	..	..
„ <i>deformis</i>	40	..	..	..
„ <i>plumbea</i>	13	..	..

	1856	1857	1858	1859	1860	1861
<i>Homalota ægra</i>	14	..	..
„ <i>plana</i>	9	..	..	..	..
„ <i>cuspidata</i>	10	..	..	..	..
„ <i>exilis</i>	41	..	..	..
„ <i>inconspicua</i>	42	..	..	..
„ <i>flavipes</i>	11	..	..	..	..
„ <i>confusa</i>	12	..	..	..	..
„ <i>anceps</i>	13	..	..	..	..
„ <i>hepatica</i>	43	..	..	..
„ <i>triangulum</i>	44	..	..	..
„ <i>sublinearis</i>	45	..	..	..
„ <i>nigritula</i>	46	..	..	..
„ <i>sodalis</i>	47	..	..	..
„ <i>divisa</i>	48	..	..	..
„ <i>coriaria</i>	49	..	..	..
„ <i>nigra</i>	50	..	..	..
„ <i>hospita</i>	51	..	..	..
„ <i>scapularis</i>	52	..	..	..
„ <i>oblita</i>	53	..	..	..
„ <i>sordidula</i>	54	..	..	..
„ <i>inquilina</i>	55	..	..	..
„ <i>marcida</i>	15	..	..
„ <i>subrugosa</i>	56	..	..	..
„ <i>villosula</i>	57	..	..	..
„ <i>melanaria</i>	68	..	..	..
„ <i>orbata</i>	16	..	..
„ <i>pulchra</i>	17	..	..
„ <i>clientula</i>	59	..	..	..
„ <i>cæsula</i>	60	..	..	..
<i>Placusa infima</i>	61	..	..	..
„ <i>pumilio</i>	29	..	..
<i>Phlæopora corticalis</i>	62	..	..	..
<i>Schistoglossa viduata</i>	63	..	..	..
<i>Oligota atomaria</i>	8	..
„ <i>granaria</i>	24	..	..
„ <i>flavicornis</i>	25	..	..
<i>Gyrophæna gentilis</i>	26	..	..
„ <i>lucidula</i>	64	..	..	..
„ <i>minima</i>	65	..	..	..
„ <i>strictula</i>	27	..	..
<i>Agaricochara lævicollis</i>	28	..	..
<i>Myllæna infuscata</i>	66	..	..	..
<i>Hypocyptus pulicarius</i>	31	..	..
„ <i>pygmæus</i>	32	..	..

	1856	1857	1858	1859	1860	1861
Tachinus rufipennis	37	..	..
„ bipustulatus	38	..	..
„ laticollis	10	..
Tachyporus tersus	34	..	..
„ transversalis	35	..	..
Lamprinus saginatus	36	..	..
Conurus pedicularius	}	9	..
(<i>Conosoma pedicularium</i>)						
„ bipunctatus.....	33	..	..
Mycetoporus lucidus	39	..	..
„ punctus	40	..	..
„ angularis.....	5
Acylophorus glabricollis	11	..
Heterothops dissimilis.....	51	..	..
„ quadripunctulus	52	..	..
Quedius truncicola	6
„ xanthopus	53	..	..
„ scitus	54	..	..
„ lævigatus	55	..	..
„ brevis	21	..	..	..	..
Philonthus lucens.....	42	..	..
„ lepidus	43	..	..
„ fuscus.....	12	..
„ corvinus.....	67	..	..	..
„ splendidulus	44	..	..
„ thermarum	45	..	..
„ fumarius	46	..	..
„ nigrita	47	..	..
„ pullus.....	48	..	..
„ cinerascens	49	..	..
„ signaticornis	50	..	..
Xantholinus longiventris.....	41	..	..
Leptacinus formicetorum.....	..	20	..	..	..	..
Lathrobium rufipenne	56	..	..
„ pallidum	57	..	..
Stilicus subtilis	61	..	..
„ similis	62	..	..
„ geniculatus	63	..	..
Scopæus lævigatus	58	..	..
Lithocharis brunnea.....	59	..	..
„ apicalis	60	..	..
Sunius filiformis	68	..	..	..
Pæderus caligatus.....	64	..	..
Evæsthetus læviusculus	68	..	..

	1856	1857	1858	1859	1860	1861
<i>Everstherus ruficapillus</i> .....	..	..	..	69	..	..
<i>Stenus asphalticus</i>	6	..	..	..	..	..
.. <i>ater</i>	7	..	..	..	..	..
.. <i>incrassatus</i>	9	..	..	..	..	..
.. <i>opacus</i>	10	..	..	..	..	..
.. <i>rapido</i>	8	..	..	..	..	..
.. <i>exiguus</i>	11	..	..	..	..	..
.. <i>Gaynemerii</i> .....	}	..	..	67	..	..
.. (<i>Stenus ruficornis</i>)						
.. <i>providus</i>	12	..	..	..	..	..
.. <i>proditor</i> .....	..	..	..	..	13	..
.. <i>Argus</i>	13	..	..	..	..	..
.. <i>cyneus</i> .....	..	..	..	..	14	..
.. <i>picipennis</i> .....	..	..	..	66	..	..
.. <i>geniculatus</i>	14	..	..	..	..	..
.. <i>navipes</i>	15	..	..	..	..	..
.. <i>palustris</i> .....	..	..	..	..	15	..
.. <i>fruscicornis</i>	16	..	..	..	..	..
.. <i>solutus</i> .....	..	..	..	65	..	..
.. <i>luteifrons</i>	17	..	..	..	..	..
<i>Pledius unicornis</i> .....	..	..	69	..	..	..
.. <i>_____?</i> .....	}	..	..	70	..	..
.. (<i>Bledius pallipes</i>)						
.. <i>femoralis</i> .....	..	..	..	71	..	..
<i>Platystethus nodifrons</i> .....	..	..	..	72	..	..
.. <i>capito</i> .....	..	..	..	73	..	..
.. <i>nitens</i> .....	..	..	..	..	16	..
<i>Oxytelus piceus</i> .....	..	..	..	74	..	..
<i>Ancyrothorus Omalinus</i> .....	..	..	..	75	..	..
<i>Tragoplicus foveolatus</i> .....	..	..	..	76	..	..
<i>Tanobius brunneipennis</i> .....	..	..	..	77	..	..
<i>Acrognathus mandibularis</i> , E. A. {	..	..	..	78	..	..
1860, fig. 6						
<i>Anthophagus caraboides</i> .....	..	..	..	79	..	..
<i>Lesteva pubescens</i> .....	..	..	..	80	..	..
<i>Omalius exiguum</i> .....	..	..	..	83	..	..
.. <i>monilicornis</i> .....	..	..	..	81	..	..
.. <i>planum</i> .....	..	..	..	82	..	..
.. <i>pygmaeum</i> .....	..	..	..	84	..	..
.. <i>infantum</i> .....	..	..	..	85	..	..
<i>Megarthus sinuato-collis</i> .....	..	..	..	86	..	..
.. <i>hemipterus</i> .....	..	..	..	87	..	..
<i>Choleva spadicea</i>	}	8	..	..	..	..
.. (<i>Cateps spadiceus</i>)						

	1856	1857	1858	1859	1860	1861
<i>Choleva coracina</i>	4	..	..	..	..
(<i>Catops coracinus</i>)	5	..	..	..	..
<i>Adelops Wollastoni</i> , E. A. 1857, fig. 8	5	..	..	..	..
<i>Euthia plicata</i>	8	..	..
<i>Anisotoma brunnea</i>	3	..	..
,, <i>ciliaris</i>	4	..	..
,, <i>nigrita</i>	17	..
<i>Cyrtusa minuta</i>	5	..	..
<i>Agaricophagus cephalotes</i>	6	..	..
<i>Liodes orbicularis</i>	7	..	..
<i>Hister marginatus</i>	88	..	..
<i>Heterius sesquicornis</i> , E. A. 1857, fig. 7	22	..	..	..	..
<i>Saprinus piceus</i>	23	..	..	..	..
,, <i>immundus</i>	89	..	..
,, <i>metallicus</i>	90	..	..
<i>Abræus granulum</i>	22	..
<i>Acritus nigricornis</i>	91	..	..
<i>Epuræa neglecta</i>	70	..	..	..
<i>Nitidula flexuosa</i>	24	..	..	..	..
<i>Cychramus fungicola</i>	13
<i>Olibrus oblongus</i>	24	..
<i>Rhizophagus politus</i>	25	..
<i>Oxylæanus cylindricus</i> , E. A. 1857, fig. 1	25	..	..	..	..
<i>Anommatus duodecim-striatus</i>	71	..	..	..
<i>Monotoma conicicollis</i>	52	..	..	..	..
,, <i>angusticollis</i>	53	..	..	..	..
<i>Læmophlæus duplicatus</i>	26	..
,, <i>Clematidis</i> , E. A. 1858, } fig. 1	72	..	..	..
<i>Silvanus similis</i>	73	..	..	..
<i>Atomaria fimetarii</i>	74	..	..	..
,, <i>peltata</i>	75	..	..	..
,, <i>atra</i>	76	..	..	..
,, <i>basalis</i>	77	..	..	..
,, <i>munda</i>	78	..	..	..
,, <i>Hislopi</i>	79	..	..	..
<i>Heterocerus rectus</i>	15
,, <i>fuscus</i>	16
<i>Hydrochus carinatus</i>	4	..
<i>Helophorus intermedius</i>	3	..
,, <i>pumilio</i>	2	..	..	..	..
<i>Trox hispidus</i>	17
<i>Cratonychus castanipes</i>	23	..	..	..	..	..

	1856	1857	1858	1859	1860	1861
Megapenthes tibialis	24	..	..	..	..	..
(<i>Ampedus subcaeratus</i>)						
Telephorus elongatus	18
(<i>Rhagonycha elongata</i>)						
Byturus fumatus	31	..
Dorcatoma flavicornis, E. A. 1858, fig. 7	81	..	..	..
.. chrysomelina	19
Rhopalodontus perforatus	20
Cis micans	21
.. Alni	22
.. festivus	23
.. fuscatus	24
Ennearthron cornutum	25
Blephs mortisaga	103	..	..
Hallomenus humeralis, L. A. 1859, fig. 8	104	..	..
Anthicus binaculatus	26
Tomoxia biguttata	32	..
Tropideres sepicola, E. A. 1861, fig. 8	..	54	..	..	..	..
Otiorhynchus septentrionis	25	..	..	..	..	..
Brachonyx indigena, E. A. 1861, fig. 7	..	*	27
Amalus minimus	47	..	..	..	..
Tychius flavicollis	28	..	..	..	..
.. hæmatocephalus	29	..	..	..	..
Smicronyx cicut	30	..	..	..	..
Orchestes rufus	32	..	..	..	..
.. lutea	33	..	..	..	..
Baridius Lepidii	31	..	..	..	..
(<i>Basis Lepidii</i>)						
Cœliodes sub-ufus	34	..	..	..	..
Begöus nodulosus	30
.. limosus	25	..	..	..	..
.. Petrosus	36	..	..	..	..
.. Frit	37	..	..	..	..
.. lutulosus	38	..	..	..	..
Pachyrhinus canaliculatus	39	..	..	..	..
Ceuthorhynchus Syrites	7.	..	..	..	..	28
.. impressicollis	40	..	..	..	..
.. Crux	41	..	..	..	..
.. crassidentatus	42	..	..	..	..
.. biguttatus	44	..	..	..	..
.. hispidulus	45	..	..	..	..
.. tarsalis	29
.. chalybeus	46	..	..	..	..

	1856	1857	1858	1859	1860	1861
<i>Gymnetron collinus</i> .....	..	48	..	..	..	..
<i>Miarus plantarum</i> .....	..	49	..	..	..	..
<i>Phlæophagus spadix</i> .....	..	50	..	..	..	..
<i>Rhyncolus truncorum</i> , E. A. 1858, fig. 9 ..	..	..	82	..	..	..
<i>Hylastes cunicularius</i> .....	..	..	..	..	..	31
<i>Scolytus Ratzeburgii</i>	27	..	..	..	..	..
„ <i>Pruni</i> .....	..	..	..	..	33	..
„ <i>rugulosus</i> .....	..	..	84	..	..	..
<i>Cryphalus binodulus</i> , E. A. 1857, fig. 9 ..	..	51	..	..	..	..
„ <i>Abietis</i> .....	..	..	..	..	..	33
„ <i>Fagi</i> .....	..	..	..	..	..	32
<i>Tomicus bispinus</i>	{	..	83	..	..	..
(<i>Bostrichus bispinus</i>) .....	}	..	..	..	..	..
<i>Tomicus Saxesenii</i> .....	..	..	..	105	..	..
<i>Donacia obscura</i> .....	..	..	..	..	34	..
„ <i>aquatica</i> .....	}	..	..	..	..	34
(<i>Donacia Comari</i>) .....	}	..	..	..	..	..
<i>Lema Erichsonii</i> .....	..	..	..	106	..	..
<i>Crioceris dodecastigma</i> .....	..	..	..	..	..	35
<i>Cryptocephalus imperialis</i> , E. A. } 1859, fig. 5 .....	..	..	..	107	..	..
<i>Cryptocephalus variabilis</i> .....	..	..	..	108	..	..
<i>Crepidodera Atropæ</i> , E. A. 1861, fig. 5 ..	..	..	..	..	..	36
<i>Symbiotes latus</i> , E. A. 1860, fig. 7....	..	..	..	..	35	..
<i>Sphærius Acaroides</i> .....	..	..	..	102	..	..
<i>Ptinella Britannica</i> .....	..	..	..	97	..	..
„ <i>aptera</i> .....	..	..	..	..	..	11
„ <i>tenella</i> .....	..	..	..	..	20	..
„ <i>denticollis</i> .....	}	..	..	..	21	..
(<i>Ptinella angustula</i>) .....	}	..	..	..	..	..
„ <i>angustula</i> .....	..	..	..	..	..	12
„ <i>libata</i> , E. A. 1861, fig. 6 ..	..	..	..	..	..	10
„ <i>Ratisbonensis</i> .....	..	..	..	..	19	..
<i>Pteryx suturalis</i> .....	}	..	..	96	..	..
(<i>Pteryx mutabilis</i>) .....	}	..	..	..	..	..
<i>Trichopteryx thoracica</i> .....	..	..	..	93	..	..
„ <i>brevipennis</i> .....	..	..	..	94	..	..
„ <i>similis</i> .....	..	..	..	95	..	..
„ <i>convexa</i> .....	..	..	..	92	..	..
„ <i>suffocata</i>	18	..	..	..	..	..
„ <i>fucicola</i> .....	}	..	..	..	..	..
(<i>Trichopteryx mollis</i>)	}	19	..	..	..	..
<i>Micrus filicornis</i> .....	..	..	..	98	..	..
„ <i>pulchellus</i> .....	..	..	..	99	..	..

	1856	1857	1858	1859	1860	1861
<i>Ptilium angustatum</i>	20	..	..	..	..	..
„ <i>coarctatum</i>	21	..	..	..	..	..
„ <i>minimum</i>	22	..	..	..	..	..
(<i>Ptilium clandestinum</i>) }						
„ <i>fuscum</i> .. . . . . .	..	..	..	100	..	..
„ <i>canaliculatum</i> .. . . . . .	..	..	..	101	..	..
„ <i>cæsum</i> .. . . . . .	..	..	..	..	18	..
„ <i>brevicolle</i> .. . . . . .	..	..	..	..	..	8
„ <i>Saxonicum</i> .. . . . . .	..	..	..	..	..	9
<i>Ptenidium picipes</i> .. . . . . .	..	..	..	..	..	7
<i>Lathridius carinatus</i> .. . . . . .	..	..	..	..	..	14
„ <i>filiformis</i> .. . . . . .	..	..	80	..	..	..
<i>Corticaria cylindrica</i>	28	..	..	..	..	..
(<i>Corticaria borealis</i>) }						
„ <i>fulva</i> .. . . . . .	..	..	..	..	28	..
„ <i>serrata</i> .. . . . . .	..	..	..	..	27	..
„ <i>Wollastoni</i> .. . . . . .	..	..	..	..	29	..
„ <i>fuscula</i> .. . . . . .	..	..	..	..	30	..

NOTES ON BRITISH TRICHOPTERA, WITH
 DESCRIPTIONS OF NEW SPECIES, &c.

BY R. M'LACHLAN.



IN the few remarks on the *Trichoptera* in the last "Annual," I had to complain of the almost total neglect of the study and even of the collecting of these insects. On this my second appearance, I have very great pleasure in withdrawing such complaint. During the past season I have received great assistance, in specimens, from numerous Entomologists, with several of whom I had no previous acquaintance, and some of whose existence I was totally ignorant. From many distant parts of the country boxes have come, containing insects in this order; and by this means, combined with my own exertions, not only has my collection been increased to nearly a hundred species, but considerable information has been gained as to their geographical distribution, a subject on which we are still in a state of great uncertainty. But there are two quarters of which we at present have little or no information; I allude to Ireland and the extreme north and islands of Scotland. From the south-western portions of Ireland we might look for species that have their metropolis in the sunny climes of Spain and Italy; while, on the other hand, it is not improbable that in the north of Scotland arctic forms may occur, some of which, as is the case with many boreal species, may be common to both continents. That in almost any locality there

exists a rich but unworked mine of information and new species is patent from the success already met with.

A still more encouraging sign arises from the fact that there are now several English Entomologists who have turned their attention not only to collecting, but to the study of these interesting creatures. That there are difficulties to contend with, there can be no doubt. The absence of striking colours, the generally hyaline appearance of many species, and the existence of specific characters not often apparent on first sight, the due appreciation of which requires the eye to be educated to them, render a considerable amount of care and discrimination absolutely necessary. But, after all, it is the same with any undertaking: that which at a distance seems an obstacle almost insurmountable, becomes on closer acquaintance comparatively easy.

The past season has been marked by an unusual scarcity of insect life in almost all orders. The wet summer—or rather no summer at all—of last year, combined with the almost unprecedented cold of the winter, destroyed a vast number of larvæ and pupæ. But this scarcity, as far as I can see, has not been shared by the *Phryganidæ*. An excess of moisture can hardly be prejudicial to insects which in their preliminary states are aquatic; and, on the other hand, while terrestrial insects were congealed beyond recovery by the intense frost, the caddis worms in their ice-bound habitations were unaffected by external influences.

It is a matter deeply to be regretted that so little has yet been done in what is truly the natural history of insects in this order; and that after a lapse of twenty-seven years, Pictet's work should still be the only one that gives any amount of information on this point. But there are difficulties in the way not met with in other orders. The larvæ or pupæ must be placed in water immediately on being

taken, and this renders the business extremely awkward. In the "Intelligencer," vol. 10, p. 149, Dr. Hagen in part details a plan pursued in Germany by Professor von Siebold, viz. to inclose the larvæ or pupæ in a bag, which is to be half sunk in some shallow stream, and suspended at the top to an overhanging branch; but though this plan may be easily pursued in private grounds, it is difficult to imagine how long the bag would remain in position were it placed in the open country, save in very secluded spots, of which there are few sufficiently so, in this thickly populated country; nevertheless the plan is worth experimenting upon by those Entomologists who may reside in suitable localities.

A very interesting account is given by Professor von Siebold in the "Stettiner Entomologische Zeitung" for 1861, p. 59, and by Dr. Hagen in the "Intelligencer," vol. 10, p. 148, of the habits of a species of Ichneumon (*Agriotypus armatus*), which is parasitic upon the larvæ of *Silo pallipes*. It appears that when a larva is infested by the larva of this *Hymenopteron*, it is not contented with the limited sphere of observation to be found at the bottom of the stream, but seeks to extend its knowledge of the surrounding waters, and spins a long footstalk by which the case is elevated. Dr. Hagen seems to be of opinion that this is caused by a morbid craving of the affected larva. That gentleman, when in London, showed me some cases so furnished, and it struck me that it might be possible to account for it in another way. It is well known that the pupa of a Phryganideous insect, when about to assume the perfect state, leaves the case and swims to the surface, where it seeks a suitable position for its final change, and it seems to be within the bounds of possibility that the pupa of the ichneumon, not possessing the same natatory powers, may need this long peduncle to raise the case to the surface, and so enable the imago to escape

without injury. This seems to receive some sort of confirmation from the fact that apparently other species of ichneumons affecting other Trichopterous larvæ, cause the latter to spin similar footstalks. But of course this is mere conjecture, and needs further observations to demonstrate if it has any foundation in facts.

The Synopsis of the British *Phryganidæ* having been completed in the last "Annual," the following remarks and descriptions may be taken as supplementary thereto. Dr. Hagen laboured under a great disadvantage in not having the types actually before him when he wrote his descriptions; and in several instances, the species being unknown or ill-understood on the Continent, the only materials he could work upon were notes, which are liable to be misunderstood when a considerable space of time elapses before they are made use of. Another circumstance, which adds greatly to the difficulty experienced in determining many species, is the bad condition of most of Stephens's types. These have at some time been damp and mouldy, and in attempting to clean them, the hairy covering of the wings has in many instances been totally destroyed, thus rendering the specimens almost useless as types; this is especially the case with the *Leptoceridæ*. Mr. Curtis's collection is, on the contrary, in excellent preservation, and I am deeply indebted to the courtesy of that gentleman for being able to leisurely and carefully examine his types. He possesses several species not included in the Synopsis, and at least one that has not yet been recorded as British. It is unfortunate that Dr. Hagen, when going through the British *Neuroptera*, could not devote more than a few hours to a collection so rich in insects of this order, and which, as far as the *Phryganidæ* are concerned, is of especial interest, as containing the types described in almost the first attempt at descriptions of these

insects in Britain. I allude to Curtis's paper in the "Philosophical Transactions" for 1834, intituled "On some Non-descript British Species of the May Flies of Anglers." Dr. Leach's article on Entomology in the "Edinburgh Encyclopedia" contained really the first contribution towards furthering the study of the British *Trichoptera*; but he describes very few species. To Dr. Hagen great praise is due, inasmuch as his papers in the "Annual" have revived in this country a taste for the study of these insects, thus rendering the publication of a Monograph of the British species merely a question of time.

The following species have not been included in the Synopsis, and are described or noticed in their places in the remarks that follow. Those to which an asterisk is affixed have not been previously described as occurring in this country. I possess, or am acquainted with, specimens of nearly as many more, but am at present unable to give precise information respecting them. I fancy that my estimate in the last "Annual," of 150 British species, will eventually prove to be under the mark.

* *Agrypnia picta*, Kol.

Phacopteryx brevipennis, Curtis.

* *Stenophylax? concentricus*, Zett., Kolen.

Stenophylax Vibex, Curtis (not of Synopsis).

* *Stenophylax radiatus*, Ramb.

Leptocerus grossus, St. Cat.

* *Leptocerus fulvus*, Ramb.

Leptocerus aterrimus, Steph.

* *Setodes notata*, Ramb.

* *Setodes interrupta*, Fab.

* *Philopotamus scoticus*, new species.

Aphelocheira flavomaculata, Steph.

Tinodes pusillus, Curtis.

Phryganea minor, Curtis. A specimen of this very local species was taken at Lewisham by Mr. Fenn, who kindly gave it to me.

Agrypnia Pagetana, Curtis. Several examples of this have been taken in the Norfolk Fens by Mr. Winter.

Agrypnia picta, Kolen., Gen. et Species Trichop. pt. 1, p. 79, 2. New to Britain. In form somewhat similar to the last, but more robust. Antennæ brown, annulated with dark fuscous; body totally dark shining fuscous, the last abdominal segment above is furnished with a fringe of long orange-coloured hairs, which conceal the appendages; legs testaceous, the tips of the joints darker; anterior wings greyish-brown, or grey with brownish markings, and a few pale greyish spots; veins fuscous; posterior wings semi-hyaline, with a brownish tinge. Exp. alar. 1 inch.

A single example of this was taken by Mr. T. Chapman on Skiddaw, in July, 1854, and identified by Dr. Hagen during his visit. On the Continent, it is found in Silesia and Sweden. The appellation "*picta*" is a misnomer, unless taken comparatively.

Colpotaulius (Limnephilus) incisus, Curtis, was common near Merstham, Surrey, on the 22nd June; and has been also taken by Mr. Wormald at Willesden, and by Mr. Winter in the Fens. The habit of this species is to conceal itself under the dead leaves, &c., on the sides of the ponds or canals where it occurs, running about with great activity when disturbed. In appearance and habits it is so dissimilar to the rest of its congeners, that I think Kolenati's genus may be advantageously preserved.

Limnephilus pavidus, Hagen, is mentioned in the "Entomologist's Annual" for 1859, p. 77, as contained in the British Museum. It is without any label, but is supposed to have formed part of Dr. Leach's collection. When

Dr. Hagen was here this summer, he again, at my request, examined the specimen, and then seemed to think it might be foreign, but there is no evidence to this effect, and it has every appearance of a British specimen. It is the only one known, and has a slight resemblance to *L. rhombicus*, but the wings are narrower and more shining, the fenestrated spot is narrow and curved, and at the apex of the wings there is a tendency to form a semilunate spot, as in *vitratu*s. The upper margin of the last abdominal segment is produced into an obtuse point between the app. sup., and covered with short black setæ. Appendices superiores triangular at the base, curved strongly upwards, the extreme points turned downwards; appendices inferiores long and pointed, turned inwards and upwards. It is to be hoped that its claims to a place in our lists will soon be settled one way or another.

Limnephilus marmoratus, Curt., has been bred by Mr. Parfitt. The case was composed of small stones, pieces of twig, shells, seeds of water plants, &c., roughly agglutinated together, and generally provided with a large stone to balance it. *L. flavicornis* he has also bred from a similar case.

Limnephilus borealis, Zett., Kolen. Several specimens of this have again been taken by Mr. Winter in the Fens. Mr. Scott met with a specimen near Enniskillen, in Ireland, and an old specimen exists in Mr. Curtis's collection.

Limnephilus elegans, Curtis. Mr. Gregson kindly sent me two specimens taken in Delamere Forest, a new locality. This is the same as *L. signifer*, Zett., Kolen.

Limnephilus hirsutus. Considerable confusion has arisen about this species. We have in England three (*perhaps four*) closely allied, but very distinct species.

a Discoidal cell in anterior wings not longer than its foot-stalk (*ramus discoidalis* before its furcation).

1. *L. irroratus*, Stephens, = *L. (Desmotaulius) hirsutus*, Kolen. (nec Pictet). This is the species described in the "Annual," 1859, p. 87. Dr. Hagen had at that time not seen Pictet's type, and has since discovered that his species is different (vide Entomol. Zeitung, 1861, p. 117). This species may be easily recognized by the deeply emarginate last abdominal segment; the app. sup. are oval and rather elongate; the app. infer. short and thick, black. Stephens's *irroratus* is probably this species, but the single type is a ♀ in bad condition. The venation agrees with this species. Widely distributed and rather common.
- b* Discoidal cell one and a half times the length of its footstalk.
2. Sp. dub. Smaller and narrower than the preceding, the margin of last segment cut off straight; app. sup. short and broadly spoon-shaped. Occurs in the Fens, at Willesden, &c. Not uncommon.
 3. Sp. dub. As large as No. 1. Wings scarcely so broad, but much more so than the last, with a reddish tinge, and sometimes a tendency to form a fenestrated spot; the veins of the anastomosis conspicuously darker; coloration not so uniform as in the two last species; margin of last abdominal segment rounded off; app. sup. long, finger-shaped, curved strongly upwards; app. intermed. long and straight, projecting beyond the app. sup.; app. infer. very extraordinary, large, pod-shaped, curved upwards, and terminating in an acute point; pale coloured; between them lies the flattened penis. This may be *L. luridus*, Curtis, which I have not now before me; if not, that will be a *fourth* species, as it is

certainly distinct from the two first. I have specimens of No. 3 from Mr. Winter, taken in the Fens. Pictet's *hirsutus* may be one of these, but at present I can give no precise information as to that species.

Genus *Phacopteryx*, Kolen., Gen. et Sp. Trichop. pt. 1, p. 59. This genus may be readily distinguished from *Chætopteryx*, to which it has some slight resemblance, by having 1, 3, 4 spurs. The anterior wings are obliquely rounded at the apex, which is not much dilated, the apical margin is sinuated; the whole of the anterior wings, excepting the *area costalis*, and the inner margin to the posterior branch of the *ramus thyriifer*, is covered with minute granulations, from each of which springs a short decumbent hair. This latter character will serve to distinguish it from *Anabolia*, with some species of which there is some resemblance in form.

Phacopteryx brevipennis, Curtis; *Limnephilus brevipennis*, Curt. Phil. Mag. 1834, p. 125; *P. granulata*, Kolen. Gen. et Sp. Trichop. pt. 1, p. 59, l. Antennæ reddish, annulated with fuscous; head, thorax and abdomen reddish-fuscous; legs testaceous, with black spines; anterior wings shining pale reddish-fuscous; veins dark fuscous, three pale spots, one at the thyridium, one at the arculus, and one at the base of the third apical cell; apical margin narrowly dark fuscous, interrupted at the terminations of the apical veins; app. sup. ♂ very large, leaf-like, angular; app. intermed. broad, the apical half black; app. infer. short, pointed. Exp. alar. 10 lin.

This species, though not actually included in the Synopsis, was indicated by Dr. Hagen as occurring here (Ent. Ann. 1859, p. 91). I have two specimens taken by Mr. Fereday at Scarborough, in September. It was unique in Curtis's collection. *Anabolia dubia*, Steph., is very different.

Stenophylax. At the last meeting of the Entomological Society I communicated a paper, with descriptions of all the British species of this genus, to which it is intended to have a plate, with figures of the appendices of the males of *nine* species, as follows:—

S. ? concentricus, Zett. ? Kolen., *L. vibex*, Brauer. New to this country, taken by Mr. Winter, in the Fens commonly, also by Mr. Robson at Hartlepool, and Mr. Wormald at Willesden. Scarcely a true *Stenophylax*, the apex of the wings being rather obliquely truncated.

S. vibex, Curtis. This is not included in the Synopsis. It is similar to *S. hieroglyphicus*, but paler, and with very differently formed appendages.

S. hieroglyphicus, St., = *vibex*, St., *striatus*, Kolen., Rambur. This is the species described in the Synopsis as *vibex*.

S. striatus, Pictet. Smaller. The same as described in Synopsis.

S. lateralis, St., = *latipennis*, St., = *tenebrosus*, Curt. Col. : darker and with more rounded wings ; the appendages somewhat similar to the last. The description in the Synopsis probably applies to *S. pilosus*, Pict., which has not yet occurred in this country.

S. cingulatus, St. Unique in Stephens's collection. Not *testaceus*, Pictet.

S. latipennis, Curtis, probably *pantherinus*, Pict., Kolen.

S. stellatus, Curtis. I must refer the reader to my paper, when published, for remarks on this species.

S. radiatus, Rambur. Several specimens of what I believe to be this species were taken by me in September, at Dawlish, Devonshire.

Apatania vestita, Kolen. This would appear to be *fimbriata* of Pictet. (Vide "Entomol. Zeit. 1861," p. 117.) I know only of Mr. Newman's specimens.

Sericostoma. I shall be glad to receive *living* specimens of this from various localities to test a suspicion entertained, that the penis sheaths, which have been considered to furnish specific characters, are liable to variation.

Leptocerus grossus, St. Catalogue; *L. cinereus*, Hag. Ent. Ann. 1860, p. 69; *L. notatus*, Hag. Stett. Entomol. Zeit. 1858, p. 122. This species has been misunderstood. Stephens in his Illustrations, p. 199, couples *grossus* with *cinereus*, and quotes Curtis's description from the "Philosophical Magazine." In his collection there stands, as *cinereus*, a single specimen, with his small catalogue ticket "*grossus*," which does not at all answer to the description in the Illustrations, and agrees admirably with two specimens in the general collection from Dr. Hagen, and sent as his *notatus*. The description in the "Annual," 1860, p. 69, applies to this species, and not to *cinereus*, Curtis, which is a smaller insect, with greyish-brown or grey anterior wings, which are ornamented with two paler fasciæ, interrupted and not very distinct, especially in dead specimens: the females are more strongly marked than the males: *bifasciatus*, of Kolenati, is probably Curtis's species.

Of *grossus*, besides Stephens's type, there is a specimen, unnamed, in Curtis's collection. Two specimens were taken this year by Mr. Wormald, at Ruislip, Middlesex, and I also have it from the Fens. *L. cinereus* is very abundant on the Thames, at Kew, and in many other localities.

Leptocerus fulvus, Rambur, Hist. Nat. Névrois. p. 509—3. A new species to this country. This has a slight general resemblance to *grossus*, but is smaller in every way, and the veins are not so distinctly marked. Antennæ clay-coloured,

sharply annulated with dark fuscous to the apex; head and thorax thickly clothed with yellowish-brown hairs; legs clay-coloured, the apex of the tarsal joints darker; anterior wings pale reddish-brown—an indistinct pale mark at the arculus is invisible in dead specimens; posterior wings blackish-grey, much shorter than the anterior in the male; this is not so apparent in the ♀, as the anterior wings are shorter in proportion. Exp. alar. 11—13 lin.

For this fine addition to our list we are indebted to Mr. P. C. Wormald, who is paying great attention to this order. He found it in considerable numbers at Ruislip, Middlesex, in August. It occurs in many places on the Continent.

Leptocerus aterrimus, Steph. Ill. p. 200—20 (♀) = *L. ater*, Steph. Ill. p. 196—5 ♂ = *L. caliginosus*, Steph. Ill. p. 201—9 ♀ = *L. niger*, Steph. Ill. p. 196—6 (partim) = *M. niger*, Kol. Gen. et Sp. Trichop. pt. 2, p. 257—10; pl. 3, fig. 31. This species is not included in the Synopsis. Much confusion has arisen in consequence of Stephens having made a double error, first, in mistaking this for Pictet's species, and, secondly, in mixing under *niger* specimens of Pictet's *atra* and the present insect. This is a true *Leptocerus*, with 2, 2, 2 spurs, and is totally black, with the exception of the antennæ, which are annulated with white. It wants the steel-blue lustre so evident in the two black species of *Mystacides*. The anterior wings have at the arculus an ochreous spot more or less distinct. The names *atra* and *nigra* being already occupied in a nearly related genus, it will be better to adopt *aterrimus* for this species; for although Stephens's types are all females, they at the same time all belong to this insect. This is excessively abundant round any pond in July. With the typical form there is always a variety in which the anterior wings are very dark reddish-brown, with the pale spots

almost invisible. I have taken it *in copulá*, with the typical form. This variety may be *perfuscus*, Stephens, of which there is a single type.

Leptocerus albifrons. I fancy we have two closely allied species in this country,—one the true *albifrons* of Linnæus, according to his types, and the other smaller and darker, with more distinct white bands and frontal spot. This last I saw in Mr. Dale's collection.

Setodes notata, Rambur, Hist. Nat. Névrof. p. 514—18; *S. lacustris*, var. Kol. Gen. et Sp. Trichop. pl. 2, fig. 37? In Mr. Curtis's collection are four specimens of a *Setodes* without name, which are identical with a specimen in the British Museum, sent by Dr. Hagen as *notata*. It is the same size as *testaceus*, with rather broader wings; the anterior pair are reddish-grey; the anastomosis edged on both sides with fuscous, and there are several spots of the same colour before the anastomosis; fringes very long. I know nothing of the locality where they were taken.

Setodes elongata, Stephens, has been bred by Mr. Parfitt. The case of the larva is very delicate, straight, attenuated gradually, and in colour dirty white; it appears to be composed of silk, mixed with some other secretion of the larva.

Setodes interrupta, Fab.; *Phryganea interrupta*, Fab. Mantiss. Insect. p. 146—22, Entomol. Systemat. vol. 2, p. 79—25; *Setodes interrupta*, Brauer, Neurop. Austriaca, p. 41; Kolenati, Gen. et Species Trichop. pt. 2, p. 268—6, pl. 3, fig. 34 (not of Donovan and Stephens). Antennæ dark brown, finely annulated with white towards the base; head, thorax and abdomen black; legs greyish-fuscous; anterior wings narrow, dark blackish-fuscous, with three transverse rows of white spots, forming interrupted fasciæ, and a series of about eight smaller spots round the apical margin; posterior wings

dark fuscous; exp. alar. $6\frac{1}{2}$ lines. A single specimen of this was taken at Taunton, in 1859, by Mr. Parfitt. Though I have called this new to Britain, it is scarcely so, for Fabricius, in the "Entomologica Systematica," gives "in Anglia" as the sole locality; however, it does not seem to have been met with again until now, as the *interruptus* of Donovan and Stephens is *L. albifrons*. It occurs in Austria, Russia, and elsewhere on the Continent; but as the list of localities given by Kolenati applies in part to *albifrons*, it is impossible to say how many of them are correct.

Glossosoma fimbriata, Stephens, I met with at Bickleigh, near Plymouth, in September. This is probably a small form of *Boltoni*, Curtis.

Chimarra marginata, L., has been taken at the same place by Messrs. Reading and Parfitt.

Polycentropus bimaculatus, L., has been taken by myself and Mr. Wormald at Willesden commonly, and by Mr. Barrett near Dublin.

Philopotamus scoticus, n. s., Frontispiece, Fig. 5.

Antennis brunneis, flavido-annulatis; capite aureo-pilosis; oculis nigris; thorace abdomineque nigris; alis anticis aureis, strigis maculisque fuscis, venis apicalibus manifeste fuscis, areolâ apicali primâ anastomosim non attingens; anticis pupurascenteo-fuscis, marginis costali dorsalique anguste flavis, maculis ad marginem apicalem flavis.

Long corp. 7 lin.; exp. alar. 11 lin.

Female: Antennæ brown, annulated with yellowish; head clothed with golden yellow hairs; eyes black; thorax and abdomen black; legs pale ochreous, tibiæ fuscous, spurs fuscous beneath; anterior wings rich yellow, with numerous more or less confluent, irregularly formed, fuscous streaks and blotches; the first apical cell does not reach the anastomosis;

posterior wings purplish fuscous, costa and inner margin narrowly edged with yellow, pterostigma and a spot at the margin in each apical cell also yellow.

A single specimen in the British Museum, taken at Rannoch, Perthshire, by the late Mr. Foxcroft.

I regret that, in consequence of the single example being a female, I am unable to say what differences the anal appendages may present, but it has an appearance quite distinct from the recorded species, in which the dark fuscous coloration occupies the greater portion of the anterior wings, which are thickly maculated with round, regularly formed, yellow spots. It is by far the handsomest species of the group.

Genus APHELOCHEIRA, Stephens.

This genus was accidentally omitted in the Synopsis; the following brief enumeration of its characters will serve to distinguish it from other genera of *Hydropsychidæ*. Antennæ scarcely as long as the wings, distinctly serrated within, basal joint very short; maxillary palpi, the four first joints of nearly equal length, terminal joint scarcely so long as the others united; head very pilose, ocelli absent; spurs 2, 4, 4; intermediate tibiæ not dilated in the female; anterior wings very short, narrow at the base, but expanding greatly towards the apex, which is very obtusely rounded; clothing of hair short, but rather thick; discoidal cell closed, four transverse veins, the last at the point where the *ramus thyrisifer* furcates; posterior wings short and broad.

Stephens in his "Illustrations" describes two species under the names of *flavomaculata* and *subaurata*. In his collection the first of these names had no representative, and there evidently had never been a specimen inserted above that name as it stood; in fact, there was no pin hole, and under his general label "*subaurata*" are many specimens of what,

from his description, I have little doubt is *flavomaculata*, and one specimen of a smaller insect with a special small label of its own—"subaurata." Of this latter insect I have taken several specimens in Devonshire and elsewhere, and it appears to me not to agree generically with the first species. The antennæ are not serrated; the third joint of the maxillary palpi is much longer than the second and fourth; and the head is furnished with ocelli, which are difficult to see unless the hairy covering be removed. This latter character will bring it close to *Philopotamus* and near to *H. occipitalis*, Pict. Vide Stett. Ent. Zeit. 1860, p. 279.

Aphelocheira flavomaculata, Stephens, Ill. p. 179—1, pl. 32, fig. 3, var.? Antennæ annulated with brown; head thickly clothed with greyish-brown hairs; thorax dark brown; abdomen brown, with paler annulations; legs greyish-ochreous; tarsi reddish ochreous, with paler rings; anterior wings greyish-brown, obscurely spotted with yellow—in fresh specimens the darker ground-colour stands out in the form of dark spots, of which several form an ill-defined band in the middle of the wing and a series of dark spots round the apical margin; posterior wings greyish-black, slightly transparent. The last segment of the abdomen in the males is rather produced, and has on its upper surface a triangular deep black space. App. infer. long and thin, curved strongly upwards and hairy; penis sheaths (app. interm.?) straight, pointed, rather broad; penis short and thick, much dilated at the apex. I can discover no trace of app. sup. Exp. alar. 6—7 lin.

The so-called variety figured by Stephens is perhaps a faded specimen, as the darker ground-colour almost disappears after a short time. Devonshire is the locality given, and I have two specimens given to me by Mr. J. J. Weir,

taken by him at Hastings. *H. flavomaculata* of Pictet is a *Polycentropus*.

Tinodes pusillus, Curtis, Phil. Mag. 1834, p. 216 (not described). Antennæ brown, annulated with ochreous; head, thorax and basal joint of antennæ thickly clothed with silky pale ochreous pubescence; abdomen fuscous, terminal segment paler; legs entirely pale ochreous; anterior wings somewhat iridescent, thickly clothed with greyish-ochreous pubescence, ciliæ greyish-ochreous; posterior wings iridescent, ciliæ greyish-ochreous. The anal appendages are complicated, and require a very high magnifying power for their discrimination. As I understand them the following appears to be a correct definition. In the middle of the upper surface of the last segment is a tongue-shaped prolongation, which is much dilated at the extremity, concealing all but the points of the app. intermed.; the app. sup. are two long hairy lobes; the terminal joint of the app. infer. appears to be long and acutely pointed, much longer than the basal joint. Exp. alar. $5\frac{1}{2}$ lin.

This small *Tinodes* is not included in the Synopsis. Curtis has not described it, but gives a reference to Fabricius. What *pusilla* of that author really was is extremely problematical. There are several specimens in Curtis's collection, but I know nothing of their locality. Mine were taken in Devonshire, in September.

The species of the genus *Hydropsyche* remain in a most uncertain condition.

Another season I hope to be able to pay more attention to the families of *Neuroptera* generally, and shall be glad of any assistance in this order.

R. M'LACHLAN,

1, PARK ROAD TERRACE, FOREST HILL, S. E.

6th November, 1861.

LEPIDOPTERA.

NOTES ON EUPITHECIA LARVÆ.

BY THE REV. H. HARPUR CREWE, M.A.

[THE following seven descriptions of the larvæ of this genus have appeared in the pages of the "Zoologist," from the pen of Mr. Harpur Crewe,—that of *Subfulvata* being in extension of the description previously published for the purpose of comparison with the description of the larvæ of *Succenturiata*, now held to be a distinct species.]

*Tripunctata.**Trisignata.**Dodonæata.**Pusillata.**Distinctata.**Subfulvata.*and *Succenturiata.*

Mr. Harpur Crewe has here added a few remarks indicating those points in the economy of the species of the genus which still require elucidation.—*Note by the Editor.*]

Tripunctata, H. S. Var. 1. Ground-colour pale lemon yellow, more or less suffused with rich brown. Down the centre of the back a series of deep brown lily-shaped spots, bordered on either side by a slender sub-dorsal line of the same colour. On each side a row of slanting, bright yellow stripes and deep brown blotches. Belly greenish-yellow. Central ventral line deep brown. Sub-ventral line deep brown, much broader than the central one. Body studded with numerous small white tubercles.

Var. 2. Ground-colour pale yellowish-green. Down the centre of the back a series of semi-lozenge-shaped dusky brown spots, connected by a central line of the same colour, and becoming indistinct on the posterior and confluent on the anterior segments. Sub-dorsal lines dusky, indistinct. On each side a series of dusky blotches. Central ventral line dusky, interrupted. Whole body, especially back, studded with minute white tubercles, and a few short blackish hairs. The dorsal, sub-dorsal and lateral blotches, spots and lines, are sometimes almost or entirely wanting, leaving the larva a uniform pale yellowish-green.

This larva very strongly resembles that of *E. Satyrata* in form and appearance, but is less robust. It tapers towards the head, and has a slightly wrinkled appearance. When full fed and ready to spin up it turns pink. Pupa inclosed in a slight earthen cocoon. Thorax yellowish-green, wing-cases dark green, furrowed and wrinkled. Abdomen tapering, rough, dull red. A slight ventral protuberance.

I have, for the last four or five years, been in the habit of taking this larva and breeding the perfect insect, which, from the first, I recognised to be quite distinct from all our previously known British species.

After much delay I have at last, through the kindness of Mr. Doubleday and Dr. Herrich-Schäffer, succeeded in getting it named. The larva appears to be totally unknown on the Continent. It feeds in September in damp woods, on the flowers and seeds of *Angelica sylvestris*, and occasionally upon late flowers of *Heracleum Sphondylium*. I have taken it in Suffolk, Kent and Derbyshire. The perfect insect appears in May and June. The larva is uncertain in its appearance. In 1859 it was by no means uncommon; in 1860 it seemed to have entirely disappeared. It is fright-

fully infested by ichneumons, and not above one in ten or twenty escapes.

Trisignata, H.-S. Rather short and stout, tapering but slightly towards the head. Ground-colour pale green. Central dorsal and sub-dorsal lines dark green, the latter broader than the former. Spiracular line waved, whitish or yellowish. Segmental divisions yellowish. Head black; when at rest curved considerably inwards. Anal tip of central dorsal line purplish. Back wrinkled, sprinkled with a few very short bristly hairs. Belly green, with a central yellowish line. Pupa enclosed in an earthen cocoon. Thorax pale olive. Wing cases pale olive, very transparent. Abdomen tapering, reddish-yellow; tip and divisions blood-red.

Two years ago, Mr. Greene and I were searching for larvæ of *E. tripunctata* in Derbyshire, when I stumbled upon two larvæ which I at once saw were those of no British *Eupithecia* I had ever yet seen, their black heads giving them a most distinct appearance. Mr. Greene was afterwards fortunate enough to meet with more, and from them we bred what turned out to be *E. trisignata*, H.-S.

The larva feeds in September on flowers and seeds of *Angelica sylvestris*, in company with and in similar situations to *E. tripunctata*. Mr. Greene and I have only met with it in Derbyshire. In Switzerland it feeds on flowers of *Heracleum Sphondylium*. The perfect insect appears in June and July.

Dodonæata. Var. 1. Ground-colour ochreous-red. Central dorsal line very dusky olive, almost black, interrupted. Down the centre of the back is a series of blackish or dusky olive arrow-shaped blotches, reduced in size on the posterior, and merged in the central line on the anterior segments. Sub-dorsal lines slender, dusky, bordered with dull yellow. Spiracular line alternating between dull yellow and dusky

olive. Between the sub-dorsal and spiracular lines is a row of slanting, bright yellow stripes, interspersed with dusky blotches. Segmental divisions orange-red. Body thickly studded with minute white tubercles, and thinly clothed with whitish hairs. In appearance strongly resembles the larva of *Eupithecia Virgaureata*.

Var. 2. Ground-colour pale yellowish-green. Central dorsal line and blotches similar to those of var. 1, but much paler olive. Spiracular line, segmental divisions and lateral stripes greenish-yellow.

Var. 3. Ground-colour orange-red. Back tinged and suffused with dull yellowish-green. Dorsal blotches wanting, Central dorsal line reddish-brown or olive, enlarged in the centre of each median segment. Sub-dorsal lines same colour, slender. Spiracular line and lateral stripes greenish-yellow, the latter indistinct. Strongly resembles the larva of *Eupithecia abbreviata*.

The larvæ, from which the above descriptions were taken, were reared from eggs kindly sent me by Mr. M'Lachlan, of Forest Hill. They fed on oak, from which tree I have been in the habit of occasionally beating the larva for some years past. I have no doubt that it also feeds on white-thorn, as my friend Mr. Greene has frequently taken the pupa under the bark of this tree, at some distance from any oaks. It is a very delicate larva. Almost all mine, this summer, died when full fed. They seemed to prefer the youngest and most succulent oak leaves, and I principally attribute their death to the difficulty of finding a constant fresh supply of newly-expanded foliage. Pupa either enclosed in a slight earthen cocoon or under bark; dark dusky red; upper edge of wing-cases brighter red than the rest of the pupa, has a rough, wrinkled appearance. The perfect insect appears in May and the beginning of June.

Pusillata. Long, slender, and tapering considerably towards the head. Ground-colour orange-red or dull ochreous-green. Central dorsal line dusky olive, often only apparent on the anterior segments. Sub-dorsal lines the same colour. Spiracular line yellow. Segmental divisions orange. Central ventral line yellowish.

The above description was taken from larvæ reared from eggs kindly sent me by Mr. M'Lachlan. They fed on spruce fir, and were full fed the first week in July. Pupa enclosed in a slight earthen cocoon; slender and delicate; pale ochreous yellow; eyes black and prominent; upper edge of wing-cases bordered with two black spots, lower edge by a slender blackish line.

Distinctata. Rather long and slender, tapering considerably towards the head. Ground-colour dark green. Central dorsal line broad, purplish-red. Spiracular line indistinct, greenish-yellow. Skin wrinkled. Back studded with numerous very short, stiff, bristly hairs. Down the centre of the belly a whitish line. Ventral segmental divisions yellowish.

I have taken this larva in Derbyshire and Bucks, feeding on flowers of *Thymus Serpyllum* in August. Pupa yellowish-green and olive enclosed in a slight earthen cocoon.

Subfulvata. Var. 1. Reddish-brown. Central dorsal line pale olive, connecting a series of perfectly oval, dusky-olive blotches, which become confluent on the anterior and posterior segments. Sub-dorsal lines blackish, interrupted; dark opposite the dorsal blotches, pale and almost, if not quite, evanescent between them. Median dorsal blotches pale in the centre, very close together, almost confluent. Spiracular line white. Back thickly studded with minute white tubercles, and less thickly whitish hairs. Belly whitish, with a purplish central line.

Var. 2. Ground-colour pale yellowish-brown. Markings similar to var. 1.

Feeds on leaves, flowers and seeds of *Achillea millefolium*. In November, 1860, I took upwards of eighty larvæ on this plant in Bucks: some I sent to Mr. Hellins, the rest I kept myself. From June 21st to July 31st, I bred about thirty moths, all true *E. subfulvata*. In two instances the bluish-grey and red of the anterior wings was suffused in patches on the disc, but with this slight exception, the thirty insects did not vary at all. I have, with some slight alterations, reproduced my description of the larva of *E. subfulvata* (see Ent. Annual, 1861, p. 130), thinking that it may facilitate a comparison of the distinctive characteristics of the two larvæ.

Succenturiata. Var. 1. Dull dark reddish-brown. Central dorsal line dingy black, connecting a chain of dull black inverted kite-shaped blotches, which become confluent on the anterior and posterior segments. Sub-dorsal lines dusky, slender, waved, uninterrupted, darker between the dorsal blotches. Median dorsal blotches at some distance from each other; border generally pale, centre dusky. Spiracular line dirty white, interrupted. Head bordered by a reddish line. Belly dusky at the edges, pinkish white in the middle. Central ventral line blackish. Back and sides sprinkled with a few reddish hairs. General appearance dingy.

Var. 2. Pale reddish-brown. Central dorsal line and blotches dingy olive. Sub-dorsal lines dusky, very indistinct. In other respects resembling var. 1.

Var. 3. Ground-colour dark, dingy olive. In other respects like var. 1. Pupa enclosed in an earthen cocoon, resembling in most points that of *E. subfulvata*.

Some four years ago I met with this larva on the banks of the Stour, near Ipswich, Suffolk, feeding on leaflets of *Artemisia vulgaris*. I left the locality immediately afterwards, and, being unable to obtain a fresh supply of the food-

plant, they all died. Last autumn my friend Mr. Hellins sent me some larvæ which he had taken on the same plant near Exeter, and I immediately recognized them as being the same as those which I had previously found in Suffolk, and from these Exeter larvæ the foregoing descriptions were taken.

During the past year, I have, it will be seen from the preceding pages, been able to add six additional descriptions of the larvæ of British *Eupitheciæ* to those already published (including two species entirely new to our English lists, and but little known on the Continent—*Eup. trisignata*, H.-S., and *tripunctata*, H.-S.) I have now drawings and descriptions of thirty-two species. Only twelve remain undescribed: *Eup. consignata*, *pulchellata*, *pernotata*, *plumbeolata*, *pygmæata*, *egenata*, *viminata*, *irriguata*, *indigata*, *subciliata*, *togata*, and *debiliata*. I shall feel deeply indebted to any entomologist at home or abroad who will send me eggs of any of the above species during the ensuing season, and thus help me to complete my researches into the œconomy of this most interesting group of insects.

Eup. succenturiata. I think that most entomologists who have read the "Zoologist" for November, 1861, will agree with me that this insect is entirely distinct from *Subfulvata*. I have, however, as yet never been able to breed it from the egg, and this is the only link wanting to complete an irrefragable chain of evidence. Will those entomologists who live near the sea, and in whose neighbourhood *Artemisia vulgaris* grows, do what they can to get me a batch of eggs next summer? The perfect insect appears in July, and may no doubt, like its congener *Subfulvata*, be taken freely by sugaring the heads of any tall flowers near where the food plant grows. *Subfulvata* deposits its eggs freely if a sprig

of *Achillea millefolium* be introduced into the chip-box, and doubtless *Succenturiata* would do the same upon a head of *Artemisia vulgaris*.

Eup. subumbrata. I shall feel deeply indebted to any continental entomologist who takes this insect, if he will procure me a few eggs and send them by letter inclosed in a quill. I cannot as yet persuade myself that the species I take freely here in the larva state is identical with the continental species which bears this name, and which is a much whiter looking insect, especially on the posterior wings. I have also a great wish to procure eggs of the allied continental species *Modicata*, *Impurata* and *Denticulata*. I shall also feel much indebted to any British entomologist who meets with this species, if he will send me a few eggs.

Eup. plumbeolata. I have a batch of pupæ which I suspect will produce this insect. The larvæ were found upon flowers of *Valeriana officinalis* growing in a wood, in July. I have never yet been able to procure ova.

Eup. isogrammata. The larvæ of this insect was abundant here this summer upon flowers and in flower buds of *Clematis vitalba*.

Eup. Helveticata. During the two past autumns I have taken a number of larvæ here in October and November, upon *wild juniper*, which closely resemble those of the Scotch *Helveticata*. The perfect insect, however, is much larger and very different in colour. Mr. Doubleday is inclined to consider it a mere southern variety of the Scotch and continental species, but before coming to any decision myself I should like to breed broods of each larva from the egg. I have little doubt that I shall be able to get my Buckinghamshire insects to pair and lay eggs. Will some of my Scotch brethren try and do the same and exchange ova with me? If the moths be placed in a gauze-covered

box, with a sprig of juniper in a bottle, they will almost to a certainty pair and deposit their eggs. Will some continental brother send me eggs of *Eup. arceuthata*?

Eup. satyrata. The larva of this insect has been very abundant here this year upon various flowers growing in rough open places near and between the woods.

Eup. tripunctata. This larva was not scarce in one wood near here upon flowers and seeds of *Angelica sylvestris*. In Derbyshire it was very scarce, though in the same locality I took it plentifully two years since. I hear from friends that it has occurred pretty freely in Middlesex, Devonshire and Suffolk. Considerably more than half the larvæ are ichneumonid, and I expect to breed but few moths.

Eup. trisignata. The larva of this insect was tolerably plentiful in the same wood upon flowers and seeds of *Angelica sylvestris*. It is about ten days earlier than the preceding species. In Derbyshire, where *Angelica* was much more abundant, I could only find two. My friend Mr. Hellins has taken it in Devonshire.

Eup. innotata. I met with three larvæ of this rare species during a short visit to Derbyshire at the beginning of September. It is (as far as my experience goes) exclusively an *ash* feeder in England. It is very strange that the continental species which bears this name, and which to my eyes certainly seems precisely the same as our British *ash* feeding species, should as exclusively feed upon *Artemisia vulgaris* and *Absinthium*. If Professor Zeller, M. H.-Schäffer, M. Guenée, or any other continental entomologist, can send me a few eggs, I will soon tell them whether the larvæ are the same as those I take upon *ash*. I once reared five larvæ from eggs laid by an English specimen of the second brood in October, upon flowers of *Laurustinus*. They spun up and

turned at Christmas. The moths appeared the following June, and were precisely the same as those bred from ash.

Eup. pimpinellata (denotata). This species, which has now regained its proper name, has been scarce this autumn, and almost every larva was stung. I have only six pupæ against nearly one hundred last year.

Eup. virgaureata. In Devonshire, Mr. Hellins informs me, this larva prefers the flowers of *Senecio jacobæa*, though there is plenty of *Solidago virgaurea*. In the Kentish locality, where I have been in the habit of taking it for some years past, it strictly confines itself to the flowers of the *Solidago*, though there is plenty of *Senecio* in and near the woods.

Eup. coronata. This species was not uncommon here last year in the larva state on flowers of *Clematis vitalba*. This autumn I could only find three or four.

Eup. pulchellata. This moth is I know taken pretty freely by various collectors. If they do not care to take the trouble themselves to procure eggs, will they next year send me some living females? I think I can persuade them to lay.

Eup. indigata. Mr. Greening, of Warrington, most kindly sent me this spring several living females of this species. Only one, however, deposited any eggs. A few larvæ, hatched and fed for a week or two upon *Pinus sylvestris*. I think I now know better how to manage both moth and larva, and hope for better luck, if Mr. Greening, and other friends who take this insect, will be equally kind another year.

Eup. tenuiata. This larva was common here in *sallow* catkins in April. It is not confined to any one species of *salix*.

Eup. subciliata. This species is taken every season by

some of our collectors. Will they do their best to send me a living ♀?

Eup. abbreviata. I very much want eggs of this species. The larva at times so closely resembles *Dodonæata* that it would puzzle an habitué to distinguish them. I want to breed the two insects from the egg, side by side. If required to lay, the females of both these species must be placed in a roomy gauze-covered box, with a sprig of *oak* stuck in a bottle. By this means Mr. M'Lachlan, after several fruitless attempts, at last procured me a number of eggs of *Dodonæata*.

Eup. consignata and *irriguata*. These are probably both *oak* feeders, and wherever the perfect insects occur might doubtless, if looked for, be found.

Eup. expallidata. I found a number of larvæ of this insect in October on *Solidago virgaurea*, during a flying visit to Kent. I fear however the greater part are dead, as I have no *Solidago* here, and was obliged to substitute flowers of *Michealmas Daisy*.

Eup. absynthiata and *minutata*. I have an un-named species which I believe to be intermediate between these two. I took the larva on *Achillea millefolium*, and, though it resembled both, it was not precisely like either. Will some continental friend send me eggs of *E. campanulata*, H.-S., a closely allied insect? I took a number of larvæ of *Absynthiata* here this autumn which were nearly black.

Eup. pygmæata. Can none of my marshy friends get eggs of this species and of *Collix sparsata*? I saw a specimen of *pygmæata* this summer, which was taken on some boggy moorland in Staffordshire.

Eup. pusillata. I reared a brood of larvæ to full growth this summer upon *spruce fir*. A journey then killed them

all but one, which is at present alive, in the pupa state. I must try again next year.

Eup. debiliata. A correspondent has bred this insect from mixed larvæ, supposed to be swept from *Vaccinium myrtillus*.

Eup. assimilata. This insect has not been common here this year. Two larvæ, taken full fed the beginning of July, produced the perfect insect in a few weeks, thus proving it to be, as I had often suspected, double-brooded.

Eup. vulgata. I beat the larva of this moth from *Clematis vitalba* this summer. I have often previously reared the larva from the egg, but this is the first time I have met with it out of doors.

Will some Scotch entomologist try and procure me eggs of *E. satyrata*, var. *Callunaria*?

H. HARPUR CREWE,

THE RECTORY, DRAYTON-BEAUCHAMP, NEAR TRING,

November 4th, 1861.

A CHAPTER ON ZYGÆNA MINOS.

(BY THE EDITOR.)



DURING the past twenty years various attempts have been made to split *Zygæna Minos* into two species. One variety has been described by Zeller under the name of *Heringi*; another has been described by Herrich-Schäffer, and the name of *Nubigena* proposed for it by Mann.

Imagining the subject would probably receive increased attention during the ensuing summer, we have collected together a mass of notes on the subject, which are here arranged chronologically.

We make no comments, leaving the whole subject to the unbiassed consideration of our readers.

ZYGÆNA MINOS.

[From Lepidopterological Contributions by P. C. ZELLER, published 1840 in the "Isis," p. 137.]

The markings on the anterior wings of a *Zygæna* consist mainly of 6 spots, placed in three pairs. For a more easy mode of explanation, we may call the upper spots 1, 3 and 5; namely, that at the base 1; that in the middle of the wing 3, and that towards the apex 5, and the corresponding lower spots, 2, 4 and 6. *Zygæna Minos* is one of those species in which spots, which are not the corresponding spots, are confluent.

1 is very long, pointed, and fills up the space between the costa and sub-costal nervure at the base; 2 and 4 are entirely confluent, form a spot anteriorly rounded, which fills up the space between the median and sub-costal nervures, and reaches as far as the first branch of the median nervure. 3 unites with 5 and 6 to form a spot, which, pointed towards the base, is much expanded posteriorily, and is gradually lost in the ground-colour towards the hind margin. The above markings may be looked on as those of the typical *Z. Minos*. In the year 1839, I collected, in three days, upwards of a hundred of this *Zygæna*, and thereby found that the normal form is very scarce near Glogau, and only occurs sparingly among the varieties.

The most frequent specimens (var. *b*), have the spot formed out of 2 and 4, more or less deeply emarginate on both sides.

This also occurs sometimes, when (though that very rarely happens) the spot composed of 3, 5 and 6 is slightly excavated on both sides between 3 and 5 (var. *c*).

But the deeper this excavation is, the smaller are the original spots, and, where they are actually separated, they are restricted to a very small space. In var. *d* (2 ♂ and 1 ♀), the separation between 2 and 4 has taken place, and one specimen has, instead of 4, a small spot of the size of the 3rd spot in *Zygæna punctum*; in the two others, 4 forms a fine point towards the base.

Var. *e* (5 ♂, 1 ♀) shows a separation between 3 and 5.

There are connecting links between these varieties, in which, on one or both wings, spots 3 and 5, 2 and 4, are connected by a slender thread of red.

The two last varieties (*d* and *e*) do not show half as much red on the anterior wings as the typical var. *a* does.

Nearly all the specimens of varieties, *b*, *c*, *d* and *e*, have, on the hinder margin of the united last pair of spots, a deep

excavation, and the margin is not gradually lost in the ground-colour. The portion which belongs to the upper spot (5) is always of a much deeper red.

Since there are also specimens of var. *b* without that emargination of the securiform spot, and again others of the typical species where there is at least a faint impression there, I perceive nowhere a decided character by which a specific separation could be effected. But I consider it possible that, in the course of time, the characters may be more firmly made out, and that then, perhaps, a difference of species may be discussible.

Since that Nature, in the formation of species of *Zygænæ* (productive or reproductive) is not yet at an end, appears to me conclusive, from the constant copulation of specimens of different species *without constraint, and when in a condition of perfect liberty*.

But just as the amount of red on the upper side of the anterior wings of *Z. Minos* decreases with us, it increases towards the south.

In a very few of our Glogau specimens of var. *b* (4 ♂), I find at the base of the wing, between the sub-dorsal nervure and the inner margin, a short, red, faint, little streak (var. *f*).

On the other hand, in an Austrian male, which otherwise resembles var. *a*, this entire space is covered with thickly scattered red scales; and spot 1 reaches, filling up the entire cell, as far as the first branch, going from the sub-costal nervure to the costa: hence the sub-costal and median nervures are clothed with red scales, the spots melt into one another (var. *g*). This, therefore, is the passage to the var. *Polygalæ*, Esper, or *Erythrus*, Bdv., which I have not yet met with.

The apex of the hind wings is usually dark grey in the males, but rarely so in the females; in many males it is

twice as broad as the cilia of the hind wings, and is continued, though very narrowly, as far as the third branch of the median nervure. In two males of var. *a*, from the south of Europe, it is at the apex more than three times as broad as the cilia, and the continuation along the hind margin is broad in proportion.

The favourite localities here are open places amongst birch and fir wood, where flowers are numerous on loamy, hillocky ground, where at the same time *Hipp. Galatea*, *Argynnis Niobe* and *Botys flavalis* fly in multitudes, and *Zygæna Filipendulæ* and *Lonicæræ* will soon begin, or have just begun to appear. Its favourite flower is *Dianthus Carthusianorum*, on which it sleeps at night, hanging on the calyx, as though to be less easily seen. More rarely it frequents *Scabiosa arvensis*. The best time of the year to obtain good specimens is the first half of July.

SOME REMARKS ON ZYGÆNÆ.

BY PROFESSOR ZELLER.

[Published in 1844, Ent. Zeitung, pp. 38 - 43.]

1. Boisduval gives in his Monograph of the *Zygænidæ*, p. 7, a notice on the larvæ of *Zygæna*, which seems less generally known than it deserves. I therefore mention it here. The larvæ only feed for about fourteen days after their exclusion from the egg, then they become torpid, and do not wake up and recommence eating till the following spring. Thus they sleep a large portion of the summer and all through the autumn and winter. That occasional exceptions will occur, is shown by Ochsenheimer's experience (Treitschke, x., 1, p. 106), since he met with two specimens of *Zygæna Trifolii* in autumn, newly escaped from the pupa state; the

larvæ of these had probably never become torpid. I myself once found near Frankfort a just hatched specimen of *Z. Filipendulæ* in the middle of autumn.

2. *Zygæna Minos*. Some species of insects owe their existence to the industry of the dealer. How Dahl misled amateurs is narrated by Treitschke in speaking of the varieties of *Zerynthia Polyxena* (x., 1, p. 84). Since most collectors content themselves with a pair of such species which they can only obtain by purchase or exchange, and indeed are generally obliged thus to moderate their desires, such dealers as Dahl have an easy game in the fabrication of species; it would be much more difficult if they had to furnish each species wholesale. Many of the southern *Zygænæ* require to be collected by conscientious observers in sufficient numbers to clear up all our difficulties.

The species of *Zygæna* are of that class in which a *few* specimens easily enables us to pronounce a confident opinion. A *large number* of specimens makes us feel much less confident, but is imperatively necessary if we would ascertain the truth. He who has not carefully examined extensive series of specimens of allied species, should only pronounce his decision as *probable*. Formerly I was of opinion that I had found in a specimen, of which the spots were smaller than usual and remote, a species distinct from *Minos*. I therefore collected above 100 specimens of *Minos*, just as they came, and soon recognized that my supposed species was merely a variety. I was thus enabled to indicate in the "Isis" (1840, p. 137) a series of very perceptibly distinct varieties of this species, most of which occur near Glogau.

Herr Keferstein goes so far as to unite (Ent. Zeit. ii. p. 117) *Zygæna Pluto* with *Z. Minos*, because it frequently occurs along with it, and has only a broader grey margin to the posterior wings. But Ochsenheimer mentions characters

which make it doubtful whether Keferstein had the true *Pluto* (with which I am likewise unacquainted) before him. Ochseneimer speaks of a more slender antennal club, and broader, more rounded wings,—thus of things in which *Z. Minos* shows no such variability; and before one could maintain that Ochseneimer had exaggerated, it would be necessary to see original specimens of *Zygæna Pluto*.

Boisduval also formerly was anxious to unite *Z. Pluto* and *Z. Minos*; but according to his new Index (in which *Z. Pluto* is introduced at an unsuitable place) he has revoked this opinion. The *Z. Pluto* of his Monograph may be identical with that of Ochseneimer; the figure is certainly, like most of those in the Monograph, bad enough, so that it furnishes little information; but in the description all Ochseneimer's distinctive characters are repeated, whence there seems little reason against the identity of his and Ochseneimer's *Z. Pluto*.

But *Zygæna Pluto* of the Icones (tab. 52, fig. 4) is quite another creature, wherefore also the characters sound very anomalous. Difference in the form of the wings and antennæ is no more the question; the securiform spot of the anterior wings is rounded, and even larger than in the next figure of *Zygæna Minos* (fig. 5); in short, Boisduval had had a *Z. Minos* before him, and erred in his references.

From Professor Hering I have received a male *Zygæna* for determination, which was sent him by Frivaldsky as *Z. Pluto*. Two males, of unknown locality, which agree specifically therewith, were received by me from Vienna. Only Hering's specimen shows the hind margin of the anterior wings externally more convex than in *Zygæna Minos*; otherwise they agree entirely with that species, except, firstly, that the middle spot is much further from the hinder margin, and seems abbreviated, and, secondly, that the posterior

wings have a broader grey margin. The second character is of less importance, and less striking than the first, since the spot reaches little beyond the transverse vein, then suddenly expands on both sides, projects a tooth obliquely over the third branch of the median vein, and has its hinder margin not hollowed. Whether this is a constant form, or whether connecting varieties occur, must be ascertained by the comparison of a greater number of specimens of *Z. Minos* from Southern Europe. Though these three specimens show much agreement in the form of the spot with Ochsenheimer's description of *Z. Pluto*, yet the other characters given by Ochsenheimer are far too contradictory to allow one to pronounce this with certainty as the true *Zygæna Pluto*. It is possible that Keferstein had specimens similar to these before him as *Pluto*; however, he should have taken more notice of the form of the middle spot if he had wished to give us complete certainty.

From Professor Hering I received a beautiful pair of a *Zygæna*, very closely allied to *Z. Minos*, with the inquiry, whether I considered it distinct? For after he had found the whitish larvæ of *Z. Minos* plentiful on *Pimpinella Saxifraga* in the fortification trenches at Stettin, he found four weeks later, in a plantation, on dry sand, many orange-yellow larvæ on *Thymus Serpyllum*, and from these he obtained a number of this *Zygæna*. Not the difference of food, nor locality, nor the appearance of the larvæ, but the peculiarities of the two perfect insects, decided me to answer the question in the affirmative. Since I also had found some years ago, after I had always found the larvæ of *Z. Minos* on *Pimpinella Saxifraga*, yellow larvæ plentifully on *Thymus Serpyllum* in dry sandy places; from these I expected *Z. Filipendulæ*, and, to my astonishment, obtained specimens which I could not distinguish from *Z. Minos*.

Since I now cannot distinguish which of my specimens were bred from these larvæ, and possess no specimens agreeing with Hering's species, I must formerly have entirely disregarded the differences in the earlier stages.

To a similar inquiry sent to Herr Freyer, the answer had come,—These were the ordinary *Zyg. Minos*. In order to attain certainty with regard to this species, I begged Professor Hering to lend me his stock of the doubtful species, and also his Pomeranian *Zygæna Minos*. He was so good as to comply with my wish, and at the same time sent me an Augsburg specimen. The latter is at any rate the true *Minos*, which Freyer has figured, which does not differ from the Glogau specimens, and which has no more accordance with Hering's species than any ordinary specimen of *Minos*. Professor Hering wrote me word that he had still two specimens of his species left, and sent them to me. Unfortunately I removed them from their box, and placed them amongst the specimens of the true *Minos* belonging to him; and since several of the latter are unlabelled, I can no longer distinguish the second specimen, also accidentally unlabelled, since none possesses the peculiarities of the supposed new species.

This circumstance has removed, in my judgment, a great deal of the confidence which it would have, if, as the words in Hering's letter imports, two specimens were in the parcel agreeing with the pair received a long time ago.

Be now the reason what it may, that precisely the unlabelled specimen can no longer be distinguished from the ordinary *Z. Minos*, yet this is certain, that the labelled male and the pair previously sent to me agree sufficiently in their characters and differ sufficiently from *Z. Minos* to render it probably a truly distinct species. Should this be confirmed, I would propose for the species the name of *Zygæna Heringi*,

after the discoverer and observer, though it may also be considered as *Z. Minos*, var. *h*.*

In this *Zygæna Heringi* the middle spot of the anterior wings immediately strikes the eye; it expands suddenly very considerably, fills up nearly the whole breadth of the space between the first and second branches of the median vein, is rounded, and reaches even further towards the hind margin than in *Z. Minos*. In no Silesian, Pomeranian, Augsburg or Austrian specimen of *Z. Minos* known to me has the spot this expansion inwardly—neither has *Z. Erythrus*—but, perhaps, almost *Z. Pluto*, Bdv. Icon. pl. 52, f. 4, only that it is here much shorter, and therefore further from the hind margin. The second peculiarity of *Z. Heringi* is, that the hind margin of the anterior wings is externally convex, with the convexity most protruding below the middle, whereby not only the apex of the wing is kept somewhat back, but also the breadth of the wing appears more considerable. The third difference is shown in the antennæ, which, in the male far more imperceptibly than in the female—one must, however, compare males with males, females with females—are more attenuated from the club towards the base, and in the female are longer and have a more slender club. Every thing else is variable, as in the allied species, even the form of the posterior wings. Only the males have a little grey in the apex of the posterior wings, the females none at all.

* Vars. *b*, *c*, *d*, *e*, *f* and *g* will be found in the "Isis," 1840, at p. 138.

ON ZYGÆNA MINOS.

BY C. F. FREYER.

[Published in 1844, Ent. Zeitung, p. 85.]

Herr Zeller of Glogau has given, in the February number of this Zeitung, some very interesting remarks on some of the

Zygænæ, and had formerly suspected that out of *Z. Minos* probably two species might be established. His former suspicions in reference to this separation, which he had communicated to Professor Hering of Stettin, become somewhat unsettled in the above treatise, so that it now seems rather doubtful whether he would maintain or not his previously determined separation of this *one* species into *two*.

Professor Hering had already inquired of me whether *Z. Minos* should not be divided into two species, since he found the larvæ quite different from those figured in my plate 86, namely, *white* and *whitish-blue*, instead of *yellow*. I have carefully examined the specimens of the imago sent by him, but after all my investigations I could find no sufficient distinctions between them and the specimens which I take here. Only in some specimens of *Minos* I find the securiform spot, in which the red middle stripe terminates, somewhat broader, larger, and more lost in the ground-colour.

When I gave my figure of *Minos* on plate 86, I had always found the larvæ yellow and no other colour. However, last summer, on the 25th May, 1843, I chanced by accident to find, in a meadow near a wood, a number of the *white* larvæ of *Zygæna Minos*, which is very like Hübner's figure, and at the very same place, amongst them, *some yellow* larvæ. They ate very properly only *Pimpinella*, but they also bit other plants, such as thyme, &c. Of these larvæ, which, when I found them, were just full grown, I collected considerably over a hundred, amongst them from 17 to 20 of the *yellow* ones, which were also rather larger. I immediately separated them, and kept the white larvæ and the yellow larvæ in separate cages. But unfortunately many, indeed most, of the larvæ were infested with Ichneumons or *Gordii*, so that in proportion to my stock of larvæ I obtained only a few perfect insects, which showed no further

differences except the above-mentioned characters. Only I may remark this, and I consider it of some importance, that the *yellow* larvæ almost all produced females, whereas the *white* larvæ furnished mostly males and very few females. Should, therefore, the difference of colour in the larvæ indicate the sexes? I should further observe, that the yellow larvæ had a dark dorsal stripe, whereas on the white or whitish-blue larvæ no dorsal stripe was perceptible. The cocoons of the yellow larvæ were silvery-grey, some few cocoons were, however, pale yellow. The cocoons of the white larvæ were also much flatter, and not so vaulted as those of the yellow larvæ.

Altogether, out of the mass of larvæ I obtained about 30 perfect insects; the greater part of which, as I could see no sufficient distinction between them, I set at liberty. Also in the form of the pupæ could I find no difference. They were very soft, some yellowish-brown, some black-brown, some altogether black.

The perfect insects appeared from the 25th June to the 10th of July.

If we reflect on the difference in the colour and markings of the larvæ, it is of course very probable, that if the differences do not indicate the sexes here two species may be mixed, yet it will always be a difficult matter to find out any good points of distinction in the perfect insects.

NOTE ON ZYGÆNA MINOS.

BY PROFESSOR HERING.

[Published in 1846, Stett. Ent. Zeitung, p. 235.]

Zygæna Minos, var *h. Heringi*, Zeller.

The larva of the ordinary *Zygæna Minos*, which we find here almost exclusively on *Pimpinella Saxifraga*, never

occurs later with us than about the middle of May. The larva of the above-mentioned variety or species, which flies in the perfect state in August, when *Minos* is long past, I had for several years sought in vain. I find them only on *Thymus Serpyllum*, on sandy places in fir-woods, never in our fortification trenches, where *Minos* is in many years quite common. This year I found a larva on the 21st June, which, for want of proper care, died. But immediately I found it I made the following description of it.

The larva is dark citron-yellow—at the end of each ring are two black spots, which consequently form a double row of spots, between which are numerous white hairs, placed on extremely fine blackish warts. Along the legs is placed, in the middle of each segment, a small black spiracle, over and under which are white hairs, as on the back. A careful comparison with the larva of the ordinary *Zygæna Minos* must be postponed, as I have neglected to seek for larvæ at the right time.

ZYGÆNA MINOS.

[From Herrich-Schäffer's Schmetterlinge von Europa, II. p. 30, published before 1847.]

MINOS, W. V., Hübner, fig. 8 (antennæ false); Boisd. Icones, pl. 52, figs. 4 and 5. (The two figures show no difference, though he calls fig. 4 *Pluto*.) Freyer, n. B., T. 86, fig. 1 (anterior wings too broad and pointed); Suppl. figs. 13—16.

Exp. 12'''—15'''.

Major, corpore nigro, alis anterioribus non limbum versus nigrioribus.

Larger; anterior wings blue-grey, not darker towards the blackish marginal line. The ends of the cilia brown. Spots

2 and 4, 3 and 5, are always confluent. The collar and shoulder pieces never with a whitish mixture. The great difference in the united spots 3 and 5 is shown by the figures.

The specimens from the Alps and the south are distinguished by the wings being more thickly scaled and therefore darker, and by the shaggy and black-haired abdomen, whereby the shorter steel-blue scales are concealed. I imagine these specimens are the *Pluto*, W. V.; at any rate I have never seen any other *Pluto*. I never saw a specimen with the anterior wings as broad behind as Hübner's fig. 88 (*Pythia*). My fig. 14 shows a specimen in which the securiform spot is hardly expanded behind. Fig. 13 shows a very peculiar cut of the anterior wing of the male. Fig. 15 a female, in which the red is much expanded. In Fig. 16 the securiform spot is much attenuated towards the base.

The apex of the hind wing in the male has sometimes a rather broad tinge of black. See Ent. Zeit. V. pp. 39 and 85.

Rather widely distributed; abundant near Ratisbon, and the earliest *Zygæna* to appear. June. The larva on various low plants.

ZYGÆNA MINOS.

[From Herrich-Schäffer's Schmetterlinge von Europa, VI., Appendix to Vol. II. p. 43, published before 1856.]

MINOS.—In one female specimen (from Herr Kaden) of unusual size, spot 3 is only connected with 5 by a slender line, and 5 is much contracted at rib 5. In another equally large, but much wasted specimen, the costa is red for three-fourths of its length, and then united with a very large undetermined spot 5. The latter is united with the magnified,

likewise indistinct spot 4, but this is only united with 2 along the middle rib, on which alone 3 is joined to 5.

Mann's *Nubigena* are Alpine specimens of *Minos*.

[The synonymy given in the Index of Vol. II. is as follows:—]

MINOS (*Zygæna*), W. V.; Fr., n. B. 86; Tr., H., 8; H.-S.,
13, 16, p. 30.

„ *Heringii*, Zeller.

„ *Pluto*, Bdv., 52.

„ *Nubigena*, Mann, in litt.

„ *Pilosellæ*, Esp., t. 24; *Polygalæ*, Esp., t. 34, 3.

„ *Purpuralis* (Pyr.), Müller.

„ *Scabiosæ*, F.

„ *Viciæ*, Lang.

ZYGÆNA MINOS.

[By E. NEWMAN, in the Zoologist, pp. 7565 and 7676, published 1861.]

Occurrence of Zygæna Achilleæ in Ireland. It is a dangerous thing to write about our British *Zygænæ*: if any one incline to take up the genus I heartily wish him well through it. It is an equally dangerous thing to introduce a new species on the faith of a single specimen; but I will risk both these dangers. About a month since, Mr. Birchall sent me a single specimen of a *Zygæna* taken by himself in the West of Ireland. I could not make it out, as it presented a combination of characters which do not exist in any other species. After a while I submitted it to Mr. Doubleday, who pronounced no opinion, but, with his invariable promptitude and kindness, sent me a pair of continental specimens of *Zygæna Achilleæ*, for the purpose of comparison, and the new comer proved to be identical with that continental species. It may at once be distinguished from every

species yet discovered in this kingdom, save and except *Z. Minos*, by the extreme bluntness and capitate form of the antennæ; and from *Z. Minos* it is instantly distinguishable by the texture and colour of the covering of the body; in *Z. Minos* this covering is long, shaggy and dead black; in *Z. Achilleæ* it is close, compact, shining and chalybeous-blue. On the Continent this species occurs more particularly on chalky soils, but I am not aware of the existence of chalk in the vicinity of its Irish habitat. I forbear describing the colour of the wings, as the species seems subject to much variation in this respect (p. 7565).

Further Note on the supposed New Irish Zygæna. Of course my note in a late number of the "Zoologist" (Zool. 7565) has produced many communications on the same subject, the most interesting of which are, first, a letter from M. Guenée, addressed to Mr. Doubleday, and, secondly, a visit from Mr. Birchall.

From M. Guenée's letter it appears manifest that that greatest of Lepidopterists considers that the two Irish *Zygæna* are distinct as species. The one which we have so long known by the name of *Minos*, and which is particularly distinguished by its black woolly or hairy body, he believes to be undescribed; and the comparatively recent addition to our Fauna, which I announced in the June number, he regards as the true *Zygæna Minos*. This view of the case is corroborated by a most careful comparison of a pair of continental specimens of *Zygæna Minos*, sent over by Herrich-Schäffer, and one of which I had supposed to be *Z. Achilleæ*. The continental specimens have been kindly presented to the cabinet of the Entomological Club by Mr. Birchall, and have been placed side by side with others of his own taking. A pair of continental *Zygæna*, presented by Mr. Doubleday

to Mr. Birchall, were at the same time submitted to a critical examination, with the result that one of them was certainly identical both with Herrich-Schäffer's *Z. Minos* and with Mr. Birchall's new Irish insect; the second specimen, however, seemed to differ, being a much more opaque insect, somewhat larger, irrorated with testaceous scales, and having a whitish or greyish tuft on each side of the mesothorax at the base of the forewings, extending on to the wing itself. These differences at first induced both Mr. Birchall and myself to think that the two specimens in question were referrible to different species, the one probably being the true *Z. Minos*, the other the true *Z. Achilleæ*; but even this conclusion appears doubtful, since we found the testaceous scales often present in the Irish specimens, and in a few instances the grey tuft at the base of the forewings is also very distinctly present. Under these circumstances, it seems best to eliminate the name of *Z. Achilleæ* from the discussion, and to confine our attention to the two species, or supposed species, which I endeavoured to differentiate at p. 7565. Let us call the most familiar black-bodied insect *Zygæna Nubigena*, thus adopting a cabinet name, used both in France and Germany, and one which M. Guenée proposes to adopt, should he ever describe this tribe of insects. And let us inquire how it came to be called *Z. Minos* in England, and in England only. The first notice of the insect is from my own pen, and runs thus:—"I am informed by my friend Mr. Thomas H. Allis that about a dozen specimens of *Zygæna Minos* were taken last summer on the west coast of Ireland by Henry Milner, Esq., of Nunappleton, near York." *Zool.* 4180, dated *January*, 1854. Mr. Stevens (*Zool.* 4272) is reported to have exhibited at the Entomological Society's Meeting specimens of the new British *Zygæna Minos*. At *Zool.* 4436 is a most interesting paper by Mr. A. G. More

on the geographical distribution of *Zygæna Minos* in the West of Ireland. Such were the earliest notices of this insect, all adopting, without hesitation, a name for which no authority had then been given. Latterly Mr. Doubleday places it in his Synonymic List as *Z. Minos*, W. V. The Vienna Catalogue is certainly high authority when we know what is intended; but, alas! in this, as in too many other instances, it is now too late to inquire what its learned authors meant by the name. It will not, I think, be urged by Mr. Allis, with whom the name, as applied to the Irish insect, seems to have originated, that he ever went into the question of its nomenclature very critically. Let me now attempt to bestow on it a name which, even if not accepted, will at any rate challenge inquiry and discussion.

ZYGÆNA NUBIGENA, *Musæorum*.

Alæ anticæ semi-hyalinæ, nigrescentes, plaga magna difformi discali rubro; alæ posticæ rubræ margine tenuiter nigro; caput, thorax et abdomen nigra, opaca, hirsuta.

The amount and disposition of the red colouring on the forewings of the species of *Zygæna* has always been held of great importance in differentiating species; thus the terms "five spot" and "six spot" describe characters which in this country were for sixty years considered amply sufficient to distinguish our indigenous species. Although this is no longer the case, we may still consult these markings with advantage. In the two supposed species I am now considering, the red area of the forewings is divided by the wing-rays into three portions or blotches; the first blotch may be called *costal*; it originates at the base of the wing, and extends immediately beneath the costal margin; the second may be called *discal*, occupying, but not limited by,

what is usually termed the discoidal cell; the third may be called the *inferior* blotch; it originates at the base of the wing, and extends towards the hind margin. The costal blotch is pointed at its discal extremity, and the discal blotch at its basal extremity. Mr. Birchall has pointed out to me that in the continental specimens of *Z. Minos* these two points do not pass or overlook each other, whereas in *Z. Nubigena* the passing or overlapping is most evident. In a letter from Mr. N. Cooke, of Liverpool, to Mr. Doubleday, this character is clearly shown by coloured sketches. This difference, I admit, appears very insignificant; but supposing that one form of blotching is constant to the black-bodied individuals, and the other form of blotching constant in the green-bodied individuals, it will aid us very materially in our attempts to establish the existence of two species. In addition, I have only to say, that I shall be much obliged for any information respecting the *Z. Minos* said to have been found both on the west and east coasts of Scotland. I have seen neither (pp. 7676, 7677).

NOTE ON THE IRISH ZYGÆNÆ.

[By Henry Doubleday, in the "Zoologist," p. 7715, published 1861.]

The remarks of my friend Edward Newman (Zool. 7676) respecting the Irish *Zygæna* will no doubt lead many of the readers of the "Zoologist" to suppose that M. Guenée has examined a number of specimens, and considers that two species have been confounded under the name of *Zygæna Minos*. This is not the case; he has only seen two individuals which I sent him some years since. In a letter to me, dated May 25th, 1861, he says:—"I have examined with great attention an Irish *Zygæna* which you sent me some time ago, and which I regarded as a simple variety of

Z. Minos. The two individuals which I received from you are identical with those which I took in 1858, at Bourg d'Oysaurs (Hautes-Alpes), and also with two specimens which I have received from the mountains of the Tyrol. I am now inclined to regard this *Zygæna* as a separate species, proper to mountainous countries. It differs from the typical *Minos* in the border of the inferior wings, and especially by their internal angles, which are tipped with dark grey; by the red spot upon the superior wings, which extends as far as the cellular bifurcation; and, lastly, by the body, which is of a dark brownish-black, instead of blue. This *Zygæna* flies in the open fields of the mountains, and does not appear to seek shady places, as *Minos* does with us. It is known in Germany by the name of *Nubigena*; and although this name is bad, I believe we must adopt it, in order that we may not introduce confusion into this genus, already so difficult." I have thought it right to give the remarks of my friend in his own words. Whether the Irish *Zygæna* is anything more than a local variety of *Minos* time may perhaps prove.

HYMENOPTERA.



NOTES ON HYMENOPTERA, OBSERVED DURING THE PAST SEASON ; SOME OBSERVATIONS ON HYMENOPTEROUS PARASITES, AND A MONOGRAPH OF THE FAMILY CHRYSIDIDÆ.

BY FREDERICK SMITH.

LAST year I commenced my observations on the *Hymenoptera*, by an account of the effect of the most ungenial weather, which prevailed during the entire season, upon the tribe *Aculeata*; the effect was principally observable upon the social genera *Bombus* and *Vespa*, a great diminution in the number of these insects being obvious to the most negligent observer.

It now becomes my province to record the effect of the cold wet season of 1860 upon the Aculeate *Hymenoptera*, as regards their scarcity or abundance in 1861. Having assiduously collected and observed the *Aculeata* during the last twenty-five years, I am able to state unhesitatingly, that the past season stands alone for paucity of the *Hymenoptera*; it is true that some of the social species have been abundant in certain localities, but the almost total disappearance of some species, even of these, is a circumstance that has not occurred in my previous experience.

It does not fall to my lot to record the capture either of new or very rare species. I have therefore thought it may prove interesting to give some account of the various parasites that

prey, either upon the larva, or upon the food stored up by the industrious portion of the family *Hymenoptera*; under this head, I include, of course, the bees, wasps, and the numerous tribe of burrowing or fossorial species. Previous, however, to entering upon this part of my subject, it will be as well if I record such facts as have come to my notice respecting the appearance of Hymenopterous insects during the past season.

One of the most interesting captures that has come to my knowledge is that of the true *Myrmica unifasciata*, by Mr. Lewis, who found the species at the Landslip, between Luccomb Chine and Ventnor, in the Isle of Wight; this is not, however, its first capture. On looking carefully over the collection of Mr. Curtis, I found several specimens, captured by that eminent Entomologist some years ago at Dover; I regret much that I was not aware of this at the time of the publication of my Monograph on the *Formicidæ*. I have now the pleasure of recording the fact of *Myrmica unifasciata* being an undoubted British insect, and of pointing out two localities for the species.

In my Monograph on the British *Formicidæ*, I published a short account of *Myrmica lævigata* (*Æcophthora pusilla* of Heer), the house-ant of Madeira; I also stated that a few specimens had been taken by myself on old walls some years ago, and that it had become abundant in hot-houses at Exeter and elsewhere; appended to this will be found the following observation:—"The species is described here, as, in all probability, it will, in the course of time, become generally distributed and naturalized like the *Myrmica molesta*, our too common house-ant." The first time that I noticed the Madeira house-ant is now upwards of twenty years ago, this was on an old wall at Battersea; subsequently, it has been found in many conservatories, &c. During the past

season my anticipations have proved to be too true. The Rev. W. White observed this ant in great numbers swarming in a baker's shop in the Borough; so great were its numbers that it was running over everything,—bread, biscuits, buns, &c.; it could not in fact fail to attract the notice of everyone; in consequence of which, the poor tradesman stated he had unfortunately lost the best part of his customers. Here then is a serious evil, a pest far more to be dreaded than the *M. molesta*, and one which will prove a sore annoyance in every house into which it manages to intrude itself. We have given figures of this formidable intruder in the plate that illustrates the "Annual."

This ant is of a black colour, with the feet and antennæ pale; it is full one-third larger than the *M. molesta*; I am here speaking of the small workers; the insect belongs to the family *Attidæ*, which is distinguished from that of the *Myrmicidæ* by the colonies consisting of four distinct forms; namely, males, females, large and small workers; the large workers have their heads greatly enlarged, from three to four times larger in proportion than that of the small workers, the latter having heads of an ordinary size; other structural differences of course separate the families *Attidæ* and *Myrmicidæ*, but these are unnecessary to be pointed out here.

Having mentioned large and small workers, it may be questioned whether there exists any positive distinction between them; this is a point that has been much disputed; some believe that one is a mere modification of the other, and that if communities of ants were carefully examined, a set of links would always be found forming a progressive chain of development from the most minute to the most gigantic individual in the community; that difference of size, and enlargement of particular parts, are simply degrees of approach to

what must be considered the perfection of the species. Such opinions, I feel convinced, are always the result of a superficial knowledge of the subject; instances amongst the *Formicidæ* might be cited to prove that in many species a difference of structure is found, so great, that it is at once obvious the functions of the two kinds of workers must be totally different; in fact, that each kind is totally incapable of performing the duties of the other. I may briefly allude to the genera *Eciton* and *Ecodoma*; in the latter, the large or soldier-workers are armed with spines at all points, and have enormous heads, furnished, in some species, with an additional eye, or ocellus, in the middle of the forehead; in *Eciton* the soldier-ants are furnished with long sickle-shaped mandibles, the small workers having them of an ordinary size; between these there exists no gradation in size, each is structurally fitted to perform a different set of duties, and is incapacitated from exercising the occupations assigned to the other form of sex.

Working honey-bees are apparently proved to be sterile or abortive females; in outward structure, however, no visible difference, excepting size, is obvious; but we do not find here, as amongst the ants, one set of individuals in a community so distinct in form and appearance from the rest, that nothing short of actual observation could lead any naturalist to believe there could possibly exist any connection between them. In all the species of ants that are known, the thorax of the worker is different in form to that of the female; in the latter it is usually oblong-ovate, whilst in the former it is more or less wedge-shaped, with the thin edge cut off, and the mandibles and antennæ are usually more elongated, fitting it for a totally different occupation in the economy of the formicarium.

During the past season fossorial insects were of rare occurrence ; I visited localities in Kent, Suffolk and Surrey, where some species usually abound, and where in 1858, in the months of August and September, I certainly observed one hundred individuals where I found a single example in 1861. This observation will apply to the whole fossorial tribe, of which I am not aware of a solitary species of any rarity having been captured.

During the entire season of 1860 I only saw three wasps, although I visited many localities where they are usually abundant ; from their great scarcity during that year it might have been reasonably inferred, that nearly the whole tribe has perished in consequence of the unusual degree of cold and rain ; such however does not prove to have been the case. I have received a communication from my friend Mr. Henry Doubleday on this subject, which I will give entire : he says, "last year I did not see a single wasp, and I am not aware that one was seen by any person in this neighbourhood ; but at the present time, August 14th, they are more numerous than they have been for years ; we have them by thousands, they are destroying all the early plums. I have no doubt they are the produce of females of 1859, which remained in a torpid state through last year." In this opinion I quite agree, no other reasonable mode of accounting for the general abundance of these insects appears to me to present itself.

Mr. Curtis informed me that at Wangford, in Suffolk, wasps swarmed in incredible numbers, proving a most intolerable nuisance in houses, whilst their depredations in the shops of fruiterers and grocers became a serious loss to them ; even butchers complained of the loss and damage done to their meat, so great and unusual were their numbers. At Halesworth, in Suffolk, wasps were extremely numerous,

and, as I experienced, proved a great annoyance by flying into railway carriages passing along the line. In the neighbourhood of Portsmouth, Mr. Bouchard observed wasps in great numbers; these pests were so numerous that all shops at which grocery or sweets were sold, were filled with them; the counters, windows and walls were literally covered; at one shop the tradesman said he took no steps to get rid of them, it was quite useless, but as he never disturbed or molested them, he had not been stung by them. I have received similar reports of wasps from several parts of the country; in Scotland I am informed they have been less abundant than in 1860.

The past season must be regarded as an unusually fine one, particularly the autumnal months, which have been characterized as a second summer, some portion having been hotter than any part of the summer months; notwithstanding this, so great a scarcity of the solitary autumnal bees has not occurred in my experience; I have always looked forward to autumn, as the time when the *Halicti* would abound; the flowers of the hawkweed, hemlock and ragwort being usually visited by them in great numbers; but I looked in vain on these flowers for my favourites, scarcely a single example was to be met with. One consequence of the hot autumnal weather was the forcing out as it were of some individuals, which under ordinary circumstances would not probably have appeared until next season; thus, I captured three males of the beautiful little *Ceratina cœrulea* at Folkestone on the 3rd of October.

Of the spring bees or *Andrenidæ*, no species is usually more generally distributed, or more abundant, than *Andrena cineraria*, yet of this species I only saw one or two examples even in situations where their burrows are usually found in great numbers.

The beautiful *Andrena fulva* was equally scarce, so much so that I did not secure a single example.

In order to ascertain, with a greater degree of certainty, the manner in which the wet and cold of the previous season had affected the solitary bees, I visited a locality at Southend, where a very extensive colony of *Anthophora* has existed for many years, and also one of *Eucera longicornis*; both these bees, in ordinary seasons, are found at that spot in great numbers, but on my last visit scarcely a single bee was to be seen on one of the finest days of early summer. Being disappointed in my search, I proceeded to dig into the bank in which the colony was situated; an explanation of the cause of the scarcity of the bees soon presented itself; hundreds of dead bees filled the burrows, whilst numberless cells were half filled with the mouldy remains of honey and pollen stored up for the larvæ, which had doubtless perished during the former ungenial season. A similar fate has, I fear, befallen three-fourths of the solitary bees, and it will I fear be some years before we shall again see these attendants upon spring and early summer, in their usual numbers, flying from flower to flower, and adding life and beauty to the sunny days of spring.

As might be expected, Humble bees did not suffer so severely, but still a great diminution in their numbers was very apparent; those which build their nest underground appeared by far the most numerous; the moss-building species were greatly diminished in number. During the autumn of 1860, I found nests of these bees in which the entire brood had perished from the cold and wet; larvæ, pupæ and perfect bees were rotting in the damp and mouldy nests which swarmed with thousands of acari that fed upon the remains of the wax and honey which they contained.

I will now proceed to give some account of the parasites that prey upon the different families of the *Aculeata*, con-

fining myself to such as live upon British species. These parasites may be divided into distinct races; first, such as feed upon the provision laid up for the larva of the future bee; secondly, such as prey upon the larvæ themselves; and, thirdly, those which are found upon the perfect insect, and lastly I may briefly notice such as prey upon the parasites themselves.

One set of parasites which prey upon the food stored up by the bee have been called cuckoo-bees, and certainly, in one respect, they merit the appellation; they never construct nests of their own, but deposit their eggs upon the food laid up by the provident and industrious species, but I am not inclined to the belief that the working bee also deposits her egg upon the same food; no hostile feeling appears to exist between the bee and its parasite; and I believe the latter, watching its opportunity, and at length finding a store suited to its own purpose, deposits its egg and then closes up the cell; I am led to adopt this opinion from the circumstance of having found, on the tibiæ of these parasites, masses of clay, or sometimes of the gummy secretions of plants, the purpose of which, in my opinion, was for closing up of the cell in which they had previously deposited their egg.

The following is a list of such parasites, and the species which they attack, as I have myself observed:—

<i>Epeolus variegatus</i>	on	<i>Colletes Daviesana</i> .
<i>Nomada varia</i>	on	<i>Halictus rubicundus</i> .
„ <i>furva</i>	on	„ <i>morio</i> .
„ <i>solidaginis</i>	on	„ <i>abdominalis</i> .
„ <i>jacobææ</i>	on	<i>Andrena fulvicrus</i> .
„ <i>ruficornis</i>	on	„ <i>nigroænea</i> .
„ <i>lateralis</i>	on	„ <i>longipes</i> .
„ <i>baccata</i>	on	„ <i>argentata</i> .
„ <i>ochrostoma</i>	on	„ <i>labialis</i> .
„ <i>borealis</i>	on	„ <i>Clarkella</i> .

- Nomada armata* on *Andrena Hattorfiana*.
 „ *Germanica* on „ *fulvescens*.
 „ *sexfasciata* on *Eucera longicornis*.
Coelioxys 4-dentata on *Megachile argentata*.
 „ *Vectis* on „ *maritima*.
 „ *simplex* on „ *Willughbiella*.
 „ *umbrina* on *Sarropoda bimaculata*.
Stelis aterrima on *Osmia aurulenta*.
 „ *phœoptera* on „ *fulviventris*.
 „ *octomaculata* on „ *leucomelana*.

The parasitic genus *Melecta*, of which we have two species, are parasitic upon *Anthophora retusa*, and *A. acervorum*, but they attack indifferently either species of bee. Some of the species of *Nomada* do not, I believe, confine their attacks to one species of *Andrena*; *M. ruficornis* appears to be parasitic upon *Andrena nitida*, *tibialis*, and perhaps some other species, but certainly the greater part of them are perfectly constant in their parasitism, the bee and its parasite being always found together.

The social humble bees are subject to the parasitic attacks of allied species: *Bombus lapidarius* is attacked by *Apathus rupestris*; *B. hortorum*, by *A. campestris*; *B. pratorum*, by *A. Barbutellus*; and *B. terrestris*, by *A. vestalis*; the latter also attacks *B. lucorum*.

The parasitism of the fossorial *Aculeata* differs widely from that of *Apidæ*; their attacks are not confined to insects belonging to their own order, or their own tribe; some being the parasites of Coleopterous insects. The genus *Tiphia* is the only representative of the family *Scoliadæ*, being closely allied to the genus *Scolia*; a species of the latter genus, *Scolia flavifrons*, having been discovered by Passerini to be the parasite of *Oryctes nasicornis*; of which a series of illustrations are to be seen in the British Museum. *Tiphia*

femorata, I have every reason to believe, to be the parasite of a species of *Aphodius*; I have several times found it beneath the droppings of cows and horses. Amongst the British fossorial species, I know of two only that I have reason to rank amongst the parasites; but several species prey upon *Apidæ*, which they store up as food for their young. The *Philanthus triangulum* stores up the *Apis mellifica*, *Halictus zonatus* and *Andrena fulvicrus*; *Cerceris ornata* preys upon *Halictus rubicundus* and *H. cylindricus*.

Amongst the *Mutillidæ*, or solitary ants, we also meet with parasitic genera; of the typical genus *Mutilla*, we have only two well authenticated, British species. The *Mutilla Europæa* is parasitic upon humble bees; M. Drewsen of Copenhagen has obtained as many as seventy-six individuals from a single nest. It must not, however, be supposed that *Mutilla* is exclusively parasitic upon *Bombus*; such cannot be the case, as many species of the genus are found in countries where the *Bombi* are not found, Australia being an example of this. I have little doubt of the rare *Methoca ichneumonoides* also being a parasite; it is the only representative, hitherto found in this country, of the family *Thynnidæ*; the species of the latter have been observed to be parasitic on Lepidoptera, by Mr. R. Bakewell, at Lower Plenty, South Australia.

There remains to be noticed certain parasites belonging, in the opinion of some naturalists, to a distinct order of insects, but which latterly have been included amongst the parasitic Coleoptera, *Sitaris*, *Rhipiphorus*, &c., and such is probably their natural position; the parasites belong to the genus *Stylops* and its affinities. The number of species hitherto discovered is small; all are internal parasites, and, as far as discoveries have been made in this country, appears to confine

their attacks to the *Andrenidæ*; this will not apply to exotic genera. The larva of *Stylops* feeds upon that of the bee, without causing the death of its victim; on the latter arriving at its perfect condition, the males of the *Stylops* escape from its body between the segments of the abdomen; the female, on the contrary, never quits the body of the bee, not possessing powers of locomotion, being in fact little more than a shapeless maggot, with only the head and a portion of the thorax protruding between the segments of the body of the bee. For a history of these remarkable parasites I may refer the reader to the works of Siebold, and to an elaborate paper by Mr. G. Newport, in the 29th vol. of the "Linnæan Transactions."

There are other bee-parasites, belonging to the family *Chalcididæ*; of these none is more remarkable than the *Melittobia Acasta*, the larva of which feeds upon that of *Anthophora acervorum*; the female is a small shining green insect, about the twelfth of an inch long, furnished with wings, the male being apterous, or having only rudimentary wings, unfitted for flight; it is also remarkable for having exceedingly minute, or microscopic eyes—not, as in the female, composed of numerous facets similar to those of most other insects; but simple, like the three ocelli with which its crown is furnished. Many chalcididous parasites are known, but the mention of one or two will suffice for our present purpose, *Monodontomerus nitidus*, and *dentipes*; both attack the larvæ of *Anthophora*, and also that of *Osmia rufa*. On more than one occasion I have discovered the larva of *Melittobia* preying upon that of the *Monodontomerus*; in fact I have found it attacking the parasite quite as frequently as the larva of the bee.

The last family of parasites to which I shall at present allude are the *Chrysididæ*; these insects are generally

known, the brilliant splendour of their colours having obtained for them several characteristic names; they are usually known by the popular one of ruby-tailed-flies.

The attacks of these insects are general: the same species at different times will be found preying upon the larvæ of different species of bees; at another on wasps, attacking both the solitary and social species of that family; it may also be found in the nests of fossorial *Hymenoptera*; *Chrysis ignita*, the most abundant species of the genus, is found in all parts of Europe, and is subject to very great differences, both of form and colouring; this insect is frequently reared from nests of *Odynerus antilope*, I have also obtained it from that of *O. spinipes*. A few years ago I brought home from Yorkshire a nest of *Vespa rufa*; as I kept this nest for several weeks in my sitting-room, I had an opportunity of obtaining many parasites on this species of wasp, amongst others, several of *Chrysis ignita*. I have also observed it about the burrows of *Cerceris arenaria*, and Wackenaer has I believe obtained it from the nests of that insect; it most probably will be found to be a very general parasite.

The beautiful *Chrysis bidentata* I have only found in company with *Odynerus spinipes*; to this species its attacks appear to be confined.

Chrysis cyanea is the parasite of *Chelostoma florissomnis*, and I think it also attacks other species of wood-boring bees; it is found in all parts of Europe.

Chrysis bicolor is a species new to the British list; I obtained specimens from a nest of *Osmia parietina*, brought from Loch Rannoch by Charles Turner, the well known collector.

It is now upwards of twenty years since Shuckard published his excellent Monograph on the *Chrysididæ*, in the "Entomological Magazine;" since that period much ad-

ditional information has accumulated ; Dahlbom's fine work on the family has appeared, and that celebrated Entomologist has carefully examined the typical specimens, described by Fabricius in the "Systema Piezatorum," and "Entomologia Systematica:" these are principally to be found in the Museum at Kiel ; every species has been referred to its proper genus, according to modern classification. Such being the case, I have thought a short Monograph of this beautiful family of *Hymenoptera* would prove even more acceptable than a mere record of captures of rarities and new species. I have not entered into all the intricacies of nomenclature ; the synonyma adopted I trust will prove adequate to the object proposed, namely, the publication of a series of short descriptions, whereby the species may be easily recognised, and such a revision of the synonyma as modern scientific research has rendered necessary.

Having omitted two species from the list comprised in Shuckard's Monograph, it is necessary to give my reasons for so doing ; having had the opportunity of tracing the localities in the registers of the British Museum, I ascertained that the *Chrysis cœrulipes* was taken in Italy by Dr. Leach ; it is also found in Austria and Turkey. The same celebrated naturalist took *Chrysis Leachii* in the south of France ; it also occurs in Italy, Hungary, and in Asia Minor.

I have included in the present Monograph an insect of which I have very great doubts of its being indigenous, the *Euchræus quadratus* ; this species, as far as I can ascertain, has occurred only in Italy, Germany, Hungary and Egypt : Shuckard says also at the Cape of Good Hope ; but, on an examination of the specimen from that locality, I do not think the two insects are identical.

Family CHRYSIDIDÆ.

Body oblong-ovate or ovate-rotundate, punctured, of moderate size, occasionally minute; of splendid metallic colouration; the antennæ 13-jointed in both sexes and convolute; the eyes oblong-ovate, entire; wings with few veins, membranaceous, or sub-hyaline; abdomen generally toothed at the apex; the female having an articulated retractile ovipositor.

The following is the list of the 22 British species of this family:—

I. CLEPTES, *Latr.*

1. semiaurata, *Latr.*
2. nitidula, *Latr.*

II. CHRYSIS, *Linn.*

1. ignita, *Linn.*
2. Ruddii, *Shuck.*
3. fulgida, *Linn.*
4. bidentata, *Linn.*
5. succincta, *Linn.*
6. cyanea, *Linn.*
7. Austriaca, *Fabr.*
8. bicolor, *Dahlb.*
9. neglecta, *Shuck.*
10. ornata, *Smith.*

III. EUCHRÆUS, *Latr.*

1. quadratus, *Shuck.*

IV. HEDYCHRUM, *Latr.*

1. lucidulum, *Latr.*
2. cærulescens, *St. Farg.*
3. ardens, *Curt.*
4. fervidum, *St. Farg.*
5. roseum, *St. Farg.*

V. OMALUS, *Panz.*

1. *auratus*, *Dahlb.*
2. *cæruleus*, *Dahlb.*
3. *nitidus*, *Panz.*

VI. ELAMPUS, *Spin.*

1. *Panzeri*, *Latr.*

Genus I. CLEPTES, *Latr.*

Head transverse, nearly sub-quadrate, as wide as the thorax; antennæ 13-jointed in both sexes; prothorax sub-quadrate, narrowed and somewhat rounded in front; the metathorax truncated, with spines at the posterior angles; anterior wings with a complete marginal cell, the first and second discoidal cells complete; abdomen ovato-conical, in the male having five segments, in the female only four; the latter with a protruded ovipositor.

1. CLEPTES SEMIAURATA, *Latr. Hist. Nat. xiii. 236, 1;*
Nouv. Dict. vii. 190.
Fabr. Syst. Piez. p. 154, 1.
St. Farg. Ann. du Musé, vii.
119, 1.
Shuck. Mon. Chrys. 158, 1.
Wesm. Bull. Acad. Brux.
vii. 168, 1.
Dahlb. Hym. Eur. ii. 15, 3;
Dispos. 2, 4.

Sphex semiaurata, *Linn. Faun. Suec. No. 1661; Syst.*
Nat. i. 946, 35. ♂

Ichneumon semiauratus, *Fabr. Ent. Syst. ii. 184, 210.*
Panz. Faun. Germ. 52, 1.

Cleptes splendens, *Fabr. Syst. Piez. p. 155, 3.*

Length 3—3½ lines. Head, thorax and basal joint of the

antennæ bright metallic green, or blue-green; the head and prothorax strongly punctured, the metathorax coarsely so; the mesothorax, scutellum and postscutellum with distant shallow punctures; the coxæ and femora green, the trochanters, tibiæ and tarsi testaceous, the latter usually dusky; the flagellum black; wings sub-hyaline and iridescent; abdomen shining, rufo-testaceous, with the apical margins of the third, fourth and fifth segments black, with a chalybeous reflection. (Male.)

Head and thorax shining coppery or golden-red, the puncturing very similar to the other sex; the antennæ rufo-testaceous, with seven or eight of the apical joints fuscous; the wings with a dark cloud beneath the stigma and a lighter one at the apex of the wings; the legs, abdomen and ovipositor rufo-testaceous; the apical segments black as in the male, with a steely-blue reflection. (Female.)

Very plentiful occasionally in May and June, running quickly on plants and flowers; in numbers on the Colts Foot at Old Brompton; very generally distributed.

2. *CLEPTES NITIDULA*, Latr. Hist. Nat. xiii. 236, 2.

St. Farg. Ann. du Musé, vii. 119,
2.

Fabr. Syst. Piez. p. 154, 2.

Dahlb. Exercit. Hym. 25, 2; Hym.

Eur. ii. 13, 2.

Shuck. Mon. Chrys. Ent. Mag. iv.
159, 2.

Wesm. Bull. Acad. Roy. des Sc.
Brux. vi. 169, 2.

Ichneumon nitidula, Rossi, Faun. Etrus. ii.; Fab. vi. fig.
1, 7.

Fabr. Ent. Syst. ii. 184, 211.

Length 3 lines. Head black with a coppery tinge, in some examples with a green or blue reflection on the face; the two first joints of the flagellum and the scape rufous; the latter usually, and sometimes the former also, of a dark bronze tint above; finely but not closely punctured. Thorax: prothorax rufo-testaceous, the mesothorax black, with a bronze tint, both slightly punctured; the scutellum, post-scutellum and metathorax metallic green or blue, the latter rugose; the intermediate and posterior coxæ and femora dark bronze-black, paler in some examples; the legs otherwise rufo-testaceous; the wings fusco-hyaline and iridescent, the tegulæ rufo-piceous. Abdomen shining rufo-testaceous, with the apical margin of the third segment and the two following entirely black, with a steel-blue reflection; ovipositor exerted, testaceous. (Female.)

The male I do not know.

Readily distinguished at once by its rufo-testaceous prothorax; it is certainly a very local species, but has been taken in the New Forest by the Rev. Mr. Rudd, and also in Suffolk; I once took a specimen near Lowestoft in July, also received one from Loch Rannoch in Scotland.

Genus II. CHRYSIS, Linn.

Head transverse, as wide as the thorax; the antennæ 13-jointed in both sexes; the thorax truncated anteriorly and posteriorly, the metathorax with a tooth on each side; the anterior wings with one marginal cell, which is complete in the majority of the species, in the others it is more or less open at the extremity; the first and second discoidal cells complete, the claws of the tarsi simple. Abdomen consisting of three segments, the apical margin of the terminal one toothed; the number of teeth various; in many species the

margin is edentate; along the apical margin is a more or less deep sulcation, in which is a row of minute fossulets; the legs moderate.

Sect. I. The marginal cell complete, the abdomen quadridentate at the apex.

1. CHRYSIS IGNITA, Linn. Faun. Suec. p. 414, No. 1665;
Syst. Nat. i. 947, 1.
De Geer, Ins. ii. 832, 1, tab. 28, fig.
17—21.
Fabr. Ent. Syst. ii. 241, 10; Syst.
Piez. p. 173, 14.
Latr. Gen. Ins. iii. 317; Hist. xiii.
238, 4.
Don. Brit. Ins. i. pl. 7.
Panz. Faun. Germ. 5, 22.
Spin. Ins. Lig. i. 64, 6.
Dahlb. Mon. Chrys. 7, 2; Hym.
Eur. ii. 292, 165.
Shuck. Mon. Brit. Chrys. Ent. Mag.
iv. 161, 1.
Wesm. Bull. Acad. Roy. des Sc.
Brux, vi. 174, 1.
Zett. Ins. Lapp. p. 433, 2.

Length $3\frac{1}{4}$ —7 lines. The head and thorax strongly and closely punctured, of fine blue or green, or of a mixture of those colours, sometimes splashed with golden or coppery effulgence; occasionally the region of the ocelli, a transverse stripe on the prothorax and the sutures of the thorax above black; the antennæ, mandibles and tarsi black, the rest of the legs metallic green; the base of the antennæ tinged with

green. Abdomen strongly punctured, the basal segment usually much more strongly so than the two following; an elevated smooth line running down the centre, sometimes becoming obsolete on the third segment, always more or less so. Wings faintly coloured, with the apical margins hyaline. The apex of the abdomen terminated by four teeth on the apical margin, the two central ones *widest apart*. (Halcione.)

Var. 1. The two central teeth *nearest together*. (Asterope.)

Var. 2. The two central teeth *nearest together, with the lateral teeth directed outwards, the central curve deepest*. (Celæno).

Var. 3. The terminal teeth *at equal distances*. (Electra.)

Var. 4. The terminal teeth at equal distances, *the lateral teeth bent inwardly*. (Maïa.)

Var. 5. The two central teeth nearest together, as in Var. 1. (Asterope), *but all much shorter and their apices only describing a slight curve*. (Taygeta.)

Var. 6. The two central teeth obsolete, the lateral angles acute, not produced into spines. (Merope.)

This is the most variable species of the genus; probably other and also intermediate varieties occur; sufficient are however given to show the protean character of the species; the puncturing of the abdomen varies greatly in depth and also in density: it is shown that the parasitism of the species is not even confined to a single genus, but that it attacks both solitary and social species; consequently the food upon which its larva feeds must vary considerably in quantity. The larva of *Vespa vulgaris* is much larger than that of an *Odynerus*, and may it not be to such circumstances that we must attribute the great variation in the size of both sexes of *Chrysis ignita*?

2. CHRYSIS RUDDII, Shuck. Mon. Chrys. Ent. Mag. iv.
163, 2.

Length 4—4½ lines. The head and thorax green, generally varied with dashes of blue; the vertex, scutellum and sometimes the tegulæ with a golden or coppery lustre; the legs green, with more or less of golden effulgence; the tarsi, mandibles and antennæ black; the scape and the base of the flagellum with metallic lustre. The puncturing of the head and thorax as in *C. ignita*. Abdomen of a rich crimson carmine, or inclining to bright copper colour; very finely and very closely punctured; the extreme base of the abdomen strongly punctured; the puncturing so fine and close as to render the abdomen opaque, wanting entirely the bright lustre of the preceding species; having a longitudinal central carina, terminated by four teeth; the teeth less acute than in the *C. ignita*; the wings as in that species.

Although this species closely resembles the preceding, still, although its differences are slight, they are constant; it is always more highly coloured than *C. ignita*;—and the puncturing of the abdomen, which is as fine as dust, at once distinguishes it.

This species is local; it was first taken in the New Forest; I have found it near London, but rarely; it also occurs at Dover, Sandgate, and Isle of Wight, but always sparingly; I once bred a few from bramble sticks.

3. CHRYSIS FULGIDA, Linn. Faun. Suec. p. 415, No. 1669;
Syst. Nat. i. 948, 7. (Female.)
Fabr. Ent. Syst. ii. 240, 8; Syst.
Piez. 172, 11.
Latr. Hist. Nat. xiii. 237, 2.
Schrank, Faun. Boic. ii. 343, 2194.
Panz. Faun. Germ. 79, 15.

St. Farg. Ann. du Musé, vii. 126.

Shuck. Mon. Chry. Ent. Mag. iv.
164, 3.

Dahlb. Dispos. 9, 6; Hym. Eur. ii.
245, 136.

Curtis, Brit. Ent. i. fol. 8, pl. 8. ♀
Zett. Ins. Lapp. p. 433, 1.

Chrysis ornatrix, Christ. Hym. p. 403, fig. 12. (Male.)

Chrysis Stouðera, Jurine, Hym. 296, pl. 12, fig. 9.
(Male.)

Panz. Faun. Germ. 107, 12.

Shuck. Mon. Chrys. Ent. Mag. iv.
165, 4.

Zett. Ins. Lapp. p. 433, 1.

Wesm. Bull. Acad. Roy. des Sc.
Brux. vi. 175, 3.

Length 4—5 lines. The head, thorax and basal segment of the abdomen closely and strongly punctured, of a deep blue, varied with tints of a golden green lustre, sometimes with rich golden effulgence; the legs green, with the tarsi black; the mandibles and antennæ black, the former with the basal half usually blue, or with a green metallic tint. Abdomen: the second and third segments of a rich carmine, purple or golden red, rather finely punctured, much more so than the basal segment; a central elevated smooth carina runs down the centre, usually more or less obsolete on the third segment. (Female.)

Length 4—4½ lines. The head, basal joints of the antennæ, thorax, first segment of the abdomen, and a large semicircular spot on the second, blue or metallic green, the remainder of the abdomen golden-red or rich carmine; the thorax and head tinged frequently with golden or coppery

lustre; the legs metallic green, or blue; the tarsi, apical half of the antennæ and the mandibles black; wings smoky, with their apical margins pale; the abdomen, except the extreme base, much more finely punctured than the head and thorax; the first and second segments of the abdomen with a central raised smooth line, the apex terminated with four short acute teeth. (Male.)

I have taken the female of this beautiful species in Hampshire, at Weybridge, and near Darenth Wood, where the only male I have captured occurred. Mr. Stephens used to take both sexes rather plentifully at Darenth. That *C. Stoudera* is the male of *C. fulgida* has been established by Zetterstedt; Dahlbom has also united them in his Monograph.

4. *CHRYSIS BIDENTATA*, Linn. Syst. Nat. i. 947, 2.

Fab. Ent. Syst. ii. 241, 11; Syst. Piez. p. 173, 16.

Don. Brit. Ins. i. pl. 19.

Panz. Faun. Germ. 77, 15.

St. Farg. Ann. du Musé, vii. 128, 23.

Shuck. Mon. Chrys. Ent. Mag. iv. 165, 6.

Dahlb. Mon. Chrys. 8, 3; Hym. Eur. ii. 257, 142.

Wesm. Bull. Acad. Roy. des Sc. Brux. vi. 175, 4.

Chrysis dimidiata, Fabr. Ent. Syst. Supp. 258, 15, 16; Syst. Piez. p. 174, 22.

St. Farg. Ann. du Musé, vii. 127, 20.

Spin. Ins. Lig. ii. 170, 15.

Length $2\frac{1}{2}$ —4 lines. Rich golden or crimson-red, sometimes with coppery lustre; the head, emargination of the

prothorax, the metathorax, the body beneath, and the terminal segment of the abdomen, blue or green, or blue dashed with golden lustre, strongly and closely punctured; the abdomen most delicately so; legs blue, or green, with the tarsi pitchy; the apex of the abdomen with the lateral angles acute, seldom produced into teeth, the centre of the margin usually emarginate, seldom forming two teeth; sometimes terminated by four equi-distant obsolete teeth.

This species is universally distributed, and may be found abundantly wherever a colony of *Odynerus spinipes* occurs.

5. CHRYSIS SUCCINCTA, Linn. Syst. Nat. i. 947, 3.
 Fab. Ent. Syst. ii. 241, 13; Syst.
 Piez. p. 174, 19.
 Panz. Faun. Germ. 77, 16.
 Spin. Ins. Lig. i. 64, 7.
 Shuck. Mon. Chrys. Ent. Mag. iv.
 166, 7.
 Dahlb. Mon. Chrys. 10, 5; Hym.
 Eur. ii. 268, 149.
 Wesm. Bull. Acad. Roy. des Sc.
 Brux. vi. 176, 5.

Head and thorax of a metallic blue or green, the mesothorax red, tinted with golden lustre; prothorax with its anterior margin more or less golden-red. Abdomen rich crimson-red, tinged more or less with golden lustre, delicately punctured, the head and thorax coarsely so; the femora and tibiæ metallic green, the tarsi obscure testaceous; the antennæ black, tinged with golden-green; wings faintly tinted, with their apical margins hyaline; the abdomen terminated by four obtuse teeth.

This is a rare species; Mr. Dale and Mr. Rudd took it some years ago in Hampshire, and I am not aware that it has been taken out of that county, I have twice captured it.

Sec. 1, A. Abdomen tridentate.

6. CHRYSIS CYANEA, Linn. Faun. Suec. p. 414, No. 1667;
 Syst. Nat. i. 948, 5.
 Fabr. Ent. Syst. ii. 243, 20; Syst.
 Piez. p. 176, 29.
 Don. Brit. Ins. vii. pl. 235.
 Latr. Hist. Nat. xiii. 238, 6.
 St. Farg. Ann. Musé, vii. 128, 22.
 Panz. Faun. Germ. 51, 10.
 Schrank, Faun. Boic. ii. 2, 345.
 Spin. Ins. Leg. i. 65, 12.
 Shuck. Mon. Chrys. Ent. Mag. iv.
 167, 8.
 Dahlb. Hym. Eur. ii. 188, 102.
 Wesm. Bull. Acad. Roy. des Sc.
 Brux. vi. 177, 8.

Length $2\frac{1}{2}$ — $3\frac{1}{2}$ lines. Dark blue, varied with bright metallic green, occasionally splashed with gold; the apical segment of the abdomen, the margins of the other segments usually bright green; the head and thorax deeply and closely punctured; the abdomen finely so, and with a deep central fossulet in the middle of its basal margin; legs tinted with metallic green, the tarsi pitchy; the apex of the abdomen tridentate, sometimes tri-angulate; wings hyaline, the nervures brown, the costal nervure and the tegulæ nearly black.

This insect is abundant everywhere on old palings, trees, outhouses, &c.; it is parasitic upon several species of wood-boring bees, and wasps.

Sect. II. The marginal cell complete, the abdomen not toothed at the apex.

7. CHRYSIS AUSTRIACA, Fabr. Syst. Piez. p. 173, 15.
 St. Farg. Ann. du Musé, vii. 128,
 28.

Shuck. Mon. Chrys. Ent. Mag. iv.
168, 11.

Dahlb. Hym. Eur. ii. 120, 67.

Chrysis refulgens, Spin. Ins. Lig. i. 8, 4; ii. 170, 16.

Head and thorax coarsely punctured, and as well as the tibiæ, femora and basal joints of the antennæ blue-green, or blue, varied with tints of green and gold; the tarsi black, the wings slightly fuscous, the apical margins pale, their nervures dark brown, with the tegulæ green. Abdomen of a rich carmine, or red, tinged with golden lustre; strongly punctured, particularly at the base, and having a slight central longitudinal carina; not toothed at the apex. This species is much more pubescent than any of the preceding.

Not often met with in the south or west of England, but not rare in the north; I have taken it freely in Yorkshire; there were many specimens in the collection of Mr. Heysham of Carlisle.

Sect. III. The marginal cell incomplete, the abdomen not toothed at the apex.

8. CHRYSIS BICOLOR, Dahlb. Hym. Eur. ii. 123, 69; Mon.
Chrys. 10, 6.

Chrysis Austriaca, Zett. Ins. Lapp. p. 466, 6.

Length 4 lines. Head and thorax strongly punctured, of a deep blue-green, tinged with golden lustre on the prothorax in some individuals; the basal joints of the antennæ, the tibiæ and tarsi metallic green, the rest of the antennæ and the tarsi black; wings faintly coloured, the nervures dark brown. Abdomen of a bright crimson-red, with a faint golden lustre; extremely delicately and very closely punctured, with a central longitudinal carina on the first and

second segments; the apical margin not toothed, but evenly rounded without lateral angles.

This species, which is now added to the British Fauna, is most closely allied to the *C. Austriaca*; but from which it may be easily distinguished by the close and minute puncturing of the abdomen, by the rounded apical margin of the abdomen, and by its general form; being widest at the apex of the second segment; the characteristic row of fossulets, which is present in all the species, is sub-obsolete; whilst in *C. Austriaca* they are deeply impressed, and the lateral angles are rounded off, or sub-acute. The lateral teeth, or spines on the metathorax larger and more acute than in *Austriaca*. The only specimens I have seen were obtained from nests of *Osmia parietina*; the cells or pupa cases of the *Chrysis* were not distinguishable from those of the bee. Zetterstedt obtained this species from nests of *Osmia nigri-ventris*, a close ally, if not identical, with *O. parietina*.

9. CHRYSIS NEGLECTA, Shuck. Mon. Chrys. Ent. Mag. iv. 169, 12.

Chrysis Austriaca, Dahlb. Mon. Chrys. 14, 12.

Chrysis integrella, Dahlb. Hym. Eur. ii. 133, 73.

Length 3—4 lines. Head, thorax, legs and basal joints of the antennæ dark blue, varied with bright tints of green, occasionally splashed with gold, particularly on the prothorax; the mesothorax sometimes nearly black, finely punctured; the scutellum and postscutellum most strongly so; wings slightly fuscous, the nervures brown, the tegulæ green; the tarsi black. Abdomen very finely and very closely punctured; of a rich carmine, semi-opaque, with a slight central longitudinal elevation in the middle of the second segment; the apex without teeth. The anterior wings have the marginal cell open at its apex.

This species is very abundant in most localities; I have repeatedly bred it from bramble sticks, which contained nests of fossorial *Hymenoptera*, or those of *Prosopis*, but I have not ascertained upon which it is parasitic; I have frequently noticed it in company with *C. bidentata*, entering the burrows of *Odynerus spinipes*.

10. CHRYSIS ORNATA, Smith, Zool. Append. ix. cxxv. (1851.)

Male. Length $4\frac{1}{4}$ lines. Head golden-green, with the vertex dark blue; the thorax, legs and apical segment of the abdomen golden-green; the thorax with a mixture of golden and coppery effulgence above, dashed with a faint tinge of carmine in parts; the scape green, the flagellum and tarsi black; the wings slightly coloured; the two basal segments of the abdomen of a rich carmine-red, very minutely and closely punctured, the extreme base more strongly so; the base of the apical segment blue, with the apex edentate, evenly rounded, not laterally angulated.

This very beautiful insect was taken by Mr. Hewitson, who presented it to me; it closely resembles *C. bidentata*, and possibly it may be an extreme variety, but the structural differences are so great that I have kept it separate in the hope that its locality, Bristol, may be assiduously searched, when more examples may be found. It differs from *C. bidentata* in being larger than any of that insect that I have seen; its prothorax is much more prolonged; the abdomen is as finely punctured as in *C. neglecta*, and the apex of the terminal segment of the abdomen is rounded and without teeth; the second discoidal cell is also considerably longer and larger.

Genus III. EUCHRÆUS, Latr.

Head large, transverse, as wide as the prothorax; antennæ 13-jointed in the male; the clypeus large, slightly elevated,

and produced over the mandibles, the sides rounded, truncated in front; the thorax truncated anteriorly and posteriorly; the metathorax toothed on each side; the anterior wings with an incomplete marginal cell; the first sub-marginal cell incomplete, the first and second discoidal cells complete. Abdomen very convex, with the apical margin of the terminal segment multidentate.

1. *EUCHRÆUS QUADRATUS*, Shuck. (Leach, MSS.), Mon.
 Chrys. Ent. Mag. iv. 169.
 Dahlb. Hym. Eur. ii. 373, 207.
 Klug (Mus. Beroli.).

Euchræus festivus, Mus. Spin.

Length $3\frac{1}{2}$ lines. Green, dashed with golden lustre, the region of the ocelli, an oblong-quadrate spot on the disk of the thorax, a line on each side of it, the base of the second abdominal segment, and the third entirely blue; the scape and legs golden-green, the knees and tarsi testaceous; the apical margin of the terminal segment with thirteen teeth, the three central teeth widest apart; the head and thorax closely and strongly punctured; the abdomen finely and strongly punctured, but the punctures distant; the second abdominal segment with a smooth, elevated, central carina.

Of this beautiful insect I have only seen a single specimen supposed to have been taken in England; it is in the British Museum, and bears a ticket with the locality Swansea. It has been ascertained, that after the death of Dr. Leach a few insects from the Continent, supposed to have been captured in England, by accident were incorporated with the British collection; I think it somewhat doubtful whether the locality given is not erroneous, the capture of a second specimen would be decisive.

Genus IV. HEDYCHRUM, Latr.

The head transverse, thorax oblong quadrate, rather narrowed in front, truncated anteriorly and posteriorly, the metathorax with a tooth on each side; the anterior wings with a marginal cell nearly completed in some species, but only commenced in others; the two discoidal cells faintly traced in some species, but totally obliterated in others; with a tooth in the middle of the claws of the tarsi. Abdomen short and convex, rounded behind.

1. HEDYCHRUM LUCIDULUM, Latr. Hist. Nat. xiii. 239, 2.
St. Farg. Ann. du Musé, vii.
122, 9.

Shuck. Mon. Chrys. Ent.
Mag. iv. 171, 2.

Dahlb. Hym. Eur. ii. 78,
45.

Panz. Faun. Germ. 51, 5.

Wesm. Bull. Acad. Roy.
des Sc. Brux. vi. 170, 3.

Chrysis lucidula, Fab. Syst. Piez. p. 174, 21.

Spin. Ins. Lig. i. 64, 8.

Hedychrum regium, St. Farg. Ann. du Musé, 7, 122, 4.

Shuck. Mon. Chrys. Ent. Mag. iv.
171, 1.

Wesm. Bull. Acad. 5.

Dahlb. Hym. Eur. ii. 79.

Chrysis regia, Fabr. Syst. Piez. p. 175, 26.

Panz. Faun. Germ. 51, 9.

Sphex nobilis, Scop. Ent. Carn. 792?

Length $2\frac{1}{2}$ — $3\frac{1}{2}$ lines. The head, thorax and legs blue; the
1862.

thorax slightly varied with tints of green or gold: in some examples the prothorax, mesothorax and scutellum with golden effulgence; the prothorax and mesothorax frequently of a rich crimson, dashed with gold in the females; the head and thorax coarsely punctured; the wings fuscous, darkest towards their apical margins; the flagellum and mandibles black; the tarsi rufo-testaceous. Abdomen shining carmine-red, frequently with a golden lustre; the terminal segment with the apical margin rounded, and with a minute tooth on each side near the base.

Walckenaer found this species parasitic upon species of *Halicti*; in this country it is very rare, so much so that I never met with a single example, but it has occasionally been found in Kent and Hampshire; there is a fine series in the collection of the British Museum.

2. *HEDYCHRUM CÆRULESCENS*, St. Farg. Ann. du Musé, vii. 122, 10.

Shuck. Mon. Chrys. Ent. Mag. iv. 172, 3.

Hedychrum chalybæum, Dahlb. Hym. Eur. ii. 64, 35.
Klug. (*viride*, Mus. Berl.)

Length $2\frac{1}{2}$ lines. Dark blue, tinged in some examples with golden-green on the head and thorax; the flagellum black, the tarsi obscurely testaceous; the wings clouded towards their apex; the head and thorax strongly and closely punctured, the abdomen delicately so; the apical margin of the terminal segment rounded and entire.

There are two examples of this species in the British collection of the National Museum, taken in Devonshire.

3. *HEDYCHRUM ARDENS*, Curtis, Brit. Ent. i. fol. 38, pl. 38.
 Shuck. Mon. Chrys. Ent. Mag.
 iv. 172, 4.
 Wesm. Bull. Acad. Roy. des Sc.
 Brux. vi. 170, 2.

Length 1—2½ lines. Head and thorax green, or blue mixed with tints of green; the vertex, the posterior portion of the prothorax above, the pro- and mesothorax, bright coppery or carmine-red; the scutellum sometimes of the same colour, but frequently golden, more or less tinged with red; the legs green, rarely blue, with the tarsi rufescent; the flagellum and mandibles black, the latter ferruginous at their apex; wings slightly coloured and iridescent. Abdomen very glossy, bright coppery or golden-red, the colour changing in different lights; its posterior margin entire, not toothed towards the base.

This species very closely resembles some of the varieties of *H. lucidulum*; it is common in many localities; at Deal, Dover, and along the entire south-east coast, it is plentiful; I have bred it from bramble sticks, and suspect it is parasitic upon *Mimesa unicolor*; it has also been taken in the London district, at Southend, Weybridge and in the New Forest.

4. *HEDYCHRUM FERVIDUM*, St. Farg. Ann. du Musé, vii.
 122, 7.
 Shuck. Mon. Chrys. Ent.
 Mag. iv. 172, 5.
 Wesm. Bull. Acad. Roy. des
 Sc. vi. 170, 5.

Hedychrum rutilans, Dahlb. Hym. Eur. ii. 76, 44.
 Megerl. (teste Kollar, in Mus. Vienn.)

Length 3—4 lines. The head, thorax beneath, the legs and metathorax blue; the pro- and mesothorax and scutellum of

a rich golden or coppery-red; abdomen red, with a golden effulgence, beneath black; the head and thorax coarsely and deeply punctured; the abdomen finely punctured, but more strongly so than in most of the other species; the apical segment rounded, entire; the tarsi rufo-testaceous; the wings fusco-hyaline, darkest towards their apical margins.

This is a very rare species, but has been taken in the London district. I never captured an example.

5. *HEDYCHRUM ROSEUM*, St. Farg. Ann. Musé, vii. 123, 13.
Shuck. Mon. Chrys. Ent. Mag.
iv. 173, 6.

Dahlb. Hym. Eur. ii. 93, 53;
Dispos. 2, 3.

Wesm. Bull. Acad. Roy. des Sc.
Brux. vi. 169, 1.

Chrysis rosea, Rossi, Mantis. Ins. 132, 290; Faun. Etrus.
ii. tab. 8, fig. 7.

Chrysis rufa, Panz. Faun. Germ. 79, 16; Jurine, Hym.
297.

Length 3 lines. Head, thorax, scape of the antennæ, femora and tibiæ, green or blue, splashed with gold in some examples, the tarsi rufo-piceous; the flagellum black; the wings hyaline at their base, but fuscous beyond the stigma. Abdomen rosy-ferruginous, frequently with a violet iridescence, particularly at the apex.

This insect was first captured in this country on Hampstead Heath by Shuckard, upwards of twenty years ago; where I have frequently captured it, but not during the last few years; in fact the Heath is fast losing its entomological reputation; the close approach of London and the consequent increase of visitors to the Heath have nearly de-

stroyed it as insect locality. I have taken *H. roseum* at Birch Wood, Kent, and one specimen near Wakefield, Yorkshire.

Probably parasitic upon *Tachytes pompiliformis*, or *Arpactus tumidus*, according to Shuckard.

Genus V. OMALUS, Panz.

Body small, robust, abdomen short, wide, and ovate; deeply emarginate at the apex; the anterior wings with the marginal cell only just commenced, or rudimentary; the discoidal cells obsolete; claws of the tarsi serrated.

1. OMALUS AURATUS, Dahlb. Hym. Eur. ii. 268; Dispos. 4, 5, 1.

Chrysis aurata, Linn. Faun. Suec. No. 1666; Syst. Nat. i. 948, 4.

Fabr. Ent. Syst. ii. 242, 18; Syst. Piez. p. 175, 25.

Panz. Faun. Germ. 51, 8.

Schrank, Faun. Boic. ii. 345, 2200.

Hedychrum auratum, Latr. Hist. xiii. 239.

St. Farg. Ann. du Musé, vii. 12, 1.

Shuck. Mon. Chrys. Ent. Mag. iv. 174, 7.

Elampus auratus, Wesm. Bull. Acad. Roy. des Sc. Brux. vi. 171, 1.

Size $1\frac{3}{4}$ — $2\frac{3}{4}$. Head and thorax coarsely punctured, blue or green, sometimes tinted with gold; the scape, femora and tibiæ green, the tarsi piceous, antennæ black; abdomen bright fiery red, the puncturing extremely delicate, the terminal segment acuminate.

This species is universally distributed.

2. *OMALUS CÆRULEUS*, Dahlb. Dispos. 5, 3; Hym. Eur. ii. 34, 12.

Chrysis cærulea, De Geer, Mem. Ins. ii. 837, 2.

Dahlb. Exercit. Hym. 33, 17.

Sphex violacea, Scop. Ent. Carn. p. 298, 793?

Omalus nitidus, Panz. Faun. Germ.

Chrysis fuscipennis, Dahlb. Mon. Chrys. Suec. 15, 13.

Hedychrum bidentulum, Shuck. Mon. Chrys. Ent. Mag. iv.

Elampus violaceus, Wesm. Bull. Acad. des Sc. Brux. vi. 171, 2.

Length 2—2½ lines. Deep blue-black, highly polished, smooth and shining on the pro- and mesothorax; the head, anterior margin of the prothorax, the scutellum, post-scutellum and metathorax strongly punctured; in some examples tinted with violet; the abdomen smooth and shining, not pubescent, the margins finely punctured, and usually brilliant green, with the disk black, or blue-black, the colour changing in different lights; the apex notched; wings and legs as in the preceding species.

All my specimens of this species were bred from bramble sticks.

3. *OMALUS NITIDUS*, Panz. Faun. Germ. 85, 13.

Chrysis ænea, Fabr. Ent. Syst. ii. 242, 17; Syst. Piez. p. 175, 24?

Panz. Faun. Germ. 51, 7?

Omalus æneus, Dahlb. Mon. Chrys. Suec. 17, 6; Hym. Eur. ii. 35, 13.

Chrysis cærulea, Dahlb. Excer. Hym. p. 33, 17.

Hedychrum bidentulum, Shuck. Mon. Chrys. Ent. Mag. iv. 174, 8. (var. 1.)

Length 2—3 lines. Shining dark blue, purple-blue, bluish-green, or blue, with an æneous tinge; very variable in

intensity and brilliancy of colour; head and thorax coarsely punctured, the abdomen very delicately so, very gibbous, convex, and pubescent; the apical segment acuminate, notched at its apex; the wings with a broad fuscous band on their apical margins; the tarsi black.

Shuckard has, for want of sufficient specimens to examine, included two very distinct species under his *H. bidentulum*; the preceding species will at once be distinguished by its having the pro- and mesothorax shining, smooth and impunctate; this species occurs in most situations and may be procured by collecting perforated bramble sticks during the winter months, it is parasitic upon such species of fossorial insects as construct their nests in them.

Genus VI. ELAMPUS, Spin.

Head transverse, rather wider than the prothorax; the thorax truncated anteriorly and posteriorly; the prothorax with a deep suture between it and the mesothorax; the post-scutellum produced into a porrect spine, flattened above and blunt at the apex; anterior wings with the marginal cell rudimentary, the discoidal cells obsolete; the abdomen rather longer than in the genus *Hedychrum*, very convex, and truncated at the extreme apex.

1. ELAMPUS PANZERI, Latr. Gen. Crust. et Ins. iv. 45.

Shuck. Mon. Chrys. Ent. Mag. iv.
176, 1.

Dahlb. Hym. Eur. ii. 45, 21.

Chrysis Panzeri, Fab. Syst. Piez. p. 172, 9.

Spin. Ins. Lig. i. 63, 3.

Chrysis scutellaris, Panz. Faun. Germ. 51, 11.

Length $2\frac{1}{4}$ —3 lines. Head and thorax coarsely punctured, shining golden-green, with tints of blue; the scape, femora

and tibiæ metallic green, the tarsi pale rufo-testaceous; the flagellum black; the anterior femora compressed and produced into a stout spine at their base beneath; the lateral angles of the metathorax spinose; wings nearly colourless, but with a fuscous stain close to the stigma; abdomen shining golden-red, carmine-red, or in some lights of a fine yellowish-green; very finely punctured, the apical segment notched at its apex.

This is a local and rare species; it has been taken in Kent and in the New Forest; some years ago I met with it in some numbers at Sandhurst near the military College; again in 1861 in the month of September I beat three or four into my net at Byfleet, near Weybridge; on attempting to lay hold of it with the fingers it falls to the ground, feigning death.

LEPIDOPTERA.



NEW BRITISH SPECIES IN 1861.

(BY THE EDITOR.)

THOUGH we have had a very fine summer in the south-east of England (the north and west having been much more rained upon), the season has not been generally favourable for insects.

Our list of novelties is even worse than last year. An attempt has been made to erect a phase or form of *Zygæna Minos* into a species: but the last sentence in Mr. Doubleday's short note is so truly philosophic that it will bear repetition, "whether the Irish *Zygæna* is anything more than a local variety of *Minos* time may perhaps prove."

A reported new *Noctua* has occurred in Ireland, but till something more decided is known about it, it is better to pass it in silence.

The following is the list of novelties:—

BOMBYCINA.

CRAMBINA.

Lithosia Caniola.

Crambus ocellæa.

,, Sericea.

NOCTUINA.

TORTRICINA.

Nonagria Elymi.

Eupæcilia albicapitana.

Xylina conformis.

TINEINA.

GEOMETRINA.

Tinea Confusella.

Lythria purpuraria.

Gelechia Tarquiniella.

Eupithecia tripunctaria.

Gracilaria Kollariella.

,, trisignaria.

Coleophora Wilkinsoni.

Cidaria reticulata.

Nepticula Ulmivora.

LITHOSIA CANIOLA, Hübner.

Of this species, which is sometimes so excessively abundant in the streets of Florence, a few specimens have occurred in Ireland. Mr. Henry Doubleday, writing in the "Zoologist," p. 7407, observes, "Mr. Barrett took four specimens in Ireland last August." Mr. Barrett in the "Zoologist," p. 7799, observes of it, "this species occurred sparingly in sheltered spots on the coast in the middle of August; it was over in fourteen days from the appearance of the first specimen. It flies gently at early dusk, and is partial to the flowers of ragwort and *Galium verum*." Some specimens were exhibited at the September Meeting of the Entomological Society of London.

Guenée remarks (Ann. Ent. Soc. France, 4th series, vol. i. p. 48) that "*Lithosia Caniola* is common in central and southern France in June. It is found in towns, in houses and public buildings; I have found it in the most elevated galleries of the cathedral at Chartres. The larva feeds principally, if not exclusively, on the lichens which grow on walls, and especially on the tiles of roofs."

Guenée's diagnosis of the species is as follows:—

"Alæ anticæ albo-griseæ, sericeæ, fimbria concolori, vitta costali albidiore, costa tenuissime fulva, versus medium convexa; subtus griseæ, margine terminali late albo. Alæ posticæ albæ, vix luteo tinctæ, margine interno levissime griseo, diluto. Caput collareque fulva. Thorax abdomenque murina, ano in mare luteo, in fœmina concolori.

LITHOSIA SERICEA, Gregson.

Under the name of *Lithosia Molybdeola* the *Lithosia Sericea* of Gregson has been described by Guenée. It would appear that Gregson's name has priority and must be retained.

I place the observations of the two authors side by side for convenience of comparison, remarking only that Guenée's *Plumbeola* is our *Complanula*.

Gregson, Int. ix. p. 30.

Intermediate between *Complana* and *Complanula*.

Differs from *Complana* in its more rounded costa, the costal streak being narrower, and not carried out to the apex of the wing parallel as in *Complana*; in the under wings always being suffused more or less, sometimes without any of the yellow upon them.

From *Complanula* it differs in being less rounded on the costa, and also in the collar being continued unicolorous with the costal streak as in *Complana*.

It always wants the ample yellow under wings of *Complanula*.

Guenée, Ann. Ent. Soc. France, 4th series, vol. i. p. 50.

Intermediate between *Complana* and *Plumbeola*.

Distinguished from *Complana* by its darker colour, by the much narrower costal yellow streak, which terminates in a point before reaching the tip as in *Plumbeola*. The under wings are strongly tinged with grey at the inner margin, and sometimes this colour extends over the whole surface, then leaving only an ochreous edging, rather broad between the median and inner nervures.

This species is still more easily distinguished from *Plumbeola* by the form of the wings quite similar to *Complana*, the grey as shining, the costal streak narrower and brighter, the cilia tinged with grey, the unicolorous collar, the leaden under wings, but especially by the tuft of scales beneath the costa of the anterior wings.

Guenée observes that the final determination of the distinctness of this species must depend on the discovery of the larva, which he thinks probably feeds on the lichens which grow on the stems of the heather, or which carpet the stones in their vicinity.

NONAGRIA ELYMI, Treitschke.

(Fig. 1.)

On the night of the 27th June last, two or three specimens of this insect were captured in the Norwich Fens by Messrs. Winter and Crotch. Two of these specimens were exhibited at the August Meeting of the Entomological Society of London.

The continental locality for this insect is the Prussian coast near Stettin, from whence a pair of bred specimens, kindly forwarded by Dr. Schleich, were exhibited at the September Meeting of the Entomological Society of London.

XYLINA CONFORMIS, W. V.

(Fig. 3.)

At the March Meeting of the Entomological Society of London, two beautiful specimens of this insect were exhibited; they had been taken in the county of Glamorgan, South Wales.

This species comes to ivy in October, and sometimes to sugar in March. Guenée says it is common in the centre and north of France in September and October.

LYTHRIA PURPURARIA, Linné.

Specimens of this insect were formerly in Mr. Swainson's collection as British, but of their locality he could give no information (Stephens, *Illust. Haust.* iii. p. 208.) From a short notice by Mr. V. R. Perkins in the "Zoologist,"

p. 7449, it appears that "two specimens, males, of this conspicuous insect were beaten out of broom, on the 18th of June, not far from the city of Perth, by Mr. D. P. Morrison, of Pelton, near Newcastle-on-Tyne."

Guenée says the insect is common on hot and dry hills, and in chalky fields and rocky woods throughout Europe in May, and again in July and August. According to Mussehl, the favourite food of the larva is the sheep's-sorrel (*Rumex Acetosella*).

EUPITHECIA TRIPUNCTARIA, Herrich-Schäffer.

This insect has been bred by the Rev. H. Harpur Crewe (see *Zoologist*, p. 7568) from larvæ found in September, in damp woods, on the flowers and seeds of *Angelica sylvestris*.

Mr. Doubleday forwarded specimens to Dr. Herrich-Schäffer as *Pimpinellata*, var., and received for reply that the insect was the *Tripunctaria* of Herrich-Schäffer. The description by this author will be found at p. 77 of the Appendix, not at the reference which he gives in the index of p. 121 of the text of the third volume.

Mr. Harpur Crewe's description of the larva (which also first appeared in the "*Zoologist*") will be found in another page of the present volume.

EUPITHECIA TRISIGNARIA, Herrich-Schäffer.

Mr. Doubleday writes in the "*Zoologist*," p. 7567: "The Rev. Joseph Greene discovered the larva of this species on *Angelica sylvestris*, in a damp wood. The perfect insect is very dull coloured, but quite distinct from any other species. It is new to this country."

A specimen sent to Dr. Herrich-Schäffer was pronounced to be his *Trisignaria*; the diagnosis of which will be found at p. 120 of vol. iii. of his "*Schmetterlinge von Europa*."

Mr. Harpur Crewe's description of the larva (which also first appeared in the "Zoologist") will be found in another page of the present volume.

CIDARIA RETICULATA, Wiener Verzeichniss.

The occurrence of this insect is announced in the "Zoologist," p. 7361, by Mr. Henry Doubleday. "Three specimens of this pretty and very distinct species were taken in August, 1856, on the border of one of the Lakes, by my friend Thomas H. Allis." One of these specimens was exhibited at the February Meeting of the Entomological Society of London.

Mr. Hodgkinson has noticed (Intell. ix. p. 179) that other specimens were captured at the same time, and distributed in collections as the "second brood of *Silacearia*."

The species, though widely distributed on the Continent, is scarce, and the larva is unknown. It occurs in the Alps, the Pyrenees, and in Hungary.

CRAMBUS OCELLEA, Haworth.

This insect had been erased from our lists. Haworth, in 1812, introduced it in his "Lepidoptera Britannica" as *Palparia ocella* (the Necklace Veneer), with the observation: "This was purchased of a collector, who says it was caught in a garden in the suburbs of London, extremely early in the spring season." This specimen, now in the collection of the British Museum, has remained unique till now. Lately, in a box of insects sent for determination, I found, to my surprise, a specimen of this species, which has not yet been found on the Continent, though it belongs to a group which appear to have their home on the shores of the Mediterranean. On inquiry as to where this specimen had been captured, I learnt that it occurred in Glamorganshire,

in a lane about a mile from a town; it was captured about the middle of March, when the captor was out one evening sallow hunting: he thought it strange that a *Crambus* should be about so early in the season.

The coincidence of Haworth's specimen and this being both caught "early in the spring season" is rather remarkable, and would certainly imply that the insect hibernates, an idea which is most decidedly corroborated by the appearance of the only two known specimens of *Crambus ocella*.

EUPÆCILIA ALBICAPITANA, Cooke.

A *Tortrix*, apparently distinct from any known species, is described by Nicholas Cooke in the "Zoologist," p. 7801.

Mr. Cooke observes: "I captured this insect on the Hill of Howth, about the 20th of June, 1857, and felt convinced at the time that it was undescribed, but did not think it desirable to name it until more specimens had been taken. Since then, I have ascertained that some specimens have been taken on the Cheshire coast, both by Mr. Gregson and Mr. Greening; and this season it has been taken in the same locality, where I found it four years since. It is more like *E. dubitana* than any other species, but is sharper-winged, larger and lighter coloured, especially near the apex of the wing."

TINEA CONFUSELLA, Herrich-Schäffer.

Of this interesting little novelty, Mr. Barrett met with some specimens near Dublin. He has thus noticed it in the "Zoologist" p. 7800:—"Rambling along the cliffs on the coast, in August, I noticed a little *Tinea*, pretty common, flitting about and running up the grass stems like an *Ela-chista*. This has been identified by Mr. Stainton as *Tinea*

Confusella of Herrich-Schäffer, new to Britain and rare on the Continent, and occurring on rocks near Vienna."

It is not an easy insect to describe, from the *confused* appearance of the markings. Herrich-Schäffer speaks of it as follows:—

"The smallest species of the genus. Head dirty-white. Anterior wings black-brown, with milk-white speckles, which seem to form three undecided fasciæ, at $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$; also in the cilia some long white scales."

Expansion of the wings 4 lines; thus size of *Bistrigella* and *Argentimaculella*.

The nearest allied species of which the larva is known is the continental *Tinea Pustulatella*; of this the larva feeds on lichens, as I am informed by Professor Frey; and I should strongly suspect that the larva of *Tinea Confusella* has similar habits.

GELECHIA TARQUINIELLA, n. sp.

For this novelty we are also indebted to the untiring exertions of Mr. C. G. Barrett, who has thus noticed it in the "Zoologist," p. 7800:—"This little gem, new to science and indebted to Mr. Stainton for a name, has habits similar to those of *G. pictella*, which it resembles. It occurs on the sand-hills, in warm hollows among moss, *Galium*, &c., in June. It cannot well be seen, much less captured, without lying down, when it is only to be secured by sharp practice with a pill-box."

This insect is intermediate in size between *Pictella* and *Superbella*, but differs from both, in having only one silvery streak from the costa, and in having the tips of the palpi black. In the antennæ, which are dark with white tips, it resembles *Pictella*, *Superbella* having annulated antennæ, with no white tips.

The female of *Tarquiniella* has acuminate anterior wings. Specimens were exhibited by Mr. Bond at the August Meeting of the Entomological Society of London.

GRACILARIA KOLLARIELLA, Zeller.

Of this very distinct-looking insect a specimen has been found in the collection of British insects in the British Museum. It was purchased of Mr. Bouchard.

This insect is figured and described in the "Transactions of the Entomological Society of London," vol. i., N.S., p. 193, plate xv. fig. 7.

The specimen in the British Museum was discovered by Mr. M'Lachlan, concealed amongst *Lyonetia Padifoliella*.

COLEOPHORA WILKINSONI, Scott.

Under the above name, Scott has described, in the "Transactions of the Entomological Society of London" (vol. v., New Series, p. 411), a unicolorous grey *Coleophora*, the larva of which feeds on birch.

"The larva mines the birch leaves in August and September. The case appears to be made of a portion of the leaf of the food-plant, and is of a dark brown colour, growing deeper, through various atmospheric causes, after the larva has retired to complete its transformation. The case somewhat resembles those of *Viminetella* and *Politella*, but it is longer than the latter and not so long as the former, neither is it bi-coloured, as in those two species. A great character in the formation of the case of *Wilkinsoni* is a rounded projection towards the middle, on its under side, of a greater or lesser size, the lower edge of which is parallel with the mouth of the case, and rests upon the leaf, both while the larva is feeding and in a state of repose."

“ I have named the insect after Mr. Thomas Wilkinson, of Scarborough, who has bred it now for four years, and who was the first to call my attention to its peculiarities.”

NEPTICULA ULMIVORA, Frey in litt.

Mr. M'Lachlan exhibited a specimen of this insect (at the July Meeting of the Entomological Society of London) which he had bred from larvæ mining in elm leaves, near West Wickham.

Mr. Tompkins showed me last spring a caught specimen of a *Nepticula*, which appeared to me decidedly referable to this species (Int. ix. p. 187).

LEPIDOPTERA.

RARE BRITISH SPECIES CAPTURED IN 1861.



VANESSA ANTIOPA. The occurrence of a specimen near Coldstream on the 11th of September is recorded in the *Intelligencer* (x. p. 194).

SPHINX CONVOLVULI. The captures of four specimens have been recorded; near Halifax, September 11 (*Zoologist*, p. 7760); near Hull, September 17 (*Zoologist*, p. 7760); near Newcastle-on-Tyne, September 19 (*Int.* x. p. 202); and near Wakefield, September 22 (*Int.* x. p. 202).

NOTODONTA BICOLORA. In the latter part of June, an artisan collector residing in Manchester captured a specimen of this insect in Burnt Wood, Staffordshire (*Zoologist*, p. 7682). I saw this specimen when at Manchester; it is much rubbed, the collector having taken little notice of it at the time of capture, fancying it was a *gold-tail*; it is undoubtedly *Notodonta Bicolora*.

NOTODONTA CARMELITA. Eight specimens were captured near Keswick, last April, by Mr. J. S. Mawson (*Zoologist*, p. 7569).

GASTROPACHA ILICIFOLIA. This has occurred on the moors near Ripon (*Int.* x. p. 75).

DREPANA SICULA. Several specimens were taken last June in Leigh Wood, near Bristol, by Mr. G. Harding and Mr. C. Butler (*Zool.* 7680; *Int.* x. p. 131).

HETEROGENEA ASELLUS. A female of this species was captured by the Messrs. Fenn, at Loughton, June 22nd (*Int.* x. p. 100).

ACRONYCTA STRIGOSA. The following notes by Mr. Saville on the habits of this insect appeared in the "Zoologist" (p. 7765):—" *A. Strigosa* prefers a covered situation in the immediate vicinity of young ash trees. It takes sugar freely. Its flight is low, undulating, and even slow. Most of my specimens I took either after a slight shower of rain or during a brisk breeze. One might easily pass this insect over, as it sits particularly close with closed wings, and its colouring being so near to small knobs of the greyish-white of the ash as to be distinguished with difficulty therefrom."

ACRONYCTA ALNI. The larva of this insect has been recorded as occurring at Worcester (Int. x. p. 154), Tamworth (Int. x. p. 170) and Brightampton (Zool. p. 7717).

LEUCANIA PUTRESCENS. This species has again occurred at Torquay and Teignmouth. "I have captured a beautiful series of *L. Putrescens*, all in first-rate condition," says Mr. Stewart (Int. x. p. 178); see also Int. x. p. 163. A specimen from Teignmouth is shown on the Plate, fig. 2.

XYLOMIGES CONSPICILLARIS. Mr. Edmunds bred two specimens at Worcester, last spring (Int. x. p. 154).

APOROPHYLA AUSTRALIS has occurred rather freely at Torquay. Mr. Stewart writes (Int. x. p. 202): "During the past week, at ivy, I have taken *A. Australis* in profusion." The Rev. Charles Grinstead met with it at Teignmouth (Int. x. p. 163).

ACOSMETIA CALIGINOSA. Mr. Farren met with thirty-three specimens in the New Forest (Int. x. p. 91).

AGROTIS OBELISCA. Mr. Barrett has met with this species near Dublin, where it frequents the Rag-wort bloom in August and the beginning of September (Zool. p. 7799).

NOCTUA DITRAPEZIUM. Specimens of this insect have been captured near Portsmouth (Zool. p. 7799).

NOCTUA SOBRINA. Specimens of this insect, captured by Mr. Bouchard during the past summer, in Scotland, were

exhibited by Mr. Waring at the October Meeting of the Entomological Society of London.

DIANTHÆCIA CAPSOPHILA. Mr. Barrett writes in the "Zoologist," p. 7799: "This species occurred again in June, both at light and hovering at flowers, on the cliffs, but only in small numbers; it appears to be scarce even in its very restricted localities. I looked for the larva among *Silene maritima*, and found some (different from all our known species) which would probably produce it, but they were so tender that only one or two have entered the pupa state, so that the chance of rearing it is diminished considerably."

HELIOTHIS ARMIGERA. Several specimens have occurred this autumn: I have heard of captures in Devonshire and Sussex.

SCORIA DEALBATA. The following notice appeared in the "Intelligencer" (vol. x. p. 91): "On the 10th and 11th instant, Mr. H. Foster, silversmith, of this place, and myself, succeeded in capturing over one hundred specimens of the above-named rare moth, in beautiful condition, several of which were found on the high grass, just come from the pupa, with the wings not then developed; since then Mr. Dowset and Mr. R. Down, of this place, have taken over fifty more at the same spot.—ALEXANDER RUSSELL, *Ashford, Kent, June 18th, 1861.*"

In September, Mr. Russell forwarded me a larva for description; he had obtained several larvæ from the eggs, feeding them on Dock and *Polygonum aviculare*.

The larva which I received on the 24th September was seven lines in length. It was greyish-ochreous; the dorsal line dark grey, only distinct on the three or four anterior and five posterior segments; the 6th to 9th segments have each an elongate dark spot in the place where the sub-dorsal line

should be. On the underside is a whitish central line between two dark grey ones; and on each side there is a greyish brown streak just above the legs. At that time the larva was apparently about to hibernate, not having increased in size for some weeks; probably they should feed-up in April or May.

EMMELESIA UNIFASCIATA. Two specimens were captured near Forest Hill by Mr. M'Lachlan in August (Int. x. p. 162); and Mr. Ellis met with two at Cheam on the 21st August (Int. x. p. 170).

MARGARODES UNIONALIS. Mr. Stewart has announced in the "Zoologist" (p. 7799) the capture of a second specimen of *Margarodes Unionalis*, on Saturday, October 5th.

ACENTROPUS NIVEUS. This insect has occurred in some plenty at the Hampstead Ponds in June last, as recorded by Mr. M'Lachlan in the "Zoologist" (p. 7614).

SERICORIS LITTORALIS. Mr. Barrett has noticed in the neighbourhood of Dublin "a second brood of this species in September, all of the true Irish type, light ground-colour, with rich dark markings" (Zoologist, p. 7800).

DICRORAMPHA CONSORTANA. Mr. Barrett has met with this near Dublin "in August, on a little spot of limestone soil on the coast, the exact spot where *D. acuminatana* and *D. senectari* occur" (Zoologist, p. 7800).

EUPÆCILIA ATRICAPITANA. Of this insect Mr. Barrett remarks (Zoologist, p. 7800): "Widely distributed along the coast near Dublin, occurring both on cliffs and sand-hills, and lasting from the middle of June to the middle of August, but rare. I never saw more than one specimen in a day."

OBSERVATIONS ON BRITISH AND CONTI-
NENTAL TINEINA.

(EXTRACTED FROM LETTERS OF OUR CORRESPONDENTS, and from other SOURCES.—The Species not yet known to occur in BRITAIN are indicated by an *.)



Dasystoma Salicella. “In October I found a few strange looking sluggish larva feeding upon *Potentilla Anserina*. (Silver-weed). I fear they have all died except three, which changed to pupæ and have emerged a few weeks since. They consist of one male and two very narrow-winged females of some species of *Dasystoma*.” (H. B., 2, 461.)

“In the larger box you will find one male and two females of my supposed *Dasystoma*, bred from *Potentilla Anserina*; they are all I was able to rear.” (H. B., 17, 461).

[The specimens were *Dasystoma Salicella*.]

“I can now send you a few larvæ of *Dasystoma Salicella*, which I can only find upon *Potentilla Anserina*, growing by the side of a dusty road, and far from anything like a *Salix*. They are rather troublesome larvæ to feed, as they eat very little at a time and roll themselves up generally in a leaf, which they have not half consumed, before you are obliged to disturb them in their retreat and change their food. They grow so slowly, that I can see scarcely any difference in them from one fortnight to another. This larva seems perfectly wedded to *Potentilla Anserina*, nor can I get them to touch anything else. They are scarce this year, and though I have

searched for them repeatedly during the past two months, I have taken very few. They appear to be inveterate wanderers, always strolling about the breeding glass, when not eating, and I find them generally on plants at some distance from each other." (H. B., 11, 9, 61.)

These larvæ were dull whitish-green, with the spots grey; the head black, the second segment with a blackish-green lunule behind, and the anal segment much speckled with grey.

The third pair of legs placed on a long stem, but not club-shaped, having a regular claw.

In one larva, the head was decidedly brown.

* *Talæporia*, n. s. "I have bred a species of *Talæporia* distinct from *Inconspicuella*. It is of a bright grey, speckled with brown. I found the cases spun up three weeks ago (*Inconspicuella* is now still in the larva state). They were under the bark of a dead tree." (E. F., 15, 3, 61.)

"All the specimens are very similar to that I send you, and I do not think the species seems liable to much variation." (E. F., 28, 3, 61.)

Ochsenheimeria Vacculella. Mr. Scott has recorded (Int. ix. p. 123) the occurrence of this species "beneath the bark of a willow tree, and on the trunk of an oak tree at Leatherhead."

Euplocamus Boleti. Mr. Farren met with an old fungus in the New Forest, infested by this insect, and bred several specimens therefrom (Int. x. p. 108.)

Adela Sulzella. "I now send you four larvæ of *Adela Sulzeriella*, Z. I had already found small cases in the autumn; on the 1st of April I made a renewed search and found six living larvæ. I have not yet observed them when very young. I found them under a hedge, in the middle of the field; the hedge was principally privet, but

mixed with rose, vetch and gooseberry. I imagine that the young larva mines in the leaves of privet, as the perfect insect is always sitting on the flowers of that plant. The larvæ are now feeding on various dry leaves." (G. G. M., 3, 4, 61.)

The cases of these larvæ were elongate, with parallel sides, apparently made by additions spun round a central nucleus.

Nemotois Scabiosellus. "I forward you six specimens of the still living, last year's larvæ of *N. Scabiosellus*. Out of about twenty larvæ which lived through last winter, only two imagos have appeared. It is thus evident that as we have already noticed that the larvæ of *Nemotois Violellus* will live over two winters, so those of *N. Scabiosellus* and *N. Minimellus* do likewise. Of both these species we have this year proportionally bred very few moths, and often in the smallest cases of *N. Violellus* and *N. Minimellus* we found larvæ still living." (F. H., 20, 9, 61.)

Nemotois cupriacellus. Mr. Healy succeeded in keeping many of his larvæ (E. A., 1861, p. 107) through last winter, but none of them made their appearance in the perfect state.

Nemotois Fasciellus. "To-day was our first fine spring day. I did not let it pass unemployed, and was fortunate in finding some *Nemotois* cases amongst the radical leaves of *Ballota nigra*. These will probably be *N. Schiffermillerellus*, S. V., of which some years ago I took a wasted female in the same locality. At the end of December I found some similar cases, but then very small; these have safely survived the winter, and now are nearly as large as the specimens I found to day.

"The young larvæ probably first feed in the flowers, like all their allies." (A. S., 24, 3, 61.)

These larvæ produced *N. Fasciellus*, Fab. The *Schiffer-*

millerellus, W. V. They fed rather voraciously on the leaves of *Ballota nigra*, gnawing holes in the leaves and making much blackish excrement.

The case was fiddle-shaped, of various shades of brown, darkest in the centre, not distinctly pieced.

Nemotois Minimellus. "The case-bearers found on *Scabiosa succisa* last October have produced, as Dr. Wocke suspected, specimens of *N. Minimellus*" (F. H., 24, 6, 61).

MICROPTERYX. The larvæ of this genus are now well ascertained. For many years they have been observed by Micro-Lepidopterists both here and in Germany, but had been mistaken for Coleopterous larvæ.

Dr. Hofmann succeeded in breeding *Micropteryx Sparmannella* last spring, and subsequently Mr. Wilkinson obtained larvæ of *M. Unimaculella* from the egg. Various other larvæ have been observed, but the species they will produce can only be conjectured at present.

Micropteryx Sparmannella. Dr. Hofmann bred this insect in February from larvæ collected the previous summer in the leaves of birch. These larvæ mine large blotches in the birch leaves, and when full-fed quit the leaves and descend below the surface of the earth, "where they construct small oval cocoons, bedecked externally with grains of sand."

The most distinctive character of a *Micropteryx* larva appears to be the excrement, which is thus described by Dr. Hofmann:—

"The excrement forms an *uninterrupted* black thread, twined into a thick coil."

In the *Micropteryx* mines I have examined I should scarcely describe the excrement as an *uninterrupted* black thread, but instead of being in round black grains, it is like *short lengths* of black cotton, from a quarter to one-sixteenth

of an inch in length,—a peculiarity by which a *Micropteryx* mine can be immediately recognized, even though the larva has quitted it.

Dr. Hofmann describes the larva as follows :—

“ The larva, entirely apodal, is three lines long, flat, and gradually narrower towards the tail end ; the thirteen segments are separated by deep incisions, the last is particularly narrow, and terminates with two small points ; the colour is dirty white or yellow, the three large segments only are tinged with reddish. The flat brown head is much narrower than the first segment ; it is pointed towards the mouth, and has a dark brown spot on each side” (Herrich-Schäffer’s *Correspondenzblatt*, 1861, p. 116 ; *Int.* ix. p. 195).

At Dresden, on the 13th of June, I obtained a larva in birch leaves, which I believe to be that of *M. Sparmannella*. It was greenish-white, with the dorsal vessel darker ; the head brown, darker above, and with two hind lobes showing through the front part of the second segment ; the fifth segment with a rounded protuberance on each side. (This remarkable character occurs in several of the *Micropteryx* larvæ which I have examined.) The three last segments have a rosy tinge. When young, this larva has a black plate on the second segment.

The mine is at first a slender gallery, perfectly Nepticuliform ; it then swells out to a complete blotch, and very frequently this blotch surrounds the original gallery, which can then only be traced with difficulty by the string of brown excrement.

Micropteryx Unimaculella. Mr. Wilkinson, of Scarborough, forwarded me early in May a birch leaf, containing a young mining larva of *Micropteryx Unimaculella*, bred from the egg the first week in April. Mr. Wilkinson thus described his mode of obtaining the eggs :—“ I took ten of

the perfect insect, and having a fine young birch in a pot, just coming into leaf, I covered the pot over with muslin, and turned the insects on to the plant, and the same evening I observed one of the females depositing her eggs on the underside of the leaves; some leaves have as many as four larvæ in them" (Int. x. p. 45).

Later in the month Mr. Wilkinson forwarded me some nearly full-grown larvæ of this species. They were whitish, with the dorsal vessel green, giving the larva a very green tinge; the head brown, with the hind lobes showing through the front edge of the second segment; the fifth and sixth segments had slight lateral protuberances; the hinder segments were very pointed.

The mine often begins with a gallery, and then expands into a large blotch.

Micropteryx, sp.? (Descr. Nos. 8 and 9). In May I received from Mr. Healy some birch leaves, mined, as I thought, by two different sorts of larvæ.

I described these as follows:—

No. 8. Whitish, dorsal vessel greenish; head brown, the two black hind lobes showing through the second segment; no plate on second segment; no ventral spots.

No. 9. Whitish, almost glassy; sides of head black, mouth brownish; the second segment with a broad subcutaneous black plate; third segment broadest; the segments deeply incised. The second, third, fourth, fifth and sixth segments each with a quadrate black spot beneath, diminishing in size, that on the sixth segment being little more than a point.

Eventually, however, it turned out that No. 8 was only the adult form of No. 9, as all the spotted larvæ became in time spotless.

After these larvæ were full fed they came out of the leaves,

and, descending into the sand at the bottom of the cage, formed cocoons there.

. *Micropteryx*, sp.? (Descr. No. 10). On the 6th of May I examined some young birches near Chislehurst, and obtained two sorts of *Micropteryx* larvæ. One, which was whitish, may not be truly distinct from that above described (Nos. 8 and 9), but the amount of excrement was much less, and the lateral protuberances on the fifth segment, which I had not observed in Nos. 8 and 9, were evident.

Micropteryx, sp.? (Descr. No. 11). This was a grey larva collected in birch leaves near Chislehurst on the 6th of May, and near Shirley on the 14th.

My description of it is as follows:—

No. 11. Dark grey; head reddish-brown, darker at the sides; second segment with two black marks of irregular form; fifth segment with slight lateral protuberances.

Micropteryx subpurpurella? On the 8th of June Mr. Wilkinson met with a *Micropteryx* larva in oak leaves, which in all probability will prove that of *Subpurpurella*. On the 9th of June Dr. Hofmann met with some of the same larvæ at Spandau, near Berlin. From these I made the following description:—

No. 27. Whitish-yellow, no markings; the dorsal vessel greenish-grey; head reddish-brown; on the fifth and sixth segments there are slight lateral protuberances.

As the larvæ were found by Mr. Wilkinson during my absence on the Continent, he forwarded them to Mr. Douglas, from whose observations I make the following extracts:—

“Feet entirely wanting; when placed upon a sheet of paper the larva was able to move in a tolerably straight line, for some time, by drawing itself together and pushing itself along by the extremity of its last segment, but having nothing to hold by it continually rolled over.

“ The larva mines the young leaves of oak ; there is no trace of the commencement of the mine, nor of the egg ; but at this time the larva was full-grown, and the lobe of the leaf completely cleared out for about half an inch from the tip, the larva continuing to eat the parenchyma, its head towards the base of the leaf. By beginning at the point furthest off, and eating towards the stem, the larva always secures the freshest food. The mined part becomes whitey-brown. The excrement is in black threads, which soon become broken into short bits, and is scattered throughout the mine.”

Micropteryx Allionella? On the 27th of June Mr. Wilkinson met with a *Micropteryx* larva on birch, which he suspected *might* be *Allionella* ; afterwards he became convinced they *must* be *Allionella*, as they occurred wherever he had met with that insect.

This larva I have described as follows :—

No. 35. Whitish, with greyish-green dorsal vessel ; head whitish, with brownish spots on each side, and reddish-brown mouth ; the three posterior segments have a reddish tinge ; on the fifth segment is a slight lateral protuberance.

The young larva has a brown-black plate on the second segment.

The mine is at first Nepticuliform, the *brown* excrement completely filling the track ; then it forms a complete blotch, with black linear excrement.

From the foregoing statements it will be seen how vast a step has been taken in working out the larvæ of the genus *Micropteryx* ; it is to be regretted that none of the smaller species (*Calthella*, *Seppella*, *Aruncella* and *Mansuetella*) have yet been detected in the larva state.

Mr. Scott has recorded the observation (Int. x. p. 3), that, “ some six years ago, he found a mine in the leaf of *Caltha palustris*, which he then considered to be that of *M. Cal-*

thella." Unfortunately this clue has not yet been successfully followed up, and the larva of so abundant an insect as *M. Calthella* still remains one of the "things hoped for."

Plutella annulatella. Mr. Barrett found this abundant under the cliffs close to the sea, near Dublin, but larger and much more richly marked than Northumberland specimens (Zool., p. 7800). Probably they approached the gayer colouring of the specimens from the Isle of Portland.

* *Depressaria Culcitella.* On the 20th of May I received some larvæ of this species from my very kind friend Herr Hoffman, of Ratisbon. They were feeding on *Chrysanthemum corymbosum*.

* *Depressaria Astantiæ.* Of this species (nearly allied to *Angelicella* but larger), I received some larvæ from Herr Hoffman, of Ratisbon, on the 13th of June. They were feeding on *Astrantia major*.

Depressaria purpurea. Kaltenbach states that "according to Dr. Wocke the larvæ of *D. purpurea* is plentiful in kitchen gardens at Breslau on carrots, on the leaves of which plants it feeds quite in the style of *Applana*. It prefers places that are rather shady. Larvæ collected on the 1st of August underwent their metamorphoses in the earth, and produced perfect insects from the 9th of August to the 1st of September" (Int. x. p. 118).

Depressaria Capreolella. Mr. Barrett met with this species on the coast near Dublin, and remarks (Zool., p. 7800) that "in August they come occasionally to ragwort bloom at dusk; in April, after hybernation, they fly in the afternoon over furze bushes." I once saw this species flying rather freely in the afternoon at Sanderstead downs; it was a glorious hot day in March, but I and my companion were alike unprovided with nets.

Depressaria Ocellana. "I have again bred this species;

I had collected the larva on the 4th August on *Salix viminalis*, amongst some *Tortrix* larvæ; it is very similar to the larvæ of *Teras sparsana* and *scabrana*' (F. W. F., 29, 9, 61).

Depressaria rotundella. Mr. Barrett observes that in the neighbourhood of Dublin (Zool. p. 7800), this and *D. nanatella* "occur together not uncommonly along the coast, in August and September, and that they are fond of the flowers of ragwort, thyme and *Galium verum*."

* *Depressaria*, sp. ? As already noticed in the "Intelligencer" (vol. x. pp. 86 and 105), a *Depressaria* larva feeds at the end of May in the shoots of *Artemisia campestris*, and produces a perfect insect belonging to the *Albipunctella* group. Treitschke had described the larva erroneously as that of *Albipunctella*. The name of this *Artemisia*-feeding *Depressaria* is not yet satisfactorily determined.

* *Gelechia Lineolella*. "Yesterday I made an excursion to the Judenburg, and beat out a specimen of *Gelechia Lineolella* for the first time in my life; it was amongst *Calamagrostis epigejos*, the plant on which Metzner discovered the species, whence I conclude that the larva feeds upon this grass" (P. C. Z., 3, 6, 61).

* *Gelechia lutatella*. "I have discovered a *Gelechia* larva on *Calamagrostis epigejos*, but it has not produced *G. Lineolella*, but *G. lutatella*" (P. C. Z., 8, 8, 61, and 15, 8, 61).

* *Gelechia flavicomella*. "This has been bred from sloe, five specimens have appeared; according to my brother the larva is reddish" (O. H., 11, 6, 61).

* *Gelechia Myricariella*, Reutti. "On the 10th of June I made an excursion with Herr Boll to the banks of the Reuss. We came to a place where *Tamarix Germanica* grew very freely, and found the terminal shoots of the branches yellowish, and as though decayed. In the interior

of the stem of these, also between united leaves, we found a greenish *Tinea* larva. They soon changed to pupa, either on the ground, or in the woody stem, and early in July produced the *Gelechia Myricariella* of Reutti" (H. F., 12, 7, 61).

Gelechia Æthiops. "I am in hopes of getting eggs of *G. Æthiops*, but the weather keeps so cold that I have yet only obtained one of the perfect insect" (T. W., 5, 5, 61).

"I took 100 *G. Æthiops* last night; I will see if I can get any eggs from them" (T. W., 16, 5, 61).

"Herewith I send you a larva of *Gelechia Æthiops* for figuring; it seems to me to have done feeding. When young the larva mines the leaves; afterwards it constructs a gallery of silk and excrement, intermixed with bits of the food plant, and so continues to feed within the gallery" (T. W., 5, 7, 61).

These larvæ I have described as follows:—

No. 37. Dull reddish, the incisions of the segments greenish, spots small and black, head brown; second segment with a black plate divided down the centre; anal segment with a blackish plate.

**Gelechia Cauligenella*, Schmid, (*G. nutantella*, Hofmann in litt.)

The larva of this species makes galls in the stems of *Silene nutans*; the lower part of the stem, when inhabited by the larva, swells out very considerably, and the larva finds within a comfortable residence. The larva is dull pale green; head brown; second segment with two black-brown marks, divided by a slender central line of the pale ground-colour; spots imperceptible.

Gelechia Vicinella. "I expect that *G. Vicinella* was tolerably common at the spot where I met with it. I saw several specimens in a very short time, but only secured
1862.

three, as I thought it was *G. Marmorea*; which I had found in abundance on the sand hills a few miles away.

Its food is very likely to be *Silene Maritima*, as that plant is abundant on the rocks where the specimens occurred" (C. G. B., 1, 2, 61).

"*G. Vicinella* is now out, but sparingly. I searched repeatedly for the larva but without success" (C. G. B., 9, 8, 61).

Gelechia leucomelanella. Mr. Barrett remarks (Zool. p. 7800) that "this species occurs on the Dublin coast amongst *Silene maritima*, and that it appears not to be nearly so active as most of the *Gelechia*, generally falling down when beaten from its concealment, and so allowing itself to be captured."

Gelechia Coronillella. Mr. Barrett met with a specimen on the coast near Dublin in August last (Zool. p. 7800).

Gelechia subdecurtella. This was bred last year (1860) from larvæ found by Mr. Brown, of Cambridge, feeding on *Lythrum Salicaria*. (These larvæ were erroneously referred in last year's "Annual," p. 113, to *Laverna decorella*.)

A full description of the imago is given in the "Intelligencer," vol. x. p. 22).

**Parasia paucipunctella*. "We have bred several specimens of this from the larvæ which we collected last October, in the heads of *Anthemis tinctoria*" (F. H., 24, 6, 61).

Pleurota Bicostella. "I send you two larvæ of *P. Bicostella*, under a web on the mid stem of *Erica Cinerea*; from their present quiescent state, I should think they intend feeding up in the spring" (T. W., 21, 11, 60).

"The *Pleurota Bicostella* larvæ are all defunct; the chief cause I fancy was the want of a fresh supply of food during the depth of winter" (T. W., 3, 4, 61).

"I now send you two fine larvæ of *P. Bicostella*, which

I think will be large enough for you to describe and figure. I have a lot more, which are not quite so large, which I shall try and keep over the winter" (T. W., 4, 11, 61).

These larvæ I have described as follows:—

No. 53. Pinkish-grey, with brownish dorsal and sub-dorsal lines and marbled with brown along the sides; spots blackish, small; head and second segment yellowish-brown, the latter with some darker markings posteriorly; mouth dark brown.

Something like the larva of *Ypsolophus marginellus*.

It spins a web among the heath, analogous to that spun by an *Ypsolophus* larva on juniper.

Æcophora flavifrontella. Mr. Miller found the larva of this species in October among fallen leaves. It fed on the dry leaves, skeletonising them like the larva of an *Incurvaria*.

It was the larva of this species which I received from Herr Hofmann two years ago, as probably that of *Lypusa Maurella*.

Egoconia quadripuncta. Mr. Barrett met with this near Dublin, beating it "out of furze bushes in August in company with *Depressaria Costosa*" (Zool. p. 7800). x

Butalis variella. "Last June I met with this insect in great numbers running over the sand on the sand-hills of the Antwerp Campine" (E. F., 28, 3, 61).

**Carposina Scirrhosella*. The larvæ in the hips of roses, received from Herr Lederer at the end of October, 1860, have just produced two beautiful specimens of *Carposina Scirrhosella* (F. H., 24, 6, 61).

Glyphipteryx Fischeriella. "I have a notion that I shall get hold of the larva of *G. Fischeriella* this season. I found a larva last season which I suspect belongs to that species" (T. W., 5, 5, 61).

“ I have this morning bred *G. Fischeriella* from the suspected larva; the larva lives in the seeds of *Dactylis glomerata* and various other grasses. I first found the larva August 19th, 1860, nearly full fed; you can see little or no trace of the larva, unless you collect some of the seed heads and put them into a glass and look at them in a day or two; you will then soon see where they are at work” (T. W., 17, 5, 61.)

This larva is whitish, with dark grey dorsal vessel; head blackish; plate on the second segment dark grey; anal segment dark grey. It bores into the grass flowers, making holes in the sides.

Argyresthia literella. I captured a specimen of this insect near the end of July among alders, at Lewisham. It was in company with *A. Goedartella*, and I am now satisfied it is not really distinct from that species. I revisited the spot several times, in hopes of obtaining other specimens; but, though I dislodged *Goedartella* by thousands, I could not observe any others referable to the *Literella* type.

**Gracilaria Simploniella*. This has occurred in Belgium. “ Flies in August and September in open places along hedges of oaks—among the heaths of the Campine; it only flies short distances” (Léon Becker to E. F.).

Gracilaria Imperialella. Herr Hofmann has bred this species from larvæ mining in the leaves of *Orobus niger*, collected near Muggendorf, in July (see Ent. Ann. 1861, p. 117, Enigma, No. 83). “ The larva loosens the lower epidermis of the entire leaf, and eats much of the parenchyma; the leaf is slightly curved and quite bladder-like; the loosened lower skin is very white. The larva spins a pale ochreous cocoon outside the leaf, but attached to the white loosened skin of the underside, where it is hardly perceptible.”

**Gracilaria Pavoniella*. On the 20th of August I

received larvæ of this species from Professor Frey, who collected them in the leaves of *Margarita bellidiastrum*, near Zürich.

The insect has been found at Frankfort-on-the-Main, mining the leaves of *Aster amellus*. Probably it occurs further north on other *Compositæ*.

The mine on the *Margarita bellidiastrum* is very peculiar; the larva mines the upperside of the leaf from the tip towards the base; the mined place is at first red, afterwards brown, and puckered and raised up in the middle (like the mine of *Nepticula Weaveri* on *Vaccinium Vitis Idæa*).

Coriscium cuculipennellum. Mr. Fereday has noticed in the "Intelligencer" (vol. ix. p. 140) the occurrence of this insect near Folkestone. "I have two specimens, which I bred from about a dozen pupæ collected from a privet bush on the coast at Folkestone; they were all found on one bush, and my search on other bushes proved quite fruitless. The formation of the end of the privet leaf into a cone, containing the pupa within, was very remarkable for symmetry of construction, being turned and jointed with the greatest nicety; it should be seen before the leaf has withered to be duly appreciated; when withered the cone becomes distorted. It was a source of regret that I knew not how to preserve its original form."

**Ornix Pfaffen-zelleri*. Thus noticed by Professor Frey (Int. x. p. 164):—

"On the rocky cliffs of the Engadine there grows a small thornless shrub, from three to five feet high, with small, oval, somewhat thick leaves and small red berries, *Cotoneaster vulgaris*, Linn. This is the food-plant of *Ornix Pfaffen-zelleri*, which first mines a leaf, and then rolls up another leaf so as to form a habitation similar to that constructed by *O. Torquillella* or *O. guttea*, in which it passes the re-

mainder of its larval existence; afterwards it spins a brown cocoon, like *O. guttea*. The larva occurs at the beginning and middle of July, and I bred the perfect insect early in August."

Ornix Scutulatella. Professor Frey has bred this from larvæ found towards the end of June and the beginning of July on *Betula torfacea* in swampy places (Int. x. p. 164).

**Ornix Fagivora*, Frey (Int. x. p. 60). This is the *Devoniella*, Frey (Tineen u. Pteroph. der Schweiz, p. 252), but not the *Devoniella*, Stainton.

The larva turns down the edge of the leaves of beech.

Larvæ probably referable to this species have occurred in various parts of England, but I have seen no British examples of the imago. "The perfect insect is easily recognized by the ochreous inner margin of the anterior wings."

**Coleophora Gallipennella*. "On the 15th of August we found some *Coleophora* larvæ feeding on the green-seeds of *Astragalus Glycyphyllus*. Dr. Herrich-Schäffer believes that these are the larvæ of *Coleophora Gallipennella* of Hübner and Zeller, as he has taken that species amongst the *Astragalus*" (F. H., 18, 8, 61).

The cases of these larvæ are extremely similar to the cases of *Coleophora Coronillæ*, to which *C. Gallipennella* is closely allied.

**Coleophora musculella*. In May last I received larvæ of this insect from Herr Mühlig, of Frankfort-on-the-Main; they were feeding on the leaves of *Dianthus superbus*. The case is something like that of *Saponariella*, but smaller; it is grey-brown, with black stripes longitudinally; the perfect insect is also allied to *Saponariella*.

Coleophora albicans. "During the Michaelmas holidays I found, along a sandy road near here, a multitude of the larvæ of *Coleophora albicans*, Stainton, on the *Artemisia*

campestris, which grows so plentifully, and collected upwards of 200 specimens. Though the cases are so like the flowers, yet they readily strike the eye in the sunshine. No doubt one overlooks many, and the terminal shoots especially must be turned down, in order to discover those which are not exposed to the sunshine. Amongst them, to my surprise, there were some cases, formed, not like the *Artemisia* blossoms, but quite of the form of the cases of *Cæspitiella*. Although I at first conceived they could only be *Albicans*, yet as they were proportionally so much thinner than those resembling the *Artemisia* blossoms, I felt rather doubtful. But my hesitation is now entirely removed, since the larvæ in the box collected together into a heap, and so rubbed one another that most of the cases lost their blossom-like appearance and put on quite the appearance of the thinner cases" (P. C. Z., 18, 10, 61).

**Coleophora Arenariella*. "Whilst seeking for *Kuhlweirii*, I found a case-bearing larva on *Astragalus arenarius*, one of the truest sand-plants. The largest case is already firmly attached, so that I hope to breed it" (P. C. Z., 19, 6, 61).

"Dr. Wocke writes me that the *Coleophora* on *Astragalus arenarius* is a new species, for which he proposes the name of *Arenariella*. I notice that the white costal streak goes further into the cilia at the apex of the wing than in *Serenella*; the ground-colour of the anterior wings and the head is also different" (P. C. Z., 18, 10, 61).

Stathmopoda Pedella. Various researches have been made for the larva of this species, but all hitherto without success. The perfect insect has occurred at Hampstead (Int. x. p. 131), but I have not again met with it at Lewisham.

Laverna decorella. Senator von Heyden has bred this

from larvæ “which feed in a more or less rounded, gall-like swelling, of the size of a pea, on stems of *Epilobium (alpinum)*, generally at the base of a leaf-stalk. There are often several galls on one stem. The larva changes in a longish whitish cocoon, within the very confined space of the gall; at the upper side of the gall some white web protrudes in a tubular form through a small hole, and out of this the perfect insect escapes. A gall found in the middle of October produced a moth the following day” (Stett. Ent. Zeit. 1861, p. 37).

Chysoclista Flavicaput. “I found the enclosed chrysalis this morning in a clipped white-thorn hedge. It appears the insect is only found in last year’s wood; consequently when the hedge was clipped last autumn many were destroyed” (W. S., 30, 3, 61).

“I enclose a twig just as I cut it from the hedge. It was by accident I first discovered it, by cutting several in two whilst trying to graft some red-thorn on the white. After destroying so many, I thought in what way could I best discover them without injuring them, and on diligently looking I discovered the little opening, you will observe, a short distance I suspect from the chrysalis. I have not discovered any in the old wood; they are all in last year’s growth” (W. S., 4, 461).

“About a month ago, when the hawthorn leaves were beginning to appear, a friend of mine brought me a couple of twigs like those I enclose, containing the slit and burrow, with pupæ at the bottom. To day the first insect made its appearance, proving to be *C. Flavicaput*. The moth comes out about 7 A.M. I observe that, in nine cases out of ten, the hole is situated about an inch from a fork, and that the pupa is just at the fork. In the specimens infested with ichneumons there is no hole” (F. A., 16, 5, 61).

**Ochromolopis ictella*. "From larvæ found at the beginning of May in webs, on the terminal shoots of a *Lithospermum*? we bred at the end of May two beautiful specimens of *Ochromolopis ictella*" (F. H., 24, 6, 61).

"I am not clear respecting the name of the food plant of *Ochromolopis ictella*" (F. H., 6, 7, 61).

"The food plant of *Ochromolopis ictella* has been named for us by a clever botanist *Thesium montanum*. This is confirmed by a comparison of the living plant with the figure in Sturm's Flora. The species probably feeds also on *Thesium pratense*. The latter occurs in meadows and sheltered places here very plentifully, and in both localities where it occurs Dr. Herrich-Schäffer has met with the perfect insect" (F. H., 20, 9, 61).

**Stagmatophora albiapicella*. "We have bred *Stagmatophora pomposella* from pupæ which we found in May in the last year's seed-heads of *Globularia vulgaris*" (F. H., 24, 6, 61).

"In the middle of May we found in the dried last year's seed-heads of *Globularia vulgaris* small pupæ, which on the 31st May produced *Stagmatophora albiapicella*. Dr. Herrich-Schäffer at first pronounced them *S. pomposella*, but we found on more accurate examination and comparison with specimens in Dr. H.-S.'s collection and our own, that the species was undoubtedly *S. albiapicella*, of which the imago occurs amongst *Globularia* (H.-S., Schmett. v. Europa V. p. 217).

"At the end of August we again searched the locality where we had found these pupæ, and we noticed the *Globularia*, though rather sparingly, but could find no trace of any larvæ. Yesterday we repeated our investigations, and were so fortunate as to find in the interior of the dried seed-heads a small yellowish-white larva with dark brown head, and dark and pale brown marbled second segment, and in the

interior of the flower stems a similar larva, rather larger. Hence we conclude that the egg is laid in June on the drooping flower of the *Globularia*, that the larva on the setting in of the moist weather in autumn quits the egg, and feeds on the seeds and pith of the stem, passes the winter in the stem, and changes to a pupa in the receptacle" (F. H., 20, 9, 61).

* *Elachista nobilella*. Professor Frey has bred this species from larvæ found in March in a species of *Festuca*. "The mine is long and white, and the larva often appears to go from one leaf to another. The larva is slender yellowish, with a brown head, and is nearly full fed before winter. The pupa reminds one of that of *E. Gleichenella*" (Int. x. p. 61).

Professor Fritzsche also bred this insect from larvæ in a species of *Festuca*.

* *Elachista bifasciella*, Treitschke. This insect had always remained a great rarity, though described nearly thirty years ago. This spring Professor Fritzsche met with the larvæ in March in a species of *Festuca* at Freiberg in Saxony, and reared many of the perfect insect.

Elachista Zonariella. "I can assure you that the larva figured in vol. 3 of the "Natural History of the Tineina," plate 5, as that of *E. Zonariella*, does not belong to that species; but that the larva figured on plate 2, as that of *Megerlella*, is truly that of *Zonariella*" (F. W. F., 29, 9, 61).

The above is the remark of so conscientious an observer as Professor Fritzsche: we cannot in any way assent to it, but we publish it with the view of inducing a more rigorous comparison of the larvæ of these two species; we fancy we know *Megerlella* very well.

Lithocolletis Bremiella. "This also occurs on *Orobus*, as I have bred it from that plant" (H. F., 10, 5, 61).

Lithocolletis Insignitella. "On the 28th July I found near Mombach a leaf of *Ononis Spinosa*, mined by a *Lithocolletis* larva. A few days ago the imago made its appearance, and is very nearly allied to *Insignitella*, if indeed it be not the same species" (A. S., 6, 8, 61).

I believe Mr. Allis has British specimens of this insect; its habitual food is clover.

Lithocolletis Torminella. Mr. M'Lachlan has bred specimens of this species from larvæ found in the leaves of a Morella cherry tree in a garden at Exeter (Zool. p. 7801).

Lithocolletis Vacciniella. "I took a few specimens of this insect on the Carinthian Alps, and enclose you a leaf mined by the larva" (P. C. Z., 8, 8, 61).

Lithocolletis Comparella. Mr. Scott has again met with the larva of this species at Lee, mining the underside of the leaves of *Populus alba*.

Cemiosstoma Wailesella. I met with several of these larvæ at Dresden, and watched the gradual development of the mines; they commence with a spiral mine, which forms a round blackish blotch; then they expand into a long slender gallery, and eventually form a large irregular blotch, which occupies nearly the whole of one of the small leaves of the *Genista tinctoria*.

Cemiosstoma Lotella. Dr. Jordan met with a *Cemiosstoma* larva early in August, in the leaves of *Lathyrus sylvestris* at Shaldon, near Teignmouth. These appeared to me referable to *C. Lotella*, but they may prove distinct.

Bucculatrix Boyerella. "It is yet a few weeks too soon for the larvæ of *B. Boyerella*" (A. S., 6, 8, 61).

"Early this morning we started in search of the larvæ of *B. Boyerella*, though the weather was very unfavourable—indeed we experienced rather a violent storm. Professor Frey and I together only obtained seven larvæ. The

creature is very scarce in our neighbourhood, *Ulmella* being much more abundant" (A. S., 15, 9, 61).

This larva differs rather from the usual *Bucculatrix* type. I have described it as "pale yellowish, with dark green (almost blackish-green) sub-dorsal stripes; spots small and grey; head pale brown; some of the segments, especially the eighth, are tinged with grey on the back."

Nepticula Weaveri. Professor Zeller has sent me a leaf of *Vaccinium Vitis Idæa*, collected near Meseritz, which was mined by the larva of this species (7, 4, 61).

* *Trifurcula Pallidella*. "On the Carinthian Alps, 4,500 feet above the sea, a yellowish *Trifurcula*, which is no doubt *Pallidella*, was flying amongst *Genista sagittalis*; it is probably attached to that plant, just as *T. immundella* is attached to the common broom" (P. C. Z., 8, 8, 61).

ANSWERS TO ENIGMAS.

81. No doubt a *Nemotois*, but the species can never be now ascertained with certainty.
82. These larvæ produced only *Incurvaria Pectinea*.
83. *Gracilaria Imperialella* (see ante, p. 132).
85. *Coleophora lineariella*.
89. *Parasia paucipunctella* (see ante, p. 130).
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ENIGMAS STILL UNANSWERED.

11. "An *Elachista* larva, found by Mr. Scott, at the end of April, 1854, mining the leaves of *Scirpus lacustris*."
20. "A *Depressaria* larva, found by Mr. Boyd, May 2nd, 1855, (it was then young,) feeding on a leaf of *Pastinaca sativa* under a turned-down corner; this was expected to be *Depressaria Douglasella*."
26. "A *Nepticula* larva, mining the leaves of birch; the mine has some resemblance to that of *N. luteella*, but central track of excrement is broader, not so mathematically linear."
27. "A *Gelechia*? larva, feeding in the heads of yarrow (*Achillea millefolium*). May this not be *Cochylis Smeathmanniana*? (see Int. x. p. 126), or *Eupæcilia dipoltana* (see Int. x. p. 134); both appear to have similar habits.

33. "A brown *Gelechia*-like larva, found amongst moss by Mr. Douglas, in March, 1857."

38. "A *Lithocolletis* larva, mining the upper side of beech leaves."

46. "A pretty red-spotted yellow larva, mining a leaf of *Carex riparia*, found at Hackney, March 29th, 1858."

47. "A *Gelechia?* larva, mining down the stems (near the root) of *Carex paludosa*, collected at Wicken Fen, near Cambridge, April 30th, 1858."

48. "A larva mining in the stems of the shoots of *Rhamnus Frangula*, near Guildford, causing the leaves to droop, collected May 21st, 1858."

49. "A grotesquely minute, pistol-form *Coleophora* case, collected by Mr. Gregson, on *Salix fusca*, at the end of May."

50. "A *Tortrix?* larva, mining down the stems of *Centaurea nigra*, and ejecting its 'frass' from a hole in the side of the stem, collected by Mr. Boyd, at Probus, in Cornwall, June 19th, 1858" (see Int. iv. p. 151).

57. "A *Gelechia?* larva, feeding inside the flowers of *Campanula persicifolia*, collected at Erlangen, at the end of June."

71. "A brown *Gelechia?* larva, found by Mr. Scott, at the beginning of August, 1859, feeding in the heads of *Statice Armeria*."

72. "A greyish-white *Coleophora?* larva, found by Mr. Boyd, burrowing in the bark of apple trees, at the beginning of May, 1859; it constructs a gallery of 'frass.'"

76. "A *Coleophora* larva, found by Herr Hofmann, the beginning of October, on oak and hazel near Ratisbon. The case of the larva is most extraordinary; the cases I have seen are all rather small, but they possess large alary appendages, attached to a slender central tube; viewed from above

the case is almost broader than long; the wings of this case are black, the body, or rather the tail portion, is brown, the anterior part of the tube being darker."

77. "A *Coleophora* larva, found by Mr. Edleston, early in April, on the seeds of the *Luzula campestris*. Theoretically, this ought to have been *C. murinipennella*, but the case was different, being cylindrical, greyish-ochreous, with the mouth turned down; indeed the case was very similar to that of *C. argentula*."

79. "A mining larva, collected by Herr Schmid, at the end of October, 1859, in the leaves of *Lysimachia vulgaris*; the mine is slightly puckered, but yet reminds one considerably of the mine which *Stephensia Brunnichella* constructs in the leaves of *Clinopodium*."

84. "A *Coleophora* larva, found at Wavendon by the Rev. Henry Burney, at the end of August. It feeds on the seeds of *Stellaria graminea*, the cylindrical whitish case being attached to the capsule, and the larva boring into the interior. In captivity they eat readily the *Stellaria media*. When the case is protruding from the calyx of an unripe capsule, it looks excessively like a dried flower of the plant, and would thus readily escape observation"* (Int. viii. p. 189).

86. "A *Gelechia?* larva, found near Ratisbon by Herr Hofmann, feeding in the seeds of *Linosyris vulgaris* (*Chrysocoma*), and devouring the seeds and fructification of that plant, which is nearly allied to *Solidago virgaurea*."

87. "A *Gelechia* larva (supposed to be that of *Ericetella*),

* I bred a single specimen from these larvæ, but have not been able to refer it to any known species. Mr. Burney did not obtain a single imago, but trusts that the pupæ are only biding their time and will appear next year. He searched in vain for the larvæ this last season, and not a single case was to be found, where the previous year they had been so abundant.

found by Mr. Wilkinson, of Scarborough, at the end of September, feeding in the flowers of the heath." Mr. Wilkinson did not succeed in rearing these; he has again collected a supply of the larvæ this autumn, and will try again to rear them.

88. "A *Nepticula* larva in birch leaves, found by Mr. Healy, Mr. M'Lachlan and others, in October. The mine is contorted, with a thread of black excrement. A peculiarity of the mine is, that when the larva is young, it does *not eat the whole thickness* of the leaf, so that the first portion of the mine remains green."

90. "A *Nepticula* larva in the leaves of *Agrimonia Eupatoria*, found by Mr. Healy, in October, near Croydon. The mine of this eventually forms a complete blotch. This is the third species which feeds in the *Agrimonia*, and possibly there are yet others."

NEW ENIGMAS FOR SOLUTION.



91. A *Gelechia?* larva, found August 10th, on the under-side of alder leaves at Reigate; it draws two side ribs together from beneath, and lives in the web it thus makes. It is pale green, the dorsal line whiter-green, the sub-dorsal lines a little darker; the head pale brown; the spots black, very neat and distinct.

92. A *Gelechia?* larva, collected near Ratisbon by Herr Hofmann, August 25th, inside the pods of *Cytisus nigricans*, where it feeds on the seeds.

93. A *Parasia?* larva. "Yesterday we found in the locality where our *Cosmopteryx* occurs some larvæ in the receptacles and seed-heads of *Chrysanthemum Corymbosum*. They are probably a *Gelechia* or *Parasia*, and come near to those which we found last year on *Anthemis Tinctoria*" (F. H., 29, 3, 61).

These larvæ burrow through the seeds, and are very similar in habit to the larvæ of *Gelechia bifractella*.

94. *Coleophora*, sp.? In the spring of 1860 Mr. M'Lachlan found, at Forest Hill, a long, slightly curved, dirty-whitish case, containing a larva which was feeding on *Centaurea nigra*. This came to an untimely end, and Mr. M'Lachlan has never been able to find another (Int. x. p. 72).

95. A larva in the seeds of *Gentiana acaulis*. "I suspect that a *Tinea* larva eats out the seeds of the *Gentiana acaulis*; but I found only "frass," the larvæ being all gone. This

species of *Gentiana* was not common on the Carinthian Alps; and in other plants of that genus which were just coming into flower of course no larvæ were to be expected" (P. C. Z., 8, 8, 61).

96. A *Bucculatrix*? larva collected by Herr Hofmann, near Ratisbon, mining the leaves of *Arnica montana*; the mines are long, and not very unlike those of *B. maritima* in *Aster Tripolium*.

NATURAL HISTORY OF THE TINEINA.

DURING the past season 53 larvæ have been described and 46 have been figured. This is a considerable improvement upon our last year's report.

The season has no doubt been more favourable than the wet season of 1860, and besides the discovery of the larvæ of the genus *Micropteryx* has given us at least six new larvæ *en masse*.

I annex a Table as formerly, showing the amount of assistance received since the last report.

		Discovered.	Bred.	Sent.	Known before.
Dasystoma Salicella	Burney	..	..	..	.25
Adela Sulzella	Mühlig	.50	.25	.25	
Nemotois Fasciellus	Schmid	.50	.25	.25	
Micropteryx unimaculella	Wilkinson	.50	.25	.25	
„ sp.?	Healy	.50	..	.25	
„ Sparmannella	Hofmann	.50	.25	..	
„ Subpurpurella	Wilkinson	.50	..	.25	
„ „	Hofmann	..	..	.25	
„ Allionella	Wilkinson	.50	..	.25	
Depressaria Culcitella	Hofmann	.50	.25	.25	
„ Astantiæ	Hofmann	.50	.25	.25	
Gelechia Fischerella	Zeller	..	..	..	.25
„ Æthiops	Wilkinson	.50	.25	.25	

		Discovered.	Bred.	Sent.	Known before.
Gelechia Cauligenella	Schmid	·50	·25	·25	
Harpella Majorella	Fologne ....	..	..	..	·25
Cecophora flavifrontella	Wilkinson ..	..	..	..	·25
Glyphipteryx Fischeriella	Wilkinson ..	·50	·25	·25	
Gracilaria Pavoniella	Frey.....	..	..	..	·25
Ornix Fagivora	Frey.....	·50	·25	·25	
Coleophora Musculella	Mühlig.....	·50	·25	·25	
„ Gallipennella?.....	Hofmann....	·50	..	·25	
Stigmatophora albiapicella.....	Hofmann....	·50	·25	·25	
Elachista bifasciella	Fritzsche ..	·50	·25	·25	
Lithocolletis distentella	Mühlig.....	..	..	..	·25
„ Comparella	Scott .....	..	..	..	·25
Bucculatrix Boyerella	Schmid ....	..	..	..	·25
<hr/>		<hr/>	<hr/>	<hr/>	
Parasia paucipunctella	Hofmann....	·50	·25	·25	
Coleophora lineariella	Hofmann....	·50	·25	·25	
Gracilaria Imperialella	Hofmann....	·50	·25	·25	

The last three entries refer to larvæ received in 1860, but which were not then specifically known. Those larvæ received in 1861, of which the names are quite problematical, stand over in like manner till our next year's statement.

We shall be glad to hear from contributors who detect any errors in this Table.

The summary yields the following results:—

Hofmann	7·75	Healy	·75
Wilkinson	4·75	Burney	} ·25
Mühlig	2·25	Fologne	
Schmid	2·25	Scott	
Frey	1·25	Zeller	
Fritzsche	1·		

The total awards to this time being:—

HOFMANN	30·	Fritzsche	}	1·
MÜHLIG	24·75	Hellins		
FREY	22·	v. Heyden		
WILKINSON	20·25	Machin		
SCHMID	20·	Miller		
<hr/>		Sang	}	·75
Scott	14·	Boll		
Boyd	8·25	Cooper	}	·50
Gregson	5·	Simmons		
Douglas	4·75	Crump	}	·25
Edleston	4·	M'Lachlan		
Zeller	3·50	Staudinger	}	·25
Wailes	3·25	Beaumont		
Bond	} 2·75	Chappell	}	·25
Parfitt				
Millière	2·	Drane	}	·25
Harding, H. J.	1·75	Fletcher		
Fologne	} 1·50	Harding, G. ..	}	·25
Healy				
Brockholes	}	Lederer	}	·25
Brown, T.				
Law	} 1·25	Newnham	}	·25
Logan				
Vaughan	}	Sayer	}	·25
Winter, W.				
		Shield	}	·25
		Wildman		

Owing to the decease of Herr Grabow and Monsieur Bruand, we regret to have to omit their names from our list.

ON HEMIPTERA, COMMONLY CALLED BUGS.

BY JOHN SCOTT.

“ It is a familiar beast to man, and signifies ————— love.”

Merry Wives of Windsor, Act I., scene 1.



CAN it be that the familiarity of the one has bred contempt for all the others? If so, on what grounds? and will any one say why it is they should not be as thoroughly known to us as other branches of Natural history? *Lepidoptera* and *Coleoptera* have been and are hunted after to such an extent that everybody knows something about them. They have been written about, and figured in so many popular ways, that the only thing now remaining to be done is to give a Shilling Volume depicting the undersides of the creatures.

Why not leave for a while this track, so much trodden, and do something in another quite as interesting? The same Divine mark is imprinted on all, and the necessity for the knowledge of the one is as essential as that for the others. Is it the Hemipterous *smell* which deters? Gardeners grow tulips and dahlias as well as roses, and can give us as much information on the one as the other, yet the perfume of the former is as inferior to that of the latter as is the colouring.

Some of the bugs have no smell whatever, others give off a rather agreeable odour, and others, again, emit a very dis-

agreeable one. This, however, is only perceptible if they are handled while alive. It ceases with death, and there is no necessity to touch any of them with the fingers until such is the case.

The end of summer and autumn is the great season for them. They are found everywhere; and the number of species belonging to Great Britain is at present an unascertained fact. Mr. Douglas and myself are engaged on a work intended to supply this deficiency,—for deficiency it is,—and we desire to have the co-operation of all genuine naturalists throughout the Islands. Our own exertions since we took the matter in hand have been signally successful; but we know that a great deal more may be learned from a distance than we are capable of working out alone; as, for instance, the distribution and variation of species,—whether they are particularly partial to the same plant or plants throughout the range of distribution,—what species are local, and whether occurring singly or in companies. If it were possible—and indeed what Mr. Douglas and myself most desire—to have the assistance of some one in each county, the value of our undertaking would be amazingly increased. Large tracts of sandy country are almost certain to be very prolific; and indeed the very fact of there being so much sand on the Continent, covered as it always is with many low plants, thereby affording the creatures a dry shelter at all times, is the secret, in a great measure, that renders the doings of the naturalist a success.

For collecting, it is necessary to be provided with a net, which can be contrived so as to answer three purposes: *first*, for beating into; *second*, for sweeping the herbage, heath, &c.; and *third*, for water purposes, as there are many species to be found in ponds, some of them familiarly known by the cognomens of “Boatmen,” “Toe-biters,” “Water-

watchers," &c. These wriggle about in the net much after the fashion of water-beetles.

Excepting the *Pentatomidæ* (cut in five ways, or resembling a shield), and a few other genera, bugs are very active in the hot sunshine, and require some adroitness in capturing them. The *Capsidæ*, for instance, no sooner feel themselves beat or swept into your net, than they raise their wings and are off again at once.

The *Saldidæ* also, found for the most part on the sandy or gravelly edges of pools, are exceedingly difficult to lay hold of. They are oval in shape, with very prominent eyes, and leap out of sight on the least apprehension of danger.

Like the moths and beetles, bugs, too, have their representatives in ants' nests; but in this country we know next to nothing what these are. What a grand chance is here afforded to those who dwell in the North, and visit such places as Rannoch, where ants' nests are worth calling so!

I remember, when staying there, how surprised I was at seeing such huge things piled up at the roots of almost every fir tree, the trunks swarming with the creatures passing up and down in long files, this one bearing a leaf, that a piece of bark; and then the curious crackling noise emitted from the thousands on the surfaces of the nests, a heaving mass working with the greatest excitement: but I knew nothing of bugs then, or I might have reaped a rich harvest.

Another feature worth mentioning in the bugs is this,—unlike moths or beetles, their forms during their transformations retain all the characters of the perfect insects, except the wings.

Very delicate species, such as *Berytus*, *Neides*, *Ploiaria*, &c.,—these are gnat-like creatures,—we put *singly* into pill-boxes; all the others we "bottle." A phial containing a few bruised leaves, or a drop or two of benzine, with some

pieces of blotting-paper so as nearly to fill it and prevent them shaking about, is the general receptacle. Their antennæ and legs are very delicate, and require the nicest manipulation, or it will be found difficult to set out a perfect creature. After they have lain for about twenty-four hours in the phial, they will be found to have lost all the rigidity occasioned by the death to which they have been subjected, and are then ready for setting.

We never pin any of them, large or small, but card all species. The gum used is the same as for beetles, viz. Tragacanth. One specimen, at least, we set out with the wings expanded, another showing the underside, and the remainder of each species in the ordinary way. On the Continent the *Hemiptera* have won the sympathies of famous men, such as Baërensprung, Dohrn, Fieber and Flor as well as others, and we sincerely hope they will find admirers other than ourselves here. They were sent for our instruction, and what HE has created is surely not beneath us to study. There is more than beauty in them, and it only remains hidden and in obscurity because of the unwillingness to give them the attention they merit, and thereby place them in the niches intended for their reception, and for which their forms and robes have been specially designed. Our own ignorance only becomes the more apparent as we turn over leaf after leaf of the book of nature. New sights are unveiled and we wonder that such things are and should have escaped our observation hitherto.

I would here call attention to some of the apparently scarcer species which we wish to obtain, as also notices of their times of appearance, locality and other general information relating thereto. The places where they are found, and the plants, &c. to which they are attached, are those quoted by Fieber in his late work ; but with the exception of

one or two cases he does not mention the months in which they occur. A great omission in a work otherwise of so much value.

Tetyra Hottentotta, Fab. On grassy banks and under various plants singly.

Thyreocoris scarabæoides, Linn. Under the leaves of bushes and on grassy hedge banks.

Coptosoma globus, Fab. On *Coronilla varia*. Not a British plant; probably to be found on some of its allies.

Ælia acuminata, Linn. (not Curtis). In grassy places and on various plants, also on the ears of corn.

Eysarcoris pusillus, Panz. On what and at what time?

Pentatoma baccarum, Linn. On various plants and bushes.

Pentatoma lynx, Fab. On *Verbascum*, *Medicago sativa*, *Fragaria*, *Artemisia campestris*. Sand-hills and the crevices of old buildings.

Pentatoma juniperina, Linn. Upon junipers.

Pentatoma sphacelata, Fab. On *Verbascum*.

Rhaphigaster grisea, Fab. On birches and in gardens on various plants.

Asopus punctatus, Linn. Upon felled timber and young birches.

Arma custos, Fab. On what and when?

Jalla dumosa, Linn. Stony places—under the leaves of nut bushes in the autumn, also on *Pteris aquilina*.

Atractus spinipes, Fall. Under the leaves of the after growth of lime trees in the autumn, also on bushes.

Rhopalus crassicornis, Linn. Upon sorrel on grassy hedges and on felled timber.

Rhopalus tigrinus, Schill. Singly upon grassy hillocks and on felled timber.

Rhopalus magnicornis, Fab. Not uncommon on dry sorrel on grassy hedge-banks, also on felled timber.

Rhopalus maculatus, Fieb. On what and when?

Metatropis rufescens, Fieb. On what and when?

Lygæus equestris, Linn. On *Seseli hippomarathrum* and *Asclepias vincetoxicum*, and sunning itself upon stones in the spring. Neither of the plants named are British, but *Seseli libanotis*, or mountain meadow saxifrage, is found in Cambridgeshire.

Lygæus familiaris, Fab. On grassy slopes.

Lygæus punctum, Fab. On rocks in sunny places.

Rhyparochromus Echii, Panz. On stony, sunny hills under leaves, in grass tufts and under stones.

Rhyparochromus quadratus, Fab. On sandy places and upon sunny hills.

Rhyparochromus marginepunctatus, Wolff. Singly in sandy places, upon hills, under low plants, *Thymus*, *Erica*, &c.

Rhyparochromus varius, Wolff. In sandy places under low plants. Frequently under *Herniaria* (rupture wort), of which we have one species in Britain, viz., *H. glabra*. It is found in Lincolnshire, Suffolk, Cornwall and Kerry, but it is very rare.

Rhyparochromus luscus, Fab. Under fallen leaves, on plants and at roots of trees frequently. Found throughout the whole year.

Rhyparochromus luniger, Schill. In sandy places.

Pilophorus clavatus, Linn. On small willows, alders and oaks.

Deræcoris scriptus, Fab. Upon *Eryngium campestre*.

Laccometopus clavicornis, Linn. Between stunted leaves and in the calices of *Teucrium chamædrys*. A rare plant, found on ruined walls and dry banks.

Derephysia cristata, Panz. Singly under fallen oak leaves; also upon grass in summer.

Monanthia scapularis, Fieb. On sandy places under *Senecio Jacobæa*.

Campylosteira brachycera, Fieb. On sunny hills under moss and *Cenomyce* (lichen).

Tingis pyri, Geoff. In gardens upon the leaves of pear trees.

Tingis spinifrons, Fall. Upon sandy places under *Artemisia campestris*; in companies at the roots of grass; and singly upon sorrel.

DESCRIPTION OF A HEMIPTEROUS INSECT NEW TO BRITAIN.—Fig. 6.

Genus METATROPIS, Fieb.

BERYTUS, H.-Sch., Burm., Gorsk.

NEIDES, Spinola.

HEAD small, somewhat heart-shaped. Thorax rising gradually and widening out until it reaches the hinder angles. Abdomen long, narrow and lanceolate. Legs and antennæ very long and slender. The basal joint of the latter and the apices of all the thighs clubbed. The first joint of the antennæ longest; the second joint scarcely half the length of the first; the third joint a little over half the length of the first; the fourth joint spindle-shaped, and about as long as the second.

Metatropis rufescens, H.-Sch., Fieb.

Berytus elegans, Burm.

Berytus annulatus, Gorsk.

Neides Sieberi, Spin.

Ramea, Am. Mon. sp. 90.

Length 4—4½ lines. Reddish-yellow or brown. Head and thorax deeply punctured. The three first joints of the

antennæ pale reddish-yellow. The two first with large black spots of unequal size, distributed irregularly throughout their entire length; the first joint having also a broad black ring before the apex. The fourth joint black, with the exception of the apex, which is reddish-yellow. Head with two longitudinal channels. Thorax with a dorsal ridge. Eyes small, black. Behind the eyes is a deep transverse channel, beyond which are placed the ocelli of a clear, shining red colour. Thorax in front with two somewhat rounded elevations; the sides wrinkled; the shoulder angles and dorsal ridge, terminating in blunted dentate processes. Scutellum small, convex, triangular. Hemielytra flat, narrowing gradually from the base until beyond the third pair of legs, when they again widen out until they reach the termination of the corium (or leathery portion) on the costal edge, at which part they are widest. The ribs of the corium very strong; the cells somewhat opaline. Membrane rather iridescent. Thighs and tibiæ spotted with black; the former with a broad black ring before the apex; and the extreme tip of the latter also black. The claws, basal and tip of the anti-penultimate joints of the tarsi black.

This genus is closely allied to *Metacanthus*, which it very much resembles.

The specimen from which I have made the description was captured by T. V. Wollaston, Esq., some years ago at Pangbourne, Berkshire, and is unique.

NEW WORKS ON ENTOMOLOGY.

BY THE EDITOR.

THIS Volume has already exceeded its usual limits, and we must therefore restrict ourselves to enumerating the Titles of some of the Publications received during the past year.

CATALOG DER LEPIDOPTEREN EUROPA'S und der angrenzenden Länder. I. Macro-Lepidoptera, bearbeitet von DR. O. STAUDINGER. II. Macro-Lepidoptera, bearbeitet von DR. M. WOCKE. Dresden: bei DR. O. STAUDINGER, und in der königl. Hofbuchandlung von HERMANN BURDACH. September, 1861. Price 4s.

CATALOGUE MÉTHODIQUE DES LÉPIDOPTÈRES D'EUROPE pouvant être employé comme étiquettes pour le classement des Collections. Prix 1fr. 50c. 1861. Paris: chez A. DEYROLLE, Naturaliste, 19, Rue de la Monnaie.

CATALOGUE OF BRITISH COLEOPTERA: by G. R. WATERHOUSE, F.Z.S., &c. Price 7s. 6d.

THE POCKET CATALOGUE OF BRITISH COLEOPTERA: by the same Author. Price 2s.

BIBLIOTHECA ZOOLOGICA. The Literature of Zoology which has appeared in Periodicals, Transactions, &c., and of the Books published from 1846 to 1861. By J. VICTOR CARUS, Professor of Comparative Anatomy, Leipzig, and WILLIAM ENGELMANN. Leipzig: ENGELMANN. London: WILLIAMS & NORGATE. 2 vols. Price 30s.

DIE SCHMETTERLINGE DEUTSCHLANDS UND DER SCHWEIZ, systematisch bearbeitet von H. v. HEINEMANN: nebst analytischen Tabellen zum Bestimmen der Schmetterlinge. Erste Abtheilung: Gross Schmetterlinge. Braunschweig: Druck und Verlag von FRIEDRICH VIEWEG und Sohn. 1859. Price 10s. 6d.

CORRESPONDENZBLATT für Sammler von Insecten, insbesondere von Schmetterlinge. (Edited by DR. HERRICH-SCHAEFFER.) Nos. 13—24. Regensburg: Druck und Verlag von G. J. MANZ.

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CONTENTS.

	PAGE
NEUROPTERA.	
Synopsis of the British Ephemeroïdæ. By Dr. HAGEN ..	1
LEPIDOPTERA.	
Some Remarks on the Species of the Genus Nepticula. By H. VON HEINEMANN, of Brunswick	36
Notes on some of the Genus Eupithecia. By the REV. H. H. CREWE, M.A.	116
New British Species and Captures of Rarities in 1862. By the EDITOR	147
HYMENOPTERA.	
Notes on Hymenoptera. By FREDERICK SMITH	51
COLEOPTERA.	
New British Species, Corrections of Nomenclature, &c., noticed since the publication of the Entomologist's Annual, 1861. By E. C. RYE	65
TRICHOPTERA.	
Notes on British Trichoptera, with Description of a New Species of Rhyacophila. By R. M'LACHLAN, F.L.S. ..	129
Notes on North American Phryganidæ, with especial refer- ence to those contained in the Collection of the British Museum. By R. M'LACHLAN, F.L.S.	155
HEMIPTERA.	
Additions to the Fauna of Great Britain, and Descriptions of two new Species. By JOHN SCOTT	139
ADDRESSES OF ENTOMOLOGISTS	164

EXPLANATION OF PLATE.

- Fig. 1. *Trichonyx sulcicollis*, Reichenbach, see page 110.
2. *Ptinella Proteus*, Matthews, see page 104.
3. *Toxocampa Craccæ*, Wiener Verzeichniss, see page 148.
4. *Trapezonotus distinctus*, Douglas and Scott, see page 145.
5. *Orthostira concinna*, Douglas and Scott, see page 143.
6. *Rhyacophila munda*, M'Lachlan, see page 135.
6*. Upper margin of anal segment of *R. munda*.
6**. Side view of apex of append. of *R. munda*.
7. Upper margin of anal segment of *Rhyacophila obliterata*,
M'Lachlan, see page 134.
7*. Side view of apex of append. of *Rhyacophila obliterata*,
M'Lachlan, see page 134.
8. Pupa of *Micropteryx*, side view; 8*. Front view; 8**. Natural
size, see page 153.
-
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ERRATA.

Page 53, omit the first paragraph about Wasps which relates to 1861,
and read—

Mr. Bold writes me that "Wasps have been very scarce this year;
where they were abundant in Cumberland last season, scarcely one was
to be found when I was there in May, and in the beginning of October
I did not see half-a-dozen."

NEUROPTERA.



SYNOPSIS OF THE BRITISH EPHEMERIDÆ.

BY DR. HAGEN.



EPHEMERIDÆ.

BODY long and narrow; head rather small, but little broader than long; antennæ slender, short, pointed; with two short thicker basal joints and a fine bristle of greater length. Eyes generally large, of very different forms in the two sexes, but always further apart and smaller in the females, in the males sometimes very large, conical and placed near together. The males in two genera have double eyes, in which an upper segment branches off either as in many *Ascalaphi* (*Potamanthus*) through a lateral furrow, or in the form of a turban-like excrescence, which is generally brightly coloured (*Cloëon*). On the flat crown are the small ocelli remote from each other. The maxillary organs are undeveloped and unfit for eating. The prothorax is annular, sometimes very short. The mesothorax is very large, stout and barrel-shaped. The metathorax is small and sometimes ill-developed. Abdomen ten-jointed, long, cylindrical or flattened, generally attenuated towards the apex, beneath the dorsal plate of the last segment are inserted three long, thin, many-jointed, caudal filaments; the middle one is sometimes longer or shorter than the others, and in some genera or even as a sexual character is either entirely or almost entirely wanting. The caudal filaments in the male are always considerably longer than those of the female, often many times longer

than the body. Legs very thin and delicate, femora and tibiæ of nearly equal length; tarsi five-jointed, at the apex with two broad claws differing more or less in form; the first joint of the tarsi is generally very small. The anterior legs of the male are considerably longer than those of the female, sometimes as long as the body. In the males beneath the outer caudal filaments are two four-jointed, rather long anal forceps, between which protrudes the well-developed cleft penis, which differs in shape according to the species. Some of the females have a rounded egg-valve at the antepenultimate abdominal plate, but in others it is wanting, and the eggs appear to be pushed out by the disruption of the abdomen.

Wings four, in one genus only two are present, and the posterior wings are wanting in individual species of other genera. The anterior wings are large and triangular, the costa forming the longest side; the posterior wings are considerably smaller than the anterior wings, often almost quite undeveloped, resembling small scales. Near the costa and almost parallel to it are two simple longitudinal veins, the third is forked more or less, and supplies the entire wing with straight veins running to the margin. Transverse veins, in greater or less number, but never entirely wanting, connect the longitudinal veins and form cells, which are generally quadrangular. The apical half of the marginal field sometimes shows very irregular transverse veins and even rows of double cells.

The colouring of the *Ephemeridæ* is generally rather dull and monotonous. The head and thorax are often glossy. The colours of the abdomen are principally a more or less dark brown or black, yellow or yellowish-red in all shades, the belly sometimes white. The eyes are often very brightly coloured, blood-red, blue, green or yellow. The caudal filaments are generally paler than the body, the joints often

with dark rings. The legs are generally pale, but often the joints are darker; the anterior legs not unfrequently are darker than the others. The wings are generally transparent and hyaline, rarely dull; sometimes yellowish or brownish, or with dark spots; the costa, especially towards the apex, is often darker. The colouring in the sexes is often very different; the females being always the palest and having the abdomen unicolorous, when in the male it is of different colour.

The larvæ have almost the form of the imago, but yet are generally very unlike it; they are elongate-cylindrical or flattened, sometimes anteriorly much expanded. The strongly developed maxillary organs are adapted for carnivorous habits. The head is much larger than in the imago; on the sides of the abdomen are six or seven pairs of branchial tufts or plates; at the apex are three caudal setæ, often feathered. The pupa is only distinguishable by the appressed triangular wing-cases. Pictet's beautiful work gives detailed information on the larvæ, and is the best guide for the student.

The larvæ always live in the water, are very active, powerful and predacious; some genera lurk in holes in the mud at the sides of streams, others swim freely or await their prey under stones.

The pupæ of the *Ephemeridæ* are metamorphosed into the winged sub-imago, which in a short time again casts its skin and appears as the perfect imago. Hence, in this way, the *Ephemeridæ* have one metamorphosis more than other insects, yet some (especially the female of *Palingenia longicauda*) always remain in the sub-imago state, and never cast off the last skin. In the "Stettin Entomologische Zeitung," 1849, p. 365, I have given a detailed description of the mechanism of this last metamorphosis. The circumstance, that thus for each species there are four different winged forms (two for each sex), has much increased the

difficulties of the study of these insects, and impeded the identification of described species. Pictet first rendered the essential service of pointing out the characters by which the sub-imago can be distinguished from the imago; they consist in the dull membrane of the wings, the presence of delicate fringes of hair on the margins of the wings, and the distinct hairs on the caudal filaments. The form of the sub-imago is analogous to that of the imago, but the caudal filaments and legs are shorter. The colouring often differs essentially; that of the body is generally paler, with a greyish tinge, that of the opaque wings is always darker, yellow, grey or even blackish, but not bright.

The duration of the life of an *Ephemera* larva will in general not exceed a year; Swammerdam suspected for the larva of *P. longicauda* a duration of several years. When about to change it appears that the pupa climbs to the surface of the water, and the sub-imago swiftly escapes from the pupa skin; it then flies to some firm object and there changes in a short time (sometimes not till the following day) to the imago state. The name of these creatures indicates their known shortness of life, but this is only correct to a limited extent. Some genera, *Palingenia*, *Cænis*, *Oligoneuria*, appear towards evening, and are gone by morning; their life is but for a few hours. The males appear before the females; copulation takes place immediately whilst on the wing (the male beneath the female), and directly afterwards the eggs are ejected in two clusters into the water. The emission of the eggs takes place with such force that, partly through the disruption of the abdomen, the two ovaries appear to be ejected with their entire contents: at least in *P. virgo* the two oval bags of eggs make this credible. The circumstance that the eggs are not poured out through the oviduct in a continuous stream, but simultaneously in two lumps one on each

side, explains the use or rather the necessity of the double penis, since each side requires to be separately fertilized.

The other genera appear to live longer; especially those females which meet with no opportunity of copulation can live a long while, and Stephens notices a female of *C. dip-terum* which continued alive for three weeks. The imago takes no food, indeed its undeveloped maxillary organs are quite unserviceable; its sole object is the propagation of the species, hence speedy copulation. For the accomplishment of this the males perform in great numbers the well-known dancing flight; only very rarely is there a female in such a swarm, for directly she appears she receives proposals from one of the numerous males, and disappears with her consort immediately from the swarm. Generally the female is found sitting sideways in the grass, and probably requires a longer time to prepare her for her more important mission. The species of the genus *Palingenia*, which, by their appearance in such numbers, like falling snowflakes, have long attracted the attention of observers, are wanting in England. But even the English species of *Cænis* sometimes appear in Prussia in such quantities, that objects near the water, such as tables or windows of houses, are covered an inch thick, and on the Curische-Nehrung they are used to feed the pigs.

The best time for capturing *Ephemeridæ* is evening and night, especially on sultry, thundery days, but yet some species of *Potamanthus* and *Ephemera* are also to be found swarming in the air in great numbers in the morning and at mid-day, but then they are almost all males. The free-swimming larvæ and pupæ are easily netted in the water, and these are not difficult to rear in ordinary aquariums in which water plants are growing. The burrowing larvæ (at least *Eph. vulgata*) are easily found when one presses the net along the side of the steep clay banks of ditches. I

have never tried to rear these; probably it would be rather difficult, since their food in sufficient quantities ought to swim past them, whilst the free-moving larvæ seek their own food.

In collections *Ephemeridæ* can only be imperfectly preserved; when pinned they lose almost entirely their colour and markings, and their delicate abdominal skins change their form very essentially. Neither do they keep well in spirits of wine, their colours then going entirely. I have, however, observed, that on taking great numbers, which in their swarms is often possible, individual specimens will always partially preserve their forms, so that, in this way, one may obtain by degrees approximately good specimens. The alteration in the *Ephemeridæ* after death is naturally one of the main causes of the low state of our knowledge of species. I am of opinion that this evil can only be remedied in one way, namely, by the careful description of living specimens, and by noticing at the same time how the same specimens change after death. But since the males and females are generally very different, and also the imago and sub-imago differ essentially, this renders necessary for each species four, and if we add thereto the dead insects, eight separate descriptions; a work the completion of which will yet require considerable time, since at present we hardly know all the four-winged states of a dozen species, and only possess descriptions of the living insects of single species. Hence here there is rich unexplored field open to investigation!

One will seldom be in doubt as to the genus to which any species should be referred, but to distinguish the species is, on the other hand, a work of considerable difficulty, and the differences which I have mentioned are those which are apparent on the examination of dried cabinet specimens. In the first place, the wings must be examined, the form and

colour of which only varies very little; unfortunately these seldom afford characters easily intelligible, yet the transverse veins in the apical part of the marginal field are not unfrequently very serviceable. The legs and caudal filaments differ in length and colouring, but are rarely so striking as to furnish decided characters for dead specimens. The eyes lose their form and colour almost entirely, the prothorax and head likewise, the thorax loses at least its colour, the abdomen generally loses entirely both form and colour; so that only very few characters are retained by which the species can be recognised. The external sexual organs, that is, the anal forceps and penis of the male, the egg-valve and the last abdominal segment, appear to me in a number of species to furnish differences rather easily recognisable, although these organs likewise lose some of their form in drying. Besides this uncertainty of the characters, there is still an aggravating circumstance to be mentioned. The sub-imago sometimes undergoes a partial metamorphosis after being pinned, and hence specimens actually occur in which the head and thorax, or else only the abdomen and the caudal filaments, are freed from the skin of the sub-imago. In the larger species such a condition is easily perceived, but in the smaller species, which shrink more in drying, attention must be paid to this, in order to avoid mistakes.

At any rate the species of *Ephemeridæ* are considerably more numerous than is generally supposed. I possess about 150 species, and in the collections which I have examined there are many species which I do not possess, so that probably at the present time there are about 250 species in collections. We know comparatively few of the exotic species, but wherever insects have been eagerly collected, a large number of species has turned up, so that we may with certainty calculate that at the present time we only know a

fragment of the existing species. Pictet's beautiful monograph is doubtless the best work we possess on the *Ephemeriidæ*, and is certainly a rich source for the investigator. Considering the scanty materials of 54 species which he possessed, we must not complain that the descriptive portion is frequently insufficient, especially since of 28 species he only had before him one condition.

With respect to the English authors, I do not precisely know what occurs in the older authors, such as Berkenhout, Samouelle, Donovan; but, as far as I remember, it is unimportant. Leach, in the Edinburgh Encyclopædia, 1815, t. ix. p. 1, p. 127, divides these insects into two families, *Baëtidæ* and *Ephemeriidæ*, with two and three caudal filaments. The former contains two genera, *Baëtis* (*bioculatus*) with four, and *Cloëon* (*pallida*) with two wings; the latter one genus, *Ephemera* (*vulgata*).

Curtis, Philos. Magazine, 1834, vol. 4, p. 120, describes very briefly nineteen species; 1 *Ephemera*, 11 *Baëtis*, 4 *Cloëon*, 3 *Brachycerus*. The last-named genus is synonymous with *Cenis* of Stephens. In the second edition of the Guide (1837) he enumerates fifty-six species, viz. 17 *Ephemera*, 7 *Brachycerus*, 22 *Baëtis*, 10 *Cloëon*. In his British Entomology he figures *Ephemera cognata* and *Baëtis dispar* in his usual masterly style. The types I have not examined.

Stephens describes (1835), Illustrations, Mandibulata, vol. 6, p. 55, the fifty species already enumerated in his Catalogue, and figures three of them. His descriptions are very short and unsatisfactory, and, as he observes at p. 62, some of the insects were much injured by damp. The Curtisian types were not compared by him, and six species were only taken from the Curtisian descriptions. Of the sixteen species placed in the genus *Ephemera*, only the two first belong thereto, the remainder to *Potamanthus*, some

even to *Baëtis* and *Cloëon*, although the presence of three caudal filaments is expressly given as the generic character. The genus *Cænis* with seven species is divided by Stephens into two sections, with long or short (*Brachycerus*) caudal filaments. That this character was only sexual seems to have escaped him. *Baëtis* includes eighteen species, of which, however, the eight last with faint venation belong to *Cloëon*. Finally, in *Cloëon* he has eight species.

My comparison of the types has admitted of a considerable reduction of species, but I fear I may thereby have committed mistakes. The investigation of the species is the more difficult, as the types are not labelled according to the Illustrations but according to the Catalogue, and some of them do not agree with the descriptions.

Westwood in his Introduction gives a masterly sketch of the families and their habits. In the Synopsis he enumerates fifty-six species, namely, 6 *Ephemera*, 10 *Leptophlebia* (*Potamanthus*), 23 *Baëtis*, 5 *Brachycerus*, 2 *Cænis*, 10 *Cloëon*. Walker in the British Museum Catalogue describes no new English species.

In working out this synopsis I have carefully compared the species in my collection with the existing descriptions, and have arrived at the conviction that our knowledge (or at any rate mine) of the *Ephemeridæ* is still very defective. Instead of the fifty-six species hitherto recorded as British, I can only make out the trifling number of twenty-five. I am sure that England possesses a considerably greater number of species, and probably on a more careful investigation of the types some of my reductions would be found to be incorrect. My work only represents the state of my knowledge of this remarkable family. I have, however, endeavoured to avoid errors as far as possible, and have therefore, when practicable, always made the descriptions

from English specimens. A number of species, kindly communicated by Mr. Francis Walker, has been of essential aid to me. It is to be hoped that English investigators will soon be incited to fill up the existing gaps.

CÆNIS, Stephens.

(BRACHYCERUS, *Curtis*; OXYCYPHA, *Burmeister*.)

Head short, broad; eyes simple, small, far apart; thorax long and thick; wings large, almost without transverse veins, fringed at the hind margin and at the base; posterior wings wanting. Abdomen short, conical; in the male with small lateral anal forceps; in the female a large oval egg-valve; in the male with three very long caudal filaments, the middle one always the longest; in the female short, feathered near the base, at the tip with a stout tuft of hair (this peculiarity is observable in the sub-imago in both sexes); penis of the male large, double, invertedly triangular; the claws of the tarsi replaced by two large quadrate lobes.

Larva and pupa unknown. I once bred the perfect insect, but unfortunately without having observed the larva. They live in stagnant water which has clayey banks, and probably belong to the tribe of burrowing larvæ. The sub-imago only differs from the imago by the duller colour, shorter legs and caudal filaments, and hairy wings. It appears in multitudes in the middle of summer towards evening, especially on thundery evenings, immediately moults, then copulates and dies in the course of the night. The small yellowish eggs are deposited in two large lumps.

1. *C. MACRURA*, Stephens, *Illust.* p. 60, 1, pl. 29, fig. 1, ♂.

Imago. Head, thorax and base of the antennæ shining dark black-brown; abdomen and the entire underside

dark pitchy-brown; antennal bristle and caudal filaments grey; legs pale-brown; anterior legs grey; wings transparent milky-white; the two costal nervures black-brown, the basal half darkest. The colouring of the female is only a little paler; caudal filaments white, feathered for some distance, the base rather darker.

Length of the body $1\frac{1}{2}$ lines; expansion of the wings $4\frac{3}{4}$ lines; setæ ♂ 7 lines, ♀ $1\frac{1}{2}$ lines.

Habitat near London, in June.

The description is made from a pair communicated to me by Mr. Walker. Stephens says, "filaments faintly dotted with fuscous," which probably only arises from the darker parts of the joints. Probably this is identical with *C. luctuosa*, Burmeister, Pictet; but my specimens from Nice are rather smaller, and show distinctly the black spot at the tarsal joints mentioned by Pictet; this scarcely appears to be represented in the English specimens.

2. *C. HALTERATA*, F.; *C. grisea*, Pict.; *C. chironiformis*, Steph. 62, 6, ♀ imago; Curtis, Phil. Mag. 122, 2.

Imago. Head and thorax shining pale-brown; antennæ grey, the base darker; the antennæ of the female quite dark-grey; mesothorax anteriorly gently sloping; abdomen beneath yellowish, above brown-grey, with indistinct black transverse streaks from the stigma; legs white, the anterior legs greyish; anterior femora of the male dark grey, blackish at the joint, tibiæ and tarsi snow-white, with the tips rather darker; caudal filaments white. Wings hyaline; the two costal nervures black-brown nearly to the apex.

Length of the body ♂ $1\frac{3}{4}$, ♀ $2\frac{3}{4}$ lines; expansion of the wings ♂ $4\frac{1}{4}$, ♀ $5\frac{3}{4}$ lines; setæ ♂ $7\frac{1}{2}$, ♀ $2\frac{1}{2}$ lines.

Sub-imago unknown. The description is made from living specimens from Prussia: the type of Stephens' *C. chironiformis*, has been compared with them and is identical; the specimens of Curtis I have not seen, but the description is not discordant. *C. interrupta*, Stephens, 62, 7, is wanting in Stephens' collection; it is a female, and should probably be referred here.

Habitat London, Bath (Stephens).

A male sub-imago from England probably belongs to this or the preceding species; according to the colouring it agrees with *C. halterata*, yet I received it with the described specimens of *C. macrura*.

3. *C. DIMIDIATA*, Stephens, 61, 2, ♂ imago; *C. pennata*, Stephens, 61, 5, ♀ imago; *C. brevicauda*, Stephens, 61, 3, ♀ sub-imago; ? *C. minima*, Curt. Phil. Mag. 122, 3.

Imago. Head and thorax brown (when alive violet-grey); antennæ white; mesothorax anteriorly steeply sloping; abdomen grey-brown, the terminal half white; caudal filaments white; legs white; the anterior legs grey; wings narrow, hyaline, the costal veins black-brown to near the apex, the basal half darkest.

Length of the body ♂ $1\frac{1}{2}$, ♀ $1\frac{3}{4}$ lines; expansion of the wings ♂ $3\frac{1}{2}$, ♀ 5 lines; setæ, ♂ 6, ♀ $1\frac{3}{4}$ lines.

Sub-imago similar throughout to the imago; the colours duller; the wings dim greyish-white, darker towards the base.

This species is readily distinguished by the white colour of the tip of the abdomen, which occupies 3 or 4 segments, and is strongly contrasted with the dark colour of the base. The description is made from living specimens from Prussia,

which have been compared with the types of the three species mentioned by Stephens. In *C. dimidiata*, Stephens says (head and thorax) "pitchy-black." I have observed differences in the colouring and met with some darker specimens, but never "pitchy-black." Stephens does not mention the dark base of the abdomen. Since his description was made from dead specimens, these two circumstances are not sufficient to prevent our uniting the species. The same remark may be made with regard to *C. pennata*, and although he here mentions a sub-imago, the description of *C. brevicauda* appears to suit very well for the female sub-imago. Curtis's description of *C. minima* is too short to decide on the species; it is very possible it belongs here.

Habitat London, Hertford, in June; Cambridge, Whittlesea Mere, in July.

The circumstance that *C. brevicauda* and *interrupta* are found in the same localities and at the same time does not prove anything for an identity of the species; since *C. halterata* and *dimidiata* fly simultaneously in Prussia in the same localities.

C. Harrisella, Curt. Phil. Mag. 122, 1; Steph. 61, 4; is only made out from Harris's figure, Exposition, pl. 6, f. 3. Harris figures a female sub-imago, which, according to the size given, belongs to *C. halterata*.

The genus *Palingenia*, Burmeister, has simple eyes, four dull wings with numerous transverse veins, three caudal filaments, the middle one very short. The two European species, *P. longicauda* and *virgo*, live in large sluggish streams, whence they seem to be excluded from the English Fauna; moreover both species, by their size, their colouring and their generally abundant occurrence, are so remarkable

that they could hardly have escaped the observation of English naturalists.

EPHEMERA, Linné.

Head moderately broad ; eyes simple, semi-conical, rather large, far apart ; wings four, with numerous transverse veins ; the anal forceps of the male is long and four-jointed ; the penis is double, like a fork ; egg-valve hardly present ; three long caudal filaments of equal length ; the first tarsal joint very short.

Larva long, round ; head two-pointed ; mandibles ensiform, curved upwards. Legs flat, the anterior legs fitted for burrowing, on each side are six tufts of branchiæ.

The larvæ live in the banks of sluggish streams.

1. *E. VULGATA*, Linné ; Stephens, 55, 1.

Imago. Head and thorax shining dark black-brown ; mouth beneath yellow ; antennæ black-brown, the apex of the bristle whitish ; abdomen yellowish-brown, with two black longitudinal streaks on the back, these expand externally at the base of each segment, so as to form a row of triangular spots ; between these streaks are two black longitudinal streaks on each segment ; anal forceps yellowish-brown ; caudal filaments of the same colour, the joints annulated a little darker ; legs yellowish-brown ; femora and tibiæ of the anterior legs black. Wings smoky-brown, with a hyaline spot at the base, transverse veins generally margined with brown ; marginal field of the anterior wings and a broader margin on the posterior wings darker ; in the middle of the anterior wings near the costa are three or four quadrate brown spots, and a single one near the base ; in

the middle of the posterior wings is generally a minute dark spot.

Female similar, but of paler colours; the middle of the head and the middle and sides of the prothorax rusty yellow; abdomen paler; the black streaks remain straight, and do not expand into triangular spots; the colouring of the wings is essentially paler than in the male, and the spots more indistinct.

Length of the body ♂ 7, ♀ $9\frac{1}{2}$ lines; expansion of the wings ♂ 15, ♀ 20 lines; setæ ♂ $15\frac{1}{2}$, ♀ 12 lines.

Sub-imago similar to the imago throughout, only the general colouring has a dull grey tinge, the caudal filaments are black. Stephens rightly observes that the colouring of *E. vulgata* is very variable, the costa and wings especially are more or less dark. Pictet's *E. Danica* should be referred to *E. vulgata*.

This description is made from Prussian specimens which have been compared with the Stephensian types.

Habitat near London, common ("the May Fly").

In comparison with the abundance of the males, one rarely meets with the female; she does not share the mazy dance of the males, but sits solitarily on the grass.

I know also one female English sub-imago of the pale variety which Pictet figures, pl. 7, f. 2, but I am not yet certain whether it should not form a distinct species.

2. *E. DANICA*, Müller; *E. cognata*, Stephens, 56, 2; Curtis, Brit. Entom. fol. 708, ♀ imago; Collinson, Philosoph. Transactions, 1746, pl. 44, p. 363—366, fig.

Imago. Head and antennæ black; mouth beneath yellow; prothorax ferruginous, on each side with a

broad black stripe; mesothorax shining black; abdomen whitish-yellow, dark brown at the base and at the tip; each of the pale segments has on each side a black line on the back and on the belly; anal forceps brown; caudal filaments dark brown, the joints annulated with black; legs yellowish, the joints and tarsi blackish; the anterior legs black-brown; wings as in *E. vulgata*, but generally paler, with the transverse veins margined with darker brown, whence they have a very different appearance.

Female similar; the abdomen yellow above, with a wavy, black, longitudinal streak on each side; the tip of the abdomen yellow, with two thick black central stripes on each segment; the anterior legs and wings are paler than in the male.

Length of the body ♂ 7, ♀ $8\frac{1}{4}$ lines; expansion of the wings ♂ 15, ♀ $20\frac{1}{2}$ lines; setæ ♂ 17, ♀ 12 lines.

Sub-imago similar to the imago, but with the same differences as in *E. vulgata*.

Habitat near London, common.

This description is made from English specimens.

3. *E. GLAUCOPS*, Pictet, Ephem. 132, 3, tab. 8, f. 1—3.

Imago. Pale fawn-colour; prothorax with two lateral brown spots; mesothorax with red streaks; abdomen with black streaks; eyes blue; wings hyaline, with brownish margins, the hind wings rather darker; venation pale brown, the second longitudinal vein darker; spots as in *E. Danica*, but paler; legs yellow; caudal filaments yellow, with black annulations.

The female is paler.

Length of the body ♂ 8, ♀ $7\frac{1}{2}$ lines; expansion of the wings ♂ 14, ♀ 15 lines; setæ ♂ 8, ♀ $6\frac{1}{2}$ lines.

Sub-imago straw-yellow; mesothorax and metathorax with a black stripe on each side, which have between them a rhomboidal spot; wings dull yellowish-grey, with a few dark spots in the middle.

Habitat London.

Stephens probably united this species with *E. vulgata*; I have before me only two English specimens of the sub-imago.

POTAMANTHUS, Stephens.

(EPHEMERA, *Stephens*(partim); BAËTIS, *Stephens*(partim).

Head rather small; eyes of the male double, large, far apart; wings four, unspotted, with numerous fine, transverse veins; males with four-jointed anal forceps; penis double; egg-valve long; three long caudal filaments of equal length; first tarsal joint very short.

Larva short, roundish; maxillary organs and legs slight; on each side are six branchial plates, sometimes with branchial setæ; three long caudal filaments.

The larva swims freely; at least some of them do so, and occurs in stagnant water or sluggish streams.

1. *P. MARGINATUS*, L., Zetterstedt; *Eph. stigma*, Stephens, 56, 3, ♀ imago; *Eph. talcosa*, Stephens, 57, 4, ♀ imago.

Imago. Head and thorax shining black; abdomen dark brown, the posterior segments with pale annulations; caudal filaments brown; legs yellowish-brown; the joints darker; anterior legs black-brown, the tarsi brown. Wings hyaline, the apical half and the costa rather smoky, the apical third of the marginal field brown, with rows of irregular double cells; venation yellowish-brown; anal forceps pale brown.

Female similar to the male, but the anterior wings with very little colouring, the smoky tint being almost entirely wanting; the apex of the marginal field is slightly tinged with brown, the large oval whitish egg-valve extends beyond the anus, and is cleft nearly to its base.

Length of the body ♂ $4\frac{3}{4}$, ♀ 5 lines; expansion of the wings ♂ $10\frac{1}{2}$, ♀ $11\frac{1}{2}$; setæ ♂ 11; ♀ $6\frac{1}{2}$ lines.

Sub-imago. The colouring is black, with a dull grey tint, only the four posterior legs and the anal forceps are pale brown; wings unicolorous, grey, the veins margined, and hence appearing darker; the marginal field of the anterior wings, especially towards the apex, is darker; the posterior wings only a little paler.

Habitat England.

Stephens' descriptions are made from female specimens of unknown locality, my description from Prussian specimens which I have compared with the types, and from an English sub-imago.

Of this species, which is so very common in the north of Europe, one very rarely finds a female amongst the swarms of males. I have bred this species. *P. marginatus*, Pictet, is a distinct species.

2. *P. GEERII*, Pictet; *Eph. dispar*, Stephens, 58, 8, ♂ imago and sub-imago; *Eph. submarginata*, Stephens, 58, 7, ♀ imago.

Imago. Head and thorax shining black; abdomen black-brown at the base and tip; the 3rd to 6th joints pale brown; caudal filaments yellowish, the joints annulated with brownish; anal forceps pale; legs pale brown, femora and tibiæ of the anterior legs

dark brown; wings and venation hyaline, the longitudinal veins of the anterior wings yellowish; apex of the marginal field with some furcate veins.

Female similar to the male, but the abdomen unicolorous brown; the large egg-valve projects beyond the anus, and is divided by a fissure in half its length into two triangular sharp points.

Length of the body ♂ $4\frac{3}{4}$, ♀ 5 lines; expansion of the wings ♂ 10, ♀ $10\frac{1}{2}$ lines; setæ ♂ $7\frac{1}{2}$, ♀ $4\frac{3}{4}$ lines.

Sub-imago blackish-grey; wings grey, the dark margined veins give them a banded and chequered appearance. In the middle of the anterior wings are a few larger white spots, which arise from the absence in those places of transverse veins.

Habitat near London in July, not scarce.

This description is made from Prussian specimens which I have compared with the types; I have English specimens only of the sub-imago.

Pictet's dimensions are not accurate, especially those given for the caudal filaments.

? 3. *P. DILUTUS*, Stephens; *Eph. diluta*, Stephens, 58, 10.

The type is wanting; according to the description I imagine the species must be a female *Potamanthus*, coming near to the preceding in colouring and size; one can hardly hope to indentify the species with certainty.

4. *P. FUSCUS*, Stephens; *Eph. fusca*, Stephens, 58, 9, ♂ imago; Curtis, Phil. Mag. 120, 7; *Eph. rufescens*, Stephens, 59, 12, ♂, ♀ imago; *Eph. rosea*, Stephens, 59, 13, ♂, ♀ imago.

Baëtis obscura, Stephens (= *Eph. rosea*), 65, 9, ♀ imago.

On a comparison of the types I have noted their identity as above; the description is made from English specimens which have not been compared with the types. *P. brunneus*, Pictet, Ephem. 217, 6, tab. 27.

Imago. Head and thorax shining pitchy-black; abdomen brown, the middle segments rather paler in the middle at the base; anal forceps brown; caudal filaments pale, the joints with darker annulations; legs pale-yellow, the anterior legs brown, the femora black. Wings hyaline; the posterior very small; venation very fine, the veins near the costa yellowish, in the apex of the marginal field are six straight, rather darker transverse veins.

Female similar to the male; egg-valve quadrate, a rectangular incision goes more than half the length and makes it two-pointed.

Length of the body ♂ $2\frac{3}{4}$, ♀ 3 lines; expansion of the wings ♂ $6\frac{1}{2}$, ♀ $6\frac{1}{2}$ lines; setæ ♂ $5\frac{1}{2}$, ♀ $4\frac{1}{4}$ lines.

Habitat Hertford in June.

The description of *Ephemera fusca* suits very well. *Eph. rosea* is probably discoloured; *B. obscura* certainly appears to belong here. With reference to *Ephemera rufescens*, comparison should be made with *P. erythrophthalmus*.

5. *P. CINCTUS*, De Geer; Pictet, Ephem. 219, 7, tab. 28; *Eph. dubia*, Stephens, 59, 15 ♂.

Imago. Head and thorax shining black-brown; the upper segment of the eyes red; abdomen snow-white, the first and the three last segments black; anal forceps and caudal filaments white; legs white; femora of the anterior legs and the tips of the tibiæ black-brown; wings hyaline, the posterior very small; vena-

tion very delicate, some straight transverse veins at the apex of the marginal field.

Length of the body ♂ $3\frac{1}{2}$ lines; expansion of the wings ♂ $4\frac{1}{4}$ lines; setæ ♂ $3\frac{1}{2}$ lines.

Habitat near London.

The description is made from English specimens.

6. P. ERYTHROPTHALMUS, Schrank; Pictet, *Ephem.* p. 222, 8, tab. 29 and 30; *Eph. rufescens*, Stephens, 59, 12, ♂, ♀ imago.

Imago. Head and thorax reddish-brown; on the side of the mesothorax is a sort of yellowish stripe; abdomen reddish, the tips of the segments with a darker transverse streak; caudal filaments pale yellow, the joints annulated with brownish-red; penis pale brown, of the form of a narrow oblong plate, the apex with a triangular excision; legs yellowish, the anterior pair darker. Wings hyaline, the marginal veins yellowish; apical field with oblique veins and a row of double cells; the row of cells next the margin much smaller than the others.

Female very similar to the male, but the abdomen unicolorous and darker; egg-valve projecting beyond the anus, large, oval, the apex slightly emarginate.

Length of the body ♂ $3\frac{1}{4}$, ♀ $3\frac{1}{4}$ lines; expansion of the wings ♂ $8\frac{1}{2}$, ♀ 8 lines; setæ ♂ $5\frac{1}{2}$, ♀ $3\frac{1}{4}$ lines.

Sub-imago entirely yellowish-grey; the caudal filaments distinctly annulated with darker; wings unicolorous ashy-grey.

Habitat near London.

Pictet refers Stephens' *Ephemera rufescens* to this species, and probably he is right; when I was examining the Stephenian types, I was not sufficiently acquainted with the dis-

tinguishing characters of *P. erythrophthalmus*, and have probably been in error in referring *E. rufescens* to *P. fuscus*.

The description is made from English specimens, which however I have not compared with the types.

Possibly *B. autumnalis*, Stephens, 67, 17, of which the description is only copied from Curtis, also belongs here; only as a *Baëtis* it should have only two caudal filaments.

BAËTIS, Leach, Stephens.

Head rather long; eyes simple, in the male large, conical, almost confluent; in the female far apart; wings four, the posterior wings hardly one-fourth the size of the anterior wings; venation considerable and distinct; the males with long four-jointed anal forceps; penis furcate, securiform; egg-valve short, broad; two long caudal filaments.

Larva short, flat and broad; mandibles slight; branchial tufts on the side of each segment but the last; caudal filaments fringed. They swim freely or hide under stones in rapid streams.

1. *B. VENOSA*, F.; Pictet, Ephem. 167, 2, tab. 20, 1; *B. dispar*, Stephens, 63, 1, ♂ imago; Curtis, Brit. Ent. fol. 484; *B. venosa*, Stephens, 63, 2, ♀ imago.

Imago. Head and thorax shining chestnut-brown; abdomen yellowish-brown; the tips of the segments with broad dark-brown margins; anal forceps black-brown; caudal filaments very long, brown, at the base black-brown; wings hyaline, yellowish towards the base; costa yellowish, apical half of the wings brown, with irregular double cells in the marginal field; legs pale brown, tarsi darker; anterior legs black-brown. Female of similar colouring, but the

wings paler; egg-valve short, broad, with rounded corners.

Length of the body ♂ $6\frac{1}{2}$, ♀ 7 lines; expansion of the wings ♂ $17\frac{1}{2}$, ♀ $16\frac{1}{2}$; setæ ♂ $22\frac{1}{2}$, ♀ 14 lines.

Sub-imago dull brown-grey; thorax yellowish in the middle; caudal filaments and legs brown-grey; wings grey, the transverse veins generally margined with darker; the marginal field not darker.

The description is made from Prussian specimens, which have been compared with the types of the sub-imago. I have English specimens before me.

Habitat near London; Ambleside, June; scarce.

2. B. LUTEA, Stephens; *Eph. lutea*, Stephens, 57, 5, ♀ imago; *Eph. marginata*, Stephens, 57, 6, ♂ imago.

Imago. Dark luteous; on the hinder part of the head near the eyes is a triangular black spot; the abdominal segments with a dark-brown band at the tips; caudal filaments yellow, the joints annulated with black; anal forceps and legs yellow, the anterior legs hardly darker; wings hyaline; costa pale yellow, with partially darker black-brown transverse veins; apex of the marginal field with straight transverse veins; penis double, straight, cylindric, the apex cup-shaped.

Female similarly coloured throughout, but paler; egg-valve oval; ventral plate of the last segment incised in the middle.

Length of the body ♂ $3\frac{1}{2}$, ♀ 4 lines; expansion of the wings ♂ $11\frac{1}{4}$, ♀ 14 lines; setæ ♂ 14, ♀ $8\frac{1}{2}$ lines.

Sub-imago coloured quite similarly to the imago, but duller, with a greyish tinge; easily recognised by the black-brown transverse veins of the costa.

Habitat near London, in June.

The description is made from an English male, and from Prussian specimens which I have compared with the types.

Stephens' description of *E. lutea* suits the female well, but the length of the caudal filaments is somewhat too little.

I have referred Stephens' *E. marginata* as the male; but he describes the head and thorax as too dark, viz. "black," and the caudal filaments as short as those of the female. A further comparison of these types would solve these doubts. From a comparison of the types it would also appear that the male of *B. costalis*, Stephens, should be referred to *B. lutea*.

3. *B. LONGICAUDA*, Stephens, 63, 3, ♂; ♀ imago.

B. subfusca, Stephens, 64, 5, ♀ imago; *B. costalis*, Curtis, Phil. Mag. 120, 7; Stephens, 64, 4, only ♀ (the ♂ belongs to *B. lutea*); *B. cerea*, Pictet, Ephem. 183, 10, tab. 23, f. 2; ♀ imago.

Imago. Ochreous-yellow, on the hind part of the head is a black streak on each side near the eyes; thorax shining; the joints of the abdominal segments darker; caudal filaments pale, the joints annulated with black; legs yellow, the anterior a little darker; tips of the femora brown. Wings hyaline, costa yellow with strongly marked black transverse veins; apex of the marginal field with straight transverse veins; egg-valve rounded, ventral plate of the last segment circular, not incised.

Length of the body ♀ $5\frac{1}{2}$ lines; expansion of the wings ♀ 18 lines; setæ ♀ $12\frac{1}{4}$ lines.

Habitat Hertford, in June.

The description is made from a solitary English female, which, however, has not been compared with the types. *B. cerea* of Pictet doubtless belongs here; the black streak on the hind part of the head, which is not mentioned in the

description, is represented in the figure. The description of *B. longicauda*, Stephens, suits very well, the length of the caudal filaments indicates the male; *B. subfusca* of Stephens indicates a smaller and darker female. Of *B. costalis*, according to my observations, the female only belongs to *B. longicauda*.

This species comes very close to the preceding in form and colouring.

Probably *B. mellea*, Curtis, Phil. Mag. 121, 5, should be referred here as the sub-imago. But where the allied sub-imago *B. straminea*, Curtis, 121, 5 a, should be referred, I cannot say.

4. *B. ELEGANS*, Stephens, 64, 6, ♂ sub-imago, ♀ imago; Curtis, Phil. Mag. 120, 6.

The female in my collection, which, after a comparison of the types I had labelled *B. elegans*, I am not now able to separate from *B. lutea*. But as, according to my notes, *B. elegans* is a distinct species, I can only here quote the description of Stephens.

“Bright ochreous-yellow; abdomen palish-chesnut; filaments pale, the tips of the joints fuscous; legs very pale ochreous; the tarsi with the apex of each joint blackish; wings iridescent, pale ochreous-yellow; costa darker, especially towards the apex, forming a stigmoid spot.”

Length of the body $4\frac{1}{2}$ lines; expansion of the wings $13\frac{1}{2}$ lines; setæ 8 lines.

Habitat near London.

Probably *B. flavescens*, Curtis, Phil. Mag. 121, 8, should be referred here as the sub-imago.

5. *B. SEMICOLORATA*, Curtis, Phil. Mag. 121, 9; Stephens, 64, 7; Pictet, Ephem. 178, 7, tab. 22, f. 4—9.

Imago. Shining yellowish-brown; the tips of the abdominal segments with a brown stripe; caudal filaments pale, the joints rather darker; anal forceps pale; penis divided, cylindrical, the apex cup-shaped; legs brownish-yellow; the tip of the femora and the tarsi darker, the femora of the anterior legs internally darker; wings hyaline, the basal half yellowish, the apex of the marginal field with straight transverse veins.

The female similar to the male, but the wings destitute of yellow; egg-valve rounded; the last ventral segment oval, with the apex excised.

Length of the body ♂ $3\frac{1}{2}$ —4, ♀ $3\frac{1}{2}$ lines; expansion of the wings ♂ $9\frac{1}{2}$ — $10\frac{1}{2}$, ♀ 10 lines; setæ ♂ $10\frac{1}{2}$, ♀ $5\frac{1}{2}$ lines.

Sub-imago pale yellowish-grey; wings very pale yellowish.

Habitat near London.

The description is made from English specimens, but they have not been compared with the types. The larger males have the base of the wings less yellow, but otherwise appear identical.

6. *B. MONTANA*, Pictet? Ephem. 172, 4, tab. 20, f. 3.

Imago. Head and thorax shining pale-brown; abdomen yellow; tips of the segments with brown stripes, which laterally expand into triangles; the last joint unicolorous yellow; caudal filaments pale brown, the joints scarcely darker, the base dark brown; anal forceps brown; the cleft penis, of which, however, the

halves keep close together, is much expanded at the tip, and almost T-shaped; legs yellow; tarsi brown; anterior legs dark brown; wings hyaline, with brown transverse veins; costa pale yellow, with the apical half brownish; the apex of the marginal field with oblique, irregular, partially double cells.

Female similar to the male; the unicolorous abdomen darker; the costa of the wings paler; ventral plate of the last segment oval.

Length of the body ♂ $4\frac{1}{4}$, ♀ $4\frac{1}{4}$ lines; expansion of the wings ♂ $10\frac{1}{2}$, ♀ $11\frac{1}{2}$ lines; setæ ♂ 12, ♀ 7 lines.

Habitat England.

The description is made from English specimens. I have not seen Pictet's type, but the identity appears probable. Stephens' description of *B. elegans* suits for this species: perhaps it should be referred here.

7. *B. OBSCURA*, Pictet? Ephem. 182, 9, tab. 23, fig. 1.

Imago. Head and thorax shining-black; abdomen brown, the tips of the segments darker; caudal filaments dark fawn-colour, the joints annulated with darker near the base; anal forceps brown; penis divided (but not very perceptibly); legs brownish; wings hyaline; venation pale brown; the apical part of the marginal field with straight veins; costa very pale yellowish. Female with the abdomen unicolorous pale brown.

Length of the body ♂ $3\frac{1}{2}$, ♀ $3\frac{1}{2}$ lines; expansion of the wings ♂ 9, ♀ $10\frac{1}{2}$ lines; setæ ♂ 7, ♀ 6 lines.

Habitat England, Ambleside.

The description is made from English specimens; Pictet's type I do not know. The *B. obscura* of Stephens, which

Pictet refers here, is a *Potamanthus*. Probably a sub-imago should be referred here which has the head and thorax yellowish, the abdomen brown and the wings ashy grey.

B. carnea, Curtis, Phil. Mag. 121, 9 a, the description of which is quoted by Stephens (65, 10) may probably belong here.

8. *B. LATERALIS*, Curtis, Phil. Mag. 121, 8 a, the description of which is repeated by Stephens, 65, 8, I cannot make out. According to my notes the male and female of a distinct species are in the Stephensian collection. But since Stephens quotes his *B. phæopa* as a synonym, and a specimen in my collection which on comparison with the types I had labelled *B. phæopa* is a sub-imago of *Cloëon*, I am unable to give any satisfactory explanation with regard to *B. lateralis*.

CLOËON, Leach, Stephens, Curtis.

(CLOË, *Burmeister*.)

Head small; eyes of the male double, the upper half turban-like; wings four, the posterior very small (in *C. dipterum* entirely wanting); venation very delicate; transverse veins few in number, generally only two rows in the middle of the anterior wings; male with powerful, three-jointed anal forceps; penis broad, deeply cleft; egg-valve divided; two long caudal filaments and a scarcely perceptible rudiment of the middle one.

Larva narrow, rounded; mandibles slight; seven pairs of small lateral branchial plates; caudal filaments fringed. The larvæ live as free swimmers.

1. *C. DIPTERUM*, Linné ; Pictet, *Ephem.* 266, 11, tab. 42 ;
C. dipterum, Stephens, 68, 1, ♀ imago and sub-
 imago ; *Eph. helvipes*, Stephens, 59, 14, ♀ imago ;
Eph. apicalis, Stephens, 59, 11, ♂ imago ; *Baëtis*
culiciformis, Stephens, 66, 14, ♂ imago.

Imago. Head and thorax black-brown ; eyes black, the turban-like part red ; abdomen pale fawn-colour ; the four last segments brown ; anal forceps white ; caudal filaments white, the joints and a slender ring in the middle of the joints blackish ; legs yellowish ; wings hyaline ; venation fine, whitish ; in the apical portion of the marginal field are some straight transverse veins ; posterior wings wanting. Female very different from the male, reddish-yellow ; eyes blue ; on the crown and prothorax are two small reddish streaks ; abdomen with a brown raised spot on the side of each segment and a dot in the middle ; egg-valve with oval tip, entirely cleft ; legs yellowish ; before the tip of the anterior femora is a red spot ; wings hyaline, the costa to a little beyond the second marginal vein yellowish-brown, marbled with white spots.

Length of the body ♂ 3, ♀ $2\frac{3}{4}$ — $3\frac{1}{4}$ lines ; expansion of the wings ♂ $8\frac{1}{2}$, ♀ $7\frac{1}{2}$ — $10\frac{1}{2}$ lines ; setæ ♂ 9, ♀ $6\frac{1}{2}$ lines.

Sub-imago ♂. Eyes black ; turban orange ; head and thorax dull brown-grey ; metathorax pale brown ; abdomen grey, the points and sides, together with the last segment and the underside, paler ; anal forceps grey ; caudal filaments grey, the joints darker ; legs dull yellow, the tip of the femora and tarsi darker ; anterior legs greyish-yellow, the femora above and the tarsi darker ; wings ashy-grey.

Sub-imago ♀. Similar to the imago, the spots obsolete; wings unicolorous grey, the costa brown, spotted with white, but duller than in the imago. The pupa is distinguished by its black wing-cases, and swims very nimbly. The 2nd—6th abdominal segments have on each side above a pale spot behind a dark dot, and in the middle of the base is a small yellowish triangle; on each side are seven pair of branchial plates, but none on the three last segments; the seventh branchial plate is single, the others are double; caudal filaments pale, with the base of the joints annulated with dark to the middle; exactly in the middle is a long joint quite dark, with three slender pale rings; then follow some joints which are quite pale, the remainder is dark; up to the end of the white part they are fringed with double rows of long hairs, which are white on the white joints, and almost blackish on the darker joints.

Length of the body $3\frac{1}{2}$; setæ $2\frac{3}{4}$ lines.

This description is made from English and from Prussian specimens, which have been compared with the type; I reared the insect from the larva (which is still undescribed) and from the pupa.

Habitat common near London, end of May.

Stephens' *C. dipterum* decidedly belongs here; *Eph. apicalis* is the male according to a specimen which I had labelled after comparing it with the type; but the description says of the caudal filaments they are unicolorous; according to my notes *Eph. helvipes* (which from the description was probably a bleached specimen) should be the female. *B. culiciformis* also, according to my notes, is only the male of *C. dipterum*. Although this species varies considerably in

size and colouring, a further accurate investigation should be made in order to confirm my conclusions.

Synonyms for the imago are *C. dipterum* and *C. mar-moratum*, Curtis, Phil. Mag. 121, 1; and for the sub-imago, according to the conjecture of Curtis, *C. obscurum*, 121, 2.

2. *C. RHODANI*, Pictet, Ephem. 248, 2, tab. 37—39; *B. horaria*, Stephens, 66, 15, ♂ imago; *B. verna*, Stephens, 66, 16, ♀ imago; *B. cingulata*, Stephens, 67, 18, ♂ imago; *C. ochraceum*, Stephens, 68, 2, ♀ imago; *B. vernus*, Curtis, Phil. Mag. 121, 11a.

Imago. Head and thorax shining black; the turban of the eyes red; abdomen pale brown, the tip darker; caudal filaments pale brown, with darker annulations; legs yellowish-brown, anterior legs dark brown; anal forceps pale, the thick basal joint brownish; penis short, not visible externally; wings hyaline; costa pale yellow, darker towards the apex; apex of the marginal field with numerous, irregular oblique transverse veins, which are only here and there united to form double cells.

Females similar to the male; abdomen entirely dark brown; the paler caudal filaments more distinctly annulated; ventral plate of the last segment two-pointed and deeply incised.

Length of the body ♂ 3, ♀ 3½ lines; expansion of the wings ♂ 9, ♀ 9 lines; setæ ♂ 9, ♀ 6 lines.

Sub-imago of both sexes unicolorous grey-brown; caudal filaments unicolorous brown; wings grey, costa rather darker, brownish.

Habitat near London, Hertford; May to July.

The description is made from English specimens; their identity with *C. Rhodani* appears to me very probable, but

I have not compared the types; however the dimensions given by Pictet in his description do not agree with the measurements in his figure. On examining the Stephensian types I noted that the four species above cited were identical, but I have no specimen before me which has been compared with the types. There is nothing in the descriptions which militates against their being referred here, but a further investigation is necessary in order to render my opinion certain. In order, therefore, to avoid mistakes, I have placed none of the Stephensian names foremost. A Prussian specimen which, after comparison with the Stephensian types, I had labelled *B. phæopa*, Stephens, is the sub-imago of *C. Rhodani*. Stephens himself refers this species to *B. lateralis* (Illust. 65, 8). The description, however, appears to refer to a sub-imago, but I cannot say with certainty of what species.

3. *C. DIMIDIATUM*, Curtis, Phil. Mag. 121, 6; Steph. 69, 7, ♂ imago; *C. cognatum*, Stephens, 69, 6, ♂ imago; *C. virgo*, Stephens, 70, 7 (partim) ♂ imago. Imago. Head and thorax shining chestnut-brown; abdomen clay-coloured, the tip brownish; the tips of the segments annulated with brown; caudal filaments pale yellow, the joints annulated with brown; anal forceps thin, cylindrical, pale brownish; penis small (apparently cylindrical and double); legs pale yellow, the anterior legs brownish; wings hyaline; venation yellowish; apical portion of the marginal field with some oblique veins; and closer to the marginal veins are some irregular transverse veins, which form smaller double cells. In the specimens which I take for the female of this, the abdomen is throughout of paler colouring; the wings and venation are as in

the male; but the caudal filaments are unicolorous pale, which makes their identity a little doubtful.

Length of the body ♂ $2\frac{1}{2}$ lines; expansion of the wings ♂ $6\frac{1}{2}$ lines; setæ ♂ 6 lines.

I consider as the sub-imago of this species some specimens which are of the same size and form of wing, but they are throughout of a dirty yellow, the caudal filaments with darker annulations; wings dull yellowish-grey, with the costa little darker.

Habitat near London, in June.

The description is made from English specimens, which have not been compared with the types. I noted that *C. cognatum*, *dimidiatum* and *virgo* (partim) were identical. The description of *C. cognatum* agrees, but the short caudal filaments indicate females, whereas the types are males. The yellow spot on the side of the prothorax in *C. dimidiatum* I could not perceive, but the specimens are much shrunk. According to the description of *C. virgo* it should have unicolorous caudal filaments, otherwise there is nothing against its identity.

Of this species I have only seen English specimens.

4. *C. PUMILUM*, Burmeister, Pictet, Ephem. 253, 4, tab. 40, fig. 2; *Baëtis bioculata*, Stephens, 65, 12, ♂ imago; *B. fuscata*, Stephens, 66, 13, ♂ imago.

Imago. Head and thorax shining dark brown; abdomen white, the tip brown; caudal filaments white; anal forceps white, with the base broad; legs white, tip of the femora darker; wings hyaline, venation delicate and pale; apex of the marginal field with a few straight transverse veins.

Female similar to the male throughout; only the abdomen is unicolorous black-brown above and pale beneath.

Length of the body $1\frac{1}{2}$ —2 lines; expansion of the wings 6 lines; setæ ♂ $3\frac{1}{2}$, ♀ $2\frac{1}{2}$ lines.

Sub-imago dirty yellowish-grey, with the tip of the abdomen darker in the male; caudal filaments grey; legs yellowish; wings dull grey.

Habitat near London; June.

The description is made from Prussian specimens, which I had labelled according to the types, and from English specimens. The description does not appear to refute the identity of the species of Stephens.

5. *C. BIOCULATUM*, Linné; Pictet, *Ephem.* 244, 1, tab. 34, 35; *C. albipenne*, Stephens, 69, 4, ♂ imago; *C. unicolore*, Stephens, 69, 5, ♀ imago; *C. hyalinatum*, Stephens, 68, 3, ♀ imago.

Imago. Head and thorax shining fawn-colour; turban of the eyes red; abdomen snowy-white, the three last segments yellowish-brown; caudal filaments white; anal forceps pale yellow, the basal joints very broad; legs white, the anterior yellowish; wings hyaline, the longitudinal veins pale yellow; the apical part of the marginal field with some wavy transverse veins, between which are the rudiments of other veins, still more irregular; posterior wings very small.

Female unicolorous, yellow; the tips of the abdominal segments brownish; caudal filaments white.

Length of the body ♂ $2\frac{3}{4}$, ♀ $2\frac{3}{4}$ lines; expansion of the wings ♂ 7, ♀ $7\frac{1}{2}$ lines; setæ ♂ $4\frac{1}{2}$, ♀ $2\frac{3}{4}$ lines.

Sub-imago unicolorous yellowish-grey; the dull wings yellowish-grey, paler in the female.

Habitat near London.

The description is made from English specimens and from Prussian specimens which have been compared with the types.

On investigating the Stephensian types I referred *C. albipenne* to the male, though the "nigrum" of the thorax does not agree; *C. unicolore*, Stephens, agrees for the female, as also does *C. hyalinatum*. According to my notes the female is also placed amongst *C. virgo*, Stephens (70, 8). The type of *B. striata*, Stephens, 65, 11, should also be the female of a *Cloëon*, but I cannot express any further opinion. The description, however, most decidedly indicates a male, and that of a species very near to *C. bioculatum*, if it be not identical; *B. autumnalis*, Curtis, Phil. Mag. 121, 11 b, of which the description is quoted by Stephens (67, 17) might perhaps be referred here.

I have before me some few sub-imagines of *Cloëon*, which I cannot refer to any of the above five species described. But it appears to me it would be unwise to construct from them new species before the imago is known.

P.S.—Whilst correcting the proof sheets I learn with regret that the first investigator of British Ephemera, JOHN CURTIS, is no more. The unsurpassable accuracy and like-life execution of his drawings will always secure for him a high rank in science. The examination of details, to which Entomology owes its greatest progress, was practised by him in a comprehensive degree, and to some extent thoroughly. As in the case of his great predecessor, Savigny, his eyes too truly used refused their further services, for Isis allows us not to glance behind her veil with impunity! It is to be hoped that his Collection, like that of Stephens, will be preserved for the purposes of science. To English Naturalists its loss would be irretrievable.

H. A. H.

LEPIDOPTERA.

SOME REMARKS ON THE SPECIES OF THE
GENUS NEPTICULA.

BY H. VON HEINEMANN, OF BRUNSWICK.

[Translated from the Wiener Entomologische Monatschrift, 1862,
August, Vol. 6, pp. 237 et seq.]

THE increase of our knowledge of the species of the genus *Nepticula* has of late been so great, especially since we have learnt to rear these insects, that every year still brings to light new species.

The good fortune of rearing several new species has also fallen to myself and my friend Buchheister of Wolfenbüttel, both of us having begun to rear these insects since the autumn of 1860; and I believe that the publication of these novelties, and also of some observations which have occurred in rearing these creatures in some abundance, will not be without interest.

In reference to the introductory portion of Frey's revision I make the following remark. There can be no doubt that a number of the *Nepticulæ* have only one brood a year, although by far the greater number appear twice a year. Amongst the single-brooded species may be enumerated, according to my experience, *Angulifasciella*, *Rubivora*, *Wocke*, *Agrimoniella* and *Weaveri*, the last named at any rate on the Upper Harz, where I found both larvæ and pupæ in the middle of June. One other species, of which

the larvæ were plentiful there in the middle of July, in the leaves of *Sorbus aucuparia*, will also be only single-brooded there, since in autumn the pupæ still contained the well developed living imago.

In spite of the most careful search last summer for *Oxyacanthella* in the hawthorn hedges, where the larvæ had been extremely plentiful the previous autumn, I could not find a single mine, although Stainton says expressly that it is double-brooded.

With regard to the duration of the larval state, this is extremely short, especially in the summer brood, yet possibly the different species vary also in this respect. In the summer brood of *Malella*, Buchheister noticed that on a young apple tree frequented by these larvæ, after he had very carefully removed from individual twigs every mined leaf, in thirty-six hours he already found empty mines, and I have noticed similar occurrences with *Plagicolella*. On the other hand, of the autumnal brood of *Plagicolella* I have had larvæ still in the mine for five or six days after the last moulting, and the same has happened with larvæ of *Splendidissimella*, *Rubivora*, *Angulifasciella*, *Ruficapitella* and others.

The larvæ of *Aceris* must have a very short duration of life even in autumn, for though the mines are not scarce on some maple trees and maple bushes of our promenades here, neither in summer nor autumn have I yet succeeded in finding a mine still tenanted, although I have searched the said trees and bushes almost daily, or at any rate on alternate days.

That the *Nepticula* larvæ moult is already noticed in Herrich-Schäffer's Correspondenzblatt, II. p. 174.* I have observed the moulting in *Ruficapitella*, *Anomalella*, *Splen-*

[* A translation of this notice is given in the "Weekly Entomologist," No. 10, p. 76.—Ed. E. A.]

didissima, *Prunetorum*, *Plagicolella*, *Angulifasciella*, *Rubivora*, *Myrtillella* and *Trimaculella*, and have found that this always takes place where the mine, which at first forms a very fine, hardly perceptible track, expands and assumes the later form which characterizes the mine. Thus the larva of *Plagicolella* moults at the place where the mine expands into a spot, and on the other hand the larva of *Prunetorum*, the mine of which at first forms a closely-wound spiral line, moults exactly at the spot where the mine removes from the so-formed blotch. In general, also, the excremental track is altered after moulting, and becomes broader or looser, or is deposited in curved, transverse lines. The moulting takes place thus:—The old skin cracks at the head, and the larva, continuing to eat its way forward, gradually creeps out of the old skin.

In larvæ in the act of moulting of *Splendidissimella*, *Angulifasciella*, *Rubivora*, and, if I am not mistaken, of *Trimaculella*, I was astonished by an extraordinary marking, which the larvæ had neither before nor afterwards. The colour itself was dirty-yellow; and on the back was a row of oblique quadrangular dark spots, which gave the larva the appearance as though it were decayed and spotted, although the regularity of the markings startled me. As the larva then gradually crept out of its old skin, these spots remained in their place, and the pale green or pale yellow larva, which had assumed a fresh colour, no longer showed any trace of them. More frequently the spots moved, as well as the old head, a short distance forward with the larva, but the row did not always remain complete, and no longer so decidedly along the back of the larva; but as this in eating turned to the side and so took up a curved position, the green dorsal line in *Angulifasciella* and *Rubivora* was perceptibly at the side of the row of spots. Afterwards the spots became lost in the excremental track. Hence it

appears that the larva assumes these spots during the moulting, that these are on the old skin which it is on the point of casting off, and that in the narrow mine of the larva the old skin is drawn forward for a short distance.

In real truth I have only observed one moulting, but I believe that there are at least two. For if we examine a mine attentively, we shall notice, unless the commencement has been covered over by a later portion of the same mine, three different degrees of development. Thus, in a mine of *Ruficapitella*, we see at the commencement a very fine, continuous, excremental line, hardly pale-margined at the sides; in the next stage the excremental line is broader and often interrupted, but still it always forms a dense mass, and on each side of it a distinct, though narrow, light space is perceptible; in the third stage the mine expands, the excrement is thinner and more scattered, and only occupies the middle of the mine, leaving a considerable empty space on each side. The same thing seems to occur in all mines, but the proportions are not always easily perceptible.

With regard to the distribution of the *Nepticulæ* at considerable altitudes, I will only remark that on the Upper Harz, at 2,800 feet above the sea, I found in June mines of *Weaveri* on *Vaccinium Vitis Idæa*; and in July I found the mines of a species, still unknown, on *Sorbus aucuparia*: the pupæ of the latter unfortunately all died; the imago contained in them had a red head and a silvery fascia. In the same place I met with some specimens of a third species, amongst bushes of *Vaccinium Myrtillus* and *V. uliginosum*, but only caught one specimen in bad condition, which is not *Myrtillella*, but has considerable resemblance with *N. Laponica*, of which I have received a worn specimen from Staudinger.

The descriptions in Stainton's great work, "The Natural

History of the Tineina," are often incomplete, and would cause doubt in many cases, were it not that the larva, mine and food-plant remove all hesitation. Thus, the colour of the cilia of the anterior wings is always given, but the other peculiarities of the cilia are never mentioned. Yet the species may be divided into two great sections by the cilia markings. For instance, one section has the base of the cilia of the anterior wings clothed with broad scales, which are pale at their bases, and dark at their apices, so that the cilia appear to be more or less pale, with dark spots. In general these spots arrange themselves to form several dark lines, intersecting the cilia entirely or partially, especially at the anal angle; the outer line is always the most distinctly and decidedly expressed, and often it is the only one in which the spots unite to form a distinct line. In some few species (*Salicis*, *Floslactella*, *Vimineticola*), this line is not generally distinct, but the dark ends of the scales project irregularly in the cilia; but in all cases the latter beyond such a line or beyond the dark scales, decidedly and abruptly defined, are paler, generally whitish. In the other section it is true that scales project from the base of the cilia, but they are narrow, very little paler at the base than at the apex, and therefore do not form so sharp and conspicuous a line as in most of the species in the other section. And though in these the tips of the cilia are paler, sometimes even whitish, the colour only becomes gradually lighter, and certainly more from the pale lustre of the tips of the cilia, whilst the latter in certain directions are always distinctly grey. I call the above-mentioned line the divisional line of the cilia, or, more shortly, the cilia line. Frey likewise does not mention it, but on the other hand Herrich-Schäffer separates on that account *Turicella* from *Tityrella* (*Basalella*, H.-S.), *Arcuatella*, *Fagella*, *Salicis* and *Floslactella*.

A further character, which must be considered when we divide the species into groups, is furnished by the length of the antennæ. As a rule the antennæ are longer in the male than in the female, and therefore in this respect we must compare males with males and females with females. In a great number of species the antennæ of the males reach above two-thirds or even three-fourths of the length of the anterior wings, in which case the antennæ of the female have rather more than half the length of the wings; in other species the antennæ of the males hardly reach beyond the middle of the costa, and the antennæ of the females are considerably less than half as long as the wings. Some few species stand midway between these sections.

For the discrimination of the species, the cervical tuft* is often of importance; sometimes this is white and then forms with the eye-caps, when the insect is sitting with its antennæ set back, a distinct white collar; in the red and yellow-headed species the cervical tuft is often of the same colour with the frontal tuft, but paler, and frequently it is quite concolorous with the thorax.

In the legs the middle tibiæ are generally strikingly paler than the posterior tibiæ. Often they are quite white, whereas in other species they are nearly as dark as the posterior tibiæ. Thus, for instance *Plagicolella* is easily separated from its nearest allies by the dark middle tibiæ.

Moreover the tibiæ as well as the antennæ seem to be paler or darker according as we turn them to the light, and hence the colouring of these parts in general rarely affords a certain character. In all species the palpi are whitish.

In the following list I have arranged the species known to me in groups, in which I have made use of the ciliary markings, the length of the antennæ, the markings of the anterior wings, the peculiarity of the latter in respect to the

[* A tuft on the middle of the prothorax.—Ed. E. A.]

glossiness and smoothness of the disk, the finer or coarser scaling, as well as the metallic or dull character of the fascia. Those species which are only known to me from descriptions and figures I have introduced, between brackets, in the groups to which they appeared to me to belong. I fancy these groups are rather natural, and find that they almost always include the species which are most closely allied.

I. Cilia of the anterior wings with no dark divisional line, becoming gradually paler towards their tips.

A. Anterior wings with no distinct fascia.

a. Antennæ long.

Pomella, Stainton.

Eneella, mihi.

Ruficapitella, Haworth.

Samiatella, Zeller.

Atricapitella, Haworth.

Nitidella, mihi.

Pygmæella, Haworth.

Basiguttella, mihi.

[*Rhamnella*, Herrich-Schäffer.

Subnitidella, Zeller.]

} Group I.

b. Antennæ short.

Tiliæ, Frey.

Anomalella, Goeze.

Lonicerarum, Frey.

Aucupariæ, Frey.

Minusculella, Herrich-Schäffer.

Oxyacanthella, Stainton.

Desperatella, Frey.

Nylandriella, Herrich-Schäffer.

[*Paradoxa*, Frey.

Viscerella, Stainton.]

} Group II.

B. The anterior wings with a pale fascia.

1. The fascia metallic.

- a. The fascia quite indistinctly margined, very broad; antennæ short.

<i>Aceris</i> , Frey.	}	Group III.
<i>Latifasciella</i> , Herrich-Schäffer.		
<i>Regiella</i> , Herrich-Schäffer.		

- b. The fascia with a decided margin, at least towards the base.

- a Basal half of the anterior wings quite smooth, or partially so, and very metallic.

- * Antennæ long.

<i>Pretiosa</i> , mihi.	}	Group IV.
<i>Æneofasciella</i> , Herrich-Schäffer.		
<i>Fragariella</i> , Heyden.		
<i>Tormentillella</i> , Herrich-Schäffer.		
<i>Splendidissimella</i> , Herrich-Schäffer.		

- * * Antennæ short.

<i>Aurella</i> , Stainton.	}	Group V.
<i>Gratiosella</i> , Stainton.		
<i>Ulmivora</i> , Stainton.		
<i>Prunetorum</i> , Stainton.		
<i>Marginicolella</i> , Stainton.		
<i>Speciosa</i> , Frey.		
[<i>Mespilicola</i> , Frey.		
<i>Ariella</i> , Herrich-Schäffer.		
<i>Acetosæ</i> , Stainton.]		

β Basal half of the anterior wings duller.

* Antennæ short.

<i>Alnetella</i> , Stainton.	}	Group VI.
<i>Dulcella</i> , mihi.		
<i>Continuella</i> , Stainton.		
<i>Centifoliella</i> , Zeller.		
<i>Microtheriella</i> , Stainton.		
<i>Inæqualis</i> , mihi.		
<i>Betulicola</i> , Stainton.		
[<i>Hübneriella</i> , Herrich-Schäffer.]		

** Antennæ long.

<i>Plagicolella</i> , Stainton.	}	Group VII.
<i>Ignobilella</i> , Stainton.		
<i>Poterii</i> , Stainton.		
<i>Distinguenda</i> , mihi.		
<i>Glutinosæ</i> , Stainton.		

2. The fascia not metallic.

a. Antennæ short.

<i>Luteella</i> , Stainton.	Group VIII.
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b. Antennæ long.

<i>Turicella</i> , Herrich-Schäffer.	}	Group IX.
<i>Hemargyrella</i> , Zeller.		
<i>Lapponica</i> , Wocke.		
<i>Argentipedella</i> , Zeller.		

II. Cilia of the anterior wings with a distinct or indicated divisional line, beyond which they are abruptly paler.

A. Anterior wings with a distinct pale fascia, sometimes interrupted, in or beyond the middle. (If the fascia is central, it is very silvery.)

1. Fascia of the anterior wings very metallic.

- a. Anterior wings finely-scaled, the fascia beyond the middle.

<i>Tityrella</i> , Stainton.	}	Group X.
<i>Freyella</i> , Heyden.		
<i>Malella</i> , Stainton.		

- b. Anterior wings coarsely-scaled, the fascia in the middle.

<i>Agrimoniella</i> , Herrich-Schäffer.	}	Group XI.
<i>Atricollis</i> , Stainton.		
<i>Angulifasciella</i> , Stainton.		
<i>Rubivora</i> , Wocke.		
<i>Arcuatella</i> , Herrich-Schäffer.		

2. Fascia not metallic.

- a. The fascia very oblique from the middle of the costa.

<i>Obliquella</i> , mihi.	Group XII.
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- b. The fascia beyond the middle of the costa.

<i>Myrtillella</i> , Stainton.	}	Group XIII.
<i>Salicis</i> , Stainton.		
<i>Carpinella</i> , Heyden.		
<i>Floslactella</i> , Haworth.		
<i>Vimineticola</i> , Frey.		
[<i>Helianthemella</i> , Herrich-Schäffer.]		

- B. The anterior wings with no pale fascia beyond the middle; coarsely scaled. (If the pale opposite spots unite to form an indistinct fascia, this is central and not metallic.)

1. The anterior wings with whitish markings, sometimes indistinct.

a. Antennæ long.

a Anterior wings with only a whitish dorsal spot.

Septembrella, Stainton.

Catharticella, Stainton.

Intimella, Zeller.

} Group XIV.

β Anterior wings with a whitish costal spot, or a whitish fascia, and with one or more other whitish spots.

Weaveri, Stainton.

Turbidella, Zeller.

Sericopeza, Zeller.

[*Decentella*, Herrich-Schäffer.

Quinquella, Bedell.]

} Group XV.

b. Antennæ short.

a Anterior wings with whitish markings at the basal half.

Trimaculella, Haworth.

Assimilella, Zeller.

Subbimaculella, Haworth.

[*Bistrimaculella*, Heyden.]

} Group XVI.

β Anterior wings with two whitish, opposite spots, sometimes united.

Argyropeza, Zeller.

Apicella, Stainton.

[*Headleyella*, Stainton.]

} Group XVII.

2. Anterior wings without markings.

Simplicella, mihi.

[*Cryptella*, Stainton.]

} Group XVIII.

A glance at this arrangement shows, that the above-named cilia-marking almost entirely appertains to the coarsely-scaled species; only with the exception that *Malella*, *Freyella* and *Tityrella* (the former and latter of which were correctly referred by Frey to the finely-scaled species) have also a distinct divisional line. But that the character of coarsely or finely scaled is not always a perfectly certain one, follows from this, that Herrich-Schäffer and Frey include *Turicella* among the coarsely-scaled species, and the first named writer also includes *Argentipedella* and *Basalella*, and Frey on the other hand has placed *Arcuatella* amongst the finely-scaled species. The character of the cilia-markings, on the contrary, separates the species sharply, and places the former species, without any doubt, in the right groups.

I have examined the venation in more than twenty species, and have, on the whole, confirmed the statements of Herrich-Schäffer, as also those of Zeller and Frey; those of the two latter with this restriction, that Zeller had before him the more complicated, Frey the more simple form. As already noticed by Herrich-Schäffer, there are two forms in the anterior wings, of which, however, one may easily be derived from the other, and, moreover, they are connected by an intermediate form. In the more complicated form the sub-costal and sub-dorsal veins are present; both are forked between one-third and one-fourth of the length of the wing, and the anterior branch of the sub-dorsal vein, and the posterior branch of the sub-costal vein, intersect soon afterwards, and the latter runs into the costa parallel to the anterior branch of the sub-costal vein; on the other hand the posterior branch of the sub-costal vein, as it turns first towards the inner margin, and then towards the costa, runs into the last named, after first emitting a branch to the inner margin, and then parallel to this a branch to the apex, or to the costa

just before the apex. By the intersection of the branches of the two main veins, a short middle cell is formed, included by the two main veins, and their converging branches to the spot where the latter meet. The anterior branch of the sub-costal vein runs in a straight direction to about the middle of the costa; the posterior branch of the sub-dorsal vein first runs obliquely towards the inner margin, curves beyond the middle of the wing towards the apex, and terminates quite close to the branch of the sub-costal vein, which runs to the inner margin or even unites with it. The dorsal vein runs obliquely towards the inner margin, is then curved forwards, and beyond is parallel to the inner margin; beyond the middle of the wing it approaches the posterior branch of the sub-dorsal vein, and often runs into it quite in the same way as the latter runs into the posterior branch of the sub-dorsal vein.

According to my observations this form occurs in *Anguliferella*, *Agrimonia*, *Argentipedella*, *Argyropeza*, *Turbidella*, *Subbimaculella* and *Simplicella*. The venation differs in *Tityrella* and *Weaveri* thus,—the posterior branch of the sub-dorsal vein is wanting, and this, therefore, runs quite simple from the base to the costa, intersecting the posterior branch of the sub-costal vein soon after the forking of the latter; and hence the dorsal vein remains separate and further removed from the branches of the two main veins, and terminates in or near the inner margin at about three-fourths of the length of the wing. In the other species which I have examined, viz., *Tilia*, *Anomalella*, *Regiella*, *Gratiosella*, *Splendidissimella*, *Plagicolella*, *Betulicola*, *Mulella* and *Septembrella*, the sub-dorsal vein is entirely wanting. It is true it occurs in *Ruficapitella*, *Salicis* and *Myrtilli*, but is very fine and short, and it terminates before it reaches the posterior branch of the sub-costal vein; hence in

all these species the cell is wanting. Sometimes the sub-costal vein forks again soon after the first fork, emitting a second branch to the costa, which corresponds to the anterior branch of the sub-dorsal vein in the more complicated form, from the place where it intersects the posterior branch of the sub-costal vein, and then proceeds to the costa. Or in other words, in the more simple form the sub-dorsal vein and its posterior branch is entirely wanting, and the anterior branch is wanting from the fork to the point of intersection of the two intersecting branches of the two veins. Finally, in the more simple form there is also wanting one of the last three branches of the sub-costal vein which terminate near the apex of the wing. The latter is consequently represented as a vein, which first runs parallel to the costa, then turns sharply towards the inner margin, and at the same time sends two parallel branches to the costa; and lastly is again forked before the apex of the wing, emitting two branches towards it. In all the three forms the costal vein is very short and fine, and terminates in the costa near the base, often hardly distinct; the dorsal vein is not furcate towards the base, and not double. What Herrich-Schäffer calls "Rippe 1 b," and Zeller and Frey call the fine upper vein of the fork, is the delicate fold of the wing, which approaches the dorsal vein in the middle and unites with it, but sometimes it remains perceptibly distinct.

The posterior wings have only one medial vein, which forks sooner or later and runs with the two forks to the margins or towards the apex of the wing, besides there is one costal and two dorsal veins.

To the descriptions of new species I have also added the detailed characters of such species as have either not been described at all, or only insufficiently described in German works. The species described are arranged according to
1863.

the groups above indicated. In the first place I give an analytical table of the individual groups, as far as the species are really known to me, or can be arranged from the existing descriptions. I am not unaware of its deficiencies, but am yet of opinion that to some extent it will facilitate the recognition of the species.

[This analytical table I tried in vain to reduce to a practical form, and have, therefore, omitted it altogether.

The descriptions of the species (thirty-three in number) would manifestly occupy too much of our space, and I am, therefore, reluctantly obliged to stop here,—possibly I may succeed in persuading the editor of the *Zoologist* to admit the translations of those descriptions in the pages of his journal.—ED. E. A.]

HYMENOPTERA.



NOTES ON HYMENOPTERA.

BY FREDERICK SMITH.

SINCE the publication of the first Entomological Annual in the year 1855, to which I contributed a few notes, I have been annually requested to furnish a record of such observations as I have made during the season on the order *Hymenoptera*; it has consequently become customary that I should make an annual report.

During the last twenty-five years, no season has offered to me so few opportunities of observing the habits of the *Aculeata*; not that I have been less assiduous in my researches, or have had less time at my disposal for that purpose, but that these insects have become so diminished in numbers, that should similar ungenial weather continue to prevail during the next two or three years, it will, probably, become my task to record the almost entire destruction of the tribe.

The almost unprecedented wet season of 1860, in the south of England, proved destructive, I believe, to two-thirds of the *Aculeate Hymenoptera*. The broods of 1861 would of course be expected to appear during the season of 1862, but the cold and continual rains that prevailed, from the first of March to the beginning of June, proved destructive, I fear, to the greater portion of them. I have frequently seen on a single day, during a season of fine genial weather,

as many bees as have fallen under my notice during the entire season of 1862.

HUMBLE BEES.—In the number of the Zoologist for August last, Colonel Newman has given a faithful picture of the effect of the season on the family of the *Bombi*; he tells us of the ineffectual attempts of *Bombus subterraneus* to establish herself, and lay the foundation of her colony; the ground, he says, “was so wet, a few inches deep, that no lodgment was made until the 7th of June, when an inundation of rain washed the poor bee completely out of her nest;” the unfortunate bee was cared for, was rescued and fed for a day, and then set at liberty to resume her task; the bee was again observed at her haunts, another attempt was made to establish herself, but torrents of rain again fell,—the poor bee appeared no more. That the majority of Humble Bees shared a similar fate, cannot be doubted by any one who has observed the scarcity of these insects; I have frequently visited localities during the past season where these insects are usually found in great numbers, but few, if any, were to be found. During an entire month spent in Suffolk, commencing in the middle of August, and terminating in the middle of September, a period of time during which the *Aculeata* are usually abundant, I certainly did not see above fifty insects belonging to this class, although the weather was in every respect suitable for their appearance. In the north of England, the *Bombi* were not more abundant, and the few individuals which I observed, were poor diminutive representatives of their kinds, scarcely more than half the usual size of the species; the latter circumstance is probably attributable to a scanty supply of food in their larval state. Of the moss-building species I have not seen half-a-dozen examples during the season, and Mr. Bold

observes that he has not seen a single specimen of *B. senilis*, *B. fragrans*, *B. sylvarum*, *B. Derhamellus* or *B. Scrimshiranus*. I received a fine series of *B. Smithianus*, from Shetland, collected by Mr. Adam White, this being a moss-building bee.

WASPS.—These insects have appeared in great abundance in some parts of the country; Mr. Perkins, in the Transactions of Tyneside Naturalists Field Club, remarks on their superabundance at Gibside, as also does Mr. Bold, who adds, "*Vespa norvegica* was the predominant species. Their nests might be noticed in especial abundance by the roadsides leading from the railway station to Naworth Castle. The same species had colonized the gardens, using the branches of the goosberry-bushes on which to suspend their nests." The ground wasps were in equal abundance.

It will be remembered that the almost unprecedented wet season of 1860 in the west of England proved so destructive to wasps that during the following season, in many districts, the remark was common, "I did not see a single wasp;" but in Scotland the summer was fine, and wasps abundant. In the course of a few years, what with the increase obtained through the few communities that survived that disastrous season, and the tide of immigration southward, wasps will again be found generally abundant.

I found many nests during September last, in deserted stone-quarries in Yorkshire, particularly such as were situated in elevated situations; I noticed only two species, *Vespa vulgaris* and *Vespa Germanica*; I did not observe a single individual of *V. rufa*, *V. norvegica* or *V. arborea*.

In the situations I have alluded to, wasps are fond of constructing their nests under large stones; these prove, no doubt, a secure shelter from wet, nothing being in my

opinion, more destructive to these insects. Beneath many of the stones I discovered females,—frequently three or four beneath a single stone,—apparently laid up for the winter, all being in a semi-torpid condition. The communities of wasps at this time were evidently gradually breaking up, the majority both of males and females having left the nests; the workers, in most of the nests, were occupied in extracting the remaining grubs from the cells, and conveying them out of the nest to a considerable distance, where they left them to perish; this apparently unnatural proceeding, is found to be probably a work of necessity; or it may be simply a part of the usual economy of the insects. When the males and females arrive at maturity and quit the nest, the great end of the community is accomplished, the perpetuation of the species is secured; additional assistance in the labours of the commonwealth becomes no longer requisite; even the feeding of the brood is no longer necessary, perhaps not even possible; be this as it may, the clearing out of the remaining worker brood is a common occurrence at the latter part of the season.

SOLITARY BEES.—The *Andrenidæ*, speaking according to my own experience of them during the past season, may be said to have become almost extinct; the whole tribe burrow in the ground, and it is such species that have suffered most during the two or three previous unusually wet seasons—that is, wet at the time when these bees appear; if such be the case, and the bees have awoke from their winter torpidity, it is sure to prove very destructive to them. I found, however, for the first time specimens of *Dasyppoda hirtipes* near Lowestoft. Several of the most abundant species, such as are usually observed in numbers in early spring-flowers, I have not seen at all during the past season; in

very favourable situations, no doubt, some have survived, but I fear several years must elapse ere we shall again see them, as in previous seasons, visiting every flower in the early days of spring.

FOSSORES.—The same influences that have reduced the numbers of the solitary bees, have also equally thinned the ranks of the fossorial group of the *Aculeata*; most of the species of the genus *Pompilus* have in consequence become rarities; I have not observed more than three or four species out of twenty that are indigenous. *Pompilus plumbeus* has been tolerably numerous on the slopes of the sandy shores of Suffolk and Norfolk, but it is an insect that usually appears there in countless numbers, it being, according to my experience, the most abundant species of the genus.

TIPHIA FEMORATA also appears in immense hordes along the same line of coast during favourable seasons; their numbers were, however, very greatly diminished last season, and such as were seen were exceedingly small examples—not more than about half the usual size of the species.

ANTS.—We have a love for old books, particularly old natural history books; it is a great treat to us to ponder and meander through the pages of “An Account of English Ants; by the Rev. William Gould, A.M., of Exeter College, Oxon. Printed for A. Millar, opposite Catherine Street in the Strand. MDCCXLVII,” published four years previously to “The Fauna Suecica.” These old books are wells of knowledge, and many an ingenious theory, and startling circumstance, that emanates from the fertile brain, or rewards the patient observation of modern Entomologists, may be fished out of them. As a theoretical instance, the following observations, to be found in Gould’s volume, will recall a subject which a few years ago attracted much attention from

its ingenious originality: "Of the antennæ, it is remarkable that insects whose eyes are very prominent, or extend over great part of their heads, have exceedingly short feelers. As may be seen in many common flies, and other *Papilio's*, especially in the dragon, or, more properly, large hawk-fly. On the contrary, such as have very little eyes, and placed on each side of the head at a distance from one another, have remarkably long antennæ. As may be observed in variety of Scarabs or beetles, in the hawk-grasshopper, *Gryllotalpa*, house-crickets, and several flies. The feelers of many insects seem to lengthen or shorten in a kind of proportion to the largeness and distance of their eyes. Probably, therefore, the feelers rather supply the want of large eyes than the immobility of them."

Every Entomologist has no doubt read the true and circumstantial account of "The Funeral Ant" published in the Proceedings of the Linnean Society; let us see what Gould has to say upon the same subject: "As soon as one of their fraternity dies, it is carried out of the settlement, and thrown upon the ground without ceremony or rites of a funeral. Pliny informs us that the ants of his country are wont to bury their dead, which is a curiosity not imitated in England."

The loyalty of ants to their queen is not exceeded in our day by the most accomplished courtier. "In whatever apartment a queen ant condescends to be present, she commands obedience and respect. An universal gladness spreads itself through the whole cell. They have a peculiar way of skipping, leaping and standing upon their hind legs. These frolicks they make use of both to congratulate and to show their regard for the queen." Gould was a man of observation, and having obtained a large black queen, together with some workers, he placed them in a box, that he might more

conveniently observe their operations. By some misfortune the queen died; "the ants, as if not apprised of her death, continued their obedience. They even removed her from one part of the box to another, and treated her with the same court and formality as if she had been alive. This lasted two months, at the end of which, the cover being open, they forsook the box, and carried her off." "Many" (says Gould) "are the moral instructions arising from the sight of a colony of ants; affection towards the young might teach us to value posterity and promote its happiness. The obedience they pay their queen might read us a lecture on true loyalty and subjection. Their labour shame the lazy part of mankind. From their œconomy we may learn prudence; from their sagacity wisdom."

Ants are found in great numbers on the hilly districts of Yorkshire, particularly those species that belong to the genus *Myrmica*; the nests are most commonly found beneath stones; in such situations I found them in the month of September last. In the places alluded to, nests of three species of the genus *Formica* are of common occurrence,—those of *F. flava*, *F. nigra* and of *F. fusca*. I found many colonies of the latter ant under stones; most of them contained larvæ, or pupæ, but I was surprised to find, that in almost every instance, the pupæ were *naked, not enclosed in cocoons*; precisely as we always find the larvæ of the genus *Myrmica*. One of the most distinctive characteristic differences in the habit of the species of the two genera, and one usually regarded as being constant, is, that *the Formicidæ spin cocoons* when about to change from the larva to the pupa state, whereas the *Myrmicidæ* undergo their metamorphoses *naked*, that is, they *do not spin cocoons*; this is the usual habit of our indigenous ants.

This apparent anomaly is not easily, if it be even possible

to account for it; the brood, when disclosed under stones, are certainly more protected from the influences of weather than when reared in nests constructed in banks, and the necessity for spinning a silken covering, might under such circumstances, appear to be unnecessary; but if this were the case, all the broods thus situated might reasonably be expected to be found unenclosed, but such was not the case; in many instances all the nymphs were enveloped in silken cocoons. When it becomes a well-ascertained fact, that it is the usual habit of a group to undergo their change from the larva to the pupa state enclosed in cocoons, which the larvæ themselves spin previous to such a metamorphosis, may we not reasonably infer that such larvæ must be provided with a secretion expressly adapted to such circumstances? and when, on the contrary, others are known as constantly to change without spinning a cocoon, is it not equally to be inferred, that such larvæ are destitute of such secretion? If this be an allowable inference to draw, our difficulty appears to increase when we attempt to account for the remarkable deviation from the usual economy of *Formica fusca*; it is quite possible, should such a secretion as I have supposed each larva to be provided with, that it may be ejected previously to changing to the nymph state, but still, why some should, and others should not spin cocoons, when apparently placed under similar conditions, remains to be accounted for.

Some years ago I found a brood of *F. fusca* that had constructed their abode in a rotten oak stump; the larvæ and pupæ were contained in chambers excavated immediately beneath the bark; in this case the pupæ were naked. These facts are, in my opinion, well worthy of record, offering, as they do, additional instances of the wonderful and endless variety observable in the operations of nature, and in how admirable a manner we always find these operations adapted

to the circumstances under which they take place; frequently we observe the same ends arrived at by a totally different process of development.

MYRMICA LIPPULA.—This minute ant appears to be a constant resident in the nests of other species, at least in this country; whether it is found invariably in such situations throughout Europe, I am not prepared to say, but I have never found it separated from other ants. Mr. Janson, and also Mr. Shepherd, find it in nests of *Formica fuliginosa*. I have also myself found it in company with the same species, but sparingly. In May last it occurred in some numbers in ants' nests near Highgate, but I have only been successful in taking workers; the only examples I have ever obtained of the other sexes are two females; one was taken on the wing in October, and the other on a Christmas Day, some years ago. I am inclined to believe that *M. lippula* never constructs its own nest, but resides constantly with species of *Formicidæ*; *M. Nylanderi* and *M. muscorum*, I am informed by Dr. Nylander, constantly reside in nests of *Formica rufa*, our common wood-ant.

MYRMICA MOLESTA.—In my former communications to the Annual, I have had frequent occasion to refer to the common house-ant, *Myrmica molesta* of Say, the *Myrmica domestica* of Shuckard. In a paper published in the "Berliner Entomologische Zeitschrift, 1862," Dr. Roger has changed the name, referring the species to the *F. Pharaonis* of Linnæus; he at the same time attempts to prove that our house-ant cannot be the house-ant of North America. In the prefatory remarks to Dr. Roger's paper, I am said to be an author who has a love for giving my own names to the well-established species of older authors; to this charge I at

once plead "not guilty:" let it be our endeavour to examine the nature of the evidence, as produced in the paper in question, without bias, and possibly we may be able to ascertain to whom the charge most truly applies.

It has been the good fortune of Dr. Roger to have a number of the Fabrician type specimens of *Formicidæ* entrusted to him by the authorities of the Copenhagen Museum; the examination of these has enabled him to make known to Hymenopterists, the modern genera to which the species belong; he has also discovered that several of the species have been re-described by myself under specific names of my own. I scarcely think it can be necessary for me to say that this was unavoidable; many of the Fabrician descriptions do not consist of more than a few words, and even the more extended descriptions are frequently of so general a character, that it would baffle Dr. Roger's, or even a Nylander's powers, to discriminate the species with the aid of the descriptions alone. Dr. Roger has conferred a great benefit on science by making known to Hymenopterists, the genera to which we are to refer so many of the Fabrician species, and I am sure every Hymenopterist in Europe will, with myself, accord to him their best thanks; I accept without reservation every correction made through the medium of the Fabrician types; Dr. Roger's knowledge of the *Formicidæ* is too profound to admit of the possibility of any error occurring as regards such species, but I certainly do hesitate to accept, without a careful examination on my own part, the conclusions at which Dr. Roger has arrived as regards those species, for the determination of which, he had the help of descriptions alone.

I have here only to do with one species, the *Myrmica molesta* of Say; I will briefly state my reasons for having adopted this name, in preference to the very characteristic

one given by the eminent Hymenopterist Mr. Shuckard; admitting at the same time, that my inclination would certainly have led me to have adopted the latter; Say described the species in the "Boston Journal of Natural History" for 1834, Shuckard's description will be found in the "Magazine of Natural History" for 1838.

It will naturally be asked what proofs exist of the identity of the insects; the following have guided me in arriving at that conclusion. In the national collection will be found a number of examples of a small *Myrmica* from North America; these were originally gummed irregularly on a large piece of card, with the note "house-ant" written at one corner; they formed part of the fine collection of American insects presented to the Museum by the late Edward Doubleday. Those specimens I carefully compared with British examples of our house-ant, and I have no hesitation in pronouncing them to be identical; I should add, that I examined them under various magnifying powers. I in the next place had recourse to Say's description; this I most carefully studied in connexion with the specimens, and, excepting that the insect is described as being entirely yellow, they agree exactly with the greater number of British examples, in which the apex of the abdomen is more or less fuscous; in some examples, however, it is very slightly, in fact scarcely perceptibly so; every one who has had occasion to work from Say's descriptions will know that a slight discoloration would in all probability be passed over unnoticed; I also observed that some of the American specimens were almost unicolorous. Dr. Roger says that if I had carefully studied Say's description, I should have found that the two terminal joints of the antennæ are of the same length, whereas in *M. Pharaonis* the penultimate joint is only half the length of the terminal one. As I have

stated above, I had read Say's description most carefully, and *I did not find* the two apical joints described as being of the same length; the description is, "the terminal joint *as long again* as the penultimate," exactly as I found it in our own house-ant. After a careful reinvestigation of the subject I am of opinion that the English and American house-ant is one and the same species, and that we shall do right in retaining for the insect the name of *Myrmica molesta*. If the species had not proved to be identical with the American one, I should have preferred to have used Shuckard's name "*domestica*." The *Pharaonis* of Linnæus is described in the following words: "*F. rufa*, abdomine magis fusco;" *F. antiquensis* of Fabricius is given as a synonyme of *Pharaonis*, the only description of which is, "parva, testacea abdomine apice solo nigro," descriptions that present to me an insurmountable difficulty when I attempt to apply them, since I find they will equally well suit half a hundred species.

It must not be supposed for a moment that I charge Dr. Roger with any wilful misrepresentation; certainly not. I will point out the error into which I believe him to have fallen, by an incorrect appreciation of Say's description; the following, "the terminal one as long again as the penultimate," does not mean, as Dr. Roger appears to have understood it, that the terminal one is of the same length, but that it is of twice or double the length; "as long again" has evidently been construed to signify that the terminal joint is (again) of the same length as the penultimate one; thus, it will be found, that all the arguments used to prove my conclusions to be erroneous, confirm their correctness.

I have entered somewhat into detail, but I trust not more so than will be deemed necessary, in order to prove the necessity of a careful investigation of synonyma before giving

full credence to every supposed correction. There has been for some time past a growing tendency, still on the increase, to accept at once, unquestioned, the determinations of foreign Entomologists. Every Entomologist who elicits the truth is a benefactor to science; but truth is to be sought for patiently, it lies deeply hidden, and is not at once to be found on the surface by any one. Do not believe that anyone can intuitively discover it; examine carefully into the correctness of alleged errors, and pause before giving them full credence, until they are confirmed by some one competent to test their accuracy.

Every one is liable to error, even when most sincerely endeavouring to establish truth; and under such circumstances I am convinced my old correspondent Dr. Roger has stumbled. When such an obvious mistake is made, as regards one species, by an eminent Hymenopterist, I certainly think it behoves us all not to be too hasty in jumping at conclusions: Homopterists as well as Hymenopterists are fallible.

PEDICULUS MELITTÆ.—Whilst on a visit to Yorkshire in September last, I captured several solitary wasps belonging to the genus *Odynerus*. I was surprised, at so late a period of the year, to find on most of them specimens of the *Pediculus Melittæ* of Kirby, the *Triungulinus andrenetarum* of Dufour. It is somewhat surprising that no one has yet been able to decide whether these little hexapods are larvæ or perfect insects; judging from analogy, it will undoubtedly be generally believed that they are the larvæ, most probably, of a Coleopterous insect. If such is the case, they must be the larvæ of some very common insect, and one very generally distributed: excepting in colour, they exactly resemble the larvæ of the genus *Melœ*. It has long been known that these animals are not the larvæ of *Melœ violaceus*, *M.*

proscarabeus, or of *M. cicatricosus*; the larvæ of neither of these species, we are informed by Mr. Newport, "ever acquire this darkened colour;" *Pediculus Melittæ* being black, and rather larger than the orange-coloured larvæ of *Melœ*. These little hexapods are of the commonest occurrence on bees and wasps, and so in fact are also the larvæ of *Melœ*; they frequently occur in early spring, in great numbers, in the flowers of the celandine, in buttercups and other flowers. They continue to be found throughout summer, during autumn, and I have found them in the cells of *Anthophora* even in winter; at all periods they are of the same colour and size. Mr. Newport wrote, in 1845, "whether they belong to some other allied genus remains for future investigation;" he felt certain that they did not belong to *Melœ*, and in 1862 we are unable to throw any additional light upon the subject.

The most remarkable discovery that has been made in the *Aculeata* during the past season, is that of an imperfect hermaphrodite example of the hive bee, *Apis mellifica*; it was taken by a bee-keeper in Scotland, and passed into the hands of Mr. T. Woodbury, of Exeter, who liberally presented the specimen to myself; an account of this remarkable bee will be found in the volume of the "Zoologist" for 1862.

An inaccuracy has inadvertently crept into the description, which I will here correct: in describing the parts of the bee that partake of the female characters, it is stated that the sting is straight; this should not have been noticed, since the sting of the queen bee is curved, that of the worker being straight.

ISLINGTON, October 29th, 1862.

COLEOPTERA.



NEW BRITISH SPECIES, CORRECTIONS OF NOMENCLATURE, &C., NOTICED SINCE THE PUBLICATION OF THE ENTOMOLOGIST'S ANNUAL, 1861.

BY E. C. RYE.

HAVING been requested at a short notice to communicate the present article, I must beg a lenient sentence for the mistakes it may probably contain, especially as I was quite unprepared for the task, and have the arrears of two years to notice.

I have adopted Waterhouse's Catalogue as a basis of operations, presuming that it is now used by all Coleopterists of repute; hence, with the exception of species apparently new to science, novelty is merely claimed as regards that work. With reference to this point I must remark that insects have often been recorded as new to Britain, which, on examination, have proved to be merely "old friends with new faces;" consequently a fresh starting-point is necessary, and as Stephens' Manual is out of the question, there remains not only no better, but no other than Waterhouse's Catalogue; to which the words of Flaccus well apply:—

" — si quid novisti rectiùs istis,
" Candidus imperti; si non, his utere mecum."

I have added a few hitherto unrecorded localities and notices of captures of rarities, in the hope that they may be of service to others; and these, together with the large number of species requiring comment, occupy so much space that I am compelled to curtail the hitherto voluminous

1863. F

references to authors, and lists of synonyms; enough, however, is given for practical purposes, and the room saved has, I trust, been made generally useful by giving distinctive characters, as often and as fully as possible. In these latter I have endeavoured to use the words of the original recorders.

1. *BLECHRUS GLABRATUS*, Dufts.; Dej.; Waterhouse Cat. Brit. Col.

This species must be erased from our lists. It was introduced on the supposed authority of the Stephensian collection; I have, however, examined the insects bearing the name *glabratus* in the latter, and can come to no other conclusion than that they are all *Metabletus truncatellus*.

The *Blechrus* found in England so commonly is *maurus*, Sturm; it is smaller than *glabratus*, Dufts., entirely jetty black and shining, with the head smaller and thorax a little more contracted behind; the elytra, moreover, in *glabratus* are even more parallel than in this species. Both Fairmaire and Dawson have considered the two as identical; however this may be, the insect known as *glabratus*, Dufts., appears to belong to Southern Europe.

2. *DYSCHIRIUS ELONGATULUS*, Dawson; Wat. Cat.

Mr. Waterhouse is inclined to believe this is the *D. extensus* of Putzeys (Monographie des Clivina, &c., p. 46, sp. 49); but our insect is not the same as that described by Dr. Schaum in his Ins. Deutschl. under the latter name, as Dr. Schaum has kindly allowed his type specimen to be compared with our British insect.

Examples have recently been taken by the Rev. H. Clark at Deal; the species, however, appears to be as rare on the continent as here.

3. *DYSCHIRIUS ANGUSTATUS*, Ahrens, Faun. Ins. Eur. i. 9;
Putzeys.

jejunus, Daws.; Wat. Cat.

This species, pre-eminently distinguished by its rugose head, is clearly the same as *D. jejunus*, Dawson. Both Dr. Schaum and Mr. Waterhouse have compared a continental specimen of *angustatus* with the two examples in Mr. T. J. Bold's collection (kindly forwarded by him for that purpose), from which the species of Dawson was described.

4. *PATROBUS CLAVIPES*, Thomson, Sk. Coll. 25, 2 (1857);
E. W. Janson, Proc. Ent. Soc. 3 Feb. 1862, Zool.
7911 (1862).

"Taken by the late H. Squire near Lerwick, Shetland, in August, 1858."

This is probably the species brought forward in Ent. Ann. 1859, p. 144, as *P. Lapponicus*, Chaud., but mentioned at the time as requiring further investigation. It has long been separated by Mr. Bold, who sent it to me as distinct, and has been taken by many others in Scotland.

5. *HARPALUS DIFFINIS*, Dejean, Spec. Gen. iv. 196, 4
(1829); E. W. Janson, Proc. Ent. Soc. 3 Feb.
1862, Zool. 7911 (1862).

Taken by Mr. Janson near Croydon.

There appears some difficulty in distinguishing between *diffinis* and *rotundicollis*; the latter, according to Dr. Schaum, seems to have the sides of the thorax more strongly rounded, and the apex of the elytra more distinctly sinuate, appearing also to belong mostly to Southern Europe. There is a specimen in the Madeirensian Coll. at the Brit. Museum, taken by Mr. Wollaston, which differs from our common British species, but exhibits precisely these characters of *rotundicollis* pointed out by Dr. Schaum.

6. *HARPALUS OBSCURUS*, Fab., Ent. Syst. i. 151 (*Carabus*).
monticola, Dej., Sp. iv. 195.
stictus, Steph.; Wat. Cat.

Mr. Waterhouse informs me that the *Ophonus stictus* of Stephens must be referred to this species.

7. *HARPALUS PARALLELUS*, Dejean, Sp. Gen. iv. 219, 25
 (1829); E. W. Janson, Proc. Ent. Soc. 3 Feb. 1862,
 Zool. 7912 (1860).

“Captured by the late H. Squire on the Sussex Coast, February, 1858.”

This may be known from the small vars. of *puncticollis*, Payk., by its shorter, sub-quadrate thorax, on which the dorsal channel and basal foveæ are indistinct or almost wanting; the elytra have also on the third and fifth interstices a row of distinctly larger punctures. Its general colour is darker, and this is especially seen on the under surface.

8. *HARPALUS GRISEUS*, Panzer, Faun. Germ. 38, 1
 (*Carabus*); Dejean, Sp. iv. 251. 49, Icon. iv. 144,
 43, pl. 186, f. 4; Boisd. et Lac. Faun. Ent. Paris, i.
 150, 12; Erichs. Käf. Brand. 47, 5.

Mr. Waterhouse has in his collection two examples of this species, hitherto unrecorded as British, and long ago separated by him under this name. This species comes next to *ruficornis*, Fab., which it much resembles; but is smaller, with the hinder angles of the thorax somewhat obtuse, and the apex of the elytra scarcely exhibiting any sinuation; whereas *ruficornis* is larger, with the thoracic angles decidedly acute, and the apex of the elytra distinctly sinuated. Detected amongst some specimens of the latter species, but Mr. Waterhouse has no locality for them, and does not

know their history ; this notice, however, may call attention to the matter, and possibly other examples may be found.

9. *STENOLOPHUS DERELICTUS*, Daws. ; Wat. Cat. ; Solomon, Zool. 7403 (1861).

The opinion of Dr. Schaum (recorded in Ent. Annual, 1860, p. 25) that this is only a dark var. of *dorsalis*, Fab., is certainly correct, so far as can be judged from specimens in metropolitan collections ; but Mr. Dawson told me long ago that the example in his possession, upon which he had founded the species, was unlike any others he had seen.

10. *BEMBIDIUM NIGRICORNE*, Gyll. ; Wat. Cat. p. 107 (1861).

In the Proc. Ent. Soc. 3rd Mar. 1862, Zool. 7981 (1862), will be found a letter from Mr. Wailes of Newcastle, the original captor, establishing the locality of Mr. Waterhouse's specimens, amongst others.

11. *LACCOPHILUS VARIEGATUS*, Germar, Faun. Ins. Eur. iii. 6 (*Dytiscus*) ; Aubé, Sp. 439 ; Wat. Cat. p. 107 (1861).

At once known from its congeners by its narrow shape, and the bright and well-defined markings on its thorax and elytra, the latter being dark and glossy. First taken by the Rev. H. Clark, plentifully, near Arundel I believe, in 1860.

12. *HYDROPORUS QUINQUELINEATUS*, Zetterst. Faun. Ins. Lapp. i. 335 (*Hyphydrus*) ; Aubé, Icon. 367, pl. 42, fig. 2 ; Rev. H. Clark, Proc. Ent. Soc. 1 Sept. 1862, Zool. 8219 (1862), Journ. Ent. 1, 469.

Hydroporus 1* sp. — ? Wat. Cat. p. 107 (1861).

Closely allied to *H. reticulatus*, Fab., and distinguished from it by the longitudinal markings of the elytra, which are

narrower, more regular, uninterrupted, and continued to the base parallel with the sutural marking; the punctuation also is more uniform and coarser.

Taken by Mr. Waterhouse, most probably in the London district.

13. *HYDROPORUS UNISTRIATUS*, Schrank; Wat. Cat. p. 13.

14. *HYDROPORUS BISULCATUS*, Curt.; Wat. Cat. p. 13.

This, and the preceding species, must be rejected from our lists, having been introduced by a mistake of nomenclature.

15. *HYDROPORUS GRISEO-STRIATUS*, De Geer, Ins. iv. 103
(*Dytiscus*); Aubé, Sp. 541.

Dytiscus halensis, Paykull.

Similar in shape to *A. picipes*, Fab., but a little less robust, with a darker thorax, and much finer punctuation.

Fulvous, with the thorax more or less pitchy on the disc, and the elytra pitchy black, with thin yellow longitudinal striæ.

Dr. Schaum, during his recent visit to London, pointed out this species, which has been doing duty for *H. halensis*, Fab., in most metropolitan collections.

It has been taken in the north of England and Scotland, by Messrs. Hislop, Somerville and others.

16. *HYDROPORUS HALENSIS*, Fab. Ent. Syst. i. 108, 52
(*Dytiscus*); Payk.; Aubé; Wat. Cat. p. 13; Rev.
H. Clark, Journ. Ent. i. 470.

areolatus, Duft. ; Lacord.

severus, Clark, Proc. Ent. Soc. 1 Sept. 1862, Zool.
8219 (1862).

This species must remain in our lists, since the single

exponent of it in the Stephensian Collection is certainly *halensis*, Fab. It is much broader and shorter than the last-mentioned insect, and more like *H. assimilis*, but with the thorax not contracted behind: its colour is flavescent, with two black central thoracic marks, and the elytra with thin black striæ, a scutellar patch, four spots on the disc, and six or seven round the margins, all more or less distinct. Recently examples have been taken by the Rev. H. Clark in Horning Fen, and by Dr. E. Adams near Stowmarket; Dr. Power has also specimens from the latter locality, and has long separated them in his collection as a distinct species.

17. HYDROPORUS DERELICTUS, Clark, Proc. Ent. Soc. 1 Sept. 1862, Zool. 8219 (1862), Journ. Ent. i. 471 (described).

Nearly allied to *H. planus*, Fab., but slightly narrower, more parallel, and not so rounded, with pubescent deep black elytra; it differs from *H. erythrocephalus*, Linn., (which it resembles in the colour of head and elytra, and in its fuscous tarsi,) in being less rounded and larger.

Taken in the Island of Orkney, August, 1855.

18. HYDROPORUS CELATUS, Clark, Proc. Ent. Soc. 1 Sept. 1862, Zool. 8219 (1862), Journ. Ent. i. 473 (described).

Closely resembling *H. vittula*, Er., but larger, thoracic punctures less regularly distributed, the striæ on the elytra less distinct, legs entirely rufo-flavous, and very like a large *H. pubescens*, Gyll., but with finer punctuation. Its place is next to *H. Gyllenhallii* in our lists.

Taken in Bradgate Park and Black Park by Dr. Power, also in Tilgate Forest by Mr. Brewer.

19. *HYDROFORUS TINCTUS*, Clark, Ann. Nat. Hist. Nov. 1862.

Near *H. palustris*, Linn. Detected by Dr. Power as distinct amongst a mass of water-beetles taken by Charles Turner in the New Forest.

20. *GYRINUS CELOX*, Schiödte; Wat. Cat. p. 15.

This species, which has been introduced into our lists, and which no one appears either to possess, or to be able to make out, is regarded simply as a synonym of *G. bicolor*, Fab., by Thomson in his Skandin. Col. ii. p. 116.

21. *ISCHNOGLOSSA CORTICINA*, Erichs. Col. March. i. 351. 15, Gen. et Spec. Staph. 153. 27; Redt. Faun. Aust. 667, 20 (*Oxyypoda*); Kraatz, Naturg. d. Ins. Deutschl. ii. 59, 3; G. R. Waterhouse, Proc. Ent. Soc. 2 Dec. 1861, Zool. 7864 (1862).

varia, Heer.

Distinguished from *I. corticalis*, Steph. (*rufo-picea*, Ktz.) by its more thickly punctured thorax and elytra, and lesser bulk generally.

Detected by Mr. Waterhouse in the collection of the late Mr. Heysham, of Carlisle.

22. *HAPLOGLOSSA PULLA*, Gyll. Ins. Suec. iv. 494; Erichs. Gen. 173; Fairm. et Lab.; (nec Kraatz, or Wat. Cat.) E. W. Janson, Proc. Ent. Soc. 4 Nov. 1861, Zool. 7862 (1861).

Mr. Janson records this distinct and coarsely punctured species as taken by Mr. H. S. Gorham in the Isle of Wight; it was, however, already in Mr. Waterhouse's collection, and well known to him (as remarked in the notice of the next

species), and is also possessed by Dr. Power and Mr. Douglas.

23. •HAPLOGLOSSA NIDICOLA, Fairmaire, Ann. Soc. Ent. Franc. (1852) 688 (*Aleochara*); E. W. Janson, Proc. Ent. Soc. 4 Nov. 1861, Zool. 7862 (1861).

pulla, Ktz.; Wat. Cat. p. 15; (nec Gyll.)

rufipennis, E. W. Janson, Proc. Ent. Soc. 6 Feb. 1860, Zool. 6937 (1860), Ent. Ann. 1861, p. 61; Wat. Cat. p. 107 (1861), (nec Kraatz).

Mr. Waterhouse, prior to the first correct British record of this species, viz., in Proc. Ent. Soc. 7 Oct. 1861, Zool. 7808 (1861), withdrew the name of *H. rufipennis*, Ktz., from his catalogue, introduced originally on the authority of Mr. Janson; and stated that the latter insect must be referred to the *H. pulla* of his catalogue. Mr. Waterhouse had, however, at the time of writing that work, only two specimens, one the true *pulla*, Gyll. (determined by himself), and the other the insect now known as *nidicola*, then considered by him, in accordance with Kraatz, to be a var. of the same species.

The present species has been found by my friend Mr. G. Lewis, in great numbers, also by Mr. Brewer; and I took it in profusion on wild flowers at the base of sandy cliffs near Walton-on-the-Naze; also in Coombe Wood.

24. ALEOCHARA MÆRENS, Gyll. Ins. Suec. iv. 493, 53-54, (1827); Erichs. Gen. et Spec. Staph. 169, 22; Kraatz; E. W. Janson, Proc. Ent. Soc. 3 Feb. 1862, Zool. 7912 (1862).

lugubris, Aubé; Fairm. et Lab.

Comes next after *A. mæsta*. "Found by the late J. Foxcroft in Perthshire, 1855."

It appears to differ from *A. mæsta*, according to Erichson, in having the thorax and abdomen, towards the apex, somewhat narrowed, and in the abdomen being more thickly punctured.

It differs from *A. lanuginosa* in the somewhat depressed pubescence, and in having the elytra thickly and less strongly punctured.

25. *TACHYUSA COARCTATA*, Erichs. Col. March. i. 308, 2, Gen. et Spec. Staph. 71, 2; Heer, Faun. Col. Helv. i. 345, 3; Redt. Faun. Austr. 655, 3; Ktz. Ins. Deutschl. ii. 152, 4.

nigrita, Heer, Faun. Col. Helv. i. 344, 2.

This species was originally determined by Dr. Power, and taken by him near Mickleham. It comes next after *constricta*, Er.; the abdomen being, however, not quite so contracted at the base as in that species, and it is smaller, duller, not so dark, and inclined to a blueish tint.

26. *TACHYUSA UMBRATICA*, Erichs. Col. March. i. 310, 6, Gen. et Spec. Staph. 73, 9; Heer, Faun. Col. Helv. i. 345, 7; Redt. Faun. Aust. 655, 7; Ktz. Ins. Deutschl. ii. 154, 8.

I am informed this species was originally determined by Mr. Janson; it was taken at Burford Bridge, near Mickleham, on the banks of the river Mole, by Messrs. Janson and Brewer, and by Dr. Power, who has also found it on the banks of the Thames at Halliford. It may be distinguished from *T. leucopa* by its generally lighter colour and lesser bulk; also by its rufescent antennæ and legs. Its place is next after *T. leucopa*.

27. *OXYPODA LUCENS*, Mulsant, Opusc. Entomol. ii. 56, 3; Kraatz, Ins. Deutsch. ii. 178, 26; Wat. Cat. p. 107 (1861).

Taken by Mr. Morris Young of Paisley, and returned to him from Paris with the above name.

28. *HOMALOTA FLUVIATILIS*, Kraatz, Ins. Deutsch. ii. 222, 22; Wat. Cat. *gagatina*, Mulsant.

Taken by Dr. Power. Comes next after *H. cambrica*, Wat. Cat.

29. *HOMALOTA LUTEIPES*, Erichs. Col. March. i. 320, 9, Gen. et Spec. Staph. 89, 16; G. R. Waterhouse, Proc. Ent. Soc. 1 Sept. 1862, Zool. 8219 (1862).

Taken by Mr. Wollaston at Whittlesea, and by Dr. Power in the London district. Comes next after *H. luridipennis*, Wat. Cat.

30. *HOMALOTA PALLEOLA*, Erichs. Col. March. i. 333, 31, Gen. et Spec. Staph. 115, 72; G. R. Waterhouse, Proc. Ent. Soc. 1 Sept. 1862, Zool. 8219 (1862).

Taken by Mr. Linnell, near Reigate, and originally determined (I believe) by Mr. Janson. Comes next after *H. ægra*, Wat. Cat.

31. *HOMALOTA PARALLELA*, Mannerh. Bullet. de Moscou, 1844, p. 173; Kraatz, Ins. Deutsch. ii. 262, 69; G. R. Waterhouse, Proc. Ent. Soc. 1 Sept. 1862, Zool. 8219 (1862).

talpa, Heer; Redt.

Taken by Mr. Gregson; and by Mr. Hislop in Scotland. Comes next after *H. inconspicua*, Wat. Cat.

32. HOMALOTA THOMSONI, Janson, Proc. Ent. Soc. 3 Feb. 1862, Zool. 7912 (1862).

nigricornis, Thomson, Kong. Vet. Akad. Förh. Stockh. (1850), 142, 42; Kraatz; (nec Kirby or Steph.).

Captured by Mr. E. W. Janson, near Hampstead, in April, 1857. Comes next after *H. divisa*, Wat. Cat.

33. HOMALOTA AUTUMNALIS, Erichs. Gen. et Spec. Staph. 113, 66; G. R. Waterhouse, Proc. Ent. Soc. 1 Sept. 1862, Zool. 8218 (1862).

foveola, Mulsant.

Taken at Hawkhurst, Kent, by Mr. Waterhouse; also by Dr. Power, and by myself at Coombe Wood. It comes next after *H. corriaria*, Wat. Cat.

Concerning this insect Mr. Waterhouse has given me the following remarks:—"When I exhibited to the Entomological Society a specimen of what I believed to be the *Homalota autumnalis*, Er., as a species new to England, I was very properly reminded that the insect had already been recorded in Murray's 'Catalogue of Scotch Coleoptera.' I have since found that the species is also recorded by Messrs. Hardy and Bold, in their 'Catalogue of the Coleoptera of Northumberland,' &c.; and indeed it is described in the latter work. Upon referring to my note-books I find that I have had an opportunity of examining the '*H. autumnalis*' both of Mr. Murray's and Mr. Bold's collections, and that in both cases the species was represented by *H. gregaria*. The description above referred to, however, certainly cannot have been taken from *H. gregaria*; and it appears to me almost as certain that it does not apply to the insect I exhibited as *H. autumnalis*."

Giving all praise to the good work done by Messrs. Murray, Hardy and Bold, I must remark that the above statement affords a clue to the reason of divers other species recorded by them having been omitted in Waterhouse's Catalogue.

34. *HOMALOTA SUBTERRANEA*, Mulsant, Opusc. Entom. ii. 40, 4; Kraatz, Ins. Deutschl. ii. 291, 99; G. R. Waterhouse, Proc. Ent. Soc. 1 Sept. 1862, Zool. 8219 (1862).

Comes next after *H. hospita*, Wat. Cat. This species was originally introduced into the Catalogue on the authority of a specimen captured by Mr. E. W. Janson, and recorded in the Proc. Ent. Soc. 2 July, 1860, Zool. 7152 (1860), Ent. Ann. 1861, p. 61, which insect, that gentleman subsequently says (Proc. Ent. Soc. 4 Nov. 1861, Zool. 7861, 1862), appears to coincide, as stated by Mr. Waterhouse, with *H. scapularis*, Sahlb., a species already included in our lists.

Prior to the last-mentioned date, viz., in Proc. Ent. Soc. 7 Oct. 1861, Zool. 7808 (1861), Mr. Waterhouse withdrew *H. subterranea*, Muls., from his Catalogue, but it must now be returned, the true species of that name having been discovered by him among some insects taken by Mr. Morris Young, of Paisley, to whose indefatigable exertions British Entomology is much indebted.

35. *HOMALOTA INTERMEDIA*, Thomson, Öfvers. af Kon. Vet. Acad. Förh. (1850), 145, 58; Kraatz, Ins. Deutschl. ii. 301, 11; G. R. Waterhouse, Proc. Ent. Soc. 1 Sep. 1862, Zool. 8219 (1862).

Taken by Dr. Power at Purley Downs. Comes next after *H. subrugosa*, Wat. Cat.

36. HOMALOTA LEPIDA, Kraatz, Ins. Deutschl. ii. 310, 120;
G. R. Waterhouse, Proc. Ent. Soc. 1 Sep. 1862,
Zool. 8219 (1862).

var. excavata, Erichs.; Redt.; Heer.

Taken by Mr. Andrew Murray in Scotland. Comes next after *H. palustris*, Wat. Cat.

37. OLIGOTA APICATA, Erichs. Gen. et Spec. Staph, 182, 6;
J. A. Power, Zool. 7530 (1861); Wat. Cat. p. 107
(1861).

granaria, Wat. Cat. p. 19 (not of Erichson).

Distinguished from its British congeners by the two last joints of the abdomen and legs being clear fulvous-yellow, and by the two first joints of the antennæ being of the same length, and relatively longer than any of the succeeding joints.

Taken in April, 1861, by Dr. Power from débris of fern, at the Holt Forest, Hants, and subsequently in numbers at the same place. The species *granaria*, Erichs., must be erased from our lists, having been introduced erroneously, on the authority of a specimen of *apicata* originally taken by Dr. Power.

38. GYROPHÆNA PULCHELLA, Heer, Faun. Col. Helv. i.
310, 1; Kraatz, Stett. Ent. Zeit. xv. 185. 4, Insect.
Deutschl. ii. 356, 3; G. R. Waterhouse, Proc. Ent.
Soc. 6 Jan. 1862, Zool. 7905 (1862), Trans. Ent.
Soc. vol. i. 3rd Series, pt. iii.

Readily distinguished from most other British species by its long antennæ; differing from *G. affinis*, Mann., the only other long-horned species, in its generally paler colour and more glossy surface, also in having the thorax and elytra

relatively longer, and the punctuations on the elytra finer. Its place is the first in the genus.

Taken by Dr. Power, also by myself at Coombe Wood.

39. *GYROPHÆNA LEVIPENNIS* (Thomson in litt.), Kraatz, Ins. Deutschl. ii. 358, 7; G. R. Waterhouse, Proc. Ent. Soc. 2 Dec. 1861, Zool. 7864 (1862), Trans. Ent. Soc. vol. i. 3rd Series, pt. iii.

Rather less than *G. nana*, with the punctures on the head and thorax less distinct than in that species, and the elytra almost perfectly smooth. Its place in our lists is next after *G. affinis*.

Detected by Mr. Waterhouse in the collection of Mr. Heysham, also taken by Dr. Power, Mr. Brewer and myself, and stated by Mr. Janson to be known to him.

40. *GYROPHÆNA*, sp. ? 6* ——. G. R. Waterhouse, Trans. Ent. Soc. vol. i. 3rd Series, pt. iii.

In Dr. Power's collection. Allied to *G. fasciata* and *gentilis*, but differing from both in having the thorax furnished with minute scattered punctures throughout, and the dorsal rows obsolete. It is smaller than *G. gentilis*, which it most resembles, and wants the transverse depression near the posterior margin of the thorax, having also the abdomen less broadly margined.

41. *GYROPHÆNA MANCA*, Erichs. Gen. et Sp. Staph. 190, 15; Kraatz, Ins. Deutschl. ii. 361, 12; G. R. Waterhouse, Proc. Ent. Soc. 2 Dec. 1861, Zool. 7864 (1862), Trans. Ent. Soc. vol. i. 3rd Series, pt. iii.

A little larger than *G. minima*, Er., and distinguished from that species by its pitchy colouring, more ample thorax

and elytra, the latter being more thickly and finely punctured; also, in the male, by the absence of any distinct ridges on the sixth abdominal segment.

Taken plentifully by Dr. Power under bark near Thorton Reservoir, Leicester, and stated by Mr. Janson to be also known to him. Its place is next after *G. minima* in our lists.

42. *QUEDIUS UMBRINUS*, Erichs. Col. March. i. 491, 11; Gen. et Spec. Staph. 541, 27; Redt.; Heer; Kraatz, Ins. Deutschl. ii. 509, 21.

maurorufus, Gyll. Ins. Suec. ii. 309, 25 (*Staphylinus*).

Determined by Mr. Waterhouse from specimens in his own collection, and in that of Mr. Morris Young.

This species must come next after *Q. peltatus* in our lists, from which it differs in being narrower, and uniformly glossy; the antennæ are shorter, the elytra shorter and less bulky, and their punctuation more sparing but much stronger.

43. *QUEDIUS SEMI-ÆNEUS*, (Kirby) Steph. Illust. v. p. 243, 8 (*Raphirus*); G. R. Waterhouse, Proc. Ent. Soc. 3 Nov. 1862.

nitipennis, Steph. Coll. (*Raphirus*).

semiobscurus, Erichs.; Ktz.; (?) nec Marsham.

var. rufipennis, Steph. loc. cit. 243, 6 (*Raphirus*).

Mr. Waterhouse has pointed out the differences between *Q. attenuatus* and this species, which has hitherto been confounded with it in our collections.

Q. attenuatus, Gyll., is somewhat less robust, the intermediate coxæ testaceous, the abdomen not striped longitudinally, and the elytra æneous, with dusky pubescence.

Q. semi-æneus varies considerably in size, and in the colour both of the elytra and intermediate coxæ; the larger examples usually have the most rufous elytra, but the

pubescence in *all* is more or less reddish, especially at the extreme apex; and the smaller specimens have the intermediate coxæ generally lighter; still the gradations are scarcely perceptible. The best specific diagnosis, however, is to be found in the abdomen, which has (or appears to have) four longitudinal interrupted bands of ashy pubescence; and the basal segments have each three shallow foveæ, consisting of one on each side, and a smaller depression on the mesial line.

The species appears to be much more common than *attenuatus*.

44. *QUEDIUS INFUSCATUS*, Erichs. Gen. et Spec. Staph. 543, 29 (1840); J. A. Power, Proc. Ent. Soc. 5 Nov. 1860; Wat. Cat. p. 107 (1861).

chrysurus, Kiesenw. in Küst. Käf. Eur. xii. 55 (1847); Kraatz, Ins. Deutschl. ii. 520, 35; G. R. Crotch, Zool. 8140 (1862).

Determined by Dr. Power, from specimens sent to him by Mr. G. R. Crotch, found near nests of *Formica fusca*.

There appears no reason why Erichson's name (which is the senior by seven years) should be rejected; his description merely differs from that of Kiesenwetter in mentioning the elytra as fusco-testaceous with a pitchy disc, instead of entirely pitchy, and such a variation must be allowed for a species in which the elytra are more or less margined; at all events, Dr. Power was enabled to determine our insect correctly by Erichson's diagnosis.

Found by Mr. Crotch at Weston-super-Mare and Cambridge; also by the Rev. A. Matthews in Leicestershire, and by Dr. Power and Mr. A. Haward in a rotten oak, near Croydon.

45. *PHILONTHUS PUNCTIVENTRIS*, Kraatz, Ins. Deutschl. ii. 579, 10; E. W. Janson, Proc. Ent. Soc. 4 Feb. 1861, Zool. 7415 (1861); Wat. Cat.

Brought forward by Mr. Janson on the authority of one specimen, taken near London by Mr. E. Shepherd.

Allied to *P. carbonarius*, Gyll. (having the basal joints of the front tarsi in the male not dilated), but distinguished by its more parallel form, the coarser and thicker punctuation of the abdomen, and especially by the seven apical joints of the antennæ not being transverse. Plentiful under decaying vegetable matter, in hay stacks, fungi, &c.

This insect has been doing duty for *P. lucens*, Mann., in certain metropolitan collections, but the latter has a narrow head, and is especially like *P. politus*, with the exception of the basal joint of the antennæ not being fuscous beneath.

Mr. Waterhouse informs me that there appears to be a *third* species, between *carbonarius* and *punctiventris* in its characters, with the joints of the antennæ as in the latter species, but the antennæ perceptibly longer, and the elytra less strongly punctured and æneous in colour, having the broader form and larger size of *carbonarius*. I have seen specimens answering to this description in that gentleman's collection, also in one or two others. Possibly these may be the *P. temporalis* of Mulsant, but we have no means of comparing with the original description at present; this notice may, however, serve to draw attention to the matter.

46. *PHILONTHUS PROLIXUS*, Erichs., Gen. et Spec. Staph. 510, 143; J. A. Power, Zool. 7325 (1861); Wat. Cat. p. 108 (1861).

Determined by Dr. Power, who took it at Cowley; also taken by myself in the London district. Comes next after

P. signaticornis, Muls., in our lists, and may be distinguished from that species by the antennæ not being pale at the base; from *P. villosulus* it may be known by the antennæ not being entirely pale. It is rather larger than *P. procerulus*, which it most resembles; the antennæ, however, being longer, elytra wider, more distinctly and sparsely punctuated, and with the rufo-testaceous apical colour extending beyond the middle.

47. *XANTHOLINUS ATRATUS*, Heer, Faun. Col. Helv. i. 246, 7; Kraatz, Ins. Deutschl. ii. 636, 5; E. W. Janson, Proc. Ent. Soc. 3 Feb. 1862, Zool. 7912 (1862).

Discovered by Mr. Janson "in a nest of *Formica rufa*, near Highgate, Middlesex, October, 1856."

This species, the last in the genus in our lists, is apparently abundant, and has been taken plentifully, long ago, also by Dr. Power, who had remarked its differences.

It may be distinguished from *X. punctulatus*, Payk., by its smaller size, the finer punctuation of the head, and generally lighter colour, especially in the antennæ, which are piceous instead of black. From *X. ochraceus*, Gyll., which it resembles superficially, it may be known by the lesser number of indentations in the two central thoracic striæ, and by the fewer and more remote punctuations on the head.

48. *LATHROBIUM GEMINUM*, Kraatz, Ins. Deutschl. ii. 673, 3; E. C. Rye, Proc. Ent. Soc. 3 Feb. 1862, Zool. 7913 (1862).

elongatum, Gyll. Ins. Suec. ii. 363, 1; Mannerh.

Brach. 37, 1; Heer, Faun. Col. Helv. i. 239, 10.

bicolor, Heer (Kraatz, Berl. Zeits. 1861, p. 409).

elongatum, var., Erichs. Gen. et Spec. Staph. 590;
Fairm. et Lab., Faun. Ent. Franc. i. p. 551.

Detected by me amongst *L. elongatum*, Lin.; from which species it may be distinguished on the upper surface by the equal breadth of the thorax and elytra, and comparative shortness of the latter; on the under surface the head is less thickly punctured, and the penultimate segment of the abdomen in the male presents no central excision, the hairy ridges being also shorter, and more parallel. It is as common as *L. elongatum*. In Dr. Schaum's Cat. Eur. Col. he identifies this species with *boreale*, Hochs.

49. LITHOCARIS RIPICOLA, Kraatz, Stett. Ent. Zeit. xv. 126,
xvi. 165, 4; Ins. Deutschl. ii. 715, 8.

fuscula, Muls. et Rey, Opusc. Entomol. ii. 78.

Head blackish, thickly and finely punctured, rather dull; thorax red-brown, very shining, finely and thickly punctured, with a smooth central line; elytra red-brown, rather duller than, and nearly half again as long as, the thorax, very thickly and finely punctured; abdomen darker and duller than the elytra, antennæ and legs reddish-yellow.

Differs from *fuscula*, Mann., in not being quite so large, and the head being darker, thorax brighter, and punctuation very much finer; also in having the elytra of greater length, in which character it resembles *apicalis*, Ktz., immediately before which it must come in our lists. From *brunnea*, Er., it may à fortiori be known by its much longer elytra.

I determined this pretty species from five examples detected by me among some un-named *Brachelytra* belonging to Mr. Douglas, who, with his usual liberality, presented a specimen to me, and another to Mr. Waterhouse. Mr. Douglas took them on the 19th May, 1861, under seaweed on the shore near Southampton.

50. *STENUS ATRATULUS*, Erichs., Col. March. i. 540, 12, Gen. et Spec. Staph. 701, 21; Redt. Faun. Austr. ed. ii. 220, 18; Heer, Faun. Col. Helv. i. 219, 19; Kraatz, Ins. Deutschl. ii. 759, 21.

This species is omitted in Waterhouse's Cat., but recorded in Hardy and Bold's Cat. Col. North. and Durh. p. 82, 1851, and Ent. Ann. 1855.

Its place in our lists is next after *S. morio*, Erichs.; I find it not unfrequently in one rather dry place in Battersea Park, and with the exception of three examples in Dr. Power's collection (taken I believe by Mr. Brewer in the Cambridge Fens), I have seen no specimens but those taken by myself.

It is a small species, $1\frac{1}{4}$ lin. in length, coarsely punctured, with a convexity between the eyes, and an abbreviated dorsal channel on the thorax; it very much resembles *S. nigritulus*, Gyll., but has the abdomen margined.

I have always wrongly supposed this insect to be the *S. morio* of Erichson, and have given it away as such, having been misled by a specimen in Dr. Power's collection, returned by Dr. Kraatz with that name; this latter example is certainly not *morio*; having, apart from other characters, the convexity between the eyes, as in *atratus*; whereas *morio* has the front of the head gently excavated.

51. *STENUS LUSTRATOR*, Erichs., Col. March. i. 548, 22, Gen. et Spec. Staph. 712, 41; Redt. Faun. Austr. ed. ii. 226; Kraatz, Ins. Deutschl. ii. 764, 28; Wat. Cat. p. 108 (1861).

Originally taken and determined by Dr. Power; subsequently found by myself and Mr. A. Hayward at Croydon, and by Messrs. Crotch and Brewer in the Cambridge Fens.

It may be known from *S. providus* at once by its more slender shape and the black apex to the palpi.

52. BLEDIUS, 5 sp. — ? Wat. Cat. p. 108 (1861).

This is the insect named *B. pallipes*, Grav., in Waterhouse's Catalogue, the latter being removed from our lists.

53. BLEDIUS SUBTERRANEUS, Erichs., Gen. et Spec. Staph. 777, 34; Wat. Cat. p. 108 (1861).

This species was originally omitted in Waterhouse's Catalogue, but recorded in Ent. Ann. 1855, p. 93.

54. BLEDIUS TALPA, Mann., Brach. 45, 10; Erichs. Gen. et Spec. Staph. 777, 33; Steph. (not of Coll.); Wat. Cat. p. 108 (1861).

Two specimens in the Leachian Collection were at first overlooked by Mr. Waterhouse.

55. BLEDIUS CRASSICOLLIS, Boisd. et Lacord., Faun. Ent. Paris, i. 456, 2; Erichs. Gen. et Spec. Staph. 770, 20; J. A. Power, Zool. 7530 (1861); Wat. Cat. p. 108 (1861).

About the size of *B. unicornis*; head and thorax unarmed, the latter strongly punctured, with a smooth space and no furrow along the middle; elytra coarsely punctured, testaceous red, with a darkish stain near the scutellum; abdomen black, with apex testaceous.

Taken by Dr. Power, on a sandy bank near Walmer, in August, 1857.

56. OXYTELUS PICEUS, Grav.; Gyll.; Erichs.; Wat. Cat. p. 30.

This species was introduced by Mr. Waterhouse on the

authority of a single specimen in his own collection; it has since been taken by him (in cow-dung in the field opposite the inn at Birchwood), also by myself and Dr. Power, and is most probably mixed with *O. laqueatus*, Marsh., in collections.

It may be distinguished from the latter species by its head, which has only one central longitudinal groove on the back, and is also more punctured in front, with the space of the clypeus less concave, and the clypeus is not so acute at the angles; the bulk of the eye is also much larger than in *laqueatus*; and in the male the sixth segment beneath is bisinuate, and the seventh tricuspid, whilst in *laqueatus* the sixth segment has two tubercles, and the seventh is bisinuate and produced into a mucro.

57. *OXYTELUS MARITIMUS*, Thomson; G. R. Crotch, Zool. 8083 (1862).

Mr. Crotch records this species as taken in tolerable abundance under sea-weed on the Somersetshire coast, and says it resembles *O. inustus*, Grav., but may be known by its testaceous antennæ and more scattered punctuation.

This is most probably the *Oxytelus* allied to *inustus* taken on the coast, and distinguished long ago by Mr. T. J. Bold, who has sent it to myself and others as distinct; but I am unable to speak decidedly on the point, not having seen the original description of *maritimus*, which is, I presume, in the recently published part of Thomson's work.

58. *ANCYROPHORUS LONGIPENNIS*, Fairm. et Lab., Faun. Fr. iii. p. 614 (*Trogophlæus*); Wat. Cat. p. 108 (1861).

Distinguished from *A. omalinus*, Erichs., by its larger size, longer antennæ and longer and more robust elytra.

Taken by Mr. Waterhouse and Mr. Morris Young, both at Paisley.

59. *THINOBIUS BREVIPENNIS*, Kiesenw., Stett. Ent. Zeit. (1850) 221; Kraatz, Ins. Deutschl. ii. 885, 5; E. W. Janson, Proc. Ent. Soc., 3rd Feb. 1862, Zool. 7912 (1862).

Taken by Mr. Janson at Holme Fen, Hunts., in May, 1859; also in some numbers by Mr. G. R. Crotch (to whom I am indebted for specimens) in the Fen district.

60. *OMALIUM ALLARDI*, Fairm. et Bris., Ann. Soc. Ent. Fr. (1859), p. 44.

When on the point of concluding this paper I was informed of the occurrence in Britain of this and the following species, which have been returned from the Continent to Mr. Morris Young with the names here given to them respectively.

I have not consequently had time to refer to the original description of the present species, which is however decidedly a distinct one from any of our other British *Omalia*.

It is about the size of *oxyacanthæ*, but in general habit more like a small example of *rivulare*, with the exception of being narrower; pitchy, with the base of the antennæ, margin to the abdomen, and a humeral spot testaceous-red; the latter sometimes suffused nearly all over the elytron.

Its place is next to *fossulatum* in our lists.

Taken somewhat plentifully by Mr. Morris Young (to whom I am indebted for specimens) at Paisley; also by Mr. Waterhouse in the same locality, as well as in different parts of the London district (including the British Museum Court Yard), but neither this nor the next species are to be referred to the two queried new species in Wat. Cat.

61. *OMALIUM NIGRICEPS*, Kiesenw., Ann. Soc. Ent. Fr. (1851), p. 435.

Comes next to *cæsum* in our lists, from which its generally rufo-testaceous colour and black head at once distinguish it; nevertheless, the description given by Kiesenwetter is very vague.

Taken by Mr. M. Young, also by Mr. Waterhouse.

62. *MICROPEPLUS MARGARITÆ*, Jacq. du Val, Gen. Col. d'Eur. ii. 82, id. in Cat. Staph. (*loc. cit.*), p. 83; H. S. Gorham, Proc. Ent. Soc., 7th Jan. 1861, Zool. 7374 (1861); Wat. Cat. p. 108 (1861).

Var. fulvus, Erichs. Gen. et Spec. Staph. 912, 3.

Mr. Gorham has pointed out the difference between this species and *M. staphylinoides*, Marsh., with which it has hitherto been mixed in collections. It may be known by its longer elytra and more rounded sides, and the inconspicuous tubercle of the fourth segment of the abdomen, which in *staphylinoides* assumes the form of an acute prominent crest; in the male of *margaritæ* also the head is more acutely toothed.

It appears more abundant than *M. staphylinoides*.

63. *CHOLEVA GRANDICOLLIS*, Erichs., Käf. Brand. i. 237. *tristis*, var. 2, (Murray) Wat. Cat. p. 34.

This conspicuous insect is separated in the continental lists as a distinct species, and surely with propriety. See remarks of Dr. Kraatz in Berlin Ent. Zeits. (1858), pp. 30, 31.

It may at once be distinguished by the great width of its thorax behind.

64. *CHOLEVA KIRBII*, Spence in Linn. Trans.; Steph. Man.
Spencii, Stephens.
rotundicollis, Kellner; Kraatz.
tristis, var. 3 (Murray), Wat. Cat. p. 34.

The same remarks apply to this insect as to the last; it may be separated from *tristis* by its much smaller size, more convex appearance, and the punctuation of the thorax, which is much closer than in that species, and somewhat rugulose.

I have taken large numbers of this insect, and never found it vary in appearance, and but very slightly in size; it has more the habit of a small *grandicollis* than *tristis*, and might possibly be mistaken for a var. of the former of these, or even for one of its sexes; but I have repeatedly found the sexes both of *Kirbii* and *grandicollis* in copulâ, and even at the same time and place, though the species have never been mixed sexually.

65. *SCYDMÆNUS GODARTI*, Latr., Gen. i. 282; Erichs. Käf. Brand. i. 252, 1; Fairm. et Lab. Faun. Ent. Franc. ii. 346, 1; Rev. A. Matthews, Zool. 7975 (1862).

The first species of the genus, and the largest of our *Scydmæni*, being nearly equal in size to *Eumicrus tarsatus*, Müll., which it resembles in colour, but differs in the shape of its head and thorax, and in having pointed elytra.

Taken in July, 1861, in Sherwood Forest, by Mr. Matthews, and determined for him by M. Aubé.

66. *SCYDMÆNUS PUMILIO*, Schaum; Rev. A. Matthews, Zool. 7975 (1862).
minutus, Chaudoir.

Allied to *S. Sparshallii*, Denny, but differs in being of a darker colour and wider form, and having more obtusely pointed elytra. Its place is next after *Sparshallii* in our lists.

Mr. Waterhouse informs me that the differences pointed out by Mr. Matthews for this species are equally applicable to the insect which the former supposes to be *rubicundus*.

Taken by Mr. Matthews near Gumley, Leicestershire, in the years 1860-2, and determined for him by M. Aubé "from Dr. Schaum's Catalogue," but I have as yet been unable to refer to the original description, which does not appear in any of Dr. Schaum's papers on *Scydmani* I have seen.

67. *SCYDMÆNUS RUBICUNDUS*, Schaum, Anal. Entom. 13, 31; Fairm. et Lab. Faune Ent. Franc. ii. 348, 7; G. R. Waterhouse, Proc. Ent. Soc. 7 Jan. 1861, Zool. 7375 (1861).

N.B. The specific name of this insect does not appear in the Proc. Ent. Soc. or Zool.

Comes next after *S. elongatulus*, Müll., in our lists.

68. *SCYDMÆNUS NANUS*, Schaum, Germ. Zeits. f. Ent. 1844, 471; Wat. Cat. p. 105 (1861).

exilis, Schaum.

minimus, Chaud.

69. *CEPHENNIUM INTERMEDIUM*, Aubé, Ann. Soc. Ent. Fr. 1859, Bullet. p. 235; Rev. A. Matthews, Zool. 7976 (1862).

Mr. Matthews says this species may be known from *C. thoracicum*, Müll., by its dark colour, smaller thorax, more elongate shape, and rather longer antennæ; according to the description, however, the shape should be shorter.

A single specimen found in moss near Silchester, Hants, by Mr. Matthews, in July, 1859, and determined for him by M. Fairmaire.

70. EUTHIA SCHAUMII, Kiesenw. in Berliner Ent. Zeits. (1858), Part i. p. 45; Wat. Cat. p. 105 (1861).

71. AGATHIDIUM ROTUNDATUM, Gyll., Ins. Suec. iv. 513, 17, 13 (*Anisotoma*); Erichs. Ins. Deutschl. iii. 101, 9; Rev. A. Matthews, Zool. 8084 (1862).

Allied to *A. mandibulare*, Sturm, but distinguished by the greater length of the sutural stria, and pale apical joint of the antennæ.

Taken by Mr. Matthews near Gumley. I noticed this as a distinct species long ago amongst some *Agathidia*, sent to me by Mr. Morris Young of Paisley, and it has also been known to Mr. Waterhouse.

72. MELIGETHES SYMPHYTI, Sturm, Deutschl. Ins. xv. 21, 9 (*Nitidula*); Erichs. Ins. Deutschl. iii. 180, 22; Wat. Cat. p. 108 (1861).
convexa, Schüpp.

73. MELIGETHES EXILIS, Sturm, Deutschl. Ins. xvi. 53, 26 (*Nitidula*); Erichs. *loc. cit.* 206, 47; Wat. Cat. p. 108 (1861).

74. ENDOPHLÆUS SPINULOSUS, Latr., Gen. Crust. et Ins. ii. 179, 2, Tab. 16, fig. 3 (*Eledona*); Eric. *l. c.* 256; Proc. Ent. Soc. 3 Mar. 1862, Zool. 7981 (1862).

This new genus, a grand addition to our Coleopterous Fauna, was taken in the New Forest by Charles Turner (who has also reared specimens of it from one of its earlier stages). Its place is in the *Colydiidæ*, next after *Sarrotrium*. Turner is unquestionably the first "wood worker" of the day, and without him our collections would be poor in *Elateridæ* and *Xylophaga*.

This species is rather flatter, more oblong, and larger than *Cicones variegatus*, being sometimes $\frac{1}{4}$ inch long: it is dull red-brown suffused with pitchy-black, the edges and suture lightest, with short hairs round the margins and on the elevations. The thorax is roughly granulated, with broad, flat margins deeply toothed at the sides; the anterior angles strongly produced, and the posterior doubly emarginate: the middle is much elevated, projecting slightly over the head, and with two irregular ridges enclosing the central line, which ends in front in a small notch; the elytra have rough interrupted ridges, and the entire margin is crenulated.

75. *MONOTOMA SPINICOLLIS*, Aubé, Ann. Soc. Ent. Franc. (1837), p. 463, 6, pl. 17, f. 6; Wat. Cat. p. 105 (1861).

76. *MONOTOMA BREVICOLLIS*, Aubé, *loc. cit.* p. 460, 4, pl. 17, f. 4; Wat. Cat. p. 105 (1861).

77. *MONOTOMA QUADRICOLLIS*, Aubé, *loc. cit.* p. 465, 7, pl. 17, f. 7 (?); Wat. Cat. p. 105 (1861).

78. *MONOTOMA SUBQUADRIFOVEOLATA*, Waterhouse, Cat. Brit. Col. p. 105 (1861).

quadrifoveolata, Waterh. (Proc. Ent. Soc. 7 Dec. (1857), p. 97 (not of Aubé, *loc. cit.* p. 468, 9, pl. 17, f. 9).

79. *ANTHEROPHAGUS SILACEUS*, Herbst, Käf. iv. 169, 6, Taf. 42, fig. 7 (*Ips.*); Erichs. Ins. Deutschl. iii. 344, 2 (nec Gyll.); Rev. A. Matthews, Zool. 8084 (1862).

Allied to *A. nigricornis*, Fab., but distinguished by the

tooth at the apex of the anterior tibiæ, and also by its long pubescence.

Taken by Mr. Matthews some years ago in Oxfordshire; also in Mr. Waterhouse's collection (taken by Chas. Turner, at Folkestone).

80. *DERMESTES UNDULATUS*, Brahm, Insecten Kalender, i. 114; Erichs. Ins. Deutschl. iii. 430, 4.
tessellatus, Illig.; Herbst; Wat. Cat.

Mr. G. R. Crotch has pointed out the above correction.

81. *DERMESTES FRISCHII*, Kugelann, Schneid. Mag. 478, 3; Erichs. Ins. Deutschl. iii. 428, 2; (*Fischeri*)
G. R. Crotch, Proc. Ent. Soc. 3 Feb. 1862, Zool. 7914 (1862).

vulpinus, Illig. (nec Fab.)

Allied to *D. vulpinus*, Fab., but distinguished by the brighter colour of the sides of the thorax, which has a black spot at each hinder angle; underneath, the middle spot on the last segment is terminal only, being produced in *vulpinus*; and in *Frischii* the mucro at the apex of each elytron is wanting.

Taken by Mr. W. Farren under a dead horse in the New Forest, 1860.

82. *APHODIUS FÆTIDUS*, Fab., Ent. Syst. i. 40, 131; Payk.; Panz. (*Scarabæus*); Gyll. Ins. Suec. i. 38, 35; Erichs. Ins. Deutschl. iii. 817, 17.

putridus, Herbst, Käf. ii. 160, 99 (*Scarabæus*).

tenellus, Say.

alpinus, Wat. Cat. p. 109 (1861), nec Scop.

The *Aphodius* named *alpinus* in Wat. Cat., and taken

by Charles Turner in Scotland at the end of 1860, must be referred to this species.

The true *alpinus*, Fab., is a larger and less convex species, presenting somewhat the appearance of *ater*, De G., and with distinct tubercles on the clypeus; whereas in *foetidus*, Fab., the clypeus presents a faint transverse line, and even in the male the tubercles are scarcely perceptible. The elytra are pitchy red, more or less suffused, and with a darker sub-apical patch.

83. APHODIUS ZENKERI, Germ., Mag. i. 118, 6; Schmidt, Germ. Zeits. ii. 107, 16; Erichs. Ins. Deutschl. iii. 852, 39.

Most resembles *porcus*, Fab., but immediately known from that species by its more convex form and polished appearance, and particularly by the smoother and broader elevation of the middle of the interstices on the elytra. It comes next to *tessellatus* in our lists, and is of the same shape, and in the same section, as that species.

Taken at Mickleham (*in stercore humano*) and determined by Dr. Power, to whose unwearied energy, discerning eye and generous nature our lists and collections are most eminently indebted; subsequently found, under similar unsavory circumstances, by myself in the same locality, also by Mr. Brewer; and detected in the collections of Messrs. S. Stevens and J. Scott, both of whom found it at Mickleham.

84. AMMÆCIUS BREVIS, Erichs., Ins. Deutschl., iii. 907, 1; J. A. Power, Proc. Ent. Soc. 4 Nov. 1860; A. Haward, Zool. 7368 (1861); Wat. Cat. p. 109 (1861).

elevaratus, Panz. Faun. Germ. 87, 1.

The addition of this new genus (whose place is between

Aphodius and *Rhyssemus*) to our lists is due to Mr. Haward of Croydon, who in May, 1859, captured a single specimen on the sand-hills at Southport, Lancashire, in company with *Ægialia arenaria*. It may at once be known from *Ægialia* by its much less globose body, which in fact resembles certain species of *Aphodius*; also by the slender tibiæ and coarsely punctured thorax.

It has subsequently been taken in profusion by Mr. Haward, and also by Mr. M. Solomon in the same locality.

85. ELATER RUFITARSIS, Desvignes, "Entomologist." 1842, p. 326; Wat. Cat. p. 109 (1861).

Allied to *E. nigrinus*, but larger, more robust, with coarser punctuation and darker tarsi.

Taken by Mr. Desvignes, and subsequently by Charles Turner in Windsor Forest.

86. AGRIOOTES, 4* sp.—, Wat. Cat. p. 109 (1861).
limbatus, pars, Steph. Coll. (*Adrastus*).

It is almost impossible to beat young trees in the spring without finding this insect in one's net; nevertheless it does not agree with any recorded British species. It is generally mixed in collections with *Adrastus pallens* (*limbatus* olim), which it much resembles; but, apart from generic distinctions, it may be known by its stouter and darker limbs, and in having the thorax not so globose. *Adrastus*, also, is much less common, and does not occur until later in the summer, according to my experience.

The present species is very like *Agriotes acuminatus*, but always smaller, with the elytra not so proportionately long, and the interstices not so wide, or containing so many punctuations.

87. TELEPHORUS, 21* sp. — ? Wat. Cat. p. 109 (1861).

Taken by C. Turner at Rannoch. Allied to *testaceus*, Linn., but larger, more robust, antennæ darker, thorax broader, less constricted, and darker, and the punctuation of the elytra decidedly closer.

88. TELEPHORUS ATER, Linn., Syst. Nat. 2, 649, 16; Gyll. Ins. i. 336, 10 (*Cantharis*); Kiesenw. Nat. der Ins. Deutschl. (1860), 516, 42; Wat. Cat. p. 109 (1861).

89. HAPLOCNEMUS NIGRICORNIS, Fab., Ent. Syst. i. 2. 81. 16, Syst. Eleuth. ii. p. 73, 10; Payk.; Gyll. *impressus*, var., Steph. Ill.

Mr. Waterhouse informs me that there are not only *two* species of this genus in England, but that on a very careful examination of the original descriptions, he comes to the conclusion that the common species has been hitherto wrongly named by him. Dr. Power originally noticed the existence of more than one *Haplocnemus* in England, and the present species was determined by Mr. Waterhouse, from a specimen found by Charles Turner in the New Forest.

It may be known from *impressus*, Marsham, by its greener colour; its tibiæ, tarsi and apex of femora being pale, and the elytra having a lesser number of punctures, which are coarser and less clearly defined: the reflected margins of the thorax and elytra are also rufescent beneath.

90. HAPLOCNEMUS IMPRESSUS, Marsham, Ent. Brit. 226, 16 (*Crioceris*); Steph. Illust. iii. p. 316, and Coll. (*Aplocnemus*).
nigricornis, Wat. Cat. p. 57.

This is the insect named *nigricornis* in our collections.
1863.

91. *Genus* DINODERUS, Redtenb., Faun. Austr. (ed. 1858) p. 569.

sp. SUBSTRIATUS, Paykull, Faun. Suec. iii. 142, 2; Gyll. Ins. Suec. iii. 374, 2 (*Apate*): Germ. Faun. Ins. Eur., Fasc. 20, Tab. 12 (*Apate substriata*); Redtenb., *loc. cit.*; Wat. Cat. p. 109 (1861), (nec Steph.)

Dinoderus substriatus of Stephens is not, as has been supposed, the insect known by the same name to continental naturalists, but belongs to a different genus. The species above recorded has, however, been found in England; on one occasion I believe at Darenth, by my friend Mr. G. Lewis.

92. TYCHIUS POLYLINEATUS, Germ., Insect. Spec. i. p. 294, 1824 (*Sibinia polylineata*); Schön. Gen. et Spec. Curc. iii. 403, 3 (1836); G. R. Waterhouse, Proc. Ent. Soc., 5 May, 1862, Zool. 8062 (1862), described. *lineatulus*, Schön. Supp. (nec Kirby). *lineatulus*, pars, Steph. Coll.

Mr. Waterhouse states this species is generally labelled *Schneideri* in our collections, and often mixed with the true species of that name, from which it differs in having several light-coloured striæ, instead of one distinct band at the suture; also in being larger, longer, and more convex, generally lighter in colour, with the scales wider when viewed under a high power, having the posterior femora somewhat obtusely toothed, and the anterior tibiæ of the male without the tooth on the inner side.

Found on the south coast generally.

93. TYCHIUS KIRBII, Waterhouse, Proc. Ent. Soc., 5 May 1862, Zool. 8063 (1862), described. *flavicollis*, var. β ., Schön. Gen. et Spec. Curc. vii. 304, 21.

flavicollis, Walton, Brit. Mus. Coll. (not of Kirby or Steph.)

Mr. Waterhouse has elevated the insect found in England, hitherto supposed to be a var. of *flavicollis*, Schön., to the rank of a separate species, and named it after the revered Kirby.

94. TYCHIUS BREVICORNIS, Waterhouse, Proc. Ent. Soc., 5 May, 1862, Zool. 8064 (1862), described.

About half the size of *T. nigrirostris*, Walt., which it much resembles, differing in its small size and short antennæ, the scape being relatively shorter and more clavate, and the separate joints of the funiculus shorter.

Taken by Mr. Waterhouse at Hawkhurst, Kent, in April, 1860, and at Gravesend in May, 1861; also in Mr. S. Stevens' collection.

95. CEUTHORHYNCHUS ULIGINOSUS (Walt.), Schönh. Supp.; Wat. Cat. p. 80; G. R. Waterhouse, Proc. Ent. Soc., 7 Oct. 1861, Zool. 7808 (1861).

This species must be withdrawn, as Mr. Waterhouse states that the Waltonian exponent in the Brit. Mus. Coll. is nothing but *Cœliodes didymus*, Fab.; also that another example, named by Mr. Walton, in Mr. Dale's collection, is a rubbed specimen of *Ceuthorhynchus litura*, Fab.

96. CEUTHORHYNCHUS BIGUTTATUS (Waterh.), Schönh. Supp.; Wat. Cat. p. 80; F. P. Pascoe, Proc. Ent. Soc., 5 May, 1862, Zool. 8062 (1862).

Mr. Pascoe remarks that the insect recently described by M. Chevrolat as *C. Raphaëlis* is identical with this species.

97. *CEUTHORHYNCHUS INORNATUS*, Waterhouse, Proc. Ent. Soc. 3 June, 1861, Zool. 7615 (1861), described.

Allied to *C. sulcicollis*, Gyll., from which it may be distinguished by the pitchy-red colour of its tarsi, and by the under surface of the body being very sparingly clothed with the white scales so conspicuous in the latter species. In the male of *sulcicollis*, also, the penultimate abdominal segment underneath has two approximated small tubercles, and the last segment is concave in the middle, the concavity being bounded by a slight ridge; whilst in *inornatus* the penultimate segment is simple, and the concavity of the last segment is bounded by a conical tubercle.

Taken by Mr. Waterhouse at Highgate, Box-hill and Northfleet, always on *Erysimum alliaria*; afterwards by Dr. Power, Mr. Brewer and others, on the same plant. *C. sulcicollis*, which feeds on *Erysimum officinale*, appears never to accompany this species.

98. *CEUTHORHYNCHIDIUS MINIMUS* (Walt. in litt.), Brit. Mus. Coll.; Walt. Cat. Brit. Curc. (1856); Waterh. Cat. p. 81.

99. *SITOPHILUS ORYZÆ*, Linn., Amœn. Acad. 6, 395, 19; Oliv.; Fab. (*Curculio*); Schönh.; Wat. Cat. p. 82.

If *S. granarius* be allowed as an English species, the present also must be included in our lists, having become naturalized, and being abundant in many parts of the country though of course originally introduced from the East.

100. *CRYPHALUS PICEÆ* [*Bostrichus (Cryphalus) piceæ*], Ratzeburg, Forst. Ins. i. 163 (1837); Rev. A. Matthews, Zool. 7918 (1862).

Resembles *C. abietis*, but may be known by the acuminate capitulum of its antennæ, which is circular in that species.

A single specimen taken many years ago by Mr. Matthews, near Weston-on-the-Green, Oxon, in October; and afterwards a second example, near the same spot.

101. *DONACIA AQUATICA*, Linn., Syst. Nat. 2, 637 (*Leptura*); G. R. Waterhouse, Proc. Ent. Soc. 3 Dec. 1860, Zool. 8335 (1861); Wat. Cat. p. 86. *Comari* (Ahrens), Suffr.; Janson, Ent. Ann. 1861, p. 77.

It appears from Mr. Waterhouse's remarks, and from his examination of the Linnæan specimens, that the name *aquatica* for this species is entitled to priority.

102. *GRAPTODERA AMPELOPHAGA*, Guér., Rev. et Mag. de Zool. (1858), p. 415; Allard, Ann. Soc. Ent. de France (1860-61), 78, 31; Wat. Cat. p. 90.

103. *CREPIDODERA CHLORIS* (*Chalcoides chloris*), Foudras, Altis. 318, 4, in Mulsant's Hist. Nat. des Col. de France (1860); G. R. Crotch, Zool. 8083 (1862).

Mr. Crotch states this species to be not uncommon on shallows.

It appears from Foudras (loc. cit.) to be allied to *C. aurata* (Marsh.), Foud., and about the same size as that insect, from which it differs in being concolorous, though varying from greenish-copper to æneous and blue; also in having the four first joints only of the antennæ

ferruginous, instead of five as in *aurata* (as remarked by Mr. Crotch.

Mr. Crotch points out that the œdeagus in the male is not emarginate; but the difference in that respect between the two species appears to be that in *aurata* the œdeagus is arched, slightly contracted in the middle, depressed in a trifling degree at the apex, and obtusely rounded; whilst in *chloris* it is arched, parallel, depressed at the apex, and acutely angled.

I find in my collection specimens answering to this description; they are all, besides, more elongate and parallel than *C. aurata*, which peculiarity is also remarked by Foudras; *aurata* however appears also to be concolorous sometimes. Mr. Waterhouse has long separated similar examples in his collection as possibly distinct, but he informs me they all came off poplars.

104. CREPIDODERA VENTRALIS, Illig., Mag. vi. 58; Allard, Ann. Soc. Ent. de Fr. (1860—61), 54, 8; Wat. Cat. p. 91.
105. PHYLLOTRETA PÆCILOCERAS (Kunze), Comolli de Col. Nov. (1837), p. 48; Allard, *loc. cit.*, 376, 93; Wat. Cat. p. 92.
106. PHYLLOTRETA VITTULA, Redt., Faun. Austr. 532; Allard, *loc. cit.*, 380, 99; Wat. Cat. p. 92.
107. THYAMIS OBLITERATA, Rosenh., Fn. Eur. p. 61 (1847); Allard, *loc. cit.*, 96, 46; Wat. Cat. p. 93.
108. THYAMIS MINUSCULA, Foudras, Alt., 1860, p. 154; Allard, *loc. cit.*, 322; Wat. Cat. p. 94.

109. THYAMIS PELLUCIDA, Foudras in Muls. Col. de Fr. 210, 52; Wat. Cat. p. 94.
lævis (Duft.), Allard, *loc. cit.*, 121, 69.
110. THYAMIS REICHEI, Allard, *loc. cit.*, 132, 80; Wat. Cat. p. 94.
111. THYAMIS LYCOPI, Foudras, Alt. p. 193; Allard, *loc. cit.*, 832; Wat. Cat. p. 94.
abdominalis (Duft.), Allard, *loc. cit.*, 119, 67.
112. PSYLLIODES CUPRONITENS, Förster, Uerbers. Kaf. Faun. Rheimp. p. 37; Allard, *loc. cit.*, 815, 214; Wat. Cat., p. 95.
113. PSYLLIODES PICIPES, Redt., Faun. 538; Allard, *loc. cit.*, 822, 223; Wat. Cat. p. 95.
114. APTEROPEDA SPLENDIDA (Förster), Allard, *loc. cit.*, 577, 182; Wat. Cat. p. 96.
115. SCYMNUS FASCIATUS (Geoffroy), Fourc. Ent. par. i. 149, 21; Mulsant, Col. de Fr. 242, 9; Wat. Cat. p. 99.
116. SCYMNUS MULSANTI, Waterhouse, Proc. Ent. Soc. 4 Mar. 1861, Zool. 7453 (1861), Trans. Ent. Soc. Vol. i., 3rd series, pt. ii. (described).
limbatus, Steph. Coll., nec Steph. Illustr.

Similar to *S. discoideus*, Illig., but smaller; having the legs uniformly testaceous, the pectoral groove obsolete, and the underside more thickly and finely punctured; the red

colour of the elytra also is usually darker, and the elytra broadly margined with black throughout.

Found in marshy places, not on or near pine trees, as is always the case with *S. discoideus*.

Taken at Southend and Holme-bush by Mr. Waterhouse, and by Dr. Power at Holme-bush, Deal and Lee.

117. CLAMBUS PUBESCENS, Redt., Faun. Aust. 119, 158 ;
Fairm. et Lab. ; Wat. Cat. p. 100.

118. PTINELLA, Motsch, Matthews.

Some members of this genus require no comment, but the following arrangement of our British species is in accordance with the views of Mr. Matthews, who informs me that subsequent observations have much confirmed his previously recorded suspicions as to the wings in *Ptinella* affording merely a sexual distinction ; and therefore species, hitherto considered distinct, are coupled together in the present notice ; still further observation is required before this association can be absolutely confirmed. I am much indebted to Mr. Matthews for his kind assistance in this matter.

Sp. 1. (fig. 2.) PROTEUS, Matthews, Zool. 8261
(1862), described.

Ratisbonensis, Matth., Zool. 8058
(1862) ; Wat. Cat. p. 101 (nec
Gillmeister).

It appears that the doubts expressed by Mr. Matthews as to the identity of the *Ptinella*, taken so plentifully by himself in the midland counties with the *Ratisbonensis* of Gillm., are now justified beyond question ; also that Mr. Matthews' insect is a new species ; to which, on account of its numerous variations, he has given the name of *Proteus*.

It occurs both with and without wings, and with the wings imperfectly developed; the specimen figured in our frontispiece having the wings very conspicuous. The usual proportion appears to be one winged to four apterous examples.

It is well distinguished from its congeners by its large size and long pubescence, also by the greater dilatation of the anterior part of the thorax and by the oblong elytra, and from all, except *P. Maria*, by its obtuse abdomen.

Sp. 2. *MARIA*, Matth., Zool. 8058 (1862), described.

At first sight resembles a minute *Omalium*; differs from its congeners in the greater width of the body, the rounded thorax, long slender legs, and fineness of its punctuation. Three winged and two apterous specimens were taken by Mrs. Matthews in Derbyshire.

Sp. 3. *PUNCTIPENNIS*, Fairm. et Bris., Ann. Soc. Ent. Fr. (1859), 32 (*Ptilium*); Rev. A. Matthews, Zool. 8058 (1862).

Ratisbonensis, E. W. Janson, Proc. Ent. Soc. 4 April, 1859, Zool. 6614 (1859), Ent. Ann. 1860, p. 111 . . . (*alata*).

DENTICOLLIS, Fairm., Ann. Soc. Ent. Fr. (1857), 732 (*Ptilium*); Matth.; Wat. Cat. Brit. Col. . . . (*aptera*).

Mr. Matthews writes that Mr. Janson, to whose persevering exertions both the above owe their introduction to our lists, has again met with them this summer, and in company, thereby considerably confirming Mr. Matthews' previously expressed opinion as to the probability of their being the sexes of the same species.

One of the two examples of the winged form previously known to science was taken by Mr. Janson in the London district, March, 1858.

The *P. Ratisbonensis* of Ent. Ann. 1860, appears (by a mistake almost inevitable at that time) to be wrongly so named; it is *P. punctipennis*, Fairm.

Sp. 4. BRITANNICA, Matth., Zool. 6032 (1858);
Wat. Cat.

This species has occurred as yet only in the apterous form.

Sp. 5. TENELLA, Erichs., Ins. Deutschl. iii. 33, 15;
Matth.; Wat. Cat.
microscopica, Gillm.

A single foreign specimen, without wings, in the collection of M. Aubé, and another with wings, taken by Mr. Matthews in Sherwood Forest, are the only known examples of this species.

Sp. 6. RATISBONENSIS, Gillm. in Sturm's Deutschl.
Faun. xvii. 61, 2, T. 324, fig. 2 (1845),
Trichopteryx, (not of Matth. Zool. 8058
(1862) nor of Wat. Cat.).
testacea, var. Erichs.

Mr. Matthews says the true *Ratisbonensis* is so closely allied to *P. testacea*, Heer, that Erichson is probably right in considering it merely a var. of that species; but, whether distinct or not, it has been taken in England by Mr. Matthews, and its name must, therefore, be retained in our lists.

It has as yet occurred here only in the winged form.

Sp. 7. TESTACEA, Heer, Faun. Col. Helv. i. 376, 9
(1841); Rev. A. Matthews, Zool. 8058
(1862).
limbata, Heer, *loc. cit.* 376, 8; Wat.
Cat. (*alata*).

APTERA, Guérin, Rev. Zool. 90 (1839)
Ptilium; Erichs.; Wat. Cat. (*aptera*).

Mr. Matthews associates these two forms, but remarks that it is strange *testacea* should so rarely occur, both here and on the continent, whilst *aptera*, the only one with which it can be associated, is the most generally distributed of the genus.

Among Mr. Matthews' specimens of *testacea* (all of which were taken in company with *aptera*), is one that agrees exactly with the type specimen of *Ratisbonensis* sent by Dr. Schaum.

Seven examples of *testacea* were taken by Messrs. Matthews and Hildebrand in the Midland counties; it has also been taken by Mr. Janson in the London district; on both occasions along with *aptera*.

P. aptera was first found by Mr. Janson in the London district, and afterwards taken plentifully by Messrs. Janson, Scott, Douglas and Gorham; found also in the Midland counties by Messrs. Matthews and Hildebrand.

Sp. 8. GRACILIS, Gillm. in Sturm's Deutsch. Ins.
 xvii. 62, pl. 324, fig. 3; Matth. Zool. 8059
 (1862) (*alata*).
 ANGUSTULA, Gillm. *loc. cit.*, 66, pl. 324, f. 6;
 Wat. Cat. (*aptera*).

One specimen only of *P. gracilis* has yet occurred, found by Mr. Matthews, in company with *P. angustula*, which latter was first taken by the same gentleman in the Midland counties, and afterwards by Mr. Janson in the London district; in both localities rather plentifully.

119. TRICHOPTERYX ATTENUATA, Gillm. *loc. cit.*, 49, pl.
 322, f. 5; Matthews, Zool. 7975 (1862).

Distinguished from the rest of the genus by the transverse

foveæ at the posterior angles of the thorax, and by having the elytra much attenuated towards the apex; the antennæ also are almost entirely black.

Its place in our lists is next after *T. fucicola*, Allib.

Taken by Rev. A. Matthews near Gumley.

120. TRICHOPTERYX GUERINII, Allibert, Rev. Zool. (1844), 52; Fairm.; Rev. A. Matthews, Zool. 7975 (1862).

Intermediate in size (and position) between *T. sericans*, Heer, and *T. pygmæa*, Erichs.; much depressed in shape, with the elytra usually more or less red, sometimes wholly so.

Taken by Mr. Matthews near Gumley; also by Dr. Power.

121. PTILIMUM INQUILINUM (Märk.) Erichs., Ins. Deutsch. iii. 26, 3; Gillm.; (nec Wat. Cat.).

canaliculatum var. Märk.

cæsum, Ent. Ann. 1860; Wat. Cat. (nec Erichson).

Mr. Matthews writes to me that the true *Pt. cæsum*, Erichs., has not yet occurred in England; the specimens bearing that name in our collections, and found by Mr. Gregson in ants' nests sent from Scotland, belonging to this species.

Mr. Matthews also informs me that the specimens taken by Mr. Waterhouse, and referred by the former in Zool. 7410 (1861) to this species, are certainly distinct, and probably must be referred to *P. discoideum*, Gillm.

122. PTILIMUM INSIGNE, Matthews, Zool. 7410 (1861), described; Wat. Cat.

Distinguished by the deep and wide longitudinal channel

of the thorax, on each side of which is a parallel, distinct and deeply impressed line; the latter in *canaliculatum*, &c., being oblique and faint; also remarkable for the dilatation of the tibiæ.

A single specimen taken by Mr. Waterhouse.

123. *PTENIDIUM FUSCICORNE*, Erichs., Ins. Deutschl. iii. 37, 4.

picipes, Matth., Zool. 7067 (1860); Wat. Cat.

I am informed by Mr. Matthews that his *P. picipes* has proved identical with *fuscicorne*, Erichs.; hence the latter name claims priority.

124. *PTENIDIUM FORMICETORUM*, Kraatz, Stett. Ent. Zeit. (1851), p. 167; Rev. A. Matthews, Zool. 7976 (1862).

Next before *P. apicale*, Erichs., in our lists, but smaller and narrower than that species, with the thorax less convex and elytra more pointed at the apex; the latter entirely bright rufo-piceous.

Detected by Mr. Matthews in his own collection, among *P. apicale*, Erichs.

125. *LATHRIDIDIUS RUGOSUS*, Herbst, Col. v. 6. 3, Tab. 44, f. 3, c. C; Gyll., Ins. Suec. iv. p. 140, 20 (*Lathridius*); Mann., in Germ. Zeits. für die Entom. vol. v. (1844), p. 90, sp. 28; G. R. Waterhouse, Proc. Ent. Soc. 1st Dec. 1862.

In the collections of Mr. Waterhouse and Rev. A. Matthews.

126. *MYRMECOXENUS VAPORARIORUM*, Guér., Ann. Soc. Ent. Fr. (1843), p. 70, pl. ii. f. 1; Wat. Cat. p. 103 (1861).

127. *BRYAXIS SIMPLEX*, Waterhouse, Proc. Ent. Soc. 4 Mar. 1861, Zool. 7455 (1861); Wat. Cat. p. 103 (1861).

As large as *B. sanguinea*, Fab., but in the same section as *B. fossulata*, Reich., having the abdomen simple in both sexes. Rufo-piceous, elytra red, margins dusky, legs fusco-testaceous, anterior coxæ unarmed in the male, which is only to be distinguished by a small spine at the apex of the intermediate tibiæ.

Found by Mr. Waterhouse at Strood, on the Medway; also by myself at Southend.

128. *BRYAXIS HELFERI*, Schmidt, de Pselaph. Faun. Prag. 33; Aubé; Wat. Cat. p. 103 (1861).

pulchella, Schaum.

assimilis, Curtis (?)

Common on the south coast, especially near Folkestone.

129. *BRYAXIS LEFEBVRII*, Aubé, Mon. Pselaph. 28 (?), G. R. Waterhouse, Proc. Ent. Soc. 4th Mar. 1861, Zool. 7454 (1861); Wat. Cat. p. 103 (1861).

Mr. Waterhouse records as above a female *Bryaxis* in his collection resembling *Helperi* but certainly distinct; the abdomen more finely and less thickly punctured, the whole insect narrower, and the humeral angles more prominent: this specimen agrees most closely with a male *Lefebvrii* received from Paris.

130. (fig. 1.) *TRICHONYX SULCICOLLIS*, Reichenb., Mon. Pselaph. 62 (*Pselaphus*); Aubé, Ann. Soc. Ent. Fr. (1844) 141; Fairm. et Lab., Faun. Ent. Fr. 364, I; G. R. Waterhouse, Proc. Ent. Soc. 2 June, 1862, Zool. 8101 (1862).

Anthicus Dresdensis, Fab.

This magnificent Pselaphidian (the largest in Europe,

except perhaps *Batrisus formicarius*) was taken in some numbers by Messrs. Douglas and Scott under elm bark, "in the London district."

It may be known from *T. Märkelii* by its superior size, its thorax not being so contracted behind, and the elytra more opaque and not so finely reticulated.

131. TRICHONYX MÄRKELII, Aubé, Ann. Soc. Ent. Fr. (1844), 142; id. Mon. Pselaph. 52 (*Euplectus sub-cicollis*); Wat. Cat. p. 104 (1861).

Bryaxis hæmatica, pars, Steph. Coll.

Recently taken by Mr. Waterhouse in moss, at Mickleham, and has been met with by other Entomologists.

132. EUPLECTUS KUNZEI, Aubé, Ann. Soc. Ent. Fr. 2^{me} série, ii. 143, sp. 3 (1844); Wat. Cat. p. 104 (1861).

Like *E. Dennii*, but larger, more depressed, and with a larger head; rufo-testaceous in colour, instead of pitchy-black.

Taken by Mr. Waterhouse at Greenhythe.

133. EUPLECTUS DENNII, Waterhouse, Trans. Ent. Soc. Lond. Vol. i. 3rd Series, Pt. ii. (1861); Wat. Cat. p. 104 (1861).

? *sanguineus*, Denny, Mon. Pselaph. p. 10, sp. 2 (1825).

Like *E. nanus*, but more elongate, and with longer and more slender antennæ; the eye also is larger and more prominent; and there is no distinct fovea on the raised part of the head.

Taken by Mr. Waterhouse at Hawkhurst, Kent.

134. SPHINDUS DUBIUS, Gyll., Ins. Suec. i. 243 (*Nitidula*);
Wat. Cat. p. 105 (1861).

Gyllenhalii, Chevr.; J. A. Power, Proc. Ent. Soc.
5 Nov. 1860.

humeralis, Mink.

Taken by Charles Turner in fungus in the New Forest.

The following notice of new localities and captures of rarities (I believe previously unrecorded) will probably be interesting.

AGABUS BRUNNEUS, Fab. This very rare species has been lately rediscovered by Dr. Power; who, with much trouble, and after the lapse of many years, found the identical spot in the New Forest where he originally took it.

DINARDA DENTATA, Grav. Taken in plenty by Messrs. Scott and Douglas in nests of *Formica sanguinea*, near Croydon.

MYRMEDONIA HAWORTHI, Steph. Taken by Mr. H. Montague at Dulwich, Mr. E. Smith on Reigate Common, and by Bouchard at Sutton.

OCYUSA PICINA, Aubé. Found by Dr. Power at Drayton and Cowley.

EURYPORUS PICIPES, Payk. Taken by myself on Purley Downs, Croydon; subsequently, at the same place, by Mr. A. Haward and Mr. C. Waterhouse.

QUEDIUS TRUNCICOLA, Fairm. Taken twice by Mr. H. Montague under elm-bark on Clapham Common. A specimen, liberally presented to me by that gentleman, exhibits a considerable depression between the eyes (which also appears in Mr. Waterhouse's specimen); I have not noticed this in *Q. fulgidus*. The third joint of the antennæ

appears also not so long in proportion as in the latter species. Those who doubt the specific value of *truncicola* must surely have omitted to notice its punctured scutellum.

PHILONTHUS CORVINUS, Erichs. Taken by Dr. Power at Merton, also by myself at Mickleham (in fungus) and elsewhere. At once distinguished from *ebeninus* by its larger size, deep black colour, rounder head, and more elongate joints of the antennæ.

LATHROBIUM PALLIDUM, Nordm. Found by Mr. H. S. Gorham, near West Wickham.

STILICUS FRAGILIS, Grav. It is astonishing how common a species sometimes becomes; this hitherto very rare insect has occurred all over the country, sometimes in profusion. Taken by Mr. Adams, Mr. Janson, Dr. Power, Mr. Brewer and Mr. E. Smith, also abundantly by my friend Mr. Garneys, in Suffolk.

STENUS PALUSTRIS, Erichs. Found in great quantity by Mr. G. R. Crotch, also by Mr. Brewer, in the Fen district.

ACROGNATHUS MANDIBULARIS, Gyll. Mr. J. Scott has taken a specimen of this rare insect at the original locality, Darenth, and, with his usual liberality, presented it to Mr. Waterhouse.

PSEUDOPSIS SULCATUS, Newm. Taken abundantly by Mr. Brewer in a haystack at Reigate.

SPHÆRITES GLABRATUS, Fab. Again taken by Turner, and in some numbers, at Rannoch.

HETÆRIUS SESQUICORNIS, Preysl. Dr. Power has taken this little notoriety in nests of *Formica rufa* at Weybridge; and Messrs. Douglas and Scott have found it near Croydon with *Formica sanguinea*.

COLYDIUM ELONGATUM, Fab. Rescued from Leachian suspicion by Charles Turner, who took it in the burrows of *Platypus* in the solid wood, New Forest, Hants.

LÆMOPHLEUS DUPLICATUS, Waltl. Taken by my friend Mr. G. Lewis at Farnborough very plentifully; also by myself at Coombe Wood.

LÆMOPHLEUS BIMACULATUS, Payk. Taken in some numbers by the indefatigable Messrs. Scott and Douglas, under bark of hornbeam, Hainault.

MYCETOPHAGUS POPULI, Fab. Found in profusion in the rotten black interior of an old elm by Mr. W. Leedes Fox of Harleston, Norfolk, to whose liberality all collections possessing this rare species are indebted.

HELOPHORUS INTERMEDIUS, Muls. This insect resembles a small example of *aquaticus* more than *nubilus*. I found it last year at Walton-on-the Naze.

MEGAPENTHES LUGENS, W. Redt. A single specimen of this species (apparently equally rare on the Continent) was taken by my friend Mr. H. Montague, under elm bark in his garden at Stockwell; the same garden has produced also *Ischnodes sanguinicollis*, *Eryx atra* and *Xylophilus populneus*.

DICTYOPTERUS MINUTUS, Fab. This rarity has suddenly occurred at two distant places. Taken at Mickleham in last September by Dr. Power, afterwards by myself at the same place, by sweeping under fir trees. About the same time it was also taken by Mr. Saunders, jun., at Bristol in some numbers, on a felled tree.

TETRATOMA DESMARESTII, Latr. Taken by Mr. H. S. Gorham at Coombe Wood; by Mr. A. Matthews in Leicestershire, Mr. Leedes Fox in Norfolk, and Turner in the New Forest.

TROPIDERES NIVEIROSTRIS, Fab. Messrs. Douglas and Scott each took a specimen of this rarity on the 8th June last, by beating dry sticks near the Fox, Darenth.

CEUTHORHYNCHUS VIDUATUS, Gyll. Taken by Mr.

Garneys in Suffolk. This insect much resembles *Cæliodes didymus*; but, apart from the generic character of the pectoral groove, may be known from that species by its larger size, and the white marks on the elytra being nearer the shoulder.

CRYPHALUS ABIETIS, Ratz. Taken by Mr. Garneys at Bungay.

STRANGALIA REVESTITA, Lin. Taken in June last by Mr. J. Scott at Darent.

SYMBIOTIS LATUS, Redt. Taken in some numbers by Mr. Gorham in a rotten stump near Clifton, Bristol; and at Bungay by Mr. Garneys.

E. C. RYE.

284, KING'S ROAD, CHELSEA, S.W.,
10th November, 1862.

LEPIDOPTERA.

NOTES ON SOME OF THE GENUS EUPITHECIA.

BY THE REV. H. H. CREWE, M.A.

Occurrence of a Eupithecia new to Science in Great Britain. EUP. FRAXINATA, Crewe.

SINCE I took up the study of habits, larvæ and food plants, &c. of the genus *Eupithecia*, I have strongly suspected that the typical Continental *Eup. innotata*, Hb., was entirely distinct from our British species bearing the same name; though the perfect insects so closely resemble each other that they are as difficult to distinguish as *Acronycta psi* and *tridens*, the larvæ are so totally dissimilar in habits, appearance, colour and food plant, that I could never believe they belonged to the same species, and I determined, if possible, to set the matter at rest during the past season. I am happy to say that I have succeeded in doing so, and have much pleasure in announcing to the Entomological world, that our British species is not only entirely distinct from the true Continental *Eup. innotata*, Hb., but apparently an undescribed species entirely new to science. In July last I was able to forward to Professor Zeller, at Meseritz, two full-fed larvæ of our British *ash*-feeding species: these were reared from four eggs, kindly sent me by my friend Mr. Greene, who, after much trouble, succeeded in getting two moths to pair in confinement. These moths were reared

from larvæ and pupæ taken from *ash* by Mr. G. in Derbyshire, in the autumn of 1861. M. Zeller immediately replied that these larvæ were in every way so totally unlike those of the Continental species, which occurs somewhat freely in the neighbourhood of Meseritz on *Artemisia campestris*, that there could be no question whatever as to the specific distinctness of the two insects. In the course of the autumn, M. Zeller very kindly sent me four living larvæ of *Eup. innotata*, Hb., taken by himself at Meseritz on *A. campestris*. I at once came to the same conclusion as himself. No two larvæ can be more dissimilar. Having taken an accurate description, and secured most exquisitely life-like drawings of both larvæ from my kind friend Mr. Buckler, I sent the latter off to Mr. Doubleday, whose opinion I value more than that of any other living Entomologist. He at once replied that there could be no doubt whatever that our British insect was totally distinct from the Continental species. With his entire concurrence, I, therefore, propose to name it *Eup. fraxinata*, Crewe. I have for some years past been familiar with the larva, and have found it to be exclusively confined to *ash*. Mr. Greene has also for some years past been in the habit of taking the pupa, and he has invariably found it under moss on the trunk or at the roots of that tree. I conceive, therefore, that it would be difficult to select a more appropriate title. The following elaborate description of *Eup. innotata*, and the points of difference between it and *Eup. fraxinata*, was kindly written for me by Mr. Westwood, to whom I sent a well-marked pair of each insect. I also subjoin a description taken by myself of the larvæ of both species.

EUP. INNOTATA, Hb.

Expanse of fore wings 10—10½ lines. Colour grey, slightly tinged with brown, varied with brown and black scales.

Disc somewhat paler than the margins. Along the anterior margin a series of about twelve irregular-sized black spots, generally arranged in pairs, forming the anterior outlines of the paler undulated strigæ, which run across the wings. From the base to the middle of the anterior margin, these spots have an outward direction, but from the middle to the tip they are directed obliquely towards the base of the wing. In the middle of the wing, closing the discoidal cell, is a small transverse black spot. The median vein between the base and the first branch is marked with one roundish and three oblong minute black spots. The branches of the median veins, as well as the two disco-cellular and the sub-anal veins, are also faintly marked with blackish spots, those on the first branch of the median vein being the most strongly marked. All these dark spots indicate the direction of the pale obliquely undulated strigæ, of which one near the base, two running across the middle of the discoidal cell (strongly elbowed near the middle of the cell), two beyond the middle of the wing (strongly elbowed towards the fore-margin), and one sub-apical (strongly elbowed near the anal angle, forming a well-marked W opposite the apical angle), are the most conspicuous: several others are, however, much more slightly indicated. The outer portion of the wing has also a series of small dark lines running from the margin towards the disc between the veins; the outer margin itself is formed by a dark line. The fringe is pale, with a dark line near its base; the outer portion is also dark.

Posterior wings paler than anterior ones, especially on the disc; anal portion darker, varied with short transversely undulating strigæ. At the commencement of the disco-cellular vein a very minute dark dot. Beyond the middle of the wing a denticulated dusky striga, followed by a whitish one commencing at the anal angle, beyond which the outer portion of the wing is dusky. Fringe paler at the base, darker

on its outer portion, with a dark line near the base dilated into dark dots opposite the extremities of the longitudinal veins. Body griseous, slightly varied with darker scales. On the middle of the posterior margin of each abdominal segment a small pale dot, preceded by a dark semicircle. Antennæ slightly luteous.

EUP. FRAXINATA, *Creve.*

Expanse of anterior wings in a full-sized specimen $10\frac{7}{8}$ lines (English measure). These wings are of a more uniformly brownish-grey colour than in the preceding species. The black markings and pale undulated strigæ always very faint and indistinct, but in number and position similar to those of *Innotata*. Fringe more uniform in all the wings. The white strigular sub-apical W, so distinct in the previous species, is here very faint, and sometimes scarcely visible. Disc of hind wings much darker; anal portion less strongly marked, especially towards the body; the dark and pale sub-apical strigæ can in fact only be traced with difficulty, though their position is clearly shown by the somewhat more decided markings at the anal angle.

The above descriptions were taken from a very fine pair of *E. innotata* bred and sent me by M. Zeller, and an equally fine pair of *E. fraxinata* bred by myself.

Description of Larva of EUP. INNOTATA, *Hb.*

Ground colour pinkish-grey. Central dorsal line dull purplish red, or rusty brown, connecting a series of well-defined top-shaped blotches of the same colour. Dorsal blotches margined by a number of lateral white stripes. Each lateral segment ornamented by a largish orange-red and dusky purple spot. Spiracular line white. Back and sides more or less suffused with orange. Head dusky purple.

Whole body studded thickly with minute tubercles. Belly purplish grey. Central ventral line dusky purple, margined with white. Resembles the pink variety of the larva of *E. nanata*; the lateral stripes also remind me of the larva of *E. virgaureata*. Feeds on *Artemisia campestris*, Zeller, and according to Knoch and Schwarz on *A. absinthium* and *vulgaris*. The larvæ sent me by M. Zeller were full fed, Oct. 6—10th. Pupæ inclosed in an earthen cocoon. Thorax and wing cases pale yellowish green. Abdomen pale yellowish red, segmental division dark red.

*Description of Larva of EUP. FRAXINATA, Creve.**

Long, smooth, tapering towards the head. Ground colour uniform dull-green. Segmental divisions yellow. Central dorsal line dingy-green or purple, very indistinct, except on the anal appendage, where it is dilated into a large dark purple spot. Spiracular line yellow. Belly whitish, wrinkled, central ventral line dark green. A variety rarely occurs in which the central dorsal line is wanting and its place is supplied by a series of dusky triangular blotches, becoming faint or evanescent on the anterior and posterior segments. On each side is a row of slanting yellowish stripes, tinged with pink. Pupa enclosed in a cocoon under moss, on the trunks of *ash*, long, slender and tapering. Thorax and wing-cases dark olive. Abdomen still darker, almost black, tinged posteriorly with red. Feeds exclusively on *ash*. Mr. Greene and myself have for some years been in the habit of taking both larvæ and pupæ, and we never found them upon any other plant. The larva will eat flowers of *laurustinus* if reared from the egg in confinement. It is full fed at the end of August and beginning of September. Perfect insect appears at the end of June and throughout

* Described as *Innotata*, Annual, 1861, p. 136.

July. The larva of *E. tamarisciata*, Frey, Guenée, p. 332, seems somewhat to resemble this species.

*Occurrence of EUP. ARCEUTHATA, Frey, in
Great Britain.*

During the three years that I have been resident in Buckinghamshire I have taken the larva of this insect on *wild juniper* on our chalk hills. When I first found it, I took it to be the larva of *Eup. Helveticata*, Bdv.; but when the moths appeared the following spring, they were so different in size, colour and general appearance, that I could not believe them to be that species. Having an opportunity during the past season of sending some *Eupitheciæ* to Professor Zeller of Meseritz, I enclosed a specimen or two of my Buckinghamshire insect with the rest. M. Zeller at once informed me that it was *Eup. arceuthata*, Frey, an insect which he was in the habit of breeding freely in his neighbourhood. He also kindly sent me some fine bred Continental specimens, which precisely tallied with my own. M. Zeller, however, added, that he considered this species and *Helveticata* to be identical, the latter being a northern variety of the former. He admitted, however, that he was not acquainted with the œconomy of *Helveticata*, and had had no means of comparing the respective larvæ. Messrs. Doubleday and Bond were inclined to hold the same opinion, but they also had not seen and compared the larvæ. I determined, therefore, if possible, to try and set the matter at rest. I succeeded in May last in getting impregnated eggs from my Buckinghamshire-bred *Arceuthata*. These I distributed among various friends: Mr. Hellins, Mr. Greene and myself succeeded in rearing a few. Through the kindness of Mr. Wilson, of Edinburgh, I procured some living larvæ of *Eup. Helveticata* from the Pentland Hills. I

made a careful and accurate comparison of each larva, and took as accurate a description as I could. I also secured from my kind and talented friend Mr. Buckler some exquisitely life-like coloured drawings. There appear to be unvarying distinctive differences between the two larvæ, and I am almost satisfied in my own mind that the two species are entirely distinct. At any rate I am convinced that there is no sufficient evidence at present for amalgamating them, though Dr. Staudinger has done so in his "Catalogue of European Lepidoptera," published in September, 1861. Almost every Entomologist to whom I have sent the perfect insect, with the exception of my excellent friends Messrs. Doubleday and Bond, who are a host in themselves, think it quite distinct from *Helveticata*, and to my eyes it has never seemed anything else. Both, however, upon seeing Mr. Buckler's drawings, tell me they think, if the differences between the larvæ are constant, they may probably be entirely distinct. I subjoin a description of the respective larvæ. Mr. Birchall has shown me an insect taken at Killarney in 1859 which seems to be this species.

Description of Larva of EUP. ARCEUTHATA, Frey.

Stout and plump, the same thickness from head to tail. Nearly one-fourth as large and long again as *Helveticata*. Ground colour grass green. Central dorsal line dark green. Sub-dorsal lines pale yellow or yellowish white, lower edge dark green. Spiracular line white or yellowish. Segmental divisions yellow. Belly bright green. Central ventral line yellow. Head somewhat bifid, slightly curved inwards when at rest, *invariably uniform dull-green*. Anal tip of central dorsal line *always dark green*. Spaces between sub-dorsal and spiracular lines darker green than rest of the body. Feeds on *wild juniper* from the end of September to middle

of November. It is seldom full fed till towards the end of October. It will feed on cypress if reared from the egg in confinement. Pupa enclosed in a slight earthen cocoon. Wing-cases very transparent, yellowish-green, thorax and abdomen rather paler, especially the latter. Tip of abdomen dull red. Perfect insect appears in confinement in May.

Description of Larva of EUP. HELVETICATA, Bdv.

Rather short and stumpy, much more so than the preceding species. Altogether a more clumsy looking insect. Same thickness from tip to tail. Ground colour grass green, duller than *Arceuthata*. Central dorsal line dark green, slender. Sub-dorsal lines ditto, broader, edged anteriorly with pale straw-colour and sometimes posteriorly with purple. Spiracular line waved, pale yellow or straw-colour. Head slightly bifid, curved inwards when at rest, *invariably dusky purple*, sometimes almost black. Anal tip of central dorsal line in *all* the individuals I have seen *purplish*. Segmental divisions yellowish. Belly duller green. Central ventral line yellowish. Feeds on *wild juniper*; full-fed from the beginning to middle of September, often a month or six weeks earlier than *E. arceuthata*. I have previously described this larva in the Annual, page 133, for 1861.

*Description of the Larva of EUPITHECIA
VIMINATA, Doubl.*

Rather short, tapering very considerably towards the head. Ground colour bright green, very translucent. Central dorsal and sub-dorsal lines dark green, varying very considerably in breadth and intensity of colour. Segmental divisions yellow. Spiracular line whitish green. Belly generally destitute of markings, but occasionally traversed longitudinally by two slender faint sub-ventral lines, rather

darker than the ground colour. When young the ground colour is greenish-white. Feeds on flowers and seeds of *Valeriana officinalis*, in woods and osier beds. Full-fed from the middle of July till the end of August. During the two past summers I have met with this larva in Bucks, Herefordshire and Dorsetshire. My friends Messrs. Hellins and Greene have by following my directions turned it up during the past summer in Devonshire and Derbyshire. Pupa enclosed in a slight earthen cocoon. Thorax and wing-cases bright green. Abdomen yellowish, tip and segmental divisions dull red. Perfect insect appears in May and June. There seems to be no doubt that this insect is *Eup. valeriana-nata*, Hub. He figures the larva, which agrees with those I have taken. The name *Viminata* must, therefore, I suppose sink.

Description of the Larva of EUP. INDIGATA.

Long, slender, tapering considerably towards the head. Ground colour pale greenish-yellow, or yellowish-red. Central dorsal line dusky reddish-brown or olive, frequently very faint or entirely evanescent, except on the capital segments. Sub-dorsal lines pale yellow. Segmental divisions and head reddish. Collar reddish-brown. Spiracular line pale yellow. Belly greenish-yellow. Central ventral line yellow; sub-ventral ditto reddish-brown. I succeeded in rearing a few larvæ of this species to full growth from eggs laid by moths sent me by Mr. Greening of Warrington. They fed upon *wild juniper* and *cypress*. I have no doubt that its natural food is *Scotch fir*, upon the trunks of which the moths are taken.

I have, as will be seen from the preceding pages, been able during the past year to add two new species of *Eupi-*

thecia to our British lists, and to secure descriptions and become acquainted with the habits and food-plant of the larvæ of three additional species to those hitherto described. I have now drawings and descriptions of thirty-five out of forty-five of our British species. If Entomologists at home and abroad will only help me, I hope to make a hole in the remaining ten during the ensuing season. These ten are:—*E. consignata*, *pulchellata*, *exiguata*, *egenata*, *pernotata*, *pygmæata*, *subciliata*, *debiliata*, *plumbeolata* and *togata*.

Eup. pulchellata.—Mr. Birks, of Stonor, near Henley-on-Thames, tells me that he takes this insect pretty freely in the woods in his neighbourhood, flying over the unexpanded buds of *Epilobium angustifolium*. He doubts, however, and so do I, whether this is the food-plant of the larva. I took a single ♀ myself during the past season in this neighbourhood, flying over the same plant; but though I confined her for some days in a gauze-covered box containing sprigs of the *Epilobium* and various other plants, she refused to deposit a single egg, and died with her abdomen full. This averseness to oviposition seems to be the great difficulty with this insect. Several of my friends have done their best to procure me eggs, but as yet without success. It would be worth the while of any collector in whose neighbourhood *Epilobium angustifolium* abounds, to take as many of the moths as he can at the end of May and beginning of June, and confine them in a large gauze-covered box with a bottle-full of sprigs of the plant. I know of but one small patch of the plant near here. This I thrashed well into an umbrella in August, but without any success.

Eup. consignata.—I never took this insect myself, and know of no one who does.

Eup. succenturiata.—Mr. Edleston has been fortunate enough during the past summer to get impregnated eggs from a pair of this insect, and to rear a brood of larvæ. Some of these he has most kindly given me. I believe no one now doubts the entire distinctness of this species from *Subfulvata*, but the result of these larvæ will set the matter at rest.

Eup. subfulvata.—I bred some forty specimens of this insect during the past summer; all of them were true typical *Subfulvata*, with the exception of five or six suffused specimens verging upon the variety *cognata*.

Eup. centaureata.—I met with a very singular variety of the larva of this insect in July in Gloucestershire. It was feeding on the flowers of the *great water hemlock*. The ground colour was mealy green. Central dorsal line very indistinct, darker green, invisible except in the capital segments. Sub-dorsal lines almost invisible dull green. Segmental divisions and spiracular line yellowish-white. I have taken some hundreds of larvæ of *centaureata*, but never saw this variety, and till the perfect insect appeared, which it did in about a fortnight after the larva spun up, I was puzzled to know what I had got.

Eup. plumbeolata.—This insect seems quite as averse to deposit its eggs in confinement as *Pulchellata*; several of my friends who take it pretty freely have tried in vain to procure me eggs. I would recommend placing a number of moths in a gauze-covered box containing a bottle filled with sprigs of *Hypericum pulchrum*, *perforatum* and *hirsutum*, and *Teucrium scorodonia*. I have an idea that one or other of these may prove the food-plant.

Eup. virgaureata.—This insect appears to be double-brooded. In May M. D'Orville of Alphington kindly sent me a batch of impregnated eggs. They hatched in a few

days. The larvæ fed up with great rapidity on flowers of cow-parsley (*Anthriscus sylvestris*). They had all spun and turned by the end of June. The perfect insects emerged between the last week in July and the middle of August. From these I obtained another batch of eggs which hatched in a few days. I fed the larva up on their typical food-plants, *Senecio jacobæa* and *Solidago virgaurea*. They were nearly as long again as the summer brood in attaining full growth. These latter, though fed on such different pabulum, differed scarcely at all in colour and appearance from the autumnal brood. The moths of the summer brood were rather smaller and darker.

Eup. tripunctata, H.-S.—This name must sink and be superseded by *Albipunctata*, Haw. Mr. Dale, who possesses Haworth's old original specimens, says they are precisely identical with the modern *Tripunctata* of Herrich-Schäffer. I suspect that this species, like the preceding, is double-brooded. It is (at least when bred in confinement) one of the earliest to appear, but the larva is not hatched till the beginning of September, and may be found full-fed till the end of October. On the 19th of August I took a fine fresh ♂ (the only perfect insect I ever took), and a few days afterwards I found the eggs upon the unexpanded buds of *Angelica sylvestris*. The larva was tolerably plentiful in this neighbourhood.

Eup. trisignata. This larva was also pretty plentiful. The perfect insect does not seem to be double-brooded. In the wild state it does not seem to emerge till August, the eggs may towards the end of the month be found deposited pretty freely on the buds and flowers of *Angelica sylvestris*.

Eup. expallidata.—M. D'Orville and Mr. Hellins have, during the past summer, bred this insect from larvæ taken in 1860.

Eup. subciliata.—This insect has again been taken flying over old maples. I have, however, been unable to procure eggs. May I again earnestly beg any Entomologist who meets with it to try and procure me some?

Eup. sobrinata.—My friend Mr. Pickard Cambridge met with two specimens of an insect allied to this species on a heath at Rannoch, in June, which I have little doubt will turn out to be a species new to the British lists.

Eup. coronata.—I have taken the larva of this insect during the past season on the flowers of *Clematis vitalba*, *Eupatorium cannabinum*, *Achillea millefolium* and *Artemisia vulgaris*. The three last-named plants are new to me as pabulum for this larva. The specimens taken upon *Artemisia vulgaris* were a singular dark-coloured variety.

Eup. debiliata.—This insect was taken in some plenty in July, at Burnt Wood, Staffordshire, but unfortunately no eggs were procured. Dr. Breyer, of Brussels, has bred it from larvæ taken on *Vaccinium myrtillus*. This plant, I believe, abounds in Burnt Wood, and the moths were taken sitting upon it. It is, I am told, a very sluggish insect in its habits, and easily captured.

H. HARPUR CREWE,

THE RECTORY, DRAYTON-BEAUCHAMP, TRING

November 18th, 1862.

TRICHOPTERA.


 NOTES ON BRITISH TRICHOPTERA, WITH DESCRIPTION OF
 A NEW SPECIES OF RHYACOPHILA.

BY R. M'LACHLAN, F.L.S.

HAVING been again requested to furnish any new information I may possess on insects of this order, I have much pleasure in complying; and in the notes which follow have endeavoured to chronicle what has been done during the past season, and I must premise that it is not my fault that this is so little. I had hoped that by this time, Dr. Hagen's labours to unravel the tangled web in which the knowledge of the British and Continental species generally had become involved, would have been better appreciated, and that now, instead of half-a-dozen workers (and this is the maximum), there would have been admirers of the group spread over the length and breadth of the land. It may be very pleasant to have a branch of study almost to one's self, but it would be far more satisfactory to know that others were following the same pursuit, and that there was some chance of obtaining something like an accurate knowledge of our wealth of species and of their habits and transformations. When one looks at the number of workers in other orders, for instance *Lepidoptera* and *Coleoptera*, and sees that notwithstanding the vigilance with which every part of the country is ransacked, yet there usually appears a long annual list of 1863.

novelties, he cannot help regretting that such orders as *Trichoptera* and *Neuroptera* should be so greatly neglected.

It may be said that it is invidious to draw a comparison between these orders, and that the former are far more local in their habits; but granting that the individual species of insects which in their earlier stages are aquatic are probably less restricted in their geographical distribution than those whose habits are mostly terrestrial, yet experience proves that the laws of distribution are very little understood: I have never yet visited a new locality at any distance from home where I did not obtain either new species or those that I had not previously met with. My collection numbers at the present time about one hundred and ten species, including several undoubtedly new, but of which I can at present say nothing definite.

The past season has not been by any means prolific in insect life generally, owing no doubt to the prevalence of cold and damp weather. I cannot say that I noticed any considerable diminution in the number of *Phryganidæ*, nevertheless there is a meagre list of novelties. The localities frequented by these insects are not, even in fine weather, always the most delectable to human beings, and a wet season renders the collecting them additionally unpleasant, unless the collector is proof against any amount of moisture both from above and below.

Mr. Parfitt has bred a Dipterous insect* about the size of the common house-fly, from the case of *Limnephilus marmoratus*. I am not aware that the presence of Dipterous parasites in *Trichoptera* has been noticed elsewhere. Kolenati says that they are attacked by either *Diptera* or *Hymenoptera*, but I believe that his observations have since been proved to apply to the ichneumon *Agriotypus armatus*.

* *Hydrotachina limnephili*, Walker.

Mr. Parfitt did not notice that the affected larvæ constructed their case in a peculiar manner, as do those species that are preyed upon by ichneumons. The manner in which this fly deposits its eggs is an interesting subject for investigation; it must be done when the case is floating on the surface, and as it would seem to be impossible that it can penetrate the mass of wood, gravel and shells, of which the case is formed, it is possible that the egg is fixed outside close to the entrance, and that the larva when hatched finds its way into the interior and attacks its victim. Those species that are attacked by ichneumons, have their cases usually fixed at the bottom of shallow streams, where they can be reached by the long ovipositors of the parasites, which probably also pierce the cases from the outside, as they are not formed of such firm materials.

The species to be added to our lists, and which are noticed in their places in the following notes, are—

Limnephilus hirsutus, Pict. (nec Kolen.)

Mormonia basalis, Kolen.

Rhyacophila obliterated, n. s.

R. munda, M'Lach.

Several others must stand over till another season, as I am not yet able to determine them satisfactorily.

Phryganea minor, Curtis. In the beginning of July, Mr. Barrett informed me that he had taken several of this species near Haslemere, and a few days afterwards I visited the spot with him. It was in a wood, and we found the insect in profusion on the trunks of oak trees, which it much resembled in colour. These trees stood round old gravel pits then dry, but filled with dead leaves; there can be no doubt that these are the breeding-places, the female probably depositing her eggs among the leaves, and the gelatinous matter in which they are enveloped, keeping them from

drying up, until the pits are filled by the autumnal rains. It has hitherto been a scarce species.

Limnephilus stigma, Curtis. This appears to be a very local species; Mr. Wormald found it abundantly at Ruislip Reservoir, Middlesex, and I also took it at the same place. It is excessively variable: some examples have no markings except the dark pterostigma, and thus resemble Curtis's and Stephens's types (some of these even have no pterostigma, but I have seen no recent specimens without it); in others the fore-wings are almost entirely dark brown, owing to the numerous dark spots becoming confluent, the pale fenestrated spot and anastomosal space then appearing very conspicuous, but the majority have the wings thickly speckled with brown, darkest towards the inner margin. This form is the typical *G. stigmaticus*, Kolenati, and probably identical with *L. fulva* and *impura*, Rambur.

An example of the dark variety was taken at Folkestone by Dr. Knaggs.

Limnephilus hirsutus, Pict. (nec Kolenati). *Phryganea hirsuta*, Pictet, Recherch. p. 159, 29, pl. 11, fig. 10. This species has not been hitherto definitively recorded as occurring in this country. Dr. Hagen compared a specimen of No. 2, Ent. Annual, 1862, p. 28, with Pictet's type, and found them identical.

Stenophylax. My paper on this genus is published in Part 3, Vol. I. of the Third Series of the Transactions of the Entomological Society. The relationship of this genus to *Anabolia* is very close; the latter seems to differ chiefly in the peculiar form of the anal appendages.

Apatania vestita, Kolenati. Mr. Piffard gave me several specimens taken by him in the beginning of May near Windermere: the app. intermediate are long, slightly curved, needle-shaped; the app. inf. very long, biarticulate; the first

joint rather longer than the second, club-shaped, with long hairs; the second obtuse, curved inwards and downwards, thickly clothed with short black hairs. This is *distinct* from *A. fimbriata*, Pictet, which is much paler and with differently formed appendices.

Silo pallipes, Curtis. I met with a form of this insect near Hythe, Kent, very small but scarcely distinct.

Mormonia basalis, Kolenati; Hag. Stett. Ent. Zeit. 1859, p. 150; *Goëra basalis*, Kol. Gen. et Spec. Trichop. pt. 1, p. 98, 1; *G. hirta*, Burm. Handb., Ent. 2, p. 924, 1 (nec Fab. Curtis). New to Britain; belongs to a group of species distinct from that to which *M. hirta*, Fab., pertains, and differing materially in their structure. In the males the antennæ are furnished beneath with a fringe of long hairs for about a third of their length from the base; the maxillary palpi, instead of being knobbed at the end, are curved round like a watch-spring; the costa in the anterior wings has a fringe of long, silky, whitish hairs turned inwards; the hairs on the membrane are simple, not clavate; in the females the antennæ and costa are not fringed, and the hairy clothing on the wings is much less dense and paler coloured.

The credit of the discovery of this species as a native of Britain is due to Mr. Parfitt, who sent me up specimens for determination in June last, taken near Exeter; subsequently I and Dr. Knaggs met with it commonly at Saltwood Castle, near Hythe, Kent, and it has since been taken near Leominster by Mr. Newman. It is slightly larger than *M. hirta*.

Mormonia irrorata, Curtis = *minor*, Stephens. Of this species, which has hitherto been excessively rare, I captured about a dozen specimens in September in various localities in South Devon. It frequents spots where there is a constant flow of water, but little of it; such as the sides of old stone-quarries, where the water keeps dribbling down from slight springs above.

Leptocerus bifasciatus, Oliv. Common in many places. Mr. Barrett met with it abundantly near Haslemere.

Rhyacophila obliterated, n. s. (Frontispiece, fig. 7.)

Mas.—Fusca; antennis, pedibus et abdominis segmento ultimo pallide testaceis, alis anticis ad basim angustis, aureo-flavis, obsolete griseo-reticulatis, maculâ dorsali dilutiore, pterostigmate saturatori, maculâ obliquâ ad marginem dorsalem maculisque duabus apicem versus griseis, venis fuscis; posticis sub-hyalinis, apicibus flavidis.

Appendices anales: laminâ dorsali fere quadratâ; appendicibus superioribus sub laminam occultis; inferioribus, articulo ultimo ad basim lato, apice sub-acuto, incurvato.

Fœm.—Valde saturator; alis anticis griseo-brunneis, confertim cinereo-irroratis.

Long. corp. 5 lin., exp. alar. 13 lin.

Male.—Fuscous; antennæ, legs, terminal segment of abdomen and appendices pale testaceous; palpi slightly fuscous; anterior wings narrow at the base, golden yellow, faintly reticulated with grey; pterostigma brownish-yellow, an oblique grey spot on the dorsal margin towards the base marks the outline of the pale dorsal blotch, near the apex two small grey spots, thyridium whitish, veins fuscous; posterior wings sub-hyaline, yellowish towards the apex, pterostigma darker. Anal appendages: lobe from the upper margin of last segment broad, nearly square, concealing the superior appendages; inferior appendages with the second joint broad at the base, then suddenly deeply incised to the apex, which is bluntly pointed and incurved.

Female.—Generally much darker than the male; fore-wings greyish-brown, thickly irrorated with cinereous spots, which, becoming confluent on the dorsal margin, form the dorsal

blotch, several smaller spots round the apical margin; hind-wings sub-hyaline, with a greyish tinge; veins and pterostigma brownish.

In general appearance the male is very similar to pale examples of *R. dorsalis*, and the female still more so; indeed had that species been present where they were taken, it would have been scarcely possible to separate this sex of both species. The form of the appendages in the male, and especially of the broad lobe from the last segment, will readily distinguish it. There are several European species very similar in general appearance, but most of these have this lobe narrow and often acute at the apex.

Four examples,—two males and two females,—were taken by Mr. Wormald near Llangollen, in September; one of these he has with great kindness presented to me.

Rhyucophila munda, M'Lachlan, Trans. Ent. Soc. London, Ser. 3, Vol. I., Part 3, p. 309. (Frontispiece, fig. 6.) A very pretty species. The anterior wings are pale golden-brown, irrorated with cinereous, and with two transverse cinereous bands; the dorsal blotch extends to the base, and is margined above by some black streaks. The lobe from the last abdominal segment is very short and broad, the terminal joint of the inferior appendages deeply cleft at the apex.

In September, 1861, I met with this species at Shaugh Bridge, near Bickleigh, Devon (junction of rivers Meavey and Cadworthy), and again this year at the same place, and also at Ivy Bridge and Cornwood. All my specimens are males, unless the female be so like that of *R. dorsalis* that I cannot separate them, but from the wide difference between the males one would scarcely think this possible.

Philopotamus? occipitalis, Pict., Hag. Stett. Ent. Zeit. 1860, p. 279; *Hydropsyche occipitalis*, Pict., Recherch. p. 211, 14, pl. 19, fig. 8; *H. brevicornis*, Pict., p. 211—13,

pl. 19, fig. 7; *Aphelocheira subaurata*, Steph. Ill. p. 180—2; *Philopotamus longipennis*, Brauer, Neurop. Aust. p. 39, (nec Rambur). This species was mentioned in the "Annual" for last year, pp. 35-6, under the genus *Aphelocheira*. I have since ascertained that it is *occipitalis*, Pict. It is not a true *Philopotamus* and will probably form a new genus, agreeing with *Philopotamus* in the possession of ocelli, but differing in the form of the palpi and general habit. I have specimens taken by myself in Devonshire much darker than usual, and have seen similar ones taken by Mr. Wormald in North Wales; they are perhaps distinct. (*H. columbina*, Pict.?)

Aphelocheira flavomaculata, Stephens. Mr. Reading met with a specimen of this at Cornwood, Devon, in June, and I took two specimens at the same place in September.

FOREST HILL, 14th November, 1862.

NOTES ON BRITISH NEUROPTERA.

IN the last year's "Annual" I mentioned that I hoped this year to be able to furnish some notes on Neuropterous insects generally. I regret that circumstances have prevented my paying that attention to these insects that I should have done, and am able to say very little on the subject. Of the two families that have not yet received the benefit of Dr. Hagen's published opinions, *Pertidæ* and *Ephemeridæ*, I possess a considerable number of species. I believe that the Synopsis of the *Ephemeridæ* will appear in the present volume, and next year I hope to be able to add some species to the list.

Psocus abdominalis, Steph.; *domesticus*, Burm.; *binotatus*, Ramb. This minute species of *Psocus* swarmed on the inside of the parlour windows several times in the month of October. I cannot help thinking that some of the so-called book-lice must be the larvæ and pupæ of this species. I have seen winged specimens inside boxes of insects that had not been opened for months.

Chrysopa. Of this genus I now possess twelve species. I much wish to obtain *C. fulviceps*, Steph., and more examples of *C. capitata*, Steph. These may both be readily recognized by their reddish colour; all our other species are blue or green.

I am of opinion that the accusation against these insects of emitting bad odours is in a great part unfounded. I have had upwards of a hundred living specimens through my hands this year, and in *only one instance* (in a specimen of *C. septempunctata*) did I perceive the slightest bad smell; and even this was nothing very horrible. Sometimes they will deposit their pedunculated eggs in a pill-box.

Sisyra terminalis, Curt. Mr. Wormald has taken several specimens of this along the banks of the Thames, between Kew and Richmond. I have also met with it in the same place, and by the river Mole, at Burford Bridge.

Hemerobius ochraceus, Wesmael, Mon. Hémérob. Belg. Bull. Acad. Roy. Bruxelles, 8, 215, 5; Brauer, Neurop. Austriaca, p. 57. This species has not been hitherto recorded as inhabiting Britain.

It belongs to the section with three sectors, and perhaps most nearly resembles *H. micans*, Oliv. The following is a short description:—

Brown, thorax paler; antennæ dark brown, annulated with pale yellow; legs pale yellow; anterior wings pale greyish-brown, slightly reddish at the pterostigma; all

the veins closely spotted with dark brown; posterior wings hyaline, tinged with brownish, darker at the pterostigma; veins pale brown, spotless, except the transverse costal veins, which are spotted as in the anterior wings. Exp. alar. 7 lin.

I have taken this species early in the year by beating fir trees at West Wickham. Mr. Wormald has met with it at the same place, and also at Hampstead.

Boreus hiemalis, Lin. Mr. Piffard gave me a ♀ specimen that he had taken with others from among moss that was sent to him from the Lake District in the winter of 1860—1, for the purpose of obtaining small *Coleoptera*. It is possible that Coleopterists in the north often find this insect on their papers in winter, and throw it away as an *Acarus* or some other queer creature they cannot understand. The produced rostrum will readily distinguish it.

FOREST HILL, 14th November, 1862.

HEMIPTERA.



ADDITIONS TO THE FAUNA OF GREAT BRITAIN, AND
DESCRIPTIONS OF TWO NEW SPECIES.

BY JOHN SCOTT.

THE close of a season brings with it its own weight of fruit, always regulated by the amount of care and toil bestowed upon it, and happy

“ For him who, with a fervent heart, goes forth
Under the bright and glorious sky, and looks
On duties, well performed, and days well spent !
For him the wind, ay, and the yellow leaves,
Shall have a voice, and give him eloquent teachings.”

In our particular branch of science, we have, this season, met with a more than ordinary share of good things, and the wisdom of our including such of the European species in our Catalogue as we thought probably might be found in this country is becoming more and more confirmed.

In the “ Annual ” for last year I gave directions as to the mode of capture, &c., and I do not think that I can add to what was then said in this respect. Our cry is still for workers. Workers in the north, in the south, in the east and in the west. Coleopterists must throw away innumerable quantities of bugs ; and I say this of my own knowledge. For whether by beating trees, bushes or hedges, sweeping flowery or grassy places, searching rubbish or

moss or ants' nests; there bugs are. Coleopterists therefore, if they would only see the ease with which they might do so, are in a better position to form a collection of *Hemiptera*, than those who are working at other branches. But it seems a difficult matter to get any one to look beyond his present wants. The thought that he has sufficient to do in collecting in his own field, and the ready answer to all questions, especially about bugs, "I cannot be bothered with them," indicates a want of appreciation of the glorious whole rather than a love for a particular portion. In the advancing state of science it seems surprising that the young blood springing up should not have attacked all orders of insects. Collectors generally resolve themselves into Lepidopterists and Coleopterists, and many even of them, after a brief period, die away and drop from the pursuit like leaves shaken from the trees by the winter winds.

Perhaps the time will shortly arrive when the stream shall have set full for them, and until then let us hope.

It is worth recording that we have observed but few of the *Scutati* or the *Rhyparocromidæ* this season, and even the one or two commoner species which fell in our way were not nearly so abundant as in former years, and it is difficult to say to what this is attributable. Indeed the general feeling seems to be that insects of all orders have been much scarcer than usual.

At the end of this paper I give a list of such of the European species, marked in our Catalogue with an E., as we have added since its publication; also one or two species not inserted in it but known on the Continent; and descriptions of two species entirely new. I may add that we have also others about which we are not thoroughly certain, and therefore prefer leaving them out until a future day.

In conclusion, we are desirous to obtain British specimens of,—

Lygæus equestris, L.

„ *familiaris*, Fab.

„ *apuans*, Rossi, and

Metastemma guttula, Fab.;

with dates of capture and localities. For although these have been recorded as British species by former authors, as yet we have not been able to prove it satisfactorily.

A LIST OF HEMIPTERA DETECTED IN BRITAIN SINCE THE PUBLICATION OF OUR LIST IN THE SPRING OF THIS YEAR.

Cimex vernalis, Wolff. A single specimen taken casually several years since by Mr. Douglas.

Mormidea nigricornis, Fab. A single specimen received from Mr. Reading, no locality given. Captured in Devon.

Macrocoleus sordidus, Mey. Common on *Stachys sylvatica*, end of May. In a wood near Lee.

Camaronotus cinnamopterus, Kirschb. A single example beat from Scotch firs at Plumstead, in July.

Macrolophus nubilus, H.-Sch. Abundant on *Stachys sylvatica*, in a wood near Lee, in May.

Psallus dilutus, Mey. A single example.

Psallus salicis, Kirschb. Common on ash trees, in June, July and August.

Psallus sanguineus, Fab. Abundant at Deal on dwarf sallows, at the end of August.

Apocremnus Quercus, Kirschb. Taken at Darenth, in June.

Anoterops setulosus, Mey. About thirty specimens by sweeping *Centaurea nigra* growing amongst furze bushes

at Hurst Wood, Tunbridge Wells, beginning of September. It gives off an exceedingly agreeable odour, resembling ripe jargonel pears.

Orthotylus flavinervis, Kirschb. Abundant on alders at Lewisham, in July.

Orthotylus angustus, H.-Sch. One specimen taken by Mr. Douglas.

Orthotylus concolor, Kirschb. One specimen from Mr. Bold, of Newcastle-on-Tyne.

Hypsitylus prasinus, Pict. Mey. Common at Southend, in September, amongst herbage.

Halticus erythrocephalus, H.-Sch. By sweeping *Stachys sylvatica* at Mickleham, in July and August.

Polymerus nigritus, Fall. Common at Mickleham with the above species, in July. This insect has, we believe, been mistaken by collectors for *P. holosericeus*, Hahn; but the antennæ sufficiently point out the difference. In *P. nigritus* the antennæ are *entirely black*, in *P. holosericeus* the antennæ are brown, the first joint entirely, and the second and third at the base, broad, dirty yellow. We have not yet seen a British example of the latter insect.

Berytus crassipes, Fab. A single specimen taken by Mr. Crotch.

Drymus brunneus, Sahlb. In company with *Drymus sylvaticus*, with which it is perhaps confounded in collections. It is readily separated by the thorax, which, in the latter, is *short and broad*, while in the former it is *long, narrow and more campanulate*.

Nabis ericetorum, Scholtz. Abundant on heaths, probably in collections as *N. fuminervis*, Dahlb., which it much resembles.

Pygolampis bifurcata, Lin. A single specimen taken many years ago by Mr. Marshall, at Quatford, in Shropshire.

Salda orthochila, Fieb. = *picta*, Curt. Specimens from North Wales, taken by Mr. Wollaston, and from the Isle of Wight by Mr. George Lewis.

Salda cincta, H.-Sch. In several places.

Temnostethus pusillus, H.-Sch. In July and August, by sweeping amongst *Centaurea nigra*, &c., at Hurst Wood, Tunbridge Wells, Mickleham and Darenth Wood. Not uncommon.

Tetraphleps vittatus, Fieb. Abundant on *Pinus sylvestris*. July, August and September, at Dartford, Tunbridge Wells, &c.

Microphysa elegantulus, Baerensprung, ♂ and ♀. The female of this species seems not to have been known previously. In life it is of a deep red colour, the head and thorax paler. In death the abdomen becomes brown. The head and thorax are much longer than in *M. pselaphoides*, and in all our specimens they are entirely devoid of elytra. In fact, if the creature was deprived of its legs and antennæ, it would resemble a longitudinal section of an ordinary porous water-bottle. Both sexes were exceedingly abundant on the trunks of chestnut trees on Blackheath and also in a hedge at Darenth, in June last.

Corisa atomaria, Ill. A single specimen taken by Mr. Crotch.

DESCRIPTIONS OF TWO NEW SPECIES.

Genus ORTHOSTIRA, *Fieber*.

O. concinna, Douglas and Scott.

(Fig. No. 5.)

Ovata, lutea, punctata; pronoto medio concavo, maculâ subquadratâ transversâ, margine reflexâ, tribus

seriebus reticulatâ ; elytris maculis sparsis nigris, margine reflexa reticulata ; femoribus tarsisque piceis, tibiis ferrugineis ; antennis ferrugineis apice nigro.

Broad, oval. *Head* wider than the front of the thorax, pitchy-black, in front of the eyes ferruginous, the two short horns on the crown ferruginous at the tip.

Antennæ ferruginous, the third joint rather paler, the fourth joint black. The reticulated sheath of the rostrum luteous.

Pronotum luteous, lightly punctured, wider behind than in front, the posterior margin produced into a long angle which extends over the region of the scutellum ; behind the anterior margin the pronotum is deeply depressed, and across this depression is a wide sub-quadrate ferruginous blotch ; the anterior and posterior angles rounded ; outer margin broad, membranous, reflexed, with three rows of rounded meshes ; the central portion of the anterior margin is produced into a hood, slightly inclined over the head, viewed from above is lozenge-shaped, reticulated ; the raised line or keel extends from the posterior angle of the pronotum across the central depression and over the centre of the hood, and viewed sideways is reticulated.

Elytra broad, oval, wider than the pronotum, deep luteous, with several irregularly disposed black spots, with rows of reticulations ; the discoidal cell on each elytron occupies two-thirds of its length, somewhat §-shaped, pointed at each end, the upper end pointing from the suture, the lower end towards it ; from the lower end of the cell a raised line extends almost the length of the remaining third of the elytron, turning at its extremity slightly towards the suture ; meshes rounded, across the centre of each elytron there are two rows from the suture to the discoidal cell, five rows across the cell and four rows from the cell to the

margin; sutural portion of the elytra depressed; outer margin reflexed, with two rows of meshes at the base of the elytra, one row in the middle, then two, three, and two rows beyond.

Thighs pitchy, except the tips, which are broadly ferruginous; *tibiæ* ferruginous; *tarsi* pitchy.

Underside black.

Length $\frac{7}{8}$ ".

We have seen only two British specimens, without any note of the locality of their capture. Dr. Fieber has seen one of these specimens, and returned it as a species unknown to him, with the name *O. concinna*, Mss.

The figure given of this insect is too narrow. It ought to be more *oval*, and the spots on the elytra more distinct.

Genus TRAPEZONOTUS, *Fieber*.

T. distinctus, Douglas and Scott.

(Fig. No. 4).

Longo-ovatus, *fusco-lutescenti*, *nigro-punctatus*.

Capite nigro luteo-piloso. *Antennis* nigris, articulo *tertio* annulo lato rufo. *Pronoto* nigro luteo-piloso, punctis nigris, postice læte lutescenti. *Scutello* nigro, punctis duobus luteis. *Elytrorum*, *claro* lutescenti punctis nigris; *corio* lutescenti punctis nigris sæpe confluentibus; *membranâ* fumatâ, juxta corium (puncto nigro excepto) alba, ad angulum internum in magna et ad angulum externum in parva plaga extensa; venis lutescentibus maculis tribus angulatis nigris interpositis. *Femoribus* nigris basi et apice rufis, *tibiis* rufis, *tarsis* rufescentibus, articulo ultimo nigro.

Long—oval. Head short, pointed, black, with yellowish pile; rostrum black; eyes black, ocelli red; antennæ black,

with short prominent black hairs; the first joint red at the base and tip, the third joint narrowly red at the base and with a broad red ring in the centre, the very slender base of the fourth joint also red.

Pronotum punctured, narrowed in front, with the anterior angles rounded, so that it is less wide than the base of the head measured across the eyes, posterior margin lutescent, the black punctures stronger than in front; posterior angles obtuse, just within them a slightly raised short line, which is yellowish.

Elytra at the base of the width of the pronotum; clavus luteous, with five rows of black punctures, the central rows confluent; corium luteous, the veins concolorous, but between them several rows of black punctures often confluent and forming black spots, but also leaving clear spaces, of which one near the base and another on the disk are more conspicuous; the extreme lateral margin luteous, apex black. Membrane smoky brown, at its junction with the corium clear white (with the exception of a round black dot close to the corium); the white colour at the internal angle spreads into a large blotch, and at the external angle forms a smaller blotch; just beneath the white colour, about half-way across the membrane, three angulated black marks, the central one the largest, are placed between the veins, which are yellowish. Legs slightly hairy, thighs black, red at the base and tip, tibiæ red, slightly blackened at the extremities, tarsi reddish, the terminal joint black.

Underside black.

Length $2\frac{1}{2}$ ".

Described from a single example taken in the summer of 1861 at Ventnor, Isle of Wight, by Mr. George Lewis; it was returned by Dr. Fieber as a new species, with the manuscript name of *T. distinctus*.

LEPIDOPTERA.

NEW BRITISH SPECIES AND CAPTURES OF RARITIES IN
1862.

(BY THE EDITOR.)

THE past season has undoubtedly been the worst for Entomology in our experience. Captures and observations have been equally scanty, and the season has been as unprofitable on the Continent as in the British Isles. The weather is, no doubt, much to blame for this; and we observe, indeed, that the Registrar-General for Scotland reports that the amount of sunshine in the summer was almost the least ever known, and the amount of cloud the greatest. The supply of *Tineina* larvæ received has been most lamentable; and the special larva required for the completion of vol. 8 of the "Natural History of the *Tineina*" (*Gracilaria Imperialella*) has not reached us. The prospect is not a cheerful one; but "after the blackest night comes the dawn."

The only novelties we have to mention are one *Noctua*, *Toxocampa Cracca*, and one *Tinea*, *Gelechia Sangiella*—a considerable falling off from our reports in former years. The new *Eupitheciæ* have been already noticed by Mr. Harpur Crewe (*ante*, p. 116). It is true that we have not had throughout the season the "Entomologist's Weekly Intelligencer," as in the six previous summers, giving weekly

intimation of all novelties and rarities captured, but the Altrincham and Bowdon Entomological Society, undeterred by the loss of three hundred and eighty pounds which attended the previous speculation, and though forewarned they *must* expect a loss of fifty pounds per annum, have boldly started a successor to the "Intelligencer" in the form of "The Weekly Entomologist," of which the first number appeared on Saturday, August 16th, 1862; and since that date we should imagine that all to whom the existence of this weekly journal (*Price Twopence*) was known would have communicated all captures and notes likely to be of interest to the entomological community.

It is no use for Entomologists to treat entomological journals as mankind are so apt to behave to their relations and friends—to grumble at them whilst living and mourn them when dead.

Whether the new weekly journal will have a Cossus-like or an ephemeral duration we cannot foresee; but assuredly it has our best wishes, and we are sorry that it does not yet seem to be so generally known as might have been expected.

TOXOCAMPA CRACCÆ, Wiener Verzeichniss.

(Figure 3.)

The Rev. E. Horton, of Lower Wick, Worcester, took four specimens of this species on the north coast of Devon, July 24—28, 1861. Allied to *Toxocampa Pastinum*, but easily distinguished by the yellowish-white veins of the anterior wings, and by the black spots on the costa.

The larva is stated to feed on *Vicia multiflora*. Mr. Horton obtained some larvæ this summer, which he presumes are referable to this species, from the locality in which he captured the imago, and these were found on *Vicia sylvatica*, which grows abundantly in the locality.

GELECHIA SANGIELLA, n. sp.

Alis anticis elongatulis, subacutis, nigris, cæruleo-suffusis, punctis discoidalibus vix distinctis, maculis dilute luteis apicem versus, parvis oblique spectantibus.

Exp. al. $5\frac{1}{2}$ — $6\frac{1}{2}$ lin.

Closely allied to *Gelechia Coronillella*, but the anterior wings are longer and more pointed; the two sub-apical spots have not the perpendicular direction of those of *Coronillella*, but though small, especially that on the inner margin, which is generally only represented by a few scales, they have an oblique direction posteriorly. Fine specimens of *G. Sangiella* have a very decided blueish gloss, which I do not perceive in bred specimens of *G. Coronillella*.

Taken by Mr. Sang, at Darlington, at the end of June, amongst clover and *Lotus corniculatus*; the larva has not yet been noticed.

DEILEPHILA LIVORNICA.—One at Worthing, April 16th (W. R. 19/4/62); one at Herne Hill, April 29th (Zoologist, 8204); one at Deal, May 6th (Zoologist, 8051); two near Plymouth, May 2nd and May 4th, taken at flowers by Mr. Bolitho of Laira (Zoologist, 8051); one at Westbourne, Sussex, May 4th (Zoologist, 8139); one at Colchester, May 14th (Zoologist, 8052); one specimen taken near Torquay in the spring, "flying over white *Narcissus* flowers" (Weekly Entomologist, p. 21).

CHÆROCAMPA NERII.—A fine female captured at Hastings, August 2nd, 1862 (Weekly Entomologist, p. 11; Zoologist, 8172), was exhibited at the September meeting of the Entomological Society (Zoologist, 8218).

CHÆROCAMPA CELERIO.—One at Tooting, March 15

(Zoologist, 7971); one at St. Leonard's-on-Sea, Sept. 12 (Zoologist, 8204); one near Weymouth, hovering over a bed of petunias at dusk, Sept. 24, taken by Mr. Pretor (Weekly Entomologist, p. 70); one near York, Sept. 28 (Weekly Entomologist, p. 99); one at Brighton, October 29th (Zoologist, 8295).

TROCHILIUM SCOLIÆFORME.—The locality for this species is thus indicated by Mr. Gregson in the Weekly Entomologist, p. 13: "Go up the Vale of Cruses to the Abbey—then turn to the right, through the fields, into the wood." Mr. N. Cooke exhibited seven specimens at the July meeting of the Northern Entomological Society, four bred and three captured by himself and sons at Llangollen (Weekly Entomologist, p. 71).

LITHOSIA CANIOLA.—Mr. Birchall records the capture of a fine series of this insect in August on the Irish Coast (Weekly Entomologist, p. 42): "It flies at dusk and again at dawn, and also comes to sugar—but not freely." Mr. Birchall remarks: "The larva does not appear to be exclusively a lichen feeder. I have a brood apparently thriving on clover, and there seems to be little lichen in the locality where the moth occurs."

LEUCANIA VITELLINA.—One specimen taken at sugar by Mr. Rogers, at Freshwater, October 21st, whilst "a gale of wind was blowing and it was raining in torrents." (Zoologist, 8296.)

LEUCANIA PUTRESCENS.—This has been taken rather freely near Torquay by Mr. R. M. Stewart (Weekly Entomologist, p. 20).

XYLOPHASIA SCOLOPACINA.—The occurrence of a specimen near Hythe, Kent, has been recorded by Mr. M'Lachlan (Zoologist, 8211).

LAPHYGMA EXIGUA.—A specimen was beaten from sallow

blossoms at Lewisham, by the Messrs. Fenn, March 24th, 1862 (Zoologist, 8019).

AGROTIS ASHWORTHII.—Mr. Gregson says (Weekly Entomologist, p. 13), that he took this insect freely at sugar on the slope at the limestone rocks, near Llangollen, on the night of the 24th July.

DASYCAMPA RUBIGINEA.—A specimen was captured at Haslemere, on the night of October 11th (C. G. B. 12/10/62).

DASYPOLIA TEMPLI.—Mr. Jeffrey found a specimen in one of his breeding-cages, Sept. 11th, 1862 (Weekly Entomologist, p. 44).

HELIOTHIS PELTIGERA.—Three specimens were taken near Torquay, by Mr. R. M. Stewart, “during June and the early part of July” (Weekly Entomologist, p. 21); one at South Shields in July on the flowers of *Silene inflata* (C. E. 11/10/62).

AGROPHILA SULPHURALIS.—Mr. Bouchard met with this insect, near Brandon, in Suffolk, last summer (P. B. 14/7/62).

ENNOMOS ALNIARIA.—A female specimen was taken in September, at Deal, by Mr. Harding. It was flying about a gas lamp (Zoologist, 8243).

BOLETOBIA FULIGINARIA.—A specimen was captured in the City by Mr. F. O. Standish, July 12th, 1862 (Zoologist, 8139).

ACIDALIA RUBRICATA.—A few specimens were captured at Brandon, in Suffolk, by Mr. Bouchard, last summer (P. B. 14/7/62).

CRAMBUS CONTAMINELLUS.—Mr. Gregson records the capture of four specimens of this insect at Morecambe, in North Lancashire, August 31st, 1862 (Weekly Entomologist, p. 37).

CRAMBUS PEDRIOLELLUS.—I have been informed by Mr. Bond that a specimen of this insect was taken last summer on the coast near Yarmouth, in Norfolk.

CHEIMATOPHILA MIXTANA.—This has been bred by Mr. T. Wilkinson, of Scarborough, from dark-green larvæ found September 2nd on *Calluna vulgaris* (Weekly Entomologist, p. 111).

PÆDISCA OPPRESSANA.—Several specimens were taken by Mr. Piffard on the trunks of poplars in June (Zoologist, 8218). These were exhibited at the September Meeting of the Entomological Society under the name of *Spilonota Doubledayana*. Mr. Wormald has recorded the capture of a specimen at Willesden (Zoologist, 8245).

EUPÆCILIA ALBICAPITANA (E. A., 1862, p. 111).—Mr. Birchall observes this flies with *Sericoris littorana*, among *Statice Armeria*, at the end of June (E. B. 25/11/62).

ACROLEPIA BETULETELLA.—A specimen was captured this season by Mr. J. E. Robson at Castle Eden Dene (Weekly Entomologist, p. 128).

ELACHISTA APICIPUNCTELLA.—This species has been bred by Mr. C. G. Barrett from larvæ which were found spun up, on fallen oak leaves, under a pretty web of parallel threads. The larvæ, when found in January or February, had not then changed to the pupa state; but, placed in a warm room, they did so in a few weeks, and the imago appeared in the early spring. The locality was a damp wood of oaks and fir trees not far from Falkirk (Weekly Entomologist, p. 120, and C. G. B. 3/12/62).

It would appear from this that the larva feeds up in autumn.

ELACHISTA SERRICORNIS.—I saw a specimen of this rare species in a collection of insects *mostly captured in Wales*.

NOTE ON THE PUPA OF MICROPTERYX.

In the summer of 1861 I had collected a considerable number of larvæ of the genus *Micropteryx*; and, in the month of January last, I began searching in my breeding-cages in order to find the cocoons, hoping by that means to become acquainted with the pupa.

My researches were for some time of a very unsatisfactory nature, as I could find nothing; but at length I stumbled on a small sand cocoon, which, on being opened with the utmost care and attention, was found to contain a dried-up larva! A further search, however, produced another sand cocoon, which seemed more fully tenanted, and it then became a piece of delicate manipulation to cut open the sand cocoon without injuring the inhabitant; in this I was at length successful, and I had before me the pupa represented on the Frontispiece at figure 8. (Fig. 8 is the magnified side view; fig. 8* the magnified front view, and fig. 8** represents the natural size.) This pupa, whilst still living, was exhibited at the February Meeting of the Entomological Society, and the following notes were read:—

“ The wing-cases, legs and antennæ are perfectly free from the body, the abdomen being able to move away from them to a considerable extent.

“ The abdomen of the pupa I examined was in almost constant motion, both to and from the wing-cases, and with slight lateral motion.

“ Neither the wing cases nor the legs appear to have any individual power of motion, but the end of the abdomen would frequently move the ends of the legs by knocking against them.

“ The abdomen was remarkably soft and flexible, reminding one rather of a female *Psyche*.

“ In front of the head one seems to distinguish both pair of

palpi, the antennæ and legs ; the legs being longer than the antennæ, for which I at first mistook them.

“ The antennæ were not symmetrical in the specimen which I examined, that on the left side being close to the leg cases, that on the right side lying nearly across the centre of the wing.

“ Below the eyes and above the palpi appears a brown knob, which may possibly represent the tongue ; it bears numerous bristles ; immediately beneath it are two large brown projections, the use of which I am utterly at a loss to conjecture ; they expand towards the tips, which are scalloped obliquely.

“ Between the eyes, but above them, is a slight protuberance or beak, which is nearly transparent ; above it are again some strong bristles.

“ On the back a slender semi-transparent membrane projects upwards from the first abdominal segment.

“ The head is very clearly separated from the thorax, and between the two is a neck or collar.”

This pupa unfortunately died, and I did not myself succeed in rearing any specimens of the genus *Micropteryx* ; but Mr. T. Wilkinson, of Scarborough, was more fortunate, having bred *Micropteryx unimaculella*, *Salopiella* and *Subpurpurella*.

When on the Continent in September I called on Herr Kaltenbach at Aix-la-Chapelle and saw the specimens which he had bred from nut leaves ; they were *Micropteryx Fastuosella*. The larvæ he finds in the scarcely expanded hazel leaves about the middle of April.

TRICHOPTERA.



NOTES ON NORTH AMERICAN PHRYGANIDÆ, WITH
ESPECIAL REFERENCE TO THOSE CONTAINED IN THE
COLLECTION OF THE BRITISH MUSEUM.

BY ROBERT M'LACHLAN, F.L.S.

ON looking over the descriptions of *Phryganidæ* in Dr. Hagen's "Synopsis of the Neuroptera of North America," I observed that numerous queries were attached to the descriptions of the species contained in the national collection, which for the most part were described by Mr. Walker in the British Museum Catalogue. As since the time that this catalogue was published, considerable progress has been made in the knowledge of the differential generic and specific characters in these insects, I determined upon comparing the types with Dr. Hagen's descriptions, and the notes which follow are the result. Dr. Hagen has with great kindness permitted me to make use of his own memoranda made during his visit in 1861, which, owing to the work being then on the eve of publication, were too late to be incorporated in it. No part of the world is probably richer in *Phryganidæ* than North America, and those described can only be a tithe of the number actually existing.

Neuronia irrorata, Synopsis, p. 249, 1.—This is not Fabricius's species; his type in the Banksian collection has the form of a *Glyphotælius*, and is perhaps the same as

Enoicyla intercisa, Walk. Mr. Walker's name *concatenata* will stand.

N. ocelligera, 250, 3.—Closely allied to *reticulata* and *clathrata* of Europe, but distinct; the app. inf. are yellow, obtusely pointed and hollowed out; in *reticulata* longer, more pointed and black, in *clathrata* short and broad.

N. signata, 250, 4.—The type in the Banksian Collection certainly does not belong to this genus; it is some small species, so covered with fungus that it is impossible to fix the genus.

N. semifasciata, 250, 5.—There is a specimen of this in the Banksian Collection labelled *reticulata*, with the locality "Terra Nova." This must be an error, as Fabricius's description applies to the true *reticulata*, with the locality "in Europæ aquis."

N. notata, 252, 8.—The type is not a *Neuronia*, but perhaps a *Sericostomide*.

Phryganea cinerea, 252, 1.—The dorsal lamina is emarginate.

P. vestita, 253, 2, and *commixta*, 3, are the same species. The ventral lamina has a deep oval excision in the centre, the sides approximating above.

Limnophilus rhombicus, 254, 2, and *combinatus*, 255, 4, are the same species; both types are males, and in the form of their appendices do not differ from the European species, but the colouring, especially of *combinatus*, is much darker.

L. divergens, 255, 5, is an *Anabolia* or *Stenophylax*. "Superior (dorsal) lamina bituberculated, bifid; app. sup. rounded; app. inf. elongated adpressed, apex drawn out, fuscous" (Hagen).

L. gravidus, 257, 11.—The British Museum possesses a male from Vancouver (Dr. Lyall). The dorsal lamina is much produced and deeply furcate at the apex; app. sup.

triangular pointed; app. intermed. long, curved upwards, acutely pointed; app. inf. quadrate.

L. hyalinus, 258, 14.—Dr. Hagen now considers this to be the same as *extractus*, Walker, p. 260, 21.

L. indicans, 258, 15, has 1, 3, 3 spurs, and so belongs to the genus *Halesus*.

L. despectus, 259, 16, and *multifarius*, 18, are the same. "In the male the superior lamina has a produced tubercle in the middle; app. sup. quadrangular, truncated at the apex, the internal angle hamate" (Hagen).

L. nebulosus, 259, 17.—*Subpunctulatus* (261, 24) is considered by Dr. Hagen to be this species, as is also one of the types of *perforatus*, Walk.; the other type of this latter pertains to *despectus*. *L. nebulosus* extends very far northwards.

L. submonilifer, 260, 20.—Allied to *hirsutus*, Kol. of Europe.

L. indivisus, 260, 22, and *subguttatus*, 261, 23, are the same species, very closely allied to, and perhaps not distinct from, the European *Stigma*, Curtis (*impura*, Rambur).

L. trimaculatus, 261, 25.—Dr. Hagen now considers that *partitus*, Walker, is distinct from this.

L. pluga, 263, 28.—"Probably recently developed, and perhaps *despectus*" (Hagen). *Dele* "allied to *trimaculatus*" in description.

L. bimaculatus, 263, 29.—Is an *Anabolia*, with the superior appendages in form similar to those of *A. nervosa* of Europe; app. intermed. truncated at the apex; app. inf. shining black, pointed.

Anabolia consocia, 264, 3.—*Dele* "allied to *Stathmophorus striatus*, Kol. in the description" (Hagen).

Halesus amicus, 265, 2.—Most probably the same as *indistinctus*, Walk. 256, 5.

Enoicyla intercisa, 268, 2.—“The ‘variety’ is not different; therefore *dele* the five lines relating to it in the description” (Hagen).

E. præterita, 268, 3.—“Superior lamina deeply excised in the middle; app. sup. short, small, triquetrous; app. inf. triangular, excavated, incurved” (Hagen).

E. difficilis, 268, 4.—“Superior lamina truncated, on each side scabrous and black; app. sup. small, inserted; app. inf. long, acute, straight, inflated at the base” (Hagen).

Apatania nigra, 270, 1.—The inferior appendices are long, straight, needle-shaped, acutely pointed.

Notidobia pyraloides, 271, 2.—Not belonging to the genus *Notidobia*. The types are male and female, and possess 2-4-3 spurs!

Hydroptila tenebrosa, 274, 1.—“Some of the types of this species belong to the genus *Agapetus*” (Hagen).

Molanna inconspicua, 275, 1.—There are three type specimens of this. One is a *Molanna*, one a *Setodes* (perhaps *ignita*), and one an insect with 2, 4, 4 spurs apparently pertaining to the *Hydropsychidæ*.

M. cinerea, 276, 2.—There are two specimens in the British Museum, answering to the description of this, which seem distinct from *inconspicua*, being smaller and darker; but I am by no means sure that the fact of their being recent and in good condition may not account for the difference in colour.

Leptocerus sepulchralis, 277, 5.—The types do not differ from the common European *ater* of Pictet.

L. mentiens, 278, 8.—The type is in bad condition. Dr. Hagen thinks it may be the same as his *lugens*.

L. incertus, 278, 9, has 1, 2, 2 spurs, and should probably be referred to the genus *Setodes*; the type is in very bad

condition. Dr. Hagen considers his *micans*, 283, 13, to be this species.

L. elegans, 279, 10, and *latifascia*, 279, 12, are the same species; the dark fascia in the former is indistinct in consequence of the type being unset. They have 2, 4, 3 spurs, and with *Notidobia pyraloides* will form a distinct genus, but the family to which it should be referred seems doubtful. The maxillary palpi do not differ in the sexes, and are similar to those of *Leptocerus*, as are also the antennæ, but the form of the wings and venation indicate an affinity with the *Sericostomides*. The numerical arrangement of the spurs is quite aberrant, no other genus being known to possess less spurs on the posterior than on the intermediate tibiæ. The middle spur on the posterior tibiæ is placed quite in a line between the apical ones, and so not in a position that would indicate that one was broken off or abortive.

A third species from Mysol, Indian Archipelago, is contained in the British Museum.

L. indecisus, 279, 11. The type has 2, 4, 4 spurs. It is of doubtful position.

Setodes nivea, 281, 3, and *S. albida*, Walk., 283, 10, are the same species. May not *Mystacides Unarowii*, Kolenati, Gen. et Spec. Trichop. part 2, p. 249, 1, pl. 8, 24, also belong here?

S. ochracea, 281, 4.—Erroneously included in the North American list; the specimen referred to perhaps belongs to *S. ignita*, 281, 5.

S. resurgens, 282, 9.—Dr. Hagen thinks that his *cineascens* may be this species. The type has 1, 2, 2 spurs.

Hydropsyche alternans, 288, 4, and *indecisa*, 5, are the same species, and Dr. Hagen thinks probably identical with his *morosa*, 287, 2.

H. reciproca, 288, 6, and *dubia*, 7. Dr. Hagen considers to be the same species.

Philopotamus confusus, 291, 1. Is a *Hydropsyche*, the type has no ocelli.

Polycentropus crassicornis, 292, 2.—The “variety” is a distinct species, smaller, and differing in the form of the appendices.

Psychomia parva, 294, 2.—The type is almost destroyed. Dr. Hagen now thinks that it belongs to the genus *Tinodes*.

Chimarra obscura, 297, 3.—Perhaps an *Agapetus*.

There is an undescribed species of *Setodes* in the British Museum, which I propose to call *Setodes Piffardii*, and append the description.

Setodes Piffardii, n. sp.

Ferruginea: antennis longissimis, fuscis, bases versus luteo-annulatis; capite luteo, niveo-piloso; pedibus ochraceis; alis anticis albidis, strigis transversis geminatis, et nebulis apicem versus, griseis, punctis ad angulum analem nigricantibus; posticis niveis.

Long. corp. 4 lin.; long. anten. 18 lin.; exp. alar. 13 lin.

Ferruginous: antennæ very long, the joints in the basal third half yellow and half dark fuscous, the rest altogether fuscous; head yellow, clothed with white hairs; legs pale-ochreous; anterior wings whitish, with numerous grey, somewhat geminated transverse bands, and the apex clouded with grey; at the anal angle are two or three confluent blackish spots; apical ciliæ also blackish; posterior wings unicolorous snowy-white.

Habitat near Halifax, Nova Scotia; B. Piffard, Esq.

Allied to *S. exquisita*, Walk.; *S. albida*, Walk., and *S. candida*, Hag. (especially to the first), but differs in the trans-

verse bands being more numerous and grey instead of yellow. In all these species the anastomosis appears semi-circular, owing to the arching of the adjoining veins.

The following is an attempt at a systematic list of all the North American *Trichoptera* contained in the national collection, after the arrangement in the Synopsis:—

Family PHRYGANIDÆ.

NEURONIA, Leach.

1. *concatenata*, Walk.
(*nec irrorata*, Fab.)
2. *pardalis*, Walk.
3. *ocelligera*, Walk.
4. *semifasciata*, Say.
fusca, Walk.
5. *postica*, Walk.
6. *ocellifera*, Walk.

PHRYGANEA, Leach.

1. *cinerea*, Walk.
2. *commixta*, Walk.
vestita, Walk.

Family LIMNEPHILIDÆ.

COLPOTAULIUS, Kol.

1. *perpusillus*, Walk.

LIMNEPHILUS, Leach.

1. *rhombicus*, Leach.
combinatus, Walk.
2. *gravidus*, Hag.

1863.

3. *extractus*, Walk.
hyalinus, Hag.
4. *despectus*, Walk.
multifarius, Walk.
perforatus, Walk.
[partim.
stipatus, Walk.
5. *nebulosus*, Kirby.
perforatus, Walk.
[partim.
6. *submonilifer*, Walk.
7. *indivisus*, Walk.
subguttatus, Walk.
Stigma, Curtis?
8. *partitus*, Walk.
(*nec trimaculatus*,
[Zett.)
9. *plaga*, Walk.

ANABOLIA, Steph.

STENOPHYLAX, Kol.

1. *bimaculata*, Walk.
2. *punctatissima*, Walk.
3. *consocia*, Walk.
4. *divergens*, Walk.

Fam. LIMNEPHILIDÆ—cont.

HALESUS, Steph.

1. *indicans*, Walk.
2. *scabripennis*, Ramb.
anticus, Walk.
3. *guttifer*, Walk.
4. *indistinctus*, Walk.
amicus, Hag.

ENOICYLA, Ramb.

1. *areolata*, Walk.
2. *intercisa*, Walk.
irrorata, Fab.?
3. *præterita*, Walk.
4. *difficilis*, Walk.
5. *designata*, Walk.

APATANIA, Kol.

1. *nigra*, Walk.

Family SERICOSTO-
MIDÆ.

SERICOSTOMA, Lat.

1. *Americanum*, Walk.
2. *crassicorne*, Walk.
(Hydropsyche).

BRACHYCENTRUS, Curtis.

1. *fuliginosus*, Walk.

HYDROPTILA, Dalm.

1. *tenebrosa*, Walk. partim.

Fam. LEPTOCERIDÆ.

———— ?

1. *latifascia*, Walk.
(Notidobia).
elegans, Walk.
(Göera).
2. *pyraloides*, Walk.
(Notidobia).

———— ?

1. *indecisa*, Walk.
(Göera).

MOLANNA, Curtis.

1. *inconspicua*, Walk.
2. *cinerea*, Hag.

LEPTOCERUS, Leach.

1. *ater*, Pict.
sepulchralis, Walk.
2. *submacula*, Walk.
3. *mentiens*, Walk.
lugens, Hag.

SETODES, Ramb.

1. *exquisita*, Walk.
2. *Piffardii*, M'Lach.
3. *albida*, Walk.
nivea, Hag.
Uwarowii, Kol.?
4. *resurgens*, Walk.

Fam. LEPTOCERIDÆ—cont.

5. *ignita*, Walk.
 inconspicua, Walk.
 [partim.]
6. *incerta*, Walk.
 micans, Hag.

Family HYDROPSY-
CHIDÆ.

HYDROPSYCHE, Pict.

1. *alternans*, Walk.
 indecisa, Walk.
 morosa, Hag. ?
2. *reciproca*, Walk.
 dubia, Walk. ?
3. *dubitans*, Walk.
4. *maculicornis*, Walk.
5. *confusa*, Walk.
6. *robusta*, Walk.
7. *transversa*, Walk.

PHILOPOTAMUS, Leach.

1. *distinctus*, Walk.

POLYCENTROPUS, Curtis.

1. *validus*, Walk.
2. *crepuscularis*, Walk.
3. *crassicornis*, Walk.
4. ——— ?
 crassicornis, var. Walk.
5. *invariatus*, Walk.

TINODES, Steph.

1. *parva*, Walk.
 (*Hydroptila*).

RHYACOPHILA, Pict.

1. *fuscata*, Walk.
 (*Neuronina*).

AGAPETUS, Curtis.

1. ——— ?
 tenebrosa, Walk. partim.
 (*Hydroptila*).
? 2. *obscurus*, Walk.

10th November, 1862.

ADDRESSES OF ENTOMOLOGISTS.

A few gentlemen who have moved since our last list was published, or who did not figure in that list, have requested their present addresses to be given as under:—

BORTHWICK, RICHARD, Chemist, Alloa, Clackmannanshire. *British Lepidoptera.*

CLARK, REV. HAMLET, M.A., F.L.S., 12, Bulstrode Street, Manchester Square, W.

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GILL, BATTERSHELL, M.D., 5, Cambridge Place, Regent's Park, N.W.

HALL, GEORGE WEBB, The Grange, Sutton, Surrey.

HEWETT, THOMAS E., 17, Gloucester Street, Gloucester Gate, Regent's Park, N.W. *Hymenoptera.*

KIRBY, W. F., 29, Nelson Terrace, New Hampstead Road, N.W. *British Insects and Lepidoptera generally.*

LEWIS, W. A., Harrow, N.W. *British Lepidoptera.*

NICHOLSON, ALBERT, Stamford Road, Bowdon, Cheshire. *British Lepidoptera.*

ROGERS, WILLIAM, Grove Cottage, Merton Road, Lower Tooting, S.

WOLLASTON, T. V., M.A., F.L.S., 1, Barnepark Terrace, Teignmouth, Devon.

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