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BRITISH ENTOMOLOGY;

BEING

ILLUSTRATIONS AND DESCRIPTIONS

OF

THE GENERA OF INSECTS

FOUND IN

GREAT BRITAIN AND IRELAND:

CONTAINING

COLOURED FIGURES FROM NATURE

OF THE MOST RARE AND BEAUTIFUL SPECIES,

AND IN MANY INSTANCES

OF THE PLANTS UPON WHICH THEY ARE FOUND.

BY JOHN CURTIS, F.L.S.

HONORARY MEMBER OF THE ASHMOLEAN SOCIETY OF OXFORD,
OF THE IMPERIAL AND ROYAL ACADEMY OF FLORENCE,
OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, ETC.

VOL IV.

HYMENOPTERA, PART II.
NEUROPTERA. TRICHOPTERA.

LONDON:
PRINTED FOR THE AUTHOR,
AND SOLD BY
E. ELLIS AND CO., 92 GREAT RUSSELL STREET, BLOOMSBURY;
SIMPKIN AND MARSHALL, STATIONERS' COURT; AND
J. B. BAILLIERE, 219 REGENT STREET.

1823—1840.

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JUN 25 1941
NATIONAL MUSEUM

PRINTED BY RICHARD AND JOHN E. TAYLOR,
RED LION COURT, FLEET STREET.

TO

MONS. P. A. LATREILLE,

Member of the Institute, of the Legion of Honour, &c. &c. Professor at the Garden of Plants,

WHOSE INVALUABLE AND UNRIVALLED WRITINGS

HAVE CONTRIBUTED SO ESSENTIALLY TO THE ADVANCEMENT OF SCIENCE,

THE PRESENT VOLUME

IS DEDICATED,

AS A SMALL BUT SINCERE TOKEN

OF THE ESTEEM AND RESPECT OF

THE AUTHOR.

London, Dec. 1, 1830.

TO

WILLIAM SHARP MACLEAY, Esq.

M.A. F.L.S. &c.

TO WHOSE LEARNED AND SCIENTIFIC RESEARCHES

ENTOMOLOGISTS ARE SO GREATLY INDEBTED,

THIS VOLUME

IS INSCRIBED,

AS A TOKEN OF FRIENDSHIP,

AND OF THE ESTEEM OF

THE AUTHOR.

London, Dec. 1, 1831.




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16-1837

724.

CLEPTES NITIDULA.

ORDER Hymenoptera. FAM. Chrysididæ.

Type of the Genus, Sphex semiaurata *Linn.*

CLEPTES *Lat., Fab., Shuck., Curt.*—Ichneumon *Rossi.*—Sphex *Linn.*

Antennæ inserted near the margin of the clypeus, approximating, not so long as the thorax, geniculated, velvety, a little attenuated in the male, and 13-jointed, basal joint the longest and stoutest, metallic and hairy, 2nd the shortest, obovate-truncate, 3rd twice as long and linear, the following shorter, oblong, slightly attenuated to the apical joint which is the slenderest and elliptic-conic (1 ♂): shorter, the flagellum curved and attenuated to the base and apex in the female, 2nd joint not very short, 3rd long and narrowed at the base.

Labrum forming a small horny subovate lobe, ciliated with long hairs (2).

Mandibles elongate-subtrigonate, tridentate on the inside towards the apex, pilose externally (3).

Maxillæ terminated by a large ovate ciliated lobe, with a smaller pubescent one on the inside. *Palpi* not very long, pubescent, 5-jointed, 2 basal joints rather short, 3rd longer, very stout, subovate, 4th not so stout, but about as long, 5th the longest, slender and linear (4).

Mentum corset-shaped. *Lip* small, fleshy and concealed. *Palpi* moderate, remote, pilose, triarticulate, 2 basal joints obovate, truncated obliquely, 3rd joint much longer, subfusiform (5).

Head *short, transverse, narrowed behind:* eyes *oval:* ocelli 3, *forming a triangle on the crown of the head.* Thorax *obovate with longitudinal sutures, and divided transversely into* 4 *segments:* scutel *semiovate:* metathorax *subquadrate, the angles acuminated.* Abdomen *ovate, depressed, not concave beneath,* 5*-jointed in the males,* 4*-jointed in the females:* oviduct *exserted, telescopiform, as long as the body* (7 ♀), *with an aculeus at the apex* (*a*) *and a lanceolate valve beneath* (*v*). Wings superior *with a small sublanceolate costal cell and* 2 *discoidal cells, the external longitudinal nervures reaching the margin:* inferior wings *with very faint nervures.* Legs *moderate:* thighs *short, incrassated towards the base:* tibiæ *clavate, spurred at the apex:* tarsi *simple,* 5*-jointed, basal joint long,* 4*th small:* claws *and* pulvilli *distinct* (8 †).

NITIDULA *Fab.*—*Curt. Guide, Gen.* 656. 2.

FROM the numerous illustrations we have given of the Cynipidæ of Latreille, it will be remembered that they either have no labrum, or it is so minute that it has not been discovered, except in Perilampus and Smiera: the small labrum of Cleptes forms a beautiful transition from the above family to the Chrysidæ through Hedychrum; and I have lately received a most remarkable metallic Bee from America, I believe from Columbia, which will prove, I expect, that there exists a strong affinity between the Andrenidæ and Chrysidæ. Latreille considered that Cleptes was allied to Bethylus (Pl. 720),

but I must confess I cannot see any analogy, and with Tiphia (Pl. 664) it has no relationship.

The Cleptes are parasitic upon other Hymenoptera, and St. Fargeau seems to think that *C. semiaurata* is the parasite of a Tenthredo.

It is very remarkable that there does not appear to be any very marked character to distinguish the males of the two species, although the females are so very dissimilar: the greatest difference seems to me to be in the colour of the 3d segment of the abdomen, which has much more of the ochre colour in *C. semiaurata* than in *C. nitidula*, and the tibiæ I believe are generally more ochreous.

1. semiaurata *Linn. Panz.* 51. 2. ♂.—splendens *Fab.* ♂.—auratus *Panz.* 52. 1. ♀.

Male bright metallic green, slightly villose: antennæ black, basal joint green: head and thorax coarsely punctured, faintest on the disc of the latter: metathorax rugose: abdomen shining deep ochre, the extremity of the 3d segment black, forming a point in the middle: the following bright blue: wings slightly fuscous, the stigma and nervures brown: legs fulvous, coxæ and thighs green, tarsi fuscous.

Female bright cupreous, 5 basal joints of antennæ ochreous, the remainder black: abdomen as in the male: wings fuscous, with the base and an irregular long spot beyond the disc transparent: legs entirely fulvous.

Rather larger than the following: it lives in sandy places, and is not uncommon in the vicinity of London in June; Mr. Paget takes it at Yarmouth; I used to find the females in gooseberry bushes in a garden, and they have been detected on the horse-bean in a field near Coventry.

2. nitidula *Fab.*—*Curt. Brit. Ent. pl.* 724 ♀.—*Panz.* 106. 11.

Male bright metallic green, inclining more or less to blue or purple: antennæ black, basal joint green, head and thorax not thickly punctured; metathorax deeply and closely punctured: abdomen shining deep ochreous, the 3d segment, excepting the base and the following, bright blue, green, or purple, the apex punctured, wings slightly fuscous with a cloud on the disc, the nervures and stigma piceous: legs bright green: tibiæ ochreous, the four posterior often piceous, excepting the tips: tarsi fuscous.

Female. Head and thorax cupreous: prothorax ferruginous-ochre, metathorax bright green: antennæ black, 2d and 3d joints ochreous: abdomen as in the male: wings with a slight cloud at the stigma: legs ochreous, hinder thighs and coxæ piceous, tarsi fuscous at the apex.

Taken by Mr. Paget on the sand hills near Yarmouth in June: Mr. Rudd finds it plentiful in Yorkshire, and it occurs also in the New Forest.

Trinia glaberrima (Pimpinella dioica), Dwarf Burnet Saxifrage, from St. Vincent's Rocks, was communicated by G.H.K. Thwaites, Esq.



1 - 1824

38.

HEDYCHRUM ARDENS.

Order Hymenoptera. Fam. Chrysididæ *Lat., Leach.*

Type of the Genus C. violaceum *Rossi.*

Hedychrum *Lat., Leach.* Chrysis *Linn., Fab., Jurine.*

Antennæ inserted close to the margin of the clypeus, geniculated, fusiform, 13-jointed; first joint the longest. (1.)

Labrum very minute, long, attenuated, ciliated. (2.)

Mandibles hairy, externally arcuated, with 3 sharp teeth towards the apex. (3.)

Maxillæ horny at the base, membranaceous towards the apex, ovate, entire, ciliated: *Palpi* 5-jointed, longer than the maxillæ, third joint rather thicker, fourth and fifth rather longer than the others. (4.)

Mentum long, dilated anteriorly: *Palpi* short, 3-jointed: *Lip* with the margins conniving externally. (5.)

Clypeus *with a deep impression between the eyes, receiving the first joint of the antennæ.* Thorax *semi-cylindric, angular, divided by* 3 *transverse sutures.* Metathorax *not elongated into a scutellum.* Body *contractile into a ball.* Abdomen *attached only by a portion of its transverse diameter, semicircular, with the extremity rounded, convex above, concave beneath, composed of three joints, the second very large.* Tarsi 5-*jointed.* (8.) Superior wings *with the marginal cell scarcely complete at the apex; discoidal cells very obscure.* Inferior wings *without distinct nerves.*

Ardens *Lat. Coq. Illus. Icon. Ins. dec.* 2. *p.* 59. *t.* 14. *f.* 7.

Shining, pubescent. Head and thorax deeply, abdomen minutely punctured. Green, centre of head, thorax and abdomen, crimson reflecting purple and gold. Posterior angles of thorax blue. Under side of abdomen black, sometimes aureous towards the base. Wings fuscous, with alternate bands of green and gold at the posterior margin. Antennæ black, green at the base. Legs green. Tarsi rufous.

In the Cabinets of the British Museum and the Author.

In a former number (folio 8.) was given the Genus *Chrysis;* and another group of the same family, separated by Latreille, is the subject of the present paper. Although the *Hedychri* may equal the *Chrysidæ* in splendour, their form is by no means so elegant; the obtuseness and breadth of the abdomen distinguishing

them at first sight; and upon further comparison, the absence of the transverse line of impressed dots upon the last joint of the abdomen, as well as the great difference in the mandibles, independently of the variation in the wings, excite our astonishment that Jurine should have rejected a Genus so natural and well established.

Dr. Leach has divided this Genus into those with the apex of the abdomen entire, 1. *H. punctatum* Leach?; 2. *lucidulum* Geoff.; 3. *ardens* Lat. The others notched at the apex, 4. *regium* Geoff.; 5. *violaceum* Rossi. There are also in the Museum cabinet a species called *cæruleum* and another unnamed. Our insect, which was taken several years back in Norfolk, agrees tolerably well with Latreille's description, and perfectly with the British specimens in the Museum, but not very well with the rude and careless figure in Coquebert. Some specimens are twice the size indicated in the plate by the crossed lines.

The habits of this Genus are somewhat dissimilar to those of the *Chrysidæ*, being generally found in the sunshine upon the leaves of brambles and other bushes, from which they fall upon being approached, rolling themselves into a ball.

The plant figured is *Antirrhinum Cymbalaria* (Ivy-leaved Snapdragon).







Published by Curtis, Brewton Street, Oct. 1, 1827.

1 - 1824

8.

CHRYSIS FULGIDA.

ORDER Hymenoptera. FAM. Chrysididæ.

Type of the Genus, Chrysis ignita *Linn.*

CHRYSIS *Linn., Fab., Lat., Panz., Jur., Curt., &c.*—Vespa *Geoff.*

Antennæ inserted close to the base of the clypeus, subfusiform, geniculated, 13-jointed, basal joint long, robust and slightly hairy, the remainder velvety, 2nd small, 3rd longer than the following, the remainder decreasing in length to the apex, the terminal one being very small, compressed and subovate (1).

Labrum transverse, somewhat oval, ciliated with long hairs (2).

Mandibles elongate-trigonate, slightly hairy externally, bent and acute at the apex, with 1 or 2 notches on the inside (3).

Maxillæ furnished with a narrow internal lobe, the external one large, suborbicular and pilose, the internal portion thickened and forming a slight projecting point on the margin. *Palpi* rather long pilose and 5-jointed, basal joint a little shorter than the 2nd and 3rd, the latter being dilated, 4th and 5th joints long, the former clavate, the latter nearly linear (4).

Mentum oblong, the sides concave (5 a). *Palpi* pilose and formed of 3 short equal joints, the 1st and 2nd subobovate, 3rd scarcely so stout and oval (b). *Labium* subtrigonate, the sides recurved (c).

Male *smaller than the* female. Head *transverse:* face *concave.* Eyes *ovate.* Ocelli 3 *in triangle.* Thorax *oblong,* collar *large,* postscutellum *broad and short, the sides acuminated.* Body *contractile into a ball.* Abdomen *attached by an exceedingly short petiole elongate-ovate, semicylindric, being convex above and flat or concave beneath, composed of 3 segments, the 2nd very large, the last with a deep transverse suture bearing a row of strong punctures, the margin generally dentated.* Ovipositor *long, composed of several coriaceous tubes, terminated by 2 strong pilose cylindric appendages with an aculeus between them.* Superior wings *with one large perfect marginal cell, submarginal cells imperfect, two discoidal cells, the superior one large with a short branch next the limb;* inferior wings *with the nervures very obscure.* Legs; *posterior the longest.* Thighs *short.* Tibiæ *short and spurred, anterior with a long dilated spine at the apex.* Tarsi 5-*jointed, basal joint the longest, emarginate on the inside at the base, in the anterior pair.* Claws *and* Pulvilli *distinct* (8).

FULGIDA *Linn. Faun. Suec. p.* 415. *n.* 1669.—*Curtis's Guide, Gen.* 659. 11.

In the Cabinets of the British Museum, Mr. Dale, &c.

NOTHING can exceed the splendour and brilliancy of the Chrysididæ, which have been compared by Latreille to precious stones, and very aptly called by Jurine the Humming-birds of entomologists. It must be confessed that Nature has been lavish in adorn-

ing them with such beautiful and effulgent colours, that our astonishment and admiration are equally awakened on contemplating them. Latreille supposes this splendour may dazzle their enemies and so facilitate their escape; and this superb armour with which they are covered, surpassing any that we have ever read of even in romance, appears to be impenetrable and quite equal to resist on every side the weapons of an assailant,—nevertheless they seem to be timid; for on touching them they roll themselves up into a ball, conscious, apparently, that their armour is their best defence. They seem to be supplied with this coat of mail to make amends for their weak sting, which being placed at the extremity of a long telescopic-formed oviduct is only able to pierce soft bodies; this flexible tube they can extend to a very great length: I have seen it reach the base of the anterior wings.

Latreille has very judiciously divided the Chrysididæ into seven genera, five of which are British; but Jurine having founded his groups upon the form of the cells of the wings, has not adopted them.

Our species of Chrysis may be thus divided.

* Apex of abdomen producing 4 spines.

1. C. ignita *Linn. Faun. Suec.* 414. 1665.—*Don. Brit. Ins. v.*1. *pl.* 7.—*Panz.* 5. 22. Length from 2 to 7 lines. Yellow or blue green, shining, clothed with soft upright gray hairs, thickly and coarsely punctured: antennæ velvety black, excepting the 2 basal joints which are green: head more or less purple or blue on the crown, collar with a spot in the centre and an elongated mark on each side, of the same colour: thorax variegated with purple also: abdomen effulgent, golden crimson, sometimes green on the sides and violaceous on the back, down the two first joints of which there is an elevated line; the punctation is generally very coarse at the base, fine on the sides and sometimes very minute, thick or vanishing towards the apex which is crenated, forming 4 teeth, much more acute in the males than females; nearly at the base of them is a semicircular row of from 14 to 18 deep punctures: wings stained brown, nervures piceous: legs green: tarsi velvety black: ovipositor frequently exserted, brownish ochre, the terminal plate of the abdomen beneath generally black.

This is one of the most variable insects in size, colour, and sculpture, and I have little doubt but a considerable number of the following species are nothing more than extreme varieties.

The head and thorax are bright green of various hues, variegated with deep blue or purple, sometimes entirely of a fine chalybeous colour; the body resembles the brightest gold, reflecting most lovely tints of crimson or violet, sometimes eneous or cupreous, and more or less encircled with a beautiful yellow green; the ridge on the back of the body sometimes extends nearly to the apex, the punctures are in some thick and coarse, in others innumerable and minute, and again almost vanishing: the teeth at the apex are also much less developed in some than in others.

This insect is distributed over the whole country, and is seen

when the sun shines running over the sides of walls, posts, and sandy banks, from May to the middle of August.

2. C. affinis *Leach.—Sam.—Curtis's Guide.*
About the size of *C. ignita,* and probably only a variety; the fore and hind part of the head, 3 spots on the collar, the mesothorax and scutellum are blue; back of the abdomen purplish; the apex with the teeth very short.
3. C. nitens *Ste.—Curtis's Guide.*
4. C. micans *Ste.—Curtis's Guide.*
5. C. fulminans *Ste.—Curtis's Guide.*
6. C. confinis *Ste.—Curtis's Guide.*

These are probably merely varieties of *C. ignita,* as well as the three next.

7. C. effulgens *Leach.—Harris's Exposition, pl.* 19. *f.* 2.?

Very similar to *C. ignita.* Mr. Dale has taken it in June and July at Glanville's Wootton, Dorset.

8. C. pulchra *Ste.—Curtis's Guide.*

Taken by Mr. Dale at Dawlish, Devon, May 22nd.

9. C. ephippium *Ste.—Curtis's Guide.*
Length 4 lines. Duller than *C. ignita,* thickly punctured and clothed with soft upright gray pubescence; bright green: antennæ velvety black, 2 basal joints green, crown of the head, a central and 2 lateral spots on the collar, the whole of the mesothorax and centre of the scutellum dark blue-purple: abdomen with the sides slightly coarctate, with a ridge down the back, rather dull golden crimson, the back somewhat blue, the row of punctures sometimes irregularly united, teeth rather acute; beneath green to the apex variegated with gold: wings slightly stained with brown, the nervures piceous: tarsi velvety black.

I do not think this is a good species, and it may be the other sex of the variety named *C. affinis.* Taken by Mr. Dale in June at Puddle Town and Glanville's Wootton; near Cambridge; at Ambleside, and in the Isle of Bute.

10. C. aurulenta *Ste.—Curtis's Guide.*
Length $3\frac{1}{2}$ lines. Thickly and rather coarsely punctured, clothed with soft long gray pubescence, especially the head; bright shining green, crown of the head and the whole of the mesothorax deep purple: abdomen with an elevated line down the back, golden reflecting crimson, 12 or 14 punctures surrounding the apex, the central teeth somewhat approximating: wings scarcely tinted, nervures piceous: antennæ and tarsi, excepting the two basal joints of the former, velvety black, underside bright green to the apex.

This insect I have taken near London.

11. C. fulgida *Linn. F. S.* 415. 1669.—*Curt. Brit. Ent. pl.* 8.—*Panz.* 79. 15.
Shining, deeply and thickly punctured, pubescent; bright green, variegated with purple and green: abdomen with an elevated line down the back, the 2nd and 3rd joints only aureous, reflecting bright crimson on the back, greenish on the sides, apex surrounded by about 16 punctures, and furnished with 4 rather acute teeth, beneath green and black: tarsi and antennæ, excepting the 2 basal joints of the latter, black: wings stained brown, nervures piceous.

The beautiful female represented in the plate was taken with other specimens in June at Birch Wood, in Kent, by Mr. Standish; it has also been found on gravelly banks in July at Bexley, in the same county, by Mr. Samouelle; it has likewise occurred in Epping Forest; Coombe Wood; Teignmouth, Devon; and Mr. F. Walker has met with it at Southgate.

12. C. Stoudera *Jur. pl.* 12. *f.* 42.—*Panz.* 107. 12.
Length $3\frac{3}{4}$ lines. Slightly shining, pubescent, thickly and strongly punctured, deep blue-purple, 2nd and 3rd joints of abdomen gold reflecting crimson and green, the former with a large orbicular-quadrate purple spot, extending from the base beyond the middle; about 18 punctures surrounding the apex, which has 4 strong teeth: antennæ and tarsi black, excepting the two basal joints of the former: wings slightly stained brown, nervures piceous.

Rare: June, sandy banks near London.

13. C. bidentata *Lim.*—*Don.* 1. 19.—*Panz.* 77. 15.—dimidiata *Fab.*
Length nearly 4 lines. Thickly and strongly punctured, pubescent, shining: collar, metathorax and scutellum golden-crimson: abdomen with an elevated line down the back, the principal part of the posterior portion of the basal, and the whole of the 2nd articulation above, of the same colour, apex with a curved line of strong punctures, the apex emarginate, forming 4 obscure teeth: antennæ and tarsi black, except in the 2 basal joints of the former.

June, July, and August, at Cambridge; Bedford; Dover; Bideford, Devon; and Isle of Portland, J. C. Dale, Esq. I once saw it in some abundance going out and into the burrows of an Odynerus (pl. 137.), on a sunny bank in Darent Wood, probably in order to deposit its eggs in those of the Odynerus.

15. C. inermis *Ste.*—*Curtis's Guide.*

Whether this be a variety of the foregoing species I am unable to ascertain.

16. C. succincta *Linn. Syst. Nat. v.* 1. *pars* 2. *p.* 947. *n.* 3.—*Panz.* 77. 16.
Length 3 lines. Strongly and thickly punctured, pubescent, bright green, shining: crown of the head purple: collar variegated with purple: mesothorax golden-green and red: abdomen golden-green, the back crimson, apex triemarginate, forming 4 small teeth: wings slightly stained brown, nervures piceous: antennæ and tarsi velvety black, the former with the 3 basal joints green; a curved line of strong punctures round the apex.

This rare and beautiful species has been taken by Mr. Dale in gravel-pits at West Hurne, Hants, 12th of July 1823; and I think I have seen it on a sandy bank in August at Ramsdown, near Heron Court, the property of the Earl of Malmesbury. The specimen in my possession was communicated to me by Captain Blomer, who took it at Bigbury Bay, Devon, 8th of September 1823. It has also been observed near Bristol by Mr. Millard.

** Apex of abdomen tridentate.

17. C. cyanea *Linn. F. S.* 414. 1667.—*Don.* 7. 235.—*Panz.* 51. 10.
Length $2\frac{1}{2}$ to $3\frac{1}{2}$ lines. Thickly but not deeply punctured, pubescent,

glossy, greenish blue, crown of the head purple: thorax variegated with the same, 1st and 2nd joints of abdomen black or blue purple above, apex with a curved line of strong punctures, biemarginate, forming 3 scarcely visible teeth: wings nearly transparent, nervures piceous: antennæ and tarsi black, basal joint of former green.

From beginning of June to August, near London; in Norfolk; Kimpton near Andover; New Forest, and Glanville's Wootton. I find this species on old posts and dead trees: and Donovan says it is common on fruit-trees.

* * * Apex of abdomen rounded, without teeth.

18. C. rufa *Panz.* 79. 16.—*Curt. Guide.*
Length 3½ lines. Rather robust, dull, exceedingly thickly punctured, pubescent: head and thorax coarsely punctured, green, crown of the head and mesothorax dark blue or purple: abdomen so thickly and minutely punctured as to appear like frosted gold reflecting crimson, apex with a semicircular line of punctures: wings stained brown, except at the apex, nervures piceous: antennæ and tarsi velvety black, the former with the 2 basal joints green.

End of June, sandy banks and chalk-pits, Darent and Dover, Kent; beginning of June on posts, &c., Chesterton near Cambridge, and Isle of Portland; also to the end of July, Parley Heath. J. C. Dale, Esq.

19. C. Austriaca *Fab. Piez.* 173. 15.—radians *Harr. Expos. tab.* 19. *f.* 3.
Length 4¾ lines. Thickly and coarsely punctured, shining, clothed with fuscous pubescence: head and thorax green, variegated with blue: abdomen golden, reflecting crimson, nearly truncated at the apex, with a row of small punctures: wings tinged brown, nervures piceous: antennæ and tarsi velvety black, 3 basal joints of the former green.

It is remarkable that Fabricius in his essential character, says, "the anus is quadridentate;" and in his specific description, which immediately follows, he says "that the anus is unarmed."

From June 7th to July 24th, Bottisham, Cambridgeshire; Glanville's Wootton and Beaminster, Dorset. J. C. Dale, Esq.

20. C. cærulipes *Fab. Syst. Piez.* 173. 13.—*Panz.* 107. 11.—cærulescens *Fab. Ent. Syst.*—*Coq. tab.* 14. *f.* 5.—Leachii *Ste.*
Length 4¼ lines. Deeply punctured, crimson: metathorax, breast and legs blue: antennæ black: superior wings stained yellowish brown.

A single specimen of this fine species is contained in the cabinets of the British Museum. I believe it was presented by Dr. Leach.

21. C. variegata *Curtis.*
About 2 lines long: slender, smooth, shining, yellowish green. Head dark green: antennæ black; collar and thorax banded with golden red; abdomen with the basal joint golden, red across the middle; 2nd and 3rd joints entirely of that colour: wings slightly fuscous: legs green and black.

This little species reminds us at first sight of *C. succincta*, but it has the apex of the abdomen entire, which is the reason I have not adopted the name *nitidula*, under which it stands with a ? in the

British Museum; as Fabricius states that the apex of his insect is quadridentate.

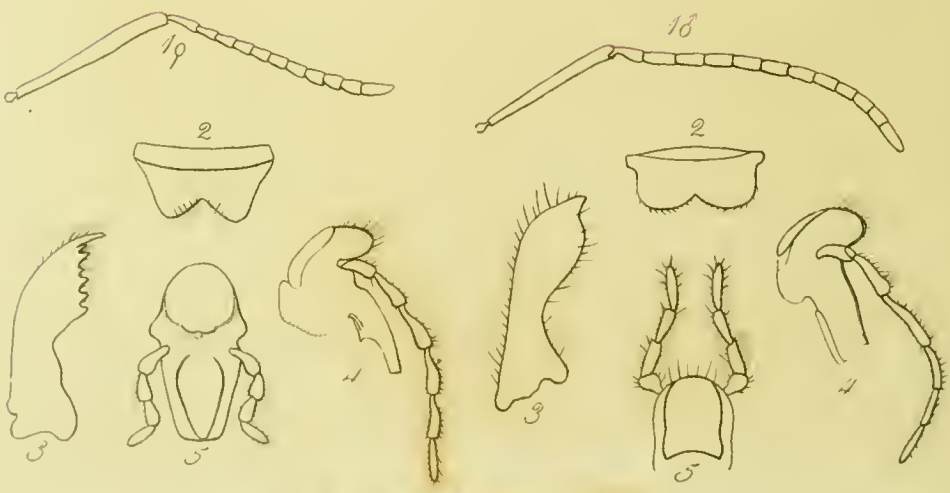
It was taken at Exeter, probably by Dr. Leach.

The Plant represented is *Thlaspi* (Capsella *Dec.*) *Bursa Pastoris* (Shepherd's Purse).





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16-1839

752.

FORMICA RUFA.

The red, hill, or horse Ant, or Pismire.

Order Hymenoptera. Fam. Formicidæ.

Type of the Genus, Formica rufa *Linn.*

Formica *Linn., &c.*

Antennæ longer than the thorax in the male (1 ♂)*, filiform, slender, geniculated, 13-jointed, basal joint very long, 2nd slender at the base, nearly as long as the following, which slightly decrease in length, apical joint as long as the 3rd; the tip attenuated: rather shorter in the female, slightly clavate, 12-jointed: scarcely so long as the thorax in the neuter (1 ♀), 12-jointed, 2nd joint longer than the 3rd; the following obovate-truncate, increasing in diameter, but decreasing in length, the apical joint as long as the 2nd, elongate-ovate.

Labrum transverse, ciliated, notched and broad in front in the male (2), attenuated, with a large triangular notch in the neuter (2).

Mandibles rather small in the male and gaping (3), hairy, constricted below the middle, dilated above, with a trigonate apex; forming a beak in the neuter, truncated obliquely and serrated, the apex elongated (3).

Maxillæ short, the apex rounded, slightly hairy. *Palpi* 6-jointed, hairy, 3 basal joints the stoutest in the male, 1st the shortest, 2nd longer clavate, 3rd the longest, remainder slender, nearly as long as the 2nd (4): stouter in the neuter, the joints nearly of equal length, apical joint slender (4).

Mentum short: *Lip* concealed in the male, large and fleshy in the neuter. *Palpi* inserted on each side, hairy and 4-jointed, basal joint pyriform, 2nd and 3rd oblong or obovate, 4th a little the longest in the male, the apex ovate-conic (5).

Trophi *of the female similar to those of the neuter.* Head *rather small in the male, ovate-trigonate:* ocelli 3 *in triangle on the crown:* eyes *moderate, lateral.* Head *more quadrate-ovate in the female and neuter:* ocelli *minute:* eyes *small.* Thorax *ovate in the male and female; narrow, elongated and constricted in the middle in the neuter:* petiole *short, producing a thick vertical scale.* Abdomen *elongate-ovate in the male, large and globose-ovate in the female and neuter:* sexual organs *large and exposed in the male:* sting *not punctorius.* Wings *ample, superior with* 1 *marginal,* 2 *submarginal and a discoidal cell or areolet:* neuter *apterous.* Legs *moderate and slender:* thighs *simple:* tibiæ *with one slender acute spine at the apex of each, dilated in the anterior:* tarsi 5*-jointed, basal joint long, curved at the base in the anterior,* 4*th small, subcordate:* claws *strong:* pulvilli *distinct.*

F. rufa *Linn.—Curt. Guide. Gen.,* 661. 3.

Male piceous-black: scale rather large, thick and orbicular, the apex slightly concave: legs and apex of abdomen bright-ochreous: coxæ, base

* The 5 figures on the right of the plate are dissections of the male, those on the left of the neuter; the coloured figures represent the male, female and neuter.

of thighs, and tips of tarsi, pale piceous: wings with a slight yellowish-brown tinge, nervures and stigma darker.

Female ferruginous, top of head and disc of thorax and scutel subpiceous, hinder part of thorax flat and oblique; scale somewhat obtrigonate, with the angles rounded: abdomen very glossy, bright pitchy-æneous, margin of the base and bands beneath ferruginous: wings ochreous-brown, lighter towards the tips.

Neuter dull pitchy: head thorax and scale ferruginous: crown channeled, the whole dull pitchy, clypeus and sides bright ferruginous, a purplish brown spot on the disc of the thorax, and a smaller one on the scutel: base of abdomen sometimes ochreous: legs often inclining to castaneous, trochanters ferruginous.

The history of the industrious and provident ant has been familiar to every one from the earliest ages, and the more recent researches of Huber on this subject are highly interesting. I am sorry that a summary of their œconomy is the utmost that my space will afford, but the amusing account given by Kirby and Spence will supply the deficiency.

Each species of ant comprises three different sorts, namely, the males, females, and neuters: there are sometimes two varieties of these last, varying in size: they form nests in the earth or under stones, and their sagacity, their unceasing industry, their perseverance in overcoming difficulties, and the care they evince for their progeny, are wonderful, and well deserving the attention of man.

The female ant lays from 4000 to 5000 eggs; those of the neuters are the smallest; they produce maggots that live a twelvemonth or upwards; these become pupæ, in which state the males and neuters remain 4 and the females 6 weeks; they are inclosed in oval whitish cocoons, which are erroneously called ants' eggs, and it is these we see them carrying off to a place of security when they are disturbed; the ants also bring them to the surface for warmth, or heap them up in the nests. The males and females are generally few in number compared to the workers, yet they are occasionally found in myriads; the latter are often deprived of their wings, being pulled off either by themselves or by the neuters, in order that they may not depart from the nest, and they then work like neuters. Gould says this does not happen till they become mothers. Ants are chiefly nourished by the saccharine fluid from Aphides (pl. 576 and 577), and they remain in their nests through the winter in a torpid state. The males and females swarm from Midsummer to Michaelmas, and the neuters bite with their serrated jaws, but none of the British species sting. Of these, eleven have been recorded in the Guide, but I have only seen indigenous examples of 5 of them. The species figured forms a large nest of straws, sticks, leaves, and other convenient materials: they are very partial to oak-woods and fir-groves, the leaves of the coniferæ supplying them with admirable and very portable building materials: they seem to be at work day and night from March to the end of October: the males and females are commonly found in June and July.



Pub: by J. Curtis June 1. 1824

6-1829

265.

MYRMECINA LATREILLII.

Order Hymenoptera. Fam. Formicidæ *Leach.* Formicariæ *Lat.*

Type of the Genus Myrmecina Latreillii *Nob.*

Myrmecina *Nobis.*

Antennæ inserted in the middle of the face, remote, longer than the head and thorax, geniculated, hairy; 13-jointed, basal joint short, but twice as long as the 2nd, which is subglobose, the 3rd and following oblong, those beyond the 5th being rather obovate-truncate, terminal joint the longest, elongate-conic (1).
Labrum large and exserted, coriaceous, dilated at the base, each side producing a small lobe beneath; anterior margin rounded and notched, with a few bristles and ciliated (2).
Mandibles none, at least in the male.
Maxillæ large and dilated, terminated by a broad membranous and ciliated lobe, meeting behind the mentum when at rest. *Palpi* rather long and slender, 4-jointed, basal joint the smallest, 2nd and 3rd of nearly equal length, 4th long subfusiform (4).
Mentum subovate, truncated at the base, with an arched suture towards the top. *Lip* none? *Palpi* rather long and slender, triarticulate, 1st and 2nd joints nearly of equal length, the 3rd longer and subfusiform (5).

Head *subglobose.* Eyes *globose.* Ocelli *very prominent, forming a large triangle.* Thorax *ovate.* Metathorax *bidentate.* Peduncle *biarticulate, 2nd joint the largest and globose.* Abdomen *ovate-conic, 5-jointed, basal joint covering the greater portion of the body.* Wings *with a trigonate stigma, the marginal cell pedicled at the apex; one discoidal cell, and the apical nervures obscure.* Legs *rather long.* Thighs *long, slender, dilated in the middle.* Tibiæ *short, anterior producing a pectinated spine.* Tarsi *5-jointed, basal joint as long as the tibia, the remainder oblong.* Claws *small,* Pulvilli *distinct* (8, *a fore leg*).

Obs. *All the figures and descriptions were taken from a male.*

Latreillii *Nobis.*

Smooth, shining, piceous black; sparingly clothed with hairs. Eyes black. Head and thorax with a few punctures. Antennæ and legs ferruginous, thighs and tibiæ piceous in the middle. Wings very iridescent, yellowish fuscous, stigma and nervures brown.

In the Author's Cabinet.

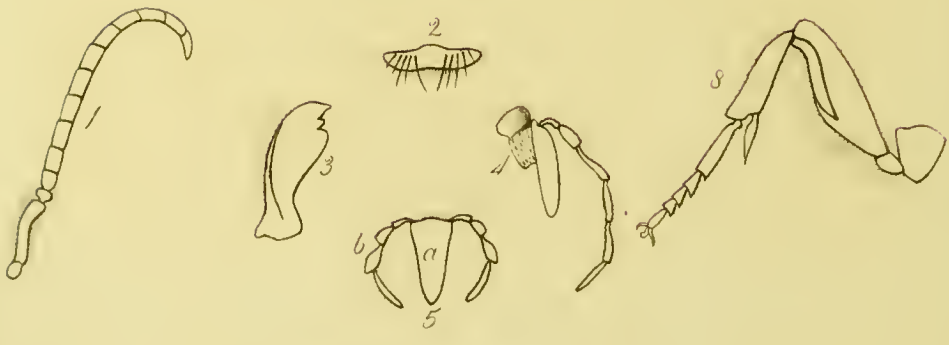
The only specimens I have ever seen of this little insect were all males, which I swept off rushes the middle of August and beginning of September, at the back of the Isle of Wight, where they were flying about; and having been unsuccessful in searching for the females and neuters, I am induced to publish the materials I possess, hoping that it may lead to the discovery of the sexes.

Myrmecina is nearly related to Myrmica, of which genus I would willingly have made it a division; but the short basal joint of the antennæ, the different nervation of the wings, and above all, the absence of the mandibles, rendered this desirable object impracticable. The labrum also is remarkable for having the basal angles thickened and produced; and these I am almost disposed to think are modifications of mandibles.

This nondescript insect I have the pleasure of dedicating to my esteemed friend Mons. Latreille, whose investigation of the family to which it belongs, as well as his numerous valuable works on Entomology, have contributed so effectively to the philosophical advancement of Science.

The beautiful plant represented is *Lathyrus sylvestris* (Wild Lathyrus), it grows luxuriantly on the sloping cliff between Bonchurch and Luccomb Chine, and spontaneously ornaments the elegant grounds of James Vine, Esq. at Puckaster Cove in the Isle of Wight.





Day & Co. lith. London July 1. 1853

2-1825

77.

MUTILLA EPHIPPIUM.

Order Hymenoptera. Fam. Mutilladæ *Lat.*, *Leach.*

Type of the Genus Mutilla Europæa *Linn.*

Mutilla *Linn.*, *Fab.*, *Lat.*, *Leach*, *&c.*

Antennæ distant, somewhat fusiform, much longer than the head, 13-jointed in the males, 12-jointed in the females, 1st joint long, hairy, incurved, not receiving the 2nd, which is small, cup-shaped, the 3rd obconic, 4th and following nearly of equal length (fig. 1). *Labrum* nearly concealed by the clypeus, transverse, coriaceous, ciliated, and producing a few long bristles near its base (2). *Mandibles* exserted, long, narrowed near the base, tridentate (3). *Maxillæ* long, terminal lobe minute, rounded, ciliated, membranaceous : *Palpi* very long, hairy, 6-jointed, 1st joint bent, 2nd dilated, remainder somewhat long, the last slender cylindric (4). *Mentum* corneous, trigonate elongated (5 a) : *Palpi* as long as the mentum, to the anterior angles of which they are attached, pubescent, 4-jointed, 1st joint bent, clavate, 2nd and 3rd compressed, the latter somewhat rhomboidal, 4th long slender cylindric (b) : Lip coriaceous, very short, hollow, completely concealed behind the mentum.

Clypeus *produced, emarginate.* Head *globose.* Ocelli 3 *in the males alone.* Thorax *of the* male *very convex with a transverse suture and scutellum; of the* female *cubical without transverse sutures and scutellum.* Abdomen *attached by a short peduncle, ovate, 2nd segment large, somewhat campanulate.* Wings *of males pubescent, stigmata celluliform, marginal cell remote from the apex, submarginal cells* 3. Females *apterous; armed with a sting.* Anterior legs *short, with a long, compressed, membranaceous spine at the apex of the tibiæ, the* 4 *posterior tibiæ spurred* (8 *a fore leg*).

Ephippium *Fab. Ent. Syst. v.* 2. *p.* 370. *n.* 18. *mas.*—rufipes. *Fab. Ent. Syst.* 2. 372. 26. *fem.*

Male black, shining, pilose with long whitish hairs. Head somewhat minutely punctured. Thorax and scutellum brick-colour, anterior margin black extending in the centre as far as the suture, strongly punctured ; metathorax very coarsely punctured. Abdomen strongly punctured. Wings stained yellowish fuscous with alternate fascia of red and green next the posterior margin.—*Female* black glossy. Head thickly punctured. Neck, thorax, peduncle and basal joint of abdomen brick-colour, thorax coarsely punctured. Abdomen minutely punctured, rufous at the apex and the margins of the segments, which appear silvery from the denseness of the hair, as well as a spot on the 2nd segment. Antennæ and legs rufous, the former fuscous towards the apex.

In the Author's Cabinet.

Although the *Mutilladæ* bear considerable resemblance to the *Formicadæ* their economy is totally different, the latter living in societies exhibiting males, females, and neuters, which last only are apterous; the former being solitary, having no neuters, the males only being furnished with wings. It is unnecessary to go any further into the differences of the two families. The female *Mutillæ* want the little eyes upon the crown of the head, as well as the wings with which the males are furnished; and the eyes and thorax are very differently formed. Jurine has justly observed "What is the object of Nature in establishing such disparities, and where is the utility of it? These are problems that we cannot resolve, because of our ignorance of the history of these insects, but which well deserve the attention of naturalists." It is well known that they inhabit sandy districts, and it is probable the females form their nests and deposit their eggs in such situations, which employment would render wings and ocelli of little use; whereas the males, which may be less numerous than the other sex, are supplied with wings to enable them to go in search of the females, as is frequently the case amongst the Lepidoptera and other orders.

We are able to record at present only three species of this beautiful genus as inhabitants of Britain: 1. *M. Europæa* Linn.; 2. *calva* Fab.; 3. *Ephippium* Fab. The first is common in sandy lanes and foot-paths in June,—it is figured in Donovan's *Brit. Ins.* v. 6. p. 212.; the second, (in the cabinet of Mr. Stephens,) is figured in Coquebert's *Icon. Ins.* tab. 16. f. 10. Latreille and many other entomologists have long suspected *M. Ephippium* and *M. rufipes* to be the sexes of the same species, since we only know the males of the one, and the females of the other: as such I have ventured to give them, having found both insects in this country,—the female in a gravel-pit, and the male flying over a sunny bank near Shooter's-hill, Kent, the 15th June 1822.

Bryum subulatum (Awl-shaped Screw-moss) is figured in the plate.





Pub. by J. Curtis Oct 1 1830

7-1830

329.

METHOCA ICHNEUMONIDES.

ORDER Hymenoptera. FAM. Mutillidæ *Lat.*, *Leach.*

Type of the Genus, Methoca ichneumonides *Lat.*

METHOCA *Lat.*, *Lea.*, *Curt.*—Mutilla *Jur.*

Antennæ inserted at the base of the clypeus, longer than the head, curved, nearly filiform, pubescent, 12-jointed, basal joint short and very robust, 2nd the shortest, remainder oblong, slightly decreasing in length to the last, which is elongate-ovate (1).

Labrum inserted under the clypeus, transverse oval, ciliated and producing a few long bristles (2).

Mandibles long, slender, slightly curved, bidentate at the apex, clothed with many long bristles (3).

Maxillæ small, terminated by a minute semilunular ciliated lobe. *Palpi* long, pilose, 6-jointed, basal joint rather the shortest, 4th the longest, 2nd and 3rd a little stouter than the others (4).

Mentum convex oblong, rounded before. *Lip* none, or very minute. *Palpi* rather long and pilose, inserted on each side the mentum close to the fore-part, 4-jointed, 1st joint slender at the base, terminal one a little the longest (5).

Head *large subglobose.* Eyes *lateral oval.* Ocelli 3 *in triangle on the crown.* Trunk *nodose, formed of* 3 *segments, the* 1*st or* prothorax *obovate, the* 2*nd or* mesothorax *smaller and oblong bearing an ovate scutellum, the* 3*rd or* metathorax *ovate, not larger than the mesothorax.* Wings *none.* Abdomen *ovoid, attached by a short peduncle, acute at the apex which is slightly incurved, and armed with a sting,* 2*nd and* 3*rd segments very large.* Legs *strong.* Coxæ *large.* Thighs *a little robust.* Tibiæ; *anterior with a long pectinated spine at the apex.* Tarsi *long,* 5*-jointed, basal joint very long,* 4*th smallest.* Claws *bent and acute* (8).

ICHNEUMONIDES *Lat. Hist. Nat. v.* 13. *p.* 269.—*Curtis's Guide, Gen.* 666.
—formicaria *Jur. pl.* 13.

Female. Bright ochraceous, shining with scattered punctures and pubescence. Antennæ fuscous towards the apex. Head and abdomen black, the latter ochreous and hairy at the apex. Legs hairy, base of the thighs and tips of the tarsi rather piceous.

In the Cabinet of the Author.

The only British insects with which Methoca might be confounded are the females of Mutilla and Myrmosa, and the apterous Ichneumonidæ (Pezomachus Grav.); the peculiar form of the thorax will however at once distinguish our insect from the rest; and it is further separated from the females of the first by the ocelli, and from the Pezomachi by the fewer joints of the antennæ, independent of the 6-jointed maxillary palpi and other differences in the trophi.

The specimen from which the drawing was made is, I believe, the only British one discovered, and has never been recorded as a native of this country, excepting in the Guide. I took it the 30th July 1828, running upon a mass of sand-stone ascending Black-gang Chine in the Isle of Wight. I looked in vain for another, and was not more successful in my search for the Tengyra Sanvitali. It is to the liberality of a most zealous and distinguished entomologist at Lyons, Mons. Foudras, that I am indebted for a specimen of this insect to dissect, as well as for the Tengyra and other rarities.

Latreille says that the Methoca is found running upon the ground in fields in the South of France, but very rarely: Mons. Foudras has taken it near Lyons with Tengyra Sanvitali, which he believes to be the male, and the same opinion having been entertained I believe in the 7th vol. of the Annales du Musée, I shall subjoin the characters, partly from Latreille's *Gen.Crust. v.* 4. *p.* 116, with additions from my own observation.

TENGYRA.

Antennæ of the male shorter than the body, subsetaceous, composed of 13 joints, the 2nd very minute.

Ocelli three.

Mandibles bidentate.

Palpi, maxillary long, the joints unequal.

Labium truncated at the apex, subemarginate (trifid, lateral laciniæ very short?).

Mentum with the apex subacuminate in the middle.

Wings, superior with the marginal cell closed, nearly touching the apex, narrow, subelliptic, and acute, 3 perfect submarginal cells, the 1st and the 2 discoidal cells long.

Abdomen elongated and narrow, subfusiform, the annulations slightly coarctate.

Feet short and slender.

SANVITALI *Lat.*

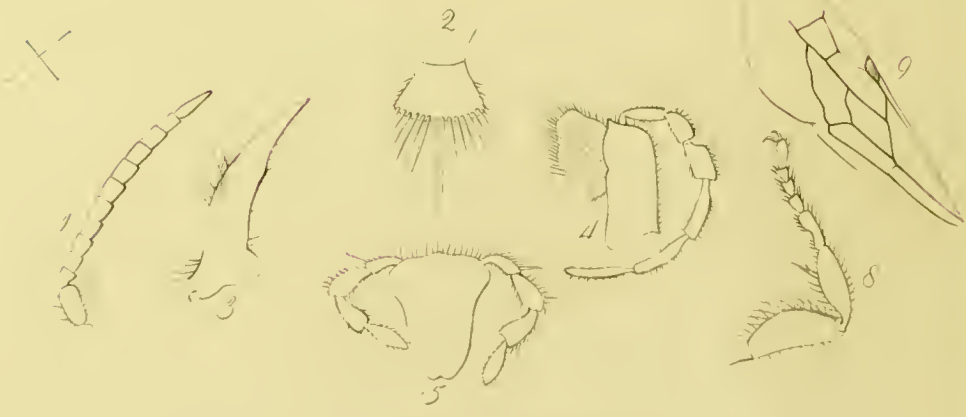
Black, shining, pubescent: clypeus carinated; trunk punctured, mesothorax rugose; stigma and nervures piceous; abdomen very shining.

Found in Etruria, in the fields of Piedmont, and near Paris and Lyons.

The plant is *Galium cruciatum* (Cross-wort or Mug-weed).



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14-133

664.

TIPHIA MINUTA.

ORDER Hymenoptera. FAM. Scoliadæ.

Type of the Genus, Tiphia femorata *Fab.*

TIPHIA *Fab., Lat., Panz., Jur., Vand. L., Shuck., Curt.*—Bethyllus *Panz.*

Antennæ inserted at the base of the clypeus, approximating, a little longer than the head, filiform or subfusiform, a little curved and 13-jointed in the males, basal joint the stoutest, subovate, 2nd small, cup-shaped, 3rd a little larger, the remainder subquadrate, apical joint a little longer and ovate-conic; more curved and 12-jointed in the female, the apical joint considerably longer than the 11th (1).

Labrum small, concealed under the clypeus, pocket-shaped, the anterior margin ciliated or pectinated with long stout spines, the 2 central ones very long (2).

Mandibles crossing, long, rather slender, curved and acute, hairy outside (3).

Maxillæ with a horny base and a large hairy lobe on the inside. *Palpi* attached to the upper margin of the horny portion, long, hairy, and composed of 6 unequal joints, 1st joint bent at the base, 2nd and 3rd the stoutest, cleaver-shaped, the former the shortest, the following long and subclavate, tapering, the apical joint being the slenderest and conical at the point (4).

Mentum top-shaped, hiding the *Lip*, which is very short. *Palpi* stout hairy and 4-jointed, basal joint the slenderest, clavate with a spine outside, 2nd truncated obliquely, 3rd more pear-shaped, 4th ovate-conic (5).

Head *transverse, not broader than the thorax;* face *orbicular;* eyes *lateral ovate:* ocelli 3 *in triangle on the crown.* Thorax *ovate, collar ample;* scutel *lunate;* metathorax *truncated.* Abdomen *ovate-conic, basal joint campanulate,* petiole *short and stout with a tooth on each side.* Wings, superior *with one marginal, 2 submarginal and 3 discoidal cells, the 1st complete in the male, open in the female* (9) *with the apex of the wing notched.* Legs *short and stout, very spiny and hairy in the female* (8)*:* thighs, *posterior very short, incrassated and compressed in the female:* tibiæ *short, with long slender spurs and series of short thick spines outside the 4 posterior in the female:* tarsi *rather short and 5-jointed, tapering and very bristly in the female:* claws *short and bifid.* (8, *a fore leg.*)

MINUTA *Vand. Lind.*—*Curt. Guide, Gen.* 667. 3.

In the Cabinets of Mr. Dale, Mr. Shuckard, and the Author.

THE Scoliidæ form a very extensive family inhabiting warm latitudes and the tropics. On the sandy shores of the Mediterranean, especially near Frejus, I found a considerable number of species, but none inhabit Great Britain or the North of Europe that I am aware of, excepting the genus *Tiphia*, for *Sapyga*, pl. 532, is evidently a distinct family, and *Tengyra*

being the male of *Methoca*, pl. 329, must be united to the Mutillidæ.

The male Tiphiæ are often found resting on the ground, especially in sandy districts, and the females frequent umbelliferous and other flowers. The difference in the marginal cell, which is closed in the male, as shown in our coloured figure, and open in the female, as represented at fig. 9, forms a remarkable character in this group.

1. femorata *Fab.—Panz.* 53. 3.—*Jur. pl.* 9. *Gen.* 11.—villosa *Fab.* ♂.—*Panz.* 98. 16.

Black, shining, pubescent, metathorax with 3 elevated lines, the central one abbreviated, legs rufous in the female, anterior pair brown; wings pale reddish-brown: length $2\frac{1}{2}$ to 5 lines.

Latreille says this insect makes its nest in the earth at the end of summer. It is a common and variable species; sometimes the legs are red in the male and black in the female.

Taken in Norfolk, Birch Wood, the New Forest; August, Parley and Charmouth, Mr. Dale; on the beach at Bournemouth, the Honourable C. A. Harris; and on flowers near Dover in July, J. C.

2. Morio *Fab.?—Panz.* 55. 1.

"Black, villose and punctured; apex of the mandibles rufescent. The metathorax rugose, without the longitudinal elevated lines; the wings with their stigma very large, and their nervures piceous. The abdomen very villose and shining: length 5 lines." *Shuck.*

The male in the British Museum is believed to have been taken in Devonshire by Dr. Leach. The Fabrician specimen was from Spain.

3. minuta *Vand. Lind.—Curt. Brit. Ent. pl.* 664. ♂.

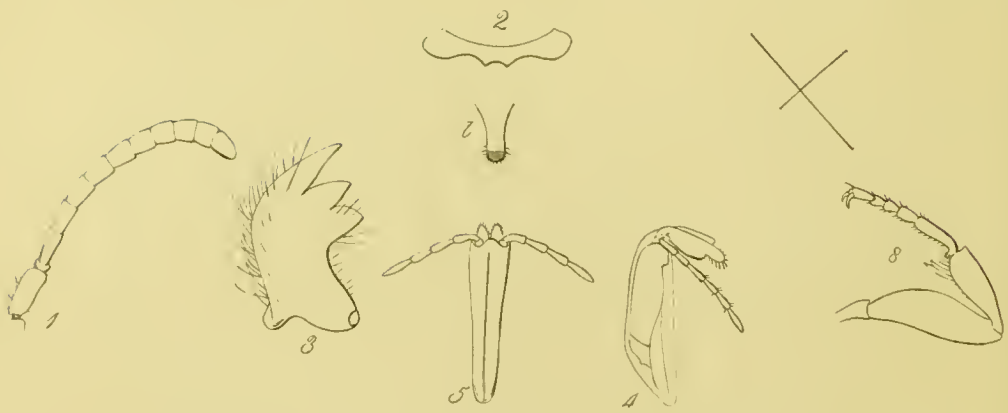
Male. Intense black; shining and pubescent; palpi brown, apex of mandibles ferruginous; metathorax with 3 complete elevated lines; abdomen very finely punctured: wings stained brown; nervures deeper, stigma large ovate and piceous; apex of anterior tibiæ ferruginous, their tarsi more ochreous, tips of the other tibiæ and all the tarsi sometimes ferruginous; spurs whitish: antennæ reddish brown beneath in the female, mandibles rufous only at the middle; apex of abdomen pitchy-red.

The neuration of the wings varies greatly in this little species, as shown by Mr. Shuckard, who has taken several specimens on Hampstead Heath, and Mr. Dale finds it in abundance at Glanville's Wootton on grass and laurels, from the end of March to June. He informs me that he took a 4th species on the sand-hills at Braunton Burrows in Devon the end of July. I observed the male of *T. femorata* in considerable numbers on the sand-hills at Boulogne the end of August, but not one female!

The Plant is *Thalictrum minus*, Less Rue-weed, from Arncliff, communicated by Mr. T. Howson.







Pub. by J. Curtis Jan. 1 1835

12 - 1835

532.

SAPYGA CLAVICORNIS.

ORDER Hymenoptera. FAM. Sapygidæ.

Type of the Genus, Scolia 5-punctata *Fab.*

SAPYGA *Lat., Jur., Klug., Van Lin., Curt.*—Hellus *Fab., Panz.*—Masaris *Panz.*—Scolia *and* Sirex *Fab.*—Vespa *Geof.*—Apis *Linn., Don.*

Antennæ remote, inserted near the middle of the face, as long as the head and thorax, clavate, especially in the males, and 13-jointed: 12-jointed in the females (1), basal joint the longest and stoutest, 2nd cup-shaped, 3rd slenderer, the remainder gradually increasing in diameter and decreasing in length, the 11th joint being nearly quadrate, 12th short and ovate.

Labrum minute and concealed beneath the clypeus, forming a tongue-shaped membranous lobe, coriaceous and ciliated at the apex (2 *l*).

Mandibles a little porrected, very hairy, slightly curved, with 3 strong teeth in both (3).

Maxillæ rather long, terminated by an ovate incurved lobe, with a notch on both sides near the apex, which forms an ovate lobe, ciliated with strong bristles. *Palpi* much longer than the lobe, slender and 6-jointed, the 2nd being the shortest and the 3rd a little the longest (4).

Mentum long linear and slightly compressed. *Labium* composed of 2 short pointed and pubescent lobes. *Palpi* bent back, composed of 4 clavate joints of nearly equal length, the apical one being fusiform (4).

Clypeus *sinuated, and bidentate at the centre* (2): head *thick and orbicular, with an elevated line between the antennæ:* eyes *lateral the inner margin notched:* ocelli 3 *in triangle on the crown of the head.* Thorax *elongate-ovate sloped and rounded behind, anterior margin truncated and a little concave, collar forming a perfect band:* scutellum *semiovate.* Abdomen *very much narrowed at the base, elongate-ovate, conical at the apex,* female *armed with a sting.* Wings, superior *with* 1 *marginal,* 4 *submarginal and* 3 *discoidal cells.* Legs *simple, rather short and slender:* thighs *short:* tibiæ, *anterior short and clavate, with a bifid compressed spine at the apex, the others with a pair of acute spurs:* tarsi *attenuated,* 5*-jointed, basal joint the longest,* 4*th minute:* claws *with a small tooth beneath:* pulvilli *minute* (8, *a fore leg*).

CLAVICORNIS *Linn.*—prisma *Fab.*—*Curt. Guide, Gen.* 668. 2.

In the Cabinets of Mr. Shuckard, the Author, &c.

SAPYGA is a remarkable Insect; its ample collar reminds us of the Chrysidæ, but in general aspect as well as in the shape of the palpi and the form of the maxillary lobe, rounded and reflected, we cannot fail from drawing a comparison with Hylæus (pl. 373) and the Andrenidæ: it appears, however, to be most related to the Mutillidæ and Scoliidæ, and like them the females have the power of stinging very acutely.

Dr. Klug says these Insects frequent flowers in meadows

and fields and fly swiftly: there are only 2 species inhabitants of England, although from the sexes being so very dissimilar in one, and the body of the male varying greatly in the number of the spots, they have been described by Fabricius and others under a variety of names, as

1. S. 4-guttata *Fab. Spec. Ins.*—6-guttata *Fab. Ent. Syst. var.*—6-punctata *Fab. Syst. Picz.*—10-guttata *Jur. pl. 9. f. 13.*—4-punctata *Panz. 87. 20.*; Males.—5-punctata *Fab. Spec. Ins.*—Pacca *Fab. Mant. Ins.*—5-guttata *Don. 13. 438.*; females.—punctata *Klug. Mon. tab. 7. fig. 4, 5, 6.*—*Panz. 100. 17?* of this reference I am doubtful, and there are too many joints in the antennæ.

Male black; antennæ with a few of the central joints ferruginous beneath; clypeus and a stripe on the anterior tibiæ white; 3rd and 4th, and sometimes the 2nd and 5th segments of the abdomen with a white spot on each side, with similar spots occasionally on the underside. *Female* often having 3 white dots on the head, and one on each shoulder, 2nd and 3rd segments of abdomen rufous, 4th and 5th with a white spot on each side, 6th with one at the apex.

I never saw so many of this insect as on the 11th of June, at Ambleside, in company with Mr. Dale, when the females were flying about the stone walls in plenty; but the males were comparatively rare, and were settling on the ground at the base of the walls: I have found this sex also at the back of the Isle of Wight; Mr. Donovan took it at Faversham in Kent; Mr. Walker at Southgate in July; and Capt. Blomer in the New-forest.

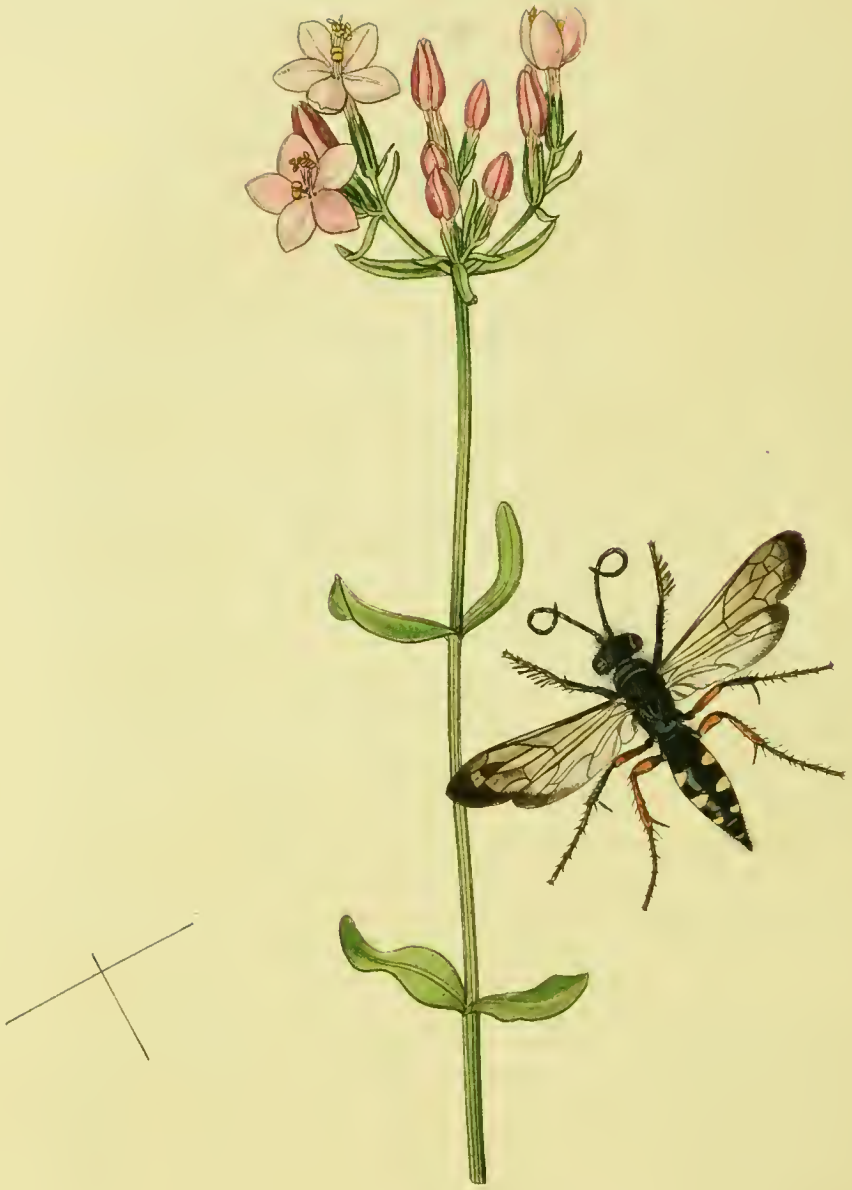
2. S. clavicornis *Linn. Faun. Succ. n.* 1686.—*Curt. Brit. Ent. pl. 532* ♂.—prisma *Fab.*—*Klug. tab. 7. f. 7* and 8.—crabroniformis *Panz. 47. 22* ♀.

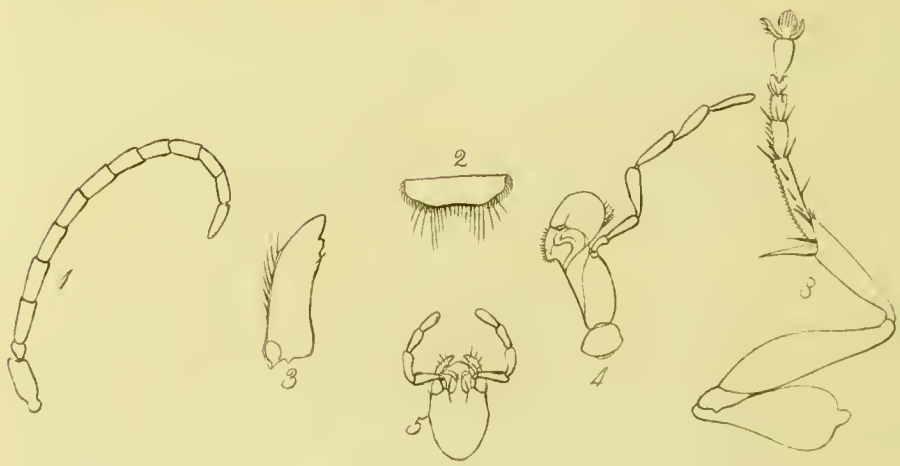
Male black, very thickly punctured and pubescent, antennæ long and clubbed, underside, excepting the 3 basal and 2 apical joints, ochreous; clypeus, a dot on each shoulder, a dot at the apex, 2 spots on the 2nd segment and an interrupted band on the 3rd and 4th, yellow, a stripe on the outside of the anterior, and a spot at the base of the other tibiæ of the same colour. *Female* with the clypeus black, 2 yellow dots between the antennæ, which are clavate only, and the apical joint alone ferruginous beneath and at the tip: wings dusky; abdomen similar to the male, but with 4 yellow spots beneath.

I am happy in being able to restore Linnæus's name to this species, the specimen contained in his cabinet being a male, with a label of his own writing.

Females were observed by Mr. G. Newman in the autumn, in considerable numbers, settling on the leaves of a Morella cherry-tree in a garden near Leominster, and also by Dr. Howitt near Nottingham: for the loan of the male I am indebted to Mr. Shuckard, who has also obligingly added the other sex to my Cabinet.

The Plant is *Hieracium Pilosella* (Mouse-ear Hawk-weed).





Drawn by J. Curtis. Nov. 1 1838

5-1828

238.

POMPILUS RUFIPES.

Order Hymenoptera. Fam. Pompilidæ *Lat.*, *Leach.*

Type of the Genus Pompilus viaticus *Fab.*

Pompilus *Fab., Lat., Panz., Jur.*—Sphex *Linn., DeG.*—Psammocharus *Lat.*

Antennæ inserted between the eyes, below the middle of the face, curved, filiform and 13-jointed in the males (1), basal joint large, 2nd minute, the remainder slightly decreasing in length to the end, the terminal joint being subovate; attenuated convoluted at the apex and slightly serrated in the females, 12-jointed, the 3rd joint the longest.

Labrum scarcely exserted, short and broad, anterior margin concave, the angles truncated and very pubescent, the front producing long and rigid bristles (2).

Mandibles slender, internally concave, pilose on the outside, 2 teeth on the inner margin towards the apex, stronger in one than in the other (3).

Maxillæ broad and much longer than the mentum and lip, terminated by 2 lobes, the lower one ciliated, the terminal one large rounded and pilose outside. *Palpi* very long, 6-jointed, basal joint small, the 3rd the most robust, the others nearly as long, the last the slenderest (5).

Mentum obovate, producing a few bristles towards the top. *Palpi* long (but shorter than the maxillary), 4-jointed, basal joint the longest subclavate, 2nd scarcely so long, 3rd and 4th shorter, of equal length, obovate. *Labium* very short. *Paraglossæ* rather longer than the lip, slightly hooked and pilose (5).

Males *much smaller than the females.* Head *transverse, orbicular.* Eyes *remote.* Ocelli 3 *in triangle.* Thorax *oblong; postscutellum rounded.* Abdomen *sessile, slender and subfusiform in the males; conical robust and armed with a sting in the females.* Superior wings *with* 1 *marginal and* 3 *submarginal cells, the stigma nearly obsolete.* Legs *long, first pair the shortest.* Thighs *of the* 1*st pair attenuated to the apex.* Tibiæ *short and furnished with very long spurs.* Tarsi *long* 5*-jointed, basal joint considerably the longest,* 4*th the shortest.* Claws *somewhat bifid and ciliated internally.* Pulvilli *large* (8, *a fore leg.*)

Rufipes *Linn. Faun. Suec. p.* 413. *n.* 1659.

Black, with hoary pubescence. Abdomen smooth and naked, slightly pubescent only at the base and apex; the males with 2 cream-coloured spots at the base of the 3rd segment; the females with 2 also at the base of the 2nd, and rarely with one on each side of the 4th; an apical spot of the same colour. Wings dusky, fuscous at their extremity. Thighs of intermediate legs ferruginous at the tips, the posterior legs with the thighs and tibiæ bright ferruginous, the former black at the base. Anterior tarsi of the females ciliated externally with long moveable lanceolate bristles.

In the Author's Cabinet.

The Pompili inhabit sandy situations exposed to the sun; and we learn from Latreille that they bury a spider or caterpillar in a cell formed in such places, and close the aperture, having previously laid an egg, which is nourished when hatched by the insect inclosed with it.

The Pompili (as the same author observes) are very active, they are continually flying from one place to another; they run also very rapidly, and often vibrate their wings and antennæ. The reader will be amused by referring to Kirby and Spence, vol. i. p. 339 or 344.

The following is the best list that has appeared of our native species, but there are probably eight or ten more unnamed: those with * have never before been recorded as British.

1. fuscus *Fab.*—*Panz.* 65. 15.—June; common every where.
2. gibbus *Linn.*—*Panz.* 77. 13.—June to end of Aug. ditto.
3. exaltatus *Fab.*—*Panz.* 86. 10.—June to b. Aug.: sandy paths amongst heath.
4. viaticus *Fab.*—*Panz.* 65. 16.—June to b. Sept.: sandy places, and amongst heath and rushes.

*5. pulcher *Fab.*—*Coq. t.* 12. *f.* 8.—m. Aug.: gravelly paths, Ramsdown, Hants, discovered by the Honourable C. A. Harris.

*6. niger *Fab.*—*Panz.* 71. 19.—e. Aug., Sept.: Braunton-burrows, Devon, and Isle of Wight.

7. hircanus *Fab.*—*Panz.* 87. 21.—m. May: Coomb Wood.

*8. rufipes *Linn.*—*Panz.* 65. 17.—This very distinct and handsome species has been added to our Fauna by the Honourable Charles A. Harris, who took it at Ramsdown near Heron Court, Hampshire; and having kindly presented me with specimens, and taken me to the spot where they were found, I had the pleasure of capturing the beautiful variety of the female represented in the plate.

*9. bipunctatus *Fab.*—*Panz.* 72. 8.—tripunctatus? *Coq. t.* 3. *f.* 10.—In the British Museum.

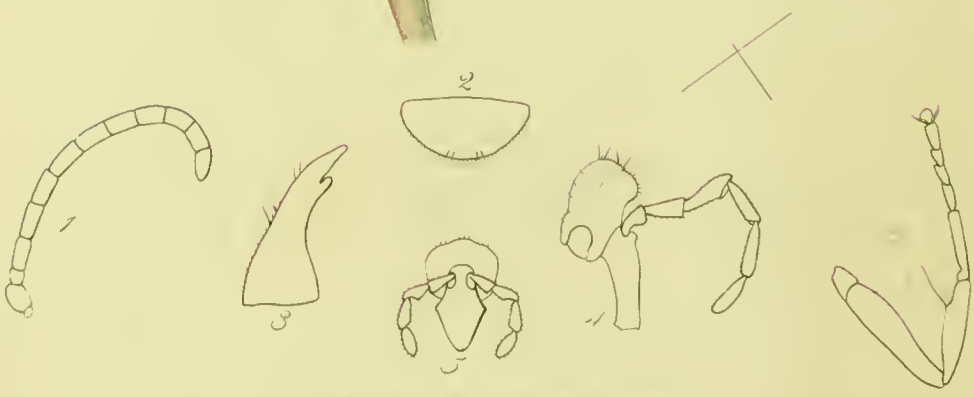
10. annulatus *Fab.*—*Panz.* 76. 16.—*Sam. Ent. Comp. p.* 274.

*11. punctum *Fab.*—*Panz.* 86. 12.

The pretty plant figured, *Chironia Centaurium* (Common Centaury), was in flower at the time the insect was taken.







16-18 39

756.

CEROPALES VARIEGATUS.

ORDER Hymenoptera. FAM. Pompilidæ.

Type of the Genus, Ceropales maculatus, *Fab.*

CEROPALES *Lat., Fab., Jur., Van Lin., Shuck., Curt.*—Pompilus *Panz.*—Ichneumon *Geof.*—Evania *Fab.*

Antennæ inserted in the middle of the face, approximating, not much longer than the thorax, filiform, simply curved in both sexes and indistinctly articulated, 13-jointed in the male, 12-jointed in the female (1), basal joint short, stout and ovate, 2nd small, cup-shaped, the following oblong, 3rd not longer than the 4th, terminal joint ovate.

Labrum exserted, semiorbicular, cilia fine and short (2).

Mandibles slender, curved and bifid, the inner tooth small, pilose and slightly bristly outside (3).

Maxillæ terminated by a broad bristly rounded lobe. *Palpi* long pubescent and 6-jointed, basal joint not very short, pyriform-truncate, 2nd longer and stouter, 3rd the stoutest and as long as the following which are slenderer, apical joint rounded at the tip (4).

Mentum short, rhombiform. *Palpi* short and attached on each side of the anterior margin, pubescent and 4-jointed, joints nearly equal, elongate-obovate, 2nd truncated obliquely, 4th ovate-conic. *Lip* large orbicular, slightly ciliated (5).

Head *transverse, as broad as the thorax:* eyes *lateral, moderate, ovate:* ocelli 3 *in triangle on the crown.* Thorax *oblong; collar angulated:* scutel *gibbose, semiovate.* Abdomen *short, narrowed at the base, sometimes elliptical and narrower than the thorax in the male, the apex truncated; stouter and ovate-conic in the female:* ovipositor *visible and elevated.* Wings, *superior with* 1 *marginal and* 4 *submarginal cells, the* 2*nd and* 3*rd receiving each a recurrent nervure.* Legs, *anterior short, hinder very long:* coxæ *large:* thighs *moderate:* tibiæ, *anterior with* 1, *the others with* 2 *rather long spurs at the apex:* tarsi *very long, simple in both sexes, basal joint the longest,* 4*th the shortest:* claws *curved acute:* pulvilli *large, undivided* (8, *a fore leg*).

VARIEGATUS *Fab.*—*Curt. Guide, Gen.* 670. 3.

In the Cabinets of the British Museum and Mr. Rudd.

THE females of this genus are readily distinguished from those of Pompilus (pl. 238) by their antennæ, which are not convoluted, but simply curved like those of the male; the anterior feet are also simple, and not ciliated with long spiny bristles, and the ovipositor is a little exserted; the males are less easily separated, but on an examination of the trophi, very decided differences will be found in the labrum and mandibles.

The Ceropales are supposed to be parasitic, depositing their eggs in the larvæ of other fossorial Hymenoptera.

1. maculata *Fab.*—frontalis *Panz.* 72. 9. ♀.

Black: clypeus and labrum in the male, and orbits of eyes in the female cream-colour: a band on the collar and a spot on the scutel of the same colour: 1st abdominal segment with 2 cream-coloured spots, margin of the 2nd and apex white: legs ferruginous; coxæ, hinder thighs and apex of tibiæ and tarsi more or less brown.

Middle of August, Norfolk, and Heron Court, Hants, on umbelliferous flowers; also in Kent, Surrey, and Wales as late as September, Mr. F. Walter.

2. semiannulatus *Curt. Guide, No.* 2. Length $2\frac{3}{4}$ lines.

Black, inner orbits of eyes, margin of 2nd abdominal segment, interrupted in the centre, and apex cream-colour: legs rufous, coxæ, trochanters, base and apex of the 4 posterior thighs and terminal half of hinder tibiæ black, tarsi brown.

This female was taken by me in Norfolk; it may prove to be only a small variety of *C. maculata.*

3. variegatus *Fab.—Curt. Brit. Ent. pl.* 756. ♂.

Male black, smooth, exceedingly minutely and thickly punctured, slightly silky with short pile: 2 basal joints of antennæ beneath and face cream-colour, the latter with a black stripe under the antennæ, a dot on each side of the collar, and the hinder margin, as well as a spot behind the scutel, of the same colour: metathorax whitish with pile: 2 basal segments of abdomen rufous, 2nd with a sublunate cream-coloured spot on each side of the margin, and 2 dots at the apex: wings yellowish-brown on the disc: stigma and nervures piceous: legs bright rufous: coxæ black, hoary sericeous, with a cream-coloured spot on the outside of each; trochanters blackish, tips of hinder thighs and tibiæ and the tarsi brownish, basal joint of the hinder feet ciliated internally.

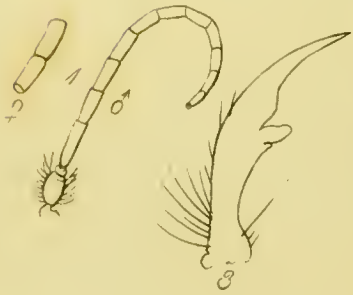
Supposed to have been first captured by Dr. Leach in Devonshire, and a pair has since been taken near Parley Copse and Catherine-hill, Hampshire, in August, by the Rev. G. T. Rudd, to whom I am indebted for the loan of the male.

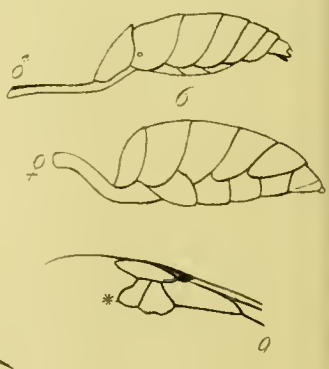
Lagurus ovatus, Hare's-tail-grass, from Guernsey, was obligingly communicated by S. H. Haslem, Esq.











Lith. Hyp. & Curtis, July 1, 18

13-1836

604.

AMMOPHILA CAMPESTRIS.

ORDER Hymenoptera. FAM. Sphægidæ.

Type of the Genus, Sphex vulgaris *Linn.*

AMMOPHILA *Kirb., Lat., VandL., Curt.*—Miscus *Jur.*—Sphex *Linn.*

Antennæ inserted in the middle of the face, approximating, not longer than the thorax, generally curved at the apex, slender and filiform; 13-jointed in the males (1 ♂), basal joint stout, ovate, hairy beneath, 2nd small, globose, 3rd the longest, the remainder elongated, slightly decreasing in length, attenuated at the apex, which is truncated and hollow; 12-jointed in the females (♀, the 2 terminal joints).

Labrum incurved, semiorbicular, ciliated with short bristles, the front emarginate, with a few long straight hairs (2).

Mandibles long, slender and crossing, arcuated and dilated in the middle and subtridentate, having an ovate tooth at the centre and a small one beneath, with a portion more or less produced above, the remainder forming a long tooth, often acute (3).

Maxillæ elongated, terminating in a very long horny linear lobe, attenuated towards the apex, which is rounded and ciliated, with an incurved spine. *Palpi* attached near the middle and extending a little beyond the lobe, 6-jointed, first 3 joints the stoutest, clavate, basal one the shortest, 2nd and 3rd the longest, 3 following slender, decreasing in length, the apical one spatuliform and scarcely longer than the first (4).

Mentum elongated, narrow, a little dilated at the middle (5).

Lip very long, nearly linear, hollow, transversely striated and pubescent beyond the middle, cleft at the apex. *Paraglossæ* long and lanceolate (*d*). *Palpi* long, but much shorter than the lip, attached to 2 membranous scapes, arising from the apex of the mentum, slender and 4-jointed, first 3 joints very long, 2nd a little the longest, 4th shorter subelliptic.

Trophi *inflected, rostriform.* Head *as broad as the thorax:* faces *of the males clothed with silvery hairs:* eyes *lateral and elliptic:* ocelli 3 *in triangle.* Thorax *ovate, the collar narrowed, sometimes forming a thickened ring:* scutellum *sublunate:* metathorax *large, cylindric-ovate.* Abdomen 8-*jointed in the male, with a slender petiole longest in that sex, the 2nd joint sometimes slender, the apex somewhat bilobed* (6 ♂); 7-*jointed in the female* (♀), *the apex armed with a sting inclosed between 2 lobes.* Wings *with one short marginal and 3 submarginal cells* (9 *), *the 2nd receiving 2 recurrent nervures, the 3rd rarely peduncled.* Legs, *especially the anterior, which are the shortest, most spiny in the females, the others long:* tibiæ *spiny, hinder the longest, the apex armed with strong spines, the anterior with one curved dilated and notched internally, 2nd pair with the spines serrated internally, hinder with one long spine, pectinated on the inside* (8 †, *apex of tibia and base of tarsus*): tarsi *long, very spiny and 5-jointed, basal joint of the 1st and 3rd pair of tarsi notched beneath at the base, especially the 1st, and ciliated.*

CAMPESTRIS *Lat.*—pubescens *Curt. Guide, Gen.* 672. 5.

NATURAL as this group is, there are many variations in the structure of the species: the trophi are less elongated in the female of *A. hirsuta* than in *A. sabulosa*, and the mandibles are

obtuse: the petiole of the abdomen varies considerably in length and form, even in the sexes, and in one species the 3rd submarginal cell is pedicled: this forms a portion of Jurine's *Miscus*, but I cannot think it advisable to establish this genus on such slender grounds.

The œconomy of these insects is very remarkable, and although well known I shall add a few lines from my own observations. On the 26th of August I saw a female *A. sabulosa* ascend a sandy bank, dragging a caterpillar, which it carried beneath it as the trunk of a tree is suspended under a *Gill*, holding it near the head with its jaws: having arrived at the desired spot it left the caterpillar, and proceeded about an inch to a place covered with sand, which it scratched away, and then with astonishing dexterity removed, and with its jaws drew out of a hole, comparatively large pieces of earth that closed and concealed the orifice; some of these were so far in that it had to go beyond its own length, of course backing out every time: having completed this operation, it seized the larva and went backward into the hole, drawing the caterpillar quite down; after a short time the fly came out, and being frightened, it flew away. On the following day the Hon. C. Harris and myself saw another larva entombed; it was a *Geometra* $1\frac{1}{2}$ inch long; that yesterday was a *Noctua*, probably *meticulosa*: having buried it the fly remained in the cell. We then dug out the caterpillar, and found a cylindrical white egg $\frac{1}{8}$th of an inch long, attached firmly to the middle; the *Ammophila* was below and came out much alarmed.

Mr. Kirby was acquainted with the male of one species only when he characterized this genus, and my ignorance of that sex led me into several errors in the Guide.

I. Petiole of abdomen elongated and formed gradually:
a. 3rd submarginal cell pedicled.

1. campestris *Lat.—Curt. Brit. Ent. pl.* 604 ♀.
Dead black, clothed with short grey pubescence, giving the apex of the metathorax and the outside of the hinder coxæ a silvery appearance: sparingly punctured: metathorax very finely striated transversely, 2nd joint of abdomen, excepting the base, 3rd joint and base of the 4th orange; costa, disc of cells and the fimbria yellowish-fuscous, scapulars, stigma and nervures brown. The male has a silvery face, the entire upper side of the 2nd joint of the petiole and a long ovate spot on the back of the 3rd segment black.

I discovered the female in Norfolk 20 years since, and the male I took at Ramsdown, near Heron Court, the end of Aug.

b. 3rd submarginal cell simple.

2. sabulosa *Linn.—Panz.* 65. 12 ♀.?—vulgaris *Kirb.*—lutaria *Panz.* 65. 14 ♂.—*Don.* 3. 93. 1 ♀.—pulvillata *Sow.?*

II. Petiole of abdomen shorter and formed abruptly.

3. affinis *Kirb.—Linn. Trans. v.* 4. *p.* 205. *No.* 2.

4. hirsuta *Scop.—Sow. B. M. pl.* 33. *f.* 1.—*Sam. Ent. Comp. pl.* 8. *f.* 5.—arenaria *Fab.—Panz.* 65. 13.—*Don.* 13. 468. 2. *females.*—argentata *Kirb.*—lutaria *Fab. males.*

The Plant is *Tussilago Petasites* (Common Butter-bur.)



Published by J. Curtis May 1. 1824

6-1829

261.

ASTATA VICTOR.

Order Hymenoptera. Fam. Larridæ *Lat.*, *Leach.*

Type of the Genus Tiphia abdominalis *Panz.*

Astata *Lat.*, *Sam.*—Dimorpha *Jur.*, *Panz.*—Tiphia *Panz.*

Antennæ approximating, inserted at the base of the nasus, rather stoutest in the middle, 13-jointed in the males, basal joint robust, 2nd globose, 3rd the longest, slender, the remainder gradually becoming shorter to the apex, the last joint small and conical (1*a) : more robust and 12-jointed in the females.

Labrum minute, transverse, emarginate, producing 6 or 7 furcate spines, 2 very long hairs and 6 rigid bristles (2).

Mandibles crossing, bent, slightly pilose, bifid at the apex (3).

Maxillæ terminated by a large transparent lobe, which is coriaceous, pubescent, and bent back at the apex; having a large transparent lobe producing a few hairs on the inside. *Palpi* long hirsute, 6-jointed, basal joint small, 2nd and 3rd long and dilated, narrowed at the base, 4th the longest, 5th not so long, the 6th shorter and slender (4).

Mentum oblong, strongly ciliated, anterior angles hollowed to receive the *Palpi* which are long and 4-jointed, basal joint the longest, sinuated and truncated, pilose on the internal side, 2nd dilated subtrigonate, 3rd small somewhat pear-shaped, 4th elongate, bean-shaped. *Lip* large, membranous cordiform (5).

Head *transverse.* Eyes *large, meeting behind in the males* (1*) ; *remote in the females.* Ocelli 3, *placed before the eyes in the males, the anterior one being the largest* (1*). Abdomen *very short especially in the males, peduncled, ovate-conic.* Wings, *superior with the marginal cell attenuated and divided; submarginal cells* 3, *the* 1*st being divided by a nervure.* Legs *more robust in the females, posterior the longest.* Thighs *robust.* Tibiæ, *anterior pair with a spine at the apex, with a membranous internal appendage; 4 posterior with several rows of spiny bristles.* Tarsi 5*-jointed, basal joint the longest, penultimate the shortest; anterior producing long clavate bristles in the females.* Claws *simple.* Pulvilli *distinct* (8, *fore leg of a female from which sex the trophi are drawn*).

Victor *Nobis,* the female is represented.

Male. Black, shining, covered with fine hoary pubescence. Ocelli reddish. Eyes brown. Thorax very thickly and minutely punctured. Metathorax reticulated. Abdomen red with a black spot at the base, the margin of the 3rd and the apical joints black also. Wings stained yellowish brown with a purplish and iridescent tint, the superior darkest across the middle ; costa, stigma, nervures and tarsi piceous.

In the Cabinets of the British Museum and the Author.

A solitary example in the British Museum, and another in Mr. Donovan's collection, were the only specimens preserved of this insect, and nothing was known of its habits or locality; I was therefore highly gratified last summer, by capturing several of both sexes; they are exceedingly active; and Latreille says they are called Astatæ, because they are always in motion.

On a fine day, the end of last July, whilst rambling about the undercliff at the back of the Isle of Wight, I observed two males on a pathway leading through heath and rushes; a few days after, I found two more males on sandy spots near the same place; and on the 12th of August, a young friend who was my companion, took a female at the top of the cliff; and towards the latter end of the same month, on a gravelly walk at Ramsdown, surrounded by heath, rhododendrons and pine-trees, I took four females, each of them carrying a pupa of *Pentatoma prasina*, Linn.; or of *P. dissimilis*, Fab.: and as nothing was known of their œconomy, it was an interesting and remarkable fact; and there is scarcely a doubt but these pupæ were to be buried by the Astata to deposit her eggs in. The Honourable Charles Harris also took one or two, which I believe were females also.

The trophi are remarkable, especially the 2nd joint of the labial palpi; and the upper lip with its long spines, some of them furcate. Latreille says the labium is trilobed; and as his accuracy is beyond all praise, I suspect that it is different in the males, mine being a female, which was bilobed. The anterior tarsi of the females are furnished with the same sort of appendages as the Pompili, perhaps to secure their prey, or to assist them in clearing away the sand in burrowing.

Panzer says his *T. abdominalis* has whitish tarsi, and his figure is so represented; and his *D. stigma* has the anterior tibiæ annulated with white. I have therefore been compelled to give my insect a new name; for Mr. Donovan (who has figured the male, which is the reason that the female is now given) has called his the *Larra pompiliformis* of Panzer, which is not of the same genus. The *D. oculata* of Jurine is also perfectly distinct.

The plant is *Trifolium* (*Melilotus*) *officinale* (Melilot Trefoil).





Publ. by J. Curtis, Dec. 1. 18

10-1833

480.

OXYBELUS ARGENTATUS.

Order Hymenoptera. Fam. Larridæ.

Type of the Genus, Vespa uniglumis *Linn.*

Oxybelus *Lat., Fab., Panz., Jur., Curt.*—Vespa *Linn.*—Crabro *Fab.*

Antennæ inserted at the base of the clypeus, short, curved, clavate, geniculated and pubescent, 13-jointed in the males and 12-jointed in the females (1); basal joint rather long and very stout, 2nd much smaller and cup-shaped, 3rd longer than the 2nd, 4th shorter, the remainder cup-shaped or subquadrate, terminal joint ovate.

Labrum small lunulate, ciliated, producing a few long hairs (2).

Mandibles long slender curved and acute with a triangular notch on the inside towards the base; externally hairy and ciliated internally (3).

Maxillæ terminated by an incurved ovate lobe, the apical margin ciliated, and a small lobe on the inside. *Palpi* rather short, slender, pubescent, pilose and 6-jointed, basal joint small, the remainder nearly equal, the 5th a little shorter than the terminal one which is elongate-ovate (4).

Mentum quadrate at the top, the anterior margin sinuated, with a spine in the middle, base obovate, forming an angle on each side. *Palpi* rather long slender and pubescent, attached to small scapes, 4-jointed, basal joint the longest, clavate, the remainder nearly of equal size, the terminal joint ovate. *Lip* subquadrate and slightly emarginate (5).

Head *transverse*, face *orbicular:* clypeus *with a deep keel in the centre in the males*: eyes *lateral long and narrow:* ocelli 3 *in triangle on the fore part of the head.* Thorax *globose, rather broader than the head:* collar *short:* (T, *the thorax in profile*): scutellum *trispinose, the lateral spines squamose* (a), *the central one the longest acuminated curved and grooved above* (b). Abdomen *not larger than the thorax, ovate-conic and 6-jointed.* Wings; superior *with* 1 *long marginal cell having the nervure continued from the apex, and* 2 *submarginal cells, the* 1*st of these being separated from one of the discoidal cells by a faint nervure:* inferior wings *with one transverse nervure very close to the base.* Legs *stout:* thighs *thick, short and ventricose:* tibiæ *short clavate and spurred at the apex and spined outside:* tarsi *longer than the tibiæ, the anterior with spiny bristles outside and serrated with smaller ones internally; 5-jointed, basal joint the longest, 4th minute, 5th thick and ovate.* Claws *curved and acute:* pulvilli *large and ovate* (8, *a fore leg*).

Argentatus *Matt. MSS.—Curt. Guide, Gen.* 681. 6.

Black, completely clothed with depressed silvery hairs and thickly punctured; scutellum with the lateral lobes and the apex of the curved spine yellow. Abdomen ovate-conic, with a yellow spot on each side of the first 4 segments, the 1st pair transverse oval, the 2nd and 3rd linear, the 4th united. Nervures of wings and legs ferruginous; anterior thighs black, yellow at the apex, the others black only at the base; anterior tibiæ yellow outside, the others only of that colour at the base: Pulvilli blackish.

In the Cabinets of the British Museum and Mr. Matthews.

Latreille distinguishes Oxybelus from Astata (pl. 261) and Nysson by a difference in the number of the cubital or submarginal cells, and the remarkable trimucronated scutellum is a striking character.

The males are smaller than the females, their bodies are narrower, the antennæ have a greater number of joints, and the clypeus, at least in the Type, has a projecting ridge, like a nose. Of their œconomy I am ignorant, but Latreille says they bury dead flies and lay their eggs close by them.

The following species have been detected in Britain.

1. O. uniglumis *Linn. F. S.* 1681.—*Panz.* 64. 14?—10-maculatus *Don.* 11. 376. 1. 1. *var.*

"Thorax immaculate: scutellum mucronate: abdomen with 8 white spots, the 2 basal ones ovate, the others linear: thighs black, tibiæ ferruginous." The male has sometimes 10 spots on the abdomen, it is said.

On umbellate flowers in Kent. June and middle of August on sandy cliffs and footpaths in pairs, at the back of the Isle of Wight, also on sunny banks Pool Harbour: J. C. At Appledore, Dawlish, Bristol, Portland, Lulworth, Parley and Monkswood? J. C. Dale, Esq., from July to September.

2. O. mucronatus *Fab. Ent. Syst.* 2. 300. 25.

"Scutellum bidentate and mucronate, black spotted with yellow: all the abdominal segments with transverse yellow spots on each side: legs black, thighs yellow."

Mr. Dale thinks he took this on Parley Heath, July 5, 1823.

3. O. concinnus *Step.*—mucronatus *Panz.*? 101. 19.

4. O. tridens? *Fab. E. S. Supp.* 270. 24.—Nomada punctata, *Fab. E. S.*

"Scutellum black immaculate; all the abdominal segments with transverse yellow spots on each side: legs rufous, thighs black."

I have taken a pair, I believe, of this species.

5. O. trispinosus *Fab. E. S.* 2. 301. 26.—*Lat. Gen., &c., tab.* 13. *f.* 13.

"Scutellum black, abdomen with 2 yellow spots on each side: legs black, apex ferruginous."

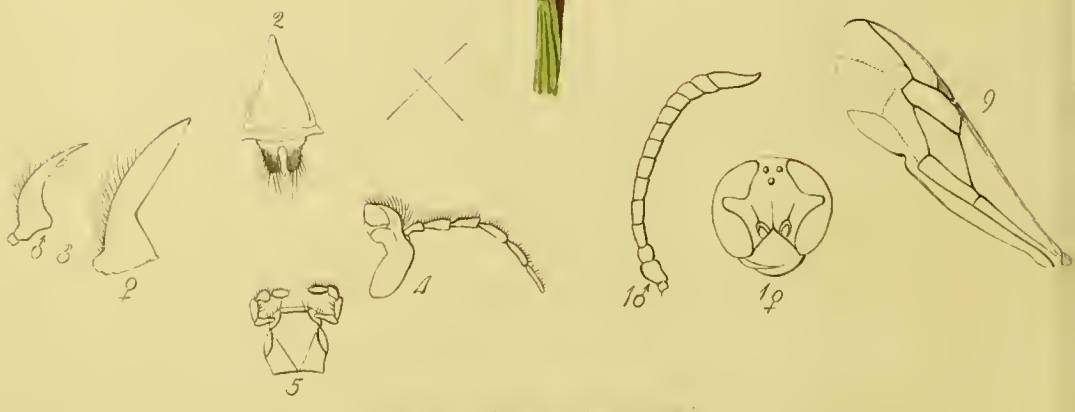
End of June, Wrentham, Suffolk.

6. O. argentatus *Matt.*—*Curt. Brit. Ent. pl.* 480. ♀.

The beautiful specimen figured was taken on the sand-hills near Liverpool in July 1831 by A. Matthews, Esq., of Lincoln College, Oxford, to whom I am indebted for the loan of it.

The Plant is *Hedypnois* (*Apargia*) *hispida* (Rough Apargia).

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14-1837

652.

TRYPOXYLON CLAVICERUM.

Order Hymenoptera. Fam. Crabronidæ.

Type of the Genus, Sphex Figulus *Linn.*

Trypoxylon *Lat., Fab., St. Farg., Shuc., Curt.*—Apius *Jur.*—Sphex *Linn.*

Antennæ inserted under a little tubercle at the base of the clypeus, approximating, short, not geniculated, but curved, a little clavate, 13-jointed in the male (1 ♂), basal joint short stout and somewhat obovate, 2nd globose, 3rd slender oblong, the following gradually decreasing in length and increasing in diameter, becoming transverse towards the apex, the last joint long, curved and conical, 12-jointed in the female, scarcely clavate, the apical joint not curved.

Labrum concealed, the base elongate-trigonate, anterior portion forming two long broad parallel lobes, obtuse and ciliated with long hairs (2).

Mandibles long slender lanceolate and curved, broadest at the base, with a large angle on the inside, externally hairy (3 ♀); smaller and claw-shaped in the male, and regularly curved, not angulated internally (♂).

Maxillæ with a small lobe inside, terminated by a larger ovate one, ciliated outside. *Palpi* long, ciliated internally, filiform, composed of 6 joints of nearly equal length, basal joint a little the shortest, the following cleaver-shaped, 5th sometimes the longest, 6th very slender (4).

Mentum short broad and suborbicular, base truncated, the sides trisinuated, anterior margin straight. *Lip* very short and nearly concealed. *Palpi* neither long nor stout, pubescent, 4-jointed, 2 basal joints the longest, clavate, 3rd nearly ovate, 4th ovate (5).

Head *transverse, face orbicular* (1 ♀)*:* eyes *large vertical and deeply notched on the inside :* ocelli 3 *in triangle on the crown.* Thorax *globose :* scutel *subquadrate, the basal angles produced.* Abdomen *very long, slender at the base, gradually becoming clavate, the apex incurved and acute.* Wings, *superior with one marginal and* 3 *submarginal cells, the nervures of the* 2*nd and* 3*rd as well as of the external discoidal cell but faintly traced* (9). Thighs *short and stout :* tibiæ, *anterior very short, with a spine at the apex, the others spurred :* tarsi 5*-jointed, hinder long, terminal joint short and stout :* claws *and* pulvilli *thick.*

Clavicerum *St. Farg.—Curt. Guide, Gen.* 682. 3. *2nd Edition.*

In Mr. Shuckard's Cabinet.

Trypoxylon is considered to be allied on the one hand to *Tachybulus*, and on the other to *Nitela*, both of them European types, but not inhabitants of this country.

1. Figulus *Linn.*—*Panz.* 80. 16.—*Jurine pl.* 9. *Gen.* 8.
Black, shining, clypeus and the margins of the segments silvery on the sides.

Authors do not seem to agree respecting the œconomy of this abundant species, which is found on old posts, paling, outhouses, gates, barn and stable doors, from the middle of May to the beginning of August, and in the Isle of Wight I have frequently found it upon rushes. Latreille says that it avails itself of the holes made by other insects in wood to form its own nest. As soon as the proprietor of the hole leaves it, the *Trypoxylon* takes possession of it, cleans, enlarges, and clothes the inside with a coat of diluted earth, places a spider (Mr. Westwood says the young of *Epeira diadema*) in it, deposits an egg, and then closes the aperture with moist earth; each cell occupies it two days. The larva is an apode and resembles those of bees: after having consumed its provision it spins a very thin cocoon, in which it becomes a pupa. This view has been confirmed by the observations of Mr. Shuckard and Mr. Westwood, but from the account of the œconomy of this insect by the latter gentleman in the Trans. of the Ent. Soc. he seems to be disposed to think that the *Trypoxylon* forms its own burrows. M. St. Fargeau considers that these insects are parasitic, and from an anecdote published in Mr. Shuckard's fossorial Hymenoptera it appears that Mr. Johnson detected them carrying masses composed of *Aphides* into the burrows occupied by *Odyneri*.

2. aurifrons. "*Male* black, silky-aureous, antennæ fulvous, margins of the abdominal segments ferruginous: 7 lines." *Shuc.* 117. 2.

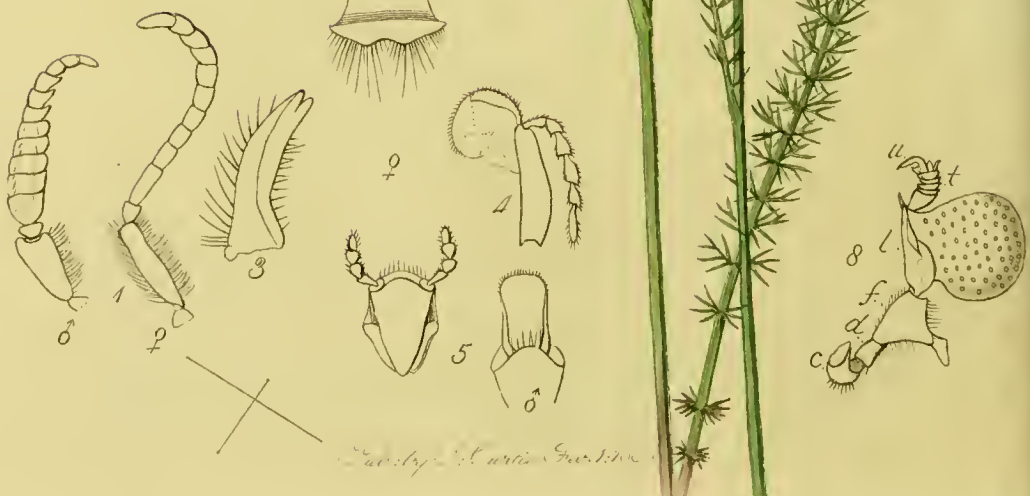
Mr. Shuckard thinks this species, which is in the British Museum, may not be an European insect.

3. clavigerum *St. Farg.*—*Curt. Brit. Ent. pl.* 652. ♀.
Black, minutely punctured, clothed with short soft white pubescence, clypeus silvery in both sexes: metathorax striated obliquely, with a large channel down the centre: abdomen piceous, basal joint elongated, subpyriform, with a sharp groove down the base, the segments constricted at the base, sides of the margins silky-white: scapulæ and tips of thighs ochreous, 4 anterior tibiæ and tarsi ochreous, the former fuscous outside, except at the base and apex. In the male the legs are darker.

Mr. Shuckard obliged me by the loan of this insect, which he has taken at Hampstead and Darent; it has also been found at Camberwell: he adds that it frequents holes in posts and paling, especially where *Heriades Campanularum* (fol. 504) nidificates.

For specimens of *Polygonum viviparum*, Alpine Bistort, I am indebted to T. Howson, Esq., who took me to their locality in the neighbourhood of Giggleswick.

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15-1838

680.

CRABRO SUBPUNCTATUS.

ORDER Hymenoptera. FAM. Crabronidæ.

Type of the Genus, Sphex cribraria *Linn.*

CRABRO *Fab., Panz., Van. Lind., Shuck., Curt.*—Pemphredon *Fab.*

Antennæ inserted towards the bottom of the face at the base of the clypeus, approximating, a little longer than the head, geniculated, fusiform and 13-jointed in the male (1 ♂), basal joint stout, elongate obovate, hairy at the back, 2nd small, cup-shaped, 5 following dilated, 3rd semiovate, the following transverse, 8th, 9th and 10th narrower, serrated, the following slender subovate: filiform and 12-jointed in the female (1 ♀), basal joint long, rather stout, sublinear and hairy, 2nd ovate-truncate, 3rd much longer than any of the following which are oblong, a little thickened and truncated obliquely, apical joint longer and subconic.

Labrum attached under the clypeus, transverse, very short, forming a depressed triangle, the centre emarginate, ciliated and fringed with long hairs (2).

Mandibles long, crossing, a little curved, sublinear, the apex cleft, forming 2 broad rounded teeth (3).

Maxillæ short, terminating in a large concavo-convex ciliated lobe. *Palpi* short, pubescent and 6-jointed, basal joint a little longer than the 2nd, which is ovate-truncate, slender and clavate, 3rd, 4th and 5th rather thick and a little cleaver-shaped, 4th the longest, 6th slender, subelliptic and at least as long as the 4th (4).

Mentum obconical. *Lip* very short, fleshy and pilose in the female (5), as long as the palpi and semicylindrical in the male (♂). *Palpi* short pubescent and 4-jointed, basal joint clavate, 2nd and 3rd somewhat obtrigonate, 4th small and ovate (5).

Head *large and broad;* face *transverse-oval:* eyes *large ovate, remote above, approximating below:* ocelli 3 *in triangle on the crown.* Thorax *as broad as the head, obovate,* collar *narrow, the angles acuminated:* scutel *transverse, semiovate.* Abdomen *very narrow at the base, as long as the head and thorax, ovate-lanceolate, 7-jointed in the male, 6-jointed in the female.* Wings *with* 1 *marginal cell, pedicled at the apex, and* 1 *submarginal.* Legs *short and stout:* thighs *stout:* tibiæ *short, spinose outside, with long spurs at the apex:* tarsi *as long as the tibiæ, slender, 5-jointed, externally spinose in the female, basal joint elongated, 3 following obtrigonate, 5th stout, elongate-clavate:* claws *short, acute:* anterior legs *patelliform in the male* (8); coxæ *stout* (*c*); trochanters *oblong* (*d*); thigh *with a minute spine at the base and a large dilated tooth on the outside* (*f*), *trigonate at the apex;* tibia *with a spur at the apex, and a large horny bowl-shaped dilatation on the outside, with transparent dots* (*l*); tarsus *short and thick, basal joint obtrigonate, 5 following saucer-shaped* (*t*); claws *very unequal, one small the other stout, curved and hooked at the base* (*u*).

SUBPUNCTATUS *Rossi.*—*Curt. Guide, Gen.* 683. 18.—4-maculatus *Fab.* ♂.

In the Author's and other Cabinets.

Crabro is a group of fossorial insects varying so much in structure, that MM. St. Fargeau and Brullé have formed them into 11 genera, the English types of which I shall subjoin, referring to the 3rd vol. of the Ann. de la Soc. Ent. for their characters. Mr. Shuckard has given a very able synoptic table, as well as elaborate descriptions of the species, a list of which will be found in the Guide. I wish to observe that the pellucid spots on the spoon of the masculine fore-legs are covered with a membrane, and it will be seen by the dissections of the trophi that there are ample grounds for establishing the genus *Rhopalum*. These insects are often found upon umbellatæ, and some of them undergo their metamorphoses in decayed trees. Latreille says that *C. cribrarius* provides for its larvæ with a *Pyralis* (Tortrix) that lives upon the oak: other females nourish them with Diptera.

Crabro. 6. cephalotes *Fab.*

12[b]. varus *Curt.*—comptus *St. Farg.*? *v.* 3. *p.* 705. 8.

Male black, minutely punctured and hairy: antennæ 13-jointed, with the 3rd and 4th joints dentate, scape yellow beneath, clypeus and inner margin of eyes silvery; crown convex: metathorax rugose: abdomen with 5 yellow spots on each side, the 1st pair, which is the largest, being on the 2nd segment; those on the 6th are united: legs black, anterior thighs with a yellow streak beneath in the anterior, the others with a spot at the apex; tibiæ black, intermediate slender and crooked, the others yellow outside; tarsi yellow, hinder brown, apical joint blackish: length 3 lines.

I took a male at Horning in Norfolk the 24th of June, and Mr. Shuckard has 2 from Scotland. The small size and crooked slender and black intermediate tibiæ, distinguish it from *C. Xylurgus.*

Solenius. 19. vagus *Linn.*—*Panz.* 46. 10. ♀.

Blepharipus. 23. dimidiatus *Fab.*—signatus *Pz.* 43. 15 ♀.

Ceratocolus. 13. striatus *St. Farg.*—Lindenius *Shuck.*?

Thyreopus. 4. cribrarius *Linn.*—*Pz.* 15.19 ♀.—palmatus *Pz.* 46. 3 ♂.

Thyreus. 1. vexillatus *Pz.* 46. 5.—clypeatus *Fab.*

Crossocerus. 2. scutatus *Fab.*—*Pz.* 15. 22. ♂.

18. subpunctatus *Rossi.*—*Curt. B. E. pl.* 680 ♀.

Male black, finely punctured; antennæ ciliated, base and tip of scape ochreous; mandibles castaneous at the centre; clypeus white with hair; metathorax with a shining cordiform space; 2nd and 3rd joints of abdomen with a large yellow spot on each side, 6th with 3 small yellow spots connected at the base: legs ochreous, yellow outside; anterior thighs black on one side, hinder legs black, the tibiæ with a yellow patch at the base, spurs ochreous. *Female* with 2 yellow spots on the collar: 5th segment of abdomen with a large yellow round spot; *var.* with a yellow streak behind the scutel and a sinuated one on the basal joint of abdomen, with broad yellow bands on the 3 following, the 5th joint entirely yellow.

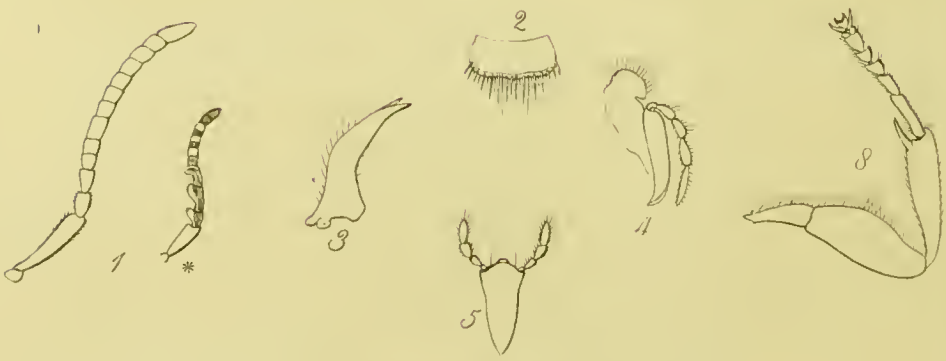
Lindenius. 37. albilabris *Fab.*—leucostoma *Pz.* 15. 24.

Dasyproctus is an African genus, and Corynopus and Physoscelus form the genus *Rhopalum* of Brit. Ent. fol. 656.

Carum verticillatum, Whorled Caraway, from Newby Cross, was communicated by T. C. Heysham, Esq.



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14-1837

656.

RHOPALUM TIBIALE.

ORDER Hymenoptera. FAM. Crabronidæ.

Type of the Genus, Crabro rufiventris *Panz.*

RHOPALUM *Kirb., Curt.*—Physoscelus, Corynopus *St. Farg.*—Pemphredon *Fab.*—Crabro *Fab., Panz., Vand. L., Shuc.*

Antennæ inserted at the base of the clypeus, approximating, scarcely longer than the head, geniculated, curved and simple at the apex; 13-jointed in the male (1), basal joint long and stout, 2nd ovate, 3rd the same length but truncated, the remainder quadrate, excepting the 6th joint which is oblong, emarginate beneath, and the terminal one which is elongate-conic: 12-jointed in the female, the 4th joint longer than the 3rd.

Labrum concealed beneath the clypeus, minute, transverse, the sides rounded, anterior margin convex and ciliated with strong bristles (2).

Mandibles rather long slender and curved, crossing over the labrum, hairy, broad at the apex and cleft, forming 2 trigonate teeth, equal in the male (3).

Maxillæ terminated by an inflected lobe, hairy outside. *Palpi* not long, pubescent, 5-jointed, basal joint minute, 3 following stout somewhat obovate, 4th longer than the preceding, but shorter than the terminal joint, which is slender and subfusiform (4).

Mentum elongate-trigonate, the anterior margin waved. *Labium* very short and concealed behind the mentum. *Palpi* attached to very minute scapes at the anterior angles, pilose, basal joint slender and clavate, 2nd stouter, somewhat obovate, 3rd a little the largest, ovate-conic (5).

Head *large subglobose:* eyes *large lateral and ovate:* ocelli 3 *in triangle on the crown.* Thorax *oval:* scutel *semiorbicular:* metathorax *smooth and convex.* Abdomen *petiolated, elongated, slender, clavate, basal joint long and slender, the apex nodose and larger than the base of the 2nd joint, the remainder forming an ovate mass.* Wings, *superior scarcely so long as the body, with a lanceolate marginal cell divided near the apex, one large submarginal and 2 discoidal cells.* Legs *rather short, hinder the longest and stoutest: anterior* thighs *very short:* tibiæ *short simple and spurred, posterior stout clavate and spinose externally:* tarsi 5-*jointed, basal joint the longest and stoutest especially in the hinder pair:* claws *and* pulvilli *short and stout* (8, *a fore leg*).

TIBIALE *Fab.*—*Curt. Guide, Gen.* 684. 1.—varicornis *Panz.*

In the Cabinets of Mr. Dale, Mr. Shuckard, and the Author.

THAT the neuration of the wings is often a valuable and useful character to assist in the formation of genera cannot be denied, but it is equally true that a strict adherence to it without an

examination of the trophi, will frequently lead to error. The group before us was many years since noticed by Mr. Kirby and called *Rhopalum*, and other celebrated writers have considered it a distinct type from *Crabro*, with which Mr. Shuckard has united it in his elegant Monograph of the Fossorial Hymenoptera. On a comparison of the trophi however the necessity of separating our two insects from *Crabro* is manifest: the most obvious differences are the palpi being only 5 and 3-jointed, whilst in *Crabro patellatus* the maxillary have 6 and the labial 4 joints, and the lip is nearly as long as the labial palpi: I ought to remark that I could not obtain recent specimens for dissection, but I have no reason to think they had been mutilated. Even the two species of *Rhopalum* vary so materially that they must form at least 2 sections; the antennæ of the males and the clypeus are very different, as well as the structure of the tarsi, and the remarkable lobes attached to the abdomen I have not yet discovered in *R. rufiventre*.

1. tibiale *Fab.*—*Curt. Brit. Ent. pl.* 656. ♂.—CORYNOPUS *St. Farg.*

Male black, shining, slightly silky; clypeus porrected obliquely, silvery, lobed in the centre; inner margin of eyes silvery; trophi ochreous, base of mandibles black; basal joint of antennæ yellow beneath, 2nd subtrigonate produced on the inside, yellow at the apex, 3rd small truncated obliquely, 4th and 5th stout, elongated and somewhat hatchet-shaped, being emarginated beneath, following short, 6th and 7th yellow at the apex, 9th and 11th straw colour (1 *): abdomen with the margin of the 2nd segment sometimes ferruginous, as well as the apex, which is furnished with 2 lanceolate laminæ: nervures and stigma piceous: legs yellow; thighs black, except at the tips, anterior tibiæ with a black spot on the outside, the others with a black ring, the hinder dilated and rufous at the apex: tarsi tipped with orange, basal joint ciliated externally and dilated in the anterior, hinder brown, the base and 4th joint subrufous, the former produced externally at the apex. *Female* larger and stouter; clypeus acuminated in the centre; antennæ simple, 4th joint longer than the 3rd or 5th; basal joint of tarsi not dilated, 4 anterior tibiæ piceous beneath: anus acuminated and channelled above.

July, Parley, Blandford, and Gl. Wootton, Mr. Dale; Darent, Mr. Shuckard; on Lime-trees, Southgate, Mr. F. Walker; about laurels at Netley, Shropshire, Mr. Westwood.

2. rufiventre *Fab.*—*Panz.* 72. 12.—PHYSOSCELUS *St. Farg.*

Shining black; margins of the 2nd abdominal segment and sides of the 3rd ferruginous; clypeus semicircular and silvery, sides of face silvery; mandibles yellow, tips ferruginous; antennæ with the basal joint yellow beneath, the following ochreous beneath excepting the apical ones; legs straw colour, thighs black, except at the apex, intermediate tibiæ with a dark dot on the inside at the middle, hinder legs piceous, base of tibiæ whitish: 2¼ lines. *Female* with the abdomen rufous, excepting the petiole, and sometimes the 2nd, 4th and 5th segments are piceous: 2¾ lines.

July, Parley, in a garden at Blandford, Gl. Wootton, Mr. Dale; near Ryde, Rev. G. T. Rudd; in June, Norfolk, and August, Isle of Arran, J. C.

The Plant is *Caucalis* (Torilis *Adan.*) *infesta*, Spreading Hedge Parsley.






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11-1834

496.

DIODONTUS GRACILIS.

Order Hymenoptera. Fam. Crabronidæ.

Type of the Genus, Psen pallipes *Panz.*

Diodontus *Curt.*—Stigmus *Lat.*—Pemphredon *Fab., Vand. L.*—Psen *Panz.*—Crabro *Fab.*

Antennæ inserted below the middle of the face, a little longer than the head, velvety, filiform, and 13-jointed in the male; 12-jointed in the female (1), basal joint the longest and stoutest, subpyriform and truncated obliquely, 2nd obovate, 3rd rather more slender and oblong, the remainder a little stouter, of equal length and oblong, terminal joint longer and ovate at the apex.

Labrum semiorbicular, notched in front, forming two obtuse points, slightly produced, the margin producing a few bristles (2).

Mandibles alike, long, narrow, obtuse, pilose, truncated obliquely and notched, forming two rounded and concave teeth, the lower one with a series of bristles on the inside (3).

Maxillæ terminated by an oblique subovate lobe, very pilose at the apex, with a porrected one on the inside, producing a few bristles. *Palpi* long, hairy and 6-jointed, basal joint the shortest and slenderest, 2nd and 3rd very broad, the remainder slender and attenuated to the apex, 4th the longest, 5th and 6th not longer than the 2nd and 3rd (4).

Mentum oblong, a little dilated before. *Labium* very short and fleshy. *Palpi* rather long, pointed and pilose, basal joint long, naked and clavate, 3 following much shorter, nearly of equal length, the 3rd a little the shortest, 4th a little narrower and ovate at the apex (5).

Head *broad, face orbicular, concave:* eyes *lateral and ovate:* ocelli 3 *in triangle on the crown of the head.* Thorax *obovate.* Abdomen *elongate conic or ovate;* petiole *very short.* Wings *with* 3 *submarginal cells, the* 1*st long, the* 2*nd small, oblong or rhomboidal and* 3 *discoidal cells.* Legs, *anterior the shortest:* thighs *slightly incrassated:* tibiæ *short, slender at the base, anterior with a broad spine at the apex, the others with* 2 *slender ones, the posterior generally spiny outside in the females:* tarsi *long, especially the posterior,* 5*-jointed, basal joint very long, the others short and decreasing in size to the apex, the terminal joint being clavate:* claws *small* (8, *a fore leg*).

Gracilis *Curt. Guide, Gen.* 685[a]. 1.

Male black, slender; head and thorax very thickly and minutely punctured, the former with the lower part of the face clothed with silvery hairs; palpi and a stripe outside the mandibles ochreous-white; metathorax coarsely reticulated, shining: abdomen very glossy, minutely but not thickly punctured, segments coarctate especially at the base, the apex ferruginous with a recurved spine: wings quite transparent, nervures and stigma piceous, 2nd submarginal cell oblong, very little narrowed above: tips of thighs, base and tips of tibiæ and tarsi ochreous, excepting the hinder pair and the apex of the others.

In the Cabinets of Mr. Shuckard and the Author.

The additional discoidal cell will distinguish Diodontus from Stigmus; and the more narrowed central submarginal one, as well as the short petiole, at once separate it from Pemphredon. I should not, however, have detached it from the latter genus if the trophi had been at all similar; but Pemphredon has an undivided *labrum*, the *mandibles* are trifid, and the *palpi* differently formed to those of Diodontus.

One British species only has been recorded, to which I have the pleasure of adding three others.

1. D. gracilis *Curt. Brit. Ent. pl.* 496. ♂.

I took two males at Glanville's Wootton the middle of June, and should have given them as that sex of the following species if the insect supposed by Vander Linden and his friend M. Wesmael to be the male, did not so materially differ from my specimens.

1ª. D. insignis *Vand. L.—Curt.*

Female 2⅔ lines; black, basal joint of antennæ beneath, a broad stripe outside the mandibles and a spot on each side below the wings, whitish ochre; metathorax not strongly reticulated, striated at the base and on a cordate space: wings slightly tinged with brown: legs similar to *D. gracilis*; but the anterior tibiæ are entirely ochreous, and the posterior are not bristly outside.

2. D. minutus *Fab. Ent. Syst.* 2. 302. 32.

Male 2 lines; black, minutely punctured, lower part of face silvery; palpi, underside of antennæ (except at the base) and mandibles, pale yellowish, excepting the tips which are ferruginous; scapulars and a spot below them yellowish white, the former with a brown spot; metathorax strongly reticulated, striated at the base; tips of thighs ochreous, tibiæ and tarsi of the same colour, the posterior tibiæ brownish at the middle and the tips of the tarsi rather dark: wings transparent. *Female* 2⅔ lines; black, mandibles as in the male, palpi brown; thorax the same; abdomen stouter, ovate-conic, clothed with very short ochreous pubescence; tibiæ, tarsi and tips of thighs ferruginous-ochre with a piceous space on all the tibiæ at the middle, the posterior having a few short spiny bristles outside: wings stained pale brown, the 2nd submarginal cell trapezate.

The 1st submarginal cell is shorter in this species than in *D. insignis*, and the 2nd recurrent nervure is not united at the middle of the posterior discoidal one, but beyond it.—July 30th, Black Gang Chine, Isle of Wight.

3. D. pallipes *Panz.* 52. 22.—tristis *Vand. L. p.* 76. 1.

Female 2 to 2½ lines, black, shining, minutely and sparingly punctured, tips of mandibles castaneous, palpi brownish: metathorax strongly reticulated; wings with a brownish cloud across the middle, the 2nd submarginal cell very much narrowed above; tarsi brown, palest at the base, anterior tibiæ sometimes of the same colour inside towards the apex.

Pallipes is not a well chosen name for this insect: nevertheless it ought to be retained.

My specimens are, I believe, from Norfolk. The male I have never seen.

The Plant is *Hypericum pulchrum* (Upright St. John's Wort).




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14-1837

632.

PEMPHREDON UNICOLOR.

Order Hymenoptera. Fam. Crabronidæ.

Type of the Genus, Pemphredon lugubris *Fab.*

Pemphredon *Lat., Fab., Vand. L., Curt.*—Cemonus *Jur.*—Crabro and Pelopœus *Fab.*—Vespa *Linn.*

Antennæ inserted in front of the face, approximating, not so long as the head and thorax, 13-jointed in the males (1), basal joint long and stout, 2nd subglobose, 3rd nearly as long as the 1st, the following decreasing in length and slightly tapering, apical joint ovate-conic, more curved 12-jointed in the female. *Labrum* inserted under the clypeus, horny, trigonate, all the angles truncated, the anterior margin narrow and producing a few long bristles (2).

Mandibles crossing, elongated, broadest at the base, a little narrowed at the middle, the apex rounded and quadridentate in the female (3); forming 3 strong teeth in the male of *P. unicolor.* *Maxillæ* small, terminated by 2 lobes, the inner one small ovate and ciliated internally, the outer one large subrhomboidal and externally pubescent. *Palpi* long, pubescent on the inside, 5-jointed, basal joint the shortest clavate, 2 following nearly of equal length, the stoutest, semilunate, 4th the longest, 2 following a little shorter, 5th a little the slenderest (4).

Mentum elongate-ovate, anterior margin bisinuated to receive the *Palpi,* which are rather long, slender, internally pubescent and 4-jointed, basal joint long and clavate, the remainder short, 2nd and 3rd the stoutest, semilunate, 4th elliptical. *Labium* transverse, cordate (5).

Head *slightly transverse, a little broader than the thorax, subquadrate, the angles rounded;* clypeus *emarginate in the male, convex in the female:* eyes *remote, ovate, placed obliquely at the anterior angles:* ocelli 3 *in triangle on the crown.* Thorax *ovate:* scutel *transverse, semiovate:* metathorax *gibbose.* Abdomen *not larger than the thorax, slightly depressed, ovate-conic and attached by an elongated strong petiole, slightly arched and narrowed at the base.* Wings, *superior with* 3 *submarginal cells,* 1*st long,* 2*nd subquadrate, each receiving a recurrent nervure* (9), *or the* 1*st receiving two, the* 2*nd none.* Legs *rather short, anterior a little the smallest:* tibiæ *short clavate, spurred at the apex:* tarsi *a little longer than the tibiæ, slender and* 5*-jointed, basal joint elongated,* 4*th the smallest:* claws *curved and acute.*

Unicolor *Fab., Lat.—Curt. Guide, Gen.* 686. 4.—Sphex ater *Fab.*

In the Author's and other Cabinets.

It would not be easy to find two groups so nearly allied, that differ more essentially in the structure of their trophi, than *Pemphredon* and the species I have separated at folio 496 under the name of *Diodontus,* from the bidentate *labrum* of the type, which, it must be remembered, is the *P. tristis* of Vander Linden, and is presumed to be synonymous with Panzer's *Psen pallipes.* *D. minutus* is also a typical species, but for want of specimens for dissection I could not at the

time ascertain whether *D. gracilis* and *insignis* had bidentate labrums.

I am happy in being able to introduce some interesting remarks connected with the œconomy of these insects which are new to me. Towards the end of August, during the late meeting at Bristol, Mr. Hewitson gave me some straws taken from the thatch of a summer-house, each of them containing from 10 to 20 Hymenoptera; a few days after, Mr. Waring took me to the summer-house in his garden, when I saw multitudes of small black Hymenoptera entering the straws of the thatch, many of them carrying an Aphis. I secured some for subsequent examination, when I was greatly surprised to find what I had supposed, whilst they were flying, to be merely the sexes of one species, comprised, I believe, four genera, viz. *Hylæus annularis* (folio 373), males of *Psen ater* (fol. 25), *Pemphredon unicolor*, and a *Diodontus*. On splitting the straws I found numbers of perfect insects, together with larvæ inclosed apparently in pollen, masses of an Aphis, and occasionally a specimen of *Hedychrum imperiale* (fol. 38). I had no opportunity of revisiting the spot after I found there were several genera whose habits were so similar; I therefore have some doubt whether I did not take the *Hylæus* and *Diodontus* out of the straws. I am pretty certain it was the *Pemphredons* that were carrying the Aphides, which I believe were taken from a rose-bush. The *Hedychrum* was in all probability a parasite of the Hylæus. The British Pemphredons may be thus divided.

* 1st and 2nd submarginal cells, each receiving a recurrent nervure.

1. Lugubris *Fab.*—*Lat.*—unicolor *Jur. Gen.* 28. *pl.* 11 ♀. Black, shining, clothed with white pubescence, thickly punctured, except the abdomen and legs: antennæ thickened a little at the middle in the males, with the clypeus silvery: ♂ 4, ♀ 5 lines long.

Beginning of June, old paling and trunks of dead trees.

2. morio *Vand. Lind. part* 2. *p.* 82. *n.* 5. "Black, clothed with griseous pubescence, the abdominal petiole short: 3 lines long."

** 1st marginal cell receiving 2 recurrent nervures, the 2nd none.

3. unicolor *Fab.*—*Curt. Brit. Ent. pl.* 632. ♂. As this is not the *S. unicolor* of *Panz.*, the Fabrician name of *ater* ought not to have been superseded. Shining black with whitish pubescence, head thickly punctured, clypeus silvery in the male, thorax sparingly punctured before, metathorax with a shining elevated semicircular line, petiole punctured and channelled: wings tinged with brown, especially the apex of the anterior.

May and June, Oaks, Coomb-wood and Lowestoft; 28th July, Castle Connel; 8th July, under the Cliff, Dover; end of August, about the thatch of a summer-house, Bristol.

For specimens of the rare plant *Caucalis latifolia*, Broad-leaved Hen's-foot, I am indebted to Miss Queckit, who gathered them in a corn-field near Langport.


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13-1836

580.

MELLINUS SABULOSUS.

ORDER Hymenoptera. FAM. Crabronidæ.

Type of the Genus, Vespa arvensis *Linn.*

MELLINUS *Fab., Lat., Jur., V. Lind., Curt.*—Crabro *Fab., Panz.*

Antennæ longer than the head, slender and inserted at the middle of the face, a little remote, subfusiform, pubescent and 13-jointed in the male, basal joint short but the stoutest, ovate-truncate, 2nd minute subglobose, 3rd and 4th nearly of equal length and not longer than the 1st, the remainder insensibly decreasing in length, 5th to the 8th oblong, the remainder concave beneath, forming a protuberance at the base, the apical joint longer, attenuated and rounded at the apex (1 ♂); longer filiform and 12-jointed in the female, with all the joints more elongated and simple, 3rd joint rather the longest (1 ♀).

Labrum broad and short, inserted under the clypeus, anterior margin nearly straight and ciliated with long hairs (2).

Mandibles long, crossing, hairy and bifid in the male, tridentate in the female (3), the apex being lanceolate, with 2 rounded teeth beneath.

Maxillæ terminated by a large ovate, concave, pubescent lobe, with a smaller one lying close behind it. *Palpi* long pubescent and 6-jointed, basal joint the shortest, 2nd a little longer and stouter, both clavate, 3rd rather stout and considerably longer, 4th the longest, 5th the length of the 3rd joint, 6th a little longer and very slender (4).

Mentum oblong, rounded before, nearly concealing the *Lip*, which is broader, the angles rounded. *Palpi* rather long, pubescent and 4-jointed, basal joint long and clavate, the remainder shorter, nearly equal in length, 2nd thickest at the apex and truncated obliquely, 3rd and 4th a little curved (5).

Males *considerably smaller than the females*. Head *large and orbicular:* eyes *lateral and ovate:* ocelli 3, *in triangle on the crown of the head.* Thorax *obovate;* metathorax *foveated.* Abdomen *ovate, with a pear-shaped peduncle.* Wings *with* 1 *marginal,* 4 *submarginal and* 3 *discoidal cells.* Legs *alike in both sexes:* thighs *incrassated, small at the apex:* tibiæ, *anterior with a curved spine at the apex:* tarsi *long,* 5*-jointed, basal joint very long in the anterior, notched at the base,* 2 *following turbinate,* 4*th bilobed,* 5*th thick and short:* claws *rather long curved and acute:* pulvilli *large, forming a large sucker at the apex* (8, *a fore leg*).

SABULOSUS *Fab.—Curt. Guide, Gen.* 687. 1.

THE Mellini are partial to dry sandy banks, where the females form burrows to deposit their eggs; and when they hatch, the parent carries the young larvæ dead flies to feed upon. I have twice watched the *M. arvensis* thus employed, and the following observations are copied from my note-book.

Sept. 16th. I was exceedingly amused at the strength and sagacity exhibited by a species of Mellinus. It had captured a large blue fly, probably *Musca vomitoria*, which it held tight by the rostrum with its mandibles, the under side of the abdo-

men lying parallel to its own; in this way it flew about a northern bank, alighting occasionally upon the grass that covered it, when at last it found its retreat, at the mouth of which it stopped, and entering it backward, drew in the victim in spite of its struggling, with the greatest facility.

The following species are recorded as British.

1. sabulosus *Fab.* ♀.—ruficornis *Panz.* 77. 17. ♀.—petiolatus *Panz.* 46. 12. ♀ *var.*

Expanse 9 lines. Black, antennæ and legs ferruginous, 2 basal joints of the former black above; base of thighs, excepting hinder pair, black; internal margin of eyes and 4 dots on the clypeus ferruginous; an interrupted line on the collar, a spot on the scutel, one under each wing, 4 on the body and a band near the apex, yellow.

I took a female of this, and a male of the following, several years since in Suffolk; and Capt. Blomer met with it, I believe, in the Isle of Man.

2. fulvicornis *Fab.*—*Curt. B. E.* 580. ♂—*Panz.* 98. 18. ♂.—frontalis *Panz.* 46. 11. ♂? I consider these to be the males of the foregoing species, for the specimen I have figured agrees with Fabricius's description, although Panzer's plate does not, but this figure is evidently inaccurate, the antennæ having 18 joints.

Black, shining, minutely and thickly punctured, hoary-pubescent; antennæ and legs ferruginous, basal joint of the former black above, yellow beneath, 2nd black, a few of the following dusky above, thighs black at the base, inner margin of eyes and clypeus, a spot at the base of the mandibles, an interrupted line on the collar, a spot on the scutel, one beneath each wing, 2 on the 3rd segment of the abdomen and a band at the base of the 6th, yellow; tips of the 4 anterior thighs beneath of the same colour, and there is a minute spot on each side the 2nd joint.

3. arvensis *Linn.*—clavata *DeG.*—U-flavum *Panz.* 17. 20. ♀.—bipunctatus *Fab. var.*

Male 6½ to 9 lines expanse. Black, antennæ rufous beneath, basal joint yellow; palpi, margins of eyes and clypeus and outside of mandibles yellow; a line on the collar, a spot on the scutel, 2 beneath each wing, a spot on each side the 2nd and 4th abdominal segments, a band on the 3rd and a narrow one on the 6th, yellow: legs ferruginous, yellow inside, base of thighs and a stripe on the inside of the 4 anterior tibiæ black. *Obs.* sometimes the coxæ and 3rd segment of the abdomen are spotted with yellow beneath, and the 2 yellow basal spots above are wanting. *Female* 12 lines: similar to the male, excepting the abdomen; on the nodule of the peduncle are 3 yellow dots, the 2nd, 3rd, and 5th segments are yellow, edges of the 2 former black, and there is a large yellow spot on each side the 4th. *Obs.* sometimes there are only 2 dots on the peduncle or none, and occasionally the 3 spots on the 4th segment form a band; in others the face, except the inner margin of the eyes, and the antennæ, except the basal joint, are black.

The females are common on all sandy banks in August and September, and the males on the Fern.

4. pratensis *Jurine, pl.* 10. *G.* 19. ♀.

Length 7 lines. Black, inner margin of eyes and clypeus, basal joint of antennæ, base of mandibles, a line on the collar, a spot on the scutel, 2nd and 3rd segments of abdomen, and a band at the base of the 5th? yellow, coxæ trochanters and base of anterior thighs black.

I have never seen a British specimen.

The Plant is *Selinum palustre* (Marsh Milk-weed).






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13-1836

584.

ALYSON KENNEDII.

ORDER Hymenoptera. FAM. Crabronidæ.

Type of the Genus, Alyson bimaculatus *Panz.*

ALYSON *Jur., Panz., Lat., V. Lind., Curt.*—Pompilus *Fab.*

Antennæ remote at their insertion, which is a little below the middle of the face, at the base of the clypeus, longer than the head, filiform and 13-jointed in the male, basal joint longer, short and stout, 2nd subglobose, 3rd scarcely longer, 4th oblong, the remainder nearly of equal length, apical joint subconic (1 ♂); more curved, slender, a little clavate and 12-jointed in the female, basal joint long and stout, 2nd obovate, nearly as long as the 1st, the latter shorter, the remainder subturbinate, gradually increasing in diameter and decreasing in length, apical joint elongate ovate (1 ♀).

Labrum inserted under the clypeus, transverse, pocket-shaped, anterior margin bisinuated, forming 3 lobes, sparingly ciliated with spines (2).

Mandibles crossing, long and narrow, curved and concave, bidentate at the apex and ciliated with bristles on both margins (3).

Maxillæ ovate, terminated by 2 incurved lobes, the inner one ovate and transparent, the outer one larger concave horny and hairy outside. *Palpi* long, pubescent and 6-jointed, basal joint small, chalice-shaped, 2 following elongated, of equal length, slightly clavate, 4th the longest, 5th nearly as long, both linear, 6th as long as the 3rd elongate-ovate (4).

Mentum oblong, rounded at the base, deeply emarginate on each side, before forming a lobe in the centre to receive the *Palpi* which are long, rough with hairs and 4-jointed, basal joint a little the longest and clavate, 2nd short obtrigonate, 3rd and 4th nearly as long as the 1st, the former subelliptic, the latter drooping and elongate-ovate (5).

Males *much smaller than the females.* Head *short and broad;* face *orbicular;* clypeus *tridentate:* eyes *entire and ovate:* ocelli 3 *in triangle.* Thorax *oblong;* collar *narrow and rather elongated in the female, in which sex the postscutel has the angles acuminated; with an elongate-trigonate space on the back, furrowed obliquely on each side.* Abdomen *elongate-ovate, attenuated in the male and bispinose at the apex.* Wings *with* 1 *marginal,* 3 *complete submarginal* (*the 2nd petiolated*) *and* 3 *discoidal cells* (9). Legs *not long but slender:* thighs, *posterior with a strong sharp tooth beneath at the apex* (8†): tibiæ *short, especially the anterior, and spurred at the apex:* tarsi *very slender, long and 5-jointed, basal joint long, the* 3 *following obtrigonate in the anterior with the terminal joint stout and ovate, 4th not much shorter than the 5th, in the others:* claws *and* pulvilli *distinct.*

KENNEDII *Curt. Guide, Gen.* 688. 1.

In the Author's Cabinet.

THE œconomy of this genus is, I believe, unknown; the males bear a little resemblance, I think, to the Mutillidæ, and the fe-

males have the habit of the Pompili, but the neuration of the wings is like that of Nysson: there is, however, a combination of characters which renders this a strongly marked genus; the narrow collar, the striated postscutel more or less spined, and bearing an escutcheon-shaped impression, and the large apical joint of the anterior tarsi characterize the females, whilst the males are distinguished by two small remote spines at the apex of the abdomen, and both sexes have a strong tooth at the apex of the posterior thighs, which, although distinct enough, is not readily seen except in profile.

The only British specimen I have seen of this genus is the one figured, but I have heard of Mr. Kirby having another, and on the authority of the "Systematic Catalogue," the sexes of *A. bimaculata* were recorded in the Guide. As I have German specimens, I shall add the characters of the latter that it may be the more readily identified.

1. A. Kennedii *Curt. Brit. Ent. pl.* 584.

Female black, very thickly and finely punctured, and clothed with very short ochreous pubescence; anterior margin of the clypeus and trophi ochreous and ferruginous, tips of mandibles piceous; antennæ dark fuscous, underside of basal joint ferruginous, postscutellum bearing an elongated escutcheon, the sides obliquely furrowed; two basal segments of abdomen and a small portion of the base of the 3rd rufous, with the edge of the 2nd silky white on the sides; wings iridescent, yellowish, nervures and marginal cell brown, as well as 2 spots beneath, forming an interrupted fascia: legs pitchy, anterior tarsi tibiæ and tips of thighs ferruginous, the tarsi and apex of hinder tibiæ brown.

I have the gratification of naming this unique insect after my friend Benjamin Kennedy, Esq., of Clapton, who was with me when I beat it out of an Oak growing in a hedge near Hastings, in August 1823.

2. A. bimaculatus *Panz.* 51. 4. ♀.—Pompilus spinosus *Panz.* 80. 17. *var.*?—Sphex fuscatus *Panz.* 51. 3. ♂.

Male black, shining, face below the antennæ silvery with pubescence; clypeus, a portion of the inner margin of the eyes, underside of basal joint of antennæ, a line before the wings, 2 spots on the scutellum, and one on each side the 2nd segment of abdomen cream-colour, apex ferruginous; legs ferruginous, darker outside, coxæ and trochanters black, the latter spotted with white, anterior tibiæ inside and the posterior at the base whitish; nervures and stigma brown, with a faint transverse cloud: expanse 4½ lines. *Female* larger, 6½ lines in expanse; the face, thorax, legs, &c. are similarly coloured, but the 1st and basal half of the 2nd segment of abdomen are rufous, the latter having the 2 cream-coloured spots; the apex is black and the cloud on the wings distinct.

The Plant is *Sagina procumbens* (Chickweed Breakstone).





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11-1834

524.

GORYTES BICINCTUS.

ORDER Hymenoptera. FAM. Crabronidæ.

Type of the Genus, Sphex mystacea *Linn.*

GORYTES *Lat., Spin., Van Lin., St. Farg., Curt.*—Mellinus *Fab., Panz.*—Arpactus *Jur., Panz.*—Sphex & Vespa *Linn.*

Antennæ inserted at the middle of the face, approximating, long, filiform, nearly straight and 13-jointed in the male (1 ♂), the basal joint subovate-truncate, 2nd cup-shaped, remainder long, of equal length, each joint slightly curved, the apical joint a little conical at the apex: not longer than the head and thorax in the female, curved, clavate and 12-jointed (1 ♀), basal joint rather the stoutest, subovate, 2nd small cup-shaped, 3rd and 4th long and slender, the remainder decreasing in length and increasing in diameter, apical joint elongate-ovate and a little curved. *Labrum* transverse, very short, a little curved and ciliated with bristles, some very long (2).

Mandibles crossed in repose, long, narrow, a little curved, with a few hairs outside, terminated by a strong tooth with a smaller one beneath it (3).

Maxillæ with the basal portion large and nearly semiorbicular, terminated by two rounded hairy lobes. *Palpi* long, pubescent, and 6-jointed, basal joint the shortest, 4th and 6th the longest, 2nd and 3rd the stoutest, somewhat obovate, especially the latter, 4th and 5th clavate, 6th slender, conical at the apex (4). *Mentum* subquadrate, the basal angles dilated, with a rounded lobe in front which conceals the *Lip*. *Palpi* not short, very pubescent and 4-jointed, basal joint a little the longest and clavate, the remainder nearly of equal length and obovate, terminal joint the slenderest and somewhat elliptical (5).

Males *smaller than the females.* Head *transverse, face orbicular:* eyes *elongate-ovate, narrowed above:* ocelli 3 *in triangle.* Thorax *globose:* scutellum *transverse-ovate.* Abdomen *ovate conical.* Wings *with one marginal and* 4 *sub-marginal cells, the 2nd receiving* 2 *recurrent nervures.* Legs *rather short and stout in the female:* thighs *short:* tibiæ *clavate, anterior with one, the others with* 2 *spines at the apex:* tarsi 5*-jointed, posterior the longest, anterior sometimes a little dilated and ciliated in the females, basal joint the longest, 4th the shortest:* claws *and* pulvilli *large in the female.*

BICINCTUS *Rossi.—Curt. Guide, Gen.* 690. *n.* 8.

Black; 2 basal joints of antennæ yellow and the others ochreous beneath; trophi and lower part of face yellow, apex of mandibles brown: collar, a dot on each side, and 2 spots on the scutellum, yellow; a triangular space on the postscutellum finely striated; basal joint of abdomen pear-shaped, with a yellow fascia divided in the middle, 2nd segment with a broad, 3rd with a narrow yellow band, the former not touching the posterior margin: wings slightly fuscous, the marginal, central submarginal, and the discoidal cell below them, clouded with brown: legs ochreous, 4 anterior coxæ, and 1st pair of trochanters with yellow spots beneath; thighs yellow beneath; tibiæ with a black streak outside; tarsi ferruginous, brown towards the apex; posterior legs black, tibiæ with a streak of yellow outside at the base.

So much confusion has been created by the misapplication of synonyms that I shall not attempt to unravel them, which is the less necessary as Mr. Shuckard will fully investigate them in his Monograph on the Fossorial Insects. In the mean while the reader may consult Vander Linden's *Observ. sur les Hymen. d'Europe* and an excellent paper of Le Pelt. St. Fargeau's in the 1st vol. of the *Ann. de la Soc. Ent. de France*.

Gorytes is distinguished by the 2nd submarginal cell receiving 2 recurrent nervures, and the following divisions form as many genera in the Count's paper.

Gorytes. Anterior tarsi simple in both sexes.

1. mystaceus *Linn.*—*Panz.* 53. 11 ♀.—campestris *Linn. var.* —the V. flavicincta *Don.* 13. 468. 1. is evidently an Ichneumon!

I have found both sexes on young oaks the beginning of June in Coomb-wood; it is abundant at Hampstead and Highgate and at Glanville's Wootton, Mr. Dale.

2. quadrifasciatus *Fab.*—*Panz.* 98. 17 ♂.

Highgate, Mr. Shuckard, to whom I am indebted for specimens.

3. arenarius *Panz.* 53. 12. I have never seen a British specimen.

Euspongus *Le Pel.* Anterior tarsi ciliated in the female.

4. Libitinarius *Curt.*

I took a male on flowers in a marsh at Horning, Norfolk, 24th of June; it is found also at Battersea, Hampstead and Highgate.

5. quinquefasciatus *Panz.* 53. 13 ♀. I know this only by the figure.

6. laticinctus *Le Pel.*

I have a female from the collection of the late Mr. Lee, and another has been taken in the New Forest.

Hoplisus *Le Pel.* Antennæ obtuse in both sexes.

7. quinquecinctus *Panz.* 72. 14.—ruficornis *Lat.*

I have never seen a British specimen.

Lestiphorus *Le Pel.* 10th joint of antennæ concave above in the male, filiform in the female: basal joint of abdomen forming a pear-shaped petiole.

8. bicinctus *Rossi.*—*Curt. Brit. Ent. pl.* 524 ♂.

The specimen figured stood for many years in my collection as an unique Insect, but Mr. Shuckard has lately met with a female taken in the New Forest by Messrs. Harding and Bond.

The Plant is *Schœnus* (*Cladium* Schrad.) *mariscus* (Prickly Bog-rush).



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Curtis London June 1 1826

Reprint of
1-1824

25.

PSEN EQUESTRIS.

ORDER Hymenoptera. FAM. Larridæ *Lat.*

Type of the Genus, Pelopæus compressicornis *Fab.*

PSEN *Lat., Jur., Panz., Van. Lind., Shuck., Curt.*—Trypoxylon, Pelopæus *Fab.*—Mimesa *Shuck.*

Antennæ inserted near the centre of the face, clavate, curved, and 12-jointed in the female (1): 13-jointed and more filiform in the male; basal joint large, second small, terminal joint ovate. (1 ♂.)

Labrum transverse, subrotundate before, entire and ciliated. (2.)

Mandibles slender, scarcely arcuated, bidentate, the teeth obtuse. (3.)

Maxillæ divided transversely, terminal lobe rounded and ciliated: *Palpi* longish, 6-jointed; first joint very small, third the largest, fourth as long, fifth the longest, sixth long and slender. (4.)

Mentum large, dilated in the centre, hairy (5. *a.* the point to which the maxillà is attached is shown at *e.*): *Palpi* long, 4-jointed, first joint very long, second and third short, fourth robust, elongate-ovate. (*b.*) *Lip* short and broad, the edges conniving internally. (*c.*)

Clypeus *convex and rounded, anterior margin elevated.* Head *transverse, as broad as the thorax, with a tubercle between the antennæ.* Eyes *oval, entire, remote.* Ocelli 3, *inserted on the crown in a triangle.* Thorax *short, nearly ovate.* Scutellum *small and subquadrate.* Abdomen *ovate-conic, with an elongated linear petiole.* Superior wings *with a lanceolate marginal cell, not extending to the apex, and three perfect submarginal cells, the middle one trigonate, receiving either one or two recurrent nervures.* Legs *rather small.* Tibiæ *spurred.* Tarsi 5-*jointed, basal joint nearly as long as the three following, last terminated by simple claws and pulvilli.* (8. *a fore leg.*)

EQUESTRIS *Fab.—Curt. Guide, Gen.* 691. 3.

Black: clypeus and face silvery with hair, shining; first segment of abdomen rufous, with a black spot at its base; second entirely, and third partly, rufous in the female, with the 2nd segment only rufous in the male: wings hyaline, iridescent: antennæ rufous beneath: thighs and coxæ black: tibiæ and tarsi pale ferruginous, the hinder tibiæ subochreous at the base.

In the Author's and other Cabinets.

THE three lobes of the lip mentioned by Latreille in his observations upon the *Larridæ*, I could not discover in the species dissected; and he does not mention that organ in his generic description. The females from which the characters and figures are taken, are armed with sharp stings, that are not entirely concealed.

In my illustration of the genus *Pemphredon*, fol. 632, I have al-

luded to the economy of *Psen atratus* (*P. ater* Lat.?), and my remarks have since been confirmed by Mr. A. Kennedy, who states in the Phil. Mag. for Jan. 1837, that "this insect has been exceedingly numerous this year, using the straws in the thatch to deposit its prey in, in some of which I have counted as many as a hundred *Aphides*. The partitions appear to be made of the scrapings of the inside of the straw cemented together. The egg is white and semitransparent, and is attached to the abdomen of an Aphis near the bottom of the cell. The males first appeared the beginning of July, flying about the thatch and the neighbouring shrubs in thousands. They disappeared about the end of the month. The females did not become numerous until the 10th."—page 18.

* *2nd and 3rd submarginal cells, each receiving a recurrent nervure.*

1. compressicornis *Fab.* ♂.—T. atratum *Fab.* ♀.—pallipes *Spin.* ♂.—serraticornis *Jur. pl.* 8. *Gen.* 6. ♂.—ater *Panz.* 72. 7. ♂.

Rare, taken by Mr. Kirby in Suffolk, and I have once taken it probably in the same county.

2. atratus *Panz.* 98. 15.—ater *Lat.?*—pallipes *Panz.* 52. 26. ♂?

End of June, bred one male and many females, out of straws from the roof of a summer-house at Bristol.

** Mimesa *Shuck. 2nd submarginal cell receiving 2 recurrent nervures.*

3. equestris *Fab.—Curt. Brit. Ent. pl.* 25. ♀.—rufa *Panz.* 96. 17. ♂.

This pretty little species I took flying near Lyndhurst in the New Forest the end of August 1822, and I have since taken it the end of July on Hampstead Heath in company with *Cerceris arenaria*, pl. 269.

4. bicolor *Jur. pl.* 13. ♂.

Females taken with the last species on Hampstead Heath the end of July; also on Blackheath, and on banks of gravel at Coomb-wood.

5. unicolor *Van. Lind. part* 2. *p.* 105.

Darent-wood, Mr. Shuckard; in posts and rails, North Wales, Mr. F. Walker.

The plant is *Ranunculus Ficaria*, Common Pilewort.



ut. by J. Curtis. July 1 1829

6-1829

269.

CERCERIS LÆTA.

ORDER Hymenoptera. FAM. Crabronidæ *Lat.*, *Leach.*

Type of the Genus, Cerceris læta *Fab.*

CERCERIS *Lat., Leach., Sam.*—Philanthus *Fab., Jur., Panz.*

Antennæ inserted near the middle of the face, approximating, thickened towards the extremity, 13-jointed in the males, 12-jointed in the females, basal-joint the longest robust, 2nd globose, 3rd slender, longer than the following, which gradually become more robust, terminal joint ovate at the apex (1).

Labrum entirely concealed, naked, transverse, with 2 lateral lobes and a central one elevated and emarginate (2).

Mandibles remote, crossing, very long, curved, dilated and sinuated on the inside, deeply notched and pilose near the base (3).

Maxillæ with the stalk long and horny, terminated by a large lobe, coriaceous and pilose at the margin, also a large horny lobe on the inside with a larger membranous appendage. *Palpi* 6-jointed, basal joint small, the remainder of equal length, 2nd and 3rd truncated obliquely, 4th and 5th subclavate, 6th the slenderest (4).

Mentum long, horny, linear, the anterior angles hollowed to receive the *Palpi,* which are 4-jointed, basal joint long, the remainder shorter of equal length, the 2nd and 3rd a little dilated.

Lip rather short, membranous pubescent, the central lobe cleft (5c), the lateral ones the narrowest (d).

Head *transverse, subquadrate; face flat.* Nasus *small semicircular entire.* Eyes *elongate ovate.* Ocelli 3 *in triangle.* Thorax *oval, narrower than the head.* Abdomen *elliptic, strangulated at the union of the articulations, 7-jointed in the males, 6-jointed in the females, the 1st segment nodiform, terminal joint narrowed, flat and truncated.* Superior wings *with 1 marginal and 4 submarginal cells, the 2nd being petiolated.* Legs *robust.* Tibiæ *clavate, anterior producing a long spine at the apex, dilated internally; posterior serrated and spurred.* Tarsi 5-*jointed, basal joint the longest, anterior producing strong spiny appendages on the outside.* Claws *simple.* Pulvilli *distinct* (8, *a fore leg*).

LÆTA *Fab. Ent. Syst. v. 2. p. 291. n. 10.*

Female. Black, strongly punctured and pubescent. Antennæ ferruginous beneath towards the base, excepting the 1st joint. Three yellow spots on the face, 2 on the collar, one on each scapula, the base of the post-scutellum and a spot on each side of the same colour. Abdomen banded with yellow, forming a lunular spot on each side the 1st joint, a large emarginate band on the 2nd; slender bands on the 3rd and 4th, and a deep oval one on the 5th. Wings slightly fuscous, the margins darker. Legs bright fulvous, coxæ and base of thighs piceous, except in the hinder pair which are dentated beneath and piceous at the apex.

In the Author's and other Cabinets.

The Cercerides are well characterized by the singular form of their abdomens, the segments being coarctate, or girted in at their margins, and the petiolated submarginal cell of the superior wings will also distinguish them from neighbouring genera*.

They are generally found in sandy and heathy situations; and the males, which have an additional joint to their antennæ as well as to their abdomens, are much rarer than the females, from which they also frequently vary in their markings. They nourish their larvæ (Latreille informs us) with the dead bodies of the Andrenæ (a genus of bees, plate 129), which they place at the bottom of their nests in the manner of the Sphecidæ.

Our British species are

1. C. læta *Fab. mas.—Curtis Brit. Ent. pl.* 269. *fem.*—aurita *Fab. fem.—Lat.*

The females of this insect were abundant last August, entering holes in sandy places at the back of the Isle of Wight, and also at Ramsdown in Hampshire; but it is remarkable that I never saw a single male.

2. C. quinquecincta *Fab. mas.—Panz.* 63. 12.—quadricinctus *Panz.* 63. 15. *fem.*

Found in June in sandy places, also in July, I believe, by Mr. Dale on Parley Heath.

3. C. labiata *Fab.—Panz.* 63. 16.—*Sturm Verz. t.* 3. *f.* 7.

This species with its singular labrum I have taken in Norfolk.

4. C. quadrifasciata? *Fab.—Panz.* 63. 14. *mas.*

I took a male flying amongst heath the 30th July.

5. C. ornata *Fab.—Panz.* 63. 10. *fem.*

I once met with this insect either in Norfolk or Suffolk.

The plant is *Mentha rotundifolia* Smith (Round-leaved Mint).

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* The dissections were made from a female, and in some of the plates the 5th and 6th joints of the maxillary Palpi are wanting, the first specimen examined having been injured.


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6-1829

273.

PHILANTHUS ANDROGYNUS.

Order Hymenoptera. Fam. Crabronidæ *Lat.*, *Leach.*

Type of the Genus, Crabro Androgynus *Rossi.*

Philanthus *Fab., Panz., Lat.*—Simblephilus *Jur.*—Crabro *Rossi.*

Antennæ remote, inserted in front of the face, short, robust, velvety, attenuated towards the base, 13-jointed in the males; 12-jointed in the females; basal joint scarcely longer than the 3rd, 2nd subglobose, 3rd obconic-truncate, the remainder subquadrate, terminal joint semiovate (1).

Labrum transverse, sides somewhat reflexed, anterior margin sinuated, producing a tongue or membrane beneath, lobed in the centre, with a small tubercle surrounded with a few long hairs (2).

Mandibles large, long, bent, acute, crossing when at rest, narrowed suddenly below the middle and slightly pilose (3).

Maxillæ thick, attached by a long incurved stalk, and terminated by an oval pubescent lobe, with a smaller one below. *Palpi* short and slender 6-jointed, basal joint minute, 2nd the longest, clavate, the remainder of nearly equal length, the terminal one very slender and subfusiform (4).

Mentum long, fusiform, incurved at the base. *Lip* large, broad, cordiform, membranous and pubescent. *Palpi* shorter than the lip, composed of 4 nearly equal subclavate joints, the terminal one obovate (5).

Head *very broad and orbicular.* Clypeus *quadridentate, the 2 central teeth the largest.* Eyes *notched on the inside.* Ocelli 3 *in triangle.* Thorax *oval.* Abdomen *ovate conic.* Superior Wings *with 1 marginal and 4 submarginal cells.* Legs *strong.* Tibiæ, *anterior with a long spine at the apex producing a dilated and membranous margin, the 4 posterior spined.* Tarsi 5-*jointed, basal joint very long, 4th the shortest, the former emarginate at the base in the anterior pair and with the 2nd, 3rd and 4th producing long lanceolate appendages on the outside.* Claws *simple.* Pulvilli *distinct* (8, *fore leg of a female from which sex all the dissections were made*).

Androgynus *Rossi.*—pictus *Panz., Fab.*—apivorus *Lat.*—diadema *Jur.*

Female. Head and thorax black, shining, pubescent and thickly punctured, the face below the antennæ pale amber, and a line behind the eyes ochreous. Trophi ferruginous, the mandibles tipped with black; a transverse line on the collar, another at the base of the postscutellum, and a spot on each scapula pale yellow: the postscutellum very minutely and thickly punctured. Abdomen and legs yellow, the former with a few scattered punctures, the base black, every segment, excepting the apical one with a black band at the base forming a triangle in the centre, but very small on the penultimate joint. Coxæ and base of thighs black, tarsi slightly ochreous.

In the Author's Cabinet.

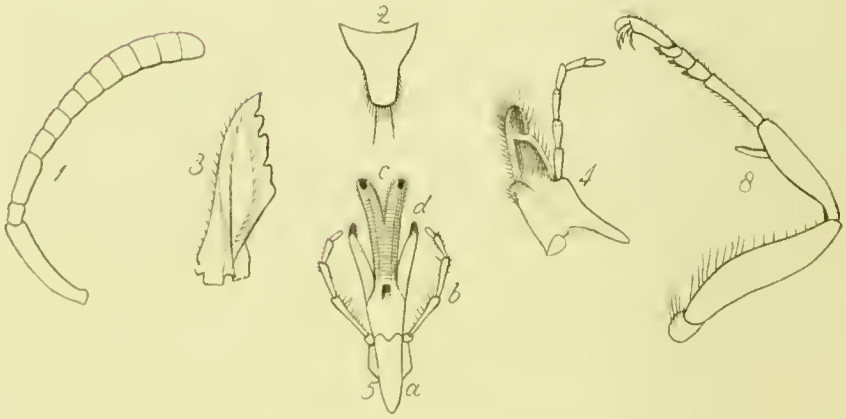
Philanthus was not known to inhabit this country until last autumn, when I discovered specimens at the back of the Isle of Wight, and afterwards near Heron Court, in company with the Hon. Charles Harris, the middle and end of August. They were either resting upon the ground amongst multitudes of bees (Andrenæ, &c.), and of the Cerceris lately figured, or were flying over grassy places at the borders of a corn-field, and settling upon Hawk's-weed and other flowers.

Latreille's account of this fine insect is too interesting to be omitted. They do not, it appears, live in society, but both sexes are found upon flowers in sandy districts; the female burrows in the earth; and placing a bee there, most commonly an Andrena, which she has killed, deposits an egg near and closes up the hole.

The same author says, the *P. apivorus* (which is our insect) is a dangerous enemy to the hive-bee. The females dig, in light soil, on a declivity exposed to the sun, a gallery almost horizontal, and about a foot deep; she employs her mandibles and her feet to raise and remove the earth, which is collected as she proceeds with her labour. When their nest is finished they go and search the flowers to find a bee, which they kill by piercing it with their sting where the head or abdomen is united to the thorax, and afterwards carry it to the end of their burrow. As each female lays at least five or six eggs, it follows that the same number of bees are destroyed; and consequently when they abound in the neighbourhood of hives, it is probable that they do great mischief.

Melampyrum arvense (Purple Cow-wheat), the local and beautiful plant figured, I have gathered from the end of July to the beginning of September, in corn-fields at the top of the Cliff in the neighbourhood of Niton in the Isle of Wight, where it is sometimes so abundant that the bread is discoloured and rendered unwholesome by the vast quantity of the seeds which are mixed with the wheat.

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3-1826

137.

ODYNERUS PARIETINUS.

Order Hymenoptera. Fam. Vespidæ *Lat.*, *Leach.*

Type of the Genus Vespa parietinus *Linn.*

Odynerus *Lat., Leach.*—Vespa *Linn., Fab., Panz.*

Antennæ inserted in the centre of the face, approximating, slightly geniculated, subclavate, 13-jointed in the male, the 2 last joints forming a small claw; 12-jointed in the female, 1st joint long, 2nd small, 3rd not so long as the first, the remainder short, terminal joint ovate (fig. 1, antenna of female).

Labrum dilated at the base, where it is concealed by the clypeus, narrow and elongated towards the apex which is ciliated (2).

Mandibles when at rest forming a beak, elongated, acute, slightly bent, having 5 blunt teeth on the internal margin (3).

Maxillæ corneous below the palpi, coriaceous above, membranous at the margins, terminal lobe elongated hairy, somewhat articulated near the apex, internal lobe small hairy. *Palpi* longer than the maxillæ, 6-jointed, the 2 first the most robust, the 3 first of equal length rather longer than the others, terminal joint ovate (4).

Mentum corneous, elongate, emarginate, (5 a): *Palpi* shorter than the lip, slender, 4-jointed, 2 first long clavate, 3rd short, 4th small ovate (b): *Lip* coriaceous, striated transversely, elongated, dilated, and bilobed at the apex, each lobe terminated by a gland (c): *Paraglossæ* shorter than the lip, glandular at the apex (d),

Head *orbicular.* Clypeus *convex, cordiform, emarginate at the apex.* Eyes *deeply emarginate.* Ocelli 3, *in triangle.* Thorax *ovate quadrate.* Scutellum *rounded.* Abdomen *ovoid-conic, peduncle very short, basal joint somewhat contracted, bell-shaped, 2nd large.* Wings; *superior folded when at rest, with* 1 *marginal and* 3 *perfect submarginal cells.* Tibiæ *spurred.* Tarsi 5-*jointed, basal joint long, 4th very short, cleft.* Claws *bifid.* Pulvilli *distinct* (8, *a fore leg*). Females *and* Neuters *armed with stings.* Larvæ *omnivorous.*

Parietinus *Linn. Faun. Suec. p.* 418, *n.* 1679.

Female. Black, punctured, pubescent. Antennæ, basal joint beneath yellow, the remainder orange; a spot at the base of each mandible, 2 small spots at the apex, and 2 lunular at the base of the clypeus, one between the antennæ and a very minute one behind each eye, yellow. Thorax with a bilobed yellow spot on the anterior margin, a small one beneath each wing and 2 larger upon the scutellum of the same colour. Wings slightly fuscous, stigma ferruginous. Abdomen shining, sparingly punctured, basal joint yellow at the posterior margin, leaving a triangular black space in the centre, 4 following joints with a broad yellow margin, terminal joint with a large yellow spot in the middle. Thighs yellow at the apex. Tibiæ yellow, ferruginous at the apex, anterior with a black stripe on the outside, the others on the inside, next the apex. Tarsi ferruginous, inclining to fuscous.

In the Author's and other Cabinets.

Some wasps, like the bees, live in society, constructing nests composed of cells, but formed of very different materials. The *Odynceri* on the contrary do not unite to form a nest to live in, whence they are called Solitary Wasps: their economy, however, is exceedingly curious, and they exhibit a degree of instinct which can scarcely be surpassed. Their eggs are deposited in cells made in old walls or sandy banks, about which the species may be found in June, as well as upon flowers.

My friend Mr. Charles Fox detected upon the top of a book, across which another was laid, some cells of a somewhat triangular form, covered externally with mud and formed of a silky substance within: he very obligingly transmitted the book to me last winter, and in the spring nearly 20 specimens of the insect figured made their appearance; they were all females, and did not vary in the least. I have no doubt of their being the *Vespa parietinus* of Linnæus's *Faun. Suec.* of which there is no figure that I am acquainted with, Panzer's *V. parietina* being the *V. muraria* Linn. It is very easily distinguished from our other species by the unclouded wings and the entire orange underside of the antennæ.

The following species are in the Author's cabinet.

1 O. spinipes *L.*, *Panz.* 17. 18.
2 pictus *Nob.*
3 murarius *L.*—parietina *Panz.* 49. 24.
4 Scoticus *Nob.*
5 Antilope *Panz.* 53. 9.
6 parietus *L.*, *Schæff. Icon.* 24. 3?
7 similis *Nob.*—quadratus *Don. Brit. Ins.* 14. 495. 2.
8 nigricornis *Nob.*
9 parietinus *Linn. Faun. Suec.* 1679.
10 quadratus *Panz.* 63. 3.
11 angulatus *Don.* 14. 495. 1. 1.
12 flavipes *Nob.*
13 6-fasciatus? *Fab.*
14 4-fasciatus? *Fab.*
15 emarginatus *Fab.*
16 bidens *Linn. S. N.* 2. 951. 16.
17 connexus *Nob.*

O. pictus has a very shining abdomen.
O. Scoticus has rufous tibiæ and tarsi.
O. similis may be only a variety of *O. parietus.*
O. nigricornis has the apex of the abdomen and antennæ, except at the base, black.
O. flavipes may be only the male of No. 10.
O. connexus is like No. 16, but has an entirely black thorax. The campanulate and narrow basal joint of these 2 species approaches the form of *Eumenes.*

Borago officinalis (Common Borage) accompanies the insect.



Pub. by J. Curtis London Mar. 1 1824

Reprint ... 1824
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13.

EUMENES ATRICORNIS.

ORDER Hymenoptera. FAM. Vespidæ.

Type of the Genus, Eumenes atricornis *Fab.*

EUMENES *Lat., Fab., Curt.*—Vespa *Linn., Fab.*

Antennæ as long as the thorax, inserted in the centre of the face, approximating, slightly geniculated, thickened towards the apex, 13-jointed in the male, 1st and 3rd joints the longest, 2nd small, 4th oblong, the remainder decreasing in length and increasing in diameter to the apical joint which forms an incurved claw (1 ♂); 12-jointed in the female, basal joint the longest, terminal one conical (♀).

Labrum elongate-trigonate, quadrate at the base, the apex rounded and ciliated (2).

Mandibles exserted meeting at the apex and forming a rostrum or beak, long and narrow with three notches forming 4 teeth on the internal margin, rounded at the apex (3).

Maxillæ with the terminal process elongated narrow lanceolate corneous at the base, coriaceous and ciliated towards the apex. *Palpi* a little longer than the maxillary process, slender and 6-jointed, 2 first joints long, 3rd shorter, the remainder slender and shorter, decreasing in length, the apical one being minute (4).

Mentum (5 *a*) long, narrow, cylindric and contracted above the insertion of the *Palpi* which are long slender and 4-jointed, two first joints long and clavate, 3rd half the length of the 2nd, 4th very small (*b*). *Labium* coriaceous, striated transversely, longer than the mentum, dilated at the apex and bilobed, each lobe ciliated and glandular at the apex (*c*). *Paraglossæ* shorter than the lip, narrowed and ciliated towards the apex and terminated by a gland (*d*).

Males *more slender than the females, the latter armed with a sting.* Head *orbicular,* clypeus *notched:* eyes *much less remote above in the male than female, deeply notched above the antennæ:* ocelli 3 *in triangle near the crown.* Thorax *globular;* collar *very narrow in the centre, forming* 2 *dilated trigonate lobes on the sides.* Abdomen *arched, with the basal segment contracted and campanulate, the remainder forming an ovate conic mass, the 2nd segment being very large.* Wings, superior *folded longitudinally, with one marginal and* 3 *complete submarginal cells.* Legs *rather short and not stout, anterior the shortest.* Tibiæ *clavate, spurred at the apex.* Tarsi 5-*jointed, basal joint very long in the posterior, the others very short in the anterior:* claws *bifid;* pulvilli *distinct* (8, *a fore leg*).

ATRICORNIS *Fab.—Curt. Guide, Gen.* 696. 1.

In the Author's and other Cabinets.

THE genus Eumenes is composed of a portion of those Wasps that are solitary in their habits; not congregating and forming nests like the common Wasps and Hornets.

Eumenes may probably, at a future period, be separated into two genera; but as I cannot detect any important differences in the trophi, after the most careful examination, I shall only propose to make two divisions of them: the 1st (which appears to be the tropical type) may contain the species with a slender petiole as long or longer than the abdomen; the 2nd (which is the European form), those with the petiole stout and shorter than the body, in which the trophi, agreeing with the habit of the insects, are also shorter and more robust than in the other division.

Fabricius, in his *Systema Piezatorum*, described 23 species, four of which only were European, and Panzer has figured 4 more; but the genus was not known to inhabit Britain until my friend the Rev. W. Kirby (equally celebrated for his invaluable works and for his acute observations) discovered it in an entomological excursion with Mr. Dale on the borders of Hampshire and Dorset, July 3rd, 1821. It has since been taken the beginning of June, on a bank in the New Forest; and Mr. Bentley found it, the middle of the same month, settling upon different species of the Ericæ on Parley Heath. Mr. Dale has met with it there in July, and the end of August 1822 I captured two on the same heath upon gravelly and dry banks, and at the same period met with the female flying about the heath at Ramsdown, a beautiful spot near Heron Court, Hampshire, belonging to the Earl of Malmesbury.

1. E. atricornis *Fab. Syst. Piez. v.* 289. 17.— *Curt. Brit. Ent. pl.* 13 ♀.

Black, shining, very pubescent.

Male; head and thorax rather coarsely punctured; basal joint of antennæ beneath yellow, 2 or 3 of the apical joints beneath and the claw ochreous; labrum and clypeus nearly to the antennæ, and a spot between them yellow; anterior margin of thorax, a lunular mark on the scapulars and the posterior margin of the scutellum yellow: peduncle short and bell-shaped, very deeply punctured with the hinder margin yellow: abdomen more minutely punctured except at the base, the large segment with an ovate spot on each as well as its posterior margin and those of the 2 following segments yellow; wings fuscous, the costa subferruginous: legs yellow, thighs black except at their tips, and a black spot on the under side of the anterior tibiæ.

Female. Antennæ entirely black, a yellow spot below and another between them: thorax as in the male with a yellow spot also under each wing and one on each side the postscutellum; there are sometimes 2 minute yellow spots on the peduncle, the spots on the side of the abdomen are longer, and the yellow margin of the large segment deeper and sinuated.

The Plant figured is the beautiful *Erica Tetralix* (Cross-leaved Heath).








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VESPA RUFA.

The Anchor-faced Wasp.

ORDER Hymenoptera. FAM. Vespidæ.

Type of the Genus, Vespa vulgaris *Linn.*

VESPA *Linn., Fab., Curt., &c.*

Antennæ inserted near the middle of the face, remote, longer than the thorax in the *males,* slightly attenuated to both extremities, 13-jointed, basal joint long, hairy, curved, 2nd cup-shaped, 3rd the longest, remainder oblong, apical joint ovate-conic (1 ♂): not longer than the thorax in the female and neuter, 12-jointed, basal and 3rd joints longer, the remainder more quadrate than in the male, apical joint short and conical (1 ♀). *Labrum* semiovate, with a rigid, linear, ciliated, projecting process in front (2).

Mandibles truncated obliquely, denticulated, having 3 teeth (3). *Maxillæ* terminating in a long hairy process, with a smaller subovate trigonate lobe at the apex. *Palpi* moderate, slender, slightly pubescent and 6-jointed, basal joint slender, clavate, 2nd a little stouter, 3rd the largest, longer, obconic, truncated obliquely, 4th and 5th the same shape but smaller, 6th the longest and slenderest, subfusiform (4).

Mentum oblong, narrowed towards the base. *Palpi* attached to the anterior angles, tolerably long, pubescent and 4-jointed, elongate-pyriform, 2nd the longest subclavate, 3rd the stoutest, short, obtrigonate, 4th small ovate. *Lip* large, 4-lobed, the centre a little narrowed and cleft at the apex, with a spreading rounded lobe on each side, with a callous or glandular patch at the apex of each (5).

Head *transverse, face ovate* (R): eyes *long, notched internally:* ocelli 3 *in triangle on the crown.* Thorax *broader than the head, oval, collar bilobed;* scutel *large, transverse and semiovate.* Abdomen *with a short petiole attached to the inferior surface of the base which is truncated abruptly, long ovate and 7-jointed in the male, the apex conical; shorter, broader, and 6-jointed in the female; an acute sting in the female and neuter.* Wings *folding longitudinally; superior with* 1 *marginal and* 4 *submarginal cells.* Legs *stoutest in the female;* thighs *tapering at the apex:* tibiæ *short, hinder the longest, all spurred, anterior with only one spine:* tarsi *longish, especially the hinder,* 4 *anterior a little dilated in the female,* 5*-jointed, basal joint the longest,* 2*nd and* 3*rd obtrigonate or crescent-shaped,* 4*th bifid,* 5*th clavate:* claws *and* pulvilli *moderate.*

RUFA *Linn.—Curt. Guide, Gen.* 697. 3.

WASPS, like the hive-bee and ants, live in societies, which consist of three different kinds of individuals, males, females, and neuters or workers. The male wasp has no sting, is as long as the female, but much more slender and elegant in form, and more handsomely marked with black; the female is the largest sex and armed with a sting, as is also the neuter, which is a miniature likeness of her.

The female lives through the winter, and deposits her eggs early in the spring in cells formed by herself; these eggs, according to the observations of authors, produce only neuters, which immediately form a colony or nest; the males next appear, and afterwards the females. Wasps scrape posts and timber to form their nests; they live upon fruit, will eat meat, and they are very dexterous in catching flies.

The insects that inhabit their nests, and probably prey upon the larvæ, are *Dromius linearis* (fol. 231); *Rhipiphorus paradoxus* (pl. 19), supposed by the Rev. E. Bigge to have been an Ichneumon; *Anomalon Vesparum* (pl. 198); and the larva of *Volucella inflata?* (pl. 452); and on the Continent *V. gallica* is infested with a Xenos.

1. V. Crabro *Linn.—Don.* 14. *pl.* 502. The hornet is found in May, August, September, and October, and builds its nest in hollow trees and in thatched roofs.
2. vulgaris *Linn.—Don.* 7. *pl.* 226.?—*Panz.* 49. 19? Found from March to December, and builds its nest in the ground, of fibres of wood scraped from *sound* timber, as observed by the late Mr. T. A. Knight.
3. rufa *Linn.—Curt. B. E. pl.* 760. ♂ and ♀.

Male black, clothed with silky hair: antennæ with a yellow stripe on the inside of the basal joint and a dot at the apex; orbits of eyes, excepting the upper internal portion, a subquadrate space between the antennæ, outside of mandibles and clypeus yellow, the latter nearly divided by a long trilobed spot: margins of collar, scapulars, 2 spots below them, and 2 on the scutel yellow: abdomen bright yellow, the black basal bands and spots more or less edged with ferruginous; basal segment black only next the thorax with 3 black spots across the middle, 2nd and following segments with a black band at the base, and a black dot on each side, the 2nd with a large black spot in the centre united with the band, the remainder angulated only in the centre and decreasing in depth: costa and some of the nervures yellowish, the others brown, stigma pale ferruginous: legs deep yellow, coxæ, trochanters, and thighs, excepting the apex, black; inside of tibiæ ferruginous, anterior with a black streak. *Female* black, spot on the clypeus anchor-shaped (R); no yellow spot at tip of basal joint of antennæ, the stripe very narrow; no black bands visibel, except on the 2nd segment, but there are semicircular streaks on the 3rd and 4th, the dorsal spots larger; 1st and sometimes 2nd pair of tibiæ with piceous patches on the inside. *Neuter*, spots on the clypeus more or less anchor-shaped; no yellow streak on the antennæ: abdomen like the female, but the spots on the basal segments are more or less, sometimes entirely ferruginous; tibiæ seldom piceous inside.

At once distinguished by the anchor-shaped mark on the face, which is represented only by a spot in *V. vulgaris*. It constructs its nest of *rotten* wood, and I once found an immense number under a clod of earth. The 3 lines in the plate show the length of the sexes.

4. Britannica *Leach, Zool. Misc.* 2. 112. *pl.* 50. May and July, building globular nests attached to trees, bushes, and roofs, from the size of an apple to a man's head. Mr. Bigge has published a very interesting memoir on this wasp and V. vulgaris in the Transactions of the Ashmolean Society.

Polycarpon tetraphyllum, Four-leaved All-seed, from Slapton, Devon, was communicated by Joseph Janson, Esq.


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8-1831

373.

HYLÆUS DILATATUS.

ORDER Hymenoptera. FAM. Andrenidæ.

Type of the Genus, Apis annulatus *Linn.*

HYLÆUS *Lat., Curt.*—Prosopis *Jur., Fab., Panz.*—Melitta *Kirb.*—Apis *Linn.*—Sphex *Panz.*—Vespa *Rossi.*

Antennæ inserted between the eyes near the middle of the face, approximating, rather short, subfiliform and 13-jointed in the males, basal joint long, robust and slightly pubescent, 2nd subglobose, 3rd scarcely larger, the remainder subquadrate, slightly increasing in diameter, apical joint conical (1): 12-jointed in the females basal joint long and slender, 2nd and 3rd of equal size, the remainder transverse or quadrate, terminal joint conical (1 a).

Labrum transverse-oval, ciliated with rather broad but acute bristles (2).

Mandibles slightly curved, hairy, bifid at the apex (3).

Maxillæ; the stalk long, terminated by a short bent ovate lobe, acuminated and ciliated with long bristles at the apex (4). *Palpi* long and 6-jointed, basal joint scarcely so long as the 2nd, which with the others are of nearly equal length, excepting the terminal joint which is a little longer and very slender, the 4th and 5th clavate (b).

Mentum long, subelliptical, acuminated before in the centre (5).

Lip very short, with a lobe on each side (c). *Palpi* rather short, 4-jointed, 1st and 2nd joints of equal size, 3rd a little smaller, 4th slender (b).

Head *orbicular, transverse.* Eyes *long and lateral.* Ocelli 3 *in triangle.* Thorax *globose.* Abdomen *ovate or conic, convex, distinctly attached by a short peduncle.* Wings *with one marginal and 2 submarginal cells.* Legs *alike in both sexes, slender and clothed only with short hairs.* Thighs *and* tibiæ *rather short and robust, the latter spurred, the anterior pair having an acute spine at the apex, with a dilated internal edge.* Tarsi *long and 5-jointed, basal joint in the anterior pair notched on the inside at the base and pectinated.* Claws *simple.* Pulvilli *distinct* (8, *a fore leg*).

THE convex and almost naked bodies of these little insects give them so different a habit, and the structure of the labium is so dissimilar to the rest of the family (excepting Colletes, pl. 85), that they have been placed at the commencement of the Andrenidæ both by Mr. Kirby and Mons. Latreille.

The following British species I shall characterize, as far as I am able.

1. H. annulatus *Linn. F. S. n.* 1706.—*Curt. Guide, Gen.* 698. 1. —*Kirb. tab.* 15. *f.* 3.

Black, face spotted with white, posterior tibiæ annulated with the same colour.

Found in the flowers of the Resedæ in July, at Barham in Suffolk, and in many other places.

2. H. annularis *Kirby* 2. *p.* 38. 4.—annulata *Panz.* 53. 1.

Black, face spotted and all the tibiæ annulated with yellow.

Found with the preceding insect the end of June and July, at Barham and Wrentham in Suffolk, and elsewhere.

3. H. signatus *Panz.* 53. 2.—*Don.* 12. 421. 1.—*Kirb.* 2. 41. 6.

Black, face spotted fulvous; basal segment of body with the margin on each side white.

Found with the others, and is common round London.

4. H. dilatatus *Kir. t.* 15. *f.* 4.—*Curt. Brit. Ent. pl.* 373. *mas.*

Black, rather shining, thickly and minutely punctured, slightly sericeous: antennæ with the 1st and 2nd joints black, the former dilated and yellow beneath, the 3rd and following fulvous, with a black line above, the face yellow: thorax with a yellow spot before the wings, postscutellum rugose: abdomen very finely punctured, the short pubescence towards the apex, yellowish: wings slightly tinted, squamulæ yellow, ferruginous, and black; stigma and nervures piceous: legs black, tips of the thighs, tibiæ and tarsi yellow, the apex of the latter fulvous.

Found at Barham and at Wrentham the end of June.

5. H. pallidens *Kir. MSS.*

The maxillæ, the 4 posterior tibiæ at the base and their tarsi are yellowish.

Taken I believe by Mr. Kirby at Barham.

6. H. cornutus *Kir. MSS.*

Clypeus bidentate; antennæ fulvous beneath; posterior tibiæ with yellowish rings.

Taken also, I believe, by Mr. Kirby.

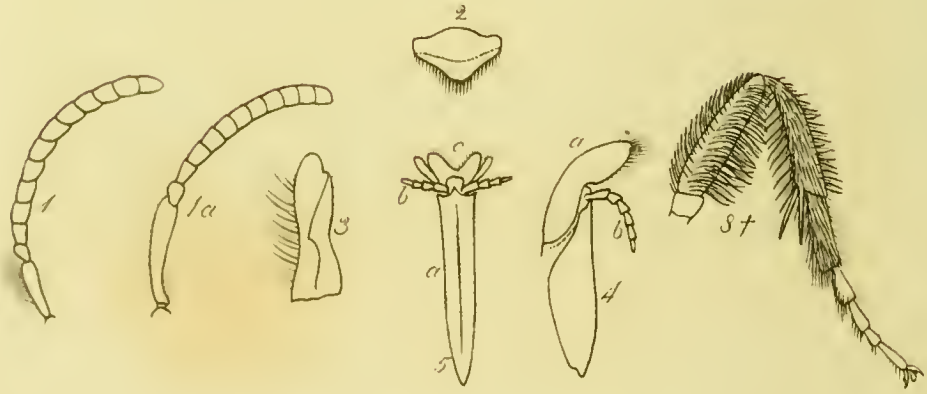
7. H. geniculatus *Leach.*—bifasciatus? *Jur. pl.* 11. *Gen.* 30.

If this be Jurine's insect, it is black, the antennæ fulvous, the face and thorax with several yellow spots, the anterior tibiæ and the base of the posterior of the same colour, the 1st and 2nd joints of the abdomen red, the anterior margins black.

In the British Museum, and said to have been taken by Dr. Leach in Devonshire.

The Plant is *Reseda Luteola* (Weld or Wolds).





Engd. by J. Curtis, London, Sept. 1, 1824.

2-1825

85.

COLLETES FODIENS.

ORDER Hymenoptera. FAM. Andrenidæ *Lat.*, *Leach.*

Type of the Genus Apis succincta *Linn.*

COLLETES *Lat., &c.* Melitta **α Kirby.* Andrena *Fab., Jur.* Apis *Linn., &c.*

Antennæ inserted near the middle of the face, distant, the 3rd joint longer than the 2nd;—in the male filiform, 13-jointed, basal joint with a tuft of hair (f. 1);—in the female, slightly clavate, 12-jointed, basal joint hairy, much longer than in the male (1 a). *Labrum* convex, trigonate, with a transverse suture, strongly ciliated (2).

Mandibles long, linear, curved, hairy, dilated at the base, notched near the apex upon the internal edge (3).

Maxillæ rigid below the palpus, terminated by a single, oval, scarcely coriaceous lobe, ciliated and bent inward (4 a). *Palpi* subsetaceous, longer than the maxilla, 6-jointed (b).

Mentum very long, linear, attenuated at the base, produced in the centre anteriorly (5 a). *Palpi* longer than the lip, 4-jointed, 3 first joints somewhat clavate, basal joint the largest (b). *Lip* hairy, dilated at the apex deeply emarginate, with 2 lateral, small obtuse lobes (c).

Head *as broad as the thorax.* Eyes *lateral.* Ocelli 3, *in a curved line.* Thorax *globular.* Scutellum *semicircular.* Abdomen *convex, ovate-conic, tomentose or hirsute, narrower in the males.* Wings *pubescent towards their posterior margins.* Superior *with* 1 *marginal, pedicled cell, and* 3 *submarginal cells, the* 2*nd and* 3*rd receiving recurrent nerves.* Posterior legs *of female very hairy, pollinigerous.* Tibiæ *with* 2 *long spines at the apex,* 1 *ciliated.* Tarsi, *basal joint long, robust,* 2*nd large clavate,* 3*rd clavate slender,* 4*th minute,* 5*th long clavate.* Claws *bifid.* Pulvilli *very distinct* (8† *hind leg of female*).

Males *smaller than the females, solitary, without neuters.*

FODIENS *Kirby's Mon. Ap. Ang. v.* 1. *p.* 130. *& v.* 2. *p.* 34. *n.* 2.

Male black, face and thorax punctured, thickly covered with fuscous-ochraceous soft hair. Abdomen punctured, especially the basal segment, which has a whitish margin of short hair as well as the 4 following, forming 5 transverse bands. Wings stained with dull yellow, slightly iridescent, fuscous at the apex. *Female* black, face thickly covered with yellowish ferruginous hair. Clypeus naked, rugulose. Thorax and scutellum punctured, thickly covered with yellowish ferruginous hair. Abdomen with the basal joint more deeply punctured than the others, with an ochraceous tomentose spot on each side at the base, and a white spot of hair on each side at the margin, 2nd joint with a band of pale ochraceous hair at the base, and another at the margin, the 3 following segments with a band of ochraceous hair at the margin, legs clothed with whitish yellow hair, the posterior thighs with a thick beard of hair.

In the Author's and other Cabinets.

Independent of the differences in the mouth, *Colletes* may be instantly known from the two genera which it most resembles externally, *Andrena* and *Halictus*, by the equal proportions of the 2nd and 3rd submarginal cells, one of which is small in the former, and by those cells receiving recurrent nerves, which is not the case in the latter.

We have 3 or 4 species of *Colletes* in Britain; viz. 1. *succincta* Linn. 2. *fodiens* Kirby. 3. *Daviesana* Kirby's MSS. and a species in my cabinet, which appears to be very different from the foregoing.

The males of *C. fodiens* I took upon the elevated cliffs at Christchurch, Hampshire, that are covered with heath, about the middle of August; and a few days after I met with the females in abundance flying about the western side of a bank upon Parley Heath in the same county, but saw no males. Although this species has been figured in *Monographia Apum Angliæ*, the beautiful state of the females that I took has induced me to give one as an example of the genus. I can scarcely think that the insects figured by Panzer, *fasc.* 105. *n.* 21 & 22, can be the *Melitta fodiens* of Kirby; they are too black, the scutella are pale, and the female wants the light spots upon the basal segment of the abdomen.

We are indebted to Reaumur for a knowledge of the economy of these bees, and it is a little singular that no one appears since his time to have been able to discover their nests, which they form amongst the earth that fills up the spaces of some stone walls; they are cylindrical, and composed of many cells of different lengths, placed in a horizontal line, each cell being formed like a thimble and fitted to the next: sometimes, however, when a stone obstructs their course, the line becomes irregular. The cells have alternate transverse bands of two or more colours; the shorter ones at their junction are white, the longer ones enveloping the body are reddish brown. These cells are constructed of many layers lying one over the other; and although their contexture is close, they are very transparent, in consequence of their extreme thinness,—sufficiently so to discover the colour of the substances contained in them, which causes the variegated line above described.

The plant figured is *Campanula glomerata* (Clustered Bellflower).







Pubd by J. Curtis Aug: 1 1831

8-1831

367.

DASYPODA SWAMMERDAMELLA.

ORDER Hymenoptera. FAM. Andrenidæ.

Type of the Genus, Melitta Swammerdamella, *Kirby.*

DASYPODA *Lat., Fab., Sam., Curt.*—Trachusa *Jur.*—Melitta *Kirb.* —Andrena *Rossi.*—Apis *Fab.*

Antennæ inserted near the middle of the face, rather remote, filiform, as long as the thorax and 13-jointed in the *male* (1), basal joint long and pilose, 2nd globose, 3rd obovate, scarcely longer than the remainder, which are oblong and truncated obliquely, terminal joint subovate: geniculated and 12-jointed in the female (1*), basal joint the longest and stoutest, clothed with long hairs, 2nd subglobose, 3rd long, slender at the base, the remainder subquadrate, terminal joint subovate.

Labrum transverse, elliptic and convex; the anterior margin ciliated with long and stout bristles (2).

Mandibles long narrow curved and crossing, deeply notched below the apex, forming 2 teeth, pilose externally and internally near the base (3).

Maxillæ long and broad, clothed at the base with long ciliated hairs, terminal lobe as long as the Palpi, lanceolate, ciliated at the apex (4). *Palpi* long, slender and tapering, 6-jointed, basal joint shorter than the 2nd which is the longest, the remainder decreasing in length (b).

Mentum long and linear (5). *Palpi* as long as the maxillary, 4-jointed, the joints clavate, basal the longest and stoutest, 4th the smallest (b). *Labium* inflexed, tapering, fleshy, as long as the Palpi (c).

Males *smaller and more slender than the females.* Ocelli 3, *nearly in a transverse line.* Eyes *lateral and narrow.* Head *not broader than the* Thorax, *which is subglobose.* Abdomen *ovate-conic in the males, ovate and depressed in the females and fringed at the apex.* Wings *with* 1 *marginal and* 2 *submarginal cells.* Tibiæ *furnished with long spurs, very pilose, especially the hinder pair in the female, as well as the basal joint of the tarsi in that sex.* Tarsi 5*-jointed, the basal joints very long especially in the* 4 *posterior of the males and dilated, particularly in the females.* Claws *bifid at the apex in the males.* Pulvilli *distinct.* (8, *fore leg of female.*)

THESE handsome insects approach considerably in form some of the Andrenæ, but they are easily distinguished by having only two submarginal cells. The sexes differ so widely, that they have been described under various names: the upper figure in our plate is the male, and the lower one the female, which I shall here describe.

D. Swammerdamella *Kir.* 2. 174. 111.—*Curt. Guide, Gen.* 701.

Male. A. farfarisequa *Panz.* 55. 14.—hirta *Fab.*

Black and minutely punctured; the pubescence long, pale ochreous or ferruginous; silvery white and combed down over the clypeus: abdominal segments with the margins fringed with pale hairs; nervures ferruginous and piceous: spurs and hairs on inside of basal joint of tarsi orange, terminal joint and claws ferruginous, the latter tipped black.

Female. D. hirtipes *Fab.*—A. plumipes *Panz.* 46. 16, and A. succincta 7. 10.

The pubescence on the crown of the head and thorax fulvous: basal joint of abdomen clothed with pale hairs, the 3 following ciliated with whitish hairs, slightly interrupted down the centre, the 5th joint densely clothed with black hairs except at the base: 4 anterior tibiæ and basal joint of tarsi clothed with fuscous hairs, orange beneath; hinder pair with the tibiæ and basal joint of tarsi perfectly concealed by long orange hairs.

This insect, which I believe is never met with in the North of England, I have found at the back of the Isle of Wight, flying about and settling on the Hawk's-weed on the top of the Cliff the whole of August; at Frejus in France the 5th of July, and on the sand hills at Calais the end of August. Captain Blomer sent me specimens from Devonshire, and many years since Mr. Kirby used to find them at Barham in Suffolk on the flowers of the Ragwort. In his Monograph are the following observations: "In the month of August 1797, I saw a female take her flight from a grassy declivity of a southern aspect, which was much entangled with roots and shrubs. Upon examining this spot more narrowly, I discovered a number of small burrows, each of which had a little heap of sand, which had been excavated from it, lying before it. In some of these burrows I saw our Melitta sitting, with her head at the mouth, enjoying the sunshine; at the same time I observed many other insects flying about the spot. Upon my attempting to take them they disappeared, but they soon returned so their amusement. With some difficulty, I at length succeeded in taking one, and it proved to be the male just described."

On the Continent there are several species of our genus, and last year I had the pleasure of capturing both sexes of the *D. discincta* of Illiger, the *A. Visnaga* of Rossi. I found this fine insect in July on the flowers of a Thistle near Frejus, and I believe Mons. Marcel de Serres takes it near Montpellier.

The Plant is *Tussilago Farfara* (Colt's-foot).



3 - 1826

129.

ANDRENA KIRBII.

Order Hymenoptera. Fam. Andrenidæ *Lat., Leach.*

Type of the Genus Melitta nitida *Kirby.*

Andrena *Fab., Lat., Panz.*—Melitta *Kirby.*—Apis *Linn.*

Antennæ inserted near the middle of the face, remote, filiform, 13-jointed in the males, basal joint not so long, 3rd much shorter than in the female (fig. 1)—12-jointed, subclavate in the females, basal joint long, 2nd short, 3rd long and slender (1 a). *Labrum* convex pilose, strongly ciliated, anterior margin entire (2). *Mandibles* long linear, especially in the males, slightly curved, dilated at the base, bifid at the apex, clothed externally with ciliated hairs (3).

Maxillæ rigid, very pilose, terminated by a broad, rather short, subovate ciliated lobe bent at its extremity (4 a), having a small hairy lobe below the palpus near the internal margin (e).

Mentum very long, linear, (5 a). *Palpi* longer than the lip, 4-jointed, basal joint long clavate, the remainder decreasing in length (b). *Lip* membranous, trigonate, acute, grooved and hairy down the middle (c and 5 * c). Paraglossæ or lobes membranous, strangulated in the middle, ciliated at the apex (d and 5 * d).

Males *much smaller and more slender than the females.* Head *as broad or broader than the thorax.* Eyes *lateral, narrow.* Ocelli 3 *in triangle.* Thorax *subglobose.* Scutellum *semicircular.* Abdomen *depressed, broad and ovate in the females, and fringed at the apex, more lanceolate in the males.* Wings *pubescent, especially towards the extremities, with* 1 *marginal and* 3 *submarginal cells, the* 2*nd and* 3*rd receiving recurrent nervures.* Posterior legs *of females very hairy pollinigerous, with a flocculus at the base of the thighs, the tibiæ and basal joint of tarsus* (*which is shorter than the tibia*) *furnished with a scopa or brush.* Tibiæ *in the males with* 2 *long spines at the apex.* Tarsi 5-*jointed.* Claws *bifid.* Pulvilli *distinct,* (8 † *hinder leg of male*).

Kirbii *Stephens's MSS. Nobis.*

Male unknown. *Female* dull black, shining. Head minutely and closely punctured, face covered with ochraceous hair, eyes and antennæ beneath brown. Thorax sparingly punctured in the disk and covered with short pale ochraceous hairs. Abdomen minutely punctured, pubescent especially at the base, the margins of the segments being thickly ciliated with pale ochraceous hairs forming 4 transverse bands, apex clothed with yellowish brown hair. Wings stained yellowish, posterior margin fuscous, post-costal nervure brown, the others ferruginous. Thighs and tibiæ clothed with pale hair, tarsi ferruginous, the basal joint clothed with pale hair, changing with the light to ferruginous.

In the Cabinet of Mr. Stephens.

There are about 80 British species of this well-known genus, of which we have upwards of 50 named in our own cabinet: most perfect descriptions are given of them in the 2nd vol. of the *Monographia Apum Angliæ;* the following have been detected and named by Mr. Kirby since the publication of his valuable work, viz. *Andrena Hallana*, *fulvescens*, *albescens*, *Spencella*, and *Yeatella*. The reader will also find an account of the habits and economy of this group in the 1st volume, p. 141 of the same work, of which we shall here avail ourselves. "The species of this family usually nidificate under-ground in a light soil, some choosing grass banks over which bushes are scattered, others bare perpendicular sections, but all seem to delight in a south aspect. They excavate cylindrical burrows from five inches to near a foot in depth, and of a diameter sufficient only for the *Melitta* (*Andrena*) to go in and out at. When they make these holes, they remove the earth grain by grain, which forms a small hillock near the mouth; they sometimes run in a perpendicular, and at others in a horizontal direction. The cell at the bottom of these burrows they replenish with pollen made into a paste with honey, and in this they deposit their eggs. The pollen they carry not only upon the scopa of their posterior tibiæ, but also upon their flocculus, and the hairs of their metathorax."—The student will be well rewarded in collecting, by visiting the Sallows when in flower as early as April; and as the males and females are exceedingly different, he should take care to discover if possible the sexes,—many species are attached at later periods to syngenesious and other flowers.

The rare insect figured was in the collection of the late Mr. M. Griffin of Norwich, and was probably taken in the neighbourhood of that city: it now enriches the cabinet of Mr. Stephens, with whom I unite most cordially in naming it after the gentleman to whom we are so greatly indebted for our perfect knowledge of this interesting family.

I feel great pleasure also in introducing a drawing of *Mespilus Cotoneaster*, which I am enabled to do through the kindness of my friend Professor Henslow, who has obligingly communicated specimens, and the following account from W. Wilson, Esq. of Warrington, Lancashire, who discovered it last year in Wales. "The surface of the Orme's head is broken into cliffs and ledges, and upon these cliffs the *Mespilus* grows. It is most abundant within half a mile of the village of Llandidus, but occurs, though much more sparingly, in other parts; and I have seen it at the N.W. extremity of the head. It is indisputably indigenous. The Orme's head consists of limestone."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d
b
5
5*
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1♂
2
b
c
d
b
6♀
6♂
3

10 - 1833

448.

LASIOGLOSSUM TRICINGULUM.

ORDER Hymenoptera. FAM. Andrenidæ.

Type of the Genus, Lasioglossum tricingulum *Curt.*

LASIOGLOSSUM *Curt. Guide, Gen.* 704[a].

Antennæ of the male inserted near the centre of the face, longer than the head and thorax, slightly fusiform, composed of 13 joints very similar to Halictus.

Labrum transverse-ovate, sides straight, angles rounded and slightly emarginate, anterior margin convex and ciliated with long hairs, broadest at the base (2).

Mandibles not so much dilated at the base as in Halictus.

Maxillæ very slender, lobe as long as the Paraglossæ, lanceolate, not notched towards the apex. *Palpi* one third longer than the lobe, 6-jointed (4).

Mentum long and very slender. *Labium* rather long lanceolate and very pubescent on the sides and at the back (5 c): *Paraglossæ* half the length of the lip, lanceolate and slightly ciliated (d). *Palpi* longer than the paraglossæ, but shorter than the lip, 4-jointed (b).

Head *ovate, depressed and porrected nearly horizontally:* eyes *long narrow and lateral:* ocelli 3. Thorax *globose, a little larger than the head.* Abdomen *ovate and convex, considerably broader than the thorax.* Wings *ample, the cells similar to Halictus, as well as the legs.*

TRICINGULUM *Curt. MSS.*

Male black, shining and pubescent, exceedingly minutely and thickly punctured and clothed with soft ochreous hairs: abdomen with a whitish fascia, narrowest at the middle, at the base of the 2nd 3rd and 4th segments, the 5th segment slightly grey with pubescence, the apex ochreous: wings iridescent, the posterior margin slightly fuscous; stigma ochreous, nervures pale brown: posterior tibiæ ochreous, and tarsi, excepting the 1st pair, whitish ochre, tipped with ferruginous.

In the Author's Cabinet.

THIS singular and I believe nondescript species appears to form a beautiful connexion between the Andrenidæ and Apidæ, but unfortunately the female is unknown. I took 3 males at Ventnor in the Isle of Wight, flying about flowers near the sea-shore, the 12th September 1826, and one of them was Stylopsed; they look very long on the wing, in consequence of the head, antennæ, and bodies being carried horizontally. Those parts that I have not described or but slightly, are similar to Halictus, which I shall now illustrate.

HALICTUS.

Type of the Genus, Melitta rubicunda *Kirby.*

Halictus *Lat., Curt. Guide, Gen.* 704.—Andrena *Panz.*—Hylæus, Megilla, & Anthophora *Fab.*—Melitta *Kirby.*

Antennæ inserted near the middle of the face, long filiform and 13-jointed in the *males* (1 ♂); basal joint the longest and clothed with long feathery hairs, 2nd cup-shaped, 3rd semiovate, 4th stouter and oblong, the remainder slightly decreasing in length and becoming very ovate or convex on the underside, terminal joint rounded at the apex: shorter and geniculated in the *females* (1 ♀), pubescent and 12-jointed, basal joint very long, clavate and pilose externally towards the base, 2nd small obovate, 3rd a little broader, the remainder stouter and subquadrate, terminal joint subovate.

Labrum short, transverse and convex in the *males* (2), the sides rounded, ciliated before with long flat hairs: producing a sublanceolate lobe in front, ciliated with long hairs dilated at the base in the *females* (2).

Mandibles rather slender in the *males* (3), sublanceolate, curved and crossing, produced inside at the base, externally pilose: sublinear in the *females* (3), hollowed inside, truncated obliquely at the apex and notched, externally pilose.

Maxillæ alike in both sexes (4), very long, terminated by a small bent lobe, subovate with a notch on the inside and ciliated with longish hairs. *Palpi* (*b*) twice as long as the lobe, slender and slightly attenuated, 6-jointed, the 3 basal joints shorter than the following.

Mentum alike in both sexes, long and linear (5). *Lip* short ovate-conic, being pointed and pubescent at the apex (*c*). *Paraglossæ* as long as the lip, subelliptical, rounded at the apex and ciliated (*d*). *Palpi* nearly twice as long as the lip, slender, attenuated and 4-jointed, basal joint the longest and stoutest, 3 following short and of equal length (*b*).

Males *smaller and slenderer than the* females. Head *orbicular, depressed:* eyes *long and ovate:* ocelli 3. Thorax *globose.* Abdomen *elliptical in the males* (6 ♂); *ovate conic in the females, with a groove on the back at the apex* (6 ♀). Wings; *superior with one marginal and 3 submarginal cells, the central cell the smallest.* Tibiæ, *with long spines or spurs, posterior robust in the female:* tarsi 5-*jointed, basal joint long and stout in the females, the others minute.* Claws *bifid in both sexes.*

The remarkable elliptical impression on the back of the penultimate segment of the abdomen distinguishes the female Halicti from all other Bees, and the head of the male is narrower and more elongated than in Andrena, and the 3rd joint of the antennæ is not much larger than the 2nd. The Paraglossæ were entire at the apex in the Halicti that I dissected, but Mr. Kirby has represented them as lacerated at the apex.

This genus contains 29 British species, for the names of which the student is referred to the 'Guide'. It is singular that not one of them appears to have been described by Linnæus.

The Plant is *Plantago lanceolata* (Ribwort Plantain).


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b
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1a
5a
5f

3-1826

101.

PANURGUS URSINUS.

Order Hymenoptera. Fam. Apiariæ *Lat.* Apidæ *Leach.*

Type of the Genus Andrena lobata *Panz.*

Panurgus *Panz., Lat., Leach.* Apis *Gmel., Kirby.* Dasypoda *Fab.* Andrena *Panz.* Trachusa *Jur., Panz.*

Antennæ approximating, inserted between the eyes, distinctly articulated, clavate in both sexes; 13-jointed in the males, basal joint long cylindric, hairy, 2nd small, 3rd cup-shaped, remainder pubescent, increasing in diameter to the last, which is conical (1): 12-jointed in the females, basal joint less hairy than in the males (1 a).

Labrum transverse-oval, narrowed at the base, cilia long and soft (2).

Mandibles long, bent, slender, acute, rough and slightly pilose, not dentated (3).

Maxillæ long, terminated by a pubescent and pilose lanceolate lobe (4 a).

Palpi shorter than the maxillæ, slender, 6-jointed, basal joint small, following longer, decreasing in length to the last, which is as long as the 2nd (b).

Mentum elongate-conic, apex tridentate (5 a). *Palpi* long slender, coriaceous membranaceous at their articulations, slightly hairy, 4-jointed, 1st joint long, clavate, the following decreasing in length to the end (b). *Tongue* lanceolate pubescent, scarcely so long as the palpi, with an acute lobe on each side at the base (c).

Head *broader than the thorax in the males.* Ocelli 3 *in triangle.* Abdomen *with the incisures slightly strangulated, somewhat conical and terminated by 2 lobes in the males; ovate more depressed, bearded and aculeated in the females.* Superior wings *with 2 marginal cells, one very small, and 3 submarginal cells, the external one scarcely complete, and the middle one receiving 2 recurrent nerves.* Hinder feet *pollinigerous.* Tibiæ, *posterior dilated towards the apex, very hairy in the females* (8 a). Tarsi 5-*jointed, 1st joint very long, broad, and hairy, especially in the females, the remainder small, pubescent only.* Claws *unidentate* (8 a *is the hinder leg, and* 1 a *the antenna of the female P. ursinus*).

Ursinus *Gmel. Linn. Syst. Nat. p.* 2790. *n.* 173. *Kirby Mon. Ap. Angl. v.* 2. *p.* 178. *n.* 1. *fem.*—and Banksiana, *p.* 179. *n.* 3. *mas.* *Male* black, shining, hirsute. Wings pale fuscous; costa, stigma and squamulæ brown; nerves, lobes of abdomen and tarsi ferruginous. Tibiæ clothed with ochraceous hairs.—*Female* less robust than the male, apex of abdomen tufted with brown hairs, posterior tibiæ and basal joint of tarsus thickly covered with long fulvous hair.—Obs. Most of the soft pubescence is ciliated, as shown at the base of the maxilla (fig. 4).

In the Author's and other Cabinets.

The uniformity that prevails in the structure of these bees, especially in the similarity of the palpi and the antennæ of the sexes, renders it easy to distinguish them from the other *Apidæ*, and nothing can be more natural, I think, than the situation assigned to them by Mr. Kirby, for in habit they so much resemble *Dasypoda*, that Fabricius (who must have judged in this instance from analogy and not from dissection, as the mouth assumes the more developed form of the *Apidæ*) had included them in his last work in that genus; and on the other side they approach very near to *Nomada*, in the form of the palpi and other parts of the organs of manducation.

We have but 2 species of this genus; for as *Apis ursina*, and *A. Banksiana* of Kirby are constantly found together, the former being all females and the latter all males, it cannot be doubted that they are one species.

1. Panurgus ursinus, Mr. Kirby took upon a heath in Suffolk, in September, and in the middle of June I captured several of both sexes upon a sunny bank near Shooter's Hill. The female having been figured in the *Mon. Ap. Angl. tab.* 16. *f.* 1., I have preferred giving the male, being in doubt about Panzer's figure of *Trachusa atra*, *fasc.* 96. *pl.* 19. all the tibiæ being destitute of the fulvous pubescence.
2. P. lobata *Panz.* Both sexes of this rare insect are well figured in his *Faun. Ins. Germ. fasc.* 96. 18. male, and 72. 16. female. Having received specimens from Germany, and Mr. Stephens having allowed me to compare his specimen, which was the one in the late Mr. Marsham's collection, referred to by Mr. Kirby, there can be no doubt of their being the same species, although the figure in the *Mon. Ap. Angl. tab.* 16. *f.* 2. does not show the spines on the posterior thighs, as exhibited in our plate (fig. 8†), which are quite concealed, except when the legs are spread out; a proof of the utility of setting insects well when first taken, or of relaxing them afterwards, as recommended by Mr. Samouelle in his Useful Compendium, p. 321.

The female of *P. lobata* I have never seen; the males have been taken in September upon Martlesham Heath, near Woodbridge, Suffolk, by Mr. Kirby, whose specific name would most willingly have been adopted, had not Panzer published his previously. Latreille observes, that our bee is fond of semifloseulous flowers; we have consequently figured *Cineraria integrifolia* (Mountain Fleawort), communicated by Professor Henslow from the Gogmagog Hills.






1
2
♂
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1
♀
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♂
c
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14-1837

628.

CHELOSTOMA FLORISOMNIS.

ORDER Hymenoptera. FAM. Apidæ.

Type of the Genus, Apis florisomnis *Linn.*

CHELOSTOMA *Lat., Curt.*—Megachile *Lat.*—Trachusa *Jur.*—Hylæus *Fab.*—Anthophora *Fab.*—Anthidium *Panz.*—Apis *Linn., Kirb.*

Antennæ inserted in front of the face, considerably longer than the head, filiform and 13-jointed in the male (1 ♂), basal joint long stout and hairy, 2nd the smallest, the following joints oblong and angulated internally, giving them the appearance of a twisted rope, the apical joint oval: short and clavate in the female (1 ♀), the 2nd joint longer than the 3rd, 4th and following cup-shaped and gradually increasing in diameter, apical joint ovate-conic.

Labrum oblong, attenuated anteriorly, ciliated and truncated (2 ♂), twice as long in the female and more attenuated (2 ♀).

Mandibles bifid at the apex, short and externally hairy in the male (3), long curved and porrected in the female and very pilose internally.

Maxillæ, stipes elongated (4), terminated by a long inflected membranous lobe, lanceolate and very acute. *Palpi* very small, composed of 3 ovate joints.

Mentum elongated, elliptic, biemarginate before (5). *Tongue* long slender and linear (*c*). *Palpi* rather longer, slender, attenuated, compressed, attached to short broad scapes, 4-jointed, basal joint oblong, 2nd very long, membranous, thickened at the inner edge, 3rd short and slender, a little pubescent at the apex, 4th the same length, attached obliquely, a little clavate-truncate (*b*).

Head *rather small in the male, the cheeks forming an obtuse tooth by the base of the mandibles; large and more quadrate in the female:* eyes *lateral, elongate-ovate:* ocelli 3 *in triangle on the crown.* Thorax *ovate, especially in the female.* Abdomen *linear in the male* (6 ♂), *very much incurved, with a trigonate protuberance beneath near the base, a ciliated cavity under the 4th segment, the apex bidentate* (7) *with a recurved bifid process in the centre: elliptic in the female, narrowed towards the base, the underside densely hairy* (6 ♀). Wings *with* 1 *marginal and* 2 *submarginal cells, the 2nd receiving* 2 *recurrent nervures.* Legs *neither long nor stout:* tibiæ *rather short and stout:* tarsi 5-*jointed, basal joint very long in the hinder pair, rather stout and densely pilose inside in the female:* claws *short broad and cleft in the males, acute in the females.*

FLORISOMNIS *Linn.* ♂.—maxillosus *Linn.* ♀.—*Curt. Guide, Gen.* 709.

Black, shining, thickly and minutely punctured, slightly clothed with ochreous down, hinder margin of wings brown, nervures piceous: *male* with the face densely clothed with soft yellow hairs, abdominal segments fringed with whitish hairs on the sides, underside of 4th segment ochreous: *female* with the internal margin of the mandibles ciliated with ferruginous hairs as well as the hinder tarsi; underside of abdomen clothed with ochreous hairs, the segments neatly margined with white above, interrupted down the back.

Since Mr. Kirby wrote his able Monograph, his suspicions have been confirmed relative to the sexes of this bee having been described by Linnæus under two names, yet the fact of Mr. Shuckard having seen the female *Chelostoma* paired with an *Osmia*, shows how difficult it is to ascertain the sexes of insects, and how cautious we ought to be in deciding on such questions.

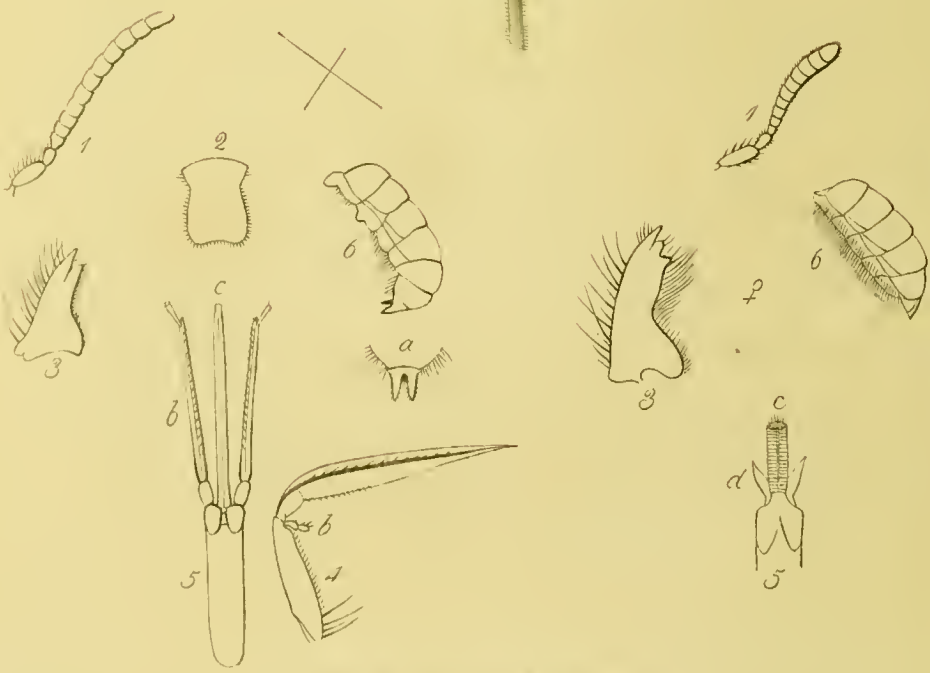
It is said that the idle males of this singular bee sleep away a great portion of their time in the bosom of some pretty flower, whilst the female labours hard with her mandibles to form cells several inches in length in posts and rails, where she deposits her eggs, supplies them with pollen, and then dies. By the following extract from a letter written by the Rev. R. Albion Cox to Mr. Dale, it is evident that they sometimes save themselves the labour of excavation by employing the stubble of wheat for their nests, a remarkable departure from their usual œconomy which has not been hitherto noticed. "The habits of this species (says Mr. Cox) are singular, the reed-motes contain their nests. On splitting a portion from one you will find a most ingenious arrangement for the support of the infant progeny. First a store of pollen, then an egg or grub, and lastly a small pellet of earth or stone, and so on in a series from the joint to the end of the straw, which is carefully sealed. The pellet is placed in the position described, evidently for the purpose of intercepting the progress of the larva in that direction, lest he should infringe upon the rights of his next-door neighbour. If you should chance to meet with a straw whose inmates are in a more advanced stage, you will find the pupa inclosed in a silken shroud at the end opposite to his original position, and behind him the rejectamenta of his banquet. Whatever may be the diameter of the straw, the quantity of food appears to be precisely the same; whence it happens that the deposits differ in length, proportionably to the size of the cylinder which contains them." Mr. Cox adds, "Mr. Paulett Mildmay first pointed out the ingenuity of the contrivance."

Mr. R. Bakewell, of Nottingham, also informs me that the females of *Sapyga clavicornis* (pl. 532.) enter the holes of *Chelostoma*, and are always to be found about posts where that bee nidificates, but the male *Sapyga* is very rare and difficult to capture.

The *Ichneumon manifestator*, *Fœnus jaculator* (fol. 423.), *Ichneumon femorator*, Kirb., and *Chrysis cyanea* are recorded also as parasites on the larvæ of *Chelostoma*.

For the pretty plant, *Exacum filiforme*, Least Gentianella, I am indebted to the Hon. C. A. Harris.

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11-1834

504.

HERIADES TRUNCORUM.

ORDER Hymenoptera. FAM. Apidæ.

Type of the Genus, Apis Campanularum *Linn.*

HERIADES *Spin., Lat., Curt.*—Anthophora *Fab.*—Anthidium *Panz.*—Trachusa *Jur.*—Megachile *Lat.*—Apis *Linn., Kirb.*

Antennæ inserted in the middle of the face, scarcely longer than the head, velvety, 13-jointed in the *male* (1), basal joint the longest and subovate, pilose above, 2nd joint small, subovate, 3rd not larger cup-shaped, 4th transverse, the remainder increasing in length to the apical joint which is ovate; shorter and clavate in the *female* (1 ♀), 3rd joint the smallest, ovate-truncate, the remainder transverse and gradually increasing in diameter to the apical joint which is large and ovate.

Labrum alike in both sexes, oblong, a little dilated at the base, the margin ciliated (2).

Mandibles elongate-trigonate, bifid in the male (3); larger with one trifid in the female (3 ♀), having long silky hairs on the inside.

Maxillæ terminated by a long broad lanceolate lobe (4). *Palpi* very short, biarticulate, basal joint a little the longest and clavate, 2nd ovate (*b*).

Mentum subelliptical, subtrifid before (5). *Lip* long, slender, linear, pilose and transversely striated (*c*). *Paraglossæ* short and lanceolate in the female (5 ♀ *d*). *Palpi* a little longer than the lip, 3-jointed, basal joint short and ovate, 2nd very long and attenuated, 3rd as long as the 1st, attached outside near the apex of the 2nd, slender and clavate (*b*).

Head *orbicular and large in the male:* eyes *lateral, oval:* ocelli *large,* 3 *in triangle on the crown.* Thorax *not larger than the head, globose.* Abdomen *narrow, cylindric, elongate-ovate, incurved, with a tubercle on the underside of the 2nd joint in the male* (6), *the antepenultimate fringed with hair, the apex furcate* (*a*); *thickly clothed with hairs beneath in the female* (6♀). Wings, *superior with one elongate-ovate marginal cell,* 2 *perfect submarginal ones, the 2nd receiving* 2 *recurrent nervures, and* 3 *discoidal cells.* Legs *simple similar in both sexes:* thighs *nearly naked:* tibiæ *short, posterior the longest, anterior with a spine at the apex, the others with* 2; tarsi 5-*jointed, basal joint the longest, especially in the hinder pair, in which it is also the stoutest and pubescent on the inside.* Claws *bifid in the male.*

TRUNCORUM *Linn.—Curt. Guide, Gen.* 710. 2.

In the Cabinets of Mr. Kirby and the Author.

HERIADES is distinguished from the other Apidæ by its labial palpi, which are only triarticulate, and the basal joint is very short. The Paraglossæ are also short, and I could not discover any in the male.

There are two species inhabitants of this country, and they are supposed to nidificate in posts, rails, holes in old trees, &c.

1. H. Campanularum *Kirb. Mon. pl.* 16. *f.* 14 & 15. ♀ & ♂.

Shining, thickly and minutely punctured, and sparingly clothed with minute ochreous pubescence; the face and especially the clypeus producing long ochreous hairs in the male, and the margin and underside of the abdomen in that sex, except at the base, are thinly covered with yellowish hairs, but in the female they are long and thick; wings fuscous round the margins, the nervures and stigma piceous; spurs ochreous, the basal joint of tarsi producing long whitish hairs in the female, especially the intermediate, inside of the same joint in the posterior clothed with bright ferruginous hairs; claws subferruginous.

"This little Apis," (says Mr. Kirby,) "by far the most minute species of this genus that I have yet seen, is common, during the summer and autumnal months, in the blossoms of *Campanula Trachelium*, *rotundifolia* and *hybrida*, and what deserves to be remarked, I never found it in the flowers of any other genus of plants. The males are often taken asleep in these flowers; their abdomen is then doubled, so that the tubercle, with which its base is armed, fits into the cavity near the anus." On the 29th of June I once found it in abundance in a garden at Fulham.

2. H. truncorum *Linn.*—*Panz.* 64.15.—*Curt.B.E. pl.* 504 ♀.

Female slate-black, slightly pubescent with whitish hairs, and closely covered with strong punctures, especially the head and thorax, a spot of long white hairs on each side the clypeus, sides of thorax similarly clothed. Abdomen concave at the base, with a transverse ridge and another at the base of the 2nd segment, the anterior margin of the 1st clothed at the sides with white pubescence, sometimes extending across, the 3 following segments ciliated with white hairs, forming very narrow bands, the pubescence at the apex very short and ochreous, the pubescence beneath as well as on the basal joint of the hinder tarsi ferruginous ochre: wings tinged with brown, especially across the middle; nervures and stigma piceous, spurs ochreous, tips of tarsi and claws ferruginous. "*Male* smaller: cheeks unarmed: maxillæ not carinated above: abdomen with the margins of the anterior segments whitish: anus inflexed, last segment entire, somewhat compressed with a little transverse fovea on each side: belly with white hairs at the base, convex, with a tolerably deep cavity at the apex."—*Kirby.*

As I have never seen the male, the above description is translated from Mr. Kirby's Monograph: the female very much resembles the same sex of *Osmia leucomelana*, but is rather more slender; the head is proportionably larger; it is more strongly punctured, and the hollow space above at the base of the 1st abdominal segment at once distinguishes it.

Taken at Brentford: I believe my female came from Norfolk.

The Plant is *Campanula* (Prismatocarpus *L'Her.*) *hybrida*, Corn Bell-flower.



Published by Curtis, London, Mar. 1, 1825

2 - 1825

61.

ANTHIDIUM MANICATUM.

Order Hymenoptera. Fam. Apiariæ *Lat.* Apidæ *Leach.*

Type of the Genus Apis manicata *Linn.*

Anthidium *Fab., Lat.* Apis *Linn., Kirby.* Trachusa *Jur.*

Antennæ inserted near the middle of the face, remote, filiform, of nearly equal length in both sexes, 13-jointed in the male, 12-jointed in the female, 1st joint elongated, hairy, 2nd very short (1, antenna of male).

Labrum inclosed beneath the mandibles, elongate, quadrate, coriaceous, entire, ciliated, a little dilated at its base (2).

Mandibles exserted, strong, broad, acute, multidentate (3).

Maxillæ long, coriaceous, horny down the centre, terminal lobe lanceolate, acute, inflexed, external edge ciliated (4 a) : *Palpi* short, of one joint, ovate, attenuated, pilose (4 b with the palpus magnified).

Mentum elongated, linear (5 a) : *Palpi* setiform, 4-jointed, 1st and 2nd elongated, compressed, of equal length, with membranaceous edges, 3rd and 4th short, the former arising from the side near the apex of the 2nd which is terminated by a few bristles (5 b, b, showing the 3rd and 4th joints greatly magnified) : *Lip* often reflexed, as long as the 2 first joints of the palpi slender, linear, suddenly contracted towards the apex (5 c).

Head *nearly as broad as the thorax.* Ocelli 3. Scutellum *with the posterior margin produced, rounded, subemarginate.* Abdomen *incurved, convex above, broadly truncate at the base, apex of the males armed with spines; underside in the females very hairy, armed with a sting* (6 *abdomen of female*). Superior wings *with* 1 *marginal,* 2 *submarginal and* 3 *discoidal cells; posterior limb without nerves.* Hinder feet *pollinigerous.* Tibiæ *short, hairy.* Tarsi *very hairy,* 5*-jointed,* 1*st joint compressed, quadrate, long, robust,* 3 *following short, terminal joint long, slender, the* 1*st joint of the hinder tarsi gradually narrowing from the base to the apex.* Claws *unindentate* (8 *a fore leg*). Larvæ *pollinivorous.*

Manicatum *Linn. Syst. Nat.* 2. 958. 28. *Fab. Ent. Syst. t.* 2. *p.* 330. *n.* 73. *Kirby's Mon. Ap. Ang.* ** *c.* 2. *β. v.* 1. *p.* 171. *v.* 2. *p.* 248.

Male piceous black, punctured, villose, hairs gray or inclining to ferruginous. Clypeus and mandibles yellow, the former black towards the base, the latter at the apex. Wings fuscous. Abdomen with fascicles of orange hairs and a yellow spot on each side the 4 first segments, the 5th with 4 yellow spots, 6th with lunar spots towards the centre and a curved spine on each side : last segment with 3 spines the centre one being the smallest. Legs black, very villose, 4 anterior tibiæ yellow at the apex. Tarsi yellowish brown.—*Female* smaller less villose than the male, hairs ferruginous, orange upon the tarsi and beneath the abdomen, which has no spines and instead of the fascicles it is ciliated on the sides of the abdomen.

In the Author's and other Cabinets.

No family of insects has excited greater interest, been better investigated, or more clearly understood than the bees,—circumstances arising no less from their wonderful economy and beautiful organization, than from the labours of some of the species supplying us with the luxuries and necessaries of life; at once affording both instruction and amusement to the naturalist, and speculation and profit to the merchant.

Whilst war like a frost (if I may be allowed the expression) locked up the streams of knowledge that during the succeeding peace flowed in kindly harmony to instruct and benefit mankind, two of the most illustrious entomologists of the age were (unknown to each other) investigating the same subject; and it is delightful to see how those who take nature and truth for their guides arrive at the same conclusions, although sometimes led by different ways. The most perfect production that ever appeared in this country was at that time given to the world from the pen of Mr. Kirby, a work which it is far more easy for me to admire than to praise as it demands: in that work the student has a noble example of a monograph; his mind is directed "to look through Nature up to Nature's God;" and so complete is the mass of scientific information, that little appears left to be done by future writers. At the same time Mons. Latreille was employed in arranging the family, including the exotic genera, and naming the groups, which first appeared in his "*Histoire Naturelle*," vol. 3.; and in his subsequent works, the "*Genera Crustaceorum*," and "*Considérations Générales*," this admirable undertaking was perfected. With these advantages over every other family of British insects, it is no wonder that the *Apidæ* should become the favourites of the entomologist; I confess they are so with me, and I anticipate much pleasure in the illustration of them. The genus now selected is extremely interesting in its habits of life; for a detailed account of which I must refer to Kirby's "*Monographia Apum Angliæ*," remarking that it is the only species of the genus found in this country. It is by no means a rare insect in the neighbourhood of London. In the months of July and August 1823 Dr. Stephenson took it in great abundance in lanes at South Lambeth and Chelsea: I am informed by him that it occurs chiefly on dry sandy weedy banks; and like most insects of this tribe, it may be taken on the wing during the whole of the day when the weather is fine, occasionally settling on various plants, especially those that are covered with short woolly hair or down, the *Stachys sylvatica* (Pl. 65.), *Glechoma hederacea*, &c., the tomentum of which it strips off for the purposes of nidification, forming its nest in hollow trees and other situations.

Mr. Kirby having observed it to frequent the *Agrostemma Coronaria* (an Italian Plant), I have figured an English species of the same genus, *A. Githago* (Corn Cockle).


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5-1828

222.

OSMIA PARIETINA.

Order Hymenoptera. Fam. Apiariæ *Lat.* Apidæ *Leach.*

Type of the Genus Apis bicornis *Linn.*

Osmia *Panz., Spin., Lat., Leach.*—Andrena *Panz.*—Megachile *Lat.*—Trachusa *Jur.*—Hoplitis & Amblys *Klug.*—Anthophora *Fab.*—Apis *Linn., Kirby, Panz.*

Antennæ inserted at the middle of the face, not approximating, long filiform and 13-jointed in the males, basal joint pilose, scarcely longer than the 4th, 2nd minute, 3rd short cup-shaped, the remainder of nearly equal length, each being slightly curved, terminal joint attenuated (1 a) : shorter geniculated cylindric, and subclavate in the females, composed of 12 joints, basal joint pilose very long, 2nd minute, 3rd longer and more slender than the following, which are quadrate, excepting the last which is longer and rounded at the apex (1).

Labrum elongate-quadrate, dilated at the base, rounded and slightly emarginate and ciliated at the apex (2).

Mandibles externally pilose, small and deeply notched at the apex in the males (3 a); large elongate-quadrate, truncated obliquely and sinuated at the apex in the females (3).

Maxillæ as long as the lip in the female, horny at the base, terminated by a long membranous sublanceolate lobe pubescent at the inner margin and apex (4 a). *Palpi* pubescent more robust in the female than male, 4-jointed, basal joint the largest, oval, 2nd and 3rd longer, of equal length, 4th shorter, subclavate (b).

Mentum elongated horny. *Palpi* 4-jointed, basal joint long, 2nd twice as long attenuated, 3rd very short clavate-truncate, 4th a little longer and slenderer (5 b). *Tongue* much longer than the palpi in the male (c), very pubescent externally, hollow, transversely striated ; down the centre apparently runs a tube which is terminated by an expanded orifice. *Paraglossæ* short, slightly pubescent, dilated at the base (d).

Males *smaller than the females.* Head *very large in the latter sex.* Ocelli 3. Wings *like those of Megachile.* Abdomen *ovate, convex, thickly pubescent beneath in the female.* Tarsi 5*-jointed, basal joint the longest and most robust, especially in the female,* 3 *following short,* 5*th longer.* Claws *deeply bifid in the males.* (8 *fore leg of the female*).

Parietina *Nob.*

Female. Dull æneous green ; head and thorax thickly and minutely punctured, the former producing hoary, the latter bright ferruginous pubescence. Abdomen very glossy, obscurely punctured, slightly pubescent, ferruginous at the base, underside clothed with black pubescence. Wings with a fuscous fimbria. Legs producing a little hoary pubescence, that of the tarsi fuscous.

In the Author's Cabinet.

I HAVE the satisfaction of again referring my readers to the following works for the histories and descriptions of these bees, viz. Reaumur, tom. 6, *Mem.* 3; and the *Monographia Apum Angliæ*, vol. 1. p. 178, and vol. 2. p. 260, from whence we learn that they build their nests upon the uneven surface of walls, and construct their cells of mud which has caused them to be called Mason-bees. Although Osmia is nearly related to Megachile, there are considerable differences in the trophi, the most important of which is the 4-jointed maxillary palpus; and there are external characters, such as the longer antennæ and more woolly bodies of the males, and the more ovate and convex bodies of the females, which will be found useful to distinguish them.

In addition to those described by Mr. Kirby, I have had the good fortune to discover two others which appear to be nondescripts. The genus may be arranged in the following order:

1. O. hirta *Fourc.*—Leaiana *Kirby.* August and beginning of Sept. Thistles, Suffolk, and Isle of Wight.
2. spinulosa *Kirby, tab.* 17. *f.* 1 & 2. August. Sand and chalk pits near Ipswich, Suffolk.
3. leucomelana *Kirby.* Amongst pines, and on flowers of Dandelion: Suffolk. July and August: upon Centaurea, and under the cliffs at Dover.
4. cærulescens *Linn.*, *Panz.* 65. 18. *fem.*—ænea *Panz.* 56, 3, *masc.* July; in chalky and sandy places.
5. parietina *Curtis Brit. Ent. pl.* 222. *fem.* Beginning of June; flying about walls near Ambleside.

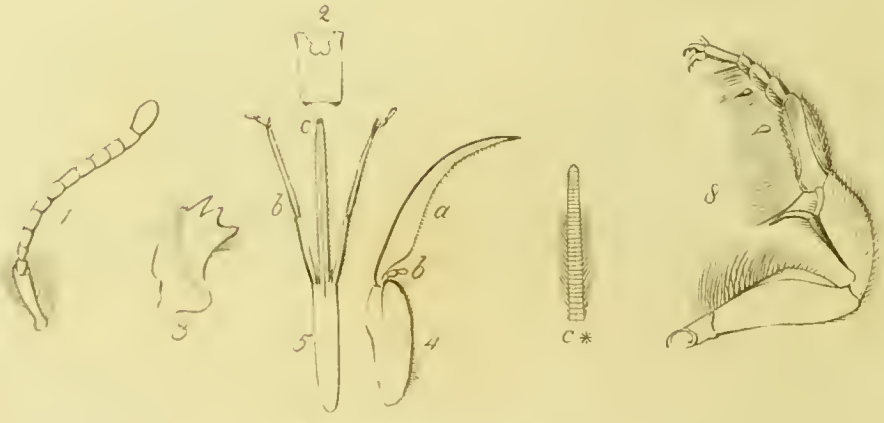
With the male of this bee I am unacquainted; the female resembles in size and colour the same sex of *O. hirta*, but the pubescence of the thorax is ferruginous, and the hair with which the underside of the abdomen is clothed is black.

6. Tunensis *Fab.*—aurulenta *Panz.* 63. 22. *fem.* July; on clayey banks.
7. bicolor *Schr.*—fusca *Panz.* 56. 11. *fem.*—hæmatoda *Panz.* 81. 20. *masc.?* End of June; Darent Wood. July; gardens and sunny banks.
8. atricapilla *Nob.*—I have only a female of this insect taken by myself; it is black, the thorax and base of abdomen fulvous.
9. bicornis *Linn.*—fronticornis *Panz.* 63. 20. *fem.* var.—rufa *Panz.* 56. 10. *masc.*—cornuta *Lat.* March, April, May; sandy places. The males are plentiful upon paling at Hampstead, Battersea, and other places near London, and also upon flowers.

The plant is *Salvia verbenaca* (Wild Clary).



6



Pub. by J. Curtis June 1 1828

5-1828

218.

MEGACHILE WILLUGHBIELLA.

ORDER Hymenoptera. FAM. Apiariæ *Lat.* Apidæ *Leach.*

Type of the Genus Apis centuncularis *Linn.*

MEGACHILE *Lat., Leach.*—Trachusa *Jur.*—Xylocopa, Centris, Anthophora *Fab., Panz.*—Phyllotoma *Dum.*—Apis *Linn., Kirby, Panz.* *Antennæ* inserted at the middle of the face, rather remote, filiform, slightly geniculated; 13-jointed in the male, basal joint long, 2nd minute, 3rd small and slender, the 9 following of equal length, oblong cylindric, last joint longer wedge-shaped (1): shorter and 12-jointed in the female.

Labrum inflected large, elongate-quadrate, a little dilated at the base, convex, rough, pubescent, slightly ciliated (2).

Mandibles meeting over the proboscis and labrum, convex, bent, pilose, quadridentate, the external tooth the largest in some species, sometimes nearly wanting in the males (3).

Maxillæ long, terminal lobe with a rib at the back, long, lanceolate, acute, inflexed, internal edge and apex ciliated (4a). *Palpi* very short, attached to a fixed scape, having the appearance of a basal joint, biarticulate, 1st joint globose, 2nd subovate (4b). *Mentum* horny elongate linear (5). *Palpi* larger than the lip 4-jointed, 1st and 2nd joints compressed, internally membranous, pubescent, basal joint long and broad, 2nd much longer, attenuated and pubescent at the apex, 3rd inserted near the apex of the 2nd, small obovate, 4th a little longer, subclavate (b). *Tongue* as long as the 2 first joints of the palpi fleshy slender cylindric hollow, externally pubescent (c) with a bundle of hairs towards the apex in some (c*). *Paraglossæ* very short acuminated.

Head *broad, almost as large as the thorax.* Ocelli 3 *in triangle.* Abdomen *oval and convex in the males, subtrigonate, depressed above, and thickly pubescent beneath, in the females.* Wings, *superior with* 1 *costal,* 2 *subcostal and* 3 *discoidal cells, posterior limb without nervures.* Legs *robust.* Tibiæ *subtrigonate, short, furnished with a bent spine at the apex, the posterior pair having* 2. Tarsi *longer in the male than female,* 5*-jointed, basal joint the longest and most robust,* 3 *following short,* 5*th longer.* Claws *hooked and bifid.*

Fig. 1 & 8 are from *M. Willughbiella mas.* c* from *M. ligniseca mas.*

WILLUGHBIELLA *Ray, Kirby's Mon. Ap. Ang.* 2. 233. 41.

Male. Black, minutely punctured, clothed with pale sulphur-coloured pubescence, especially the face. Antennæ with the terminal joint compressed ovate, subcapitate (1). Abdomen notched at the apex. Anterior thighs produced internally, the apex of their tibiæ and the tarsi straw colour, the latter palmate, basal joint very large and hollow, which with the 3 following are united on one side, by a pilose and deeply ciliated membrane (8).

Female, less pubescent than the male above, the face clothed with shorter and darker hairs, the apex of the antennæ simple. Abdomen with the segments whitish at their margins, the hairs beneath bright ferruginous, black at the apex (6). Anterior feet simple.

In the Author's and other Cabinets.

The large mandibles of these Bees have supplied the generic appellation of *Megachile*, which has been retained in justice to Mons. Latreille, although Mons. Dumeril's name of Phyllotoma (Leaf-cutters) is more characteristic. They all form their nests either in decaying trees or under ground; and the skill displayed by these little animals in cutting the petals of flowers and the leaves of plants to construct their curious cells is so wonderful and interesting, that the reader will be highly gratified by referring to the following works, which contain their histories: namely, Reaumur, tom. 6. Mem. 4; Donovan's "British Insects," vol. 4. p. 31; Kirby's "Monographia Apum Angliæ," vol. 1. p. 156. and vol. 2. p. 244; and Kirby and Spence's "Introduction to Entomology," vol. 1. p. 438 or 441.

The following are British species of Megachile:

1. Willughbiella *Ray, Kirby, Nob.*

Inhabits the decaying trunks of Willows in low meadows: found in July in Suffolk, and on the banks of the Thames, at Brentford, Fulham, &c.

2. centuncularis *Linn., Fab., Kirby.—Schæf. Icon.* 262. *f.* 6. 7. —*Harris, Exp. t.* 49. *f.* 2.

The nests of this Bee are formed in walls and decayed trees; the cells are composed of the leaves of roses, the Laburnum and *Mercurialis annua*. They are found in August upon Thistles.

3. Leachella *Kirby's MSS.*

The smallest species of the genus, and may be the *M. Papaveris* Lat. Specimens are preserved in the British Museum.

4. maritima *Kirby Mon. Ap. Ang.* 2. 242. 43.

Taken near Landguard Fort, on the coast of Suffolk, in July.

5. ligniseca *Kirby* 2. 243. 44. *tab.* 16. *f.* 11. *mas.*—argentata? *Panz.* 99. 16. *mas.*—centuncularis *Panz.* 55. 12. *fem.*—*Don.* 4. *pl.* 120.

Found in September. It forms its cells of the leaves of roses and of elms, in the trunks of this tree and of the oak also.

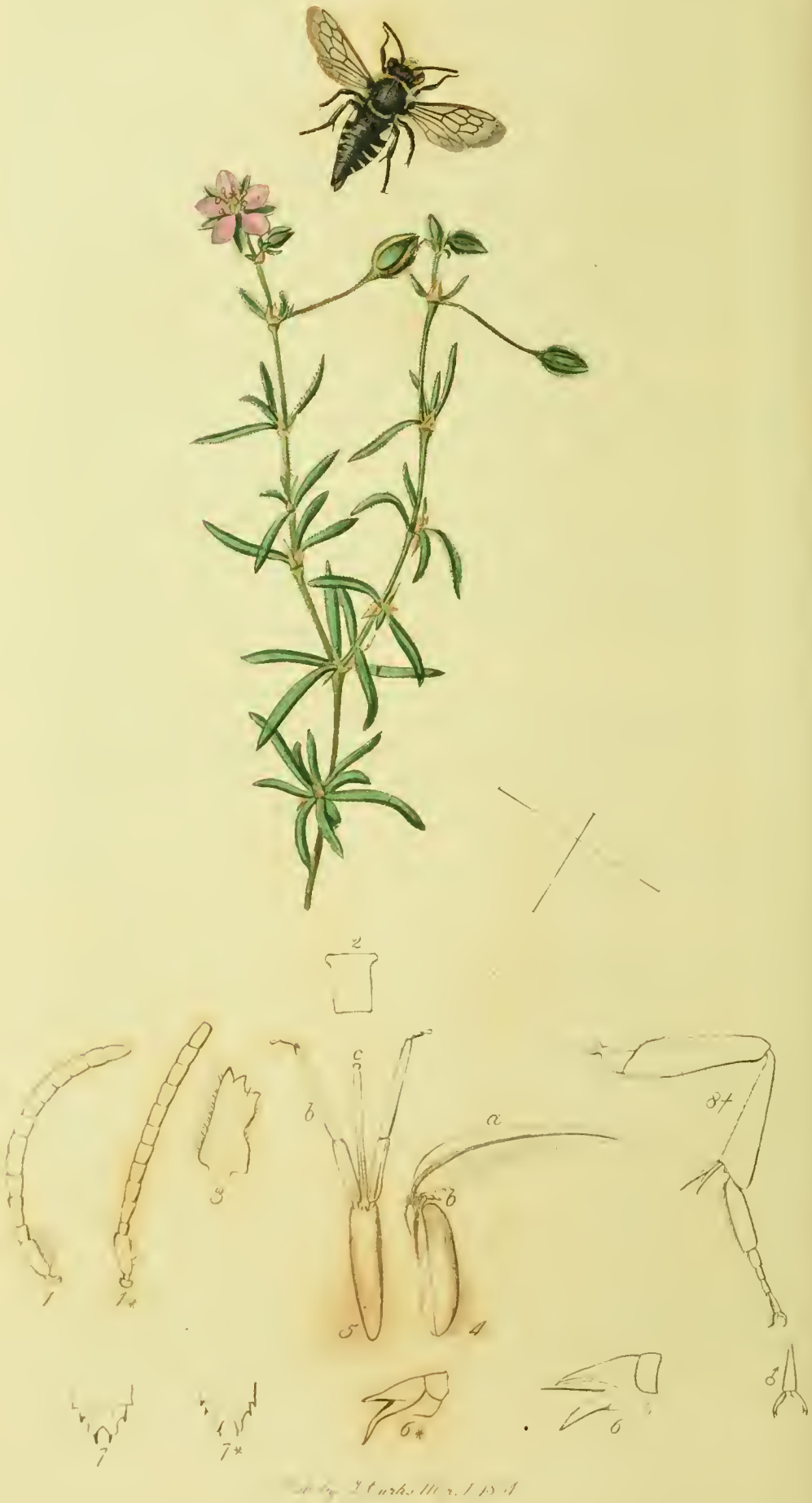
6. circumcincta *Kirby* 2. 246. 45, *tab.* 16. *f.* 10. *fem.*

This Bee was first discovered by the Rev. Dr. Goodenough (the late Lord Bishop of Carlisle), in the month of May, on a bank of a southern aspect at Dartford in Kent. I once dug some of the centunculi out of a bank on the beautiful domains of Lord Stafford, at Costessey in Norfolk: they were formed of rose leaves.

7. xanthomelana *Kirby* 2. 246. 46.—parietina? *Fourcroy. Ent. Par. n.* 4.

A single specimen was taken by the Rev. W. Kirby in July, creeping upon a clay bank at Somersham, near Ipswich, Suffolk.

The plant figured, *Mercurialis annua* (Annual Mercury), is represented as cut by the *M. centuncularis.*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8-1831

349.

CŒLIOXYS VECTIS.

Order Hymenoptera. Fam. Apidæ *Lat.*, *Leach.*

Type of the Genus, Apis conica *Linn.*

Cœlioxys *Lat.*, *Lea.*, *Curt.*—Anthidium *Panz.*—Trachusa *Jur.*—Anthophora *Fab.*—Apis *Linn.*, *Kirb.*

Antennæ inserted near the middle of the face, rather remote and short; 13-jointed in the *male,* basal joint the longest, rather robust, clothed with fine, long hairs, 2nd small, 3rd rather longer and slenderer than the following which are nearly quadrate, the apical one subovate (1); thicker and 12-jointed in the *female,* basal joint the longest, robust, 2nd small, 3rd subovate, the remainder clothed with very short pubescence, oblong, the apical joint rounded at the apex (1 *).

Labrum inflected, oblong, basal angles a little produced, slightly pubescent, the anterior margin ciliated (2).

Mandibles oblong and very hairy, truncated obliquely and trifid(3).

Maxillæ as long as the mentum, horny semielliptic (4), terminated by a very long recurved, lanceolate lobe (a), coriaceous, with a thick rib down the middle. *Palpi* very minute, triarticulate, basal joint the stoutest, apical the slenderest (b).

Mentum long and narrow, emarginate before, slightly produced in the centre (5). *Labium* hollow, long and slender, terminated by a mouth-piece (c). *Paraglossæ* short and obtuse. *Palpi* longer than the labium, 4-jointed, 1st and 2nd joints long and flat, the former the shortest, 3rd and 4th forming an angle with the 2nd; the terminal joint rather the shortest (b).

Head *rather large, as broad as the thorax: eyes remote long and narrow:* ocelli 3 *on the crown.* Thorax *globose.* Scutellum *producing a tooth on each side at the base.* Abdomen *conical, the apex dentated in the male* (7); *subtrigonate, terminated by 2 horizontal valves, inclosing a sting in the female* (6). Superior wings *with* 1 *long marginal,* 2 *submarginal and* 3 *discoidal cells, posterior limb nerveless.* Legs *nearly alike in both sexes:* tarsi 5*-jointed, basal joint the longest and thickest* (*especially in the hinder pair of the female*). Claws *bifid at the apex in the male* (♂); *simple in the female* (8 †).

Vectis *Curtis's Guide, Gen.* 715. *n.* 2.

Male black, clothed with soft yellowish cinereous hairs: head and thorax very thickly punctured: abdomen glossy and more finely punctured, the margins of the annulations fringed with white beneath; 5 whitish pubescent pointed spots on each side, the basal one the largest, the apical one minute, the apex notched triangularly, the lobes broad (7). *Female* with a humeral tuft of cinereous pubescence, the four following joints with spots on each side like the male; rarely continued across: apex obtuse, the lower valve scarcely longer than the upper one (6).

In the Author's Cabinet.

These bees, with several others, are supposed to be parasitic, but nothing I believe is known of their economy. I have frequently dug them out of the earth, late in the year, in a dead state: they were buried very deep, the holes being made on the perpendicular side of a cliff, and the galleries ran horizontally, but whether they were formed by themselves or they had merely taken possession of them, I could not ascertain.

The males of Cœlioxys and Anthidium (pl. 61.) are distinguished by the denticulated apex of their abdomens, and the cleft and gaping ones of the females are peculiar I believe to our genus and to Epeolus.

I suspect there are several species of this genus in Europe, but only two have been discovered in this country.

1. C. conica *Linn. Panz.* 55. 13. *mas.*—4-punctata *Linn. Fab. Panz.* 59. 7. *fem.*

Male black, clothed with soft yellowish cinereous hairs; head and thorax very thickly and strongly punctured, the former sometimes with the pubescence of the face ochreous: abdomen more glossy, and finely punctured, and less pubescent, with a scale on each side at the base fringed with white, the margins of the other annulations fringed all round with white, excepting down the back where they are interrupted or meet in a point; penultimate joint with the angles acuminated, the apex notched semicircularly (7*). *Female* with the basal tuft of cinereous pubescence larger, the white fringe very narrow and not interrupted down the back; apex acute, the lower valve twice as long as the upper one (6*).

Inhabits flowers, and is not uncommon the end of June and beginning of July.

2. C. inermis *Kirby Mon.* 2. 229. 38. *t.* 16. *f.* 8. *mas.*

Black, scutellum unarmed: abdomen of the male linear, margins of 4 of the segments white, interrupted above, continued beneath: apex with several spines. *Kirby.*

This is supposed to be a variety of the former, and was taken at Brentford by Mr. J. Trimmer.

3. C. Vectis *Curtis's Brit. Ent. pl.* 349. *fem.*

This species is not only twice the size of *C. conica*, but the penultimate joint of the abdomen in the male has not the angles acuminated, the apex is notched more acutely, yet the lobes are more obtuse, and the inferior spines are longer. In the female the upper valve is curved, the lower one much shorter, straight, and less acuminated.

I took several the beginning of August, on flowers near Ventnor, and, flying about heath and pathways, at Black-gang Chine in the Isle of Wight.

The plant is *Arenaria media* Linn., *marina* Fl. Dan. (Sea Spurrey Sandwort).


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11-1834

516.

EPEOLUS VARIEGATUS.

ORDER Hymenoptera. FAM. Apidæ.

Type of the Genus, Apis variegata *Linn.*

EPEOLUS *Lat., Fab., Curt.*—Apis *Linn., Kirb.*—Nomada *Fab., Panz.* *Antennæ* inserted at the middle of the face, nearly alike in both sexes, rather long, stout and velvety, 13-jointed in the male, 12-jointed in the female, basal joint ovate-truncate, 2nd globose, 3rd of the same form and size as the 1st, the remainder rather shorter and quadrate, excepting the terminal one which is as long as the 1st, round and compressed at the apex (1).

Labrum transverse oval, with a large semitransparent spot on each side, the anterior margin ciliated and notched at the centre, with a small tooth at the middle and 2 above it (2).

Mandibles rather small, curved and narrow, ovate at the apex, with a shoulder on the inside producing 2 bristles (3).

Maxillæ broad, the base ciliated internally (4), the terminal lobe as long as the basal portion and rounded at the apex, with a few short bristles outside (*a*). *Palpi* very minute and formed of a single ovate joint (*b*).

Mentum long, narrow and cylindric, trifid at the apex (5). *Lip* as long as the mentum, slender and linear (*c*). *Paraglossæ* membranous and lanceolate (*d*). *Palpi* a little longer than the lip, 4-jointed, first 2 joints broad and compressed, basal joint considerably the longest, 2nd attenuated and hairy at the apex, 3rd inserted outside the apex of the 2nd, short and slender as well as the 4th (*b*).

Head *short and broad:* eyes *large, lateral and ovate:* ocelli 3 *in triangle very conspicuous.* Thorax *short not broader than the head, nearly globose:* scutellum *short slightly emarginate, with a flat triangular tooth on each side at the base.* Abdomen *short and ovate-conic, 6-jointed in the male, 5-jointed in the female, and armed with a long sting* (*s*) *and* 2 *elongated lobes* (6 *the lateral view*). Wings, *superior with a short oval marginal, and* 3 *complete submarginal cells, 2nd and 3rd small, of equal size, and each receiving a recurrent nervure.* Legs *naked, nearly alike in both sexes, anterior the shortest, posterior the stoutest:* tibiæ, *anterior with* 1, *posterior with* 2 *spines at the apex:* tarsi *longer than the tibiæ, 5-jointed, basal joint long, notched on the inside at the base of the anterior pair, a little dilated and pubescent beneath in the posterior, especially in the male, the other joints very short:* claws *simple.*

VARIEGATUS *Linn.*—*Curt. Guide, G.* 716. 1.—crucigera *Pz.* 61. 20. ♂.

Female. Opake black, thickly and minutely punctured and densely clothed with depressed pubescence: face and sides of thorax hoary; margin of collar pale ochreous, as well as the base of the abdomen; a transverse spot on each side the hinder margin of the 2 first segments, 2 on each side of the 3rd and 4th, and 3 surrounding the 5th of the same colour; the mouth, a tubercle on each side the collar, the scapulars, the scutellum and the lobes, castaneous; legs rather more ferruginous: wings tinged with yellow-brown and forming a fimbria; nervures and stigma piceous.

This pretty little bee seems to connect Cœlioxys (pl. 349.) and Nomada (pl. 419.); from the former it is readily distinguished by the additional submarginal cell, and from the latter by its conical and pubescent abdomen. There are also other more important distinctive characters, but less visible, such as the great length of the basal joint of the labial palpi, with the 2nd joint acuminated, the minute maxillary palpus of one joint, as in Anthidium (pl. 61.), the obtuse lobe of the maxillæ, and the singular labrum with a small tooth in front and two above it, forming a triangle, which seem to have escaped the observation of Mr. Kirby and M. Latreille.

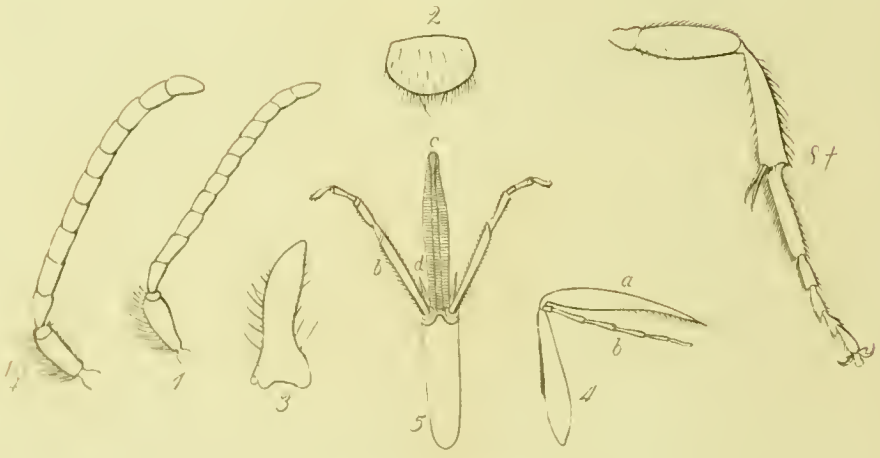
It is a remarkable fact noticed by Mr. Kirby, that the male of this bee was unknown to him. I have taken a very considerable number of specimens, and am much gratified at having discovered one male amongst them, since it enables me to state that Panzer's figure is of that sex, and not a variety of the female; for my male has an entirely black labrum and scutellum, with the lobes also black and less prominent than in the other sex: the 5th and 6th segments of the abdomen have a long transverse band of ochreous hairs entirely covering the back, and the little apical lobe is also black. The male is as large as the female, but the abdomen is more ovate, with 6 joints: the antennæ are rather shorter if anything, although 13-jointed, and the basal joint of the hinder tarsi is clothed, I think, with rather longer hairs.

The females seem to vary considerably in size, and the authentic specimen in the Linnæan cabinet mentioned by Mr. Kirby as having a black scutellum is probably the male.

In Hampshire this bee is very abundant at the middle and end of August, on sandy and gravelly districts covered with the *Calluna vulgaris* and other heaths, as Parley Common and Ramsdown near Heron Court. Mr. Samouelle once met with it in a sand-pit near Bexley, Kent, in July, where Mr. Johnson has lately taken it; Mr. Dale has captured it the beginning of August at Blackgang Chine; and Mr. Kirby found it, "but by no means common, in the autumn of two succeeding years, 1797 and 1798, flying about sunny banks;" and he adds, "since then I have not met with it."

The pretty *Ophrys muscifera* or *myodes* (Fly Ophrys) was communicated by N. B. Ward, Esq.

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9-1832

419.

NOMADA DALII.

Order Hymenoptera. Fam. Apidæ.

Type of the Genus, Nomada ruficornis *Linn.*

Nomada *Scop., Fab., Lat., Curt.*—Apis *Linn., Kirby, &c.*

Antennæ inserted near the middle of the face, rather long and filiform, composed of 13 joints in the male (1), basal joint a little the longest pilose, 2nd subglobose, 3rd obconic truncate, remainder oblong, slightly decreasing in length, terminal joint subconic compressed: 12-jointed in the female (1 ♀).

Labrum transverse-ovate, ciliated with pubescent hairs (2).

Mandibles rather long and slender, simple and obtuse at the apex, slightly hairy (3).

Maxillæ with the basal portion as long as the mentum, horny, narrowed before, the lobe as long as the stalk, lanceolate and ciliated towards the apex (4 a). *Palpi* very long slender and 6-jointed, basal joint minute, 2nd and 3rd long of equal length, the remainder slightly decreasing in size (b).

Mentum not very long but robust, rounded behind, emarginated in front (5). *Labium* as long as the mentum, rather stout, hollow, pubescent and transversely striated, suddenly narrowed at the apex (c); *Paraglossæ* short and acute (d). *Palpi* longer than the lip, somewhat linear, pubescent and 4-jointed; basal joint long, 2nd short, 3rd and 4th slender and subclavate, the latter the shortest (b).

Head *suborbicular, face rather flat:* eyes *long and narrow:* ocelli 3. Thorax *globose.* Abdomen *of the females ovate obtuse and 6-jointed, tufted at the apex the terminal joint minute; 7-jointed and more conical at the apex in the males, attached by a short stout petiole.* Wings; *superior with 1 marginal and 3 perfect submarginal cells, stigma sublanceolate.* Legs *alike in both sexes.* Tibiæ *naked, spurred, anterior with a spine dilated on the inside.* Tarsi 5-*jointed, basal joint long.* Claws *recurved at the base.* Pulvilli *distinct,* (8 †, *hind leg of female*).

Dalii *Curt. Guide, Gen.* 717. 35.

Piceous black, shining, clothed with yellowish hair, silvery on the clypeus: margin of labrum yellow, tips of mandibles ferruginous: tips of antennæ ochreous, underside ochreous brown: head and thorax thickly punctured, the former with a minute spot on each side the crown close to the eyes and the margin below them yellow: abdomen with 2 yellow dots towards the base a large one on each side at the middle, the following segments with a yellow line on each side towards the base: wings bright iridescent, squamulæ brown, a dark brown fimbria to the superior wings, the inferior tipped with the same colour, nervures and stigma brown: inside of 4 anterior thighs and tibiæ and their tarsi ferruginous; tips of posterior thighs and tibiæ of the same colour.

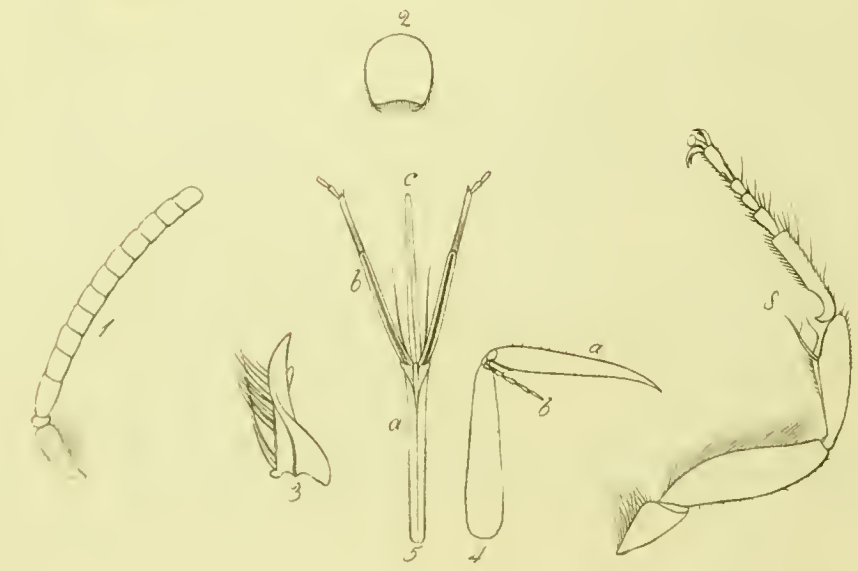
In the Cabinets of Mr. Dale and the Author.

This extensive genus of bees is remarkable for the wasp-like appearance of the species, as well as for an odour which they emit like honey and otto of roses. Many of them are very common, yet nothing is known I believe of their œconomy: they are frequently seen coming out of holes in warm sandy banks, and Dr. Leach supposed them to be parasitical.

1. N. Goodeniana *K.*—May, beginning of June, Gooseberry and White-thorn flowers.
2. N. confinis *Kirby MSS.*
3. N. alternata *K.*—May, sunny banks and Gooseberry flowers.
4. N. Lathburiana *K.*—July, sunny banks?
5. N. varia *Panz.* 55. 20.—Sept., ditto.
6. N. flava *Panz.* 53. 21.—Middle of April, May, commons Glanville's Wootton and Southgate.
7. N. rufiventris *K.*—End of March, Epping Forest.
8. N. Marshamella *K. Int. Ent. t.* 4. *f.* 3.—May, June, Round-rooted Crowfoot and White-thorns.
9. N. cornigera *K.*—*Don.* 12. 408. 1.?—June, sunny sandy banks.
10. N. subcornuta *K.*—May, on *Geranium reflexum.*
11. N. Capreæ *K.*—May, blossoms of *Salix Caprea.*
12. N. lineola *K.*—*Panz.* 53. 23.—Middle of June, August, umbelliferous plants, Isle of Wight.
13. N. fucata *Panz.* 55. 19.—30th of July, amongst heath, Blackgang Chine.
14. N. leucophthalma *K.*—May, blossoms of *Salix Caprea.*
15. N. sexcincta *K.*—June, banks?
16. N. Schæfferella *K.*—*Schæf. Icon.* 81. 7.—End of June, Blackgang Chine.
17. N. connexa *K.*—6-fasciata *Panz.* 62. 18.? Ditto.
18. N. Jacobææ *K.*—*Panz.* 72. 20.—*Don.* 12. 408. 2.?—Spring, Gooseberry; August, Ragwort.
19. N. flavopicta *K.*—September, Ragwort, Suffolk and Ireland.
20. N. Solidaginis *Panz.* 72. 21. ♂.—End of August, sandy places amongst heath near Lyndhurst and Ramsdown, Hants.
21. N. picta *K.*—End of July to the middle of September, with last.
22. N. rufopicta *K.*—July? flowers and banks.
23. N. Hillana *K.*—May, June, near London, Kersall Moor and Westmoreland.
24. N. ochrostoma *K.*—*Don.* 12. 421. 3.—July?
25. N. zonata *Panz.*—Discovered by J. C.
26. N. ruficornis *L.*—*Panz.* 55. 18.—May, June, July; dry banks and sandy places.
27. N. xanthosticta *K.*—July, flowers and banks.
28. N. Fabriciana *L.*—*Kirb. Mon. tab.* 16. *f.* 3.
29. N. quadrinotata *K.*—July, Coomb Wood.
30. N. flavoguttata *K.*—June, sunny banks.
31. N. pusio *K. MSS.*
32. N. rufocincta *K.*—June, sunny banks.
33. N. infuscata *K. MSS.*
34. N. Sheppardana *K.*—June, beginning of August, Darent.
35. N. Dalii *Curt. Brit. Ent. pl.* 419.—Discovered by J. C. Dale, Esq. I believe in the New Forest.
36. N. ferruginata *L.*—*Kirby Mon. t.* 16. *f.* 4.—germanica *Panz.* 72. 17.
37. N. Wilkinana *Kirby's MSS.*?

The Plant is *Ribes Grossularia* (Rough Gooseberry).





W. Curtis. London July 1. 1821.

3-1826

125.

MELECTA PUNCTATA.

ORDER Hymenoptera. FAM. Apiariæ *Lat.* Apidæ *Leach.*

Type of the Genus Apis punctata *Fab.*

MELECTA *Lat., Fab., Panz.*—Crocisa *Jur.*—Apis *Linn., Fab., Kirby.*

Antennæ inserted near the middle of the face, remote, filiform, of equal length in both sexes, submoniliform and 13-jointed in the males (fig. 1), 12-jointed in the females, 1st joint elongated, hairy, 2nd minute, 3rd longer than the following, terminal joint subquadrate.

Labrum large, inflected, convex, rough, pubescent, ciliated and emarginate before (2).

Mandibles folding over the proboscis, rather long and slender, dilated at the base, acute, with a tooth on the internal edge, pilose externally (3).

Maxillæ long, coriaceous, terminal lobe lanceolate, acute, inflected (4 a). *Palpi* long, 5-jointed, 1st and 2nd joints more robust than the remainder, which are very slender and nearly of equal length (4 b).

Mentum elongated, slender linear, pubescent towards the base (5 a). *Palpi* longer than the lip, 1st and 2nd joints compressed, membranous at the edges, basal joint very long, 2nd shorter, pubescent at the apex, 3rd arising near the apex of the 2nd, small clavate, 4th small, elongate, ovate (b). *Tongue* membranous, often reflexed, as long as the 2 first joints of the palpi, slender, slightly attenuated (c) : *lobes* more than half the length of the lip, setaceous, dilated at the base.

Head *broader than the thorax.* Ocelli 3 *in triangle.* Scutellum *bidentate.* Abdomen *ovate-conic.* Superior wings *with* 1 *marginal and* 3 *submarginal cells.* Stigma *minute.* Tibiæ *short, slender at the base, slightly pubescent, anterior with a winged spine on the internal side.* Tarsi *pilose, long,* 5*-jointed, basal joint very long, incurved at the base and emarginate in the anterior pair,* 3 *following short, terminal joint longer, clavate.* Claws *deeply bifid.* Pulvilli *distinct* (8, *a fore leg*).

Obs. *The dissections are taken from a male.*

PUNCTATA *Fab. Ent. Syst. v.* 2. *p.* 337. *n.* 99.—*Kirby Mon. Ap. Ang. v.* 2. *p.* 219. *n.* 35.

Black, shining, minutely punctured. Head and thorax densely covered with yellowish gray pubescence; scutellum with black pubescence : basal joint of abdomen covered with silvery pubescence, especially in the males, 2nd joint with a whitish spot on the side, the 3 following with a pure white spot on the side of each. Wings transparent, margined, and a little clouded with fuscous. Tibiæ with silvery pubescence at the base. Tarsi silvery externally.

In the Author's and other Cabinets.

This Genus, which approaches nearest to *Epeolus*, is distinguished from it by the long pubescence with which the head, thorax, and base of the abdomen are clothed; and upon an examination of the trophi, by the remarkable long and bristly laciniæ or lobes at the base of the tongue, and also by its long and 5-jointed maxillary palpi (described by Latreille and Leach as 6-jointed).

The pretty species figured is the only one of the genus found in Britain, where it is universally distributed, being plentiful in South Wales, and at Hampstead in the neighbourhood of London; Mr. Kirby has found it near Ipswich, and I have met with it occasionally in Suffolk from March to June. In April I have frequently observed its head of a bright orange colour, from its being covered with the pollen, I suspect, of *Ulex Europæus*, as I have seen it early in the morning traversing sunny banks where the Furze was in flower.

Our bee is fond of dry banks and sandy situations; but we know nothing satisfactory respecting its economy. Mr. Kirby more than 20 years back had reason to believe that it deposited its eggs in the cells of *Anthophora retusa*; and Dr. Leach also supposed it to be a parasite; but we have heard of nothing since either to confirm or disturb these opinions.

The plant figured is *Glechoma hederacea* (Ground Ivy).



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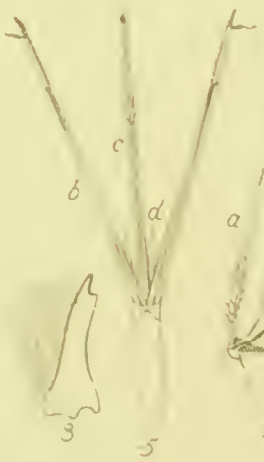
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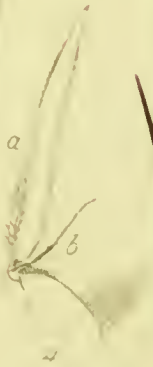
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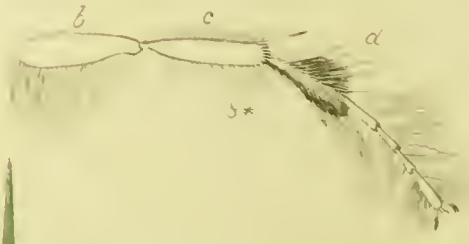
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8-/831

357.

ANTHOPHORA HAWORTHANA.

Order Hymenoptera. Fam. Apiariæ *Lat.* Apidæ *Leach.*

Type of the Genus, Apis retusa *Linn.*

Anthophora *Lat., Sam., Curt.*—Megilla *Fab., Panz.*—Lasius *Jur.*—Andrena *Fab.*—Apis *Linn., Kirby, &c.*

Antennæ inserted in the centre of the face, not approximating, short, geniculated and 13-jointed in the male (1), basal joint the most robust and very pubescent, 2nd globose, 3rd as long as the 1st clavate, 4th shorter than any of the following which are oblong: similar in the female but a little longer and 12-jointed (1*).

Labrum deflexed, convex, nearly quadrate, the angles a little rounded with two transparent spots at the base, anterior margin a little convex and ciliated (2).

Mandibles slightly curved, clothed with long hairs, notched near the apex (3): larger in the females and but slightly notched below the apex (3 ♀).

Maxillæ with the basal portion short and broad, hairy towards the base, the edge above pectinated; terminal lobe long and lanceolate, with a small pencil of hairs at the apex (4a). *Palpi* rather long and setaceous, 6-jointed, basal joint short, 2nd long, the remainder decreasing in length (b).

Mentum rather short and linear (5). *Tongue* very long and slender, ringed and tubular, the interior margins very pilose, terminated by a lanceolate appendage (c). *Paraglossæ* lanceolate (d). *Palpi* extending as far as the tongue, slender, tapering, 4-jointed, basal joint very long, 2nd not half the length, ciliated towards the apex, 3rd inserted below the apex and very small as well as the 4th (b).

Head *subtrigonate:* eyes *long and narrow:* ocelli 3. Thorax *much broader than the head in the female.* Abdomen *subovate conic, broad in the female.* Wings *with one marginal and 3 submarginal cells.* Legs *rather robust:* Tibiæ, *posterior dilated and very pilose externally and the intermediate also in the females.* Tarsi, *intermediate pair long in the males, the basal joint of the 4 posterior dilated in both sexes and furnished with a strong brush at the apex, in the hinder pair of the female.* Claws *bifid in the males, with a tooth on the underside in the females.* Pulvilli *distinct.*

Haworthana *Kirby Mon. Ap.* 2. 307.—*Curtis's Guide, Gen.* 720. 2.

Male, black, thickly and minutely punctured: eyes pale brown: head and thorax clothed with bright fulvous hairs, labrum and underside of basal joint of antennæ pale yellow, the former margined with black, the clypeus irregularly edged with yellow: abdomen clothed with black hairs, excepting the basal joint and the margins of the 2nd and 3rd which are fulvous: wings stained pale yellow, the nervures piceous, the posterior margin pale fuscous. Legs variegated with black and fulvous hairs: tibiæ with the spurs ferruginous: middle and posterior tarsi fulvous, excepting the basal joint which is black and the apical one piceous, the intermediate joints being destitute of long hairs: claws ferruginous tipped with black.

In the Cabinets of the Brit. Mus., Mr. Haworth, and Mr. Hanson.

A. Haworthana was first described by Mr. Kirby from a specimen taken by the gentleman whose name it bears, in Ashdown Forest, Sussex, he believes: and about the same time Major General Davies captured one in a wood near Charlton in Kent. The male here represented was found in Epping Forest the first week in June, and for the loan of it I am indebted to Mr. S. Hanson. The female is unknown. Our other species I shall describe.

A. retusa *Linn. female. Harris. Exp. tab.* 38. *f.* 7.—acervorum *Fab. Don, v.* 3. *pl.* 108. *f.* 2. *Panz.* 78. 18.—*Male*, pennipes *Linn. MS. Don*, 13. *pl.* 434.—pilipes *Pz.* 55. 8.—Hispanica *Pz.* 55. 6. *Harris, pl.* 40. *f.* 14.

Male rather more robust than *A. Haworthana*, thickly and minutely punctured and clothed with fulvous or yellowish hairs, more or less black at the apex of the abdomen: labrum, face, and underside of basal joint of antennæ yellow, the first margined with black, with two black spots at the base, the second with two oblique black lines approaching the insertion of the antennæ: mandibles sometimes with a yellow spot at the base: wings pale yellowish fuscous, nervures piceous: legs variegated with black and silvery pubescence and hair; spines of tibiæ black: tarsi, middle, and posterior ferruginous or piceous, the basal and apical joints black, all the joints of the former plumose, producing very long hairs (fig. 8*; *b*, the thigh; *c*, the tibia; *d*, the tarsus): claws ferruginous at the base. *Female* black, very pilose; labrum, middle and posterior tibiæ externally, and the basal joint of the tarsi entirely clothed with bright ferruginous hairs.

This species builds its nest in banks and old walls, and is seen flying about sunny and sandy banks in March, April, May, and the beginning of June: the male in its flight very much resembles a Helophilus. "When I first set out in my entomological career," says Mr. Kirby, "I began to notice the motions of this Apis, and have continued to do so occasionally ever since. Early in the spring the male may generally be seen attendant upon his swarthy bride, fluttering round her, or hovering over her, while she with great coolness collects the honey from flower to flower, without bestowing any attention upon him; if she departs he departs, and if she returns he returns likewise. During the season of courtship, his whole employment seems to be to attend upon her; but when the halcyon days of love are over, like many other husbands, he goes about his business, and leaves her to take her flights in solitude."

Mr. Mathews, who is now engaged in collecting subjects of natural history in South America, found a nest of this insect in a wall at Chiswick, where they destroyed the grapes in the garden in September; and having caught a male and confined it in an open box, he was enabled to take many specimens of the female, which came and settled there. This led him to think the *first* was a *female*; he also observed a considerable number of *Melecta punctata* (*pl.* 125.) entering and coming out of this nest as if they lived together, which renders Mr. Kirby's supposition very probable that they deposit their eggs in the nest of *A. retusa*.

The plant is *Aira cristata* (Crested Hair-grass), communicated by Professor Henslow.


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b
d
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8-1831

361.

SAROPODA BIMACULATA.

ORDER Hymenoptera. FAM. Apidæ.

Type of the Genus, Apis bimaculata *Panz.*

SAROPODA *Lat., Sam., Curt.*—Megilla *Ill. Panz.*—Heliophila *Klug.*—Apis *Kirby.*

Antennæ geniculated, filiform, compressed at the apex, almost as long as the thorax, and 13-jointed in the *male* (1), basal joint robust and long, 2nd cup-shaped, remainder short, 3rd obovate-truncate, the following subquadrate, apical joint oblong rounded: shorter and 12-jointed in the female (1 ♀), basal joint long, 2nd globose, 3rd longer than any of the following, subclavate-truncate, remainder subquadrate, terminal joint oblong, rounded and compressed.

Labrum rather transverse-oblong, the angles rounded, the pubescence extending over the anterior margin (2).

Mandibles curved, broadest at the base, pilose, rounded at the apex and notched (3).

Maxillæ with the stalk clothed with fine long hairs, concave and pectinated below the palpi (4); the lobe (a) long and broad, obtuse and pubescent at the apex. *Palpi* not very short, slender and pilose, 4-jointed, basal joint minute, 2nd the longest, 3rd shorter, 4th scarcely so long (b).

Mentum elliptical (5). *Tongue* twice as long as the mentum, very pilose towards the extremity to which is attached a small appendage (c). *Paraglossæ* slender (d). *Palpi* extending as far as the tongue when at rest, rather broad at the base, but attenuated, 4 ?-jointed, basal joint very long, 2nd short, the others very indistinct, the apex pubescent (b).

Head *broad, suborbicular.* Eyes *long and narrow.* Ocelli 3. Thorax *globose.* Abdomen *ovate or conical, produced and deeply notched at the apex in the* male, *broader and more depressed in the* female *terminated by a broad spine with a tuft of short hair on each side.* Wings *with one marginal and 3 submarginal cells.* Legs *rather long and robust, intermediate very long in the male, with the terminal joint of their tarsi a little dilated.* Claws *bifid near the apex* (8 ♂): Tarsi *with the basal joint large and dilated in 4 posterior feet in both sexes, furnished externally with a bunch of long bristles in the posterior pair of the female.* Claws *with a tooth beneath each* (8†, *hind leg of female*).

BIMACULATA *Panz.* 55. 17. ♀.—*Curtis's Guide, Gen.* 722. 1.

Male black, minutely punctured, clothed with greyish hair: basal joint of the antennæ beneath and the face below, yellow; clypeus and mandibles sulphur, tips of the latter piceous: eyes when living sea-green: pubescence on head and thorax pale tawny: segments of abdomen margined with whitish hairs: tarsi, excepting the basal joint and the tip of the last, ferruginous. *Female:* face below the antennæ (which are entirely black) yellow, with 2 square black spots nearly meeting in the centre and 2 dusky spots at the base of the labrum (1*); margins of the 1st segment of abdomen slightly, of the 3 following densely fringed with greyish hair, apex black.

In the Author's and other Cabinets.

Nearly related as this genus is to Anthophora (pl. 357), there are most important differences in their trophi, antennæ, and legs; but the easiest means of distinguishing them will be by examining the 3rd joint of the antennæ, which is shorter than the first in Saropoda.

1. S. bimaculata *Panz.* *Kirby* 2. 286. 63.—*Curt. Brit. Ent. pl.* 361. ♂.

The 31st of July I observed the females at the back of the Isle of Wight, flying about and alighting upon the plant figured in the plate: they made a loud and shrill buzzing with their short wings. On the 15th of August I found a male and many females sleeping in the same flowers, it having rained several days previously. A few days before I saw both sexes flying over barren and heathy places and entering their burrows.

2. S. vulpina *Panz.* 56. 6. ♂?—*Kir.* 2. 290. 65.

Black, clothed with pale soft hairs; thorax flavescent; segments of the abdomen with the margins pale; intermediate thighs large and clavate. *Kirby.*—*Male* with the basal joint of antennæ beneath, the face below, and labrum ochreous, 2 black triangular spots on the clypeus, and 2 at the base of the labrum.

I think I took one the beginning of August at Bognor, flying about a felled tree.

3. S. rotundata *Panz.* 56. 9. ♂.—*Kir.* 2. 291. 66.

Clothed with soft greyish hair; mouth yellow; abdominal segments with the margins subrufous; thorax of the female blackish, of the male fulvous. *Kirby.*

July, on the flowers of Erica in a sunny sand-pit near Coombe-wood, Mr. Kirby; and Mr. Newman in his garden at Deptford.

4. S. subglobosa *Kir.* 2. 295. 68.

Black, slightly clothed with whitish hairs; abdomen subglobose. *Kirby.*—*Obs.* In my specimen the edges of the abdominal segments are somewhat ochreous.

Taken by Mr. Haworth.

5. S. furcata *Panz.* 56. 8. ♂.—*Kir.* 2. 288. 64.; *tab.* 17. *f.* 5 & 6.

Female black, clothed with griseous pubescence, anterior part of face, labrum and anus, clothed with ferruginous hair. *Male* black, clothed with cinereous pubescence; anterior portion of face and labrum yellow, apex of abdomen furcate. *Kirby.*

This species is rare in Suffolk, but more frequent near London. We learn from Mr. Kirby that it nidificates in a manner similar to *Apis violacea*, in pieces of putrescent wood. —*vide v.* 1. *p.* 188.

The plant is *Centaurea Scabiosa* (Great Knapweed).


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15-1033

468.

PSITHYRUS RUPESTRIS.

The black-winged Humble-bee.

ORDER Hymenoptera. FAM. Apidæ.

Type of the Genus, Apis rupestris *Fab.*

PSITHYRUS *Le P.*—Bombus *Lat., Curt.*—Bremus *Jur.*—Apis *Linn., Kirby.*

Antennæ inserted at the middle of the face, longer than the head, geniculated, filiform, 13-jointed in the male, basal joint long clavate, 2nd minute, 3rd obovate, nearly as long as the 5th, 4th subquadrate, only half the length of the following which are oblong, the terminal joint compressed and rounded at the apex (1 ♂); similar but shorter in the female, and only 12-jointed.

Labrum transverse, subovate-trigonate, very hairy (2).

Mandibles crossing, alike, long narrow and slightly curved, ovate at the apex, or rounded obliquely, hairy externally (3).

Maxillæ as long as the mentum, very hairy externally, with a brush of hairs on the inside (4), terminated by a horny lobe as long as the tongue, broad at the base and attenuated to the apex (*a*). *Palpi* minute, formed of one oblong joint attached to a scape at the external apex of the stipula (*b*).

Mentum long and rather stout, linear, slightly attenuated towards the base, the anterior margin sinuated (5). *Tongue* nearly as long as the palpi, tubular, slightly attenuated at the apex and terminated by a little mouth, the outside thickly clothed with depressed hairs (*c*). *Paraglossæ* short, broad rounded, and ciliated at the apex (*d*, with one detached and more magnified). *Palpi* long, rather broad and slightly attenuated, the internal margin hairy towards the apex, 4-jointed, basal joint more than twice the length of the 2nd; the 3rd and 4th very minute obovate (*b*).

Neuters *none.* Head *vertical ovate:* eyes *long and narrow:* ocelli 3, *placed transversely in a curved line.* Thorax *large and globose; scutellum large semiorbicular.* Abdomen *ovate or oblong, incurved at the apex.* Wings, *superior with one marginal,* 3 *nearly equal submarginal and* 3 *discoidal cells.* Legs, *anterior small.* Tibiæ *spurred at the apex, posterior convex and very hairy externally, especially in the female* (8 †), *smaller, straight and slightly clavate in the male.* Tarsi 5-*jointed, basal joint long and dilated, posterior not producing a tooth at the base.* Claws *with a tooth on the inside:* pulvilli *very pubescent.*

Obs. Fig. 1. is the antenna of *B. Barbutellus* Don.

RUPESTRIS *Fab.*—*Curt. Guide, Gen.* 723. 1.

Female black, shining, punctured, clothed with black hairs: abdomen with the 4th and following segments clothed with deep orange hairs: wings long, dark brown and iridescent: tarsi rusty brown, the basal joint black, clothed inside with ferruginous pile. *Male* not identified.

In the Author's and other Cabinets.

Four of the Bombi were formed into a subdivision by Mr. Kirby in his Monograph, and they have been lately designated as the genus Psithyrus, which I think might as well have been called Bremus, a name given to the Bombi by Jurine.

The males are distinguished from the Bombi by the nearly equal breadth of the posterior tibiæ, which are externally convex and thickly clothed with hairs, whereas in Bombus they increase from the base to the apex, are slightly concave externally at the centre, and have only scattered hairs; the females are still more strongly marked, having in addition to the above characters, a trigonate labrum and mandibles not toothed.

The following are our British species:

1. P. rupestris *Fab.*—*Curt. Brit. Ent. pl.* 468. represents the female a little larger than life.—arenaria *Pz.* 74. 12. *var.* The male is unknown unless it be the *P. frutetorum.*

End of June, several on a thistle, near Drayton Norfolk, and Wrentham Suffolk, also by the road-side, and flying about a hay-stack in Cambridgeshire; middle of August, on a common near Coombe, Mr. R. Lewis; beginning of September and middle of October, Isle of Wight, J. C.; near Axbridge and Glanville's Wootton, Mr. Dale.

2. P. frutetorum *Pz.* 75. 20.—Albinellus *Kir. v.* 2. *p.* 361.

Beginning and middle of August, on thistles, Richmond Park, once with *P. rupestris*, Mr. R. Lewis: at Barham, in the autumn, Mr. Kirby.

3. P. Rossiellus *K. tab.* 18. *f.* 1 ♂.—*Schæf. Icon. t.* 241. *f.* 7 & 8. The male only of this Insect is known, but probably *P. campestris* may be the female.

Barham, in flowers: middle of July, Dover, J. C.; middle of August, Coombe Wood, on thistles, Mr. Lewis.

4. P. campestris *Pz.* 74. 11.—*Kir. t.* 18. *f.* 2 ♀.

Barham, in spring and summer; June and July, near Brixton Hill and Coombe, Mr. Lewis; Shanklin Chine, Mr. Dale.

5. P. Barbutellus *Don. v.* 11. *pl.* 385. *f.* 3.—saltuum *Pz.* 75. 21 ♂?—autumnalis *Fab.* ♂ *var.*

Barham, flowers in summer; male frequent on thistles: middle of May, Hampstead; end of June, Darent; common in Battersea Fields.

6. P. vestalis *Four.*—*Kir. t.* 18. *f.* 3 & 4 ♀ & ♂.—*Don.* 13. *pl.* 464—æstivalis *Pz.* 89. 16.

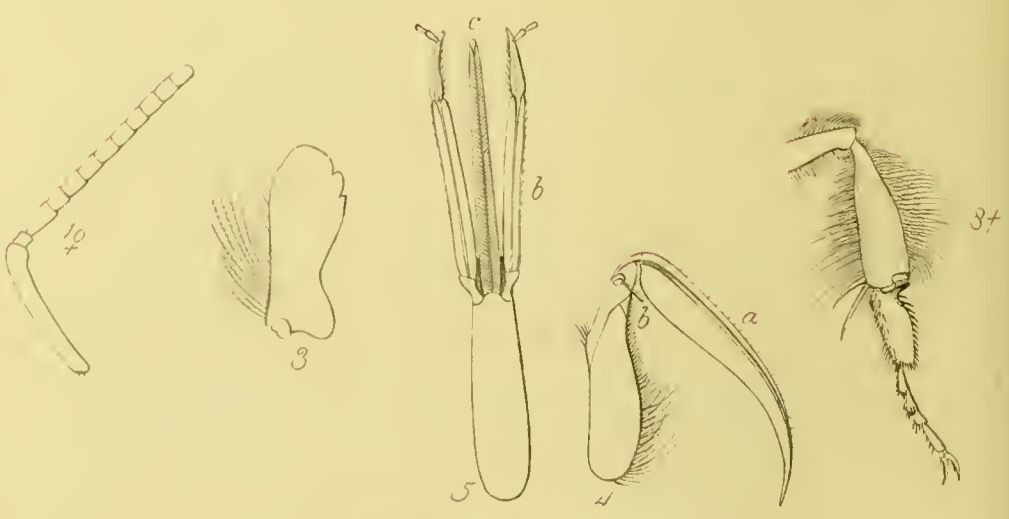
Barham, flowers of *Tussilago Farfara* (pl. 367), often flying close to the ground. Mr. Lewis finds it in Coombe Wood lane about May.

The Plant is *Digitalis purpurea* (Purple Foxglove).






2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12-1835

564.

BOMBUS ERICETORUM.

The heath Humble-bee.

Order Hymenoptera. · Fam. Apidæ.

Type of the Genus, Apis terrestris *Linn.*

Bombus *Lat., Curt.*—Bremus *Jur., Panz.*—Apis *Linn., Kirby, Panz.*

Antennæ inserted at the middle of the face, longer than the head, geniculated, filiform; 13-jointed in the male, basal joint long, clavate, 2nd somewhat cup-shaped, 3rd obovate; nearly as long as the 5th, 4th subquadrate, the remainder longer, oblong, terminal joint wedge-shaped, rounded at the apex; rather shorter and 12-jointed in the female (1 ♀), 3rd joint longer than any of the following.

Labrum transverse, thickly ciliated with rather long hairs, anterior margin slightly notched on each side (2).

Mandibles elongated, rounded and crenated at the apex, spoon-shaped, narrowed a little towards the base; ciliated externally with pubescent hairs (3).

Maxillæ as long as the mentum, hairy outside, terminated by a long lanceolate horny lobe (4 *a*). *Palpi* short, attached to an ovate scape, composed of one very slender elongated joint (*b*).

Mentum long, elliptic, rounded at the base, bisinuated before (5).

Lip long and linear but slightly attenuated at the apex (*c*). *Paraglossæ* short broad and rounded. *Palpi* rather longer than the lip, attached to scapes, broad compressed and 4-jointed; basal joint very long, 2nd very much shorter, lanceolate and distinctly ciliated on the inside, 3rd and 4th joints minute, somewhat obtrigonate and attached near the apex of the 2nd joint (*b*).

Neuters *small.* Head *triangular-ovate:* eyes *long, vertical and narrow:* ocelli 3, *forming a transverse curved line.* Thorax *large and globose:* scutellum *large, semiorbicular.* Abdomen *ovate, very hairy.* Wings, *superior with one marginal,* 3 *nearly equal submarginal and* 3 *discoidal cells.* Legs, *anterior short:* tibiæ *spurred at the apex, anterior small and trigonate, posterior broad, externally smooth, shining, concave, and free from hair in both sexes.* Tarsi 5-*jointed, basal joint oblong and dilated, with the external basal angle forming a horizontal tooth in the hinder pair of the female* (8†). Claws *bifid.*

Ericetorum *Panz.?—Curt. Guide, Gen.* 723. 13ª.

Black, clothed with yellow hairs; those of the mouth ferruginous; hinder portion of the thorax and base of scutellum dusky; a line of ferruginous hairs at the base of the 2nd abdominal segment, which bears a slightly dusky band, as well as the 3rd; 4th with a black band at the base, 5th and 6th white: apex of wings pale reddish brown, with the costa towards the apex darker, nervures piceous, the subcostal nervures pale ferruginous; tarsi with the inside of the basal joint clothed with bright ferruginous hairs, the following joints, especially the apical one, of a duller colour.

In the Author's Cabinet.

The Humble-bees comprise a fine group of insects in this country, readily distinguished by their hairy and handsome clothing. In the first fine days of spring, or even earlier, the females, which I believe hybernate, are attracted by the blossoms of the Willows to collect honey and pollen; the neuters appear later in the season, but the males are not common till the autumn, when, as Mr. Kirby observes, "the thistles are in bloom, upon the flowers of which they are abundant, sometimes seemingly asleep, or torpid, at others acting as if intoxicated with the sweets they have been imbibing."

Humble-bees build their nests in the roots of trees or amongst rubbish of bricks and stones; they may be constantly seen in the summer collecting moss for the purpose of covering their nests, which are sometimes lined with wax. The comb is irregular, and formed of oval cocoons made of a kind of silk daubed with wax; they vary greatly in number, sometimes amounting to sixty, and are adapted in size to the three sexes. Want of space compels me to refer the reader to the 6th vol. of Reaumur, and to Kirby's Monograph, for admirable accounts of this interesting tribe.

Perhaps no genus presents more difficulties in determining the species than Bombus; there are males, females, and neuters of two sizes, and the hairs with which they are clothed vary in colour with age; it is therefore only by examining their nests that the species can be ascertained, and perhaps not then with constant or unerring success. I have some suspicion that there are hybrids, and my friend Mr. Lyell took a female of *B. subinterruptus* or *terrestris*, and two specimens of *B. sylvarum* or *Burrellanus* out of the same nest in Scotland, and I have specimens of the second and third of these insects, which were captured together.

One species was added to this genus in my Guide, and since then three others have been discovered.

12ª. B. Hypnorum *Linn.*—*Panz.* 7. 12.

Found near Hampstead by Mr. Shuckard.

13ª. ericetorum *Panz.* 75. 19.?—*Curt. Brit. Ent. pl.* 564. ♂.

Mr. Lyell kindly presented this specimen to me, which he took at Kinnordy. It does not quite agree with Panzer's figure.

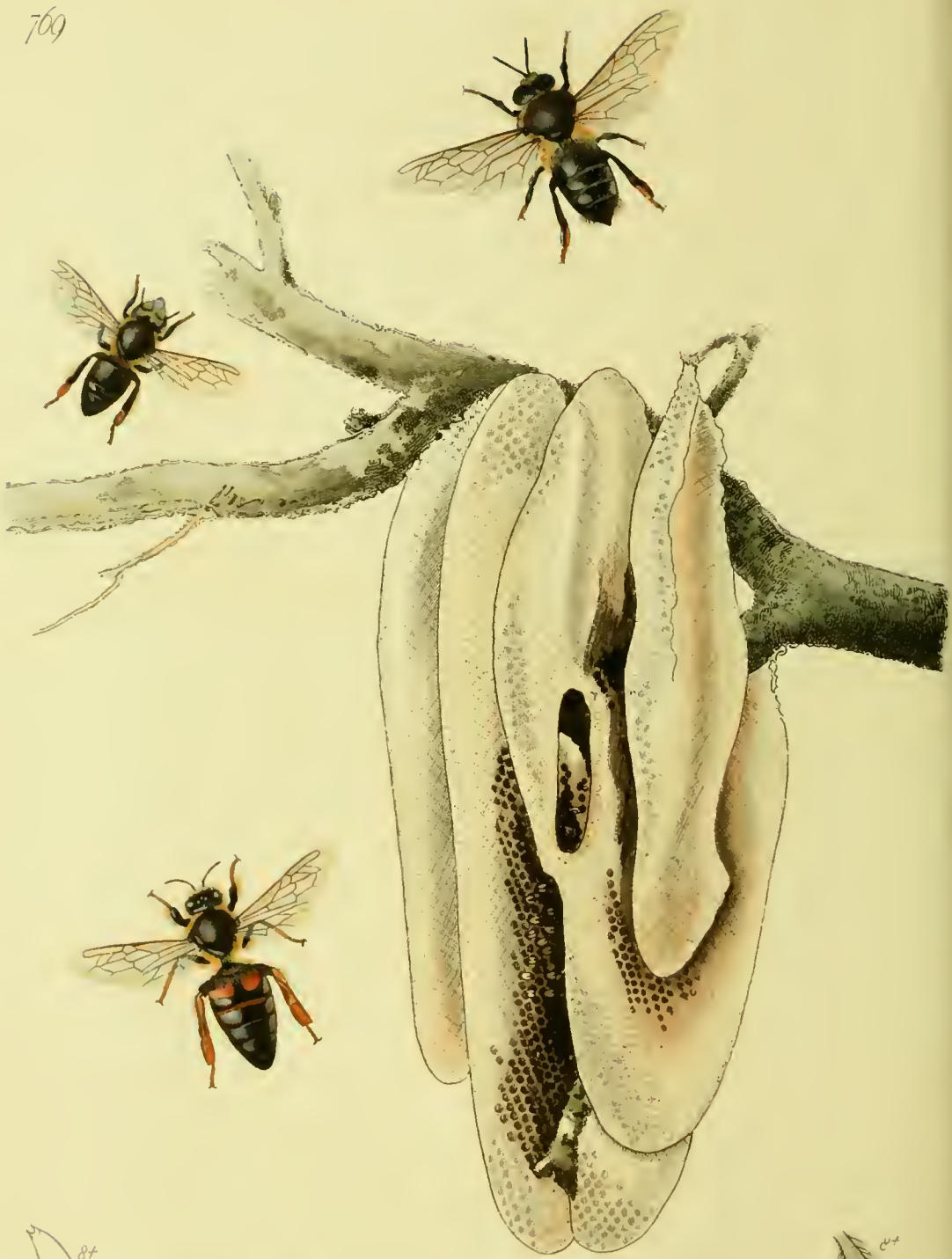
15. Pomorum *Panz.* 86. 18.

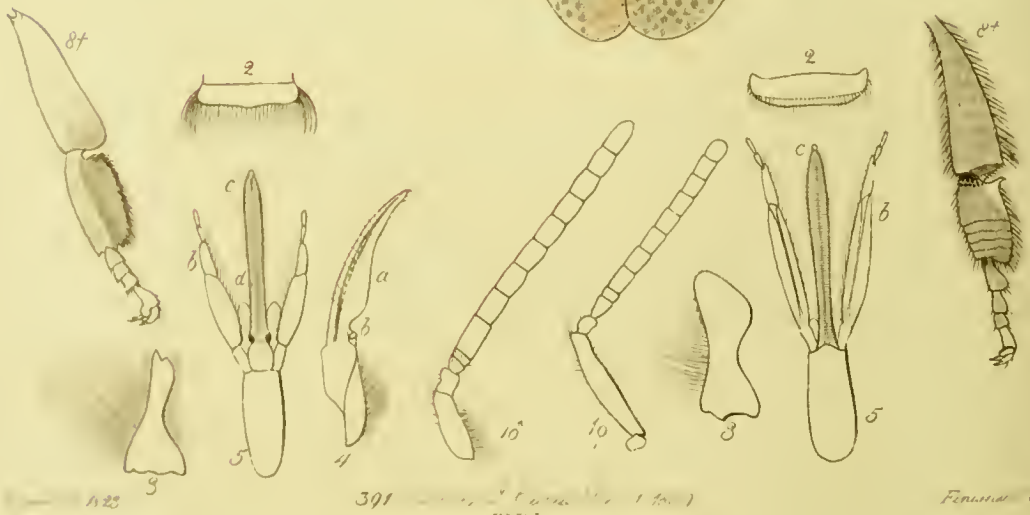
I took this handsome species near Dover the middle of August.

24ª. regelationis *Panz.* 86. 17.

Found near Halifax by Mr. A. H. Davis.

The Plant is *Tillæa muscosa* (Mossy Red-shanks).

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16-1839

769.

APIS MELLIFICA.

The Common Hive or Honey Bee.

ORDER Hymenoptera. FAM. Apidæ.

Type of the Genus, Apis mellifica *Linn.*

APIS *Linn., Fab., Kirb., Curt. Guide, Gen.* 724. 1.

Antennæ inserted at the centre of the face, approximating, geniculated, filiform, 13-jointed in the *male* (1 ♂), basal joint the longest and stoutest, hairy outside, 2nd oblong, 3rd and 4th short, the remainder oblong, apical joint conical compressed: 12-jointed in the *neuter* (1 ♀), basal joint much longer, hairy, 2nd small, 3rd a little longer, obovate-truncate, 3rd the shortest, following oblong, apical joint short, conic compressed.

Labrum of *male* short, broad, and nearly linear, ciliated with long hairs (2): anterior margin convex in the *neuter* (2).

Mandibles small in the *male*, dilated at the base, slender above, apex bidentate, densely clothed with long pubescence outside (3): corset-shaped in the *neuter*, hairy outside, apex obliquely ovate, concave and ciliated on the margin (3).

Maxillæ a little shorter than the mentum in the *male* (4), terminated by a horny lanceolate lobe as long as the lip (*a*). *Palpi*, minute ovate lobes (*b*): a little more distinct in the *neuters*.

Mentum not very long in the *male*, elliptic-truncate (5); rather broader at the base in the *neuter* (5). *Lip* twice as long, linear, very pubescent, except at the base, apex ovate in the *male* (*c*): longer, less hairy, with a valve at the apex in the *neuter* (*c*).

Paraglossæ rather large and ovate in the *male*, notched behind (*d*): much smaller in the *neuter*. *Palpi* shorter than the lip in the *male*, attached to scapes, broad, compressed and 4-jointed, ciliated internally, basal joint long and elliptic, 2nd moderate, subovate, 3rd attached to the apex of the 2nd, small, elongate-ovate as well as the 4th (*b*): longer than the lip in the *neuter*, from the greater length of the basal joint (*b*).

Male: face *orbicular:* eyes *very long, pubescent, contiguous above:* ocelli 3 *in triangle in front.* Thorax *large, transverse:* scutel *lunate.* Abdomen 6-*jointed, elongate-ovate, very hairy at the base and apex, basal joint concealed.* Wings *ample, with* 1 *long marginal and* 3 *submarginal cells,* 2*nd subtrigonate,* 3*rd oblique.* Legs *stout, hinder the longest pubescent* (8†)*:* thighs *not long:* tibiæ *short, anterior with a membranous dilated spine at the apex, intermediate with a long and slender one, hinder tibiæ longer, dilated and compressed at the apex, very velvety inside, spurs none:* tarsi 5-*jointed, basal joint oblong, anterior with a very deep notch at the base, hinder large, elliptic and very velvety inside, remainder short, hairy, obtrigonate,* 4*th cordate,* 5*th large, obconic:* claws *strong, bifid at the apex:* pulvilli *ovate.* Neuter: *face cordate:* eyes *moderate, remote:* ocelli 3 *on the crown.* Abdomen *short, ovate-conic, basal joint short, but distinct:* sting *serrated at the apex, inclosed in* 2 *valves.* Wings *moderate.* Legs *all hairy:* tibiæ, *hinder very broad and pectinated at the apex* (8†), *very pubescent inside:* tarsi, *basal joint dilated in the intermediate, very large in the hinder, densely pubescent and striated transversely on the inside, the outer superior angle hooked, following joints compressed and a little dilated:* claws *deeply bifid on the inside.* Female: *head smaller.* Wings *shorter than the body.* Abdomen *long and conical. Hinder legs and all the tarsi with very short pubescence inside, basal joint not hooked above.* Obs. *the female resembles the neuter in the trophi, and other parts unnoticed above, and the oral and other parts of the neuter, not noticed, are similar to those of the male. The* 6 *dissections on the left are from the* male, *the* 5 *on the right from the* neuter.

A. Mellifica *Linn.*—mellifera *Fourc.*—cerifera *Scop.*—gregaria *Geoff.*—domestica *Ray.*

Piceous, clothed with fine silky ochreous hairs: antennæ black: wings yellowish, nervures ferruginous. *Male* the darkest, thorax and 2nd joint of abdomen velvety, the space between them filled up with ochreous down, margins of segments pale; 2 apical joints clothed with longish piceous hairs: tarsi ferruginous, excepting outside of basal joints. *Neuter*: thorax hairy, hinder tibiæ as well as tarsi ferruginous internally, light brown outside. *Female*: second abdominal segment with 2 large rufous patches at the base: hinder legs deep and bright ochreous.

Our figures represent the male, neuter, and female somewhat larger than life, but their relative proportions are preserved: the comb was one foot in length. I consider myself fortunate in being able to introduce into my plate the nest of some Hive-bees, which was discovered by Lord Malmesbury in his plantations, near the river Avon, not far from Sopley. I had the gratification of seeing it before it was removed in October 1838; it was attached to the arm of a tree, and hung down, as represented in the plate, about 2 feet from the ground: a considerable number of the bees had died with their heads in the cells. Combs have been rarely found in hollow trees in this country, but one formed on the outside is I believe without a parallel in the history of bees.

It would not be possible for me to condense into my limited space the valuable remarks that have resulted from the observations of Swammerdam, Reaumur, Huber, Wildman and Kirby, I must therefore content myself with referring to their works, and to Dr. Bevan's "History of the Honey-Bee," for accounts of the wonderful œconomy of these little animals; I shall however transcribe a few remarks from the Mag. of Zool.

It is more than probable (says Dr. Bevan) that the life of the working bee does not exceed 6 or 7 months. A good family of bees consists of from 12 to 20,000, and a fertile queen breeds that number every year, but they all die annually except about 3000, which are supposed to be the summer and autumn hatched ones. In the 1st week of July the young workers begin to issue from their cells, and continue to do so for nearly 3 weeks: on the 13th July was the first issue of drones, which continued to come forth till the 25th; these, if not killed by the neuters, begin to die naturally the end of October till the middle of November, so that the life of the drone is about 4 months; the queen has been traced from hive to hive through a period of nearly 4 years, so that she sees many generations pass away.

I may add that in the early days of April the workers awake from their slumbers, and resort to the catkins of the willows to replenish their stores; the males appear later, and amount to about 1500.

With the bee I have now concluded my task, and I trust the materials collected have been selected to the taste and advantage of those who have taken an interest in my Hive. I have to thank my friends who have so handsomely protected it against the attacks of enemies, as well as those whose valuable materials have been so kindly contributed during sixteen years to its support. After a little rest I hope to resume my labours,* and I trust the contents of a future hive may prove as acceptable to the public as the present one.

* Vide the Prospectus attached to this volume, regarding the Synopsis of Species and an Atlas of Genera.



15-1838

712.

LIBELLULA RUBICUNDA.

ORDER Neuroptera. FAM. Libellulidæ.

Type of the Genus, Libellula depressa *Linn.*

LIBELLULA *Linn.* &c.—*Curt. Guide, Gen.* 725.

Antennæ inserted on each side of a vesicle before the eyes, short slender setiform and 6-jointed, basal joint the stoutest, short and cylindrical, 2nd not so stout but a little longer and bristly, the remainder slender and setaceous, 3rd joint much the longest, 4th scarcely so long as the 2nd, 5th a little longer, 6th as long as the 3rd, acute at the apex and terminating in a bristle (1).
Labrum large, transverse, convex, semioval, bristly outside (2).
Tongue? subovate, dilated towards the apex and bristly (*).
Mandibles short and stout, deeply bifid at the apex, with a cluster of 4 or 5 short teeth on the inside (3).
Maxillæ with a short stipes, the terminal portion dilated at the base, rounded and bristly internally, the apex claw-shaped, with 2 smaller teeth below and 3 long stout spines on the outside, external lobe long curved and very bristly (4).
Mentum small. *Lip* very large and convex, formed of 2 quadrate orbicular lobes very bristly on the margins (5), with 2 minute teeth at the inner angle, opposite each other (*p*).

Head *large, the base concave;* eyes *very large, meeting on the crown:* ocelli 3, *placed round a vesicle before the eyes.* Thorax *large and oblong.* Abdomen *moderately long, sometimes broad depressed and attenuated at the apex, with* 2 *horny lobes at the base in the* males, *and* 2 *moveable lobes at the apex* (6 ♂); females *with* 2 *shorter lobes at the apex* (♀). Wings *extended horizontally, alike in both sexes, inferior the broadest, especially at the base, very much reticulated, stigma elongated but short in some.* Legs, *anterior the stoutest, hinder a little the longest:* thighs *spiny on the inside:* tibiæ *slender, with* 2 *series of spreading acute slender spines on each side:* tarsi *short triarticulate, hinder the longest, basal joint the shortest, terminal the longest:* claws *cleft towards the apex.*
Larva *and* Pupæ *aquatic, short and broad, both furnished with legs for walking, similar to the imago.* Roesel, v. 2. tab. 6. f. 1. 2.

RUBICUNDA *Linn.*—pectoralis *Charp.*?—dubia *Vand. Lin.*?

Male. Dull black, face and labrum yellowish-white: thorax with 2 deep orange stripes before the wings and several marks under them; the disc, including the scutel, postscutel and scapulæ sanguineous: abdomen with the 1st segment, excepting the base, and the basal ring of the 2nd, sanguineous, this and the 4 following with deep orange spots at or near the base, more or less ovate and increasing in size; underside blueish-grey: wings hyaline, nervures piceous, the costal and transverse costal nervures whitish; stigma oval and brown, a small brown spot at the base of the superior, and a small and larger one at the base of the inferior wings. *Female.* Labrum brown with yellowish spots, the spots on the thorax and abdomen all yellow, the latter with 3 large yellow spots on each side of the base, and one on each side of the 2nd, 3rd and 4th segments, the central one the largest: the basal spots on the wings are more extended.

In the Cabinets of Mr. Dale, the Author, &c.

Libellula is one of the most extensive genera of this magnificent family of insects, which may be divided into 2 sections.

1. *Abdomen dilated and more or less depressed.*

1. depressa *Linn.—Don. v.* 3. *pl.* 81 ♂. *v.* 1. *pl.* 24 ♀.
Marshy places and ponds everywhere, from April to Aug.

2. quadrimaculata *Linn.—Don.* 12. 407.—*Sam. pl.* 7. *f.* 1.—prænubila *Newm.* var.
Ponds and woods, middle of May to August, Middlemarsh, Parley, New Forest, Oxford, Whittlesea and Meldon Park, Mr. Dale; also at Epping.

3. bimaculata *Charp.*? *Step.* June, Whittlesea Mere.

4. conspurcata *Fab.*—4-fasciata *Don.* 12. 425.
Hedges, lanes, &c., from middle of May to the middle of July, Parley, Glanville's Wootton and Newnham, Bedfordshire, Mr. Dale; Sprowston near Norwich and Deptford.

5. cancellata *Linn.—Don.* 14. 472.—*Int. to Ent. pl.* 3. *f.* 5. ♀.
Croydon canal, Peckham, Horning and Fakenham, Norfolk, Whittlesea Mere, Abbey Meadows, Kilburn, end of June to middle of August, J. C.

6. Sparshalli *Dale's Mss.* Taken at Horning in 1823 by the late Mr. J. Sparshall; it is very similar to a Chinese species.

2. *Abdomen triquetrous, sublinear or slightly clavate.*

7. cœrulescens *F.*—Donovani *Lea.*—biguttata *Don.* 13. 449 ♂.
May to September, Charmouth, Portland, Empole, Parley, Enborne, Gamlingay bogs and Isle of Man, Mr. Dale; New Forest and Black-gang-chine, J. C.

8. vulgata *Linn.—Don.* 10, 337. 1.
Ponds and ditches from June to 19th Nov. everywhere.

9. Veronensis *Charp.* Taken by Mr. Harrison of Hull.

10. flaveolata *Linn.—Schæff. Icon. t.* 4. *f.* 1.
Taken by Mr. Lyell at Kinnordy in Forfarshire, and by Mr. Doubleday last year at Epping in abundance.

11. angustipennis *Step. Ill.* June, near London.

12. Roeselii *Curt.—Roesel*, 2. *pl.* 8, *f.* 4.—basalis *Step.* ♀? rufostigma *New.* var. Whittlesea Mere, Mr. Bentley.

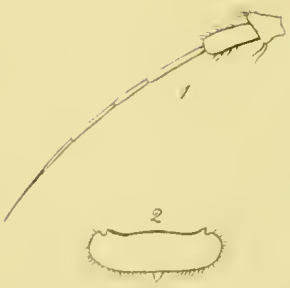
13. Scotica *Don.* 15. 523.—nigra *Van. Lin.*—pallidistigma *Step.* var.
June to Nov. abundant on Parley Heath; Isle of Arran.

14. rubicunda *Linn.—Curt. Brit. Ent. pl.* 712. ♂.
This fine insect was discovered last year, about deep pools of water on Thorne moor near Dorchester, by Mr. Beckett; Mr. Dale found it there in abundance the middle of July, but it was less common in August; Mr. Harrison also took it near Glandford Brigg, Lincolnshire. For a fine series I am indebted to the Rev. F. O. Morris and T. C. Heysham, Esq., who took them in the North of England.

The plant is *Carex digitata*, Fingered Carex, from Leigh wood, communicated by Mr. Thwaites.



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616.

CORDULIA CURTISII.

Order Neuroptera. Fam. Libellulidæ.

Type of the Genus, Libellula ænea *Linn.*

Cordulia *Leach., Curt.*—Libellula *Linn., Fab., Lat., Vand. Lind.* —Æschna *Charp.*

Antennæ very small, inserted close to the ocelli on the anterior margin of the eyes, 6-jointed, 2 basal joints stout and hairy, 1st the shortest and dilated anteriorly, 2nd elongate cylindric, the remainder forming a slender seta, 3rd joint longer than the 2nd, 4th not longer than the 1st, 5th as long as the 2nd, 6th the longest (1).

Labrum exserted, broad and short, the sides rounded and ciliated as well as the anterior margin (2).

Tongue? large, inflated, broadest and hairy at the apex (*).

Mandibles broad, short and thick, the apex truncated obliquely, and forming 5 short sharp teeth (3).

Maxillæ with the stripes short, terminated by a horny falcate lobe, dilated at the base and ciliated internally, with 6 elongated curved acute teeth at and below the apex, and a thick linear palpiform lobe outside, subfalcate and hairy externally (4).

Labium very large and convex, entirely covering the mouth and concealing the trophi, excepting the labrum, trilobate, the lateral lobes very large, suborbicular, hairy, the internal margins crossing, central lobe smaller, transverse and covering a portion of the base of the others (5).

Head *large, concave at the base:* eyes *very large meeting on the crown:* ocelli 3? *in a cavity in front of a vesicle before the eyes.* Thorax *large and ovate.* Abdomen *long cylindric or compressed, clavate, narrowed towards the base in the male with 2 spines beneath the 2nd joint and 4 appendages at the apex, the inferior ones furcate* (6 ♂); *but these are absent in the female* (6 ♀). Wings *nearly equal, extended horizontally, very much reticulated, stigma elongated;* inferior wings *with the anal angle acute in the male* (9 ♂). Legs *slender, anterior the shortest:* thighs *linear, serrated inside:* tibiæ *armed with a double row of spreading long spines:* tarsi *spiny, triarticulate, basal joint short, 2nd and 3rd elongated:* claws *cleft near the apex* (8, *a fore tibia and tarsus*).

Larvæ *and* pupæ *aquatic, both furnished with legs for walking similar to the imago.* Roesel, v. 2. t. 5. f. 1.

Curtisii *Dale in Loudon's Mag. Nat. Hist. vol. 7. p. 60.—Curt. Guide, Gen.* 726. 2.

In the Cabinets of Mr. Dale and the Author.

The Corduliæ are distinguished by their uniform metallic colour; they are separated from Libellula, to which they are most allied, by the angulated anal margin of the inferior

wings, and from all the other Dragon-flies by the small central lobe of the labium, as well as by the vesicle on the crown of the head.

The species of Cordulia are the following:

1. metallica *Vand. Lind. Mon.* 18. 13.—*Schæf. Icon. tab.* 113. *f.* 4. ♀.—*Roesel* 2. *Aq. II. tab.* 5. *f.* 2. ♂.—*Harris Expos. tab.* 27. *f.* 2. ♀.

   Brassy-green, abdomen thickened in the middle, all the anal appendages in the male simple, acuminated; wings lutescent, stigma yellow.

   This species is admitted as British on the authority of Vander Linden, who quotes Harris's figure as the male, but it is the female he has represented.

2. ænea *Linn.*—*Schæf. tab.* 167. *f.* 4. ♀. *tab.* 182. *f.* 1. ♂.—*Sow. Brit. Mis. tab.* 47. ♂.—*Don.* 12. 415. ♂.

   Brassy green, abdomen thickened towards the apex, inferior anal appendages furcate in the male; stigma black; labium and spots on the underside of 2 or 3 of the basal abdominal segments ochreous.

   This species has been taken from the end of May to July at Winandermere; near Wisbeach; in Starston and Costessey Woods, Norfolk; Martlesham Heath, Suffolk; Woodford; Epping Forest; Hampstead; near Beaulieu, Brockenhurst; and Pennington Commons, Hants. I have generally found it in plantations where there are fir-trees, in such situations as Calepteryx frequents.

3. Curtisii *Dale.—Curt. Brit. Ent. pl.* 616. ♀.

   Male glossy green, with ochreous pubescence; face bright green; base of the labrum and the labium ochreous; eyes pale pea-green, with a purple transverse stripe; back of the thorax ochreous, marked with black; abdomen compressed, with a line of yellow spots down the back, decreasing in length, forming 2 connected oval spots on each segment, the basal one being the largest, 7th and 8th segments with a pale margin only; wings of a very pale yellowish tint, with a small space at the base bright ferruginous; stigma, nervures and legs dark piceous; anterior thighs ochreous inside at the base. *Female* with ferruginous-yellow wings, softened into pale brown towards the posterior margin.

   This fine species, which is unknown upon the Continent, was discovered by Mr. Dale on Parley Heath the 29th June, 1820, and subsequently at Hurne in Dorsetshire as late as the 16th July. On the 8th June, 1831, I captured a specimen on the side of Ramsdown near Heron Court, in company with Mr. Dale, who soon after described it in Loudon's Magazine under its present name. I understand it has also been taken on Braunton Burrows, Devon, by Mr. Cocks.

The plant is *Luzula* (*Juncus*) *campestris*, Field Rush.






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16-1839

732.
AGRION RUBELLUM.

ORDER Neuroptera. FAM. Libellulidæ.

Type of the Genus, Libellula puella, *Linn.*

AGRION *Fab., Lat., Vand. Lind., Curt.*—Libellula *Linn.*

Antennæ inserted between the eyes close to the inner margin, very remote, shorter than the head, triarticulate, basal joint the stoutest, subovate, 2nd not so stout but longer, a little globose at the apex, both with very long hairs, 3rd a moderately long seta, stoutish and tapering (1).
Labrum large, transverse-ovate, thickly clothed with long hairs (2).
Mandibles rather small, broad at the base, subtrigonate, the apex acute, trifurcate, with 2 clusters of teeth on the inside (3).
Maxillæ small, forming a compressed lobe, terminated by a long curved claw, with 2 teeth on the inside, 3 long spines below, the rest producing hairs; *external lobe* or *palpus* compressed, curved and hairy, with a small tubercle or joint at the apex (4).
Mentum short but broad. *Labium* large hairy and covering the mouth, ovate-trigonate, the apex rounded, with a deep broad notch in the centre. *Palpi* very hairy, biarticulate, basal joint very large, curved, compressed, a little attenuated, furnished with a long incurved claw at the inner apical angle, 2nd joint slender, a little curved, subelliptic (5).

Head *broad*: clypeus *narrowed:* eyes *moderate, very remote, prominent and ovate:* ocelli 3, *forming a triangle on the crown.* Thorax *narrower than the head, obconic-truncate:* collar *forming a lunate scale:* alitrunk *very short and nearly vertical.* Abdomen *long slender and cylindric, the apical processes very short and varying greatly in form;* male *furnished with* 2 *short remote horny lobes above, and a furcate one on each side below* (6 ♂); female *with* 2 *short teeth and* 2 *filiform processes below* (6 ♀). Wings *erect in repose, very similar, membranaceous, elongate-ovate, most of the cells quadrangular:* stigma *small and rhomboidal.* Legs *rather short, slender, tapering, anterior the shortest:* thighs *with two rows of spiny bristles beneath:* tibiæ *with a double series of spreading spiny bristles on each side, the anterior pectinated inside towards the apex:* tarsi *triarticulate, basal joint very short, 3rd the longest in the anterior, in the others the 2nd and 3rd are equal:* claws *long narrow and bifid at the apex.* Obs. *the dissections are from* A. minium.

RUBELLUM *V. Lind.,—Curt. Guide, Gen.* 733, 7.

Male: head and thorax dull æneous, underside face and legs ochreous: abdomen red: wings slightly tinted with yellow, stigma fuscous-ochre. *Female*: abdomen æneous, 3 basal and 2 apical joints rufous. *Var.* bright ferruginous, ochreous beneath; crown of head, clypeus, disc of collar, a broad line down the thorax and a fine one on each side purplish-black; abdomen of same colour, except the 2 first joints, and the base of the 3rd, on which there is a broken dorsal line of 4 black spots and a ring; base of all the other segments with an ochreous ring interrupted at the centre: nervures sometimes reddish: a black dot at the apex of the thighs, a streak outside the tibiæ and tips of tarsi and of claws black.

These elegant and beautiful insects, which are distinguished from cognate genera by their rhomboidal stigma, are abundant in June and July in marshes, the sides of rivers, ponds, ditches, hedges, &c., where they fly about sedges, reeds, rushes, and other aquatic plants, on which they often settle. The French have given them the trivial name of Demoiselle, but with us they bear the formidable appellation of Dragon-flies, which they in some measure deserve, as, like the rest of the Libellulidæ, they feed upon other insects, both in the larva and imago states. It will be seen by the following list, that there are many species, the sexes of which not only differ, but from some cause or other individuals vary so much in colour, that it is a difficult task sometimes to determine to which species a variety belongs, and I think it not improbable that some of these may be hybrids. The caudal appendages of the males vary so greatly, that Charpentier thinks they will supply good specific characters.

1. Platypoda *Van. Lind.—Schæff. Icon. t.* 48. *f.* 1. *β.*—Corea *Lea.*—lacteum *Charp.*

This species has the 4 hinder tibiæ dilated: it is found in Norfolk, the New Forest, and in Devonshire.

2. Chloridion *Charp. Hor. Ent. p.* 14 ?—*Schæf. t.* 121. *f.* 4 ♂. *f.* 5 ♀.—*Röesel. v.* 2. *t.* 11. *f.* 6.

June, Lincolnshire, on the authority of the "Illustrations."

3. fulvipes *Step.*—June, Coomb Wood.

4. rufescens *Lea.*—This and the following species, excepting Nos. 10. & 15. have been found in the vicinity of London.

5. minium *Harris, Expo. t.* 29. *f.* 2 ♂. *f.* 1 ♀.—*Charp.*—sanguineum *Van. L.—Schæf. t.* 116. *f.* 1 ♂.

6. annulare *Lea.* 7. furcatum *Charp. p.* 18.

8. hastulatum *Charp. p.* 20 ?—*Schæf. t.* 120. *f.* 5 ♂. *f.* 6 ♀.

Is a var. of the next according to Vander Linden.

9. Puella *Linn.—Roesel.* 2. *tab.* 11. *f.* 7 ♂.—*Schæf. t.* 117. *f.* 1 ♀.—*Harris, Expo. t.* 29. *f.* 4 ♂. *f.* 3 ♀ ?

10. pulchellum *Van. L.—Schæf. t.* 120. *f.* 4 ♀.

June, Cosmore Common, near Glanville's Wootton, Mr. Dale.

11. zonatum *Leach.* 12. xanthopterum *Ste.*

13. elegans *Van. L.* 14. ezonatum *Ste.*

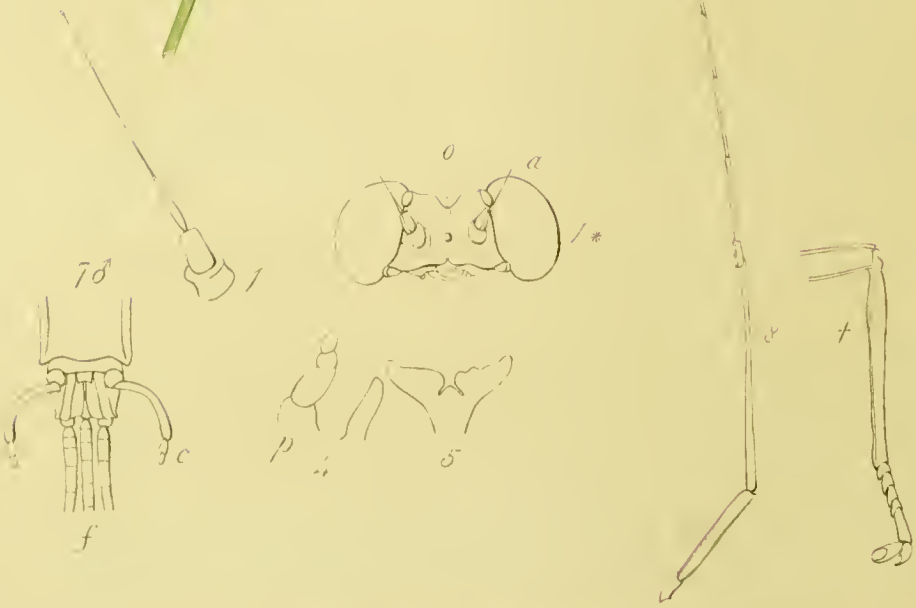
15. rubellum *Van. L.—Curt. B. E. pl.* 732 ♀. *var.*—rufipes *Dale.*

Taken by Mr. Dale on Parley Heath in July and August: the specimen figured appears to be a fine variety of Vander Linden's insect, and I believe it is the true *rufipes* of Dale.

Illecebrum verticillatum, Whorled Knott-grass, from specimens collected in bogs near the Land's End by Mr. William Branch, was communicated by J. Janson, Esq.



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15-1835

708.

EPHEMERA COGNATA.

The large May-fly.

Order Neuroptera. Fam. Ephemeridæ.

Type of the Genus, Ephemera vulgata, *Linn.*

Ephemera *Linn., Fab.*

Antennæ very short, inserted in large cavities in front of the face (1* *a*), triarticulate, basal joint the thickest, 2nd stout and oblong, 3rd a long seta somewhat fusiform at the base, the apex subovate (1).

Trophi imperfect, soft and filled with fluid.

Maxillæ each forming a compressed, elongated, sublinear lobe, rounded at the apex (4). *Palpi* larger, triarticulate ? basal joint large, 2nd and 3rd small subglobose (*p*).

Mentum short, dilated anteriorly. *Palpi* ? forming 2 large, fin-like lobes (5).

Head *rather broad and short:* eyes *large and remote in both sexes:* ocelli 3, *forming a triangle in front of the head* (1**o*), *remote,* 2 *very large, the lower one smaller* (1* *front view of head*). Thorax *very long and narrow, oval:* scutel *rather small and gibbose.* Abdomen *long and sublinear, the apex furnished with* 3 *very long slender filaments, composed of numerous joints* (7 *f*), *the central one a little the shortest in the male, in which sex there is also a pair of curved triarticulate appendages, the* 2 *apical joints small and subovate* (*c*). Wings *erect in repose, reticulated with nervures;* superior *ample, elongate-trigonate;* inferior *small and oval.* Legs *short, the anterior very long in the males* (8): thighs *short and compressed:* tibiæ *short and attenuated, anterior very long and slender in the males as well as the* tarsi, *which are* 5*-jointed, basal joint very short,* 2*nd very long, the following slightly decreasing, the* 4 *first joints are very short in the other tarsi:* claws, *anterior forming* 2 *equal lobes, the others with one large lobe and one claw, notched at the apex* (†, *a hind leg*).

Metamorphoses *quadruple.* Larvæ *with* 6 *feet,* 12 *lateral lobes, and* 3 *setaceous ciliated tails.* Pseudimago *similar in form to the perfect insect.*

Cognata *Step.—Curt. Guide, Gen.* 734. 2.

Head and thorax piceous, with several yellow spots on the latter, formed by membrane; sides of the collar orange, with 2 yellow stripes behind them: abdomen ochreous, with a dark waved line down each side, and 2 long piceous spots on each of the 2 or 3 terminal segments, the edges of all yellowish-white: wings transparent, stained greenish-yellow, with 3 fuscous spots on the disc and 1 near the base; nervures piceous: legs yellowish, all the articulations with piceous spots at the apex.

The Ephemeræ are the true May-flies of anglers, no less celebrated as a bait for trout, than they are for the shortness of their lives; yet short as the natural term of their existence is, myriads are swept away and devoured by the rising fish before they have escaped from the water which gave them birth. The importance of these insects in the œconomy of nature is manifest by the immense quantities that are produced, and without them many species of fishes would become extinct. The multitudes of eggs that are deposited by the *E. vulgata* must be incalculable, for a very small proportion only of the whole can be hatched; then the larvæ living at the bottom of the water become a ground bait for fishes, and the prey of predaceous insects in all their stages. The pupa, if it be permitted to rise to the surface, must there remain until the fly in its first winged state or Pseud-imago, has time to burst from its shroud, when its soft and heavy wings render its progress to the shore slow and uncertain; there it alights on a blade of grass or some plant, and casts off its skin again, as related in folio 484, and then it becomes the beautiful fly, which notwithstanding the myriads that have been destroyed, we still see in myriads undulating over rivers and their banks, in the mornings and evenings of calm and fine days in the months of May and June, again to contribute to the support of the finny tribes.

I am convinced it would well reward any one living in the Lake districts to study this family and the Phryganidæ, for I have never visited either Scotland or Ireland without finding new and interesting species, especially of the latter order, which swarms even on the steam-boats; and the valuable and talented memoir of Mons. Pictet proves what may be done by steady attention to a subject in a favourable locality. In North America, again, a vast and magnificent field must remain to be explored by some zealous and fortunate lover of these tribes, it is to be hoped at no distant period.

Having obtained living specimens of the Ephemera, I was able to detect some rudimentary trophi, which seem to comprise 2 large palpi with 2 lobes below them and a dilated labium with 2 divaricating lobes. Imperfect as these oral organs are, I think they are an additional proof of the affinity of the perfect Ephemeridæ with the Phryganidæ, nearly related as they are in their larva state to the Libellulidæ.

I found both *E. vulgata* and *cognata* in the greatest profusion on the banks of the river at Oxford the beginning of June, and I am doubtful whether the latter is distinct. Our figure represents the female a little larger than life; the male is much smaller and darker.

The plant is *Callitriche aquatica*, Star-grass.


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11-1837

484.

BAËTIS DISPAR.

The dissimilar May-fly.

ORDER Neuroptera. FAM. Ephemeridæ.

Type of the Genus, Baëtis dispar *Curt.*

BAËTIS *Leach, Sam., Curt.*—Ephemera *Linn., Fab.*

Antennæ inserted in 2 cavities in front of the face (1* *a*), short setiform and triarticulate, basal joint very short and cup-shaped, 2nd ovate, 3rd forming a coriaceous seta (1).

Trophi none ?

Head *transverse, hemispherical:* eyes *large, meeting on the crown of the head in the male* (1*, *front view*), *remote in the female:* ocelli *large,* 3 *in triangle, placed before the eyes, the lateral ones elevated* (*o*) : clypeus *very large, coriaceous, somewhat semicircular, carinated down the middle and very deeply notched at the centre* (*c*). Thorax *ovate.* Abdomen *rather short and terminated by* 2 *setæ* (6 *and* 7 *f*) ; *attenuated in the male with two* 4*-jointed appendages* (7 *c, being a portion of the underside*); *the* female *furnished with a single process;* (6 *the apex in profile*). Wings 4, *mostly thickly reticulated,* superior *long and narrow;* inferior *small and subovate.* Legs, *anterior inserted close to the head, very long in the male* (8), *the others short:* thighs *compressed:* tibiæ *simple;* tarsi 5*-jointed, anterior much longer than the tibia in the male* (8), *the basal joint much shorter than the* 2*nd or* 3*rd, which are very long,* 4*th longer than the* 1*st,* 5*th about the same length, the joints nearly of equal length in the female, the* 4*th a little the shortest; the other tarsi are rather short and alike, the terminal joint being as long as the basal one, the* 4*th minute* († *tibia and tarsus of hind leg*) : claws, *one horny curved and acute, the other an ovate and fleshy lobe like a pulvillus* (*c, terminal joint of tarsus and claws*).

Obs. *The dissections are from* B. dispar.

Metamorphosis *quadruple.*

Larvæ *and* Pupæ *with* 6 *feet,* 12 *external lobes and* 3 *broad short tails. Roësel* (*v.* 2, *tab.* 12, *f.* 3 *and* 4) : *Pseud-imago similar to the perfect insect.*

DISPAR *Curt. Guide, Gen.* 735. 2.

Pale castaneous, eyes and disc of thorax sometimes much darker in the male ; segments of the abdomen with the margins brown, filaments more than twice as long as the insect ; tibiæ, excepting the anterior pair, ochreous towards the apex, tarsi fuscous : wings transparent, superior pale yellow at the base in the male, as well as the costal margin, which is pale brown towards the apex, nervures of the same colour.

In the Cabinets of Mr. Dale and the Author.

THE habits and œconomy of the Baëtes are similar to the Ephemeræ, from which they are distinguished by having only

2 filaments at the apex of the abdomen, and from Cloëon by having 4 wings. They may be advantageously formed into two sections: 1st, those with wings very much reticulated; 2nd, having very few transverse nervures, and these have the wings ciliated in the Pseud-imago.

Latreille and Leach describe the tarsi as 4-jointed, but they are distinctly composed of 5 joints, and their singular form as well as that of the claws is worthy of notice.

This probably is an extensive family, and for a list of the species I must refer to the Guide, and for the descriptions of some new ones to the Lond. and Edin. Phil. Mag.

As Linnæus in his description of *E. bioculata* says nothing of the number of the wings, it may not be a Baëtis; and as I suspect his *E. striata* is the Pseud-imago of another species, I have thought it better to adopt the one figured as the type.

B. dispar *Curt. Brit. Ent. pl.* 484. ♂.

I have named this insect *dispar* from the little resemblance that exists between the Pseud-imago and the perfect fly; the wings in the former have all the nervures suffused with fuscous and the costa is not darker than the rest of the wing.

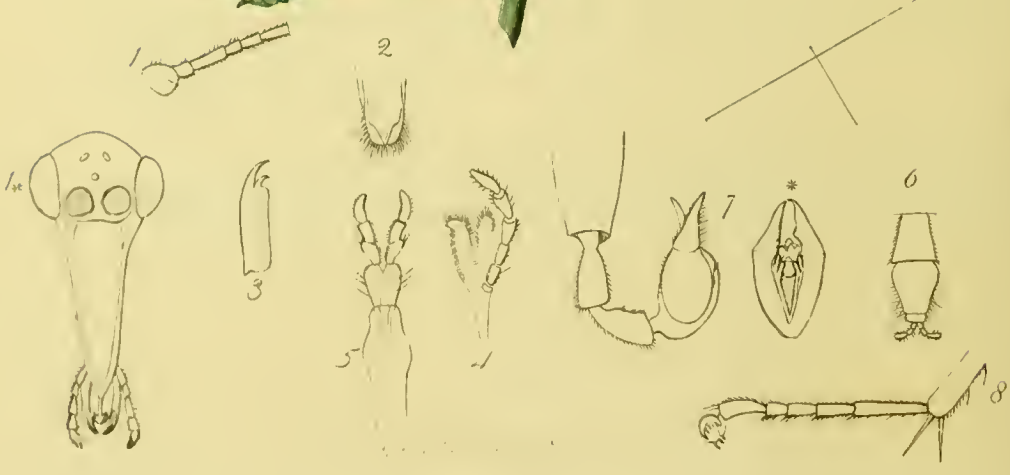
On the 4th of June I found the Pseud-imago on White-thorns near Ambleside, and on the following day I saw the operation of shooting its skin: the thorax swelled and first burst through, then by drawing up its body, it kept forcing itself out, and being exhausted it lay down for a short period, having the appearance of a Nympha, it then turned upon its back, began struggling, soon gained its legs and walked on to the gauze that covered the top of the box.

The Plant figured is a species of Chara, new to Great Britain, which differs from *C. gracilis* in its much smaller size and in the denser and more tuft-like arrangement of the branches. This addition to our Flora was pointed out to me by Professor Henslow, in Bottisham-fen, during an excursion*, and Professor Agardh, of Lund, who was present, pronounced it to be his *Nitella hyalina*, the specific characters of which we quote from his Systema Algarum: "Caule hyalino setaceo, fructibus ad nodos in glomerulum congestis." This species, from its great transparency and the comparative size of the detached globules floating in the fluid contained in the stem, is admirably calculated for exhibiting the circulation so conspicuous in this genus.

* This very agreeable excursion was proposed and conducted by Professor Henslow with his accustomed kindness and liberality: it took place after the Meeting at Cambridge of the Association for the Advancement of Science, and I am happy in this opportunity of recording the pleasant day I spent with him on that occasion.



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696.

PANORPA GERMANICA var.

The lesser spotted Scorpion-fly.

ORDER Neuroptera. FAM. Panorpidæ.

Type of the Genus, Panorpa communis *Linn.*

PANORPA *Linn., Fab., Lat., Curt.*

Antennæ inserted near the base of the rostrum, approximating, almost as long as the body, slender, filiform, pubescent, composed of numerous oblong joints, 1st the stoutest, 2nd the shortest, 3rd the longest, the remainder decreasing in length to the apex (1, the base).

Trophi attached to the apex of the rostrum (1*).

Labrum oblong, margined, rounded and pubescent (2).

Mandibles elongated, linear, terminated by 2 curved claws, inner one the smallest (3).

Maxillæ terminated by 2 long hairy lobes, a little curved and rounded at the apex. *Palpi* longish, slightly pilose and 5-jointed, 2 basal joints oblong, the following a little stouter, 3rd and 4th elongate obconic, truncated, 5th subconical at the apex (4).

Mentum elongated, sides dilated and convex before the apex. *Labium* oblong, a little narrowed at the base. *Palpi* much shorter than the maxillary, triarticulate? 2 basal joints pubescent internally, 3rd curved a little, the apex ovate (5).

Head *small, transverse-ovate*: rostrum *long stout tapering and vertical:* eyes *lateral prominent and oval:* ocelli 3, *forming a triangle in front of the head* (1* *the face, &c.*). Thorax *oval, a little broader than the head, with a deep suture across the middle;* collar *short:* scutel *and* postscutel *transverse-ovate.* Abdomen *subcylindric at the base,* 8*-jointed, the apex recurved in the* males (7), *6th and 7th joints subcampanulate, 8th dilated, ovate and armed with lateral forceps* (7*)*; tapering in the* female, *the apex ovate-truncate and furnished with* 2 *divaricating filaments, apparently triarticulate and hairy* (6). Wings *alike, reticulated, long, narrowed at the base, the apex rounded; deflexed in repose, the inferior covered, these are a little shorter than the superior; longitudinal nervures numerous, as well as the transverse ones towards the apex.* Legs *long but slender, hinder the longest:* coxæ *long:* thighs *linear:* tibiæ *slender, with fine long spurs at the apex:* tarsi *a little shorter,* 5*-jointed, basal joint long:* claws *curved, with long teeth beneath:* pulvilli *spongy* (8, *a fore foot*).

GERMANICA *Linn.—Curt. Guide, Gen.* 737. 3.

In the Author's and other Cabinets.

COMMON and conspicuous as these insects are, nothing is known of their metamorphoses; this is very remarkable, and it leaves one to imagine that their early stages are passed under ground. I cannot think the larvæ are aquatic; it is more pro-

bable that they inhabit the trunks of trees like many other Neuroptera.

The perfect insects are said to live upon Diptera, and the two first species are found in woods, hedges, meadows, and gardens, in May and June.

The rostrum is formed by the union of the elongated bases of the trophi, and the singular structure of the tail in the males has caused them to be called Scorpion flies.

As there are innumerable varieties of these insects, I think it is very probable they may all belong to one species; I shall however give the essential characters of the types found in Britain.

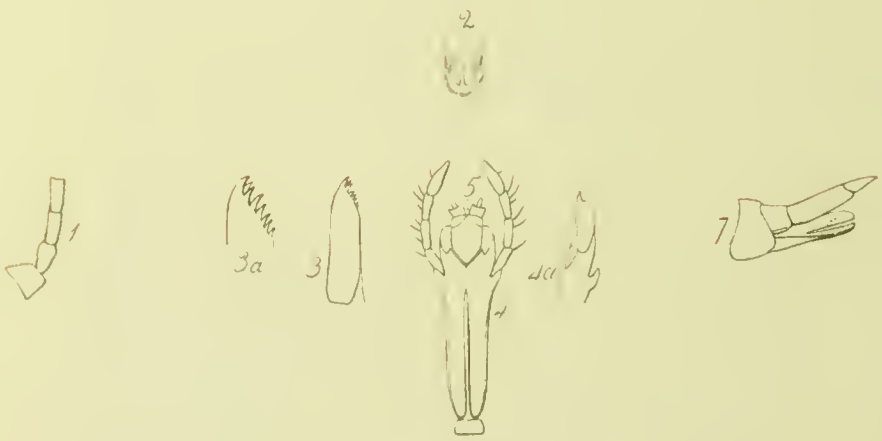
1. communis *Linn.—Don.* 6. 201. ♀.—*Zool. Misc.* 2. *t.* 95. *f.* 1.
   Blackish; rostrum, crown of head, and 3 terminal joints of abdomen ferruginous, 4 spots down the thorax and legs ochreous; wings with a fascia beyond the middle, the apex and a few spots towards the base brown: expanse 1 inch and upwards.
2. affinis *Lea. Zool. Misc.* 95. 2.—communis *Don.* 6. 201. ♂.
   Similar to No. 1.: wings spotted with brown; instead of the fascia there are 3 spots, and the apex is margined and spotted below.
3. apicalis *Ste. Ill.* 6. 52. 3.
   Black, wings hyaline, the apex and nervures fuscous, legs piceous: expanse 9 to 10 lines.
   June, Darent Wood.
4. borealis *Leach, MSS.*
   Black; rostrum, apex of abdomen and legs piceous; wings hyaline, stigma and nervures fuscous.
   In the British Museum: it was found by Dr. Leach near Edinburgh.
5. germanica *Linn.—Curt. Brit. Ent. pl.* 696. ♂. *var.*
   Ochreous, finely pubescent, head ferruginous, face black, excepting the 2 cavities in which the antennæ are inserted: antennæ piceous, basal joint ferruginous: thorax greyish-black with a broad ochreous stripe down the middle, as well as a spot on each side before the wings: abdomen greyish black, 3 terminal joints ferruginous, a line down each side of the others, and the edges of the segments ochreous: wings iridescent, nervures brown, transverse ones pale: stigma yellow, with a quadrate fuscous spot, a small faint fuscous cloud below each, a few smaller ones on the disc of the superior, and a lunulate one at the apex: tips of tarsi piceous.
   Obs. The spots are often much stronger than in the variety figured and described.

Beginning of September in damp woods, Glanville's Wootton, Mr. Dale; also in the New Forest and Cumberland in June and July.

The Plant is *Malva rotundifolia*, Dwarf Mallow.



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118.

BOREUS HYEMALIS.

Order Neuroptera. Fam. Panorpidæ *Lat., Leach.*

Type of the Genus Panorpa hyemalis *Linn.*

Boreus *Cuvier, Lat.*—Panorpa *Linn., Fab., Panz.*

Antennæ approximating, inserted in large deep foveolæ, long, filiform, pubescent, composed of upwards of 20 joints, basal joint large transverse, 2nd robust clavate (fig. 1), the 10 following elongated, the remainder sub-ovate, terminal joint conic.

Labrum produced into a rostrum, horny, apex membranous, rounded and densely ciliated (2 the apex).

Mandibles naked, elongated, nearly linear, truncated obliquely at the apex, and furnished with 7 or 8 small sharp teeth (3 and 3 a).

Maxillæ horny, elongated, united, forming the underside of the rostrum (4); the apex membranous, pubescent, narrow, with the internal angle produced (4 a) : *Palpi* inserted near the apex of maxillæ, long, 4-jointed, 3 first joints nearly equal, 4th elongate conic (4).

Mentum scutiform, horny, received between and divided from the maxillæ by a suture. *Lip* short. *Palpi* terminal, short, biarticulate, basal joint transverse, 2nd slender conic (5).

Rostrum *longer than the head, nutant.* Head *nearly vertical.* Eyes *large lateral.* Ocelli *none.* Thorax *long, 1st segment large, uneven, the 2 following producing short, recumbent, subulated wings in the males; and 2 fleshy scales and 2 appendages in the females.* Abdomen *robust, cylindric, simple in the males; composed of 8 joints in the females, and terminated by an ovipositor composed of an upper valve horny, hollow, acute, 3-jointed, and an under valve dilated bilobed, shorter than the other, coriaceous and rough towards the apex* (7). Legs *simple, hinder pair the longest.* Tibia *with a minute spur.* Tarsi *5-jointed.* Claw *simple dilated at the base.* Pulvilli *none.*

Hyemalis *Linn. Syst. Nat. t.* 1. *pars* 2. *p.* 915. *n.* 3.—*Fab. Ent. Syst. t.* 2. *p.* 98. *n.* 5.—*Le Règne Animal, v.* 3. *p.* 433.

Female, bronzed smooth shining. Head and eyes black the former bronzed; rostrum ochraceous, brown at the apex. Thorax fuscous ochre, anterior segment the darkest. Abdomen dark bronzed with green and reddish purple. Ovipositor ochre sometimes black at the apex. Legs and antennæ pale fuscous ochre, last joint of tarsi black, terminal portion of antennæ black also.

Male. Wings 4, half the length of the abdomen, fuscous, apex incurved, ciliated. *Linn.*

In the Cabinets of the British Museum, Mr. Walker, and the Author.

The learned authors of the *Introduction to Entomology* have most justly observed that "of all the Linnean Orders this (Neuroptera) appears to consist of the most discordant tribes; so that it seems next to impossible to construct a definition that will include them all:" of the truth of which remark there cannot be a more convincing proof than the genus before us, when compared with the Libellulidæ for example, or even the Filicornes to which section it belongs, and the want of ocelli and reticulated wings excludes it at present even from the family in which it must be included, for the contour of the head and the structure of the trophi prove beyond a doubt its affinity to *Panorpa*, although the ovipositor with which the females are furnished, is different to every thing we can recollect to have seen in any of the Orders, unless it be that of the genus *Psylla;* it is we apprehend, like the appendages of *Blatta*, employed for carrying the eggs as well as for depositing them, for it has no oviduct, and the 2 valves open vertically instead of laterally, as in Orthoptera and Hymenoptera. The mandibles it will be seen are serrated, and not bifid as described by Panzer, and the stalks of the maxillæ unite and form a base for the mentum.

Dr. Leach first added this curious insect to our Fauna by detecting a single specimen at Costessey in Norfolk in the month of December; and last November and January, Mr. Henry and Mr. Francis Walker found 4 or 5 specimens secreted in the moss in a plantation at Southgate; and it is to their handsome contribution of specimens that I have the opportunity of presenting my readers with dissections and an account of this extraordinary genus. It is remarkable that all the specimens hitherto taken in this country have been females, and I have not been able to find even a foreign specimen of the other sex in our cabinets, which I very much regret; they probably may appear earlier than November, and may not reside in the moss as the females do. *B. hyemalis* occurs in Sweden and Germany during the winter, and upon the Alps amongst the snow.

Hypnum velutinum (VelvetFeather-moss), the plant figured, is a little magnified.


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520.

CHRYSOPA ABBREVIATA.

The short-winged Golden-eye.

ORDER Neuroptera. FAM. Hemerobidæ.

Type of the Genus, Hemerobius Perla *Linn.*

CHRYSOPA *Leach, Sam., Curt.*—Hemerobius *Linn., Fab.*

Antennæ inserted in front of the head between the eyes, filiform, pubescent, as long as the body, composed of numerous oblong joints, basal joint the largest, 2nd somewhat chalice-shaped, 3rd longer than the following, a little attenuated, the remainder gradually decreasing in size to the apical joint which is somewhat conical (1, a portion of the base).

Labrum transverse, the edges membranous, notched in the middle, the anterior margin densely ciliated (2).

Mandibles elongate-trigonate, curved and acute at the apex, with a small tooth below on the inside, having a small portion of the margin pubescent (3).

Maxillæ formed of 2 very pubescent lobes, the internal one ovate, the other more quadrate. *Palpi* long hairy and 5-jointed, 2 basal joints small, 3rd long, 4th a little shorter and clavate, 5th the longest, a little dilated at the middle and rounded obliquely at the apex (4).

Mentum subquadrate. *Lip* larger, orbicular and pubescent. *Palpi* considerably longer than the lip, triarticulate, basal joint short, obovate, 2nd longer, 3rd considerably longer, dilated at the middle and rounded obliquely (5).

Head *short:* eyes *lateral, very globose brilliant and prominent:* ocelli *none.* Thorax *elongated, the prothorax forming a neck as long as the head.* Wings *very much deflexed in repose, smooth, generally long and narrow, subelliptical, very much reticulated and iridescent.* Abdomen *short, linear in the male, more dilated and truncated in the female.* Legs *very short and slender, posterior the longest:* tibiæ *simple:* tarsi *short and 5-jointed, basal joint a little the longest, 3 following very short, 5th nearly as long as the 1st:* claws *curved, acute, dilated at the base:* pulvilli *rounded* (8 *apex of tibia and tarsus of fore leg*).

Eggs *pedunculated.*

Larvæ *active, furnished with antennæ long mandibles and palpi, having 6-pectoral legs, and clavate bristly tubercles on each side the thorax and abdomen.* Pupæ *inclosed in a cocoon.*

ABBREVIATA *Curt. Guide, Gen.* 739. 3[c].

In the Cabinets of Mr. Dale, Mr. Paget, and the Author.

THESE beautiful insects, with their splendid eyes and exquisite gauze-like wings, are nearly allied to the Ant-Lions, and from their preying in the larva state upon plant lice, they have been termed by Reaumur the Aphis-Lion. The perfect insect is short-lived, flies heavily and generally by night, and the scent of it is very offensive.

There are few persons who have not been attracted by the wonderfully brilliant eyes of these insects, which are, when alive, like the head of a highly polished gold pin; and their green wings reflect the most lovely rose-colour and blue. The larvæ are very curious animals, and are well represented in the 66th Plate of Sowerby's Brit. Mis., and also in the 3rd vol. of Reaumur: they are most singularly formed, and their appearance is rendered more grotesque by their bodies being covered with the skins of their victims, the Aphides, on which they live; and by this means they render themselves almost invisible amongst the Lichen on the trunks of trees where they resort. Their eggs are not less worthy of notice, being protected from the attacks of parasitic and other insects by being attached to the end of a long stiff filament, the base of which is fastened to a leaf, as represented in our Plate.

The following species have been detected in Britain, and they are all found in June, July, and August.

1. fulvocephala *Sam.*—fulviceps *Step.* Considerably like the following in colour, but the wings are longer, the nervures lighter, and the costa is not brown at the apex.
2. capitata *Fab.* Fuscous, head orange, wings iridescent, nervures and stigma brown; legs pale testaceous.
3. reticulata *Lea.*—*Schæf. Icon. tab.* 5. *f.* 7 *&* 8.—chrysops *Linn.* Green, head and thorax spotted with black, sides of abdomen and most of the transverse nervures of the wings black.

Always found in woods in June; New Forest, Coomb and Darent-woods.

3ᵇ. ventralis *Curt.* Pale or yellowish green; antennæ fuscous at the apex, with a black dot between the basal joints, another before each eye, 2 on the back and 2 on each side of the prothorax, and 2 between the anterior wings; underside of the abdomen piceous, except at the apex: wings with short and pale pubescence, and a few of the nervures partially piceous.

3ᶜ. abbreviata *Curt. Brit. Ent. pl.* 520. ♂. Bright green, wings comparatively short and ovate, beautifully ornamented with blue and rose colour, the stigma and nervures bright green, producing distinct black hairs; tarsi and antennæ dull ochre, with a black dot on the upper side of the basal joint of the latter, and another between them, 2 others on the crown and a curved black line at the base, a black dot at the base of each wing, and the hairs on the abdomen of the same colour.

Taken by Mr. Dale on the sand hills at Appledore and Ravenglass, and on the Marrams near Yarmouth, by Mr. C. J. Paget, in June.

4. alba *Linn.*—*Panz.* 87. 14.? "White, eyes brassy-green. Like *C. Perla*, but smaller."
5. affinis *Lea.*—*Roesel. tab.* 21. *f.* 5.? Is considerably smaller than the following, I believe.
6. Perla *Linn.*—*Schæf. Icon. tab.* 9. *f.* 2. *&* 3.?—*Panz.* 87. 13.?—*Don.* 8. 277. 2.? "Yellowish green, wings hyaline with green veins."

Common in gardens, orchards, &c.

The Plant is *Elymus arenarius* (Upright Sea Lime-grass), communicated by Jas. Paget, Esq., from Caistor, Norfolk.



Pub. by J. Curtis Feb. 1 1828

5-1328

202.

HEMEROBIUS FIMBRIATUS.

Order Neuroptera. Fam. Hemerobiadæ *Leach.*
Hemerobini *Lat.*

Type of the Genus Hemerobius hirtus *Linn.*

Hemerobius *Linn., Geoff., DeGeer, Fab., Oliv., Lat., Leach, Stew., Turt., Sam.*

Antennæ inserted between the eyes, on the crown of the head, moniliform, pubescent, nearly as long as the body, composed of numerous obovate joints, basal joint the largest, 2nd larger than the remainder which decrease in length to the apex, where they become transverse (fig. 1).

Trophi membranous.

Labrum rather broader than long, angles rounded, slightly ciliated (2).

Mandibles small, subtrigonate, bent acute, one denticulated below the centre, the other angulated at the middle (3).

Maxillæ terminated by 2 lobes, nearly equal in size, very pubescent at the apex, the external one articulated, extending beyond the internal one, which is horny at the margin and apex. *Palpi* rather long, 5-jointed, basal joint robust, 2nd short, 3rd and 4th longer of nearly equal length, 5th the longest, subfusiform, thickened externally, the inner edge thin (4).

Mentum dilated at the base, rounded anteriorly. *Labium* fleshy, rather long, rounded and pubescent. *Palpi* nearly as large as the maxillary, arising from scapes, 3-jointed, basal joint not short, 3rd nearly as long as the 2 first, subfusiform, thickened on the outer, membranous on the inner side (5).

Head *short, transverse.* Eyes *small, lateral, prominent.* Ocelli *none.* Thorax *not broader than the head, the prothorax sometimes narrower.* Abdomen *slender.* Wings 4, *very much deflexed when at rest, longer than the abdomen, pubescent, the nervures very numerous especially in the superior wings and producing hairs.* Legs *slender.* Tibiæ *simple.* Tarsi 5-*jointed, basal joint the longest, 4th the shortest.* Claws *minute, simple.* Pulvilli *small* (8, *a fore leg*).

Fimbriatus *Nob.*

Piceous, pilose. Antennæ with the 1st and 2nd joints dull ochreous. Thorax with an ochraceous line down the middle and a spot on each side of the same colour, mesothorax variegated with ochre: the base of the abdomen subferruginous. Wings tinged with ochre, iridescent, ciliated: superior spotted with fuscous, the nervures spotted with brown; inferior with an interrupted fuscous fimbria, across which the nervures are dark brown, as well as upon a narrow space of the disc. Legs dull ochre, thighs inclining to piceous, the posterior as well as the base of their tibiæ piceous; apex of tarsi piceous also.

In the Cabinets of the British Museum and Mr. Dale.

The Hemerobiadæ are no less remarkable for their beautifully reticulated wings and pedicled eggs, than for their singular appearance and valuable qualities in the larva state, during which period of their existence they live upon *Aphides* (plant-lice), and in conjunction with the larvæ of the *Coccinellæ* (lady-birds); and some of the Syrphidæ are of the utmost importance to the hop-grower, by assisting to free him from one of his greatest enemies. Our readers will be much gratified by consulting the 3rd volume of Reaumur, who gives figures of the larvæ, &c. on the 32nd plate, and the 1st volume of Kirby and Spence, where their extraordinary habits are amusingly related.

We have seen ten or twelve undescribed British species, besides the following, which have been recorded by the authors whose names are attached to them; those which have been noticed in the *Entomologist's Useful Compendium* are preserved in the British Museum.

1. H. phalænoides *Linn.*—*Panz.* 87. 15. The only indigenous specimen I have seen of this fine insect, was taken last June near Lanark, Scotland, by Mr. H. Walker.
2. Beckwithii *Sam.*—June to August, Woods, &c.
3. variegatus *Fab.*—June, July, and August, upon grass and alders, Ambleside, Glanville's Wootton Dorset, and the Ochill Hills near Stirling.
4. obscurus *Sam.*—June to August. Hedges and Woods.
5. fasciatus *Fab.*
6. nervosus *Fab.*—June. Hedges and Woods.
7. hirtus *Linn.*—*Don.* 4. 113.—June and July upon the Hop and Hazel. Donovan observes, that like the *Hemerobius* (*Chrysopa*) *Perla*, it is always very brisk at the approach of a thunder-storm.
8. irroratus *Sam.*—June. Hedges and Woods.
9. affinis *Sam.* do. do.
10. lutescens *Fab.*—*DeG.* 2. *t.* 22. *f.* 8.—June, Aug., do.
11. punctatus *Turt.* do. do.
12. nemoralis *Sam.* do. do. and Loch Rannoch, Perthshire.
13. decussatus *Sam.*—June, Hedges and Woods, Ambleside; m. Aug. Dover, and Glanville's Wootton.
14. Pini *Sam.*—June, Aug. Hedges and Woods in various parts of England, and Kinnoul and Dunkeld, Perthshire, Scotland.
15. fimbriatus *Nob.*—The specimen figured was found July 1, 1825, on the grass, at Dundingston Loch, near Edinburgh, by Mr. Dale; and in the British Museum is another, probably from the same spot.
16. crispus *Schæf. Icon. pl.* 122. *f.* 2. & 3.

The plant is *Betonica officinalis* (Wood Betony).


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528.

CONIOPTERYX PSOCIFORMIS.

ORDER Neuroptera. FAM. Psocidæ.

Type of the Genus, Coniopteryx Tineiformis *Curt.*

CONIOPTERYX *Curt.*

Antennæ inserted between the eyes, as long or longer than the body, filiform, composed of numerous pubescent and submoniliform joints, from about 20 to 40 in number, basal joint the stoutest, 2nd oblong, the following globose, gradually becoming ovate towards the apex, the terminal joint being elongate-conic (1, portions of the base and apex).

Labrum semicircular, slightly concave before, with 2 bristles on each side (2).

Mandibles subtrigonate, apex acute with a notch on the inside forming a rounded shoulder (3).

Maxillæ small, terminated by 2 curved lobes, the inner one linear and rigid, the other a little broader, more membranous and rounded at the apex. *Palpi* rather long and porrected, forming a kind of beak, and 5-jointed, first 4 joints nearly of equal length and stoutness, 1st oblong, 2nd 3rd and 4th obovate, the two latter truncated obliquely, 5th long and sublanceolate (4).

Mentum subquadrate. *Palpi* triarticulate, first two joints subovate, 3rd large ovate and compressed (5).

Head *orbicular, depressed in front;* neck *distinct:* eyes *near the anterior angles of the head, remote and ovate:* ocelli *undiscovered.* Thorax *gibbose and tuberculated.* Abdomen *short, elongate-ovate.* Wings *deflexed when at rest, rounded and powdered, the superior very ample and larger than the inferior, which are sometimes very small; many longitudinal nervures and a few transverse ones, forming* 3 *discoidal cells in each* (9). Legs, *anterior the shortest, posterior the longest:* tibiæ *compressed, longer than the thighs, except in the* 1*st pair:* tarsi *short slender and* 5*-jointed, basal joint the longest,* 2*nd and* 3*rd obtrigonate,* 4*th very short and bilobed,* 5*th very slender and clavate:* claws *bent and acute* (8, *a fore leg*).

PSOCIFORMIS *Haliday's Mss.—Curt. Guide, Gen.* 741ª. *No.* 2.

Length $\frac{2}{3}$ of a line, expansion 4 lines. Dead pearly white, antennæ twice as long as the body, composed of nearly 40 joints, subochreous: superior wings very ample and distinctly iridescent; inferior wings small.

In the Cabinets of Mr. Haliday and the Author.

THIS group may be distinguished from Psocus by the greater number of joints in the antennæ palpi and tarsi, by the powdered wings (from whence the name of Coniopteryx) and the absence of a stigma.

For the curious Larva represented at fig. L, I am indebted

to my friend Mr. Haliday, who says in his letter, "This larva is found wandering in groves from the end of August to October; it is probably Aphidivorous, though this I have not proved, nor have I bred it, but I can entertain no doubt that it is the larva of *C. tineiformis*. The general character is closely allied to the larva of Hemerobius, to which genus it is related." It is rosy, with a large oval blackish patch on the back, and large white spots down each side.

1. C. tineiformis *Curt.*

Length $\frac{3}{4}$ of a line, expansion $2\frac{2}{3}$.

Dead pearly grey, powdered: antennæ not longer than the body, containing about 25 joints; superior wings very ample (9 *s*), inferior small (*i*), abdomen ochreous.

This insect is not uncommon in Norfolk and the New Forest, and I have found it abundant the end of June flying out of a hedge in the day time in Mr. Dale's garden at Glanville's Wootton. Mr. Haliday says, "It occurs in groves (especially on Coniferæ) in summer: the colour is clear bluish white, but the dried specimens either fade or become rubbed. In the living insect the palpi are porrected and adhere together, forming a kind of beak. When captured they feign death, with their antennæ bent in under the thorax, as in Hemerobius and Chrysopa."

2. C. Psociformis *Hal.—Curt. Brit. Ent. pl.* 528 ♂ ?

This Insect I also found in Norfolk many years since, and Mr. Haliday took it in the same situation as the last: and adds, "when the deflected upper wings in repose conceal the lower, it resembles the former species, but it is distinguished by its superior size and more brilliant white colour." The natural size of the insect at rest is shown towards the lower part of the Plate.

The Plant is *Trifolium glomeratum* (Round-headed Trefoil), communicated by James Paget, Esq., one of the authors of a "Sketch of the Natural History of Yarmouth," an invaluable abstract of local information, and an admirable example, which I hope to see followed in every County of the United Kingdoms.






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14-1387

PSOCUS FENESTRATUS.

ORDER Neuroptera. FAM. Psocidæ.

Type of the Genus, Psocus lineatus *Lat.*

PSOCUS *Lat., Fab., Coq., Panz., Curt.*—Hemerobius *and* Termes *Linn.*

Antennæ inserted on each side the clypeus before the eyes, generally as long as the wings, subsetaceous, pilose and 13-jointed, basal joint stout, 2nd short, 3rd very long and slender, the following decreasing in length (1, a few basal and apical joints). *Labrum* large, pocket-shaped, the anterior margin convex (2). *Mandibles* trigonate, very broad at the base, the apex very acute with a notch beneath, one having a sharp tooth near the base (3). *Maxillæ* elongated, with a long narrow horny process notched at the apex (4 *), arising at the base and reaching nearly to the extremity of the terminal lobe, which is fleshy at the apex. *Palpi* long hairy and 4-jointed, basal joint oblong, 2nd longer and stouter, 3rd shorter, 4th as long as the 2nd and ovate (4). *Mentum* and *Labium* subquadrate, a little broadest at the base, a deep suture down the centre, anterior margin sinuated, the angles notched, with a rounded and ciliated membrane behind. *Palpi* none (5).

Head *large, ovate-trigonate:* eyes *remote, lateral, small, globose and prominent:* ocelli 3 *in triangle on the crown* (H *the face*). Thorax *suborbicular.* Abdomen *short, soft, often ovate:* oviduct *inclosed between* 2 *valves.* Wings *deflexed in repose, superior much longer than the animal, very ample, with a trigonate stigma, one furcate nervure and* 3 *distinct cells at the posterior margin* (9): inferior *smaller with one large and one small furcate nervure.* Legs *slender;* thighs *slightly thickened:* tibiæ *slender, hinder the longest:* tarsi *short, biarticulate, basal joint a little the longest, especially in the hinder pair:* claws *curved and acute* (8, *a fore leg*).

Larvæ *apterous.* Pupæ *with rudimentary wings.*

FENESTRATUS *Curt. Guide, Gen.* 742. 1.

In the Cabinets of Mr. Dale and the Author.

THE genus *Psocus* bears considerable resemblance to the *Aphides,* but the mandibulate mouth and the neuration of the wings at once distinguish it, and as the disposition of the nervures is sufficient to characterize two groups, I shall propose the name of *Cæcilius* for the second.

The Psoci are found upon the bark of trees, paling, walls, and under stones, and in all probability they and their larvæ feed upon the minute animals that live amongst the Lichen and Mosses that grow in such situations.

1. Psocus: *superior wings with a long and short furcate nervure, having 4 perfect cells on the posterior margin* (*fig.* 9).

1. pilicornis *Lat.*—*Coq. tab.* 2. *f.* 12. June, New Forest.

3. fasciatus *Fab.*—*Panz.* 94. 20. May, June, July, paling and trunks of trees, Coomb Wood and Glanville's Wootton.

4. variegatus *Lat.*—*Coq. f.* 13. End of July, Castle Connel; August, on Birch-trees, Loch Fad.

5. lineatus *Lat.*—*Coq. f.* 8. End of July, Coomb Wood; August, Glanville's Wootton.

8. bifasciatus *Lat.*—*Coq. f.* 4. August, Isle of Bute.

10. longicornis *Fab.*—*Panz.* 94. 19.

16. bipunctatus *Linn.*—*Panz.* 94. 21.—*Coq. f.* 3.

17. sexpunctatus *Linn.*—*Coq. f.* 10 & 11.

18. Morio *Lat.*—*Coq. f.* 5. July, trunks of Lime-trees, Thetford.

19. 4-maculatus *Lat. Coq. f.* 6. & 7.

21. 4-punctatus *Fab.*—*Panz.* 94. 22.—*Coq. f.* 9. May, on Holly-trees.

22. fuscopterus *Lat.*—*Coq. f.* 2.

24. abdominalis *Fab.*—pedicularius *Lat.*—*Coq. f.* 1.

2. Cæcilius: *superior wings with 2 short furcate nervures, having 3 perfect cells on the posterior margin, with a bisinuated nervure at the posterior angle.*

25. fenestratus *Curt. B. E. pl.* 648. Antennæ not so long as the wings; head and thorax brown; abdomen dull scarlet, wings richly iridescent, superior brown with a semiovate transparent space on the costa, divided by an oblique brown stripe, also a transparent stripe opposite, at the extremity of the interior margin; inferior pale fuscous with a long transparent space on the costa: legs ochreous.

End of June, Glanville's Wootton, Dorset.

26. strigosus *Curt.* Ochreous; antennæ not longer than the wings, brown, except at the base; an elongated trigonate brown spot on the crown, disc of thorax of the same colour; abdomen yellow; wings pale yellowish fuscous, nervures suffused with brown in the superior as well as the interior margin at the base: expanse 4 lines.

September, October, on Alders, Parley Heath and Cartland Craigs.

27. irroratus *Curt.* Yellow; antennæ not longer than the body; head, thorax, and back of abdomen spotted with brown: superior wings with suffused fuscous nervures and pale spots on the disc of most of the cells, forming a row round the posterior margin: 3¼ lines.

28. vitripennis *Curt.* Black; antennæ as long as the wings; head very broad, eyes very prominent; labrum, palpi, and sutures of thorax yellowish; wings immaculate, nervures delicate dark brown, stigma long and brown, legs ochreous, tips of tibiæ and tarsi brown: 4½ lines.

End of June, Clifton, near Bristol.

The Plant is *Sedum villosum*, Hairy Stonecrop.


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37.

RAPHIDIA OPHIOPSIS.

Order Neuroptera. Fam. Raphidiadæ *Lat., Leach.*

Type of the Genus R. Ophiopsis *Linn.*

Raphidia *Linn., Fab., Lat.*, &c.

Antennæ inserted between the eyes, remote, as long as the thorax, nearly filiform, composed of many joints (44 in the male, 42 in the female of the type), two first joints robust, last conical. (1.)

Labrum exserted, subquadrate, rather broader than long, anterior margin circular, entire. (2.)

Mandibles corneous, strong, extending beyond the labrum, elongate, curved, acute, with two sharp teeth on the internal side. (3.)

Maxillæ short, crustaceous, bilobed, ciliated: *Palpi* short, filiform, 4-jointed; first joint short, second longer, third and fourth of equal length, the latter truncated. (4.)

Mentum short, quadrate: *Palpi* short, attached to two immoveable articulations, 3-jointed, last joint long, truncated. (5.)

Clypeus *broad, anterior margin nearly straight.* Head *inflexed, ovat, narrowed behind.* Eyes *prominent.* Ocelli 3 *in triangle.* Thorax *with the first segment very long, cylindric.* Wings *deflexed, nearly equal in size, reticulated, all the nerves hairy.* Abdomen *of the* male *produced at the apex with* 2 *strong teeth* (7. *the terminal joints viewed in profile*) : *of the* female *terminated by* 2 *united canals, transversely striated, slightly hairy, with two valves at the apex.* (6.)

Ophiopsis *Linn. Syst. Nat.* 2. 916. 1. *Fab. Ent. Syst. v.* 2. *p.* 99. *n.* 1.

Black, shining. Head slightly punctured. Clypeus, base of antennæ, legs, (excepting the base and upper surface of the thighs), 2 lines down each side of the abdomen, and a spot on each segment down the back straw colour. Wings slightly coloured. Stigma brown.

In the Author's and other Cabinets.

Dr. Leach has divided this extraordinary Genus into the following species—1. *R. Londinensis,* 2. *affinis,* 3. *maculicollis,* 4. *megacephala,* and 5. *Ophiopsis;* how far they may be good species it is not easy to determine, as they are subject to great variations, and the nervures of the wings are very inconstant, frequently not agreeing in the same specimen.

R. Londinensis, as its name implies, is found in the vicinity of our capital, even as near as Copenhagen Fields; it has no stigma. *R. affinis* is a smaller species, the male of which is figured in Kirby and Spence's Introduction to Entomology (pl. 3. f. 6.); *R. maculicollis* is very similar to *R. Londinensis* and *R. megacephala* and *Ophiopsis* appear to me to be the same.

The larvæ are described by Latreille as very nimble and voracious, living upon small insects, and concealing themselves in crevices in the bark of trees; the pupæ, like the rest of the Order, have the power of locomotion. The perfect insect also feeds upon smaller ones, its long moveable thorax enabling it to seize its prey in any direction with great facility; and it is able to bite with considerable force with its acute mandibles, which it can extend considerably.

The ovipositor is exceedingly dissimilar to those of any other insects; by Latreille's description and my own observations, it appears to be formed by two canals united, with a space between, being composed of transverse rings which enable the insect to propel the eggs to the apex, where they are received and deposited by the two appendages, in clusters like fly-blows.

The month of June appears to be the season for all the species in the imago state, and they are stated to prefer the neighbourhood of streams; the specimen, however, figured in the plate, with two or three others, were beat out of White-thorns in rather high ground in the New Forest.

The plant figured is *Veronica Chamædrys* (Wild Germander).



PERLA CEPHALOTES.

Order Neuroptera. Fam. Perlidæ *Nob.*—Perlides *Lat.*

Type of the Genus Phryganea bicaudata *Linn.*

Perla *Geoff., Lat., Leach.*—Semblis *Fab., Panz.*—Phryganea *Linn.*

Antennæ remote, inserted before the eyes close to the base of the mandibles, about the length of the body, setaceous, composed of numerous joints, basal joint large, 2nd smaller, the remainder increasing in length to the apex, being transverse towards the base, and obovate at the extremity (fig. 1).

Labrum transverse, linear and pubescent (2).

Mandibles small, produced internally, pilose externally, acute at the apex, sometimes furnished with 2 short spines (3).

Maxillæ small, bilobed, internal lobe producing a few hairs and slightly notched, external much longer, narrower, and lanceolate, having an obscure mark of articulation at the apex. *Palpi* long, subsetaceous slender and pilose, 5-jointed, basal joint minute, 2nd the most robust, 3rd rather the longest, 4th nearly as long, 5th not longer than the 2nd (4).

Mentum large, covering the underside of the head, transverse sublunulate. *Lip* subquadrate, producing a fleshy lobe at each of the anterior angles. *Palpi* not long, 3-jointed, pubescent, joints of nearly equal length, the basal one the most robust, terminal the slenderest (5).

Males *sometimes smaller than the females.* Trophi *submembranous.* Head *horizontal, transverse ovate, very much depressed.* Eyes *lateral, not large but prominent.* Ocelli 3 *in triangle, hinder ones the largest* (1 a). Thorax *subquadrate.* Mesothorax *and* Metathorax *producing 2 pair of reticulated wings, incumbent and horizontal when at rest, of nearly equal length, the superior being the narrowest.* Abdomen *short, oblong-quadrate in some, the apex furnished with 2 long articulated setæ.* Legs *simple, longest in the males.* Tibiæ *not spined.* Tarsi 3-*jointed, glandular beneath, 1st and 2nd joints minute, 3rd long.* Claws *acute.* Pulvilli *globose* (8, *a fore leg*).

Obs. *The dissections were taken from a male of* P. marginata.

Cephalotes *Nob.*

Male brown. Head considerably broader than the thorax, a transverse ochraceous spot between the eyes, the base of the same colour; thorax transverse quadrate, rugose, with a channel down the middle and an elevated line on each side curved outward. Abdomen inclining to ochre at the apex. Setæ not so long as the antennæ. Wings scarcely so long as the body; the inferior with 2 transverse nervures in the 4th discoidal cell.

Female 4 times as large as the male and much broader; abdomen frequently ochraceous, wings extending to the apex of the setæ, semitransparent, stained fuscous, rarely wanting the 2 transverse nervures in the under wings.

In the Cabinets of Mr. Dale and the Author.

The insects of the genus now under investigation, like many others belonging to the same order, live in the water till they assume their perfect state, when they form a principal portion of the food of fishes, especially trouts, and are consequently well known to the angler.

The following is a list of our British species.

A. Abdomens very robust.

1. P. grandis *Nob.*
2. margiuata *Fab.*—*Panz.* 71. 3.—flavipes *Lat.*, *Geoff.* ?
3. P. cephalotes *Nob.*
4. bicaudata *Linn.*, *Fab.*, *Panz.* 71. 4.

B. Abdomens slender.

5. P. fuscipennis *Nob.*
6. media *Nob.*
7. P. viridis *Fab.*—lutea *Lat.*, *Geoff.* ?
8. minor *Nob.*

P. grandis is half as large again as the species figured, and has been taken I have understood near the Croydon Canal.

P. marginata. On the 4th of June Mr. Dale and myself found a few specimens of this insect upon a species of fern near Ambleside, and a few days after I took a considerable number, lying three and four together concealed amongst the foliage of the plant figured, as well as others that grew close to the water's edge, also the exuviæ attached to a fern.

P. cephalotes. This species I found with the last; and although at first sight the two may be easily confounded, our insect is distinguished by a much broader head; the antennæ wings and setæ in the males are not longer than the body, the thorax is differently sculptured and transverse in the females, and there are with very few exceptions two transverse nervures on the disk of the inferior wings, which are always wanting in *P. marginata*, the exuvia of the latter is beautifully maculated, but in our insect it is entirely fuscous. The female sometimes carries a globular bundle of little black shining eggs at the apex of her abdomen. These two insects are a favourite food of the trout in Cumberland, and are succeeded by the Bracken-clock (*Anomala horticola*), and that again I believe by the Willow-fly (*P. viridis*).

P. bicaudata is known by an orange stripe down the head and thorax, and has been taken by Mr. Bracy Clark in Worcestershire, and in June upon Battersea bridge by Mr. Haworth.

P. fuscipennis, larger than *P. viridis*, with slightly fuscous wings. This I took in Scotland.

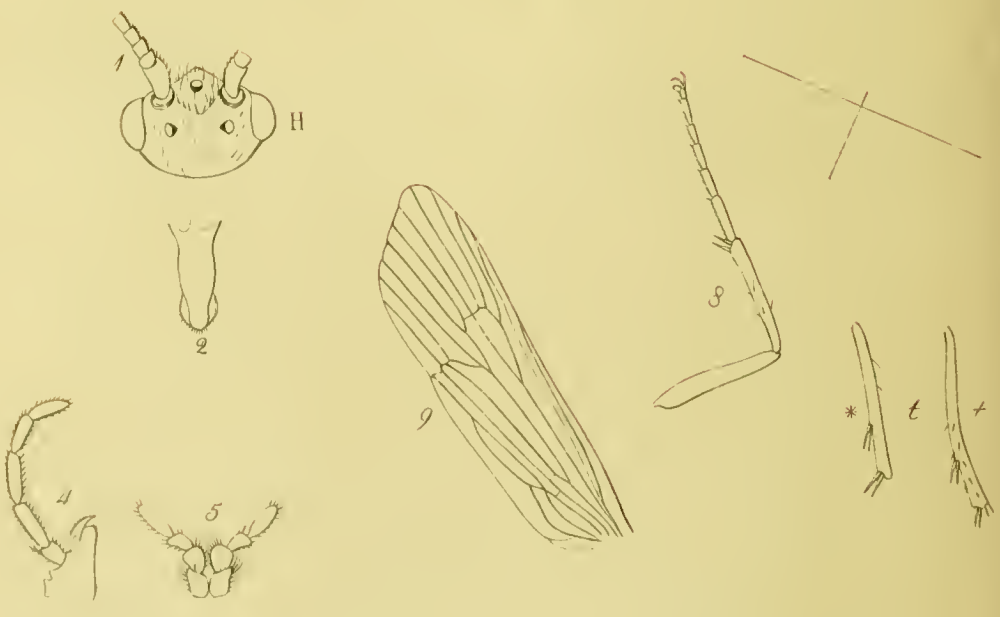
P. media, the size of the last with yellowish wings and black body,—beginning of June, on Oaks, &c., Ambleside.

P. viridis, smaller, thorax with a black margin, body pale with a black stripe. Beginning of June, upon Alders, New Forest.—Reaumur believes figures 8, 9 and 10, *pl.* 14, to be the larvæ and their cases of a small Perla (*pl.* 13. *f.* 12), which is probably this or a congenerous species.

P. minor, like the last, but only half the size; found near Ambleside, the beginning of June, running about in pairs, which proves they are not males of *P. viridis*.

Trollius europæus (Globe-flower) accompanies the insect.





Lith. v. C. Barbieux Bruxelles 1865

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AGRYPNIA PAGETANA.

The Yarmouth Grannom or May-fly.

ORDER Trichoptera. FAM. Phryganidæ.

Type of the Genus, Agrypnia Pagetana *Curt.*

AGRYPNIA *Curt.*

Antennæ as long as the body, inserted in front of the head, between and near to the eyes, composed of numerous slightly pubescent joints, the basal one very robust, 2nd slightly cup-shaped, the remainder becoming gradually oblong (1).

Labrum long and tongue-shaped, the sides at the apex a little dilated and ciliated (2).

Mandibles minute.

Maxillæ small, with a rounded ciliated internal lobe, and a pointed curved external one. *Palpi* long, compressed, pubescent, pilose and 5-jointed, basal joint short, 2nd and 3rd long, of equal length, 4th and 5th equal but a little shorter, the latter subelliptic (4).

Labial palpi attached to 2 scapes, pubescent, slightly pilose and triarticulate, basal joint the stoutest, somewhat obconic, 2nd the smallest, but of similar form, 3rd the longest, elongate-ovate (5).

Depressed: *head broad, transverse-ovate* (H): eyes *lateral, prominent, globose and minutely granulated:* ocelli 3 *in triangle, remote, large and prominent.* Thorax *small and suborbicular:* postscutellum *large and semiovate.* Abdomen *depressed, long broad and narrowed at the base, with* 8 *distinct joints.* Wings *longer than the body, deflexed when at rest,* superior *narrow and sublanceolate, but rounded at the apex* (9); inferior *shorter, folded in repose, both having numerous longitudinal nervures, especially at the apex.* Legs, *anterior the shortest:* coxæ *and* thighs, *middle pair the longest:* tibiæ, *all having a pair of spurs at the apex, anterior short, posterior the longest and a little bent, with a pair of spurs also above the apex* (t †), *the middle tibiæ being armed in the same manner* (*): tarsi *long and 5-jointed, basal joint long:* claws *and* pulvilli *minute* (8, *a fore leg*).

PAGETANA *Curt. MSS.—Guide, Gen.* 747ᵇ. 1.

Pale dull ochreous; eyes and ocelli brownish; antennæ head and thorax a little more ferruginous, and clothed with ochreous hairs, the latter with an ash-coloured tint, the postscutellum and abdomen dull castaneous with a grey bloom, the base of the segments in the latter dark, the apex ochreous: tips of superior wings slightly fuscous; inferior transparent iridescent, the tips suffused with ochre, all the nervures dark brownish ochre, excepting a few of the basal ones in the under-wings: legs and underside brighter ochre.

In Mr. Paget's Cabinet.

I ENDEAVOURED to call the attention of Naturalists to this neglected Order ten years since, when I described and illustrated the genus Leptocerus (folio 57); and the hope I expressed in a memoir published in the London and Edinburgh Phil. Mag. the beginning of last year, has been realised by the appearance of Mons. Pictet's admirable work on the Phryganidæ. His divisions, formed on the structure and œconomy of the larvæ, supply the most natural and unexceptionable definitions for Families, and the Genera he has characterized and adopted may be considered the types of them. Averse as I am to multiplying genera, I am convinced that many more are already required in this order, and the number and situation of the spurs in the tibiæ, and the neuration of the wings, will furnish admirable distinctions for such groups: the palpi I consider the best test; but without dissection and a number of specimens it is frequently impossible to obtain a view of them, or to ascertain whether these Insects possess labial palpi at all.

The following are two of M. Pictet's analytical Tables, which cannot fail to be acceptable to Entomologists.

PHRYGANEA.

Antennæ setaceous.	Maxillary palpi of the male spoon-shaped or clavate	forming a rounded face			Sericostoma Lat.
		clavate, with bristly scales			Trichostoma Pict
	Palpi of male filiform	terminal joint of palpi ovate	long and hairy.	Antennæ very long	Mystacide Lat.
			moderately long and slightly hairy	triarticulate in the male; wings with transverse nervures	Phryganea Lat.
				5-jointed in both sexes; wings without transverse nervures	Rhyacophila Pict
		terminal joint of palpi forming an elongated filament		inferior wings folded	Hydropsiche Pict
				inferior wings not folded	Psychomia Lat.
Antennæ filiform					Hydroptila Dal.

LARVÆ

with a case	case opening by a round hole	segments of the thorax rounded	external respiratory organs isolated, legs moderately long		Phryganea.
			respiratory organs in tufts	hinder legs long	Mystacide.
				hinder legs short	Sericostoma.
		segments with the anterior angles produced			Trichostoma.
	case opening by a cleft				Hydroptila.
without a case	pupa with a double envelope				Rhyacophila.
	pupa with a simple envelope				Hydropsiche.

The remarkable insect figured in our plate is most allied to Limnephilus (pl. 488.), before which it may be placed. A portion of the apex of the horns has evidently been broken off whilst the insect was alive, as their length is unequal, and the tips are of a darker colour. I have named it after my friend C. J. Paget, Esq., who took it off some rushes in a salt marsh between Yarmouth and Caister, the 14th of August 1833.

The Plant is *Frankenia lævis* (Smooth Sea-Heath).






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LIMNEPHILUS ELEGANS.

The elegant Grannom or May-fly.

ORDER Trichoptera. FAM. Phryganidæ.

Type of the Genus, Phryganea grisea *Linn.*

LIMNEPHILUS *Lea., Sam., Curt.*—Phryganea *Linn., Fab., Lat.*

Antennæ inserted close to the interior margin of the eyes, but remote from the mouth, shorter than the wings, slender, setaceous and pubescent, composed of numerous joints, the basal one stout ovate and hairy, 2nd cup-shaped, 3rd oblong, longer than the following, which are quadrate gradually becoming oblong towards the apex, the terminal joint elongate-conic (1).

Labrum (2) resting in a groove in the labium, tongue-shaped, hairy, dilated, convex and orbicular at the base.

Mandibles very minute.

Maxillæ small, terminated by an obcordate lobe, hairy on the outside (4. *m*). *Palpi* shorter than the thorax, and 5-jointed, pubescent and slightly pilose, basal joint short and oblong, the remainder slightly attenuated, long and of equal length, except the 4th, which is considerably shorter (4).

Mentum transverse, short, concave before, the anterior angles dilated and rounded. *Lip* nutant, long, fleshy and conical. *Palpi* attached to very short scapes, approximating at the base, triarticulate, 1st and 2nd joints hairy, of equal length, subovate, the latter the slenderer, 3rd considerably longer, as broad as the 1st and elliptical (5).

Head *small, transverse:* eyes *lateral very prominent and globose:* ocelli 2, *placed on the crown of the head near to the eyes.* Thorax *small subglobose.* Abdomen *rather compressed in the male, longer and stouter in the female.* Wings, superior *deflexed when at rest, long and narrow, pubescent, and slightly coriaceous with numerous longitudinal hairy nervures and an irregular line of transverse ones beyond the middle with an elongated stigmatic cell* (9) : inferior *rather shorter than the others but very ample, folded when at rest, very delicate, with numerous longitudinal cells, many of them united by transverse nervures.* Legs, *excepting the thighs, bristly :* coxæ *long :* thighs *slender :* tibiæ *simple, posterior with a pair of spurs at and another pair above the apex :* tarsi 5-*jointed, basal joint the longest:* claws *and* pulvilli *minute.* Larvæ *inhabiting the water and living in cases formed of sand, shells, pebbles, bits of wood, grass or straw and leaves of plants; the head and* 3 *first segments horny, with* 6 *rather long pectoral legs,* 4*th segment with* 2 *or* 3 *tubercles, the apical joint furnished with* 2 *claws.* Pupæ *formed in the same case.*

ELEGANS *Curt. Guide, Gen.* 748. 17^{b}.

Palpi and antennæ ferruginous; head and thorax somewhat castaneous, the crown of the former and the back of the latter lead colour; abdomen ochreous, the back fuscous with whitish margins to the segments. Wings shining, superior pale brown, the nervures darker, with the 3rd cell, a stripe on the disc, the 1st, 2nd, 4th and 5th posterior cells and a spot at the base of the 3rd and 6th whitish, the superior discoidal cell very long.

The female Phryganidæ like the Ephemeridæ produce their eggs in double series: the larvæ live upon those of aquatic insects and the leaves of water plants: in this state the Limnephili form cases (from whence they are called Caddis or case-worms) constructed of various materials, with a silken lining impervious to the water and open at both ends; but previous to becoming pupæ a grating is placed at each end to prevent other animals from molesting and destroying them, and at the same time for admitting the water. The larvæ are furnished with fleshy tubercles on the following segment to the pectoral feet, which no doubt are to prevent them from being drawn out of the case in the event of any resistance, as they walk along in the water. There seems to be a state in the Phryganidæ somewhat analogous to that of the Ephemeridæ, for at first the pupa is quiescent, but when it is about to become an Imago it cuts through the grating of the case before alluded to, rises to the surface of the water, crawls upon some plant, the antennæ and legs being free, excepting the hinder pair, and there it leaves the exuvia.

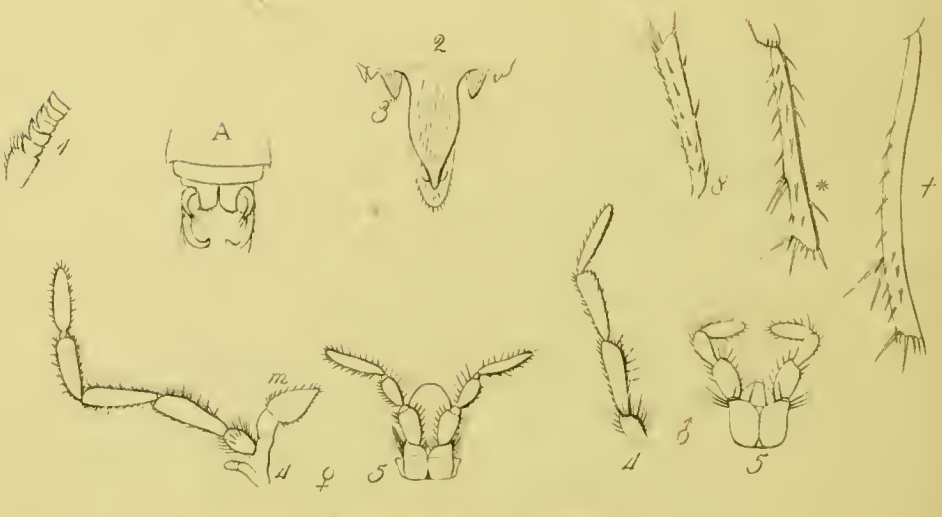
For descriptions of the new species I must refer the reader to the Phil. Mag., vol. 4, and for a list of the whole to my Guide.

1. L. basalis *Curt.*—B. June, Holly-bushes, New Forest.
2. emarginatus *Curt.*—Do. and Glanville's Wootton.
3. Strigosa *Gmel.*—May to September, marshy places.
4. griseus *Linn.*—Do. Do.
6. flavicornis *Fab.*—*Ahr.* 5. 14. *var.* ?—Duddingston Loch.
7. rhombicus *Linn.*—*Don.* 7. 220.—May to September, trees in woods, sides of lakes, rivers, &c., everywhere.
10. apicalis *Curt.*—B. Sept. to Oct., bushes in meadows, everywhere.
12. fenestralis *Curt.*—B. June, Fir-trees, &c., New Forest.
13. bipunctatus *Curt.*—B. June, Holly and White-thorns, Do. and b. September, Durnford, Wilts.
14. affinis *Curt.*—B. June, Southampton and New Forest; e. August, Covehithe, Suffolk; m. October, Sand-hills, Sandgate.
23. sparsus *Curt.*—B. May and June, Coombe, New Forest and G. Wootton.
25. Vinculum *Curt.*—B. June, New Forest.
11. Auricula *Curt.*—Spring Fir-trees, Glanville's Wootton, Mr. Dale; b. June, Oxford; m. October, Sand-hills, Lowestoft.
18. bipartitus *Curt.*—B. June, Oaks, Rushes, &c., New Forest.
19. Consobrinus *Curt.*—M. October, Heron Court.
17^{b}. elegans *Curt. Brit. Ent. pl.* 488. ♂. 1st of June Mr. Dale took 2 from Alders, by side of river in New Forest.
27. nervosus *Lea.*—May to m. October, sides of rivers Heron Court, and between Sandgate and Sand-hills in abundance.
28. radiatus *Lea.*—Do. Isle of Wight, and Apple-trees, Glanville's Wootton, and m. November paired and feeding on Yew berries, Mr. Walton.
29. hieroglyphicus.—M. October, on windows at Cobham, Surrey.
30. Vibex *Curt.*—Norfolk and Halifax, Rev. J. B. Reade.
32. stellatus *Curt.*—Autumn Glanville's Wootton, Mr. Dale.
34. villosus *Fab.*—September to m. October, in plenty at Hurne, Hants, near the river, and one at Glanville's Wootton, Mr. Dale.

"Phryganeæ," says Stewart in his Elements of Nat. Hist., "are the favourite food of Swallows, and the larvæ are used by fishermen for bait: in some parts of Holland they are so abundant, as to be used for manure."

The Plant is *Stratiotes aloides* (Fresh-water Soldier).

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PHRYGANEA MINOR.

ORDER Trichoptera. FAM. Phryganidæ.

Type of the Genus, Phryganea grandis *Linn.*

PHRYGANEA *Linn*, &c.

Antennæ inserted in front of the forehead, approximating, as long as the body, setaceous, composed of numerous short joints, pubescent beneath (1, the base).

Labrum elongated, pilose, subacuminate at the apex, but surrounded by a membranous ovate pubescent membrane (2).

Mandibles small, soft, pubescent and trigonate (3).

Maxillæ small, terminated by an articulated, obpyriform pubescent lobe (4, m). *Palpi* long, pubescent, pilose and 5-jointed, basal joint ovate and bristly, 2nd the longest, stout and subclavate, the remainder slightly decreasing in length, 5th joint elliptic (4 ♀) : shorter and 4-jointed in the male (4 ♂).

Mentum small and transverse. *Palpi* long, porrected, pilose and triarticulate, attached to large scapes, arising behind the mentum; basal joint the stoutest, ovate-truncate, 2nd smaller obovate, 3rd the longest, subelliptic (♀ 5); shorter and stouter in the male (♂ 5). *Lip* large, fleshy and ovate, much smaller in the male.

Head *transverse ovate :* eyes *lateral globose and very prominent :* ocelli 3 *forming a large triangle.* Thorax *orbicular.* Abdomen *short and compressed in the male, the apex furnished with* 2 *long incurved horny appendages with* 2 *short ones below them and a bilobed one between them* (A, *the underside*): *longer stouter and more conical at the apex in the female.* Wings *somewhat deflexed when at rest, elongated and lanceolate in the female, more obtuse in the male.* Legs *strong ;* thighs *velvety :* tibiæ *spined ; anterior short and spurred at the apex* (8)*; intermediate* (*) *and hinder which are very long and curved* (†), *spurred at the apex, with a pair also considerably below the middle :* tarsi 5-*jointed, basal joint the longest, the remainder gradually decreasing in length, the* 4*th being the shortest in the anterior pair :* claws *and* pulvilli *minute.*

MINOR *Curt. in Phil. Mag.—Guide, Gen.* 750. 6.

Subochreous, antennæ annulated with brown, the base, crown of head, and back of thorax greyish clothed with ochreous hairs; base of abdomen brown, back fuscous : wings pubescent, nervures brown; superior ochreous variegated and reticulated, with a brown patch at the base, an imperfect fascia at the middle, with a black lunate spot and a white dot on the disc, a brown fimbria at the posterior margin bearing 2 round ochreous spots on the costa, a distinct line formed of similar spots parallel to the margin, which is broken by similar spots and the edges spotted brown ; inferior wings iridescent, pale fuscous at the apex ; palpi, anterior thighs and tips of tibiæ brown.

In the Author's Cabinet.

It appears from Roesel's figure that the larva of *P. grandis* forms a case of the outside sheaths of the base of Reeds or some such aquatic plants. DeGeer found the eggs in a double mass of jelly deposited on Sallow leaves which hung over a stream; and Mr. Hyndman of Belfast has seen the female *P. grandis* enter the water for that purpose, which is so remarkable a fact that I shall transcribe his remarks on the subject, which he was so obliging as to communicate to me. "The Phryganea was taken at the Botanic Garden, Belfast, the 27th May, 1833. I first observed it on the leaf of an aquatic plant, from which it crept down along the stem, under the water, very nearly a foot deep. It then appeared to have been disturbed by some Sticklebacks which approached it and seemed inclined to attack it, and swam vigorously and rapidly beneath the water over to some other plants. I then took the insect up and found a large bundle of eggs of a green colour closely enveloped in a strong jelly-like substance, attached to the extremity of its abdomen. The bundle of eggs was of an oblong form, bent in the middle, and the two ends attached to the tail of the animal."

The following are British species.

1. grandis *Linn. Female Roesel v.* 2. *pl.* 17.—*Panz.* 94. 18.—*Schæf. Icon.* 109. *f.* 3. 4.—*Male* P. striata *Linn.*—*DeGeer* 2. *pl.* 13. *f.* 1.—*Schæf.* 180. *f.* 1. & 2.?—Obs. Reaumur's and Geoffroy's figures referred to by Linnæus are a Limnephilus!

   May and June, woods and willows in marshes.

3. Beckwithii *Leach. Fig.* 4. *pl.* 3. in the Intr. to Ent. is a magnified figure I believe of this species; it was drawn from a fine specimen in the late Mr. Beckwith's cabinet.

4. atomaria *Fab. Ent. Syst.* 2. 78. 15. I have never seen this species.

5. varia *Fab.*—*Don.* 8. *pl.* 277. 1.—*Pictet pl.* 11. *f.* 1.

   End of June, trunks of Willows, Darent, Bottisham, and Scotland, J. C.; beginning of July, amongst rocks in Cumberland, Mr. Marshall; Parley, Uggmere, and the Trossacks, Mr. Dale.

6. minor *Curt. Brit. Ent. pl.* 592.

   21st July, Epping Forest, J. C.; where it has also been taken by Mr. Bentley; Parley Heath and Scotland, Mr. Dale.

The Plant is *Scirpus* (Isolepis) *fluitans*, Floating Club-rush.



12-1835

544.

POLYCENTROPUS IRRORATUS.

ORDER Trichoptera. FAM. Hydropsychidæ.

Type of the Genus, Philopotamus irroratus *Curt.*

POLYCENTROPUS *and* Philopotamus *Curt.*—Hydropsyche *Pictet.*

Antennæ inserted in front of the crown close to the eyes, a little longer than the body, rather stout and attenuated, composed of numerous pubescent joints, the basal one very short and thick, 2nd quadrate, 3rd and 4th oblong, the remainder becoming gradually slender, longer and oval (1, a few basal joints).

Maxillary Palpi long, incurved, pilose and 5-jointed in both sexes, 2 basal joints short, the latter very pilose, 3rd long and stout, 4th rather shorter, subclavate and furnished with strong bristles on the inside as well as the 3rd joint; 5th slender, as long as the others united, wrinkled, giving it the appearance of being composed of numerous cup-shaped joints, the apex ovate (4).

Mentum somewhat trilobed. *Palpi* considerably shorter than the maxillary, pubescent, triarticulate, 2 basal joints very stout, 1st the shortest, somewhat obconic, 2nd truncated obliquely, 3rd longer than the other 2, but much slenderer, membranous, a little dilated at the base and *apparently* composed of 12 or 13 joints, the apex ovate (5).

Head *rather transverse ovate:* eyes *lateral and globose:* ocelli *undiscovered.* Thorax *not broader than the head, and rather short.* Abdomen *short and narrow, the apex of the male furnished with* 2 *ovate lobes beneath, and a process producing* 2 *divaricating appendages like claws; conical in the female.* Wings *deflexed in repose,* superior *with* 6 *furcate terminal nervures and* 4 *or* 5 *transverse ones* (9): inferior *folded with* 3 *furcate marginal nervures.* Legs, *hinder pair the longest:* thighs, *middle pair a little the longest:* tibiæ, *anterior short, with a spine on the side before the middle and* 2 *at the apex* (8); intermediate *rather the stoutest, with* 2 *pair of long spurs, one pair near to the base* (*); posterior *pair very long and slender, with two pair of long spurs, one at the apex and another considerably below the middle* (†); tarsi *long slender and* 5*-jointed, intermediate a little dilated and compressed, as well as the apex of the tibiæ, particularly in the females;* claws *and* pulvilli *small.*

Larvæ *living without a case:* Pupæ *with a simple envelope.* Pictet.

IRRORATUS.—*Curt. Guide, Gen.* 751[b].

In the Author's Cabinet.

THE present genus is a proof of the necessity of minutely investigating these curious insects, for although at first sight they bear a strong resemblance to the true Philopotami, they are considerably different in structure: there are no less than 22 spurs on the legs, and the terminal joint in all the palpi is very remarkable: in the labial especially it has so much the

appearance of numerous cup-shaped joints that I am doubtful whether they may not be membranous articulations.

It appears to me that I have three species of Polycentropi, which I shall proceed to describe, observing that the first of them may be the *H. flavo-maculata* of Mons. Pictet.

1. trimaculatus *Curt. Lond. & Edin. Phil. Mag. v.* 4, *Genus* 751, No. 4.

Male. Expansion scarcely 6 lines. Fuscous with an ochreous or coppery tinge: head clothed with pale shining hairs; antennæ annulated with the same colour; superior wings with numerous ochreous round spots, most distinct towards the margin, where they form a line, with 3 in triangle at the posterior angle; legs dirty ochre.

The above name I applied to this species when I had only a bad specimen, in which most of the spots, excepting the 3 above noticed, were obliterated.

I believe I found this insect twice in a ditch at Horning, Norfolk, in June.

2. multiguttatus *Curt. MSS.*

Male, expansion 6, female 8 lines. Fuscous, iridescent: antennæ nearly as long as the superior wings in the male, spotted or annulated with ochre; superior wings with innumerable ochreous spots, with a white dot on a fuscous space on the interior margin, and an oblique line on the disc; posterior tibiæ brown, especially the upper side in the male.

The blacker colour of the upper wings and the hinder tibiæ, and the whitish transparent dot and line on the former, most evident in the female, distinguish this from the former species.

It appeared in multitudes on the shores of Loch Fad in the Isle of Bute the beginning of last August.

3. irroratus *Curt. Brit. Ent. pl.* 544 ♂.

Male, expansion $6\frac{2}{3}$ to 8 lines, female 9 lines. Brown, head and thorax with shining yellowish hairs; antennæ annulated with ochre; superior wings with numerous ochreous silky spots, close together, but leaving several spaces, forming 7 or 8 brown patches on the costa, disc, and inferior margin; under wings very iridescent; legs dull ochreous, with a pale castaneous tint.

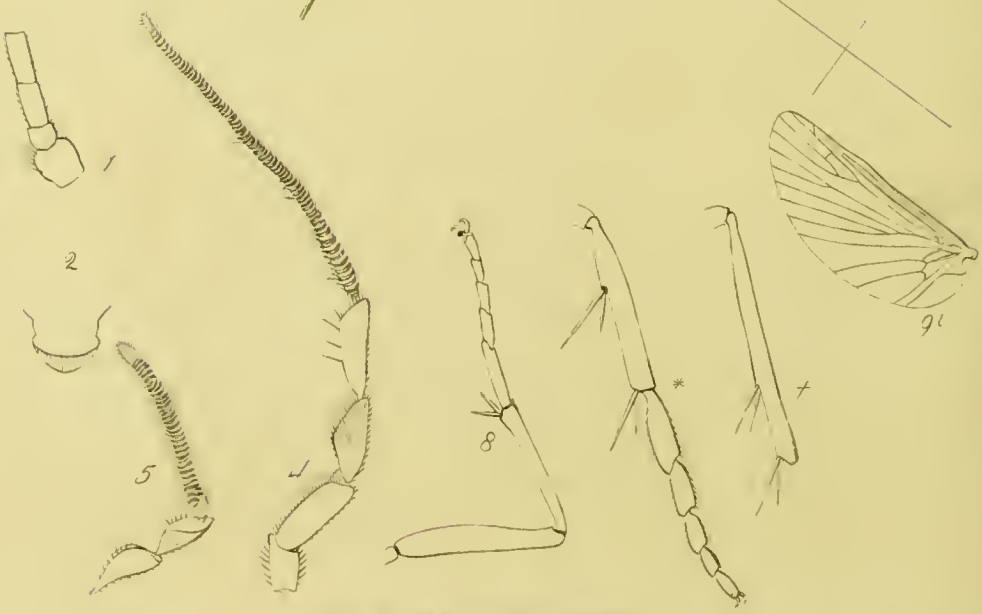
The brown spots on the upper wings, most evident in the males, distinguish this species from the others.

I took specimens the middle of last August in the Isle of Arran, and the beginning of September I met with others on large masses of rock in the bed of the river at Cartland Craigs, a magnificent and highly picturesque ravine near Lanark, which I visited with Mr. Haliday and Mr. H. Walker.

The Plant is *Schœnus nigricans* (Black Bog-rush), communicated by Jas. Paget, Esq.



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601.

HYDROPSYCHE FULVIPES.

Order Trichoptera. Fam. Hydropsychidæ.

Type of the Genus, Philopotamus instabilis *Curt.*

Hydropsyche *Pictet.*—Philopotamus *Curt.*—Phryganea *Gmel.*

Antennæ inserted in front of the face, very slender, much longer than the body, generally longer than the wings, composed of numerous elongated joints, the basal one robust and subglobose, 2nd small (1).

Labrum transverse, the sides notched, anterior margin convex, with a lunate membranous pubescent margin (2).

Maxillary palpi long, hairy and 5-jointed, 4 basal joints robust, 1st oblong, 2nd twice as long, 3rd shorter subtrapezate, 4th as long as the 2nd, 5th as long as the others united, slender, slightly attenuated and wrinkled or composed of numerous irregular transverse joints with long hairs on the inside (4).

Labial palpi not half the length of the maxillary, hairy and triarticulate, 2 basal joints stout somewhat obtrigonate, truncated obliquely, 3rd twice as long, but more slender and filiform, composed of numerous transverse irregular joints having a wrinkled appearance (5).

Head *transverse:* eyes *lateral and globose:* ocelli *undiscovered.* Thorax *subovate.* Abdomen *short and linear in the male, terminated by one central and* 2 *elongated incurved appendages beneath; more conical and simple in the female.* Wings *very much deflexed in repose;* superior *long, narrowed towards the base, truncated obliquely, the apex rounded, with* 5 *furcate nervures on the posterior margin;* inferior *ovate, with* 2 *furcate and a trifid nervure at the centre* (9 *i*). Legs, *anterior short, hinder the longest;* tibiæ, *anterior with* 2 *spurs at the apex* (8), *intermediate a little dilated in the females, spurred at the apex, with a long pair above the middle* (*); *hinder with* 2 *pair of spurs, one pair a little above the apex* (†): tarsi 5*-jointed, the intermediate compressed and dilated in the female* (*): claws *and* pulvilli *small.*

Larvæ *not living in a case.* Pupæ *with a simple envelope.* Pictet.

Fulvipes *Curt. Guide, Gen.* 751^{b}.—nebulosa *Pictet?.*

Dark brown; antennæ fulvous, annulated with brown; head and neck clothed with griseous hairs; margins of abdominal segments pale: superior wings yellow-brown with a rosy hue, obscurely freckled with ochre, nervures dark, with a small dark dot on the costa at the apex of the first furcate nervure; inferior wings similar in colour but iridescent and less yellow; legs fulvous; thighs fuscous and sometimes the tibiæ.

In the Cabinets of Mr. Dale and the Author.

As this group, which I gave as a section of Philopotamus in the "Phil. Mag.", comprises the typical species of M. Pictet's genus Hydropsyche, I have adopted his name: it is nearly related to Philopotamus and Polycentropus; but is distinguished from the former by its much longer and slenderer antennæ,

as well as by the dilated tarsi of the female intermediate feet; from the latter by the absence of the central spur on the anterior tibiæ; and from both those genera by the trifid nervure in the inferior wings and differences in the palpi.

The following are British species:

1. instabilis *Curt. in Phil. Mag. v.* 4.—maculatus *Don. v.* 16. *pl.* 548. 2.—atomaria *Pict., Gmel.?*

May, Southgate; June, bushes and plants near the river, Ambleside; July, Glengariff; several pair on the steam-boat on Loch Derg and in Galway. As there is a *P. maculatus* Oliv. it became necessary to change Donovan's name, and our insect does not quite agree with Gmelin's description.

2. hibernica *Curt.* Ochreous; antennæ with slender rings to the basal joints, head thorax and abdomen fuscous; superior wings with a few small obscure spots at the base, below the disc and round the apex and cilia: expanse 12 lines.

I took a male the end of July at Roundstone in Connemara; it is readily distinguished by its ochreous nervures.

3. pellucidula *Curt. Phil. Mag.*—læta *Pict.?* Head, thorax and abdomen slate-black; antennæ very long, ochreous spotted fuscous; wings semitransparent, superior obscurely freckled with pale fuscous and ochre, margin spotted with ochre from the stigma to the posterior angle, with 2 long spots on the inferior margin and the legs ochreous: 14 to 15 lines.—Common in Perthshire in July.

4. lanceolata *Curt. Phil. Mag.* Wings fuscous, superior slightly hooked, clothed with shining ochreous pubescence, slightly freckled, the posterior margin spotted fuscous: 13 lines.

I took a male either in Scotland or near Ambleside.

5. angustipennis *Curt. Phil. Mag.* Antennæ slightly serrated and annulated; head and thorax slate-black, abdomen reddish black; wings fuscous, superior with an ochreous tint, an ochreous oblong spot before, and a round one at the posterior angle, very distinct in the males; legs ochreous, darker at the base: 10 to 13 lines.—I have taken several in Norfolk.

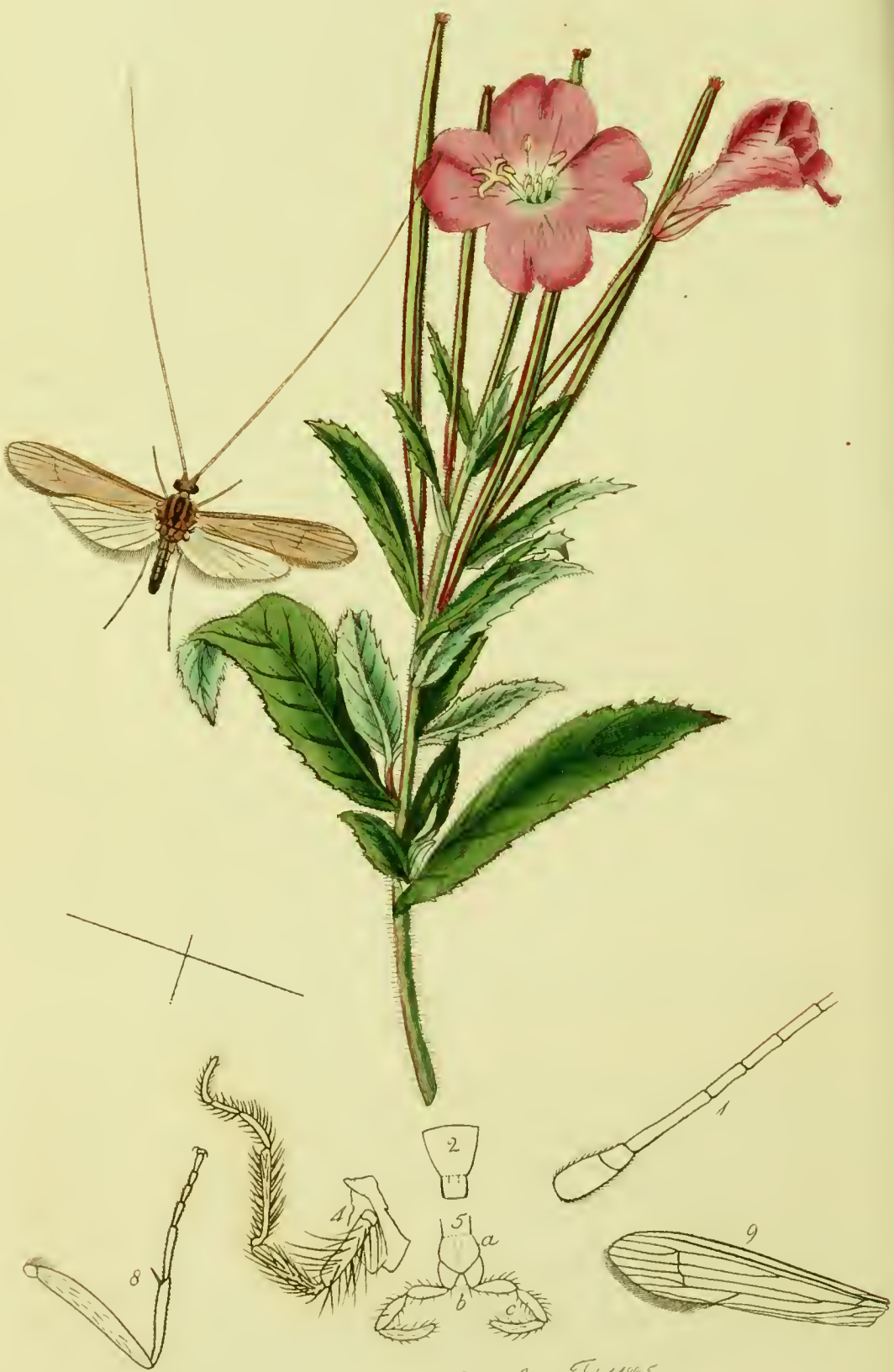
6. fulvipes *Curt. Brit. Ent. pl.* 601 ♀.

Taken by J. C. Dale, Esq., the end of June, off a hedge, with a brook running below it, by Muller's Copse, near Glanville's Wootton.

7. ventralis *Curt.*—angustata? *Pict.* Antennæ shorter than the wings, annulated; head and thorax griseous; abdomen slate-colour, beneath silky green or whitish; wings subdiaphanous fuscous, superior ochreous, with silky yellowish pubescence and slightly iridescent, a large obscure ochreous spot on the costa towards the apex, and another on the interior margin beyond the middle: $6\frac{1}{2}$ lines.

This makes an approach in habit to the genus Tinodes. I took both sexes in July on the steam-boat on Loch Derg.

The Plant is *Chara vulgaris* var. β (Common Stonewort).



Fish by J Curtis London Feb 1 1825

2-1825

57.

LEPTOCERUS OCHRACEUS.

ORDER Trichoptera. FAM. Leptoceridæ *Leach.* Phryganites *Lat.*

Type of the Genus *Phryganea interrupta *Fab.*

LEPTOCERUS *Leach.* Phryganea *Linn., Fab., Lat.*

Antennæ inserted between the eyes, setaceous, very long, especially in the males, porrected, composed of numerous simple joints, 1st and 2nd joints thick, hairy, forming together an obovate club, 3rd joint long, 4th and following shorter, nearly of equal length (fig. 1.)

Labrum inflected, broad and coriaceous at the base, narrowed towards the apex, which is membranaceous quadrate, and hollow beneath (2.)

Mandibles very minute.

Maxillæ membranaceous, small, somewhat trigonate, lying parallel to the sides of the lip: *Palpi* very long and hairy, coriaceous at the base, membranaceous towards the apex, 6-jointed, 1st and 2nd joints long, robust, 3rd long, slender, bent at its base, 3 following shorter of nearly equal length (4.)

Mentum bilobed (5. b.): *Palpi* hairy, 3-jointed, articulations of nearly equal length, terminal joint compressed, flexible (c.)

Lip short, moveable, pubescent, received between the labrum and mentum (5. a.)

Eyes *prominent.* Ocelli 2, *distant.* Abdomen *somewhat compressed, composed of* 9 *joints, in the male, with a considerable space down each side covered only with a thin membrane.* Superior wings *very much deflexed, ciliated, covered with hairs, having many hairy nerves, of which the costal and the next to it are the strongest* (9.). Inferior wings *not very large, plicate.* Legs *elongated.* Tibiæ *spined.* Tarsi 5-*jointed,* 1*st joint very long.* Claws 2. Pulvilli *small* (8 *a fore leg.*)

Larva *inhabiting the water and residing in tubes, covered externally with sand, pebbles, shells, small pieces of grass, &c.*

Pupa *resembling the imago, inclosed in the case in which it lived in the larva state.*

OCHRACEUS *nob.*

Pale and dull ochre colour. Eyes black. Antennæ towards their apex and annulations fuscous. Head and thorax ferruginous, the latter with 3 longitudinal fuscous obscure stripes Abdomen cinereous. Superior wings long, lanceolate, rounded. Cilia fuscous. Inferior wings semi-transparent. Legs pale.

In the Author's Cabinet.

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* The dissections are made from *Leptocerus ochraceus.*

There are in the cabinets of this country about 130 native species of the various genera forming the order Trichoptera established by Mr. Kirby: of this number the greater portion are unnamed and undescribed; of those that have been noticed by authors, descriptions may be found in the works of Linnæus, Fabricius, and the 13th volume of Latreille's *Histoire Naturelle*.

Neglected as Trichoptera has been, it is difficult if not dangerous at present to enter far upon the subject of species. Dr. Leach divided the order into 12 genera, but no characters have been published of them even, excepting four, viz. *Leptocerus, Odontocerus, Phryganea,* and *Limnephilus*.

Of the genus Leptocerus there are probably 20 British species: the elegant one figured has been selected from its appearing to be a nondescript; its rarity does not less entitle it to illustration, for I have not observed it in any of the cabinets of my friends: the specimens figured and described were taken by myself resting upon the paling which surrounds the Regent's Park, in the summer of 1822: the end of last August I took 3 from off plants in a marshy situation near the sea, upon the estate of Sir Thomas Gooch, bart., Benacre, Suffolk: being certain that those which I took near town appeared much earlier in the year, I suspected that they were another species, but I cannot discover the slightest variation in them.

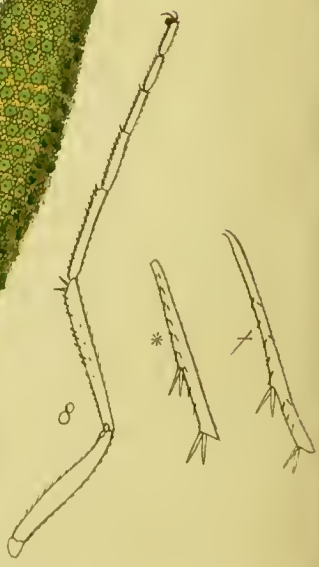
With the larvæ and pupæ we are unacquainted; but little doubt exists, from their being found in the neighbourhood of streams or stagnant waters, that they are in their economy like the rest of the family, the beauty of whose habitations as well as the instinct displayed in the construction of them never fail to excite our admiration. An investigation of their economy would in all probability put us in possession of good secondary generic characters: it would not be attended with any difficulty to those who live in neighbourhoods where they are found, for the cadis is well known and celebrated amongst fishermen as a bait, and the case-worm may be met with in every brook and pond; the subject could not but be highly interesting to any one who loves to explore and study the works of Nature. Whenever such materials can be obtained as satisfactorily to identify the different stages of the insect figured, I shall not fail to avail myself of the opportunity of laying them before my readers.

The type of the genus (*L. interruptus*) is figured in Donovan's *Brit. Ins.* v. 16. t. 551. The plant figured, upon which *L. ochraceus* was found in the autumn, is *Epilobium hirsutum* (Large-flowered Willow-herb).









Pub: by S. Sowerby & Co. Nov: 1. 1838

15-1838

716.

MOLANNA ANGUSTATA.

ORDER Trichoptera. FAM. Leptoceridæ.

Type of the Genus, Molanna angustata *Curt.*

MOLANNA *Curt., Step.*

Antennæ porrected in repose but divaricating, a little longer than the wings in the male, shorter in the female, rather stout, a little tapering, pubescent, composed of numerous joints, basal joint the stoutest, 2nd short, 3rd cup-shaped, longer than the 4th, the 6 following increasing in length, the remainder elongated (1 the base and apex).

Maxillæ small, with a minute terminal ovate lobe, a little ciliated. *Palpi* much longer than the head, porrected, alike in both sexes, very hairy, 5-jointed, basal joint short and the stoutest, 2nd the smallest, semiconical, 3 following long, nearly equal in length, a little tapering (4).

Mentum terminated by 2 horny oval scales placed obliquely. *Labium* rather large, subglobose and inflated. *Palpi* considerably shorter than the maxillary, very hairy, triarticulate, basal joint oval, 2nd nearly twice as long and linear, 3rd a little longer, the apex ovate (5).

Males *smaller than the females.* Head *transverse, hairy:* eyes *prominent, globose, coarsely granulated and hairy:* ocelli *none?* Thorax *small and oval.* Abdomen *short linear and clavate, with* 2 *lobes at the apex above and* 2 *horny curved processes beneath in the males; thick and obtuse in the female.* Wings *deflexed in repose, depressed on the back and compressed behind, long, narrow and rounded at the apex,* superior *with a short furcate cell at the apex, a long one below and an oblique nervure above it.* Legs *with short bristles internally, anterior the shortest:* thighs, *anterior the shortest; middle pair a little the longest:* tibiæ, *anterior the shortest, with a pair of spurs at the apex* (8), *the others with the spurs longer, with a pair also below the middle* (*), *especially in the hinder tibiæ, which are the longest and slenderest and a little flexuose* (†): tarsi *long and* 5*-jointed, basal joint long, the remainder gradually decreasing, but the* 4*th is not shorter than the* 5*th:* claws *and* pulvilli *small.*

ANGUSTATA *Curt. in Phil. Mag.—Guide, Gen.* 754[b].

Male ochreous: head, thorax and abdomen dull castaneous, head and shoulders clothed with a few coarse ochreous hairs: eyes black: superior wings silky, nervures brown; inferior pubescent, pale fuscous with darker nervures; cilia black next the abdomen. *Female* with the superior wings fuscous, being sparingly clothed with minute silky aureous hairs.

In the Cabinets of Mr. Dale, the Author, &c.

AN ample series of fine specimens of Chimarra, which I found in vast abundance in Ireland, enabled me to study its affinities;

and it was my intention to place it in the 2nd edition of my Guide next before Molanna, but by some accident it was inserted between Potomaria and Sericostoma, which in all probability belong to one genus. Although I still doubt if it be better located than it was at first, when it was illustrated in this work (fol. 561), I am anxious to correct the palpable error committed in the Guide, before I proceed to discuss the affinities of Molanna.

This type appears to have been unknown to M. Pictet at the time his Memoir was printed; we therefore know nothing of its early œconomy; but from its being found in the neighbourhood of deep water, it is no doubt similar to its allies.

It appears to me that its natural situation is between Leptocerus and Odontocerus. The trophi are considerably like those of the former genus, as well as the wings, and the long stout antennæ and the whole contour assimilate with those of the latter group.

The way in which Molanna rests is peculiar, and bears a striking resemblance at a little distance to the ochreous Crambi: the antennæ, palpi, and breast are pressed close to the surface on which it stands, the wings are elevated and somewhat cylindric, enveloping the abdomen, which is of course concealed, and the legs are spread out: when thus settled they are rather loath to move, especially the females.

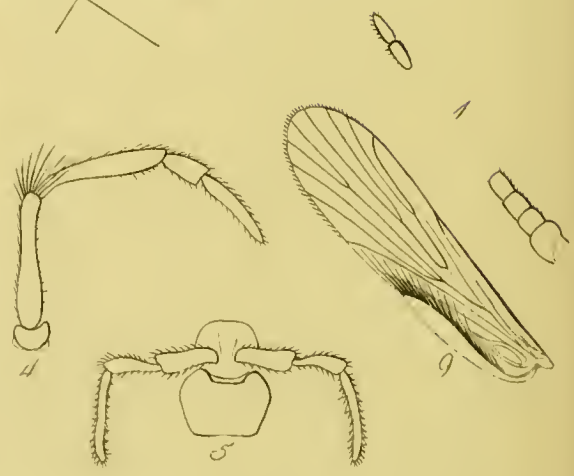
M. angustata I find on paling near the water in the Regent's Park: the males first come out the end of May; the females I do not find until the middle of June; and a few males appear again the beginning of August. I have never taken it elsewhere, excepting a single male in a boat whilst I was fishing last August at Henley. With them I find occasionally a specimen with the palpi, head, and abdomen fuscous, which is the *M. nigripalpis* of Stephens.

The plant is *Acorus Calamus*, Sweet Flag, specimens of which were transmitted to me by Laurence Sulivan, Esq., and others from Wimbledon by J. E. Gray, Esq.









Curtis del. et fec. Curtis's Mag. 1. 1833.

12-1835

561.

CHIMARRA MARGINATA.

ORDER Trichoptera. FAM. Psychomidæ.

Type of the Genus, Phryganea marginata *Linn.*

CHIMARRA *Leach., Curt.*—Psychomia ? *Pictet.*—Phryganea *Linn.*

Antennæ inserted before the eyes, as long as the wings in the male, shorter in the female, tapering, hairy, composed of numerous oblong joints, basal one stout, subovate, 2nd the shortest, a few of the following short, apical joint oval (1 the base and apex).

Labrum minute and trigonate.

Maxillæ closely united to the labium, with a pointed and bristly terminal lobe. *Palpi* alike in both sexes, long, curved, compressed, pubescent and 5-jointed, basal joint the broadest, cup-shaped, 2nd and 3rd very long, the former stoutest at the base and surrounded with long hairs at the apex, the latter narrowed at the base, 4th short, subovate, truncated, 5th twice as long, the slenderest and somewhat filiform (4).

Mentum suborbicular, truncated at the base, emarginate before. *Palpi* not so long as the maxillary, hairy, triarticulate, basal joint broad, somewhat oblong, 2nd a little shorter, elongate, obtrigonate, 3rd nearly as long as the other two, slender and filiform (5).

Head *subglobose:* eyes *lateral, globose and very prominent:* ocelli 3, *large, forming a spacious triangle.* Thorax *rather ovate.* Abdomen *rather short, especially in the male.* Wings *hairy, slightly deflexed when at rest, the superior crossing, the back flattened;* inferior *not folded;* superior *with* 8 *or* 9 *longitudinal nervures,* 3 *of them forked; transverse nervures none* (9). Legs, *anterior the shortest:* thighs, *anterior the broadest but narrow at the apex, intermediate the longest:* tibiæ, *anterior simple* (8), *the others spurred at the apex, the intermediate having a pair above* (*), *and the hinder tibiæ which are the longest a pair below the middle* (†): tarsi 5-*jointed, intermediate compressed and a little dilated in the female; basal joint the longest,* 4*th small*: claws *of anterior feet rather long, the others minute.*

MARGINATA *Linn.* ?—*Curt. Guide, Gen.* 752. 1.

Smoky black; basal joint of antennæ, face and head, excepting the crown, clothed with orange hairs; superior wings margined with yellow-ochre, the marginal cell being of that colour forming the broadest portion, the cilia the narrowest; an oblique nervure furcate at the apex, yellow-ochre, as well as another beneath it towards the base, inferior wings with the costa except at the base and the cilia at the apex of the same colour: legs ochreous, base of thighs and anterior tarsi at the apex, fuscous.

In the Author's and other Cabinets.

This highly interesting insect has been described by Linnæus, but it has never been figured, and M. Pictet does not appear to have been acquainted with it; and although Dr. Leach gave it a generic name, it has never yet been characterized. There is no specimen contained in the Linnæan Cabinet, and from the size mentioned in the Systema Naturæ it appears to have been the male that Linnæus described, which is much smaller than the female, being only 6 instead of 8 or 9 lines in expanse.

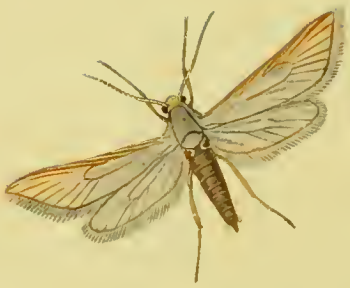
Chimarra is probably nearly allied to Hydroptila, but without recent specimens it would not be safe to discuss its affinities: those which I possess being much injured I cannot vouch for the correctness of the form in the mentum, and the labium also was too mutilated for description: I suspect that the long hairs represented on the inferior basal nervure in fig. 9. may be the cilia of the inferior wings transferred by damp and pressure.

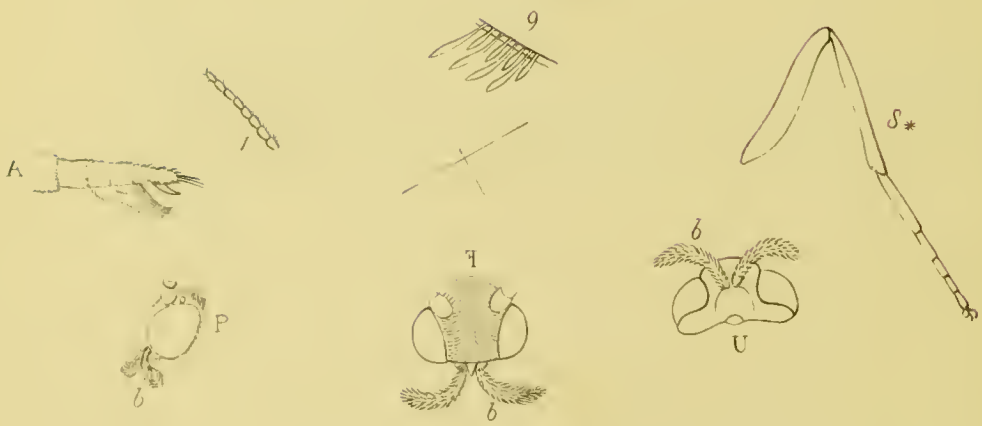
My friend Mr. Dale first gave me a specimen of this insect, which he took on the Dart near Spitchwick, Devon; the Rev. W. L. P. Garnons met with it in plenty near Ambleside, and at Capel Cerig, Wales, the 11th of June 1832. I am also indebted to Dr. Stephenson for specimens, accompanied with the following memorandum: "On the 7th of last June I took this insect in abundance on dry stones in a small mountain stream close by Rydal Hall, Westmoreland, the beautiful seat of Lady Ann le Fleming."

I have much satisfaction in adding a figure of the local *Eriocaulon septangulare* (Jointed Pipewort). One of my objects in visiting the Isle of Skye last summer was to see this curious plant growing, and I am happy in the opportunity it affords me of acknowledging the many kindnesses we received from Colin Elder, Esq., of Isleonsay, who directed us to the little Loch where it was in flower, and pointed out to me the variety with ten angles on the stalk.

In a tour through the south-west of Ireland last July, Mr. Haliday and myself observed the Eriocaulon in abundance, in various lakes from near Oughterard to Roundstone in Connemara.



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497.

ACENTROPUS GARNONSII.

ORDER Trichoptera. FAM. Phryganidæ.

Type of the Genus, Acentropus Garnonsii *Curt.*

ACENTROPUS *Curt.*

Antennæ inserted on the crown of the head close to the eyes, not so long as the body, slightly setaceous, pubescent, being clothed with very short hairs; joints numerous obovate, the basal one subglobose (1, a portion of the apex).

Labrum rather elongated and tongue-shaped.

Maxillary Palpi (in the male at least) large, drooping, triarticulate ?, and densely clothed with scaly hairs (*b*).

Labial Palpi none.

Head *subglobose, hollow beneath:* eyes *lateral globose, minutely reticulated.* Ocelli 2, *placed behind the antennæ* (P *the head in profile,* F *front view and* U *underside of the same*). Thorax *somewhat oval.* Abdomen *attenuated, terminated by a curved horny lobe and* 2 *hairy ones on each side in the male* (A, *apical portion in profile*). Wings, superior *sublanceolate, with a long cell and several nervures issuing from it and extending to the posterior margin;* inferior *ovate, with similar nervures;* cilia *formed of long and short scales, dilated and lanceolate at the apex* (9). Thighs *rather short:* tibiæ *simple not spurred:* tarsi 5-*jointed, basal joint long, the remainder slightly decreasing in length:* claws *and* pulvilli *distinct* (8 *, *intermediate leg*).

GARNONSII *Curt. Guide, Gen.* 762ª. 1.

Ochreous, head clothed with short white, and thorax with greyish scales; eyes black: wings white and rather satiny, superior with the costa ochreous and the edge of the other margins slightly so; the underside of the former densely clothed with short and broad upright scales towards the apex, which is very acute.

In the Cabinet of Mr. Dale.

IF Trichoptera be related to Neuroptera on the one hand, it most certainly is as nearly allied to the Lepidoptera on the other: it would therefore be impossible to join it to either without uniting the three Orders. In the present instance, so near an approach does Acentropus make to the Lepidoptera, that if the palpi were broken off, it would not be easy to de-

cide to which Order it belonged, whether to the Trichoptera or Lepidoptera. The mealy texture of the insect might induce an opinion that it was Trichopterous, whilst the contour and neuration of the wings would be in favour of its relation to the Lepidoptera. The absence of a proboscis proves nothing, since it is sometimes wanting in the Bombycidæ and other groups. I do not, however, remember any instance amongst the Lepidoptera in which the maxillary palpi are strongly developed, and the labial absent; yet such appears to be the case in Acentropus: and amongst the Trichoptera, if there be no other instance in which the labial palpi are wanting (but I believe there is), at any rate they are frequently, if not always, smaller than the others, as in Limnephilus (Pl. 488.) and Leptocerus (Pl. 57.). From recent investigations of this Order, the results of which have been published in the 4th volume of the London and Edinburgh Philosophical Magazine, I have ascertained that this character is not only general but much stronger in many of the groups than in those above referred to. I lay more stress upon this observation, as it appears to be an important definition in separating the Trichoptera from the Lepidoptera, since the characters hitherto given do not seem to be sufficient to distinguish them *.

The generic name of this curious insect alludes to the absence of spurs at the apex of the tibiæ; the species, I have the pleasure of naming after the Rev. W. L. P. Garnons, of Sidney Sussex College, Cambridge, who took it at Layer Murney, near Colchester, Essex, and presented it to J. C. Dale, Esq., to whom I am indebted for the opportunity of illustrating this remarkable genus. I think I have heard of Dr. Leach taking a specimen in June, in Scotland, and that it has been found also on the Croydon Canal, and in Berkshire.

The Plant is *Myriophyllum verticillatum* (Whorled Milfoil); communicated by Professor Henslow, from Bottisham Fen, Cambridgeshire.

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* The want of some such guide, it is to be presumed, has led Mr. Newman to place Psyche (Pl. 332.), a genus of Moths, in his Neuropterous Circle, to elucidate the affinity between that Order and the Lepidoptera.

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Folio. *Continuation of Errata from Vol. III.*

381[b] last line but one, *for* Aira præcox (Early Hair-grass) *read* Carex dioica mas (Common Separate-headed Carex). I regret that in their journey from Cambridge the labels were displaced, which led to a transposition of the names.

389 *Agriotypus armatus.* Mr. Wailes in a letter says, "I took a specimen on the shore of Derwentwater (amongst the small stones so characteristic of lakes amongst the older strata,) in April last. It is a female."

395 The characters of ♂ and ♀ added to the figures of the antennæ in the Plate, have been accidentally transposed, and the signs in the description, lines 14 and 17, have been made to correspond, to prevent further mistakes.

419[b] *Nomada Dalii* was taken at Charmouth, Dorset, May 12, and not in the New Forest.

439 *line* 34, *after* centre *add* and produced behind like a scutellum which is sometimes.

472[b] *line* 25 *for* sublunulate one *read* sublunulate spot.

VOL. IV.

129[b] *line* 4 from the bottom, *for* Llandidus *read* Llandidno.

202[b] *for* Betonica officinalis, &c. *read* Prunella vulgaris (Self-heal).

ib. last line but 4. *for* Dundingston *read* Duddingston.

357 Anthophora Haworthana. Since this species was published I have received a pair from Dr. Howitt, who takes the sexes near Nottingham: the *female* is so similar to that of *A. retusa*, that the only difference I can discover is in the colour of the spurs to the tibiæ, which are *ferruginous*, and not dusky or *black* as in *A. retusa*.

448 *Lasioglossum tricingulum.* I find that I possess the female of this curious insect.

616 *line* 25, *after* crossing, *add* with a tooth at the extremity of the inner margin.

632[b] last line but one, *for* Queckit *read* Quckett.

652 *line* 32, *for* clavigerum *read* clavicerum.

712[b] *line* 41 *for* Dorchester *read* Doncaster.

732 *Agrion rubellum* Van. Lin.: the var. figured is *A. aurantiacus* of Mons. de Selys-Longchamps.


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