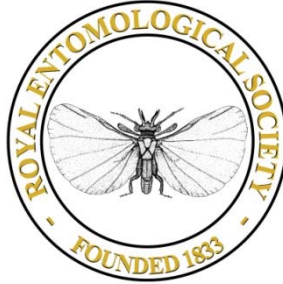


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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



HYMENOPTERA

2. SYMPHYTA. SECTION (b)

By
R. B. BENSON

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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

The aim of this series of publications is to provide illustrated keys to the whole of the British Insects (in so far as this is possible), in ten volumes, as follows :

- | | |
|------------------------------------|------------------------|
| I. Part 1. General Introduction. | Part 9. Ephemeroptera. |
| " 2. Thysanura. | " 10. Odonata. |
| " 3. Protura. | " 11. Thysanoptera. |
| " 4. Collembola. | " 12. Neuroptera. |
| " 5. Dermaptera and
Orthoptera. | " 13. Mecoptera. |
| " 6. Plecoptera. | " 14. Trichoptera. |
| " 7. Psocoptera. | " 15. Strepsiptera. |
| " 8. Anoplura. | " 16. Siphonaptera. |
- II. Hemiptera.
 - III. Lepidoptera.
 - IV. and V. Coleoptera.
 - VI. Hymenoptera : Symphyta and Aculeata.
 - VII. Hymenoptera : Ichneumonoidea.
 - VIII. Hymenoptera : Cynipoidea, Chalcidoidea, and Serphoidea.
 - IX. Diptera : Nematocera and Brachycera.
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The Society is indebted to the Royal Society for a grant towards the cost of initiating this series of *Handbooks*.

A list of parts now available appears on the back cover.

CORRIGENDA TO SECTIONS (a) AND (b).

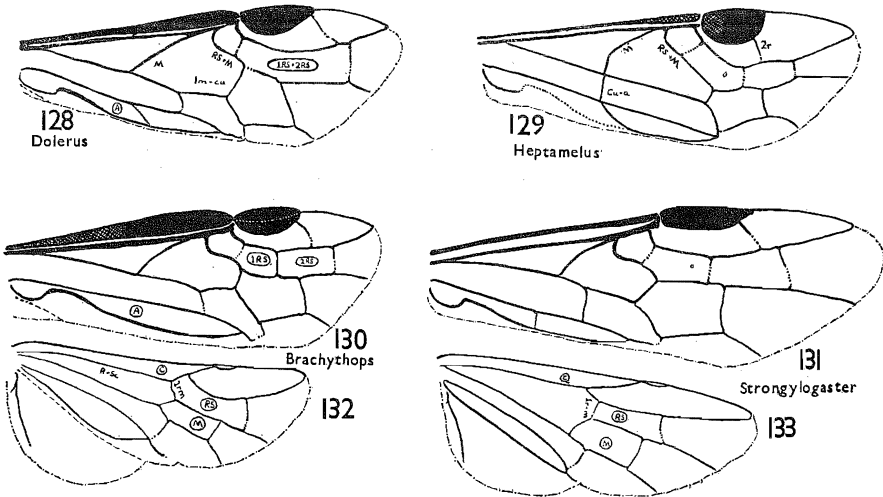
- Page 14, line 23, for "4, 5 and 6" read "3, 4 and 5".
- Page 21, top line, for "medial cell" read "cell 3R1".
- Page 29, line 10 up and 3 up, for "basal stalk" read "apical stalk".
- Page 40, line 18 up, for "**femorata**" read "**femoratus**".
- „ line 8 up, for "**lutea**" read "**luteus**".
- Page 41, line 5, for "**connata**" read "**connatus**".
- „ line 15, for "**femorata**" read "**femoratus**".
- „ line 14 up, for "**lutea**" read "**luteus**".
- „ line 12 up, for "**connata**" read "**connatus**".
- Page 42, bottom line, for "**sylvaticum**" read "**latreillei**".
- Page 44, line 11 up, add ("†*Morice*, 1913, Ent. mon. Mag. 49: 143)".
- Page 45, top line, add "*and in Ireland*".
- Page 61, line 3 up, for "subfamily" read "tribe".
- Page 83, line 11 up, for "*Prince horpe*" read "*Princethorpe*".
- „ line 10 up, for "*Sawn*" read "*Sawnt*".
- Page 88, line 3 up, for "as broad as long" read "as long as broad".
- Page 95, line 10, delete "(var. *filiformis* Klug)".
- Page 97, line 10, for "*Perilista*" read "*Perichlista*".
- Page 98, lines 25-26, delete "and hind wing with or without an enclosed cell".
- „ lines 29-30, delete "hind wing without an enclosed cell".
- Page 100, line 16 up, add "Hind wing without enclosed cell".
- „ line 10 up, add "Hind wing with an enclosed cell".
- Page 108, line 24, for "*Fenusia*" read "*Profenusia*".
- „ line 33, for "etpraea" read "petraea".
- Page 127, line 10 up, for "231-51" read "231-5".

HYMENOPTERA (SYMPHYTA)

By ROBERT B. BENSON.

Family TENTHREDINIDÆ.

This is the predominant sawfly family in almost all parts of the world except Australia, where it is mainly replaced by PERGIDÆ. There are already more than 4,000 species in over 250 genera grouped into 5 sub-families; there are some 8-900 species known from Europe and over 380 from Britain. The predominance of this family over all the others increases northwards in the northern hemisphere; taking the world sawflies the proportion of species of Tenthredinidæ to species of all other families together is about 3 : 1; in Britain it is about 5 : 1.



FIGS. 128-131.—Right fore wing of Selandriinæ: 128, *Dolerus*; 129, *Heptamelus*; 130, *Brachythops*; 131, *Strongylogaster*.
 FIGS. 132, 133.—Right hind wing of: 132, *Brachythops*; 133, *Strongylogaster*.

The size of the British TENTHREDINIDÆ varies from over 14 mm. long to under 2.5 mm. The great majority have 9-segmented antennæ, but they may have as many as 15 or as few as 7. The antenna is usually simply setiform, filiform, or slightly clubbed in shape; only in the male of *Cladius* is it pectinate.

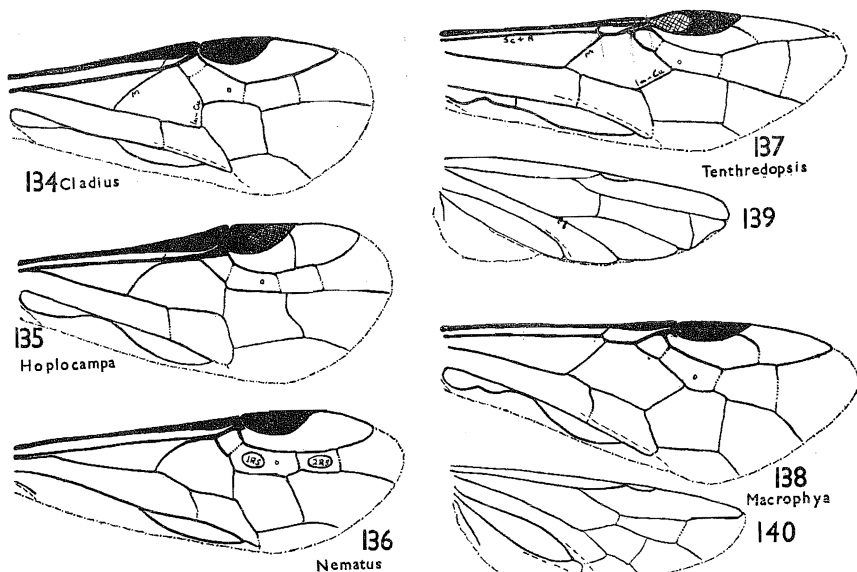
The sutures between the mesopleura and mesosternum are obsolete. The scutellum has an extra posterior sclerite, the post-tergite—not clearly developed in other sawflies. The tibiae never have pre-apical spines, and the inner of the two apical spurs on the front tibia is usually cleft at the tip.

The larvae are usually free-living with 6–8 pairs of abdominal legs, but some species feed in leaf-mines, galls, stems or fruit.

The subfamily and tribal system adopted here is built on the scheme proposed in 1938. The most radical changes are the inclusion here of the DOLERINAE as one of the five tribes of the SELANDRIINAE and the transfer of the Heptamelini to the SELANDRIINAE from the HETERARTHRIINAE (= PHYLLOTOMINAE), the fusion of the BLENNOCAMPINAE and EMPHYTINAE together with the tribes Caliroini and Fenusini of the HETERARTHRIINAE into a single subfamily, the BLENNOCAMPINAE, with seven British tribes. It seems very likely that *Heterarthrus* belongs to the same complex, but for the present it is being retained as a separate subfamily, the HETERARTHRIINAE.

KEY TO SUB-FAMILIES OF *Tenthredinidae*.

- 1 Wings normal; fore wings usually reaching apex of abdomen 2.
 -- Wings reduced, so that fore wings do not reach nearly to apex of abdomen and have abnormal venation NEMATINAE in part (see Section C).

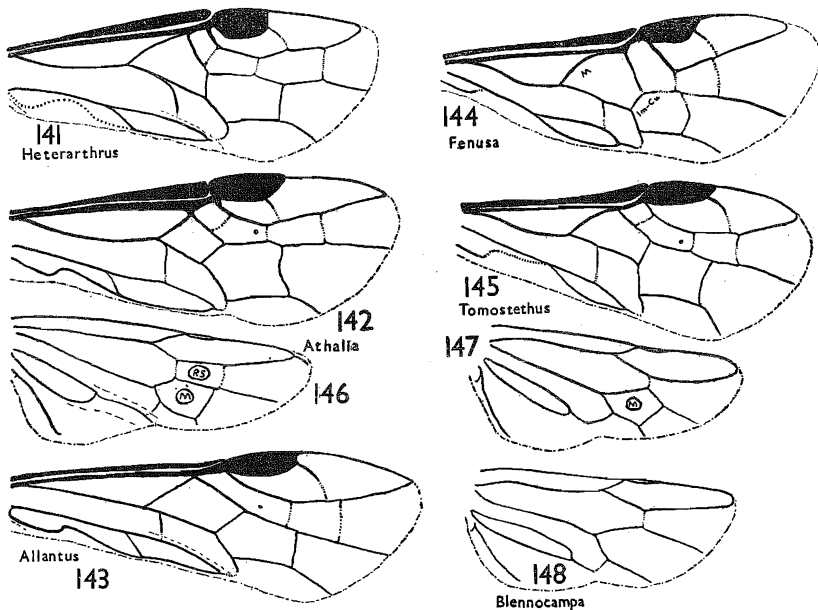


FIGS. 134–138.—Right fore wing of: 134, *Cladius*; 135, *Hoplocampa*; 136, *Nematus*; 137, *Tenthredopsis*; 138, *Macrophya*.

FIGS. 139, 140.—Right hind wing of: 139, *Tenthredopsis*; 140, *Macrophya*.

- 2 (1) Veins M and 1m-cu of fore wing strongly converge towards the stigma (figs. 128–31, 134–6, 141, 144 and 145); and hind wing with 2 enclosed middle cells (RS and M) (figs. 132–133) and without a marginal vein 3.
 -- Either veins M and 1m-cu of fore wing subparallel or diverging towards stigma (figs. 137, 138, 142 and 143); or hind wing with only one middle cell (M) or none (figs. 147 and 148) but it may have a marginal vein (cf. fig. 139) 5.

- 3 (2) Extreme base of vein Rs + M in fore wing is recurved back towards stigma just before it joins Sc + R (figs. 128-31). Anal cell of fore wing open (without any cross-vein), or of a generalised form (with a straight or oblique cross-vein); and vein 2r always present. SELANDRIINAE (+ Dolerinae), p. 54.
- Extreme base of vein Rs + M in fore wing is not recurved towards stigma (figs. 134-36, 141, 144 and 145). Anal cell of fore wing either petiolate (fig. 40), or medially constricted into 2 cells (figs. 36 and 37), or with an oblique cross-vein (figs. 33, 41 and 42). Fore wing often without vein 2r. 4.
- 4 (3) Anal cell of fore wing with oblique cross-vein (fig. 141). Vein 2r always present in fore wing and cell 1Rs receives the cross-vein 1m-cu but not 2m-cu. . . . 6.
- Anal cell of fore wing petiolate (fig. 136) or medially constricted into 2 cells (figs. 134 and 135). Vein 2r of fore wing often absent and cell 1Rs often receives 2m-cu as well as 1 m-cu (fig. 136). NEMATINAE (see Section C).



FIGS. 141-145.—Right fore wing of: 141, *Heterarthrus*; 142, *Athalia*; 143, *Allantus*; 144, *Fenusa*; 145, *Tomostethus*.

FIGS. 146-148.—Right hind wing of: 146, *Athalia*; 147, *Tomostethus*; 148, *Blennocampa*.

- 5 (2) Vein Sc + R in fore wing angled at the junction with vein M, and this junction is about as far as, or further from, the junction of Rs + M as the junction of Rs + M is from the base of the stigma (figs. 137 and 138). Veins M and 1m-cu of fore wing are subparallel or diverge towards stigma. Anal cell of fore wing more or less contracted or even constricted in the middle into 2 cells; if only contracted here it is crossed by a short almost erect vein. Hind wing usually with both cell Rs and cell M enclosed (fig. 140), or, in certain males, with a marginal vein (fig. 139) . . . TENTHREDININAE, p. 109.
- Vein Sc + R of fore wing not conspicuously angled at the junction with M (fig. 142-5); and either this junction is much closer to the junction of Rs + M than the distance between the junction of Rs + M and the stigma, or veins M and 1m-cu converge strongly towards stigma (fig. 144). 6.
- 6 (4 and 5) Vein M of fore wing almost straight and converging strongly with 1m-cu towards the stigma (fig. 141). Face long and flattened with very short vertex; malar space at least as long as greatest length (height) of clypeus

(figs. 243 and 244); antenna 10-15 segmented and very low on the face, so that the sockets beneath are almost in line with the bottom of the eyes; labrum extruded and scarcely covered by the clypeus, which is truncate apically. Anal cell of fore wing complete with oblique cross-vein, though sometimes more or less discoloured (figs. 41, 42 and 141)

(= Phyllotominae in part) HETERARTHRIINAE, p. 77.

- Vein M of fore wing subparallel with 1m-cu, or, if converging with it towards the stigma (fig. 144), then it is clearly curved or bent. Face normal and more or less convex, with malar space at most much shorter than greatest length of clypeus (fig. 247); antenna variable but often with only 9 segments and always set well above the level of the bottom of the eyes (usually about one-quarter from the bottom of the eye); labrum largely covered by the clypeus or the clypeus is deeply excised. Anal cell of fore wing variable.

(+ Emphytinae and Phyllotominae in part), BLENNOCAMPINAE, p. 78.

Subfamily SELANDRIINAE.

This subfamily occurs in all the main inhabitable regions of the world except Australia; but it is concentrated in the warmer forests of South-East Asia, and especially South America where it is the dominant sawfly group.

The host-plant association for the subfamily as a whole is mainly with the ferns (Filicales), though a few genera are attached to herbaceous flowering plants; in Britain the Dolerini are the predominant tribe, and this is associated with Equisetaceae, Gramineae, Juncaceae and Cyperaceae. 53 species and subspecies are recorded for Britain in 10 genera, and 34 of these belong to the 2 genera of the Dolerini.

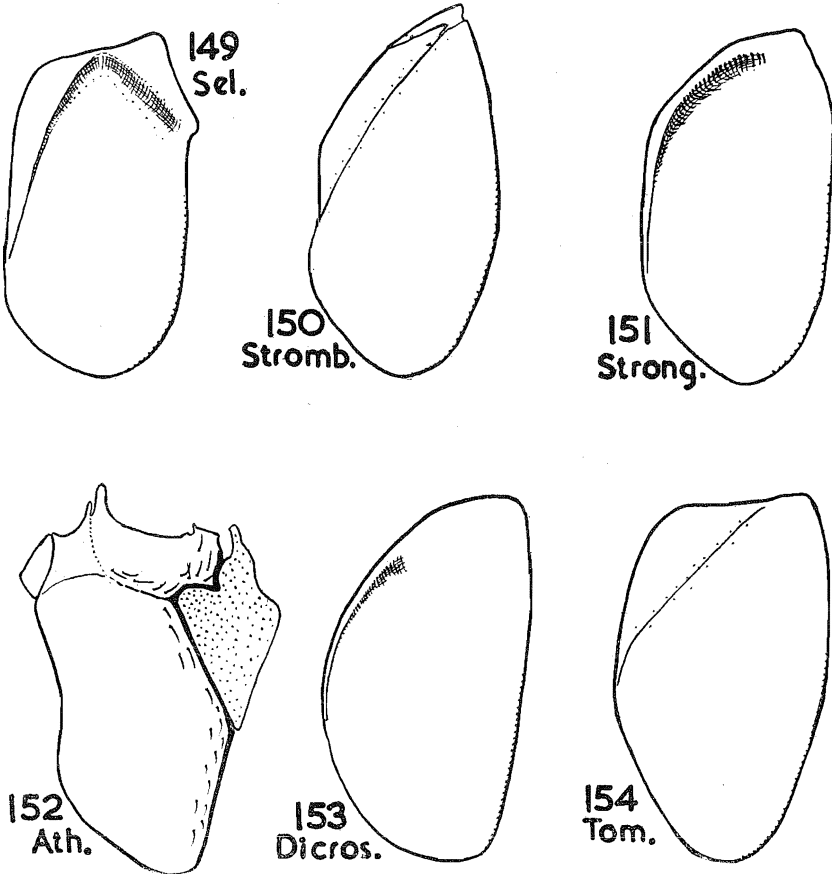
KEY TO GENERA OF SELANDRIINAE.

- 1 Fore wing with vein 2r_m always present (figs. 129-31), and anal cell either open without any cross-vein, or with a cross-vein. Prepectus to mesepisternum often present. 2.
- Fore wing with vein 2r_m absent (fig. 128) and anal cell always with an oblique cross-vein. Prepectus absent. (DOLERINI) 9.
- 2 (1) Antenna 9-segmented. Veins M and Cu-a in fore wing not interstitial; stigma narrower than length of vein 2r; anal cell with a sub-erect cross-vein or without one, and the basal lobe not faded (figs. 130-1). Ovipositor much shorter than hind tibia 3.
- Antenna 7- to 8-segmented. Veins M and Cu-a in fore wing interstitial (fig. 129); stigma as broad or almost as broad as the length of vein 2r; anal cell with an oblique cross-vein and with the basal lobe very faint. Ovipositor longer than hind tibia. *Larva bores in ferns*. 1 sp. (HEPTAMELINI)
- Heptamelus** Haliday, p. 57.
- 3 (2) Short broad insects in which the length of the antenna does not exceed twice the breadth of the head behind the eyes. Costa (C) of fore wing swollen at apex to more than half breadth of the stigma (cf. figs. 128 and 130) 4.
- Longer slenderer insects in which the antenna is always more than twice as long as the breadth of the head behind the eyes. C only slightly swollen apically in the fore wing (fig. 131), where it is much less than half the breadth of the stigma. *Attached to ferns* (STRONGYLOGASTRINI) 7.
- 4 (3) Abdomen generally entirely yellow, sometimes more or less infusate above but even in the darkest forms mostly yellow beneath. Cell RS in hind wing touching cell C, the vein 1r_m arising from vein R + SC instead of from vein RS (fig. 132) Mesepisternum with a V-shaped furrow dividing the sclerite into an upper and lower portion (fig. 149). On *Cyperaceae*, *Gramineae* and *Juncaceae* (SELANDRIINI) 5.
- Abdomen entirely black except in *Aneugmenus coronatus*, which, even in the ♂, is mostly black beneath. Cell RS in hind wing widely separated from cell C, the vein 1r_m arising from vein RS and not from R + Sc (fig. 133). Mesepisternum with the normal anterior prepectus divided off by a straight suture. On *ferns or herbaceous flowering plants* (ANEUGMENINI) 6.

5 (4) Eyes short and oval ; malar space at least as long as 2nd antennal segment (fig. 157). Mouthparts much reduced with labial palps 3- and maxillary palps 4-segmented. Clypeus arcuately emarginate in front. Hind basitarsus less than 3 following segments together. 2 spp.

Brachythops Haliday, p. 61.

- Eyes elongate so that the malar space is shorter than 2nd antennal segment (fig. 158). Mouthparts normal with labial palps 4- and maxillary palps 6-segmented. Clypeus subtruncate. Hind basitarsus clearly longer than 3 following segments together. 2 spp.....**Selandria** Leach, p. 61.



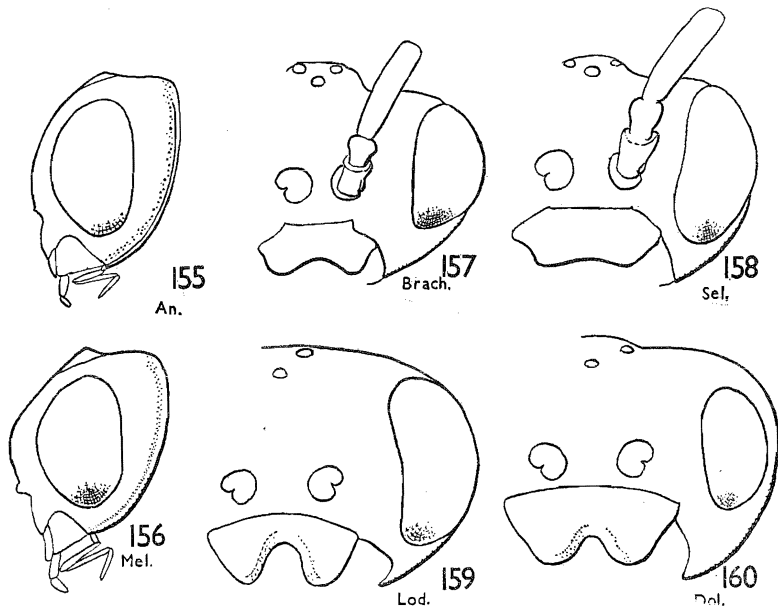
FIGS. 149-154.—Left lateral view of mesopleurum to show form of pre-pectal and other grooves in : 149, *Selandria* ; 150, *Stromboceros* ; 151, *Strongylogaster* ; 152, *Athalia* ; 153, *Dicrostema* ; 154, *Tomostethus*.

6 (4) Tegulae entirely black ; legs black and white, or red ; wings infuscate. Head without a carina on the hind margins (fig. 156). Anal cell of hind wing pedunculate at apex. 2 spp. Attached to herbaceous flowering plants.

Melisandra Benson, p. 60.

- Tegulae and legs mainly yellowish-white ; wings hyaline. Head with a carina on the hind margins at least at the sides (fig. 155). Anal cell of hind wing sessile. Attached to ferns. 4 spp.....**Aneugmenus** Hartig, p. 60.

- 7 (3) Prepectus not in the form of a raised rim to the mesepisternum, but level with it and separated from it by a clearly defined suture (fig. 150). Hind basitarsus longer than the 3 following tarsal segments together. Sawsheath tapering and simple towards apex 8.
- Prepectus in the form of a raised rim to the front of the mesepisternum and separated from it by a furrow instead of a clearly defined suture (fig. 151). Hind basitarsus at most as long as the 3 following tarsal segments together. Sawsheath often bifid at apex (figs. 161-164). 5 spp. (= *Pseudotaxonus* A. Costa and *Thrinax* Konow) **Strongylogaster** Dahlborn, p. 57.
- 8 (7) Mainly pale green species with at least the following parts pale : front lobe of mesonotum, scutellum, stigma of fore wing, mesopleura, underside of abdomen and at least the middle of the upperside of the abdomen. Anal cell of fore wing without cross-vein ; anal cell of hind wing with a short



FIGS. 155, 156.—Left lateral view of head to show development of occipital carina in : 155, *Aneugmenus* ; 156, *Melisandra*.

FIGS. 157-160.—Part of face in : 157, *Brachythops* ; 158, *Selandria* ; 159, *Loderus* ; 160, *Dolerus*.

pedicel, shorter than the breadth of the cell. Claws with large sub-apical tooth ; inner front tibial spur flattened and bifid apically. Malar space shorter than 2nd antennal segment, which is longer than broad ; 3rd antennal segment almost as long as 3 apical segments. Frontal area of head surrounded by a raised carina. 1 sp. **Stromboceros** Konow, p. 57.

- Mainly black species with front lobe of mesonotum, scutellum, stigma and mesopleura black ; abdomen mostly black with only apical segments and margins to middle segments brown. Anal cell of fore wing with a sub-erect cross-vein towards apex ; anal cell of hind wing with a long pedicel more than twice as long as the breadth of the cell. Claws simple ; inner front tibial spur not bifid at apex. Malar space longer than 2nd antennal segment, which is broader than long ; 3rd antennal segment not longer than 2 apical segments together. Frontal area of head not surrounded by a carina. 1 sp. **Pseudohemitaxonus** Conde, p. 57.

- 9 (1) Eyes elongate with their inner margins concave ; malar space usually not longer than the 2nd antennal segment (fig. 159). Tarsi slender ; basitarsus

more than 4 times longer than its apical breadth and longer than the 2 following tarsal segments together. Antenna never longer than twice width of the head. Tegulae and sometimes clypeus or front legs or other parts more or less marked with white.

Sawsheath as long as or longer than basal plates, and ovipositor as long as or longer than a hind femur; saw with the divisions between the segments marked by toothed ridges as in the "red" group of Dolerus (figs. 167-9). Body mainly black though red-girdled in 1 species. Attached to Equisetum, 4 spp. and subsp. Loderus Konow, p. 63.

Eyes more round with the inner margins straight or but slightly convex; malar space longer than the 2nd antennal segment (fig. 160). Tarsi stouter; basitarsus less than 4 times longer than its apical breadth and not longer than the 2 following segments together. Antenna often longer than twice width of head. Never with white marks on clypeus, tegulae or front legs. *Attached to Equisetum, Cyperaceae, Juncaceae or Gramineae. 30 spp. and subsp.*

Dolerus Jurine, p. 64.

Tribe Heptamelini.

This tribe has previously been included in the Heterarthrinae (Phyllostominae).

Genus **Heptamelus** Haliday.

Only one of the five known species of this genus occurs in Britain.

Colour, ♀, mainly black or piceous with the following parts pale: 1st antennal segment often, clypeus often, tegulae, sometimes a fleck on the sides of the mesonotum and on the mesosternum. Legs white with tarsi and apex of hind tibia often infuscate. Wings subhyaline; costa reddish; stigma piceous with pale base. The ♂ is much paler with pronotum, mesonotum, mesosternum and metapleura reddish-yellow; stigma yellow; flagellum of antenna brownish. 4-6 mm.

Larva bores downwards in stems of ferns such as Athyrium filix-femina (L.) Roth, Poypodium vulgare L. and Blechnum. In Britain local and more common in Scotland than England, where most of the records are from Cheshire, Lancs., Yorks., and northwards. In 1933 it was, however, notified as a pest among cultivated ferns at Reading, Berks. V-VI and VII-VIII. N. and C. Europe

♂ and ♀ **ochroleucus** (Stephens).

Tribe Strongylogastrini.

Genus **Pseudoheimitaxonus** Conde.

Only one species in the genus. 5.5 mm.

Larva unknown, but the species is associated with ferns. Only 6 specimens ever recorded: Scotland, Dumfries, Crickhope Linn. 1 ♀, vi. 1879 (D. Sharp); 1 ♀ in British Museum, without data; England, Durham, Ruffside near Hexham, 1 ♀, 1914, and 1 ♀, 1922 (A. D. Peacock) and 2 ♀ in Latvia by Conde, 1930 and 1933. (See Morice, 1920, Ent. mon. Mag. 56: 78-82, and Conde, 1932, Notul. Ent. 12: 9-15)

♀ (= **esectus** Conde) **sharpi** (Cameron).

Genus **Stromboceros** Konow.

The single European representative of this genus is 5.5-7 mm. long.

*Larva on fronds of various ferns such as Pteridium aquilinum (L.) Kuhn, Athyrium filix-femina (L.) Roth, Dryopteris filix-mas (L.) Schott., Onoclea and Polypodium. Throughout Britain and Ireland, very common on ferns. V-LX. C. and N. Europe, E. to Kamchatka. ♂ and ♀ **delicatulus** (Fallén).*

Genus **Strongylogaster** Dahlbom.

(= **Pseudotaxonus** A. Costa and **Thrinax** Konow).

Six of the eight Central European species have been recorded from Britain, but *S. filicis* and *S. contigua* need confirmation.

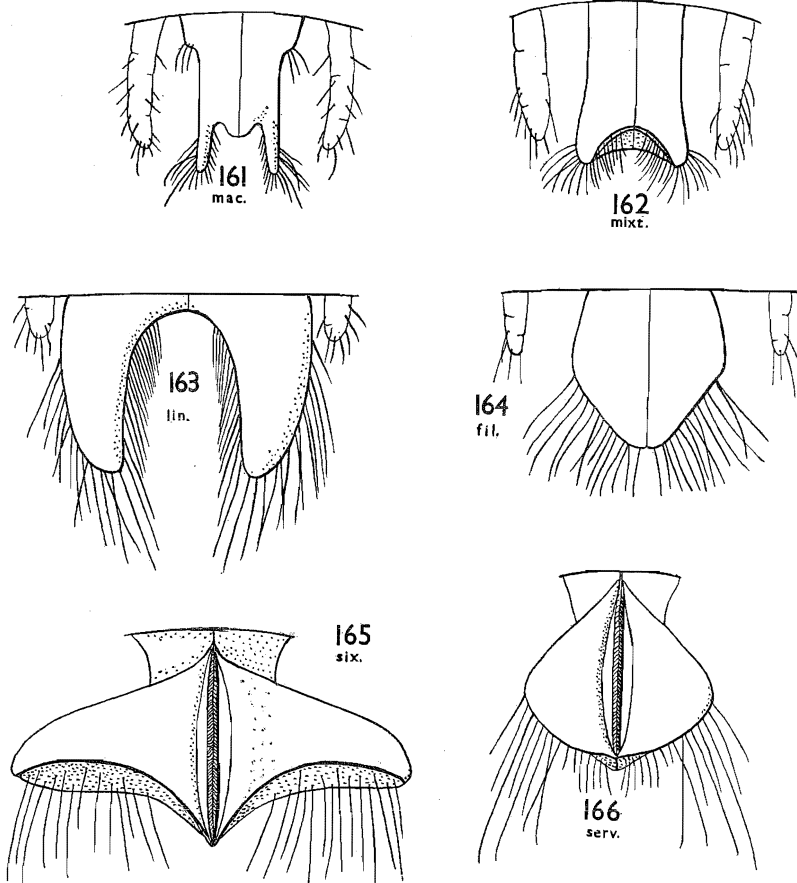
KEY TO SPECIES OF *Strongylogaster*.

- 1 Mesonotum densely punctured; abdomen dull with dense coriaceous sculpture. Claws with an inner tooth. Antenna about twice as long as the breadth of the head behind the eyes; segment 3 not shorter than 4. Clypeus deeply excised in front 2.
- Mesonotum almost impunctate; abdomen shining with only faint transverse coriaceous sculpture. Claws simple. Antenna about 3 times as long as breadth of head behind the eyes and with segment 3 shorter than 4. Clypeus slightly emarginate in front 4.
- 2 (1) Anal cell of fore wing without cross-vein. Costa and lower half of stigma brown; hind tibia uniformly brown. ♀ Abdomen variable in colour from black to brown with a very pale apical margin to each segment; sawsheath divided at apex into 2 large diverging lobes. Abdomen of ♂ yellow with 2 basal tergites mostly black and sometimes some of the apical tergites more or less infuscate 3.
- Anal cell of fore wing with cross-vein. Costa and lower half of stigma black; hind tibia white at base and black at apex (in ♂ black is confined to extreme apex only). In ♂ and ♀ abdomen black with some of middle segments more or less banded with red; ♀ sawsheath only slightly emarginate at apex in dorsal aspect (fig. 164). 8-11 mm.
Larva on Pteridium aquilinum (L.) Kuhn, etc. Britain, only known from Cameron's record, Northumberland, Wooler, 1 ♂ (J. Hardy). N. and C. Europe, E. to Urals and Japan. ♂ and ♀ filicis (Klug).
- 3 (2) Hind claws with inner tooth very small, less than half as long as the end tooth. Punctuation on thorax coarser and more irregular, especially at the sides of the front lobe of the mesonotum. Antenna of ♀ black except at most for segments 1 and 2 and the base of 3, which are more or less yellow; saw-sheath (fig. 163) usually piceous and epipygium brown; hind femur usually only black at base. 1st tergite of ♂ black in middle but with yellow lateral spot or margin; 2nd tergite with still more yellow laterally. 8-11 mm. Males much scarcer than females in this common species and much scarcer than the males of the less common *S. xanthoceros*. Presumably therefore the species is mainly parthenogenetic, but the occurrence of males at all suggests that at least some strains reproduce by normal sexual means.
Larva on Pteridium aquilinum (L.) Kuhn, Dryopteris filix-mas (L.) Schott, etc. Very common throughout Britain and Ireland. V-IX. Europe, S. to Iberia, S.E. to Cyprus, Asia Minor and N. Iran (Elburz Mountains), E. to C. Asia and Japan ♂ and ♀ (= cingulata Fabricius) lineata (Christ).
- Hind claws sub-bifid, the inner tooth more than half as long as the end tooth. Punctuation on thorax fine and even, front lobe of mesonotum without many coarse punctures laterally. Antenna of ♀ with at least 3 basal segments yellow; sawsheath, usually with epipygium and hind femur (except at extreme apex), black. 1st tergite of abdomen in ♂ black right to lateral margins and 2nd tergite usually entirely black also. 8-11 mm. Males more abundant than females in this less common species and more abundant than the males of the common *S. lineata*.
Larva on Pteridium aquilinum (L.) Kuhn. S. and S.E. England. V-VI. C. and N. Europe, E. to China ♂ and ♀ xanthoceros (Stephens).
- 4 (1) Clypeus and labrum white; femora usually entirely red, or, in ♂ at least, the four front legs mostly red. Anal cell of hind wing usually stalked. Abdomen with segments 2-5 more or less yellow above in the middle, but laterally and beneath more or less black 5.
- Clypeus and labrum black; all femora black except at extreme apex. Anal cell of hind wing usually sessile. Abdomen with segments 2-5 usually reddish-yellow above and below. Mesopleura shining, scarcely punctured. Sawsheath with very small apical lobes gaping at apex in dorsal aspect (fig. 162); ♂ with antenna as long as whole insect. 7-9 mm.
Larva on Athyrium filix-femina (L.) Roth. Apparently rare in S. England; known from Devon, Somerset, Hants., Surrey and Bucks. Less rare in N. England, Wales and Scotland. Occurs also in Ireland. IV-VI. C. and N. Europe, E. to Kamchatka ♂ and ♀ (= femoralis Cam.) mixta (Klug).

- 5 (4) *Mesopleura* shining and unpunctured. Sawsheath of ♀ with apical lobes subparallel and contiguous in dorsal aspect; ♂ antenna shorter than abdomen. 6-7 mm.

Larva unknown. I have not seen any representative of this species at all from any part of the world. Cameron records it: "not very common in Clydesdale in May and June." Clark (1927, Hist. Berwickshire Nat. Club: 237) records 1 ♀ (det. Konow) from Berwickshire, Earlstone, v.1890. Europe and N. Africa, E. to Kamchatka

♂ and ♀ (= *mixtus* Klug, Cam. nec Klug) **contigua** (Konow).



Figs. 161-166.—Sawsheath from above in Selandriinae: 161, *Strongylogaster macula*; 162, *S. mixta*; 163, *S. lineata*; 164, *S. filicis*; 165, *Selandria sixii*; 166, *S. serva*.

- *Mesopleura* shining between definite punctures. Sawsheath of ♀ with small cylindrical apical lobes diverging in dorsal aspect (fig. 161); ♂ antenna as long as abdomen. 5-7 mm.

Larva on Athyrium filix-femina (L.) Roth, Pteridium aquilinum (L.) Kuhn, etc. Local throughout Britain and Ireland, commoner in N. England and Scotland. V-VI. C. and N. Europe ♂ and ♀ macula (Klug).

Tribe Aneugmenini.

Genus *Aneugmenus* Hartig.(= *Selandria* in part).

All the four recorded C. European species occur in Britain.

KEY TO SPECIES OF *Aneugmenus*.

- 1 Head and abdomen smooth and shining without visible surface punctures or warts. Claws with a large inner tooth. Mandibles bent obtusely. Labrum white. Males only occasionally found. 2.
- Head shining but covered with warts, especially in the frontal area; abdomen above dull with fine surface transverse coriaceous sculpture. Claws without an inner tooth. Mandibles bent almost at a right angle. Head with frontal area not surrounded by carina; hind margins of head with lateral carina to level of top of eyes. Males about as common as females. 5-6 mm.
Larva unknown, but the species is associated with Pteridium aquilinum (L.) Kuhn, and other ferns. England, Scotland and Ireland, scarce. (†Morice, 1910, Ent. mon. Mag. 44: 190). V-VI. N. and C. Europe
 ♂ and ♀ *fürstenbergensis* (Konow).
- 2 (1) Abdomen and usually pronotum and clypeus in both sexes entirely black. Frontal area in the form of a raised platform more or less concave in the middle but without a clearly defined surrounding carina. 3.
- Abdomen in ♀ with the apical tergite white in the middle; in the ♂ with a white spot in the middle of the dorsum and another occupying most of the sternum. Pronotum edged with white. Clypeus usually white in the middle. Frontal area surrounded by a carina which is broken in front. Hind margin of head with carina reaching to top of eyes. 4-6 mm.
Larva on Athyrium filix-femina (L.) Roth, Dropteris filix-mas (L.) Schott, Pteridium aquilinum (L.) Kuhn, etc. S. England scarce, N. to Lancs. and Cheshire. V-VIII. ♂ only known from 1 specimen taken at Berkhamsted, Herts., vi. 1929. Europe, S. to Iberia and Greece, E. to Siberia.
 ♂ and ♀ (= *analis* Thomson) *coronatus* (Klug).
- 3 (2) Hind margin of the head at the sides carinate only behind the bottom half of the eye; the side margin of the head behind the top half of the eye is without a carina; frontal area scarcely concave in middle and not clearly defined. 5-6 mm.
Larva, not described, but associated with Pteridium aquilinum (L.) Kuhn, and other ferns. England, Scotland and Ireland, but scarce. V-VIII. ♂ not seen. N. and C. Europe, to E. Siberia. ♀ temporalis (Thomson).
- Hind margin of the head carinate at the sides as far as the level of the top of the eye; frontal area clearly concave in the middle and with clearly defined raised margins.
Larva on Pteridium aquilinum (L.) Kuhn, and other ferns. Abundant throughout Britain and Ireland. V-IX. ♂ not seen. Throughout Europe and N. Africa, to Asia Minor and Transcaucasia.
 ♀ (= *stramineipes* Klug) *padi* (L.).

Genus *Melisandra* Benson.(= *Selandria* in part).

Two of the three or four C. European species occur in Britain.

KEY TO SPECIES OF *Melisandra*.

- A Legs black marked with white; the hind tibia black apically; claws with small subapical tooth. Head above covered with small warts and the frontal area in the form of a raised hexagonal platform; malar space nearly as long as diameter of front ocellus. Prepectus to mesopleura clearly defined.
Larva on Myosotis scorpioides L. Common throughout Britain and Ireland. V-IX. N. and C. Europe ♂ and ♀ (= aperta Hartig) cinereipes (F.).

- B Legs mostly red, hind tibia entirely so; claws sub-bifid. Head shining above without punctures or warts; frontal area scarcely defined; malar space shorter than half diameter of front ocellus. Prepectus obsolete.
Larva undescribed. Throughout Britain and Ireland. V-IX. N. and C. Europe, S. to Iberia, E. to Transcaucasia and E. Siberia
 ♂ and ♀ morio (F.).

Tribe Selandriini.

Genus **Brachythops** Haliday in Curtis.

The two C. European species both occur in Britain.

KEY TO SPECIES OF *Brachythops*.

- A Wings infusate with venation black except at extreme base, stigma with the hind half yellowish-brown. Front lobe of mesonotum densely pubescent and with fine surface punctures. Clypeus and antenna entirely black. Pronotum mostly black. 6-7 mm.
Larva on Carex lasiocarpa Ehrh., etc. Scarce; in bogs in Inverness, and Roxburghshire in Scotland and N. Kerry in Ireland († Morice, 1898, Ann. Scot. Nat. Hist., 1898: 80). V-VI. C. and N. Europe
 ♂ and ♀ (= *flavens* (Klug) ab. b. Cam.) **wüstneii** (Konow).
- B Wings yellowish-hyaline with yellow venation at least on basal half of fore wing; stigma usually all black. Front lobe of mesonotum with very sparse pubescence at sides only and the surface shining, without fine punctures. Clypeus usually with front margin yellow. Antenna usually with at least the basal segment yellow. Pronotum mostly yellow. 6-7 mm.
Larva on Carex spp. Throughout Britain and Ireland, in wet places, local, but commoner in N. and W. than S. V-VI and VII-VIII. C. and N. Europe and Siberia ♂ and ♀ **flavens** (Klug).

Genus **Selandria** Leach.

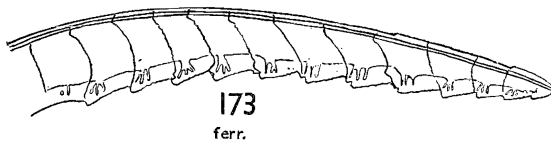
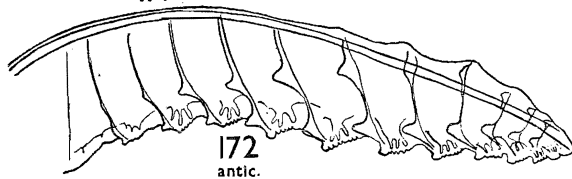
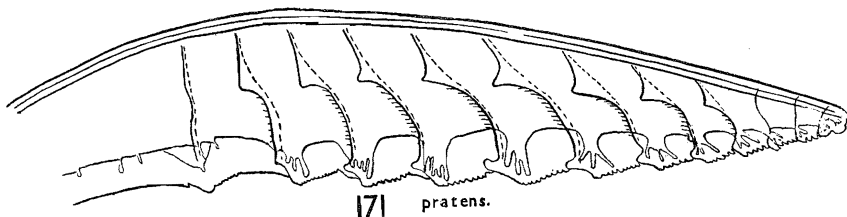
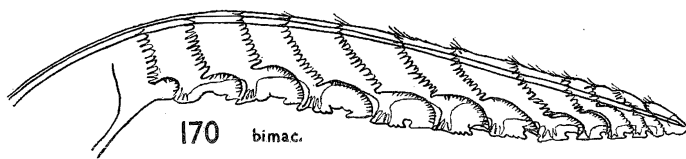
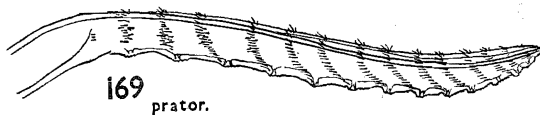
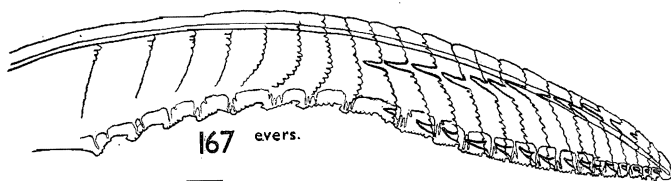
The two C. European species both occur in Britain.

KEY TO SPECIES OF *Selandria*.

- A 3rd segment of the antenna shorter than the 3 apical segments together. ♂ with malar space about one-third diameter of front ocellus. ♀ with malar space more than half diameter of front ocellus; sawsheath in dorsal aspect with the apex not or scarcely wider than the apex of the hind tibia (fig. 166). Smaller (6-8 mm.).
Larva on various Cyperaceae, Gramineae (Alopecurus, Dactylis, Lolium, Phalaris, Phleum, Poa and Triticum) and Juncaceae. Cocoon underground. Common throughout Britain and Ireland in wet places. V-X. C. and N. Europe, S. to Iberia, E. to Asia Minor, Transcaucasia and Siberia
 ♂ and ♀ **serva** (F.).
- B 3rd segment of antenna longer than 3 apical segments together. ♂ with malar space linear, much less than one-third diameter of front ocellus. ♀ with malar space less than half diameter of front ocellus; sawsheath in dorsal aspect much wider, about one and one-half times as wide as the apical breadth of the hind tibia (fig. 165). Larger (8-14 mm.).
Larva on various Cyperaceae, Gramineae and Juncaceae. Throughout Britain locally and much less common than S. serva. V-IX. C. and N. Europe ♂ and ♀ **sixii** Vollenhoven.

Tribe Dolerini.

This subfamily is widespread throughout the whole of the subarctic and northern temperate parts of Eurasia and N. America, and one species has even been found to occur in the mountains of Uganda in East Africa.



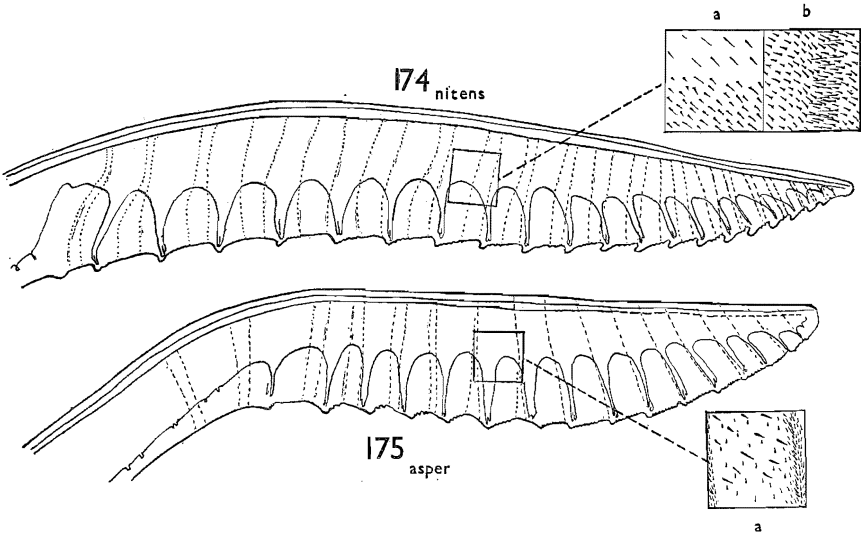
FIGS. 167-173.—Saws of *Loderus* and “red” *Dolerus*: 167, *Loderus eversmanni*; 168, *L. vestigialis*; 169, *L. pratorum*; 170, *Dolerus bimaculatus*; 171, *D. pratensis*; 172, *D. anticus*; 173, *D. ferrugatus*.

They are mostly single-brooded spring species of bog, grass-land and steppe, slow on the wing and gregarious in habit. A number of well-defined species groups occur throughout the holartic region and they are grouped here into two genera.

Of these, *Dolerus* itself is deeply divided into two sections which could with some justification be treated as distinct genera when the world fauna is better known.

I have called these two the "Red Groups" and "Black Groups." The Black Groups are the better represented in Britain and other parts of Europe, while in Asia and N. America the Red Groups predominate (or perhaps have merely been better collected).

Loderus with 3 British Species (world, 16) is entirely associated with *Equisetum*. *Dolerus* Red Groups with 12 British species have 7 associated with *Equisetum* and 3 with *Juncus* (world, about 70 known in all); Black Groups have 15 species associated with Cyperaceae and Gramineae (world, 33). In all 30 spp. in 2 genera (world, 120). *Dolerus coracinus* Klug is published here as British for the first time.



Figs. 174, 175.—Saws of "black" *Dolerus*: 174, *nitens* group, (a) pubescence on inner surface, (b) pubescence on outer surface; 175, *asper* group, (a) pubescence on outer and inner surface.

Genus *Loderus* Konow.

KEY TO SPECIES OF *Loderus*.

- 1 ♂ without a white unsclerotized patch covering the middle of tergites 5-6; sawsheath in dorsal aspect broadly rounded behind, scarcely reaching beyond apex of abdomen and with its long lateral hairs distinctly curved apically; in lateral view it is acuminate apically above and about the same length as the basal plate, and the whole ovipositor is shorter than a hind femur.....2.
- ♂ with a white unsclerotized patch covering the middle of each of tergites 5-6; sawsheath in dorsal view in the form of a narrow point, the long hairs on the sides being nearly straight and directed strongly backwards

(fig. 178); in lateral view it is broadly rounded behind, slightly hooked below, much longer than the basal plate, and the whole ovipositor is longer than a hind femur. Mostly black species with red usually restricted to the front knees and tibia. Saw, fig. 167; penis valve, fig. 215. 9-10 mm.

Larva on Equisetum. Distributed throughout Britain and Ireland. IV-VI. C. and N. Europe to E. Siberia. (= palmatus Klug) eversmanni (Kirby).

- 2 (1) Small species (6-7 mm.) with labrum, and generally also clypeus, brownish. Mesopleura dull and rough, with a few large widely-separated round crater-like punctures in the middle. Antenna only slightly thickened on the middle segments (segments 7 and 8 are three times as long as their greatest breadth). Claws simple. Sawsheath with the lateral hairs more backwardly projecting (fig. 177). Abdomen may be red-girdled (subsp. *pratorem* Fallén) or entirely black (subsp. *gilvipes* Klug). Legs red or piceous. Saw, fig. 169; penis valve, fig. 217.

Larva undescribed, but attached to Equisetum. Apparently rare in Britain.

Subsp. pratorem has only been taken at Chobham and Woking in Surrey, and at Madeley, Staffs., vi. 1932 (H. W. Daltry); and subsp. gilvipes by the River Brock in Lancs. († Morice, 1920, Ent. mon. Mag., 56: 80) and Upper Teesdale, N. Yorks. (Benson, 1940, Ent. mon. Mag. 76: 36-7). V-VI. C. and N. Europe and Siberia. Subsp. gilvipes is a subarctic and subalpine form but apparently hybridises locally with pratorem; E. of Lake Baikal only gilvipes occurs and is common there. ♂ and ♀ pratorem (Fallén).

- Larger species (7-9 mm.) with head entirely black or piceous. Mesopleura dull and rough with the surface in the middle thrown into large close crater-like punctures giving a honeycomb appearance. Antenna clearly thickened in the middle (segments 7 and 8 less than two and a half times as long as broad). Claws with a small sub-basal tooth. Sawsheath with the lateral hairs directed more outwards (fig. 176). Body normally black, but the prothorax and abdomen are sometimes more or less marked with red; legs normally red, more or less infusate at apices of tibiae and tarsi; in Scottish and Irish forms the legs are often still more infusate, and in extreme examples the red is so reduced that only the front knees show any red at all. Saw, fig. 168; penis valve, fig. 216.

Larva on Equisetum. Widely distributed throughout Britain and Ireland. V-VI. C. and N. Europe, Siberia and S.E. to Caucasus.

♂ and ♀ *vestigialis* (Klug).

Genus *Dolerus* Jurine.

KEY TO SPECIES OF *Dolerus*.

Females.

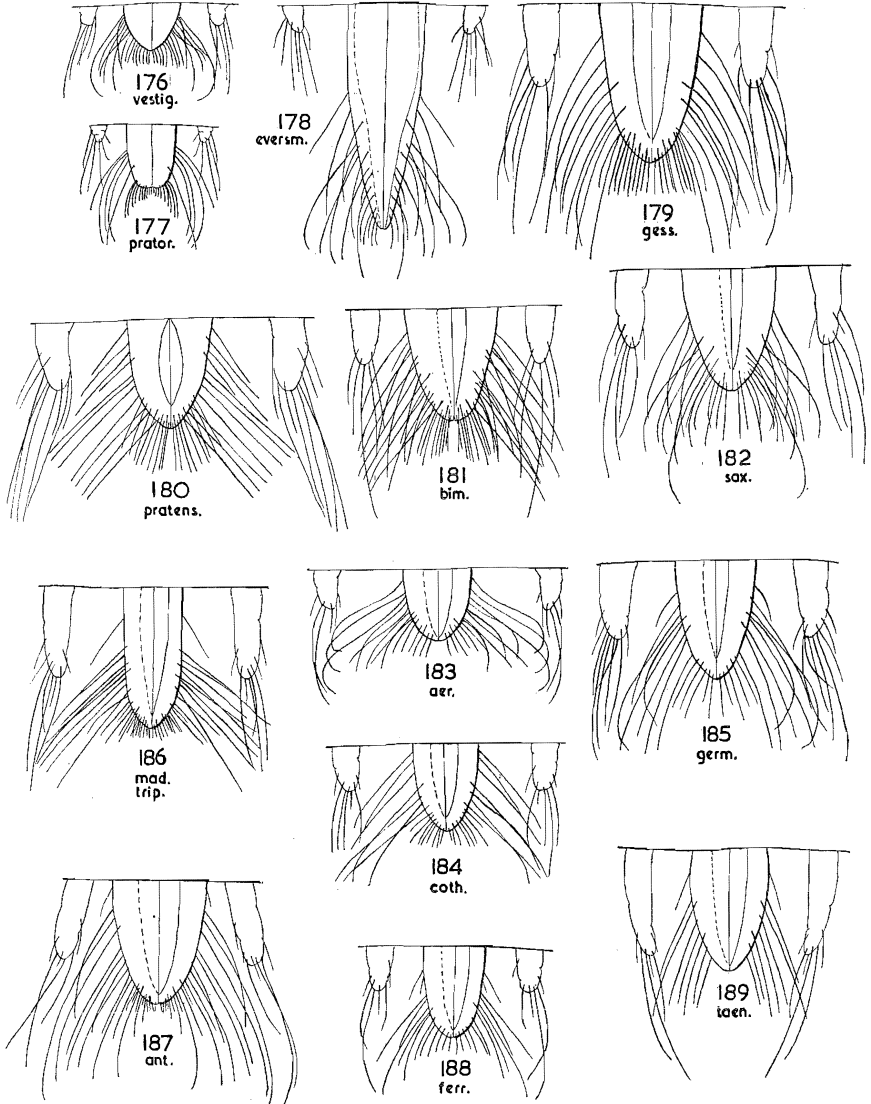
- 1 Abdomen always entirely black or blue-black (though legs and even thorax may be red-marked); always with some transverse surface sculpture on 1st and 2nd tergites. Punctuation of mesopleura may be dense and coarse but never with any deep crater-like punctures larger than an abdominal spiracle. Cerci with apical setae short and usually not extending further back than apex of sawsheath (figs. 190-203). Sawsheath clearly longer than basal plate and whole ovipositor at least as long as hind femur. Saw without lateral teeth and the divisions between the segments indicated only by bands of minute setae; ventral lobes with regular minute teeth; lubricating ducts long and on middle lobes with 2 ventral openings (figs. 174-5). Attached to Gramineae and Cyperaceae. Black Groups. . . . 13.
- Abdomen more or less red-marked, or, if entirely black, then so is thorax; the abdomen has no visible surface sculpture at $\times 45$ magnification on at least 1st and 2nd tergites; and/or punctuation of upper part of mesopleura thrown into at least some deep crater-like punctures larger than an abdominal spiracle and giving a honeycomb appearance. Cerci with long apical setae usually reaching further back than the setae on the apex of the sawsheath (figs. 179-89). Sawsheath shorter or at most little longer than the basal plate, and the whole ovipositor shorter than a hind femur. Saw with the divisions between the segments marked by lateral ridges often developed into complex lateral teeth and spines; ventral lobes with tendency for teeth to fuse; lubricating ducts short and wide with 3 ventral

- openings on middle lobes (figs. 170-3). Attached to Juncaceae, Cyperaceae and *Equisetum*. Red Groups.....2.
- 2 (1) Abdomen above with general transverse alutaceous surface sculpture; this is usually strongly developed but in *saxatilis* it is very fine, and in *taeniatus* absent from the 2nd and 3rd tergites.....3.
- Abdomen on the 2nd and following tergites smooth and shining without any general alutaceous sculpture visible even at $\times 45$ magnification.....7. *can fuse in character see niger*
- 3 (2) Often abdomen more or less red-banded, and at least front legs red-marked (except in a rare form of *pratensis*). Middle parts of mesonotal lobes and scutellum densely or sparsely punctured, but never with shining interspaces larger than 2 or 3 diameters of a puncture. Inland species associated with *Equisetum*.....4.
- Entirely black insect with the middle of the front and lateral lobes of the mesonotum as well as the middle of the scutellum covered each with a large shining area impunctate or but feebly punctate. Estuarine or salt-marsh species. 9-9.5 mm. Sawsheath, fig. 189.
- Larva undescribed. Local species of salt marshes, recorded only from Devon (mouth of River Teign), Essex (Colchester), Suffolk (Southwold) and Yorks. (Spurn Head). V-VI. Europe*
- 4 (3) Scutellum very densely, irregularly and coarsely punctured all over, the coarser punctures much larger than those in the middle of the lateral lobes of the mesonotum; and on these lobes too the punctures are very irregular, often confluent at the sides and coarser in the middle, where they are widely separated. Abdomen red-girdled and tegulae red also; abdomen with dense transverse sculpture. Sawsheath acute in lateral aspect and dorsally with the lateral hairs slightly curved (fig. 181); saw, fig. 170. 8.5-10 mm.
- Larva on Equisetum. Only known from Spey Valley, Inverness in Scotland, Wicklow and Dublin in Ireland, Skipwith near Selby, Yorks., and Flitwick Bog, Beds., in England. V-VI. C. and N. Europe*
- Scutellum with regular punctures thinning out in front where there are shining interspaces; in size the punctures are scarcely larger than those in the middle of the mesonotal lobes; on the lateral lobes of the mesonotum the punctures are small, more evenly spread and separated from each other.....5.
- 5 (4) Larger species (9-12.5 mm.) with wings slightly infuscate apically. Abdomen densely transversely striate with definite coarse punctures on the 1st and 2nd tergites. Sawsheath with lateral setae stiff and almost straight (figs. 179 and 180).....6.
- Smaller species (6.5-8 mm.) with entirely hyaline wings. Abdomen with shining areas on the tergites between the patches of fine surface sculpture and without definite punctures on the 1st and 2nd tergites. Sawsheath with lateral setae finer and definitely curved (fig. 182), and in lateral view the sheath is acutely angled apically.
- Northern species normally entirely black except for the fore legs, though forms with a red-girdled abdomen also occur. Larva (not described) on Equisetum. The endemic British subspecies scoticus Cameron is common locally in Scotland, often together with gessneri, also in England N. of the Humber/Severn line. Some specimens from Askham Bog, Yorks., 31.v.34, (J. Wood), appear to belong to the normal continental form, which is very similar in general appearance to D. germanicus fuscipennis, with its red-girdled abdomen, but they can be distinguished from the latter species which lacks microsculpture on the abdomen, has slightly infuscate wings and deeper occipital furrows. V-VI. N. Europe, Siberia to Kamchatka..... ♀ saxatilis Hartig.*
- 6 (5) Larger (10.5-12.5 mm.). Very variable in colour, normally red-girdled, but if the abdomen is entirely black then the legs are also. Setae on sides of sawsheath straight (fig. 180), and set more outwards so that those on one side form almost a right angle with those on the other. Saw, fig. 171.
- Larva on Equisetum. Local, but often abundant, throughout Britain and Ireland. V-VI. Europe, Siberia, E. to Kamchatka, also in high mountains of E. Africa..... ♀ (= dubius Klug) pratensis (L.).*
- Smaller (9-10 mm.). Normally entirely black except for the red front and middle knees; in some specimens, however, the abdomen is more or less

girdled with red. Setae on sides of sawsheath very slightly curved and set more backwards, so that the longer ones on one side form an acute angle with those of the other (fig. 179).

Larva on Equisetum. Local in Scotland and Ireland, and in England N. of Humber/Severn line (in the west as far south as the Forest of Dean, Glos. (1936, J. F. Perkins)). V-VI. C. and N. Europe, E. to Kamtchatka.

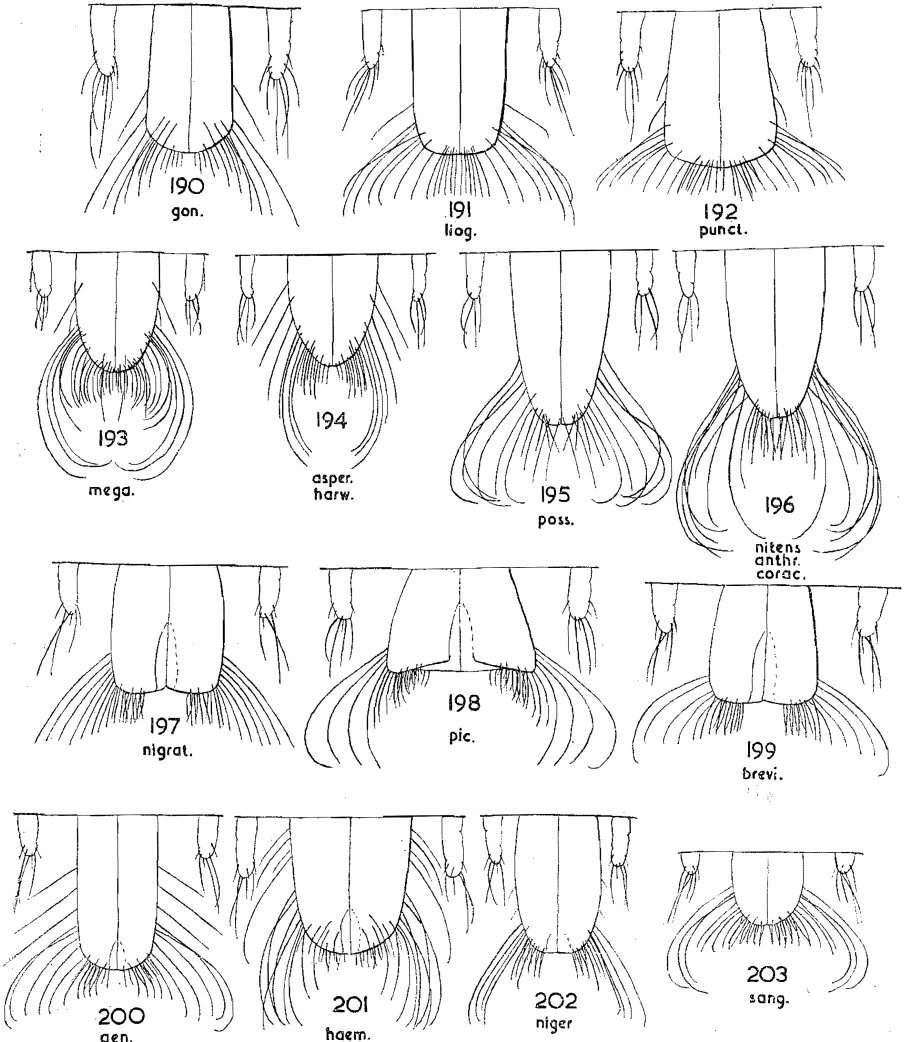
♀ *gessneri* Ed. André.



FIGS. 176-189.—Sawsheath from above in *Loderus* and "red" *Dolerus*; 176, *Loderus vestigialis*; 177, *L. pratorum*; 178, *L. eversmanni*; 179, *Dolerus gessneri*; 180, *D. pratensis*; 181, *D. bimaculatus*; 182, *D. saxatilis*; 183, *D. aericeps*; 184, *D. cothurnatus*; 185, *D. germanicus*; 186, *D. madidus* and *triplicatus*; 187, *D. anticus*; 188, *D. ferrugatus*; 189, *D. taeniatus*.

- 7 (2) Legs with at least the front pair red about the knees. Mesopleura with crater-like punctures in the middle. Not more than 9 mm. long. On *Equisetum* . . . 8.
- Legs entirely black. Mesopleura in the middle without any crater-like punctures as large as an abdominal spiracle. 9–10.5 mm. long. On *Juncus* . . . 10.
- 8 (7) Long setae on the sides of the sawsheath set more outwards so that, in dorsal aspect, they form with the corresponding setae on the other side of the sawsheath an obtuse angle (figs. 183 and 184) 9.
- Long setae on the sides of the sawsheath set more backwards so that, in dorsal aspect, they form with the corresponding setae on the other side of the sawsheath an acute angle (fig. 185). 7.5–8.5 mm.
- Wings strongly infusate. Mesonotum in S. England, Wales and Ireland (Lough Neagh Basin), with side lobes red (subsp. *germanicus* Fab.) but in N. England and Scotland entirely black (subsp. *fuscipennis* Steph.). Abdomen normally red except at base and apex. The subsp. *fuscipennis* is very similar to the typical form of *saxatilis* Hartig, but can be distinguished by its smoky wings, its entirely unsculptured tergites and deeper occipital furrows (Benson, 1945, *Ent. mon. Mag.* 81: 104).
- Larva* on *Equisetum*. V–VI. Europe, Siberia to Kamtchatka and ? N. America in various subspp.
- ♀ (= *fulviventris* Scopoli, *pratensis* L. auctt. nec L.) **germanicus** F.
- 9 (8) Setae on the sides of the sawsheath strongly curved apically in dorsal aspect (fig. 183). Mesonotum with the side lobes entirely, and often the front lobes also, red. Head with a bronzy sheen and occipital furrows obsolete. Side lobes of mesonotum with irregular punctures which are obsolete in the middle. 7–8 mm.
- Larva* on *Equisetum*. Very common in England, also occurs in Scotland and Wales less commonly. (cf. † *Morice*, 1910, *Ent. mon. Mag.* 46: 155). In Ireland so far only known from E. Cork. V–IX. All Europe
- ♀ **aericeps** C. G. Thomson.
- Setae on sides of sawsheath only very slightly curved (fig. 184). Entire mesonotum and apex of abdomen black. Head without bronzy sheen and with clearly defined occipital furrows. Side lobes of mesonotum with fine and regular punctures all over. 8–9 mm.
- Larva* on *Equisetum fluviatile* L. and *palustre* L. Locally common throughout Britain and Ireland. V–VII. C. and N. Europe, Siberia to Kamtchatka
- ♀ (= *palustris* Klug) **cothurnatus** Lepeletier.
- 10 (7) Side lobes of mesonotum with at least the posterior two-thirds black 11.
- Side lobes of mesonotum almost entirely yellow on the dorsal face. Prothorax, mesonotum (except scutellum) and abdomen (except sawsheath) yellow; in the sporadic ab. *schultessi* the 1st abdominal tergite is also black. Saw-sheath narrow in dorsal aspect with straight lateral setae near apex (fig. 186). 9–10.5 mm.
- Larva* on *Juncus*. Local throughout Britain and Ireland. III–VI. All Europe ♀ (= *lateritius* Klug, *chappeli* Cameron, *anticus* var. *schultessi* Konow) **madidus** (Klug).
- 11 (10) Scutellum and 1st abdominal tergite black. Hind tibial spurs broadened basally so that they are only 3–4 times longer than their basal breadth . . . 12.
- Scutellum and 1st abdominal tergite yellow. Hind tibial spurs slenderer and more than 5 times longer than their basal breadth. Large species, 9.5–10.5 mm. long, with thorax above (except side lobes and front of fore lobes of mesonotum) and the whole abdomen yellow; on the continent of Europe forms occur in which the thorax is entirely black, but these have not been found in Britain and, should they occur, can easily be recognized by the pale 1st tergite and the slender tibial spurs. Sawsheath, fig. 186.
- Larva* on *Juncus*. Local in England. V–VI. All Europe
- ♀ **triplicatus** (Klug).
- 12 (11) Side lobes of mesonotum yellow in front. Sawsheath in dorsal aspect wide (more than twice width of a cercus), with slightly curved lateral setae (fig. 187). 9–10.5 mm. Saw, fig. 172.
- Larva* on *Eleocharis palustris* (L.) Roem. & Schult (*Cyperaceae*). Very local and restricted to a few localities S. of Humber/Severn line: Cornwall, Glos., Surrey, Essex, Middlesex, Herts., Norfolk and Lincoln. V–VI. All Europe ♀ (nec Cameron ex parte cf. *ferrugatus*) **anticus** (Klug).

- Side lobes of mesonotum entirely black. Sawsheath much narrower with almost straight lateral setae (fig. 188). 9-10 mm. Saw, fig. 173.
Larva on Juncus. Local throughout Britain and Ireland. V-VI. C. and N. Europe. . . . ♀ (= anticus Klug, Cameron, ex parte) ferrugatus Lepeletier.
- 13 (1) Hind legs with tibia or femur conspicuously marked with red 14.
- Hind legs not marked with red on tibia or femur 16.
- 14 (13) Only apex of hind femur and base of hind tibia red. Head parallel-sided or swollen behind in dorsal aspect and with poorly defined occipital furrow . . 15.
- Hind femur entirely red and tibia entirely or almost entirely black. Head with



Figs. 190-203.—Sawsheath from above of "black" *Dolerus*: 190, *gonager*; 191, *liogaster*; 192, *puncticollis*; 193, *megapterus*; 194, *asper* and *harwoodi*; 195, *possilensis*; 196, *anthracinus*, *nitens* and *coracinus*; 197, *nigratus*; 198, *picipes*; 199, *brevitarsus*; 200, *aeneus*; 201, *haematodes*; 202, *niger*; 203, *sanguinicollis*.

well defined occipital furrows and often contracted behind. Punctuation of thorax and form of sawsheath very much as in *puncticollis* (fig. 191).

- Larva on Gramineae. Rare, in woods, throughout Britain and Ireland; ♂ not known. V—VI. Rare throughout Europe. ♀ liogaster* C. G. Thomson.
15 (14) Side lobes of mesonotum closely and copiously punctured laterally. Longer lateral setae near apex of sawsheath are directed more outwards in dorsal aspect (fig. 192), so that they form with the corresponding setae on the other side of sawsheath an obtuse angle. 8–9 mm.
- *Larva on Gramineae, undescribed. Generally distributed in Britain but not yet found in Ireland. V—VI. ♀ puncticollis* C. G. Thomson.
- Side lobes of mesonotum very shining laterally, with sparse and very superficial punctures. Longer lateral setae near apex of sawsheath directed more backwards so that they form with the corresponding setae on the other side of the sawsheath an acute angle (fig. 190). 8–9 mm.
- *Larva on Gramineae. Generally distributed in Britain but not yet found in Ireland. V—VI. All Europe and Caucasus. ♀ gonager* Fabricius.
16 (13) Pronotum black without red markings. 17.
- Pronotum marked with red.
(A conspicuous metallic species, the head and abdomen usually with green and blue reflections. Side lobes of mesonotum evenly and strongly but not very coarsely punctured. Sawsheath (fig. 201). 9–10 mm.
Larva on Cyperaceae (Carex and Scirpus) and Gramineae (Avena, Poa and Triticum). Widely distributed throughout Britain and Ireland. III—VI. C. and N. Europe, S.E. to Armenia ♀ haematodes Schrank.
17 (16) Sawsheath in dorsal aspect narrowing to the tip so as to appear more or less pointed, though as a rule bluntly (figs. 193–6, 200, 202–3) 18.
- Sawsheath clearly dilated apically, the tip very broadly rounded, truncate or appearing emarginate through the dehiscence of the valves (figs. 197–9) 26.
18 (17) Front lobe of mesonotum strongly convex, and usually with a median depression or channel normally developed. 19.
- Front lobe of mesonotum flat, scarcely convex, densely punctured all along the middle line which appears but slightly channelled or keeled medially. Head and thorax bluish-black. Sawsheath as in fig. 196. 28.
19 (18) The longer hairs near the apex of the sawsheath are directed strongly backwards and are curved so that the apices of the long hairs on one side of the sawsheath approach those on the other side and at the tips are closer together than the greatest breadth of the sawsheath when viewed dorsally (figs. 193–196) or the mesonotum and head (in profile) with the hairs sparse, straight and extremely short, shorter than the diameter of an ocellus (figs. 207, 210 and 214). 20.
- The tips of the longer hairs near the apex of one side of the sawsheath further from the tips of those on the other side than the breadth of the sawsheath (figs. 200, 202 and 203) and the mesonotum and head (in profile) always densely clothed with curved and long hairs, much longer than the diameter of an ocellus 24.
20 (19) Front lobes of the mesonotum punctured all over although more densely at the sides; longer hairs on the sawsheath evenly curved and directed strongly backwards from the base (figs. 193–194) 21.
- Front lobes of mesonotum only punctured laterally; the middle parts adjoining the medial furrow and the front, without punctures, or longer hairs on the sawsheath more strongly curved apically than basally and directed more outwards from the base (figs. 195–196) 23.
21 (20) Upper part of head and mesonotum with short pubescence, the longest hairs of which are scarcely longer than the diameter of an ocellus (figs. 207 and 208). Pubescence on middle of mesopleura shorter than apex of fore basitarsus (figs. 210–211). Clypeus almost flat and usually emarginate to a depth as great as half total length of clypeus. Sawsheath, fig. 194. 22.
- Upper part of head and mesonotum and mesopleura clothed in dense woolly pubescence much longer than apex of fore basitarsus (figs. 209 and 212). Clypeus with its front margin sharply incurved and emarginate to a depth of much less than half the total length of the clypeus. Sawsheath, fig. 193. 9–10·5 mm.
Larva on Cyperaceae. In Britain so far only known from the valleys of the

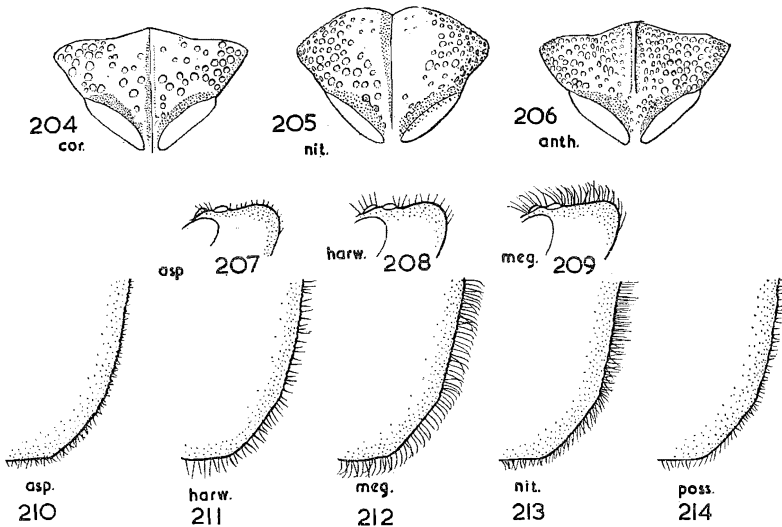
- Spey and Findhorn in Inverness, and Moray, and the Dee in Aberdeen and Kincardine in Scotland, and, according to Cameron, the Manchester district of England. V-VI. Europe. ♀ megapterus Cameron.*
- 22 (21) Whole insect with sparse and very short pubescence; the hairs on the head and mesopleura above are seen in profile to be less than the diameter of an ocellus (figs. 207 and 210). 8.5-10 mm.
Larva on Cyperaceae and Gramineae. Widely distributed and common throughout Britain and Ireland. IV-VI. C. and N. Europe to E. Siberia ♀ (= carbonarius Zaddach, oblongus Cameron) asper Zaddach.
- Pubescence on head, mesonotum and mesopleura dense, and in profile much of this is seen to be as long as, or even longer than, the diameter of an ocellus (figs. 208 and 211). 8.5-10 mm.
Larva unknown. Discovered in Inverness in 1945 by P. Harwood. IV-VI. Also in Sweden and Bohemia (†Benson, 1947, Ent. mon. Mag. 83 : 62-63) ♀ harwoodi Benson.
- 23 (20) Mesopleura above with rather long pale hairs (longer than the apical breadth of the front basitarsus) (fig. 213). Head, thorax and abdomen with evident metallic reflections. Mesosternum mainly impunctate. 8.5-10 mm.
Larva ? on Gramineae or Cyperaceae (undescribed). A widely distributed but rare species throughout Britain occurring in both sexes in very early spring. III-IV. N. and C. Europe. ♀ (= coracinus Klug, Cam. nec Klug) nitens Zaddach.
- Mesopleura above with much shorter and sparser hairs (shorter than the apical breadth of the front basitarsus) (fig. 214). Not metallic. Mesosternum with shallow punctures all over. 8.5-10 mm.
Larva ? on Gramineae or Cyperaceae (undescribed). A widely distributed species throughout Britain and much commoner than D. nitens, but occurring in the female sex only and later in the season. IV-VI. Not yet recognized outside Britain. ♀ (= nitens Zaddach, Morice (ex parte) possilensis Cameron.
- 24 (19) Setae near apex of sawsheath strongly curved apically (dorsal view) (figs. 200 and 203). Abdomen above with finer surface sculpture and more shining; tergite 1, for instance, is usually furnished with large lateral and medial unpunctured areas. Smaller species usually under 10 mm. long. . . . 25.
- Setae near apex of sawsheath almost straight (fig. 202). Abdomen above dull and more strongly rugulose sculptured, so that tergite 1, for instance, is without large lateral or medial unpunctured areas. Larger species usually over 10 mm.
Larva on Gramineae, including corn. Common throughout Britain, the males often seen swarming round trees, sometimes at a great height, at the borders of pastures or corn fields. V-VI. C. and N. Europe. ♀ niger L.
- 25 (24) Antenna with the flagellar segments unusually long and slender, the 3rd and 4th antennal segments being almost equal in length. Cerci usually pale testaceous or red. Setae near apex of sawsheath directed more backwards (fig. 200). 6-10 mm.
Larva on Gramineae. Head narrowed behind the eyes with a clearly defined occipital furrow; mesonotum very shining with sparse punctures; a very elongate and slim insect. One of the commonest sawflies throughout Britain including many of the islands and even at the tops of our highest mountains. IV-VII, sometimes also VIII-IX (? partial second brood). Throughout Europe except the extreme south. . . . ♀ (= elongatus Thomson) aeneus Hartig.
- Antenna less elongate, the 3rd segment distinctly longer than the 4th. Cerci usually black or dark. The curved setae on the sawsheath are directed more strongly outwards (fig. 203). 7-8 mm.
Larva ? on Gramineae (undescribed). In the typical ♀ of the species on the Continent the pronotum and mesonotum (except for the scutellum) are red, though the ♂ is always entirely black. Between the red-marked ♀ and the entirely black ♀ every gradation occurs. The British race, however, is always entirely black (= var. fumosus Steph.). Common and widely distributed in England and Wales and Scotland but not known from Ireland. IV-VI. All Europe ♀ (= fumosus Stephens) sanguinicollis Klug.
- 26 (17) Sawsheath in dorsal aspect but slightly dilated apically, the width here being

less than three-quarters the apical width of the hind tibia and the setae each side either almost straight or only slightly curved (figs. 197 and 199). .27. Sawsheath extraordinarily dilated apically, the width here being about the same as the apical width of the hind tibia (fig. 198); each side of apex of sawsheath with long curved setae. 8-9 mm. Side lobes of mesonotum finely, not deeply punctured. Head behind the eyes not narrowed, but often somewhat widened and on either side, adjoining the lateral sulci of the vertical area, there is a conspicuous smooth shining area almost or entirely free from punctures; occipital furrows wanting or feeble.

Larva on Gramineae. Common throughout Britain. IV-VI. All Europe ♀ (= *intermedius* Cam.) **picipes** Klug.

- 27 (26) Sawsheath with the long setae on each side apically almost straight (fig. 197). Head widened or subparallel behind the eyes, with the occipital furrows very feebly developed. Mesonotum very densely punctured all over; cenchri white and closer together than one and a half times the breadth of one; 9-10.5 mm.

Larva on Gramineae. Generally distributed and common throughout Britain. V-VI. C and N. Europe. ♀ (= *fissus* Hartig) **nigratus** Müller.



FIGS. 204-206.—Front lobe of mesonotum in ♀ *Dolerus*: 204, *coracinus*; 205, *nitens*; 206, *anthracinus*.

FIGS. 207-209.—Lateral view of top of head in ♀ *Dolerus* to show length of pubescence: 207, *asper*; 208, *harwoodi*; 209, *megapterus*.

FIGS. 210-214.—View of mesopleura of ♀ *Dolerus* from in front to show length of pubescence (drawn to same scale as figs. 207-209, for comparison): 210, *asper*; 211, *harwoodi*; 212, *megapterus*; 213, *nitens*; 214, *possilensis*.

Sawsheath with the long setae on each side longer and more curved apically (fig. 199). Head subparallel or slightly contracted behind the eyes, with the occipital furrow well developed and distinct. Mesonotum shining with more scattered and shallower punctures; cenchri infuscate and further apart than one and a half times the breadth of one. 8-9 mm.

Larva on Gramineae. Generally distributed throughout England, Wales and Scotland, rare in Ireland. IV-VI. C. and N. Europe

♀ (= *varispinus* Hartig, Cameron and *rugosulus* Dalla Torre) **brevitarsus** Hartig.

- 28 (18) Front lobe of mesonotum with fine medial groove (fig. 204). Mesopleura above with rather long pale hairs (longer than apical breadth of front basitarsus) (cf. fig. 213). Mesosternum almost impunctate. Wings normal. 9-10 mm.

Larva unknown. New British record. Only known in Britain from single series of females taken by P. Harwood at Aviemore, Inverness in iii. 1946. C. Europe. Male not known for certain.

- ♀ (nec *coracinus* Klug, Cameron, see *nitens* Zaddach) **coracinus** Klug.
 - Front lobe of mesonotum with a fine medial keel. Mesopleura above with much shorter and sparser hairs (shorter than the apical breadth of the front basitarsus (cf. fig. 214). Mesosternum evenly and strongly punctate all over. Wings often not reaching apex of abdomen. 9-10 mm.

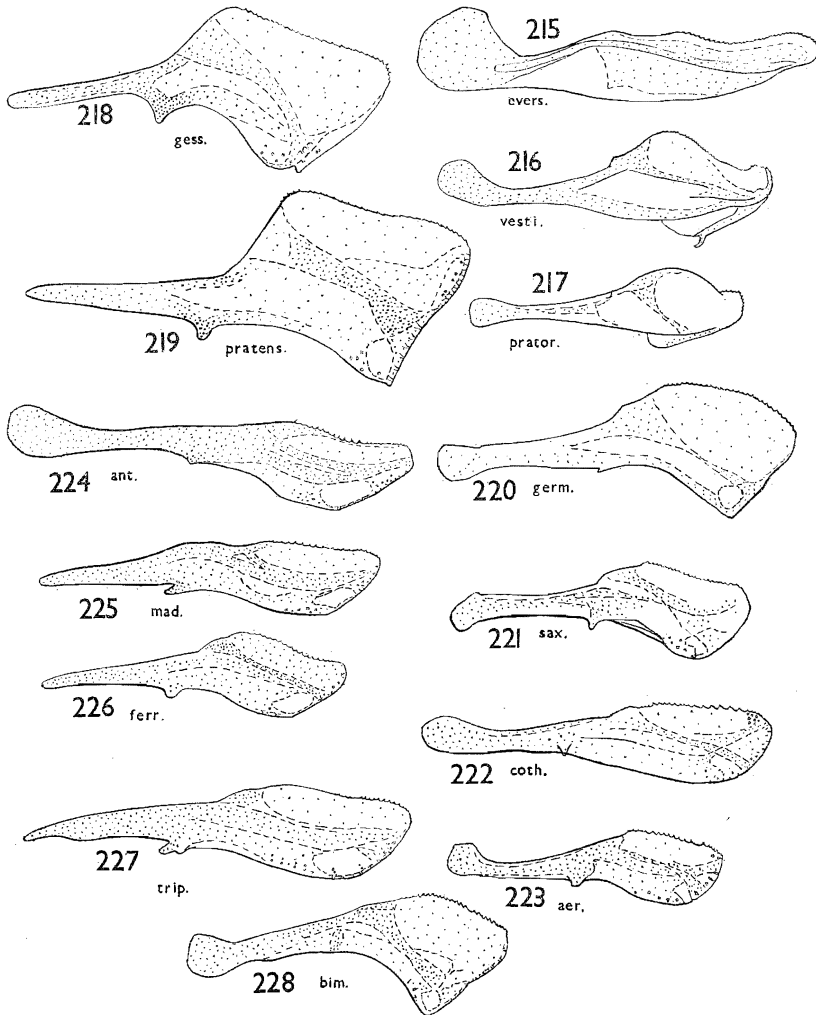
Larva on Gramineae. Locally common throughout Britain (in the S.E. mainly on chalk grassland). II-IV. C. Europe. ♀ anthracinus Klug.

KEY TO SPECIES OF *Dolerus*.

Males.

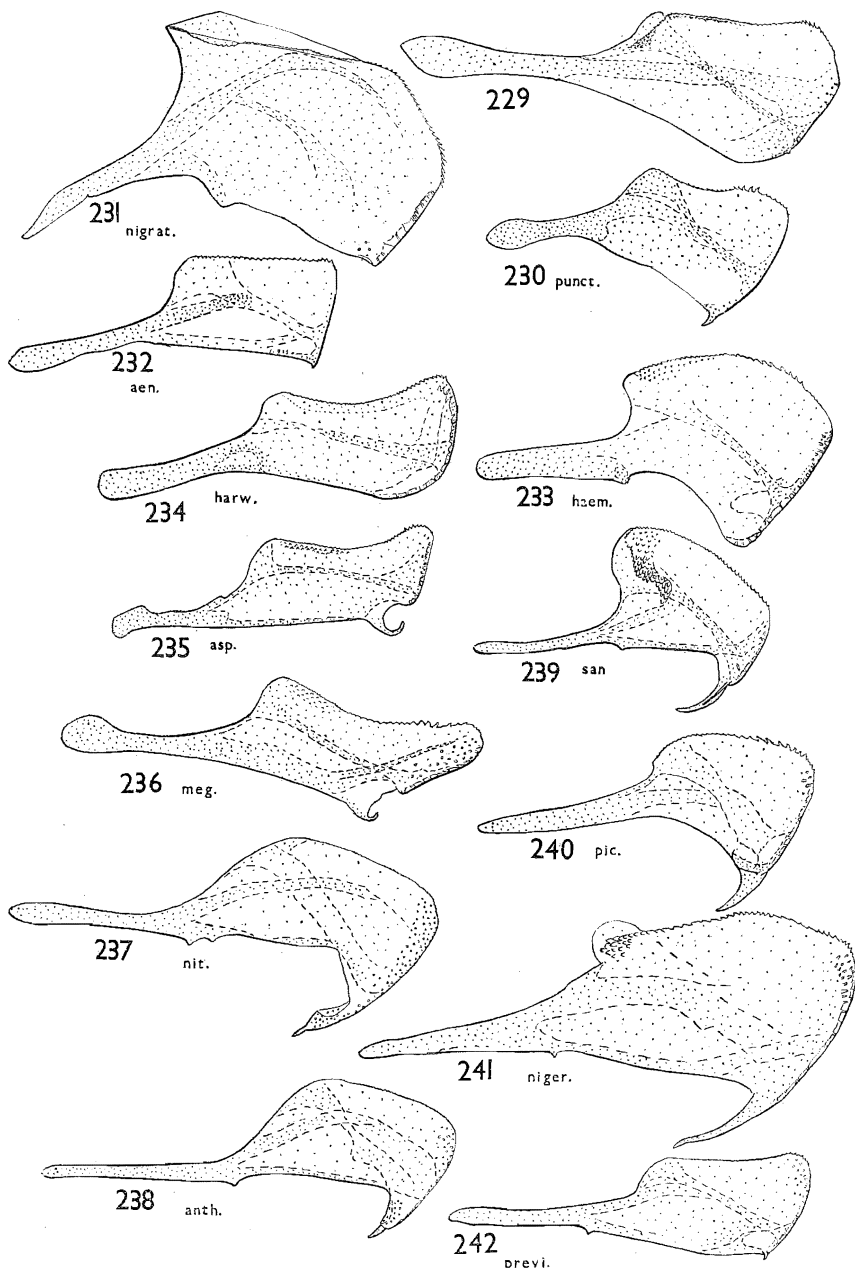
- 1 Abdomen entirely black (though legs may be red-marked), and with the tergites all dull with transverse coriaceous sculpture. Mesopleura may be densely and coarsely punctured, but never in the middle, with crater-like punctures larger than an abdominal spiracle. Black Groups 13.
 - Abdomen more or less red, or, if entirely black, then either very shining without any transverse coriaceous sculpture on tergites 2 and 3, or in the middle of the mesopleura are crater-like punctures, larger than an abdominal spiracle giving a honeycomb pattern. Red Groups 2.
 2 (1) Abdomen from at least the 4th tergite with general coriaceous surface sculpture usually strong, but very fine in *saxatilis* (*Equisetum*). 3.
 - Abdomen from the 2nd and 3rd tergites smooth and shining without surface sculpture visible at $\times 45$ magnification (*Juncaceae* or *Equisetum*). 7.
 3 (2) Often abdomen more or less red-marked and at least front legs red at the knees (except in a rare form of *pratensis*). Middle parts of mesonotal lobes and scutellum densely or sparsely punctured but never with shining interspaces larger than 2 or 3 diameters of a puncture. Inland species associated with *Equisetum*. 4.
 - Entirely black insect with the middle and the front lobes of the mesonotum as well as the middle of the scutellum covered each with a large shining impunctate or but feebly punctate area. Estuarine or saltmarsh species. 9-9.5 mm. Penis valve similar to fig. 225, but with longer peduncle. **♂ taeniatus** Zaddach.
 4 (3) Scutellum with regular punctures thinning out in front, where there are shining interspaces; in size the punctures are scarcely larger than those in the middle of the mesonotal lobes; on the lateral lobes of the mesonotum the punctures are small, more evenly spread and separated from each other. . . . 5.
 - Scutellum very densely, irregularly and coarsely punctured all over, the coarser punctures much larger than those in the middle of the lateral lobes of the mesonotum; and on these lobes too the punctures are very irregular, often confluent at the sides and coarser in the middle, where they are widely separated. 8-9 mm. (1st tergite of abdomen very smooth and shining without visible punctures.) Penis valve, fig. 228. . . . **♂ bimaculatus** (Geoffroy).
 5 (4) Larger species (9-11 mm.) with wings slightly infusate apically. Abdomen densely transversely striate with definite coarse punctures on the 1st and 2nd tergites. Penis valve figs. 218 and 219. 6.
 - Smaller species (6.5-8 mm.). Wings hyaline throughout. Abdomen with shining areas between the patches of fine surface sculpture, and without definite coarse punctures on the 1st and following tergites. Penis valve, fig. 221. (Normal British form has an entirely black abdomen and belongs to an endemic subsp. *scoticus* Cameron. In some specimens the abdomen is however more or less red-girdled and is then very similar to *germanicus* but this latter species has slightly infusate wings, no microsculpture on the abdomen and deeper occipital furrows). **♂ saxatilis** Hartig.
 6 (5) Larger species (10-11 mm.). Very variable in colour, usually red-girdled and with all legs marked with red, but if the abdomen is entirely black then the legs are also. Head not contracted behind the eyes in dorsal view. Penis valve, fig. 219. **♂ pratensis** (L.).
 - Smaller species (9-10 mm.). Entirely black except for the front and middle knees. Head contracted behind the eyes in dorsal aspect. Penis valve, fig. 218. **♂ gessneri** Ed. André.

- 7 (2) Legs with at least the front knees red 8.
 - Legs entirely black 10.
 8 (7) Middle and hind tibiae entirely or at least mostly red. Penis valve, figs. 222 and 223 9.
 - Middle and hind tibiae entirely or at least mostly black. Penis valve, fig. 220. Wings strongly infusate. Abdomen always with a red girdle covering the middle 4 or 5 tergites 7-8 mm. Very similar to *saxatilis* (q.v.), which, however, has an entirely black abdomen in most of the Scotch colonies (subsp. *scoticus*) with patches of fine surface sculpture, hyaline wings and



FIGS. 215-228.—Penis valve in *Loderus* and “red” *Dolerus*: (the base towards the left and the dorsal side upwards): 215, *Loderus eversmanni*; 216, *L. vestigialis*; 217, *L. pratorum*; 218, *Dolerus gessneri*; 219, *D. pratensis*; 220, *D. germanicus*; 221, *D. saxatilis*; 222, *D. cothurnatus*; 223, *D. aericeps*; 224, *D. anticus*; 225, *D. madidus*; 226, *D. ferrugatus*; 227, *D. triplicatus*; 228, *D. bimaculatus*.

- very shallow occipital furrows. 2 subsp. separable in ♀: subsp. *germanicus* in S. and C. England, Wales and Ireland (Lough Neagh Basin); subsp. *fuscipennis* Steph. in N. England and Scotland. . . . ♂ *germanicus* (Fabricius).
- 9 (8) Very small species, usually 6-7 mm. Hind tibia conspicuously dark right round the apex. Antenna very short and slender (segment 8 about 3 times as long as broad at the apex). Penis valve, fig. 223
♂ *aericeps* C. G. Thomson.
- Larger species, usually 7-8 mm. Hind tibia piceous or brown along the whole length of its inner or lower side. Antenna longer, stouter at base and more tapering towards apex (segment 8 almost 4 times as long as broad at the apex). Penis valve, fig. 222. . . . ♂ *cothurnatus* Lepeletier.
- 10 (7) Abdomen with some of the apical tergites black. 11.
- Abdomen without any black on the apical tergites. Penis valve, fig. 227. In the typical form of the ♂ of this species the whole thorax and 1st tergite are entirely black. I have not seen any of this form in Britain, though Morice said it was the only form known to him from Britain. The common British form has the thorax and abdomen coloured as in the ♀, that is to say the 1st tergite is red, as also is the pronotum, the mesonotum (except for a black spot on the front lobes and the black side lobes), the upper part of the mesopleura and the metapleura. 9.5-10.5 mm.
♂ *triplicatus* Klug.
- 11 (10) Antenna at most about as long as the abdomen; segment 8 at most little more than 3 times longer than broad. Mesopleura with honey-comb punctation above. Hind tibial spurs broadened basally so that they are only 3-4 times longer than broad at the base. 12.
- Antenna distinctly longer than the abdomen and very slender, with segment 8 more than 4 times longer than the basal breadth. Mesopleura without large crater-like punctures forming honeycomb pattern in the middle. Tibial spurs narrower so that they are 5 or more times longer than their basal breadth. 8-10 mm. (The red girdle on the abdomen of this species is often reduced or obsolete; entirely black forms sometimes occur. Penis valve, fig. 225). ♂ *madidus* Klug.
- 12 (11) Antenna unusually short and stout; segment 8 is scarcely twice as long as its basal breadth. Wings slightly infusate. Abdomen with red girdle, but the 2nd tergite has always either a dark spot on each side of the middle line or a dark mark right across it. Penis valve, fig. 224. 8.5-10 mm.
♂ *anticus* Klug.
- Antenna longer and less robust; segment 8 about 3 times longer than its basal breadth. Wings subhyaline. Abdomen normally with red girdle covering the 2nd tergite which has no dark spot, though the red girdle is sometimes more or less obsolete. Penis valve, fig. 226. 8.5-10 mm.
♂ *ferrugatus* Lepeletier.
- 13 (1) Hind legs with tibia or femur marked with red. 14.
- Hind legs not marked with red on tibia or femur. 16.
- 14 (13) Hind femur red only at apex and tibia at base. Head sub-parallel sided or swollen behind the eyes and occipital furrows not clearly defined. . . . 15.
- Hind femur entirely red and tibia entirely or nearly entirely black. Head often contracted behind eyes and with well-defined occipital furrows. 8-9 mm. (Punctuation of thorax similar to that of *puncticollis*; ♂ not known in Britain). ♂ *liogaster* C. G. Thomson.
- 15 (14) Side lobes of mesonotum closely and copiously punctured. Penis valve, fig. 230. 8-9 mm. ♂ *puncticollis* C. G. Thomson.
- Side lobes of mesonotum very shining with sparse and very superficial punctures. Penis valve, fig. 229. 8-9 mm. ♂ *gonager* Fabricius.
- 16 (13) The apex of the 8th tergite in the middle either with a pale membranous lunulate or subtriangular area, or species over 9 mm. long with a large, strongly depressed triangular glabrous area. 17.
- The 8th tergite without apical membranous area or depressed triangular glabrous patch, but pubescent all over with at most a tubercle or small glabrous patch (not depressed) on the apical margin. 19.
- 17 (16) 8th tergite with an apical lunulate or subtriangular membranous area. Often under 10 mm. 18.
- 8th tergite without a membranous area but with a large subtriangular glabrous



FIGS. 229-242.—Penis valve of ♂ “black” *Dolerus*: 229, *gonager*; 230, *puncticollis*; 231, *nigratus*; 232, *aeneus*; 233, *haematodes*; 234, *harwoodi*; 235, *asper*; 236, *megapterus*; 237, *nitens*; 238, *anthracinus*; 239, *sanguinicollis*; 240, *picipes*; 241, *niger*; 242, *brevitarsis*.

- and unpunctured area wide behind, where it occupies about one-third of the hind margin of the segment and narrowing in front. Species over 10 mm. ♂ *niger* (L.).
- 18 (17) Smaller species (6-7 mm.). The pale membranous part of the 8th tergite small, lunulate or subtriangular, but not reaching back to the middle of the segment. Mesonotum shining, finely punctured. Head strongly narrowed behind the eyes with occipital furrows strong. Penis valve, fig. 239. ♂ *sanguinicollis* Klug.
- Larger species (9-10.5 mm.). Pale membranous part of the 8th tergite reaching to the middle and often to the base of the segment. Mesonotum densely punctured all over. Head not or hardly narrowed behind and with occipital furrows feeble or obsolete. Penis valve, fig. 231 ♂ *nigratus* Müller.
- 19 (16) Head with whitish or greyish-white hairs 20.
- Head, including the face beneath the antennae, clothed with dark or sooty hairs. [Head usually metallic blue-black and the whole body with metallic reflections. 3rd tergite with large hair patch extending over its middle third. Wings sub-infusate. Penis valve, fig. 238. 8.5-10 mm.] ♂ *anthracinus* Klug.
- 20 (19) More metallic species, the head generally with blue or green reflections; thorax also with more or less distinct metallic tints, often varied, the abdomen notably metallic on the basal as well as the apical half; species not unusually slender and elongate; the 3rd abdominal tergite without a large hair-patch extending over the middle third of its surface 21.
- Less metallic species, often black or only very slightly or partly aeneous; more rarely the whole insect is nigroaeneous, in which case it is either of very slender and elongate form or the 3rd tergite has a median hair-patch 22.
- 21 (20) Lateral lobes of mesonotum very highly polished, almost impunctate or with only a few almost obliterated punctures. Penis valve, fig. 237. 8-9.5 mm. ♂ *nitens* Zaddach.
- Lateral lobes of mesonotum well punctured. Penis valve, fig. 233. 9-10 mm. ♂ *haematodes* Schrank.
- 22 (20) Slender insects with long antennae, the 8th segment of which is at least 5 times longer than its apical breadth. Head very strongly contracted behind the eyes and with deep occipital furrows. Temples shining between coarse punctures, but the impunctate areas are not concentrated in a spot adjoining each side of the post-ocellar area. Penis valve, fig. 232. 6-10 mm. ♂ *aeneus* Hartig.
- Broader insects with less elongate antennae, the 8th segment of which is not more than 4 times as long as its apical breadth. Head not strongly contracted behind the eyes and with shallow post-occipital furrows. Temples dull above and densely punctured, except that there may be a large unpunctured spot (larger than an ocellus) adjoining each side of the post-ocellar area 23.
- 23 (22) Temples densely punctured without an impunctate spot adjoining the post-ocellar furrows. Abdominal clothing with a bare median line on tergites 4-7 24.
- Temples densely punctured except that there is a conspicuous impunctate spot adjoining each side of the post-ocellar area. Abdominal clothing dense and without a bare median line on tergites 4-7. Penis valve, fig. 240. 8-9 mm. ♂ *picipes* Klug.
- 24 (23) Post tergite of scutellum impunctate and without a median carina. 25.
- Post tergite with a median carina and usually with rugulose striations laterally. Penis valve, fig. 242. 8-9 mm. ♂ *brevitarsus* Hartig.
- 25 (24) Abdomen dull with dense pubescence and surface sculpture covering 1st as well as 8th tergite 26.
- Abdomen shining with sparse pubescence and feeble surface sculpture. 1st and 8th tergites without sculpture visible under magnification $\times 45$. Penis valve, fig. 234. (Clypeus flat and deeply excised in front to half its own depth.) 8-9 mm. ♂ *harwoodi* Benson.
- 26 (25) Clypeus with the front margin sharply reflexed and with a rounded emargination to a depth of less than half the total length of the clypeus. Head and

scutellum without shining interspaces between the fine dense punctures. Occipital furrows deep and clearly defined. 8th antennal segment about 3 times longer than its apical breadth. Penis valve, fig. 236. 8.5-10 mm.

♂ **megapterus** Cameron.

Clypeus almost flat and with an acute apical excision to a depth of at least half total length of clypeus. Upper part of head and front of scutellum with small shining interspaces between the punctures. Occipital furrows on head obsolete. 8th antennal segment about 4 times longer than its apical breadth. Penis valve, fig. 235. 8-9 mm. ♂ **asper** Zaddach.

Subfamily HETERARTHURINAE.

(= Phyllotomini of Phyllotominae).

A small group of specialized leaf-mining species showing some primitive features and included in the single genus *Heterarthrus* Stephens (= *Phyllotoma* Fallén *nec* Leach).

The larvae live in blister mines extending from the apex or edge of a leaf; they are attached to trees of the families Aceraceae, Betulaceae and Salicaceae.

There are 10 known species all restricted to Eurasia except for *H. nemoratus*, which is now very common in N. America and destructive to birch trees, though probably originally introduced there. Five of the 7 European species occur in Britain.

KEY TO SPECIES OF *Heterarthrus* (= *Phyllotoma*)

- 1 Abdomen at least mostly orange yellow beneath 4.
- Abdomen black entirely, or with white flecks laterally, or with white apical margins to segments, or with the underside white 2.
- 2 (1) Larger species (4.5-5.5 mm.); the fore wings not uniformly infuscate the apex being hyaline and either with the base infuscate or with an infuscate band under the stigma. Abdomen smooth and shining above without alutaceous sculpture. Hind femur, tibia and tarsus mostly white.
 - ♂ or ♀ 3.
 - Smaller species (3.5-4.5 mm.); fore wings uniformly infuscate throughout. Abdomen dull above with transverso alutaceous sculpture. Hind femur, tibia and tarsus black except on the knees and on the underside of the tibia. Mesonotum, especially on the front lobe, with patches of reticulate-coriaceous sculpture. Antenna 10-14 segmented. Parthenogenetic species with very rare ♂.
 - Larva mines in leaves of Acer campestre L. and A. pseudo-platanus L., and has the power of jumping its disc when fully fed. Locally common in Britain to Roxburghshire but commonest in the South. V-VI. N. and C. Europe and Iberian Peninsula ♂ and ♀ aceris (Kaltenbach).*
- 3 (2) Fore wing infuscate with the tip beyond the apex of the stigma hyaline; antenna 12-14 segmented; mesonotum with front lobes slightly reticulate-coriaceous. Abdomen of ♀ entirely black but in ♂ mostly white below.
 - Larva mines leaves of Populus tremula L. S. Britain to Inverness but not common. V-VI. N. and C. Europe and Italy. . . ♂ and ♀ ochropoda (Klug).*
 - Fore wings yellowish at base, with an infuscate band under the stigma and hyaline at the apex; antenna 10-11 segmented; mesonotum with front lobes entirely smooth. Abdomen of ♀ black with yellowish-white flecks on the lateral apical margins of the tergites; ♂ unknown.
 - Larva mines leaves of Betula, preferring the thicker leaves at the tops of the trees. Throughout Britain. V-VII. N. and C. Europe. Appeared in Nova Scotia in about 1908 and spread rapidly westward as a serious pest in New Brunswick and Maine (cf. Peirson, 1929, J. econ. Ent. 22: 588-594).*
 - ♀ **nemoratus** (Fallén).
- 4 (1) Sawsheath of ♀ in dorsal aspect thinner than the metatarsus and only with very short lateral setae (fig. 246); ♂ with mesopleura all black. Eyes very large, so that the malar space is only about one-fifth (♀) to about one-eighth

(♂) the height of an eye (fig. 244). Antenna 11- to 14-segmented. 3-5 mm.

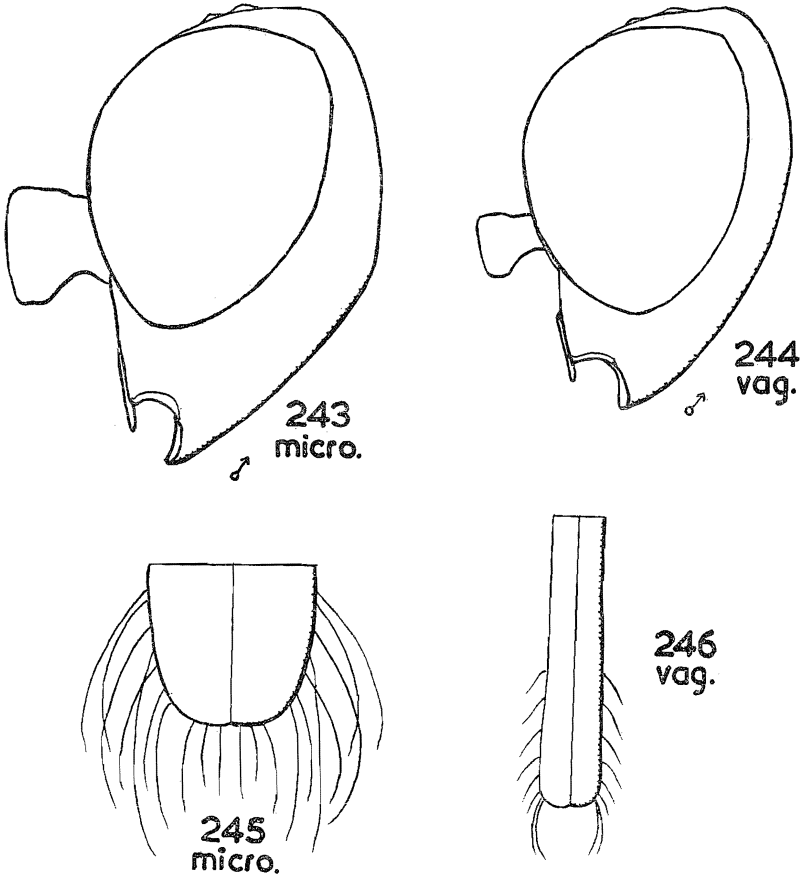
Larva mines leaves of Alnus. Britain to Inverness and Ireland. V-IX.

N. and C. Europe ♂ and ♀ **vagans** (Fallén).

- Sawsheath of ♀ in dorsal aspect at least as thick as metatarsus, widening apically where it is sub-truncate and furnished with long lateral setae (fig. 245); ♂ with the mesopleura mostly yellow. Eyes normal for the genus so that the malar space is about half (♀) to one-third (♂) the height of an eye (fig. 243). Antenna 13- to 15-segmented. 3-5 mm.

Larva mines leaves of Salix. Britain to Dunbarton and Co. Kerry in Ireland. V-VII. N. and C. Europe to Iberian Peninsula and Caucasus

♂ and ♀ **microcephalus** (Klug).



FIGS. 243, 244.—Left lateral view of head in *Heterarthrus*: 243, *microcephalus*; 244, *vagans*.

FIGS. 245, 246.—Sawsheath of *Heterarthrus* from above: 245, *microcephalus*; 246, *vagans*.

Subfamily BLENNOCAMPINAE (+ EMPHYTINAE + FENUSINAE).

This subfamily includes the FENUSINAE (except the Phyllotomini) and EMPHYTINAE (or Emphytine section of the SELANDRIINAE of earlier workers). Representatives of the subfamily occur in all the main regions of the

world, including Australia, in which it has the only native representatives of the TENTHREDINIDAE. In Africa it constitutes the major part of the Tenthredinid fauna.

It is diverse in its host-plant association, though each genus or tribe has its own circumscribed food-plant range.

Out of some 140 known genera 34 are represented in Britain with 93 species.

KEY TO TRIBES OF BLENNOCAMPINAE.

- 1 Anal cell of fore wing complete and with an oblique transverse vein (figs. 142-3); veins M and 1m-cu in fore wing subparallel 2.
- Anal cell of fore wing with the basal loop broken or absent (figs. 38-40) or discoloured (fig. 145), or else veins M and 1m-cu converge strongly towards the stigma (cf. fig. 144) 5.
- 2 (1) Slenderer species with head and thorax together much shorter than abdomen; and body not black with a red mesonotum. Antenna often longer than one and a half times breadth of head and without ventral sensory cups to the 4 apical segments, which together are longer than the 3rd segment. Thorax irregularly or vaguely punctured; the cenchri are various in form but never more than 2 or 3 times further apart than the breadth of one. Eyes, mandibles and clypeus various 3.
- Very robust species with length of head and thorax together about equal to abdomen. Body black except, in the ♀, for the red-marked lobes of the mesonotum. Antenna little longer than the breadth of the head, black except for the 4 apical segments, which are pale, subequal and short (together about equal to the 3rd antennal segment), each with a ventral sensory hollow. Thorax with strong regular crater-like punctures on the scutellum and mesopleura; small triangular cenchri about 4 times as far apart as the breadth of one. Head with hind margin strongly carinate behind a deep groove; labrum flat; mandibles strongly asymmetrical (the left one with a broad medial tooth and the right one with only a small subapical notch in addition to the end tooth); clypeus arcuately emarginate in front; eyes long and converging in front, where they are closer together than the height of an eye 1 genus, *Eriocampa*, ERIOCAMPINI, p. 95.
- 3 (2) Antenna with 9 segments. Colour pattern various. Clypeus at least emarginate apically and often deeply excised (figs. 271-3, 279 and 280). Eyes shorter so that they are much further apart in front than the height of an eye. Post-genal carina often developed on the lower hind margin of the head. Inner fore-tibial spur bifid at apex. Hind wing with 0-2 enclosed medial cells and with or without a continuous marginal vein. Mesopleural suture straight; upper half of mesepimeron flat and not rounded 4.
- Antenna with more than 9 segments (10-12). Abdomen yellow except for at most 1 or 2 of the basal tergites; mesonotum with at least the side lobes black. Clypeus subtruncate apically or slightly produced (figs. 247-51). Eyes large and converging below so that the shortest distance between them is less than the height of one of them. Post-genal carina absent. Inner fore-tibial spur simple. Hind wing with 2 enclosed medial cells (RS and M) and never with a continuous marginal vein (fig. 146). Mesopleural suture S-shaped; upper half of mesepisternum rounded and convex (fig. 152) 1 genus, *Athalia*, ATHALINI, p. 80.
- 4 (3) Clypeus strongly arcuately or quadrately excised in front with the lateral teeth acute and the whole convex on a transverse axis (fig. 280). Mandibles strongly asymmetrical (the left one bent almost at a right angle and with a large sub-apical inner tooth; the right one falciform with only a small sub-basal tooth). Head with pronounced post-genal carina. Propleurae meeting broadly in front. Claws with pronounced basal lobe 3 genera, ALLANTINI (= EMPHYTINI), p. 92.
- Clypeus various in shape, either tri-dentate (figs. 271-3) or with a shallow emargination, broad lateral teeth and flat surface plane (fig. 279). Mandibles sub-symmetrical with 1 or 2 inner teeth and not bent at a right angle. Head with or without a post-genal carina. Propleurae meeting narrowly or not meeting in front. Claws with or without basal lobe 6 genera, EMPRIINI, p. 84.

- 5 (1) Anal cell of fore wing with basal loop broken or absent (figs. 38-40) or discoloured (fig. 145); veins M and 1 m-cu of fore wing subparallel or converging towards the stigma 6.
- Anal cell of fore wing complete with oblique cross-vein (figs. 285-6); veins M and 1m-cu of fore wing converging strongly towards stigma. 2 genera, CALIROINI, p. 95.
- 6 (5) Under 6 mm. Veins M and 1m-cu of fore wing converge strongly towards stigma and M joins Sc + R at a distance from the origin of RS + M about equal to the distance of RS + M from the stigma (fig. 144). 7 genera, FENUSINI, p. 104.
- Either over 6 mm. long, or veins M and 1 m-cu of fore wing subparallel, or the vein M joins Sc + R at a point closer to the origin of Rs + M than the distance of RS + M from the stigma. 13 genera, BLENNOCAMPINI, p. 97.

Tribe Athaliini.

Represented in Britain by one genus : *Athalia*.

Genus *Athalia* Leach.

The genus *Athalia* is restricted to the old world. There are about 50 known species, and these are divided equally between Africa and Eurasia.

The larvae are mostly velvety bluish-black or grey, often unicolorous, and feed on the undersides of the leaves of various herbaceous dicotyledonous plants. The larvae, like the adults, tend to be gregarious; the species are potentially many-brooded in a favourable season so that a rapid local increase of numbers is possible; and among the plants they attack are many cultivated Cruciferae; in fact throughout its range this genus contains several serious agricultural pests. Probably the most notorious is the Turnip Sawfly (*Athalia rosae*), which throughout temperate and subtropical Eurasia attacks turnip, radish, mustard and other crops; in India and China this species is accompanied by a race of our *A. lugens* which there pursues a similar rôle. The prepupal stage is passed in a cocoon underground.

The British species were revised by Benson, 1931 (*Ent. mon. Mag.* 67 : 109-14 and 134-7).

KEY TO SPECIES OF *Athalia*.

- 1 Whole abdomen including the 1st tergite at least mainly yellow. Pubescence on head and thorax longer than half the diameter of front ocellus and usually outstanding. Antennae closer together (distance between the antennal sockets about the same as the distance of socket from the eye margin in ♀ and about one and a half times this distance in the ♂). Clypeus narrower (the width being at most little more than the length of the front basitarsus) (figs. 248-51). Inner hind tibial spur much longer than apical width of hind basitarsus (in ♀ almost as long as apical width of hind tibia and in ♂ longer than this) (except in *A. glabricollis*)..... 2.
- 1st abdominal tergite entirely black. Pubescence on head and thorax forming a dense close adpressed pile, the individual hairs of which are shorter than half the diameter of front ocellus. Antennae further apart (distance between the sockets at least twice the distance from a socket to an eye margin (fig. 247). Clypeus very wide (the width being about the same as the length of the 2 front basal tarsal segments). Inner hind tibial spur in ♀ not longer than the apical width of the hind basitarsus and in the ♂ scarcely longer. (Thorax entirely black except for the tegulae and hind edges of pronotum. 4 front legs entirely yellow and only the hind tibiae and tarsi apically black-ringed. Wings slightly infusate with yellowish bases; costa entirely black. Antenna with segment 3 = 4 + 5; 8-9 or 8-10 broader than long. Clypeus slightly produced in front and with sparse pubescence). 5-7 mm.

Larva not known but probably associated with *Ranunculus*, as it is usually on buttercups or flying over them that the adults are to be found. Though formerly thought to be rare in Britain (see Benson, 1931) the species has been of recent years locally common in the south of England and has been found as far north as Dumfries. V-VIII. Europe and Mediterranean to Transcaucasia

- ♂ and ♀ (= *annulata* Fabricius) **bicolor** Lepeletier.
 2 (1) Costa black except for the extreme base only. Head and mesonotum densely pubescent. Clypeus dull with pubescence, or if glabrous then truncate in front. Inner hind tibial spur much longer than apical width of hind basitarsus (in ♀ almost as long and in ♂ at least as long as apical width of hind tibia) 3.

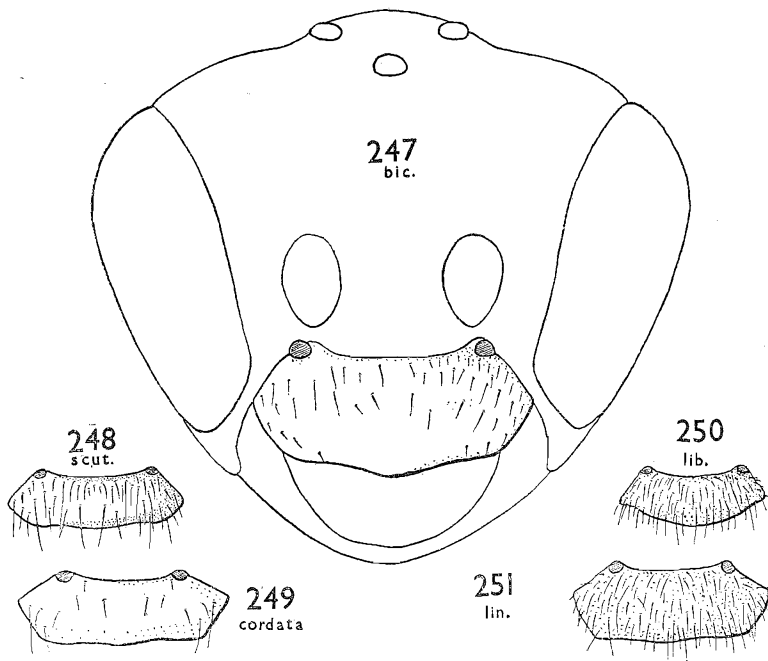


FIG. 247.—Face of *Athalia bicolor* to show clypeus.

FIGS. 248–251.—Clypeus of *Athalia*: 248, *scutellariae*; 249, *cordata*; 250, *liberta*; 251, *lineolata*.

Costa with basal one-third yellow. Head above and mesonotum, especially behind, sparsely clothed with pubescence and shining. Clypeus almost glabrous and produced in front. Inner hind tibial spur in ♀ not longer than apical width of hind basitarsus and scarcely longer in ♂. Mesonotum black except for tegulae and sometimes more or less the scutellum; underthorax and usually 4 front legs entirely yellow and only the hind legs with the tibia and tarsi black-ringed apically. Wings conspicuously yellow at base and subinfuscate apically. Antenna with segment 3 less than 4 + 5; 7- or 8-9 or 8-10 broader than long. 5-7 mm.

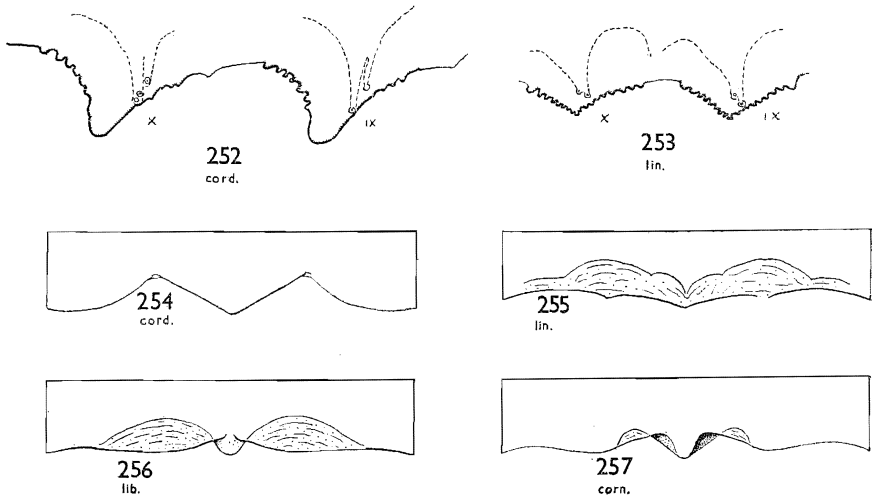
Larva on various *Cruciferae* such as *Alliaria*, *Erysimum*, *Raphanus* and *Sisymbrium*. Throughout Britain and Ireland, very common locally, mostly in wet places. V-IX. Europe and Mediterranean to S.W. Persia and Turkestan . . . ♂ and ♀ (= *ancilla* Lep. Cam. nec Lep.) **glabricollis** Thomson.

- 3 (2) Tarsal claws simple. Clypeus much longer than the width of the 2nd antennal segment and various in shape and clothing (figs. 249-51). Underthorax

variously coloured but never black only on the mesepimeron, and the pubescence is never broken through by a glabrous band at the junction of the mesosternum with the mesepisternum. 4.

- Tarsal claws with a small inner tooth. Clypeus subtruncate in front and only about as long as the width of the 2nd antennal segment and dull with pubescence (fig. 248). Underthorax normally with mesosternum and episternum yellow and only the epimeron black (but it may be entirely yellow); and the pubescence is more or less divided by a transverse glabrous band at the junction of the mesosternum with the mesepisternum. Mesonotum normally black, but the margins of the mesonotal lobes and the scutellum may be more or less yellow. Wings subhyaline with yellowish bases. Antenna with $3 = 4 + 5$; 9 or 9-10 broader than long. 4.5-6 mm.

Larva on Scutellaria galericulata L. and minor Huds. Widely distributed throughout England to S. Scotland, also in Ireland. V-IX. N and C. Europe ♂ and ♀ *scutellariae* Cameron.



FIGS. 252, 253.—Section of lower margin of saw to show shape of 9th and 10th teeth from apex in: 252, *Athalia cordata*; 253, *A. lineolata*.

FIGS. 254-257.—Hypopygium of ♀ *Athalia* to show shape of hind margin in: 254, *cordata*; 255, *lineolata*; 256, *liberta*; 257, *cornubiae*.

- 4 (3) Mesonotum black except at most for the extreme front and side margins. 5.
- Mesonotum with the front lobe, scutellum and more or less the front part of the lateral lobes reddish yellow. Underthorax all yellow; wings subhyaline with yellowish bases to subinfuscate with brownish bases. Antennal segments $3 = 4 + 5$; 8 or 8-9 broader than long; clypeus rounded in front and dull with pubescence. 6-8 mm.

Larvae periodically a pest on turnips (Brassica campestris L.), radish (Raphanus sativus L.) and other Cruciferae, including Armoracia, Barbarea, Sinapis and Sisymbrium. This species was a serious pest in this country in the late 18th and early 19th century when it is reported to have repeatedly invaded England from the Continent. It became rare in the latter half of the 19th and early 20th century throughout much of N.W. Europe. From about 1940 it began to increase and spread again in N.W. Europe and by 1945 had begun to appear again in England as a pest. Since then it has continued to establish itself in the southern, eastern and midland counties. During the 2nd, 3rd and 4th decades of the present century it was never found in England away from the south and south-east coast and was probably extinct as a breeding species.

V-X with (?) 3 broods. Typical race throughout temperate Eurasia and Mediterranean Africa with related subspecies in Japan, China and India

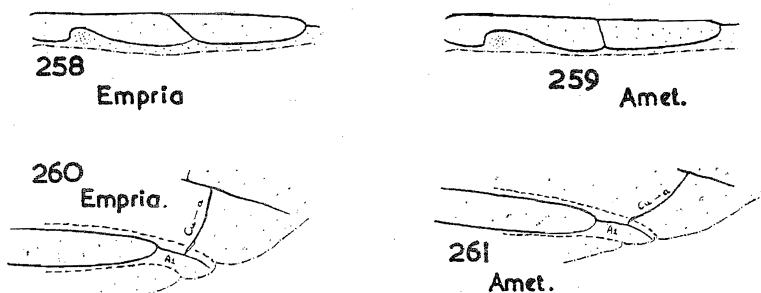
- ♂ and ♀ (= *colibri* Christ, *spinarum* F. and *centifoliae* Panz.) **rosae** (L.).
- 5 (4) Legs with hind tibiae and tarsi at most only ringed apically with black. Wings subhyaline with yellowish bases. Antenna with segments 9 or 9-10 broader than long 6.
- Legs with tibiae and tarsi more or less lined throughout with black, at least on outer sides of hind pair. Wings uniformly more or less subinfuscate throughout. Antenna with no flagellar segment broader than long. This species with *liberta* and *cornubiae* is notable in having fuscous pubescence on the frontal area of the head in the ♀ (but, as in these species, not in the ♂). Clypeus slightly produced in front and dull with dense pubescence. Underthorax all yellow. Antenna with segment 3 less than 4 + 5. 5-6 mm.
- Larva in the typical subspecies unknown, but the larvae of subsp. infumata Marlatt in Japan and proxima Lep. in China and India are not distinguished from the larvae of A. rosae L., with which it is likewise a serious pest of cultivated Cruciferae such as Brassica campestris L., Leptidium, Raphanus and Sinapis. Throughout Britain and Ireland in wet places. V-IX. Typical subspecies throughout Europe; other subspecies in temperate and subtropical E. and S.E. Asia* ♂ and ♀ **lugens** Klug.
- 6 (5) Clypeus dull with dense pubescence and often produced in front (figs. 250-1). Colour of underthorax various; front tibiae with or without dark apical rings. Saw of ♀ with less conspicuous teeth (cf. fig. 253) 7.
- Clypeus shining with very sparse pubescence, and with front margin truncate (fig. 249). Underthorax entirely or almost entirely black; front tibiae clearly ringed with fuscous apically. Saw of ♀ with very pronounced sharp teeth (fig. 252). Antenna with segment 3 less than 4 + 5. Hypopygium of ♂ strongly excised apically; hypopygium of ♀ fig. 254. 4-7 mm.
- Larva bluish-black on Ajuga reptans L., Antirrhinum and Plantago sp. One of the most abundant of sawflies throughout Britain and Ireland. V-IX. (†Benson, 1931.) Europe and Mediterranean to Transcaucasia*
- ♂ and ♀ (= *lineolata* Lepeletier in part = *rosae* auctt. in part) **cordata** Lepeletier.
- 7 (6) Underthorax all yellow or almost so. ♀ (but not ♂) with fuscous pubescence in frontal area; ♂ with hypopygium entire behind. Antennal segment 3 less than 4 and 5. Clypeus rounded in front (fig. 250). Front tibiae more or less fuscous ringed apically 8.
- Underthorax normally yellow with a black band covering the junction of the mesepisternum and mesosternum, but the black may spread over the whole underthorax or disappear entirely. ♂ and ♀ with only pale pubescence in frontal area; ♂ with hypopygium emarginate behind. Antennal segment 3 = 4 + 5. Clypeus subtruncate in front (fig. 251). Front legs usually without fuscous apices to tibiae. ♀ hypopygium, fig. 255; saw, fig. 253. 4-6 mm.
- Larva has not been distinguished from that of A. rosae; on Glehoma hederaceum L., Lycopus, Plantago and Veronica. Common throughout Britain and Ireland chiefly in wet places. V-X. Europe to Mediterranean, E. Asia and Himalayas*
- ♂ and ♀ (= *rosae* auctt. nec L.) **lineolata** Lepeletier.
- 8 (7) Hypopygium strongly excised each side of the middle (fig. 257); ♂ not distinguished from that of the following. 5-7 mm.
- Larva unknown. Only 4 ♀ British records known: Cornwall, Looe, ix. 1922 (G. C. Champion); Bucks., Beaconsfield, 26.v. 1935, (J. F. Perkins); Warwickshire, Princehorpe, 26.v. 1931, and Tile Hill, 30.vii. 1932 (J. W. Saun.) (†Benson, 1931). Belgium, Spain, Switzerland, Italy and Persia.*
- Hypopygium of ♀ with hind margin almost entire (fig. 256); ♂ not distinguished from that of the preceding. 5-7 mm.
- Larva not distinguished from that of A. rosae; on Alliaria petiolata (Bieb.) Cavara and Grande, Cardamine hirsuta L. and Sisymbrium officinale (L.) Scop. Widespread in England and also in Ireland but usually uncommon. V-VIII. (†Benson, 1931). Europe and Mediterranean to Persia*
- ♂ and ♀ (= *lineolata* Lepeletier in part, *rosae* auctt. nec L. in part) **liberta** (Klug).

Tribe Empriini.

This tribe is represented in Britain by 22 species in 5 genera.

KEY TO GENERA OF *Empriini*.

- 1 Fore wing with cross vein to anal cell oblique (forming an angle of about 45° with vein 1A) (fig. 258). Hind wing with vein cu-a forming almost a right angle with vein 1A (fig. 260), and either with an enclosed cell (M) (cf. fig. 147) or the outer orbits of the head are marked with white 2.
- Fore wing with cross vein to anal cell sub-erect (fig. 259). Hind wing with vein cu-a received obliquely on vein 1A (fig. 261), and without an enclosed cell; head without white markings on the outer orbits. 7 species
Ametastegia A. Costa, p. 90.
- 2 (1) Larger insects at least over 5 mm. long. Antenna with 2nd segment shorter than 1st and not more than one and a half times longer than broad. Vein M of fore wing joins Sc + R before or at the origin of the vein Rs + M (cf. fig. 143); costa less swollen apically where it is less than half the breadth of the stigma and mostly brown or piceous in colour 3.
- Smaller insects less than 5 mm. in length. Antenna with 2nd segment longer than 1st and more than one and a half times longer than broad. Vein M of fore wing joins vein Rs after its origin from the Sc + R (cf. fig. 142);



FIGS. 258, 259.—Anal cell in fore wing in: 258, *Empria*; 259, *Ametastegia*.
FIGS. 260, 261.—Anal cell in hind wing in: 260, *Empria*; 261, *Ametastegia*.

costa strongly swollen apically where it is more than half as broad as the stigma and green to white in colour. Head without post-genal carina. Hind tibia less than hind tarsus; hind basitarsus = 3 following tarsal segments together. 1 green or yellow and black species

- 3 (2) Abdomen mainly black or piceous with pale apical margins or lateral flecks to some of the basal tergites. Wings subhyaline. Head with a post-genal carina. Antenna more than one and a half times as long as breadth of head. Hind tibia = hind tarsus 4.
- Abdomen mainly yellow, at most more or less suffused with black from the base. Wings more or less suffused with brown from the base. Antenna less than one and a half times breadth of head. Head without a post-genal carina. Hind tarsus only about two-thirds length of hind tibia. 1 species
Monostegia O. Costa, p. 85.
- 4 (3) Abdomen piceous with pale apical margins to segments but without lateral flecks. 2nd antennal segment longer than broad, and about as long as malar space. Costa of fore wing less swollen apically so that, at the point of origin of the vein Rs + M, the cell C is almost as wide as the costa. 1 species **Monosoma** Macgillivray, p. 85.
- Abdomen mainly black at least at base and usually with one or more of the basal tergites bearing a pale lateral fleck each side and often pale apical margins as well. 2nd antennal segment not longer than broad and much shorter than malar space. Costa of fore wing more strongly swollen apically so that, at the point of origin of vein Rs + M, the cell C is less than half as wide as the costa at that point. 13 species **Empria** Lepeletier, p. 85.

Genus *Harpiphorus* Hartig.

The solitary species of this genus is very small (4-5 mm. long) and its ground-colour is yellowish green with black markings as follows: in the ♂ the upperside of the antennae, a fleck covering the ocellar and post-ocellar regions of the head, the middle of the front lobes of the mesonotum and the middle of the lateral lobes, the scutellum and neighbouring depressed parts as well as the metanotum, also the medial portion of the basal 2 or 3 tergites; in the ♀ the black is much more extensive, the antennae are almost entirely black, the frontal patch on the head reaches to the clypeus and to the tops of the eyes leaving only the upper inner orbits pale and the post-genae, the whole mesonotum together with the mesosternum and mesepisternum, the metanotum, the coxae and bases of the femora, and most of the abdomen above and below except for a lateral stripe along the sides of the tergites and more or less some of the apical tergites.

The larva feeds on the upper surface of the leaves of Quercus. Very rarely found in Britain and only recorded from the following localities: Devon (near Plymouth, Dartmoor and near Totnes); Dorset (Glanvilles Wootton); Hants. (Lyndhurst); Oxford (Wood Eaton); Herts. (Bricket Wood); Beds. (Rowney Warren); E. Suffolk (Bentley Wood near Ipswich); Lancs. (near Manchester); in Ireland from Killarney and the Wicklow Mountains. V-VI. N. and C. Europe ♂ and ♀ lepidus (Klug).

Genus *Monostegia* O. Costa (= *Empria*, *Poecilosoma* in part).

A small holarctic genus with one British species.

Head and thorax black except for the clypeus, labrum and some of the mouthparts, tegula, and edge of the pronotum, which are yellow; legs yellow except more or less bases of coxae; abdomen mainly yellow sometimes more or less suffused with black from the base above. Wings suffused with brown from the base; stigma and venation piceous becoming yellow at extreme base. 6-8 mm.

Larva on Lysimachia vulgaris L., nummularia L., etc., and Anagallis arvensis L. Entirely parthenogenetic. (♂ not known in Britain). Wide-spread in the south of England to Yorkshire and Lancs.; also from Glamorgan in Wales; in Ireland only known singly from N. and S. Kerry. V-VIII (2 or more broods). Europe to Spain, to Asia Minor and Caucasus, also Siberia and the Atlantic Coast of N. America. . . . ♀ (= luteola Klug) abdominalis (F.).

Genus *Monosoma* MacGillivray.

A very small holarctic genus with only 1 British species.

♀. Head and antenna black, though the labrum and the front margin of the clypeus are more or less yellow. Thorax black with the edge of the pronotum and the tegula yellow; legs reddish brown with usually only the bases of the coxae black though the tarsi, especially on the hind legs, are more or less piceous; wings hyaline, with the stigma yellow except for its darker front margin and the rest of the venation brown. Body black with fine white apical margins to the segments after the 1st and with the anal segment yellow.

(♂ is darker with tegula and legs mostly black but it is not yet recorded from Britain).

Larva feeds on Alnus glutinosa (L.) Gaertn. and Salix. At any rate in Britain this species must be entirely parthenogenetic as no ♂ has yet been found. Widespread throughout Britain and Ireland. V-VI. C. and N. Europe.

♀ *pulverata* (Retzius).

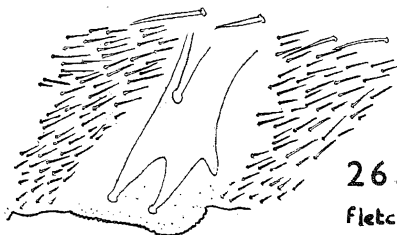
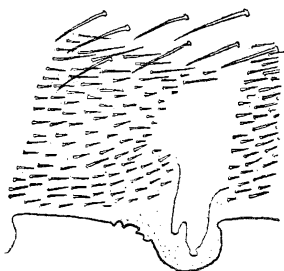
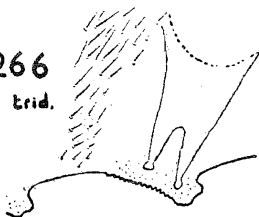
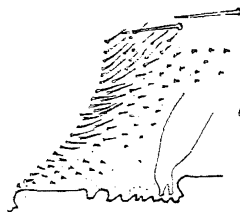
Genus *Empria* Lepeletier.

(= *Poecilostoma* Dahlbom, *Poecilosoma* auctt.)

Of the 35 species known in this genus 21 are found in Europe and 13 in Britain. The British species were revised by Benson, 1938 (*Trans. Soc. Brit. Ent.* 5 (3): 181-191). The larvae are mostly attached to Rosaceae but some occur on Betulaceae and Salicaceae.

KEY TO SPECIES OF *Empria*.

- 1 Pale parts of legs reddish yellow and hind femur often entirely so. Eyes almost round (1 : 1.2 or less). Penis valve with a spine-like apical projection (fig. 274).
 Antenna slender with 7th segment 3-4 times longer than broad. Clypeus tridentate

262
imm.263
fletcheri.264
balt.265
excis.266
trid.267
alp.268
alect.

FIGS. 262-268.—10th tooth from apex of saw in *Empria*: 262, *immersa*; 263, *fletcheri*; 264, *baltica*; 265, *excisa*; 266, *tridens*; 267, *alpina*; 268, *alector*.

- Hind legs including femur mostly black and the pale parts of all the legs are yellowish white. Eyes long oval (1 : 1.3 or more). Penis valve without a spine-like apical projection (cf. figs. 275-278)
- 2 (1) Tarsal claws bifid with the inner tooth parallel to the apical tooth. Abdomen with pale flecks on tergites 2-5 or 6; in ♀ apical tergites black. Sawsheath

in dorsal view with curved hairs and saw with a very prominent lobed marginal projection to each tooth (fig. 262). Antenna of ♂ with 7th segment shorter than length of an eye. 6-7 mm. In all the English specimens I have seen the hind legs are predominantly reddish yellow but in some Scottish and Irish specimens (and all ♂ *fletcheri*) these legs are entirely black.

Larva on Salix spp. (alba L., atrocinerea Brot., viminalis L., etc.). *Local throughout Britain and Ireland. V-VI. C. and N. Europe and Siberia*

♂ and ♀ *immersa* (Klug).

Tarsal claws with erect subapical tooth. Abdomen with pale flecks on tergites 2-6 or -7; in ♀ apical segments reddish yellow also. Sawsheath in dorsal view clothed with almost straight hairs and saw with shallow marginal teeth much longer than deep (fig. 263). Antenna of ♂ very long with 7th segment, for example, longer than length of eye. 6-7 mm.

Larva unknown. Only found very rarely in Scotland, Perthshire: Rannoch (P. Cameron); Aberdeen: Braemar (D. Sharp); and in 1946 Inverness: Aviemore (P. Harwood, who discovered the previously unknown ♂). V-VI. N. Europe ♂ and ♀ *fletcheri* (Cameron).

- 3 (1) Head (except mouthparts and labrum) and mesopleura black. Hind wing with a closed cell M present 4.
- Head with white on the inner and outer orbits and in the ♀ also on the clypeus, cheeks and mesopleura. Hind wing without a closed cell M. 6-8 mm. Abdomen generally, at least in ♀, with white margins to all the segments, and with white flecks on tergites 2-5 or -7. Head swollen slightly behind the eyes in ♀, but scarcely so in ♂; post-genal carina not continued upwards behind the eyes; clypeus only slightly emarginate in front and without a medial carina. Claws simple or with minute tooth only.

Larva on Betula. Local and scarce throughout Britain, not recorded from Ireland. IV-VI. C. and N. Europe to E. Siberia

♂ and ♀ *candidata* (Fallén).

- 4 (3) Claws simple, and either the 1st abdominal tergite has a pair of white flecks or the temples are smooth and shining 5.
- Claws with at least a small inner tooth except in some specimens of *liturata*, but this species has no white flecks on 1st tergite and the temples dull with minute tubercles 6.
- 5 (4) Abdomen with white flecks on tergites 1-8 (♀) or 1-5 (♂). Antenna short: in ♀ less than twice as long as breadth of head; in ♂ less than 3 times; segments laterally compressed so that the 8th, in lateral view, is less than 3 times longer than broad. Clypeus with the medial tooth about half as long as the lateral teeth (cf. fig. 272). 4-6 mm.

Larva not described, but appears to be associated with Filipendula ulmaria (L.) Maxim. Devon, Somerset, Surrey, Herts., Bucks., Cambs., Hunts, in England; Perth and Inverness in Scotland; Cavan, Louth, Meath, Dublin, Wicklow and Roscommon in Ireland. V-VI. (†Perkins, 1929, Trans. Devon. Ass. Adv. Sci. 61: 291). N. and C. Europe

♂ and ♀ *pumila* (Konow).

- Abdomen with white flecks on tergites 2-6 (♀) or 2-5 (♂). Antenna longer; in ♀ about twice as long as breadth of head; in ♂ about 3 times; segments not so compressed so that the 8th is more than 3 times longer than broad. Clypeus deeply excised in front with a very short middle tooth much less than half length of lateral tooth (cf. fig. 271). 5-7 mm. Penis valve, fig. 278 (cf. *excisa*, fig. 277).

Larva on Filipendula ulmaria (L.) Maxim. Common throughout Britain and Ireland. V-VII (†Benson, 1938). Europe

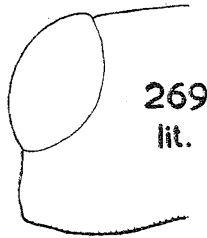
♂ and ♀ (= *excisa* Thomson in part) *baltica* Conde.

- 6 (4) Hind ocelli further apart from each other than their distance from the hind margin of the head. Antennal segments incrassate below so that in the ♀ segment 8 is less than 3 times longer than broad (lateral view) 7.
- Hind ocelli closer together than their distance from the hind margin of the head. Antennal segments often not incrassate below so that in the ♀ segment 8 is often more than 3 times longer than broad 8.
- 7 (6) Larger robust species (6-7.5 mm.) with wings usually slightly infusate. Tergites 2-4 (♀) or 2-5 (♂) white flecked. Inner hind tibial spur at least two-fifths as long as basitarsus.

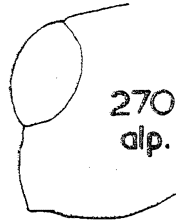
Larva on Geum rivale L. Widespread in Britain but not common, and from Cavan and Wicklow in Ireland. V-VI. Europe, including Spain and Asia Minor to Caucasus

♂ and ♀ (= *guttata* Fall., Cam., nec Fall.) **klugii** (Stephens).
 - Smaller species (4.5-5.5 mm.) with hyaline wings. Tergites 2-3 or -5 white flecked. Inner hind tibial spur at most one-third as long as the basitarsus.

Larva unknown. Apparently uncommon: S. Devon (Perkins); Herts., Boxmoor, 21.v.1938, 2 ♂; E. Suffolk, Framlingham, v.1927, 1 ♂, (R.B.B.) V-VI. N. and C. Europe († Perkins, 1929, Trans. Devon. Ass. Adv. Sci. 61: 291) ♂ and ♀ parvula (Konow).



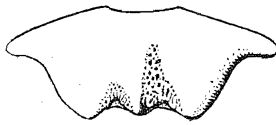
269
lit.



270
alp.



271
exc.



272
lit.



273
trid.

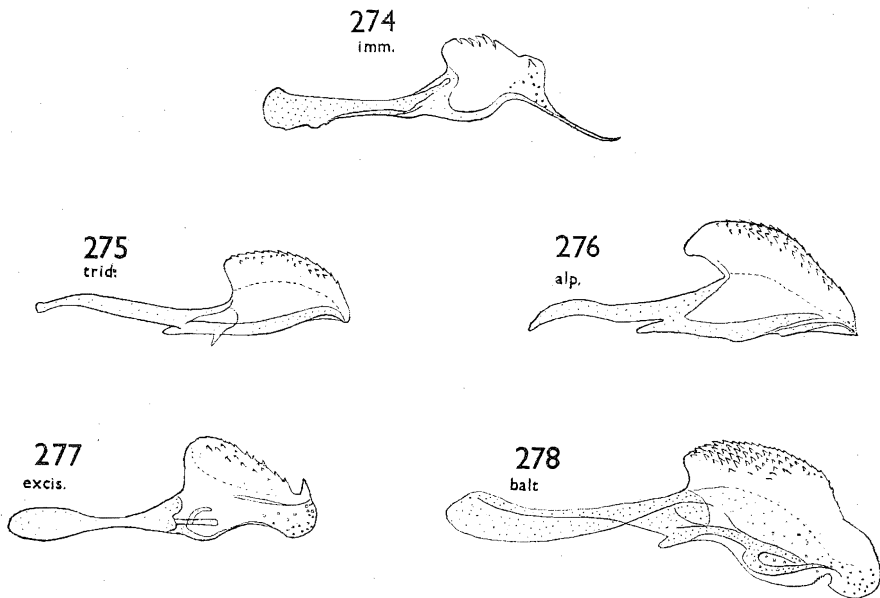
Figs. 269, 270.—Left half of head from above in *Empria*: 269, *liturata*; 270, *alpina*.
 Figs. 271-273.—Clypeus of *Empria*: 271, *excisa*; 272, *liturata*; 273, *tridens*.

- 8 (6) Eyes large so that in dorsal view the eye appears nearly twice as long as the head behind the eyes (fig. 269). Habitats various 9.
 - Eye smaller so that in dorsal view it appears about as long as the head behind the eyes (fig. 270) Arctic-alpine species. 5.5-6 mm. Sexual dimorphism in antenna is marked in this species; in ♀ antenna is two and a quarter and in ♂ three and a quarter times as long as breadth of head, or only as long as costa up the vein M in ♀ but in ♂ as long as costa + stigma; segment 8 is 2-3 times as broad as long in ♀ but 4-5 in ♂. Head distinctly swollen behind eyes in ♀ but subparallel in ♂; by its small eyes distinguished from any other known species. O.O.L. = one and a half

P.O.L. Pronotum and tegula usually black; tergites 2-7 white-flecked. Wings hyaline with stigma, costa and venation piceous to brownish white. Penis valve, fig. 276; saw, 267.

Larva unknown. In Britain only known from type series collected in Perthshire, on the crags above Lochan à Lairige in the Breadalbane Mountains, about 2000 ft. on catkins of *Salix reticulata* L., 2 ♀ and 1 ♂; vi. 1932. Also known from Switzerland and Finland.....♂ and ♀ *alpina* Benson.

- 9 (8) Clypeus excised in front to a depth of not more than one-third its total length and the middle tooth usually more than half length of lateral teeth (figs. 272 and 273). Propleurae not meeting in front. Temples often dull with minute tubercles or fine surface sculpture. Penis valve, fig. 275.....10.
- Clypeus deeply excised in front to a depth of about half its total length (fig. 271); and the middle tooth is short, at most about one-fifth the length of a lateral tooth. Propleurae meeting in front. Temples largely smooth and



Figs. 274-278.—Penis valve of *Empria* (base towards left and dorsal side upwards): 274, *immersa*; 275, *tridens*; 276, *alpina*; 277, *excisa*; 278, *baltica*.

shining. 6-8 mm. Antenna short, 2-2.5 times as long as the breadth of the head; 8th segment 2-3 times longer than broad. Penis valve, fig. 277 (cf. *baltica* fig. 278); saw, fig. 265. Edge of pronotum, tegula, flecks on tergites 2-5 or -6, and in ♀ basal one-third of hind tibia, white. Claws with a large thin inner tooth.

Larva undescribed (cf. *E. baltica* Conde). Widely distributed throughout Britain and Ireland but not common. V-VII. Europe to Caucasus

♂ and ♀ *excisa* (Thomson).

- 10 (9) Antennal segment 8 more than 3 times longer than broad. Front of the clypeus with the outer teeth acute apically (fig. 273).....11.
- Antennal segment 8 less than 3 times longer than broad. Front of clypeus with the outer teeth rounded apically (fig. 272). 5.5-7 mm. Tegula generally entirely black; abdomen with white flecks on tergites 2-5 to -8 and with white apical margins of the tergites often obsolete. Frontal furrow on the head well developed and reaching from ocelli to antennae. Claws with the inner tooth small and weak and often obsolete. Genitalia as in *tridens*.

Larva on Fragaria and Geum. Common throughout Britain and in Ireland.

V-VI. *Europe to Caucasus and Siberia to Irkutsk*

- 11 (10) ♂ and ♀ (= *submutica* C. G. Thomson, *undulata* Konow) **liturata** (Gmelin).
 Head subparallel-sided behind the eyes and with frontal furrow reduced to a medial pit. Antenna in ♀ shorter than costa of fore wing and in ♂ = costa + stigma; segment 8 about 4 times longer than broad. Tegula often white or edged with white 12.
- Head sharply contracted behind the eyes in both sexes and the frontal furrow is well developed and reaches from the ocelli to the antennae. Antenna in ♀ longer than the costa and in ♂ longer than costa + stigma; segment 8 about 5 times longer than broad. Tegula entirely black. 5.5-7.5 mm. Abdomen usually with white flecks on tergites 2-5; genitalia as in *tridens*.
Larva undescribed but feeds on Rubus idaeus L. Apparently rare in Britain: W. Cornwall, S. Devon, and Herts. in England; Glamorgan in Wales; Lanark in Scotland; Carlow, Dublin and Wicklow in Ireland. V-VI. N. and C. Europe.....♂ and ♀ longicornis (Thomson).
- 12 (11) Abdomen usually with 4 or 5 large white flecks each side and 1 small fleck (tergites 2-6 or -7). Saw with prominent teeth on ventral margin and minute denticulations (fig. 266). 5.5-7 mm. Penis valve, fig. 275.
Larva on Geum, Rubus idaeus L., etc. Common throughout Britain and Ireland. V-VI. Europe to Spain and Caucasus. (†Morice, 1908, Ent. mon. Mag., 44: 265).....♂ and ♀ tridens (Konow).
- Abdomen usually with 3 large white flecks each side and 1 small one (tergites 2-5). Saw with very flat ventral teeth, the coarser denticulations in a straight line (fig. 268). 5.5-7 mm. Penis valve as in *tridens*.
Larva undescribed but probably on Filipendula ulmaria (L.) Maxim. as throughout Britain and Ireland it is common where this plant grows. V-VI. (†Benson, 1938). N. and C. Europe.....♂ and ♀ alector Benson.

Genus *Ametastegia* A. Costa.

(= *Taxonus* in part, *Emphytus* in part, *Allantus* in part and *Protemphytus*).

A small holarctic and oriental genus with about 20 described species, of which 8 are known from Europe and 7 of these from Britain.

They are associated mainly with herbaceous plants (several with Polygonaceae and Chenopodiaceae, but *A. pallipes* is a pest of cultivated violets, *A. carpini* of *Geranium*, while *A. glabrata* larvae frequently bore into apples to hibernates) but also with Salicaceae. The type of *Taxonus fletcheri* Cameron is now lost, and the type of *T. glottianus* Cameron appears to be an abnormal *A. carpini* in which cells 1R1 and 1RS are separated in the fore wing by a sector of vein RS.

KEY TO SPECIES OF *Ametastegia*.

- 1 Hind femora reddish yellow and/or eyes clearly converge below in front. Fore wing with cells 1R1 and 1RS usually separated by a sector of vein RS (cf. fig. 142)..... 2.
- Hind femora white and/or black; eyes subparallel in front. Fore wing with cells 1R1 and 1RS fused by the obsolescence of vein RS sector..... 4.
- 2 (1) Abdomen entirely black..... 3.
- Abdomen black with a red girdle occupying segments 3 or 4 to 5 or 6. Antenna with 3rd segment less than 7 + 8 + 9. Clypeus with a blunt shallow emargination to a depth of less than one-third the greatest length of the clypeus. Anal cell of hind wing with a stalk. 5.5-7 mm.
Larva on Chenopodiaceae (Chenopodium album L.), Polygonaceae (Polygonum persicaria L. and Rumex acetosella L., etc.) and Lythraceae (Lythrum salicaria L.) Common throughout Britain and Ireland. V-VIII with at least 2 broods. Europe and the Mediterranean Region, Siberia and N. America.....♂ and ♀ equiseti (Fallén).

- 3 (2) Tegula and pronotum black. Antenna with 2nd segment broader than long and 3rd less than $7 + 8 + 9$. Legs including coxae and trochanters red; hind tarsi but not apex of tibia black. Clypeus with a blunt shallow emargination in front to a depth of less than one-third the greatest length of the clypeus; malar space about as long as the diameter of the front ocellus. Larger species, 5.5-8 mm.

Larva on Chenopodiaceae (Chenopodium) and various Polygonaceae (Polygonum and Rumex including cultivated forms, as well as rhubarb (Rheum) and buckwheat (Fagopyrum)), and also occasionally on other plants such as Plantago and Salix. Resting stage without cocoon in hollow stems or soft wood of various plants on which it is sometimes erroneously recorded as feeding. Commonly bores into the fruit of apple in the autumn. Common throughout Britain and Ireland. IV-IX with 2 or more broods. Europe and Mediterranean Region, Siberia and N. America. ♂ and ♀ glabrata (Fallén).

- Tegula and usually hind margin of pronotum white. Antenna with 2nd segment longer than broad and 3rd more than $7 + 8 + 9$. Legs yellow; coxae and trochanters white; hind tibia at apex and tarsi black. Clypeus with a deep rounded emargination in front to a depth of almost half length of the clypeus; malar space less than diameter of the front ocellus. Smaller species, 5-6 mm.

Larva not described, but appears to be associated with Populus tremula L. Local in England S. of the Wash/Severn line (Cornwall, Devon, Somerset, Berks., Hants., Surrey, Middlesex, Herts., Cambs.), also from N. Kerry and Cavan in Ireland. V-VI and VIII. N. and C. Europe to E. Siberia

♂ and ♀ **albipes** (C. G. Thomson).

- 4 (1) Abdomen entirely black. Malar space twice as long as diameter of front ocellus 5.

- Abdomen with the sterna entirely yellow but the terga marked with black: in the ♀ the abdomen is mainly black above but there is a medial dorsal row of triangular yellow patches broadened apically and contiguous; in the ♂ the yellow extends along the whole apical margin of each tergum so that the black is broken up into a row of spots each side. Malar space about as long as the diameter of the front ocellus. 5-6 mm.

The larva has been found in Britain on Polygonum persicaria L., Salix viminalis L. and Populus, skeletonising the leaves from the underside. Local in Britain and recorded from Dorset, Somerset, Bucks., Herts., Norfolk, Lancs. and Yorks. in England; Berwick and Perth in Scotland; and from Co. Sligo in Ireland. VI. C. and N. Europe to E. Siberia

♂ and ♀ **perla** (Klug).

- 5 (4) Tegula and hind legs entirely black or scutellum shining and impunctate in the middle. Antennal segment 3 scarcely longer than $7 + 8$ 6.

- Tegula and hind legs mostly white. Scutellum dull with dense surface striations between the punctures. Antennal segment 3 (at least in ♀) almost as long as $7 + 8 + 9$. 6-8 mm.

Larva on Viola canina L., tricolor L. and odorata L. and a well-known pest of cultivated forms throughout the whole of the northern hemisphere. Common throughout Britain and Ireland but chiefly in gardens. IV-IX with 3 or more broods. Throughout Europe to Iceland and Mediterranean Region, to E. Siberia and N. America. Entirely ♀ parthenogenetic species

♀ (= *grossulariae* Klug) **pallipes** (Spinola).

- 6 (5) Tegula and hind legs entirely black in both sexes. Scutellum usually more or less punctate in the middle. 5-7 mm.

Larva feeds on Rumex. Prepupa in stems and soft wood; and has been reported as causing damage to vines, cherry and other trees. In Russia sometimes a pest of cultivated Rumex. Widespread throughout Britain and also in Ireland. IV-VIII, with 3 or more broods. Europe and Mediterranean to Armenia, to Siberia and N. America. ♂ and ♀ tener (Fallén).

- Tegula usually white; and hind legs with at least trochanters partly white. Scutellum shining and impunctate in the middle. 6-8 mm.

Larva on Geranium spp. including robertianum L., pratense L., sanguineum L. and sylvaticum L. Throughout Britain and in Ireland. V-VI and VII-VIII. Europe, to Mediterranean and Armenia, and to E. Siberia

♂ and ♀ (= *glottianus* Cameron) **carpini** (Hartig).

Tribe Allantini (= Emphytini).

All 3 European genera occur in Britain.

KEY TO GENERA OF ALLANTINI

- 1 Antenna shorter than a hind tibia + tarsus; 8th segment less than 3 times as long as broad at the apex. Post-genal carina continued as post-occipital carina behind temples almost as far as post-ocellar region. Abdomen black entirely or with a red or yellow girdle. Spring or summer insects... 2.
- Antenna as long or longer than a hind tibia + tarsus; 8th segment more than 4 times as long as broad at the apex. Post-occipital carina ends at level with top of eyes. Abdomen yellow, but may be more or less suffused with black or entirely black. 2 species, flying in summer or autumn
- Apethymus Benson, p. 94.
- 2 (T) Hind wing without either enclosed cell RS or M, and without continuous marginal vein. Abdomen variously coloured. 9 species
- (= *Emphytus* Klug) Allantus Panzer, p. 92.
- Hind wing with an enclosed cell RS as well as an enclosed cell M in the ♀, and in the ♂ with a continuous marginal vein. Abdomen black with a red girdle. 1 species.....Taxonus Hartig, p. 92.

Genus *Taxonus* Hartig.

A holarctic genus of some 35 described species mainly concentrated in E. Asia and N. America and associated so far as is known with *Rubus*. The only European species occurs in Britain.

Abdomen black with a red girdle occupying the 3rd to 4th or 5th segments; legs red except for the following which are black, coxae (except for their white apices), front femur more or less from base, the knees of the hind legs and sometimes of all the legs, the apex of the hind tibia, a line along the hind parts of the front tibiae and tarsi, and mostly the whole of the hind tarsi. Antenna shorter than twice breadth of head. Wings hyaline with the stigma and venation piceous. 8-10 mm.

Larva on Rubus idaeus L. Local throughout Britain from Cornwall to Sutherland, but less common in Scotland than in England; rare in Ireland. V-VI. C. and N. Europe.....♂ and ♀ agrorum (Fallén).

Genus *Allantus* Panzer.(= *Emphytus* Klug).

A genus of some 35 described species mainly Eurasian; only 4 occur in N. America, whereas of the 16 in Europe 9 occur in Britain.

Rather elongate species with powerful mandibles and carnivorous habits, attached to Rosaceae and other arborescent families. Prepupae without cocoon and usually in bark, pith, rotten wood or hollow stems.

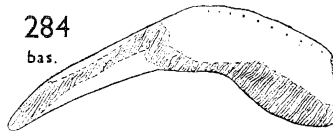
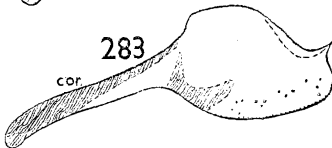
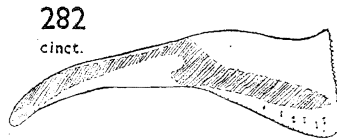
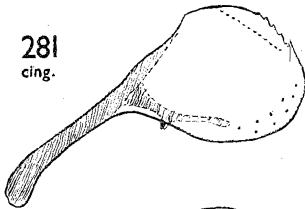
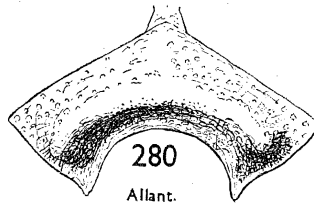
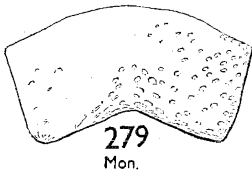
KEY TO SPECIES OF *Allantus*

- 1 Fore wings equally hyaline throughout; Vein cu-a reaches the cell 1 M more than half its own length behind M.....2.
- Fore wings with a piceous patch covering the cells 2R1 and 3R1 and more or less cells IRS and 2RS; Vein cu-a interstitial with vein m. Stoutly built insects with the abdomen clearly contracted at base, and with antenna less than twice the breadth of the head in the female and about twice as long in the male. Body black with yellowish white tegulae, 1st tergite of abdomen and a girdle on segment 5 or 4 and 5, and also the 2 apical tergites. Legs black with white on the trochanters, apices of fore and middle femora and tibiae except at their apices; reddish brown are all the tarsi and the apices of the fore and middle tibiae. 8-9 mm.

Larva on *Quercus* and sometimes *Betula* and *Salix*. England local ; Scotland, Berwickshire and Inverness rare. VI-VIII. Throughout Europe and Siberia to Sakhalin and Japan.....♂ and ♀ **togatus** Panzer.

- 2 (1) Abdomen black with red girdle.....3.
 - Abdomen either entirely black or black with a yellow girdle.....4.
 3 (2) Hind femora red or yellow with at most base black ; abdomen with at most only 4th and 5th tergites red ; tegulae and hind trochanters black. Mesopleura dull all over and coarsely punctured above ; malar space longer (approximately as long as distance between antennal sockets). 7-10 mm.

Larva most commonly on *Alchemilla vulgaris* L. and *Sanguisorba officinalis* L. but also on *Filipendula*, *Fragaria*, *Rosa* and *Rubus*. Common throughout Britain and Ireland. V-VI. All Europe.....♂ and ♀ **calceatus** (Klug).



Figs. 279, 280.—Clypeus of: 279, *Monstegia* (*Empriini*); 280, *Allantus* (*Allantini*); Figs. 281-84.—Penis valve of *Allantus*: 281, *cingulatus*; 282, *cinctus*; 283, *coryli*; 284, *basalis*.

- Hind femora black with at most the extreme base white ; abdomen with 3rd-5th and sometimes 6th tergites red or red-marked ; tegulae and hind trochanters white or at least marked with white. Mesopleura punctured above but shining below ; malar space shorter (about half as long as distance between antennal sockets). 7-9 mm.

Larva on *Rosa* and *Rubus*. Throughout Britain. V-VII. All Europe
 ♂ and ♀ **rufocinctus** (Retzius).

- 4 (2) Hind femora mainly red or yellow.....5.
 - Hind femora mainly black or piceous, sometimes white at base.....6.
 5 (4) Stigma of fore wing entirely piceous. Abdomen of ♀ black with 5th tergite white ; ♂ abdomen entirely black. Clypeus and scutellum dull with a rugged surface. 8-9 mm.

Larva on *Potentilla erecta* (L.) *Räusch*, *Sanguisorba officinalis* L. and *Rosa*. In England not common and known only from Hants., Sussex, Surrey, Bucks., Cambs. and Glos. ; Cameron took it at Rannoch, Perthshire, Scotland. V-VIII. C. and N. Europe to E. Siberia. († Morice, 1909, Ent. mon. Mag. 45: 73-4) (♂ = *melanarius* Kl., Morice ; ♀ = *cingulum* Kl., Morice)

♂ and ♀ **truncatus** (Klug).

- Stigma with basal half white and apical half piceous. Abdomen of ♀ entirely black; ♂ unknown. Clypeus and scutellum shining with but sparse punctures. 8-9 mm.
Larva on Cornus sanguinea L. Not common in Britain; apart from the specimens taken in Darenth Wood, Kent by Stephens, Mr. P. Harwood collected 1 ♀ near Colchester, Essex. VII. All Europe
- 6 (4) Labrum, palpi and front trochanters yellowish white. Antenna longer (would reach to base of stigma from tegula); ♂ with 3rd antennal segment at least 4 times longer than broad in lateral view.....7.
 - Labrum, palpi and trochanters piceous. Antenna shorter (would not reach from tegula to base of stigma); ♂ with 3rd segment not more than 3 times longer than broad. Clypeus and upper part of mesopleura dull with coarse irregular sculpture; 2 or 3 apical segments of hind tarsus infusate; rest of hind tarsus and apex of tibia reddish-brown. Abdomen of ♀ with white limited to 5th tergite. 7-10 mm. Penis valve, fig. 282.
Larva on various Rosaceae, especially Fragaria and Rosa. Prepupa in pith, especially favouring the cut ends of pruned Rosa in which it was formerly transported to many different parts of the world. Common throughout Britain and Ireland. V-VI and VII-VIII. Europe to E. Siberia and N. America
- 7 (6) Coxæ black except for extreme apices. Scutellum punctured all over, and clypeus and mesopleura with at least coriaceous sculpture. Usually apex of clypeus, base of mandibles and, in ♀ as well as ♂, all sternites usually black or at least piceous.....8.
 - Coxæ white except for extreme bases. Scutellum punctured usually only at edges, being shining and impunctate in the middle, while the clypeus and mesopleura are shining and scarcely punctured. Apex of clypeus, base of mandibles and in ♀ 5th and base of 6th sternite white; in the ♂ also the 5th sternite often has a pale median spot. Hind tarsus slightly infusate so that it is clearly darker than the apex of the tibia. Penis valve, fig. 281. 7-10 mm.
Larva on Fragaria and Rosa. S. England to Yorks. V-VI. All Europe to E. Siberia.....♂ and ♀ cinctus (L.).
- 8 (7) Head not broadened behind the eyes. Hind tarsus darker than the apex of the hind tibia; hind femur may be only piceous at apex or in ♂ even red. 8-10 mm. Penis valve, fig. 283.
Larva on Corylus avellana L. England known only from a single ♀ specimen taken at Oxshott, Surrey, 12.v.1928, by D. E. Kimmins. V-VI. C. Europe. (†Benson, 1938, Ent. mon. Mag. 74:256)..♂ and ♀ coryli Stritt.
 - Head clearly broadened behind the eyes. Hind tarsus coloured the same as the hind tibia (reddish brown in ♀; dark brown in ♂); hind femur almost entirely black. Penis valve, fig. 284. 7-10 mm. British specimens belong to the subsp. *caledonicus* Bens., differing from the typical subspecies in having the apices of the hind tibia and the tarsus brown instead of black.
Larva of typical form on Rosa. In Britain only known from the Spey Valley, Inverness, Scotland, from a few specimens taken between 1914 and 1944 (†Benson, 1945, Ent. mon. Mag. 81:102-3). VI-VII. Typical subsp. N. and C. Europe to E. Siberia; subsp. caledonicus Scotland and N. Scandinavia.....♂ and ♀ basalis (Klug).

Genus *Apthymus* Benson.

(= *Emphytus* and *Allantus* in part).

A small genus of 3 species, so far as is known confined to Europe. Differ from all other known Tenthredinidae in Europe in that the flight of the adults is in late summer and autumn only and that the eggs overwinter before hatching. Attached to *Quercus* and *Rosa*.

KEY TO SPECIES OF *Apthymus*

- A Hind tibia white on at least the basal one-third contrasting with the black of at least the apical one-third. Antenna in ♀ and often in ♂ with segments

6-8 white and only about as long as the combined lengths of the hind tibia and tarsus. Abdomen entirely black. 8-10 mm.

Larva on Quercus. Local in England, Wales and W. Scotland; Co. Wicklow in Ireland. VIII-X. All Europe

- B Hind tibia yellow with only the extreme apex infuscate. Antenna entirely black in both sexes and longer than combined lengths of the hind tibia and tarsus. Abdomen normally entirely yellow except for the 1st tergite, but may be more or less infuscate above or rarely almost entirely black (var. *filiformis*-Klug). 9-11 mm.

Larva on Quercus. Generally distributed and locally common throughout the whole of Britain, but in Ireland is only locally common in Cos. Wicklow and Armagh (see Benson, 1935, Ent. mon. Mag. 71: 240-1). IX-XI. C. & N. Europe

♂ and ♀ (= *tibialis* Panzer) **braccatus** (Gmelin).
♂ and ♀ (= *serotinus* auctt. in part nec Müller = *autumnalis* Forsius) **abdominalis** (Lepelletier).

Tribe Eriocampini.

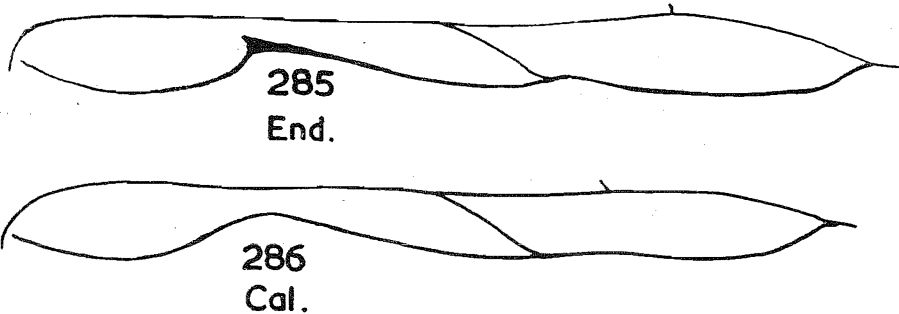
Only one European genus.

Genus **Eriocampa** Hartig.

A small, holarctic genus of about 9 species; only 1 of the 3 European species has been found in Britain.

Very stout insects, 5-7 mm. long. Body of ♀ black except for the front and more or less the lateral lobes of the mesonotum and mostly also the edges of the pronotum, which are red (♂, which has not yet been found in Britain, has the body entirely black); antenna from the 6th segment onwards brownish at least beneath; legs with front of fore tibia brown, the middle and hind tibia more or less white-ringed basally. Wings subhyaline with the base of the fore wings slightly yellowish and with a brownish band under the stigma. Head, pronotum, scutellum and mesopleura ornamented with large crater-like punctures; mesonotum and mesosternum shining and but sparsely punctured.

Larva on Alnus glutinosa (L.) Gaertn. Entirely ♀ parthenogenetic species in Britain. Common throughout Britain and Ireland. V-VIII (1 brood). N. and C. Europe to Spain. ♀ ovata (L.).



Figs. 285, 286.—Anal cell of fore wing in Caliroini: 285, *Endelomyia*; 286, *Caliroa*.

Tribe Caliroini.

A small tribe with 2 genera and about 20 North temperate species. The 5 European species all occur in Britain.

KEY TO GENERA OF *Caliroini*.

- A Anal cell of fore wing angularly emarginate at the basal shoulder, bearing within the cell a short basally projecting spur at this angle (fig. 285); anal

cell of hind wing with a peduncle, vein cu-a being received some distance from the apex of the anal cell; fore wings uniformly slightly infusate. Abdomen with alutaceous sculpture above. 1 species

- Endelomyia** Ashmead.
 B Anal cell of fore wing evenly emarginate at the basal shoulder and without a spur there (fig. 286); anal cell of hind wing without a peduncle, vein cu-a being received on the cell though sometimes at its extreme apex; fore wing less infusate at the apex than under the stigma. Abdomen smooth above. 4 species.....**Caliroa** O. Costa.

Genus **Endelomyia** Ashmead.

(= *Eriocampa* in part = *Caliroa* in part).

The single species of this monotypic genus is from 4-5 mm. long and black in colour except for the yellowish-white knees and tibiae of the fore and middle legs. The wings are uniformly infusate.

The larva skeletonizes the leaves of Rosa canina L., arvensis Huds., etc. Throughout Britain and Ireland, sometimes common as larvae. V-VI. All Europe including the Caucasus, also N. America where the males that here are very rare seem more abundant. One ♂ was found at Tring, Herts., 29.v.1941

♂ and ♀ (= *Poecilosoma nigricolle* Cameron, *rosae* Harris, *testaceipes* Cameron) **aethiops** (F.).

Genus **Caliroa** O. Costa.

(= *Eriocampa* in part).

Small species (4-6 mm. long), entirely black except for the legs, which may be more or less marked with white or yellow.

The larvae, which include the Pear and Cherry "Slugs," skeletonize the leaves of trees, leaving one cuticle intact.

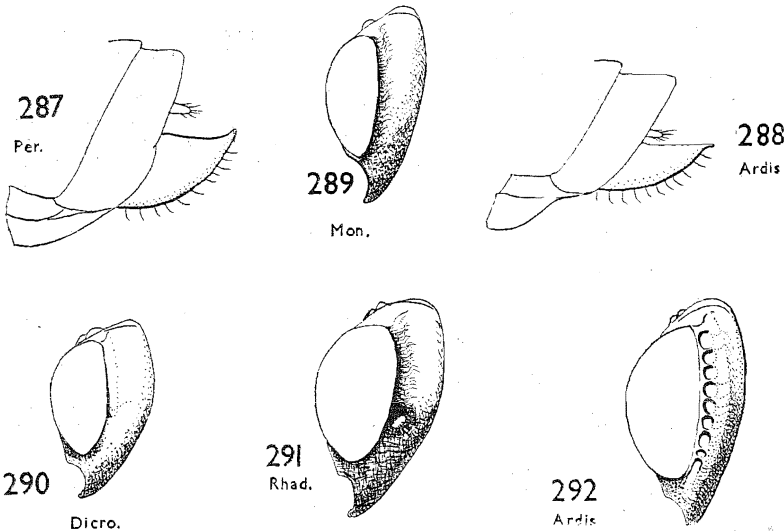
KEY TO SPECIES OF *Caliroa*

- 1 Antenna with 3rd segment clearly shorter than 4 + 5. Hind tibia or tarsus marked with white (♂ or ♀) or ♂ with marginal vein to hind wing (cf. fig. 139) 2.
- Antenna with 3rd segment about as long as 4 + 5. Hind legs entirely black and hind wing without marginal vein in ♂. Clypeus emarginate; hind wing with 2 (Rs and M), 1 (M) or 0 enclosed middle cells.
Larva is the notorious Pear and Cherry "Slug" a pest now almost wherever these fruit are cultivated. Prefers Pyrus and Prunus but also recorded from Amygdalus, Cydonia, Crataegus, Mespilus, Quercus, Rosa, Rubus, Salix and Sorbus. Common locally throughout Britain and also in Ireland. V-IX (usually at least 2 broods). From temperate Eurasia and N. America has become established in Chile, Argentine, S. Africa, Australia, Tasmania, and New Zealand. Parthenogenetic with very rare ♂
 ♂ and ♀ (= *limacina* Retzius) **cerasi** (L.).
- 2 (1) Either hind basitarsus of ♀ at least mainly black and with less than one-third of hind tibia white, or clypeus subtruncate and hind wing with only one enclosed middle cell (M) (cf. fig. 147); ♂ with marginal vein to hind wing. Fore wings subhyaline with a more or less deeper infuscation under the stigma 3.
- Hind basitarsus of ♀ with basal half white and hind tibia with at least basal one-third white. Clypeus emarginate and hind wing with 2 enclosed middle cells (Rs and M) (cf. fig. 146). Fore wings with basal two-thirds infusate, though more so under the stigma, and only the apices subhyaline.
Larva on Quercus, Tilia, Betula, Salix, Fagus and Vaccinium. Throughout Britain, locally common also in Ireland. V-VIII (2 or more broods). N. and C. Europe to E. Siberia, sometimes as a forestry pest
 ♂ and ♀ **annulipes** (Klug).
- 3 (2) Clypeus emarginate. Hind wing of ♀ with 2 enclosed middle cells (RS and M) (cf. fig. 146).

Larva on Populus, Salix, Betula and Quercus. S. England to Norfolk and Cheshire. V-VI and VIII. All Europe.....♂ and ♀ **varipes** (Klug).
 Clypeus subtruncate. Hind wing of ♀ with only 1 enclosed cell (M) (cf. fig. 147).
 Larva on Quercus. Worcester, Hants., Bucks., Beds. and Norfolk.
 VI-VIII. All Europe.....♂ and ♀ **cinxia** (Klug).

Tribe *Blennocampini*.
 (= *Blennocampa* Hartig).

The 14 British genera in this tribe were all included in the genus *Blennocampa* by Cameron.



FIGS. 287, 288.—Lateral view of apex of abdomen to show sawsheath in : 287, *Perilista* ; 288, *Ardis*.

FIGS. 289-292.—Lateral view of head of *Blennocampini* : 289, *Monophadnoides* ; 290, *Dicrostema* ; 291, *Rhadinoceraea* ; 292, *Ardis*.

KEY TO GENERA OF *Blennocampini*.

- I Wings more or less infusate, and either (1) there is a prepectus present (there is a suture or a sulcus dividing off the front margin of the mesepisternum (figs. 153-154)), or (2) (i.e., if this prepectus is absent or not very clear), the basal stub of vein A3 of the fore wing is bifid at the apex (fig. 39). Claws without an erect basal lobe (figs. 43 to 47).....2.
- Wings hyaline or at least subhyaline. Prepectus never defined. Stub of vein A3 of fore wing never bifid at apex (figs. 38 and 40). Claws with or without a basal lobe.....7.
- 2 (1) Antenna long (at least more than one and a half times width of head) with segments 3 and 4 subequal. Stub of A3 bifid at apex (fig. 39).....3.
- Antenna short (less than one and a half times width of head) with segment 3 at least one and one-third times longer than 4. Stub of A3 not bifid at apex. (figs. 38, 40 and 145).....5.
- 3 (2) Wings strongly infusate. Post-genal carina absent (cf. fig. 156). Upper hind orbits margined by a deep sulcus ending half way down orbits in a deep pit (fig. 291). Antennal segments each slightly expanded apically. Over 7 mm.....4.
- Wings only slightly infusate. Post-genal carina present (cf. fig. 155). Upper hind orbits margined by only a small sulcus which does not end in a pit (fig. 290). Antennal segments not expanded apically. Under 7 mm.

- Prepectus* represented by only a very narrow upturned margin (fig. 153).
Malar space as long as front ocellus. *Type species*: *Selandria gracilicornis*
Zaddach.....**Dicrostema** gen. n., p. 101.
- 4 (3) *Mesepisternum* with a raised front rim (cf. fig. 151). Antenna much longer and beset with outstanding setae below in ♂, but not ♀. In ♂ the antenna is longer than 3 times the width of the head, as long as the whole of the rest of the insect, and longer than the costa + stigma of the fore wing; in the ♀ it is about as long as 3 times the width of the head, and longer than the costa. 1 species**Phymatocera** Dahlbom, p. 100.
- *Mesepisternum* flat right up to the front margin without any raised rim. Antenna shorter and without any outstanding setae in ♂. In ♂ antenna little more than twice as long as width of head, about as long as abdomen, and almost as long as costa; in ♀ it is less than twice as long as width of head and shorter than costa. 1 species....**Rhadnoceraea** Konow, p. 101.
- 5 (2) *Prepectus* as a raised rim to the front margin of the mesepisternum, from which it is separated by a deep rugose sulcus (cf. fig. 151). Post-genal carina present (cf. fig. 155). Veins M and 1m-cu in fore wing subparallel (cf. fig. 142).....6.
- *Prepectus* flat and in the same plane as the rest of the mesepisternum, from which it is separated by a fine suture (fig. 154). Post-genal carina absent (cf. fig. 156). Veins M and 1m-cu in fore wing converge strongly towards the stigma (fig. 145). 1 species**Tomostethus** Konow, p. 99.
- 6 (5) Post-genal carina developed on the head behind as far as the top of the eyes. Stub of vein A3 in fore wing curved up at apex (fig. 38), often joining A1 faintly to enclose a 2nd anal cell (cf. fig. 145); and hind wing with or without an enclosed cell M. Inner fore tibial spur not bifid at apex. 4 species.....**Eutomostethus** Enslin, p. 99.
- Post-genal carina only developed below and obsolete behind the upper half of the eyes. Stub of vein A3 straight at apex (fig. 40); hind wing without an enclosed cell M. Inner fore-tibial spur bifid at apex. 2 species
Stethomostus Benson, p. 100.
- 7 (1) Post-genal carina absent (see fig. 156), or claws with large inner tooth and basal lobe (fig. 49), or malar space as long as diameter of front ocellus....8.
- Post-genal carina developed below the eyes. Claws without a basal lobe (fig. 45-46). Malar space shorter than diameter of front ocellus. 1 species
Monophadnus Hartig, p. 101.
- 8 (7) Malar space longer than the diameter of the front ocellus. Hind wing with an enclosed middle cell M (cf. fig. 147) or a surrounding marginal vein (cf. fig. 139). Claws with the basal lobe sometimes obsolete.....9.
- Malar space not longer than the diameter of the front ocellus; if almost as long then hind wing is without enclosed cell or surrounding marginal vein (fig. 148). Claws with an enlarged basal lobe as well as an inner tooth (fig. 49).....11.
- 9 (8) Head without row of large deep punctures along outer orbits. Abdomen yellow, yellow-marked, or black with pale apical margins to tergites....10.
- Head with a row of large deep punctures in a groove along outer orbits (fig. 292). Abdomen black with at most fine pale apical margins to tergites. Claws with a long inner tooth and a small basal lobe. Sawsheath in lateral view with short apical spine (fig. 288). 2 species.....**Ardis** Konow, p. 102.
- 10 (9) Sawsheath in lateral view with the apex acute (fig. 287); ♂ with marginal vein to hind wing (cf. fig. 139). Basal loop of anal cell in fore wing closed, though it may be discoloured (cf. fig. 145). Claws with a well-marked basal lobe as well as an inner tooth (fig. 49). Often larger species (5-8 mm.). Abdomen yellow or mainly black with pale apical margins to tergites; if yellow then costa and stigma also yellow. 3 species
Periclista Konow, p. 102.
- Sawsheath in lateral view simply rounded at apex; ♂ without marginal vein to hind wing. Basal loop of anal cell in fore wing open apically (figs. 38 and 40). Claws with basal lobe scarcely developed and inner tooth very small. Small species (5-6 mm.). Abdomen mainly yellow with thorax, costa and stigma of fore wing black. 1 species
Pareophora Konow, p. 102.
- 11 (8) Abdomen almost entirely black. Antenna with segment 3 shorter than the

- three apical segments together and apical segments without ventral sensory pits. Stub of vein A3 in fore wing straight or upturned at apex 12.
- Abdomen mostly yellow with at most 2 basal tergites and extreme apex black. Antenna with segment 3 longer than the three apical segments together and each of these apical segments has a ventral sensory pit. Vein A3 of fore wing turned up at apex and reaching halfway to vein A1 (fig. 38). 1 species **Halidamia** Benson, p. 104.
- 12 (11) Small species (4-5 mm.). Veins M and 1m-cu of fore wing converging towards stigma (cf. fig. 145). 2nd antennal segment much longer than broad. 1 species **Blennocampa** Hartig, p. 103.
- Larger species (5-6 mm.). Veins M and 1m-cu of fore wing subparallel (cf. fig. 142). 2nd antennal segment transverse or scarcely longer than broad 13.
- 13 (12) Larger and more elongate species (6-8 mm.). Vein 2r in fore wing received on Rs at a distance of more than one-third its own length in front of vein 2rm; stub of vein 3A upturned at apex (fig. 38). Antenna with 2nd segment longer than broad. Ovipositor about as long as hind tibia. Monotypic. Type species: *Tenthredo elongatula* Klug
- Smaller and stouter species (5-6 mm.). Vein 2r interstitial, with stub of 3A straight at apex (fig. 40). Antenna with 2nd segment at most as long as broad. Ovipositor at most four-fifths as long as hind tibia. 6 species
- Cladardis** gen. n., p. 103.
Monophadnoides Ashmead, p. 103.

Genus **Tomostethus** Konow.

(= *Tomostethus* in part).

A small holarctic genus concentrated in east Asia with about 12 described species, 2 of which occur in Europe and 1 in Britain. The larvae so far known are attached to Oleaceae and Juglandaceae.

Broad clumsy species 7-8 mm. long with infusate wings, and black all over except at most for the piceous front legs.

Larva on *Fraxinus excelsior* L. This species is from time to time recorded as a serious pest of shade and ornamental trees; an outbreak of this nature was recorded at Shirley, Southampton in June, 1937; but in the steppes of S. Russia the consequences are sometimes serious. Widely distributed and some years common locally in England especially in the south. IV-VI. The typical subspecies throughout Europe to Caucasus and Iberian Peninsula and to E. Siberia; replaced in N. Africa and Asia Minor by subsp. *claripennis* Enslin with hyaline wings ♂ and ♀ **nigrilus** (Fabricius).

Genus **Eutomostethus** Enslin.

(= *Tomostethus* in part and including *Atomostethus* Enslin).

A genus of about 20 known species concentrated in east Asia and with several of them holarctic in distribution. It differs from all other British Blennocampini in its unmodified inner fore tibial spur, a character it shares with *Senoclia* and several other related genera in S.E. Asia. Associated with Gramineae, Juncaceae and Cyperaceae. 4 British species, of which 2 occur here only as entirely parthenogenetic strains although they produce males in S. Europe; these parthenogenetic strains have reached N. America.

KEY TO SPECIES OF *Eutomostethus*.

- 1 Larger species (5-7 mm.) with an enclosed cell (M) in the hind wing (cf. fig. 147). Body entirely black or with abdomen mainly yellow . . . ♂ and ♀ 2.
- Smaller species (4-5 mm.) without an enclosed cell (M) in the hind wing (cf. fig. 148). Body entirely black or with red-marked thorax; ♀ only. In S. England the red-marked form predominates, but the proportion of

entirely black forms increases northwards and in Scotland forms most of the population.

Larva feed on Poa and other soft Gramineae. Generally distributed throughout Britain and Ireland. V-VI and VIII. All Europe to N. Africa, Asia Minor, Caucasus, Transcaucasia and Himalayas, and also N. America
♀ (= *dubius* Gmelin, black form = *cinereipes* Klug, Cameron nec Klug)

- 2 (1) Abdomen all black; ♂ & ♀.....3.
- Abdomen yellow except for the black basal and apical tergites, and the black medial dorsal line; head and thorax black, scarcely punctured and shining; legs yellow except for the black coxae, trochanters and bases of femora especially on fore legs. ♀ only.

Larva bores in sterile shoots of Juncus effusus L. until its last instar when it emerges and feeds externally. Common and widely distributed throughout Britain and Ireland. V-VII. All Europe and Transcaucasia as well as N. America..... ♀ (= *fuscipennis* Lepeletier) **luteiventris** (Klug).

- 3 (2) Hind margin of temples and sides of scutellum behind clearly punctured. Legs black with only the front knees and tibiae pale in front.

Larva has not been described but feeds on the Tussock Sedge Carex paniculata L. Locally common and known from Devon, Hants., Bucks., Herts., Beds., Notts. and Cheshire in England; and from Kirkcudbrightshire in Scotland. V-VII. C. Europe to E. Siberia and N. China

♂ and ♀ (= *micans* Klug, Carn., nec Klug. = *brachycera* Cameron) **punctatus** (Konow).

Temples unpunctured and scutellum only on hind margin lined with small punctures. Legs with tibiae, apices of all femora and sometimes whole of hind femur yellow.

Larva unknown. Scarce in South and East England; known from Dorset., Kent, Herts., Bucks., Oxford, Beds., Cambs. and Lincoln. (†Morice 1901, Ent. mon. Mag. 37: 5.) V-VII. All Europe including Iberian Peninsula, Cyprus, and Caucasus; and Siberia..... ♂ and ♀ **gagathinus** (Klug).

Genus **Stethomostus** Benson.

(= *Tomostethus* in part).

A small genus with 2 known species, both found in Britain; one of these is associated with *Ranunculus*.

KEY TO SPECIES OF *Stethomostus*

- A Legs piceous except for the fore and middle tibiae which are brownish in front. Prepectal sulcus and hind margin of scutellum lined with coarse punctures. Hind ocelli much closer together than their distance from the back of the head. 5-6 mm.
Larva on Ranunculus sceleratus L. Throughout Britain as far north as Inverness. V-VIII. All Europe including Iberian Peninsula and the Caucasus..... ♂ and ♀ **fuliginosus** (Schrank).
- B Legs yellow except for trochanters and coxae and at most extreme bases of femora. Prepectal sulcus and hind margin of scutellum almost impunctate. Hind ocelli almost as far apart as their distance from the back of the head. 5-6 mm.
Larva unknown. Apparently scarce and only known from Appledore, Kent, viii.1900 (A. Beaumont), Somerset (J. W. Saunt) and Cheshire, Rostherne, vi.1930 (H. Britten). (†Morice, 1901, Ent. mon. Mag. 37: 5.) All Europe and Asia Minor, also Siberia..... ♂ and ♀ **funereus** (Klug).

Genus **Phymatocera** Konow.

A small genus of 6 or 7 described species, all except one of them confined to North America. Associated with Liliaceae. One European and British species.

An entirely black heavily built and slow-flying insect, 8-9 mm.

*Larva on Polygonatum spp. especially multiflorum (L.) All., and gregarious in habit. This species, though discovered at Putney in 1846 (Curtis, 1850, Proc. Linn. Soc. Lond. 2: 66), does not seem to have become widely distributed until the present century (cf. Billups, 1887, Entomologist 20: 161-2); it is now to be found almost wherever its food-plant grows in gardens or woods in south England and Wales, and is still spreading northwards; by 1931 it had reached Notts., and by 1938 Staffs.; in 1949 Mr. H. E. Britten found it in Cheshire and reports that it is now becoming common in gardens. V-VI. C. and S. Europe to Caucasus . . . ♂ and ♀ (= robinsoni Curtis) **aterrima** (Klug).*

Genus **Rhadinoceraea** Konow.

(= *Rhadinoceraea* in part).

A small genus of perhaps 12 species of which only 3 or 4 are European (several that have been placed here belong to other genera). Associated with Liliaceae and Iridaceae. One British species.

An entirely black heavily-built insect of very sedentary habit, 7-8 mm.

*Larva on Iris pseudacorus L. and in gardens, also I. laevigatus Fish. and spuria L. This is an extremely local and sedentary species, though common where found; in England chiefly south of the Wash/Severn line, though found in Shropshire and Cheshire. (†Morice, 1904, Ent. mon. Mag. 40: 99.) V-VI. C. Europe. (For micans Klug, Cameron see Eutomostethus punctatus) . . . ♂ and ♀ **micans** (Klug).*

Genus **Dicrostema** gen. n.

(= *Rhadinoceraea* in part).

To this genus, which is characterized in the key above, there belongs, in addition to the type species (*Selandria gracilicornis* Zaddach), also *Neotomostethus japonicus* Malaise, 1931 (on the basis of paratype material in the British Museum). The genus appears to be very closely related to *Paracharactus* MacGillivray, which is, however, most easily distinguished by the simple form of the stub of its vein A3 in the fore wing; *Paracharactus* is represented in Europe by the species heretofore known as *Rhadinoceraea hyalina* Konow.

All black except for the yellowish-white labrum and the more or less brownish knees and tibiae of all legs. Wings subhyaline. 5-6 mm. ♂ unknown.

*Larva on Adoxa moschatellina L. England, discovered at Cothill Bog, Berks., in 1944 (Woollatt, 1945, Ent. mon. Mag. 81: 154); found since at Heath Woods, Whipnade, Beds., and at Aldbury and Studham in Herts. IV. C. and N. Europe . . . ♀ **gracilicornis** (Zaddach).*

Genus **Monophadnus** Hartig.

(= *Monophadnus* in part).

A small genus with 8 or 9 known palaeartic species, of which 1 only is found in Britain. Associated with Ranunculaceae.

Black except for the brownish labrum and the yellowish-white tibiae, tarsi and apices of femora of all legs. 5-6 mm. ♂ very rare.

Larva on Ranunculus acris L. and repens L. Cocoon under ground. Common and generally distributed throughout Britain and Ireland. IV-VI. All Europe to Transcaucasia and Siberia

♂ and ♀ (= *albipes* Gmelin) **pallescens** (Gmelin).

Genus *Periclista* Konow.

There are about 25 described species of this genus mainly concentrated in North America; and associated with *Quercus* and *Carya*. Of the 4 European species 3 occur in Britain.

KEY TO SPECIES OF *Periclista*.

- 1 Stigma piceous. Abdomen black with pale apical margins to segments or with a yellow lateral band covering the ventral down-turned portions of the tergites..... 2.
 - Stigma yellow. Abdomen mainly yellow. Head and thorax of ♂ black except for tegulae, hind margins of pronotum, spot on lateral lobe of mesonotum and stripe on mesepimeron; legs mostly yellow; abdomen yellow above except for the extreme base, which is black, and the whitish venter. In ♀ thorax mostly red except for the depressed parts of the mesonotum and the mesosternum; abdomen yellow, more or less spotted with piceous on the tergites and especially the sternites; legs yellow, very pale on the tibiae and tarsi, but the coxae, trochanters and bases of femora are black. 5-7 mm.

Larva on Quercus robur L. and Q. petraea (Matt.) Liebl. England locally common in the S. and Scotland to Perthshire; also Ireland. IV-V. C. and N. Europe to Spain and Caucasus. . . ♂ and ♀ (= melanocephala F.) albida (Klug).

- 2 (1) Abdomen in ♂ and ♀ black with pale apical margins to the segments; legs with coxae and femora black and tibiae white except at the apices, which, together with the tarsi, are brownish. Antenna shorter, so that segment 3 is clearly longer than 7 + 8 in both sexes. Thorax shining without fine surface sculpture. 6-7 mm.

Larva on Quercus robur L. and petraea (Matt.) Liebl. Probably widespread in Britain but only recorded from Devon, Worcester, Hants., Surrey and Herts. in England, and Dumfries, Berwick, Roxburgh and Perth in Scotland. IV-V. N. and C. Europe to Spain. . . . ♂ and ♀ lineolata (Klug).

- Colour of ♂ as in *lineolata*; but ♀ has a yellow lateral band developed on the ventral down-turned portions of the tergites and has the femora as well as the tibiae mainly reddish yellow. Antenna longer, so that segment 3 is equal to (♂) or less than (♀) segments 7 + 8. Thorax dull with numerous very fine shallow punctures. 7-8 mm.

Larva on Quercus robur L. and petraea (Matt.) Liebl. S. England: Devon, Somerset, Hants., Surrey and Herts. IV-V. (†Morice, 1911, Ent. mon. Mag. 47: 227-9). C. Europe and Balkans

♂ and ♀ *pubescens* (Zaddach).

Genus *Ardis* Konow.

A small holarctic genus of about 6 described species; the two known European species both occur in Britain. Larvae bore in stems of *Rosa*, and have therefore reduced legs and setae.

KEY TO SPECIES OF *Ardis*.

- A Head, thorax and abdomen all black; legs black with knees and front of fore and middle tibiae and tarsi brown. 5.5-6.5 mm.
Larva feeds in the leaf petioles and twigs of Rosa. S. England to Yorkshire. V-VI. Europe and N. America. . . . ♂ and ♀ sulcata (Cameron).
 B Hind edges of pronotum and tegulae white; rest of head and body black; femora black, but the tibiae and the bases of the tarsal segments are mostly white. 5.5-6.5 mm.

Larva bores in the stems of Rosa, being specially destructive to rambler roses. Throughout Britain to Sutherland. IV-V and VII-VIII. C. and N. Europe and Siberia. . . ♂ and ♀ (= bipunctata Klug) bruniventris (Hartig).

Genus *Pareophora* Konow.

A small genus of about 3 known species, of which only one is European and occurs in Britain. Larvae feed on *Prunus*.

Abdomen except for the 1st tergite and the extreme apex yellow; these parts with the head, thorax, and the stigma and costa of the fore wings black. 5-6 mm.

Larva on *Prunus spinosa* L. England to Cheshire, not common. V-VI.
All Europe and Caucasus ♂ and ♀ (= *nigripes* Klug) **pruni** (L.).

Genus **Blennocampa** Hartig.

(= *Blennocampa* in part).

Monotypic genus.

Small black species, only 3-4.5 mm. long; knees, tibiae and tarsi whitish, though on the hind legs tibia and tarsomeres are brownish at their apices.

The larvae live in the rolled-back margins of leaves of *Rosa*. Throughout Britain, common in the S.; also in Ireland. IV-VII. All Europe to Caucasus and Siberia to Kamchatka ♂ and ♀ **pusilla** (Klug).

Genus **Cladardis** gen. n.

(= *Monophadnus* in part).

This monotypic genus is defined in the key above.

Black except that the front of the fore and middle knees and tibiae may be brownish. Wings slightly infusate with black venation. Malar space shorter than diameter of front ocellus. Antenna shorter than costa of fore wing, with 3rd segment about one and a half times length of 4th, 5th to 9th each slightly shorter than the segment in front. Head and thorax shining and with only very fine punctures.

Larva is a stem borer in *Rosa*. Recorded by Cameron as British without precise data, but in his own copy of the monograph he has added "York (J. Wilson)." No other records. V-VI. C. Europe

♂ and ♀ (= *sericans* Hartig, Cameron *nec* Hartig) **elongatula** (Klug).

Genus **Monophadnoides** Ashmead.

(= *Blennocampa* in part and *Monophadnus* in part).

The seven British species placed here belong to four distinct groups which may later each come to be regarded as separate genera when the world species are better known. The great similarity of the larvae, all with branched spines and feeding externally on Rosaceae, does, however, suggest they they are all at any rate closely related and, I believe, more conveniently regarded as belonging to the same genus, at least until more of the world species are known. About 20 known world species.

KEY TO SPECIES OF *Monophadnoides*.

- 1 Outer orbits shining, sparsely punctured and without a deep groove; malar space as long as half diameter of the front ocellus; antenna with segment 8 not more than twice as long as wide. Hind wing usually with enclosed cell M (cf. fig. 147). (Hind ocelli closer together than distance of one of them from the eye margin) 2.
- Outer orbits densely coriaceous and with a deep rugulose groove at the eye margin (fig. 289); malar space mostly linear or absent, if as long as half diameter of front ocellus then segment 8 of the antenna is at least 3 times as long as broad. Hind wing usually without closed cell M (cf. fig. 148) 3.
- 2 (1) Tegulae as well as hind margin of pronotum and hind tibiae yellow. Claws with a long inner tooth halfway between the outer tooth and the basal lobe. Head very smooth with supra-antennal groove obsolete. Larger, 6-7 mm. Larva unknown. England and S. Scotland to Lanark, not common. V-VI. C. and S. Europe ♂ and ♀ **rufieruris** (Brullé).
- Thorax all black, so also is hind tibia except at most for outer base, which may be piceous. Claws with apex bifid, the inner tooth being close to the outer

tooth and with its base beside it. Head smooth, but the supra-antennal and other grooves are deep. Smaller, 5-6 mm.

Larva on *Geum*, *Filipendula* and *Rubus* spp. *Common throughout Britain, also in Ireland. V-VI. Europe and Caucasus to Japan*

- ♂ and ♀ **geniculata** (Hartig).
 3 (1) Malar space linear and much less than half diameter of front ocellus. Antenna shorter, with segment 8 only about twice as long as broad. Vein 2r of fore wing received on Rs interstitially or before vein 3rm 4.
 - Malar space almost as long as the diameter of the front ocellus. Antenna longer with segment 8 at least 3 times as long as broad. Vein 2r of fore wing received on Rs beyond vein 3rm. Segment 2 of antenna less than half as long as broad. Tegulae and edge of pronotum often white. Abdomen normally without surface sculpture, as is typical also for most of the genus; in a rare aberration from Teesdale (Yorks.) and from S. Sweden the abdomen is dull with alutaceous sculpture. 5-5.5 mm.

Larva on *Filipendula ulmaria* (L.) *Maxim. most commonly but also on Alchemilla vulgaris L. agg. and alpina L. Common throughout Britain and Ireland. IV-VIII, but mainly V-VI. Europe to Caucasus and Siberia*

- ♂ and ♀ (= *alchemillae* Cameron) **tenuicornis** (Klug).
 4 (3) Segment 3 of antenna less than one and a half times 4 in length, so that 3 is much less than 4 + 5; segment 2 less than half as long as broad 5.
 - Segment 3 of antenna more than one and a half times as long as 4, so that 3 almost = 4 + 5; segment 2 almost as long as broad.

Larva on *Rubus idaeus* L., etc. *Local in England, chiefly S. of Wash/Severn line, but also recorded from Roxburgh and Berwick in Scotland. IV-V. C. and N. Europe* ♂ and ♀ **alternipes** (Klug).

- 5 (4) Frons and temples smooth and shining without tubercles, though the lower inner orbits may be coriaceous and the frontal area is very poorly defined. . 6.
 - Frons and temples more or less covered with conspicuous tubercles which are usually dense on the lower inner orbits; frontal area more clearly defined. Tibiae usually white but may be more or less infusate. 5-6 mm.

Larva on *Poterium sanguisorba* (L.). *Common and widespread throughout Britain. IV-VII. All Europe and Siberia*

- ♂ and ♀ (= *subcana* Zaddach, Cameron in part) **puncticeps** (Konow).
 6 (5) Antenna with the flagellar segments subserrate, each segment being slightly produced apically below, and segment 8 less than twice as long as the apex is wide. Tibiae white except for their apices. Post-ocellar region not medially divided. 5.5-6.5 mm. ♂ and ♀.

Larva on *Geum rivale* L., and related cultivated species. *England: Worcester, Hants., Bucks., Herts. and Beds. V-VI. All Europe and Siberia*

- ♂ and ♀ (= *subserrata* Thomson and *subcana* Zaddach) **waldheimii** (Gimmerthal).
 - Antenna with the flagellar segments simple, not conspicuously produced apically below, and 8 about twice as long as its apical width. Tibiae often with the white more or less infusate. Post-ocellar region more or less divided medially by a longitudinal depression. 5-6 mm. ♀ only.

Larva on *Fragaria*. *This species is entirely parthenogenetic, at least in Britain. England locally as a pest on cultivated strawberries: Somerset, Kent, Bucks., Beds. and Herts., V-VI. All Europe* ♀ **confusa** (Konow).

Genus *Halidamia* Benson.

(= *Blennocampa* in part).

A monotypical genus of probable tropical affinities.

Small species only, 5-5.5 mm. Entirely parthenogenetic ♀.

Larva on *Galium aparine* L. and *G. mollugo* L. *Britain sparingly to Firth of Forth; also in Ireland. IV-VI. All Europe to Caucasus, and also in N. America* ♀ (= *assimilis* Fallén, Cameron nec Fallén) **affinis** (Fallén).

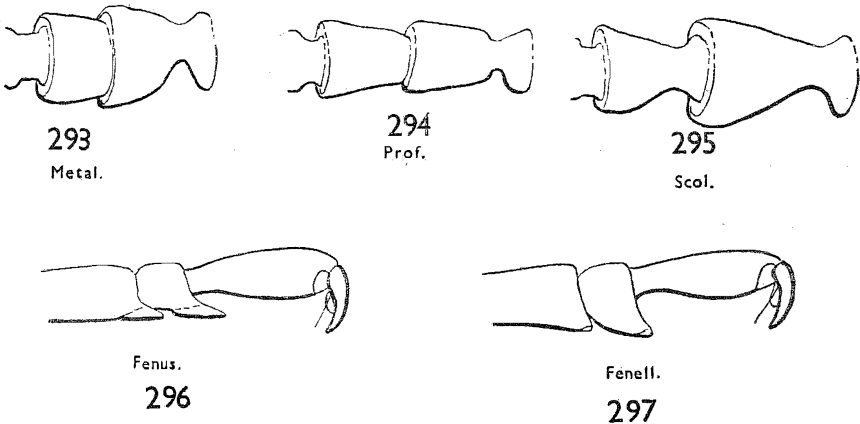
Tribe Fenusini.

Of the nine European genera (Benson, 1941, *Proc. R. ent. Soc. Lond.* (B) 10: 85-90) seven occur in Britain with 14 small species (2-5 mm.), including

the smallest British sawfly. The larvae live in blister mines, and all the British species are on trees or herbaceous Rosaceae. In Cameron's work these species are all included in the genera *Fenusia*, *Fenella* and *Blennocampa*.

KEY TO GENERA OF FENUSINI.

- 1 Fore wing with basal stub of vein A3 curving to join A1 and so to enclose a basal anal cell, though the vein is often discoloured and very faint (fig. 144) ; cells IR1 and IRS of fore wing fused ; and vein 1m-cu is received much nearer to the distal end of cell IR1 and IRS than to the proximal end. Hind wing with both cell R1 and anal cell open apically. Tarsal claws without a basal lobe (fig. 43). Antenna 9-12 segmented, with the 2nd at least about as broad and long as the 1st (cf. fig. 294). Sawsheath in dorsal aspect narrower than basitarsus6.
- Fore wing with the basal stub of A3 either straight (fig. 40) or converging towards the vein A1 (fig. 38), but never fusing with it to enclose a basal anal cell, however faint ; cells IR1 and IRS of fore wing not fused together except in *Profenusia pygmaea** (see below) ; and vein 1m-cu is received as near



Figs. 293-295.—Basal segments of antennae of Fenusini : 293, *Metallus* ; 294, *Profenusia* ; 295, *Scolioneurus*.
 Figs. 296, 297.—Apex of hind tarsus in : 296, *Fenusia* ; 297, *Fenella*.

or nearer to SC + R than to the distal end of the combined cells IR1 + IRS. Hind wing with cell R1 and anal cell closed or open apically. Tarsal claws with an enlarged basal lobe (fig. 48). Antenna 9-10 segmented, with the 2nd segment narrower and shorter than the 1st (figs. 293 and 295) (except in *Profenusia*). Sawsheath narrow or broad.....2.

- 2 (1) Either a prepectus is indicated by a furrow at the front of the mesopleura (cf. fig. 154) or else the 2nd antennal segment is broader than long (fig. 293). Basal stub to vein A3 of fore wing straight (fig. 40). Sawsheath in dorsal aspect narrower at apex than base of hind tibia 3.
- Prepectus never defined, and the 2nd antennal segment always longer than broad (fig. 295). Vein A3 of fore wing straight at apex or converging towards vein A1. Sawsheath narrow or broad 4.
- 3 (2) Post-ganal carina present behind the eyes and a prepectus defined on the mesopleura. 2nd antennal segment longer than broad ; flagellum of ♂ not laterally compressed, the basal segment being almost 4 times longer than broad. One species with sexes differently coloured ; ♂ with abdomen mainly yellow and ♀ all black. Larger (4-5 mm.) .. **Parna** Benson, p. 106.

* *Profenusia pygmaea*, which is under 3.5 mm., can very usefully be distinguished from all other British species in the tribe through its mesopleura being evenly covered all over with pubescence ; in all the other species there is a large glabrous area sharply distinguished below the mesepisternal hair patch.

- Post-gonal carina and prepectus absent. 2nd antennal segment broader than long (fig. 293); ♂ with flagellar segments strongly compressed laterally, so that the basal segments are only about twice as long as broad. Sexes less markedly different in colour. Smaller (3-4 mm.) 3 species.
(= *Entodecta* Konow) **Metallus** Forbes, p. 106.
- 4 (2) Antenna with 2nd segment narrower and shorter than 1st (fig. 295). Fore wing with stub of vein A3 converging at its apex towards vein A1 (cf. fig. 38); vein 1r strongly recurved at base to join stigma some distance from Sc + R. Hind wing with cell 1R at most only slightly open at apex, with RS reaching the wing-margin. Hind tarsus at least almost as long as hind tibia. Front and side lobes of mesonotum usually with patches of very fine squamose sculpture more or less developed. Sawsheath in dorsal aspect subtruncate at apex, where it is about as broad as the base of the hind tibia 5.
- Antenna with 2nd segment about as long and broad as 1st (fig. 294). Fore wing with stub of vein A3 straight at apex (cf. fig. 40); vein 1r joins vein Sc + R. Hind wing with cell 1R widely open at apex, with RS not reaching the wing-margin. Hind tarsus much shorter than tibia. Front and side lobes without squamose surface sculpture. Sawsheath in dorsal aspect much narrower at apex than base of hind tibia. Wings infusate. Post-gonal carina absent. (See note about *P. pygmaea* in couplet 1). 2 species
Profenusa MacGillivray, p. 108.
- 5 (4) Slenderer species (4-5 mm. long), with tergites of abdomen smooth and shining. Post-gonal carina present behind eyes. Antenna longer (more than twice as long as breadth of head, with segment 8 about 3 times longer than broad). 1 species **Scolioneura** Konow, p. 107.
- Stoutier species (3-4 mm. long), with tergites alutaceous and dull. Post-gonal carina absent. Antenna shorter (not much more than one and a half times breadth of head at the most, with segment 8 less than 3 times longer than broad). 3 species (= *Fenusella* Enslin) **Messa** Leach, p. 107.
- 6 (1) Antenna 9-segmented. Hind tarsus with 4th segment strongly produced apically (fig. 296). 3 species **Fenusella** Leach, p. 108.
- Antenna 11 to 12-segmented. Hind tarsus with 4th segment not conspicuously produced apically (fig. 297). 1 species **Fenella** Westwood, p. 109.

Genus **Parna** Benson.

(= *Scolioneura* in part).

Monotypic genus, the one species showing marked sexual colour difference.

In the ♂ the abdomen, except for the 2 basal tergites, is yellow together with the legs; in the ♀ the abdomen is entirely black. The wings are infusate and the abdomen alutaceous in sculpture. Very stout insects but only 4-5 mm. long.

Larva mines in leaves of Tilia platyphyllos Scop., and cordata Mill., which often fold over and form a roll. Local probably throughout England and S. Scotland, but not found north of Firth of Forth. (†Morice, 1922, Ent. mon. Mag. 58 : 197-200). V. C. and N. Europe and the Balkans

♂ and ♀ **tenella** (Klug).

Genus **Metallus** Forbes.

(= *Entodecta* Konow).

Of the seven described species of this genus four are known from Europe and three of these in Britain. So far as known the larvae are associated with Rosaceae.

KEY TO SPECIES OF *Metallus*.

- 1 Antenna of ♀ stouter (segment 8 only about twice as long as broad). Either abdomen brownish above, or legs with femur more or less piceous. Wings infusate to subhyaline. 3.5-4.5 mm. 2.
- Antenna of ♀ slenderer (segment 8 more than twice as long as broad). Abdomen entirely black or piceous; legs entirely white. Wings subhyaline. Only ♀ known. 2.5-4 mm.

Larva mines leaves of wild and cultivated Rubus idaeus L., and fruticosus L. agg. Has been a pest in Devon, Herts., Perth and probably elsewhere but confused with M. pumilus; originally found in Lanark. (†Benson, 1941, loc. cit.) V-VI and VII-VIII. Also known from Skåne in Sweden (1938, J. F. Perkins coll.) ♀ (= pumilus Klug. in part) albipes (Cameron).

- 2 (1) Abdomen black all over. Hind legs yellow with femur more or less piceous at base. Antenna of ♂ strongly enlarged and laterally compressed. ♂ and ♀.

Larva mines leaves of wild and cultivated Rubus idaeus L. and fruticosus L. agg. Confused with M. albipes, but identified from Middlesex, Surrey, Lancs., and Yorks. ? V-VI and VII-VIII.

All Europe.. ♂ and ♀ (= pumilio Hartig) pumilus (Klug).

- Abdomen brownish above. Hind legs almost entirely white. Only ♀ known.

Larva mines leaves of wild and cultivated Geum, often several to a leaf.

Larva common in gardens in S. England and as far north as Roxburghshire, often as a pest, but the adults are very elusive. (†Perkins, 1929, Trans. Devons. Ass. Adv. Sci. 61 : 296). V-VI and VII-VIII ♀ gei (Brischke).

Genus *Scolioneura* Konow.

A small genus with only two known species, both confined to Europe and only one of them found in Britain.

Black species with legs mainly roddish-yellow except for the black coxae, trochanters, more or less base of femora and apical tarsal segments. Wings subhyaline. 4-5 mm.

Larva mines in Betula. Common throughout Britain and Ireland. V-VI and VII-IX. N. and C. Europe

♂ and ♀ (= *betulae* Zaddach) **betuleti** (Klug).

Genus *Messa* Leach.

(= *Fenusella* Enslin).

A small genus of five known species, of which three have been found in Britain. Normally the British species are entirely parthenogenetic, with only very rare males known. Attached to Salicaceae and Betulaceae.

KEY TO SPECIES OF *Messa*.

- 1 Frons without a 8-shaped carina. Wings uniformly subhyaline. Mesonotum with patches of well-developed squamose surface sculpture on middle and side lobes. Antenna with segment 8 not twice as long as broad 2.
- Frons with 8-shaped carina enclosing a supra-antennal field below and almost enclosing a frontal field above. Wings subhyaline, but usually with an infusate band under the stigma of the fore wing. Mesonotum with squamose sculpture scarcely visible. Antenna with segment 8 more than twice as long as broad. ♀ mainly piceous black with white labrum and tegulae, and yellowish-white knees, tibiae and tarsi of all legs; sawsheath from above appears short and broadening behind where it is emarginate and furnished with long curved hairs. ♂ mainly yellow; white are: the tegulae and the outer half of each side of the pronotum; black or piceous are: the vertical and post-occipital parts of the head, middle of pronotum, mesonotum except for sides of front lobes, mesosternum, mesepimeron, most of metathorax, and also the medial basal portions of the basal tergites, though fading out between the 4th and 6th; costa and stigma pale yellow, rest of venation brownish white. 4-4.5 mm.

Larva mines in leaves of Betula, especially pubescens Ehrh. Widely distributed throughout Britain, also in Ireland. Mainly parthenogenetic species; the only known ♂ are 2 which I beat together out of a Betula, one in copulation with a ♀, at Dunwich, Suffolk, on 27.v.1927. V-VI. N. and C. Europe

♂ and ♀ (= *quercus* Cameron) **nana** (Klug).

- 2 (1) Antenna 9-segmented, with the apical segment less than one and a half times as long as the 8th. Hind femur of ♀ basally and antenna more or less infusate; pronotum except at extreme hind margins and mesopleura entirely

black; labrum and clypeus more or less yellow or piceous; only base of mandible white. Very rare ♂ coloured as in *nana*, with outer pronotum white.

Larva mines in leaves of Populus tremula L., and alba L. in Britain, but the species in Germany attacks instead P. nigra L. Has been found in Herts. (Aldbury, Boxmoor and Bricket Wood) and Beds. (Kings Wood); probably occurs elsewhere. V. (†Benson, 1936, Ent. mon. Mag. 72: 205). C. Europe

- ♂ and ♀ **glaucopsis** (Konow).
Antenna with 10 segments or with a very long 9th at least one and a half times as long as 8th. Hind femur of ♀ and antenna beneath yellow, so also are pronotum, marks on mesopleura and often on mesonotum; labrum, clypeus and base of mandibles white or almost so; abdomen piceous, with pale apical margins on most of the tergites above as well as the sternites. Very rare ♂ differs from *glaucopsis* in colour in that the outer pronotum is yellow.

Larva mines in leaves of Populus nigra L. Not common, and only ♀ has been found; Hants., Surrey, Herts., Cambs., Lincoln, Worcester and Warwick. V-VI. ♂ and ♀ hortulana (Klug).

Genus **Profenusa** MacGillivray.

(= *Fenusella* in part).

This genus occurs not only throughout the holarctic region but also in temperate South America. Of the seven known world species three occur in Europe and two of these in Britain.

KEY TO SPECIES OF *Fenususa*.

- A Abdominal tergites dull with alutaceous sculpture. Mesopleura entirely covered with pubescence. Fore wings slightly infusate throughout; anal cell of hind wing closed apically; sector of vein RS between cells 1R1 and 1RS in fore wing not indicated. Sawsheath from above narrow and parallel-sided, tapering abruptly at the apex. Black except for the more or less white tegulae, and the white knees, tibiae and basal tarsal segments of all legs. ♂ unknown. 3-4 mm.

Larva mines in the upper superficial layers of leaves of Quercus robur L. and etpraea (Matt.) Liebl. Britain N. to Perthshire, common locally and probably widely distributed also in Ireland. V-VII. N. and C. Europe to Italy and to Caucasus. ♀ pygmaea (Klug).

- B Abdominal tergites smooth. Mesopleura with dense pubescence above, ending abruptly, and glabrous below. Fore wings infusate with clearly subhyaline apices; sector of vein RS between cells 1R1 and 1RS in fore wings indicated; anal cell of hind wings open at apex. Sawsheath from above slightly expanding towards the apex. Coloured as in *pygmaea*, except that the tegulae are black and the pale parts of the legs more brownish white. ♂ unknown. 3-4 mm.

Larva mines in Betula. Only known from 2 specimens: Warwickshire, Tile Hill, near Coventry, vii. 1930, (J. W. Saunt); and one in Dr. R. C. L. Perkins's collection at Oxford, received from Prof. E. G. R. Waters and probably collected near Oxford. Also from Sweden and Germany. (†Benson, 1941, Proc. R. ent. Soc. Lond. (B) 10: 88-9) ♀ thomsoni (Konow).

Genus **Fenususa** Leach.

A small genus with seven North American species, three of which occur also in Europe, including Britain.

KEY TO SPECIES OF *Fenususa*.

- 1 Abdominal tergites and side lobes of mesonotum without surface sculpture. Vein 2r in fore wing received on vein Rs beyond vein 3rm
- Abdominal tergites dull with alutaceous surface sculpture; side lobes of mesonotum with a patch of very fine squamose surface sculpture. Vein 2r

received on vein RS before vein 3rm. Entirely black or piceous; 3rd antennal segment one and a half times as long as 4th. ♂ rare. 3-4 mm.

Larva mines in leaves of Ulmus. Britain N. to Inverness, common. IV-VI and VIII. Holarctic, though probably introduced into N. America

♂ and ♀ *ulmi* Sundewall.

- 2 (1) Antenna longer than thorax; with 3rd segment only one and a half times as long as 4th; and at least 4th and 5th more than twice as long as broad. ♂ unknown. 3-4 mm.

Larva mines in Alnus leaves. Common throughout Britain and Ireland. V-VI and VIII. Holarctic: in N. America is a pest destroying Alnus, but is considered truly native there... ♀ (= melanopoda Cameron, westwoodi Cameron) dohrnii (Tischbein).

- Antenna not longer than thorax; with 3rd segment twice as long as 4th; and 4th and 5th less than twice as long as broad. 2.5-3.5 mm. ♂ rare.

Larva mines in leaves of Betula, with a preference for B. pubescens Ehrh. Common throughout Britain and Ireland. V-VI and VII-VIII. Holarctic but probably introduced into N. America, where it has up to 4 broods a year and is a forestry pest..... ♂ and ♀ (= pumila Klug) pusilla (Lepelletier).

Genus *Fenella* Westwood.

A small genus of six described species, five confined to Europe and one only known from Palestine, all associated with herbaceous plants. One "species" occurs in Britain in two distinct foodplant races.

Minute species (2-3 mm.) entirely black or piceous in colour except for the paler labrum, knees, tibiae and tarsi of all legs. The ♂ have not been recorded, and as far as is known the species is entirely parthenogenetic.

Larva mines in the leaves of Agrimonia eupatoria L., and also Potentilla reptans L. Both races are common in S. and S.E. England, but have not been noticed north of Notts. In Ireland the species has been found in W. Meath. V-VI and VIII-X. Europe and Caucasus ♀ nigrita Westwood.

Subfamily TENTHREDININAE.

This subfamily, with over 1,000 valid species already known, is divided into about 35 genera, concentrated in East and South-east Asia and in the warmer parts of North America. Of the 7 tribes all except the Conaspidiini occur in Europe but the Sioblini do not reach Britain. (The British tribes and genera were dealt with by Benson (1946, *Proc. R. ent. Soc. Lond.* (B) 15: 33-40). Six of the tribes consist of only 2 or 3 genera apiece for the whole world, though the Macrophyini have as many as 230 species in their 2 genera; most of the genera (22) belong to the Tenthredinini, of which the great genus *Tenthredo* already contains no fewer than 700 valid described species.

The larvae are largely associated with herbaceous plants, and feed mainly at night unless the days are very humid, hiding away under leaves or beneath the ground when the air is dry. They mostly overwinter as prepupae in earthen cells underground.

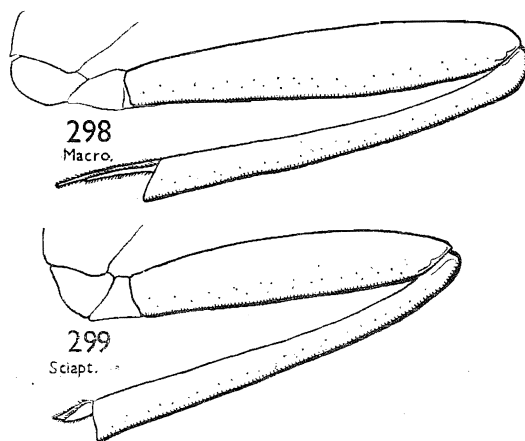
They have one flight a year and that is mostly in late spring or summer. The adults frequently visit flowers to feed on pollen and other insects and to find mates.

KEY TO GENERA OF TENTHREDININAE.

- 1 Hind femur (excluding trochantellus) shorter than the hind tibia and with its apex rarely reaching the apex of the abdomen (fig. 299). Labrum flat or slightly convex; if emarginate it is flat except for its reflexed front margin (figs. 303-308). Tibial spurs, anal cell of fore wing and occipital carina of various forms 3.

2 Anal cell of fore wing with 1 or 2 veins and the 1st cell of 2nd wing with short erect 2 veins and the 1st cell of 2nd wing with 1 or 2 veins from junction of 1st and 2nd veins. Tibial spurs, anal cell of fore wing and occipital carina of various forms 3.

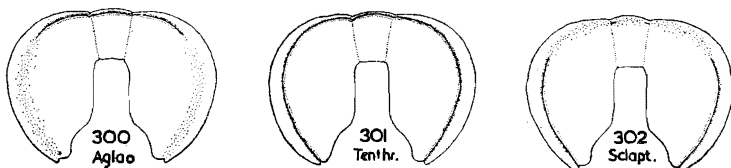
- Hind femur enlarged and (excluding trochantellus) about as long as the hind tibia (fig. 298); as the coxae are also enlarged the femur often reaches to the apex of the abdomen. Labrum convex, sometimes semi-cylindrical, with the apex truncate or emarginate (fig. 309). Apical hind tibial spurs much longer than the apical breadth of the tibia. Anal cell of fore wing either constricted in the middle, or with a short straight cross-vein (figs. 137 or 138). Occipital carina well developed all round the hind margin of the head (fig. 301)..... MACROPHYINI 2.
- 2 (1) Antenna with flagellum slender and much longer than twice the width of the head; 3rd and 4th antennal segments subequal; ♂ flagellum with a carina along the whole of the inner upper edge. Eyes scarcely converging below (cf. fig. 303) so that they are further apart there than the height of an eye; the malar space is at least as long as the diameter of the front ocellus. Fore wing with the anal cell broadly constricted medially. 5 species
Pachyprotasis Hartig, p. 128.



Figs. 298, 299.—Hind femur and tibia of: 298, *Macrophyia*; 299, *Sciapteryx*.

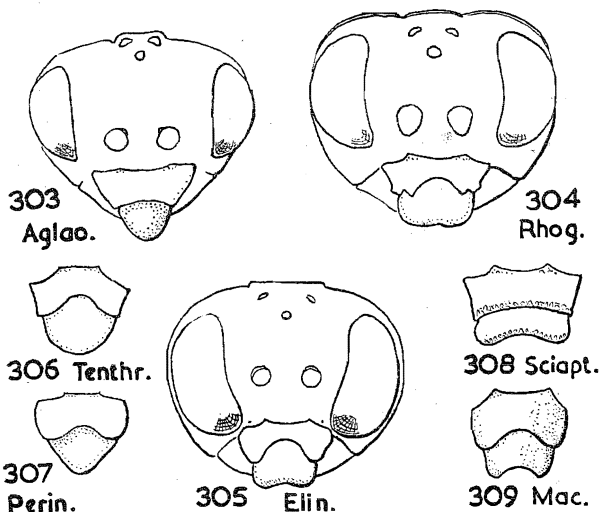
- Antenna with flagellum slightly compressed and thickened and at most scarcely longer than twice the width of the head; 3rd antennal segment at least one and a half times as long as the 4th; ♂ flagellum without a carina along the upper inner side. Eyes converging below and (except in *M. punctum-album* L.) closer together below than the height of one (cf. fig. 305); malar space shorter than the diameter of an ocellus. 9 species
Macrophyia Dahlbom, p. 129.
- 3 (1) Labrum normal in front and entire (figs. 303, 306, and 307), except in certain green and black species (*Rhogogaster*) (fig. 304). Occipital carina well developed throughout (fig. 301) or obsolete only laterally (*Aglaostigma*) (fig. 300). Tibial spurs longer than the apical breadth of the hind tibia by much more than their own basal breadth. Antennae various, often longer than one and a half times breadth of the head5.
- Labrum reflexed in front so that it appears emarginate or even excised (figs. 305 and 308), and the occipital carina is more or less obsolete on the upper hind margin of the head, though developed below (fig. 302) (cf. *Aglaostigma*). Apical hind tibial spurs stout and short, never longer than the apical breadth of the tibia by more than their own basal breadth (fig. 299). Species not green and black. Antenna shorter than one and a half times the breadth of the head, slightly compressed with segment 3 as long as 4 + 5
(SCIAPTERYGINI) 4.
- 4 (3) Stout, dull and mainly black-bodied, heavily punctured insects with small eyes much further apart in front than the height of one. Labrum deeply reflexed in front (fig. 308); front margin of clypeus evenly emarginate for its whole width. 2 species..... **Sciapteryx** Stephens, p. 116.

Less stout insects conspicuously marked with yellow or red and yellow on the body, and more shining owing to sparser punctation. Eyes large and converging strongly in front so that there they are closer together than the height of one (fig. 305); labrum with the apex subtruncate and only slightly emarginate; clypeus with the front margin excised only in the middle. 1 species.... (= *Tenthredo* in part, *Allantus* in part). *Elinora* Benson, p. 117.



FIGS. 300-302.—Diagrams of head from behind in Tenthredininae to show development of occipital carina in : 300, *Aglao stigma*; 301, *Tenthredo*; 302, *Sciapteryx*.

- 5 (3) Either occipital carina obsolete laterally (fig. 300), or claws with inner tooth much shorter than the end tooth and widely separated from it (fig. 44), or 1st abdominal segment undivided medially (the furrow being obsolete or or only represented by a carina). Eyes further apart in front than the height of one eye (fig. 303). Hind wing often with abnormal venation; ♀ often with only one enclosed cell (M) and ♂ often with a marginal vein (fig. 139). Clypeus with the front subtruncate to deeply excised. Labrum often



FIGS. 303-305.—Face of Tenthredininae to show position of eyes, and form of clypeus and labrum in : 303, *Aglao stigma*; 304, *Rhogogaster*; 305, *Elinora*.

FIGS. 306-309.—Clypeus and labrum of : 306, *Tenthredo*; 307, *Perineura*; 308, *Sciapteryx*; 309, *Macrophya*.

convex. Anal cell of fore wing often more or less constricted in the middle or else with a short straight cross-vein. Cenchri larger and closer together than the breadth of one. Scutellum acutely pointed in front7. Occipital carina well developed all round hind margin of head (fig. 301). Claws normal, with long inner tooth as long or longer than the end tooth and adpressed to it (figs. 46 and 47). 1st abdominal segment clearly divided medially by a furrow, and eyes often closer together in front than the height of one (cf. fig. 305). Hind wing always with 2 enclosed middle cells (RS and

- M) and in ♂ without a marginal vein. Clypeus deeply excised on front margin (figs. 304, 306); labrum flat, at most but slightly reflexed apically. Anal cell of fore wing with short cross-vein (cf. fig. 137). Cenchri smaller and usually further apart than the breadth of one. Scutellum obtuse or truncate in front (TENTHREDININI) 6.
- 6 (5) Green and black species with the eyes not closer together below than the breadth of the clypeus (fig. 304); labrum subtruncate or slightly emarginate in front, more or less reflexed apically; clypeus with the sides of the front margin sometimes toothed. Head and mesopleura shining without prominent crests or protuberances. 7 species (*Tenthredo* in part.) **Rhogaster** Konow, p. 118.
- Not green and black in colour, or eyes strongly converging in front so that they are closer together below than the width of the clypeus. Labrum entire apically, usually rounded or acutely pointed (fig. 306); clypeus never with the sides of the front margin toothed. Head and mesopleura may be dull all over with heavy punctuation, and may have prominent crests above the antennae and sometimes pyramidal projections on the mesopleura. 27 species (= *Allantus* auctt. nec. Panzer and *Tenthredella* Rohwer) **Tenthredo** L., p. 121.
- 7 (5) Claws with the inner tooth much shorter than the end tooth and widely separated from it (fig. 44). 1st abdominal segment divided medially by a wide-shaped excision. Labrum flat and almost triangular in shape (fig. 307). 1 species (PERINEURINI) **Perineura** Hartig, p. 112.
- Claws with inner tooth about as long as end tooth and closely adpressed to it (fig. 46). 1st abdominal segment not widely excised medially, often with the furrow replaced by a carina or even entirely obsolete. Labrum convex and rounded in front (fig. 303) (TENTHREDOPSINI) 8.
- 8 (7) 1st abdominal segment with a medial furrow present. Occipital carina obsolete from mandible base to level with top of eyes (fig. 300). 7–9 mm. long and abdomen red-girdled in the 2 British species. Venation often abnormal. (= *Rhogaster* in part, *Laurentia* A. Costa nec Ragonot.) **Aglaostigma** Kirby, p. 113.
- 1st abdominal segment without a medial furrow. Occipital carina well developed all round hind margin of head (cf. fig. 301). 7–12 mm. long and abdomen variously coloured. 4 species **Tenthredopsis** A. Costa, p. 113.

Tribe Perineurini.

A small tribe with only three species in two genera, of which one species occurs in Europe, including Britain.

Genus **Perineura** Hartig.

(= *Synaerema* Hartig)

The two sexes of this species are so different in appearance that Hartig originally described them as species belonging to different genera.

The ♂, which is far more commonly found, has a marginal vein to the hind wings and long antennae (about seven-eighths as long as the fore wing). Abdomen above bright yellow, becoming whitish on the basal segments, which are margined more or less with black in front and behind; the sternites are more or less piceous basally. The antennae have the 2 basal segments black and the flagellum pale brown, darker above. Head white except for a large frontal and vertical patch, which is also continuous with the post-occipital region. Thorax black except for the hind angle and margin of the pronotum, tegulae, a fleck on the inner side of each of lateral lobes as well as the scutellum and postscutellum of the mesonotum, also most of the mesepisternum and metapleura. Legs pale yellow with coxae, trochanters and base of femora white. Wings subhyaline with brown stigma and venation.

The ♀ has normal wing venation and is a much darker and very strikingly coloured insect. Her abdomen is mainly black, with the middle parts of the tergites orange, becoming more extensive and whitish towards the apex of the abdomen. The antenna

has the 6 basal segments black and the 7th-9th yellowish white. Head and thorax coloured much as in the ♂, but more extensively black; the head is mainly black, and only white are: mandibular bases, labrum, front of clypeus, and on the upper inner orbits only a small stripe and on the temples only a small irregular lateral fleck; on the mesopleura the white is reduced to a small longitudinal stripe in the middle; and the legs are marked more or less with piceous, at least on the hind surface of the femora and tarsi, but sometimes the whole of these parts. Wings subinfusate with a darker band under the stigma, venation brown except for the conspicuously white basal half of the stigma. 7-8 mm.

Larva unknown, but the species is associated with Rubus in the more open parts of various types of woods with Fagus or Quercus. Local throughout England and N. to R. Forth in Scotland; and also Co. Cavan in Ireland. V-VII. C. and N. Europe ♂ and ♀ rubi (Panzer).

Tribe Tenthredopsini.

A tribe with about 50 valid described species that have been divided up into several genera but are probably most satisfactorily treated as belonging to two. Represented in Britain by seven species.

Genus *Aglaostigma* Kirby.

(=*Tenthredo* in part, *Rhogogaster* in part and *Laurentia* A. Costa nec Ragonot.)

A Abdomen not marked with white laterally or ventrally.

Black with reddish girdle covering 4th to 6th segments of abdomen. The following parts white: labrum, sometimes front margin of clypeus, more or less inner orbits, hind angle of pronotum, tegula and base of stigma. Antenna piceous above and pale below. Legs reddish yellow with black coxae, and with more or less infusate upper side of femora, apices of tibiae and whole of tarsi. Wings hyaline with brownish or piceous venation. 7-9 mm.

Larva on Galium boreale L. and G. mollugo L. Very common throughout Britain and Ireland, with the following species but emerging slightly earlier. III-VI. All Europe, including Iberian Peninsula to Caucasus and E. Siberia ♂ and ♀ (= gibbosa Fallén) aucupariae (Klug).

B Abdomen with a white lateral band in the ♀, and with most of the underside white in the ♂.

Differs from *aucupariae* mainly in that it is more richly marked with white. In the ♀ the sternites are mostly piceous and tergites 4-6 are often more or less infusate, especially in northern regions; the mesopleurum has a white medial fleck; the inner orbits are more richly marked with white, and the extreme apex and base of the costa together with a broader base to the stigma are yellowish white. In the ♂ the white is even more extensive; the whole of the orbits and face below the antennae, most of the pronotum, much of the mesopleurum and almost the whole of the underside of the abdomen are yellowish white. 7-9 mm.

Larva on Galium mollugo L. and G. verum L. Very common in Britain but rarer in Ireland; occurs with the preceding species but appears slightly later. IV-VI. C. and N. Europe, E. to Siberia

♂ and ♀ (= *lateralis* F.) *fulvipes* (Scopoli).

Genus *Tenthredopsis* A. Costa.

About 40 species of *Tenthredopsis* are known in the world and these are mostly Eurasian and concentrated in S.E. Europe. Only five species are recognized here from Britain, and these belong to three distinct species groups (see Benson, 1934, *Ent. mon. Mag.* 70: 69-75), in one of which *coquebertii*, *friesei* and *nassata* are so closely related as only to be distinguishable for certain in the males and larvae. For information on the larvae I am much indebted to Dr. F. L. Waterhouse of Dundee. *T. friesei* has not previously been recorded as British.

Cameron dealt with 21 British species and Morice 15 (1914, *Ent. mon. Mag.* 50 : 48-51, 145-52, and 207-12). The synonymy of these names is as follows :

<i>excisa</i> C. G. Thomson	=	<i>ornata</i> Lepeletier, Cameron
<i>litterata</i> Geoffroy	=	<i>caliginosa</i> Stephens
		<i>carbonaria</i> L. 1767 <i>nec</i> Scopoli 1763
		<i>cordata</i> Geoffroy
		<i>femoralis</i> Stephens
		<i>microcephala</i> Lepeletier
		<i>nigriceps</i> Cameron
		<i>nigronotata</i> Cameron
<i>coquebertii</i> Klug	=	<i>ignobilis</i> Cameron
		<i>nigricollis</i> Cameron
<i>nassata</i> L.	=	<i>albomaculata</i> Cameron
		<i>austriaca</i> Konow
		<i>campestris</i> L. Konow <i>nec</i> L.
		<i>dorsalis</i> Lepeletier
		<i>dorsivittata</i> Cameron
		<i>elegans</i> Konow
		<i>fenestrata</i> Konow
		<i>flavomaculata</i> Cameron
		<i>fulviceps</i> Stephens
		<i>gibberosa</i> Konow
		<i>inornata</i> Cameron
		<i>lividiventris</i> Cameron
		<i>palmata</i> Geoffroy
		<i>piciceps</i> Cameron
		<i>saundersi</i> Cameron
		<i>scutellaris</i> Fabricius
		<i>sordida</i> Klug, Cameron <i>nec</i> Klug
		<i>spretta</i> Lepeletier
		<i>thornleyi</i> Konow
		<i>tristis</i> Stephens
		<i>tristior</i> Morice
<i>friesei</i> Konow	=	<i>nassata</i> L. in part
(<i>andrei</i> Konow)	=	* <i>gyandromorpha</i> Rudow, André <i>nec</i> Rudow)

* The record of *T. gynandromorpha* was based on "One example from Clydesdale," now lost. As the species is otherwise restricted to the E. Mediterranean more evidence is needed before it can be regarded as British.

KEY TO SPECIES OF *Tenthredopsis*.

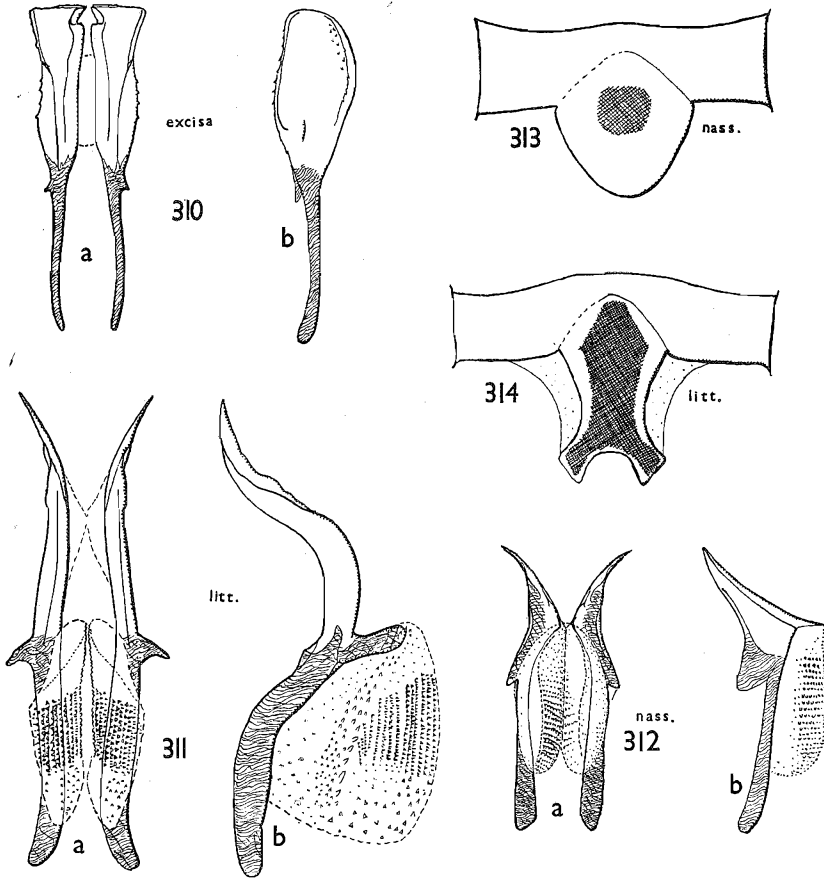
Males.

- 1 Clypeus with the front margin sub-truncate, only slightly emarginate. Apical tergite of abdomen with a smooth central depression divided longitudinally by a raised keel; apical sternite emarginate behind. Penis valves of genitalia each with a narrow acute appendage (figs. 311, 312). Often over 9 mm. 2.
- Clypeus with front margin deeply and arcuately excised. Apical tergite of abdomen without a smooth apical median depression divided by a raised keel; apical sternite entire behind. Penis valves of genitalia truncate apically without any acute appendage (fig. 310). 7-9 mm. Venation as in *nassata*
Larva unknown. Local in damp grassy places in S. England to Yorks. V-VI. All Europe to Caucasus ♂ *excisa* (C. G. Thomson)
- 2 (1) Projection of the acute appendage on each penis valve is shorter than the inner apical hind tibial spur (fig. 312), which itself is less than half the length of hind basitarsus. Colour very variable, but antennae are always black above and pale brown below. Apical sternite more rounded behind with only a slight median emargination. 7-12 mm. 3.
- Projection of the acute appendage on each penis valve is longer than the inner apical hind tibial spur (fig. 311), which itself is about half as long as the

basitarsus. Head white below and on orbits, black above; antenna reddish yellow below and brown above; thorax yellowish white with black and yellow marks above; abdomen mainly reddish yellow marked with black on basal segments. Large species (11–12 mm.). Venation as in *nassata*.

Larvae on Gramineae especially *Dactylis glomerata*. L. Throughout Britain, common in the S. V–VII. All Europe, N. Africa and Caucasus

♂ *litterata* (Geoffroy).



FIGS. 310–312.—Penis-valve of *Tenthredopsis* (a) dorsally, (b) laterally, in: 310, *excisa*; 311, *litterata*; 312, *nassata*.

FIGS. 313, 314.—Hypopygium of *Tenthredopsis*: 313, *nassata*; 314, *litterata*.

- 3 (2) Hind wing with a continuous or almost continuous marginal vein (fig. 139) . . 4. *coquebertii* Klug.
 - Hind wing with marginal vein absent (cf. fig. 140). 10–11 mm.
 Larva on Gramineae, especially *Deschampsia caespitosa* (L.) Beauv. and *D. flexuosa* (L.) Trin., but also *Glyceria fluitans* (L.) R. Br., *Nardus stricta* L., and *Poa pratensis* L., etc. Throughout Britain, commoner in the S. V–VII. All Europe ♂ *coquebertii* (Klug).
 4 (3) Coloured like *litterata* except for the darker antenna and more extensive black on base and apex of abdomen. (Head white below and on orbits, and black above; thorax yellowish-white below and black above with yellowish-white markings; abdomen reddish-yellow, more or less infuscate at the base and

apex.) Hind tarsus with the middle segments more or less white. Larger species, 9–12 mm.

Larva on Gramineae. Probably common though confused with litterata. I have found it in Bucks., Herts. and Hunts. New British Record. V-VI. All Europe......♂ *friesel* Konow.

Colour very variable, but if abdomen is predominantly reddish-yellow then mesopleura not yellowish white or hind tarsus not white ringed. Smaller species, 7–10 mm.

Larva on Gramineae, especially Dactylis glomerata L., but also Deschampsia caespitosa (L.) Beauv. and D. flexuosa (L.) Trin., etc., and also Cyperaceae. One of the commonest of sawflies, occurring throughout the whole of Britain and Ireland, to the outer Hebrides. V-VIII. All Europe and the Caucasus, and Siberia to China and Japan......♂ *nassata* (L.).

KEY TO SPECIES OF *Tenthredopsis*.

Females.

- 1 Clypeus with the front margin subtruncate and but very little emarginate. Often over 9 mm. and colour very variable.....2.
- Clypeus with front margin deeply and arcuately excised. Small species, under 9 mm. long. Head and thorax black with conspicuous white on inner orbits, temple, pronotum, tegula and scutellum; abdomen black with an orange girdle covering 4–6 middle segments, though there is always a medial dorsal row of black spots crossing the orange girdle
♀ *excisa* (C. G. Thomson).
- 2 (1) Hypopygium smaller and not bifid at apex (fig. 313). Often smaller forms, 7–11 mm.....3.
- Hypopygium larger and bifid at apex (fig. 314). Larger forms, 11–12 mm. Very variable in colour from forms entirely orange with white flecks, forms with thorax and base of abdomen black and only the apex of the abdomen red, to forms entirely black except for the white scutellum
♀ *litterata* (Geoffroy).
- 3 (2) Head and body black with red girdle covering 4–5 middle abdominal segments; hind femur entirely black or piceous; the following parts more or less white: labrum, clypeus, inner and outer orbits, and scutellum.....4.
- Colour very variable, varying from yellow forms richly marked with white on head and thorax (especially in northern regions), black forms with a red-girdled abdomen, to forms almost entirely black except only for the white scutellum; and the hind tarsus may be black or yellow or white. 8–11 mm. (The red girdled forms often cannot be distinguished from the species in couplet 4).....♀ *nassata* (L.).
- 4 (3) Hind legs entirely black or piceous. 8–11 mm.....♀ *coquebertii* (Klug).
- Hind legs with 3–4 mid-tarsal segments yellowish-white. 10–11 mm.
♀ *friesel*-Konow.

Tribe Sciapterygini.

A small tribe of probably about 30–40 valid described species concentrated in the Mediterranean and the Steppes of South-west Asia, but with allied forms in North America. Two genera recognized so far and both occur in Britain.

Genus *Sciapteryx* Stephens.

KEY TO THE SPECIES OF *Sciapteryx*.

- A Wings hyaline; stigma and costa entirely black; Sc + R white in front (Sc) and black behind (R). Tegula white with black base and pronotum with narrow dorsal hind margin white. Hind tibial spurs longer than apical width of tibia. 6–10 mm. Mainly black with white only as follows: in ♀, palps, spot on labrum, inner and outer orbits more or less below, narrow dorsal hind edge of pronotum, front of tegula, narrow apical margins of abdominal segments, spot on apex of coxa, front side of all tibiae and more or less undersides of tarsi; ♂ with more white, having the whole labrum and clypeus as well as broad inner orbits white.

Larva on Adoxa moschatellina L. Only known from Guestling, Sussex, where a single ♂ was collected on 3.iv.1893, by W. Bennett († Bloomfield, 1895, Ent. mon. Mag. 31 : 24) and from Cothill Bog, Berks., in iv.1944 and since, where its biology was worked out by L. H. Woollatt. N. and C. Europe to Caucasus..... ♂ and ♀ consobrina (Klug).

B Wings subinfusate; stigma orange with a piceous apex; C and Sc + R black in the middle, but with extreme apex and basal quarter orange. Tegulae orange and broad dorsal hind margin of pronotum yellowish white. Hind tibial spur shorter than apical width of tibia. 6-10 mm. (Otherwise very similar to *consobrina* but the pale margins to the abdominal segments are broader and more yellowish and the labrum is all yellowish-white in both sexes; the ♂ differs from that of *consobrina* further by having a white transverse band under the antennal sockets joining the 2 pale inner orbits. *S. soror* was considered by Benson (1943, *Ent. mon. Mag.* 79 : 138) to belong with *S. costalis* F. to a subspecies pair of the Atlantic/continental type. The two are very similar, but *costalis* differs in having C and Sc + R of the fore wing entirely orange, the stigma more broadly orange, no white in the ♀ on the face below the antenna, the front lobe of the mesonotum being about as broad as the length of a side instead of clearly broader than this, the 2nd segment on the antenna longer than broad and the ♂ hypopygium subacute behind instead of subtruncate.)

Larva unknown, but that of S. costalis is recorded from Ranunculus acris L. Local but widespread throughout Britain, N. to Aberdeen and Inverness in meadows and on downlands. IV-V. An Atlantic species restricted outside Britain to W. France, Spain, Switzerland and Italy. (S. costalis occurs in Belgium, E. France, Switzerland, and E. and S.E. Europe generally) (= costalis F. in part) ♂ and ♀ soror Konow.

Genus *Elinora* Benson.

(=*Allantus* auctt. nec Panzer, in part, and *Tenthredo* L. in part.)

In the only British species the sexes are differently coloured, the ♂ differing from the ♀ in having red on the abdomen as well as yellow.

♂ black or piceous with the following parts yellow: labrum, clypeus, 2 basal segments of the antenna, hind angle of pronotum, tegulae, legs (except for coxae, more or less inner side of femora, apices of fore and middle tibiae, and tarsal segments), apex of 6th and 7th and whole of following tergites of abdomen, narrow apical margins of sternites together with whole of hypopygium; red are: the apex of the 3rd, apical two-thirds of the 4th and 5th and more or less middle of the 6th abdominal tergites. Wings slightly yellowish with yellow stigma and venation.

♀ differs from ♂ in that there is a yellow fleck on the mesepisternum; the apex of the hind tibiae and the tarsi are reddish brown; the abdomen is black with apical lateral flecks of yellowish-white on the 4 basal tergites, the entire apical margins of the 5th and 6th and the whole of the following tergites, while the sternites are all black with very thin pale apical margins. 10-12 mm.

Larva on Brassica oleracea L., and nigra (L.) Koch; Sinapis alba L. and arvensis L.; and Raphanus raphanistrum L. This species was discovered in abundance in Battersea Fields, London, by Shuckard before the fields were drained in the early 19th century; and here also the larvae were seen and collected by Curtis and Smith for some years. Apart from these there are only 3 known British records: Surrey, Chobham, 1 ♀, 29.vi.1895 (Beaumont); Essex, Colchester, 1 ♀ (Harwood) and Oxford, 1 ♂, vi.1888 (Morice Coll.). VI-VII. An Atlantic species spread from the W. Mediterranean. The British form is the W. Mediterranean and Atlantic counterpart of the paler E. Mediterranean and continental ♀ flaveola (L.). The two were previously considered to be distinct species, but the British form was wrongly identified as belonging to the eastern and more continental species (cf. Benson, 1946, op. cit.: 39). E. flaveola dominiquei (Konow) occurs in N. Africa, Spain, France and Belgium; while E. flaveola flaveola (L.) occurs in S.E., E. and C. Europe as far as Belgium, where both forms occur

♂ and ♀ (= *flavipes* Geoffroy, *flaveola* L.) *flaveola dominiquei* (Konow).

Tribe Tenthredinini.

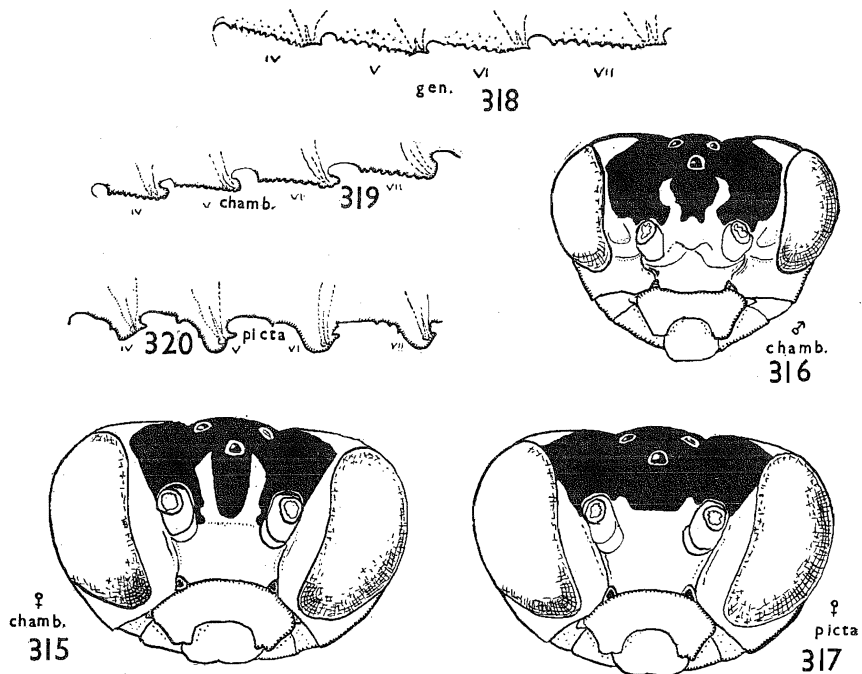
Genus *Rhogogaster* Konow.

(= *Tenthredo* L. in part).

Over 20 species known and seven of the eight known European species occur in Britain. *Pachyprotasis nigronotata* (Kriechbaumer) and *Tenthredo olivacea* Klug (penis valve in fig. 326) are frequently mistaken for *Rhogogaster* because of their similar colouring.

KEY TO SPECIES OF *Rhogogaster*.

- 1 Stigma bi-coloured, with the apex dark and the base pale, in fore wing; vein 2r interstitial or almost interstitial with vein 3r-m; anal cell medially constricted (cf. fig. 138). Eyes of ♀ converge so strongly in front that they are here closer together than the height of an eye (figs. 315 and 317), and the malar space is linear, much less than the breadth of the 2nd antennal segment. Side lobes of clypeus scarcely dentate on the front margin. Smaller species 6-8.5 mm.....(*picta* group) 2.

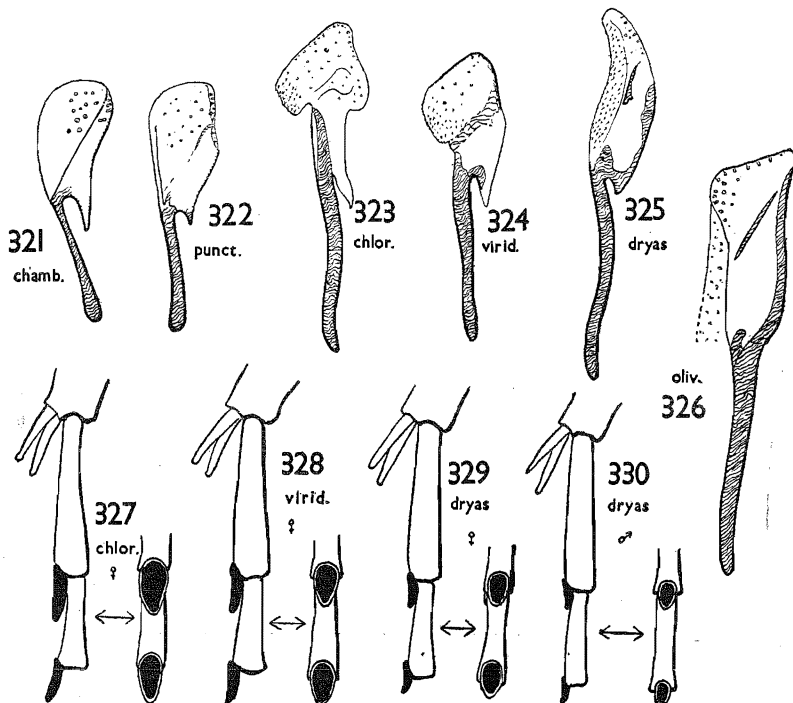


FIGS. 315-317.—Face in *Rhogogaster picta* group: 315, *chambersi*, ♀; 316, *chambersi*, ♂; 317, *picta*, ♀.

FIGS. 318-320.—Portion of lower edge of saw in *Rhogogaster picta* group to include 4th to 7th teeth from the apex in: 318, *genistae*; 319, *chambersi*; 320, *picta*.

- Stigma unicolorous pale green to straw; vein 2r received on Rs clearly before vein 3r-m; anal cell with short medial cross-vein (cf. fig. 137). Eyes in both sexes further apart in front than the height of an eye (fig. 304), the malar space about as long as the length of the 2nd antennal segment and the side lobes of the clypeus dentate (*viridis* group) 4.
- 2 (1) Frontal area of the face with its surrounding ridge black like the rest of the facial patch (fig. 317); ♀ only.....3.

Frontal area of the face with the surrounding ridge in front pale so that the black facial patch is broken in front by the pale along the ridges (figs. 315 and 316); ♂ and ♀. Legs including the hind femur, tibia and tarsi black lined behind. All British ♂ so far found seem to belong to this species, but it is not known how they would be distinguished from ♂ of the other species (cf. Benson, 1947, *Ent. mon. Mag.* 83: 96-9 and 1949, *ibid.* 85: 286-287). Colour of ♀ greenish white marked with black. Head with a variable black mark covering the ocellar region, the post-ocellar region (except sometimes for a pale medial fleck) and reaching forwards almost to the front of the frontal basin (except for its pale ridges as mentioned above) and laterally almost to the inner eye-margins, and backwards to cover the whole of the hind surface



FIGS. 321-326.—Penis valve (base below, dorsal side to left) in: 321, *Rhogogaster chambersi*; 322, *punctulata*; 323, *chlorosoma*; 324, *viridis*; 325, *dryas*; 326, *Tenthredo olivacea*.

FIGS. 327-330.—Hind basal tarsal segments in *Rhogogaster* to show size of tarsal pulvilli in: 327, *chlorosoma*, ♀; 328, *viridis*, ♀; 329, *dryas*, ♀; 330, *dryas*, ♂.

of the head (occiput and post-genae) and the upper genae to the eye margin (there is usually a conspicuous pale fleck on the temple adjoining the upper inner angle of the eye and joining the pale narrow inner orbit); also black are: the antennae above, the front medial portion of the pronotum and most of the mesonotum (except a fleck on each side of the front lobes and inner side of each of the lateral lobes and the scutellum); also black are the mesosternum and the mesepimeron, at least above. Wings with stigma mainly pale, also most of costa and front of subcosta. Abdomen together with saw-sheath mostly black on the upper parts of all the tergites except the last, but on the underside mostly black only at the bases of the segments. The ♂ differs in colour in that the extent of black is less and all the pale flecks on the head and thorax larger, though the pale front ridges of the frontal area may be

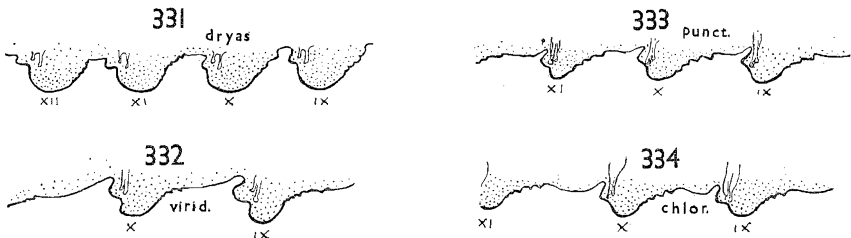
obsolete, and the mesosternum is entirely pale; in the ♂ also, of course, the eyes are smaller and much further apart in front than the height of one and the malar space about as long as the 2nd antennal segment. Saw, see fig. 319; penis valve, fig. 321.

Larva on Linum catharticum L. Widely distributed in Britain at least to Inverness, chiefly in scrub and the edges of woods; common on the chalk. V-VII. France, Switzerland, Austria and Germany. (First distinguished in Beds. by Dr. V. H. Chambers, cf. †Benson, l.c.)..... ♂ and ♀ **chambersi** Benson.

- 3 (2) Hind tibia lined behind with black. Saw with marginal teeth scarcely projecting at all (fig. 318). Very similar to *chambersi* but parthenogenetic, without ♂, or at least these are very rare and not distinguished from those of *chambersi*.

Larva on Sarothamnus scoparius (L.) Koch and also Genista tinctoria L. etc. Throughout Britain N. to Sutherland, and common in the S. V-VII (†Benson, 1949, Ent. mon. Mag. 85: 286-7). France, Germany and Czechoslovakia..... ♀ **genistae** Benson.

- Hind tibia not lined with black behind, but black only at base and apex. Saw with very pronounced marginal teeth, the projections being about half as high as the length of each tooth (fig. 320). Very similar to *genistae* and likewise parthenogenetic, with very rare ♂ at most and these not for certain (cf. Benson, 1947, l.c.).



Figs. 331-334.—Portion of lower margin of saw in *Rhogaster* to include the 9th tooth from the apex and those following: 331, *dryas*; 332, *viridis*; 333, *punctulata*; 334, *chlorosoma*.

Larva on Sarothamnus scoparius (L.) Koch. Less common than the preceding but known from Surrey, Essex, Middlesex, Herts., Bucks., Beds. and Suffolk. V-VII. France, N. Africa, Germany, Czechoslovakia, Roumania and ?Turkestan..... ♀ **picta** (Klug).

- 4 (1) Abdomen either entirely pale, or with a black median vitta above or almost entirely black above, but never with lateral pairs of black dots on the tergites. Frons with a black patch entirely enclosing a pale fleck on the ridge each side of the front ocellus, but sometimes the pale flecks are obsolete. In dorsal view, length of eye in ♀ much greater than length of head behind the eye..... 5.
- Abdomen entirely pale except for a pair of minute black dots on the lateral margins of tergites 2-5 or 2-6, and sometimes a narrow black streak along the extreme basal margin of 2 or 3 basal tergites, but there is never any median dorsal black vitta. Frons green except for a black w-shaped mark, i.e., the pale on the ridges on each side of the front ocellus are continuous with the pale in front of the black mark. In dorsal view, length of eye in ♀ about the same as the length of the head behind the eye. Saw, fig. 333; penis valve, fig. 322. 10-12 mm.

Larva feeds on various trees such as Alnus, Betula, Corylus, Fraxinus, Prunus, Rosa, Salix and Sorbus. Throughout Britain but commoner in the N. V-VII. C. and N. Europe..... ♂ and ♀ **punctulata** (Klug).

- 5 (4) Variable in colour with subhyaline wings. Crests above antennae not prominent and the hollows behind them are shallow, often almost filled by a tubercle; frontal black patch on head normally does not reach to eyes, which have pale inner orbits. Mesonotum together with scutellum and postscutellum sparsely punctured, with shining areas; postscutellum without

- a sharp median keel. Penis valve, figs. 323 and 324; saw, figs. 332 and 334.....6.
- Very dark and mainly black above, the black vitta on the abdomen never broken up into patches, and with subinfusate wings. Crests above the antennae large and outstanding with very deep hollows behind; black patch on frons reaches right to the eye margin. Mesonotum dull all over with alutaceous sculpture between the punctures, including the scutellum and postscutellum, which has a sharp median keel. Penis valve, fig. 325., (cf. penis valve of *Tenthredo olivacea*, fig. 326); saw with very prominent lobes to the ventral teeth and close together (fig. 331). Tarsal pulvilli (figs. 329 and 330) even smaller than in *viridis*. 8-12 mm.
- Larva not described, but feeds on Populus tremula L., and on the leaves of this Populus only could I get adults to oviposit. Locally common in Britain in woods with aspen, N. to Inverness. V-VIII. (†Benson, 1943, Entomologist 76 : 138-42). N. and C. Europe.....♂ and ♀ dryas (Benson).*
- 6 (5) Very pale. Abdomen in ♂ mostly entirely pale with, at most, a median black dot on some of the basal tergites and a narrow black basal line; ♀ usually a little darker, but at most with a narrow median black vitta broken into separate spots. Mesopleural groove pale. Tarsal pulvilli larger (those on the basitarsus of the ♀ (fig. 327) more than half as long as the following tarsal segment; those of the ♂ about half as long). Penis valve, fig. 323; saw, fig. 334. 10-13 mm.
- Larva on Alnus, Populus, Salix, Sorbus and Filipendula ulmaria (L.) Maxim. Common throughout Britain. V-VII (†Benson, 1943, Entomologist 76 : 139-43). All Europe and Siberia.*
- ♂ and ♀ (= *scalaris* Klug, Thoms nec Klug) **chlorosoma** (Benson).
- Very variable in colour but the palest ♂ have at least a median dorsal black vitta and the darkest ♂ and ♀ may be almost entirely black above. Mesopleural groove lined with black. Tarsal pulvilli smaller (those on the hind basitarsus of the ♀ are about two-fifths as long as the following tarsal segment (fig. 328), and one-third in the ♂). Penis valve, fig. 324; saw fig. 332, 10-13 mm.
- Larva on Alnus and probably many other plants. Common throughout Britain and Ireland. V-VII. Europe to Caucasus to E. Siberia, Japan and across N. America from W. to Hudson Bay♂ and ♀ viridis (L.).*

Genus *Tenthredo* L.

(= *Allantus* Jurine nec Panzer and *Tenthredella* Rohwer).

This vast genus with over 700 described species is at present the largest sawfly genus known (though *Nematus* will probably ultimately prove larger).

In Britain there are 27 out of about 65 species known from N. and C. Europe.

For a long time the genus was divided into the long-horned group *Tenthredella* Rohwer (= *Tenthredo* auctt. nec L.), associated more with woodland country, and the short-horned group *Tenthredo* L. (= *Allantus* Jurine nec Panzer), associated more with open country; but it has proved impossible to maintain this twofold division on a world basis. Actually there are not two but many species-groups; and those few that are represented here are further being lumped together into artificial colour-groups for convenience in keying.

KEY TO GROUPS OF SPECIES—GROUPS OF *Tenthredo*.

- 1 Antenna setiform with the subapical segments narrower than the scape; often more than twice as long as breadth of head. Abdomen variously coloured; if black and banded right across dorsally with yellow then the stigma is black..... 2
- Antenna subclavate, with the subapical segments as broad or almost as broad as the scape; less than twice as long as the breadth of the head. Abdomen black with 1 or more of the tergites banded right across with pale yellow. Costa and at least base of stigma yellow..... **D Groups** (*arcuata*, etc.).

- 2 (1) Body not black and green, fading to straw 3
 - Body black and green, fading to straw; scutellum always pale
- C. Groups** (*mesomelas* and *olivacea*).
- 3 (2) Abdomen black above with 1 or more tergites banded with yellow right across
 - Abdomen more or less black or brown or red, but not yellow-banded
- A. Groups** (*campestris*, *maculata* and *temula*).
B. Groups (*atra*, etc.).

KEY TO SPECIES OF A GROUPS (*campestris*,* *maculata* and *temula*).

* *campestris* L. (= *flavicornis* F. = *flava* Poda). Stephens recorded this as "Taken near Plymouth: apparently rare." I have not been able to confirm any more recent record. This large species (12-14 mm. long) is readily distinguished from all others in Europe by its yellow antennae and mesonotum, and by its yellowish wings, of which the front pair are infuscate towards the apex.

The larva feeds on *Aegopodium podagraria* L. and the species is common in C. Europe.

- A Larger (12.5-14 mm. long). Thorax entirely black except for the yellow pronotal edge and scutellum, and in the ♀ the metapleura. Abdomen of ♀ black with tergites 4, 5, and often part of 6 yellow above and below; ♂ abdomen yellow above and below except for the first 2 and the last 2 tergites. Stigma black or piceous, but the costa and subcosta yellow. Legs yellow with femora and apices of tibiae black, and in ♂ basitarsus also.

Larva unknown. Widespread and sporadic in woods throughout Britain N. to Firth of Forth, but commoner in the S. V-VII. Europe to Caucasus and Asia Minor ♂ and ♀ **maculata** Geoffroy.

- B Smaller (10-12 mm. long). Thorax including pronotal edge and scutellum entirely black in ♀; in ♂ thorax entirely black above but almost entirely yellow underneath. Abdomen of ♀ black except for tergite 3, sides of 4 and 5, and middle of 6-9, all of which are yellow; ♂ abdomen black above except for 3rd tergite, the sides of the 4th and the extreme apex which like the whole underside are yellow. Stigma black or piceous and costa mainly yellow, but it is black at the apex as is the posterior half of the subcosta. Legs yellow with black femora, apices of tibiae and more or less tarsi in ♀; but in ♂ they are yellow lined almost throughout with black behind.

Very common in S. England; N. to Firth of Forth; common in Ireland. V-VI. All Europe and eastwards to E. Siberia

♂ and ♀ (= *bicincta* L. auctt. nec L.) **temula** Scopoli.

KEY TO SPECIES OF B GROUPS (*atra*, etc.).

- 1 Antenna entirely black 2.
 - Antenna partly pale, at least at the apex or on the underside 4.
- 2 (1) Body black or black and red, but the hind legs with at least the tibia partly red; clypeus and labrum as well as most of the mandible white. Head with at least shallow punctures and more or less coriaceous between; mesonotum dull with rough surface. Malar space longer than diameter of front ocellus. Smaller, 9-12 mm. 3.
 - Body and hind legs all black in both sexes; clypeus and often labrum black and only part of mandible base white. Head above shining without punctures or surface sculpture; and mesonotum shining between very shallow irregular coarse punctures. Malar space scarcely as long as diameter of front ocellus. Larger, 13-14 mm.
- Larva on Petasites hybridus (L.) Gaertn. Mey. & Scherb., etc., also sometimes on Tussilago farfara L. Recorded from Dorset, Hants., Essex, Kent, Beds., Oxon., Yorks., and Cheshire. Probably occurs wherever the Petasites is abundant in England. VI-VIII. C. Europe to Caucasus*
 ♂ and ♀ **mandibularis** Fabricius.
- 3 (2) Stigma and apex of costa of fore wing brown. Abdomen of ♀ black with segments 3-6 more or less red; ♂ with abdomen entirely red except from the basal and the apical tergite; metapleura and 1st tergite at the side usually with a white spot; hind femur black-marked apically; hind tibiae and tarsi red. Head dull with coarse punctures and fine surface sculpture.

Larva not described, but the species is associated with Menyanthes trifoliata L. It is thus commoner in Scotland and Ireland, but occurs in suitable bogs throughout Britain. VI-VIII. C. and N. Europe to Caucasus, and also Siberia ♂ and ♀ (= lachlaniana Cameron) moniliata Klug.

- Stigma and apex of costa of fore wings black. Abdomen of ♀ without red band; ♂ with tergites 2-6 red; metapleura entirely black or with a white mark; hind femur mostly red (though occasionally yellow or more or less infuscate); apices of hind tibiae and tarsi black. Head shining with sparser sculpture.

Larva feeds on Brassica napus L., Lamium, Mentha, Plantago, Ranunculus, Sedum, Solanum tuberosum L., and Succisa pratensis Moench, etc. Common throughout Britain and Ireland, to the Orkneys and Outer Hebrides. V-VIII. All Europe and N. Asia to E. Siberia and N. America

♂ and ♀ (= dispar Klug and scotica Cameron) atra L.

- 4 (1) Stigma of fore wing unicolorous 5.
- Stigma of fore wing bicolorous, the apical two-thirds being piceous or brown and the basal one-third yellowish white or yellow. Large species, 12-15 mm. Head almost impunctate above and contracted behind the eyes. Abdomen of ♀ either entirely black (except for white spot each side of 1st tergite) or with the apex more or less red, sometimes with up to the 5 apical segments red; ♂ abdomen variable in colour, but the basal tergites are usually black, the middle tergites black at the sides but yellowish white in the middle, and the apical tergites reddish brown—the pale area in the middle of the tergites is peculiar in this genus to ♂ of this species.

The larva has been recorded from numerous plants: Pteridium aquilinum (L.), Kuhn, Epilobium, Lonicera, and many trees such as Corylus, Rosa, Salix, Sorbus and Viburnum. Common throughout Britain and Ireland. V-VIII. All Europe, including Caucasus, and in Siberia . . . ♂ and ♀ livida L.

- 5 (4) Head above clearly punctured, with a bronze sheen between the punctures . . . 6.
- Head shining black, or dull black with coriaceous surface sculpture 7.
6 (5) Larger species (10-13 mm.). Stigma of fore wing yellowish-brown; abdomen red or reddish-yellow, with 1st and often also 2nd tergite blackened and occasionally also the apical tergite; underside of the thorax normally reddish yellow, but in the darker forms may be almost entirely black.

The larva is recorded from numerous plants: Pteridium aquilinum (L.) Kuhn, Filipendula ulmaria (L.), Maxim., Prunus, Alnus and Salix. Common throughout Britain and Ireland. V-VI. C. and N. Europe, to Asia Minor, Armenia, and across Siberia to Kamtchatka

♂ and ♀ (= rufiventris F.) ferruginea Schrank.

- Smaller species (9-10 mm.). Stigma black or piceous; abdomen black at base and apex, with a varying amount of red on the middle segments, and in the ♂ only the 1st and last tergites are black; underside thorax black.

Larva on Hypericum perforatum L., and quadrangulum L. Common throughout Britain and common locally in Ireland. VI-VIII. N. and C. Europe and Iberian Peninsula ♂ and ♀ balteata Klug.

- 7 (5) 1st tergite of the abdomen as well as the metapleura with a white fleck each side; costa of fore wing yellowish brown; antenna black with only the 6th-7th or -8th segments white; ♂ with whitish marked mesosternum and ♀ may have white scutellum. Larger species (10-15 mm.) 8.
- 1st tergite of abdomen entirely black though the metapleura has a white fleck; costa piceous; antenna white beneath from the 3rd segment; ♂ black above throughout; ♀ may be more or less white-ringed or entirely white from 6th-9th segment; neither mesosternum nor scutellum marked with white. Smaller species (8-11 mm.). Abdomen usually entirely black in ♀ but reddish from the 3rd tergite in ♂; legs reddish but more or less infuscate, and the fore and middle legs whitish in front. Head and thorax dull with dense coriaceous sculpture.

Larva unknown. Widespread in Scotland and southwards at least to Teesdale in Durham and the Lake District in Westmorland. VI-VIII. C. and N. Europe and Spain, and N. Asia to Siberia . . . ♂ and ♀ velox Fabricius.

- 8 (7) Scutellum never marked with white, only slightly convex and always with definite coarse punctures in the middle. Smaller species (♂, 10-11 mm.; ♀, 10-12 mm.). Abdomen of ♀ with a red girdle covering at least tergites

5 and 6 (sometimes 3-9); abdomen of ♂ red or reddish-brown. Tegula more or less red. Head shining above without surface sculpture (cf. *T. solitaria**.)

Larva recorded from *Circaea lutetiana L., Epilobium hirsutum L., Fuchsia, Salix, and Pteridium aquilinum (L.) Kuhn. Britain N. to Dumfries, sparingly; very rare in Ireland. V-VIII. All Europe to Asia Minor and Armenia, and N. Asia to Kamtchatka* ♂ and ♀ *colon* Klug.

- Scutellum marked with white (except in a few ♂), almost hemispherical and without definite punctures in the middle. Larger species (♂, 11-13 mm.; ♀, 12-15 mm.). Abdomen of ♀ entirely black except for the white flecks; ♂ abdomen mainly pale yellowish-brown. Tegula black. Head shining above without surface sculpture.

Larva recorded on *Corylus avellana (L.) and Sorbus aucuparia L. Scaree and mostly from S. and E. England, Cornwall, Sussex, Surrey, Kent, Suffolk, Lincoln; but also recorded from Notts. and from Roxburghshire in Scotland. V-VII. Typical subspecies from all Europe; replaced in E. Siberia by subsp. facigera Konow*

♂ and ♀ (= *solitaria* Scopoli, Cameron nec Scopoli) *fagi* Panzer.

KEY TO SPECIES OF C GROUPS (*olivacea* and *mesomelas* groups).

The species in these groups together with *Rhogogaster* were dealt with by Benson, 1943, *Entomologist* 76 : 133-44.

- 1 Stigma and costa of fore wing black, and also most of head, thorax and abdomen above (*mesomelas* group) 2.
- Stigma and costa of fore wing green, and most of head, thorax and often abdomen olive-green. Mainly olive-green species with variable black markings above; the abdomen may be entirely olive-green or may have a median dorsal black vitta more or less developed chiefly in ♀, but even in the darkest forms the 1st tergite remains mainly pale. Head and mesonotum coriaceous and covered evenly with short stiff black hairs. Our only representative of a group rich in species in E. Asia. 9-12 mm.
- Larva unknown. Widely distributed throughout Britain though commoner in the N., extending to Skye and the Orkneys but not Ireland; in open woods and scrubby heaths, extending above 2000 ft. in the highlands. V-VII. Europe mainly northern and subalpine to Spain and Atlas Mts. N. Asia to E. Siberia and Kamtchatka, and N. America* ♂ and ♀ *olivacea* Klug.
- 2 (1) Crests above the antennae very prominent, as high as their distance apart in the ♀, and still higher than this in the ♂. Pubescence of head, mesonotum and scutellum fuscous. Antenna variable in length, the apical segments short or long. Postocellar area contracted in front so that the front margin is little longer than a side margin. Head not swollen behind the eyes and usually shining with sparse sculpture 3.
- Crests above the antennae less prominent; in ♂ only about as high in front as their distance apart and in the ♀ further apart than their height. Pubescence on head, mesonotum and scutellum largely silvery. Antenna short, with apical segment less than twice as long as broad. Postocellar area almost parallel-sided, so that the front margin is clearly longer than a side margin. Head usually swollen behind the eyes and dull with alutaceous and coriaceous sculpture. 9.5-12.5 mm. Mesopleura usually pale with a black subvertical stripe and coriaceous sculpture all over. Penis valve, fig. 336.

Larva ? on Ranunculus and Heracleum. Not uncommon in moorland localities in Scotland (Perth, Inverness, Aberdeen and Angus) and S. to Cumberland and Robin Hood's Bay in Yorks.; in Ireland it has been found

* *T. solitaria* Scopoli (= *coryli* Panzer). Under the name *coryli* this species is given as British by Cameron on the evidence of Stephens, who says: "Taken in June within the metropolitan district." But there are no specimens in Stephens's collection and no more recent records. If found it can be distinguished from *colon* by its yellow stigma and dull head (as in *velox*), with densely coriaceous surface sculpture.

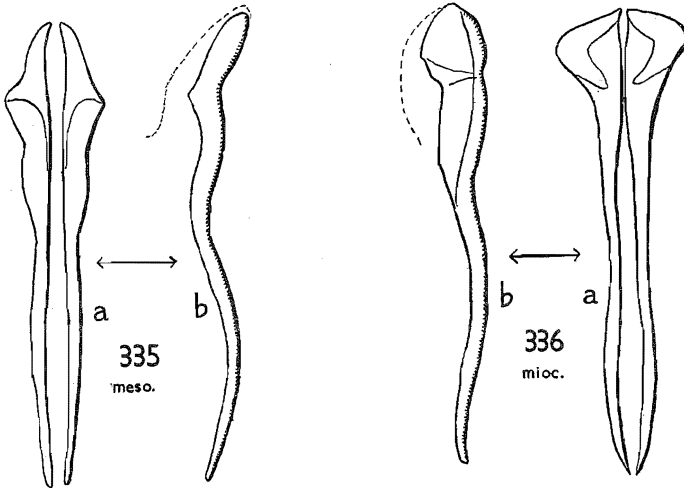
Larva on Euphorbia cyparissia L. V-VII. Adults partial to flowers of Euphorbia. All Europe.

in *Cos. Cavan and Wicklow. VI-VII. (†Benson, 1943, l.c.). N. and subalpine Europe to N. Persia. ♂ and ♀ mioceras (Enslin).*

- 3 (2) Antenna short, with the apical segment scarcely one and a half times as long as broad. Mesopleura and sternum mainly black and shining with but sparse sculpture. Penis valve truncate at apex as in *mioceras* (cf. fig. 336). 9.5-12.5 mm.

Larva on Plantago lanceolata L. In moorland localities in Scotland (Dumfries, Dunbarton, Lanark, Angus, Inverness and Aberdeen), and also from Co. Cavan in Ireland. VI-VII. N. and subalpine Europe

- ♂ and ♀ *obsoleta* Klug. Antenna variable in form but normally with apical segment about twice as long as broad. Mesopleura and mesosternum mainly yellowish green with a black subvertical stripe on the pleura, which is dull and coriaceous above. Penis valve with acute apex (fig. 335). 9.5-13 mm. In N. Britain a form with antennae short as in *obsoleta* occurs apparently as an aberration.



Figs. 335, 336.—Penis valve, (a) from above, (b) from the side, in : 335, *Tenthredo mesomelas*; 336, *T. mioceras*.

Larva probably polyphagous; recorded from Arctium lappa L. and Polygonum persicaria L. (but see under mioceras). Very common and almost generally distributed throughout Britain and Ireland. V-VII. All Europe with Asia Minor and the Caucasus, N. Asia to Japan

♂ and ♀ *mesomelas* L.

KEY TO SPECIES OF D GROUPS (*arcuata*, etc.).

- 1 Head never strongly widened behind the eyes; if slightly widened then much more richly marked with yellow; often smaller 2.
- Large (11-13 mm.) very dark species with head strongly widened behind the eyes; almost entirely black all over except for the more or less yellowish-white hind margin of the pronotum, tibiae and apical margins of tergites 3-4 or 3-5. Wings infusate, especially at their apices. 11-13 mm.

Larva on Sonchus arvensis L. Found by collectors in the early 19th century near Dover and at Darenth Wood, Kent, and also near Bristol. The only recent records are of those collected probably during the early 20th or late 19th century by E. B. Nevinson at Wicken Fen, Cambs. (Benson, 1932, in J. S. Gardiner's Natural History of Wicken Fen 6 : 545); and possibly the species still occurs there. ? VII. All Europe, Caucasus and Siberia

♂ and ♀ (= *tenula* Scopoli, Cameron and *vidua* Rossi, Cameron) **rossii** Panzer.

- 2 (1) Head above shining and only sparsely punctured on the frons and inner orbits; post-occipital carina obsolete behind post-ocellar area.....3.
 - Head above copiously punctured or coarsely coriaceous on the frons and inner orbits; post-occipital carina often well developed and at least indicated as a sharp angle behind the post-ocellar area.....4.
- 3 (2) 1st antennal segment with a black fleck on the outer side; tegula entirely yellow; swollen apex of costa piceous and stigma piceous with a yellow base; hind tibia black-tipped apically in both sexes; ♀ with 5 tergite entirely yellow. Mesepisternum dull with very fine close punctures. Smaller species (8.5-9.5 mm.).
Larva unknown. Local, S. of the Wash/Severn line, mostly on Chalk: Glos., Dorset, Hants., Sussex, Surrey, Kent, Bucks., Herts. and Suffolk. V-VI. C. and S. Europe to Caucasus (†Morice, 1912, Ent. mon. Mag. 48: 158).....♂ and ♀ distinguenda (R. v. Stein).
 - 1st antennal segment entirely yellow; tegula only margined with yellow in front; swollen apex of costa reddish-brown and stigma reddish-brown with a yellow base; hind tibia black-tipped apically in ♂, but reddish-brown tipped in ♀; ♀ with 5th tergite yellow at base and black at apex (unlike any other species in this group). Mesepisternum with shining interspaces between the fine but shallow punctures. Larger species (9-11 mm.)
Larva on Hypericum perforatum L. Local in S. England, mainly on chalk downlands and heaths: Hants., Sussex, Surrey, Kent, Bucks. and Herts. VI-VIII. C. and S. Europe and Asia Minor
 ♂ and ♀ (= *cingulum* Klug) **amoena** Gravenhorst.
- 4 (2) Flagellum of antenna entirely black. Fore wing with posterior half of subcosta as well as medius piceous.....5.
 - Flagellum all or mostly reddish or yellow. Subcosta and medius of fore wing entirely yellow. Normally large species 11-15 mm. Wings yellowish with a brownish smudge in the radial cell of the fore wing; tibiae and tarsi yellow with reddish-brown apices.
Larva on Scrophularia aquatica L. and nodosa L. and Verbasum nigrum L. Britain N. to Roxburgh and Dumfries, common in S. VI-VIII. All Europe to Asia Minor and Caucasus.....♂ and ♀ scrophulariae L.
- 5 (4) Fore wing yellowish-hyaline with a brownish smudge between the stigma and the apex of the wing. Yellow bands on tergites not generally broadening laterally; the sternites are usually entirely black in both sexes with at most pale apical margins at sides only.....6.
 - Fore wing uniformly hyaline or yellowish-hyaline. Yellow bands on hind margins of tergites broadening laterally; underside of ♂ entirely yellow and in the ♀ with pale apical margins to the black sternites (*arcuata*-complex; only ♀ of this complex are separable into species at present).....9.
- 6 (5) Metapleura and often also scutellum yellow marked. Larger species (9-12 mm.).....7.
 - Metapleura and scutellum entirely black. Smaller species (8-10 mm.). Yellow are: the 2 basal segments of the antenna, the edge of the pronotum, the tegula, apex of 1st tergite, whole of 5th and more or less apex of abdomen from 7th tergite; legs yellow with femora and apex of hind tibia in ♂ black, but in ♀ apex of hind tibia and tarsi in both sexes are reddish-brown; stigma in fore wing yellow with a piceous apex.
Sparingly in England S.E. of Wash/Severn line, mainly on dry heaths and chalk downs: Devon., Glos., Wores., Hants., Surrey, Essex, Suffolk, Herts., Bucks., Oxford. V-VI. C. and S. Europe
 ♂ and ♀ (= *quadricinctus* auctt. nec Uddmann) **zona** Klug.
- 7 (6) Tegula black; at least base of tibiae and trochanters yellow; infuscation at apex of fore wing not sharply defined and spreads over radial, 2nd and 3rd cubital and 2nd apical cells. Malar space shorter than 2nd antennal segment in ♀ and less than half 2nd antennal segment in ♂. Head and thorax heavily punctured but shining between the punctures. Smaller insects (9-11 mm.).....8.
 - Tegula at least reddish-yellow at the edges; trochanters, tibiae and tarsi reddish-brown; infuscation at the apex of the fore wing covers only the radial cell and the upper edge of the cubitals and is sharply defined. Malar space is as long as the 2nd antennal segment in the ♀ and more than half as

long as this in the ♂. Head and thorax dull with very dense punctures and scarcely any shining interspaces. Larger insects (11–12 mm.)

Larva on *Viburnum* but also recorded from *Fraxinus*, *Jasminum*, *Ligustrum*, *Lonicera*, *Symphoricarpos* and *Syringa*. Throughout Britain to the Orkneys (C. J. Wainwright, 1945) sparingly. V–IX. All Europe to Asia Minor and Caucasus, and Siberia. . . ♂ and ♀ (= *tricinctus* Fabricius) **vespa** Retzius.

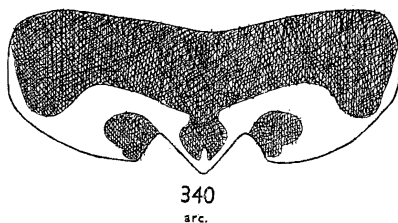
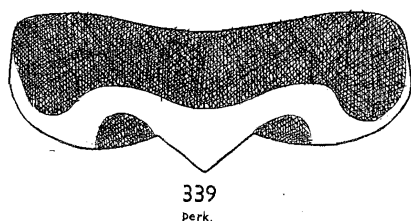
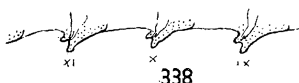
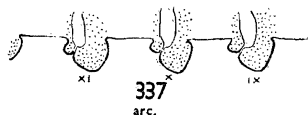
- 8 (7) Hind tarsus black at least apically in both sexes; apex of tibia black in ♂, and reddish-brown in ♀.

Larva on *Origanum vulgare* L., but also recorded from *Lycopus*, *Mentha* and *Plantago*. Locally abundant in England S. of the Wash/Severn line, at the edges of marshes and also on chalk downs. VII–IX. All Europe and W. Asia. . . ♂ and ♀ (= *omissus* Först., Mörice in part) **marginella** Fabricius.

- Hind tarsus, as well as apex of tibia, reddish-brown in both sexes.

Larva unknown. Recorded only from the fens and broads of Suffolk, Norfolk, Cambridge and Lincoln. VII–IX. All Europe

♂ and ♀ (= *marginellus* F., Cameron in part) **omissa** (Förster).



FIGS. 337, 338.—Portion of lower edge of saw to include 9th to 11th teeth from the apex in : 337, *Tenthredo arcuata* ; 338, *T. acerrima*.

FIGS. 339, 340.—Hypopygium to show posterior margin in : 339, *Tenthredo perkinsi*, ♀ ; 340, *T. arcuata*, ♀.

- 9 (5) 1st abdominal tergite of ♀ with the yellow band (when present at all) constricted laterally. Hypopygium of ♀ with a sharp-angled excision in the hind margin on each side of the middle (fig. 340). Hind tibia black at apex. Smaller species (8–11 mm.) ♂ with black beneath hind tarsi black at least on inner side 10.
- 1st tergite of ♀ always with a broad yellow band that is not constricted laterally. Hypopygium of ♀ evenly emarginate behind on each side of the middle (fig. 339). Hind tibia black or reddish-brown at apex. Larger species (10–13 mm.) ♂ with black beneath hind tarsi black at least on inner side 11.
- 10 (9) Saw with the ventral teeth blunt and rounded (fig. 337). Head and thorax more densely punctured, scarcely shining. Basal antennal segment in ♀, at least in S. England, usually marked with yellow.
- Larva on *Trifolium repens* L. Common throughout Britain and Ireland. IV–VI (occasionally VII and VIII). Prior to 1940 confused with the two following species (see Benson, Ent. mon. Mag. 76 : 231–51). Europe and Siberia (♂) and ♀ **arcuata** Förster.
- Saw with ventral teeth sharp (fig. 338). Head and thorax less strongly punctured and shining between the punctures. Basal antennal segment usually black, only rarely flecked with yellow. In the palest forms of this species the front and middle legs are all yellow and the hind legs have only an apical black spot on the femur, but these pale forms are more characteristic of S. Europe, though they have been found in Herts.; in the commonest British form (also characteristic of northern and subalpine Europe generally) the femora are all lined behind with black as in *arcuata*.

Larva unknown. Type: England, Herts., Tring, 25.vii.1940, 1 ♀, (R.B.B.): 4 ♂ and 70 ♀ paratypes from Cornwall to Caithness, to Outer Hebrides and Ireland to Aran Islands. VI-IX and 2 ♂ and 70 ♀ paratypes from France, Germany, Switzerland, Austria and Yugoslavia; (†Benson, 1940, l.c.) Throughout Europe

(= *arcuata* Forster in part, * *sulphuripes* Kriechbaumer, Benson, 1940 nec Kriechb.) (♂) and ♀ *acerrima* sp.n.

- 11 (9) Hind tibia of ♀ and tarsus marked with black apically; and downturned lateral portion of each tergite of ♀ entirely yellow.

Larva on *Trifolium repens* L. Common throughout Britain and Ireland. VI-IX (occasionally V-X). Prior to 1940 confused with *arcuata* (see above). (†Morice, 1919, Ent. mon. Mag. 55: 62-65)

- (♂) and ♀ (= *arcuata* Forster in part) *perkinsi* (Morice).
- Hind tibia and tarsus of ♀ marked apically with reddish-brown; black basal band on each tergite in ♀ continued on the downturned portion right to the edge of the segment.

Larva unknown. Very scarce. Single specimens from Cornwall, Devon, Hants., Sussex, Surrey, Norfolk and Lincoln. VII-VIII. C. and S. Europe and Siberia.....(♂) and ♀ *schaefferi* Klug.

Tribe Macrophyini.

Genus *Pachyprotasis* Hartig.

Over 50 species of this genus have been described, concentrated in temperate east Asia, whence only five species have spread far enough westward to reach Europe; all these five occur in Britain.

KEY TO SPECIES OF *Pachyprotasis*.

- 1 Abdomen mostly black above; stigma of fore wing mostly piceous.....2.
- Abdomen almost entirely and whole stigma of fore wing green fading to straw. Entirely green species except for the following parts, which are black: upper side of antenna, a fleck to cover the ocellar region of the head, a fleck on each of the mesonotal lobes and also the sunken parts of the thorax above, more or less spots on the middle of the basal tergites, apex of the hind femur and a line along the outside of the tibiae and tarsi. 7-9 mm.
Larva on *Mentha aquatica* L., *Alchemilla*, *Geum* and *Plantago*. Only known in Britain from the single ♀ taken in Wales, Merioneth, Fairbourne, vi.1941, by G. S. Kloet. C. Europe to E. Siberia
♂ and ♀ *nigronotata* Kriechbaumer.
- 2 (1) Underside of thorax conspicuously marked with black.....3.
- Underside of thorax entirely green except for the mesopleural groove which may be marked with black more or less. Almost the whole underside is of an evanescent green including most of the legs except the apices of the femora, rings round the hind tibia and tarsus and a line along the upperside of the front and middle tibiae and tarsi. 8-9 mm.
Larva on *Filipendula* and *Fraxinus*. Common locally throughout Britain and Ireland. VI-VII. N. and C. Europe including the Iberian Peninsula, Siberia to Japan and China.....♂ and ♀ *antennata* (Lepelletier).
- 3 (2) Tergites with white apical margins conspicuously thickened on the mid-dorsal line or else the hind tibiae and femora are conspicuously red; mesopleura may have dark margins and a dark longitudinal sterno-pleural band but no median suberect black stripe.....4.
- Tergites without median white apical margins, or these are very narrow and not thickened on the mid-dorsal line and the hind legs are not marked with red; mesopleura with a suberect median black stripe in addition to the black margins and black sterno-pleural longitudinal band. Black and white species; head dull with coriaceous sculpture and punctures. 7-8 mm.

* Through the kindness of Dr. Kühlnhorn of München I have recently been able to see Kriechbaumer's types: *Allantus sulphuripes* Kriechb., 1869 = *Tenthredo beaumonti* Benson, 1950, syn.n.

* *Pachyprotasis* *perkinsi* is a colour variant of *Schaefferi* Klug

Larva has been recorded on Betonica, Scrophularia, Solidago and Fraxinus. One of the commonest of British sawflies, and almost generally distributed throughout Britain to the Orkneys and in Ireland. V-VII. All Europe to Caucasus, Siberia to China and N. America ♂ and ♀ rapae (L.).

- 4 (3) Frons shining with only faint coriaceous sculpture. Femora black and white in both ♂ and ♀. Smaller species (6.5-7.5 mm.).

Larva recorded from Scrophularia, Solidago and Senecio. Very scarce, recorded from Devon, Dorset, Sussex, Kent, and Norfolk, in England; and Perth and Inverness in Scotland. V-VI. C. and N. Europe, Siberia, China and Sakhalin ♂ and ♀ simulans (Klug).

- Frons dull with fine coriaceous surface between the dense shallow punctures. Femora and most of hind tibia red in ♀, though in the ♂ they are only black and white. Larger species (8-9 mm.)

The larva has been found feeding on potatoes (Solanum tuberosum L.) in S.W. England, as a pest, especially when these grow mixed with cereals (Edelsten, 1942, Ent. mon. Mag. 78: 292); on the Continent it feeds also on Digitalis lutea L., and so perhaps has a wide foodplant range. Britain locally N. to Inverness, commoner in the S. V-VI. N. and C. Europe, Siberia to China and Japan ♂ and ♀ variegata (Fallén).

Genus *Macrophya* Dahlbom.

Of over 180 described species less than 30 occur in Europe, and only 9 of these in Britain, where they are concentrated in the South-east. They are absent from Ireland except for the species *M. punctum-album*, of which a few specimens have lately been taken in Co. Dublin, where it may well have been introduced, as it has been into North America.

KEY TO THE SPECIES OF *Macrophya*.

- 1 Hind femur partly red, or else the front and middle femora are entirely yellow 2.
- Hind femur not marked with red and all femora at least partly infuscate . . . 4.
- 2 (1) Front and middle femora and (except at extreme apex) tibiae entirely yellow. Eyes converge strongly in front, where they are at least as close together as the width of the clypeus in the ♀ and closer than this in the ♂, and the malar space is less than the diameter of the front ocellus 3.
- Front and middle femora and tibiae black or fuscous in part. Eyes converge less strongly in front, where in the ♀ they are further apart than the width of the clypeus and in the ♂ about as far apart as this length; malar space of ♀ as long as diameter of front ocellus. Very conspicuous with its red hind femur and in the ♀ with its white scutellum, white flecks on the sides of the abdomen and white marked hind tibia; the ♂ lacks these white markings but is very rare. The species is mainly parthenogenetic. 7-8 mm.
The larva feeds on Fraxinus excelsior L. and Ligustrum vulgare L.; on the former it sometimes occurs locally in such enormous abundance, especially in E. and S.E. Europe, as to destroy their value as shade trees. Britain local N. to Roxburgh, commoner in the S.; Ireland, Co. Dublin only, probably introduced. V-VI. All Europe to Caucasus; also in eastern States of N. America probably by introduction ♂ and ♀ punctum-album (L.).
- 3 (2) Stigma of fore wing yellow; hind femur red from the apex though more or less black at the base, especially in the ♂; abdomen black with a red or orange band covering usually 3 (♂) or 2 (♀) segments, though the red band may be obsolete; in the ♀ there are usually white marks on the sides of tergites 1, 6, and often 5 and 7, as well as the middle of 10. 7-11 mm.
Larva undescribed. Locally abundant in England, S.E. of Humber/Severn line, in marshes and scrub. V-VI. All Europe to Asia Minor and Caucasus
♂ and ♀ (= *haematopus* Panzer, *Cameron nec Panzer rufipes* (L.).
- Stigma black; hind femur yellow from the base though more or less black from the apex, especially in the ♂; abdomen all black in the ♂ or with pale apical margins to the tergites, and in the ♀ with 1st tergite all yellow, 5th and 6th with broad yellow bands broken medially, 7th and sometimes 4th with side flecks and 9th yellow above. 9-11 mm.

Larva on Rubus caesius L., etc. Locally common mostly S. of the Wash/Severn line in England, but extends N. to Roxburgh, Berwick and Lanark in Scotland and even to the Orkneys, where it was found by C. J. Wainwright in 1945. V-VI in S. but VIII-IX in Orkneys. All Europe, N. Africa, Asia Minor and Caucasus

- ♂ and ♀ (= *rustica* L. auctt. nec L.) **montana** (Scopoli).
- 4 (1) Head and mesonotum with the surface shining either on large impunctate areas or else between the coarse punctures. Abdomen black with or without pale lateral flecks. Wings subhyaline. Mesepisternum without a small apical appendage. Smaller species under 10 mm. 5.
- Head and mesonotum dull with coriaceous surface sculpture between the very dense fine punctures. Abdomen black or red-girdled. Wings flavescenscent or infuscate. Mesepisternum with a small oval apical appendage. Large species, 10-12.5 mm. 7.
- 5 (4) Fore wing with a black stigma and species either over 8 mm. or with abdomen entirely black at least at the sides. 6.
- Stigma pale and translucent in the middle though dark margined; abdomen with lateral apical margins of tergites and apical margins of sternites white; small species, 6-8 mm. Black species with white on the following: labrum, front of clypeus, edge of pronotum, tegulae, trochanters and part of tibiae together with flecks on apical margins of tergites laterally and sternites. Head shining with sparse shallow punctures.

Larva on Geranium sylvaticum L. Local and scarce; has been found in Aberdeenshire, Inverness, Perth and Kirkcudbrightshire in Scotland; in England has been found in Yorks. (Grassington by J. Wood in 1930, and Upper Teesdale 1939, R. B. B.) VI. N. and subalpine Europe

- ♂ and ♀ **albipuncta** (Fallén).
- 6 (5) Smaller species (8-10 mm.) and head with dense coarse punctures above. Mainly black with more or less white on the labrum and clypeus, coxae, trochanters and apices of femora, tibiae and tarsal segments.

Larva on Sambucus nigra L. England N. to Yorks. and Cheshire, locally abundant in the S. V-VII. C. Europe to the Caucasus

- ♂ and ♀ **ribis** (Schrank).
- Larger species (10-11 mm.) and head above on the frons and temples almost impunctate. Coloured much as the former but the edge of the pronotum and the scutellum and the 1st tergite are sometimes also touched with white.

Larva usually on Sambucus nigra L., but sometimes on Valeriana officinalis L. Common throughout the whole of Britain from Cornwall to Sutherland. IV-VII. All Europe to Caucasus and N. Persia, also W. Siberia

- ♂ and ♀ **albicincta** (Schrank).
- 7 (4) Stigma of fore wing black; abdomen black, with or without a red girdle, but without lateral pale flecks on any of the subapical tergites. 8.
- Stigma yellowish and translucent in the middle; abdomen black with pale lateral flecks to some of the subapical tergites. Sexes differently coloured: ♀ with flavescenscent wings and yellow costa, subcosta and stigma of fore wing, and body black with yellowish white on pronotum, scutellum, front and middle tibiae and tarsi, base of hind coxa and apex of hind tibia; ♂ with pale brownish wings, and though the stigma is yellow within, its marginal vein, together with the costa, subcosta and all the rest of the venation is piceous, and the body has less yellowish white, which is much reduced on the pronotum, lacking on the scutellum and hind tibiae and much reduced on the sides of the tergites.

Larva on Cyperaceae (Carex vesicaria L., etc.) and various Gramineae. England N. to Durham, S. of the Wash/Severn line almost generally distributed and very common in marshy places. V-VII. All Europe and Caucasus, and Siberia. ♂ and ♀ duodecim-punctata (L.).

- 8 (7) Hind coxa conspicuously flecked with white; abdomen with the red girdle often more or less infuscate in the middle above, or even entirely absent in ♂.

Larva undescribed. Very local mostly S. of the Wash/Severn line in England but extends as far N. as Roxburgh and Berwickshire. V-VII. All Europe with Asia Minor and Caucasus. ♂ and ♀ blanda (Fabricius).

- Hind coxa not flecked with white; abdomen with the red girdle very rarely obsolete in either sex.

Larva on Potentilla reptans L. Britain N. to Roxburgh; very common in England S. of the Wash/Severn line. V-VII. All Europe and Caucasus to N. Persia, and Siberia. ♂ and ♀ (= neglecta Klug) annulata (Geoffroy).

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- zona* (*Tenthredo*), 126

SUPPLEMENT TO SECTION (b).

- Page 53, line 13 up, after " stigma " add " (except in *Eriocampa*) " .
 ,, line 10 up, for " is crossed " read " is often crossed " .
 Page 57, line 21, for " five " read " four " .
 ,, line 31, add " Also Wales, Radnor and Ireland. " .
 Page 57, line 16 up, delete " Only 6 specimens ever recorded. " .
 ,, line 15 up, add " Berwicks., Earlstone, 1 ♀, v. 1890 (J. Clark) " .
 ,, line 11 up, before " *exsectus* " add " *mixta* Klug, Cameron *nec.* Klug " .
 Page 58, line 10 up, delete " 5 " and add the second half of couplet 5 (4)
 from page 59 ending with " ♂ and ♀ *macula* (Klug) " .
 Page 59, delete lines 1-9, being first half of couplet 5 (4).
 Page 61, line 18, for " *C. and N. Europe* " read " *Holarctic* " .
 ,, lines 27-28, for " *C. and N. Europe* " read " *Arctic* " .
 Page 64, line 6, after " *Siberia* " add " and *N. America* " .
 ,, line 20, after " *Siberia* " add " Also *N. America* " .
 ,, lines 22-23, delete " *E. of Lake Baikal . . . common there* " .
 ,, line 36, after " *Caucasus* " add " and *E. to N. America* " .
 Page 65, line 4, for " *saxatilis* " read " *yukonensis* " .
 ,, line 17, for " *undescribed* " read " on *Juncus gerardii* Loïs " .
 ,, line 29, after " *Wicklow* " add " *Co. Cavan* " and after " *Yorks.,*"
 add " *Cothill Bog, Berks.* " .
 ,, line 10 up, for " *saxatilis* Hartig " read " *yukonensis* Norton " .
 Page 68, fig. 199, for " *brevi* " read " *lio* " .
 ,, bottom line, for " *brevitarsus* " read " *liogaster* " .
 Page 70, line 2, after " *Scotland* " add " *Staffs.: Madeley and Hereford:*
Moccas Park (H. W. Daltry) " .
 ,, line 13, after " *Harwood* " add " Also found in *Arran (W. D.*
Hincks, 1953) " .
 ,, line 22, add " and *N. America* " .
 ,, line 29, for " *Not yet recognized outside Britain* " read " *Finland* " .
 ,, line 24 up, after " *Britain* " add " and *Ireland* " .
 ,, line 15 up, after " *Britain* " add " and *Ireland* " .
 ,, line 12 up, after " *south.* " add " also *Japan and Kurile Is.* " .
 Page 71, line 9, after " *Britain* " add " and *Ireland* " .
 ,, line 15, after " *Britain* " add " and *Ireland* " .
 ,, line 4 up, for " *brevitarsus* Hartig " read " *liogaster* Thomson (*cf.*
couplet 14) " .
 ,, line 5 up, delete and insert " ♀ (= *varispinus* Hartig, Cameron,
rugulosus Dalla Torre and *brevitarsus* Hartig, Benson *nec*
Hartig) " .
 Page 72, line 8 up, for " *saxatilis* Hartig " read " *yukonensis* Norton " .
 Page 76, line 9 up, for " *brevitarsus* Hartig " read " *liogaster* Thomson (*cf.*
couplet 14) " .
 Page 79, line 6, for " 34 " read " 33, " and for " 93 " read " 92 " .
 ,, line 9, for " 2 " read " 3 " .
 ,, lines 20-32, omit whole couplet (*cf.* p. 109).

- Page 83, line 13 up, for "*Larva unknown*" read "*Larva on Sedum album L.*" and delete "*Only 4 ♀ British records known*".
- ,, line 12 up, before "*Bucks.*" read "*Dorset: Wimborne, 1954 (P. Harwood); I. of Wight, East Cowes, 1953 (J. W. Saunt) and Oxford, reared from larvae, 1956 (G. R. Gradwell)*".
- Page 85, line 29, add "*and Glaux maritima L.*".
- ,, line 31, after "*Kerry*" add "*and Cavan*".
- Page 91, line 21, add "*and Salix*".
- ,, line 23, after "*Herts.*" add "*Beds.*".
- ,, bottom line, delete "*♂ and*" and add "*Parthenogenetic species*".
- Page 94, line 6, after "*Essex*" add "*and has found it at Wimborne, Dorset. Dr. Chambers has found it at Culworth, Beds., 1952*".
- Page 95, Transfer lines 17-33 ("*Tribe Eriocampini*") to p. 112, before "*Tribe Perineurini*".
- Page 100, line 21, after "*England*" add "*from Radnor, Wales;*".
- ,, line 13 up, add "*(= geniculata Stephens)*".
- ,, line 6 up, before "*Somerset*" add "*Dorset, Parley, 1953 (P. Harwood)*".
- Page 101, line 10, after "*Caucasus*" add "*and Japan*".
- ,, line 12 up, after "*Herts.*" add "*and at Byton, Hereford. In Wales near Presteigne, Radnor, 1953*". . .
- Page 102, line 18, after "*England*" add "*and Wales*".
- ,, line 20, after "*Caucasus*" add "*and Japan*".
- Page 103, line 4 up, for "*Larva unknown*" read "*Larva on Rubus fruticosus L.*".
- Page 104, line 5 up, after "*Ireland*" add "*The very rare ♂ has been found in S. Devon, at Mardon Common and Bagtor, Dartmoor, 1951-52 (L. H. Woollatt)*".
- Page 108, line 5, for "*instead*" read "*also*".
- ,, line 11 up, delete "*Only known from 2 specimens*" and add "*Staffs.: Maer Woods, 1936 (H. W. Daltry) and Herts.: Bricket Wood, 1950 (R. B. B.)*".
- ,, line 10 up, after "*Germany*" add "*and N. America*".
- Page 109, lines 21-22, for "*One species occurs in Britain . . .*" read "*Two species occur in Britain, one of them . . .*"
- ,, line 25, for "*the species is . . .*" read "*the species are . . .*"
- ,, line 25, *et seq.* after "*. . . parthenogenetic.*" insert the following:
- " A. ♀ antenna 13-16-segmented, at least twice as long as breadth of head. Basal sector of M in fore wing almost angled at base, then straight in apical two-thirds. Antennal segments 3 : 4 as 1 : 2 : 1.
" Mines in leaves of ? Geranium sylvaticum L. etc. Scotland: Inverness., Kincaig, 2 ♀, v. 1952, and England: Yorks., near Austwick, 3 ♀, vi. 1955 (R. B. B.) († Benson, 1953, Proc. R. ent. Soc. Lond. (B) 22 : 136-8). Mines in leaves of Geranium sylvaticum found by L. Parmenter in Glen Lyon, Perth., vii. 1955, may belong to the same species. Norway, Sweden and Switzerland
 ♀ *monilecornis* Dahlbom
- " B. ♀ antenna 11-12-segmented, less than one and a half times breadth of head. Basal sector of M in fore wing arcuate throughout, though more strongly at base. Antennal segments 3 : 4 as 1 : 6 : 1."
 (Biological data as before.)

Page 109, line 5 up, under "KEY TO GENERA OF TENTHREDININAE" insert another couplet thus :

- " 1a Anal cell of fore wing either medially constricted or with short erect cross-vein and M joins Sc + R about as far from junction of Rs + M as Rs + M is from base of stigma (figs. 137-8)..... 1
 " - Anal cell of fore wing with oblique cross-vein and M joins Sc + R much closer to junction of Rs + M than distance between Rs + M and base of stigma (cf. figs. 142-3)."

Insert here lines 20-32 from page 79 but ending :

". . . 1 species. (Eriocampini) *Eriocampa* Hartig, p. 112."

Page 112, Before "Tribe Perineurini" insert "Tribe Eriocampini . . ."
 (lines 17-33 from p. 95).

Page 115, line 10 up, for ". . . 4" read ". . . *nassata* L." and eliminate couplet 4 (3) continued on to page 116.

Page 116, line 17 up, for "♀ *friesei* Konow" read "form of ♀ *nassata* L."

Page 117, line 12 up, for "only 3" read "very few".

" line 11 up, before "Surrey" add "*Berks. : Silwood Park, vi.1953 (A. Woods),, vi.1954 (J. C. Felton) and Cothill Bog, vi.1956 (K. G. V. Smith)*".

" line 7 up, for "f. *flaveola*" read "flaveola" and delete "*The two were*".

" line 6 up, delete "*considered to be distinct species but . . .*".

" line 4 up, delete "flaveola".

" line 3 up, for "E. *flaveola flaveola*" read E. *flaveola*".

" line 2 up, after "occur." add "*For differences between these two species see Benson, 1954 (Bull. Brit. Mus. (Nat. Hist.) (Ent.), 3 (7) : 285)*".

" bottom line, delete "*flaveola* L." and "flaveola".

Page 122, line 21, for "*Larva unknown*" read "*Larva on Gramineae (Calamagrostis epigejos (L.) Roth. and Dactylis glomerata L.)*".

Page 122, line 34, for "*All Europe and eastwards to E. Siberia*" read

"*T. celtica Benson (1953, Ent. mon. Mag. 89 : 275-7) forms with T. temula Scopoli an Atlantic-continental species pair and replaces it in the British Isles, Spain and Italy ; T. temula occurs throughout the rest of temperate Europe and Siberia to E. Asia. T. celtica is more extensively marked with yellow at the apex of the abdomen than temula and has a more prominently convex scutellum, forming almost a right angle in profile.*"

line 35 after ". . . nec L." add "*temula Scopoli Brit. auctt. nec Scopoli*" and for "*temula Scopoli*" read "*celtica Benson*".

Page 123, line 24, add "Antenna occasionally all black".

" line 5 up, after "*Westmorland*" add "*Occurs also in Staffordshire and Northants.*".

Page 124, line 5, for "*Dumfries*" read "*Midlothian*".

Page 125, line 2, add "*and N. Korea*".

" line 19 up, add "*Ranunculus repens L. and Senecio fuchsii Gmelin.*".

Page 127, line 20 up, insert "♂ with brush beneath hind tarsus brown."

" line 16 up, insert "♂ with brush beneath hind tarsus black at least on inner side."

- Page 128, top line, for "*Larva unknown*" read "*Larva on Lotus corniculatus L.*".
- Page 128, line 10, before "*Larva . . .*" insert "Presumed now to be only a colour variant of the following species."
- line 13, before "**perkinsi** (Morice)" insert "**schaefferi** ab."
- Page 129, top line, after "*Scrophularia*" add "*Antirrhinum*".
- Page 130, line 28, for "8-10 mm." read "7-10 mm."
- line 34, for "10-11 mm." read "8-11 mm."

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