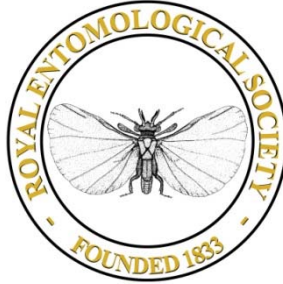


Royal Entomological Society



HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

To purchase current handbooks and to download
out-of-print parts visit:

<http://www.royensoc.co.uk/publications/index.htm>



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 2.0 UK: England & Wales License](https://creativecommons.org/licenses/by-nc-sa/2.0/).

Copyright © Royal Entomological Society 2012

ROYAL ENTOMOLOGICAL
SOCIETY OF LONDON

Vol. X. Part 1.

HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



DIPTERA

SYRPHIDAE

By

R. L. COE

LONDON
Published by the Society
and Sold at its Rooms
41, Queen's Gate, S.W. 7

25th August, 1953

Price ~~37s. 6d.~~ 23.6d.

Accession No.	4966
Author	Coe R L
Subject	DIPTERA

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 : Ichneumonidea.
VIII. Hymenoptera : Cynipoidea, Chalcidoidea, and Serphoidea.
IX. Diptera : Nematocera and Brachycera.
X. Diptera : Cyclorrhapha.

Volumes II to X will be divided into parts of convenient size, but it is not possible to specify in advance the terms of the parts of the series.

Co
each p
much
it is e
Pa
availa
Or
at the
Th
of init

and
ough
ted,
ome
strar
cost

ACCESSION NUMBER

**British Entomological & Natural History
Society**

c/o Dinton Pastures Country Park,
Davis Street, Hurst,
Reading, Berkshire
RG10 0TH

Presented by N. A. CALLOW

Date OCT 2010

.....
Librarian

REGULATIONS

- 1.- No member shall be allowed to borrow more than five volumes at a time, or to keep any of them longer than three months.
- 2.- A member shall at any time on demand by the Librarian forthwith return any volumes in his possession.
- 3.- Members damaging, losing, or destroying any book belonging to the Society shall either provide a new copy or pay such sum as the Council shall think fit.

DIPTERA

Family SYRPHIDAE

By R. L. COE

CHARACTERISTICS.

FLIES of the family SYRPHIDAE are commonly known as "Hover-flies" and "Flower-flies," the former popular name having reference to their frequent mode of flight and the latter to their fondness for flowers. The males are habitual hoverers, often appearing almost motionless in the air, although capable of exceedingly swift movement when disturbed. In body coloration

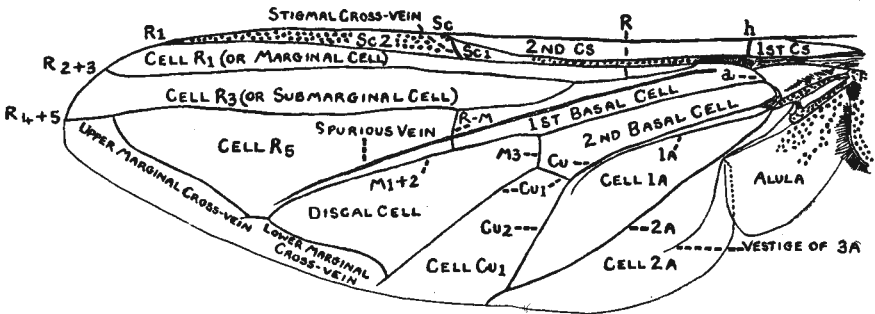


FIG. 1.—Wing of a Syrphid, showing notation of veins. (h = humeral cross-vein. 1st CS = first costal cell. 2nd CS = second costal cell. SC = subcostal vein. SC1 = first section of subcostal cell. SC2 = second section of subcostal cell. 1A = first anal vein. 2A = second anal vein. 3A = third anal vein. a = arculus.)

SYRPHIDAE are often entirely black or dark (e.g., *Cheilosia* and *Pipizella*), but in many genera the thorax bears yellow or orange stripes or other markings, and the tergites are ornamented with more or less conspicuous white, yellow or orange lunules, spots or bands.

Scientifically, SYRPHIDAE may be distinguished from other Cyclorrhaphous families of Diptera by the following combination of characters: wings (fig. 1) with cell R₅ (first posterior) closed by the bending forward of the upper marginal cross-vein, which runs almost parallel to the wing margin; discal cell closed at apex by the lower marginal cross-vein, which also runs more or less parallel to the wing margin; a spurious (free) vein present, passing through the first basal cell and cell R₅, being really a vein-like thickening of the wing membrane. In Britain there are 234 known species of SYRPHIDAE, and 13 named varieties of these. The smallest British species are *Paragus tibialis* Fallén (range of wing-length 3-4.5 mm.), *Neoscasia podagrica* Fabricius (range of wing-length 3-5 mm.) and *N. dispar* Meigen (range of wing-length 3-5.25 mm.), while the largest is the fine black and yellow fly, *Volucella zonaria* Poda (range of wing-length 15.5-19.5 mm.).

LIFE-HISTORY.

The eggs of SYRPHIDAE are chalky-white in colour, and the chorion (shell) bears a typically reticulate pattern. In the species with carnivorous larvae the eggs are usually glued singly on plants or trees amongst or near the prey, while those whose larvae have other feeding habits usually deposit the eggs in masses on or near the larval habitat. A female of *Rhingia campestris* Meigen was observed to deposit within five minutes an aggregate of 108 eggs on clover-leaves overhanging ox-dung (Coe, 1942); the eggs (fig. 2a) were deposited side by side in close batches. The feeding-habits of the larvae of SYRPHIDAE are varied, some being carnivorous, others phytophagous, and others acting as scavengers in various media. As the early stages of fourteen of the fifty British Syrphid genera are practically unknown, there is obviously much scope for careful and energetic field study.

In the carnivorous class the known larvae of various genera (e.g., *Syrphus* and *Sphaerophoria*) devour Aphids and other Homoptera, while the larvae of *Xanthandrus comtus* Harris suck the juices of the larvae of a Eucosmid moth (Lucchese, 1942). Prominent among the phytophagous kind are the larvae of *Cheilosia*, which feed in the stems and roots of various plants, also in fungi. The habitats of the scavenging larvae are very varied, some living in damp or wet rot-holes of trees (e.g., *Xylota*, *Mallota* and *Pocota*), others in dung (e.g., *Rhingia*), others in foul water or liquid manure (e.g., *Eristalis* and *Helophilus*), while the larvae of *Volucella* live in the nests of *Bombus* and *Vespa* and those of *Microdon* in the nests of ants.

The aquatic larva of *Chrysogaster hirtella* Loew pierces the roots of the grass *Glyceria aquatica* Smith by means of the spine-like hind spiracles and so obtains a supply of oxygen from the intercellular spaces of the plant (Varley, 1935 and 1937). Another interesting larva (fig. 2e) is that of *Callicera rufa* Schummel, which leads a subaqueous existence in rot-holes in the Scots Pine (Coe, 1938). The remarkably well-developed trachea enable the "short-tailed" larva to live in this manner.

The larva (fig. 2b, c) of *Rhingia campestris* Meigen lives in ox-dung, and the formidable segmental spines of the third-stage larva become so closely coated with fragments of the dung that the only visible part is the tip of the posterior respiratory process (Coe, 1942).

In SYRPHIDAE the puparium is formed, as in other Cyclorrhapha, from the hardened, inflated larval integument, which encloses the true pupa. The shape is variable, being pear-shaped and stream-lined in the aphidophagous species, and more barrel-shaped in other forms, e.g., *Rhingia* (fig. 2d) and *Xylota* (fig. 2f). The fully formed adult emerges by pushing off the lid-like operculum at the anterior end of the puparium.

HABITS.

Adult SYRPHIDAE frequent various flowers, from which they suck the nectar and transfer or consume the pollen. In early spring the newly opened catkins of Sallow attract many SYRPHIDAE, and the male (pollen-bearing) flowers appear to be more attractive than the female kind. Alderson (1909 and 1910) published some interesting observations on Syrphid visitors to Sallow. Ilse (1949) has demonstrated by experiment that *Eristalis tenax* Linnaeus shows a colour discrimination in selecting flowers, and that it seems to prefer yellow blossoms.

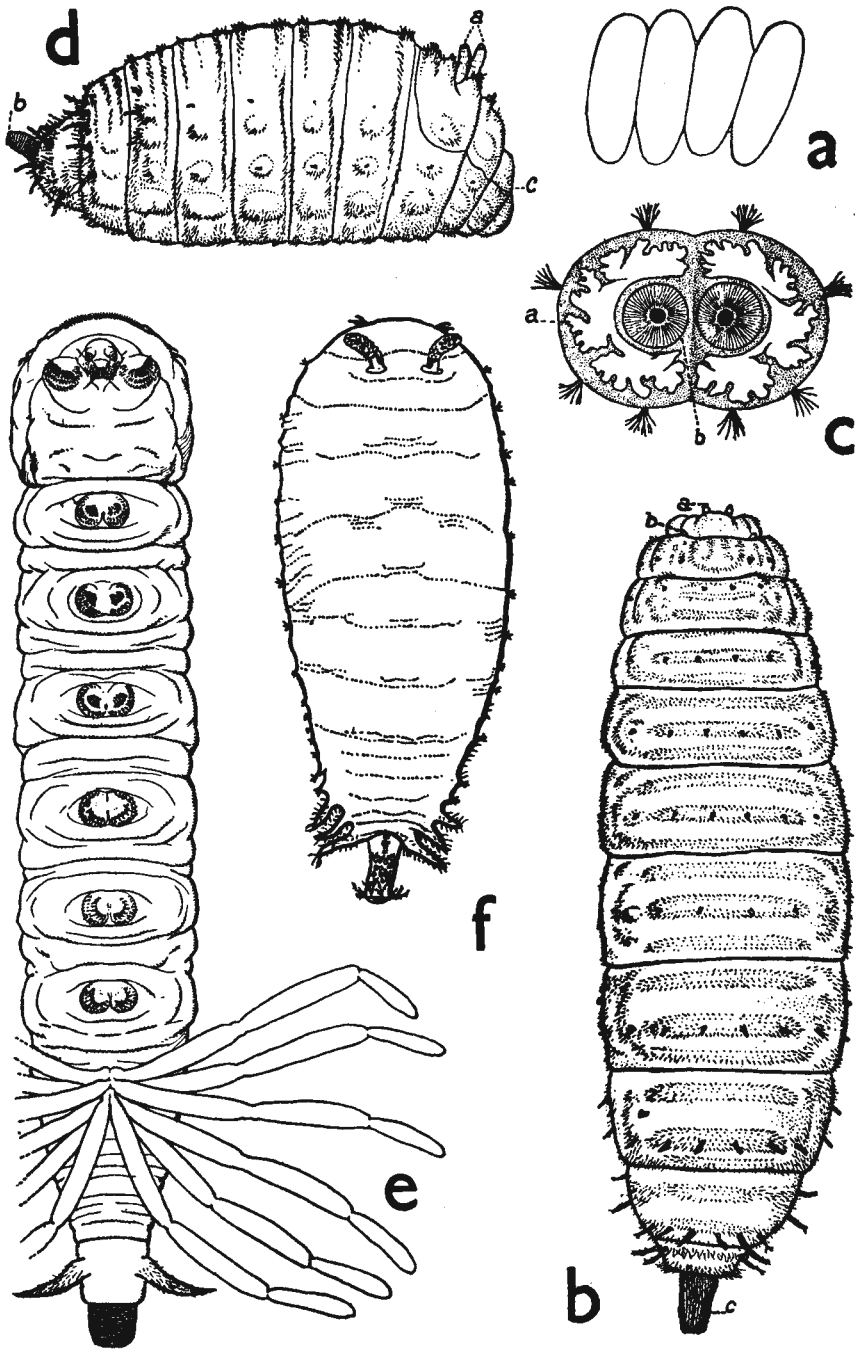


FIG. 2.—Early stages of SYRPHIDÆ. a-d. *Rhingia campestris*. a. Eggs in outline. b. Mature third-stage larva (a = antenna, b = anterior respiratory cornu, c = posterior respiratory apparatus). c. Posterior respiratory process of third-stage larva (a = spiracular opening, b = circular plate). d. Pupa (a = pupal respiratory cornua, b = larval posterior respiratory apparatus, c = operculum). e. *Callicera rufa*, larva, showing extended anal gills. f. *Xylota nemorum*, puparium. (All after Terzi, except f.)

There is no doubt that some species of SYRPHIDAE over-winter in the adult stage. A living male and female of the common Drone-fly, *Eristalis tenax*, were found on 1st January beneath the dried outer scales of stored onions (Timms, 1946), while living specimens of the same species were found sheltering in a crevice of exposed chalk in November (Ellis, 1937). Morley (1941) reported the discovery of a cluster of *Eristalis aeneus* Scopoli under a steel helmet inside a Suffolk church in November. Goffe (1934) observed numbers of *Syrphus balteatus* Degeer flying in warm sunshine on 17th February, and from the dull condition of captured specimens these had evidently over-wintered as adults.

COLLECTING AND PREPARATION.

While the general technique for collecting adult Diptera (see Oldroyd, 1949) applies to SYRPHIDAE, the following hints should prove useful to students of the family :

For killing SYRPHIDAE, the present writer uses an ordinary cyanide bottle or tube, and pins the insects while in the field. Other killing agents that have been found satisfactory by collectors are sulphur dioxide gas or a little ethyl acetate on filter-paper, the former being useful for retaining the bright yellow colours of *Chrysotoxum*, etc., and the latter having the advantage of keeping the specimens in a relaxed condition.

In pinning SYRPHIDAE, stainless steel pins of sufficient thickness are recommended, but these *must* be of good quality. Poor quality pins are extremely dangerous, as they are likely to bend at the slightest pressure with probable damage to the specimen. It is sometimes necessary to dissect, and mount the male genitalia in order to determine a specimen accurately. Edwards (1929 : 282) gives a suitable technique for preparing such mounts. In mounting the comparatively bulky genitalia of SYRPHIDAE, however, I have found that to ensure sufficient depth of balsam (or other mountant) it is advisable to nick the celluloid mount at the edges and turn up a narrow strip at the sides and at the front.

Larvae are best killed by momentary immersion into very hot (*not* boiling) water, which process fully extends the specimen. The larva is then deposited on blotting-paper to absorb the surplus moisture, and preserved in a tube of 80% alcohol.

ECONOMIC.

Although a large number of SYRPHIDAE perform a useful function as larvae in devouring Aphids, among the phytophagous kinds there are several well-known horticultural pests. The latter category includes the Large Narcissus-fly or the Large Bulb-fly (*Merodon equestris* Fabricius) and the Lesser Bulb-flies (*Eumerus strigatus* Fallén and *E. tuberculatus* Rondani), all of which cause severe damage to cultivated bulbs. Another phytophagous larva that has been named as a horticultural pest is that of *Cheilisia antiqua* Meigen, which Carpenter (1913 : 96) records as a pest of *Primula* species, on the roots of which the larva feeds. Lundbeck (1916 : 126) states that the larvae of a *Cheilisia* species were destructive to the roots of Turnips.

The scavenging kinds of larvae are undoubtedly beneficial in breaking down quantities of dead animal and vegetable matter, and as adults

SYRPHIDÆ are among the principal pollinators of fruit trees, flowers and many kinds of vegetables.

MEDICAL.

The rat-tailed larvae of *Eristalis* and probably other allied aquatic larvae sometimes internally infest man, the likely source of infection being the drinking of foul water containing the eggs or young larvae. Medical opinion is that such saprophagous larvae would not attack living tissues (Cookson and Oldroyd, 1937), and they are evacuated without causing material damage to the intestine.

HISTORICAL.

It is considered that the common Drone-fly (*Eristalis tenax*) may be the mysterious "Oxen-born bee" (*Bugonia*) of the Ancients, and the "bee" observed by Samson as swarming in the body of the lion and referred to in his riddle (Judges, 14 : 14), "Out of the eater came forth meat, and out of the strong came forth sweetness." *Eristalis* larvae would certainly breed in a corrupt pool such as would form around a large carcass in an advanced state of decay, and the adult *E. tenax* closely resembles a honey-bee. Undoubtedly a putrefying carcass would not attract bees, and many explanations have been advanced to account for Samson removing honey from it.

A considerable and fascinating literature exists on this question, Osten Sacken (1894, etc.) having written on it at length.

IRISH FAUNA.

Prior to my recent visit to Dublin, only one-third of the British Syrphid fauna were recorded from Ireland, but it is now established that 134 British species out of the total of 234 occur in Ireland, i.e., more than half the British fauna. Species recorded by Haliday as Irish (*in* Walker, 1851) of which I have seen no examples from that country are as follows: *Scaeva selenitica* Meigen, *Rhingia rostrata* Linnaeus, *Brachyopa bicolor* Fallén, *Cherolsia maculata* Fallén, and *Eristalis similis* Fallén.

100% of those species that I consider as "Common and generally distributed" in Britain occur in Ireland, 76% of my "Frequent and generally distributed," and 59% of my "Uncommon and generally distributed." Further collecting of Irish SYRPHIDÆ will undoubtedly increase the list.

As there are large areas in Ireland from which no SYRPHIDÆ have been collected, in the case of species occurring there that are generally distributed in Britain the word "Ireland" has been added in brackets. When the area of occurrence in Britain is apparently limited or a species is rare there, the full data of any Irish specimens is given. I have not accepted any species as Irish unless I have examined the specimen(s) myself.

GENERAL NOTES ON THE KEYS.

1. Wing length has been measured with dividers from the basicosta to the wing-tip. Limits of wing-length do not include bred dwarfs, which are sometimes produced through deficiency in larval food or other adverse factors.

2. When facial dusting is mentioned, it should be borne in mind that this may be more or less rubbed off in worn examples.

3. Regarding the dates given as the flight period of a species, it may be generally assumed that the "peak" period of flight is about midway between the months quoted.

4. So far as possible only verified records have been included. In the case of rare species it may be taken that Mr. J. E. Collin or myself have examined the actual specimens, with the exception of a few conspicuous and easily recognised species.

5. When in doubt of the precise meaning of any specialised term used, the reader should refer to the Introduction which forms Part 1 of this volume of these Handbooks.

ACKNOWLEDGMENTS.

I am grateful to those who have allowed me to examine material from collections at institutions or from their private collections. My thanks are also expressed to Dr. B. M. Hobby, of the University Museum, Oxford, for lending me the blocks of figs. 21, 23, 25 and 43, these illustrations having already appeared in the *Entomologist's Monthly Magazine*, of which he is the editor.

Mr. J. E. Collin has kindly permitted me to copy several of his published drawings and has helped in other ways, while Mr. C. O. Hammond has generously drawn the cover illustration.

I am indebted to Dr. P. O'Connor and Miss G. Roche for permission to examine the specimens of Syrphidae in the National Museum of Ireland at Dublin, and to the Royal Irish Academy for providing a grant towards the expenses of my visit to Ireland for that purpose. Through the good offices of Mr. A. R. Waterston, O.B.E., I was permitted to study the Syrphidae in the Royal Scottish Museum.

Many of the drawings have been made by Mr. Arthur Smith, to whom I am grateful for the use of certain drawing apparatus.

KEY TO SUBFAMILIES.

(Partly based on Hull, 1949.)

- 1 Antennae elongate, at least as long as head; face strongly and evenly convex, absolutely without trace of central prominence and not at all produced at anterior oral opening; eyes widely separated in both sexes; rather large roundish flies
MICRODONTINAE (p. 88).
- Antennae usually shorter than head, or if as long, then face has an obvious central prominence and is at least slightly produced at anterior oral opening.....2
- 2 Face flat, sometimes receding, absolutely without trace of central prominence and at most only slightly produced at anterior oral opening; tergites always with three pairs of slanting whitish bars; eyes touching in the male; small narrow flies EUMERINAE (p. 89).
- Face usually well developed with a central prominence and obviously produced at the anterior oral opening, or if flat, tergites are without three pairs of slanting whitish bars (in British species).....3
- 3 Humeri wholly destitute of pile or with a few hairs only along the posterior margin; femora simple, their bases without anterior patches of stubby decumbent black spinules; bases of tibiae simple, rounded; r-m always before the middle of discal cell4
- Humeral pilose; femora frequently enlarged, their bases often with anterior patches of stubby decumbent black spinules; tibiae frequently modified; r-m either basal or distal in position.....5
- 4 Antennae usually short; if long the abdomen is not convex or emarginate
SYRPHINAE (p. 7).
- Antennae quite elongate, the abdomen convex and emarginate
CHRYSOTOXINAE (p. 39).

- 5 Arista arising near the base, or at least before the middle of the third antennal segment6
 Antennae with a true terminal style or arista arising beyond the middle of the third antennal segment10
- 6 r-m before the middle of the discal cell (except sometimes in *Ferdinandea* (CHELOSIINAE) and *Sericomyia* (SERICOMYIINAE), where it may be at middle); stigmal cross-vein absent (except sometimes in *Volucella*)7
 r-m at or beyond middle of discal cell (except in *Syritta*, where it is slightly before middle); stigmal cross-vein present or absent.....9
- 7 Arista plumose; upper marginal cross-vein recurrent, the costa sometimes recurrent from the actual wing margin where it meets R_{4+5} (VOLUCELLINAE).....8
 Arista bare or pubescent, only plumose in *Hammerschmidtia*, which has neither upper marginal cross-vein nor costa recurrent.....CHELOSIINAE (p. 41).
- 8 Upper marginal cross-vein strongly recurrent, the costa sometimes recurrent where it meets R_{4+5} ; vein 2A somewhat concave on its posterior side; R-M always well before the middle of the discal cellVOLUCELLINAE (p. 66).
 Upper marginal cross-vein only moderately recurrent, the costa not at all recurrent where it meets R_{4+5} ; vein 2A always concave on its anterior side; R-M only slightly before the middle of the discal cell, or at middle
 SERICOMYIINAE (p. 67)
- 9 R_{4+5} always looped; all three pairs of femora with a well-developed basal patch of stubby decumbent black spinules; metasternum always pilose; stigmal cross-vein present (except in some *Helophilus*)ERISTALINAE (p. 69).
 R_{4+5} sinuous, but never looped; only first or second pair of femora with basal patch of spinules; metasternum with or without pile; stigmal cross-vein absent (or an ill-formed one may be present in *Pocota* and some *Criorhina*)
 XYLOTINAE (p. 77).
- 10 Antennae elongate, with a true terminal style; large, handsome, usually metallic fliesCALLICERINAE (p. 86).
 Antennae nearly as deep as long; arista arising at about middle of third antennal segment, or terminal; small, black flies, abdomen yellow banded
 PELECCOCERINAE (p. 86).

Subfamily SYRPHINAE.

KEY TO GENERA.

- 1 First abdominal segment well developed, especially on disc, where it is frequently almost half as long as second segment and always extending well beyond scutellum, at greatest length (towards sides) about three-quarters as long as second segment; abdomen black, often with a central orange marking; smallest flies in subfamily (wing-length 3-5 mm.) *Paragus* Latreille (p. 8).
 First abdominal segment small and (except in *Baccha*) greatly reduced on disc, where it is frequently almost linear and practically covered by scutellum, at greatest length (towards sides) at most one-third as long as second segment, frequently much less; abdomen often yellow and black.....2
- 2 Second abdominal segment greatly constricted, at narrowest part not half so wide as scutellum, third segment similar in male, less constricted in female; alula practically absent; scutellum aeneous*Baccha* Fabricius (p. 8).
 Second abdominal segment usually wide; if constricted it is scarcely narrower than scutellum; third segment wide; alula normal; scutellum aeneous, brownish or yellow3
- 3 Scutellum aeneous; face with entirely dark ground-colour, although often dusted 4
 Scutellum at least partly brownish or yellow; face with ground-colour at least partly yellow (except in *Syrphus quadrimaculatus*).....7
- 4 Abdomen steadily widening from its base up to the tip of third segment, noticeably broad and flattened; four anterior tarsi remarkably dilated (fig. 4a) in male of *granditarsa**Pyrophaena* Schiner (p. 10).
 Abdomen widening at most from its base up to the tip of second segment, although the third segment may be quite parallel-sided5
- 5 Front tibiae and/or tarsi of male (fig. 5) conspicuously dilated (less so in *sticticus*), of female (fig. 6b) noticeably broad and flattened
Platycheirus St. Fargeau and Serville (p. 10).
 Front tibiae and tarsi (fig. 6c) simple in both sexes6

- 6 Abdomen broad, flat, ovate with large spots ; third antennal segment large, nearly twice as long as first two segments combined (inside measurement) ; rather large flies *Xanthandrus* Verrall (p. 16).
Abdomen narrow, not noticeably ovate ; third antennal segment small, or at least not noticeably large, not or only slightly longer than the first two segments combined (inside measurement) ; smallish flies *Melanostoma* Schiner (p. 17).
- 7 Thorax with shining yellow side-lines ; pleurae with shining yellow markings.....8
Thorax with or without inconspicuous pale side-lines ; pleurae dark, or partly or entirely dull grey10
- 8 Face much more produced than frons ; wings immaculate, apart from yellowish stigma ; abdomen narrow, elongate or clubbed, in male often longer than wings
Sphaerophoria St. Fargeau and Serville (p. 18).
Face not more produced than frons ; fore-margin of wings streaked with brown, apart from stigma ; abdomen not longer than wings9
- 9 Abdomen much constricted towards base, cylindrical ; second segment at tip hardly wider than scutellum ; third and fourth segments with complete yellow bands ; wasp-like flies *Doros* Meigen (p. 19).
Abdomen not constricted at base, flattened, broad ; second segment at tip twice as wide as scutellum, all yellow bands divided.....*Xanthogramma* Schiner (p. 20).
- 10 Abdomen with sharply defined yellow bands or pairs of yellow or whitish spots or stripes ; wings unmarked.....11
Abdomen with a broad yellow basal band only ; no subsequent yellow markings ; wings with a dark spot at the middle ; face somewhat descending with a dark central stripe *Leucozona* Schiner (p. 20).
- 11 Frons considerably inflated (fig. 15a), more so in the male ; abdominal spots on third and fourth tergites strongly lunulate ; eyes hairy
Scaeva Fabricius (p. 21).
Frons not inflated (fig. 15b) ; abdominal spots sometimes lunulate, but usually otherwise shaped ; eyes bare or hairy.....12
- 12 R_{4+5} looped (fig. 11a) ; abdomen rather flat ; scutellum without a fringe below its margin, although sometimes a few isolated hairs are present
Didea Macquart (p. 22).
 R_{4+5} not looped, although dipped in *annulipes* (fig. 15d) and *lapponicus* (fig. 14a) ; abdomen usually convex above ; scutellum with a fringe below margin
Syrphus Fabricius (including *Ischyrosyrphus* Bigot and *Melangyna* Verrall) (p. 23).

Genus *Paragus* Latreille.

Wing length 3-5 mm. Small black flies, tergites sometimes with reddish markings. Occur in various situations. The larvae feed on various species of Aphids on plants. The early stages of *P. tibialis* and *P. bicolor* are described by several authors, the most recent being Heiss (1938 : 70).

KEY TO SPECIES OF *Paragus*.

- 1 Face considerably jutting forward, on upper part practically continuing direction of frons, yellow or orange, with a broad black middle stripe, or, occasionally in ♂ and frequently in ♀, more extensively darkened, in latter sex sometimes entirely so ; scutellum entirely black ; wing length 3-4.5 mm. ♂ tergites sometimes with restricted reddish markings. ♀ abdomen entirely black. *Frequent. Generally distributed (Ireland)*. 5-9 *tibialis* Fallén
Face only slightly produced, sloping downwards at an obvious angle with frons ; scutellum usually more or less extensively yellow or orange at apex ; tergites usually more or less extensively reddish ; wing length 4-5 mm. ♂ face entirely yellow. ♀ face yellow, with broad black middle stripe. *Rare. Oxon., Kent (Isle of Sheppey and Deal), Sussex (Balcombe, Alfriston and Seaford), Dorset (Studland and Isle of Portland)*. 5-8 *bicolor* Fabricius

Genus *Baccha* Fabricius.

Wing length 4.5-8 mm. Rather small narrow bodied "wasp-waisted" black and yellow flies. Occur mainly in thickets and woods, amongst low plants. Such larvae as are known feed on Aphids and other Homoptera

on various plants. Morley (1910 : 192) observed that *B. obscuripennis* ♀ hovered above a bullace leaf which was curled by *Aphis pruni* Degeer and deposited several eggs upon the underside. Osten Sacken (1862 : 412) gave several records of the breeding habits of various species of *Baccha*.

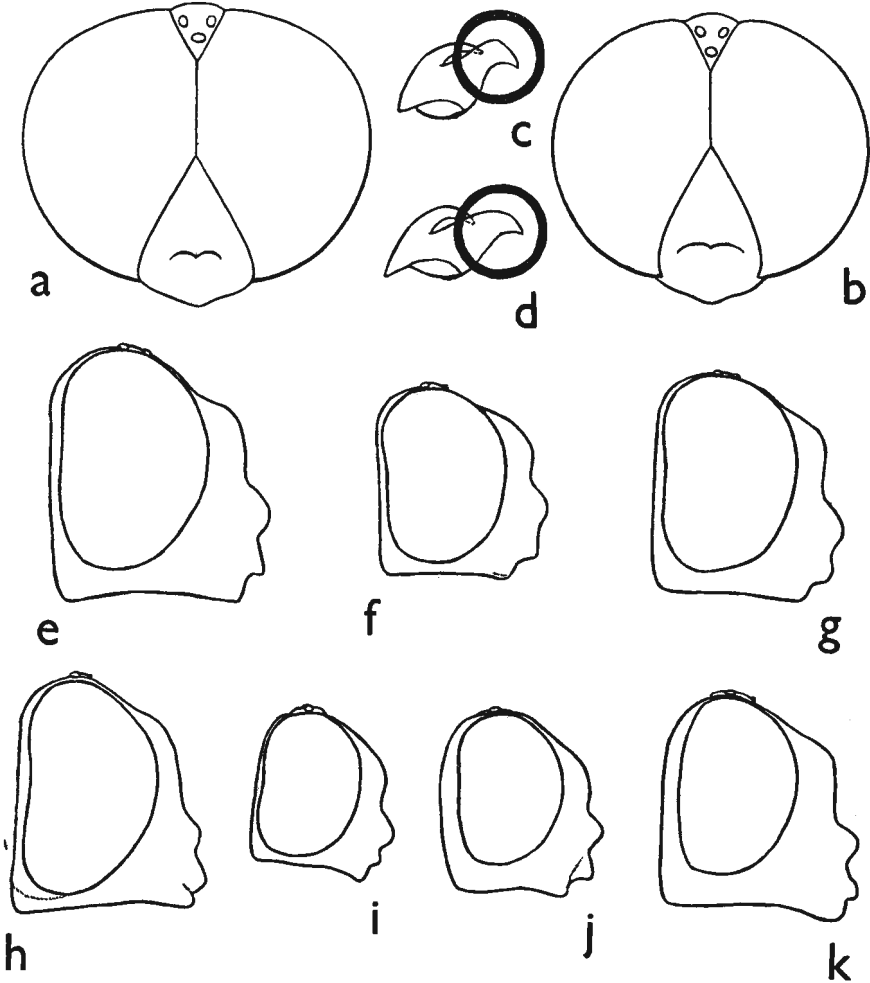


FIG. 3.—a, b. Heads of male *Baccha*, from above. a. *elongata*. b. *obscuripennis*. c, d. Lobes of penis-sheaths of *Baccha*. c. *elongata*. d. *obscuripennis*. e-k. Heads of females of *Platychirus*, in profile. e. *pellatus*. f. *scutatus*. g. *albimanus*. h. *tarsalis*. i. *sticticus*. j. *discimanus*. k. *melanopsis*.

Scott (1939 : 515) describes the puparium of *B. elongata* and notes that the larva hibernates in winter. Bhatia and Shaffi (1932 : 549) dealt in detail with the early stages of the Indian *B. pulchrifrons* Austen, the larvae of which were feeding on *Psylla* nymphs.

KEY TO SPECIES OF *Baccha*.

- 1 ♂ frons completely, heavily and evenly covered with greyish or whitish dust, the bronzy green ground-colour only vaguely showing through when viewed from above; integument normally smooth, with fine punctures at base of the whitish hairs; distance between front ocellus and beginning of frons much greater than from beginning of frons to base of antennae (fig. 3a); face with whitish hairs; wings normally hyaline, occasionally slightly brownish tinged. Genitalia with lobe of penis sheath (fig. 3c) differently shaped from that of *obscuripennis*. ♀ frons completely whitish dusted for almost anterior third, broadly dusted at sides only on more than middle third, undusted above; wings hyaline. ♂ ♀ mesonotum shining aeneous black; tergites aeneous black, 3 and 4 with a yellow or orange basal band of varying breadth, one or both bands sometimes incised and that on 3 occasionally absent; legs yellow, hind coxae and tarsi more or less darkened; wing length 5.25-7.75 mm. *Frequent. Generally distributed (Ireland).* 5-10 *elongata* Fabricius
- ♂ frons with the shining black or bronzy green ground-colour exposed at least on a broad undusted area above the antennae, the greyish or whitish dusting usually restricted to sides, in extreme instances spreading across the upper part or altogether absent; integument often more or less deeply striated towards sides, with coarse punctures at base of the brownish, yellowish or whitish hairs; distance between front ocellus and beginning of frons at most only moderately greater than from beginning of frons to base of antennae (fig. 3b); face with brownish, yellowish or whitish hairs; wings varying from light brownish tinged to a chocolate brown; lobe of penis sheath as in fig. 3d. ♀ frons broadly whitish dusted only at sides for about anterior two-thirds, undusted above; wings hyaline. ♂ ♀ mesonotum, tergites and legs as in *elongata* (q.v.); wing length 4.5-8 mm. *Common. Generally distributed (Ireland).* 5-10 *obscuripennis* Meigen

Genus *Pyrophaena* Schiner.

(*Cheilosia* Panzer, of Kloet and Hincks.)

Wing length 5.25-8.5 mm. Rather small black and yellow flies; abdomen usually more or less spatulate. Occur in marshy places. The larvae of *Pyrophaena* are believed to be aphidiphagous, but this has not been established. Lundbeck (1916: 223) describes the larva and puparium of *P. granditarsa* and the puparium of *P. rosarum*, all of which were found in flood refuse in fens. Sack (1932: 140) mentions the close resemblance of these larvae to those of *Platychirus*.

KEY TO SPECIES OF *Pyrophaena*.

- 1 Tergites 2-4 mainly yellow or reddish yellow, also basal corners of tergite 5 in ♀; four anterior tarsi mainly black; wing length 5.25-8.5 mm. ♂ front tarsi with segment 1 remarkably dilated, with an inwardly directed projection (fig. 4a), mid tarsi with segments 1 and 2 considerably dilated. *Frequent. Generally distributed (Ireland).* 5-9 *granditarsa* Forster
- Tergite 3 with a rather broad yellow or reddish-yellow band, usually partially or entirely divided; tergites otherwise black, except sometimes for a small yellow or reddish yellow marking at basal corners of tergite 4 in ♀; four anterior tarsi yellow, simple in both sexes; wing length 5.25-7.75 mm. *Frequent. Generally distributed (Ireland).* 5-9 *rosarum* Fabricius

Genus *Platychirus* St. Fargeau and Serville.

Wing length 4.25-9 mm. Rather small black and yellow flies, the females commonly melanic. Occur in various situations, more frequently in marshy places. The larvae are predaceous on various species of Aphids on plants, and Heiss (1938: 38) states that they are nocturnal feeders and prefer moist situations. They have frequently been taken in flood refuse. The

early stages of *P. perpallidus* have been described by Metcalf (1917 : 167), and the egg of *P. albimanus* and puparium of *P. scutatus* by Scott (1939 : 515). Dunn (1949 : 109) describes the early stages of *P. manicatus* and *P. immarginatus*, and Bhatia (1939 : 102) the third-stage larva of *P. scutatus*.

KEYS TO SPECIES OF *Platychirus*.

(1) Males (based on Verrall).

- 1 Front tibiae scarcely dilated even at the extreme tip (fig. 4b) ; front tarsi considerably dilated at base (fig. 4b).....2
- Front tibiae very distinctly dilated, even if only at the extreme tip (fig. 5f), or (*sticticus*) tibiae and tarsi only slightly dilated (fig. 5g).....5

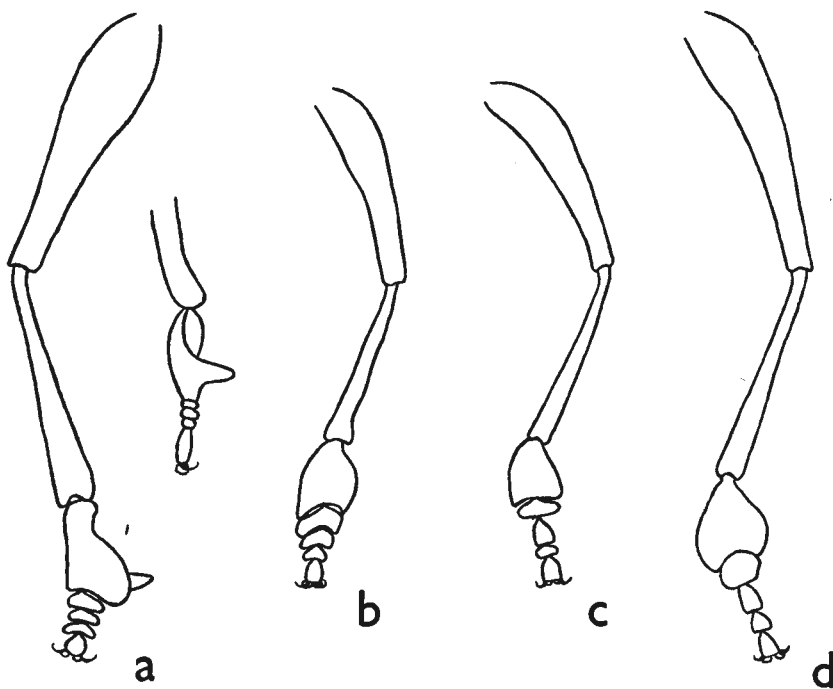


FIG. 4.—Front legs of male SYRPHIDAE. a. *Pyrophoena granditarsa*. b-d. *Platychirus*. b. *melanopsis*. c. *discimanus*. d. *manicatus*. (After Verrall.)

- 2 Front tarsi with segment 3 much wider than 4 (fig. 4b) ; mesonotum black, shining ; face considerably produced, upper mouth-edge slightly more produced than central prominence ; tergite 2 with yellow side-spots usually small ; wing length 6-7.25 mm. Rare. *Inverness (Feshie Bridge), Aberdeen (Braemar), Perth (Rannoch), Cumb. (Ullswater)*. 6-7**melanopsis** Loew
- Front tarsi with segment 3 not or scarcely dilated, about as wide as 4 (fig. 4c).....3
- 3 Tergites 2-4 with paired silvery side-spots, these sometimes yellowish-tinged, especially basal pair ; head noticeably large and broad ; frons rather swollen ; face only moderately produced, upper mouth-edge slightly less produced than central prominence ; front leg as in fig. 4c ; small species ; wing length 5.75-6.75 mm. *Uncommon. Generally distributed*. 4-6**discimanus** Loew
- Tergites with orange markings ; moderate-sized species.....4

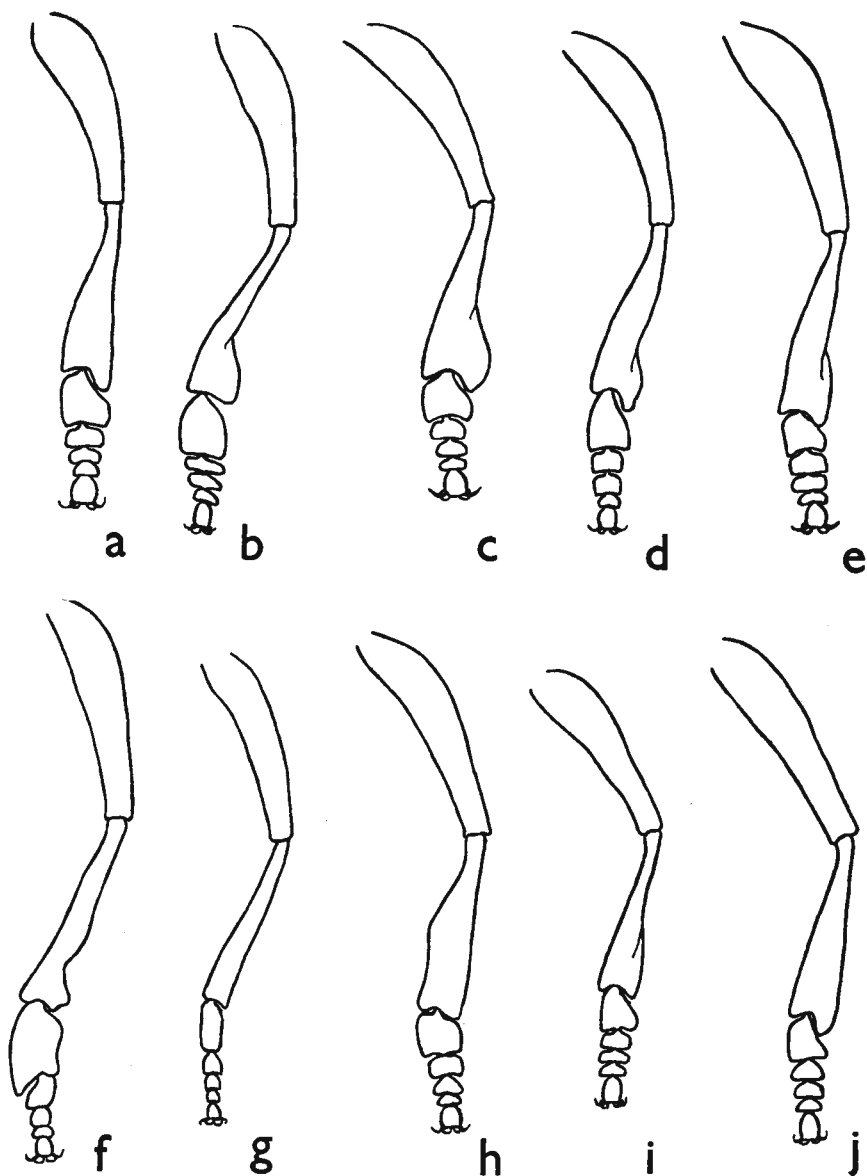


FIG. 5.—Front legs of male *Platychirus*. a. *immarginatus*. b. *scutatus*. c. *podagratus*. d. *albimanus*. e. *scambus*. f. *peltatus*. g. *sticticus*. h. *fulviventris*. i. *clypeatus*. j. *perpallidus*. (After Verrall.)

- 4 Mouth-edge produced much more than central prominence; thorax greenish-black, dull at least anteriorly on disc; face with sides continuing to widen steadily below level of base of antennae; front leg as in fig. 4d; hind tibiae with anterior fringe including at most four or five longish black bristly hairs; wing length 6.75-9 mm. *Common. Generally distributed (Ireland).* 5-10
- manicatus** Meigen
- Mouth-edge only slightly more produced than central prominence; thorax metallic black, brightly shining; face with sides parallel shortly below level of base of antennae; front leg as in fig. 6a; hind tibiae with anterior fringe including a considerable number of longish black bristly hairs; wing length 7.5-8.75 mm. *Uncommon. Generally distributed.* 5-8 **tarsalis** Schummel
- 5 Front tibiae (fig. 5d) abruptly dilated shortly before the tip after some long posterior black hairs, arranged as a tuft (*scutatus*) or singly (*albimanus*), or with front metatarsus greatly enlarged, as long as remaining four segments together (fig. 5f); antennae with segment 3 more or less obviously pale beneath.....6
- Front tibiae otherwise shaped, or (if not) without long posterior black hairs (*podagratus*); front metatarsus not or only moderately enlarged, obviously shorter than remaining four segments together (fig. 5c); antennae entirely black except in *sticticus*8
- 6 Front femora with a ciliation of strong coarse blackish or brownish bristly hairs behind on almost entire length; front metatarsus greatly enlarged, as long as remaining four segments together (fig. 5f); face moderately produced, central prominence and upper mouth-edge about equally produced; rather large species; wing length 7-9 mm. *Common. Generally distributed (Ireland).* 5-10.
- peltatus** Meigen (*timeo* Harris, of Kloet and Hincks) some
- Front femora with clumps of tangled hairs behind near the base, followed by some long black hairs, ciliation otherwise simple; rather small species.....7
- 7 Front metatarsus about six times as long as the very short equally wide second segment (fig. 5b); face only slightly produced; tergites with pale yellow markings, appearing more or less silvery from some viewpoints; wing length 5.5-7.75 mm. *Common. Generally distributed (Ireland).* 4-10 **scutatus** Meigen
- Front metatarsus scarcely three times as long as the narrower second segment (fig. 5d); face moderately produced; tergites with markings silvery or obscurely yellowish, hue varying according to viewpoint; wing length 5-8 mm. *Common. Generally distributed (Ireland).* 4-11, 2 (in hot-house) **albimanus** Fabricius
- 8 Front tibiae rather abruptly and considerably dilated after middle, the dilated portion appearing somewhat semicircular posteriorly (fig. 5c); face flattish, heavily dusted, central prominence only slightly produced, upper mouth-edge not produced; mesonotum greenish black, moderately shining; hind legs practically all black, only the knees yellow; wing length 5.25-7 mm. *Uncommon. Scotland, Ireland, Lancs., Ches., Derby, Leics., Gloucs.* 5-7
- podagratus** Zetterstedt
- Front tibiae not abruptly dilated about the tip (fig. 5a).....9
- 9 Front femora (fig. 5a) behind with a row of isolated, usually mainly black, long bristly hairs, rather evenly spaced from about end of basal third to shortly before tip, interspersed with very few short fine whitish hairs after base.....10
- Front femora behind with any long black bristly hairs interspersed with numerous shorter fine whitish hairs, or clustered on basal half of femora only, or a close-set fringe of long black hairs occupying practically entire length of femora.....11
- 10 Front femora with a peculiar long white hair behind at the extreme base, followed by five or six long isolated mainly black bristly hairs; front tibiae (fig. 5a) with a slight kink behind after middle; tergites with very large pale yellow or orange markings, the black posterior cross-bands very narrow; rather small species; wing length 5.5-7 mm. ♂ angle of frons at approximation of eyes not exceeding ninety degrees, and usually obviously less. *Uncommon. Generally distributed (Ireland).* 5-8 **immarginatus** Zetterstedt
- Front femora without a long whitish hair at the extreme base, and with about five long isolated mainly black bristly hairs behind; front tibiae (fig. 5e) with a pronounced kink behind after middle; tergites with large orange markings, more restricted than in *immarginatus*, the black posterior cross-bands thus being wider and the median longitudinal black stripe frequently so; rather large species; wing length 7.25-8.25 mm. ♂ angle of frons at approximation of eyes not less than ninety degrees, and usually obviously more. *Uncommon. Generally distributed (Ireland).* 5-9..... **scambus** Staeger

- 11 Front tibiae and tarsi only slightly dilated (fig. 5g); halteres brown or black; front femora with two long, widely spaced, stout black bristly hairs behind, one near middle and other shortly before tip, ciliation otherwise shorter, fine; face moderately produced, glittering black, broadly whitish-dusted against eye-margins, central prominence and upper mouth-edge about equally produced; tergites with the small side-spots silvery, golden or orange, hue frequently varying according to viewpoint; wing length 4.25-6 mm. *Uncommon. Generally distributed.* 4-8.....*sticticus* Meigen
- Front tibiae and tarsi very obviously dilated (fig. 5h); halteres yellow.....12
- 12 Femora entirely orange, or vaguely darkened on middle third only; tergites 2-4 with the clear yellow or occasionally orange side-markings large, usually longer than wide, the black ground-colour very restricted.....13
- Hind femora mainly blackish, yellow or orange only at base and tip; tergites 2-4 with the yellow or orange side-markings more restricted, those on tergite 2 usually much reduced, the black ground-colour of tergites more extensive.....14
- 13 Front femora with long dense curly blackish hairs behind on practically the entire length; front tibiae (fig. 5h) dilated soon after base, widest on middle third; antennae with segment 3 large, inclined to be distinctly longer than deep; wing length 6-7.75 mm. *Uncommon, in marshy districts. Generally distributed (Ireland).* 5-10.....*fulviventris* Macquart
- Front femora with rather short, mainly pale hairs behind; front tibiae (fig. 5j) steadily dilated from base to tip; antennae with segment 3 small, squarish; wing length 5.25-6.75 mm. *Uncommon. Scotland, N. Lancs., E. Yorks., Ches., Warwks., Hereford, Ireland (Counties Galway and Kerry).* 6-8
perpallidus Verrall
- 14 Abdominal segment 2 at least as wide as long, and 3 at least slightly wider than long; tergites with moderately large yellow or orange side-markings, those on tergite 3 widely separated and usually occupying about two-thirds or less of the length of tergite; front legs as in fig. 5i; wing length 5-7.5 mm. *Common. Generally distributed (Ireland).* 4-10.....*clypeatus* Meigen
- Abdominal segments 2 and 3 much longer than wide; tergites with the yellow or orange side-markings somewhat larger than in *clypeatus*, those on tergite 3 usually rather narrowly separated, sometimes partly coalescent, and usually occupying about three-quarters the length of tergite; front legs resembling those of *clypeatus*; wing length 5-7 mm. *Common. Generally distributed (Ireland).* 5-10.....*angustatus* Zetterstedt

(2) Females.

(Wing length, distribution and dates, see Key to Males.)

- 1 Thorax dull; upper mouth-edge very much produced; frons dusted yellowish grey except along vertex and on frontal lunule; front tarsus as in fig. 6b
manicatus Meigen
- Thorax shining.....2
- 2 Antennae partially yellow, at least beneath the base of segment 3.....3
- Antennae absolutely black.....6
- 3 Frons with conspicuous grey side-spots occupying about two-thirds (or more) of width of frons.....4
- Frons with inconspicuous grey side-spots not nearly occupying two-thirds of width of frons.....5
- 4 Grey side-spots gradually widening from eye-margins to extend broadly across two-thirds of frons; sides of thorax immediately behind humeri heavily grey-dusted; lower part of face and central prominence rather strongly produced (fig. 3e).....*peltatus* Meigen
- Grey side-spots confined to eye-margins, then abruptly and narrowly extending across two-thirds (or more) of frons; sides of thorax immediately behind humeri undusted or only lightly dusted, brightly shining; lower part of face and central prominence only moderately produced (fig. 3f).....*scutatus* Meigen
- 5 Face evenly grey-dusted all over, except sometimes on actual central prominence, only slightly shining; occiput grey-dusted up to upper limit of eyes; lower part of face and central prominence rather strongly produced (fig. 3g); tergites with three pairs of bluish spots (normally).....*albimanus* Fabricius

- Face only distinctly dusted along side-margins, glittering black; occiput glittering, undusted, behind upper part of eyes; lower part of face and central prominence only moderately produced (fig. 3*i*).....**sticticus** Meigen
- 6 Face with central prominence less produced than upper mouth-edge; face very much produced.....7
- Face with central prominence more produced than upper mouth-edge, or face almost flat.....8
- 7 Face with sides parallel; frons with side-spots large, occupying two-thirds of width of frons; face (fig. 3*h*) gradually sloping forward to upper mouth-edge; central prominence rather slight; sides of thorax immediately behind humeri heavily grey-dusted**tarsalis** Schummel
- Face steadily widening; frons with side-spots slight, practically confined to eye-margins; central prominence strongly developed (fig. 3*k*); sides of thorax immediately behind humeri undusted, shining.....**melanopsis** Loew

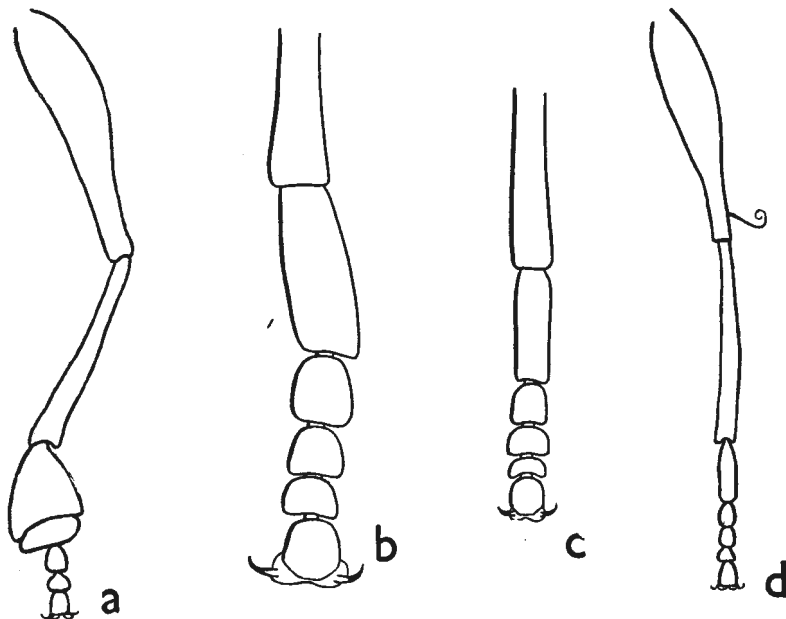


FIG. 6.—Front legs of SYRPHIDAE. a, b. *Platychirus*. a. *tarsalis*, male. b. *manicatus*, female. c, d. *Melanostoma*. c. *mellinum*, male. d. *ambiguum*, male. (Partly after Verrall.)

- 8 Frons undusted, or with inconspicuous grey side-spots not nearly occupying two-thirds of width of frons.....9
- Frons with conspicuous grey side-spots occupying about two-thirds of width of frons.....12
- 9 Front and mid legs more or less extensively darkened, at least tibiae darkened after middle.....10
- Front and mid legs immaculately yellow or orange, apart from the blackish coxae and trochanters.....11
- 10 Frons much longer than wide, with small but obvious grey dust-spots; face slightly shining, evenly dusted, central prominence narrow, viewed in profile gradually extended forward (fig. 3*g*).....**albimanus** Fabricius
- Frons about as wide (at widest part) as long, without obvious dust-spots; face glittering black, only lightly dusted, central prominence broad, viewed in profile abruptly jutting forward (fig. 3*j*).....**discimanus** Loew

- 11 Hind legs black apart from narrowly yellow knees and extreme tips of tibiae and of tarsal segments occasionally yellow ; frons with side-spots broadly and evenly confined to eye-margins, not noticeably extending inwards at their highest point ; abdominal segments 2 and 3 usually broader than long
podagratus Zetterstedt
- Hind legs extensively yellowish, hind femora more or less broadly so at base and at tip, frons with side-spots narrowly confined to eye-margins, then abruptly extending inwards at their highest point ; abdominal segments 2 and 3 usually longer than broad.....*angustatus* Zetterstedt
- 12 Hind legs with at least femora and tibiae immaculately orange.....13
- 13 Hind legs with at least a dark band on femora and tibiae.....14
- 13 Antennae with segment 3 large, distinctly longer than deep ; face rather lightly dusted ; frons with side-spots rather small, space immediately above antennae practically undusted, shining ; wings distinctly brown-tinged
fulviventris Macquart
- Antennae with segment 3 small, hardly longer than deep ; face heavily dusted ; frons with side-spots large, space immediately above antennae distinctly dusted, dullish ; wings almost hyaline*perpallidus* Verrall

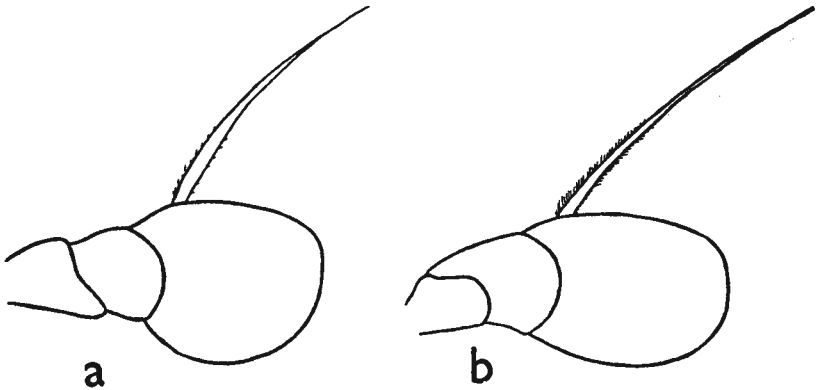


FIG. 7.—Antennae of female *Platychirus*. a. *immarginatus*. b. *scambus*.

- 14 Front femora with posterior hairs becoming increasingly longer towards base ; hind femora and tibiae usually with extensive blackish rings ; tergite 6 usually black.....*clypeatus* Meigen
- Front femora with posterior hairs not noticeably longer towards base ; hind femora and tibiae usually with slight dark rings only ; tergite 6 usually more or less yellow.....15
- 15 Front femora with an isolated outstanding whitish hair at the base ; tergite 2 with the yellow or orange side-markings usually rather small ; antennae small, arista short (fig. 7a).....*immarginatus* Zetterstedt
- Front femora without an isolated outstanding whitish hair at base ; tergite 2 with the yellow or orange side-markings usually large ; antennae rather large, arista rather long (fig. 7b).....*scambus* Staeger

Genus *Xanthandrus* Verrall.

Medium-sized black and orange fly. Occurs in various situations, particularly in meadows and woods. Lucchese (1942 : 44) described the early stages of *X. comtus* in detail. He observed the larvæ sucking those of the Eucosmid, *Acroclita naevana* Hübner; and refers to the larvæ of other small moths being consumed. Chapman (1905 : 150 and 1906 : 14) observed

the larvae of *X. comtus* preying on various "quasi-gregarious" *Tortrix* larvae.

KEY TO SPECIES OF *Xanthandrus*.

- 1 Face black, heavily grey-dusted except on central prominence; eyes bare; antennae orange, segment 3 darkened above and at tip; mesonotum shining black; wings hyaline; legs mainly orange; wing-length 8.75–11.5 mm. ♂ tergite 2 with pair of rather large roundish orange spots, occasionally reduced, 3 with a broad orange band deeply incised behind at middle, 4 with similar but narrower band. ♀ tergites with much more restricted orange markings, the spots on tergite 2 usually very small or even absent, and tergites 3 and 4 with large subquadrate orange spots, widely separated at middle. *Frequent. Generally distributed (Ireland).* 5–10.....*comtus* Harris

Genus *Melanostoma* Schiner.

Wing length 4.5–8 mm. Small or rather small black and yellow flies; melanic forms common in females. Occur in various situations, more frequently in marshy places. The larvae are carnivorous, feeding to some extent on various species of Aphids on plants. Heiss (1938: 34) states

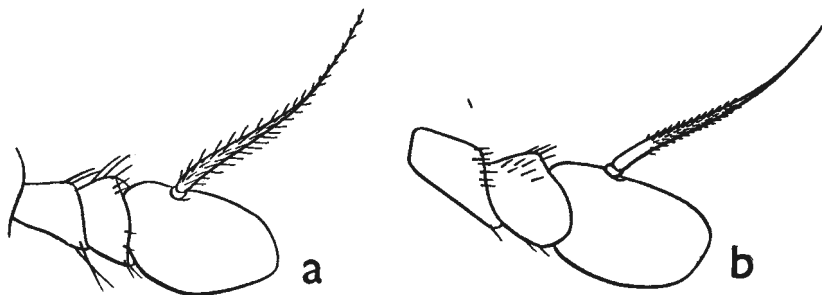


FIG. 8.—Antennae of *Melanostoma*. a. *scalare*. b. *mellinum*.

that they are nocturnal and prefer moist situations. Davidson (1922: 47) records the observation by Curran (*in litt.*) that the larvae of *M. obscurum* Say (non-British) consumed both Aphids and decomposing Chickweed, the latter being the more successful breeding material. Giard (1896: 234) found larvae of *M. mellinum* on umbels of *Daucus carota*, where they attacked and sucked adults of *Musca domestica* Linnaeus and *Egle cinerella* Fallén (as *Chortophila pusilla* Meigen), the flies evidently being torpid at the time. Chapman (1905: 149) mentioned that larvae of *M. mellinum*, when deprived of Aphids among which eggs were found, took *Tortrix* larvae as their prey. Metcalf (1916: 226) described in detail the early stages of *M. mellinum*.

KEY TO SPECIES OF *Melanostoma*.

- 1 ♂ front femora with a postero-dorsal long curled black hair just before the tip, quite twice the length of the short black hairs immediately preceding it (fig. 6d); tergites with paired grey spots. ♀ tergite 2 with paired grey spots, 3 and 4 with broad grey bars, connected medianly by a rather broad grey longitudinal stripe; a similar, but broader, median grey stripe sometimes occurs as an appendix to the bar on tergite 4. (This sex superficially resembles females of *Platychirus discimanus* and *P. albimanus*, which, however, have the tergites with separated spots.) ♂ ♀ wing length 4.5–7 mm. *Frequent. Generally distributed (Ireland).* 4–7.....*ambiguum* Fallén

- ♂ front femora without a long curled hair towards tip ; tergites with paired yellow spots. ♀ tergites with paired yellow spots or unicolorous.....2
- 2 Arista with short hairs, obvious even under low magnification, those on basal half usually longer above than below (fig. 8a) ; antennae with third segment $1\frac{1}{2}$ - $1\frac{1}{4}$ times as long as deep, partly blackish, basal segments normally orange ; wing length 5.5-8 mm. ♂ abdomen long and narrow, tending to be narrowest at tip of segment 2 ; tergites 2-4 all much longer than wide, with paired yellow spots ; frons completely dulled by dust, less heavily above lunule ; face all dulled by dust, less heavily on the slightly shining central prominence. ♀ frons with large dust-spots spreading across quite two-thirds width of frons, dusting along eye-margins immediately below dust-spots not noticeably narrow and widening just above level of antennae ; face rather heavily dusted, except for the shining undusted central prominence ; tergites with paired yellow spots (except in melanic examples), abdomen variable in shape. *Common. Generally distributed (Ireland). 4-11*.....*scalare* Fabricius
Arista with very short hairs, only visible under high magnification, those on basal half not noticeably longer above than below (fig. 8b).....3
- 3 Antennae with third segment about $1\frac{1}{2}$ times as long as deep, extensively yellow below or occasionally almost all or entirely black, basal segments black or at least darkened ; arista as in fig. 8b ; face brightly shining, only eye-margins narrowly dusted ; wing length 4.75-7 mm. ♂ frons shining, lightly dusted against eyes ; abdomen rather short and narrow, sides usually parallel ; tergite 2 longer than wide, 3 and 4 almost square, all with paired yellow spots. ♀ frons shining ; dustspots very small and narrow, practically confined to eye-margins ; dusting along eye-margins below dust-spots linear, widening (if at all) at or below level of antennae ; tergites with paired yellow spots (except in melanic examples) ; abdomen variable in shape. *Common. Generally distributed (Ireland). 4-11*.....*mellinum* Linnaeus (Typical form)
Antennae with segment 3 only slightly longer than deep, entirely black or occasionally yellow below at base, basal segments black ; face moderately shining, dusted, more heavily so against eye-margins ; wing length 4.75-6.25 mm. ♂ frons dulled by dust, except above lunule ; abdomen usually shorter and rather broader than in typical *mellinum* ♂ ; tergite 2 variable in shape, but usually almost square ; 3 and 4 wider than long, all with paired yellow spots. ♀ frons mainly shining, the middle dulled by the rather broad connected dust-spots, which form a grey band across frons ; tergites unspotted or with more or less reduced spots ; abdomen short and stoutish. *Frequent in mountainous areas, mainly in Scotland and North of England (Ireland). 6-7*
mellinum var (*dubium* Verrall nec Zetterstedt)

Genus *Sphaerophoria* St. Fargeau and Serville.

Wing length 4.25-7 mm. Small or rather small narrow-bodied yellow and black flies. Occur in various situations. The larvae are predaceous on various species of Aphids and other Homoptera on plants. Scott (1939: 516) describes the larva and puparium of *S. scripta*, and mentions that the larva hibernates in winter. Bhatia (1939: 100) describes the third-stage larva and the puparium of *S. ruepellii*, and Bhatia and Shaffi (1932: 557) the early stages of the Indian species, *S. javana* Wiedemann. Lundbeck (1916: 340) describes the larva and puparium of *S. menthastri*, and refers to several other papers dealing with the early stages of *Sphaerophoria*.

KEY TO SPECIES OF *Sphaerophoria*.

- 1 Thorax brightly shining, metallic black, with a yellow lateral stripe extending only from anterior extremity to transverse suture, where it ends sharply, the side-margin then continuing *absolutely* black until the more or less yellow posterior callus2
- Thorax dull or moderately shining, greenish-black or bronzy-black, with a continuous yellow lateral stripe, extending from anterior extremity to the scutellum, sometimes less intense, but always obvious, between transverse suture and posterior callus.....4

- 2 Antennae yellow, except segment 3 usually darkened towards tip; face with upper mouth-edge projecting almost or quite as much as central prominence.....3
 Antennae completely black; upper mouth-edge far less projecting than central prominence; wing length 6-6.75 mm. *Rare. Kent (Gravesend), Hants. (Christchurch), Dorset (Studland Heath).* 7.....*loewii* Zetterstedt
- 3 Legs yellow, only hind tarsi sometimes vaguely darkened above; wing length 4.25-6.5 mm. *Uncommon. Generally distributed.* 5-9
rueppellii Wiedemann (Typical form) (*flavicauda* Zetterstedt)
 Legs extensively darkened, especially hind pair. (Wing length, distribution and dates, see typical *rueppellii*).....*rueppellii* ♂ var. *nitidicollis* Zetterstedt
- 4 Males.....5
 Females.....11
- 5 Abdomen strikingly long, obviously longer than the wings; hind femora with some crowded short black bristles postero-ventrally on about apical three-quarters; scutellum yellow-haired or mainly so.....6
 Abdomen of normal length, about as long as the wings; hind femora with evenly distributed strong black hairs; scutellum usually black-haired or mainly so.....8
- 6 Legs completely yellow; tergites 2-4 with variable yellow markings; wing length 5.75-7 mm. *Common. Generally distributed (Ireland).* 5-10
 ♂ *scripta* Linnaeus (Typical form)
 Coxae, trochanters and sometimes femora more or less extensively black.....7
- 7 Tergites 2-4 with yellow bands narrowing laterally, but their posterior corners reaching side-margins. (Wing length, distribution and dates, see typical *scripta* ♂).....♂ *scripta* var. *dispar* Loew
 Tergites 2-4 with yellow bands narrowing laterally and not reaching side-margins. (Wing length, distribution and dates, see typical *scripta* ♂)
 ♂ *scripta* var. *strigata* Staeger
- 8 Scutellum entirely or mainly yellow-haired. (Wing length, distribution and dates, see typical *menthastris* ♂).....♂ *menthastris* var. *taeniata* Meigen
 Scutellum black-haired or mainly so.....9
- 9 Tergites 3 and 4 (at least) with entire yellow bands.....10
 Tergites 2-4 with interrupted yellow bands. (Wing length, distribution and dates, see typical *menthastris* ♂).....♂ *menthastris* var. *picta* Meigen
- 10 Tergite 2 with interrupted yellow band, 3 and 4 entire; wing length 4.5-6.25 mm. *Common. Generally distributed (Ireland).* 4-9
 ♂ *menthastris* Linnaeus (Typical form)
 Tergites 2-4 with entire yellow bands. (Wing length, distribution and dates, see typical *menthastris* ♂).....♂ *menthastris* var. *dubia* Zetterstedt
- 11 Hind femora broadly bare at the base postero-ventrally, besides the bare mid-ventral strip, which extends for full length of femora; legs entirely yellow as in typical *scripta* ♂; tergites 2-4 with variable yellow markings; wing length 5-7 mm. (Distribution and dates, see typical *scripta* ♂).....♀ *scripta* Linnaeus
 Hind femora with hairs evenly distributed postero-ventrally, reaching almost or quite to base, only the mid-ventral strip bare for full length of femora; legs entirely yellow; named varieties are as in ♂. (Wing length, distribution and dates, see typical *menthastris* ♂).....♀ *menthastris* Linnaeus

Genus *Doros* Meigen.

Large "waisted" black and yellow fly. Occurs in various situations, particularly in woodlands, where it has been taken on rotten tree-trunks, and on trunks from which sap was flowing. Two males were found at rest on reeds at Leigh-on-Sea by Colyer and Hammond (1951: 160). Bremi (1846: 164) states that the larva lives in hollow tree-trunks inhabited by ants, while Mik (1864: 797) found an almost mature larva under moss at the base of an oak tree, and briefly described this "leech-like" larva and the puparium.

KEY TO SPECIES OF *Doros*.

- 1 Frons black with yellow side-stripes; face black or brownish with yellow side stripes, which meet between bases of antennae; central prominence often yellowish or orange; antennae with segment 1 black, 2 and 3 extensively or

entirely orange; thorax black, moderately shining, with clear yellow side-stripes; scutellum yellowish-brown; tergite 2 with oblique yellow side-stripes, 3 with rather broad yellow basal cross-band, which widens laterally, 4 with a narrow yellow basal cross-band and a broad apical band, which widens considerably at middle; wings brownish along entire fore-margin, otherwise almost hyaline; femora black, narrowly reddish at base and broadly so at tip, sometimes extensively reddish; tibiae orange, slightly darkened just after middle; tarsi orange except last two or three segments darkened; wing length 11.25-13.25 mm. *Rare. N. Lancs. southwards. 5-6.....conopseus Fabricius*

Genus *Xanthogramma* Schiner.

Wing length 6.5-10.25 mm. Medium-sized flies. Occur in various situations, particularly in woodlands and meadows amongst low herbage. The feeding habits of the larvae are apparently unknown, but from the structure of those described they are probably aphidiphagous. **Beling** (1882 : 232), who described the early stages of *X. pedissequum* (as *ornatum*), found the larva in three successive years in the ground under heaps of turf, and from his dates it is evident that they hibernate. **Lundbeck** (1916 : 355) records that a puparium of *X. citrofasciatum* was found under a stone, and he gives an English translation of **Beling's** descriptions of the larva and puparium of *X. pedissequum* (ref. above). **Heiss** (1938 : 76) describes the larva and puparium of a North American species, *X. flavipes* **Loew**, the larva of which was found lying on leaf-mould beneath a tree in a wood and was about to pupate.

KEY TO SPECIES OF *Xanthogramma*.

- Tergite 2 with equilaterally triangular yellow side-markings, which occupy laterally fully half length of tergite, 3 and 4 with narrow yellow side-stripes; coxae and trochanters black; hind femora and tibiae with prespical black or brown bands; legs otherwise yellow; wing-length 7.25-9.75 mm. *Frequent. N. Lancs. southwards. 5-9.....pedissequum Harris (ornatum Meigen).*
- Tergite 2 with rather narrow yellow side-markings, only moderately widening outwardly and occupying laterally much less than half length of tergite, 3 and 4 as in *pedissequum*; coxae and trochanters black, legs otherwise yellow; wing length 6.5-10.25 mm. *Frequent. N. Lancs. southwards, Ireland (Counties Kildare, Dublin, Kilkenny). 5-7.....citrofasciatum Degeer*

Genus *Leucozona* Schiner.

(*Syrphus* Fabricius, of Kloet and Hincks.)

Medium-sized black and yellow fly, wings with conspicuous brown marking. Occurs in various situations. The early stages are apparently unknown.

KEY TO SPECIES OF *Leucozona*.

- 1 Face heavily yellow-dusted, except on the broad shining black median stripe; antennae black; thorax dull yellowish-green with long abundant rufous hairs; scutellum yellow; tergite 2 and frequently base of 3 more or less extensively yellow or orange, tergites otherwise black; abdominal hairs long and abundant, partly pale yellow or whitish and partly black; wings with a conspicuous brownish marking extending downwards from the dark brown stigma to vein Cu_1 ; femora black, yellow-tipped; tibiae with about basal half yellow, remainder darkened; tarsi black; wing length 7.75-10 mm. *Common. Generally distributed (Ireland). 5-8.....lucorum Linnaeus*

Genus *Scaeva* Fabricius.

Wing length 8.5–12 mm. Rather large black and yellow flies. Melanic females are found in *S. pyrastris*. Occur in various situations, and at times in vast swarms along the South and South-East coasts of England. The larvae are predaceous on various species of Aphids on plants. The early stages of *S. pyrastris* have been described by, among other authors, Campbell and Davidson (1924 : 64), Bhatia (1939 : 99), and by Scott (1939 : 514). The last-named author also describes the puparium of *S. selenitica*.

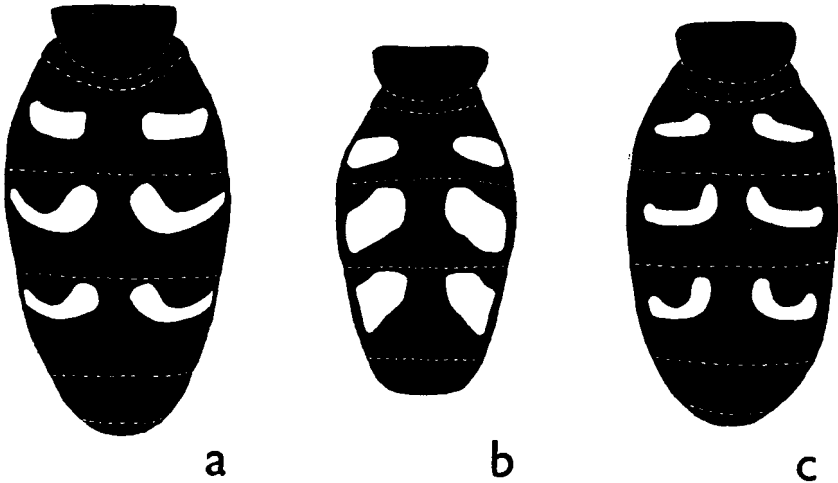


FIG. 9.—Abdomens of *Scaeva*. a. *selenitica*. b. *albomaculata*. c. *pyrastris*.

KEY TO SPECIES OF *Scaeva*.

- 1 Tergites 3 and 4 with yellow lunules, which have the inner extremity much more anteriorly situated than the outer, the latter being approximately equidistant from the fore- and hind-margins of the tergites (fig. 9b, c); the outer extremity of these lunules is about as broad as the inner; hind tibiae usually quite yellow; lower squama with whitish fringe of hairs.....2
- Tergites 3 and 4 with the inner extremity of the yellow lunules only slightly more anteriorly situated than the outer, the latter being much nearer to the fore- than to the hind-margin (fig. 9a); the outer extremity of these lunules is much narrower than the inner; hind tibiae with a broad dark ring just after middle; lower squama with golden fringe of hairs; wing length 10.5–12 mm. *Uncommon. Generally distributed.* 6–11.....*selenitica* Meigen
- 2 Tergites 3 and 4 with the yellow lunules rather narrow, at their outer extremity occupying little more than one-third of the length of tergite (fig. 9c); lunules on both tergites deeply concave anteriorly; thorax with rather vague orange side-stripes, which merge into the greenish-black colour of disc; profile of face as in fig. 15a; wing length 9.25–11.5 mm. (A frequent female melanic variety, *unicolor* Curtis, has no yellow lunules, or little trace of these.) *Common. Generally distributed (Ireland).* 5–11.....*pyrastris* Linnaeus
- Tergites 3 and 4 with the yellow lunules very broad, at their outer extremity occupying about half length of tergite (fig. 9b); lunules on tergite 3 only shallowly concave anteriorly, those on 4 similar or quite straight anteriorly; thorax with clear pale yellow side-stripes, which contrast sharply with the greenish-black colour of disc; wing length 8.5–9.75 mm. *Rare. Sussex (Jevington).* 8. *See Wainwright (1942 : 3)**albomaculata* Macquart

Genus *Didea* Macquart.

Wing length 7–11.5 mm. Medium to rather large black and yellow or black and orange flies, abdomen flattish. Occur in various situations. Such larvae as are known feed on Aphids. Heiss (1938 : 72) describes the early stages of *D. fasciata* var. *fuscipes* Loew, and refers to several earlier accounts by other authors.

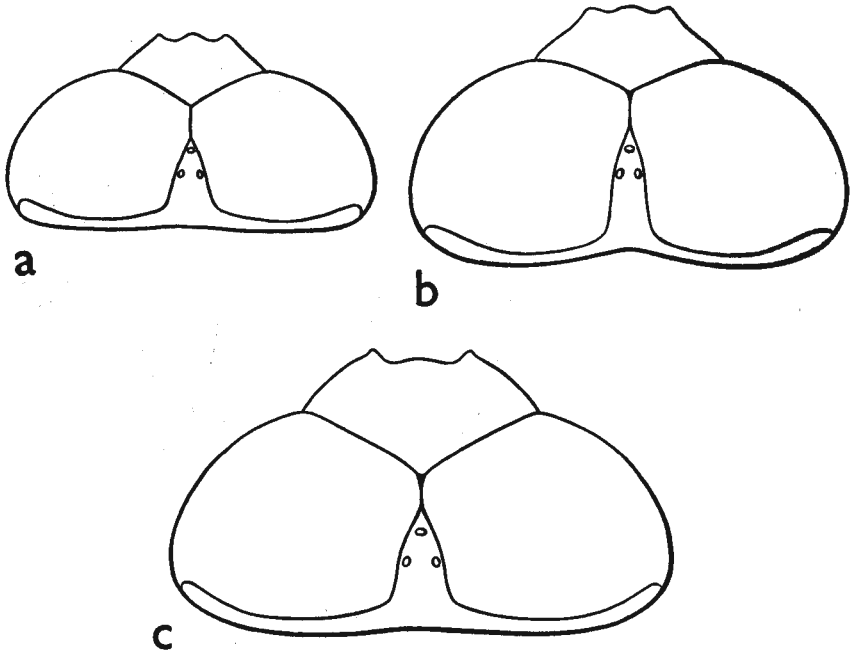


FIG. 10.—Heads of male *Didea*, from above. a. *intermedia*. b. *fasciata*. c. *alneti*.

KEY TO SPECIES OF *Didea*.

- 1 Face yellow, central prominence and mouth-edge entirely yellow or orange, or at most with very restricted brownish markings; R_{4+5} deeply looped at middle (fig. 11a); halteres with yellow knob; tergites with yellow, orange or greenish-yellow markings; wing length 8.25–11 mm. ♂ vertex long and narrow, ocelli arranged in a more or less elongate isosceles triangle (fig. 10b). ♀ frons with a Y-shaped black marking extending down from the black area of vertex, the prongs reaching the bases of antennae or not; tergite 5 with triangular yellow or orange side-markings. Uncommon. Generally distributed (Ireland). 5–10
fasciata Macquart
- Face yellow, except central prominence and mouth-edge down to at least vibrissal angles continuously black or brown; halteres with at least knob black or dark brown. ♂ vertex (fig. 10a, c) not noticeably long, less narrow than in *fasciata* ♂; ocelli usually arranged in a more or less equilateral triangle.....2
- 2 Tergite 3 with yellow or greenish-yellow band, deeply incised behind or even divided, 4 with widely separated side-markings, broadening outwardly; R_{4+5} rather shallowly looped; scutellum mainly black-haired; abdomen very wide, oval; wing length 9.75–11.5 mm. ♂ vertex quite broad (fig. 10c). ♀ frons with a Y- or V-shaped black marking extending down from the black area of vertex,

the prongs reaching the bases of antennae; tergite 5 without yellow or orange side-markings. *Uncommon. Generally distributed (Ireland, Co. Wicklow, Clare).* 5-9.....*alneti* Fallén
 Tergite 3 with yellow or orange band, not very deeply incised behind, 4 with an entire yellow band, more or less deeply incised behind (a single female variety from Aviemore (Coe) has the band on tergite 3 deeply incised behind and that on 4 narrowly divided); R_{4+5} rather deeply looped, though less so than in *fasciata*; scutellum black-haired on at most posterior half; abdomen not noticeably wide, elongate-oval; wing length 7-10 mm. ♂ vertex narrow (fig. 10a). ♀ frons with a Y-shaped black marking extending down from the black area of vertex but the prongs not nearly reaching bases of antennae; tergite 5 with triangular yellow or orange side-markings. *Uncommon. Scottish Highlands, N. Lancs., Warwks., Bucks., Surrey, Hants., Sussex.* 5-9. (Apart from two New Forest examples and one from Crowborough, all the specimens that I have actually seen are from the Scottish Highlands, and it is possible that some lowland records really relate to *D. fasciata*)*intermedia* Loew

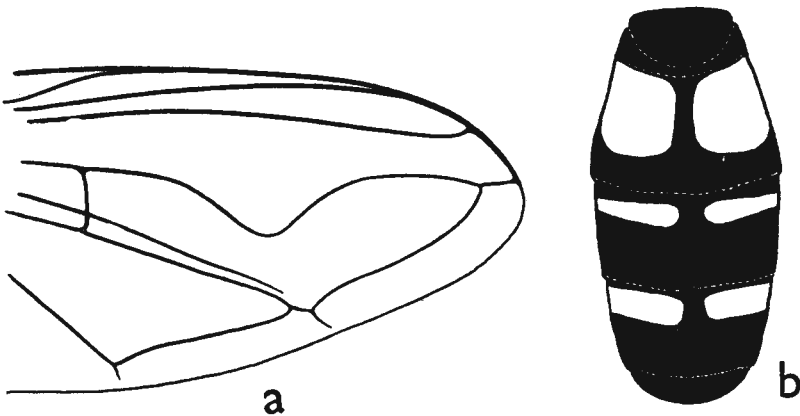
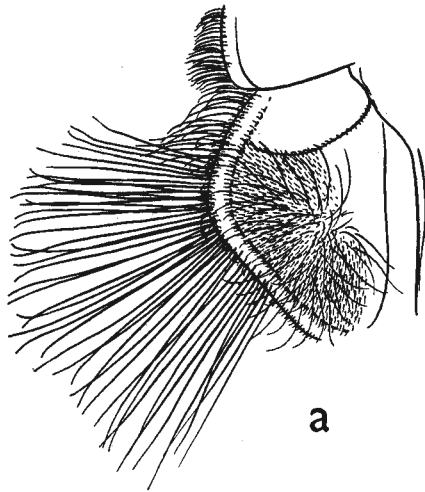


FIG. 11.—a. *Didea fasciata*, part of wing. b. *Syrphus laternarius*, abdomen. (After Verrall.)

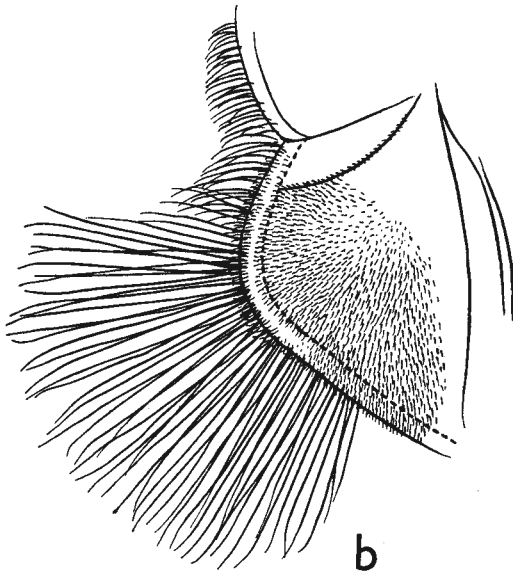
Genus *Syrphus* Fabricius.

(including *Melangyna*, *Stenosyrphus*, *Mesosyrphus*, *Episyrphus*, *Ischyrosyrphus*, *Epistrophe*, *Metasyrphus*, *Syrphella* and *Syrphidis* of Kloet and Hincks).

Wing length 5-12.25 mm. Rather small to rather large black and yellow clear-winged flies. Melanoid females are not uncommon in some species. Occur in various situations. *S. auricollis* and *S. balteatus* have occurred in vast swarms of Syrphidae along the South and South-East coasts of England. The known larvae are predaceous on various species of Aphids on plants. The early stages of *S. ribesii*, *torvus*, *cinctus* and *triangulifer* have been described by Heiss (1938 : 45 and 63), while those of *S. luniger*, *corollae*, *ribesii*, *vitripennis*, *torvus*, *auricollis*, *cinctellus*, *albostrigatus* and *balteatus* are described by Scott (1939 : 510). Metcalf (1916 : 240) describes the life-stages of *S. torvus* and *S. nitens*. Bhatia (1939 : 83) describes the early stages of *S. luniger*, *balteatus* and *ribesii*. Lundbeck (1916 : 268) refers to many papers dealing with the early stages of *Syrphus*.



a



b

FIG. 12.—Lower lobe of squama of *Syrphus*. a. *torvus*. b. *grossulariae*.

KEY TO SPECIES OF *Syrphus*.

- 1 Second abdominal tergite with a pair of narrowly separated, large squarish yellow or grey spots, occupying basal half to two-thirds of tergite (fig. 11b); tergites 3 and 4 with a pair of narrow yellow or grey bars just after base; eyes hairy (*Ischyrosyrphus* Bigot).....2
- 2 Second tergite not with large, squarish spots; eyes bare or hairy.....3
- 2 Scutellum completely yellow; four anterior legs mainly yellow, only base of femora broadly black; hind tibiae yellow, with a more or less distinct dark ring just after middle; wing length 8-11.25 mm. *Frequent. Generally distributed (Ireland).* 6-9.....*glaucius* Linnaeus
- Scutellum mainly black, only apex more or less distinctly yellowish; four anterior legs mainly black, only tip of femora narrowly, and base of tibiae broadly, yellow; hind legs entirely black; tergites as in fig. 11b; wing length 7-10 mm. *Frequent. Generally distributed (Ireland).* 6-9.....*laternarius* Mueller
- 3 Lower lobe of squama with numerous long, yellowish hairs on disc (fig. 12a).....4
- 4 Lower lobe of squama only with microscopic pile on disc (fig. 12b).....7
- 4 Eyes distinctly hairy, the hairs short and dense in ♂, very short and slightly more scattered in ♀; hind femora with more than basal half black; wing length 8.5-11.75 mm. *Frequent. Generally distributed (Ireland).* 3-10
- torvus** Osten-Sacken
- Eyes bare, or a few scattered microscopic hairs present in some males.....5
- 5 Tergites 3 and 4 with entire yellow bands.....6
- Tergites 3 and/or 4 with divided bands; otherwise resembles typical *vitripennis*. (Wing length and distribution, see typical *vitripennis*).....*vitripennis* Meigen var.
- 6 ♂ hind femora black for about basal half; even in darkest examples more than apical third remains yellow; hind femora, at least anteriorly, with apical half or more of the yellow portion closely and evenly covered with tiny black hairs. ♀ hind femora entirely yellow, or only extreme base black. ♂ ♀ wing length 7.25-11.5 mm. *Common. Generally distributed (Ireland).* 4-11
- ribesii** Linnaeus
- ♂ hind femora black for at least basal three-quarters; hind femora anteriorly entirely yellow haired or any tiny black hairs are mainly clustered around tip. ♀ hind femora black on basal two-thirds or more. ♂ ♀ wing length 7.25-10.25 mm. *Common. Generally distributed (Ireland).* 3-11
- vitripennis** Meigen (Typical forms
- 7 Tergite 3 compressed just before the lateral margins, along which a conspicuous narrow ridge or beading extends for the entire length of the tergite (fig. 13a); tergites 2 and 4 more or less compressed laterally.....8
- All tergites rolled over at sides (fig. 13b), or (*nigritarsis*—only ♀ seen) tergites 3 and 4 with a broad lateral beading, that on 3 not clearly extending to base of tergite; tergite 2 with trace of beading at tip (fig. 13c). (*S. eligans, grossulariae, diaphanus* and *nitidicollis* sometimes have tergite 3 with a rather vague, broad and complete lateral beading, and are included in both sections).....28
- 8 Thorax with two greyish median stripes anteriorly (most distinct viewed from behind).....9
- Thorax without such stripes, or (*lumulatus*) a vague pair present.....11
- 9 Eyes hairy; thorax shining black; tergites 3 and 4 with a pair of straight yellow bars, almost or quite touching anterior margin of tergites on median line, where they are usually narrowly connected, and sloping obliquely down towards side-margins; in some examples the yellow markings of tergites are reduced; wing length 6.25-9.5 mm. *Common. Generally distributed (Ireland).* 5-10
- albostriatus** Fallén
- Eyes bare; thorax entirely or almost all dull greenish; tergites 3 and 4 with entire straight yellow bands, not sloping obliquely down towards side-margins.....10
- 10 At least anterior femora darkened at extreme base; wing length 9-12.25 mm. ♂ vertex unusually long and narrow, ocelli disposed in an elongate isosceles triangle (fig. 13d); frontal lunule darkened; frons mainly or entirely black-haired. ♀ upper part of frons with a bronzy-green area, longer than wide, from which a gradually widening black or bronzy-green streak descends to antennal pits; frons entirely black-haired. *Frequent. Generally distributed (Ireland).* 6-10
-**grossulariae** Meigen
- All femora entirely yellow; wing length 7.25-9.75 mm. ♂ vertex not long and narrow, ocelli disposed in an equilateral triangle (fig. 13e); frons entirely yellow,

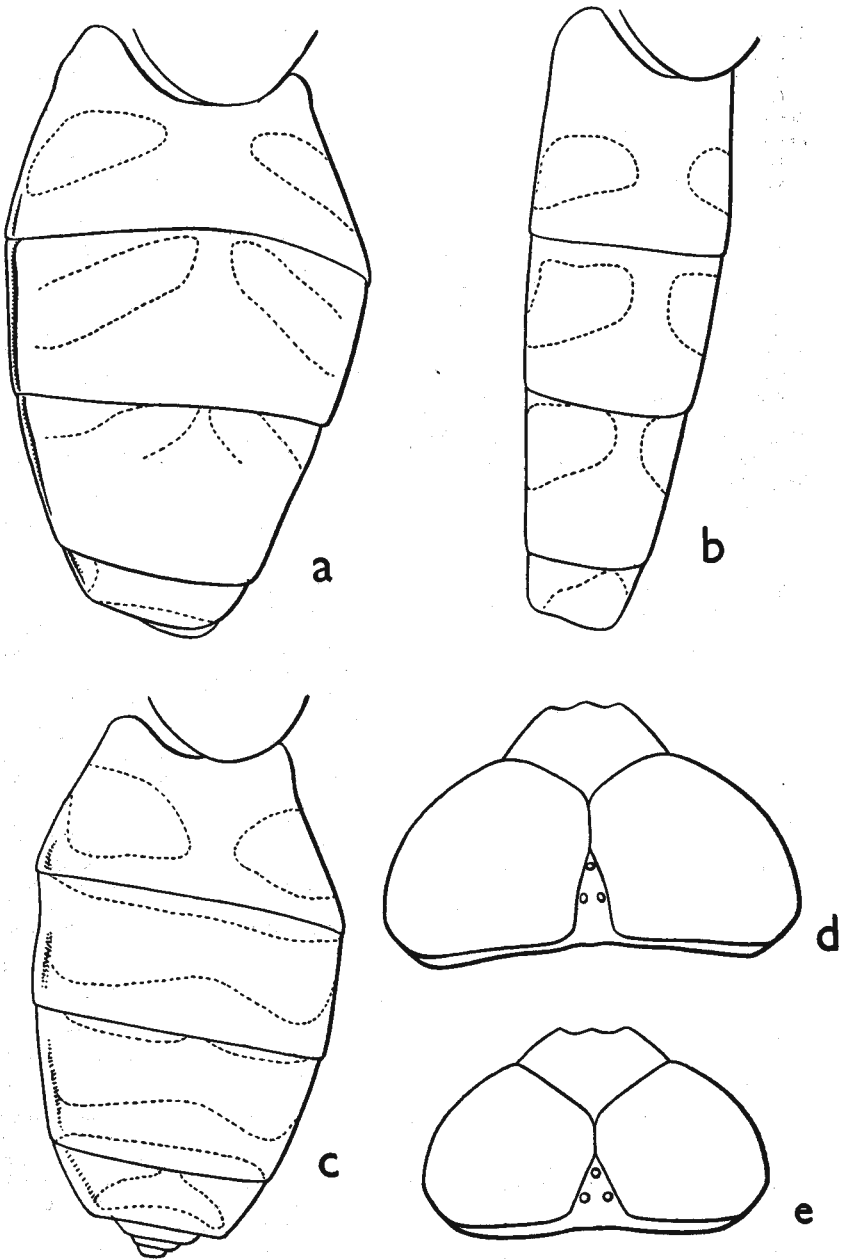


FIG. 13.—a-c. Abdominal tergites of *Syrphus*. a. *albostrigatus*, male. b. *auricollis*, male. c. *nigritarsis*, female. d-e. Heads of *Syrphus*, from above. d. *grossulariae*, male. e. *diaphanus*, male.

- mainly or entirely yellow-haired. ♀ upper part of frons with a bronzy-green area, wider than long, from which a very short median streak extends downwards, leaving frons yellow for about anterior half; frons yellow-haired for at least anterior half. *Uncommon. Worcs. southwards.* 6-8.....**diaphanus** Zetterstedt
- 11 Tergite 4 wholly black or with a narrow yellow basal band, entire or divided, which at broadest part is not much more than half as broad as that on tergite 3 12
- Tergite 4 with yellow markings at broadest part much more than half as broad as those on tergite 3.....13
- 12 Eyes bare; stigma pale yellow; tergite 2 with a pair of large, usually somewhat triangular, yellow side markings or rarely with an entire yellow band, 3 with a moderately broad entire or divided yellow band, 4 normally all black or occasionally with a straight narrow yellow basal band, usually entire; in some examples the tergites, except 2, are entirely black; wing length 6.25-9.5 mm. *Common. Generally distributed (Ireland).* 4-8
- eligans** Harris (*bifasciatus* Fabricius)
- Eyes hairy; stigma black; tergite 2 with or without a pair of narrow, isolated yellow spots, 3 with a broad yellow band, emarginate behind or divided into spots, 4 with a narrow, usually slightly interrupted, yellow band, narrowest towards median line; wing length 7.25-10.25 mm. *Common. Generally distributed (Ireland).* 4-9.....**tricinctus** Fallén
- 13 Tergites 3 and 4 with a pair of well-separated yellow lunules, normally broadest towards median line; eyes hairy.....14
- Tergites 3 and 4 with entire yellow bands, or, if with separate lunules, the eyes are bare15
- 14 Tergites 3 and 4 with lunules extending widely over side-margins; wing length 6.25-10 mm. *Common. Generally distributed (Ireland).* 4-9
- venustus** Meigen
- Tergites 3 and 4 with lunules not reaching side-margins; wing length 6.5-8.5 mm. *Frequent. Generally distributed (Ireland).* 5-8.....**lunulatus** Meigen
- 15 Tergites 3 and 4 either with a pair of yellow lunules or with an undulating yellow band; if latter, then not reaching side-margins for more than its upper half (except occasionally on tergite 4 in *corollae*); thorax in some species rather dull greenish-black; abdomen sometimes flattened above; wings hyaline.....16
- Tergites 3 and 4 with straight wide yellow bands, upper margin not incised and rarely at all undulating, lower margin usually incised at middle, always extending over side-margins for practically entire width; thorax shining black; abdomen strongly convex above; wings distinctly yellowish-tinged.....27
- 16 Eyes hairy; face with a rather narrow brownish middle stripe extending over central prominence down to mouth-edge; antennae more or less extensively darkened; thorax rather greenish-black, moderately shining; tergite 2 with a pair of yellow bars, reaching side-margins or not; tergites 3 and 4 with narrow flattish lunules extending over side-margins for anterior half or less of their width; body and legs with mainly pale pubescence; R_{4+5} moderately dipped at middle, costa ending slightly before tip of wing where it meets R_{4+5} ; legs variable in colour; coxae and trochanters darkened; four anterior femora usually brownish about base, posterior pair usually brownish for basal two-thirds; tibiae entirely yellow; tarsi more or less extensively brownish on dorsal surface; wing length 10 mm. ♀ frons dusted whitish except in front of ocellar triangle and above antennae. *Rare. Edinburgh (Arniston, nr. Dalkeith).* 8 (1 ♀; ♂ not yet taken in Britain). See Collin (1946a : 11).....**meogramma** Bigot
- Eyes bare; tergites 3 and 4 with yellow markings more strongly lunulate, usually narrower in ♀.....17
- 17 R_{4+5} strongly dipped at middle (fig. 14a); costa continued to, and meeting R_{4+5} at a point just above actual wing-tip; tergites 3 and 4 with a pair of well-formed yellow lunules, widely separated and isolated from side-margins, except sometimes at extreme upper corners in ♀; thorax black; wing length 8.5-10 mm. ♀ frons with a pair of large rather widely-separated yellow or greyish-yellow dust-spots. *Rare. Sutherland (Golspie and Invershin), Inverness (Aviemore and Glenmore), Perth (Pitlochry and Kinnoul Hill), S. Devon (R. Tamar, near Gunnislake): See Cowley (1949 : 117) and Goffe (1950 : 149).* 5-7, 9.....**lapponicus** Zetterstedt
- R_{4+5} only slightly curved down at middle (fig. 14b), or not; costa normally continued to, and meeting R_{4+5} at a point well above actual wing-tip.....18

- 18 Face wide (more so in ♂), broadest at middle, then contracting down to level of upper mouth-edge; face with a black median stripe extending from above central prominence down to upper mouth-edge, which is broadly and continuously black to actual eye-margins; tergites 3 and 4 with simple, rather narrow to moderately broad, lunules, only shallowly concave above and clearly separated from side-margins; wing length 7.5-9 mm. ♂ frons obviously inflated, the angle at approximation of eyes obviously more than ninety degrees. ♀ frons with a pair of large golden dust-spots. Rare. Inverness (Cairngorm, Nethy Bridge, Boat of Garten and Aviemore), Perth (Rannoch). 5-8, 10. See Collin (1931b : 70)
- arcuatus Fallén**

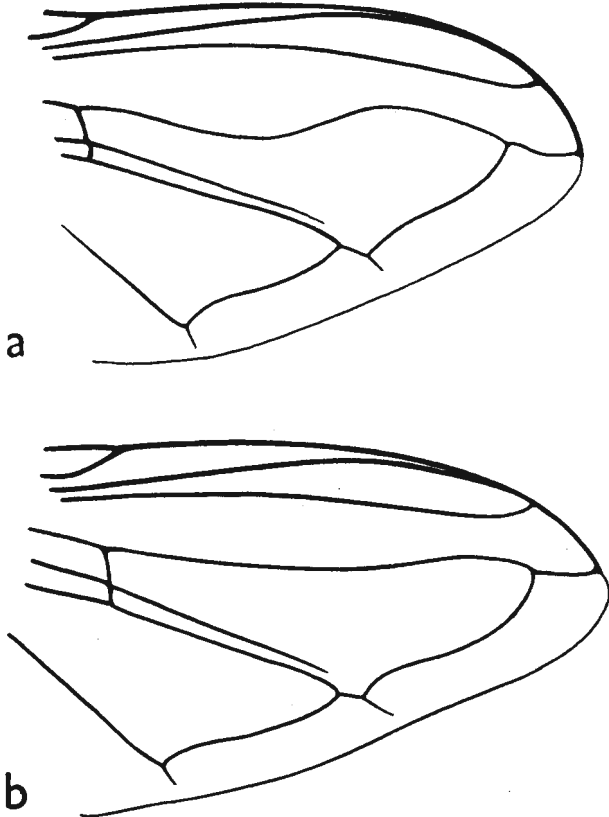


FIG. 14.—Part of wings of *Syrphus*. a. *lapponicus*. b. *luniger*.

- Face narrow, sides usually almost parallel down to level of upper mouth-edge; face usually without the combination of a black median stripe and upper mouth-edge continuously black to eye-margins; tergites 3 and 4 with undulating yellow bands, or these separated into spots or lunules. ♂ frons not at all inflated.....19
- 19 Males.....20
- Females.....24
- 20 Tergites 3 and 4 with the entire yellow bands not, or scarcely, broader than the black cross-band separating them, and than the black cross-band bounding front margin of tergite 3 and hind-margin of tergite 2; eyes touching for a distance

- about equal to the length of vertical triangle; thorax shining, bronzy-black, yellow-haired; scutellum and abdomen partly black-haired; pre-genital segment and genitalia small, former black-haired; wing length 6.75-8.75 mm. *Uncommon. Generally distributed.* 5-9.....♂ *nitens* Zetterstedt
- Tergites 3 and 4 with yellow bands or lunulate spots much broader than the black cross-band separating them, and than the black cross-band bounding front margin of tergite 3 and hind-margin of tergite 2.....21
- 21 Abdomen with pre-genital segment remarkably large and conspicuous, greenish-black, sometimes narrowly yellowish on posterior rim, brightly shining; genitalia large; eyes touching for a distance at least equal to length of vertical triangle; tergites 3 and 4 with yellow spots or bands reaching side-margins more or less broadly in front and frequently spreading along the lateral beading, which is only rarely more black than yellow; tergite 3 with large, broad yellow spots situated close to base of tergite and often united at middle, narrowing and somewhat concave towards upper corners, posteriorly straight, with or without a median incision; tergite 4 with a yellow band, sometimes divided into spots, incised towards upper corners and posteriorly at middle; wing length 5-8.25 mm. *Common. Generally distributed (Ireland).* 4-10
- ♂ *corollae* Fabricius (*consisto* Harris, of Kloet and Hincks)
- Pre-genital segment and genitalia small and inconspicuous; tergites 3 and 4 with yellow bands or lunulate spots not reaching side-margins; or only their extreme upper corner reaching them, so that the actual lateral beading of these tergites is entirely black or more black than yellow.....22
- 22 Tergites 3 and 4 with upper margin of the broad yellow bands or lunulate spots only very slightly undulating and situated rather close to base of tergites; eyes actually touching for a shorter distance than length of vertical triangle; post-ocular orbits only slightly narrowing for extent of straight upper hind margin of eyes (fig. 17a); penis, see fig. 18c; wing length 6.5-8.5 mm. *Common. Generally distributed (Ireland).* 4-9.....♂ *latifasciatus* Macquart
- Tergites 3 and 4 with upper margin of the broad yellow bands or lunulate spots considerably undulating and well removed from base of tergites (if tergite 4 is telescoped into 3 the bands or spots on 4 appear close to base of that tergite); eyes actually touching for about length of vertical triangle; postocular orbits considerably narrowing as they extend upwards along straight upper hind margin of eyes (fig. 17b).....23
- 23 Angle of frons at approximation of eyes practically ninety degrees, distinctly wider than in *luniger*; tergites 3 and 4 with the broad lunules sometimes connected, if so then with tendency to be more widely connected than in *luniger*; upper mouth-edge with greater tendency to be darkened than in *luniger*; genitalia with middle part of penis differently shaped from that of *luniger* (fig. 18b); wing length 7.5-8.5 mm. *Uncommon. Generally distributed (Ireland).* 7-9 (♀ unknown). See Collin (1931a: 179).....♂ *latilunulatus* Collin
- Angle of frons at approximation of eyes distinctly less than ninety degrees; tergites 3 and 4 with the broad lunules with greater tendency to be separated, and, when joined, usually more narrowly so than in *latilunulatus*; penis, see fig. 18a; wing length 6.5-10 mm. *Common. Generally distributed (Ireland).* 4-11
- ♂ *luniger* Meigen
- 24 Frons with mainly yellow ground-colour, only black for about posterior one-fourth to one-third of space between front ocellus and base of antennae, pale golden dust-spots rather small, not readily seen because of yellow ground-colour, frontal lunule usually brownish; scutellum normally yellow-haired; tergites 3 and 4 with broad yellow lunules, at their broadest part occupying about half length of tergite, almost touching base of tergite (at least on 4), occasionally narrowly joined at middle, and reaching side margins at their upper corners, or more broadly. (Wing length, distribution and dates, see ♂).....♀ *corollae* Fabricius
- Frons with black ground-colour (exposed at least on disc) for about posterior half or more of space between front ocellus and base of antennae.....25
- 25 Frontal dust-spots absent; scutellum normally yellow-haired, some black hairs occasionally present; frontal lunule yellow; tergites 3 and 4 with broad yellow lunulate bands, at broadest part occupying at least half length of tergite; upper margin usually only slightly undulating and placed close to base of tergite, usually broadly joined on median line and usually reaching side-margins at the upper corners or more broadly. (Wing length, distribution and dates, see ♂.)
- ♀ *latifasciatus* Macquart

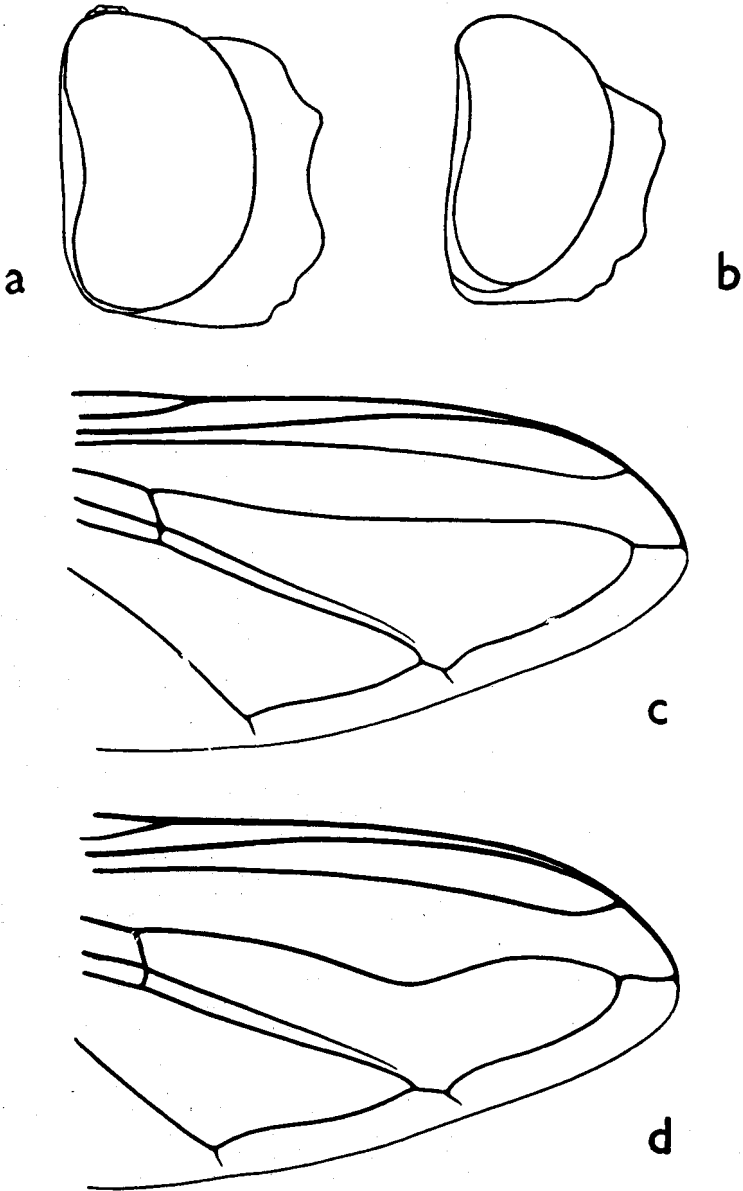


FIG. 15.—a, b. Heads of male *Scaeva* and *Didea*, in profile. a. *S. pyrastris*.
b. *D. fasciata*. c, d. Part of wings of *Syrphus*. c. *nitidicollis*. d. *annulipes*.

- Frontal dust-spots present; scutellum usually more or less extensively black-haired; tergites 3 and 4 with lunulate bands or lunules at broadest part usually occupying less than half length of tergite, usually well removed from base of at least tergite 3.....26
- 26 Pale golden dust-spots small, not spreading much across frons, so that between them the black ground-colour is usually exposed for quite half width of frons; face with sides extremely narrowly whitish-dusted against eye-margins, and this dusting continued narrowly and thinly around mouth-edge; central prominence with a black, occasionally reddish stripe, which is widest below; frontal lunule usually blackish; abdomen inclined to be wide and shortly oval; tergites 3 and 4 with rather narrow moderately undulating yellow lunulate bands, more or less broadly connected on median line, apparently never separated into lunules, reaching side-margins at their upper corners or more broadly. (Wing length, distribution and dates, see ♂).....♀ *nitens* Zetterstedt
- Pale golden dust-spots large, spreading considerably across frons, so that between them the black ground-colour is exposed for only one-third or less of width of frons; face with sides quite broadly whitish-dusted against eye-margins, and this dusting continued quite widely and densely around mouth-edge; central prominence usually yellow or orange; frontal lunule sometimes darkened; abdomen elongate-oval, not noticeably wide; tergites 3 and 4 normally with well separated lunules, or rarely with these more or less broadly joined, usually rather deeply concave on front margins, varying in breadth, usually well separated from side-margins, but occasionally reaching them at upper corners. (Wing length, distribution and dates, see ♂).....♀ *luniger* Meigen
- 27 Eyes hairy; vein R_{4+5} strongly dipped at middle (fig. 15*d*); face with a black middle line; frontal lunule black; antennae black; four anterior femora black for basal third, hind femora black for basal two-thirds, hind tibiae with black ring after middle, all tarsi with segments 2-4 darkened; wing length 10·75-12 mm. *Uncommon. Generally distributed.* 4-10.....*annulipes* Zetterstedt
- Eyes bare; R_{4+5} not noticeably dipped at middle (fig. 15*e*); face entirely yellow; frontal lunule yellow; antennae yellow; legs yellow, only coxae and sometimes extreme base of femora darkened; wing length 8-11·25 mm. *Frequent. Generally distributed.* 4-8.....*nitidicollis* Meigen
- 28 Mesopleura with the anterior depressed portion immediately behind prothoracic spiracle bearing obvious hairs (fig. 16*a*).....29
- Mesopleura with only soft microscopic pile on anterior depressed portion (fig. 16*b*); wings without strips of dark chitin on actual hind margin (except in *cinctus*)....37
- 29 Wings with actual hind margin bearing a series of minute strips of dark chitin placed alternately on upper- and underside of wing surface, these appearing as minute black dashes under high magnification (fig. 17*e*).....30
- Wings without such strips of chitin on actual hind margin.....32
- 30 Thorax partly shining with three dull green stripes merging into a large semi-circular dull green patch posteriorly; tergites 3 and 4 with a broad yellow band partially or completely divided by a narrow black transverse stripe; abdomen rather narrow, inclined to be parallel-sided; antennae mainly yellow, segment 3 usually darkened above; legs mainly yellow, hind tarsi usually somewhat darkened; wing length 6-10·25 mm. *Common. Generally distributed (Ireland).* 2-11, 1 (in conservatory).....*balteatus* Degeer
- Thorax entirely shining metallic black.....31
- 31 Tergites 3 and 4 with yellow or partly or entirely metallic grey bands, deeply incised behind, where they slope more or less obliquely down towards sides; in var. *maulicornis* Zetterstedt the bands are yellow laterally and metallic grey on median line, giving the impression of pairs of yellow spots; face, antennae and legs variable in colour; summer examples frequently have face quite yellow, antennae mainly yellow, segment 3 partly darkened, legs mainly yellow; spring and autumn examples especially have a tendency to be much darker, face with black median stripe and even sides sometimes darkened, antennae mainly blackish, legs more or less extensively blackish; wing length 6-9·5 mm. *Common. Generally distributed (Ireland).* 2-11.....*auricollis* Meigen
- Tergites 3 and 4 with straight yellow bands, not or only moderately incised behind, extending for full width or practically so over the sides; face yellow, the central prominence elongate and broad, undusted, shining, occasionally darkened; arista rather long; legs as given below in diagnoses of sexes, or in pale forms more extensively or entirely yellow; wing length 7-9·75 mm. ♂ frons heavily dusted

yellowish-grey, frontal lunule shining, usually black; four anterior legs yellow, except front femora narrowly, and mid femora more broadly, black from just after base; hind legs with femora black except at extreme base and tip; tibiae mainly black, brownish at base and tip, tarsi darkened. ♀ frons heavily dusted yellowish-grey, more lightly so around vertex and sometimes on median line, frontal lunule as in ♂; legs as in ♂, but mid femora yellow and hind femora and tibiae usually less extensively blackish. Common. Generally distributed (Ireland). 4-10.....*cinctellus* Zetterstedt

- 32 Tergites 3 and 4 with yellow bars narrowly separated on median line, these bars markedly semicircular; eyes with short pale hairs, very short and inconspicuous in ♀; face more or less distinctly yellowish, dusted yellowish-grey except on

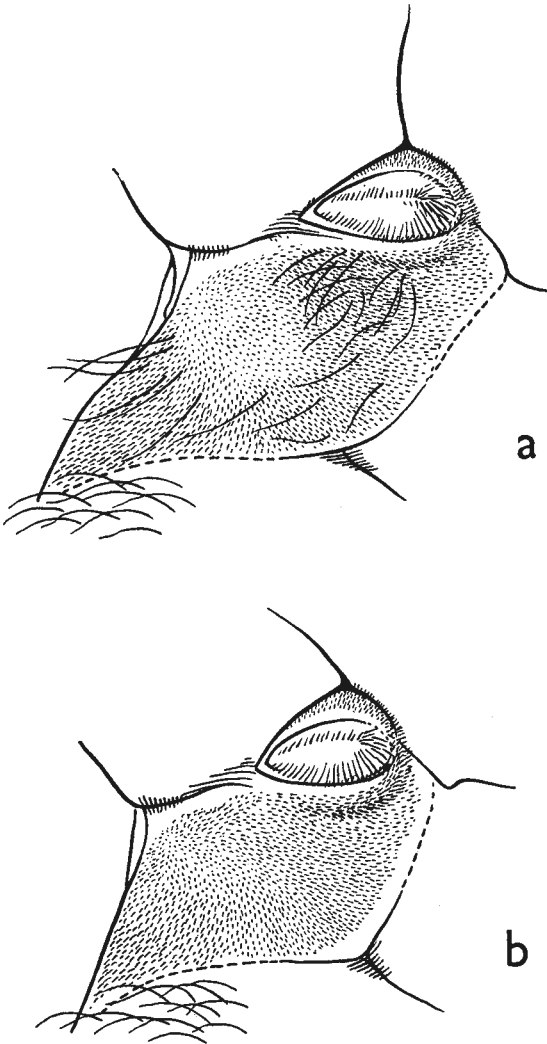


FIG. 16.—Mesopleura and adjoining parts of *Syrphus*. a. *cinctellus*. b. *cinctus*.

- the short moderately broad shining black median stripe; four anterior legs more or less extensively yellowish; hind legs black except knees usually more or less broadly yellowish; wing length 5.5-7.75 mm. ♀ frons shining black, with large yellowish-grey dust-spots, contiguous or almost so. *Frequent. Generally distributed (Ireland)*. 3-6.....**punctulatus** Verrall
Tergites 3 and 4 with entire yellow bands.....33
- 33 All femora and tibiae clear yellow; face completely yellow, central prominence very large, much produced, broad, occupying fully two-thirds width of face; frons shining black, with large contiguous yellowish-grey dust-spots, frontal lunule yellowish; tergites 3 and 4 with the yellow bands broad, narrowing behind towards median line and broadly extending over side-margins anteriorly; wing length 8.25-9.5 mm. *Rare. Moray (Grantown-on-Spey)*. 6. See Collin (1952: 35).....♀ **nigritarsis** Zetterstedt (♂ not seen)
Hind femora mainly black, hind tibiae with at least broad black ring beyond middle34
- 34 Four anterior tibiae and tarsi immaculately clear yellow; dark facial stripe usually broad, extending well above central prominence, oral margin darkened; antennae partly yellowish, at least beneath segment 3; mesonotum moderately shining; pleurae shining, greenish-black; tergite 2 with yellow side-stripes usually not much cut away behind towards sides and not usually reaching forward to actual base of tergite; 3 and 4 with yellow bands not usually much cut away behind towards sides; stigma pale yellowish; otherwise differs from three following species; antennae smaller; pubescence mainly shorter; facial prominence smaller (and more evenly rounded than in *vittiger* and *lineola*); wing length 5.5-8 mm. ♀ four anterior legs with only coxae darkened. *Frequent. Generally distributed (Ireland)*. 5-8**annulatus** Zetterstedt.
Four anterior tarsi blackish, or at least partly darkened; four anterior tibiae sometimes with preapical black ring.....35
- 35 Mesonotum shining black, glittering metallic towards sides, punctures at base of hairs extremely fine, not readily seen; pleurae shining, greenish-black; antennae partly yellowish, at least beneath segment 3; facial prominence rather rounded and projecting (fig. 17c); face grey-dusted in ♂, in ♀ dusted only at sides, so that the rest of face apart from the long dark median stripe is shining brownish-yellow; stigma brownish; tergite 2 with yellow side-stripes usually much cut away behind towards sides, and not usually reaching forward to base of tergite, 3 and 4 with yellow bands usually much cut away behind towards sides; wing length 7.75-8.75 mm. *Rare. Moray (Grantown), Perth (Loch Katrine), Hants. (Holmsley), Sussex (Crowborough)*. 4-6. See Collin (1952a: 35)
malinellus Collin
Mesonotum yellowish-green, rather dull on disc, moderately shining towards sides; punctures rather coarse, readily seen as distinct black dots; pleurae dullish, greenish-grey; antennae normally black; facial prominence less rounded, less conspicuous (fig. 17d)36
- 36 Stigma yellowish-brown or light yellowish-brown; legs extensively yellow; four anterior femora mainly yellow, blackish only at base, hind pair mainly blackish, broadly yellow at tip; four anterior tibiae all yellow, or rarely with faint dark preapical ring, hind pair with broad black ring beyond middle; four anterior tarsi, except usually metatarsi, more or less distinctly darkened, hind pair all black; tergite 2 with yellow side-stripes usually much cut away behind towards sides and usually reaching forward to actual base of tergite; tergites 3 and 4 with yellow bands usually much cut away behind towards sides; wing length 6.25-8.75 mm. *Frequent. Generally distributed*. 5-9.....**vittiger** Zetterstedt
Stigma blackish-brown; legs extensively black; tergite 2 with yellow side-stripes usually not much cut away behind towards sides and not usually reaching forward to base of tergite; tergites 3 and 4 with yellow bands usually not much cut away behind towards sides; profile of face as in fig. 17d; wing length 7.25-8.25 mm. ♂ four anterior femora black, broadly yellow at tip, hind pair all black; four anterior tibiae yellow with preapical black ring, hind pair black, sometimes narrowly pale at base; all tarsi black. ♀ four anterior femora with about basal half black, hind pair black except at tip; four anterior tibiae entirely yellow, hind pair black except usually at base; tarsi black except four anterior metatarsi sometimes pale. *Uncommon. Generally distributed*. 5-8
lineola Zetterstedt

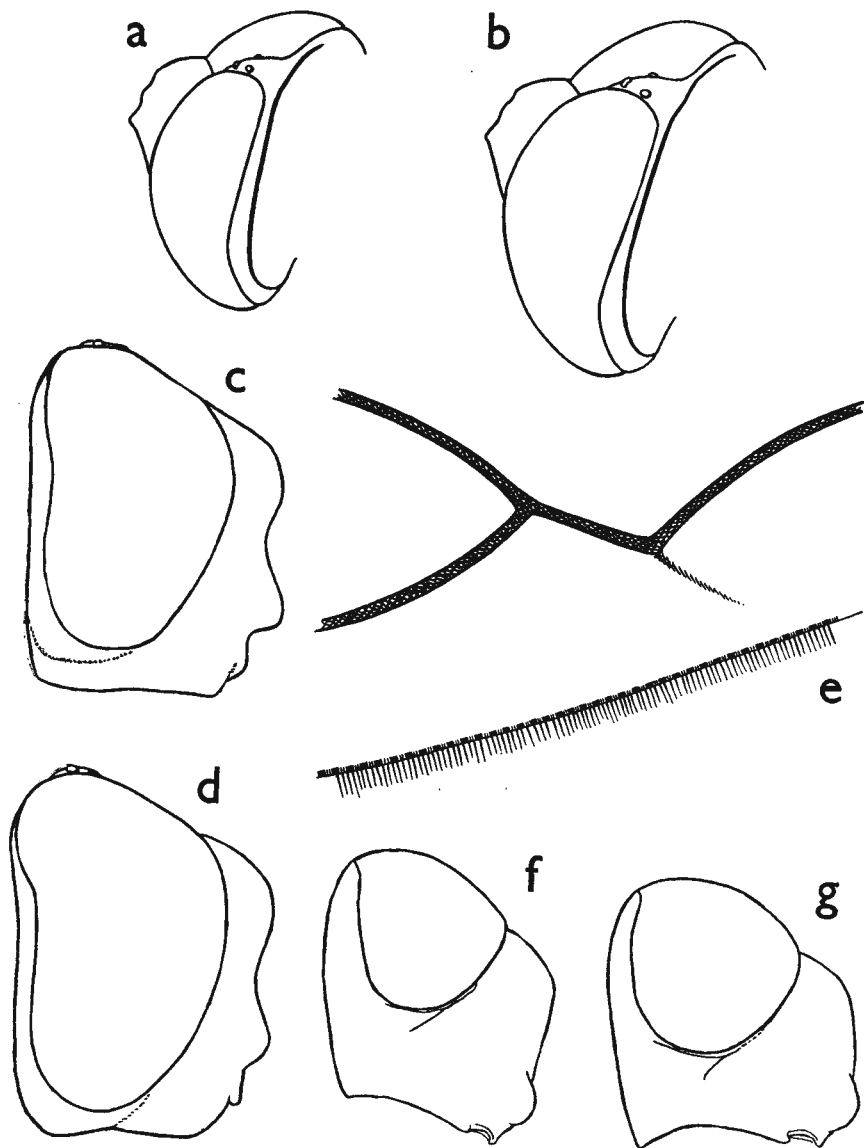


FIG. 17.—Heads and part of wing of *Syrphus*. a, b. Heads of males, dorso-lateral view. a. *latifasciatus*. b. *luniger*. c, d. Heads of males, in profile. c. *malinellus*. d. *lineola*. e. Hind margin of wing of *balteatus*. f, g. Heads of males, latero-ventral view. f. *barbifrons*. g. *arcticus*.

- 37 Tergite 4 with entire yellow band, or if tergite 4 is completely black (*eligans* normally), then at least tergite 2 has yellow markings.....38
 Tergite 4 either with a pair of clearly divided yellow or whitish bars, or tergites completely black (*quadrifasciatus* ♀)42
- 38 Thorax entirely dull greenish or partially so.....39
 Thorax entirely shining metallic black.....40
- 39 At least anterior femora darkened at extreme base; wing length 9-12.25 mm.
 ♂ vertex unusually long and narrow, ocelli disposed in an elongate isosceles triangle (fig. 13*d*); frontal lunule darkened, frons mainly or entirely black-haired. ♀ upper part of frons with a bronzy-green area, longer than wide, from which a gradually widening black streak descends to antennal pits; frons entirely black-haired. *Frequent. Generally distributed (Ireland).* 6-10...**grossulariae** Meigen
 All femora entirely yellow; wing length 7.25-9.75 mm. ♂ vertex not long and narrow, ocelli disposed in an equilateral triangle (fig. 13*e*); frons entirely yellow, mainly or entirely yellow haired. ♀ upper part of frons with a bronzy-green area, wider than long, from which a very short dark median streak descends, leaving frons yellow for about anterior half; frons yellow-haired for at least anterior half. *Uncommon. Worcs. southwards.* 6-8.....**diaphanus** Zetterstedt
- 40 Tergite 4 normally entirely black, or if (rarely) with a narrow yellow basal band, this is only about half as wide as that on tergite 3, which may be emarginate behind or interrupted; in some examples the tergites are entirely black except for the large, usually somewhat triangular yellow basal spots or rarely an entire yellow band on tergite 2; body mainly yellow-haired; legs mainly yellow, hind tarsi mainly black, femora sometimes more or less extensively darkened at base; wing length 6.25-9.5 mm. *Common. Generally distributed (Ireland).* 4-8**eligans** Harris (*bifasciatus* Fabricius)
 Tergite 4 always with yellow band, nearly or quite as wide as that on tergite 3....41
- 41 Face (fig. 19*a*) much wider than maximum width of an eye, clear yellow, only lightly dusted towards sides; central prominence large, not at all circular; wings without strips of chitin on actual hind-margin; legs yellow, only coxae and sometimes extreme base of femora darkened; normally rather broad species; wing length 8-11.25 mm. ♂ eyes touching for about length of vertical triangle; frons yellow, grey-dusted on posterior half and at sides. ♀ frons shining black; with a yellow area above antennae, and large grey dust-spots. *Frequent. Generally distributed.* 4-8**nitidicollis** Meigen
 Face (fig. 19*b*) narrower than maximum width of an eye, yellow, rather heavily dusted except on the small, almost circular central prominence; wings with microscopic strips of dark chitin on actual hind-margin; legs as in diagnoses of sexes, or in pale examples more extensively or entirely yellow; narrow species; wing length 6.25-8.75 mm. ♂ eyes touching for about twice length of vertical triangle; frons obscurely yellowish, heavily grey-dusted except on frontal lunule; four anterior legs yellow, except femora black at base, more extensively so in mid pair; hind legs with femora black except at tip; tibiae brownish-yellow with black ring at middle, tarsi darkened. ♀ frons with heavy grey lateral dusting soon after vertex, leaving a narrow shining black median stripe, bordered anteriorly by an undusted normally yellow area; legs as in ♂, but four anterior femora yellow, and hind femora and tibiae usually less extensively blackish. *Frequent. Generally distributed (Ireland)* 4-9.....**cinctus** Fallén
- 42 Front tibiae and tarsi entirely clear yellow or orange; scutellum entirely pale-haired; antennae extensively yellow or orange.....43
 At least front tarsi distinctly darkened, even in pale examples never clear yellow or orange; scutellum entirely or partly black-haired (except in *quadrifasciatus* and some examples of *lasiophthalmus*).....44
- 43 At least tergites 3 and 4 with the yellow side-spots isolated from side-margins; face produced much more than frons; wing length 6.75-8 mm. ♂ hind legs mainly yellow. ♀ frons shining black, not at all metallic and without purple reflections; frontal lunule not arched and with only a slight median depression. *Uncommon. Inverness (Aviemore), then N. Lancs. southwards.* 4-6
euchromus Kowarz
 All yellow side-spots on tergites extending over side-margins; face only slightly more produced than frons (slightly more prominent in ♀ than in ♂); wing length 5-8 mm. ♂ hind legs mainly black. ♀ frons shining metallic black, with purple reflections; frontal lunule very arched, with three distinct depressions. *Uncommon. N. Lancs. southwards.* 4-9.....**triangulifer** Zetterstedt

- 44 Face entirely clear yellow or orange; frons with lower part mainly yellow or orange; thorax with pale yellow ground-colour at sides and sometimes with a pair of yellow spots posteriorly; wing length 5.25-7 mm. *Uncommon. Generally distributed.* 6-9*guttatus* Fallén
 Face with at least a black median stripe; frons with lower part mainly darkened; thorax uniformly black or greenish-black, sometimes grey-dusted at sides in front of suture.....45
- 45 Males.....46
 Females.....53
- 46 Face entirely black or obviously darkened, or if sides orange, then the median black stripe is broad, extending well above central prominence and mouth-edge is with a broad black shining lightly dusted area.....47
 Face always yellow or orange at sides, rather heavily dusted, the median black stripe normally narrow, not wider than central prominence, above which it does not usually much extend; mouth-edge often narrowly darkened, but this area is heavily obscured and dulled by the universal facial dusting.....50

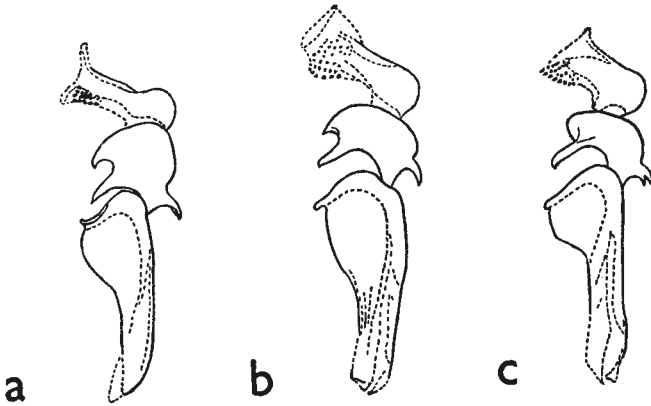


FIG. 18.—Aedeagus of *Syrphus*. a. *luniger*. b. *latilunulatus*. c. *latifasciatus*. (After Collin.)

- 47 Eyes obviously short-haired; scutellum mainly or entirely pale-haired.....48
 Eyes quite bare; scutellum mainly or entirely black-haired; face usually entirely black or darkened; antennae of moderate size or small; tergite 2 with yellow side-spots much reduced or absent49
- 48 Face with sides obviously orange; antennae noticeably large, segment 3 obviously longer than deep; tergite 2 with moderately large yellow side-spots, these sometimes slightly reduced; scutellum usually partly black-haired; wing length 7-9.25 mm. *Frequent. Generally distributed (Ireland)* 3-8
 ♂ *lasiophthalmus* Zetterstedt
 Face entirely black; antennae small, segment 3 as deep as long; tergite 2 entirely black; scutellum entirely pale-haired; wing length 7.25-9 mm. *Frequent. Generally distributed (Ireland, Co. Down, Rostrevor, W. F. Johnson, 1 ♂)* 3-5
 ♂ (*Melangyna* Verrall) *quadrimaculatus* Verrall
- 49 Tergite 2 without yellow side-spots; jowls (fig. 17f) below eyes obviously deeper than arista is long; antennae of moderate size; abdomen mainly black-haired; halteres conspicuously yellowish; wing length 5.75-7.25 mm. *Uncommon. Generally distributed.* 3-6♂ *barbifrons* Fallén
 Tergite 2 with a pair of small yellow side-spots; jowls below eyes not deeper than arista is long (fig. 17g); antennae noticeably small; abdomen mainly pale-haired; halteres obscurely yellowish or greyish-brown; wing length 5.75-7.5 mm. *Uncommon. Generally distributed (Ireland).* 4-9.....♂ *arcticus* Zetterstedt

- 50 Anterior pair of femora with at least apical third clearly or obscurely orange; anterior pair of tibiae clearly or obscurely orange, apart from a distinct black marking just after middle; thorax distinctly shining, black, without obvious dusting except at sides in front of suture.....51
- Anterior pair of femora narrowly yellow or orange at tip only; anterior pair of tibiae more extensively darkened, usually orange only for basal third and at extreme tip; thorax obviously dulled by dust, greenish-black (best appreciated by comparing with black of tergites).....52

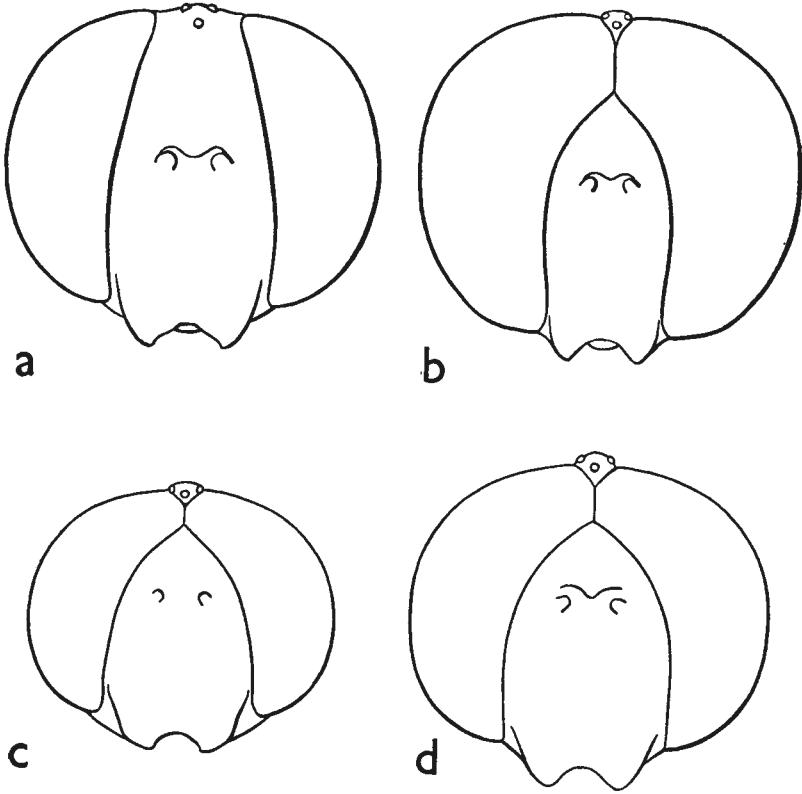


FIG. 19.—Heads of *Syrphus*, from in front. a. *nitidicollis*, female. b. *cinctus*, male. c. *labiatarum*, male. d. *compositarum*, male.

- 51 Thorax pale-haired on disc; jowls with only pale hairs below eyes; tergite 2 with yellow side-spots moderately large and extending close to or over side-margins; legs with distinct clear orange markings; four anterior femora with few or no bristly black hairs behind; wing length 6.5–8.75 mm. *Frequent. Generally distributed, but more prevalent in S. England (Ireland).* 5–9

♂ *umbellatarum* Fabricius

- Thorax extensively black-haired on disc; jowls with some dark hairs below eyes; tergite 2 with yellow side-spots rather small and widely distant from side-margins; legs with rather obscure orange markings; four anterior femora with numerous bristly black hairs behind; wing length 8–10 mm. *Rare. Sutherland (Glen Shin), Inverness (Strathspey and Aviemore).* 7–10. See Collin (1946b : 117)

♂ *ericarum* Collin

- 52 Face broad, duller than in *compositarum* ♂; slightly, but steadily, widening down to level of central prominence (fig. 19c); eyes more distinctly hairy than in *compositarum* ♂; thorax less shining than in *compositarum* ♂; wing length 6.25-8.75 mm. *Frequent. Generally distributed, but more prevalent in S. England.* 4-8.....♂ *labiatarum* Verrall
- Face narrower and more shining than in *labiatarum* ♂, sides almost parallel (fig. 19d); eyes very slightly hairy; thorax more distinctly shining than in *labiatarum* ♂; wing length 5.25-8.5 mm. *Frequent. Generally distributed, but more prevalent in Scotland.* 5-9.....♂ *compositarum* Verrall
- 53 Frons with dust-spots vague, indeterminate in shape, sometimes contiguous, or absent..... 54
- Frons with dust-spots clearly defined, of determinate shape, or entire frons dusted; occiput almost or quite dull, heavily dusted56
- 54 Eyes shortly hairy; face entirely black; antennae with segment 3 as deep as long; tergites entirely black. (Wing length, distribution and dates, see ♂.)
♀ *quadrifasciatus* Verrall
- Eyes bare; face extensively yellow or orange; tergites with distinct yellow or orange side-spots55
- 55 Body with glittering black ground-colour, including sides of thorax, which is completely devoid of dusting; occiput shining, only lightly dusted; frons glittering black, dust-spots very vague; antennae noticeably large. (Wing length, distribution and dates, see ♂)♀ *barbifrons* Fallén
- Body moderately shining, sides of thorax dull, obviously dusted greyish in front of suture; occiput dull, heavily dusted; frons with large, vague, contiguous dust-spots; antennae noticeably small. (Wing length, distribution and dates, see ♂)♀ *arcticus* Zetterstedt
- 56 Frons entirely dusted yellowish, more sparsely on upper part, but black ground-colour completely obscured, the yellow dusting connecting with that along occiput; thorax completely dull; antennae rather small. (Wing length, distribution and dates, see ♂)♀ *labiatarum* Verrall
- Frons with yellowish dust-spots not extending back to ocellar triangle; a roughly rectangular shining area of black ground-colour extending back from well in front of anterior ocellus to upper hind corner of eyes; thorax obviously shining on disc57
- 57 Thorax uniformly but lightly dusted on disc, moderately shining, greenish, heavily dusted at sides in front of suture; frons with limits of yellow dust-spots less clearly defined than in the following species, broad and semicircular at the point of approximation and rather vaguely separated, the area immediately in front of anterior ocellus lightly dusted, but not enough to hide the black ground-colour; antennae rather small. (Wing length, distribution and dates, see ♂)
♀ *compositarum* Verrall
- Thorax not obviously dusted except at sides in front of suture, blackish; frons with the area immediately in front of anterior ocellus not at all dusted, shining black.....58
- 58 Eyes obviously short-haired; frons with dust-spots obviously narrowing from eyes to point of approximation, usually rather small and narrow, usually separated by considerably more than thickness of base of arista; scutellum very extensively pale-haired; sides of thorax in front of suture only lightly dusted. (Wing length, distribution and dates, see ♂).....♀ *lasiophthalmus* Zetterstedt
- Eyes apparently bare; dust-spots broad, rather large, very distinctly contrasted with black ground-colour, not appreciably narrowing from eyes to point of approximation, separated (if at all) by scarcely more than thickness of base of arista; scutellum extensively black-haired; sides of thorax in front of suture heavily dusted59
- 59 Face with median black stripe narrow, at its widest (lowest) part less wide than space between bases of antennae, usually extending narrowly and indistinctly around upper part of mouth-edge; thorax with entirely pale hairs; tergite 2 with yellow side-spots reaching base of tergite towards sides, and extending broadly over side-margins; four anterior femora with only pale hairs behind (Wing length, distribution and dates, see ♂).....♀ *umbellatarum* Fabricius
- Face with median black stripe wider than in *umbellatarum* ♀, at its widest (lowest) part as wide as space between bases of antennae, and extending broadly and distinctly around upper part of mouth-edge; thorax with hairs partly black,

more obviously near lateral margins; tergite 2 with yellow side-spots smaller than in *umbellatarum* ♀, widely removed from base of tergite and not nearly reaching the side-margins; legs darker than in *umbellatarum* ♀, especially mid femora less broadly yellow towards tip, and mid tibiae more extensively darkened; four anterior femora with a row of bristly black hairs behind. (Wing length, distribution and dates, see ♂).....♀ *ericarum* Collin

Subfamily CHRYSOTOXINAE.

Genus *Chrysotoxum* Meigen.

Wing length 7–13 mm. Medium-sized to rather large yellow and black wasp-like flies. Occur in various situations, and especially near wooded areas. The feeding habits of the larvae are apparently unknown. Beling (1882 : 231), who describes the larva and puparium of *C. bicinctum*, found the larva in a compost heap. Greene (1923 : 84) describes the larva and puparium of *C. pubescens* Loew, a North American species; he found the larva under a stone in a moist situation, and from his description and figures it appears to conform to the aphidiphagous type. Dr. J. Smart found a puparium of *C. festivum* under loose turf in a cultivated field in April.

KEY TO SPECIES OF *Chrysotoxum*.

- 1 Abdomen with the raised lateral beading of tergites continuously black; tergites 2–4 with a pair of well-separated posteriorly concave yellow bows, sloping outwards; antennae (fig. 20a) with segment 3 shorter than 1 and 2 together (ventral measurement).....2
- Abdomen with the raised lateral beading of tergites partly yellow.....3
- 2 Thorax with a pair of rather broad grey longitudinal stripes anteriorly, separated just in front of transverse suture by, at most, slightly more than the width of a stripe; pleurae with well-formed yellow markings, including one against upper margin of sternopleura; wings with R₄₊₅ strongly dipped after middle; legs completely yellow and orange; antennae as in fig. 20a; wing length 8·25–12 mm. *Frequent. Angus southwards (Ireland). 6–10.....festivum* Linnaeus
- Thorax with a pair of narrow (sometimes faint) grey longitudinal stripes anteriorly, separated just in front of transverse suture by about twice the width of a stripe; pleurae with reduced yellow markings, at least the one on sternopleura sometimes missing; R₄₊₅ only moderately dipped after middle; four anterior femora broadly black at base, legs otherwise yellow and orange; wing length 8–10·25 mm. *Rare. Hants. (New Forest and Mudeford), Dorset (Studland, West Moors, etc.), Devon (Tamerton Foliot), Cornwall (Penzance). 5–7.....vernale* Loew
- 3 Stigmal area of subcostal cell, most of cell R₁ and upper part of cell R₃, intensely chocolate-brown tinged; tergite 3 with yellow markings absent or reduced, at most an almost linear yellow band, divided or not, near base; tergite 2 with a pair of broad yellow bows only narrowly separated or occasionally joined on median line; tergite 4 with a normally entire broad yellow bow; antennal proportions almost as in *festivum* and *vernale*; wing length 7–10·25 mm. *Frequent. Generally distributed (Ireland). 6–9.....bicinctum* Linnaeus
- Stigma orange, surrounding area yellowish or almost clear; tergites 2–4 with a pair of broad yellow bows, and usually other yellow markings.....4
- 4 Antennae (fig. 20b) with segment 3 obviously longer than 1 and 2 together (v.m.); abdomen more arched, more shortly ovate than in other species; wing length 8–10·25 mm. *Frequent in Scotland, uncommon elsewhere (Ireland). 5–9*
arcuatum Linnaeus
- Antennae (fig. 20c) with segment 3 at least slightly shorter than 1 and 2 together (v.m.).....5
- 5 Antennae (fig. 20c) with segment 1 only about two-thirds as long as 2, latter slightly shorter than 3 (v.m.); largest British *Chrysotoxum*; wing length 10·25–13 mm. ♂ eyes actually in contact for at most length of vertical triangle; genitalia exceptionally large and extruding. *Common. N. Lancs. southwards. 5–8*
cautum Harris

Antennae (fig. 20*d*) with segment 1 as long as or slightly longer than 2 (v.m.).
 ♂ eyes actually in contact for a distance at least equal to length of vertical triangle; genitalia small and compact.....6

- 6 Tergite 2 with front margin of the interrupted yellow band almost parallel with front margin of tergite, receding only moderately (and never steeply) just before side-margins; tergites extensively yellow, the transverse dark markings with tendency to be very narrow, and yellow hind-margins with tendency to be correspondingly broad; tergites 3 and 4 with basal transverse dark markings extending towards side-margins without interruption; antennae as in fig. 20*d*; wing length 8.25-10.5 mm. *Frequent. S.E. England (Norfolk southwards).* 6-8

verralli Collin

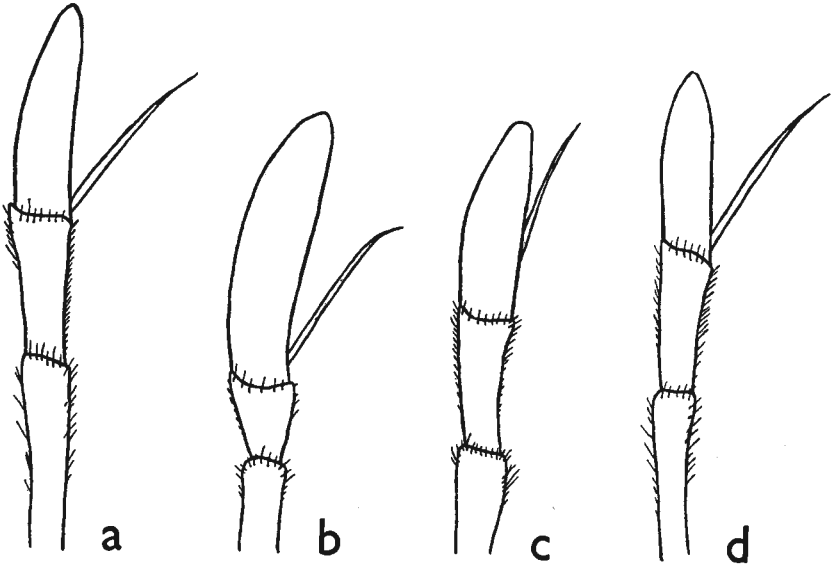


FIG. 20.—Antennae of *Chrysotoxum*, from below. a. *festivum*.
 b. *arcuatum*. c. *cautum*. d. *verralli*.

Tergite 2 with front margin of the interrupted yellow band steadily and often steeply receding from front margin of tergite as it proceeds towards side-margins, or if (occasionally) not or only slightly receding for greater part of length it curves very sharply downwards just before side-margins; tergites usually extensively black, the transverse dark markings with tendency to be broad, and yellow hind-margins with tendency to be correspondingly narrow.....7

- 7 Tergite 4, and usually 3, with basal dark transverse marking *always interrupted* just before side-margins, being resumed on the beaded edging; frontal prominence narrower and its sides more parallel than in following species; wing length 9-10.25 mm. ♀ hairs at sides of thoracic disc noticeably short; fringe of hairs and small black bristles along side-margins of tergites also noticeably short, the golden hairs bordering tergites 3 and 4 scanty. *Uncommon and local, mainly on heaths. Hans., Dorset.* 5-8.....**octomaculatum** Curtis
- Tergites 3 and 4 with basal dark transverse marking *not interrupted* before side-margins, although occasionally *ending* short of the side-margins, which are then continuously yellow. ♀ hairs at sides of thoracic disc and along side-margins of tergites moderately long, the golden hairs bordering tergites 3 and 4 numerous.....8
- 8 Tergites 2-4 with narrow yellow hind-margins, narrowest on tergite 2, those on tergites 3 and 4 much less wide than the yellow bows immediately above them;

wing length 9.5–12 mm. ♂ tergites 2–4 with yellow hind-margins extending or not to actual side-margins. ♀ tergites 3 and 4 with yellow hind-margins even narrower than in ♂, that on tergite 2 normally abbreviated, apparent only for middle third or less of tergite. *Uncommon. Norfolk southwards.* 5–9

elegans Loew
Tergites 2–4 with wide yellow hind margins, those on tergite 2 less wide, those on 3 and/or 4 frequently at widest part at least as wide as the yellow bows immediately above them, extending to actual side-margins on all three tergites; wing length 10–12.5 mm. ♀ tergites 3 and/or 4 with the yellow hind-margins sometimes so wide as to amalgamate with the yellow bows above, the normally intermediate black transverse marking then being completely absent. *Frequent. Southern half of Britain.* 6–9.....*latilimbatum* Collin

(NOTE.—Collin (1940) treats *elegans* and *latilimbatum* as two distinct species, and although following him here, I am of the opinion that *latilimbatum* is simply a colour variety of *elegans*. The dissected male genitalia appear identical.)

Subfamily CHEILOSINAE.

KEY TO GENERA

(partly based on Hull).

- 1 Face below extended into a long straight porrect snout; R_{4+5} and costa meeting far below apex of wing.....*Rhingia* Scopoli (p. 42).
Face without such snout; R_{4+5} and costa meeting at or just before apex of wing...2
- 2 Face without a median tubercle, although sometimes protruding below.....3
Face with a median tubercle, sometimes small, between antennae and oral margin; oral margin usually not sharply produced.....16
- 3 Wing without bristles along R, although inconspicuous fine hairs may be present...4
Wing with some conspicuous fine bristles along R.....5
- 4 Face either concave and/or produced diagonally forward upon lower half or straight in profile with the oral margin strongly projecting; hind femora simple, or very thick and denticulate.....7
Face straight in profile, the oral margin not or only slightly projecting; eyes pilose; hind femora simple or moderately swollen distally, sometimes micro-denticulate ventrally; upper marginal cross-vein confluent with R_{4+5} well before actual tip of wing.....11
- 5 Aeneous flies, with very strong bristles or bristly hairs on mesonotum, especially conspicuous laterally on thorax and along hind border of scutellum; face concave on upper half, rounded, but without a median tubercle, below
Ferdinandea Rondani (p. 43).
Not aeneous flies, usually grey and yellow or brownish; if strong bristles or bristly hairs are present on mesonotum, the face is deeply concave and projecting obliquely below.....6
- 6 Arista with long hairs on basal three-quarters, most of these hairs several times as long as arista is thick at base and all arranged on upper and lower sides of arista only; mesonotal bristles strong; upper marginal cross-vein curved inwards where it meets R_{4+5} , the appendix long; femora considerably swollen, especially hind pair, the latter with numerous conspicuous spines below (face of ♂ with a median tubercle; see under Couplet 17)
Hammerschmidtia Schummel ♀ (p. 45).
Arista almost bare, or at most hairs scarcely longer than arista is thick at base; hairs arising all around arista; mesonotal bristles usually weak, hairlike; upper marginal cross-vein directed outwards where it meets R_{4+5} , the appendix short; femora more slender with weaker spines.....*Brachyopa* Meigen (p. 45).
- 7 Face strongly retreating upon the upper half, projecting bluntly and diagonally forward upon the lower half; hind femora moderately thickened with short spines below towards tip; upper marginal cross-vein confluent with R_{4+5} practically at wing-tip (face of ♂ with a median tubercle; see under Couplet 16)
Myolepta Newman ♀ (p. 47).
Face straight or very slightly retreating on upper half, the oral margin always more or less produced forward.....8
- 8 Abdomen short, oval, compact or flattened.....9
Abdomen elongate, slender, usually constricted at the base and often quite petiolate; oral margin frequently much produced forward; antennae rather short.....10

- 9 Eyes densely pilose; vena spuria absent; anterior oral margin very prominent; abdomen convex and oval; body bluish-black.....**Psilota** Meigen (p. 48).
Eyes bare; vena spuria usually present, although sometimes faint; greenish or blackish, partly or entirely metallic, flies (face of ♂ (part) with a median tubercle, see under Couplet 18).....**Chrysogaster** Meigen sens. lat. ♂ part, ♀ (p. 48).
- 10 Wings with the outer backward angles of the subapical cell almost rectangular; arista bare, about as long as the third segment of antenna; third antennal segment usually elongate.....**Neoscia** Williston (p. 50).
Wings with lower angle of subapical cell rounded; arista usually pubescent, longer than third antennal segment, which is rounded.....**Sphagina** Meigen (p. 52).
- 11 Abdomen with tergites 2 and 3 well developed and subequal in length, 4 minute and barely visible from above.....**Triglyphus** Loew (p. 54).
Tergites 2, 3 and 4 well developed and subequal in length.....12
- 12 Some long hairs between prothoracic spiracle and convex, swollen, part of mesopleura (fig. 24g); vein Sc ending opposite or after r-m in ♂, usually somewhat before r-m in ♀; upper marginal cross-vein sloping in ♂, usually more upright in ♀.....**Parapenium** Collin (p. 54).
No long hairs between prothoracic spiracle and convex part of mesopleura. ♀ a more or less shallow transverse depression across front part of frons, often vague in *Pipizella*.....13
- 13 ♂ frons not so conically projecting forward, convex on upper part without a median flattened area (fig. 28e). ♂ ♀ at least some long hairs on upper transverse ridge of hypopleura14
♂ frons more conically produced, not convex on upper part, often with a median flattened area of definite pattern (fig. 28d). ♂ ♀ no long hairs on hypopleural ridge; third antennal segment never much longer than wide; vein Sc ending opposite or beyond r-m; cell R_5 not truncate at end.**Pipiza** Fallén (p. 54).
- 14 Vein Sc ending opposite or before r-m; cell R_5 truncate at end, upper marginal cross-vein more upright.....**Pipizella** Rondani (p. 57).
Sc ending beyond r-m; cell R_5 less truncate at end, upper marginal cross-vein more sloping.....15
- 15 ♂ coxae and trochanters without spurs. ♀ third antennal segment much longer than wide; frons with conspicuous side dust-spots.....**Heringia** Rondani (p. 58).
♂ mid coxae and hind trochanters with long spurs, hind coxae with short spur. ♀ third antennal segment not, or only slightly, longer than wide; frons with very small and inconspicuous dust-spots, or these absent
Cnemodon Egger (p. 59).
- 16 Upper marginal cross-vein confluent with R_{4+5} practically at wing-tip (♀ face without median tubercle; see under Couplet 7).....**Myolepta** Newman ♂ (p. 47).
Upper marginal cross-vein confluent with R_{4+5} some distance before wing-tip, the appendix rather long.....17
- 17 Femora considerably swollen, particularly hind pair, the latter with numerous and conspicuous spines below; body entirely brown (♀ face without median tubercle; see under Couplet 6).....**Hammerschmidia** Schummel ♂ (p. 45).
Femora not, or only slightly, swollen; body black.....18
- 18 Frons arched and considerably puffed out (fig. 24a); tergites dull on entire disc, only shining around margin of abdomen (face of ♂ in other subgenera of *Chrysogaster* and all ♀ are without median tubercle; see under Couplet 9)
Chrysogaster Meigen s. str. ♂ (p. 49).
Frons otherwise (fig. 32); tergites entirely shining or disc only partly dull
Cheilosia Meigen (p. 60).

Genus *Rhingia* Scopoli.

Wing length 6-9.5 mm. Medium-sized flies with black or grey thorax and mainly yellow or orange abdomen. Occur mainly amongst low herbage on the borders of meadows and woods. The larvae of *R. campestris* live in ox-dung as it lies in the fields; Coe (1942: 121) has described the early stages. Nothing is apparently known of the early stages of *R. rostrata*.

KEY TO SPECIES OF *Rhingia*.

- 1 Tergites with side-margins continuously and broadly black, pale-haired; at least hind tibiae with a blackish ring; wing length 6-9.5 mm. ♂ thorax shining black, lightly grey-dusted, pubescence rather long, narrowly yellow anteriorly, otherwise black; tergites 2-4 with median black markings, sometimes spreading along hind margins; pre-genital (8th) sternite black-haired; genitalia as in fig. 21 (3), (4). ♀ frons shining on and around the ocellar triangle and often down a median line; notopleurae mainly pale-haired, thorax blackish, shining, lightly grey-dusted, pubescence moderately long, mainly pale; tergites pale orange, tergite 1 sometimes darkened on disc, 2 with a broad median black streak on basal half, 3 and 4 sometimes with a narrow median black streak. *Common. Generally distributed (Ireland).* 4-11

campestris Meigen (*macrocephala* Harris, of Kloet and Hincks)

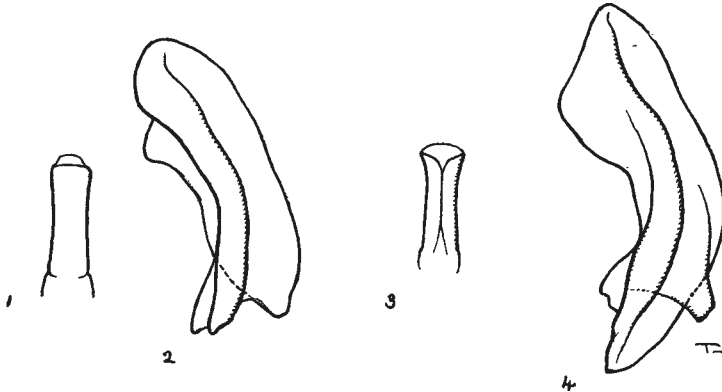


FIG. 21. Genitalia of male *Rhingia*, ventral view. (1), (3). Ejaculatory hood of penis-sheath. (1). *rostrata*. (3). *campestris*. (2), (4). Right style of tenth tergite. (2). *rostrata*. (4). *campestris*. (After Terzi.)

Tergites with side-margins continuously orange, mainly black-haired; all tibiae entirely orange; wing length 7.5-9.5 mm. ♂ thorax extensively and heavily grey-dusted, the shining black ground-colour largely obscured, pubescence rather short, narrowly yellow anteriorly, otherwise black; tergites 3 and 4 completely orange; pre-genital (8th) sternite yellow-haired; genitalia as in fig. 21 (1), (2). ♀ frons heavily grey-dusted; thorax heavily grey-dusted, scarcely shining except on the longitudinal streaks of exposed black ground-colour, pubescence very short, black except at extreme front; tergites pale orange, only tergite 1 sometimes darkened on disc and tergite 2 with a narrow median black streak on basal half. *Rare. Merioneth (Barmouth and Tanybulch), Somerset (Clevedon), Middx. (Northwood), Surrey (Bookham and Chelsham), Kent (Bexley), Hants. (King's Somborne).* 5-6, 8-9. See Coe (1939c: 225)

rostrata Linnaeus

Genus *Ferdinandea* Rondani.

Wing length 6.25-11.25 mm. Medium-sized to rather large flies; thorax blackish with more or less obvious longitudinal grey stripes, tergites gleaming brassy or bluish-black. Occur in wooded areas. The larvae of *F. cuprea* and *F. ruficornis* live in sap exuding from wounds in various kinds of trees, especially those infested by *Cossus*, and the puparia have often been found at the roots of such trees. Lundbeck (1916: 543) describes the larva and puparium of *F. cuprea*, and states that these stages of *ruficornis* appear similar.

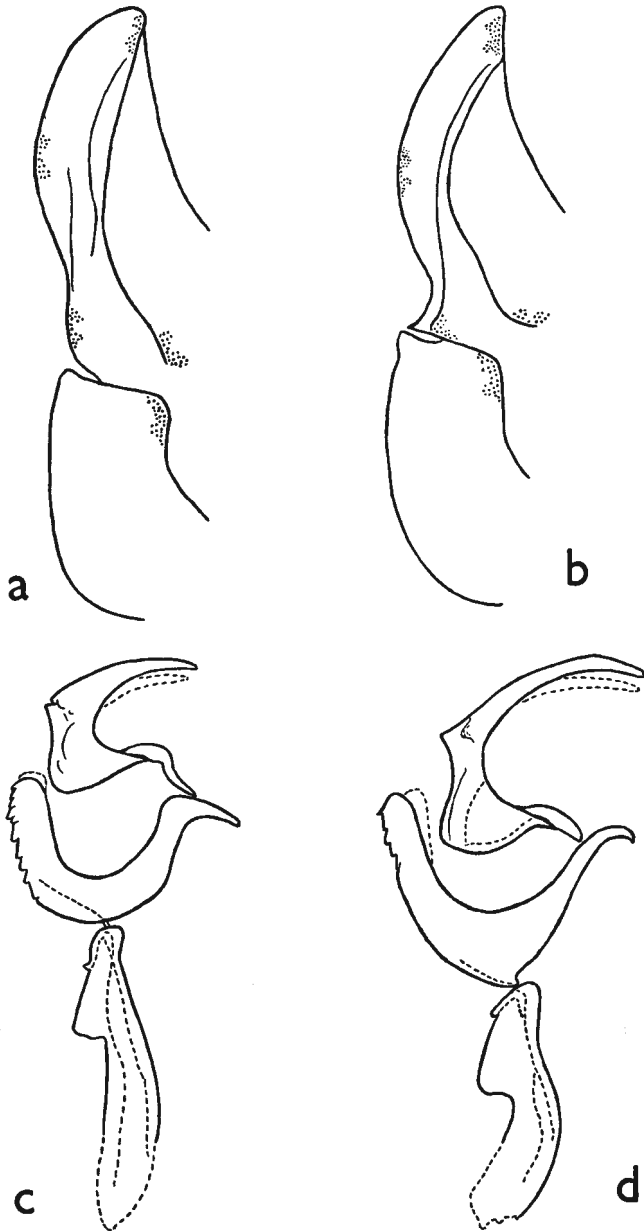


FIG. 22.—Genitalia of male *Ferdinandea*. a, b. Left style of tenth tergite, ventral view. a. *cuprea*. b. *ruficornis*. c, d. Axial system of penis, viewed from left side. c. *cuprea*. d. *ruficornis*.

KEY TO SPECIES OF *Ferdinandea*.

Abdominal tergites gleaming brassy; tergites 2 and 3 with dull brownish or blackish posterior cross-band, practically touching hind-margin for entire width; that of tergite 2 narrow, moderately broadening towards disc to connect with the narrow (often obscure) median longitudinal dark stripe, which in turn joins the narrow (often obscure) anterior dark cross-band; that of tergite 3 at least as narrow, slightly broadening towards disc and occasionally absent; median longitudinal stripe and anterior cross-band absent; thorax with abundant strong black bristly hairs and scanty fine yellow hairs; four anterior femora and all tibiae with some strong black bristles and bristly hairs; jowls descending considerably below level of eyes; wing length 7.25–11.25 mm. ♂ genitalia as in fig. 22a, c. *Frequent. Generally distributed (Ireland). 4–10.....cuprea* Scopoli

Tergites bluish-black; tergites 2 and 3 with dull brownish or blackish posterior cross-band, quite clear of hind-margin on disc, leaving a narrow slightly shining space along hind-margin; that of tergite 2 broad, steadily extending forward towards disc until it covers at least posterior half of tergite at junction with the rather broad median longitudinal stripe, which in turn joins the narrow anterior cross-band (latter may be obscure or even absent); that of tergite 3 at least as broad; median longitudinal stripe abbreviated or absent, anterior cross-band absent; thorax with abundant fine yellow hairs and scanty strong black bristly hairs; femora and tibiae without black bristles and bristly hairs apart from some very short black hairs below hind and sometimes mid femora; jowls descending only slightly below level of eyes; wing length 6.25–9 mm. ♂ genitalia as in fig. 22b, d. *Rare. Worcs. (Wyre Forest), Oxon. (Hogley), Essex (Colchester and Epping Forest), Kent (Dartford), Somerset (Backwell), Hants. (New Forest). 4–5, 7–8. See Coe (1941b : 165).....ruficornis* Fabricius

Genus *Hammerschmidtia* Schummel.

Medium-sized yellow and orange fly. The adult has usually been taken on trunks of sound birch and aspen, and on stumps and logs of those trees. The early stages are apparently unknown. Zetterstedt (1843 : 687) records finding several pupae of *H. ferruginea* on a dry tree-trunk. Wainwright (1944 : 8) gives an interesting account of the history of this species in Scotland.

KEY TO SPECIES OF *Hammerschmidtia*.

- 1 Frons, antennae and face yellow or orange, cheeks with a broad stripe of whitish dusting, dense in ♂ and apparently sparse in ♀, extending down from eye-margin to upper mouth-edge; thorax reddish, with at least indications of four dark longitudinal stripes, the median pair close together; scutellum reddish; tergites reddish, with at least traces of a dark median stripe, which sometimes spreads extensively towards the sides; wings extensively yellow-tinged; legs reddish, except last few tarsal segments usually blackish, and occasionally tips of hind femora and tibiae narrowly darkened; wing length 8.25–9.75 mm. *Rare. Moray (Grantown-on-Spey), Inverness (Loch Alvie, near Aviemore). 6–7 ferruginea* Fallén

Genus *Brachyopa* Meigen.

Wing length 6.5–9.25 mm. Rather small flies with grey thorax and yellow or orange abdomen. Occur mainly in wooded places, amongst low vegetation and on wounded trees, also on tree-blossom including Hawthorn. The larvae live in sap exuding from wounds in various kinds of trees, especially those infested by *Cossus*. Dufour (1846 : 47) bred *B. bicolor* from larvae found in the exuding sap of an elm, while *B. insensilis* Collin has been bred by E. A. Fonseca from larvae found in a similar habitat. Lundbeck (1916 : 386) described the larva and puparium of *B. bicolor* (*sic*). Greene (1917 : 154), who described the early stages of the North American

B. vacua Osten-Sacken, found the larvae under dead bark in the juice of decaying fungi. He states that the larvae were brown or black according to the colour of the juice of the fungi.

KEY TO SPECIES OF *Brachyopa*

(based on Collin).

- 1 Arista (fig. 23 (1), (2)) almost bare, none of the minute hairs nearly as long as arista is thick at base.....2
 Arista (fig. 23 (3)–(5)) with longer, obvious hairs, some quite as long as arista is thick at base.....3

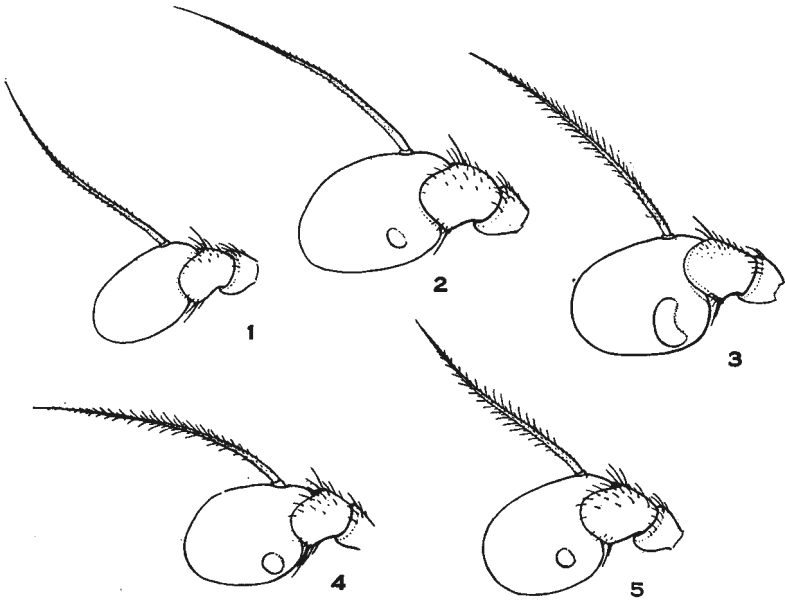


FIG. 23.—Antennae of *Brachyopa*. (1). *insensilis*. (2). *bicolor*. (3). *scutellaris*. (4). *plena* (non-British). (5). *pilosa*. (After Collin.)

- 2 Antennae (fig. 23 (1)) with segment 3 comparatively small, longer than deep, without a sensory pit on inner side; thorax with hairs on notopleural area mainly pale; scutellum shining tawny yellow, dusted only along extreme basal margin and without a transverse depression before tip; face less produced than in *bicolor*; wing length 6.5–7.25 mm. ♂ frons dusted greyish except very narrowly in front above antennae. Rare. Cambs. (Chippenham Fen and Cambridge), Suffolk (Newmarket and Barton Mills), Worcs. (Upper Arley), Herts. (Letchworth), Gloucs. (Coombe Dingle and Cirencester), Berks. (Bagley Wood), Somerset (Edington). 5–8. See Collin (1939 : 105).....*insensilis* Collin
 Antennae (fig. 23 (2)) with segment 3 larger, with a rather small round sensory pit on inner side below near base, removed from lower margin of segment by about its own depth; thorax with hairs on notopleural area all dark; scutellum with basal half obscured by dust, otherwise shining tawny yellow, with a more or less distinct transverse depression; face more produced than in *insensilis*; wing length 6.5–9.25 mm. ♂ frons extensively shining yellowish, dusted only on upper angle and very narrowly along eye-margins. Rare. Herts. (Little Gadderton), taken by O. W. Richards, Hants. (New Forest). 5–6. See Collin (1939 : 104).....*bicolor* Fallén

3 Antennae (fig. 23 (3)) with segment 3 of moderate size, with a large kidney-shaped sensory pit, only slightly removed from lower margin of segment; tergite 2 with hairs on side-margins black posteriorly; wing length 6.5-7.75 mm. ♂ frons yellow, faintly dusted on about upper half, otherwise unobscured; humeri usually clear yellow, sometimes more brownish, ground-colour usually somewhat obscured by dust. *Frequent. Moray (Brodie), then Clyde southwards, Ireland, Co. Roscommon (Mote Park), J. N. Halbert. 4-7. See Collin (1939 : 107)*

scutellaris Desvoidy

♂ antennae (fig. 23 (5)) with segment 3 of moderate size with a small rounded sensory pit, removed from lower margin of segment by about its own depth; tergite 2 with hairs on side-margins all pale; frons dusted only on upper angle and very narrowly along eye-margins; humeri seen from above so heavily dusted as to appear completely grey, but from lateral view more or less translucently yellowish; wing length 7.5-8.5 mm. *Rare. Hants. (New Forest), taken by J. W. Yerbury, Gloucs. (Blaise Woods, nr. Bristol), taken by E. A. Fonseca. 4-5. (♀ unknown). See Collin (1939 : 107).....♂ pilosa Collin*

Genus Myolepta Newman.

Wing length 6-8.75 mm. Rather small flies, with black thorax and black and yellow or orange abdomen. Occur in woods, fens and in thickets. The larvae live in the decaying wood of various kinds of trees. Becher (1882 : 250) found the larvae of *M. obscura* Becher (non-British) in a hollow poplar, also the puparium of *M. luteola*, both of which he described. Lundbeck (1916 : 486) repeats in English Becher's description of the larva of *M. obscura*, and discusses some characters of the puparium.

KEY TO SPECIES OF Myolepta.

1 ♂ face with a narrow parallel-sided shining black median stripe extending from upper limit of central prominence down to mouth margin, the central prominence having a longer, more gradual, curve above than beneath; tergite 3 with lateral yellow markings extending to the hind margin (sometimes obscured by post-mortem darkening of the tergite), and the median dark stripe at its narrowest point normally occupying less than one-third width of tergite. ♀ frons with a median longitudinal depression extending from about the level of the lower extremity of the whitish side-spots right up to the front ocellus; tergite 2 with median dark stripe at its narrowest point normally occupying at least one-third width of tergite. ♂ ♀ wing length 6-8.75 mm. *Uncommon. Cambs. (Wicken Fen), Suffolk (Burgate), Essex (Epping Forest), Middlesex (Cranford Park), Wilts. (Whiteparish), Hants. (New Forest), Kent (Soakham Down). 6-8. See Collin (1950 : 133).....luteola* Gmelin (*potens* Harris, of Kloet and Hincks)

♂ face with a large wide shining black area on middle for lower two-thirds, this dark area being twice as wide at upper end as at mouth-margin, the central prominence as evenly and equally rounded above as beneath; tergite 3 with lateral yellow markings normally ending well (often one-third or more) before the hind margin, and the median dark stripe at its narrowest point normally occupying more than one-third width of tergite; otherwise differs from *luteola* ♂: prominence bearing antennae in profile less projecting; antennae with segment 3 smaller; femora with shorter pubescence; vein Cu₁ longer in proportion to Cu₂. ♀ frons with a median longitudinal depression extending up from about the level of the lower extremity of the whitish side-spots for some distance, but fading out before reaching the front ocellus; tergite 2 with median dark stripe at its narrowest point normally occupying less than one-third width of tergite; in addition, size of antennae, pubescence of femora and venation differ as in the ♂ from *luteola*. ♂ ♀ wing length 6.25-7.75 mm. *Rare. Gloucs. (Coombe Dingle and Blaise Castle), Somerset (Loxley Wood, Shapwick and Edington). 6-7. See Collin (1950 : 133).....potens* Harris

Genus *Psilota* Meigen.

Rather small bluish-black fly. Occurs in forests, where females have been taken at hawthorn blossom. The early stages are apparently unknown.

KEY TO SPECIES OF *Psilota*.

- 1 Frons and face black; antennae completely black in ♂, segment 3 extensively reddish below in ♀; mesonotum and tergites bluish-black, body-hairs mainly dark, noticeably long in ♂; wings with at least basal veins yellowish, stigma pale yellowish; four anterior legs mainly black, extreme tip of femora and nearly basal half of tibiae reddish, in ♀ front tarsi and mid metatarsi also more or less distinctly reddish; hind legs completely black; wing length 6-7.5 mm. *Rare. Berks. (Windsor Forest), Hants. (New Forest). 4-5. See Donisthorpe (1932 : 93) anthracina* Meigen (*atra* Fallén, of Kloet and Hincks)

Genus *Chrysogaster* Meigen.

(including *Orthoneura* and *Sulcatella*, of Kloet and Hincks).

Wing length 4-7.25 mm. Small greenish or blackish, often metallic, flies. Occur mainly in marshy places. Varley (1935 : 30 and 1937 : 55) describes the early stages of *C. hirtella*, the larva of which pierces the roots of the aquatic grass, *Glyceria aquatica*, by means of the spine-like posterior spiracles and so obtains a supply of oxygen from the intercellular spaces of the plant. Beling (1888 : 3) mentions that he bred *C. (L.) metallina* from larvae found in mud in a ditch, and Lundbeck (1916 : 96) states that puparia of *C. macquarti* were found in flood refuse.

KEY TO SUBGENERA OF *Chrysogaster*.

- 1 Tergites equally shining all over, without any dull patches; eyes widely separated in both sexes.....*Liogaster* Rondani (*Sulcatella* Goffe). (p. 48).
Tergites 2-4 obviously dulled except for a broad brightly shining metallic area laterally, which may not include sides of tergite 2. ♂ eyes touching.....2
- 2 Abdomen with entire margin shining metallic, including sides of tergite 1, which has disc at least slightly shining; antennae rather large (except in *brevicornis*)
Orthoneura Macquart (p. 49).
Tergite 1 quite dull, except sometimes extreme posterior margin laterally in ♀; tergite 2 sometimes dull at sides; antennae small
Chrysogaster Meigen s. str. (p. 49).

Subgenus *Liogaster* Rondani.KEY TO SPECIES OF *Liogaster*.

- 1 ♂ Antennae with third segment very large, much deeper than long, entirely black (normally); arista considerably thickened on basal two-thirds; tergites shining green with slight yellow reflections. ♀ third antennal segment scarcely longer than deep, often more or less extensively yellow below, but such yellow area not nearly extending to tip; tergites green or bluish-green, often with slight yellow reflections. ♂ ♀ legs entirely black; wing length 4.75-6.5 mm. *Frequent. Generally distributed (Ireland). 5-9.....metallina* Fabricius
- ♂ antennae with third segment moderately large, not deeper than long, extensively yellow at base; arista slightly thickened on basal half; tergites shining golden, frequently with reddish reflections. ♀ third antennal segment considerably longer than deep, broadly yellow below, this yellow area normally extending to tip; tergites yellowish-green with blue and purple reflections except around margin of abdomen. ♂ ♀ tarsi often more or less extensively yellowish; wing length 4.5-6 mm. *Uncommon. Generally distributed. 6-8*
splendida Meigen (*tarsata* Meigen, of Kloet and Hincks)

Subgenus *Orthoneura* Macquart.

KEY TO SPECIES OF *Orthoneura*.

- 1 Face with upper two-thirds covered by a broad straight white cross-band extending from eye to eye, no shagreened area below; third antennal segment distinctly less than twice as long as deep; legs entirely black; largest British species of *Orthoneura*; wing length 5.5-7 mm. ♂ eyes touching for a distance at least equal to length of vertex. *Frequent. Generally distributed (Ireland).* 5-9
splendens Meigen

Face with white side-markings at or just below level of antennae, or a mainly narrow white cross-band, always bounded below by a broad finely shagreened band extending across from eye to eye.....2
- 2 Face with a pair of somewhat triangular white side-markings, which extend narrowly inwards almost to base of antennae, no white marking present below antennae; third antennal segment quite twice as long as deep; legs extensively yellow; wing length 4.5-5.5 mm. ♂ eyes touching for a distance slightly less than length of vertex. *Rare. Inverness (Nethy Bridge, Boat of Garten and Aviemore), Perth (Rannoch), Warwick (Sutton), Oxon., Surrey (Oxshott and Egham), Hants. (New Forest), Ireland (Co. Cavan, Cordonaghy and Farrinseer, R. C. Faris).* 4-7
geniculata Meigen

Face with a white marking immediately below antennae, connected with the pair of somewhat triangular white side-markings, which extend narrowly inwards.....3
- 3 Face with the broad white marking immediately below antennae roughly rectangular, the side-markings extending downwards against eyes only for a short distance; third antennal segment only slightly, or not longer than deep; legs entirely black; wing length 5-6.25 mm. ♂ eyes touching for a distance slightly more than length of vertex. *Uncommon. Generally distributed.* 5-8
brevicornis Loew

Face with the white marking immediately below antennae rounded, the side-markings extending narrowly downwards against eyes for a long distance almost to connect with the white markings along occiput; third antennal segment almost, or quite, twice as long as deep; legs entirely black; wing length 4-5.75 mm. ♂ eyes touching for a very short distance only. *Frequent. Generally distributed (Ireland).* 5-9.....**nobilis** Fallén

Subgenus *Chrysogaster* Meigen, s.str.

KEY TO SPECIES OF *Chrysogaster*.

- 1 Antennae with at least third segment entirely black2
- 2 Antennae with at least third segment partly or entirely reddish.....3
- 2 ♂ face (fig. 24a) with central prominence slightly less protruding than upper mouth-edge, both only moderately produced; thoracic pubescence (viewed from front) light yellowish-brown. ♀ upper mouth-edge only moderately produced and rather angular; thoracic pubescence short, greyish, upstanding. ♂ ♀ wing length 5.25-6.75 mm. *Common. Generally distributed (Ireland).* 5-8
hirtella Loew

♂ face (fig. 24b) with central prominence protruding as much as upper mouth-edge, both considerably produced; thoracic pubescence (viewed from front) mainly black. ♀ upper mouth-edge rather prominent, rounded; thoracic pubescence short, golden, closely adpressed. ♂ ♀ wing length 5.5-6.25 mm. *Uncommon. Generally distributed (Ireland).* 4-9.....**macquarti** Loew
- 3 Face (fig. 24c) much less than twice as wide as maximum width of an eye (viewed from front); wings strongly blackish-tinged, more intensely on anterior part; wing length 6-7.25 mm. ♂ angle of frons at approximation of eyes not exceeding ninety degrees. ♀ thorax with strong purplish reflections. *Frequent. Generally distributed (Ireland).* 5-9.....**solstitialis** Fallén

Face (fig. 24f) nearly or quite twice as wide as maximum width of an eye (viewed from front); wings at most brownish on anterior part. ♂ angle of frons at approximation of eyes obviously more than ninety degrees. ♀ thorax shining black, absolutely without purplish reflections.....4
- 4 Wings with basal veins, and often subcostal cell, strongly yellow-tinged; pleurae pruinose above front coxae, hypopleura also pruinose; wing length 5.25-6.5 mm.

♂ face (fig. 24c) with central prominence practically absent, in profile not obviously projecting. *Uncommon. Generally distributed (Ireland). 6-8*

chalybeata Meigen

Wings with basal veins, and often subcostal cell, brownish; pleurae not at all pruinose; wing length 5.75-6.75 mm. ♂ face (fig. 24d) with central prominence small, narrow, in profile obviously projecting. *Uncommon. Generally distributed (Ireland). 5-8.....virescens* Loew

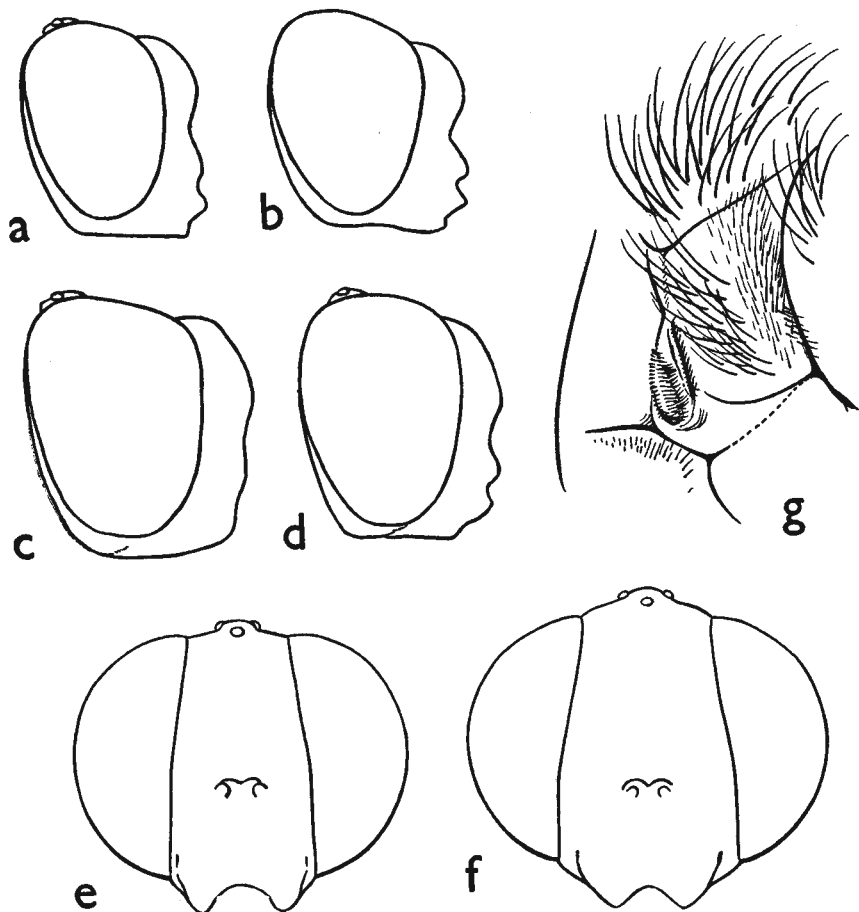


FIG. 24.—a-d. Heads of male *Chrysogaster*, in profile. a. *hirtella*. b. *macquarti*. c. *chalybeata*. d. *virescens*. e, f. Heads of female *Chrysogaster*, from in front. e. *solstitialis*. f. *chalybeata*. g. Mesopleura and adjoining parts of *Parapenium flavitarsis*.

Genus *Neoscasia* Williston.

Wing length 3-5.5 mm. Small black and yellow or black "waisted" flies. Occur mainly in damp places among low herbage. Lundbeck (1916: 374) described the larva and puparium of *N. geniculata* from larvae sifted

from flood refuse. From the same material he obtained larvae of *N. floralis* (non-British), of which he describes and figures the larva and puparium. The larvae of these two species conform to the "short-tailed" saprophagous type, and Lundbeck states that they have no (well-developed?) mouth-hooks.

KEY TO SPECIES OF *Neoascia*
(based on Collin).

- 1 Upper and lower marginal cross-veins infuscated; at least tergite 3 in both sexes with yellow markings, these sometimes obscure.....2
- 2 These veins clear. ♂ tergites with yellow markings. ♀ tergites entirely black (normally).....3

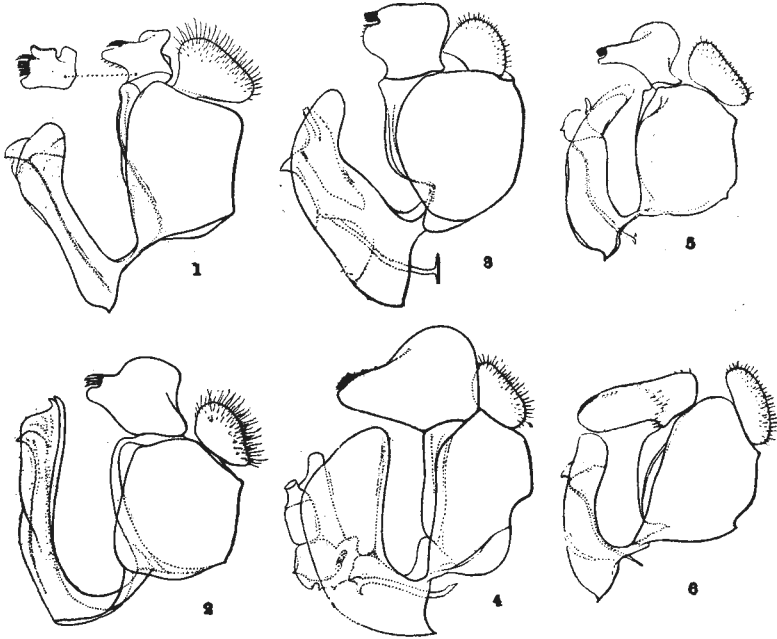


FIG. 25.—Genitalia of male *Neoascia*, in profile. (1). *podagrica*. (2). *obliqua*. (3) *floralis* (non-British). (4). *aenea*. (5). *dispar*. (6). *geniculata*. (After Collin.)

- 2 ♂ styles of genitalia (fig. 25 (1)) very small, with the dorsal lobe almost rectangular and not more than twice the size of the apical one. ♀ frons with a large and semicircular depression. ♂ ♀ tergite 2 normally with a transverse yellow band, often indented or interrupted at middle, rarely vague or absent. *Common. Generally distributed (Ireland). 4-10. See Collin (1940 : 153)*

podagrica Fabricius

♂ styles of genitalia (fig. 25 (2)) of moderate size, with the dorsal lobe gently rounded and much larger than the apical one. ♀ frons with depression confined to a comparatively narrow middle channel. ♂ ♀ tergite 2 normally with oblique yellowish side-stripes sloping forward towards median axis, these occasionally reduced or even absent. *Rare. Perth (Bridge-of Cally), Fife (Lundin Links), Renfrew (Erskine), Lanark (Gorge of Avon), Edinburgh (Blackford Hill), Kent (Darenth). 5-6. See Coe (1940 : 18) and Collin (1940 : 150).....obliqua* Coe

- 3 Antennae with segment 3 decidedly longer than broad, if only slightly longer than hind femora not at all yellow at tip.....4
 Antennae with segment 3 very short, scarcely longer than broad; wing length 3.75-5 mm. ♂ pre-genital segment pale-haired; genitalia as in fig. 25 (6); hind femora very narrowly yellow at tip, rather broadly so at base. ♀ frons with a rather broad depression, occupying more than half the total width. *Uncommon. Generally distributed (Ireland). 4-8. See Collin (1940 : 153)*
geniculata Meigen
- 4 Hind femora narrowly yellow at tip, rather broadly so at base; four anterior tibiae yellow, or with a brownish ring only; wing length 4-5.5 mm. ♂ tergite 2 entirely black, 3 with yellow cross-band extending for entire width over side-margins; pre-genital segment black-haired; genitalia as in fig. 25 (4). ♀ abdominal segment 2 narrowest just beyond base, then very rapidly widening; antennae longer than in *dispar*; frons with a large depression, occupying almost entire width. *Uncommon. Generally distributed (Ireland). 5-8. See Collin (1940 : 153)*
aenea Meigen
- Hind femora yellow only at base, then black including actual tip; four anterior tibiae (except in immature specimens) with a distinct dark ring; wing length 3-5.25 mm. ♂ tergite 2 often with yellow markings, which do not reach side-margins, 3 with a yellow band of which at least the front corners never extend to side-margins; pre-genital segment pale-haired; genitalia as in fig. 25 (5). ♀ abdominal segment 2 narrowest at base and gradually widening; antennae shorter than in *aenea*; frons with a comparatively narrow middle channel. *Common. Generally distributed (Ireland). 4-8. See Collin (1940 : 153)*
dispar Meigen

Genus *Sphegina* Meigen.

Wing length 4.75-7 mm. Small "waisted" flies with black thorax and black and yellow or orange abdomen. Occur in damp situations among low plants, especially in wooded areas. Little is known of the early stages of these flies. The short-tailed larvae of *S. kimakowiczi* and *S. clunipes* have been found in moist situations under the bark of trees. Superficially, the larvae resemble those of *Pocota personata* Harris. Sack (1932 : 4) figures the larva and puparium of *S. clunipes*.

KEY TO SPECIES OF *Sphegina*.

(based on Collin).

- 1 Face whitish-yellow on lower part2
 Face entirely grey; antennae (fig. 26a) practically as in *clunipes*; r-m practically opposite end of Sc; humeri darkened, at least above; wing length 5.75-6.25 mm. ♂ hind tibiae without a slight projection at tip beneath; genitalia (fig. 26d, g) with side lamellae simple, but shorter and wider than in *clunipes*. ♀ abdomen with segment 2 rather short, a little wider at base, but less wide at tip, than in *clunipes*, sternites wider than in *kimakowiczi*. *Rare. Radnor (Clyro), Hereford (Doward, Cusop Dingle and Grosmont), Cornwall (Lostwithiel). 6-8. See Collin (1937 : 182)***verecunda Collin**
- 2 r-m well beyond end of Sc; humeri darkened, at least above; antennae (fig. 26b) smaller and darker than in *kimakowiczi*, segment 3 in ♂ almost equally wide from base to tip; wing length 4.75-7 mm. ♂ hind tibiae with slight projection at tip beneath; genitalia (fig. 26e, h) with long slender simple side lamellae. ♀ abdomen with segment 2 narrow at base and very much wider at tip; sternites wider than in *kimakowiczi* ♀, sternite 4 wider than long. *Frequent. Generally distributed (Ireland). 5-9. See Collin (1937 : 183)*.....**clunipes Fallén**
- r-m practically opposite end of Sc; humeri clear yellow, lightly grey-dusted; antennae (fig. 26c) larger and paler than in *clunipes*, segment 3 in ♂ distinctly widening from base to tip; wing length 5-6.75 mm. ♂ hind tibiae without indication of an apical projection; genitalia (fig. 26f, i) with side lamellae shorter and stouter than in *clunipes*, and with a projection on the inner side. ♀ abdomen with segment 2 proportionately less wide at tip and sternites narrower than in *clunipes*; sternite 4 much longer than wide. *Uncommon. Generally distributed (Ireland). 6-8. See Collin (1937 : 183)*.....**kimakowiczi Strobl**

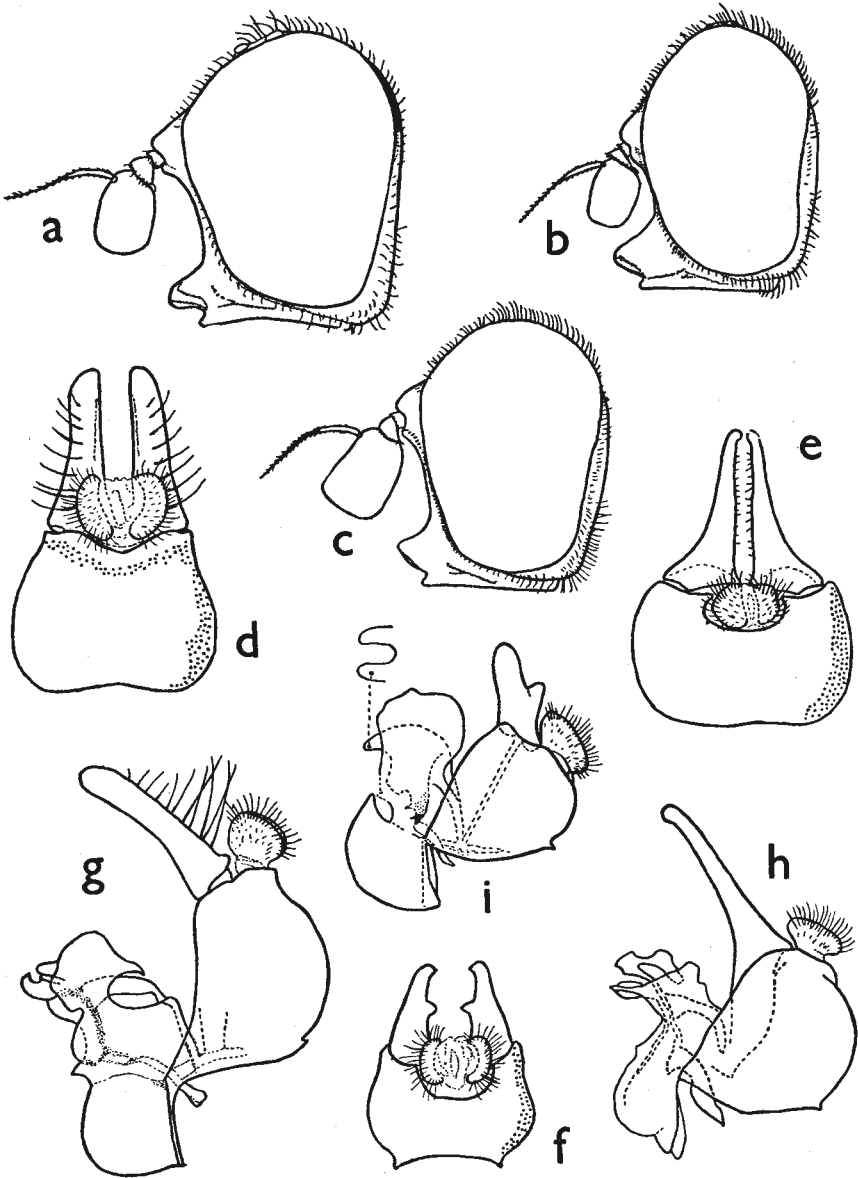


FIG. 26.—Heads and male genitalia of *Sphegina*. a–c. Heads, in profile. a *verecunda*. b *clunipes*. c *kimakowiczi*. d–f. Genitalia, in ventral view. d. *verecunda*. e. *clunipes*. f. *kimakowiczi*. g–i. Genitalia, in profile. g. *verecunda*. h. *clunipes*. i. *kimakowiczi*. (After Collin.)

Genus *Triglyphus* Loew.

Small black fly. Habitats include commons and gardens. The larvae of *T. primus* have been found on Mugwort (*Artemisia vulgaris* Linnaeus) amongst a colony of the Aphid, *Cryptosiphum artemisiae* Passerini (now *gallarum* Kaltenbach), by Leclercq (1944 : 43).

KEY TO SPECIES OF *Triglyphus*.

- 1 Frons and face glittering black, ♀ frons with a pair of very small grey dust-spots against eyes; antennae mainly black, segment 3 usually reddish below, and in ♀ segment 2 usually somewhat reddish; mesonotum black, more or less brightly shining; tergites black, in ♂ mainly dull, with side margins narrowly shining, also segment 3 narrowly at base and tip, 4 narrowly at base and on about apical two-thirds; in ♀ tergites completely shining; wings with yellowish stigma, membrane otherwise usually somewhat brownish-tinged in ♂, clear in ♀; femora black, extreme tips usually reddish, except hind pair in ♂; four anterior tibiae narrowly yellow at base and in ♀ at extreme tip also, hind pair narrowly yellow at base in both sexes; four anterior metatarsi more or less distinctly reddish, and in ♀ frequently segment 2 of mid tarsi; wing length 4.25–5 mm. *Rare. Suffolk (Newmarket), Middx. (Yiewsley and Wood Green), Surrey (Thornton Heath, Mûcham Common and Wimbledon Common), Hants. (Wick and King's Somborne), Devon (Putsborough).* 6–9.....*primus* Loew

Genus *Parapenium* Collin.

Small black fly, second abdominal tergite of female usually with orange spots. Occurs in various situations, more frequently amongst low plants. The early stages of *P. flavitarsis* are apparently unknown.

KEY TO SPECIES OF *Parapenium*.

- 1 Frons and face glittering black; antennae black; mesonotum shining black; mesopleural hairs as in fig. 24g; wings almost clear, stigma yellowish; four anterior femora black, narrowly yellow-tipped, hind pair entirely black; front tibiae narrowly yellow at base, mid pair broadly and hind pair very narrowly so; four anterior tarsi with first two segments yellow, front pair often obscurely so, hind metatarsus usually narrowly yellow-tipped and second segment usually entirely yellow; wing length 4–6 mm. ♂ tergites bluish-black, rather dullish. ♀ frons with a pair of small grey dust-spots against eyes; tergites black, moderately shining, tergite 2 usually with a pair of rounded orange spots, occasionally reduced, vague or even absent. *Common. Generally distributed (Ireland).* 5–8
flavitarsis Meigen

Genus *Pipiza* Fallén.

Wing length 4.5–9.25 mm. Small to medium-sized black flies, tergites sometimes with orange bars or spots. Occur in various situations. The larvae are predaceous on various species of Aphids on plants, both above and below the ground. Heiss (1938 : 66) observes that they seem to prefer as hosts those colonies of Aphids which secrete a waxy flocculence, e.g., the Woolly Aphis or American Blight (*Eriosoma lanigera* Hausmann).

KEY TO SPECIES OF *Pipiza*.

- 1 Front tarsi yellow, apart from a more or less distinct brownish shade on basal two-thirds of metatarsi; body-pubesence mainly light brown (♂), paler (♀); thorax very finely punctate; face (fig. 27a) steadily widening below antennae (more so in ♂); wings hyaline; hind femora slightly thickened, narrowing well before tip; wing length 6.5–8 mm. ♂ frons (fig. 27b) with median shining flattened area at least as broad as long, rounded in front, somewhat heart-shaped. *Uncommon. Generally distributed (Ireland).* 4–6.....*luteltarsis* Zetterstedt
Front tarsi extensively darkened. ♂ body-pubesence otherwise.....2

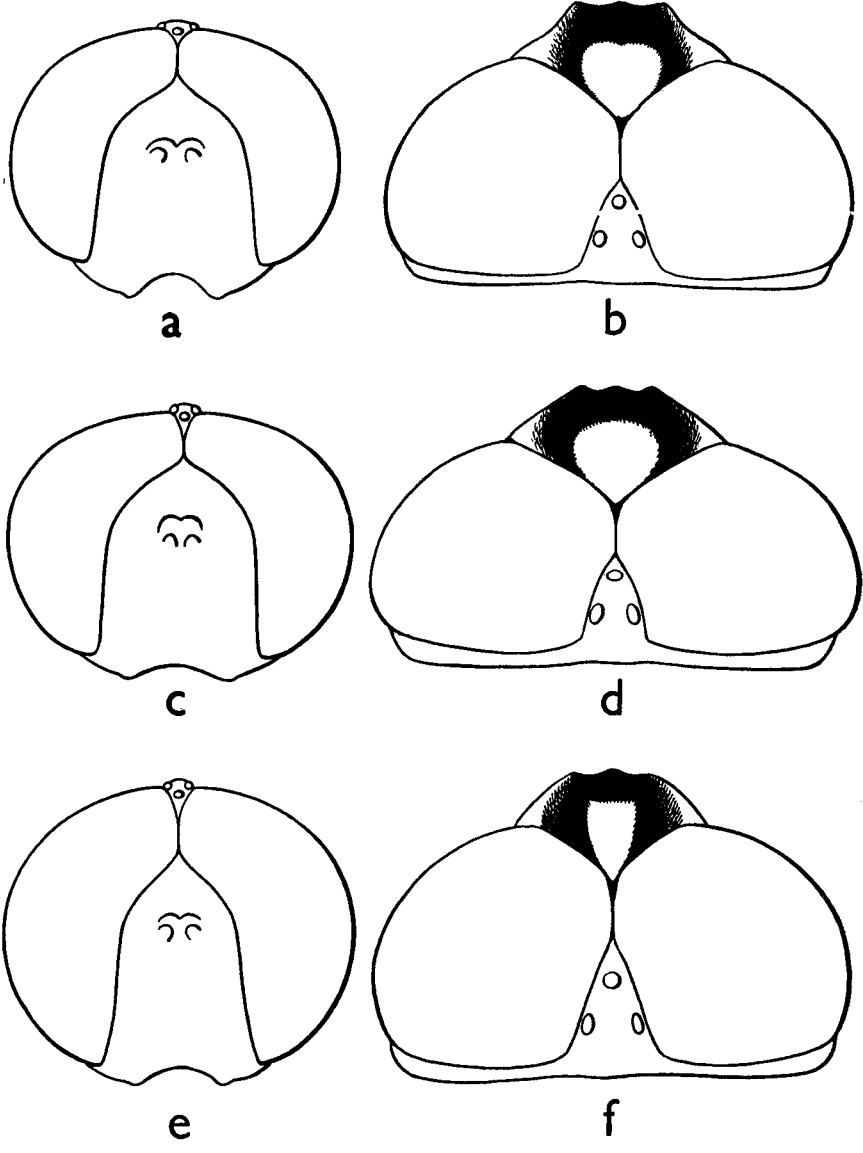


FIG. 27.—Heads of male *Pipiza*. a, c, e. View from in front. a. *luteitarsis*. c. *austriaca*. e. *fenestrata*. b, d, f. Dorsal view. b. *luteitarsis*. d. *austriaca*. f. *fenestrata*.

- 2 Hind femora greatly thickened, with a distinct bulge below towards tip, club-shaped, widening almost to tip; hind tibiae only slightly (if at all) curved; body-pubescence predominantly white; face (fig. 27c) usually with numerous pale hairs, scarcely widening below antennae; wings clear on basal half, otherwise brownish, with a distinct dark brown cloud spreading upwards from tip of second basal cell across middle of wing; wing length 6-8 mm. ♂ frons (fig. 27d) with median shining flattened area often ill-defined, about as broad as long, rounded in front. *Frequent. Co. Durham southwards (Ireland). 5-9.....austriaca* Meigen
 Hind femora less thickened, without a bulge below towards tip. ♂ body-pubescence not predominantly white.....3
- 3 Males.....4
 Females.....7
- 4 Frons with median flattened area dull, ill-defined or absent; wing (in mature examples) with a very distinct dark brown cloud across middle, sharply contrasted with remainder of wing; face (fig. 28a) usually pale-haired, scarcely widening below antennae; hind femora considerably thickened (but less than in *austriaca*), club-shaped, widening until shortly before tip; hind tibiae only slightly curved; body-pubescence predominantly light brown, or occasionally whitish; wing length 6-7.5 mm. *Uncommon. S. Westmorland southwards. 5-10.....♂ lugubris* Fabricius
 Frons with distinct median shining flattened area; wing clear or with faint cloud on outer half.....5
- 5 Face (fig. 27e) distinctly widening below antennae, predominantly grey-haired; profile of face as in fig. 28d; frons (fig. 27f) with median shining flattened area elongate, squarish in front, normally embracing eyes for a very short distance only (i.e., narrow at base); abdomen extensively light brown-haired, lateral hairs partly whitish; pre-genital segment larger than usual; hind femora considerably thickened, club-shaped, widening until shortly before tip; hind tibiae only slightly curved; large species (normally); wing length 7-9.25 mm. *Frequent. Midlothian southwards. 4-6.....♂ fenestrata* Meigen
 Face (fig. 28c) not appreciably widening below antennae, normally black-haired, occasionally partly or entirely grey-haired; frons (fig. 28b) with median shining flattened area normally roundish or oval, rounded in front, normally embracing eyes for at least a third of its length (i.e., broad at base); abdomen mainly black-haired (normally), including lateral hairs; hind femora less thickened, narrowing well before tip.....6
- 6 Frons and body glittering black; frons with median shining flattened area sparsely punctate, the punctures rather fine; eye-pubescence short, that on face, body and legs mainly so; face as in fig. 28c; third antennal segment small; hind femora not much thickened; hind tibiae usually almost straight; smallest British *Pipiza*; wing length 4.5-6.5 mm. *Frequent. Generally distributed. 4-8*
 ♂ *bimaculata* Meigen
 Frons and body less shining than in *bimaculata* ♂, body more or less distinctly greyish-black; frons (fig. 28b) with median shining flattened area usually broader, more densely punctate, the punctures rather coarse; eye-pubescence rather long, that on face, body and legs mainly so; third antennal segment noticeably larger; hind femora usually more thickened; hind tibiae at most slightly curved; larger species (normally); wing length 6.5-8 mm. *Frequent. Generally distributed (Ireland). 5-8.....♂ noctiluca* Linnaeus
- 7 Wing (in mature examples) with intense dark brown cloud at middle, terminating abruptly below stigma, not at all diffused on outer part and appearing roundish to naked eye; third antennal segment large; hind femora rather stout, club-shaped, widening until shortly before tip. (Wing length, distribution and dates, see ♂).....♀ *lugubris* Fabricius
 Wing-cloud present or not, when present diffused on outer part so that it does not appear in the least roundish to naked eye, and rarely so intense as in *lugubris* ♀.....8
- 8 Tergite 4 with numerous obviously yellow hairs and few or no black hairs; general pubescence with pale hairs tending to become yellowish; third antennal segment large, strikingly deep; body greyish-black, rather dull; general pubescence moderately long; hind femora much thickened, club-shaped, widening until shortly before tip; large species (normally). (Wing length, distribution and dates, see ♂).....♀ *fenestrata* Meigen

- Tergite 4 absolutely without yellowish hairs, although pubescence may be almost all whitish; third antennal segment distinctly smaller, not strikingly deep; hind femora moderately thickened, narrowing well before tip.....9
- 9 Frons and body glittering black, punctures mainly fine; general pubescence noticeably short, especially that of eyes and along occiput; wings with a slight cloud or not; third antennal segment noticeably small, usually somewhat squarish; smallest British *Pipiza*. (Wing length, distribution and dates, see ♂)

♀ *bimaculata* Meigen
 Frons and body less shining than in *bimaculata* ♀, body more or less distinctly greyish-black, punctures mainly coarse; general pubescence moderately long, including that of eyes and along occiput; wings usually with some indication of cloud; third antennal segment larger, usually longer than deep; larger species (normally). (Wing length, distribution and dates, see ♂).....♀ *noctiluca* Linnaeus

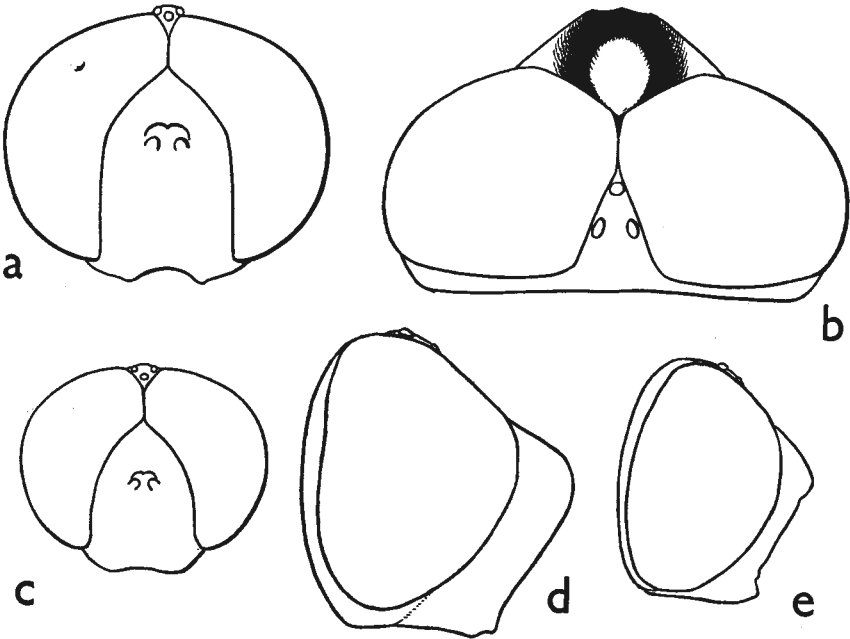


FIG. 28.—Heads of male SYRPHIDAE. a-d. *Pipiza*. a. *lugubris*, front view. b. *noctiluca*, dorsal view. c. *bimaculata*, front view. d. *fenestrata*, in profile. e. *Pipizella varipes*, in profile.

Genus *Pipizella* Rondani.

(*Phalangus* Meigen, of Kloet and Hincks).

Wing length 3.75–6.25 mm. Small black flies. Habitats, see *Parapenium*. The early stages of *P. varipes* (*sic*) have been described under the genus *Pipiza* by Heeger (1858: 299), who found the larvae feeding on several species of Aphids at the roots of Umbelliferae.

KEY TO SPECIES OF *Pipizella*.

- 1 ♂ eyes in actual approximation only for a distance equal to or less than that between front ocellus and rear ocelli; body pubescence usually yellow or whitish-yellow; external genitalia as in fig. 29b. ♀ mesonotum black, shining; wings blunt-

ended; abdomen distinctly stubby; tergites black, slightly greenish-tinged, moderately shining. ♂♀ antennae of moderate size; profile of face as in fig. 28e; hind tibiae fringed anteriorly with shortish hairs, none of which is much longer than tibiae are thick; femora yellow at extreme tip; four anterior tibiae more or less extensively yellow at base, hind pair usually more narrowly so; tarsi black except mid metatarsi usually yellow; wings usually clear, stigma yellowish; wing length 3.75-5.25 mm. *Common. Generally distributed (Ireland). 5-8. See Collin (1952b : 86).....varipes* Meigen
 ♂ eyes in actual approximation for distance greater than that between front ocellus and rear ocelli; ♂♀ hind tibiae fringed anteriorly with long or very long hairs, of which some are usually longer than tibiae are thick; legs coloured as in *varipes*, but yellowish areas sometimes more restricted, more often so in ♂, antennae usually longer than in *varipes*.....2

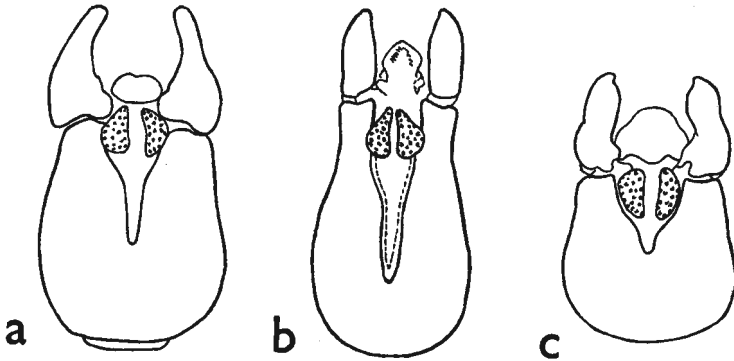


FIG. 29.—Genitalia of male *Pipizella*, external view. a. *virens*. b. *varipes*. c. *maculipennis*. (After Collin.)

- 2 ♂ body-pubesence normally rich brownish-yellow; hind tibiae fringed anteriorly with longish hairs, of which some are very much longer than tibiae are thick; external genitalia as in fig. 29a. ♀ wings more pointed than in ♀ *varipes*; abdomen not at all stubby; tergites with a distinct bluish bloom, dullish; hind tibiae with a long fringe as in ♂. ♂♀ wings inclined to be suffused with brownish; wing length 5-6.25 mm. *Uncommon. Norfolk-Hereford southwards. 6-7*

virens Fabricius

- ♂ mesonotum with whitish pubescence; tergites 3 and 4 with more extensive area of black hairs about middle than in ♂ *virens*; hind tibial fringe shorter than in ♂ *virens*, but some hairs much longer than tibiae are thick; external genitalia as in fig. 29c. ♀ wings blunt-ended and abdomen stubby as in ♀ *varipes*; tergites black, shining; hind tibiae with a rather more sparse and slightly shorter fringe than in ♂. ♂♀ wings with an obvious brownish cloud across middle; wing length 5.25-6 mm. *Rare. Essex (nr. Colchester). ? date. Taken by B. S. Harwood.....maculipennis* Meigen

Genus *Heringia* Rondani.

Wing length 4.25-6.25 mm. Small black fly. Habitats, see *Parapenium*. Wachtl (1882 : 279) bred *H. heringii* from galls of *Schizoneura lanuginosa*, and the larvae were evidently feeding on this Aphid. Vimmer (1933 : 184) briefly describes and crudely figures a puparium of *Heringia*.

KEY TO SPECIES OF *Heringia*.

- 1 Frons and face glittering black, eye-margins narrowly dusted greyish; antennae black, segment 3 usually somewhat reddish below; body shining black; wings

clear or slightly brownish-tinged, stigma yellowish; femora black, narrowly yellow-tipped; tibiae narrowly yellow at base, sometimes more broadly so; tarsi black except mid metatarsi yellow; wing length 4.25-6.25 mm. ♀ frons with a pair of rather large narrow, grey dust-spots. (Individuals of the summer (July-August) brood are much smaller than those of the spring emergence, the limits of wing-length of the former being 4.25-5 mm. and of the latter 5.5-6.25 mm. Males of the summer brood are often darker-haired than those of the spring emergence.) *Uncommon. Hebrides (Skye), then Co. Durham southwards (Ireland). 4-8.....heringii* Zetterstedt

Genus **Cnemodon** Egger.

(*Neocnemodon* Goffe, of Kloet and Hincks).

Wing length 4.25-6.5 mm. Small black flies. Occur in various situations, frequently among low plants. The larvae of *C. vitripennis* were found sucking Coccids on *Populus italica* by Heeger (1858: 295), who described the early stages.

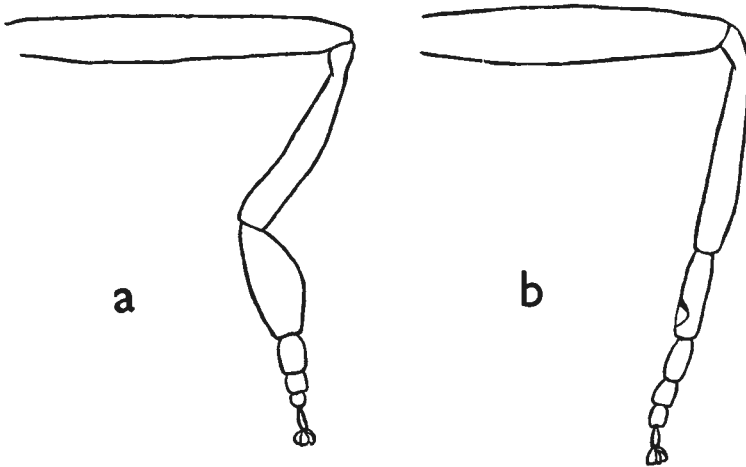


FIG. 30.—Front legs of male *Cnemodon*. a. *latitarsis*. b. *vitripennis*.

KEY TO SPECIES OF *Cnemodon*.

- 1 Males.....2
- Females.....4
- 2 Front tarsi (fig. 30a) with basal segment about twice as deep as following segments; mid tibiae with a large rounded swelling in front after middle; abdominal sternite 2 with a basal patch of very long outstanding soft hairs, which have the ends frizzed; sternite 3 with a keel-shaped median projection at base, ending abruptly shortly after middle; wing length 5.5-6.5 mm. *Rare. Midlothian (Arniston), Suffolk (Barton Mills), Essex (Epping Forest), Surrey (Chelsham), Somerset (Banwell and Over Stowey), Hants. (Bournemouth distr.). 5-8*
♂ *latitarsis* Egger
- 3 Front tarsi (fig. 30b) with basal segment scarcely, if at all, deeper than following segments; mid tibiae moderately swollen in front after middle; sternite 2 with rather short hairs; sternite 3 without a keel-shaped projection.....3
- 3 Sternite 4 with a small median wart just beyond middle; otherwise differs from *vitripennis* ♂: frons rather wider; eyes with shorter pale hairs; front tarsi only obscurely yellowish, basal segment less excavated behind towards tip; mid coxæ and hind trochanters with rather more slender spurs; genitalia with

terminal claspers slightly longer; wing-length 4.25-5.25 mm. *Rare. Midlothian (Polton), Cambs. (Chippenham), Suffolk (Barton Mills), Sussex (Tilgate), Hants. (New Forest).* 5-6.....♂ *verrucula* Collin
 Sternite 4 simple; eyes with moderately long brownish or pale hairs; front tarsi (fig. 30b) with at least segments 1-3 yellow, basal segment considerably excavated behind towards tip; mid-coxae and hind trochanters with moderately thick spurs; wing length 4.5-6.25 mm. *Frequent. Generally distributed.* 4-9

- ♂ *vitripennis* Meigen
 4 Occiput considerably swollen above, and noticeably so on lower part, at upper corner of eyes considerably wider than distance separating hind ocelli from upper corner of eyes; frons with a transverse depression bounded anteriorly by a shallow indefinite median pit; hind tibiae with an anterior fringe of strikingly long whitish hairs, most of which are longer than tibia is wide at tip. (Wing length, distribution and dates, see ♂).....♀ *latitarsis* Egger

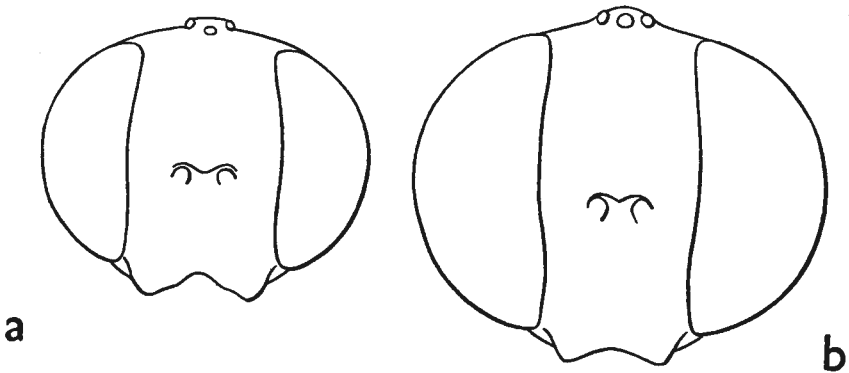


FIG. 31.—Heads of female *Cnemodon*, from in front. a. *verrucula*. b. *vitripennis*.

- Occiput only moderately swollen above, and not noticeably so on lower part, at upper corner of eyes not wider than distance separating hind ocelli from upper corner of eyes; frons with a transverse depression bounded anteriorly by a deep well-marked roundish median pit5
 5 Face (fig. 31a) practically twice as wide as maximum width of an eye (view from front); hind tibiae with a slight anterior fringe of whitish hairs, none of which is longer than tibia is wide at tip; pubescence mainly shorter than in *vitripennis* ♀. (Wing length, distribution and dates, see ♂).....♀ *verrucula* Collin
 Face (fig. 31b) much less than twice as wide as maximum width of an eye; hind tibiae with an anterior fringe of whitish sometimes mixed with blackish hairs, some on at least apical part longer than tibia is wide at tip; general pubescence not noticeably short. (Wing length, distribution and dates, see ♂)

♀ *vitripennis* Meigen
 (The anterior hair-fringe on hind tibiae in *vitripennis* ♀ seems to vary considerably in length; a number of *Cnemodon* females taken by G. H. Verrall at Exning, Suffolk and two females (in Cambridge University Museum) taken by T. W. Kirkpatrick at Cambridge have only a short hind tibial fringe, otherwise they resemble *vitripennis*; it is possible that these specimens may represent a fourth British species, of which the male is apparently unknown.)

Genus *Cheilosia* Meigen.

(including *Chilomyia*, *Portevinia* and *Cartosyrphus* of Kloet and Hincks).

Wing length 4.5-11.75 mm. Small to rather large black flies, abdomen sometimes with conspicuous yellow or tawny pubescence, tergites occasion-

ally with pale markings. Occur in various situations, and frequently on early flowering trees (e.g., *Salix*) in spring. The larvae are phytophagous, feeding in the stems and roots of various plants, also in fungi. Nurse (1910a, b: 313 and 349) bred *C. grossa* from the stems of the Marsh Thistle, *Cnicus palustris*, and he stated that the larvae pupated either in the ground or in the hollow stem at or near ground-level. Fryer (1915: 193) records *C. variabilis* from roots of the Figwort, *Scrophularia nodosa*, while Carpenter (1913: 96) notes *C. antiqua* (as *sparsa*) as a pest of *Primula* spp., on the roots of which the larva feeds. *C. scutellata* has been bred from various fungi, including *Boletus* spp. by Dufour (1840: 149), and *C. albipila* from larvae in stems of *Cnicus palustris* by Andrews (1944: 71). Lundbeck (1916: 124) gives details of the larval habitats of a number of species.

KEY TO SPECIES OF *Cheilosia*.

- 1 Face (fig. 32a) deeply concave for upper two-thirds, then almost vertical down to upper mouth-edge; in profile no central prominence perceptible; eyes and face bare; arista almost bare; antennae clear orange; tergites 2-4 with large grey markings, distinct in ♂, vague in ♀; legs black, knees narrowly reddish; wing length 6-8.25 mm. *Frequent. Generally distributed.* 4-6.....**maculata** Fallén
- Face (fig. 32b) with conspicuous central prominence separated from upper mouth-edge, obvious from all view points.....2
- 2 Wings with conspicuous dark brown cloud across middle anteriorly; eyes and face hairy; arista with small distinct hairs on basal half; antennae dark reddish brown; body with mainly yellow or reddish-yellow and white hairs; some areas of black hairs present, or these very restricted or absent; legs mainly blackish; wing length 8.5-10.25 mm. *Common. Generally distributed (Ireland).* 4-9
- illustrata** Harris
- Wings unmarked, or at most lightly infuscated (*nebulosa*).....3
- 3 Legs entirely black (or entirely dark reddish in teneral examples); face bare; antennae black or dark brown; arista hairs minute, often barely perceptible...4
- Legs partly yellow or orange.....10
- 4 Eyes bare.....5
- Eyes hairy.....8
- 5 Thorax with fine punctures. ♂ thoracic hairs all long.....6
- Thorax with coarse punctures. ♂ thoracic hairs mixed short and long.....7
- 6 Thorax entirely dulled by dust (more obviously from front view); frons and face entirely dusted greyish; thoracic hairs mainly golden brown; wing length 7-8 mm. *Rare. Yorks., Cambs. (Woodditton Wood) taken by J. E. Collin, Suffolk (Bradfield), Hants. (Horsebridge) taken by E. R. Goffe.* 5.....**pubera** Zetterstedt
- Thorax shining black, quite undusted (except occasionally on anterior part of disc in ♂); frons and facial prominence undusted; wing length 5.75-8.25 mm. ♂ thoracic hairs mainly black. *Common. Generally distributed (Ireland).* 4-8
- antiqua** Meigen
- 7 Face (fig. 32e) with central prominence abruptly directed forward, almost horizontal above, "retroussé"; wing length 5.25-7.75 mm. ♂ thorax with the short hairs mainly pale, the long hairs black. ♀ thorax with the dark hairs confined to a small area at middle of disc. *Frequent. Generally distributed.* 5-8
- nasutula** Becker
- Face (fig. 32c) with central prominence gently sloping downwards, not at all horizontal above, not "retroussé"; wing length 6.25-7.5 mm. ♂ thorax with all hairs black; tergites with fine punctures. ♀ thorax with mainly dark hairs; tergites with coarse punctures. *Rare. Oxon. (Aston Rowant), Gloucs. (Coombe Dingle), Sussex (Chichester).* 5.....**nigripes** Meigen
- 8 Face (excluding eye-margins) with outstanding hairs, apart from any dusting or microscopic pile; antennae black or dark brown; arista hairs minute; thorax mainly black-haired; tergites mainly pale yellow-haired; wing length 7.75-10.25 mm. *Common. Generally distributed (Ireland).* 4-8
- variabilis** Panzer (*funebres* Harris, of Kloet and Hincks)
- Face (excluding eye-margins) bare, apart from any dusting or microscopic pile.....9

- 9 Thorax coarsely punctate, shining, undusted; wings strongly yellowish towards base; face (fig. 32*d*) with central prominence situated just below middle; abdomen not maculated; broadly built species; antennae black or dark brown; arisal hairs minute; wing length 5.75-8 mm. *Frequent. Generally distributed (Ireland).* 5-9.....*impressa* Loew
 Thorax finely punctate, moderately shining and dusted in ♂, brightly shining and undusted in ♀; wings not at all yellowish; face with central prominence situated strikingly low, proximal to upper mouth-edge; rather small, narrow species;

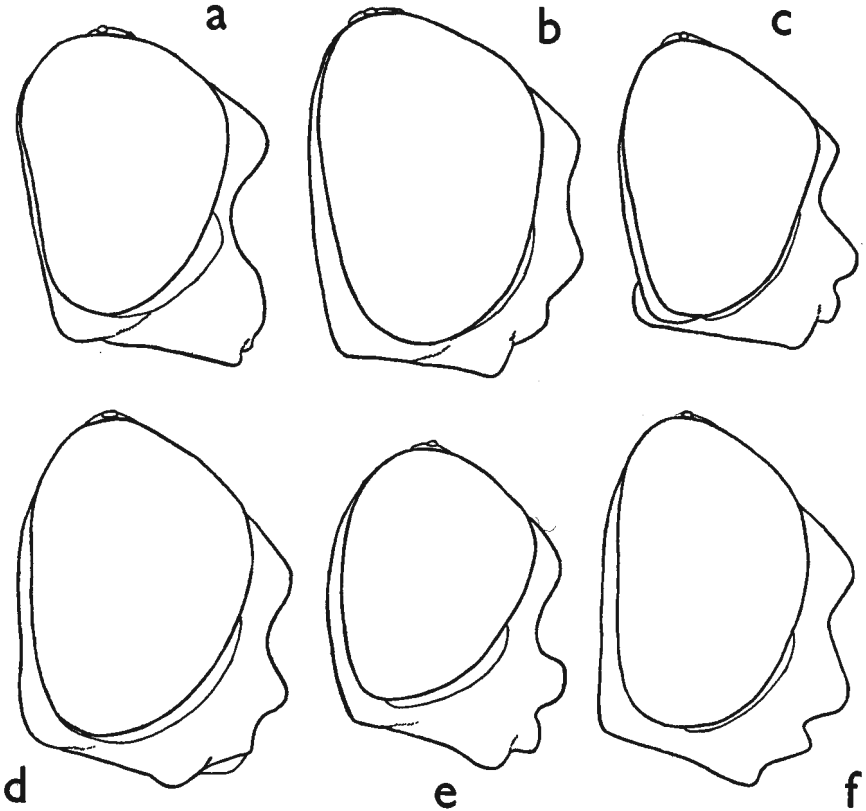


FIG. 32.—Heads of *Cheilosia*, in profile. a-e. Males. a. *maculata*. b. *velutina*. c. *nigripes*. d. *impressa*. e. *nasutula*. f. *proxima*, female.

- antennae black or dark brown; arisal hairs barely perceptible; wing length 6-7 mm. ♂ abdominal tergites 2-4 with large paired quadrate pale markings, more obvious from front view. ♀ tergites without obvious pale markings. *Rare. Merioneth (Cader Idris), Cambs. (Woodditton Wood), Herts., Kent (Darenth Wood), Hants. (Rownhams).* 4-5.....*fasciata* Schiner and Egger
- 10 Eyes bare (under high power a few scattered hairs may sometimes be discerned in *paganus*).....11
 Eyes hairy.....17
- 11 Scutellum without obvious bristly hairs at margin; face with short outstanding hairs; antennae black or partly or entirely dark reddish; arisal hairs minute. (Wing length, distribution and dates, see ♂, Couplet 18).....♀ *intonsa* Loew

- Scutellum with obvious normally black bristly hairs at margin, besides the soft fine hairs; face bare, apart from any dusting (excluding eye-margins).....12
- 12 Antennae with third segment clear orange, occasionally darkened at tip and/or along a narrow dorsal strip; legs mainly yellow.....13
- Antennae with third segment black to brownish-yellow.....14

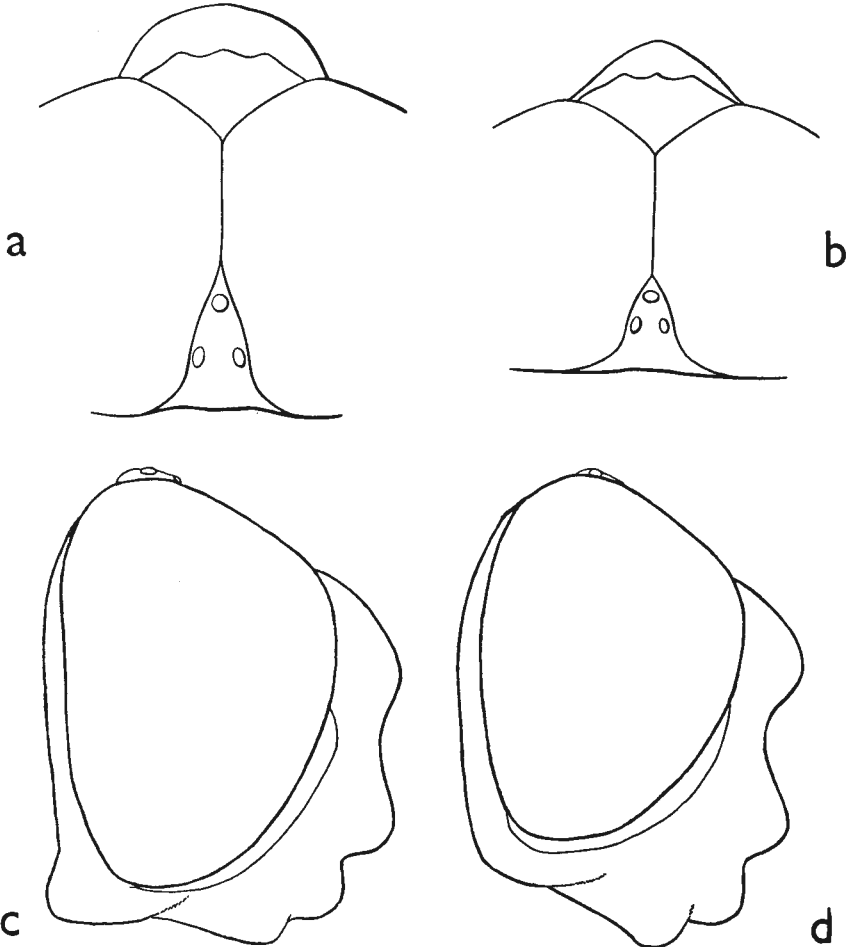


FIG. 33.—Heads of male *Cheilosia*. a, b. Dorsal view. a. *scutellata*. b. *longula*. c, d. In profile. c. *vulpina*. d. *variabilis*.

- 13 Arista with obvious moderately long, close-set hairs on at least basal third; thoracic pubescence mainly pale; wing length 7.5–9 mm. ♀ scutellum with tip yellow; antennae with segment 3 large, but less so than in *paganus* ♀. *Uncommon*. *Co. Durham southwards*. 4–9.....*soror* Zetterstedt
- Arista without obvious hairs; thoracic pubescence varying from all pale to all dark; central prominence somewhat variable in shape; wing length 4.75–8.5 mm. ♀ scutellum entirely black; antennae with segment 3 strikingly large. *Common*. *Generally distributed (Ireland)*. 3–9

paganus Meigen (*pulchripes* Loew)

- 14 Thorax with coarse punctures; tergites with fine punctures; front tarsi with segments 2-4 more or less distinctly yellowish; arista almost bare. (Wing length, distribution and dates, see ♂, Couplet 31).....♀ *albitarsis* Meigen
Thorax with fine punctures.....15
- 15 Front tarsi with segments 2-4 clear yellow, 1 and 5 contrasting blackish; scutellar bristles short, median pair shorter than scutellum; scutellum entirely black; humeri black; arista with minute hairs. (Wing length, distribution and dates, see ♂, Couplet 31).....♀ *mutabilis* Fallén
Front tarsi ranging from blackish to yellow, but segments 2-4 not contrastingly paler than 1 and 5; scutellar bristles rather long, median pair at least as long as scutellum; arista with rather short but obvious hairs. ♀ scutellum usually with at least tip yellowish (sometimes obscurely so); humeri usually yellowish...16
- 16 Face with actual central prominence extending evenly across to encroach on eye-margins, appearing semicircular from above (fig. 33a); front tarsi extensively yellowish, first segment at most darkened dorsally; wing length 6-9 mm. ♀ face bears on either side of upper mouth-edge a large yellowish spot. *Common. Generally distributed (Ireland).* 5-9.....♀ *scutellata* Fallén
Actual central prominence confined to middle of face, although face is swollen to eye-margins, prominence not appearing semicircular from above (fig. 33b); front tarsi mainly brownish or blackish, first segment usually darkened; wing length 6-8.25 mm. ♀ face obscurely brownish on either side of upper mouth-edge. *Frequent. Generally distributed (Ireland).* 6-9.....♀ *longula* Zetterstedt
- 17 Face (excluding eye-margins) with outstanding hairs, apart from any dusting or microscopic pile18
Face (excluding eye-margins) bare, apart from any dusting or microscopic pile; arista almost bare or with minute hairs.....22
- 18 Scutellum without obvious bristly hairs at margin; antennae black or partly or entirely dark reddish; thorax rather finely punctate; wing length 5.5-9.25 mm. *Frequent. Generally distributed (Ireland).* 4-9.....♂ *intonsa* Loew
Scutellum with obvious (normally black) bristly hairs at margin, besides the soft fine hairs.....19
- 19 Arista (fig. 34b) noticeably short, especially in ♀; scutellum with the black bristly hairs at margin noticeably short; antennae black or partly or entirely dark reddish; thorax rather finely punctate; facial prominence rather large and broad; wing length 7.25-9 mm. *Frequent. Generally distributed.* 4-7
honesta Rondani
- Arista (fig. 34a) and bristly scutellar hairs of normal length.....20
- 20 Antennae with third segment partly reddish; occiput shining black, undusted, on upper part immediately behind eyes (brilliantly shining in ♀); thorax finely punctate in ♂, coarsely so in ♀; small, narrow species; wing length 7-8 mm. *Uncommon. Derbyshire southwards.* 5-8.....♀ *barbata* Loew
Antennae with third segment dark; normally larger, broadly-built species.....21
- 21 Jowls (fig. 33c) only slightly descending below eye-level; wing length 7-10 mm. ♂ abdomen and mid and hind femora with abundant rufous hairs. ♀ occiput more or less densely obscured by whitish dust on upper part immediately behind eyes. *Uncommon. Generally distributed (Ireland).* 5-9.....♀ *vulpina* Meigen
Jowls (fig. 33d) descending well below eye-level; wing length 7.75-10.25 mm. ♂ abdomen and legs partly whitish-yellow haired, but without rufous hairs. ♀ occiput shining black, undusted, on upper part immediately behind eyes; antenna as in fig. 34a. *Common. Generally distributed (Ireland).* 4-8
variabilis Panzer
- 22 Scutellum without obvious bristly hairs at margin.....23
Scutellum with obvious (normally black) bristly hairs at margin, besides the soft fine hairs.....26
- 23 Antennae with third segment brownish-black to black; thorax finely punctate, pale or tawny-haired; abdomen with pubescence normally almost all foxy-tawny; wing length 8.5-11.75 mm. *Frequent. Generally distributed (Ireland).* 3-5
grossa Fallén (*corydon* Harris, of Kloet and Hincks)
- 24 Antennae with third segment somewhat squarish above at tip, clear yellowish-red; face with central prominence small and rounded, situated lower than usual; body with pubescence normally conspicuously bright foxy-tawny; wing length 8-10.25 mm. *Uncommon. Generally distributed (Ireland).* 4-8
chrysocoma Meigen

- Antennae with third segment rounded as usual; body-pubescence brownish or orange, never foxy-tawny.....25
- 25 Wings obviously infuscated, especially at cross-veins and towards tip; body-pubescence moderately long; antennae brownish or orange, at least the tip darkened; wing length 6-8.5 mm. *Uncommon. N. Yorks. southwards, Ireland (Counties Monaghan, Cavan, Leitrim and Roscommon, R. C. Faris). 4-5*
nebulosa Verrall
- Wings unclouded; entire pubescence strikingly long; antennae clear orange, tip sometimes slightly darkened; wing length 8.75-10.75 mm. ♂ face with central prominence sometimes peculiarly depressed at middle. *Frequent. Generally distributed (Ireland). 3-6*.....*alpipila* Meigen
- 26 Antennae with third segment entirely clear orange (or rarely black-tipped), almost circular; hind femora orange-tipped, usually rather broadly so; moderately large, usually rather broadly-built species27
- Antennae with third segment normally entirely blackish, and even in palest females tip is always darkened; hind femora entirely black or orange-tipped, if latter then usually very narrowly so.....28

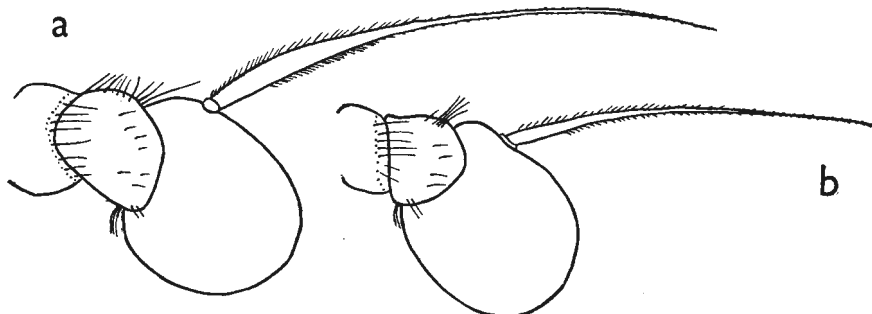


FIG. 34.—Antennae of female *Cheilosia*. a. *variabilis*. b. *honesta*.

- 27 Hind tibiae entirely reddish-yellow; body-hairs and scutellar bristles shorter, abdomen rather broader and more ovate than in *bergenstammi*; wing length 6.5-10.25 mm. *Common. Generally distributed (Ireland). 4-8*
fraterna Meigen
- Hind tibiae with distinct dark marking around middle; wing length 7.25-9.25 mm. (Two males that I took at Howth, Co. Dublin have the third antennal segment darkened at tip, and front tarsi extensively darkened.) *Frequent. Generally distributed (Ireland). 5-9*.....*bergenstammi* Becker
- 28 Hind femora with about apical sixth clear orange; hind tibiae mainly clear orange with a broad preapical black ring, this ring sometimes absent; antennae with third segment slightly longer than deep, not at all circular; small, narrow species; wing length 5.75-6.5 mm. *Uncommon. Generally distributed. 4-6*
praecox Zetterstedt (*ruralis* Becker nec Meigen)
- Hind femora entirely black or at most the extreme tip orange (less than apical sixth); hind tibiae entirely black or partly orange, but usually more black than orange.....29
- 29 Front and hind metatarsi strikingly thickened. Wing length 6.25-6.75 mm. *Rare. Suffolk (West Stow and Worlington), taken by J. E. Collin. 4*
♀ (♂ unknown) *globulipes* Becker
- Front and hind metatarsi at most moderately thickened.....30
- 30 Front tarsi with segments 2-4 entirely yellow.....31
- Front tarsi with segments 2-4 entirely or mainly darkened32
- 31 Face entirely dulled by heavy greyish dust; larger, broadly-built species; wing length 7-9.5 mm. *Common. Generally distributed (Ireland). 4-7*
♂ *albitarsis* Meigen

Face glittering black, very lightly grey-dusted except on central prominence; small, narrow species; wing length 4.75-6.75 mm. (In ♀ the eye-hairs are extremely short and scanty, and that sex is dealt with under couplet 15 in the "bare-eyed" section of key.) *Uncommon. Generally distributed.* 3-8

- ♂ *mutabilis* Fallén
- 32 Thorax bluish-black; tergites 3 and 4 with lateral hairs mainly black; wing length 6.25-7.25 mm. *Uncommon. Lanarkshire southwards.* 5-9
- ♀ *cynocephala* Loew
- Thorax greenish-black or black; tergites 3 and 4 with lateral hairs entirely or mainly yellowish or whitish.....33
- 33 Eye-hairs blackish on at least upper part.....34
Eye-hairs completely whitish or light brown.....35
- 34 Post-alar calli and margin of scutellum with rather long bristles; wings noticeably long, usually extensively brownish; eye-hairs moderately long; wing length 8-9 mm. *Uncommon. Derbyshire southwards.* 4-8.....*carbonaria* Egger
Post-alar calli and margin of scutellum with short bristles; wings of normal length, usually hyaline; eye-hairs normally shorter; wing length 4.5-6.75 mm. *Common. Generally distributed (Ireland).* 3-9.....*vernalis* Fallén
- 35 Upper mouth-edge (viewed in profile) quite vertical, not at all protruding (fig. 32b); actual central prominence moderate, but face swollen for entire width, more so in ♂; wing length 7.25-8.25 mm. ♀ tergite 2 with conspicuous undulating band of short adpressed whitish hairs, tergites 3 and 4 with less distinct bands of such hairs. *Uncommon. Co. Durham, Yorks. (Allerthorpe), then line Norfolk-Oxford-Somerset southwards, Ireland (Co. Wexford, Ballyteige, R. C. Farris, 2 ♂♂, 1 ♀).* 4-8
- ♀ *velutina* Loew
- Upper mouth-edge (viewed in profile) jutting forward or rounded.....36
- 36 Front and mid-tibiae broadly yellow at base, narrowly so at tip; eye-hairs noticeably long, especially in ♂; face (fig. 32f) with central prominence situated just below middle, more evenly round in ♀; thorax shining black, undusted; abdomen not maculated; wing length 6.25-8.5 mm. *Common. Generally distributed (Ireland)* 4-9.....*proxima* Zetterstedt
Front and mid-tibiae obscurely reddish-yellow at base, and sometimes narrowly so at tip; eye-hairs not noticeably long; face with central prominence situated strikingly low, proximal to upper mouth-edge, rather slight, especially in ♂; wing length 6-7 mm. ♂ thorax obscured by grey dusting, only slightly shining; tergites 2-4 with large, paired, quadrate, greyish markings. *Rare. Merioneth (Cader Idris), Cambs. (Woodditton Wood), Herts., Kent (Darenth Wood), Hants. (Rounhams).* 4-5.....*fasciata* Schiner and Egger

Subfamily VOLUCELLINAE.

Genus *Volucella* Müller.

Wing length 8-18 mm. Large black and yellow or orange flies, some species humble-bee-, hornet- and wasp-like in appearance. Occur in various situations, particularly in glades and clearings in woods. The larvae of *Volucella* live as scavengers in the nests of *Bombus* and *Vespula*. Fraser (1946: 158) bred *V. pellucens* and *V. zonaria* from larvae in nests of the Common Wasp (*Vespula vulgaris*), and Newstead (1891: 41) found the larvae of *V. bombylans* occurring plentifully in nests of *Vespula germanica*. Metcalf (1913: 68) refers to *V. inanis* having been taken in nests of *Vespula crabro* by Sharp, while Hamm (1941: 44) records taking the same species sitting in the entrance to a nest of *V. vulgaris*. d'Herculais (1875) deals in considerable detail with the biology of the European species of *Volucella*.

KEY TO SPECIES OF *Volucella*.

- 1 Body densely pilose; scutellum yellow, without marginal bristles; thorax black, yellow or orange towards sides; tergites black with extensive yellow and/or reddish markings, pubescence ranging from mainly yellow (form *plumata* Meigen) through various intermediate forms to predominantly black (form

- bombylans**); humble-bee mimic; wing length 8-14 mm. *Common. Generally distributed (Ireland).* 5-8.....**bombylans** Linnaeus
 Body with inconspicuous short pubescence; scutellum with long black marginal bristles; species not resembling humble-bees, sometimes hornet- or wasp-like in appearance.....2
- 2 Thorax entirely or extensively reddish-orange; scutellum reddish-orange; tergites reddish-orange or partly yellow, 2 and 3 with a broad black posterior cross-band; large, hornet- or wasp-like species; wing length 15.5-19.5 mm. *Uncommon. Until recent years a rare immigrant from the Continent, now apparently established and increasing in Southern England. Present recorded northerly limits are Bristol in S.W. and Essex (Leytonstone) in S.E.* 5-10.....**zonaria** Poda
 Thorax mainly black on disc, if any restricted reddish-orange markings are present, then tergites 3 and 4 are entirely black.....3
- 3 Tergites lemon-yellow, 2 and 3 with a rather narrow black posterior cross-band, 4 sometimes with a narrower black band; thorax dullish, brownish-yellow with a broad black median stripe, divided posteriorly, flanked by two narrower broken black stripes; scutellum yellow; hornet- or wasp-like species; wing length 13.25-14.25 mm. *Uncommon. Oxon. southwards.* 7-9.....**inanis** Linnaeus
 Tergites 3 and 4 entirely black; thorax moderately or brightly shining.....4
- 4 Thorax broadly and conspicuously yellow or orange at sides, and usually with a restricted median yellow or orange patch on posterior margin, otherwise moderately shining black; scutellum yellow to reddish-orange; tergite 2 yellow or orange with a more or less complete median black stripe; wing length 11-12.75 mm. *Frequent. Derby and Ches. southwards.* 5-8
inflata Fabricius
 Thorax inconspicuously reddish-brown towards sides, otherwise shining black; scutellum orange to dark brown; tergite 2 pale yellow with or without a more or less complete median black stripe; wing length 10-15.5 mm. *Common. Generally distributed (Ireland).* 5-9.....**pellucens** Linnaeus

Subfamily SERICOMYIINAE.

KEY TO GENERA.

- 1 Face (fig. 35a) moderately produced and only descending moderately below lowest eye-level, median prominence quite well developed; body rather thinly haired; tergites with yellow bars**Sericomyia** Meigen (p. 67).
 Face (fig. 35b) very flattish and descending considerably below lowest eye-level, median prominence very slight; body densely hairy; tergites without yellow markings.....**Arctophila** Schiner (p. 69).

Genus **Sericomyia** Meigen.

(*Cinxia* Meigen, of Kloet and Hincks.)

Wing length 9.25-14 mm. Large, broadly-built flies, thorax black, tergites with yellow or whitish side-stripes. Occur on moors and heaths, also in woods and fens. The "rat-tailed" larvae of *S. silentis* were recorded by Bloomfield (1897 : 222) to have been found in a depression in the ground from which peat had been previously cut; the larvae were living in a wet decomposing mass of turf sods surrounded by stagnant water. No description has apparently been published of the early stages of *Sericomyia*.

KEY TO SPECIES OF *Sericomyia*.

- 1 Tergites 2-4 with more or less broad dark yellow side-stripes, which widen considerably towards lateral margins, those on tergites 3 and 4 sometimes coalescent; pre-genital tergites yellow; scutellum black (in a single Irish male reddish-brown); face as in fig. 35a; larger species than *lappona*; wing length 9.5-14 mm. *Common. Generally distributed (Ireland).* 5-9.
silentis Harris (*borealis* Fallén)

Tergites 2-4 with narrow pale yellow or whitish side-stripes, which only widen slightly towards lateral margins, those on tergites 3 and 4 sometimes coalescent; pre-genital tergites black; scutellum reddish-brown; wing length 9.25-11.25 mm. *Frequent. Generally distributed (Ireland). 4-8.....lappona* Linnaeus

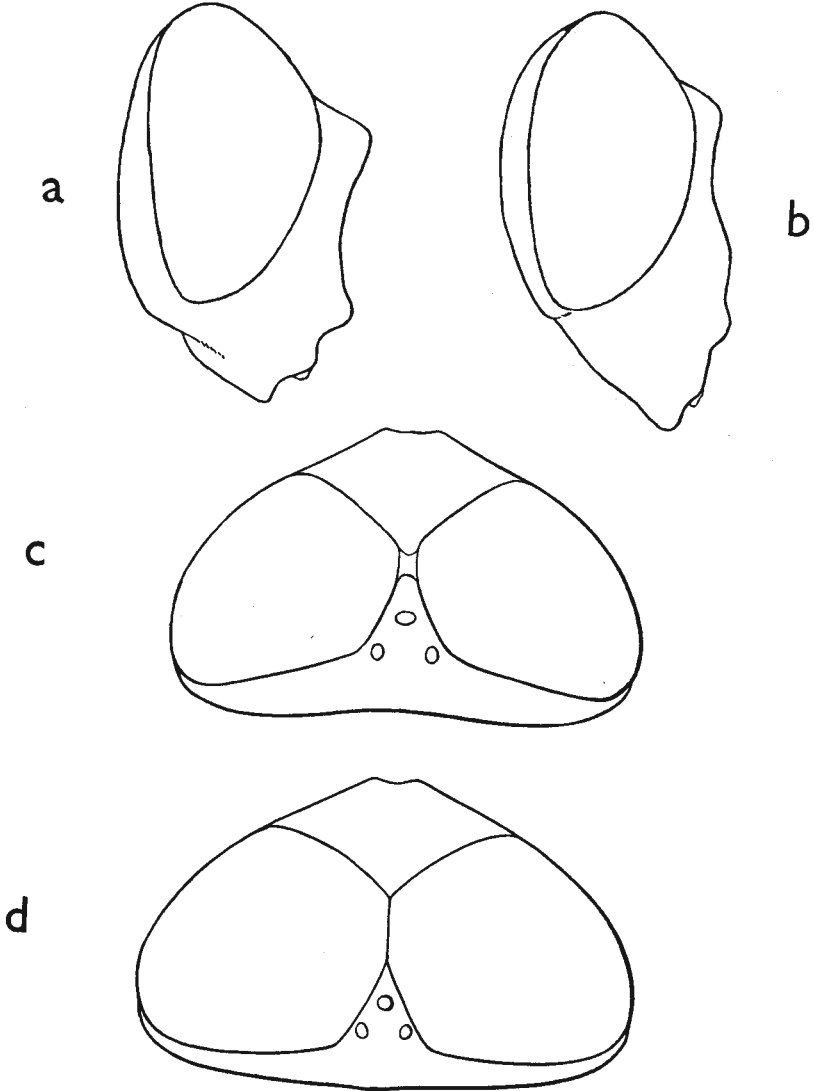


FIG. 35.—Heads of male SYRPHIDAE. a, b. In profile. a. *Sericomyia silentis*. b. *Arctophila fulva*. c, d. *Eristalis*, dorsal view. c. *abusivus*. d. *arbustorum*.

Genus *Arctophila* Schiner.

Large, densely yellow-pilose, broadly-built fly. Occurs mainly in wooded areas. The metamorphoses are unknown. The present writer has seen females of *A. fulva* resting on rotten logs and fallen trees.

KEY TO SPECIES OF *Arctophila*.

- 1 Face (fig. 35*b*) and antennae yellow; tergites greenish-black, with long, dense yellow hairs (eight Irish examples from Counties Donegal, Down and Wicklow have these hairs greyish, with only a trace of yellowish hue, and in most of these specimens the basal corners of tergite 2 bear blackish hairs. Mr. A. R. Waterston, O.B.E., of the Royal Scottish Museum (where the above material is located, drew my attention to this form. The remaining two Irish examples that I have examined were taken by me at Naas in Co. Kildare, and have all tergites yellow-haired.) Wings with anterior dark brown cloud across middle; legs black, or anterior and mid tibiae and tarsi occasionally somewhat brownish; wing length 10–13.5 mm. *Frequent. Generally distributed (Ireland). 7–9.*
fulva Harris (*mussitans* Fabricius)

Subfamily ERISTALINAE.

KEY TO GENERA.

- 1 Cell R_1 closed.....*Eristalis* Latreille (p. 69).
 R_1 at least slightly open.....2
2 Upper marginal cross-vein recurrent; hind femora antero-ventrally with a sub-apical flat triangular toothed process.....*Merodon* Meigen (p. 71).
Upper marginal cross-vein not recurrent; hind femora without such process3
3 Eyes hairy, in ♂ actually touching for considerable distance
Myiatropa Rondani (p. 71).
Eyes bare, in ♂ at least slightly separated.....4
4 Thorax with obvious grey or yellow stripes, hairs scanty and rather short, not obscuring the ground-colour; eyes widely separated in both sexes
Helophilus Meigen (p. 72).
Thorax not obviously striped, hairs dense and long, obscuring the ground-colour; eyes rather closely approximated anteriorly in ♂.....*Mallota* Meigen (p. 77).

Genus *Eristalis* Latreille.

(including *Eristalinus*, *Tubifera* and *Lathyrophthalmus* of Kloet and Hincks).

Wing length 6.5–13 mm. Medium-sized to large black or black and yellow flies. Occur in various situations. The "rat-tailed" larvae are found in accumulations of foul or stagnant water, also in liquid animal manure, and in moist decaying sewage. Gäbler (1932: 143) describes the larvae of *E. sepulchralis*, *tenax*, *arbustorum* and *pertinax*, while Buckton (1895) discusses and illustrates exhaustively the physiology and morphology of *E. tenax* and *E. arbustorum*. Lamb (1911: 215) bred *E. aeneus* from larvae found on a slaty seashore in pools of somewhat saline water containing rotting seaweed and other debris. Lundbeck (1916: 409) gives numerous notes on the early stages of various species, with references to the literature. (See also introductory notes.)

KEY TO SPECIES OF *Eristalis*.

- 1 Eyes patterned with conspicuous black spots; scutellum black; arista bare2
Eyes not spotted; scutellum yellow, orange or reddish-orange.....3
2 Eyes hairy all over; tergites black, partly shining (more extensively so in ♀), with greenish or other reflections; small species; wing length 6.5–8 mm.
♂ eyes well separated; thorax with vague greyish stripes. ♀ thorax with five conspicuous greyish stripes. *Frequent. Generally distributed (Ireland). 4–9.*
sepulchralis Linnaeus

Eyes with scattered pale hairs on upper part only; tergites black, more or less brightly shining all over, with greenish or other reflections; medium-sized species; wing length 6.5-9.25 mm. ♂ eyes touching; thorax unstriped. ♀ thorax with at most traces only of greyish stripes. *Uncommon, mainly on sea-coasts. Generally distributed (Ireland). 4-9, 11 (six living examples inside helmet in church, see Morley, 1941; also one on window-pane in Westminster).*

aeneus Scopoli

- 3 Antennae clear orange; arista bare; scutellum reddish-orange; tergite 2 with conspicuous large roughly triangular reddish-orange side-patches; tergites 2-4 with hind-margins conspicuously yellow-bordered; body-pubescence mainly orange; rather small rotund species; wing length 6.5-10 mm. *Uncommon. Counties bordering S. coast of England, also Glos. (Cleeve), Somerset (Britty Common). Ireland (Counties Wicklow and Kerry). 4-9.....* **cryptarum** Fabricius
- Antennae with at least segment 3 brownish or blackish; at least tergite 2 with more or less obvious yellow, orange or reddish side-markings, except in most ♀ *intricarius*, and in melanic or dark examples of other species.....4

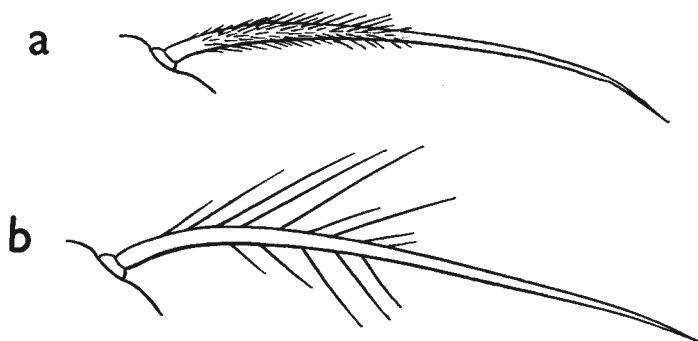


FIG. 36.—Arista of *Eristalis*. a. *abusivus*. b. *arbustorum*.

- 4 Four anterior tarsi entirely orange; arista plumose until shortly before tip; large species; wing length 8.25-12.75 mm. *Common. Generally distributed (Ireland). 3-11.....* **pertinax** Scopoli
- All tarsi more or less extensively black.....5
- 5 Body covered with conspicuous long dense hairs, varying in colour from practically all tawny (*typical form*) to mainly black (*var. furvus* Verrall); arista with long plumes on basal half; wing length 8.25-12 mm. *Common. Generally distributed (Ireland). 3-9.....* **intricarius** Linnaeus
- Body-hairs not dense and long.....6
- 6 Arista with about basal half very short-haired (fig. 36a).....7
- Arista with rather long plumes for at least basal half (fig. 36b).....8
- 7 Face with broad black shining median stripe; eyes brown-haired, with two longitudinal bands of denser and generally darker hairs; large species; the Drone-fly, and probably the "Oxen-born bee" of the Ancients (*see* introductory notes); wing length 9.75-13 mm. ♂ eyes touching for a considerable space. *Common. Generally distributed (Ireland). 3-11, 12-2 (hibernating in sheltered situations, e.g., houses, quarries, crevices).....* **tenax** Linnaeus
- Face covered with pale dust, apart from a narrow shining bare median stripe on lower part; eyes entirely pale yellow haired; arista as in fig. 36a; small species; wing length 8-9.5 mm. ♂ eyes slightly separated (fig. 35c). *Uncommon. Shetlands southwards to Perthshire, then Merioneth-Norfolk southwards, Ireland (Counties Cavan, Roscommon, Wicklow, Wexford and Kerry). 4-9*
- abusivus** Collin (*lyra* Harris, of Kloet and Hincks)

- 8 Face entirely covered with pale dust, in rubbed specimens with a narrow shining bare median stripe; hind femora pale at tip only; resembles *abusivus*, but easily distinguished by the plumose arista (fig. 36b), also mouth-edge less projecting and general pubescence shorter; wing length 7-10 mm. ♂ eyes touching for a considerable space (fig. 35d). *Common. Generally distributed (Ireland).* 4-10
arbustum Linnaeus
- 9 Face with a broad black shining median stripe.....9
 Hind femora pale at the base in ♂, and for about the basal half in ♀; stigma extended as a brown cloud across middle of wing, varying in intensity; tergite 2 with the yellow or orange side-markings very large and conspicuous; wing length 8.25-11.5 mm. *Frequent. Generally distributed (Ireland).* 4-10
horticola Degeer
- 10 Hind femora all black in ♂, sometimes pale for much less than basal half in ♀...10
 Wings very pellucid with a very small quadrate brownish stigma; body mainly yellow-haired; hind metatarsi darkened; wing length 8.25-10.5 mm. *Frequent. Generally distributed (Ireland).* 4-9.....**nemorum** Linnaeus
- Wings infuscated at least towards base, stigma blackish with a large conspicuous dark brownish blotch below it; body usually mainly tawny-haired; hind metatarsi usually yellowish; wing length 7.75-11.25 mm. *Frequent in mountainous areas throughout British Isles.* 6-9.....**rupium** Fabricius

Genus *Merodon* Meigen.

(*Lampetia* Meigen, of Kloet and Hincks.)

Rather large fly, densely yellow or yellow and black-haired. Occurs in various situations, particularly in gardens and wooded areas. *M. equestris* is known as the Large Narcissus-fly or the Large Bulb-fly, and the larva lives in the bulbs of Narcissi and various other bulbous-rooted plants, being a major pest to bulb-growers. Larvae have been found in bulbs of the Wild Hyacinth (*Scilla nutans*). Hodson (1932b : 429) gives an account of the biology. Eggs are deposited on the neck of the bulb or on its dying leaves.

KEY TO SPECIES OF *Merodon*.

- 1 Thorax yellow-haired anteriorly, black-haired posteriorly; scutellum black or yellow-haired, or a mixture of both; tergites entirely yellow-haired, or tergite 2 partly or entirely black-haired; wing length 8.5-10.25 mm. ♂ (all forms) hind tibiae with a conspicuous inwardly directed spur at tip. *Frequent. Generally distributed (Ireland).* 4-8, 2-3 (probably emerged from bulb-forcing houses)
equestris Fabricius (*Typical form*)
- 2 Thorax with entirely reddish-yellow, yellow or black hairs.....2
 Thorax entirely reddish-yellow or yellow haired; scutellum similar.....3
 Thorax entirely black-haired; scutellum similar; tergite 2 and often base or more of 3 black-haired, tergites otherwise greyish-yellow or yellow-haired. (Wing length, distribution and dates, see *typical form*).....**equestris** var. **validus** Meigen
- 3 Tergites entirely greyish-yellow or yellow-haired. (Wing length, distribution and dates, see *typical form*).....**equestris** var. **narcissi** Fabricius
 Tergite 3 mainly black-haired, except towards sides, pubescence of other tergites as in var. *narcissi*. (Wing length, distribution and dates, see *typical form*)
equestris var. **transversalis** Meigen
- (Intermediates of the above named varieties occur occasionally.)

Genus *Myiatropa* Rondani.

Large black and yellow fly. Occurs mainly in vicinity of wooded areas. The "rat-tailed" larvae of *M. florea* occur in water-filled cavities in trees, and occasionally in other accumulations of water. The present writer has frequently found them in leaf-filled water pockets amongst the surface roots of large beech and oak trees. Beiling (1888 : 4) described the larva and

puparium (as *Helophilus nigrotarsatus* Schiner). There is a note by F. W. Edwards on specimens in the British Museum (Natural History) to the effect that the full-grown larvae found in wooden water-butts were about two-thirds of an inch long exclusive of the "tail," which, when fully extended, reached a length of 10½–11 inches.

KEY TO SPECIES OF *Myiatropa*.

- 1 Face yellow or orange at sides, moderately grey-dusted, with a broad bare shining black median stripe; antennae black; thorax more or less dull, greenish-black, mainly yellow-haired, with greyish anterior, posterior and mid-lateral markings, also a pair of longitudinal grey stripes, which sometimes merge; scutellum clear yellow or orange; tergite 2 with large triangular yellow side-patches, occupying most of lateral margins and narrowing towards disc, 3 with moderate or small yellow basal side-patches, 4 with narrow grey basal side-patches and pre-apical grey marking; tergites 2–4 with hind-margins narrowly yellow; wings clear or faintly brownish anteriorly; femora black, yellow-tipped; tibiae mainly yellow, black-tipped, hind pair more broadly so; tarsi black, at least anterior and mid pairs usually reddish at base; wing length 7–12 mm. *Common. Generally distributed (Ireland).* 5–10.....*florea* Linnaeus

Genus *Helophilus* Meigen.

(including *Lejops*, *Anasimyia* and *Parhelophilus* of Kloet and Hincks).

Wing length 5.75–12.25 mm. Medium-sized to large flies, the thorax black with longitudinal yellow or grey stripes, the abdomen black and yellow, orange or grey. Occur mainly in marshy and wet situations. The "rat-tailed" larvae are found in accumulations of foul or stagnant water, and in moist excrement. The present writer has observed *H. pendulus* depositing eggs around the rim of a bucket containing liquid manure. Gabler (1932 : 143) first published the fact that *Helophilus* larvae may be distinguished from other known "rat-tailed" kinds by the curiously undulating tracheal trunks. Buckton (1895 : 83) briefly describes the larva of *H. pendulus*, in general terms only. The larva of the North American *H. latifrons* Loew has been described by Lintner (1891 : 228) and the egg, larva and puparium by Jones (1922 : 7), while Bhatia and Shaffi (1932 : 567) dealt with the early stages of the Indian species, *H. bengalensis* Wiedemann.

KEY TO SPECIES OF *Helophilus*.

- 1 Tergites 2–4 with absolutely longitudinal grey stripes, sometimes outwardly concave; antennae with segment 3 much deeper than long; arista black, broadly whitish at tip; face (fig. 37a) very deeply excavated below antennae; wing length 8–10 mm. *Uncommon, in marshy localities in S.E. England, including Norfolk.* 5–9.....*vittatus* Meigen
- Tergites with otherwise disposed grey, yellow or orange markings; antennae with third segment not, or only slightly, deeper than long; arista otherwise coloured; face (fig. 37b) not, or only moderately, excavated below antennae.....2
- 2 Face undusted on the median line from just below antennae to the mouth-edge, this bare area appearing as a broad, shining black, brown or yellow stripe; stigma elongate, pale yellow, with or without a small brown patch in area of stigmal cross-vein; antennae black; large species.....3
- Face entirely yellow, dusted yellowish or whitish, occasionally shining around mouth-edge only; stigma absent, stigmal cross-vein often infuscated or yellowish; antennae clear reddish-orange; moderate-sized or small species.....6
- 3 Face with median stripe yellow; largest British *Helophilus*; wing length 10.25–12.25 mm. *Frequent. Generally distributed.* 5–10.....*trivittatus* Fabricius (*parallelus* Harris, of Kloet and Hincks)
- Face with median stripe black or brown.....4

- 4 Hind tibiae yellow on basal two-thirds; face as in fig. 37b; wing length 7.25–10.5 mm. *Common. Generally distributed (Ireland).* 4–10.....*pendulus* Linnaeus
 Hind tibiae yellow on about basal third only.....5
 5 Face (fig. 37c) only slightly descending below lowest level of occiput; the two yellow or grey thoracic stripes broad; occiput golden-dusted on upper part; tergites predominantly yellow, tergite 2 with the yellow markings very large and squarish; wing length 8.5–11.25 mm. *Uncommon. Generally distributed (Ireland).* 5–9.....*hybridus* Loew

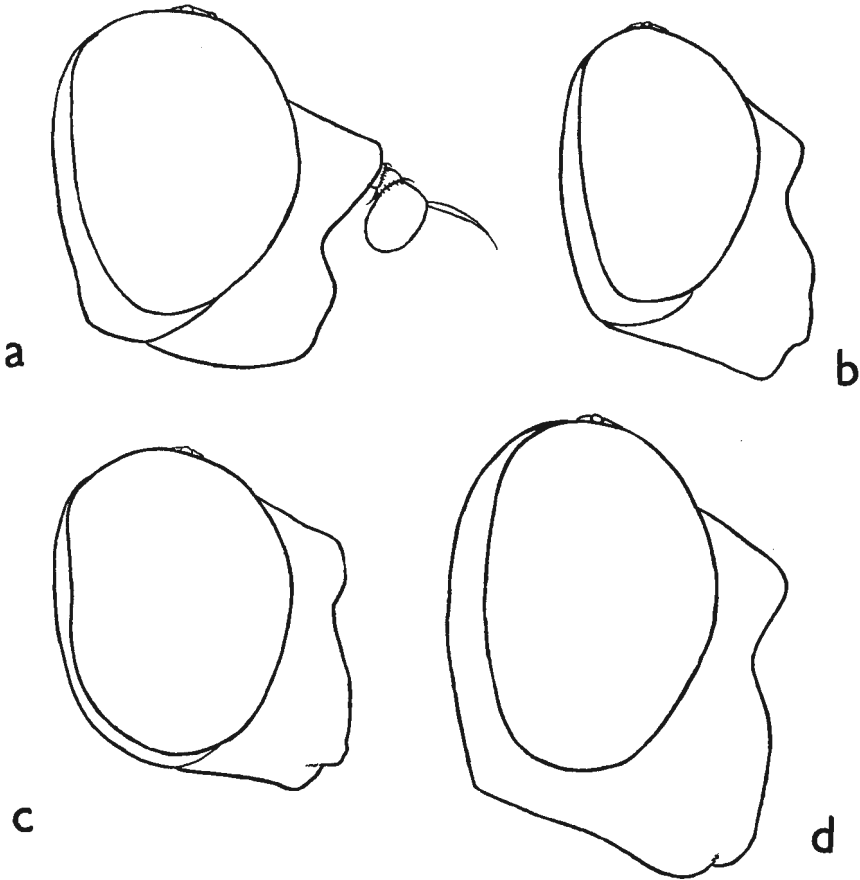


FIG. 37.—Heads of male *Helophilus*, in profile. a. *vittatus*. b. *pendulus*. c. *hybridus*. d. *groenlandicus*.

Face (fig. 37d) descending considerably below lowest level of occiput; the two grey thoracic stripes narrow; occiput whitish-dusted on upper part; tergites predominantly black, tergite 2 with the yellow markings rather small and triangular; darker species than the three preceding; wing length 8.75 mm. *Rare. Hebrides (Canna).* 7. (Single British record—1 ♂, see Bertram (1939: 63)).....*groenlandicus* Fabricius

- 6 Males.....7
 Females.....12

- 7 Broad species; tergites predominantly yellow; lateral ocelli removed from eye-margin by not more than their individual diameter, and usually less (fig. 38a); tergite 2 wider than 3, with its sides strongly and regularly convex.....8
- Narrow species; tergites predominantly black, lateral ocelli removed from eye-margin by more than their individual diameter (fig. 38b); tergite 2 not wider than 3, with its sides almost parallel, or slightly concave.....10
- 8 Hind femora postero-ventrally towards base with a prominent projection, which bears a fan-shaped arrangement of 15-20 black bristly hairs; face (fig. 39a) obviously less prominent than tip of third antennal segment; ocelli as in fig. 38a; front tibiae yellow, or with a slightly darkened antero-ventral patch at tip; thoracic stripes brownish-black; wing length 7-9 mm. *Uncommon, in marshy localities. Lincs.-Worce.-Hereford southwards. 5-8.....♂ frutetorum* Fabricius
- Hind femora without projection.....9

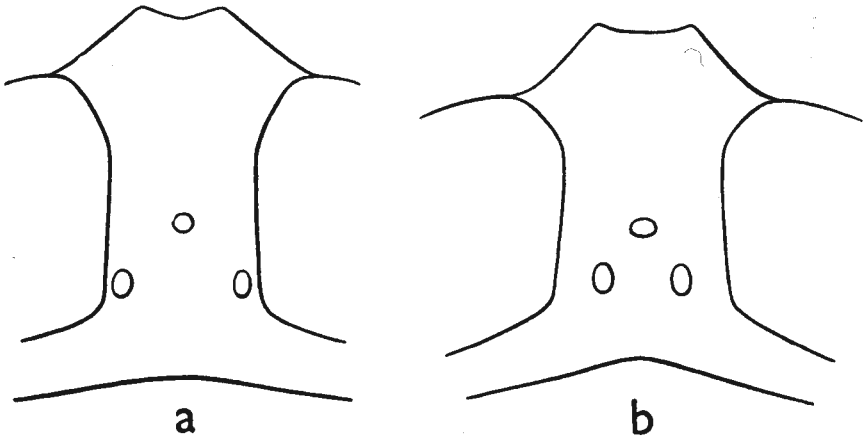


FIG. 38.—Heads of male *Helophilus*, dorsal view. a. *frutetorum*. b. *lineatus*.

- 9 Hind femora postero-ventrally towards base with a brush of long golden and black hairs; face (fig. 39b) obviously less prominent than tip of third antennal segment, front tibiae yellow, or with a slightly darkened antero-ventral patch at tip; thoracic stripes brownish-black; wing length 7-9 mm. *Uncommon, in marshy localities. N. Lincs. southwards, Ireland (Co. Kildare, Naas, R. L. Coe, 1 ♂, and Co. Wexford, Wexford, J. J. F. X. King, 1 ♀). 4-8... ♂ versicolor* Fabricius
- Hind femora with short pale postero-ventral ciliation only; face (fig. 39c) scarcely less prominent than tip of third antennal segment; front tibiae with tip blackened; thoracic stripes distinctly black; wing length 7.5-8.5 mm. *Rare. Lincs. (Theddlethorpe), Norfolk (Upton and Catfield), Oxon., Glam. (Crmllyn Bog), Somerset (Catcott and Edington), Cornwall (Roche), Ireland (County Cavan, Cornafean, R. C. Faris, 1 ♂, 2 ♀, Co. Leitrim, Carrigallen, R. L. Coe, 1 ♀ and Co. Kerry, Kenmare, J. W. Yerbury, 1 ♂). 5-8..... ♂ consimilis* Malm
- 10 Face (fig. 39d) greatly produced, snout-like, almost pointed at anterior extremity; ocelli as in fig. 38b; hind femora with about middle third black dorsally; tergite 2 with yellow or yellowish-red side-markings, large and roughly triangular, these, and side-markings on tergite 3, on inner side not at all produced upward towards base of tergite; wing length 6.25-8.25 mm. *Frequent, in marshy localities. Generally distributed (Ireland). 5-9..... ♂ lineatus* Fabricius
- Face (fig. 39e) less produced, quite blunt at anterior extremity; hind femora continuously yellow or yellowish-red dorsally; tergite 2 with yellowish-grey or yellowish-red side-markings, narrow towards disc and not at all triangular, these, and side-markings on tergite 3, on inner side sometimes produced upward towards base of tergite.....11

- 11 Face (fig. 39e) descending well below lowest level of eyes, antennae entirely pale orange; hind tibiae very slightly produced on ventral side at tip; tergites 2 and 3 with yellowish-grey or yellowish-red side-markings, on inner side running almost parallel with base of tergite; wing length 5.75-8.5 mm. *Uncommon, in marshy localities. Sutherland, Hebrides (S. Uist), then Pems.-Ches.-Norfolk southwards (Ireland) 5-8.*.....♂ *lunulatus* Meigen
- Face (fig. 39f) descending moderately below lowest level of eyes, less produced than in *lunulatus* ♂; antennae with segment 2 brownish or blackish; hind tibiae with a long pointed projection on ventral side at tip; tergites 2 and 3 with yellowish-grey markings on inner side, produced abruptly upwards towards base of tergite; wing length 6-8.25 mm. *Uncommon, in marshy localities. Clyde southwards, Ireland (Co. Mayo, Westport, ? collector, 1 ♂).* 5-9
- ♂ *transfugus* Linnaeus
- 12 Lateral ocelli removed from eye-margin by their individual diameter, or slightly more; tergites usually predominantly yellow or yellowish-red, any greyish or greyish-yellow markings being very restricted; abdomen rather broad.....13
- Lateral ocelli removed from eye-margin by two or three times their individual diameter, tergites predominantly black, with grey or yellowish-grey markings; abdomen inclined to be narrow.....15
- 13 Front tibiae with black tip, intense at least dorsally; face scarcely less prominent than tip of third antennal segment; thoracic stripes distinctly black; tergites with rather restricted yellow side-markings, those on tergite 3 almost right-angled on outer posterior margin; tergite 1 with a pair of oblique grey stripes. (Wing length, distribution and dates, see ♂).....♀ *consimilis* Malm
- Front tibiae yellow, or with a slightly darkened antero-ventral patch at tip, which is never darkened dorsally; face obviously less prominent than tip of third antennal segment; thoracic stripes brownish-black; at least tergite 2 with extensive yellow side-markings, those on tergite 3 usually rounded on outer posterior margin; tergite 1 with an entire semicircular grey or yellowish-grey marking.....14
- 14 Tergites 2 and 3 with large yellow or yellowish-grey side-markings, the black transverse stripe just before hind-margin scarcely if at all spreading forwards along side-margins of tergite 2 and rarely to any extent along those of tergite 3; the side-markings on tergite 2 separated on disc by not more than the width posteriorly of median dark thoracic stripe; side-markings on tergites 3 and 4 closely approximating on disc; costa with short adpressed golden hairs at base which only spread along ventral surface for a short distance, not nearly as far as a point opposite tip of anal lobe of wing. (Wing length, distribution and dates, see ♂).....♀ *irutetorum* Fabricius
- Tergites 2 and 3 with more restricted yellowish or yellowish-grey side-markings, the black transverse stripe just before hind-margin of these tergites spreading forwards along side-margins of tergite 2 for at least one-fourth length of tergite, and along side-margins of tergite 3 for at least one-third length of tergite; the side-markings on tergite 2 separated on disc by more than the width posteriorly of median dark thoracic stripe; side-markings on tergites 3 and 4 not closely approximated on disc; costa with short adpressed golden hairs at base which spread along ventral surface almost as far as a point opposite tip of anal lobe of wing. (Wing length, distribution and dates, see ♂).....♀ *versicolor* Fabricius
- 15 Face greatly produced, snout-like, almost pointed at anterior extremity, hind femora with about middle third black, at least dorsally; tergites with yellow or grey side-markings, on inner side only moderately produced upwards towards base of tergite. (Wing length, distribution and dates, see ♂)
- ♀ *lineatus* Fabricius
- Face much less produced, quite blunt at anterior extremity; hind femora continuously yellow or yellowish-red dorsally; tergites with yellow or grey side-markings, on inner side more strongly produced upwards towards base of tergite.....16
- 16 Face descending well below lowest level of eyes, ventrally oblique; antennae entirely pale orange; tergites 2-4 with moderately and evenly lunulate yellow or grey side-markings. (Wing length, distribution and dates, see ♂)
- ♀ *lunulatus* Meigen
- Face only descending slightly below lowest level of eyes, not ventrally oblique; less produced than in *lunulatus* ♀; antennae with segment 2 brownish or blackish;

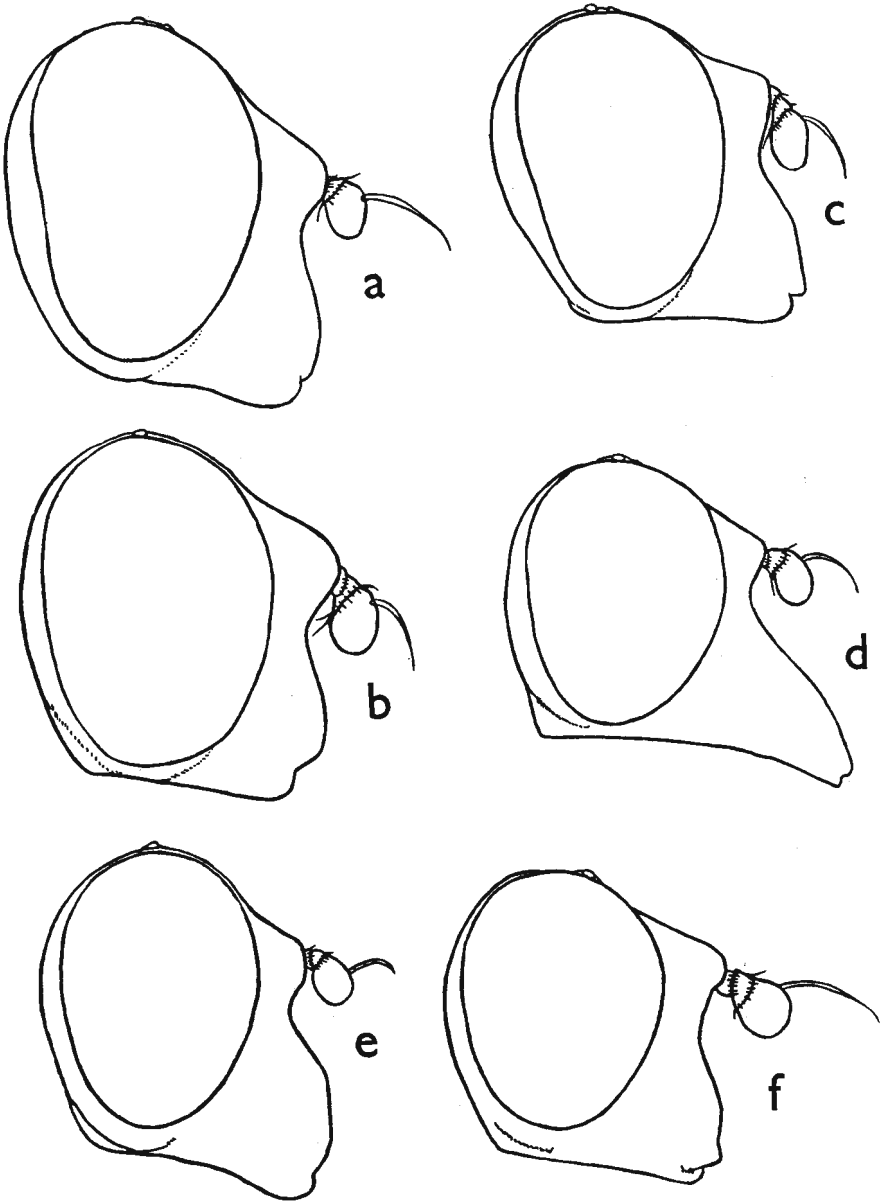


FIG. 39.—Heads of male *Helophilus*, in profile. a. *frutetorum*. b. *versicolor*. c. *consimilis*. d. *lineatus*. e. *lunulatus*. f. *transfugus*.

tergites 2-4 with grey or yellow side-markings, on inner side produced abruptly upwards towards base of tergite. (Wing length, distribution and dates, see §) ♀ *transfugus* Linnaeus

Genus *Mallota* Meigen.

Large greenish-yellow and black fly. Occurs mainly in wooded areas. The "rat-tailed" larvae of *M. cimbiciformis* occur in wet rot-holes of various trees. Britten (1916 : 83) found a considerable number of larvae in sodden debris within the rotten centre of a felled elm-tree, and noted that puparia were buried in the material. Becher (1882 : 253) and Lundbeck (1916 : 473) describe the larva and puparium.

KEY TO SPECIES OF *Mallota*.

- 1 Face heavily dusted grey or whitish, except on a rather broad bare shining black median stripe; antennae reddish-brown, or segments 1 and 2 sometimes black; thorax dull greenish-yellow, with long dense yellow hairs; scutellum clear yellow; tergites black, hairs entirely grey or mixed grey and black, tergite 2, and sometimes 3 and 4, with a more or less obvious pair of reddish side-markings; wings with a small brown anterior cloud across middle; legs partly black, at least tibiae and tarsi partly reddish, these reddish areas frequently more extensive; wing length 11.25-12.5 mm. *Uncommon. Notts. southwards.* 6-8
cimbiciformis Fallén

Subfamily XYLOTINAE.

KEY TO GENERA.

(Part based on Hull.)

- 1 Hind femora very swollen antero-ventrally with a large flattened triangular projection towards tip; face laterally compressed, keeled on median line
Tropidia Meigen (p. 85).
Hind femora without such antero-ventral projection towards tip.....2
- 2 Face laterally compressed, slightly but distinctly keeled on median line; hind femora very swollen. ♂ vertex (fig. 40f) unusually long and narrow
Syritta St. Fargeau (p. 85).
Face not compressed, without any trace of a median keel. ♂ vertex (fig. 40a) normal.....3
- 3 Upper marginal cross-vein meeting R_{4+5} at, or practically at, tip of latter, continuing outwards up to point of contact (fig. 42).....4
Upper marginal cross-vein meeting R_{4+5} well before tip of latter, directed upwards at point of contact.....5
- 4 Head small, much narrower than thorax; mesonotum with long dense yellow and black hairs; hind tibiae dorsally flattened at middle, then greatly constricted; squamae blackish; resembles humble-bee.....*Pocota* St. Fargeau (p. 84).
Head normal, as wide as thorax; mesonotum with rather short black hairs; hind tibiae not flattened dorsally at middle, then scarcely constricted; squamae whitish.....*Cynorrhina* Williston (p. 84).
- 5 Abdomen bright brassy aeneous, rather long and narrow; frons projecting considerably in front of eyes, cone-like; face largely yellowish
Calliprobola Rondani (p. 84).
Abdomen not bright brassy aeneous; frons usually projecting only slightly in front of eyes.....6
- 6 Face (fig. 40d) descending well below level of eyes; species with long pile.....7
Face (fig. 40b) not or scarcely descending below level of eyes; short-haired species
Xylota Meigen (p. 79).
- 7 Face (fig. 40d) much less deep than depth of eyes, moderately concave from shortly below antennae almost to upper mouth-edge.....*Brachypalpus* Macquart (p. 80).
Face (fig. 40c) as deep, or deeper, than depth of eyes, moderately or strongly concave for upper half only, then almost flat after a slight prominence
Criorhina Meigen (p. 82).

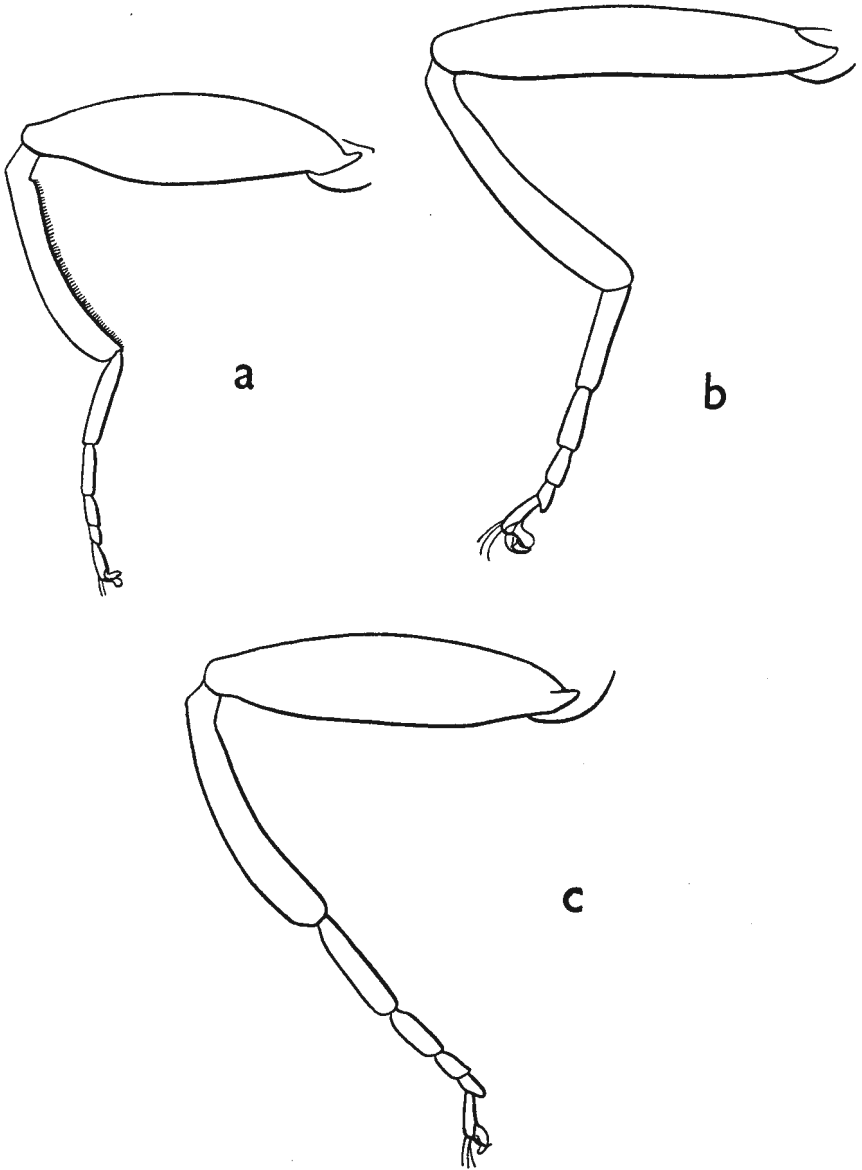


FIG. 40.—Heads of male SYRPHIDAE. a, b. *Xylota segnis*. a. Dorsal view. b. In profile. c. *Criorhina berberina*, in profile. d. *Brachypalpus bimaculatus*, in profile. e. *Pocota personata*, in profile. f. *Syritta pipiens*, dorsal view.

Genus *Xylota* Meigen.(including *Zelima* and *Xylotomima* of Kloet and Hincks.)

Wing length 5.5–12 mm. Small to rather large flies, thorax bronzy-black, tergites black with yellow, reddish or steely markings. Occur in wooded areas. Some species (e.g., *segnis*, *sylvarum* and *xanthocnema*) are fond of running about in sunshine on leaves of low bushes and plants. The larvae of several species have been found in damp or wet rot-holes in trees and logs. Lundbeck (1916 : 509), who found larvae of *X. segnis* and *X. nemorum* in a decaying, damp, stub of a beech, described the larva and puparium of both species. The present writer bred *X. sylvarum* and *X. abiens* from puparia found in a rotten damp cavity at the base of an oak trunk. Verrall (1909 : 39) figures the larva and puparium of *X. sylvarum*, without notes, Perris (1870 : 328) bred *X. pigra* (non-British) from larvae found under the bark of felled pine trees in a layer of slime amongst the detritus and excrement of coleopterous larvae. Heiss (1938 : 77) gives several references to literature dealing with the early stages of *Xylota*.

KEY TO SPECIES OF *Xylota*.

- 1 Legs entirely black; tergites 2 and 3, and base of 4 in ♀, clear reddish; wing length 10–12 mm. ♂ hind trochanters simple. *Uncommon. Generally distributed (Ireland, Co. Wicklow, The Devil's Glen). 5–7.....lenta* Meigen
At least four anterior legs partly yellow, usually extensively so.....2
- 2 Tergite 4 entirely covered with conspicuous, close-set, adpressed golden hairs.....3
Tergite 4 at least partly clothed with black and/or pale hairs, sometimes mixed with some golden hairs.....4
- 3 Tibiae darkened on apical half; tergites 1–3 bluish-black without steely or yellow markings, 2 and 3 with vague greyish side-markings towards base (more readily seen from behind); wing length 9–12 mm. ♂ hind trochanters with a pair of rather conspicuous short rounded processes, side by side, below near the apex. *Common. Generally distributed (Ireland). 5–9.....sylvarum* Linnaeus
Tibiae entirely yellow; tergite 1 entirely steely, 2 and 3 with conspicuous steely side-patches; tergite 3 with a pair of somewhat triangular yellow side-markings towards base, 2 often with a pair of smaller rounded yellow spots, similarly placed, all yellow markings less distinct in ♀; thorax and scutellum more brightly shining and general pubescence shorter than in *sylvarum*; wing length 7–10 mm. ♂ hind trochanters with a small rounded process below near apex. *Uncommon. Gloucs.-Beds.-Essex southwards. 6–8. See Collin (1939 : 104) and Coe (1939b : 224).....xanthocnema* Collin
- 4 Tergite 2 yellowish or yellowish-red, usually narrowly black at base and along a longitudinal median basal streak, 3 yellowish or yellowish-red except at apex, rarely with a narrow black longitudinal streak.....5
Tergites 2 and 3 black apart from paired yellowish or yellowish-red spots, these sometimes reduced or absent.....6
- 5 Hind femora with two widely spaced rows of well separated long, stout spines, antero-ventral and postero-ventral, the former usually extending over apical three-quarters and latter over apical half; few or no small close-set spines present, the space between rows of long spines being practically bare apart from short hairs; hind tibiae abruptly and strongly curved after middle, less so in ♀; mesopleura completely dull greenish, with abundant long whitish or yellowish hairs; wing length 7–9.5 mm. ♂ hind trochanters with a remarkably long upcurved narrow pointed process below near apex; profile of face as in fig. 40b. *Common, frequenting leaves of low bushes in woods. Generally distributed (Ireland). 5–10.....segnis* Linnaeus
Hind femora with short numerous close-set spines below, scattered for at least middle third (i.e., not arranged in rows); hind tibiae evenly curved, moderately in ♂ and only slightly in ♀; mesopleura brightly shining black, with rather sparse

mainly short yellowish or whitish hairs; general pubescence shorter than in *segnis*; wing length 5.5-8.5 mm. ♂ hind trochanters with a short rather pointed process below near apex. *Frequent and widespread in N. and C. Scotland, then uncommon and local from Warwks. southwards.* 6-8.....*tarda* Meigen

- 6 Hind femora (fig. 41a) remarkably swollen and deep, maximum depth (after middle) equal to or exceeding length of hind metatarsus; hind tibiae (fig. 41a) very strongly curved from shortly after base to tip, ventral surface with obvious absolutely upright closely-set short black or partly brownish hairs for entire length; abdomen short; tergites 2 and 3 quite one and a half times as wide as long, the yellowish or yellowish-red spots only rarely reduced; legs mainly black, knees narrowly yellowish, anterior and mid tarsi and occasionally hind tarsi more or less extensively so; wing length 6.5-8.25 mm. ♂ hind trochanters simple. *Uncommon in N. Scotland and from Notts. southwards.* 5-9.

memorum Fabricius

Hind femora (fig. 41b) less swollen, maximum depth (not beyond middle) less than length of hind metatarsus; hind tibiae (fig. 41b) at most moderately curved on apical half only, the short hairs along ventral surface sloping, at least partly pale; tergites with the yellowish or yellowish-red spots, sometimes reduced in ♂, frequently reduced or absent in ♀. ♂ hind trochanters with a short process below near apex.....7

- 7 Thorax moderately shining, more or less obscured by a bluish bloom; hind trochanters brightly polished beneath, quite unfrosted; hind femora (fig. 41b) only slightly thickened, only slightly convex above, and not obviously so for middle third; hind tibiae (fig. 41b) usually almost regularly concave below from shortly after base to tip, at least basal third clear yellow; wing length 6.25-9.25 mm. ♂ hind trochanters with the process rather pointed. *Frequent in Scotland and N. England, uncommon elsewhere; Ireland (Co. Down, Newcastle, W. F. Johnson).* 6-8.....**florum** Fabricius

Thorax brightly shining, without trace of bloom; hind trochanters more or less dull beneath, frosted at least in ♀; hind femora (fig. 41c) considerably thickened, more so and strongly and evenly convex above in ♂; hind tibiae (fig. 41c) usually concave after basal third, usually more obviously so in ♂, only extreme base yellow, occasionally slightly more extensively yellow in ♀; wing length 6-8.25 mm. ♂ hind trochanters with the process blunt. *Uncommon. Generally distributed (Ireland, Co. Kildare, Naas, a female taken by Coe—this specimen escaped after positive determination).* 5-8

abiens Meigen (*semulatra* Harris, of Kloet and Hincks)

Genus **Brachypalpus** Macquart.

Wing length 8.5-10.75 mm. Medium-sized blackish flies with clouded wings. Occur in wooded areas. The "short-tailed" larvae have been found in the rotten wood of trees, and under the bark. Bremi (1846 : 174) notes that he found the larvae of *B. valgus* (non-British) in decaying wood of willow-trees. Heiss (1938 : 91) describes the early stages of two North American species, and gives references to earlier literature on the subject.

KEY TO SPECIES OF *Brachypalpus*.

- 1 Thorax unstriped, aeneous black, dusted around anterior and posterior margins, also along transverse suture and at sides, otherwise shining; scutellum aeneous black; tergites shining black, reddish laterally towards base of abdomen, more extensively so in ♀, which also has hind-margins of tergites narrowly reddish; legs extensively yellowish; wing length 8.5-10.75 mm. ♂ eyes touching for a short distance; hind trochanters with a nipple-like process behind; profile of face as in fig. 40d. *Uncommon. N. Lancs. southwards.* 4-8

bimaculatus Macquart

♂ only (♀ not seen). Thorax with three distinct dull black longitudinal stripes, the median one forking immediately behind the transverse suture, ground-colour bronzy-green, moderately shining; scutellum bronzy-green; tergites rather dull black, without reddish markings; tergite 2 with a conspicuous broad dull greyish-white band just before the middle, broadly divided towards the median

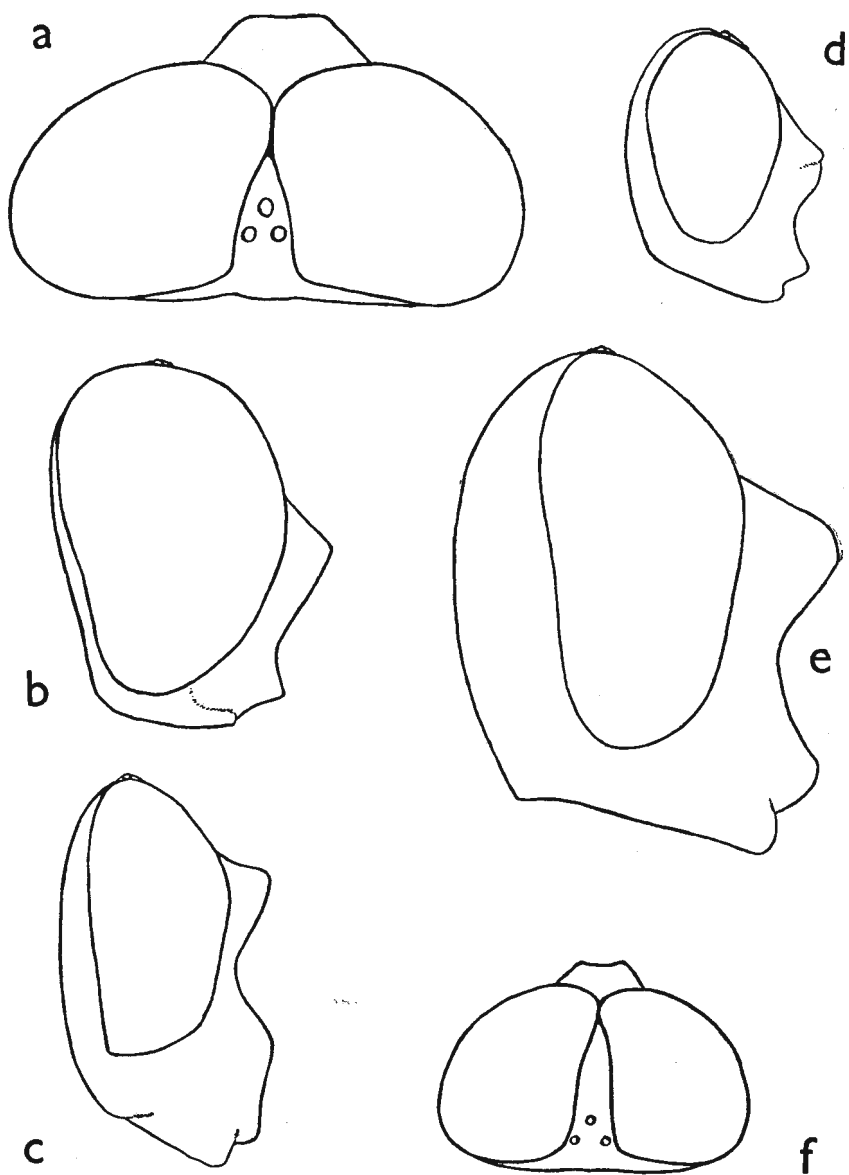


FIG. 41.—Hind legs of male *Xylota*. a. *nemorum*. b. *florum*. c. *abiens*.

axis; tergite 3 with an anterior shining hoary aeneous band, not distinctly divided; legs black, apart from the narrowly yellow knees; eyes slightly separated; hind trochanters simple; wing length 9.5 mm. *Rare. First British example taken at Ledbury in Herefordshire by J. H. Wood, 6.v.1899, and 1 ♂, Berks. (Cothill), C. O. Hammond, 3.v.1953. (♀ not yet taken in Britain.) See Coe (1941c: 193).....♂ eunotus Loew*

Genus *Criorhina* Meigen.

(*Penthesilea* Meigen, of Kloet and Hincks.)

Wing length 8–14 mm. Rather large to large flies, densely yellow or yellow and black pilose, at least on thorax. Occur mainly in wooded areas, frequently on Hawthorn and other spring tree blossoms. The larvae have

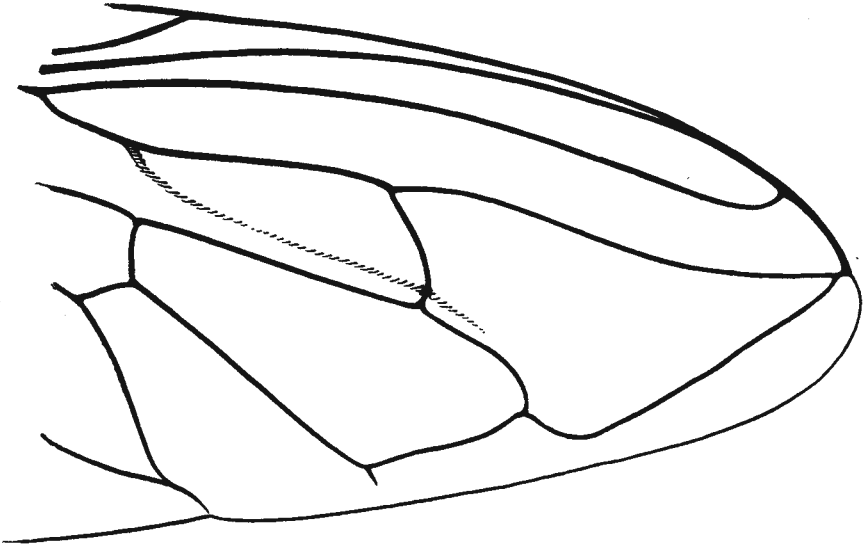


FIG. 42.—*Pocota personata*, part of wing.

been found in the rot-holes of trees, amongst wet decaying material. Lundbeck (1916: 491) described the puparium of *C. berberina*, and remarked on its resemblance to that of *Tropidia*. Greene (1917: 152 and 1923: 87) described the early stages of several North American species. It is remarkable that the puparium of *berberina* has a very short posterior respiratory process, whereas the puparia described by Greene are all of the “rat-tailed” type.

KEY TO SPECIES OF *Criorhina*.

- 1 Thorax with greyish-black hairs; scutellar hairs yellowish or brownish; abdomen mainly black-haired, yellow or rufous haired after middle of tergite 3; hind femora considerably thickened, especially in ♂; hind tibiae sickle-shaped; large species; wing length 11.25–14 mm. ♂ genitalia as in fig. 43 (4). *Frequent. Inverness (Kincaig), then N. Cumbs. southwards. 3-6.....ranunculi Panzer*
- 2 Thorax yellow-haired, or mainly so; hind femora only moderately thickened.....2
- 2 Narrow species; tergites 2–4 glossy black with pale yellow side-stripes, those on tergite 2 rather broad and conspicuous, spreading laterally along side-margins,

- those on tergites 3 and 4 narrow and inconspicuous ; pubescence of tergites scanty, not obscuring the ground-colour ; wing length 9.5–11.25 mm. ♂ genitalia as in fig. 43 (5). *Frequent. Berwick southwards. 4–7*.....*asilica* Fallén
 Broad species ; tergites without obvious pale side-stripes.....3
- 3 Tergite 2 with a tuft of long yellow or tawny hairs at the basal corners, pubescence of body otherwise short and tawny, not obscuring the ground-colour ; frons rather prominent ; wing length 10–13 mm. ♂ genitalia as in fig. 43 (1), (2). *Frequent. Inverness (Aviemore), then Co. Durham southwards (Ireland). 4–7 floccosa* Meigen

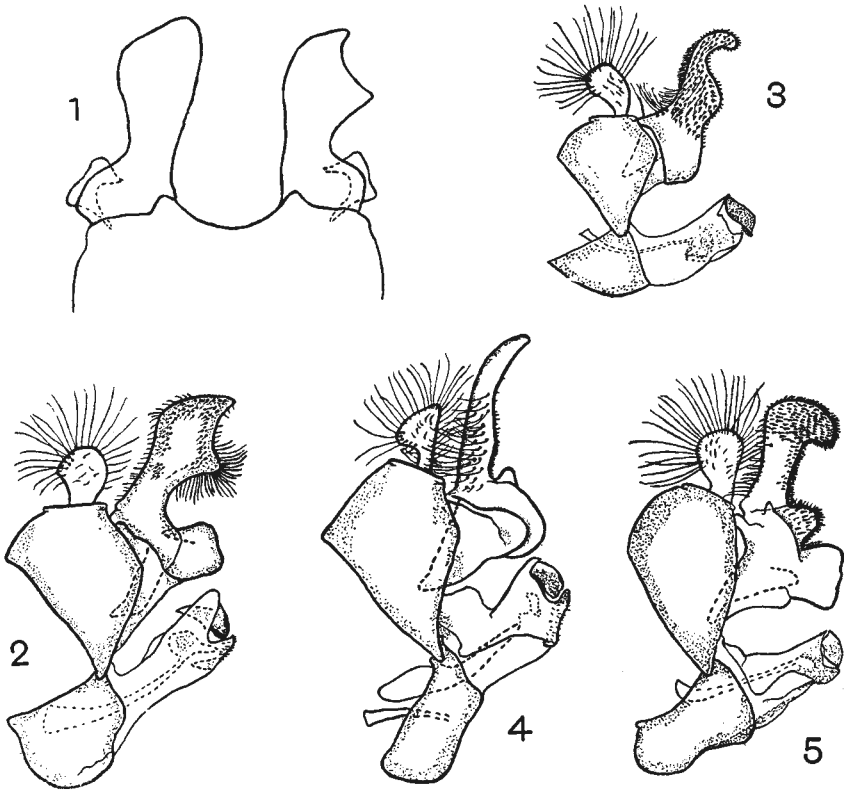


FIG. 43.—Genitalia of *Criorhina*. (1). *floccosa*, outline of styles, showing asymmetry. (2)–(5). In profile. (2) *floccosa*. (3). *berberina*. (4). *ranunculi*. (5). *asilica*.

- Body with uniformly long dense pubescence, obscuring the ground-colour ; frons not prominent ; profile of face as in fig. 40c.....4
- 4 Body-pubescence more or less extensively blackish ; wing length 8–12 mm. ♂ genitalia as in fig. 43 (3). *Frequent. Perthshire southwards (Ireland). 4–8. See Coe (1950 : 124)*.....*berberina* Fabricius (*Typical form*)
 Body-pubescence entirely yellow or tawny. ♂ genitalia as in typical *berberina*. (Wing length, distribution and dates, see typical *berberina*)
berberina var. *oxyacanthae* Meigen

Genus *Pocota* St. Fargeau and Serville.

Rather large fly, densely black and yellow or orange pilose. Occurs mainly in wooded areas, and has been taken on Hawthorn and other spring tree blossoms. The "short-tailed" larva of *P. personata* is found in the decaying wood of various trees, living in wet and sappy frass. The entrance to rot-holes from which the larvae have been taken is usually at a considerable height from the ground, and it is only when the tree falls or is felled that such a habitat is discovered. Donisthorpe (1928 : 150) described the bionomics and Aubertin (1928 : 151) the larva from material obtained from a decayed ash-tree which had been felled. The puparium has been described by several authors, and most recently by Lundbeck (1916 : 499).

KEY TO SPECIES OF *Pocota*.

- 1 Face (fig. 40e) black, silvery-dusted at sides, more extensively so in ♂; antennae reddish-brown; mesonotum black, anterior half with dense yellow hairs and posterior half with dense black hairs; abdomen black; tergite 2 black-haired, 3 yellow or reddish haired towards sides, these admixed with blackish hairs on disc, 4 yellow or whitish haired; wing with dark brown cloud anteriorly across middle and vague dark markings on apical half; femora black, extreme tip reddish; tibiae dark reddish, often blackish around middle; tarsi reddish, except last one or two segments black; wing length 11-13 mm. *Rare. Notts. southwards.* 4-6.....*personata* Harris

Genus *Cynorrhina* Williston.

(*Blera* Billberg, of Kloet and Hincks.)

Medium-sized black and orange fly. Occurs in vicinity of wooded areas in Scottish Highlands. The early stages of *C. fallax* are apparently unknown, but Verrall (1901 : 589) states that the female has been seen laying eggs in sap exuding from beech and oak trees. He does not quote the source of this observation.

KEY TO SPECIES OF *Cynorrhina*.

- 1 Face yellow, thinly white-dusted at sides; antennae dark brown; mesonotum black, moderately shining; wings vaguely brownish; femora black, narrowly yellow-tipped; tibiae yellow, broadly darkened around middle; tarsi yellow, except last one or two segments black; wing length 8-9.5 mm. ♂ tergites 1 and 2 black, mainly whitish-haired, 3 and 4 orange, yellow-haired. ♀ tergites 1-3 black, mainly whitish-haired, 4 black at base, then orange, yellow-haired. *Rare. Moray (Logie), Inverness (Spey Valley and Aviemore), Aberdeen (Braemar).* 6-8.....*fallax* Linnaeus

Genus *Calliprobola* Rondani.

Large narrow-bodied fly. Girschner (1884 : 199) writes, "they fly to and fro in the sunshine, the hind legs hanging down, and sometimes rest in the hot sun, the legs directed backwards, the tip of the splendidly coloured abdomen somewhat lifted, and the wings spread out" The puparium of *C. speciosa* has been described by Girschner (ref. above), who found the fully-grown "short rat-tailed" larvae in the rotten wood of a beech stump. These larvae pupated before he had time to describe them.

KEY TO SPECIES OF *Calliprobola*.

- 1 Face and frons yellow or orange; antennae orange; thorax black, yellow-haired; abdomen rather long and narrow; tergites bright brassy aeneous, with bands of dense pale yellow hairs posteriorly and a narrow median stripe of similar hairs; wings strongly yellow-tinged, darkened towards tip; femora black except towards tip, legs otherwise orange; wing length 11-12.5 mm. *Rare. Yorks., Derby (Burton-on-Trent), Berks. (Windsor Forest), Hants. (New Forest). 5-7 speciosa* Rossi

Genus *Syritta* St. Fargeau and Serville.

Small black and yellow fly. Occurs in various situations. The larva is of the "short-tailed" filth inhabiting type, and occurs in various animal manures, in human excrement, and in heaps of vegetable refuse. Hodson (1931 : 55) bred *S. pipiens* from larvae found in rotting *Narcissus* bulbs. The larvae do not attack healthy bulbs, and are merely scavengers, their mandibular sclerites being only vestigial in contrast to the powerful toothed sclerites of *Eumerus* larvae, with which those of *Syritta* are often found. The life-stages of *S. pipiens* have been described by several authors, including Metcalf (1916 : 253).

KEY TO SPECIES OF *Syritta*.

- 1 Face laterally compressed, obviously keeled, heavily silvery-dusted; antennae yellowish-red, segment 3 partly blackish in ♀ and sometimes extreme tip blackish in ♂; thorax rather dull black, with greyish anterior and lateral markings; scutellum black; wings hyaline; front and mid legs mainly yellow, femora with a black dorsal streak, tibiae somewhat darkened on apical half or two-thirds, tarsi at most vaguely darkened; hind femora and tibiae mainly or partly black, yellow about base and middle, tarsi black; hind femora very swollen, strongly convex above in ♂, usually less so in ♀; wing length 4.25-7 mm. ♂ tergites black, 2 with large broad yellow or more or less hoary basal side-spots, 3 with similar but smaller spots, 4 with very small narrow grey side-markings; vertex as in fig. 40f. ♀ tergites with similar markings, except that those on tergite 3 are almost as small and narrow as those on 4. *Common. Generally distributed (Ireland). 3-10.....pipiens* Linnaeus

Genus *Tropidia* Meigen.

Rather small black and yellow or orange fly. Occurs amongst low vegetation in marshy places and in fens. Lundbeck (1916 : 481) describes the puparium of *T. scita* from a number sifted from flood refuse. Metcalf (1916 : 248) describes the early stages of the common North American *T. quadrata* Say, the larvae of which he found in partially decomposed human excrement near the mouth of a sewer and also in masses of rotting potatoes lying on the ground.

KEY TO SPECIES OF *Tropidia*.

- 1 Face laterally compressed, keeled, whitish-dusted; antennae brownish or blackish; thorax shining black; scutellum black, yellow-tipped; tergites 2 and 3 yellow or orange with a broad black median stripe, sometimes more or less spreading across tergites; tergite 4 black, with a pair of silvery side-markings on basal half and in ♂ only a small reddish median spot; wings almost clear; front and mid legs with femora black, yellow-tipped; tibiae yellow, black-tipped; tarsi yellow except segment 4 black; hind legs black except tibiae yellowish at extreme base; hind femora very swollen, strongly curved (more so in ♂), and bearing antero-ventrally towards tip a large flattened triangular projection; wing length 5.5-8.25 mm. *Uncommon. N. Lancs. southwards, Ireland (Counties Cavan, Wicklow and Kerry). 4-8.....scita* Harris

Subfamily CALLICERINAE.

Genus *Callicera* Panzer.

Wing length 9.75–15 mm. Medium-sized to rather large handsome metallic flies, with strikingly long antennae. Occur mainly in wooded areas. The larvae of *C. rufa* were found by Coe (1938 : 97) in a decayed cavity partly filled with resinous water in an ancient Scots Pine. After the first stage the trachea of the larvae develop to a remarkable degree, which enables them, despite the short posterior respiratory apparatus, to lead a subaqueous existence, ascending to the surface for respiration at infrequent intervals. Larvae kept in captivity by Coe (1941a : 131) took up to five years to pupate. Puparia were found by Coe (1939a : 228) in fissures, and between plates, of the bark of the Scots Pine referred to above. The early stages of other species of *Callicera* are apparently unknown.

KEY TO SPECIES OF *Callicera*.

- 1 Antennae (fig. 44a) with segment 1 at least twice as long as 2, proportions of the three segments 1:3:4 (measure on inner side); arista short, more so in ♂, rather bulbous at base, then thread-like; tergites shining black, 2 and 3 with inconspicuous dull blackish markings; pubescence of tergites entirely tawny, or tergite 4 more or less extensively black-haired; legs yellowish-red, except last two tarsal segments darkened, and front metatarsi sometimes bear a dorsal black streak; wing length 9.75–11.25 mm. *Rare, in vicinity of ancient Caledonian Pines. Inverness-shire, Aberdeenshire, Perthshire.* 6–8.....*rufa* Schummel
- Antennae (fig. 44b) with segment 1 scarcely, if at all, longer than 2; arista rather long, tapering on apical half only; tergites mainly bright brassy, yellow-haired.....2
- 2 Tergites 2 and 3 with a conspicuous dull black band; proportion of antennal segments 1:3:2 (measure on inner side); wings with anterior border broadly tawny up to the tip; wing length 12–15 mm. ♂ (foreign examples examined) legs yellowish-red, except femora black apart from tip, and last few tarsal segments darkened. ♀ legs yellowish-red except last few tarsal segments darkened. *Rare.* 1 ♀ taken in Suffolk (Southwold), 1.x.1928, by J. W. Bowhill (first British specimen, in Royal Scottish Museum collection), and 2 ♀♀ taken in Suffolk (Brandiston Marshes and Monks Soham) by C. Morley. 9–10. See Morley (1942 : 14 and 1947 : 149), Coe (1943 : 155) and Blair (1948 : 51)

spinolae Rondani

Tergites 2 and 3 with a scarcely perceptible dull black band; antennae (fig. 44b) with proportion of segments 1:1:2 (measure on inner side); wings with anterior border only vaguely tawny with tip clear; legs yellowish-red, except femora black apart from tip, and last few tarsal segments darkened; wing length 10–12.5 mm. *Rare.* Yorks. (Bradford) southwards. 6–8.....*anea* Fabricius

Subfamily PELECCOCERINAE.

KEY TO GENERA.

- 1 Antennae with segment 3 flat above, only rounded below, deep, pouch-like, sub-triangular (fig. 44c) in ♂, more evenly rounded below (fig. 44d) in ♀, the arista very thick, spike-like, inserted at the actual anterior extremity of the segment
Peleccocera Meigen (p. 86).
- Antennae (fig. 44e, f) with segment 3 almost evenly rounded, the arista only moderately thickened towards base and inserted at least slightly before the actual anterior dorsal extremity of the segment.....*Chamaesyphus* Mik (p. 88).

Genus *Peleccocera* Meigen.

Small black and yellow or orange fly. Occurs mainly on heaths. The early stages are apparently unknown.

KEY TO SPECIES OF *Pelecocera*.

- 1 Face yellow, whitish-dusted at sides and just below antennae, with a shining median stripe, which is narrow and yellowish-brown in ♂, broad and usually darker in ♀; antennae (fig. 44c, d) yellow or orange, segment 3 darkened above towards tip in ♂ only; thorax shining black, humeri greyish; tergites 2-4 with a broad

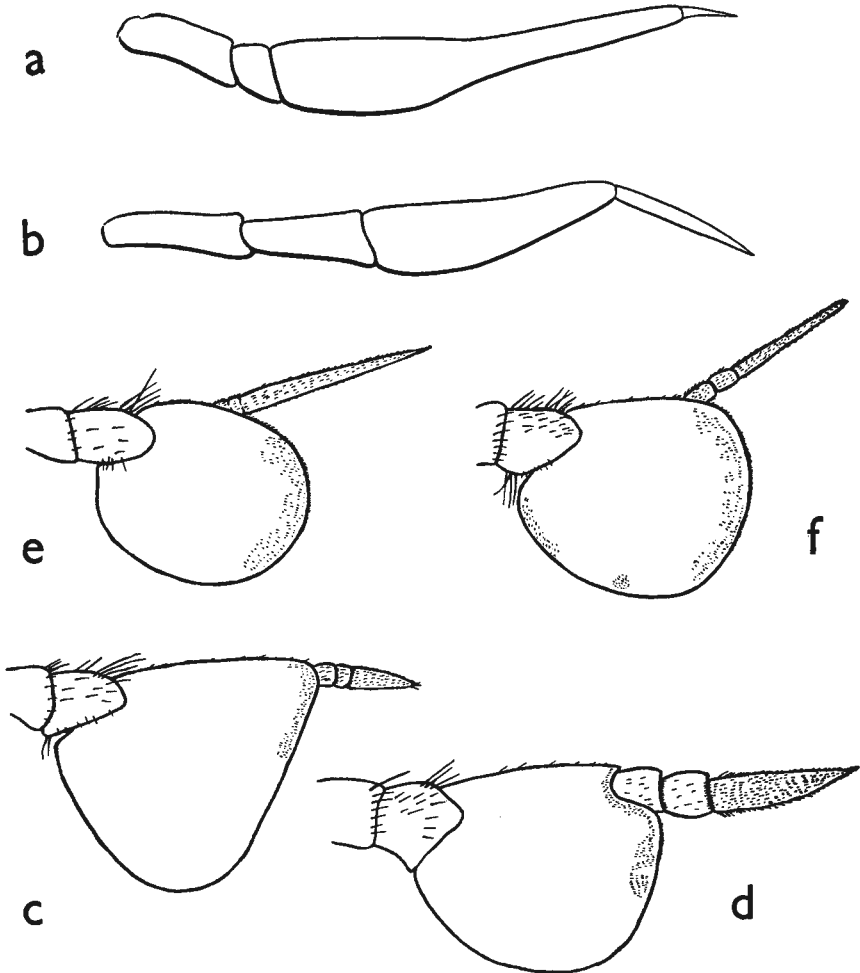


FIG. 44.—Antennae of SYRPHIDAE. a, b. *Callicera*, males. a. *rufa*. b. *aenea*. c, d. *Pelecocera tricincta*. c. Male. d. Female. e, f. *Chamaesyrrhus*, males. e. *scaevoides*. f. *caledonicus*.

yellow band, which is entire or (more often on tergite 2) partly or entirely divided; wings hyaline; front and mid legs yellow or sometimes femora and/or tibiae darkened behind; hind femora with a blackish pre-apical ring, hind tibiae and tarsi more or less extensively darkened; wing length 3.5-5.25 mm. *Uncommon.*
Hants., Dorset. 6-8.....*tricincta* Meigen

Genus *Chamaesyrrhus* Mik.

Wing length 4-6.25 mm. Small black and yellow or orange flies. Occur mainly amongst low herbage in shady damp situations. The early stages are apparently unknown.

KEY TO SPECIES OF *Chamaesyrrhus*.

- 1 Mesopleura with a conspicuous long yellowish backwardly directed bristle near upper hind corner; notopleural depression and suture only slightly grey-dusted, the shining black ground-colour at least partly exposed; frontal lunule with only the semicircular ridge shining, the more or less triangular extension downwards towards base of antennae heavily grey-dusted; antennae as in fig. 44e; arista inserted halfway along dorsal margin of third antennal segment; tergites with paired yellow side-markings, which have no trace of grey; wing length 4-6.25 mm. ♂ frons slightly more constricted at middle than in *caledonicus* ♂. *Uncommon.* *Sutherland, Moray, Inverness-shire, Aberdeenshire, Perthshire.* 6-8

scaevoides Fallén

Mesopleura without a conspicuous long yellowish bristle; notopleural depression and suture completely and heavily grey-dusted, without trace of the shining black ground-colour; frontal lunule free of dust down to base of antennae, somewhat shining; arista inserted beyond middle of dorsal margin of third antennal segment (fig. 44f); tergites with the paired yellow side-markings with a greyish sheen, or entirely replaced by grey; wing length 4-5 mm. ♂ frons slightly less constricted at middle than in *scaevoides* ♂. *Rare.* *Moray (Culbin Sandhills), Inverness (Boat of Garten), Perth (Rannoch).* 7-8

caledonicus Collin

Subfamily MICRODONTINAE.

Genus *Microdon* Meigen.

Wing length 6-9.25 mm. Medium-sized, broad, stubby, bronzy-black flies, tergites with cross-bands of yellow or whitish pubescence. The remarkable mollusc-like larvae live in the nests of various species of ants, where they act as scavengers, feeding on the pellets ejected by the ants from their infrabuccal pockets. Syms (1935:163) describes the biology of *M. eggeri*, the larvae of which were found in the nests of *Acanthomyops niger*. Donisthorpe (1927:120) discusses in considerable detail the association of *Microdon* with British ants, and Lundbeck (1916:579) gives numerous notes on the early stages of various species, with references to the literature.

KEY TO SPECIES OF *Microdon*.

- 1 Scutellum reddish, with two rather small reddish apical spines, the space between them slightly concave (view from behind); wing length 6-9 mm. ♂ distance between upper front corners of eyes (i.e., point of closest proximity) less than distance between upper front corner and upper hind corner (fig. 45a). *Frequent.* *Perthshire, then N. Lancs. southwards; Ireland (Counties Kerry and Cork).* 5-7
- mutabilis* Linnaeus
- 2 Scutellum steely black or steely greenish-black, shining.....2
- 2 Thorax with patch of black hairs on disc between roots of wings at least, thoracic pubescence otherwise yellowish; scutellum with two moderately large usually reddish apical spines, the space between them obviously concave (view from behind); wing length 6.25-9.25 mm. ♂ distance between upper front corners of eyes less than distance between upper front corner and upper hind corner. *Uncommon.* *Worcs. southwards.* 5-7.....*devius* Linnaeus
- Thorax with entirely golden-yellow or pale yellow hairs; scutellum with two normally small black or reddish apical spines, these occasionally almost undeveloped, the space between them straight (view from behind); wing length 6.75-8.25 mm. ♂ distance between upper front corners of eyes greater than distance between upper front corner and upper hind corner (fig. 45b). *Uncom-*

mon, in vicinity of pine-trees. Inverness (Nethy Bridge, Aviemore, etc.), Perth (Rannoch), Berks. (Ascot), Surrey (Esher, etc.), Hants. (New Forest), Sussex (Tilgate Forest), Dorset (Crichel, etc.). 5-7.....*eggeri* Mik

(NOTE.—The proportions of antennal segments in *Microdon* are subject to intra-specific variation, and cannot be used as an aid to identification.)

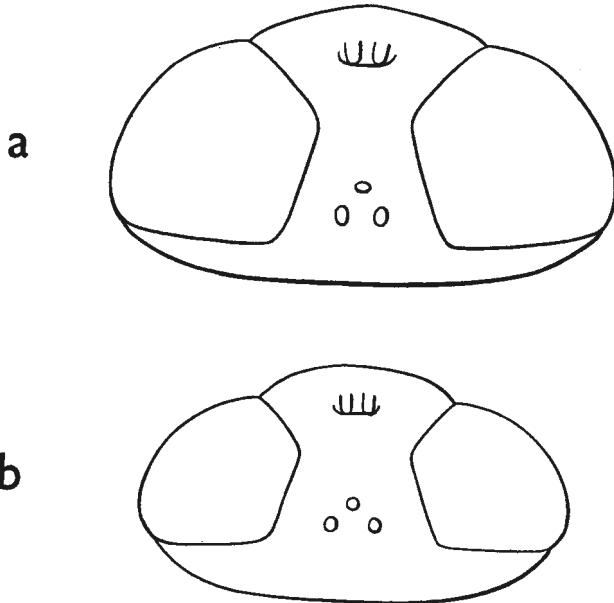


FIG. 45.—Heads of male *Microdon*, dorsal view. a. *mutabilis*. b. *eggeri*.

Subfamily EUMERINAE.

Genus *Eumerus* Meigen.

(*Paragopsis* Matsumura, of Kloet and Hincks.)

Wing length 3.25–6.75 mm. Small flies, thorax bronzy-black with grey longitudinal bars, tergites black or reddish-brown with slanting whitish bars. Occur in various situations, particularly in gardens, in wooded areas and in dry sandy places. *E. tuberculatus* and *E. strigatus* are known as the Lesser Bulb-flies, and their larvae are well-known pests living in *Narcissus* bulbs, *tuberculatus* being the more prevalent species in Britain. According to Hodson (1932a : 247) the larvae of *strigatus* also attack *Iris* and Parsnip roots, and Collin (1918 : 77) states that on the Continent the larvae of this species have been recorded as attacking Onions and Potatoes, while Miles (1951 : 192) bred a number from an Onion grown at Aberystwyth. Hodson (1927 : 373) dealt at some length with the bionomics of both species. Bouché (1847 : 145) mentions that the larvae of *E. strigatus* (as *aeneus* var. *strigata*) sometimes do great damage to the bulbs of *Allium cepa*.

KEY TO SPECIES OF *Eumerus*.

- 1 Tergites mainly reddish-brown; wing length 3.25–5.25 mm. Frequent near sand-hills and earthy cliffs along South coast of England, also Suffolk (Felixstowe), Caern.

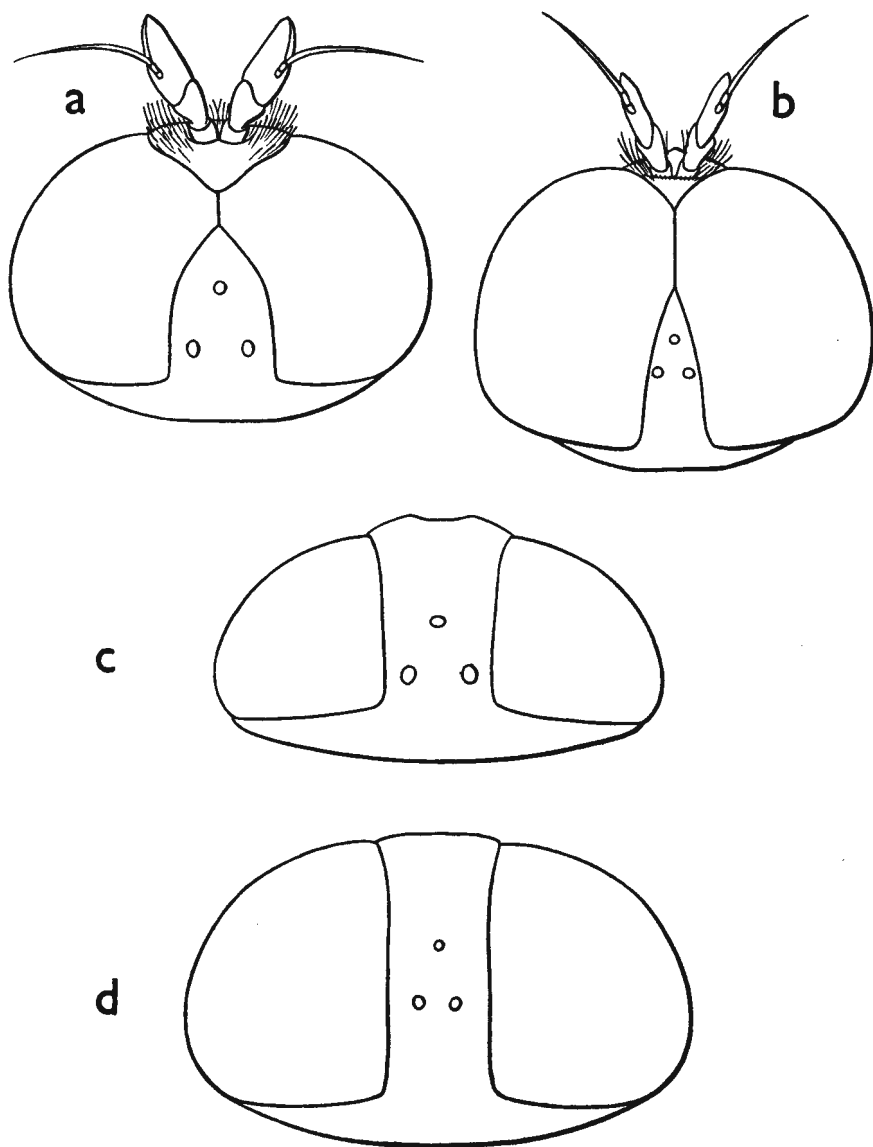


FIG. 46.—Heads of *Eumerus*, dorsal view. a, b. Males. a. *strigatus*. b. *ornatus*. c, d. Females. c. *tuberculatus*. d. *ornatus*.

(Aberdaron), Merioneth (Barmouth and Llwyngrŷl), Pems. (St. Davids). 6-8

sabulonum Fallén

- Tergites blackish, absolutely without reddish-brown markings.....2
- 2 Stigma yellowish or light brown; hind femora simple; wing length 4-6.25 mm. ♂ eyes (fig. 46a) touching for a distance equal only to half length of third antennal segment. ♀ frons with anterior polished flattened area large and squarish, occupying entire width, dulled against eyes by the rather wide whitish dust-strips; occiput lightly but obviously obscured by dust on upper part, moderately shining; distance between front ocellus and hind ocelli slightly greater than distance between hind ocelli and upper hind corner of eye. *Frequent. Angus southwards (Ireland)*. 3-9.....**strigatus** Fallén
- 3 Stigma dark brown or blackish.....3
- 3 Hind femora with a slight but obvious rounded projection at extreme base beneath (more developed in ♂); wing length 3.5-6 mm. ♂ eyes touching for a distance equal only to half length of third antennal segment. ♀ frons with polished flattened area large and squarish, occupying entire width, dulled against eyes by the narrow whitish dust-strips; occiput quite undusted and glittering on upper part; frons (fig. 46c) with distance between front ocellus and hind ocelli obviously greater than distance between hind ocelli and upper hind corner of eye. *Frequent. Inverness southwards*. 3-9.....**tuberculatus** Rondani
- Hind femora absolutely simple; wing length 4.5-6.75 mm. ♂ eyes (fig. 46b) touching for a distance equal to at least one and a half times length of third antennal segment. ♀ frons with polished flattened area elongate, narrowing behind, well separated from eye-margins; occiput quite undusted and glittering on upper part; frons (fig. 46d) with distance between front ocellus and hind ocelli much less than distance between hind ocelli and upper hind corner of eye. *Frequent. Midlothian southwards*. 4-8.....**ornatus** Meigen

REFERENCES.

- ALDERSON, E. M., 1909, *Melangyna quadrimaculata* Verr. *Ent. mon. Mag.* 45 : 166.
- , 1910, A further note on *Melangyna quadrimaculata* Verr. *Ibid.* 46 : 193.
- ANDREWS, H. W., 1944, *Chilosia albipila* Meigen bred. *Ent. Rec.* 56 : 71.
- AUBERTIN, D., 1928, The larva of *Pocota apiformis* Schrank. *Entomologist* 61 : 151-152.
- BECHER, E., 1882, Ueber die ersten Stände einiger Syrphiden und eine neue *Myiolepta*-Art. *Wien ent. Ztg.* 1 : 249-254.
- BELING, T., 1882, Beitrag zur Metamorphose zweiflügeliger Insecten aus den Familien Tabanidae, Leptidae, Asilidae, Empidae, Dolichopodidae und Syrphidae. *Arch. Naturgesch.* 48 (1) : 187-240.
- , 1888, Beitrag zur Metamorphose einiger zweiflügeliger Insecten aus den Familien Tabanidae, Empidae und Syrphidae. *Verh. zool.-bot. ges. Wien.* 38 (Abh.) : 1-4.
- BERTRAM, D. S., 1939, The natural history of Canna and Sanday, Inner Hebrides : a report upon the Glasgow University Canna Expeditions, 1936 and 1937. *Proc. R. phys. Soc. Edinb.* 23 (1) : 1-72.
- BHATIA, H. L., and SHAFFI, M., 1932, Life-Histories of some Indian Syrphidae. *Indian J. agric. Sci.* 2 (6) : 543-570.
- BHATIA, M. L., 1939, Biology, morphology and anatomy of aphidophagous Syrphid larvae. *Parasitology* 31 : 78-129.
- BLAIR, K. G., 1948, Some recent additions to the British Insect Fauna. *Ent. mon. Mag.* 84 : 51-52.
- BLOOMFIELD, E. N., 1897, Habits of *Sericomyia borealis* Flin. *Ibid.* 33 : 222-223.
- BOUCHÉ, P. F., 1847, Beiträge zur Kenntniss der Insekten-Larven. *Stettin. ent. Ztg.* 8 : 142-146.
- BREMI, J. J., 1846, Beitrag zur Kunde der Dipteren. *Isis* 1846 : 164-169.
- BRITTON, H., 1916, *Mallota cimbiiformis* Flin., bred from rotten wood. *Trans. ent. Soc. Lond. (Proc.)* 1916 : lxxxiii-lxxxiv.
- BUCKTON, G. B., 1895, *The Natural History of Eristalis tenax*. 88 pp. London.
- CAMPBELL, R. E., and DAVIDSON, W. M., 1924, Notes on aphidophagous Syrphidae of Southern California. *Bull. S. Calif. Acad. Sci.* 23 : 3-9; 59-71.
- CARPENTER, G. H., 1913, Injurious insects and other animals observed in Ireland during the year 1912. *Econ. Proc. R. Dublin Soc.* 2 (6) : 79-104.
- CHAPMAN, T. A., 1905, Some observations on *Hastula hyerana* Mill. *Ent. mon. Mag.* 41 : 141-157.
- , 1906, Food and habits of *Xanthandrus comtus* Harris. *Ibid.* 42 : 14.

- COE, R. L., 1938, Rediscovery of *Callicera yerburyi* Verrall; its breeding-habits, with a description of the larva. *Entomologist* 71 : 97-102.
- , 1939a, *Callicera yerburyi* Verrall a synonym of *C. rufa* Schummel; further details of its life-history, with a description of the puparium. *Ibid.* 72 : 228-231.
- , 1939b, Description of the female of *Xylota xanthocnema* Collin. *Ent. mon. Mag.* 75 : 224.
- , 1939c, A second British record of *Rhingia rostrata* L.: its distinctions from *R. campestris* Mg. *Ibid.* 75 : 225-227.
- , 1940, A new British species of the genus *Neoscasia* Williston. *Ibid.* 76 : 18-19.
- , 1941a, *Callicera rufa* Schummel; colour-variation of abdominal hairs in the adult, with a note on longevity of the larva. *Entomologist* 74 : 131-132.
- , 1941b, *Chrysochlamys rufticornis* F.: its distinctions from *C. cuprea* Scop. *Ent. mon. Mag.* 77 : 165-167.
- , 1941c, *Brachypalpus eunotus* Loew new to Britain; its distinctions from *B. bimaculatus* Macquart; and notes on synonymy in the genus. *Ibid.* 77 : 193-197.
- , 1942, *Rhingia campestris* Meigen: an account of its life-history and descriptions of the early stages. *Ibid.* 78 : 121-130.
- , 1943, *Callicera spinolae* Rond. taken in Britain, its redescription, with notes on *C. aenea* Fabr. and *C. rufa* Schumm. *Entomologist* 76 : 155-158.
- , 1950, *Criorrhina oxyacanthae* Meig. a variety of *C. berberina* F. *Ent. mon. Mag.* 86 : 124-126.
- COLLIN, J. E., 1918, A Dipteron new to the British List. *Trans. ent. Soc. Lond. (Proc.)* 1918 : lxxvii.
- , 1931a, Notes on some Syrphidae. *Ent. mon. Mag.* 67 : 153-159, 177-182.
- , 1931b, The Oxford University Expedition to Greenland, 1928. Diptera (Orthorhapha Brachycera and Cyclorhapha) from Greenland. *Ann. Mag. nat. Hist.* (10) 7 : 67-91.
- , 1937, Notes on Syrphidae, 2. *Ent. mon. Mag.* 73 : 182-185.
- , 1939, Notes on Syrphidae, 3. *Ibid.* 75 : 104-109.
- , 1940, Notes on Syrphidae, 4. *Ibid.* 76 : 150-158.
- , 1946a, A redescription of *Syrphus mecogramma* Bigot, and a note on the occurrence of probably the same species in Scotland. *Proc. R. ent. Soc. Lond. (B)* 15 : 11-12.
- , 1946b, *Syrphus ericarum* sp. n. *Ent. Rec.* 58 : 117-119.
- , 1950, A second British species of *Myolepta*. *J. Soc. Brit. Ent.* 3 : 133-137.
- , 1952a, *Syrphus malinellus* sp. n. *Proc. R. ent. Soc. Lond. (B)* 21 : 35-36.
- , 1952b, On the subdivisions of the genus *Pipizella* Rond., and an additional British species. *J. Soc. Brit. Ent.* 4 : 85-88.
- COLYER, C. N., and HAMMOND, C. O., 1951, *Flies of the British Isles*. 383 pp. London.
- COOKSON, H. A., and OLDROYD, H., 1937, Intestinal Infestation by larvae of a Drone Fly. *Lancet* 233 : 804-805.
- COWLEY, J., 1949, Some Diptera from Surrey and the South-west of England. *J. Soc. Brit. Ent.* 3 : 101-118.
- DAVIDSON, W. M., 1922, Notes on certain species of *Melanostoma*. *Trans. Amer. ent. Soc.* 48 : 35-47.
- D'HERCULAIS, J. K., 1875, *Recherches sur l'organisation et le développement des Volucelles*. 208 pp. Paris.
- DONISTHORPE, H., 1927, The guests of British ants. 268 pp. London.
- , 1928, The bionomics of *Pocota apiformis* Schrank. *Entomologist* 61 : 150-151.
- , 1932, *Psilota anthracina* Meigen, a rare Dipteron taken in Windsor Forest. *Ent. Rec.* 44 : 93.
- DUFOUR L., 1840, Sur les métamorphoses des Diptères. *Ann. Sci. nat. Paris* (2) 13 : 148-163.
- , 1846, Quelque chose sur le *Brachyopa bicolor* Mg. et le *Subula citripes* Duf. *Ann. Soc. ent. Fr. (Bull.)* (2) 4 : 47.
- DUNN, J. A., 1949, The parasites and predators of potato Aphids. *Bull. ent. Res.* 40 : 97-122.
- EDWARDS, F. W., 1929, British Non-biting Midges. *Trans. ent. Soc. Lond.* 77 : 279-430.
- ELLIS, E. A., 1937, *Eristalis tenax* hibernating, clustered in crevice of exposed chalk, in November. *Trans. Norfolk Norw. nat. Soc.* 14 (2) : 189.
- FRASER, F. C., 1946, Breeding of *Volucella* larvae in nest of *Vespula vulgaris*. *Ent. mon. Mag.* 82 : 158.
- FRYER, J. C. F., 1915, The food-plant of *Chilosia variabilis* Panzer. *Ibid.* 51 : 193.
- GÄBLER, H., 1932, Beitrag zur Kenntnis der *Eristalis*-larven. *Stettin. ent. Zig.* 93 : 143-147.

- GIARD, A., 1896, Sur un changement de régime des larves de *Melanostoma mellina* L. *Bull. Soc. ent. Fr.* 1896: 234-235.
- GIRSCHNER, E., 1884, Beschreibung der Puppe von *Spilomyia (Calliprobola) speciosa* ROSSI. *Wien. ent. Ztg.* 3: 199.
- GOFFE, E. R., 1934, *Epistrophe balteata* de Geer, on wing in February. *J. Soc. Brit. Ent.* 1 (2): 47-48.
- , 1950, *Syrphidis lapponica* Ztsdt., 1838, recorded from South Devonshire. *J. Soc. Brit. Ent.* 3: 149-150.
- GREENE, C. T., 1917, A contribution to the biology of North American Diptera. *Proc. ent. Soc. Wash.* 19: 146-161.
- , 1923, A contribution to the biology of North American Diptera. *Ibid.* 25: 82-89.
- HALIDAY, A. H., 1833, Catalogue of Diptera occurring about Holywood. *Ent. Mag.* 1: 147-180.
- HAMM, A. H., 1941, *Volucella inanis* L. taken in entrance to nest of *Vespa vulgaris*. *Ent. Rec.* 53: 44.
- HEEGER, E., 1858, Neue Metamorphosen einiger Dipteren. *S.B. Acad. Wiss. Wien* 31: 295-309.
- HEISS, E. M., 1938, A classification of the larvae and puparia of the Syrphidae of Illinois exclusive of aquatic forms. *Univ. Ill. Bull.* 36 (1): 1-142.
- HODSON, W. E. H., 1927, The bionomics of the lesser bulb-flies, *Eumerus strigatus* Fall. and *Eumerus tuberculatus* Rond., in South-west England. *Bull. ent. Res.* 17: 373-384.
- , 1931, A comparison of the immature stages of *Eumerus tuberculatus* Rond. and *Syrphita pipiens* Linn. *Ibid.* 22: 55-58.
- , 1932a, A comparison of the larvae of *Eumerus strigatus* Fln., and *Eumerus tuberculatus* Rond. *Ibid.* 23: 247-249.
- , 1932b, The large Narcissus-fly, *Merodon equestris* Fab. *Ibid.* 23: 429-448.
- HULL, F. M., 1949, The Morphology and Inter-relationship of the Genera of Syrphid Flies, Recent and Fossil. *Trans. zool. Soc. Lond.* 26: 257-408.
- ILSE, D., 1949, Colour discrimination in the Dronefly, *Eristalis tenax*. *Nature, Lond.* 163: 255-256.
- JOHANSEN, O. A., 1935, Aquatic Diptera, Pt. 2 (Orthorrhapha-Brachycera and Cyclorrhapha). *Mem. Cornell agric. Exp. Sta.* 177: 1-62.
- JONES, C. R., 1922, A contribution to our knowledge of the Syrphidae of Colorado. *Bull. Colo. agric. Coll.* 269: 1-73.
- KLOET, G. S., and HINCKS, W. D., 1945, *A Check List of British Insects.* 483 pp. Stockport.
- LAMB, C. G., 1911, The habitat of *Eristalis aeneus* Scop. *Ent. mon. Mag.* 47: 215-216.
- LECLERCQ, M., 1944, Notes sur les Diptères des environs de Liège (2me sér.). *Bull. Soc. sci. Liège* 1: 34-44.
- LINTNER, J. A., 1882, *Mallota posticata* (Fabr.) Wlston. MS. *Rep. N.Y. St. Ent.* 1: 211-216.
- LUCCHESI, E., 1942, Contributi alla conoscenza dei Lepidotteri del melo. 3. *Acrochita naevana* Hb. *Boll. Lab. Ent. Portici* 5: 1-120.
- LUNDBECK, W., 1916, *Diptera Danica* 5 (*Lonchopteridae, Syrphidae*): 1-591. Copenhagen.
- METCALF, C. L., 1913, The Syrphidae of Ohio. *Bull. Ohio Univ.* 17 (31): 1-124.
- , 1916, The Syrphidae of Maine. *Bull. Me. agric. Exp. Sta.* 253: 193-264.
- , 1917, The Syrphidae of Maine, 2nd Report. *Ibid.* 263: 153-176.
- MIX, J., 1864, Ueber die ersten Stände einiger Dipteren. *Verh. zool.-bot. Ges. Wien* 14: 797.
- MILES, P. M., 1951, The Small Bulb Fly, *Paragopsis* (= *Eumerus*) *strigatus* Fall., bred from Onion in Wales. *Ent. mon. Mag.* 87: 192.
- MORLEY, C., 1910, Oviposition of *Baccha*. *Ibid.* 46: 192-193.
- , 1941, *Eristalis aeneus* clustered under steel helmet. *Trans. Suffolk Nat. Soc.* 4: 272-273.
- , 1942, Golden hoverer-fly new to Britain. *Ibid.* 5: 14-15.
- , 1947, The second Golden Hoverer. *Ibid.* 6: 149-150.
- NEWSTEAD, R., 1891, Insects, etc., taken in the nests of British Vespidae. *Ent. mon. Mag.* 27: 39-41.
- NURSE, C. G., 1910a, Notes regarding the breeding of *Chilosia grossa*. *Entomologist* 43: 313-314.
- , 1910b, Further notes regarding the breeding of *Chilosia grossa*. *Ibid.* 43: 349-350.

- OLDROYD, H., 1949, *Handbooks for the Identification of British Insects* 9 (1). *Diptera* 1. *Introduction and Key to Families*. 49 pp. R. ent. Soc. Lond.
- OSTEN SACKEN, C. R., 1862, Zur Lebensweise von *Baccha*. *Stettin. ent. Ztg.* 23 : 412.
- , 1894, *On the Oxen-born Bees of the Ancients*. Heidelberg. 80 pp.
- PERRIS, E., 1870, Histoire des Insectes du Pin maritime. *Ann. Soc. ent. Fr.* 10 : 321-366.
- SACK, P., 1932, *Flieg. Palaearkt. Reg.* 4 (4), no. 31 (*Syrphidae*). 451 pp. Stuttgart.
- SCOTT, E. I., 1939, An account of the developmental stages of some aphidophagous Syrphidae and their parasites. *Ann. appl. Biol.* 26 : 509-532.
- SYMS, E. E., 1935, Notes on the biology of *Microdon eggeri* Mik. *Trans. Soc. Brit. Ent.* 2 : 163-165.
- TIMMS, C., 1946, Hibernation of *Tubifera tenax* L. *Ent. Rec.* 58 : 39.
- VARLEY, G. C., 1935, A new Syrphid larva and some other aquatic insect larvae which obtain their oxygen from plant roots. *Proc. R. ent. Soc. Lond.* (A) 10 : 30-31.
- , 1937, Aquatic insect larvae which obtain oxygen from the roots of plants. *Ibid.* (A) 12 : 55-60.
- VERBALL, G. H., 1901, *British Flies* 8 (*Platyppezidae, Pipunculidae, and Syrphidae*). Pp. 1-691 + 1-121 (Catalogue, etc.). London.
- , 1909, *British Flies* 5 (*Stratiomyidae, etc., Diptera Brachycera*). Pp. 1-780 + 1-34. (Systematic List). London.
- VIMMER, A., 1933, Larvy a pupy Českých Pestrenek. *Acta Soc. ent. Bohem.* 30 : 181-187.
- WACHTL, F. A., 1882, Beiträge zur Kenntniss der Biologie Systematik und Synonymie der Insecten. *Wien. ent. Ztg.* 1 : 275-279.
- WAINWRIGHT, C. J., 1942, A new British Syrphid: *Lasiophthicus (Catabomba) albomaculata* Macq. (*gemellarii* Rond.). *Ent. mon. Mag.* 78 : 3-4.
- , 1944, *Hammerschmidtia ferruginea* Fall. in Scotland. *Ibid.* 80 : 8-9.
- WALKER, F., 1851, *Insecta Britannica. Diptera* 1. London.
- ZETTERSTEDT, J. W., 1843, *Diptera Scandinaviae* 2 : 441-894. Lund.

INDEX

Numbers refer to pages. Principal reference is given first. Heavy type indicates a page with an illustration. Synonyms are in italics.

- abiens (*Xylota*), 80 ; 79, **81**
abusivus (*Eristalis*), 70 ; **68**
Acanthomyops, 88
Acroclita, 16
aenea (*Callicera*), 86 ; **87**
aenea (*Neoscasia*), 52 ; **51**
aeneus (*Eristalis*), 70 ; 4, 69
aeneus (*Eumerus*), var. *strigata*, 89
albimanus (*Platychirus*), 13, 14, 15 ; **9**,
11, **12**
albipila (*Cheilosia*), 65 ; 61
albitarsis (*Cheilosia*), 64, 65
albomaculata (*Scaeva*), **21**
albostrigatus (*Syrphus*), 25 ; 23, **26**
Allium, 89
alneti (*Didea*), 23 ; **22**
ambiguum (*Melanostoma*), 17 ; **15**
Anasimyia, 72
angustatus (*Platychirus*), 14, 16
annulatus (*Syrphus*), 33
annulipes (*Syrphus*), 31 ; 8, **30**
anthracina (*Psilota*), 48
antiqua (*Cheilosia*), 61 ; 4
Aphis, 9
aquatica (*Glyceria*), 2, 48
arbustorum (*Eristalis*), 71 ; **68**, 69
arcticus (*Syrphus*), 36, 38 ; **34**
Arctophila, 69 ; 67
arcuatum (*Chrysotoxum*), 39 ; **40**
arcuatus (*Syrphus*), 28
Artemisia, 54
artemisiae (*Cryptosiphum*), 54
asilica (*Criorhina*), **83**
atra (*Psilota*), 48
auricollis (*Syrphus*), 31 ; 23, **26**
auricollis (*Syrphus*), var. *maculicornis*,
31
austriaca (*Pipiza*), 56 ; 55
- Baccha, 8 ; 7
balteatus (*Syrphus*), 31 ; 4, 23, **34**
barbata (*Cheilosia*), 64
barbifrons (*Syrphus*), 36, 38 ; **34**
bengalensis (*Helophilus*), 72
berberina (*Criorhina*), **83** ; 78, 82
berberina (*Criorhina*), var. *oxyacanthae*, 83
bergenstammi (*Cheilosia*), 65
bicinctum (*Chrysotoxum*), 39
bicolor (*Brachyopa*), **46** ; 5, 45
- bicolor (*Paragus*), 8
bifasciatus (*Syrphus*), 27, 35
bimaculata (*Pipiza*), 56, 57
bimaculatus (*Brachypalpus*), 80 ; **78**
Blera, 84
Boletus, 61
Bombus, 2, 66
bombylans (*Volucella*), 66
bombylans (*Volucella*), form *bombylans*, 67
bombylans (*Volucella*), form *plumata*,
66
borealis (*Sericomyia*), 67
Brachyopa, 45 ; 41
Brachypalpus, 80 ; 77
brevicornis (*Chrysogaster*), 49
Bugonia, 5
- caledonicus (*Chamaesyrphus*), 88 ; **87**
Callicera, 86
CALLICERINAE, 86 ; 7
Calliprobola, 84 ; 77
campestris (*Rhingia*), **43** ; 2, 3, 42
carbonaria (*Cheilosia*), 66
carota (*Daucus*), 17
Cartosyrphus, 60
cautum (*Chrysotoxum*), 39 ; **40**
cepa (*Allium*), 89
chalybeata (*Chrysogaster*), **50**
Chamaesyrphus, 88 ; 86, **87**
Cheilosia, 60 ; 1, 2, 4, 42
Cheilosia, 10
CHEILOSIINAE, 41 ; 7
Chilomyia, 60
Chrysogaster, 48, 49 ; 42
chrysocoma (*Cheilosia*), 64
CHRYSOTOXINAE, 39 ; 6
Chrysotoxum, 39 ; 4
cimbiciformis (*Mallota*), 77
cinctellus (*Syrphus*), **32** ; 23
cinctus (*Syrphus*), 35 ; 23, 31, **32**, **37**
cinerella (*Egle*), 17
Cinxia, 67
citrofasciatum (*Xanthogramma*), 20
clunipes (*Sphegina*), 52 ; 53
clypeatus (*Platychirus*), 14, 16 ; **12**
Cnemodon, 59 ; 42
Cnicus, 61
compositarum (*Syrphus*), 38 ; 37
comtus (*Xanthandrus*), 17 ; 2, 16

conopseus (Doros), 20
 consimilis (Helophilus), 74, 75; 76
 consisto (Syrphus), 29
 corollae (Syrphus), 29; 23
 corydon (Cheilosia), 64
 Cossus, 43, 45
 crabro (Vespula), 66
 Criorrhina, 82; 7, 77
 cryptarum (Eristalis), 70
 Cryptosiphum, 54
 cuprea (Ferdinandea), 45; 43, 44
 cynocephala (Cheilosia), 66
 Cynorrhina, 84; 77
 Daucus, 17
 devius (Microdon), 88
 diaphanus (Syrphus), 27, 35; 25, 26
 Didea, 22; 8
 discimanus (Platychirus), 11, 15; 9
 dispar (Neoascia), 52; 1, 51
 domestica (Musca), 17
 Doros, 19; 8
 eggeri (Microdon), 89; 88
 Egle, 17
 elegans (Chrysotoxum), 41
 eligans (Syrphus), 27, 35; 25
 elongata (Baccha), 10; 9
Epistrophe, 23
Episyrphus, 23
 equestris (Merodon), 71; 4
 equestris (Merodon), var. *narcissi*, 71
 equestris (Merodon), var. *transversalis*, 71
 equestris (Merodon), var. *validus*, 71
 ericarum (Syrphus), 37, 39
 Eriosoma, 54
 ERISTALINAE, 69; 7
Eristalinus, 69
 Eristalis, 69; 2, 4, 5, 68
 euchromus (Syrphus), 35
 EUMERINAE, 89; 6
 Eumerus, 89; 85
 eunotus (Brachypalpus), 82
 fallax (Cynorrhina), 84
 fasciata (Cheilosia), 62, 66
 fasciata (Didea), 22; 23, 30
 fasciata (Didea), var. *fuscipes*, 22
 fenestrata (Pipiza), 56; 55, 57
 Ferdinandea, 43; 7, 41
 ferruginea (Hammerschmidtia), 45
 festivum (Chrysotoxum), 39; 40
 flavicauda (Sphaerophoria), 18
 flavipes (Xanthogramma), 20
 flavitarsis (Parapenium), 54, 50
 floccosa (Criorrhina), 83
 floralis (Neoascia), 51
 florea (Myiatropa), 72, 71
 florum (Xylota), 80; 81
 fraterna (Cheilosia), 65
 frutetorum (Helophilus), 74, 75; 76
 fulva (Arctophila), 69; 68
 fulviventris (Platychirus), 14, 16; 12
 funebres (Cheilosia), 61

gallarum (Cryptosiphum), 54
 geniculata (Chrysogaster), 49
 geniculata (Neoascia), 52; 50, 51
 germanica (Vespula), 66
 glaucius (Syrphus), 25
 globulipes (Cheilosia), 65
 Glyceria, 2, 48
 granditarsa (Pyrophaena), 10; 11
 groenlandicus (Helophilus), 73
 grossa (Cheilosia), 64; 61
 grossulariae (Syrphus), 25, 35; 24, 26
 guttatus (Syrphus), 36
 Hammerschmidtia, 45; 7, 41, 42
 Helophilus, 72; 2, 7, 69
 Heringia, 58; 42
 heringii (Heringia), 59; 58
 hirtella (Chrysogaster), 49; 2, 48, 50
 honesta (Cheilosia), 64; 65
 horticola (Eristalis), 71
 hybridus (Helophilus), 73
 illustrata (Cheilosia), 61
 immarginatus (Platychirus), 13, 16;
 11, 12
 impressa (Cheilosia), 62
 inanis (Volucella), 67; 66
 inflata (Volucella), 67
 insensilis (Brachyopa), 46; 45
 intermedia (Didea), 23; 22
 intonsa (Cheilosia), 62, 64
 intricarius (Eristalis), 70
 intricarius (Eristalis), var. *furvus*, 70
 Iris, 89
Ischyrosyrphus, 23; 8
 italica (Populus), 59
 javana (Sphaerophoria), 18
 kimakowiczi (Sphagina), 52; 53
 labiatarum (Syrphus), 38; 37
Lampetia, 71
 lanigera (Eriosoma), 54
 lanuginosa (Schizoneura), 58
 lappona (Sericomyia), 68
 lapponicus (Syrphus), 27; 8, 28
 lasiophthalmus (Syrphus), 36, 38
 laternarius (Syrphus), 25; 23
Lathyrrophthalmus, 69
 latifasciatus (Syrphus), 29; 34, 36
 latifrons (Helophilus), 72
 latilimbatus (Chrysotoxum), 41
 latilunulatus (Syrphus), 29; 36
 latitarsis (Cnemodon), 59, 60
Lejops, 72
 lenta (Xylota), 79
 Leucozona, 20; 8
 lineatus (Helophilus), 74, 75; 76
 lineola (Syrphus), 33; 34
 Liogaster, 48
 loewii (Sphaerophoria), 19
 longula (Cheilosia), 64; 63
 lucorum (Leucozona), 20

- lugubris (Pipiza), 56 ; 57
 luniger (Syrphus), 29, 31 ; 23, 28, 34,
 36
 lunulatus (Helophilus), 75 ; 76
 lunulatus (Syrphus), 27
 luteitarsis (Pipiza), 54 ; 55
 luteola (Myolepta), 47
 lyra (Eristalis), 70
- macquarti (Chrysogaster), 49 ; 48, 50
 macrocephala (Rhingia), 43
 maculata (Cheilosia), 61 ; 5, 62
 maculipennis (Pipizella), 58
 malinellus (Syrphus), 33 ; 34
 Mallota, 77 ; 2, 69
 manicatus (Platychirus), 13, 14 ; 11, 15
 meogramma (Syrphus), 27
 Melangyna, 23 ; 3, 36
 melanopsis (Platychirus), 11, 15 ; 9
 Melanostoma, 17 ; 8, 15
 mellinum (Melanostoma), 18 ; 15, 17
 menthastri (Sphaerophoria), 19 ; 18
 menthastri (Sphaerophoria), var. dubia,
 19
 menthastri (Sphaerophoria), var. picta,
 19
 menthastri (Sphaerophoria), var. taeni-
 ata, 19
 Merodon, 71 ; 69
 Mesosyrphus, 23
 metallina (Chrysogaster), 48
 Metasyrphus, 23
 Microdon, 88 ; 2
 MICRODONTINAE, 88 ; 6
 Musca, 17
 musitans (Arctophila), 69
 mutabilis (Cheilosia), 64, 66
 mutabilis (Microdon), 88 ; 89
 Myiatropa, 71 ; 69
 Myolepta, 47 ; 41, 42
- naevana (Acroclita), 16
 Narcissus, 85, 89
 nasutula (Cheilosia), 61 ; 62
 nebulosa (Cheilosia), 65
 nemorum (Eristalis), 71
 nemorum (Xylota), 80 ; 3, 79, 81
 Neoscasia, 50 ; 42
 Neocnemodon, 59
 niger (Acanthomyops), 88
 nigripes (Cheilosia), 61 ; 62
 nigritarsis (Syrphus), 33 ; 25, 26
 nigrotarsatus (Helophilus), 72
 nitens (Syrphus), 29, 31 ; 23
 nitidicollis (Syrphus), 31, 35 ; 25, 30,
 37
 nobilis (Chrysogaster), 49
 noctiluca (Pipiza), 56, 57
 nodosa (Scrophularia), 61
 nutans (Scilla), 71
- obliqua (Neoscasia), 51
 obscura (Myolepta), 47
 obscuripennis (Baccha), 10 ; 9
- obscurum (Melanostoma), 17
 octomaculatum (Chrysotoxum), 40
 ornatum (Xanthogramma), 20
 ornatus (Eumerus), 91 ; 90
 Orthoneura, 49 ; 48
- paganus (Cheilosia), 63
 palustris (Cnicus), 61
 Paragopsis, 89
 Paragus, 8 ; 7
 paralellus (Helophilus), 72
 Parapenium, 54 ; 42, 57, 58
 Parhelophilus, 72
 pedissequum (Xanthogramma), 20
 Peleccocera, 86
 PELECCOGERINAE, 86 ; 7
 pellucens (Volucella), 67 ; 66
 peltatus (Platychirus), 13, 14 ; 9, 12
 pendulus (Helophilus), 73 ; 72
 Penthesilea, 82
 perpallidus (Platychirus), 14, 16 ; 11,
 12
 personata (Pocota), 84 ; 52, 78, 82
 pertinax (Eristalis), 70 ; 69
 Phalangus, 57
 pigra (Xylota), 79
 pilosa (Brachyopa), 47 ; 46
 pipiens (Syrpita), 85 ; 78
 Pipiza, 54 ; 42, 57
 Pipizella, 57 ; 1, 42
 Platychirus, 10 ; 7, 9, 15, 16
 plena (Brachyopa), 46
 Pocota, 84 ; 2, 7, 77
 podagratus (Platychirus), 13, 16 ; 12
 podagrica (Neoscasia), 51 ; 1
 Populus, 59
 Portevinia, 60
 potens (Myolepta), 47
 potens (Myolepta), 47
 praecox (Cheilosia), 65
 Primula, 4, 61
 primus (Triglyphus), 54
 proxima (Cheilosia), 66 ; 62
 pruni (Aphis), 9
 Psilota, 48 ; 42
 Psylla, 9
 pubera (Cheilosia), 61
 pubescens (Chrysotoxum), 39
 pulchrifrons (Baccha), 9
 pulchripes (Cheilosia), 63
 punctulatus (Syrphus), 33
 pusilla (Chortophila), 17
 pyrastris (Scaeva), 21 ; 30
 pyrastris (Scaeva), var. unicolor, 21
 Pyrophaena, 10 ; 7
- quadrata (Tropidia), 85
 quadrimaculatus (Syrphus), 36, 38 ; 7
- ranunculi (Criorhina), 82 ; 83
 Rhingia, 42 ; 2, 41
 ribesii (Syrphus), 25 ; 23
 rosarum (Pyrophaena), 10
 rostrata (Rhingia), 43 ; 5, 42

rueppellii (Sphaerophoria), 19
rueppellii (Sphaerophoria), var. *nitidicollis*, 19
rufa (Callicera), 86 ; 2, 3, 87
ruficornis (Ferdinandea), 45 ; 43, 44
rupium (Eristalis), 71
ruralis (Cheilosia), 65

sabulonum (Eumerus), 91
Salix, 61
Scaeva, 21 ; 8
scaevoides (Chamaesyrrhus), 88 ; 87
scalare (Melanostoma), 18 ; 17
scambus (Platyichirus), 13, 16 ; 12
Schizoneura, 58
Scilla, 71
scita (Tropidia), 85
scripta (Sphaerophoria), 19 ; 18
scripta (Sphaerophoria), var. *dispar*, 19
scripta (Sphaerophoria), var. *strigata*, 19
Scrophularia, 61
scutatus (Platyichirus), 13, 14 ; 9, 11, 1
scutellaris (Brachyopa), 47 ; 46
scutellata (Cheilosia), 64 ; 61, 63
segnis (Xylota), 79 ; 78
selenitica (Scaeva), 21 ; 5
semulatra (Xylota), 80
sepulchralis (Eristalis), 69
Sericomyia, 67 ; 7
 SERICOMYIINAE, 67 ; 7
silentis (Sericomyia), 67 ; 68
similis (Eristalis), 5
solstitialis (Chrysogaster), 49 ; 50
soror (Cheilosia), 63
sparsa (Cheilosia), 61
speciosa (Calliprobola), 85
Sphaerophoria, 18 ; 2, 8
Sphegina, 52 ; 42
spinolae (Callicera), 86
splendens (Chrysogaster), 49
splendida (Chrysogaster), 48
Stenosyrphus, 23
sticticus (Platyichirus), 14, 15 ; 7, 9, 12
strigatus (Eumerus), 91 ; 4, 89, 90
Sulcatella, 48
sylvarum (Xylota), 79
Syritta, 85 ; 7, 77
Syrphella, 23
Syrphidæ, 23
 SYRPHINAE, 7 ; 6
Syrphus, 23 ; 2, 8, 20

tarda (Xylota), 80
tarsalis (Platyichirus), 13, 15 ; 9
tarsata (Chrysogaster), 48
tenax (Eristalis), 70 ; 2, 4, 5, 69.
tibialis (Paragus), 8 ; 1
timeo (Platyichirus), 13
Tortrix, 17
torvus (Syrphus), 25 ; 23, 24
transfugus (Helophilus), 75, 77 ; 76
triangulifer (Syrphus), 35 ; 23
tricincta (Pelecocera), 87
tricinctus (Syrphus), 27
Triglyphus, 54 ; 42
trivittatus (Helophilus), 72
Tropidia, 85 ; 77, 82
tuberculatus (Eumerus), 91 ; 4, 89, 90
Tubifera, 69

umbellatarum (Syrphus), 37, 38

vacua (Brachyopa), 46
valgus (Brachypalpus), 80
variabilis (Cheilosia), 61, 64 ; 63, 65
varipes (Pipizella), 58 ; 57
velutina (Cheilosia), 66 ; 62
venustus (Syrphus), 27
verecunda (Sphegina), 52 ; 53
vernale (Chrysotoxum), 39
vernalis (Cheilosia), 66
verralli (Chrysotoxum), 40
verrucula (Cnemodon), 60
versicolor (Helophilus), 74, 75 ; 76
Vespula, 2, 66
virens (Pipizella), 58
virescens (Chrysogaster), 50
vitripennis (Cnemodon), 60 ; 59
vitripennis (Syrphus), 25 ; 23
vittatus (Helophilus), 72 ; 73
vittiger (Syrphus), 33
Volucella, 66 ; 2, 7
 VOLUCCELLINAE, 66 ; 7
vulgaris (Artemisia), 54
vulgaris (Vespula), 66
vulpina (Cheilosia), 64 ; 63

Xanthandrus, 16 ; 8
xanthocnema (Xylota), 79
Xanthogramma, 20 ; 8
Xylota, 79 ; 2, 77, 81
 XYLOTINAE, 77 ; 7
Xylotomima, 79

Zelima, 79
zonaria (Volucella), 67 ; 1, 66

The Royal Entomological Society of London is a scientific Society founded in 1833 and incorporated by Royal Charter in 1885 for the improvement and diffusion of Entomological Science exclusively.

The principal **Publications** of the Society are the following :

TRANSACTIONS. Papers published in the Transactions are issued separately and separately priced. One volume is issued every year at a subscription price of £10 10s. 0d.

PROCEEDINGS: Series A. Contains short papers on general entomology. Four parts are issued annually at a subscription price of £2 8s. 0d.

PROCEEDINGS: Series B. Consists exclusively of short papers on systematic entomology. Six parts are issued each year at a subscription price of £2 8s. 0d.

PROCEEDINGS: Series C. Contains the minutes of meetings, Presidential Addresses, etc. A part is issued before each meeting as an agenda paper. The annual subscription price is £1 4s. 0d.

The above are supplied free to Fellows. Further copies can be obtained by Fellows on special terms.

Other publications issued by the Society, in addition to the *Handbooks* (for particulars of which see p. ii of cover), are the following :

The Generic Names of British Insects. Nine parts so far published, covering the Rhopalocera, Odonata, Neuroptera, Hymenoptera Aculeata, Carabidae, Hydradephaga, Hemiptera-Heteroptera, and Staphylinidae.

Stylops: A Journal of Taxonomic Entomology. 1932-1935, Vols. 1-4 (all issued). £2 3s. 0d. per Vol.

Hübner: A bibliographical and systematic account of the entomological works of Jacob Hübner and the supplements thereto. By Francis Hemming, 2 Vols., £2 10s. 0d.

The Centenary History of the Society. 10s. 6d.

Communications offered to the Society for publication should be addressed to the Registrar at the Society's Rooms. Those intended for the Transactions must be communicated by a Fellow of the Society.

Meetings are held at the Society's Rooms on the first Wednesday in each month, except January (third Wednesday) and August (no meeting).

Particulars concerning the Fellowship can be obtained on application to the Registrar, 41, Queen's Gate, London, S.W. 7.

HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS.
PARTS NOW AVAILABLE

I. Part	2	<i>Thysanura and Diplura.</i> By M. J. Delany.	8 pp.	2s. 6d.
"	5	<i>Dermoptera and Orthoptera.</i> By W. D. Hincks. (Second edition).	24 pp.	6s. 0d.
"	6	<i>Plecoptera.</i> By D. E. Kimmins.	18 pp.	3s. 6d.
"	9	<i>Ephemeroptera.</i> By D. E. Kimmins.	18 pp.	3s. 6d.
"	10	<i>Odonata.</i> By F. C. Fraser. (Second edition.)	49 pp.	10s. 0d.
"	12-13	<i>Mecoptera, Megaloptera, Neuroptera.</i> By F. C. Fraser.	40 pp.	10s. 0d.
"	16	<i>Siphonaptera.</i> By F. G. A. M. Smit.	94 pp.	20s. 0d.
II.	3	<i>Hemiptera-Homoptera: Fulgoromorpha.</i> By W. J. Le Quesne.	68 pp.	17s. 6d.
IV.	1	<i>Coleoptera: Introduction and Key to Families.</i> By R. A. Crowson.	59 pp.	10s. 0d.
"	3	<i>Coleoptera: Hydradephaga.</i> By F. Balfour-Browne.	34 pp.	6s. 0d.
"	8(a)	<i>Coleoptera: Staphylinidae</i> (part). By C. E. Tottenham.	79 pp.	15s. 0d.
"	9	<i>Coleoptera: Pselaphidae.</i> By E. J. Pearce.	32 pp.	6s. 0d.
V.	5(b)	<i>Coleoptera: Phalacridae.</i> By R. T. Thompson.	17 pp.	3s. 6d.
"	7	<i>Coleoptera: Coccinellidae and Sphindidae.</i> By R. D. Pope.	12 pp.	2s. 6d.
"	9	<i>Coleoptera: Lagruidae to Meloidae.</i> By F. D. Buck.	30 pp.	6s. 0d.
"	11	<i>Coleoptera: Scarabaeoidea.</i> By E. B. Britton.	29 pp.	7s. 6d.
"	12	<i>Coleoptera: Cerambycidae</i> By E. A. J. Duffy.	18 pp.	3s. 6d.
"	15	<i>Coleoptera: Scolytidae and Platypodidae.</i> By E. A. J. Duffy.	18 pp.	3s. 6d.
VI	1	<i>Hymenoptera: Introduction and Key to Families.</i> By O. W. Richards.	94 pp.	20s. 0d.
"	2(a)	<i>Hymenoptera: Symphyta</i> (part). By R. B. Benson.	47 pp.	10s. 0d.
"	2(b)	<i>Hymenoptera: Symphyta</i> (contd.). By R. B. Benson.	88 pp.	15s. 0d.
"	2(c)	<i>Hymenoptera: Symphyta</i> (concl.). By R. B. Benson.	114 pp.	20s. 0d.
VII.	2(ai)	<i>Hymenoptera: Ichneumonoidea</i> (part). By J. F. Perkins.	116 pp.	25s. 0d.
"	2(aii)	<i>Hymenoptera: Ichneumonoidea</i> (contd.). By J. F. Perkins.	96 pp.	25s. 0d.
VIII.	2(a)	<i>Hymenoptera: Chalcidoidea</i> (part). By Ch. Ferrière, G. J. Kerrich.	40 pp.	8s. 6d.
"	3(d)	<i>Hymenoptera: Proctotrupoidea</i> (part). By G. E. J. Nixon.	107 pp.	20s. 0d.
IX.	1	<i>Diptera: Introduction and Key to Families.</i> By H. Oldroyd. (Second edition.)	49 pp.	7s. 6d.
"	2	<i>Diptera: Nematocera</i> (part). By R. L. Coe, Paul Freeman, P. F. Mattingly.	216 pp.	20s. 0d.
X.	1	<i>Diptera: Syrphidae.</i> By R. L. Coe.	98 pp.	17s. 6d.
"	4(a)	<i>Diptera: Cyclorrhapha</i> (part). By F. I. van Emden.	134 pp.	20s. 0d.