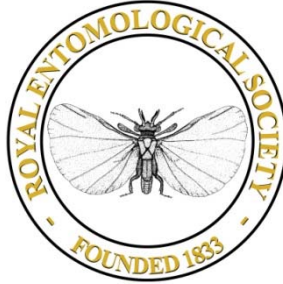


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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



DIPTERA

2. NEMATOCERA : families TIPULIDAE TO CHIRONOMIDAE

CHIRONOMIDAE 121

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Family CHIRONOMIDAE.

By R. L. COE.

FLIES of the family CHIRONOMIDAE may be distinguished from other Nematoceros families of Diptera by the following combination of characters: Ocelli absent; antennae hairy (especially in ♂); six to eight veins reaching wing-margin; one or both anal veins not reaching margin; vein M simple; cross-veins R-M and M-CU (latter when present) near middle of wing. The reduced mouthparts and the fact that the costa is not continued around the entire wing provide simple distinctions from CULICIDAE, to which family some groups bear a superficial resemblance. The closely-related CERATOPOGONIDAE ("biting midges") were formerly included in the CHIRONOMIDAE ("non-biting midges"), and differ most obviously by the forked vein M; head rounded behind instead of flattened; postnotum without a distinct median longitudinal furrow or keel, which is present in most CHIRONOMIDAE.

In Britain there are 389 known species of CHIRONOMIDAE, and 16 named varieties of these. The adults are yellow, green, brown or black-bodied, and the scutum frequently bears longitudinal stripes, which are usually of a darker hue than the ground-colour. Although the wings are usually unornamented, in some cases they are more or less distinctly patterned (e.g. *Pentaneura* and *Anatopynia* (TANYPODINAE) and *Stictochironomus* (CHIRONOMINAE). Such patterning is due to dark stains on the membrane, or to the irregular distribution of macrotrichia and/or microtrichia. In the CLUNIONINAE the wings are sometimes reduced (*Psammathiomyia pectinata* Deby ♂♀) or even absent (*Clunio marinus* Haliday ♀). The largest British CHIRONOMID is *Chironomus tentans* Fabricius (CHIRONOMINAE), which has a wing-length of up to 8 mm., while the smallest species is *Corynoneura fuschalter* Edwards (ORTHOCLADIINAE), the wing-length of which is barely 0.7 mm.

LIFE-HISTORY.

CHIRONOMIDAE pass their early stages in either terrestrial or aquatic situations. Among the terrestrial larvae, those of *Hydrobaenus furcatus* Kieffer (ORTHOCLADIINAE) have been found on several occasions attacking the roots of greenhouse plants. There are numerous other terrestrial forms, living in decaying vegetation, rotten wood, moss, various dung, at roots of grass, and in humus. Most of the aquatic larvae occur in stagnant or sluggishly flowing waters, and others, including some TANYPODINAE and

ORTHOCLADIINAE, in swift rivers and streams. The early stages of *Cardiocladius* (ORTHOCLADIINAE) live in waterfalls and swift currents, where the larvae are free-living on rocks and plants, and pupate in strong cocoons spun on rocks, stones and water-weeds, as described by Saunders (1924) and others. Elmhirst (1919) gives a short account of *Orthocladius* (= *Hydrobaenus*) *sordidellus* Zetterstedt and two undetermined species of that genus breeding in the sea in the Clyde area.

The eggs of aquatic CHIRONOMIDAE are usually enclosed in a gelatinous string which, in turn, may be enveloped in a gelatinous covering; the egg-string is variously arranged in more or less regular rows or spirally or in convolutions. In some species the egg mass is attached to stones, twigs or aquatic plants by means of a thread, but in others the string is lacking. According to Johannsen (1937 : 35) the eggs of some aquatic ORTHOCLADIINAE are laid singly in moist situations. The larvae of *Zavrelia* and *Lauterborniella* (CHIRONOMINAE) live in freely movable cases of characteristic form; others construct fixed cases, or live in a free condition. The aquatic larvae of many CHIRONOMINAE (and occasionally of other sub-families) contain haemoglobin and are red in colour, being popularly termed "blood-worms." An example of this type of larva is that of *Endochironomus dispar* Meigen, which mines in the leaves of *Sparganium* and in the stems of *Sagittaria*. The feeding-habits of aquatic CHIRONOMID larvae are diverse. Comparatively few (including most TANYPODINAE) are predaceous on small crustacea and other minute creatures, the majority being herbivorous, feeding on green algae, decaying organic matter, plankton, or mining the leaves and stems of aquatic plants. Some of the leaf-miners appear to be confined to a single species of plant. The duration of the early stages of aquatic species is very variable, being to a large extent dependent on the amount of suitable food available and on climatic conditions. Where food is abundant and climatic conditions are favourable some species produce several broods in a year.

Relatively few life-histories of British species of CHIRONOMIDAE have been fully worked out, and students who are prepared to undertake careful investigation in this direction will be performing most valuable work.

Edwards (1929 : 281) states that the terrestrial larvae, as well as those living in stagnant or slowly-moving water, may be readily reared in a tin with a hole in the lid over which a glass tube or a glass-bottomed box has been fitted; on emergence the adults fly upwards and are easily removed.

HABITS.

The habit of swarming is a well-known characteristic of the males of most species of CHIRONOMIDAE. As a rule, individuals congregate shortly before dusk, although assemblies of certain species may be found in sheltered places during the day, especially in the colder part of the year. A swarm usually consists of a single species, but this is not invariably so. The males fly up and down rhythmically and, as a female joins them, so mating takes place and the pair at once drop from the swarm to the ground or adjacent foliage. Some species swarm low over the surface of water (e.g. *Gracvus ambiguus* Goetghebuer (CHIRONOMINAE)), others, including certain TANYPODINAE, high above the ground. Interesting accounts have been published of vast swarms of "midges" occurring around the tops of high

buildings, the phenomenon having invariably been observed during spells of very hot weather. During such an occurrence at Plön, Holstein, according to an editorial note in the *Entomologist's Monthly Magazine* (1925 : 20-1), vast swarms of "midges" around the tower of a church were taken for smoke, an alarm of fire was actually raised and the fire brigade appeared on the scene. Scott (1926) relates the repeated appearance of insects "believed to be gnats or midges" round the top of the spire of Salisbury Cathedral, which is 404 feet high. He states that people have believed that the spire was on fire below and that smoke was coming out at the top. Because of the difficulty of capturing specimens in such circumstances as quoted above, no positive identifications of the insects concerned appear to have been made. Instances have been recorded of ants producing a similar phenomenon (Bond : 1865, and others).

In the daytime CHIRONOMIDAE of both sexes usually rest in various sheltered situations. Some species are found on flowers, evidently partaking of the nectar or pollen, but many do not appear to take nourishment as adults. Malloch (1917 : 286) states that he has observed one species feeding upon moist fly-specks on a shop-window at night.

Some CHIRONOMIDAE are definitely photophilous, and Elmhirst (1919 : 193) describes how *Orthocladius sordidellus* Zetterstedt occurs in large numbers on summer evenings about the shore in the Clyde area, and is attracted by the lights of houses. Certain marine species of CLUNIONINAE are incapable of flight in one or both sexes, the wings being atrophied or absent. While exploring the rocky Cornish coast at Land's End, Brown (1947) studied the habits of the CLUNIONINE, *Psammathomyia pectinata* Deby, both sexes of which have the wings reduced to minute straps and run, spider-like, over the surface of wet rocks and seaweed close to low tide level. Brown considers that the insects cannot possibly escape from the rising tide, so that the life of the individual fly extends only between one high tide and the next. Buxton (*in litt.*), however, states that he thinks the insects may survive the tide by hiding in rock crevices. Deby (1889) describes how the early stages are passed below water, the larva feeding on *Enteromorpha*, and the adult leaving the pupal case when the algae-covered rocks are exposed at low tide.

COLLECTION AND PRESERVATION.

The remarks under this heading in the TIPULIDAE section apply equally well to adult CHIRONOMIDAE. In the present family, however, it is necessary to emphasise that great care must be taken when collecting the insects to avoid rubbing the delicate hairs from the wings, as the relative density and pattern of the hairs is widely used in the taxonomy.

CHIRONOMIDAE may often be taken by day resting on foliage, logs, tree-trunks, fences and in grass, especially near water, and specimens so collected are less liable to suffer damage than when netted. Because of their fragile character, it is essential that midges should be killed and pinned or mounted in the field or else taken home alive in pill-boxes or tubes, a few together without insects of other kinds. The swarming males may readily be netted, particularly at dusk, and the associated females may usually be taken as they appear and pair with members of the swarm, or else swept from adjacent vegetation.

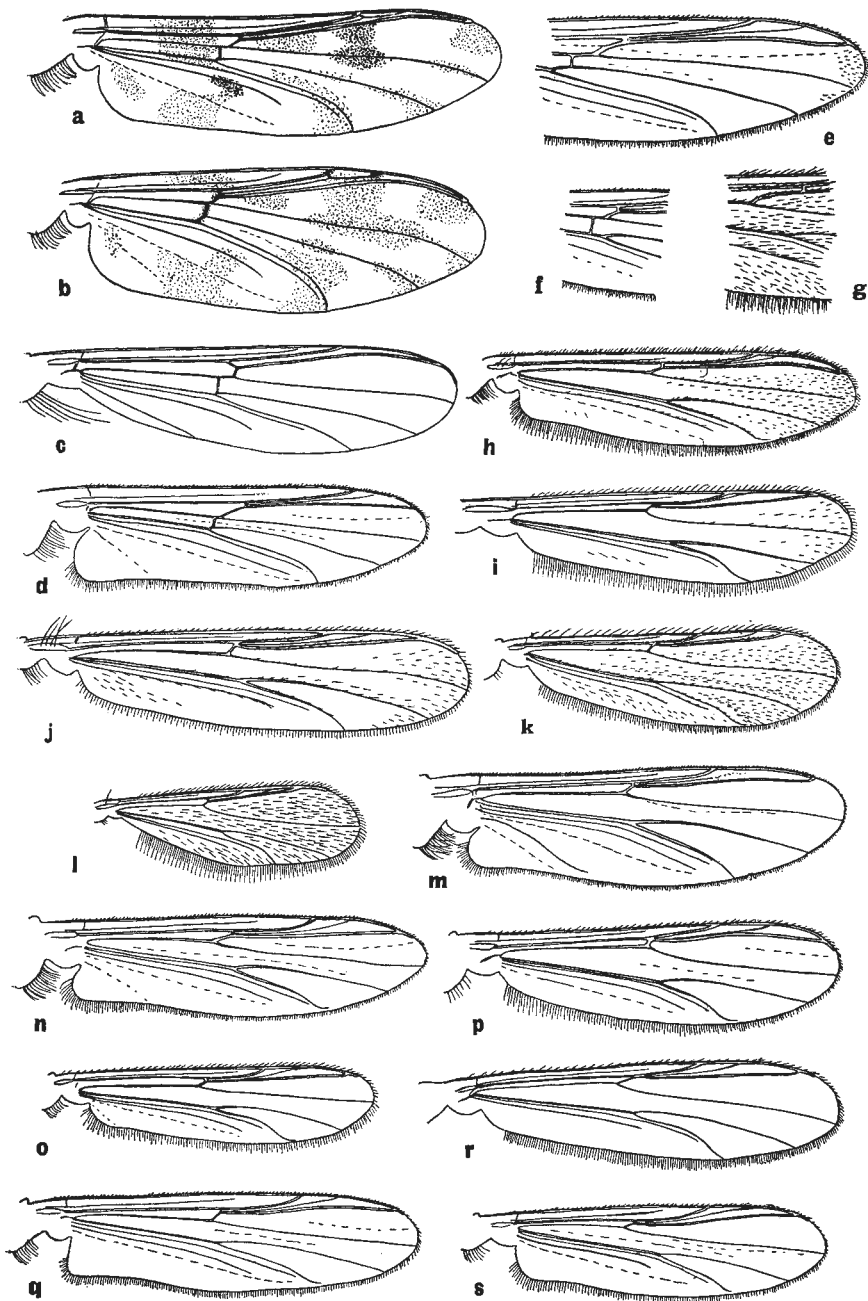


FIG. 180.—Wings of CHIRONOMIDAE. (a) *Pentaneura northumbrica* ♂ (hairs and fringe omitted). (b) *P. eximia* ♀ (hairs and fringe omitted). (c) *Podonomus kiefferi* ♂ (hairs and fringe omitted). (d) *Diamesa montium* ♂. (e) *Syndiamesa pilosa* ♂ (apex of wing). (f) *Prodiamesa olivacea* ♂ (middle of wing). (g) *Brillia longifurca* ♂ (middle of wing). (h) *Metriocnemus grimshawi* ♂. (i) *M. subnudus* ♂. (j) *M. tristellus* ♂. (k) *M. penerasus* ♂. (l) *M. cuneatus* ♀. (m) *Cardiocladius capucinus* ♂. (n) *Hydrobaenus (Psectrocladius) platypus* ♂. (o) *H. (P.) turfaceus* ♂. (p) *H. (Trichocladius) foveatus* ♂. (q) *H. (Orthocladius) dissipatus* ♂. (r) *H. (O.) illimbatus* ♂. (s) *H. (O.) xanthogyne* ♂.

In no circumstances should adult specimens be preserved in spirit or other liquid, as this makes it very difficult to trace the course of the fainter veins; also the colours eventually fade, the tint of the wing-membrane cannot be ascertained, and in general identification of the specimen may become practically impossible.

It is frequently necessary to dissect and make a mount of the male hypopygium, and in some cases the antenna, in order accurately to determine a specimen. Edwards (1929 : 282) gives a suitable technique for preparing such mounts.

GENERAL NOTES ON THE KEYS.

In the following keys most species are separated primarily by external characters, but where clear external differences are lacking it has become necessary to make primary use of male hypopygial structure. It is particularly difficult, if not impossible, to separate the females of many closely-related species, and in a few groups no attempt has been made to do so.

It is probable that as more material becomes available for comparison, some species now treated as distinct will sink as varieties, while conversely some present varietal forms will be established as separate species.

The notation of wing-veins is illustrated by fig. 181 (wing of *Procladius flavifrons* Edwards : TANYPODINAE). Some controversy exists regarding the interpretation of certain veins, and the nomenclature of Comstock and Needham has been followed throughout the keys. The precise meaning of any specialized term is usually explained where first mentioned in the text or appended to the legend of the relevant figure. When in doubt, however, regarding any detail of general terminology of Diptera the student should refer to the Introductory part to Diptera in this series of Handbooks. Edwards (1929 : 283-285) gives a detailed explanation of the characters used in the classification of CHIRONOMIDAE.

In the subfamily ORTHOCLADIINAE reference is made to the sense-bristles of the female antennae. These organs are hollow membranous extensions of the cuticle, thus differing from the ordinary hairs and bristles which are solid chitin and articulated at the base. The structures are hyaline, and the head may require staining before they can be seen.

The colour of the thorax, and the formation of the scutal stripes, can seldom be used as primary specific characters, as there is considerable variation within a species, according to the sex and age of the individual and to other factors.

The use of a microscope is essential for the accurate determination of the majority of CHIRONOMIDAE. A magnification of 80 is sufficient for the observation of most of the characters used in these keys, but to examine minute structures (such as details of the male hypopygium) a monocular with $\frac{1}{8}$ -in. objective is required.

ABBREVIATIONS.

A.R. = Antennal ratio, i.e. length of last segment of male antenna in relation to the preceding segments of the flagellum (by estimation). Expressed as a decimal. (NOTE.—At the extreme apex of the normally long last segment there is usually a constriction; in a few groups this minute

constricted part is more or less clearly divided off, but for the purposes of A.R. is not treated as a separate segment.)

L.R. = Leg ratio, i.e. length of first segment of tarsus in relation to the tibia (by estimation). Expressed as a decimal. Reference is to the front legs unless otherwise stated.

ACKNOWLEDGMENTS.

In general the arrangement followed in these keys is that of Edwards' *Non-Biting Midges*. Edwards' generic and subgeneric diagnoses have been reproduced, and his keys have been utilised with certain adaptations. Where keys are lacking in Edwards' work I have constructed these with the aid of characters given by Edwards in his text supplemented by a study of the CHIRONOMIDAE in the British Collection at the British Museum (Natural History).

The illustrations are reproduced from Edwards' work, with the exception of fig. 183, drawn by Mr. Paul Freeman, and fig. 193, by Mr. Arthur Smith.

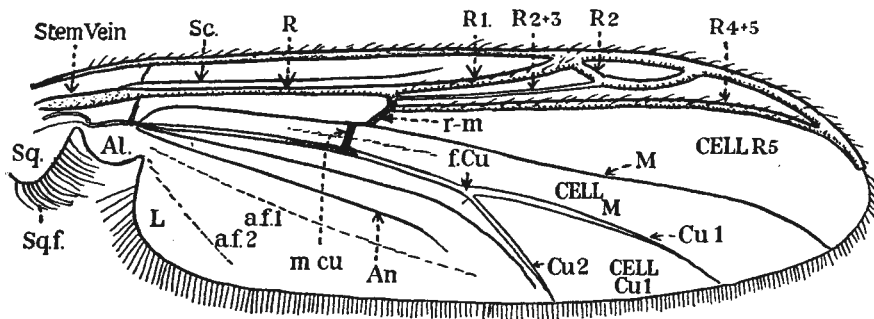


FIG. 181.—Wing of *Procladius flavifrons* Edwards, to illustrate CHIRONOMID venation. Notation of veins after Comstock and Needham. (sq. = squama, sqf. = squamal fringe. Al = alula. L = anal lobe. af.1 and af.2 = the two anal folds (vein Ax, when present, lies between these two folds: af.2 is frequently absent). f.Cu = cubital fork. r-m = cross-vein.

KEY TO SUBFAMILIES.

- 1 Cross vein m-cu present 2
m-cu absent 4
- 2 $R_2 + 3$ present and forked (i.e. connected with R_1 by R_2) or if absent R_1 and $R_4 + 5$ almost in contact (figs. 180a, b and 181) TANYPODINAE (p. 127).
 $R_2 + 3$ present and simple (i.e. not connected with R_1 by R_2) or if absent R_1 and $R_4 + 5$ well separated 3
- 3 $R_2 + 3$ present and simple (fig. 180d-f) DIAMESINAE (p. 135).
 $R_2 + 3$ entirely absent, R_1 and $R_4 + 5$ well separated (fig. 180c).
PODONOMINAE (p. 134).
- 4 L.R. (log ratio) less than 1; front tibia with distinct apical spur; male styles folded inwards 5
L.R. usually more than 1; front tibia rarely with distinct spur (a long spur present in *Pseudochironomus*); male styles directed rigidly backwards.
CHIRONOMINAE (p. 172).
- 5 Pronotum scarcely divided; anepisternal suture (situated between sternopleura and mesopleura) well marked, almost reaching front coxae (fig. 191a); male antennae normally plumose ORTHOCLADIINAE (p. 137).
Pronotum widely divided into lateral lobes; anepisternal suture short or absent (fig. 191b); male antennae almost bare, never plumose... CLUNIONINAE (p. 171).

Subfamily TANYPODINAE.

KEY TO GENERA.

- 1 f.Cu just before m-cu (fig. 180 a-c) 2
f.Cu beyond m-cu (fig. 181) 3
- 2 Costa not or hardly produced beyond $R_4 + 5$. ♀ antennae 12-13 segmented.
Costa distinctly produced beyond $R_4 + 5$. ♀ antennae 15-segmented
Pentaneura Philippi (p. 127).
Anatopynia Johannsen (p. 131).
- 3 Cu_2 not twice as long as distance between m-cu and f.Cu 4
 Cu_2 over thrice as long as distance between m-cu and f.Cu; differs from all other **Tanypodine** genera in Britain in having no acrostichal hairs
Tanypus Meigen (p. 132).
- 4 Fourth tarsal segment bilobed above (cordiform), shorter than fifth
Fourth tarsal segment cylindrical **Clintanypus** Kieffer (p. 134).
Procladius Skuse (p. 133).

Genus **Pentaneura** Philippi.

(Wings densely hairy. Costa not or only very indistinctly produced. R_2 normally present. m-cu placed immediately beyond f.Cu. Antennae of ♀ 12-13 segmented. Pronotum more reduced than in other **Tanypodinae**. Tarsal spurs absent. Pulvilli usually absent.)

KEY TO GROUPS OF SPECIES.

- 1 Wings marked, sometimes faintly; legs ringed or not 2
Wings unmarked; legs light or dark, without darker rings 4
- 2 Tibiae with three dark rings, one near middle **Group A** (p. 127).
Such rings absent 3
- 3 Wings dark with light spots **Group B** (p. 128).
Wings light with dark bands, spots or clouds **Group C** (p. 129).
- 4 Wing length 3.5 mm. or more; $R_2 + 3$ and R_2 distinct **Group D** (p. 129).
Wing length 3 mm. or less; $R_2 + 3$ faint, R_2 faint or absent 5
- 5 $R_4 + 5$ ending above or beyond level of tip of Cu_1 **Group E** (p. 130).
 $R_4 + 5$ ending before level of tip of Cu_1 **Group F** (p. 131).

GROUP A.

(Subgenus **Isoplastus** Kieffer.)

Wings with numerous dark bands on a light ground. $R_2 + 3$ distinct and forked. Legs whitish, with numerous dark rings, one near middle of each tibia, others at tips of femora, tibiae and most of the tarsal segments, and at bases of tibiae. ♂ styles rather peculiar, with the tip narrowed and blackened, spine bristle-like and inserted well before the tip, with which it lies parallel.

KEY TO SPECIES.

- 1 ♂ front tarsus with beard very short or absent. ♀ antennae normally 12-segmented.
♂♀ thorax with reddish-brown ground colour, conspicuously dusted bluish grey; abdomen more or less extensively pale, dark longitudinal markings usually present after base, sometimes spreading over tergites, whole abdomen occasionally darkened; legs sometimes very extensively darkened, the two outer dark rings of tibiae and the two rings on first segment of each tarsus indistinctly separated, though the base of this latter segment remains white; wing-markings rather variable; small species; wing-length under 3.5 mm. (It is possible that some apparent varieties in this species may ultimately be designated as subspecies.) *Common. Generally distributed.* 4-9 **monilis** Linnaeus.
- ♂ front tarsus with very long beard; hypopygium resembling that of *monilis* but coxite relatively broader and less tapering. ♀ antennae 13-segmented.
♂♀ body coloration as in *monilis* but abdomen usually more extensively darkened than in paler varieties of that species; larger species; wing-length usually over 4 mm. *Frequent. Northumberland (Crag Lough) southwards.* 5-9 **phatta** Egger.

GROUP B.

KEY TO SPECIES.

- 1 Wings with numerous whitish spots on a dark ground; $R_2 + 3$ and R_4 fairly distinct; legs mainly dark, with narrow white rings at bases of tibiae and first tarsal segments; thorax reddish-brown, with conspicuous spots and patches of grey dusting; abdomen extensively darkened, with narrow pale rings at tips of segments; wing-length about 3 mm. ♀ antennae 13-segmented. *Frequent. Generally distributed.* 5-7..... *guttipennis* van der Wulp.

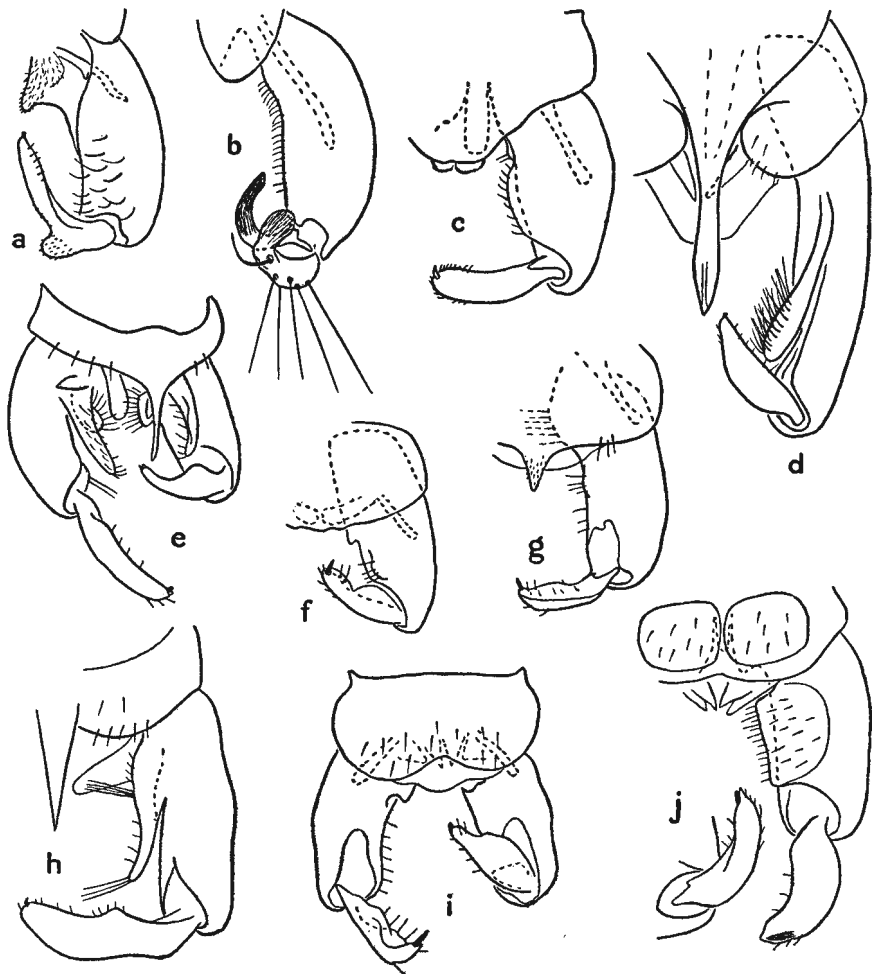


FIG. 182.—Male hypopygium, dorsal view, of (a) *Pentaneura fusciceps* Edwards. (b) *Podonomus kiefferi* Garrett. (c) *Diamesa permacer* Walker. (d) *D. waltli* Meigen. (e) *D. latitarsis* Goetghebuer. (f) *D. gaedii* Meigen. (g) *D. montium* Edwards. (h) *D. prolongata* Kieffer. (i) *D. campestris* Edwards. (j) *D. incallida* Walker.

GROUP C.

Wings with more or less obvious dark markings on a light ground. $R_2 + 3$ distinct and forked. Wing-length 3-4 mm. Legs usually pale, without dark rings except sometimes at or close to tips of femora.

KEY TO SPECIES.

- 1 Femora with a dark ring at or close to the tip.....2
Femora without such ring.....6
- 2 Wing-markings distinct; cross-veins blackened.....3
♂ only (♀ unknown). Wing-markings faint or ill-defined; cross-veins pale.
Yorks (Keighley). 7.....**woodi** Edwards ♂.
- 3 Palpi blackish; scutal stripes dark brown, almost uniform; a dark cloud below tip of $R_4 + 5$4
Palpi yellow; scutal stripes reddish, front ends of lateral pair and middle of central pair black.....5
- 4 ♀ only (♂ unknown). Black dots over R_2 and tip of R_3 ; a grey cloud near base of cell R_6 (fig. 180b); abdomen greyish, tergites with black basal bands.
Denbigh (Llangollen). 7. (Type only).....**eximia** Edwards ♀.
Such wing-markings absent; each abdominal segment with three distinct black spots at base (often fused in ♀). *Frequent. Westmorland (Temple Sowerby) southwards*. 5-7, 9.....**lentiginosa** Fries.
- 5 Pulvilli present; no dark cloud below tip of $R_4 + 5$. *Notts (Attenborough), Oxford*. 6.....**ornata** Meigen.
Pulvilli absent; a small dark cloud below tip of $R_4 + 5$. *Westmorland, Yorks, Notts, Derbyshire (Dovedale)*. 5-7.....**maculipennis** Zetterstedt.
- 6 Cross-veins black; wing-tips broadly pale.....7
- 7 Cross-veins scarcely darkened; outer dark wing markings almost reaching tip...9
♂ only (♀ unknown). Darker species; head black; legs entirely pale yellowish.
Hypopygium (fig. 182a) with styles enlarged at base. *Westmorland (Windermere)*. 6.....**fusciceps** Edwards ♂.
Lighter species; head yellow; ♂ styles not enlarged at base.....8
- 8 Scutal stripes brown, the lateral pair darker anteriorly; outer wing-band broad.
Distribution (see Typical carnea).....**carnea** Fabricius var. **festiva** Meigen.
Scutal stripes uniformly light reddish; outer wing-band narrower. *Westmorland southwards to Sussex (Three Bridges)*. 5-8.....**carnea** Fabricius typical form.
- 9 A dark spot (usually separate) in middle of cell R_610
Middle of cell R_5 pale.....11
- 10 Basal cells clear. ♂ front tarsus with longish beard. *Westmorland southwards*. 3-6, 9, 11.....**hirtimanus** Kieffer.
Outer half of basal cells darkened (fig. 180a). ♂ front tarsus without beard. *Argyll (Mull), Northumberland (Crag Lough), N.W. Yorks (Malham Tarn)*. 5-7, 10.....**northumbrica** Edwards.
- 11 Wings with two dark bands, the first blacker and situated just distal of the cross-veins, the second fainter, sometimes hardly perceptible (a separate dark cloud is often present between the bands over the tip of Cu_2); body usually darkened.
Frequent. Perthshire (Killin) southwards. 5-10.....**nubila** Meigen.
Wings with four faint grey markings on the outer half, and another in the anal cell; body nearly all yellow. *Frequent. Argyllshire (Bonawe) southwards to Surrey (Richmond), S.W. Ireland (Athlone)*. 5-8.....**pallidula** Meigen.

GROUP D.

Wings quite unmarked. Legs light or dark, but darker rings absent, even at tips of femora. $R_2 + 3$ distinctly present and forked. Wing-length 3-5 mm. or more. First segment of mid tarsus shorter than tibia.

KEY TO SPECIES.

- 1 Abdomen entirely pale yellow (both sexes). *Common. Ayrshire (Dreghorn) southwards*. 5-9.....**melanops** Meigen.
Abdomen with some darker markings (sometimes lacking in ♀).....2

- 2 Pulvilli present..... 3
 Pulvilli absent..... 4
- 3 Legs very long; front tibia nearly 1.5 as long as the femur; darker species. ♂ front tarsus without beard. *Common in hilly districts throughout British Isles.* 5-9..... **longimana** Staeger.
 Legs normal; front tibia hardly longer than femur; lighter species. ♂ front tarsus with moderate beard. *Argyllshire (Bonawe), Westmorland (Ullswater), North Wales.* 4, 6-8..... **viator** Kieffer.
- 4 Abdomen mainly yellow; scutal stripes reddish. ♂ tarsal beard moderate. *Inverness (Nethy Bridge), Yorks (Gormire), Cambridgeshire (Wicken), Herts (Radwell), S. Devon (Sidmouth).* 6-8..... **melanura** Meigen.
 Abdomen more extensively darkened; scutal stripes blackish. ♂ tarsal beard longer..... 5
- 5 ♂ abdominal tergites with broad pale bands. ♂♀ scutellum yellow; postnotum not sharply angled posteriorly on median line. *Westmorland (Witherslack), Lancs, Hunts, Cambs, S. Devon (Slapton).* 5-9.... **griseipennis** van der Wulp.
 ♂ tergites with narrow pale bands; scutellum often darkened. ♂♀ postnotum sharply angled posteriorly on median line, the angle often produced into a slight tubercle. *Inverness (Ben Alder) southwards to Suffolk (Mildenhall).* 4-7
barbitarsis Zetterstedt.

GROUP E.

(Subgenus **Pentaneura** s.str.)

Wings and legs quite unmarked. $R_2 + 3$ faint, R_2 indistinct or absent. $R_4 + 5$ ending as usual above or beyond level of tip of Cu_1 . Cross-veins approximated. Wing-length 2-3 mm. First segment of mid-tarsus at most as long as tibia.

KEY TO SPECIES.

- 1 Abdomen nearly all yellow (*cf. melanops* in Group D)..... 2
 Abdomen with extensive dark markings (sometimes lacking in ♀)..... 3
- 2 ♂ tergites 6 and 7 with dark marks at bases. ♀ abdomen entirely yellow. *Common. Argyllshire (Bonawe) southwards.* 5-8..... **binotata** Wiedemann.
 ♂♀ tergites 2-6 with narrow brown bands (often faint) near bases; somewhat larger species than *binotata*. *Cumberland (Skirwith), N.W. Yorks (Helwith Moss), Cambs (Wicken), Herts (Letchworth), Surrey (Richmond), Sussex (Lewes).* 5-7..... **nigropunctata** Staeger.
- 3 Thorax blackish; legs pale yellow. ♂ front tarsus with distinct beard; abdomen yellow with black bands on tergites 4 and 5, 7 and 8 entirely black. *Westmorland (Witherslack), Herts, Essex, S. Devon (Beesands).* 6-8.... **schineri** Strobl.
 Colour combination otherwise. ♂ front tarsus without beard..... 4
- 4 ♂ abdomen ochreous, tergites 3 and 4 with brown bands, 6-8 entirely dark brown. *Uncommon. Inverness (Feshie Bridge) southwards.* 6-9..... **divisa** Walker.
 ♂ abdomen regularly banded on all tergites (sometimes entirely darkened in **falcigera** var. **nigricans**)..... 5
- 5 Thorax with greenish-yellow ground colour. *Yorks (Skipwith), Herts, S. Devon (Dart Head).* 5-7..... **nemorum** Goetghebuer.
 Thorax with ground colour otherwise..... 6
- 6 ♂ style sickle-shaped, inserted well before tip of coxite. ♂♀ wing-length over 3 mm. 7
 ♂ style gently curved, or almost straight, and inserted terminally..... 8
- 7 Scutal stripes separate, reddish-yellow; scutellum yellowish. ♂ tergites regularly banded. *Common. Yorks (Skipwith) southwards.* 4-9
falcigera Kieffer Typical form.
 Scutal stripes, and often entire thorax, blackish. ♂ tergites sometimes entirely darkened. *Distribution (see Typical falcigera)*
falcigera var. **nigricans** Goetghebuer.
- 8 Mid tarsus with first segment a little shorter than tibia; $R_4 + 5$ longer (about $1.7 \times R_1$) and slightly curved; scutal stripes brown or black, with greyish pruinescence, especially dense between the stripes; larger species; wing-length about 3 mm. *Common. Westmorland (Witherslack) southwards.* 5-9
cingulata Walker.

Mid tarsus with first segment fully as long as tibia; $R_4 + 5$ shorter (about $1.5 \times R_1$) and practically straight; smaller species; scutal stripes reddish or black, with variable amount of greyish pruinescence; wing-length about 2-2.5 mm. *Westmorland (Witherslack), Yorks (Skipwith), Cheshire (Bollin Valley), Herts (Letchworth), Essex (Epping)*. 6-7. **brevitibialis** Goetghebuer.

GROUP F.

(Subgenus *Nilotanypus* Kieffer.)

Wings and legs unmarked. $R_2 + 3$ apparently absent. $R_4 + 5$ ending distinctly before level of tip of Cu_1 . Cross-veins rather widely separated. Wing-length 1.5-2 mm. First segment of mid tarsus distinctly longer than tibia.

KEY TO SPECIES.

- 1 Eyes bare (as usual); scutal stripes buff-coloured, separated by narrow blackish lines; base of vein M distinct. *Yorks (Ikley and Castle Howard), Norfolk (Hickling), Cambs (Quy Fen)*. 7-8. **longipalpis** Goetghebuer.
Eyes pubescent; scutum entirely black or dark brown with irregular greyish pruinescence; base of M obsolete, the two basal cells not distinctly separated; smallest British species in subfamily. *Common in mountainous regions*. 5-9
dubia Meigen.

Genus *Anatopynia* Johannsen.

Wings densely hairy (in all British species). Costa very distinctly produced. R_2 always present and distinct. m-cu placed immediately beyond f.Cu. Pronotum rather well developed, visible dorsally and hairy above. Minute apical spurs present on first two segments of posterior tarsi. Pulvilli sometimes present. ♀ antennae 15-segmented.

KEY TO SPECIES.

- 1 Pulvilli present. (Subgenus *Psectrotanypus* Kieffer) 2
Pulvilli absent. (Subgenus *Macropelopia* Thienemann) 3
- 2 Wings with two irregular dark bands, first over cross-veins and second, including some pale spots, on outer half of wing. ♂ antennal plumes blackish. ♂♀ wing-length 3.5-5 mm. *Common. Generally distributed*. 4-9. **varia** Fabricius.
Wings with three rather irregular dark bands, first before, second beyond cross-veins, third at tip, without pale spots. ♂ antennal plumes brownish. ♂♀ wing-length 4-4.5 mm. *Frequent. Generally distributed*. 5-9
trifascipennis Zetterstedt.
- 3 Wing-markings confined to dark cloud over cross-veins 4
Other wing-markings present 5
- 4 Thorax uniformly brownish-ochreous; wing-hairs yellow; abdomen brownish-ochreous with black basal bands on tergites; wing-length 4-4.5 mm. (a dark variety, ? *subtenuis* Kieffer, has the scutum greyish, with indications of four darker stripes; pleurae and postnotum almost black; bands on tergites broader, tergites 6 and 7 entirely dark). *Yorks (Gormire), Denbigh (Llangollen), Merioneth (Dolgelly), Herts (Hitchin)*. 6-7. **nugax** Walker.
Thorax blackish; wing-hairs dark; wing-length 4.5-5 mm. *Frequent in peaty districts. Inverness (Loch Morlich) southwards, S.W. Ireland (Killarney)*. 4-6, 9. **goetghebueri** Kieffer.
- 5 Cell R_5 with a single dark marking, just after middle; scutal stripes rather distinct, dark brown on a greyish-brown ground; wing-length 4-5 mm. *Frequent. Generally distributed*. 5-8. **notata** Meigen.
Cell R_5 also with an outer dark marking 6
- 6 Largest British species of Tanypodinae; wing-markings distinct; scutal stripes distinct, blackish; body predominantly dark; wing-length 4-6 mm. *Common. Generally distributed*. 3-11. **nebulosa** Meigen.
Smallest British species of genus; wing-markings less distinct; thorax almost uniformly brownish-ochreous; scutal stripes hardly distinguishable; body predominantly yellowish; wing-length 3-4 mm. *Frequent. Generally distributed*. 5-8. **punctata** Fabricius.

Genus *Tanypus* Meigen.

Wings more or less hairy. Costa distinctly produced. R_2 present and very distinct. m-cu before f.Cu, distance between cross-vein and cubital fork rather less than one-third as long as Cu_2 . Pronotum well developed, hairy above. Tarsal spurs absent. Fourth tarsal segment on all legs cylindrical. Pulvilli absent. ♀ antennae 15-segmented.

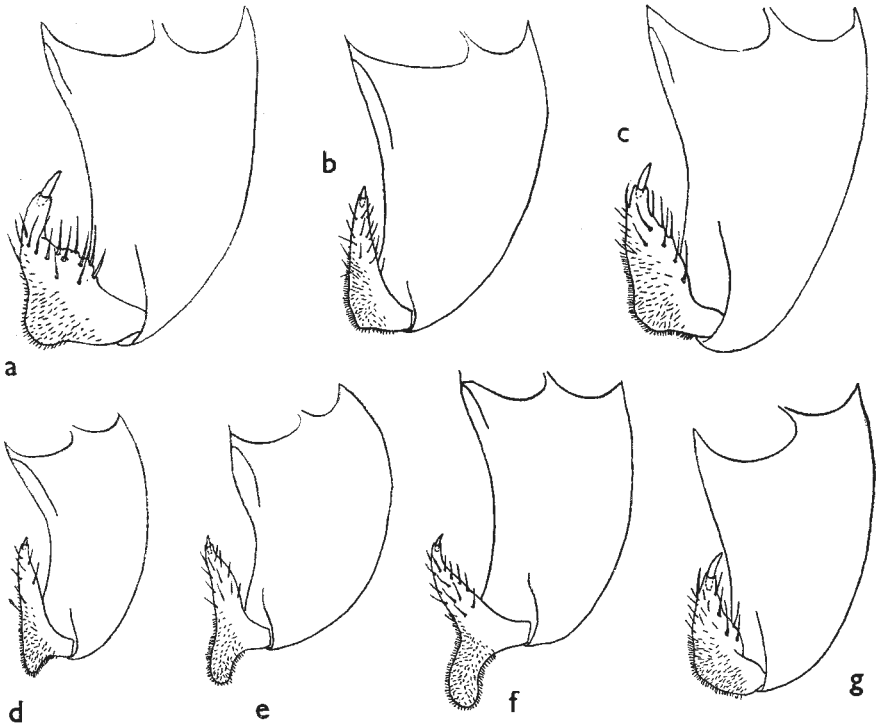


FIG. 183.—Right style, dorsal aspect, of male hypopygium of *Procladius* species. (a) *P. (Psilotanypus) rufovittatus* van der Wulp. (b) *P. (s.str.) simplicistilus* Freeman. (c) *P. (Ps.) lugens* Kieffer. (d) *P. (s.str.) sagittalis* Kieffer. (e) *P. (s.str.) choreus* Meigen. (f) *P. (s.str.) crassinervis* Zetterstedt. (g) *P. (Ps.) flavifrons* Edwards.

KEY TO SPECIES.

- 1 Wings with numerous dark spots, including (normally) a row of five double spots in cell R_5 , the wing-markings varying in size and intensity; wing-length 3.5–4.5 mm. Common. Derbyshire (Matlock) southwards. 5–9

punctipennis Meigen.

Wings unspotted, apart from the blackened cross-veins and a black streak on vein M before the cross-veins, a slight dark shade also present on outer half of wing; wing-length 4–5 mm. Yorks (Castle Howard), Oxford (Yarnton). 5–7,

villipennis Kieffer.

Genus **Procladius** Skuse.

Wings bare or hairy. Costa distinctly produced. R_2 present and very distinct. m-cu before f.Cu, distance between cross-vein and cubital fork more than half as long as Cu_2 . Pronotum well developed, hairy above. Minute apical spurs present on first two segments of posterior tarsi. Fourth tarsal segment on all legs cylindrical. Pulvilli absent. ♀ antennae 13-14 segmented.

(Fig. 183a-g depicting the male hypopygial styles of the British species of the genus *Procladius* are by Mr. P. Freeman, who assisted in preparing the following keys to the two subgenera.)

KEY TO SUBGENERA.

- 1 Wing-membrane with macrotrichia. ♀ antennae 14-segmented **Procladius** Skuse s.str.
- Wing-membrane bare. ♀ antennae 13-segmented **Psilotanyus** Kieffer.

Subgenus **Procladius** Skuse s.str.

KEY TO SPECIES.

- 1 ♂ front tarsus with long beard; styles simple, without backward process (fig. 183b). ♂♀ wings without trace of dark shade across outer part; large, blackish species; wing-length 4-5 mm. *Lancs (Hawkshead, Three Dubs Tarn)*. 5
simplicistilus Freeman.
- ♂ front tarsus with beard slight or absent. ♂♀ wings usually with distinct dark shade across outer part; smaller species. 2
- 2 ♂ styles curved and with long backward process (fig. 183f); tergites 2-7 without distinct apical pale yellowish bands. ♂♀ wing-length about 3 mm.; dark species. *Inverness (Loch Garten and Ben Alder), Perthshire (Killin), N.W. Yorks (Malham Tarn), Lancs (Hawkshead, Three Dubs Tarn), Cheshire (Rostherne)*. 4, 6. **crassinervis** Zetterstedt.
- ♂ styles less curved and with shorter backward process; tergites 2-7 with distinct apical pale yellowish bands. ♂♀ normally paler species. 3
- 3 ♂ styles with moderate backward process (fig. 183e). ♂♀ wings with moderately dense hair, and with a distinct dark shade across outer part. 4
- ♂ styles with short backward process (fig. 183d); tarsal beard absent. ♂♀ wings very densely covered with dark hair, outer part without a dark shade; wing-length about 3 mm. *Frequent. Arran (Catacol) southwards to Sussex (Lewes)*. 4-9. **sagittalis** Kieffer.
- 4 ♂ tarsal beard short but distinct. ♂♀ wings with a slight indication of a dark patch in anal cell; wing length 2.5-4.5 mm. *Common. Generally distributed.* 4-9. **choreus** Meigen **Typical**.
- ♂ tarsal beard absent (in the few specimens examined). ♂♀ wing-markings more distinct, a distinct dark spot in anal cell, wing-tip rather noticeably pale; smaller than typical *choreus*; wing-length about 2 mm. (Possibly a distinct species.) *Distribution (see typical choreus)*. **choreus** var. **cutieiformis** Linnaeus.

Subgenus **Psilotanyus** Kieffer.

KEY TO SPECIES.

- 1 Scutum light yellow with four dull stripes (black in ♂, black or reddish in ♀); legs mainly pale; wing-length 2.5 to 3 mm. ♂ styles with pronounced internal bulge (fig. 183a). *Lancs (Reddish), Middlesex (Ruislip), London, Ireland (Castlebar Lough)*. 6-9. **rufovittatus** van der Wulp.
- Thorax entirely black. ♂ styles without pronounced bulge. 2
- 2 Legs entirely blackish or dark brown; thorax moderately shining; larger species; wing-length 2.5-3 mm. ♂ head black; styles somewhat angled behind (fig. 183c). ♀ occasionally with a restricted pale yellow patch on frons above antennae. *Inverness (Aviemore), Lancs (Hawkshead, Three Dubs Tarn), Suffolk (Timuworth)*. 4-6. **lugens** Kieffer.
- Legs partly yellowish-brown, including middle of all tibiae; thorax more brightly shining; head (normally) with a creamy yellow patch on frons above antennae; smaller species; wing-length 2 mm. ♂ styles rounded behind (fig. 183g). *Westmorland (Windermere), Lancs (Hawkshead, Three Dubs Tarn), Ireland (Waterville)*. 5-8. **flavifrons** Edwards

Genus *Clinotanypus* Kieffer.

Wings quite bare. Costa strongly produced. R_2 present and very distinct, but disconnected from $R_2 + 3$ and appearing as a free branch of R_1 . m-cu before f.Cu, distance between cross-vein and cubital fork more than half as long as Cu_2 . Pronotum forming a distinct collar. Postnotum with fine pubescence. Small tarsal spurs present. Fourth tarsal segment of each leg shorter than fifth and bilobed dorsally. ♀ antennae 14-segmented.

KEY TO SPECIES.

- 1 Wings bare, unmarked; thorax and scutellum black, brightly shining; tergites black, moderately shining, sometimes yellowish towards side-margins; legs more or less yellowish; wing-length 3.5–5 mm.; stoutly built species. *Frequent. Generally distributed.* 5–8.....*nervosus* Meigen.

Subfamily PODONOMINAE.

KEY TO GENERA.

- 1 Hind tibia without a definite comb on inner side at tip, both spurs long; R_1 very long, slender throughout in both sexes. ♀ antennae elongate, 15-segmented
Lasiodiamesa Kieffer
Hind tibial comb present, one spur short; R_1 shorter, more or less swollen at tip in ♀. ♀ antennae short, 8–12 segmented.....*Podonomus* Philippi

Genus *Podonomus* Philippi.(Subgenus *Paratanypus* Garrett.)

Eyes bare, reniform. Thorax hairy, acrostichal hairs biserial. Hind tibiae with two small but unequal spurs, and a distinct comb on inner side at tip. Fourth and fifth tarsal segments subequal, fourth simple, without sole and scarcely produced at tip beneath fifth. Claws simple. Pulvilli absent or rudimentary, empodium well developed, about as long as claws. Wings densely hairy. R_1 only about half as long as $R_4 + 5$, swollen at tip in ♀. $R_4 + 5$ curved. f.Cu sessile. ♀ antennae short 12-segmented, last segment somewhat clubbed.

KEY TO SPECIES.

- 1 Thorax and abdomen entirely black, shining, with long yellow hairs; wings (fig. 180c) greyish, quite unmarked; halteres blackish, knob occasionally yellowish; squamae with several very long hairs; legs blackish, or more or less extensively yellowish; wing-length 2.2 mm. ♂ tarsal beard absent; hypopygium (fig. 182b). ♀ abdomen often brownish. *Perthshire (Killin), Arran (Machrie), Yorks (Ilkley and Pen-y-Ghent).* 5–6....*kiefferi* Garrett (*peregrinus* Edwards).

Genus *Lasiodiamesa* Kieffer.

Eyes bare with a rather long and narrow dorsal projection. Antennae 15-segmented in ♀ about as long as head and thorax together, all flagellar segments cylindrical and at least 2–3 times as long as broad, the terminal segments more slender and vaguely separated. Palpi long, fourth (terminal) segment much longer than third. Scutum slightly produced over pronotum, lobes of pronotum rather small and widely separated. Hind tibia with two rather long and slender spurs of equal length; no tibial comb. Fourth tarsal segment simple, cylindrical, longer than fifth; fifth in ♀ cylindrical, in ♂ concave beneath with a slight enlargement at base bearing a group of hairs. Pulvilli absent, empodium small. Claws of ♂ blunt-tipped, with fine teeth near base. Wings more or less hairy. Costa strongly produced and reaching to or beyond wing-tip. R_1 very long, three-fourths as long as $R_4 + 5$, not swollen in ♀. $R_4 + 5$ curved down at tip and almost (♂) or quite (♀) reaching wing-tip. Cubital fork sessile. ♂ hypopygium with a projecting lobe at tip of coxite; rodlike parameres present.

KEY TO SPECIES.

- 1 Thorax and abdomen blackish-brown, hardly shining; wings densely hairy on almost the entire surface, basal cells partly bare, cell R_1 entirely so; halteres and legs yellow; wing-length 2.5-3.5 mm. ♂ front tarsi with short beard. *N.W. Yorks (Austwick Moss)*. 5.....**sphagnicola** Kieffer.

Subfamily DIAMESINAE.

KEY TO GENERA.

- 1 f.Cu just beyond m-cu (fig. 180f).....**Prodiamesa** Kieffer (p. 137).
f.Cu just before m-cu (fig. 180d, e).....2
- 2 Pronotum completely hairy. ♀ antennae 14-segmented
Protanypus Kieffer (p. 135).
Pronotum bare above. ♀ antennae 6-8 segmented.....3
- 3 Fourth tarsal segment cylindrical, as long as fifth or longer; wings greyish
Syndiamesa Kieffer (p. 135).
Fourth tarsal segment more or less cordate (at least on the posterior legs) and shorter than fifth **Diamesa** Meigen (p. 135).

Genus **Protanypus** Kieffer.

Eyes bare, widely separated in both sexes. Pronotum conspicuously hairy. Fourth tarsal segment cylindrical, as long as fifth. Wings without macrotrichia or distinct microtrichia. m-cu placed a little beyond f.Cu. ♂ antennae 14-segmented, a minute 15th segment usually also traceable, but this is rarely completely separated and is variable individually; 14th segment longer than the remainder. Hypopygium with tips of coxites produced beyond insertion of styles, latter simple.

KEY TO SPECIES.

- 1 Black species; wings slightly milky; legs short-haired; wing-length 4-5 mm. ♂ front tarsal beard absent. *Inverness (Loch Erich), Perthshire (Pitlochry and Killin), Westmorland (Windermere), Yorks (Chelker Res.), Cheshire (Longendale)*. 3, 5-6.....**morio** Zetterstedt.

Genus **Syndiamesa** Kieffer.

Eyes bare. Pronotum bare. Fourth tarsal segment cylindrical, at least as long as fifth. All tarsi with minute apical spurs on first three segments. Wings greyish, with small microtrichia and sometimes a few macrotrichia at tip. m-cu placed a little beyond f.Cu. ♂ styles simple. ♀ antennae 7-8 segmented.

KEY TO SPECIES.

- 1 Fourth tarsal segment as long as fifth; macrotrichia present at tip of wing (the only British Diamesine with this character); m-cu before r-m; wing (fig. 180e) with lobe almost right-angled; wing-length 4-6 mm.; blackish species. ♂ front tarsal beard absent. ♀ wing-hairs more numerous. *Inverness (Ben Alder), Perthshire (Killin), Yorks (Keighley)*. 5-6.....**pilosa** Kieffer.
Fourth tarsal segment about twice as long as fifth. ♂ front tarsus with long beard. *Ireland (Belfast)*.....**chiron** Haliday.
(The above is from original description, type being lost and no further examples found.)

Genus **Diamesa** Meigen.

Eyes pubescent or bare. Pronotum bare, or only slightly hairy at sides. Fourth tarsal segment shorter than fifth and more or less cordiform at tip (at least on posterior legs). m-cu a little beyond f.Cu; r-m long, usually curved. ♂ antennae without trace of 15th segment. Styles simple, tips of coxites not prolonged. ♀ antennae 7-8-segmented.

KEY TO GROUPS OF SPECIES.

- 1 Eyes pubescent ; wings grey **Group A.**
 Eyes bare.....2
 2 Wings grey, with fine microtrichia **Group B.**
 Wings white, without microtrichia **Group C.**

GROUP A.(Subgenus **Diamesa** s.str.)

Eyes densely pubescent. All tarsi with minute apical spurs on first two segments. Fourth tarsal segment of middle and hind legs (viewed from above) rather broad, constricted beyond middle and bilobed at tip, always shorter than fifth. Wings greyish, with distinct microtrichia visible under a magnification of 300. Lobe of wing large, right-angled.

KEY TO SPECIES.

- 1 Pronotum ochreous ; wing-length 3-4.5 mm. ♂ antennae only very slightly plumose ; A.R. about 0.3 ; hypopygium with styles broad basally, abruptly narrowed on apical half. Frequent. Inverness southwards to Herts (Hexton). 4-8.....**culicoides** Heeger.
 Pronotum blackish. ♂ antennal plumes normal ; A.R. more than 1.....2
 2 ♂ hypopygium (fig. 182*d*) with very long and stout anal point, long basal appendages which are densely hairy at tip, and rather short styles. ♂♀ wing-length 4-5 mm. Inverness (Loch Einich), Perthshire (Killin), Yorks (Whernside), Herts (Hitchin). 4, 6.....**watlii** Meigen.
 ♂ hypopygium (fig. 182*h*) shorter ; basal appendages long and slender, almost bare, tip with not more than two or three short hairs ; styles long, with median swelling on inner side. ♂♀ wing-length 3.5-4 mm. ; closely resembles *watlii*. Arran (Brodick and Catacol), Ayrshire (Dreghorn), Yorks (Austwick and Skegby), S. Devon (Sidmouth). 5.....**prolongata** Kieffer.

GROUP B.

Eyes bare. Legs and wings as in **Group A**, to which group Edwards considers the species are closely related.

KEY TO SPECIES.

- 1 Fourth tarsal segment with distinct constriction beyond the middle.....2
 ♂ only (♀ unknown). Fourth tarsal segment without constriction beyond the middle. ♂ A.R. 1.0 ; hypopygium (fig. 182*c*) much as in *incallida*, without distinct anal point or basal lobe, style moderately broad ; wing-length 3.5 mm. (species only known from Walker's type). *Locality unknown*.....**permacer** Walker ♂.
 2 ♂ hypopygium (fig. 182*j*) without distinct anal point, styles rather broad and almost bare, basal lobe not separated from coxite, but extending to over two-thirds of its length ; A.R. about 1.8. ♂♀ wing-length 3.5 to 4.5 mm. (species only known from Walker's types). *Locality unknown*.....**incallida** Walker.
 ♂ hypopygium (fig. 182*e*) with rather long and slender anal point, styles long and not very broad, basal lobe long, slender, bare, separate from coxite ; A.R. about 1.5. ♂♀ wing-length 3-4.5 mm. Inverness (Aviemore), Perthshire (Loch Laidon), Yorks (Whernside and Pen-y-Ghent), Derbyshire (Miller's Dale and Glossop), Brecon (Gader Fawr). 4-6.....**latitarsis** Goetghebuer.

GROUP C.(Subgenus **Psilodiamesa** Kieffer.)

Eyes bare. Fourth tarsal segment much shorter than fifth, on the posterior legs distinctly cordiform and with constriction beyond the middle. Front tarsi without spurs. Wings milky-white, microtrichia absent. Anal lobe of wing larger than in **Groups A and B**, more or less produced.

KEY TO SPECIES.

- 1 Front coxae yellow; front femora at least pale at base.....2
All coxae and femora black, or at least darkened.....4
- 2 All tibiae and metatarsi broadly whitish; halteres pale yellowish; wing-length 3·5-4 mm. ♂ A.R. about 2; hypopygium with a short anal point. *Oxford (Bagley Wood)*. 5.....*galactoptera* Nowicki.
Tibiae and metatarsi partly yellowish, sometimes rather indistinctly so.....3
- 3 Thorax grey, heavily pruinulent, without distinct yellowish markings even in female; halteres pale yellowish; wing-length 3·5-4 mm. ♂ A.R. about 2; antennal plumes usually light brownish; posterior tibiae more ochreous-brown than in *gaedii*; hypopygium strongly chitinized, and with a very short anal point. *Cumberland (Skirwith), N. Lancs (Holker Moss), N.W. Yorks (Austwick), Norfolk (Blakeney Point), S.W. Ireland (Killarney and Cork)*. 5
lactepennis Zetterstedt.
(NOTE.—*ammon* Haliday evidently resembles *lactepennis* from Haliday's description; no specimen seen.)
Thorax slightly shining, lightly pruinulent, blackish in ♂, more or less ochreous in ♀; front tibiae dark brown, indistinctly paler in middle, posterior tibiae whitish-ochreous, dark brown at base and tip; halteres whitish; wing-length 3-3·5 mm. ♂ A.R. about 1·5; antennal plumes whitish; hypopygium (fig. 182f) only weakly chitinized and without anal point. *Common by mountain streams. Sutherland southwards to Derbyshire*. 5-8.....*gaedii* Meigen.
- 4 ♂ front tarsal beard absent; small species.....5
♂ front tarsus bearded; average-sized species.....6
- 5 ♂ antennal plumes all brownish; A.R. 0·9-1·1; hypopygium with fine, bare anal point. ♀ antennae blackish, basal segment often grey or brownish; legs darkened. ♂♀ wing-length 2·7-3 mm. *Inverness (Loch Einich), Perthshire (Killin), N.W. Yorks (Pen-y-Ghent)*. 5-7.....*parva* Edwards.
♂ antennal plumes all whitish; A.R. about 1·5; hypopygium without anal point. ♀ antennae clear yellow, including basal segment, tip sometimes darkened; legs more yellowish. ♂♀ wing-length 3-4 mm. *Morayshire (Grantown), Perthshire (Killin and Glen Lyon)*. 6.....*pastoris* Edwards.
- 6 ♂ antennal plumes all pale brownish; A.R. almost 2; hypopygium (fig. 182i) without anal point. ♀ thorax heavily pruinulent, quite dull. ♂♀ wing-length 3-4 mm. *Caitness (Dingwall), Arran (Dreghorn), Yorks (Ilkley), Cambridge, Middlesex (Staines)*. 4, 7.....*campestris* Edwards.
♂ antennal plumes blackish, pale at tip; A.R. about 2; hypopygium (fig. 182g) with a conical anal point. ♀ thorax lightly pruinulent, slightly shining. ♂♀ wing-length 3·5-4 mm. *Arran, Yorks (Ingleborough and Cautley)*. 5-7
montium Edwards.

Genus *Prodiamesa* Kieffer.

Eyes bare. Pronotum bare. Fourth tarsal segment on all legs cylindrical and longer than fifth. Wings greyish, with very small microtrichia. m-cu placed distinctly before f.Cu. ♂ hypopygium with styles double. ♀ antennae 6-7 segmented.

KEY TO SPECIES.

- 1 Brownish species; scutum somewhat shining, with three dark brown to blackish stripes, which are usually fused in ♂, separate in ♀. ♀ antennae either 6-segmented (second segment only slightly constricted) or 7-segmented (second segment completely separated). ♂♀ wing-length 4-5·5 mm. *Common. Generally distributed*. 4-11.....*olivacea* Meigen.

Subfamily ORTHOCLADIINAE

KEY TO GENERA.

- 1 Wing-membrane with macrotrichia, at least at tip.....2
Wing-membrane devoid of macrotrichia.....5
- 2 r-m very long and oblique (fig. 180g); male styles bifid; small pulvilli present..3
r-m much shorter; male styles not bifid.....4

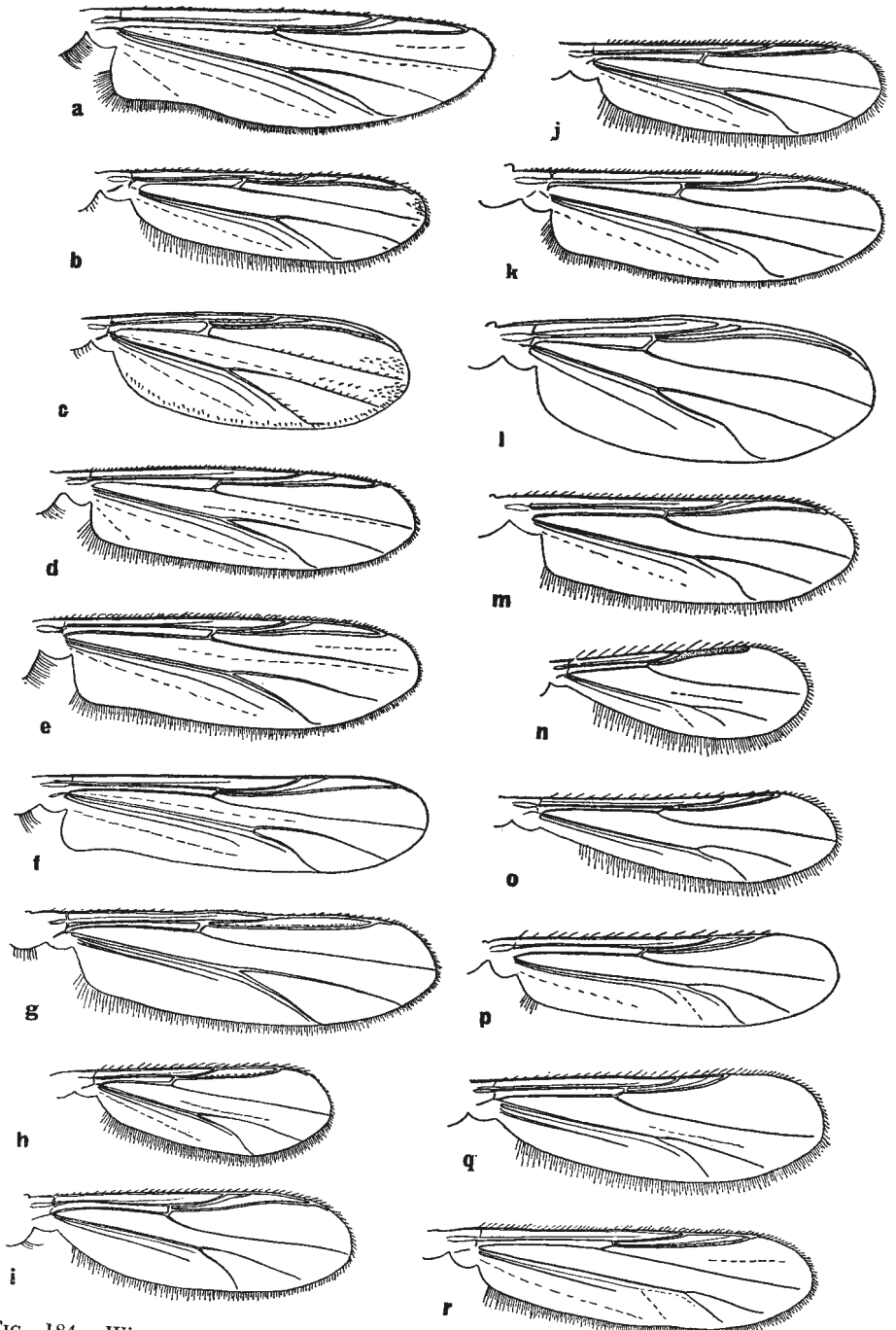


FIG. 184.—Wings of CHIRONOMIDAE (ORTHOCLADINAE). (a) *Hydrobaenus* (*Orthocladius*) *gracei* ♂. (b) *H. (O.) apicalis* ♂. (c) *H. (O.) apicalis* ♀. (d) *H. (O.) hospitus* ♂. (e) *H. (O.) minor* ♂. (f) *H. (O.) flexuellus* ♂. (g) *H. (Eukiefferiella)* *cheethami* ♂. (h) *H. (E.) camptophleps* ♂. (i) *H. (Limnophyes)* *gurgicola* ♂. (j) *H. (S.) rectus* ♂. (k) *H. (S.) ephemerae* ♂. (l) *H. (S.) ephemerae* ♀. (m) *H. (S.) conjunctus* ♀. (n) *H. (S.) angustus* ♂. (o) *H. (S.) angustus* ♂. (p) *H. (S.) trilobatus* ♂. (q) *H. (S.) curticosta* ♂. (r) *H. (S.) brevifurcatus* ♂.

- 3 Scutum conically produced in front; wings spotted
Eurycnemus van der Wulp (p. 139).
 Scutum not conically produced; wings unmarked. **Brillia** Kieffer (p. 139).
- 4 Wing-hairs decumbent (fig. 180*h-l*); pulvilli absent
Metricnemus van der Wulp (p. 140).
 Wing-hairs suberect (fig. 184*b, c*); small pulvilli present
Hydrobaenus apicalis Kieffer (p. 158).
- 5 $R_4 + 5$ completely fused with the thickened costa, and reaching to at most two-thirds of wing-length; a false vein running close to anterior margin on outer half of wing (fig. 192*a-e*). 6
 $R_4 + 5$ not completely fused with costa, and reaching to at least three-quarters of wing-length; if (rarely) it is slightly shorter, there is no false vein near anterior margin beyond costa. 7
- 6 Hind tibia not swollen and without conspicuous apical projection on inner side; An curved down at tip and reaching to or beyond f.Cu
Thienemanniella Kieffer (p. 168).
 Hind tibia distinctly swollen at tip, obliquely truncate and with a conspicuous apical projection on inner side; An straight and not reaching f.Cu
Corynoneura Winnertz (p. 169).
- 7 Dorso-central hairs of thorax minute, weak and decumbent, not arising from obvious punctures; tibiae usually with pale rings; eyes densely pubescent
Cricotopus van der Wulp (p. 144).
 Dorso-central hairs distinct, strong, suberect, arising from obvious punctures (particularly obvious posteriorly); tibiae unicolorous; eyes usually bare. . . . 8
- 8 Fourth segment of posterior tarsi cordiform, shorter than fifth
Cardiocladius Kieffer (p. 144).
 Fourth segment of all tarsi cylindrical, *usually* as long as or longer than fifth (exceptions noted in keys). . . **Hydrobaenus** Fries (see also under 4) (p. 148).

Genus **Eurycnemus** van der Wulp.

Eyes bare, with rather long and narrow dorsal extensions. ♂ antennae 14-segmented, ♀ 7-segmented. Pronotum fairly well developed, but covered by a forward extension of the scutum, which is almost pointed in front. Femora and tibiae appearing rather thick, chiefly because of dense hair. Hind tibiae without comb; spurs subequal and rather long. Pulvilli present. Wings rather densely hairy all over, the hair dark in places, forming rather definite markings. r-m very long and curved. Squama fringed. ♂ coxite with a long, bare basal appendage, styles forked, without terminal spine.

KEY TO SPECIES.

- 1 Large greenish-yellow species; thorax with some black spots and stripes, mainly at sides; legs mainly yellowish, knees and tarsal joints dark; wing-length 4-6.5 mm. *Westmorland (Rydal), Yorks (Ilkley), Shropshire (Shrewsbury)*. 6-7
crassipes Panzer.

Genus **Brillia** Kieffer.

Eyes bare. ♂ antennae 14-segmented, ♀ 6-segmented. Pronotum forming a distinct collar, but divided narrowly in middle. Scutum not produced in front. Legs rather slender; spurs and hind tibial comb normal, outer spur rather shorter than inner. Pulvilli present, very small. Wings rather densely hairy, but the hair uniform in colour. r-m (in British species) long and curved (fig. 180*g*). Squama fringed. ♂ hypopygium (fig. 185*a*) with bare basal appendage and forked styles, as in *Eurycnemus*.

KEY TO SPECIES.

- 1 Pronotum widening somewhat at middle towards point of division; sternopleura entirely blackish, or at least darkened, no yellowish area towards anepisternal suture; scutum yellowish with dark brown or blackish stripes; wing-length 3.5-4.5 mm.; larger species. ♂ outer branch of style (fig. 185*a*) very long, more than twice as long as inner. *Inverness, (Spey Valley), Perthshire (Killin), Dumbarton (Bowhill), Westmorland (Staveley), Lancs (Didsbury, etc.), Shropshire (Church Stretton), Herts (Hitchin and Watford)*. 5-9. **longifurca** Kieffer.

Pronotum narrowing at middle towards point of division; sternopleura often more or less darkened, but normally a triangular yellowish area is present, reaching from middle of posterior margin upwards and forwards to upper anterior angle, thus anepisternal suture is entirely bordered with yellow below; scutal stripes in darker examples (chiefly ♂) black and more or less fused, scutellum black; or scutal stripes brown, well-separated, scutellum yellow; wing-length about 3 mm.; smaller species. ♂ styles with the two branches subequal in length. *Common. Generally distributed. 1, 3-10.....modesta* Meigen.

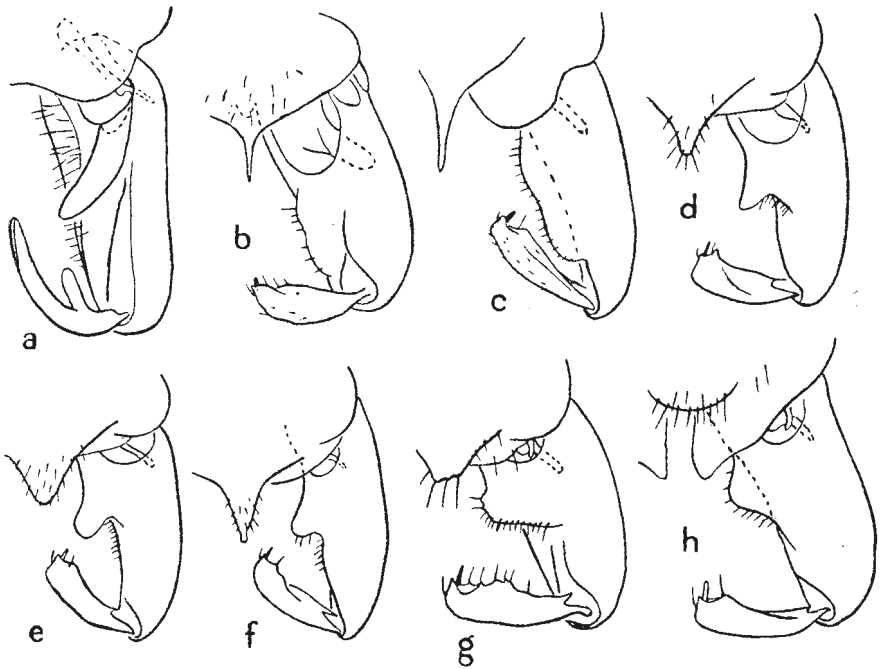


FIG. 185.—Male hypopygium (right half, dorsal view) of species of *Brillia* and *Metriocnemus*. (a) *B. longifurca* Kieffer. (b) *M. tristellus* Edwards. (c) *M. graciei* Edwards. (d) *M. irritus* Walker. (e) *M. irritus* Walker, var. (f) *M. penerasus* Edwards. (g) *M. brumalis* Edwards. (h) *M. subnudus* Edwards.

Genus *Metriocnemus* van der Wulp.

Wings with distinct macrotrichia, at least at tip. r-m rather short. Eyes bare (except in *M. ? gracilis*). Pulvilli absent. Pronotum forming a distinct collar; scutum not produced in front. Hind tibia with normal comb, outer spur much shorter than inner. ♂ styles not bifid.

KEY TO SUBGENERA.

- 1 Eyes pubescent.....*Thienemannia* Kieffer (p. 141).
Eyes bare.....2
- 2 Hind L.R. 0.55 or less; $R_2 + 3$ ending near R_1
Metriocnemus van der Wulp s.str. (p. 141).
Hind L.R. 0.6 or more; $R_2 + 3$ usually ending well beyond R_13
- 3 Costa ending abruptly at tip of $R_4 + 5$, which reaches beyond level of tip of Cu_1 (fig. 180h).....*Heterotrissocladius* Spärck (p. 142).
Costa more or less produced; $R_4 + 5$ shorter.....4

- 4 $R_4 +_5$ ending well before level of tip of Cu_1 ; squama fringed, at least partially (fig. 180k, l).....**Paraphaenocladus** Thienemann (p. 142).
 $R_4 +_5$ ending above or scarcely before level of tip of Cu_15
 5 Squama partially fringed.....**Parametrioctnemus** Goetghebuer (p. 143).
 Squama quite bare (fig. 180t).....**Gymnometrioctnemus** Goetghebuer (p. 143).

Subgenus **Thienemannia** Kieffer.

Eyes pubescent. Legs slender; front L.R. about 0.65, hind L.R. about 0.55; tarsal spurs just distinguishable. Wings not very densely hairy. Costa strongly produced. $R_4 +_5$ ending just beyond level of tip of Cu_1 . $R_2 +_3$ running close to R_1 , r-m more nearly transverse than in *Metrioctnemus* s.str. Cu_2 gently curved. f.Cu scarcely beyond r-m. Squama almost bare (2 small hairs only in the single British species. Stem-vein with two hairs). ♂ antennae only 12-13-segmented.

KEY TO SPECIES.

- 1 Small, delicate species; thorax yellow; scutal stripes dark brown; abdomen brown; wing-length under 2 mm. ♂ A.R. only 0.25-0.3. (Kieffer states that ♂ antennae are 12-segmented, instead of 13- as in British specimens.) Arran (*Corrègills and Brodrick*), Westmorland (*Staveley*), Cheshire (*Goyt Valley*), Flintshire (*Ffrith*). 3, 5-6.....? **gracilis** Kieffer.

Subgenus **Metrioctnemus** s.str.

Eyes bare as usual. First two hind tarsal segments with small apical spurs (except in *M. gracil*). Front L.R. about 0.65, hind L.R. 0.55 or less. Femora rather thick. Empodium usually quite short. Costa very distinctly produced. $R_2 +_3$ running close to R_1 . $R_4 +_5$ ending before level of tip of Cu_1 . r-m oblique. Stem-vein with numerous long hairs. Squama with complete fringe. Body generally all black, at least in ♂. ♂ hypopygium with long, bare anal point.

KEY TO SPECIES.

- 1 Wings moderately hairy at tip only, basal half with at most some scattered hairs..2
 Wings densely hairy all over (less dense in *picipes*).....3
 2 Palpi reduced; wings (fig. 180j) usually with scattered hairs on basal half, noticeably towards base of cell R_5 and along posterior margin; wing-membrane slightly tinged with brown; entirely black species; wing-length 2 mm. ♂ A.R. about 1.2; hypopygium as in fig. 185b. Yorks (*Pen-y-Ghent*), Cambs. (*Haupton*), Herts (*Weston*). 2, 4-5.....**tristellus** Edwards.
 Palpi long; wings with hairs at tip only, basal half quite bare; wing-membrane milky-white; entirely black species; wing-length 2 mm. ♂ A.R. almost 2. Perthshire (*Killin, Beinn Heasgarnich*). 6.....**ursinus** Holmgren.
 3 Wing-hairs greyish or dark.....4
 Wing-hairs whitish; wings milky-white; wing-length about 2.5 mm. ♂ A.R. about 1.2; thorax black; mesonotal hairs black. ♀ thorax with light to dark brown ground colour; mesonotal hairs yellowish. Frequent. Arran southwards to Essex (*Epping*). 4-7.....**atratus** Zetterstedt.
 4 Halteres and mesonotal hairs black, at least in ♂. ♀ thorax all black.....5
 Halteres and mesonotal hairs yellow. ♀ thorax often with yellowish ground colour.....7
 5 ♂ wing-membrane whitish; A.R. nearly 3; hypopygium with a small subapical lobe to coxite. ♂♀ wing-length 2-3 mm. Uncommon. Yorks (*Ilkley*) southwards. 3-6, 9.....**picipes** Meigen.
 ♂♀ wing-membrane greyish. ♂ A.R. under 2.....6
 6 ♂ coxite with rather large basal lobe. ♂♀ wing-length 2-3 mm. Common. Generally distributed. 3-10.....**hygropetricus** Kieffer.
 ♂ coxite with a small subapical lobe (as in *picipes*). ♂♀ wing-length 2-3 mm. Frequent. Generally distributed. 4-7.....? **atriclavus** Kieffer.

- 7 ♂♀ hind leg ratio only about 0.35; body and legs usually all black; wing-length 2-3.5 mm. ♂ A.R. about 1. *Common. Generally distributed.* 3-11
fuscipes Meigen.
- 8 ♂♀ hind leg ratio almost 0.5.....8
 ♂ A.R. about 1.7; body black. ♀ body partly yellowish. ♂♀ wing-length 2-2.5 mm. *Common. Generally distributed.* 9-11.....*hirticollis* Staeger.
 ♂ A.R. 1.0 or less.....9
- 9 ♂ A.R. barely 1.0. ♂♀ body entirely black; wing-length 2-2.5 mm. *Cambs (Babraham), Herts (Baldock, etc.), Middlesex (Harrow).* 4-5, 8
martinii Thienemann.
 ♂ A.R. about 0.5, last segment strongly clubbed; body brownish; scutal stripes dark brown; hypopygium as in fig. 185c. ♀ body almost entirely yellowish.
 ♂♀ wing-length about 2.2 mm. *Yorks (Castle Howard and Ilkley).* 7
gracei Edwards.

Subgenus *Heterotrissocladius* Spärck.

Hind tarsi without spurs. Front L.R. about 0.85-0.9, hind L.R. about 0.65. Femora moderately slender. Costa ending abruptly at $R_4 + 5$, which reaches beyond level of tip of Cu_1 . $R_2 + 3$ ending well beyond R_1 ; R_7 nearly two-thirds as long as $R_4 + 5$, r-m very oblique. Cu_2 bent forward at tip only. An reaching far beyond f.Cu. Stem vein hairy. Squama with complete fringe. ♂ hypopygium usually with short, hairy anal point.

KEY TO SPECIES.

- 1 Wings moderately hairy all over; membrane almost colourless; scutal stripes usually separate, sometimes fused in ♂; wing-length 3.5-4 mm. ♂ anal point small but distinct. *Frequent. Inverness (Loch Erich) southwards to Herts, S.W. Ireland (Killarney).* 3-6, 9.....*marcidus* Walker.
 ♂ only (♀ unknown). Wings (fig. 180h) moderately hairy at tip only, a few scattered hairs present at tip of cell Cu_2 , and few or none in anal cell; membrane distinctly brown-tinged; scutal stripes as in *marcidus*; wing-length 2.5 mm. Anal point scarcely differentiated (though the ninth tergite is sharply pointed in the middle). *Midlothian (Glencorse), S.W. Ireland (Killarney).* 6, 9
grimshawi Edwards ♂.

Subgenus *Paraphaenocladus* Thienemann.

Hind tarsi without minute spurs. Front L.R. about 0.75, hind L.R. about 0.65. Femora slender. Empodium fairly long. Costa more or less produced, but $R_4 + 5$ ending well before level of tip of Cu_1 . $R_2 + 3$ ending well beyond R_1 , or else R_1 and $R_4 + 5$ are very close together; R_1 at most half as long as $R_4 + 5$, r-m nearly transverse. Cu_2 more or less bent in middle. Stem vein bare or with a single hair only. Squama more or less completely fringed. ♂ hypopygium with broad, hairy anal point.

KEY TO SPECIES.

- 1 Costa only slightly (sometimes indistinctly) produced beyond $R_4 + 5$; wings rather densely hairy; wing-length 1.5-2.5 mm. ♂ A.R. about 0.9-1.1; typically blackish with dark legs and fused scutal stripes, but sometimes legs are pale and scutal stripes separate (as in ♀). *Common. Generally distributed.* 4-10.....*impensus* Walker.
 Costa strongly produced beyond $R_4 + 5$2
- 2 Anal lobe of wing fairly well developed; wing-length 1.5-2 mm. ♂ A.R. 0.9-1.1; thorax black, scutal stripes fused; wings moderately hairy towards tip, basal half nearly bare; hypopygium as in fig. 185d. (A ♂ var. from Cambs (Wicken) has $R_4 + 5$ shorter; costa more produced; A.R. only about 0.7: hypopygium (fig. 185e) with anal point extremely broad, basal lobe very prominent.) *Perthshire (Killin), Yorks (Ilkley), Herts (Bricket Wood).* 4, 6
irritus Walker.
 Anal lobe of wing reduced, or quite obsolete.....3

- 3 Anal lobe reduced; wings rather densely hairy; wing-length 1.5-2 mm. ♂ A.R. only about 0.4-0.6, last segment rather strongly clubbed; hypopygium as in fig. 185f. Arran (*Brodick, etc.*), Cheshire (*Rostherne*), N. Wales (*Newtown*), S.W. Ireland (*Killarney*). 5-6, 9..... **penerasus** Edwards.
 ♀ only (♂ unknown). Anal lobe obsolete, hind margin running almost straight to alula; wings (fig. 180l) densely hairy, hairs relatively long and thick; wing-length 1-1.2 mm. Essex (*Epping*). 6, 8..... **cuneatus** Edwards ♀.

Subgenus **Parametricnemus** Goetghebuer.

Legs as in *Heterotriosocladius*. Eyes of ♂ with long, narrow dorsal projections. Antennae of ♀ with vertical on last segment (absent in other British *Metricnemus*). Costa produced. $R_4 + 5$ ending above or scarcely before tip of Cu_1 . $R_2 + 3$, ending far beyond R_1 , which is about half as long as $R_4 + 5$. Cu_2 with a strong double bend beyond middle. Stem-vein with a single hair. Squama with incomplete fringe. ♂ hypopygium with long anal point.

KEY TO SPECIES.

- 1 Light brownish species; scutal stripes, postnotum and sternum dark brown to black in ♂, reddish in ♀; wing-length 2.5 mm. ♂ A.R. about 1; antennae with 3-4 very long curved hairs towards tip, also a bunch of shorter, straight hairs at extreme tip. ♀ segments 3-5 of antennae with rather long necks. Westmorland (*Staveley*), Yorks (*Ilkley*), Derbyshire (*Dovedale*), Denbighshire (*Llangollen*), N. Wales (*Newtown*), Herts (*Hitchin and Letchworth*). 4-7, 9
stylatus Kieffer.

Subgenus **Gymnometricnemus** Goetghebuer.

Eyes normal, reniform. Wings hairy at tip only, at least in ♂. Costa strongly produced. $R_4 + 5$ ending near level of tip of Cu_1 . Cu_2 strongly bent in middle. f.Cu well beyond r-m. Stem-vein with a single hair or none. Squama quite bare. Front L.R. variable; hind L.R. about 0.6. Tarsi apparently without spurs. Empodium long. ♂ hypopygium without anal point.

KEY TO SPECIES.

- 1 ♀ only (♂ unknown). L.R. only about 0.35, the front tarsi being shorter than in any other known British Chironomid; sixth (terminal) antennal segment subequal to fifth; thorax with brownish ground colour; scutal stripes and sternum black; wing-length 1.5 mm. Herts (*Knebworth*). 4
brevitarsis Edwards ♀.
 ♂♀ L.R. at least 0.6. ♀ sixth antennal segment at least half as long again as fifth..... 2
 2 ♂ thorax with yellowish ground colour; scutal stripes brownish, separated; legs pale yellowish; L.R. about 0.7; antennal plumes whitish; A.R. about 1.3; tip of antennae with moderately long pubescence; wings as in fig. 180i; hypopygium as in fig. 185h. ♀ practically all yellow; scutal stripes scarcely perceptible, pale orange; L.R. about 0.6. ♂♀ wing-length 1.5-2 mm. Morayshire (*Elgin*), Arran (*Brodick*), Westmorland (*Witherslack, etc.*), N. Lancs (*Grange*), Cheshire (*Cotterill Clough*), Herts (*Knebworth*), Sussex (*Three Bridges*). 5-7..... **subnudus** Edwards.
 ♂ thorax and pleurae entirely blackish; scutal stripes completely fused; legs more or less darkened; antennal plumes brownish; A.R. about 1.3; tip of antennae with shorter pubescence than in *subnudus*; hypopygium as in fig. 185g. ♀ mainly yellowish; scutal stripes distinct, brownish; sternopleura somewhat darkened. ♂♀ L.R. about 0.6; wing-length 1.6 mm. Herts (*Welwyn and Baldock*), Hants (*Ampfield*), Sussex (*Crowborough*). 2, 11-12
brumalis Edwards.

Genus *Cardiocladius* Kieffer.

Eyes bare. Pronotum collar-like, just divided in middle. Ninth tergite of ♀ abdomen with a finger-like projection on each side. Fourth tarsal segment of posterior legs rather distinctly cordiform and much shorter than fifth. Empodium small. Pulvilli absent. Tibial spurs and comb normal. Wings (fig. 180*m*) bare, without macrotrichia or microtrichia. Anal lobe well developed. $R_2 + 5$ ending well beyond R_1 , but faint and not distinctly reaching costa. f.Cu very little beyond r-m. Cu_2 almost straight and clearly reaching the margin without a forward curve at the extreme tip. Ax present and fairly distinct, lying between the two anal folds. Squama with complete fringe.

KEY TO SPECIES.

- 1 Scutum shining, black; pronotum, shoulders and first two abdominal tergites black in ♂, yellow in ♀; pleurae black; shoulders and pleurae heavily dusted with silvery-grey; wing-length 3 mm. *Bucks (Denham), Hants (Kings Somborne)*. 7.....**fuscus** Kieffer.
Scutum dull, black; pronotum, shoulders, scutal stripes and pleurae conspicuously silvery-grey; dorsum of abdomen completely black; fourth tarsal segment longer and less distinctly cordiform than in *fuscus*, but shorter than the fifth; wing-length 3-4 mm. *Perthshire (Glen Lochay and Ben Chalum), Durham (Teesdale), Yorks (Whernside), S. Devon*. 6.....**capucinus** Zetterstedt.

Genus *Cricotopus* van der Wulp.

Eyes densely pubescent. Scutum distinctly shining, humeral pits very small. Dorso-central hairs minute and decumbent, the punctures from which they arise scarcely visible under a magnification of 100. Abdomen usually with yellowish markings. Styles and coxites of ♂ and cerci of ♀ usually white or whitish. Tibiae usually with at least some indication of pale rings in middle. Small pulvilli present or absent. Wings more or less whitish, microtrichia absent or scarcely distinguishable even under a high power. Anal lobe rather well developed, slightly prominent or right-angled. Costa rarely produced distinctly beyond $R_4 + 5$. $R_2 + 3$ ending near or before half-way between ends of R_1 and $R_4 + 5$. Squama with complete fringe. ♂ hypopygium without anal point.

KEY TO GROUPS OF SPECIES.

- 1 Pale tibial rings more or less distinct, at least on posterior legs. ♂ hypopygium usually white or whitish. ♀ cerci always so.....2
Tibiae practically unicolorous. ♂♀ genitalia light brown to blackish
Group C (p. 147).
2 Small pulvilli present; wings milky.....**Group A** (p. 144).
Pulvilli absent; wings usually less distinctly milky.....**Group B** (p. 145).

GROUP A.

Wings distinctly milky-white. Small pulvilli present. Front tarsi entirely dark in ♂, often with slight beard. Hind tarsi often pale in middle. Tibial rings distinct, except in varieties of *silvestris*.

KEY TO SPECIES.

- 1 Abdomen in both sexes with yellowish markings.....2
Abdomen in both sexes black or brownish, without yellowish markings; small species; wing-length 2 mm. ♂ A.R. nearly 2; body entirely black; halteres darkened; legs black, tibial rings indistinct or occasionally absent. ♀ scutum with yellow ground-colour, stripes separate; abdomen dark, unbanded; halteres yellow; pale tibial rings all distinct. *Perthshire (Loch Kinardochy)*. 6
laricomalis Edwards.
2 Segments 1, 4 and 7 of abdomen mainly or entirely yellow.....3
Segments 4 and 7 of abdomen largely dark.....4

- 3 Paler species; middle scutal stripe abbreviated, the prescutellar area yellow; femora yellow with black tips; white tibial bands very broad; bases of abdominal segments 2, 3 and 5 narrowly yellow; wing-length 2-3.5 mm. *Common. Yorks (Ilkley) southwards. 4, 6-7, 9. trifasciatus* Panzer.
Darker species; middle scutal stripe extending back to scutellum; femora mainly black; white tibial bands narrower; tergites 2, 3 and 5 entirely black; wing-length 3-3.5 mm. *Inverness (Loch Garten), Lances (Hawkshead, Three Dubs Tarn), Notts (Attenborough), Carnarvon (Llanwrog), Hunts (Wood Walton), Suffolk (Mildenhall), Herts (Hitchin), Dorset (Studland). 5, 7-8*
tricinetus Meigen.
- 4 Hind tarsi whitish except at base and tip; femora usually yellow on basal half or more. 5
Hind tarsi uniformly pale brownish, at most indistinctly lighter in middle; femora mainly blackish. 7
- 5 ♂ front tarsi with rather long beard. ♀ scutellar hairs fine and whitish. ♂♀ segment 1 of abdomen all yellow, 4, 5 and 7 with rather narrow yellow basal bands; wing-length 3-3.5 mm. *Hunts (Wood Walton), S. Devon (Slapton). 6-9. pilitarsis* Zetterstedt.
♂ tarsal beard very short or absent. ♀ scutellar hairs stouter and blackish. . . . 6
- 6 Scutellum blackish; segment 1 of abdomen mainly yellow, 4 and 5 yellow at base, 7 at apex; femora yellow, black-tipped; front tibial rings pure white and very broad; wing-length 2-3 mm. ♂ front tarsus usually with very short beard; hypopygium entirely white. *Common. Generally distributed. 4-9*
sylvestris Fabricius **Typical form.**
Scutellum yellow; otherwise resembles typical *sylvestris*. *Distribution (see typical sylvestris)* *sylvestris* var. *ornatus* Meigen.
- 7 Front tibial ring distinct and pure white. 8
Front tibial ring indistinct or even absent; femora gradually darkened from base to tip; yellow on abdomen reduced, especially on first segment. ♂ hypopygium mainly dark. *Distribution (see typical sylvestris)*
sylvestris var. *fuscimanus* Meigen.
- 8 All tibial rings very narrow; segment 1 of abdomen yellow; large, stoutly-built species; wing-length 3.5-4 mm. ♂ front tarsus without beard. *Cambridge, Glos (Minchinhampton). 5. speciosus* Goetghebuer.
All tibial rings rather broad. *Distribution (see typical sylvestris)*
sylvestris var.

GROUP B.

Wings not distinctly milky. Pulvilli absent. Femora usually mainly black, also hind tarsi. White tibial rings usually distinct. ♀ antennae 6-segmented. $R_2 + 3$ ending about midway between ends of R_1 and $R_4 + 5$.

KEY TO SPECIES.

- 1 Front tarsi with at least second segment white. 2
Front tarsi entirely dark. 3
- 2 White marking on front tarsi confined to second segment; scutal stripes separate; abdomen with narrow yellow bands at bases of segments 3-5, 1 and 2 entirely yellow; wing-length 2.5 to 3.5 mm. *Common in hilly districts. Generally distributed. 5-9. pulchripes* Verrall.
White marking on front tarsi involving third segment except at tip; scutal stripes fused; abdominal segments 1 and 2, 3-5 resembling *pulchripes*; wing-length 2-3.5 mm. *Common in hilly districts. Generally distributed. 5-8*
tremulus Linnaeus.
- 3 Segment 4 of abdomen entirely yellow or leaden-yellow. 4
Segment 4 partly or entirely black. 9
- 4 Segments 1, 2 and 4 of abdomen entirely yellow, remainder black; scutal stripes more or less separate; wing-length 1.5-2.5 mm. *Frequent. Generally distributed. 4, 6-8. albiforceps* Kieffer ♂.
Segment 2 mainly dark. 5
- 5 Segments 4 and 5 of abdomen entirely yellow; wing-length 2-3 mm. (*Distribution, see ♂*). *triannulatus* Macquart ♀.
Segment 5 black, except narrowly on hind margin. 6

- 6 Costa distinctly produced; scutal stripes separate. ♂ hypopygium without basal lobe.....7
 Costa less distinctly produced; scutal stripes fused, at least in ♂. ♂ hypopygium with basal lobe.....8
 7 Front tibia broadly black at tip; An distinct far beyond f.Cu; anal lobe slightly produced; a broad thickening of membrane in axillary region (representing Ax); wing-length 3-3.5 mm. ♂ hypopygium as in fig. 186c. *Westmorland* (Temple Sowerby), *Notts* (Glapton), *Derbyshire* (Dovedale), *S. Devon* (Sidmouth). 5-6, 8.....*trifascia* Edwards.
 Front tibia narrowly black at tip; An faint beyond f.Cu; anal lobe not at all produced; no thickening of membrane in axillary region; wing-length 1.8 to 2.2 mm. *Perthshire* (Ben Chalum), *Westmorland* (Rydal), *N. Lancs* (Holker Moss), *Yorks* (Ilkley), *Cheshire* (Skirwith), *S. Devon* (Sidmouth). 6-8
similis Goetghebuer.

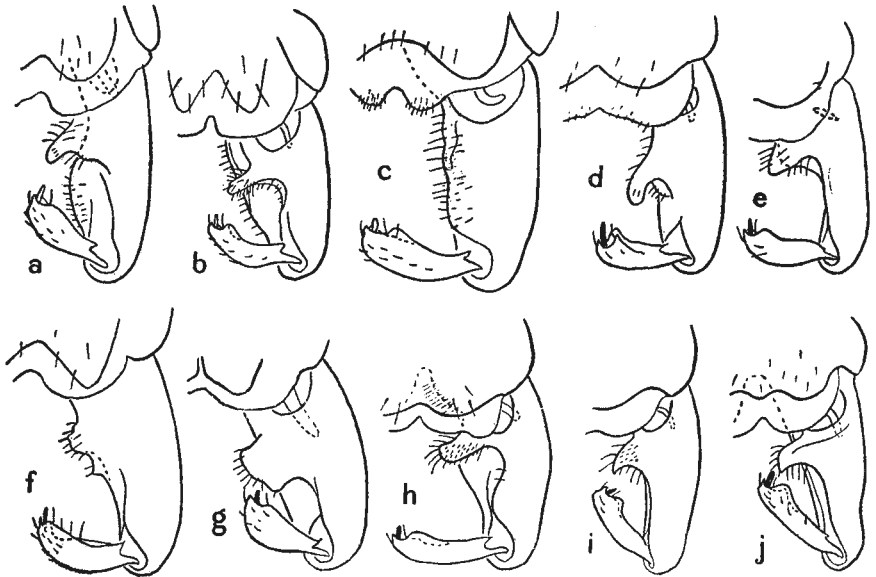


FIG. 186.—Male hypopygium (right half, dorsal view) of species of *Cricotopus*. (a) *C. bicinctus* Meigen. (b) *C. dizonias* Meigen. (c) *C. trifascia* Edwards. (d) *C. flavocinctus* Kieffer. (e) *C. pallidipes* Edwards. (f) *C. biformis* Edwards. (g) *C. lacuum* Edwards. (h) *C. obnixus* Walker. (i) *C. obtexens* Walker var. *inserpens* Walker. (j) *C. obtexens* Walker typical.

- 8 Front tibia not nearly so broadly black at base as at tip; abdominal segments 1 and 4 clear yellow, 2-3 and 5-8 black; wing-length 1.5 to 3 mm. ♂ hypopygium as in fig. 186a. *Common. Generally distributed.* 4-8...*bicinctus* Meigen.
 Front tibia at least as broadly black at base as at tip; abdominal segments 1 and 4 entirely leaden-yellow or leaden-grey, not clear yellow; wing-length about 2.5 mm. ♂ hypopygium as in fig. 186b. *Argyllshire* (Bonawe), *Lancs* (Manchester), *Cheshire* (Rostherne), *Norfolk* (Ormesby), *Herts* (Radwell), *London* (Putney). 5-8.....*dizonias* Meigen.
 9 Segment 4 of abdomen black basally, broadly yellow apically; scutal stripes fused; wing-length 2-2.5 mm. *Morayshire* (Forres), *Westmorland* (Windermere), *Yorks* (Bramhope), *Cambs* (Wicken), *Essex* (Epping), *S. Devon* (Beesands and Slapton). 5-7, 9.....*festivus* Meigen.
 Segment 4 yellow basally, or all black.....10

- 10 Basal half (at least) of segments 4 and 5 yellow; scutal stripes separated, sometimes narrowly; wing-length 2-3 mm. *Frequent. Argyllshire (Bonawe) southwards to Surrey (Richmond).* 5-8..... **triannulatus** Macquart ♂.
Segments 4 and 5 mainly or all black..... 11
- 11 Scutum entirely black; abdomen black with shining greyish bands; all tibiae with white rings of variable widths; wing-length 2.5 mm. *Inverness (Aviemore), Westmorland (Windermere), Yorks (Gormire), Carnarvon (Llyn Gwynant), Herts (Knebworth), Berks (Reading).* 4-9..... **tibialis** Meigen.
At least the shoulders yellow..... 12
- 12 Tergites 2-8 of abdomen all black; femora black; front tibia with very broad white ring in middle, almost equally black at base and tip; wing-length 1.5-2 mm. ♂ hypopygium as in fig. 186d. *Inverness (Aviemore and Loch Pityoulish), Westmorland (Windermere), Yorks (Gormire), Herts (Benington), Essex (Epping).* 6-7..... **flavocinctus** Kieffer.
Tergites 2-5 with yellow markings..... 13
- 13 Segment 2 of abdomen entirely clear yellow; wing-length 1.5 to 2.5 mm. (*Distribution, see ♂*)..... **albiforceps** Kieffer ♀.
Segment 2 with dark markings at least at sides, ground colour less clear yellow and usually more extensive in ♀..... 14
- 14 Front tibia with black area at tip not much broader than that at the base; also differs from typical *motitator* in having light areas of abdomen bluish-green instead of yellow and second abdominal segment with lateral dark spots only. *Carnarvon (Llyn Gwynant), Flintshire (Ffrith), Derbyshire (Matlock and Dove-dale), S. Devon (Sidmouth and Dartmouth).* 5-8
motitator var. **subcoeruleus** Edwards.
Front tibia with black area at tip at least two, often three times as broad as that at base..... 15
- 15 Segment 2 of abdomen with a broad, sometimes indistinct, brownish band; scutal stripes just separate or more or less fused in ♂, usually distinctly separate in ♀; wing-length 2-3 mm. *Common. Westmorland (Rydal) southwards.* 4-9
motitator Linnaeus **Typical form.**
Segment 2 with dark colour reduced to a narrow brown ring or faint brown lateral spots, sometimes a trace of these only. *Westmorland (Staveley), Bedford (Cardington), Essex (Audley End), Surrey (Richmond).* 4, 6-8
motitator var. **annulator** Goetghebuer.

GROUP C.

Tibiae either unicolorous or only indistinctly pale in middle (especially the latter in ♀). Pulvilli absent. ♂ hypopygium mainly or all dark. ♀ cerci yellowish-brown or black, never pure white. ♀ antennae often distinctly 7-segmented (second segment divided). $R_2 +_3$ often ending distinctly before midway between ends of R_1 and $R_4 +_5$.

KEY TO SPECIES.

- 1 An becoming faint just after f.Cu..... 2
An remaining distinct after f.Cu..... 4
- 2 Wings strongly milky; wing-length 2-2.5 mm.; scutal stripes separate, shining; halteres yellow, base of stem blackish. ♂ A.R. about 1.4; hypopygium (fig. 186h) with basal lobe much produced and thumb-like. ♀ antennae with segments 2 and 3 not clearly separated, last segment hardly longer than 5 and 6 together; cerci blackish. *Arran (Machrie), Yorks (Gormire), Essex (Epping).* 6-7..... **obnixus** Walker.
Wings scarcely milky; wing-length about 1.8 mm..... 3
- 3 Legs mainly pale yellow; scutal stripes distinctly separated. ♂ antennal plume whitish; hypopygium as in fig. 186e. ♀ thorax with clear yellowish ground colour; abdominal tergites mainly clear yellow. *Argyllshire (Bonawe), N. Wales (Newtown), Hants (Brockenhurst).* 5, 8-9..... **pallidipes** Edwards.
Legs obscurely yellowish. ♂ scutal stripes fused; antennal plumes brownish. ♀ scutal stripes indistinctly separated; tergites blackish, except tergite 1, which is obscurely yellowish. *Surrey (Richmond), Hants (Souley Pond), S. Devon (Beesands).* 6-7, 9..... **intersectus** Staeger.

- 4 $R_2 + 3$ ending just before midway between ends of R_1 and $R_4 + 5$5
 $R_2 + 3$ ending at about one-third of distance between these points.....9
- 5 Abdomen with shining bands at joints, otherwise dull blackish after first segment; legs mainly dark. ♂ A.R. 1·8-2; scutal stripes more or less fused, rarely quite separate; hypopygium (fig. 186f) mainly dark, but styles pale. ♀ antennae 7-segmented; cerci yellowish. *Common. Westmorland southwards. 1-11*.....**biformis** Edwards.
 Abdomen uniformly dull or moderately shining.....6
- 6 Thorax shining; scutal stripes completely fused. ♀ antennae 6-segmented....7
 Thorax less shining; scutal stripes usually indicated in ♂ and always separate in ♀. ♀ antennae 7-segmented.....8
- 7 ♀ only (♂ unknown). Pronotum, thorax and pleurae entirely black; halteres obscurely yellowish, knob distinctly darkened; abdomen dull black, without shining bands; cerci yellow; tibiae uniformly black; wing-length 3-5 mm. *Westmorland (Rydal). 6*.....**lygropis** Edwards ♀.
 Thorax partly yellowish; halteres clear yellow; abdomen uniformly shining black. ♂ shoulders and pleurae with restricted yellowish markings, pronotum usually yellow; A.R. about 1·3; hypopygium as in fig. 186g. ♀ yellowish markings on shoulders more extensive; posterior tibiae with fairly obvious light brownish rings towards base. ♂♀ wing-length 3 mm. *Bute (Loch Fad), Westmorland (Windermere). 6*.....**lacuum** Edwards
- 8 ♂ blackish; scutal stripes narrowly separated, black; A.R. about 2; hypopygium as in fig. 186j. ♀ scutal stripes broadly separated, black; abdomen blackish; cerci brown; antennae with segment 2 constricted near middle, short, 4-6 shortly oval. ♂♀ r-m rather strongly darkened. Wing-length 3·5-4 mm. *Nofts (Sherwood Forest), Derbyshire (Dovedale), Cambs (Newmarket, etc.), Herts (Radwell, etc.), Oxford (Hogley Bog and Shotover), Wilts (Salisbury). 3-7*
obtexens Walker **Typical form.**
 Smaller and paler in both sexes than typical *obtexens*; r-m not darkened. ♂ yellowish; scutal stripes broadly separated, brownish; hypopygium as in fig. 186i. ♀ scutal stripes broadly separated, at least middle stripe brownish; abdomen, including cerci, yellowish. *Cambs (Quy Fen), Herts (Radwell), Surrey (Richmond). 5, 7-8*.....**obtexens var. inserpens** Walker.
- 9 ♂ antennae normal; A.R. 1·1-1·4. ♀ wings unusually broad.....10
 ♂ antennae unusually short, plumes rather scanty; A.R. 0·6-0·8; scutal stripes completely or almost fused. ♀ wings normal; scutal stripes more or less separated. ♂♀ wing-length about 2 mm. Along rocky coasts. *Arran (Brodieck and Corriegills), Glamorgan (Porthcawl), Pembroke (Skokholm I.), Lundy Island, N. Devon (Buck's Mills). 5-8*.....**fucicola** Edwards.
- 10 ♂ scutal stripes completely, or almost, fused, black; A.R. 1·1-1·4; anal lobe rather prominent. ♀ scutal stripes separated, at least middle stripe brownish; antennae 7-segmented. ♂♀ thorax distinctly grey-dusted; wing-length about 3·5 mm. *Rocky coasts around Britain. 5-9*
vitripennis Meigen **Typical form.**
 ♂ scutal stripes well separated, middle stripe often brownish. ♀ scutal stripes forming a distinct but usually narrow collar reaching up to anterior edge of scutum. Single or double rows of suberect bristly hairs between scutal stripes and extending back to scutellum; hairs always arising from distinct punctures which are visible (even in the smallest species) under a magnification of 50. Genitalia almost always dark (both sexes). Legs slender; tibiae practically unicolorous, without trace of white or pale rings; hind tibiae with comb on inner side at tip; fourth tarsal segment on all legs cylindrical, usually at least as long as fifth. Wings (except in *H. apicalis*) without macrotrichia even at tip; microtrichia usually absent, when present very minute, visible only under a magnification of 300. Vein Ax absent or scarcely distinguishable.
vitripennis var. halophilus Kieffer.

Genus **Hydrobaenus** Fries.(*Spaniotoma* Philippi, *Orthocladius* van der Wulp.)

Eyes usually bare; in a few cases finely pubescent, and rarely densely and obviously pubescent as in *Cricotopus*. Palpi 4-segmented. Pronotum (with rare exceptions) forming a distinct but usually narrow collar reaching up to anterior edge of scutum. Single or double rows of suberect bristly hairs between scutal stripes and extending back to scutellum; hairs always arising from distinct punctures which are visible (even in the smallest species) under a magnification of 50. Genitalia almost always dark (both sexes). Legs slender; tibiae practically unicolorous, without trace of white or pale rings; hind tibiae with comb on inner side at tip; fourth tarsal segment on all legs cylindrical, usually at least as long as fifth. Wings (except in *H. apicalis*) without macrotrichia even at tip; microtrichia usually absent, when present very minute, visible only under a magnification of 300. Vein Ax absent or scarcely distinguishable.

GROUP B.

♂ hypopygium with distinct hairy anal point. ♀ antennae 6-segmented, the last segment usually rather short. ♂♀ humeral pits usually very large. Pulvilli present. Wing-length about 2·5 mm.

KEY TO SPECIES.

- 1 Humeral pits small; $R_2 + 3$ ending at one-third the distance between ends of R_1 and $R_4 + 5$. ♂ A.R. about 1·5; body and halteres entirely black; scutum somewhat shining; legs dark brown or blackish. ♀ thorax with yellow ground colour; scutal stripes black, well separated and slightly shining; halteres light yellow. *Common. Westmorland (Brothers Water) southwards. 2, 4-7*
dispar Goetghebuer.
- Humeral pits very large; $R_2 + 3$ ending about midway between ends of R_1 and $R_4 + 5$ (except in ♀ *effusus*).....2
- 2 Thorax dull black, with grey lines between the scutal stripes and grey dusting around the humeral pits; abdomen dark brown. ♂ A.R. about 1·1; halteres blackish; hypopygium as in fig. 187c. ♀ halteres yellow; $R_2 + 3$ ending at one-third of the distance between ends of R_1 and $R_4 + 5$. *Perthshire (Killin), Arran (Corriegills), Westmorland (Windermere), Shropshire (Snailbeach and Church Stretton). 5-7*.....**effusus** Walker.
- Thorax brightly shining.....3

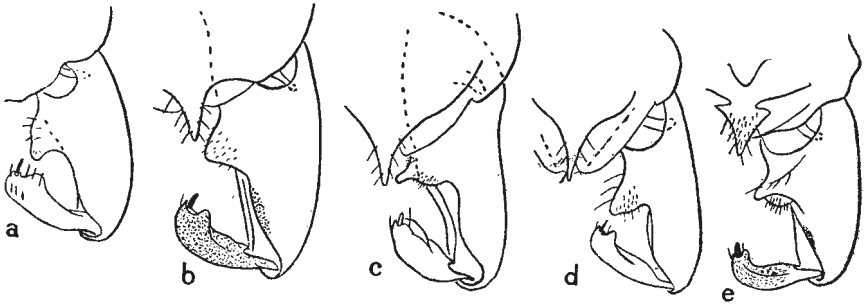


FIG. 187.—Male hypopygium (right half, dorsal view) of species of *Hydrobaenus*, subgenus *Trichocladus*. (a) *H. skirwithensis* Edwards. (b) *H. glabricollis* Meigen. (c) *H. effusus* Walker. (d) *H. foveatus* Edwards. (e) *H. chalybeatus* Edwards.

- 3 Halteres blackish; thorax with a distinct metallic blue sheen; scutellum wholly velvety black, without shining area at base; abdomen dull black; legs blackish. ♂ A.R. about 1·3; hypopygium as in fig. 187e. *Westmorland (Windermere, etc.), Yorks (Ilkley), Shropshire (Shrewsbury), Beds (Biggleswade), Herts (Watford), S. Devon (Sidmouth, etc.). 6-8*.....**chalybeatus** Edwards.
- Halteres yellow; thorax shining, but without metallic blue sheen; scutellum with large shining area at base.....4
- 4 Wings milky; scutum black. ♂ A.R. about 1·7; shoulders and pleurae black; hypopygium as in fig. 187b. ♀ shoulders and pleurae more or less yellowish. *Shropshire (Snailbeach). 7*.....**glabricollis** Meigen.
- Wings (fig. 180p) not milky. ♂ A.R. 1·0-1·2; shoulders and part of pleurae yellowish; scutal stripes sometimes separated; hypopygium as in fig. 187d. ♀ scutum with yellow ground colour, stripes shining black, middle stripe continued back to scutellum as a narrow blackish line. *Inverness (Kincaig), Arran (Corriegills), Westmorland (Staveley and Rydal), Glos (Minchinhampton), S. Devon (Sidmouth). 5-6, 8*.....**foveatus** Edwards.

Subgenus *Diplocladius* Edwards.

Eyes densely but very shortly pubescent. Scutum dull. Tibial spurs better developed than usual, outer spur on hind tibia more than half as long as inner. Pulvilli absent. Wings greyish, with fine microtrichia, but no macrotrichia; anal lobe rather large. Costa slightly produced. $R_2 + 3$ ending about two-fifths of the distance between ends of R_1 and $R_4 + 5$. f.Cu not much beyond r-m. Cu_2 only gently curved. An continued far beyond f.Cu. Squama without fringe.

KEY TO SPECIES.

- 1 Blackish species, without ornamentation; scutum dull. ♂ A.R. nearly 3. ♀ antennae 6-segmented, segments 3-5 rather elongate oval, almost cylindrical, with slender, simple sense-bristles. *Yorks (Leeds), Cambs (Shepreth), Beds (Sheffield), Herts, Middlesex (Harrow and Pinner)*. 1-4. **cultriger** Kieffer.

Subgenus *Psectrocladius* Kieffer.

Eyes bare. Pulvilli present, broad and distinct, usually only slightly shorter than claws. Wings brown by transmitted light, microtrichia absent. $R_2 + 3$ ending at or before midway between ends of R_1 and $R_4 + 5$. $R_4 + 5$ reaching to or slightly beyond level of tip of Cu_1 . Cu_2 not or scarcely bent. f.Cu hardly beyond r-m. An reaching far beyond f.Cu. Anal lobe usually very distinctly produced in ♂. Squama with a complete fringe.

KEY TO SPECIES.

- 1 Last segment of all tarsi flattened dorsoventrally. 2
Last segment of all tarsi compressed laterally. 3
- 2 Middle tibia with two distinct spurs; halteres yellow; larger species; wing-length 3.5-5 mm. ♂ A.R. about 2; front tarsus bearded. *Inverness (Loch Garten), Argyllshire (Bonawe), Arran (Machrie), Lancs (Freshfield), Cambs (Wicken), Glamorgan (Porthcawl), Hunts (Wood Walton), Surrey (Mitcham)*. 4, 6-9. **obvius** Walker.
Middle tibia with outer spur very small or absent; wing as in fig. 180n; wing-length 2.7-3 mm. ♂ A.R. nearly 2; front tarsus without distinct beard; halteres usually dark brown. ♀ halteres yellow. *Inverness (Aviemore), Arran (Brodick), Westmorland (Stickle Tarn), Lancs (Hawkshead), Three Dubs Tarn, Yorks (Pen-y-Ghent, etc.)*. 5-10. **platypus** Edwards.
- 3 Outer spur of middle tibia short but distinct; wing-length 3 mm. ♂ A.R. about 2; front tarsus with distinct beard. ♀ antenna with last segment fully as long as preceding three together. *Inverness (Loch Pityoulish), Westmorland (Windermere)*. 6-7. **calcaratus** Edwards.
Middle tibia with only one spur. 4
- 4 Wing-length 2.5-4 mm.; halteres pale. ♂ anal lobe of wing prominent. 5
Wing-length about 1.7 mm.; wing as in fig. 180o; halteres blackish; dull black species. ♂ anal lobe of wing rather obtuse; A.R. about 1.3; front tarsus without beard; posterior tibia and tarsi with rather long hair. *Perthshire (Loch Kinardochy), Westmorland (Brothers Water), Carnarvon (Llanberis Pass), Hants (New Forest), S.W. Ireland (Killarney)*. 5-7. **turfaceous** Kieffer.
- 5 ♂ only (♀ unknown); front tarsi with long conspicuous beard, especially on outer part of segments 2-4; wings strongly milky; wing-length 3.5 mm.; A.R. about 2.5. *London (Putney)*. 8. **barbimanus** Edwards ♂.
♂ front tarsi with short beard, or none. ♂♀ wings more or less milky. 6
- 6 Wings slightly milky; wing-length 3-4 mm. ♂ front tarsi with short beard on segments 2-4; A.R. about 2. *Inverness (Ben Nevis, etc.), Westmorland (Windermere), Hunts (Wood Walton), S.W. Ireland (Killarney)*. 4-7
sordidellus Zetterstedt var.
Wings strongly milky. ♂ front tarsi without trace of beard. 7
- 7 Body usually paler. ♂ scutellum yellowish. 8
Body darker. ♂ scutellum blackish. 9

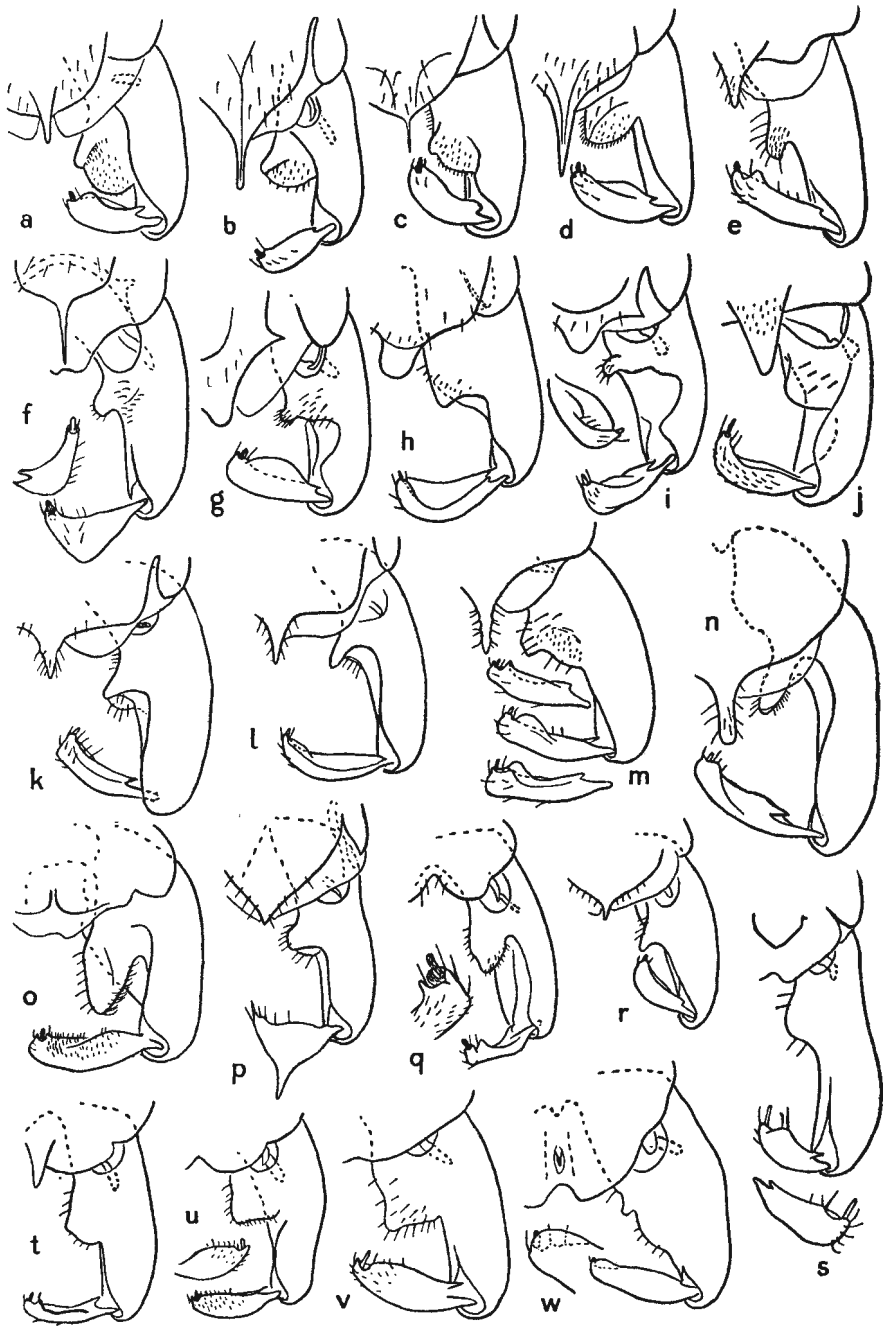


FIG. 188.—Male hypopygium (right half, dorsal view) of species of *Hydrobaenus*, subgenus *Orthocladius*. (a) *H. perennis*. (b) *H. succicus*. (c) *H. dissipatus*. (d) *H. piger*. (e) *H. excerptus*. (f) *H. subvernalis*. (g) *H. nidorum*. (h) *H. femineus*. (i) *H. tuberculatus*. (j) *H. illimbatus*. (k) *H. oblidens*. (l) *H. rubicundus*. (m) *H. thienemanni* (showing variation in shape of style in three specimens of same batch). (n) *H. frigidus*. (o) *H. gracei*. (p) *H. dentiforceps*. (q) *H. minor*. (r) *H. semivirens*. (s) *H. apicalis*. (t) *H. verralli*. (u) *H. ilkleyensis*. (v) *H. devonicus*. (w) *H. fleuxellus*.

- 8 ♂ A.R. about 2. ♂♀ $R_2 + 3$ usually ending at about one-third of distance between ends of R_1 and $R_4 + 5$; wing-length 3-4 mm. *Frequent. Inverness (Brae Riach, etc.) southwards to Cambs (Wicken). 4, 6-7, 9 . . . sordidellus Zett. typical.*
 ♂ A.R. about 1.3-1.6. ♂♀ wing-length about 2.5 mm. (possibly only a form of *sordidellus*). *Oxford, Essex (Epping), London (Putney). 6, 8. . . stratiotis Kieffer*
- 9 ♂ A.R. 2. ♂♀ $R_2 + 3$ usually longer than in typical *sordidellus*, ending about midway between ends of R_1 and $R_4 + 5$; wing-length 3-4 mm. *Westmorland (Stickle Tarn), Lancs (Hawkshead, Three Dubs Tarn), Yorks (Whernside), Scilly Is. 3, 6. sordidellus Zett. var.*
 ♂ A.R. 1.5-1.8; anal lobe of wing less prominent. ♂♀ $R_2 + 3$ ending at about one-third the distance between ends of R_1 and $R_4 + 5$; wing-length 2.5-2.8 mm. *Inverness (Aviemore, etc.), Arran (Catacol, etc.), Carnarvon (Llyn Gwynant), Glos. (Minchinhampton), London (Putney). 4-11. limbatellus Holmgren.*

Subgenus **Orthocladius** van der Wulp.

Eyes bare. Small tarsal spurs usually present. Pulvilli usually absent, when present very small. Wing-membrane with or without very small microtrichia. Squama usually with a complete fringe, occasionally bare or with fringe reduced to a few hairs. $R_2 + 3$ well separated from $R_4 + 5$ and ending separately in costa, usually at or before midway between ends of R_1 and $R_4 + 5$. f.Cu rather variable in position, usually below or only slightly beyond r-m. Cu_2 usually straight, or almost so, but its extreme tip usually curved forward and not reaching wing-margin.

KEY TO GROUPS OF SPECIES.

- 1 Wings colourless by transmitted light; scutellum slightly and uniformly shining; smooth bare area at its base not, or scarcely, distinguishable. 2
 Wings at least faintly tinged with brown or purplish by transmitted light; scutellum with a smooth bare area at the base, sharply marked off from the dullish apical part. 3
- 2 An reaching far beyond f.Cu **Group A** (p. 154).
 An reaching only slightly, if at all, beyond f.Cu **Group B** (p. 155).
- 3 An distinctly reaching beyond (usually far beyond) f.Cu; Cu_2 often almost straight 4
 An becoming faint below, or scarcely beyond, f.Cu; Cu_2 usually rather strongly bent 5
- 4 Anal lobe of wing more or less distinctly produced (at least in ♂); f.Cu scarcely beyond r-m; empodium very short (especially in ♂) **Group C** (p. 157).
 Lobe of wing right-angled or obtuse; f.Cu beyond r-m; empodium rather long
Group D (p. 158).
- 5 Lobe of wing distinctly produced; $R_2 + 3$ ending nearer R_1 than to $R_4 + 5$
Group E (p. 160).
 Lobe of wing rather obtuse; $R_2 + 3$ ending nearer $R_4 + 5$ than to R_1
Group F (p. 160).

(Students are warned that in the above key the initial characters of "wings colourless" and "wings at least faintly tinged with brown or purplish" require extreme caution in use, although considered by Edwards as rather easy to apply. Careful attention should be paid to the correct manipulation of light.)

SUPPLEMENTARY GUIDE TO CERTAIN SPECIES OF ORTHOCLADIUS.

- 1 Squama bare, ♂♀ (at least two hairs, and often complete fringe, present in other species): **illimbatus, ictericus.**
- 2 Body entirely yellow, ♂♀ (body more or less extensively dark in other species): **ictericus.**
- 3 Scutal stripes separate, ♂ only (fused in other species, or thorax entirely black): **excerptus** (type only, fused in rest of series), **bipunctellus, subvernalis** (type only, more or less fused in rest of series), **tuberculatus, thienemanni, rubicundus, rhyacobi, frigidus** (in some examples, more or less fused in others), **apicalis, semivirens, verralli, curtistylatus.**

- 4 Macrotrichia present on membrane at wing-tip ♂♀ (membrane quite bare in other species) : **apicalis**.
- 5 Posterior tarsi with segments 4 and 5 subequal in length, or 4 shorter than 5, ♂ only (segment 4 distinctly, often considerably, longer than 5 in other species) : **illimbatus, oblidens, thienemanni, rhyacobius, gracei, grampianus, apicalis, minor, devonius, curtistylatus**.

GROUP A.

(Chaetocladius Kieffer.)

Wings colourless or faintly greyish by transmitted light, fine microtrichia distinguishable, at least in ♀, under a high power. Costa only slightly produced. $R_4 + 5$ ending a little beyond level of tip of Cu; r-m distinct, almost transverse; An reaching far beyond f.Cu, which is usually below or hardly distal to r-m. Wing broad at base, lobe right-angled or only slightly produced in ♂. Squamal fringe complete. Scutellum slightly and uniformly shining, smooth bare area at its base hardly distinguishable. Empodium distinct. ♂ A.R. usually 1.5 or more; hypopygium (except in **excerpius**) with bare anal point; claws small and not very blunt. ♀ antennae 6- or 7-segmented, last segment not longer than two preceding together; sense-bristles (see General Notes on the Keys, p. 125) simple.

KEY TO SPECIES.

- 1 Thorax dull..... 2
 Thorax rather brightly shining; ground colour of scutum yellowish, thorax otherwise black; punctures at bases of mesonotal hairs unusually large and conspicuous, especially those on shoulders; abdomen blackish; wing-length about 3 mm. ♂ A.R. only about 1.2; scutal stripes separate in type, but fused in other male examples; hypopygium (fig. 188e) with basal lobe bearing fringe of long hairs. ♀ antennae 6-segmented, segment 2 hardly constricted; 3-5 oval, with very short sense-bristles and long verticils; 6 not sharply pointed, pubescence especially abundant beneath and fully as long as diameter; scutal stripes separate. *Westmorland (Temple Sowerby), Derbyshire (Dovedale), S. Devon (Sidmouth), Scilly Is.* 5-6..... **excerpius** Walker.
- 2 Thorax with conspicuous whitish dusting on shoulders, on prescutellar area and along rows of mesonotal hairs; blackish species; halteres pale; wing-length 2.5-3 mm. ♂ A.R. about 1.5. *Inverness (Ben Alder), Perthshire (Killin), N.W. Yorks (Austwick, etc.), S. Lancs (Crosby), Carnarvon (Snowdon), Merioneth (Dolgelly), S. Devon (Dart Head).* 6-7..... **melaleucus** Meigen.
 Thorax grey-dusted, usually inconspicuously so..... 3
- 3 Halteres pale in both sexes..... 4
 Halteres black (at least in ♂)..... 5
- 4 ♂ hypopygium (fig. 188a) with anal point very short and slender; A.R. about 1.5. ♀ antennae 7-segmented, last segment with short pubescence on underside only, besides 4-5 long curled hairs, two of which are apical; intermediate segments with long slender sense-bristles. ♂♀ body dull black; thorax with more or less obvious grey-dusting on shoulders, prescutellar area and along rows of mesonotal hairs; wing-length 3-4 mm. *Common. Generally distributed.* 1-2, 4-12..... **perennis** Meigen.
 ♂ hypopygium (fig. 188b) with anal point long and stout; A.R. about 1.5. ♀ antennae 7-segmented as in *perennis*, but sense-bristles shorter, last segment more uniformly pubescent and with only two rather longer hairs at tip. ♂♀ body dull black; thoracic dusting as in *perennis*; wing-length 2.5-3.5 mm. *Yorks (Ikley), Lancs (Denton), N. Wales (Newtown), Shropshire (Salop).* 7, 9
suecicus Kieffer.
- 5 ♂♀ pulvilli absent as usual; body dull black; grey dusting on thorax less obvious than in two preceding species; wing-length 2.5-3.5 mm. ♂ A.R. 1.7-2.2; hypopygium (fig. 188d) resembling that of *perennis*, but basal lobe quite differently shaped and anal point longer. ♀ halteres occasionally yellowish; antennae 6-segmented, sense-bristles short, terminal segment finely pubescent all over, longer than 4 and 5 together, and with only two rather longer hairs at tip. *Yorks (Ikley), Cambs, Suffolk (Framlingham), Herts, Middlesex (Harrow).* 3-4
piger Goetghebuer.

♂♀ small pulvilli present, about one-third as long as the claws; body dull black; grey dusting on thorax distinct (more so in ♀); halteres dark; wings (fig. 180g) with costa more distinctly produced than usual; wing-length 2.5-3 mm. ♂ A.R. 1.3-1.5; hypopygium (fig. 188c) with anal point very slender and delicate. ♀ antennae 6-segmented, segment 6 not longer than 4 and 5 together. *W. Scotland (Flannan Is.), Perthshire (Killin), N.W. Yorks (Pen-y-Ghent), Scilly Is.* 6-7.....**dissipatus** Edwards..

GROUP B.

Wings colourless or faintly greyish by transmitted light; fine microtrichia usually distinguishable under a high power. Costa usually very distinctly produced. $R_4 + 5$ ending above or a little beyond level of tip of Cu_1 ; r-m very oblique, almost continuing direction of basal part of M; An scarcely reaching beyond f.CU, which is very distinctly distal to r-m; Cu_2 often rather wavy. Wings narrower than in **Group A**; anal lobe rounded, usually obtuse. Squamal fringe less complete than in **Group A**, sometimes reduced to a few hairs or even absent. Scutellum as in **Group A**. Empodium distinct. ♂ claws small and more or less pointed. ♀ antennae with last segment at most as long as preceding two together; sense-bristles usually bifid or trifid, a character unique in Orthocladiinae.

KEY TO SPECIES.

- 1 Body entirely or mainly yellow.....2
 Body darker (at least in ♂).....3
- 2 Body entirely yellow; squama quite bare; costa strongly produced; f.Cu slightly beyond r-m; Cu_2 strongly wavy; wing-length 2.4-3 mm. ♂ A.R. 1.5-1.7; hypopygium with longish anal point and rounded basal lobe; style without subapical expansion. ♀ antennae 6-segmented, 3-5 each with a long neck; sense-bristles mostly bifid near their base. *Frequent. Generally distributed.* 5-6, 9.....**ictericus** Meigen...
 Scutal stripes distinct, separate, brown, more intense in ♂; postnotum blackish in ♂, dark brown in ♀; squama with one or (usually) two small hairs; in other respects, including ♂ hypopygium and ♀ antennae, resembling *ictericus*, of which it is possibly a variety. *Argyllshire (Bonaue), Westmorland (Staveley), Yorks (Gormire), Carnarvon (Llyn Gwynant), Merioneth (Dolgelly), Middlesex (Pinner).* 6-9.....**hipunctellus** Zetterstedt.
- 3 Squama quite bare; body blackish; scutum shining; wings (fig. 180r) greyish, practically without milky tinge; knob of halteres blackish; wing-length 1.7 mm. ♂ A.R. about 1.4; terminal antennal segment slender, pointed, tip with very little fine pubescence; posterior tarsi with segments 4 and 5 subequal in length; wing with anal lobe very slightly developed and obtusely rounded; hypopygium (fig. 188j) with anal point very broad; lobe of coxite large, rounded, strongly chitinized and almost bare; style bent at tip, without lateral expansion. ♀ antennae with segments 3-5 oval, short-necked, sense-bristles slender, simple; segment 6 slender, nearly twice as long as 5, finely pubescent, with longer hairs at tip. *Herts (Letchworth),* 5-6.....**illimbatus** Edwards.
- 4 Wings greyish by reflected light.....5
 Wings whitish by reflected light; ♂ all black, ♀ all yellow.....11
- 5 Costa rather strongly produced.....6
 Costa only slightly produced.....8
- 6 Scutellum normally yellowish.....7
 ♀ only (♂ not seen). Scutellum black; body, legs and halteres blackish; thorax shining; squama with 4-6 hairs; antennae 6-segmented, 3-5 spindle-shaped, without distinct necks, 6 hardly as long as 4 and 5 together; sense-bristles mostly forked near the base; wing-length 2-2.5 mm. *Herts (Cheshunt and Harpenden), London (Bedford Park), Surrey (Wisley), Sussex (Lewes).* 4, 6, 12
furcatus Kieffer ♀.

- 7 ♂ hypopygium with anal point rather stout and moderately long ; style somewhat broadened in middle ; basal lobe prominent, rounded, simple ; body mainly blackish ; scutal stripes entirely or partially fused ; A.R. 1·2-1·4. ♀ thorax mainly dark brown ; antennae with segments 3-5 rather short-necked. ♂♀ squama with 4-5 hairs ; wing-length 2·2-2·5 mm. *Frequent. Generally distributed.* 4-5, 7-9, 11.....**vernalis** Goetghebuer.
- ♂ only (♀ unknown). Anal point very slender and slightly longer than in *vernalis* ; hypopygium (fig. 188*f*) with styles much broadened in middle, almost triangular ; basal lobe prominent, hook-like ; thorax mainly blackish, shoulders yellowish ; scutal stripes blackish, usually separate anteriorly but fused behind (entirely separate in type only) ; abdomen brown ; A.R. about 1·3, last segment somewhat swollen before tip and moderately pubescent ; $R_2 + 3$ touching costa at one-third distance between ends of R_1 and $R_4 + 5$, then gradually fusing with it ; f.Cu well beyond r-m ; anal lobe better developed than in *vernalis*, right-angled, rounded at corner ; wing-length 2·5 mm. *Westmorland (Windermere), N.W. Yorks (Norber).* 5-6.....**subvernalis** Edwards ♂.
- 8 ♂ only (♀ unknown). Thorax yellow with separate black scutal stripes ; wing with anal area only slightly developed, very obtuse ; postnotum, sternum and abdomen blackish ; A.R. 1·1 ; f.Cu well beyond r-m ; squama with about 6 hairs ; halteres yellow ; hypopygium (fig. 188*e*) with anal point short, broadly triangular, bare ; coxite with a small rounded tubercle representing basal lobe ; style broad, with a large flange on inner dorsal aspect ; terminal spine single, rather strong ; wing-length 2 mm. *Shropshire (Salop).* 7.....**tuberculatus** Edwards ♂.
- ♂ thorax mainly or all black ; anal area of wing well developed, rounded....9
- 9 ♂ only (♀ unknown). Scutellum and shoulders yellowish ; thorax blackish, scutal stripes distinctly shining, rest of scutum and pleurae slightly grey-dusted ; abdomen blackish ; A.R. about 1·7 ; f.Cu slightly beyond r-m ; squama completely fringed ; femora dark brown, tibiae and tarsi light brown ; hypopygium resembling that of *tuberculatus*, but anal point less blunt and basal tubercle appearing slightly more hairy ; wing-length 2·5 mm. *Herts (Baldoock).* 5.....**simus** Edwards ♂.
- ♂ thorax entirely black.....10
- 10 ♂ antennal plume normal ; A.R. 1·1-1·3 ; body almost entirely blackish ; thorax shining, hardly dusted ; f.Cu distinctly beyond r-m ; squama with about 5 hairs ; hypopygium with anal point slender, short ; styles hairy, without extensive flange and with two terminal spines, one dark and the other pale ; coxite with a small, bare thumb-like projection at base. ♀ scutum with light-brown ground colour ; scutal stripes shining black, almost fused ; abdomen light brown ; sense-bristles of antennae long, slender and simple ; last segment with a pair of sense-bristles near base but no verticil, 3-5 with short necks. ♂♀ wing-length 2·2 mm. *N.W. Yorks (Pen-y-Ghent), Lancs (Manchester).* 7-8.....**nitidicollis** Goetghebuer.
- ♂ only (♀ unknown). Antennal plume (fig. 190*g*) reduced ; A.R. about 0·7, tip of last segment with extremely short pubescence for some distance ; segment 13 nearly twice as long as broad ; thorax dull, moderately dusted ; entirely blackish species ; wing with f.Cu below r-m ; squama pale, with 3-5 short hairs, hypopygium (fig. 188*h*) with short, broad and rounded anal point ; style without distinct flange or subapical projection ; lobe of coxite large and rather square ; wing-length 2·7 mm. *Cheshire (Saltesley Moss).* 11.....**femineus** Edwards ♂.
- 11 Costa distinctly produced ; squama with about 5-7 longish hairs ; wing-length about 2-3 mm. ♂ body black ; thorax moderately shining, slightly grey-dusted ; A.R. about 1·8 ; antenna with a few short straight hairs ; wing (fig. 180*s*) with anal area rather well developed, rounded ; f.Cu well beyond r-m ; hypopygium resembling that of *tuberculatus*, but inner flange of style slightly less developed, and tubercle representing basal lobe slightly less prominent. ♀ body pale yellow ; antennae 6-segmented ; segment 2 not constricted, 3-5 rather shortly oval ; 6 not much longer or thicker than 5, with rather scanty short pubescence ; sense-bristles short, irregularly bifid or trifid from about the middle ; wings broader than in ♂ (as usual) and anal area more obtuse. *N.W. Yorks (Norber), Herts (Knebworth), Oxon (Wychwood), Berks (Temple).* 4-5.....**xanthogyne** Edwards.

♂ only (♀ unknown). Costa scarcely produced; black species, differing from *xanthogyne* as follows: hair on thorax unusually long and dense, dorsocentral hairs occupying rather wide stripes, triserial instead of irregularly uniserial or biserial as usual; scutellar hairs very numerous, long and bristly, arranged in more than a single row; scutum shining, almost without grey-dusting; wing with stem-vein bearing 2-3 hairs instead of the usual one; f.Cu well beyond r-m; anal lobe slightly but distinctly produced; squamal fringe unusually long and rather dense; hypopygium (fig. 188g) as in *xanthogyne*; wing-length about 1.8 mm. *Oxford*. 6.....**nidorum** Edwards ♂.

GROUP C.

(*Orthocladius* s.str.)

Wings at least faintly brown-tinged by transmitted light; microtrichia absent. Costa not or scarcely produced. $R_4 + 5$ ending only slightly if at all beyond level of tip of Cu_1 ; An reaching far beyond f.Cu, which is scarcely distal to r-m; r-m nearly transverse; Cu_2 nearly straight. Anal lobe large and more or less distinctly produced, at least in ♂. Squama with complete fringe. Scutellum with a smooth bare area at base, sharply marked off from the dull apical part. Empodium very short, at most half as long as claws, but more distinct in ♀ than in ♂. ♂ A.R. more than 1; claws rather large, stout and blunt-tipped; hypopygium usually with hairy anal point; ninth tergite bare.

KEY TO SPECIES.

(The females in this group cannot be separated satisfactorily, and are omitted from the key.)

- 1 ♂ halteres with knob varying from yellowish to dark brown, stem usually darker. . . 2
♂ halteres entirely blackish. 7
- 2 ♂ thorax dull; scutal stripes not shining. 3
♂ thorax somewhat shining, at least on the scutal stripes. 4
- 3 ♂ front tarsus with distinct beard; A.R. about 2.5; body entirely dull black; costa not produced; f.Cu below r-m; four posterior tibiae with long dorsal hairs; hypopygium with anal point well developed, pale, rather hairy; styles truncate at tip; basal lobe prominent, but not free; wing-length about 4 mm. *Cheshire (Rotherne), Cambs (Hauxton), Herts (Hitchin), Surrey (Kingston)*. 4, 11. **glabripennis** Goetghebuer.
♂ front tarsus without beard; A.R. about 2; scutal stripes black, separate; scutum, between the stripes, dull yellowish and rather heavily grey-dusted; costa produced; f.Cu below r-m; knob of halteres clear yellow; fourth and fifth tarsal segments subequal in length; hypopygium (fig. 188m) with distinctive basal lobe; style with a projection (variable in size) on inner side before tip; wing-length 3-4 mm. *Cambs (Hauxton), Beds (Sandy), Glos (Minchinhampton), Herts (Hitchin and Radwell), Middlesex*. 3-5. **thienemanni** Kieffer.
- 4 ♂ scutal stripes fused; A.R. about 2; body black; scutum hardly dusted; front tarsus without beard; costa not produced; f.Cu below r-m; knob of halteres yellowish; fourth tarsal segment subequal in length to fifth; hypopygium (fig. 188k) resembling that of *glabripennis*, but styles somewhat curved and less truncate; wing-length 2.5-4 mm. *Frequent. Inverness (Loch Ericht) southwards to Essex (Audley End)*. 4, 6. **oblidens** Walker.
♂ scutal stripes usually separate; A.R. usually well below 2. 5
- 5 ♂ fourth segment of posterior tarsi distinctly shorter than fifth; very similar to *rubicundus*, but darker; antennal plume whitish apically; hypopygium almost as in *rubicundus*, but style somewhat truncate at tip (as in *oblidens*); anal point somewhat more slender than in either; wing-length 3-3.5 mm. *Perthshire (Loch Rannoch), Arran (Brodick), Westmorland (Staveley), Yorks (Ilkley)*. 5-6. **rhyacobius** Kieffer.
♂ fourth tarsal segment slightly longer than fifth. 6

- 6 ♂ hypopygium (fig. 188*l*) with basal lobe not free; style somewhat curved, projection on inner side before tip only slightly developed; colour variable, but usually lighter than in three preceding species; in some examples thorax is mainly yellowish-brown, scutal stripes light brown, only postnotum blackish; in others scutal stripes and sternum are blackish and pleurae largely dark; scutum lightly grey-dusted, or undusted and distinctly shining; dorso-central hairs fewer and shorter than usual, punctures small; antennal plume dark or vaguely paler at tip; A.R. 1.3-1.7; wing with anal lobe right-angled or very slightly produced; wing-length 2.3-3.5 mm. *Common. Generally distributed.* 4-8, 11.....**rubicundus** Meigen.
- ♂ hypopygium (fig. 188*n*) with basal lobe large and free; scutal stripes occasionally fused; resembles *oblidens* but differs (apart from hypopygium) as follows: A.R. about 1.7; shining area at base of scutellum less developed; tibiae and tarsi with shorter hairs; wing-length 3-4 mm. (*St. Kilda, Inverness (Loch Einich, etc.), Perthshire (Killin), Arran, Durham (Teesdale), Yorks (Ilkley and Whernside), Sussex (Crouborough).* 4-6.....**frigidus** Zetterstedt.
- 7 ♂ only (♀ unknown). Wing (fig. 184*a*) with costa ending abruptly at tip of R₄ + 5 and unusually short; hypopygium (fig. 188*o*) without anal point; basal lobe thumb-like, free; styles swollen in middle on inner side; body and legs blackish; scutum somewhat grey-dusted; fourth segment of posterior tarsi very slightly longer than fifth; wing with anal lobe only slightly produced; f.Cu slightly beyond r-m, slightly more widely open than is usual in **Group C**; wing-length about 3.5 mm. *Yorks (Ilkley). Date not stated.*.....**gracei** Edwards ♂.
- ♂ costa slightly produced; hypopygium (fig. 188*p*) with very short anal point; basal lobe small; styles triangular, with a long erect tooth in middle of outer margin; body dull black; thorax somewhat grey-dusted; femora black, tibiae and tarsi brownish; fourth segment of posterior tarsi distinctly longer than fifth; wing with anal lobe rather distinctly produced; f.Cu distinctly beyond r-m; wing-length 2.5 mm. *Westmorland (Stickle Tarn), Bucks (Burnham Beeches).* 4, 6.....**dentiforceps** Edwards.

GROUP D.

(Dactylocladius Kieffer.)

Wings brown by transmitted light; microtrichia absent. Costa usually rather distinctly produced; R₂ + 3 ending at or before midway between ends of R₁ and R₄ + 5; R₄ + 5 ending a little before level of tip of Cu₁; r-m distinct, almost transverse; An usually reaching well beyond f.Cu (though often faint apically); f.Cu distal to r-m; Cu₂ nearly straight. Anal lobe right-angled or obtusely rounded, not produced. Squama fringed. Empodium distinct, as long as claws, or almost so. A.R. usually less than 1.

KEY TO SPECIES.

- 1 ♂ wing (fig. 184*b*) with a few macrotrichia on membrane at tip; thorax with yellowish ground-colour, slightly shining, apparently bare; scutal stripes separate, black; scutellum, postnotum, sternum and abdomen black; A.R. about 0.7; penultimate segment twice as long as broad, last segment with about 7-10 short hairs at tip, extending back shortly; hypopygium (fig. 188*s*) without definite anal point; tergite 9 small and triangular; style rather short, with long terminal spine and unusually stout and long pre-apical seta; basal lobe not very prominent. ♀ body as in ♂, but scutum more yellow; antennae 6-segmented, 6 about as long as 4 and 5 together, 2 not constricted; wing (fig. 184*c*) with more macrotrichia at tip, and an irregular row extending the whole wing-length near posterior border, also rows on veins m, Cu₁ and Cu₂. ♂♀ hind tibiae and tarsi long-haired; small round pulvilli present, scarcely half as long as claws; squama with about 6 hairs; wing-length about 1.8 mm. *Westmorland (Brothers Water), Lancs (Hawkshead, Three Dubs Tarn), S.W. Ireland (Killarney).* 5-6.....**apicalis** Kieffer.
- Wings without macrotrichia on membrane.....2

2 ♂ antennae with last segment slightly clubbed and with only 3-4 long curly hairs at extreme tip (fig. 190e); A.R. about 0.8; thorax usually with clear yellow ground colour, scantily grey-dusted; scutal stripes separate, black; postnotum and sternum black, often scutellum and prescutellar area of scutum darkened; abdomen dark brown; legs yellowish, front femora darkened; wings (fig. 184d) with rather strong brown tinge, more intense at tip; anal lobe almost right-angled; hypopygium (fig. 188r) with short anal point; styles without pre-apical tooth on inner side. ♀ body yellow; scutal stripes light brown, sometimes very faint; postnotum dark brown; antennae 6-segmented; segment 2 not constricted, 3 nearly globular, 4 and 5 more oval, with short, simple sense-bristles; 6 hardly as long as 4 and 5 together, not sharply pointed, tip with about 3-4 long curly hairs. ♂♀ wing-length 2.2-2.5 mm. *Common. Westmorland (Windermere) southwards, S.W. Ireland (Killarney).* 4-8

semivirens Kieffer (*tripilatus* Edwards).

♂ hairs at tip of antenna rather numerous and short..... 3

3 ♂ anal point present; costa distinctly produced..... 4

♂ anal point absent; costa not or scarcely produced..... 5

4 ♂ body entirely black; thorax slightly shining, hardly dusted; A.R. 1.3; last antennal segment not clubbed at tip; wing dark at tip; f.Cu slightly beyond base of r-m; hypopygium with hairy anal point; style with strong terminal spine, but without subapical projection; lobe of coxite very slightly developed, very distinctively shaped. ♀ antennae 6-segmented, last segment about as long as preceding three together; scutum with dull brown ground colour; median scutal stripes dark brown, rather dull, lateral stripes shining black. ♂♀ legs brown; wing-length 2.5-3 mm. *Inverness (Ben Alder), Perthshire (Ben More).* 6..... **grampianus** Edwards.

♂ only (♀ unknown). Thorax with yellowish ground colour; scutal stripes separate, black; scutum distinctly dusted; postnotum and sternum black; abdomen dark brown; A.R. about 0.9-1; last segment not clubbed at tip; legs yellowish; wing brown-tinged, more distinctly so at tip; f.Cu much beyond r-m; hypopygium (fig. 188t) with short anal point; style with long terminal spine, preceded on inner side by a pale tooth-like projection; basal lobe not free; wing-length about 2.3 mm. *Denbigh (Llangollen).* 7

verralli Edwards ♂.

5 ♂ only (♀ unknown). Hypopygium (fig. 188q) with style bearing a slender sub-apical projection on inner side; basal lobe large, free; body mainly blackish; shoulders and pleural membrane often light brown; scutum somewhat pruinose; A.R. about 0.8; last segment pointed, but slightly enlarged before tip; tip with short pubescence extending back for a distance greater than diameter of segment (fig. 190f); legs dark brown; hind tarsi with fourth segment hardly longer than fifth; wings (fig. 184e) slightly and uniformly brown-tinged (by transmitted light); squama with complete fringe of 10-12 hairs; wing-length about 2.3 mm. *Durham (Teesdale), Yorks (Pen-y-Ghent, etc.), Derbyshire (Dovedale).* 4, 6..... **minor** Edwards ♂.

♂ style without subapical projection; basal lobe not free..... 6

6 ♂ only (♀ unknown). A.R. about 0.9; very similar to *minor*, but differs as follows: wings more strongly brown-tinged, especially at tip (by transmitted light); costa slightly produced (not at all produced in *minor*); anal lobe a little more obtuse; An fainter at tip; hypopygium (fig. 188u) with quite distinct style and anal lobe not free; wing-length 2.5 mm. *Yorks (Ikley).* *Date not stated.* **ilkleyensis** Edwards ♂.

♂ A.R. only about 0.6; very similar to *minor*, but differs as follows: wings with a deeper brown tinge, especially at tip (by transmitted light); costa very slightly produced; anal lobe a little more obtuse; An fainter towards tip; antennae with last segment rather strongly clubbed; hind tarsi with fourth segment much shorter than fifth; hypopygium (fig. 188v) almost as in *ilkleyensis*, but style and basal lobe slightly different; squama with about 6 rather widely spaced hairs. ♀ thorax yellowish; scutal stripes separate, dark brown or black; postnotum blackish, with yellowish base; abdomen brown; antennae 6-segmented; 6 as long as 3-5 together, abruptly narrowed on apical half. ♂♀ wing-length 2-2.5 mm. *N.W. Yorks (Settle), S. Devon (Gorge of Dart).* 5-6..... **devonicus** Edwards.

GROUP E.

Wings brown by transmitted light; microtrichia absent. Costa not produced. $R_2 + 3$ ending before midway between ends of R_1 and $R_4 + 5$. $R_4 + 5$ ending above or just beyond level of tip of Cu_1 ; r-m almost continuing direction of M; An not reaching f.Cu, which is far beyond r-m; Cu_2 distinctly bent in middle. Anal lobe distinctly produced. Pulvilli absent. Empodium longer than claws. ♂ A.R. more than 1.

KEY TO SPECIES.

- 1 ♂ body entirely black; thorax shining, except on scutellum; abdomen dull, with narrow shining bands at joints; antennae with dark plumes, tip with fine pubescence extending back some distance; A.R. about 1.7; femora blackish, tibiae and tarsi lighter; wing (fig. 184f) with veins pale except stem-vein, which is blackish; squama dark, with complete fringe; halteres white, base of stem black; wing-length 2 mm.; hypopygium as in fig. 188w. ♀ body as in ♂; wings milk-white at base; antennae 6-segmented, remarkably long, almost as long as thorax. *Yorks (Whernside, etc.), Shropshire (Salop), Herts (Knebworth), Middlesex (Pinner), S. Devon (Slapton)*. 6-9..... *flexellus* Edwards.

GROUP F.

Wings brown or purplish by transmitted light; microtrichia absent. Costa rather conspicuously produced. $R_2 + 3$ ending much nearer to $R_4 + 5$ than to R_1 , sometimes only slightly separated from $R_4 + 5$ at tip. $R_4 + 5$ ending above or just beyond level of tip of Cu_1 ; An ending close to f.Cu, which is beyond r-m; Cu_2 more or less bent in middle. Anal lobe rather obtuse. Empodium about as long as claws. Small narrow pulvilli present.

KEY TO SPECIES.

- 1 ♂ thorax with yellowish ground colour, slightly shining, scarcely grey-dusted; scutal stripes separate, blackish-brown; scutellum, postnotum and sternum blackish-brown; abdomen brown; antennae brown, plumes pale, tip with about 5-8 rather long curly hairs; A.R. about 0.7; posterior tarsi with fourth segment subequal in length to fifth; hypopygium without anal point; ninth tergite small, triangular, with a few bristles; style with rather long terminal spine; basal lobe broad, not free. ♀ yellow, scutal stripes scarcely indicated; dorsum of abdomen light brown, venter and cerci yellow; antennae 6-segmented, flagellum all dark; last segment oval, broader than fifth, shorter than 4 and 5 together, hairs rather shorter, straighter and more numerous than in ♂. ♂♀ squama with 2-3 small hairs; halteres yellow; wing-length about 1.4 mm. (A ♂ var. from Cheshire (Poynton) has antennal plume dark; halteres with knob slightly darkened; wings less milky, faintly purplish-brown by transmitted light; squama with 3-5 hairs.) *Cheshire (Poynton), Cambs (Wicken), Herts (Radwell)*. 6-7..... *curtistylatus* Goetghebuer.
- ♂ body practically all dull black; antennae brown, plumes lighter, tip with about 6-8 rather long curly hairs; A.R. 1.1; posterior tarsi with fourth segment distinctly longer than fifth; halteres dark; hypopygium resembling that of *curtistylatus*, but styles longer and straighter. ♀ ground-colour of thorax pale yellow; lateral scutal stripes usually black, median reddish; antennae 6-segmented, segment 6 long, pointed, about as long as 4 and 5 together; dorsum of abdomen dark brown, venter and cerci yellow; halteres yellow. ♂♀ squama with 6-8 hairs; wing-venation differing from *curtistylatus* as follows: $R_4 + 5$ straighter; costa less produced; f.Cu slightly longer; Cu_2 slightly less bent; wing-length nearly 2 mm. *Frequent. Generally distributed*. 5-9.....? *filiformis* Kieffer.

Subgenus *Eukiefferiella* Thienemann.

Eyes bare or pubescent. Squama usually with an incomplete fringe of a few hairs only, in some species quite bare. Wings milky, without microtrichia or macrotrichia. f.Cu well beyond r-m, which is oblique. M usually quite straight, not curved

down beyond the crossvein. Cu_1 straight and continuing the direction of Cu . Cu_2 usually straight, the fork rather wide. $R_2 + 3$ difficult to distinguish, owing to its lying close to $R_4 + 5$, and either fading out towards the tip or indistinctly reaching costa at same point as $R_4 + 5$. $R_4 + 5$ almost straight, tip slightly turned up towards costa, which ends well before wing-tip. Anal lobe more or less rounded, not produced. Empodium well developed. Tarsal spurs absent. Small species; never entirely black; wing-length 2.5 mm. or less.

KEY TO SPECIES.

- 1 Hind femora with only basal half dark; pulvilli present; eyes pubescent; legs largely whitish; wing-length 1.5-2 mm. ♂ A.R. about 1.0; antennal plumes whitish; thorax almost all black; hypopygium with short anal point, style apparently with two terminal spines placed close together, one dark and the other pale. ♀ thorax light yellow; scutal stripes well separated, light brown to black. *Frequent. Westmorland (Temple Sowerby) southwards.* 4-6, 8-9
bicolor Zetterstedt.
- Hind femora uniformly coloured; pulvilli absent.....2
- 2 Squama fringed. ♂ A.R. at least 0.5.....3
- Squama quite bare. ♂ A.R. about 0.3-0.4.....5
- 3 Wing (fig. 184g) with costa ending distinctly before level of tip of Cu_1 ; eyes bare; legs light to dark brown or blackish; wing-length about 2 mm. ♂ A.R. about 0.9; antenna (fig. 190a) with plume dark; thorax almost all black; hypopygium (fig. 189b) without anal point, style with one stout, dark terminal spine. ♀ thorax yellow; scutal stripes blackish. *Common. Generally distributed.* 4-7, 12.....**hospitus** Edwards.
- Costa ending above or scarcely before level of tip of Cu_1 . ♂ A.R. 0.5-0.7; scutal stripes more or less separate.....4
- 4 ♂ hypopygium (fig. 189a) without anal point; style with a small pale terminal spine; pleurae mainly pale. ♂♀ wing-length 1.5-2.3 mm. *Frequent in hilly districts throughout Britain.* 4-9.....**brevicalcar** Kieffer.
- ♂ hypopygium (fig. 189c) with anal point present; style with a long, stout terminal spine; antenna as in fig. 190b; pleurae largely dark; scutal stripes blackish; legs dark (a ? variety has brownish scutal stripes, pleurae entirely yellow and legs pale). ♂♀ wing-length 1.8-2.2 mm. *Frequent. Westmorland (Brothers Water, etc.) southwards to Wilts (Salisbury).* 4, 6-7.....**calvescens** Edwards.
- 5 Eyes pubescent; wing-length about 1.3 mm. ♂ A.R. about 0.3, last segment clubbed, about equal in length to the three preceding, and with apical pubescence extending back a short distance from tip; thorax practically all black; hypopygium (fig. 189e) without anal point. ♀ thorax yellowish with separate brown scutal stripes. *Arran (Correir Lochan), Westmorland (Staveley, etc.), Yorks (Whernside and Austwick), S. Devon (Gorge of Dart).* 5-7...**coerulescens** Kieffer.
- Eyes bare.....6
- 6 ♂ only (♀ unknown). Cu_2 almost straight; wing-length 1.3 mm. A.R. 0.4, apical pubescence confined to extreme tip of antenna (fig. 190c), where it forms a small rosette (as in certain species of *Corynoneura*); thorax entirely black; hypopygium almost as in *camptophleps*, but styles a little shorter and stouter, lobe of coxite more square. *Inverness (Corroun), Carnarvon (Llyn Guymant).* 7
coronatus Edwards ♂.
- Cu_2 distinctly bent; wing as in fig. 184h; wing-length about 1.2 mm. ♂ A.R. only about 0.35, last segment rather distinctly clubbed and hardly longer than preceding three together, with short pubescence extending back some distance from tip (fig. 190d); thorax with yellow ground colour, scutal stripes dull blackish and well separated; hypopygium (fig. 189d) without distinct anal point, style with long pale terminal spine. ♀ almost entirely yellow, including mouth-parts and legs, only the terminal antennal segment darkened. *Westmorland (Staveley), N. Wales (Newtown).* 6, 9.....**camptophleps** Edwards.

Subgenus **Limnophyes** Eaton.

Eyes bare. Squama with an incomplete fringe of from 2-6 hairs. Wings greyish-hyaline, in ♀ with fine microtrichia visible under a magnification of 300; macrotrichia absent; anal lobe very obtuse. $r-n$ very short. fCu much beyond $r-m$. $R_2 + 3$ well separated from $R_4 + 5$ and ending nearer to R_1 . M much curved down beyond

r-m. Cu_2 moderately or strongly bent in middle, fork wide. An straight and ending opposite f.Cu. Costa moderately produced. Tibiae and tarsi without long hairs. Pulvilli absent. Empodium almost or quite as long as claws. Small, usually black species; wing-length 1.5-2.2 mm.

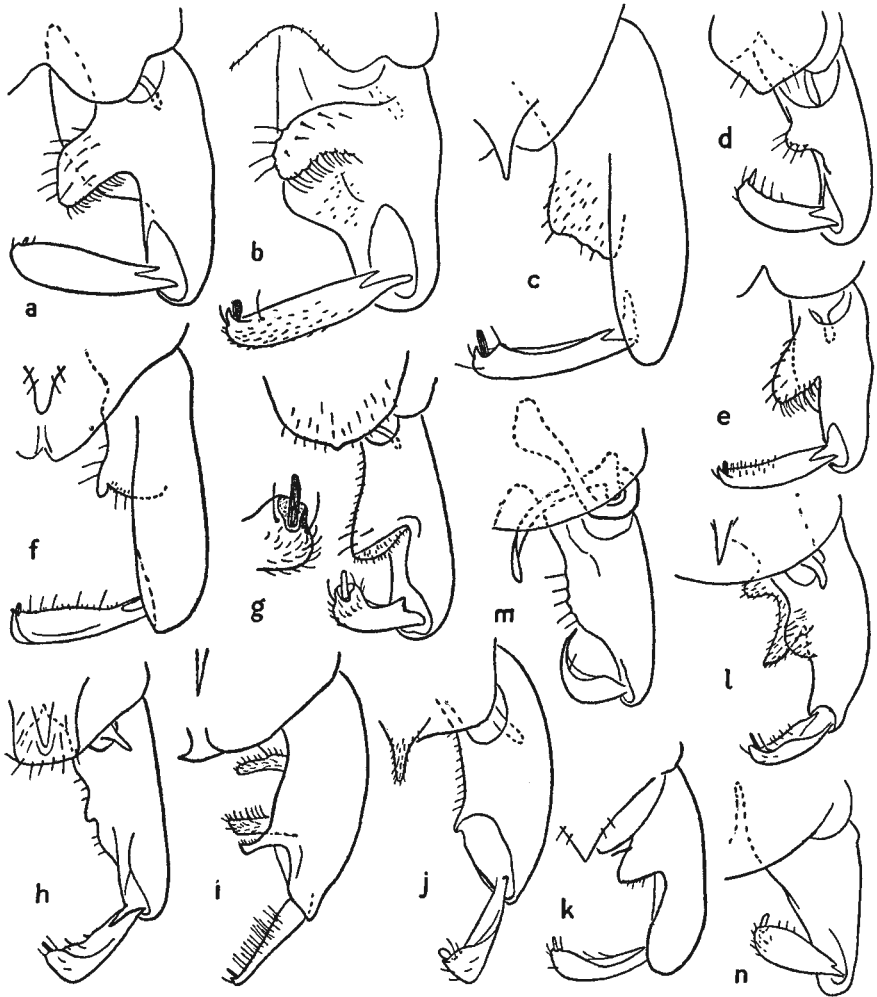


FIG. 189.—Male hypopygium (right half, dorsal view) of species of *Hydrobaenus* and *Corynoneura*. (a) *H. (Eukiefferiella) brevicealcar* Kieffer. (b) *H. (E.) hospitus* Edwards. (c) *H. (E.) calvescens* Edwards. (d) *H. (E.) camptophleps* Edwards. (e) *H. (E.) coerulescens* Kieffer. (f) *H. (Smitia) ephemerae* Kieffer. (g) *H. (S.) ornaticollis* Edwards. (h) *H. (S.) rectus* Edwards. (i) *H. (S.) trilobatus* Edwards. (j) *H. (S.) curtica* Edwards. (k) *H. (S.) cheethami* Edwards. (l) *H. (S.) angustus* Edwards. (m) *C. (s.str.) scutellata* Winnertz. (n) *Thienemanniella flavescens* Edwards.

KEY TO SPECIES.

- 1 ♂ hypopygium with short but distinct anal point; antennae with only short pubescence at tip; A.R. about 0.8. ♀ last antennal segment without verticil. ♂♀ thorax with dorso-central hairs biserial, dark; squama with 3-4 hairs; wing-length 1.8-2 mm. *Westmorland (Stickle Tarn), Bucks (Burnham Beeches), Herts (Knebworth), Middlesex (Harrow)*. 4-6.....**hydrophilus** Goetghebuer.
- ♂ hypopygium without anal point; antennae with long pubescence at tip (fig. 190h). ♀ last antennal segment with verticil at base.....2
- 2 ♂ tip of style prolonged and blackened. ♂♀ scutum with suberect scales (i.e. modified hairs, slender at both ends, broad in middle, shorter than dorso-central hairs) observable, even in dry specimens, on prescutellar area between dorso-central hairs.....3
- ♂ tip of style not prolonged. ♂♀ scales not observable on prescutellar area of scutum, at least in dry specimens, except occasionally in **pumilio**. (Note.—When mounted on slide for microscopical study a few minute racquet-shaped scales are seen to be present in **minimus**, but only under high power.).....5
- 3 Anal lobe of wing well produced, somewhat squarish; scutal scales sparse, apparently none on shoulders; dorso-central hairs uniserial, dark; squama with 4-6 hairs; wing-length 1.4-2 mm. ♂ A.R. about 0.75. *Arran (Catacol), Notts (Beeston), Hunts (Wood Walton), Cambs (Shelford), Herts (Welwyn, etc.), Sussex (Crowborough), S. Devon (Beesands)*. 1-2, 4-7
truncorum Goetghebuer.
- Anal lobe very obtuse; scutal scales obvious on shoulders.....4
- 4 ♂ A.R. about 0.5-0.6, plume normal. ♂♀ dorso-central hairs pale, biserial; squama usually with 4-6 hairs; wing-length 1.3-2 mm. *Frequent. Generally distributed*. 1-2, 4-9.....**prolongatus** Kieffer.
- ♂ A.R. only 0.25-0.3, plume rather scanty; wing as in fig. 184i. ♂♀ dorso-central hairs dark, biserial; squama usually with 2-3 hairs only; wing-length about 1.5 mm. *Westmorland (Staveley), Yorks (Whernside), Middlesex (Harlesden)*. 5-6.....**gurgicola** Edwards.
- 5 Halteres (both sexes) entirely yellowish or whitish; dorso-central hairs uniserial, pale; squama usually with 2-3 hairs; wing-length 1.8-2 mm. ♂ A.R. about 0.8. ♀ scutum yellow with brown or blackish stripes. *Common. Generally distributed*. 2, 4-9.....**pusillus** Eaton.
- Halteres (both sexes) with at least knob distinctly darkened.....6
- 6 Anal lobe of wing very obtuse; dorso-central hairs uniserial, dark; squama usually with 2-3 hairs; wing-length 1.8-2 mm. ♂ A.R. about 0.6. ♀ thorax entirely black. *Common. Generally distributed*. 2-11.....**minimus** Meigen.
- Anal lobe well produced, somewhat squarish (both sexes).....7
- 7 Wings greyish; scutal scales absent; dorso-central hairs irregularly biserial; squama usually with 4-5 hairs; wing-length about 2.2 mm. ♂ A.R. about 0.85. *Cambs (Wicken), Herts (Welwyn and Ickleford), Essex (Audley End)*. 2, 4, 7.....**habilis** Walker.
- Wings strongly milky (by reflected light); small scales present on shoulders and occasionally on prescutellar area; dorso-central hairs shorter than usual, pale, uniserial; squama usually with 4-6 hairs; wing-length 1.7-2 mm. ♂ A.R. about 0.6. ♀ antenna 7-segmented (instead of the normal 5-6). *Ross (Kinlochewe), Perthshire (Killin), Arran (Catacol), Westmorland (Hartsop)*. 5-6, 8
pumilio Holmgren.

Subgenus *Smittia* Holmgren.

Eyes bare or very shortly pubescent, the hairs when present shorter than the diameter of one facet. Pulvilli usually absent, small when present. Wings more or less milky by reflected light, at least slightly tinged with brown or purplish by transmitted light. $R_2 +_3$ at least slightly separated from $R_4 +_5$ and ending in costa. f.Cu considerably beyond r-m. Cu_2 usually sharply curved or bent in middle, rarely quite straight. Squama always quite bare. Small, usually black species, with a maximum wing-length of 2.5 mm.

KEY TO GROUPS.

- 1 An reaching beyond f.Cu 2
- An not reaching beyond f.Cu 5
- 2 An straight; thorax largely yellow **Group A** (p. 165).
- An curved down at tip; body all black 3
- 3 Pulvilli absent; An not reaching margin 4
- Pulvilli present; An normally reaching margin **Group C** (p. 166).
- 4 Eyes bare **Group B** (p. 165).
- Eyes pubescent, at least on lower part **Group F** (p. 167).
- 5 An ending approximately opposite f.Cu; $R_4 + 5$ ending near level of tip of Cu_1 **Group D** (p. 166).
- An usually ending before f.Cu; $R_4 + 5$ ending before level of tip of Cu_1 **Group E** (p. 166).

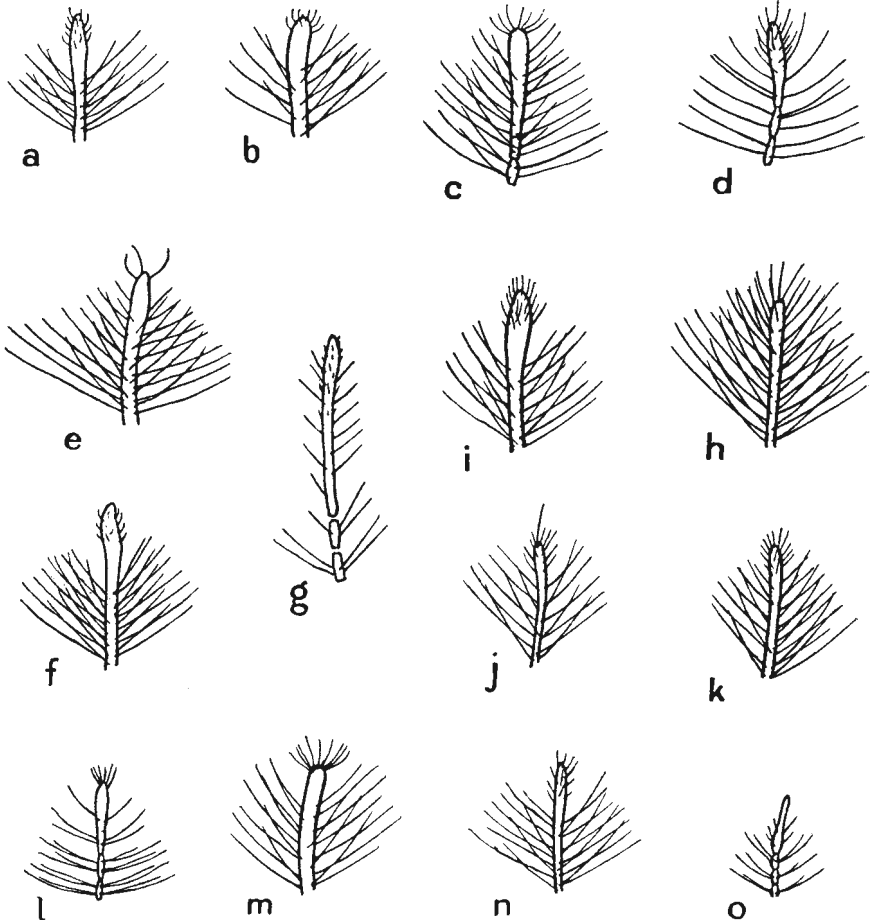


FIG. 190.—Tips of male antennae of species of *Hydrobaenus* and *Corynoneura*. (a) *H. (Eukiefferiella) hospitus* Edwards. (b) *H. (E.) calvescens* Edwards. (c) *H. (E.) coronatus* Edwards. (d) *H. (E.) camptophleps* Edwards. (e) *H. (Orthocladus) semivirens* Kieffer. (f) *H. (O.) minor* Edwards. (g) *H. (O.) femineus* Edwards. (h) *H. (Limnophyes) minimus* Meigen. (i) *H. (Smittia) rectus* Edwards. (j) *H. (S.) angustus* Edwards. (k) *H. (S.) trilobatus* Edwards. (l) *C. (Eucorynoneura) celtica* Edwards. (m) *C. (E.) coronata* Edwards. (n) *C. (s.str.) scutellata* Winnertz. (o) *C. (Paracorynoneura) carriana* Edwards.

GROUP A.

(Epoicocladius Zavrel.)

Eyes bare. Pulvilli absent or indistinct. Costa distinctly produced. r-m oblique. Cu_1 distinctly bent in middle. An almost straight, reaching well beyond f.Cu. Anal lobe well developed but rather obtuse. Thorax with yellow ground-colour.

KEY TO SPECIES.

- 1 ♂ scutal stripes only slightly darker than the yellow ground-colour; posterior half of postnotum and a dot at posterior end of lateral scutal stripes brownish; A.R. about 0.9; wing as in fig. 184k; hypopygium as in fig. 189f. ♀ thorax entirely yellow; wing as in fig. 184l. ♂♀ wing-length about 2 mm. *Yorks (Leeds), Cheshire (Poynton)*. 6.....*ephemerae* Kieffer.
- 2 ♂ scutal stripes black. ♀ scutal stripes reddish-brown.....2
- 2 ♂ tip of last antennal segment with at least a dozen longish and somewhat curled hairs; thorax slightly shining; scutal stripes fused or narrowly separated; wing as in fig. 184j; A.R. about 0.8; hypopygium as in 189k. ♀ ground-colour of thorax clearer yellow, slightly shining as in ♂; scutal stripes reddish-brown, more widely separated. ♂♀ wing-length about 1.3 mm. *Westmorland (Windermere), Yorks (Bolton Abbey), Herts (Letchworth)*. 5-6...*cheethami* Edwards.
- ♂ last antennal segment apically with about 7-10 short straight hairs, all very close to tip; mesonotum with yellowish ground-colour obscured by heavy grey pruinescence; scutal stripes black, heavily pruinose from some aspects; A.R. about 0.9; hypopygium as in fig. 189g. ♀ mesonotum pruinose as in ♂. ♂♀ wing-length about 1.5 mm. *Durham (Fatfield), Lancs (Nelson), S.W. Ireland (Killarney)*. 5, 8-9.....*ornaticollis* Edwards.

GROUP B.

(Smittia s.str., part.)

Eyes bare. Hair on posterior tibiae and tarsi of ♂ often very long. Pulvilli absent. Costa produced well beyond tip of $R_4 + 5$, and usually beyond level of tip of Cu_1 . An somewhat curved down at tip and reaching distinctly beyond f.Cu. r-m usually almost horizontal or moderately oblique. $R_4 + 5$ slightly sinuous, meeting costa at a low angle.

KEY TO SPECIES.

- 1 Halteres blackish.....2
- Halteres whitish. ♂ A.R. only about 0.7; body dull black; legs pale ochreous; anal lobe rather large but obtuse; hypopygium with broad anal point, rounded at tip, coxite with two separate lobes. ♀ thorax with yellowish ground colour; scutal stripes separate, brownish to black. ♂♀ wing-length 1.2-1.8 mm. *Common on coasts around Britain, between tide-marks*. 5-6, 9
thalassophilus Goetghebuer.
- 2 $R_4 + 5$ ending above or slightly beyond tip of Cu_1 ; anal lobe obtuse.....3
- $R_4 + 5$ ending before level of tip of Cu_14
- 3 ♂ hypopygium with large basal lobe; A.R. about 1.5. ♂♀ body dull black; wings milky; squama dark; anal lobe obtuse; wing-length 1.2-3 mm. *Frequent. Lancs (Hawkshead, Three Dubs Tarn) southwards*. 2, 4-11
pratorum Goetghebuer.
- ♂ hypopygium without distinct basal lobe. ♂♀ wings less milky than in *pratorum*. purplish by transmitted light; wing-length about 2 mm. *Arran (top of Goat Fell)*. 5.....*sp. incert.*
- 4 Larger species; anal lobe right-angled; body and legs black; wings somewhat milky; wing-length 2-3 mm. ♂ A.R. quite 2.5, all basal segments broader than long. ♀ sense-bristles of antennae small, almost equilaterally triangular. *Westmorland (Brothers Water), Cambs (Hauxton and Cambridge), Herts (Letchworth)*. 2, 4, 6.....*foliaceus* Kieffer.
- Small species; anal lobe obtuse; body and legs black; wings strongly milky; wing-length about 1.3 mm. ♂ A.R. 1.4-1.6. ♀ sense-bristles of antennae short and rather broad. *Arran (Correin Lochan), Cambridge*. 5
edwardsi Goetghebuer.

GROUP C.

(Camptocladius van der Wulp.)

Eyes bare. Pulvilli present, rather distinct. Costa not or scarcely produced beyond tip of $R_4 + 5$ in ♂; rather distinctly produced in ♀. Cu_2 strongly bent. An curved down at tip and almost or quite reaching margin of wing (unique in Orthocladiinae). Anal lobe well developed.

KEY TO SPECIES.

- 1 Entirely black, including halteres, legs, squama and stem-vein; wing-length 1.4-2.2 mm. ♂ A.R. usually about 1.3; antennal plumes mainly white, hairs towards base black. ♀ antennae with broad, leaf-like sense-bristles. (A small ♂ var. from Cambridge has A.R. only 0.9, plume entirely white and An not reaching margin.) *Common. Generally distributed.* 4-9

stercorarius Degeer.

Halteres yellowish; body dull black, but shoulders and pleural membrane yellowish in ♀; legs light brown; stem-vein scarcely darkened; wing-length 2 mm. ♂ A.R. about 1.5; plumes whitish. ♀ antennae with hair-like sense-bristles. *Inverness (Ben Nevis).* 6.....*submontanus* Edwards.

GROUP D.

Eyes bare. Pulvilli absent. Costa scarcely produced beyond tip of $R_4 + 5$ in ♂, sometimes more produced in ♀. Tip of $R_4 + 5$ above or scarcely before level of tip of Cu_1 . Cu_2 strongly bent. An practically straight and ending almost opposite f.Cu. Anal lobe well developed. Body black, at least in ♂.

KEY TO SPECIES.

- 1 ♂ only (♀ not seen). Legs pale; halteres whitish; body black; scutum rather shining; anal lobe obtusely rounded; wing-length 1.2 mm. A.R. 0.3 or less; antennal plume whitish; hypopygium without conspicuous basal lobe, style somewhat square-ended. *Yorks (Addingham), N. Wales (Newtown).* 5, 8.....*gracilis* Goetghebuer ♂.

Legs blackish; halteres dark brown or black.....2

- 2 Halteres dark brown; thorax black, dusted grey except on scutal stripes, which are somewhat shining; abdomen dark brown; fourth and fifth tarsal segments subequal, over twice as long as broad; anal lobe large, practically right-angled; wing-length 2 mm. ♂ A.R. about 0.6, last segment rather strongly clubbed (fig. 190i); plumes blackish; wing as in fig. 184m; hypopygium (fig. 189h) almost as in *gracilis*, but basal lobe rather more obvious. ♀ antennae not noticeably short, segments 3-5 oval, slightly constricted apically and about twice as long as broad. *Perthshire (Ben Lawers), Westmorland (Windermere and Staveley).* 6.....*rectus* Edwards.

♀ only (♂ unknown). Halteres black; body dull black; anal lobe fairly well developed, but obtuse; antennae short, segments 3-5 not longer than broad, without necks; fourth tarsal segment nearly globular, shorter than fifth, which is oval; wing-length barely 1 mm. *Arran (Corriegills).* 6

secticus Edwards ♀.

GROUP E.

Eyes bare. Pulvilli absent or very small. Costa usually not produced. $R_4 + 5$ ending before, often much before, level of tip of Cu_1 . Cu_2 almost straight, or more or less bent. An ending before f.Cu, at least in ♂. Anal lobe of wing very obtuse or absent. Body all black, at least in ♂.

KEY TO SPECIES.

- 1 ♀ only (♂ unknown). Halteres whitish; wing (fig. 184n) with R_1 and $R_4 + 5$ fused; Cu_2 not nearly reaching wing-margin; anal lobe absent; wing-length 0.85 mm.; body mainly dull black, shoulders and wing-base yellow, scutellum and venter brownish; legs rather light brownish; fourth tarsal segment rather shorter than fifth, and not much longer than broad. *Essex (Epping).* 7-8

conjunctus Edwards ♀.

Halteres black, at least in ♂; R_1 and $R_4 + 5$ not fused; Cu_2 almost or quite reaching wing-margin.....2

- 2 Cu_2 distinctly bent as usual.....3
 Cu_2 quite straight; dull black species.....6
- 3 Anal area of wings obtuse, but distinctly developed.....4
 Wings cuneiform, without anal angle.....5
- 4 Legs entirely dull black in ♂, tibiae and tarsi lighter in ♀; fourth and fifth tarsal segments subequal in length, fourth quite twice as long as broad; wing as in fig. 184p; wing-length 1.3 mm. ♂ antenna (fig. 190k); A.R. 1.5; hypopygium (fig. 189i), with three conspicuous separate lobes on coxite, projecting inwards. ♀ thorax yellow; scutal stripes dull black, narrowly separated. *Arran* (*Corriegills*), *N.W. Yorks* (*Pen-y-Ghent*), *Cambs* (*Wicken*), *Beds* (*Sandy*), *Herts* (*Letchworth*), *Somerset* (*Shapwick*). 5-7, 9.....**trilobatus** Edwards.
- Femora and tibiae dark brown, tarsi paler; fourth tarsal segment slightly longer than fifth; wing-length 1.5 mm. ♂ A.R. 1.2; hypopygium with three lobes on coxite as in *trilobatus*, but dorsal lobe broader, and ventral lobes united at base. ♀ thorax yellow; scutal stripes shining black, or median stripe brownish, rather broadly separated. *Hants* (*New Forest*). 6....**foreipatus** Goetghebuer.
- 5 ♂ only (♀ unknown). Pronotum normal, visible dorsally; body dull black; hypopygium (fig. 189j) without distinct basal lobes; A.R. 0.9-1; pubescence at tip of antennae normal; wing as in fig. 184q; wing-length 1.2 mm. *Arran* (*Corriegills*), *Carnarvon* (*Llyn Gwynant*), *Oxford*. 6-7....**curticosta** Edwards ♂. Pronotum reduced, hardly visible dorsally (as in *conjunctus*); body black, slightly shining; wing as in fig. 184o; wing-length 1-1.2 mm. ♂ hypopygium (fig. 189l) with three well-developed lobes on inward aspect of coxite, one dorsal, two ventral; A.R. about 0.7; pubescence at tip of antenna with one longer hair (fig. 190j). ♀ shoulders and prescutellar area yellowish; scutal stripes almost separate. *Yorks* (*Skipwith*), *Carnarvon* (*Llyn Gwynant*), *Herts* (*Knebworth*), *Middlesex* (*Harrow*). 6-7.....**angustus** Edwards.
- 6 ♂ only (♀ unknown). Wing (fig. 184r) with costa not or scarcely produced; anal lobe obtuse; a distinct transverse fold beyond end of An running parallel with Cu_2 ; A.R. about 1.5; wing-length 1.8 mm. *Frequent on seaweed along coasts of Somerset and Dorset*. 6, 8.....**brevifurcatus** Edwards ♂. Costa rather strongly produced (more so in ♀); anal lobe almost obsolete; no transverse fold beyond end of An; wing-length 1 mm. *Westmorland* (*Witherslack*), *Herts* (*Welwyn*), *S.W. Ireland* (*Killarney*). 5-6
alpipennis Goetghebuer.

GROUP F.

(Smittia s.str., part.)

Diagnosis as for Group B, but eyes pubescent, at least on lower part.

KEY TO SPECIES.

- 1 Eyes finely and densely pubescent; anal lobe of wing right-angled or almost so..2
 Eyes with very short and often scanty pubescence (sometimes bare in *foliaceus* and ♂ *edwardsi*, which are also diagnosed under Group B); black, including legs and halteres.....4
- 2 Squama dark. ♂ antennal plume dark.....3
 Squama and wing-base white; body dull black; legs mainly pale, tibiae and tarsi sometimes almost whitish; wing-length 1.8-2 mm. ♂ A.R. about 1.3; antennal plume white; halteres brownish to white; hypopygium with slight basal lobe; style more slender than in *aterrimus*. ♀ halteres whitish. *Arran* (*Corriegills*, etc.), *Westmorland* (*Witherslack*, etc.), *Yorks* (*Gormire*), *Shropshire* (*Snailbeach*, etc.), *Herts* (*Hitch Wood*, etc.), *S. Devon* (*Sidmouth*). 5-8
leucopogon Meigen.
- 3 ♂ style with large subapical expansion; anal point rather short; A.R. 1.5-2.
 ♀ antenna with segment 6 about one-and-a-half times as long as 5, sense-bristles thick, almost leaf-like, but pointed, tips almost acuminate. ♂♀ body dull black; legs dark; halteres variable in ♂, usually yellow in ♀; anal lobe of wing well developed, right-angled; wing-length 1.5-2.5 mm. (A probable var. of ♀ has antennae shorter, segments 3-5 more rounded, 6 hardly longer than 5; halteres blackish; An somewhat shorter.) *Common. Generally distributed*. 1-12.....**aterrimus** Meigen.

- ♂ style without subapical expansion; anal point longer and more slender. ♂♀ halteres usually blackish; basal lobe of wing with less prominent lobule at the angle; wing-length barely 2 mm.; otherwise resembles *aterrimus*, *Beds* (Sheffield), *Herts* (Radwell and Knebworth), *Bucks* (Farnham Royal), *Middlesex* (Harrow), *Berks* (Temple). 4-5, 8, 10.....**contingens** Walker.
- 4 ♂ A.R. 2·5, all the basal segments broader than long. ♀ sense-bristles of antennae small, almost equilaterally triangular. ♂♀ anal lobe of wing right-angled; wings somewhat milky; R_{4+5} ending slightly before level of tip of Cu_1 , slightly sinuous as usual; wing-length 2-3 mm.; body dull black. (*Distribution, see under Group B*).....**foliaceus** Kieffer.
- ♂ A.R. 1·6 or less. ♂♀ anal lobe of wing obtuse or absent; R_{4+5} ending well before level of tip of Cu_1 ; smaller species.....5
- 5 ♂ A.R. 1·4-1·6. ♀ sense-bristles of antennae short and rather broad. ♂♀ anal lobe of wing obtuse; wings strongly milky; R_{4+5} straight; wing-length only about 1·3 mm.; body dull black. *Arran* (*Correïn Lochan*), *Cambridge*. 5
edwardsi Goetghebuer.
- ♂ A.R. scarcely exceeding 1. ♂♀ anal lobe absent; wings scarcely milky; R_{4+5} slightly sinuous as usual; wing-length 1·5-1·8 mm.; thorax somewhat shining. *Arran* (*Brodick and Corriegills*), *Westmorland* (*Windermere*). 5-6
nudipennis Goetghebuer.

Genus *Thienemanniella* Kieffer.

R_1 and R_{4+5} entirely fused together and almost entirely fused with the thickened costa, forming a "clavus" which extends to about two-fifths of wing-length and to a point nearly opposite f.Cu in ♂, beyond middle of wing and beyond f.Cu in ♀; in ♀ the clavus is thicker; a false vein commences at r-m, running below the clavus and then near the anterior margin almost to the wing-tip; An curved down at tip and reaching to or beyond f.Cu. Wing-membrane bare. Anal lobe obtuse. Squama bare. Hind tibiae not swollen and without inner apical projection; front trochanters keeled, but evenly rounded above; fourth tarsal segment shorter than fifth, more or less cordiform. ♂ antennae 10-13-segmented, segmentation often vague; ♀ 6-segmented. Tergites 2-4 of ♂ abdomen each with a transverse row of 5-7 bristly hairs near base. ♂♀ eyes usually pubescent. Very small species; wing-length under 2 mm.

KEY TO SPECIES.

- 1 Wholly black, except for brownish-yellow legs and pale yellow halteres; wing-length 1·3 mm. ♂ antennae from some aspects apparently 13-segmented, last segment only as long as preceding two together, oval, without verticil at base and with very short and scanty pubescence towards tip; in other positions the last one or two joints are not distinct and the antenna appears 12- or 11-segmented, last segment clavate, with one or two verticils on basal portion. ♀ antennae shorter than in other species of subgenus, segments 2-5 at most as broad as long, 6 as long as 3-5 together. *Westmorland* (*Melkinthorpe*), *S. Devon* (*Gorge of Dart*), *S.W. Ireland* (*Killarney*). 5-7.....**morosa** Edwards.
At least the shoulders lighter in colour.....2
- 2 Males.....3
Females.....7
- 3 ♂ antennae with 11 distinct segments only (if apparently 13-segmented, the last two articulations are very indistinct).....4
♂ antennae with 12 or 13 distinct segments.....6
- 4 ♂ antennae obviously only 11-segmented, the last segment only as long as preceding 3 together; segment 9 fully three times as long as broad; scutal stripes indistinct or fused, shoulders and pleural membrane yellowish; wing-length 1 mm. *Inverness* (*Loch Ericht*), *Arran* (*Brodick*), *Westmorland* (*Witherslack*), *Yorks* (*Ingleton, etc.*), *Shropshire* (*Church Stretton*), *Hants* (*New Forest*), *S. Devon* (*Gorge of Dart*). 5-7.....**clavicornis** Kieffer
- ♂ antennae apparently 13-segmented, but the last two joints are indistinct, and the last segment is much longer than preceding three together; scutal stripes often more or less separated.....5

- 5 ♂ last antennal segment as long as preceding 8 together, tip not or scarcely swollen ; shoulders, margin of scutum, upper part of pleurae and at least sides of basal abdominal segments yellowish ; hypopygium with large basal lobe ; wing-length 1.3-1.5 mm. *Westmorland (Staveley), Cheshire (Skirwith), Cambs (Shepreth), Beds (Cardington, etc.), Herts (Letchworth and Radwell), Wilts (Salisbury)*. 1, 5-6, 8.....*lutea* Edwards ♂.
- ♂ only (♀ unknown). Antennal segments 11-13 together about as long as preceding 8 together ; coloration almost as in *lutea* ♂ ; hypopygium with large basal lobe (a variety from *Westmorland (Temple Sowerby)* and *Yorks (Ilkley)* has the scutum practically all black and basal lobe of hypopygium smaller) ; wing-length 1.3 mm. *Westmorland (Temple Sowerby), Yorks (Ilkley), Cheshire (Skirwith), N. Wales (Neutown)*. 6, 9.....*vittata* Edwards ♂.
- 6 ♂ only (♀ unknown). Antennae apparently 12-segmented, last segment strongly clubbed and as long as preceding three together, with only one basal verticil and usual apical pubescence ; basal part of terminal segment, including the verticil, appears in some positions to be divided off from the clubbed apex, and the antenna then appears 13-segmented, with last segment as long as preceding two ; thorax with clear yellow ground colour ; scutal stripes distinct, dull black ; pronotum and upper part of pleurae yellow ; eyes bare ; hypopygium (fig. 189n) with styles short, almost oval, with long terminal spine, coxites somewhat thickened on basal half, but without lobe ; wing (fig. 192a) ; wing-length 1.3 mm. *Westmorland (Staveley), S.W. Ireland (Killarney)*. 5-6
flavescens Edwards ♂.
- ♂ antennae distinctly 13-segmented, last segment as long as preceding 8-10 together, tip somewhat swollen, segment 9 not twice as long as broad ; body mainly black, only shoulders and pleural membrane vaguely yellowish ; pronotum black ; hypopygium with large basal lobe ; wing-length 1.8 mm. *Suffolk (Mildenhall), Cambs (Hauxton), Oxford*. 4.....*majuscula* Edwards ♂.
- 7 ♀ almost entirely yellow ; scutal stripes orange or light brownish, middle stripe sometimes a little darker ; scutellum and postnotum yellowish. (*Wing-length and distribution, see ♂*).....*lutea* Edwards ♀.
- ♀ darker species ; scutal stripes dark brown or blackish ; scutellum and postnotum partly brownish or blackish.....8
- 8 ♀ anal area of wing well-developed, not very obtusely angled. (*Wing-length and distribution, see ♂*).....*majuscula* Edwards ♀.
- ♀ anal area of wing less developed, very obtusely angled. (*Wing-length and distribution, see ♂*).....*clavicornis* Kieffer ♀.

Genus *Corynoneura* Winnertz.

Diagnosis as for *Thienemanniella*, except : costa extending from scarcely one-third to about two-fifths of wing-length and ending far before f.Cu in ♂, to about middle of wing and not quite to f.Cu in ♀ ; An straight and not reaching f.Cu ; anal lobe absent. Hind tibia somewhat swollen at tip, obliquely truncate and with a conspicuous apical projection on inner side ; front trochanters with a more or less conspicuous flat dorsal expansion on apical half or more. Tergites 2-5 of ♂ abdomen each with a single mid-dorsal bristly hair, sometimes also with a smaller one near each lateral margin. ♂♀ eyes bare.

KEY TO SUBGENERA.

- 1 Extreme tip of antenna with a rosette of hairs (fig. 190l, m), which are often longer in ♂ than in ♀ ; a portion of antenna before the rosette is bare. ♂ hypopygium without specially developed internal basal appendages
Eucorynoneura Goetghebuer (p. 170).
- Extreme tip of antenna in both sexes without a rosette of hairs.....2
- 2 Tip of antenna pubescent for a distance at least as long as its breadth (fig. 190n), the hairs not aggregated into an apical rosette. ♂ hypopygium with strongly chitinized internal basal appendages (fig. 189m)
Corynoneura Winnertz *s.str.* (p. 170).
- Actual tip of antenna bare, although the last segment bears some fine pubescence before the tip (fig. 190o) ; femora somewhat thickened, especially front pair. ♂ costa longer than in other subgenera of *Corynoneura* (fig. 192e) ; hypopygium without specially developed internal basal appendages
Paracorynoneura Goetghebuer (p. 170).

Subgenus **Eucorynoneura** Goetghebuer.

KEY TO SPECIES.

- 1 ♀ only (♂ unknown). Halteres brownish; scutum with dark brownish stripes, ground colour obscurely yellowish; antennae short, segments 4 and 5 almost globular, 6 scarcely as long as 4 and 5 together and rather more slender, with only about 4 short hairs projecting forwards at tip; wings (fig. 192*d*) with costa not reaching middle, f.Cu pointed at base, Cu₂ straight; wing-length barely 0.7 mm. Smallest British Chironomid. *Essex (Epping)*. 5
fuschhalter Edwards ♀.
 Halteres whitish (both sexes).....2
- 2 Males.....3
 Females.....6
- 3 ♂ antennae 12-13-segmented; thorax entirely dull black.....4
 ♂ antennae 10-11-segmented; thorax entirely dull black.....5
- 4 ♂ antennae 12-segmented, last segment (fig. 190*m*) as long as preceding 8 together; wing-length 1.5-1.7 mm. *Suffolk (Mildenhall), Beds (Cardington), Oxford, Wilts (Salisbury)*. 4, 6, 8.....**coronata** Edwards ♂.
 ♂ antennae 13-segmented, last segment as long as preceding 4 together; wing-length 1.2-1.5 mm. *Arran (Correin Lochan), Westmorland (Brothers Water), Lancs (Manchester), N. Wales (Levenshulme)*. 4-6, 9.....**lacustris** Edwards ♂.
- 5 ♂ antennae 11-segmented, last segment as long as preceding 4-6 together, with short terminal rosette and numerous long hairs towards base; wing-length 1-1.4 mm. *Arran (Corriegills), Cambs (Shepreth), Herts (Radwell), S. Devon (Dartmouth)*. 1, 5-6.....**lobata** Edwards ♂.
 ♂ antennae 10-11-segmented, last segment (fig. 190*l*) only as long as preceding two or three together; wing as in fig. 192*c*; wing-length 0.7-0.8 mm. *Westmorland (Staveley), N. Wales (Newtown), S. Devon (Gidleigh and Gorge of Dart)*. 6, 8-9
celtica Edwards ♂.
- 6 ♀ thorax entirely dull black. (*Wing-length and distribution, see ♂*)
lacustris Edwards ♀.
 ♀ at least scutum with some indication of yellowish ground colour, stripes often separate.....7
- 7 ♀ scutal stripes only narrowly separated, ground colour of scutum obscurely yellowish, restricted; scutellum black. (*Wing-length and distribution, see ♂*)
celtica Edwards ♀.
 ♀ scutal stripes well separated.....8
- 8 ♀ scutum with extensive clear pale yellow ground colour; scutellum all or partly yellow. (*Wing-length and distribution, see ♂*).....**coronata** Edwards ♀.
 ♀ scutum with more restricted obscurely yellowish ground-colour; scutellum brownish. (*Wing-length and distribution, see ♂*).....**lobata** Edwards ♀.

Subgenus **Corynoneura** s.str.

KEY TO SPECIES.

- 1 ♂ antennae 13-segmented, last segment as long as the preceding 8; antennal plumes white; hypopygium with large lobe on coxite. ♂♀ scutal stripes completely fused; blackish species; wing-length 1.2 mm. *Yorks (Bramhope), Herts (Letchworth), Essex (Epping)*. 5-6.....**celeripes** Winnertz.
 ♂ antennae 11-segmented, last segment (fig. 190*n*) as long as the preceding 6-8; plumes rather brownish; hypopygium (fig. 189*m*) with very slight lobe; scutal stripes completely fused. ♀ at least thorax and pleural membrane largely yellowish; scutal stripes dark brownish, well separated. ♂♀ wing-length 1-1.5 mm. *Common. Generally distributed.* 3-7, 9.....**scutellata** Winnertz.

Subgenus **Paracorynoneura** Goetghebuer.

KEY TO SPECIES.

- 1 Scutal stripes brownish or blackish, well separated; wing-length about 1 mm. ♂ antennae 11-segmented, last segment as long as preceding 3 or 4; antennal plumes very poorly developed, only a few hairs on each segment. *Cheshire (Wirral), Notts, Norfolk (Hickling Broad)*. 6, 8, 10.....**carriana** Edwards.

Subfamily CLUNIONINAE.

Eyes round. Front without a median longitudinal impressed line, but usually with a transverse fold above antennae. Face very small. Male antennae never plumose. Sense-bristles of ♀ antennae absent or rudimentary. Pronotum completely divided into lateral lobes. Postnotum without distinct median furrow or keel. Suture between sternopleurite and anepisternite absent or but little developed, extending forward only a short distance from base of middle coxa. Male hypopygium inverted; anus opening at the end of a membranous tube; styles infolded, distinct terminal spine lacking. Legs very long (except in *Clunio*), especially the hind pair. Front coxa enlarged. First segment of front tarsus shorter than tibia. Front tibia with spur; posterior tibia with one or two spurs but without combs. Wings (when present) without macrotrichia; m-cu absent; venation much as in the Orthoclaudiinae, but $R_2 + 3$ always very indistinct.

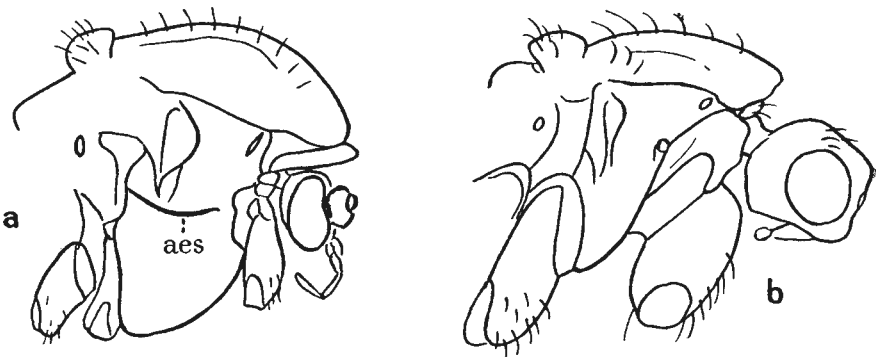


FIG. 191.—Lateral view of thorax of (a) an ORTHOCLAUDINE (*Cardioclaadius capucinus* Zetterstedt) and (b) a CLUNIONINE (*Psammathomyia pectinata* Deby), showing presence of anepisternal suture (aes) in the former and its absence in the latter.

KEY TO GENERA.

- 1 Eyes pubescent; mouth-parts reduced, palpi consisting of a small single segment. ♂ antennae 11-segmented; hypopygium very large and long; wings well-developed (fig. 192g). ♀ antennae 7-segmented; wings lacking; cerci not noticeably long. *Clunio* Haliday (p. 171).
Eyes bare. 2
- 2 ♂♀ wings well developed (fig. 192f); palpi moderately long, 4-segmented; antennae 7-segmented. ♂ hypopygium very small. ♀ cerci short and rounded. *Thalassomyia* Schiner (p. 172).
♂♀ wings reduced (fig. 192h), without definite venation; mouth-parts reduced; palpi consisting of only one or two short segments; antennae 7-segmented. ♂ hypopygium small. ♀ cerci long and pointed. *Psammathomyia* Deby (p. 172).

Genus *Clunio* Haliday.

Diagnosis as in key to genera. In addition: Antennae in both sexes almost bare. Hypopygium of ♂ at least as large as thorax and quite half length of abdomen. Legs rather stout. All tibiae with a single spur. All tarsi short, fourth segment subcordiform, fifth simple. Wing of ♂ with anal lobe large and rather sharply angled, but narrowly separated from alula; R_1 (in the single British species) very short and indistinct, not a quarter as long as $R_4 + 5$, which ends well before the wing-tip; costa not produced; Cu_2 strongly recurved; squama bare; halteres normal.

KEY TO SPECIES.

- 1 ♂ thorax and genitalia brownish; scutellum usually pale yellow or whitish; abdominal tergites mainly blackish (in life base and venter of abdomen are said to be greenish); antennae with flagellum brownish on middle segments, broadly pale yellowish at base and tip; legs stoutish, yellow; wing-length 1.2-1.4 mm. ♀ wingless; coloration as in ♂. Occurs along coasts of English Channel, Ireland and Isle of Man. 4-5, 8.....**marinus** Haliday.

Genus **Thalassomyia** Schiner.

Diagnosis as in key to genera. In addition: Last antennal segment with a nipple-like terminal projection. Legs long, especially the hind pair. Posterior tibiae each with two spurs. Third tarsal segment bilobed at tip, fourth short and strongly cordiform, fifth not lobed at tip. Empodium very large. Wings broad, surface with small but distinct microtrichia. Anal lobe large and right-angled, arising immediately beyond alula as usual. R₁ moderately long. R₄₊₅ curved and reaching almost to wing-tip. f.Cu not much beyond r-m. Cu₂ gently curved. Squama fringed. Halteres normal.

KEY TO SPECIES.

- 1 Dark brown, including antennae; thorax, scutellum and abdomen with coarse, outstanding brownish hairs; wings smoky; legs light brown; wing-length 2.5-4 mm. Occurs along west, east and south coasts of Britain. 8-9
frauenfeldi Schiner.

Genus **Psammathiomyia** Deby.

Diagnosis as in key to genera. In addition: Antennae almost bare, last segment with a short nipple-like projection. Legs long, especially the hind pair. All tibiae with a single very short spur. Fourth tarsal segment somewhat shorter than fifth and indistinctly cordiform, fifth trilobed at tip, median lobe especially long and finger-like. Empodium very large. Claws of ♂ toothed. Squama bare. Halteres reduced.

KEY TO SPECIES.

- 1 Dark greyish; thorax and antennae sometimes rather brownish; thorax, scutellum and abdomen with rather coarse, outstanding brownish hairs; wings dark brownish with sparse fringe of brownish hairs, obliquely truncate at tip; legs pale yellowish; wing-length 1-1.3 mm. ♂ styles of hypopygium with numerous short spinules on outer surface (irregularly arranged, not forming a fringe as stated in original description). Coastal species. On rocks and pools at low tide. Cornwall (St. Ives and Lands End). 8-9.....**pectinata** Deby.

Subfamily **CHIRONOMINAE**.

Cross-vein m-cu absent. R₂₊₃ present, simple, generally reaching costa less than halfway between the tips of R₁ and R₄₊₅. Costa almost always ending abruptly at tip of R₄₊₅. Front tibia seldom with spur (if present it is usually very small and bristle-like). Middle as well as hind tibiae normally with combs composed of basally fused spinules (combs absent in **Pseudochironomus** and a few genera not yet found in Britain); one or both spurs usually short or absent. First segment of front tarsi nearly always longer than tibia (i.e. L.R. more than 1). Male styles directed rigidly backwards and without terminal spine; coxites usually with two or more basal appendages.

KEY TO GENERA.

- 1 Wings with macrotrichia, at least at the tip.....2
Wings devoid of macrotrichia; r-m distinct and oblique.....3
2 Squama fringed; r-m distinct and oblique
Chironomus Meigen subgenus **Pentapedilum** Kieffer (p. 194).
Squama bare; r-m nearly horizontal or indistinct
Tanytarsus van der Wulp (p. 196).

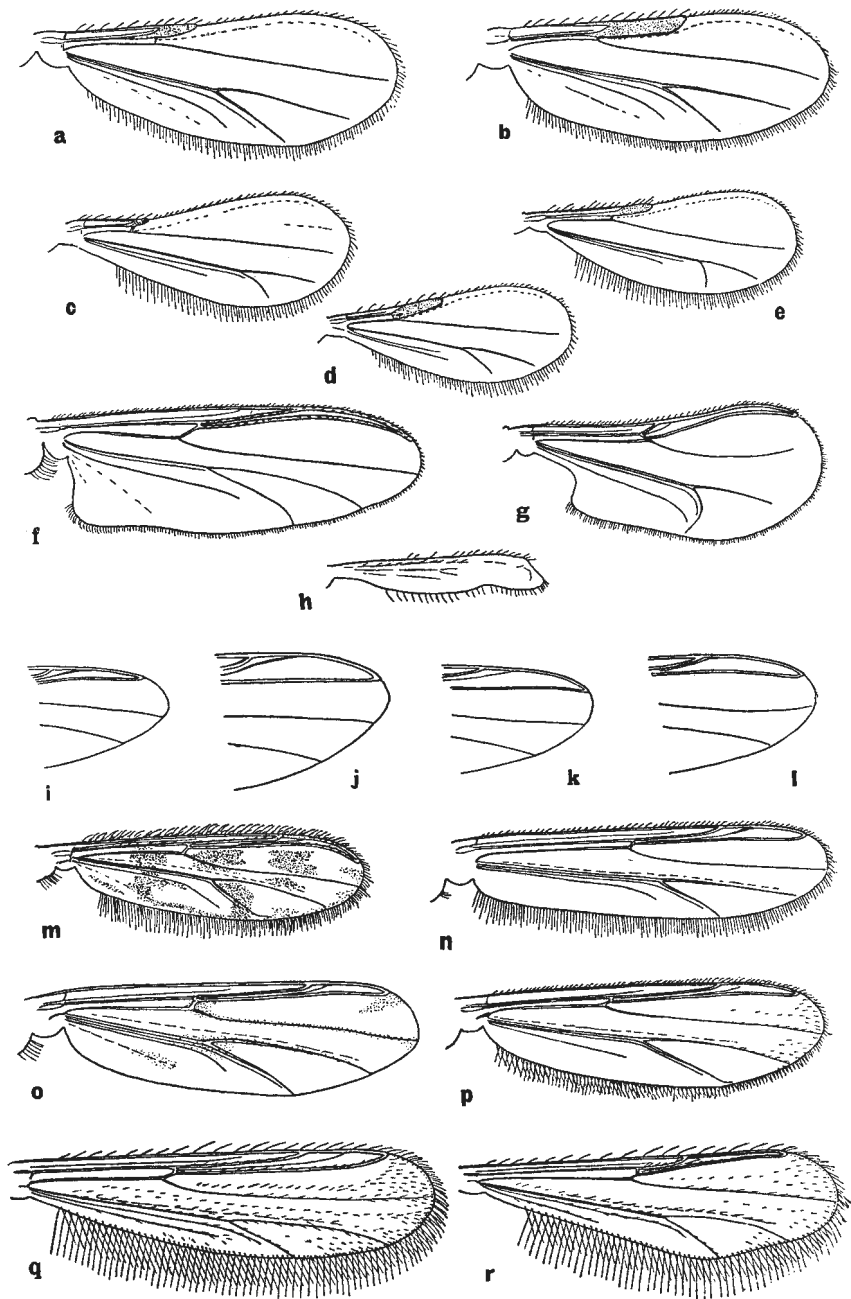


FIG. 192.—Wings of CHIRONOMIDAE. (a) *Thienemanniella flavescens* ♂. (b) *T. lutea* ♀. (c) *Corynoneura (Eucorynoneura) cellica* ♂. (d) *C. (E.) fuscihalter* ♀. (e) *C. (Paracorynoneura) carriana* ♂. (f) *Thalassomyia frauenfeldi* ♂. (g) *Clunio marinus* ♂. (h) *Psammathomyia pectinata* ♂. (i) *Pseudochironomus prasinatus* (apex of wing). (j) *Chironomus (Glyptotendipes) paripes* (apex of wing). (k) *C. (Endochironomus) impar* (apex of wing). (l) *C. (Microtendipes) confinis* (apex of wing). (m) *C. (Polypedilum) apfelbecki* ♀. (n) *C. (Lauterborniella) orophilus* ♂. (o) *C. (Pentapedilum) nubens* ♀ (hairs omitted). (p) *Tanytarsus (s.str.) van-der-wulpi* ♂. (q) *T. (Stempellina) brevis* ♂. (r) *T. (S.) cuneipennis* ♀.

- 3 All tibiae with long, conspicuous spurs (fig. 194a); eyes widely separated, reniform; pronotum large, with V-shaped emargination above
Pseudochironomus Malloch (p. 174).
 Front tibial spur absent or indistinct; eyes with long dorsal projection (fig. 193c); pronotum otherwise.....4
- 4 Combs of posterior tibiae composed of very short free spinules, without trace of spurs (fig. 194b).....**Graceus** Goetghebuer (p. 174).
 Combs of posterior tibiae composed of longer, basally fused spinules, at least one comb with spur (fig. 194e-h) (see also under 2)
Chironomus Meigen (p. 174).

Genus **Pseudochironomus** Malloch.

Wings without hair on membrane or veins, except on costa and radius. Venation as in *Chironomus*, except that $R_4 + 5$ ends distinctly before tip of m (fig. 192i). Squama with complete fringe. Eyes slightly reniform, very widely separated above. Antennae of ♂ 14-segmented, of ♀ 7-segmented. Palpi long. Pronotum large, reaching up to front edge of scutum, but with a deep, V-shaped excision. ♂ hypopygium with appendages 1 and 2 present, of peculiar form. Front tibia with a long spur. L.R. slightly less than 1. Posterior tibiae with two long spurs (fig. 194a), the bases of which are much enlarged and crenulate. Pulvilli large.

KEY TO SPECIES.

- 1 Medium-sized greenish species; wing-length 4-4.5 mm. ♂ scutum with four distinct black stripes. ♀ scutum with four brownish or yellowish stripes, median pair often fused. *Inverness* (*Nethy Bridge and Corroul*), *Westmorland* (*Witherslack, etc.*), *Lancs* (*Hawkshead, Three Dubs Tarn*), *N. Wales* (*Dolgelly and Carnarvon*), *Cambs* (*Wicken*), *N. Ireland*. 6-7.....**prasinatus** Staeger.

Genus **Graceus** Goetghebuer.

Antennae of ♂ 14-segmented, of ♀ 7-segmented. Palpi 4-segmented, but unusually short, in ♂ segment 4 shorter than 3, in ♀ 2, 3 and 4 about equal in length and only twice as long as broad. Eyes with long dorsal projection. Frontal tubercles absent. Pronotum fairly well developed, not completely divided in middle. Tibial combs very short, hardly discernible in the dry specimen; under a high power (fig. 194b) they appear to be composed of semi-free spinules; no trace of a spur on either comb. Pulvilli present but small. Wings rather narrow, venation as in *Chironomus*; costa not retracted; $R_2 + 3$ ending well beyond R_1 . ♂ hypopygium much as in *Chironomus s.str.*; styles rather large, oval; appendage 1 curved, 2 much swollen apically moderately long, with long curved hairs.

KEY TO SPECIES.

- 1 Thorax and abdomen blackish; scutum with slight pruinescence; antennae brownish; legs stout, posterior pairs brownish, anterior pair often darker; wings rather dark greyish, anterior veins brownish; anal lobe small and rounded; halteres dark brown; wing-length 3 mm. ♂ A.R. about 1.3; antennal plumes light brown, moderately dense. *Bucks* (*Burnham Beeches*), *Surrey* (*Woking*). 4. ("Flying low in great numbers over ponds on heaths")
ambiguus Goetghebuer.

Genus **Chironomus** Meigen.

Wings without hairs on membrane, except in subgenus **Pentapedilum**, or on veins M, Cu or An. Squama with complete fringe, except in subgenera **Lauterborniella**, **Kribioxenus** and one species of **Paratendipes**. Anal area of wing well developed. r-m distinct and oblique. Costa usually ending above tip of M. $R_4 + 5$ well removed from R_1 and often somewhat curved down at tip. An rather close to Cu and almost parallel, first with Cu and then with Cu_2 , the tip of An being bent down and reaching almost to middle of fork. Eyes moderately separated above, with long dorsal projections (fig. 193c). ♂ antennae 12-14-segmented, ♀ 6-7-segmented. Palpi long,

fourth segment usually much longer than third. Pronotum variably developed. Combs of posterior tibiae always large, more or less confluent ventrally, occupying at least half of circumference of tibia and composed of basally fused spinules. ♂ hypopygium with appendages 1 and 2 usually present, 1a and 2a absent (except in subgenus *Paratendipes*).

KEY TO SUBGENERA.

- 1 Wing-membrane hairy, at least towards tip.....*Pentapedilum* Kieffer (p. 194).
Wing-membrane bare..... 2
- 2 Hind tibial combs each with a short spur (very rarely the outer spur is absent) (fig. 194e-g)..... 3
Hind tibiae with a long, or rather long, spur on the small outer comb, the large inner comb unarmed (fig. 194h)..... 8
- 3 Pulvilli well developed, at least half as long as claws..... 4
Pulvilli absent or scarcely distinguishable..... 7

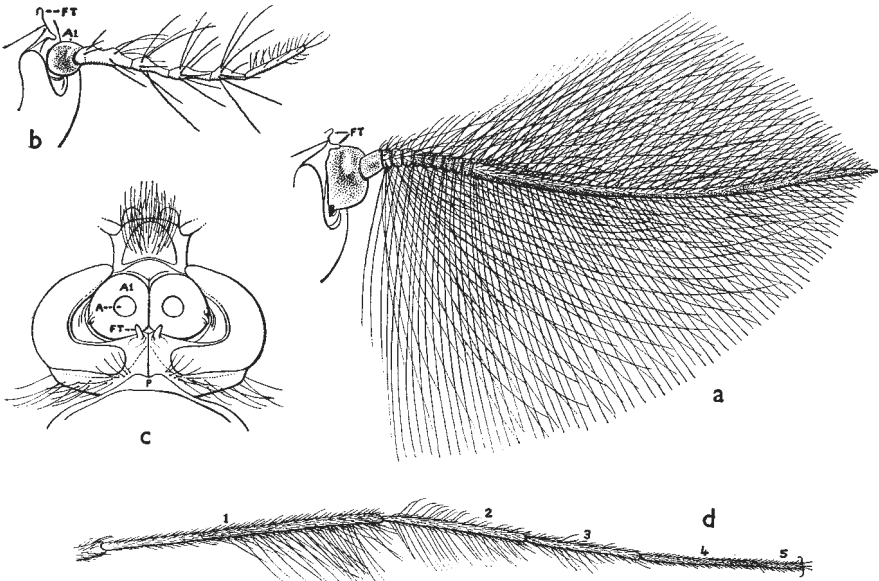


FIG. 193.—(a) Antenna of a male *Chironomus* (*C. dorsalis* Meigen). (b) Antenna of a female *Chironomus* (*C. dorsalis* Meigen). (c) Head and pronotum of a *Chironomus* (*C. riparius* Meigen ♂), dorsal aspect, showing long postero-dorsal projections of eyes, also frontal tubercles. (FT = frontal tubercles. A1 = first antennal segment. A = position of antennal segments 2-12 (removed). P = pronotum.) (d) Front tarsus of a male *Chironomus* (*C. aprilinus* Meigen), showing long tarsal beard (1-5 = tarsal segments).

- 4 Pronotum forming a distinct collar, reaching up to front edge of scutum and not completely divided in middle (figs. 193c and 195a)
Chironomus Meigen s.str. (p. 177).
Pronotum otherwise..... 5
- 5 Pronotum reaching up to front edge of scutum, but bilobed (as seen from above) (fig. 195c).....*Endochironomus* Kieffer (p. 187).
Pronotum more reduced, not visible from above (fig. 195b, d-g)..... 6
- 6 Scutum not produced forward; wings not banded (fig. 195b)
Glyptotendipes Kieffer (p. 186).
Scutum produced forward over head (fig. 195d); wings banded
Stenochironomus Kieffer (p. 188).

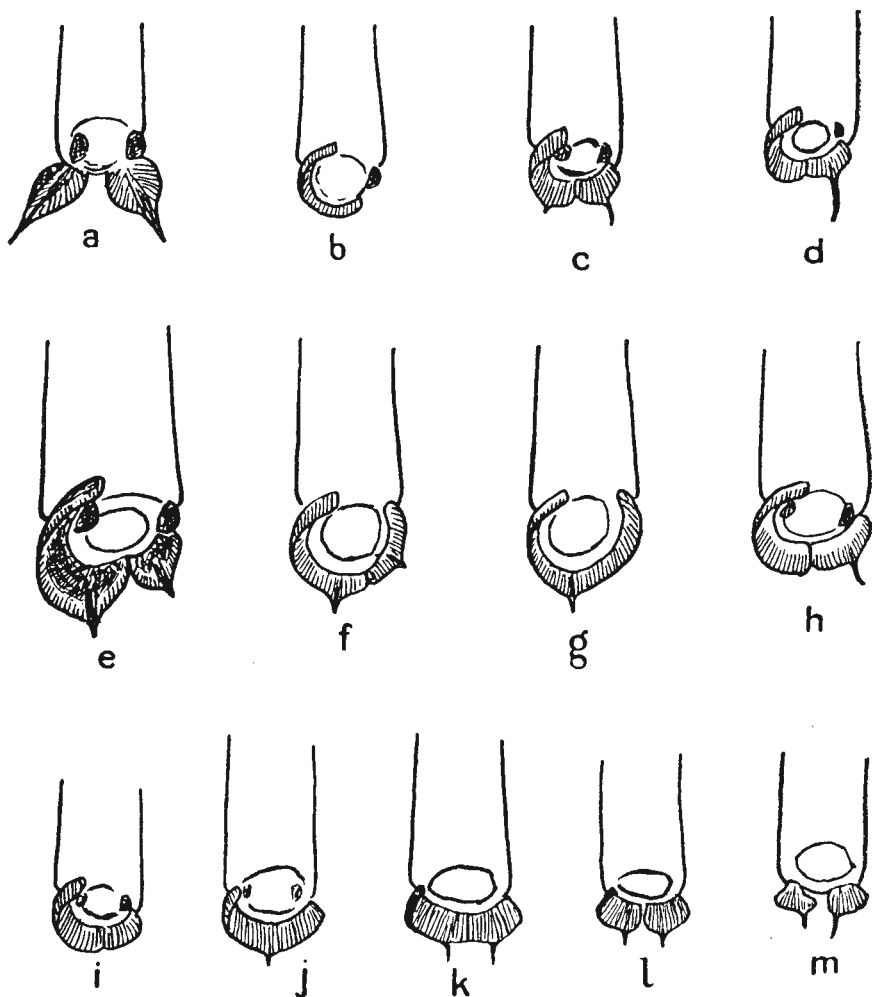


FIG. 194.—Diagrams showing form of right hind tibial combs of CHIRONOMINAE, in postero-dorsal aspect after removal of tarsus. (a) *Pseudochironomus prasinatus* Staeger. (b) *Graceus ambiguus* Goetghebuer. (c) *C. (Pentapedilum) flavipes* Meigen. (d) *C. (P.) sordens* van der Wulp. (e) *Chironomus (s.str.) plumosus* Linnaeus. (f) *C. (Endochironomus) tendens* Fabricius. (g) *C. (E.) dispar* Meigen. (h) *C. (Microtendipes) pedellus* Degeer. (i) *Tanytarsus (Micropsectra) brunripes* Zetterstedt. (j) *T. (Lundstroemia) praecox* Meigen. (k) *T. (L.) penicillatus* Goetghebuer. (l) *T. (s.str.) tenellulus* Goetghebuer. (m) *T. (s.str.) ejuncidus* Walker.

- 7 Front tibia with short spur; thorax shining black
Paratendipes Kieffer (p. 189).
 Front tibia with longish curved spur; thorax green
Kribioxenus Kieffer (p. 189).
- 8 Squama fringed.....9
 Squama bare.....Lauterborniella Bause (p. 195).
- 9 Large or medium-sized species; wings unmarked; legs not ringed; thorax usually shining black; $R_2 + 3$ ending in close approximation to tip of R_1
Microtendipes Kieffer (p. 189).
 Small to medium-sized species; wings often spotted or clouded or legs ringed; $R_2 + 3$ ending more or less distinctly beyond tip of R_1 10
- 10 Scutum with a slight hump in middle (fig. 195f); f.Cu below or before r-m.
Stictochironomus Kieffer (p. 191).
 Scutum without a hump in middle; f.Cu at least slightly beyond r-m
Polypedilum Kieffer (p. 192).

SUPPLEMENTARY GUIDE TO CERTAIN GROUPS OR SPECIES OF Chironomus.

- 1 ♂ antennae with 12 segments (the others have 14): **Chironomus, Glyptotendipes, Endochironomus rufipes.**
- 2 ♀ antennae with 7 segments (the others have only 6, segments 2 and 3 not being separate): **Glyptotendipes, Endochironomus, Paratendipes, Kribioxenus, Microtendipes.**
- 3 Wings with one or two dark transverse bands: **Stenochironomus, Endochironomus rufipes.**
- 4 Wings with spots or clouds: **Stictochironomus, Polypedilum, Lauterborniella marmorata.**
- 5 Wings with R-M blackened, otherwise unmarked: **Chironomus (Groups A and B), Glyptotendipes, Stictochironomus.**
- 6 Tibiae with dark rings: **Stictochironomus.**
- 7 Thorax all shining black: **Chironomus nigrontens, Endochironomus, Paratendipes, Microtendipes.**
- 8 Body all green: **Chironomus (several groups), Glyptotendipes viridis, Endochironomus albipennis ♀, Kribioxenus brayi ♀.**

Subgenus **Chironomus** s.str.

♂ antennae 12-segmented (fig. 193a); A.R. usually 3 or more; ♀ antennae 6-segmented (fig. 193b). Frontal tubercles (fig. 193a-c) often present. Pronotum forming a distinct collar, reaching up to front margin of scutum, where it is often emarginate but not quite divided (fig. 193c). Front tibia without trace of spur. Combs of posterior tibiae large, occupying most of circumference of tibia and each with a short spur. Pulvilli always large. Wings without spots or bands, at most with darkened cross-vein. $R_2 + 3$ ending only a little beyond tip of R_1 ; f.Cu below or slightly beyond r-m.

KEY TO GROUPS.

(Male characters only: the females in these groups cannot be satisfactorily defined.)

- 1 Styles very stout, with hard dorsal keel; appendage 2 long and densely pubescent; tergite trilobed apically (fig. 196a, b). Frontal tubercles large
Group A (p. 178).
 Styles less stout, rarely with dorsal keel; appendage 2 otherwise; tergite not trilobed2
- 2 Appendage 2 reaching well beyond end of coxite, with long curved hairs.....3
- 3 Appendage 2 not reaching beyond end of coxite, without long curved hairs....4
- 3 Appendage 2 broad and almost straight (fig. 196c). Frontal tubercles usually present (fig. 193a-c).....Group B (p. 179).
- Appendage 2 narrower, curved ventrally, bare except towards tip (fig. 196d). Frontal tubercles absent.....Group C (p. 182).
- 4 Appendage 2 broad, pubescent (fig. 196l-n). Frontal tubercles absent
Group D (p. 183).
 Appendage 2 rudimentary or absent (fig. 196h-k). Frontal tubercles absent or very small.....Group E (p. 183).

GROUP A.

(Camptochironomus Kieffer.)

♂ tergite 9 trilobed, with a small hairy lobe on each side of anal point, latter in the form of a deep vertical keel with two dorsal flanges. Appendage 1 rudimentary, 2 very long, with long dense pubescence along the whole of the inner face, but no specially long hairs; styles unusually thick and horny, with sharp dorsal keel. Large species with large frontal tubercles, milky wings and strongly pruinose thorax.

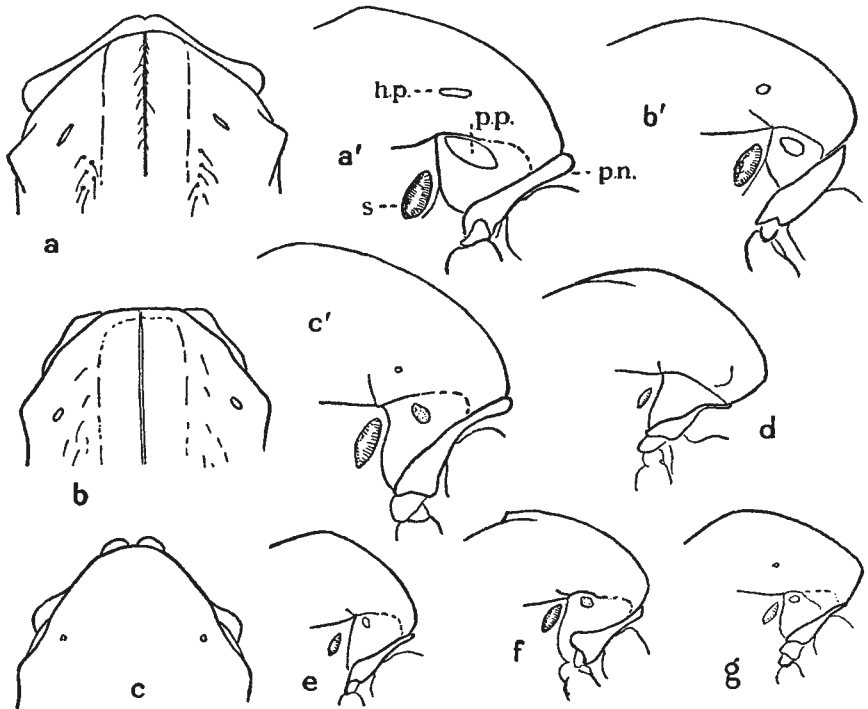


FIG. 195.—Diagrams of anterior part of thorax of different subgenera of *Chironomus*, to show form of pronotum, etc. (a) and (a') *C. (s.str.) anthracinus* Zetterstedt, dorsal and lateral aspect. (b) and (b') *C. (Glyptotendipes) glaucus* Meigen. (c) and (c') *C. (Endochironomus) dispar* Meigen. (d) *C. (Stenochironomus) gibbus* Fabricius. (e) *C. (Polypedilum) arundineti* Goetghebuer. (f) *C. (Stictochironomus) pictulus* Meigen. (g) *C. (Microtendipes) pedellus* Degeer. (pn = pronotum, p.p. = prothoracic sensory pit. h.p. = humeral pit. s = spiracle.)

KEY TO SPECIES.

- 1 Scutal stripes black; postnotum black, sometimes narrowly yellow at base; abdomen mainly black; legs often more or less extensively darkened, front tibia in mature specimens often almost entirely black; r-m darkened; wing-length 5.5-8 mm. ♂ front tarsi sometimes with slight beard; lateral lobes of tergite 9 short (fig. 196b). *Yorks (Bramhope), Glamorgan (Porthcawl), Notts (Bulwell Forest), Hunts (Wood Walton), Cambs (Wicken), Suffolk (Diss), Herts (Tring), Essex (Epping), Somerset (Blagdon).* 5-7.....*tentans* Fabricius.

Rather smaller and lighter than *tentans* ; scutal stripes reddish, lateral pair usually with a blackish spot at posterior end, which sometimes extends forward and occupies half the stripe or more ; postnotum rather broadly yellow at base ; abdomen usually more or less greenish-ochreous towards base ; legs as in *tentans* ; r-m pale or at most light brownish ; wing-length 5.5-8 mm. ♂ front tarsi without beard ; lateral lobes of tergite 9 longer and narrower than in *tentans* ; anal point rather differently shaped (fig. 196a) ; styles shorter. *Norfolk* (*Hickling*), *Hunts* (*Wood Walton*), *Surrey* (*Mitcham*), *Sussex* (*Seaford*). 6-8.....**pallidivittatus** Malloch.

GROUP B.

(*Chironomus* s.str.)

♂ tergite 9 not trilobed, anal point without dorsal flanges. Appendage 1 variable, 2 broad, straight or almost so, reaching well beyond end of coxite, and with numerous long curved hairs apically ; styles long, usually contracted on about the apical third, and nearly always with a close-set row of short stiff bristles on inner side at tip. Large to medium-sized species. Frontal tubercles nearly always present. Thorax usually pruinose. Middle femora with the apical projection broad.

Series 1.

(*Chironomus* s.str.)

♂ appendage 1 strongly chitinized and quite bare. r-m more or less conspicuously darkened. Body not entirely green.

KEY TO SPECIES.

- 1 Body and legs almost entirely black (in mature examples).....2
Body not entirely black, legs more or less pale, at least posterior tibiae.....4
- 2 Halteres blackish ; mesonotal hairs black ; L.R. unusually short, 0.95-1.0 ; wing-length 5-7.5 mm. *Inverness* (*Nethy Bridge*), *Perthshire* (*Killin*), *Edinburgh*, *Yorks* (*Leeds*), *Notts* (*Widmerpool*), *Hunts* (*Wood Walton*). 3-4, 6
pllicornis Fabricius.
Knob of halteres and mesonotal hairs pale.....3
- 3 Larger species ; wing-length 5-7.5 mm. ; L.R. 1.05-1.25. ♂ tarsal beard rather long. *Common by lakes throughout Britain.* 4-6
anthracinus Zetterstedt.
Small species ; wing-length 4-5 mm. ; L.R. about 1.25. ♂ tarsal beard very short or absent. *Perthshire* (*Killin*), *Yorks* (*Ilkley*, *Whernside* and *Pen-y-Ghent*), *S. Wales* (*Brecknock*). 5-7.....**lugubris** Zetterstedt.
- 4 L.R. 1.2-1.4. ♂ tarsal beard usually present even if short.....5
L.R. 1.5-1.7 ; wing-length 4-5.5 mm. ♂ tarsal beard absent ; antenna as in fig. 193a. ♀ antenna as in fig. 193b. ♂♀ **Typical form** : scutal stripes light to dark brownish or quite black, somewhat shining ; whole scutum sometimes lightly pruinose. **Var. venustus** Staeger : scutum more heavily pruinose. **Var. viridicollis** van der Wulp : front tibiae more extensively dark than usual, or even entirely blackish. *Common. Generally distributed.* 4-11....**dorsalis** Meigen..
- 5 Wing-length 6.5-8 mm. ; thorax heavily pruinose ; frontal tubercles large, rather longer than usual. ♂ A.R. 5 ; tarsal beard rather long. ♂♀ **Typical form** : scutal stripes dark grey ; abdomen largely dark. **Var. ferrugineovittatus** Zetterstedt : scutal stripes reddish-brown ; thorax and abdomen with lighter ground colour. **Var. prasinatus** Meigen : abdomen greenish, with small dark dorsal spots. *Common. Generally distributed.* 4-9.....**plumosus** Linnaeus.
Wing-length 4-6 mm. ♂ A.R. less than 5.....6
- 6 Frontal tubercles absent (present in all other British species of this group) ; body dark ; legs more or less darkened ; L.R. about 1.4 ; wing-length 5-6 mm. ♂ tarsal beard very short. *Argyllshire* (*Bonawe*), *Lancs* (*Hawkshead*, *Three Dubs Tarn*). 7-9.....**inermifrons** Goetghebuer.
Frontal tubercles very distinct.....7
- 7 ♂ appendage 1 of hypopygium rather long and slender.....8
♂ appendage 1 short, more or less swollen apically.....11

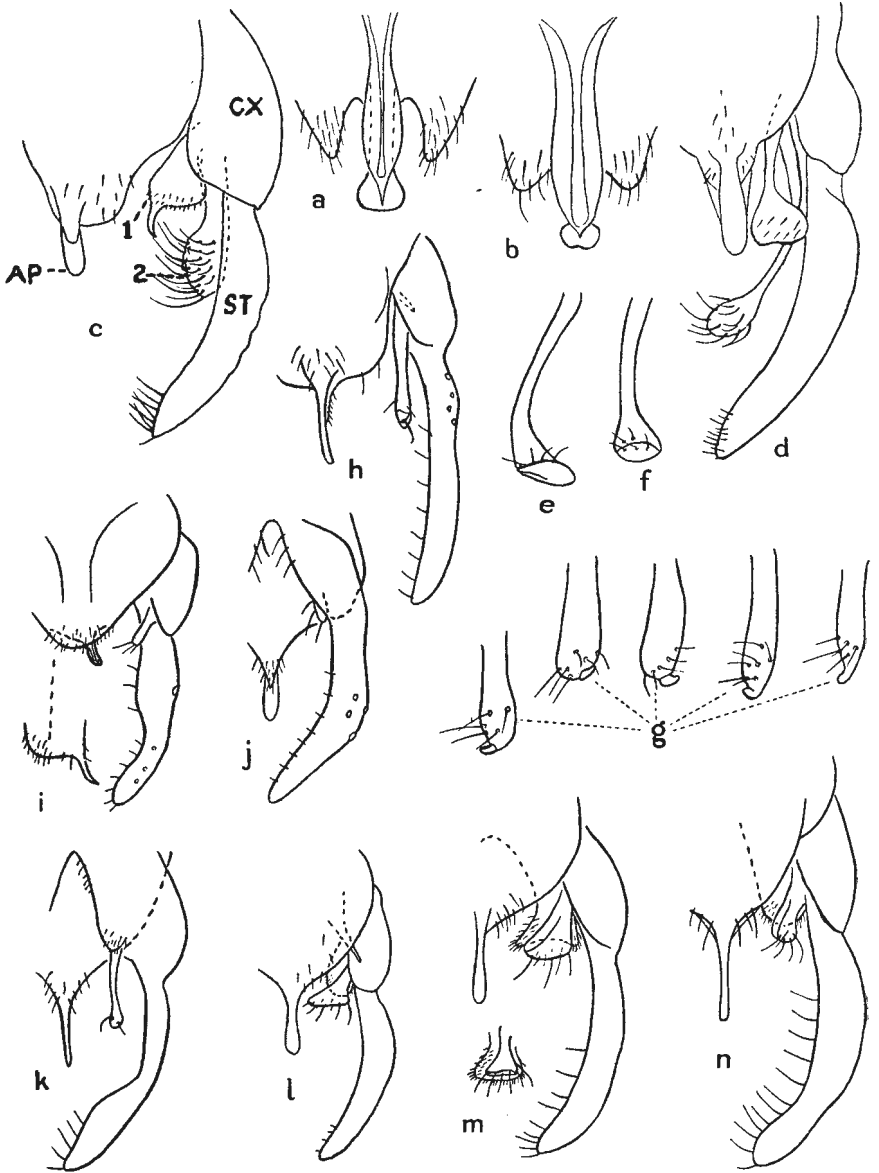


FIG. 196.—Male hypopygium of species of *Chironomus s.str.* (a) Tip of ninth sternite with anal point of *C. pallidivittatus* Malloch. (b) Same part in *C. tentans* Fabricius. (c) *C. dissidens* Walker, dorsal aspect. (d) *C. pulsus* Walker, dorsal aspect. (e) Dorsal basal appendage (appendage 1) of *C. nervosus* Staeger. (f) Same part in *C. tritomus* Kieffer. (g) *C. lobiger* Kieffer, showing five variations in form of appendage 1. (h) *C. digitalis* Edwards, dorsal aspect. (i) *C. nigronitens* Edwards, dorsal aspect. (j) *C. edwardsi* Krusemann, ventral aspect. (k) *C. baciliger* Kieffer, ventral aspect. (l) *C. camptolabis* Kieffer (? var. *laminatus* Kieffer), dorsal aspect. (m) *C. camptolabis* K., showing two other variations in form of basal appendages. (n) *C. claripennis* Malloch (?). (CX = coxite. ST = style. AP = anal point. 1 and 2 = basal appendages 1 and 2 respectively.)

- 8 Scutellum dark; thorax heavily pruinose, with little trace of green even on shoulders.....9
Scutellum more or less pale; ground colour of thorax often greener.....10
- 9 ♂ tarsal beard rather long, though not dense; appendage 1 of hypopygium resembling that of *plumosus*, but shorter and less stout, somewhat curved down at tip. ♂♀ L.R. about 1.3; wing-length 5.5-7 mm. (Possibly a small, dark form of *plumosus*.) *Inverness (Aviemore), Yorks (Whernside), Hunts (Wood Walton), Herts (Letchworth)*. 4, 6.....**annularius** Degeer.
♂ tarsal beard short or absent. ♂♀ thoracic pubescence often with bluish tint; the dark median line extending from middle scutal stripe to scutellum often tends to widen posteriorly; wing-length 5-6 mm. (or 4-5 mm. in small coastal variety). *Common. Generally distributed.* 4-9.....**longistylus** Goetghebuer.
- 10 ♂ anal point very broad; tarsal beard absent. ♂♀ wing-length 4 mm. *Yorks (Ilkley)*. (*Date not known*).....**obtusidens** Goetghebuer.
♂ anal point not unusually broad; tarsal beard present, but usually short. ♂♀ wing-length 4-6.5 mm. *Common. Generally distributed.* 4-9.....**cingulatus** Meigen.
- 11 ♂ tarsal beard rather long (fig. 193d). ♂♀ wing-length 4-6.5 mm. *Common. Generally distributed.* 4-9.....**aprilinus** Meigen.
♂ tarsal beard short; frontal tubercles as in fig. 193c. ♂♀ wing-length 4-6 m.m. *Common. Generally distributed.* 4-9, 11.....**riparius** Meigen.
(Goetghebuer (1937 : 26) treats *riparius* as a variety of *dorsalis* Meigen.)

Series 2.

(Einfeldia Thienemann.)

♂ appendage 1 broad and pubescent on basal half or more, ending in a bare chitinized hook. r-m not obviously darkened.

KEY TO SPECIES.

- 1 Frontal tubercles absent; palpi black; scutum lightly pruinose, somewhat shining; body bright green; tarsi mainly brownish; L.R. about 1.3; wing-length 3-5 mm. ♂ anal point very stout; styles abruptly narrowing well before the pointed tip. *Common. Westmorland (Witherslack) southwards to Essex (Epping)*. 5-8.....**paganus** Meigen.
Frontal tubercles present.....2
- 2 Thorax with green or greenish-yellow ground-colour.....3
Thorax black (only shoulders and upper part of pleurae usually yellowish in ♀); head, scutellum and postnotum black; frontal tubercles well developed; abdomen black; front femora brownish with black tip, posterior femora entirely blackish; tibiae yellowish with base and tip black, front pair darker; tarsi blackish, basal half of first segment yellowish-white; L.R. about 1.7; wing-length 3-4 mm. ♂ hypopygium (fig. 196c) with anal point moderately long and slender. *Inverness (Aviemore), Yorks (Gormire), Lancs (Manchester), N. Wales (Newtown), Herts (Radwell, etc.), Hants (Sowley Pond), Sussex (Three Bridges)*. 6-9.....**dissidens** Walker.
- 3 Scutal stripes reddish-orange; thorax only slightly shining; postnotum mainly brown or black, but pale basally; abdomen mainly brown or black, usually greenish basally; frontal tubercles very small; legs usually greenish, tibiae and tarsi occasionally somewhat brownish; L.R. 1.6-1.8; wing-length 3-5 mm. ♂ A.R. about 3.5. *Frequent. Inverness (Aviemore) southwards to Hants (Sowley Pond)*. 5-9.....**longipes** Staeger.
Scutal stripes black; thorax brightly shining; postnotum entirely shining black; abdomen black, greenish basally; frontal tubercles well developed; legs partly greenish or light brownish; anterior femora with apical sixth black, other femora only darkened at apex; anterior tibiae entirely black, other tibiae black-tipped; all tarsal segments black-tipped; L.R. 1.3-1.5; larger than preceding three species; wing-length 4.5-6 mm. ♂ A.R. about 4. *Lancs (Hawkshead, Three Dubs Tarn)*. 6-7.....**macani** Freeman.

Series 3.

(Xenochironomus Kieffer.)

♂ appendage 1 rudimentary, fleshy and pubescent. Frontal tubercles absent. r-m more or less darkened, but not conspicuously so. Body all green.

KEY TO SPECIES.

- 1 Green species superficially resembling *paganus* (Series 2), but rather smaller; wing-length 3.5-4.5 mm.; palpi pale at base. ♂ front tarsi normally with slight beard, but this is absent in small specimens; styles of hypopygium broad after base, shortly tapering at tip. *Beds (Biggleswade), London (Bedford Park, etc.), Surrey (Richmond), Cornwall (Mullion).* 5-8. *xenolabis* Kieffer.

GROUP C.

(Limnochironomus Kieffer.)

♂ appendage 2 long, narrow, more or less arched ventrally, long curved hairs present only at the tip, which is somewhat enlarged. Frontal tubercles absent. Middle femora with the apical projection rather hook-like. r-m not darkened.

KEY TO SPECIES.

- 1 Front tibia conspicuously black or dark brown; front femora black-tipped; front tarsus black except base of first segment; abdominal segments 1-5 clear green, 6-8 normally black; wing-length 3-4 mm. ♂ scutal stripes usually reddish; postnotum usually black or reddish; appendage 2 of hypopygium with membranous dorsal expansion. ♀ scutal stripes and postnotum black. *Frequent. Generally distributed.* 5-9. *notatus* Meigen.
Front tibia normally darkened at tip only. 2
- 2 ♂ scutal stripes, postnotum and sternum blackish; tarsi with slight beard; L.R. about 1.5; wing-length 3-4 mm. 3
♂ scutal stripes reddish-yellow. 4
- 3 ♂ abdomen olive-green, darkened apically; legs light brown, front femora and tibia black-tipped; hypopygium (fig. 196d) resembling that of *nervosus*, but styles shorter and club of appendage 1 much broader, about four times as broad as the stem. ♀ not examined. *Frequent. Generally distributed.* 5-8
pulsus Walker **Typical form.**
♂ body almost all blackish; legs entirely brownish. ♀ almost entirely green; scutal stripes and postnotum reddish-yellow. *Inverness (Aviemore), Arran (Correan Lochan).* 5, 7. *pulsus* Walker **var.**
- 4 Resembles typical *pulsus* apart from coloration of scutal stripes. (*Walker's types only, locality and date unknown*) *pulsus* var. **objectans** Walker.
Differ otherwise from *pulsus*. 5
- 5 ♂ styles of hypopygium much longer than in *notatus*. 6
♂ styles much shorter than in other species of **Group C** 8
- 6 ♂ appendage 1 of hypopygium with slender curved stem, expanded at tip on outer side only, 2 very long and curved, without dorsal membrane, tip not or scarcely bilobed. 7
♂ appendage 1 (fig. 196f) broader, almost straight, expanded almost equally on both sides at tip, 2 distinctly bilobed at tip (according to Kieffer, trilobed, but British specimens do not show the small median lobe). ♂♀ greenish species; wing-length 3-3.5 mm. *Carnarvon (Llyn Gwynant), S. Devon (Slapton).* 7, 9
tritonus Kieffer.
- 7 Entirely greenish species apart from reddish-yellow scutal stripes; front tibia narrowly dark at tip; wing-length 3-4 mm. ♂ tarsal beard very short or absent; hypopygium as in fig. 196e. *Common. Lancs (Hawkshead, Three Dubs Tarn) southwards to Sussex (Three Bridges).* 5-8, 9, 11
nervosus Staeger **Typical form.**
Resembles typical *nervosus*, but abdomen blackish apically. *Warwickshire (Rugby).* 5. *nervosus* Staeger **var**

- 8 Entirely greenish species apart from reddish-yellow scutal stripes; tip of front femora vaguely darkened, of tibia more distinctly so; first segment of front tarsus whitish, narrowly dark at tip, remaining segments all darkened; wings not distinctly milky; wing-length 3·3-5 mm. ♂ tarsal beard very short or absent; appendage 1 of hypopygium (fig. 196g) short, almost cylindrical, with a more or less distinct beak-like projection at tip and with 5-6 variably arranged hairs; appendage 2 shorter, less slender and less curved than in other species of **Group C**, tip enlarged and more or less conspicuously bilobed. *Common. Generally distributed.* 5-9.....**lobiger** Kieffer **Typical form.** Resembles typical *lobiger*, but wings distinctly milky; wing-length 3·5-4 mm. ♂ tarsal beard moderately long; club of appendage 2 more strongly bilobed. (*Distribution, see typical lobiger*).....**lobiger var. miriforceps** Kieffer.

GROUP D.

(*Cladopelma* Kieffer.)

♂ appendage 2 short, but broad, distinguishable in the dry specimen, densely pubescent but without long hairs; appendage 1 also short and broad, with rather dense pubescence and a few long hairs; styles long, slender, curved, without conspicuous row of short bristles on inner side at tip. Frontal tubercles absent.

KEY TO SPECIES.

- 1 Ground colour of thorax light to dark greenish; scutum somewhat pruinose, scutal stripes red or black, usually separate but sometimes almost confluent; postnotum and sternum dark brown to blackish; abdominal segments 5-8 usually blackish, entire abdomen occasionally darkened; legs light brown or yellowish, front tibia and tip of femora usually darker; wing-length 2·5-2·8 mm. ♂ basal appendages of hypopygium variable in shape (fig. 196l, m). *Frequent. Westmorland (Windermere, etc.) southwards to Sussex (Three Bridges).* 6-9.....**camptolabis** Kieffer. Body all black; thorax pruinose except on the black, shining scutal stripes; postnotum and sternum usually blackish; legs light to dark brownish; somewhat larger species than *camptolabis*; wing-length about 3·2 mm. ♂ styles slightly narrowed at tip (fig. 196n). *Inverness (Glen Nevis), Perthshire (Loch Laidon), Westmorland (Windermere), Cumberland (Skirwith).* 5-7
claripennis Malloch.

GROUP E.

(*Cryptochironomus* Kieffer.)

♂ appendage 2 very small, not distinguishable in the dry specimen, usually discernible in the mount as a small pubescent pad, but often entirely absent. Body usually mainly or all green. r-m not darkened. Middle femora with the apical projection more or less hook-like.

KEY TO SERIES.

- 1 Frontal tubercles rather large.....**Series 1** (p. 183).
Frontal tubercles absent or very small.....2
2 Tarsi distinctly black and white.....**Series 2** (p. 184).
Tarsi not distinctly black and white.....3
3 Front tibia greenish with dark tip.....**Series 3** (p. 184).
Front tibia (usually tarsi also) entirely blackish.....**Series 4** (p. 185).

Series 1.

Frontal tubercles present and rather large. Tarsi mainly dark, or at least not definitely black and white. Wing-length 3·5-5 mm. ♂ styles rather short and thick; appendage 1 very short, but broad, pubescent, visible in the dry specimen.

KEY TO SPECIES.

- 1 ♂ front tarsal beard long. ♀ scutal stripes and postnotum black; front tibia and tarsi entirely black; abdomen dark green; L.R. about 1.1; wing-length about 5 mm. *Lancs (Manchester)*. 6.....**psittacinus** Meigen.
♂ tarsal beard rather short or absent. ♂♀ smaller, light greenish or yellowish species; scutal stripes usually brownish; front tibia greenish or yellowish, usually with darkened tip.....2
- 2 Front tarsi with segments 1 and 2 obscurely whitish, tips darkened, 3 brownish with darkened tip, 4 and 5 brownish or blackish; wing-length about 5 mm. ♂ tarsal beard short but distinct. *Lancs (Manchester)*. *Cambs (Quy Fen)*, *Oxford*, *Herts (Radwell)*, *Hants (Sowley Pond)*. 6, 8-9
albofasciatus Staeger.
Front tarsi darkened after segment 1.....3
- 3 ♂ tarsal beard short but distinct. ♂♀ front tarsi almost entirely darkened, only segment 1 a little paler at base; wing-length 3.5-5 mm. *N.W. Yorks (Malham Tarn)*, *Carnarvon (Llyn Guymant)*, *Suffolk (Aldeburgh)*, *S. Devon (Slapton)*. 6-7, 9.....**supplicans** Meigen.
♂ tarsal beard apparently absent. ♂♀ front tarsi almost entirely darkened, segment 1 gradually darkened to tip; wing-length 4 mm. *Middlesex (Uxbridge)*. 7. (Also *Walker's type* ♀, without locality or date)
obreptans Walker.

Series 2.

Frontal tubercles absent. Tarsi with contrasting bands of black and white. Body all green. Wing-length 3.5-5 mm. ♂ styles rather long, appendage 1 rod-like (but often hidden), not pubescent, two or three terminal hairs present. ♂ front tarsi bearded.

KEY TO SPECIES.

- 1 Front tibia narrowly black-tipped; front tarsi with segment 1 mainly white, terminal two-fifths black, 2 white with narrow black tip, 3-5 black; wing-length 4-4.5 mm. ♂ tarsal beard short. *Bedford (Cardington)*, *Oxford*. 8
biannulatus Staeger.
Front tibia with at least distal fourth black; smaller species; ♂ tarsal beard longer.....2
- 2 Front tarsi as in *biannulatus*; front tibia with distal third to two-thirds black; wing-length 3-5 mm. *Herts (Tring)*, *Middlesex (Staines)*, *London (Putney)*. 6-7
longiforceps Kieffer.
Front tarsi of ♂ with segments 1 and 2 all white, 3 partly white with about distal half blackish, 4 and 5 all black; in ♀ segment 3 usually all black, 2 black-tipped; front tibia of ♂ with about distal fourth black, of ♀ distal one-third to two-thirds black; wing-length 3-4.5 mm. ♂ tarsal beard longer than in *longiforceps*. *Argyllshire (Bonawe)*, *Yorks (Castle Howard)*, *Cambs (Wicken and Shelford)*, *Beds (Cardington)*, *London (Putney)*. 6-8.....**vitiosus** Goetghebuer.

Series 3.

(*Parachironomus* Lenz.)

Frontal tubercles absent. Front tibia greenish with dark tip. Front tarsi usually more or less darkened. L.R. 1.5-1.7. ♂ styles long; appendage 1 usually distinct, rod-like, with two or three short hairs at tip. Front tarsi with very slight beard or none.

KEY TO SPECIES.

- 1 ♂ abdominal tergites green or light brownish, not at all darkened.....2
- ♂ at least terminal tergites distinctly darkened.....6
- 2 Front tarsi with first segment mainly brownish or blackish; scape brown or blackish; largest species in Series 3; wing-length 4-4.5 mm. ♂ hypopygium brownish or blackish; styles stout, tapering apically, with dorsal keel; appendage 1 rather long, enlarged at tip. *Lancs (Manchester)*, *Cheshire (Stockport)*, *Hunts (Wood Walton)*. 5.....**varus** Goetghebuer.
Front tarsi with first segment mainly whitish, at most vaguely darkened or black-tipped.....3

- 3 Legs pale, at most front tarsi vaguely darkened; entirely greenish species; wing length 2.5-3.5 mm. ♂ styles very long and slender, hairy only near the base and on the swollen tip, anal point and appendage 1 very long and very slender. *Oxford, Herts (Letchworth), Sussex (Three Bridges), S. Devon (Slapton and Beesands)*. 6, 8-9.....**baeiliger** Kieffer (*monochromus* Goetghebuer nec van der Wulp).
 Front tarsi with first segment distinctly, if narrowly, black-tipped.....4
- 4 ♂ styles much swollen apically, long and mainly slender; anal point and appendage 1 not unusually long (fig. 196k); A.R. not quite 3. ♂♀ entirely greenish species; f.Cu scarcely beyond base of R₃; wing-length 2.8 mm. *Herts (Letchworth)*. 6-7.....**monochromus** van der Wulp (*claviforceps* Edwards).
 ♂ styles not swollen apically. ♂♀ scutal stripes more or less distinct, brownish..5
- 5 ♂ styles rather stout, tapering apically, moderately incurved, appendage 1 rather long, enlarged at tip; hypopygium pale. ♂♀ greenish species; scape pale; wing-length 3-4 mm. *Yorks (Gormire), N. Wales (Newtown), Herts (Letchworth), Middlesex (Harlesden), Surrey (Richmond), S. Devon (Slapton)*. 4, 6-7, 9.....**parilis** Walker.
 ♂ styles long, almost cylindrical, strongly incurved, appendage 1 short, not reaching beyond end of coxite. ♂♀ greenish species; wing-length 2.5-3.5 mm. Frequent. Generally distributed. 6-9.....**falcatus** Kieffer.
- 6 Postnotum and sternum dark brown or black; all tergites distinctly darkened; front tarsi almost entirely brownish; scutal stripes more or less distinct, brownish; wing-length 3.5 mm. ♂ styles long and slender, almost straight, and of practically uniform thickness throughout; appendage 1 reaching well beyond end of coxite, scarcely enlarged at tip (fig. 196h); A.R. at least 3. *Inverness (Kincaig), Ayrshire (Dreghorn), Oxford, Surrey (Richmond)*. 5, 7
digitalis Edwards.
 Postnotum and sternum light brown; only terminal tergites darkened; front tarsi usually somewhat darkened; scutal stripes usually brownish; wing-length 2.5-3 mm. ♂ styles slightly constricted in middle; appendage 1 scarcely reaching beyond end of coxite, but distinct; A.R. about 2.5. *Herts (Radwell)*. 6.....**pseudotener** Goetghebuer.

Series 4.

(*Harnischia* Goetghebuer.)

Frontal tubercles absent or very small. Front tibia entirely blackish, usually also the front tarsi. Scutum usually striped. ♂ appendage 1 of hypopygium short or absent. Front tarsi without beard.

KEY TO SPECIES.

- 1 ♂ front femora conspicuously and rather broadly black-tipped; posterior femora with chitinized apical hooks black and very conspicuous; scutal stripes, scape and sternum reddish; wings not milky; styles rather short and thick, appendage 1 rather broad, pubescent. ♂♀ wing-length 3.5-4 mm. *Westmorland (Temple Sowerby), Yorks (Ilkley), Surrey (Richmond)*. 6-7
denticulatus Goetghebuer.
 ♂ front femora with tips not or only obscurely darkened; posterior femora with apical hooks pale and transparent.....2
- 2 ♂ only (♀ unknown). Thorax entirely shining black; palpi black; A.R. about 3; front legs entirely brownish, posterior legs dark olive-green; L.R. about 1.4; wings milky-white, including all veins; abdomen dark olive-green; tergite 9 much swollen, almost square-ended as seen in side-view; anal point short; styles rather long, thickened on basal half; appendage 1 reaching slightly beyond end of coxite, with three terminal hairs; appendage 2 entirely absent (fig. 196i); wing-length 2.5 mm. *Lancs (Manchester)*. 7
nigronitens Edwards ♂.
 Thorax not entirely black, scutal stripes usually reddish.....3
- 3 Front tarsi with first segment distinctly paler towards base.....4
 Front tarsi with first segment uniformly blackish, brownish or greenish.....5

- 4 Scape reddish ; postnotum black ; first front tarsal segment broadly pale towards base ; L.R. 1.8-1.9 ; scutal stripes reddish ; abdomen usually distinctly darkened towards tip ; wing-length 3-3.5 mm. ♂ styles of uniform thickness, steadily incurved to tip. *Westmorland (Bowness and Windermere), Sussex (Three Bridges)*. 6-7.....+.....**pseudosimplex** Goetghebuer.
- Scape blackish ; postnotum yellowish or light reddish ; first front tarsal segment rather narrowly pale at base ; L.R. 1.5-1.7 ; scutal stripes yellowish or light reddish ; abdomen not or scarcely darkened at tip ; wing-length 2-2.5 mm. ♂ styles abruptly bent inward at middle, terminal half tapering (fig. 196j). *Yorks (Gormire), Cambs (Quy Fen), Essex (Epping), London (Putney)*. 6-8
edwardsi Krusemann (*virescens* Edwards nec Goetghebuer, Meigen).
- 5 Scape, sternum and postnotum orange or yellowish.....6
- Scape, sternum and postnotum (except perhaps at base) black or dark brown...8
- 6 Wings strongly milky ; scutal stripes reddish ; abdomen more or less darkened apically ; largest species of **Series 4** ; wing-length 5 mm. ♂ styles rather long, stoutest in middle, with longitudinal dorsal keel ; appendage 1 very small. *Inverness (Aviemore), Outer Hebrides (Lewis), Westmorland (Windermere), Beds (Biggleswade), Surrey (Witley), Sussex (Three Bridges)*. 6-7
vulneratus Zetterstedt.
- 7 Front femora not noticeably darkened at tip ; scutal stripes orange ; wing-length 3-3.5 mm. ♂ styles stout, scarcely tapering until tip. *Yorks (Leeds), Beds (Biggleswade)*. 7.....**rostratus** Kieffer.
- Front femora obscurely, but noticeably, darkened at tip ; scutal stripes orange ; wing-length 3-4 mm. ♂ styles less stout, steadily tapering after middle. *Westmorland (Milnthorpe, etc.), Yorks (Ilkley), Carnarvon (Llyn Guymant), Merioneth (Dolgelly)*. 6-7.....**atriforceps** Goetghebuer.
- 8 Antennal flagellum brown or black ; scutal stripes reddish ; postnotum black, pale at base ; wing-length 2-2.5 mm. ♂ styles rather long, thickened on about the basal half. *Herts (Radwell)*. 6.....**tener** Kieffer.
- Flagellum distinctly yellowish, at least towards base.....9
- 9 Abdomen (including hypopygium) and posterior legs with very long pale hairs ; scutal stripes reddish-brown ; abdomen usually brownish ; larger species than *viridulus* ; wing-length about 3 mm. ♂ styles long, almost cylindrical, strongly incurved, but (*in situ*) not crossing, except sometimes at extreme tip ; appendage 1 present, but not reaching to end of coxite. *Middlesex (Harlesden)*. 5
? **cinetellus** Goetghebuer.
- Abdomen (including hypopygium) and posterior legs rather short-haired ; scutal stripes reddish, or partly or entirely blackish ; abdomen usually greenish, occasionally brownish ; smaller species ; wing-length 2-3 mm. ♂ styles long, somewhat thickened on basal half, tapering after middle, steadily incurved, and (*in situ*) crossing for a considerable distance ; appendage 1 practically absent. *Westmorland (Windermere), Lancs (Manchester), N. Wales (Newtown), London (Kensington Gardens), S. Devon (Slapton and Beesands)*. 5-6, 8-9
viridulus Linnaeus.

Subgenus **Glyptotendipes** Kieffer.

Antennae of ♂ 12-segmented, of ♀ 7-segmented. Frontal tubercles absent or very small. Pronotum small, divided in middle, closely applied to the mesonotum and not visible from above. In the typical species abdominal tergites 2-5 have in both sexes a racquet-shaped impressed area at the base, and tergite 6 has a similar but more elongate impression. Tibial combs large, each with a short spur. Pulvilli large. $R_2 + 3$ ending well beyond R_1 (fig. 192j) ; f.Cu below r-m. ♂ styles only moderately long, without stiff bristles on inner side at tip ; appendage 1 short, curved, bare ; 2 stout, with long curved hairs apically, reaching only a short distance beyond base of style.

KEY TO SPECIES.

- 1 Abdominal tergites 2-6 with a very distinct racquet-shaped impressed area extending from the base, that on tergite 6 more elongate ; r-m darkened....2
- Abdominal impressed areas only feebly indicated ; r-m not darkened.....5

- 2 Second segment of front tarsi slightly longer than third; frontal tubercles absent 3
 Second segment of front tarsi not longer than third; small frontal tubercles present..... 4
- 3 Blackish species; thorax heavily pruinose; wings with posterior veins hardly darkened; legs dark brownish; wing-length 5-6 mm. *Common. Generally distributed.* 5-8..... **glaucus** Meigen.
 Brownish species; thorax lightly pruinose; all veins darkened; legs clear yellowish; wing-length 4-5.5 mm. *Frequent. Westmorland (Witherslack) southwards.* 3, 6-9..... **gripekoveni** Kieffer.
- 4 Second and third front tarsal segments equally long; L.R. about 1.25; legs dark brown or black; wing-length 5-6 mm. ♂ front tarsi with long but sparse beard. *Perthshire (Killin), Yorks (Whernside), Notts (Fiskerton), Somerset (Bridgwater).* 6-8..... **paripes** Edwards.
 Second front tarsal segment shorter than third; L.R. about 1.25; legs reddish-brown; wing-length about 5.5 mm. ♂ front tarsi with abundant, evenly distributed, long beard extending from middle of first segment to tip of fourth. *Merioneth (Barmouth).* 5..... **barbipes** Staeger.
- 5 Body blackish; thorax moderately grey-dusted, except on the slightly shining scutal stripes; frontal tubercles absent; L.R. about 1.4; wing-length 4 mm. ♂ A.R. about 3; legs all dark brown or black; front tarsi with short beard; hypopygium as in fig. 197b. ♀ femora and tibiae brown, black-tipped, tarsi dark brown or black. *Inverness (Aviemore), Westmorland (Rydal, etc.), Lancs (Manchester and Reddish), Cheshire (Bollin Valley), Herts (Ickleford, etc.).* 5-8
foliicola Kieffer.
- At least ground colour of thorax and all femora greenish..... 6
- 6 ♂ only (♀ unknown). Scutal stripes black; scutum slightly grey-dusted; abdomen blackish, at least towards base; frontal tubercles absent; A.R. nearly 4; front tarsi with long beard; tibiae and tarsi usually darkened; L.R. about 1.25; hypopygium as in fig. 197a; wing-length about 3.7 mm. *Lancs (Manchester).* 6..... **mancunianus** Edwards ♂.
 Lighter coloured species..... 7
- 7 Scutal stripes reddish-yellow, distinct; frontal tubercles absent; abdomen mainly green, tergites with brownish median streak and segments 6-8 usually brown or black; wing-length 3.5-4 mm. ♂ front tarsi with rather long beard. *Middlesex (Staines).* 6..... **imbecillis** Walker.
 Lateral scutal stripes brownish, median stripe reddish-yellow, former usually obvious, latter usually faint; frontal tubercles absent; abdomen green, segments 6-8 sometimes brownish; wing-length about 3.5 mm. ♂ front tarsi with rather long beard. *Beds (Cardington).* 6..... **viridis** Macquart.

Subgenus **Endochironomus** Kieffer.

Antennae of ♂ 14-segmented, except in **rufipes**; of ♀ 7-segmented. Frontal tubercles absent. Pronotum moderately well developed and reaching up to anterior margin of scutum, but divided medially into two rounded lobes. Scutum without hump in middle. Abdominal tergites smooth. Posterior tibiae with large combs, each with a short spur, the one on the outer comb very small and difficult to detect, perhaps sometimes absent; the more distinct spur is ventral rather than internal in position. Pulvilli present, sometimes rather small. Wings unmarked. $R_2 + 3$ ending well beyond tip of R_1 (fig. 192k); f.Cu hardly beyond r-m. ♂ hypopygium with rather stout oval styles; appendage 2 usually with two long apical hairs.

KEY TO SPECIES.

- 1 Wings with a brown transverse band just before the middle, darker and more extensive towards costa; thorax shining black; abdominal tergite 1 yellow, 2 black, 3-6 yellow with black bands; legs mainly clear yellow, front tarsi usually darker; wing length 4-5.5 mm. ♂ front tarsi with long beard; antennae 12-segmented. *Lancs (Manchester), Yorks (Castle Howard), Herts (Felden), Middlesex (Harlesden), Surrey (Kew).* 6-8..... **rufipes** Linnaeus.
 Wings plain..... 2

- 2 Thorax with yellowish or greenish ground colour. 3
 Thorax entirely shining black. 4
- 3 ♂ front tarsal beard slight; scutal stripes yellowish-orange, rarely distinctly separated; abdomen greenish, terminal segments sometimes darkened and tergites occasionally with light brownish median streak. ♀ body entirely brownish without trace of green. ♂♀ wing-length 4-6 mm. *Frequent. Westmorland (Witherslack) southwards. 5-9. tendens* Fabricius.
 ♂ front tarsal beard moderately long; scutal stripes varying from yellowish-orange, light or dark brownish to black (*var. maritimus* Kieffer), usually narrowly but distinctly separated; abdomen greenish, terminal segments sometimes darkened, tergites frequently with distinct broad brownish median streak. ♀ abdomen usually almost all greenish, or at least so at base. ♂♀ wing-length 4-6 mm. *Common. Generally distributed. 5-9. albipennis* Meigen.
- 4 Legs mainly dark brown or black; thorax occasionally with light pleural patch and scutum with vague indications of lighter ground colour; abdomen all black; wing-length 4-4.5 mm. ♂ front tarsi without beard. *Westmorland (Windermere, etc.), Yorks (Gormire), Cheshire (Poynton), Staffs (Colwich Park), Hants (Christchurch), Sussex (Three Bridges). 5-7. intextus* Walker.
 Legs mainly yellowish or light brownish. 5
- 5 Legs mainly light brownish, front femora black-tipped; abdomen entirely black, or at most with restricted pale lateral markings; wing-length 3.5-5 mm. ♂ front tarsi without beard. *Frequent. Westmorland (Staveley) southwards to Sussex (Worthing). 3-9. impar* Walker.
 Legs mainly clear yellowish; front femora not black-tipped. 6
- 6 ♂ front tarsal beard absent; at least scape of antennae light brownish; abdomen greenish. ♀ scape of antennae light brownish, flagellum yellowish; abdomen mainly light brownish. ♂♀ front tibiae entirely brownish or blackish; wing-length 5.5-6.5 mm. *Essex (Epping), Sussex (Three Bridges). 6-8 lepidus* Meigen.
 ♂ front tarsal beard moderate; antennae entirely blackish or dark brown; abdomen blackish, tergites broadly pale laterally. ♀ scape of antennae usually dark brownish, flagellum light brownish; abdomen varying from light brownish to blackish. ♂♀ front tibiae darkened towards tip only; wing-length 5-6.5 mm. *Inverness (Aviemore), Essex (Epping). 6, 8. dispar* Meigen.

Subgenus *Stenochironomus* Kieffer.

♂ antennae 14-segmented, ♀ 6-segmented. Frontal tubercles absent. Pronotum much reduced, not nearly reaching anterior margin of scutum, which is more prominent than usual and almost pointed. Tibial combs each with a short spur. Pulvilli well developed. Wings with one or two dark transverse bands. R_{1+2} running very close to R_1 , almost fused with it. ♂ hypopygium with styles very long; appendage 2 very long, strap-like, pubescent at base, with a few long hairs towards tip and a terminal spine.

KEY TO SPECIES.

- 1 Scutum with distinct yellowish-orange stripes; postnotum brown except at base, which is broadly yellowish; body mainly greenish, abdomen with segment 6, and often segment 5 apically and segment 7 basally, blackish; femora dark-tipped, front pair at least broadly so; hind tibiae all dark; wings with a broad dark grey median band, which in ♀ extends basally some distance into anal cell; wing-length 4-5 mm. *Inverness (Loch an Eilean), Westmorland (Rydal), Surrey (Richmond and Staines), Hants (New Forest), S.W. Ireland (Killarney). 5-7. gibbus* Fabricius.
 Scutal stripes very indistinct, yellowish; postnotum yellowish; body mainly greenish, abdomen with dark markings as in *gibbus*; femora all narrowly dark-tipped; hind tibiae obscurely darkened at base and tip; hind tibiae more broadly so; wings with a narrower and lighter grey median band than in *gibbus*, and a broad band over the tip; wing-length about 4 mm. *Suffolk (Newmarket), Herts (Watford). 8. fascipennis* Zetterstedt.

Subgenus *Paratendipes* Kieffer.

Antennae of ♂ 14-segmented, A.R. more than 1; of ♀ 7-segmented (sometimes 6, according to Kieffer). Frontal tubercles absent. Pronotum fairly well developed, not distinctly divided in middle. Front tibia with a very short spur. Tibial combs normal, fused, each with a very short spur. Pulvilli absent. Wings unmarked. Squamal fringe present or absent. ♂ hypopygium with appendage 1 hook-like, 2 normal, 2a present.

KEY TO SPECIES.

- 1 Legs blackish, apart from first segment of front tarsi, which is normally all white or (*var. plebejus* Meigen) yellowish-white on basal third to half; in both forms the four posterior tibiae are more or less yellowish with both ends darkened, and all tibiae are often paler in ♀; body all black, thorax shining; squamal fringe short, but complete; $R_4 + 5$ ending above tip of m; larger species; wing-length 3-3.5 mm. ♂ anal point of hypopygium moderately long and slender; styles moderately broadened in middle, with some short stiff bristles on inner side at tip. *Frequent. Westmorland (Windermere) southwards. 5-8*

albimanus Meigen.

Legs uniformly brownish; body all black, thorax shining; squama quite bare; $R_4 + 5$ ending distinctly before level of tip of m; small species; wing-length barely 2 mm. ♂ hypopygium resembling *albimanus*, but styles more slender, finger-like, with fewer short stiff bristles at tip (fig. 197h). *Herts (Baldock and Letchworth), S.W. Ireland (Parknasilla). 5, 7. nudisquama* Edwards.

Subgenus *Kribioxenus* Kieffer.

Antennae of ♂ 14-segmented, A.R. only about 0.3; of ♀ 7-segmented. Pronotum much reduced, not visible from above. Front tibia with longish, slender spur; combs of posterior tibiae subequal, almost fused, each with a short spur. Pulvilli very small. Squamal fringe absent. $R_4 + 5$ ending slightly before level of tip of m; f.Cu well beyond r-m. ♂ hypopygium with a large conical projection on tergite 9, behind anal point; appendage 1 pubescent, 2 normal, 2a absent.

KEY TO SPECIES.

- 1 Small, greenish species; scape yellow or grey; scutal stripes and postnotum yellow or reddish; legs pale yellowish, front femora and tibiae rather broadly dark-tipped; L.R. 1.4; wing-length barely 2 mm. *Carnarvon (Llyn Gwynant), Surrey (Richmond). 7. brayi* Goetghebuer.

Subgenus *Microtendipes* Kieffer.

Antennae of ♂ 14-segmented, A.R. usually about 2; of ♀ 7-segmented. Frontal tubercles absent. Pronotum much reduced, overhung by scutum and divided in middle. Front tibia without spur; posterior tibial combs very unequal, posterior comb of middle tibia and external comb of hind tibia each with longish spur, other combs larger and unarmed. Pulvilli rather small. Wings unmarked. $R_2 + 3$ closely approximated to tip of R_1 (fig. 192l); f.Cu below or slightly beyond base of R_6 . Rather large species; wing-length 3.5-5 mm. ♂ styles usually somewhat oval; appendage 2 usually without long apical hair.

KEY TO SPECIES.

- 1 Femora (except at base) and tibiae brownish or blackish, tarsi with at least first segment mainly whitish or pale yellowish. 2
Legs otherwise coloured. 3
- 2 Tarsi mainly whitish, only last one or two segments darkened; thorax shining black; abdominal segments 1-5 green, 6-9 black; scape yellow or orange; wing-length 4 mm. ♂ front tarsal beard absent; styles straight and rather stout, broadest at middle. *Herts (Radwell), Hants (New Forest), Dorset (Glanvilles Wootton), S. Devon (Chudleigh). 5-8. tarsalis* Walker.
- Tarsi with first segment mainly pale yellowish, rest mainly darker; thorax and abdomen shining black; scape blackish; wing-length 3.5-4 mm. ♂ tarsal beard very slight; styles sinuous, strongly incurved at tips. *Inverness (Loch Pityoulish). 6. caledonicus* Edwards.

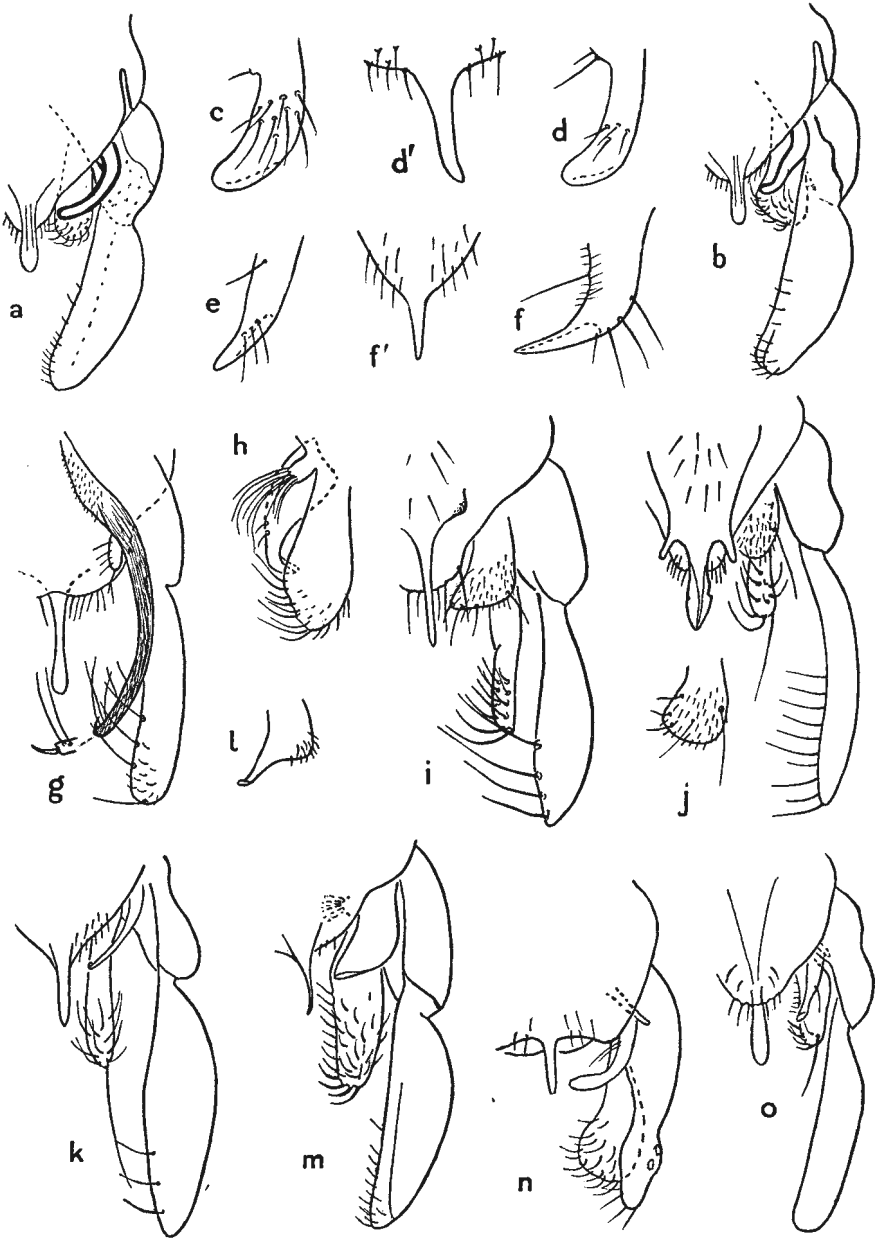


FIG. 197.—Male hypopygium of species of *Chironomus*. (a) *C. (Glyptotendipes) mancumianus*. (b) *C. (G.) foliicola*. (c-f) dorsal basal appendage of (respectively) *C. (Microtendipes) pedellus*, *C. (M.) diffinis*, *C. (M.) confinis* and *C. (M.) britteni*. (d') Anal point of *C. diffinis*. (f') anal point of *C. britteni*. (g) *C. (Microtendipes) hibernicus*, left half, ventral aspect. (h) *C. (Paratendipes) nudisquama*, basal appendages, ventral aspect. (i) *C. (Polypeditum) appfelbecki*, dorsal aspect. (j) *C. (P.) prolixitarsis*. (k) *C. (P.) acutus*. (l) *C. (P.) convictus*, appendage 1. (m) *C. (P.) rydalenensis*, right half, dorsal aspect. (n) *C. (Lauterborniella) brachylabis*. (o) *C. (L.) orophilus*.

- 3 At least front tibiae darkened at base.....4
Tibiae yellow, not darkened at base.....5
- 4 Front femora blackish on apical third or more.....5
Front femora black only at tip, otherwise yellowish.....7
- 5 Abdominal segments 1-5 clear green, 6-9 blackish (except sometimes in ♀, which may have entire abdomen darkened); thorax usually with dark brown ground colour; scutal stripes shining black, more or less contiguous; scape brownish; front tibiae broadly dark at base and more narrowly so at tip, or entirely black (**var. lividus** Meigen); wing-length 4-4.5 mm. ♂ front tarsal beard absent; appendage 1 of hypopygium as in fig. 197c. **Typical form:** *Common. Generally distributed.* 4-8. **Var. lividus:** *Yorks (Gormire), Shropshire (Shrewsbury), Herts (King's Walden).* 7-8.....**pedellus** Degeer.
Abdominal segments 1-5 olive-green to black.....6
- 6 ♂ hypopygium with appendage 2 normal, short and hairy; styles short, widest at middle; front tarsi with short or moderate beard. ♂♀ thorax shining black; scutal stripes at most only indistinctly separated; sometimes the whole abdomen darker, or even entirely black (**var. lugubris** Kieffer); wing-length 3.5-5 mm. *Common. Generally distributed.* 3-9.....**chloris** Meigen.
♂ only (♀ unknown). Hypopygium (fig. 197g) with appendage 2 very long and almost bare; styles rather long, almost cylindrical, slightly incurved; front tarsi missing in type (*unique*); thorax shining black; scutal stripes entirely fused; wing-length 3.2 mm. *S.W. Ireland (Killarney).* 5
hibernicus Edwards ♂.
- 7 Thorax shining, at most ♀ has slight pruinescence between scutal stripes.....8
Thorax heavily pruinescent, less so on scutal stripes, which are slightly shining; abdomen light olive-green, segments 2-5 somewhat darkened, mainly at base, 6-8 mainly darkened; L.R. only about 1.1; wing as in fig. 197l; wing-length 3.5-5 mm. ♂ front tarsi with very slight beard; appendage 1 of hypopygium as in fig. 197e. *Yorks (Ilkley), Berks (Wytham and Sulhamstead), Sussex (Lewes).* 5-7.....**confinis** Meigen.
- 8 Front tibiae largely yellowish; front tarsi with tips of first two or three segments more or less darkened; L.R. about 1.2; abdomen with segments 1-5 clear pale green, 6-9 darkened, less so at sides; wing-length 3.5-4 mm. ♂ front tarsal beard absent; appendage 1 of hypopygium as in fig. 197d. *Lancs (Hawkshead, Three Dubs Tarn), Cambs (Quy Fen).* 8.....**diffinis** Edwards.
Front tibiae black; front tarsi with tips of basal segments not at all darkened L.R. and abdomen as in *diffinis*; wing-length 4 mm. ♂ tarsal beard absent; appendage 1 of hypopygium as in fig. 197f. *Cumberland (Skirwith), Westmorland (Melkinthorpe), N.W. Yorks (Helwith Moss), Glos (Chedworth).* 6-7
brittini Edwards.
- 9 Legs and halteres yellow; abdomen black; wings greyish-hyaline, veins pale; wing-length 3.5 mm. ♂ short tarsal beard present. *Herts (Knebworth).* 5
nitidus Meigen.
Front femora partly black; halteres with black knob; abdomen with only segments 6-9 black; wings with outer two-thirds somewhat smoky, especially in ♀; wing-length 4-5 mm. ♂ short tarsal beard present. *Frequent. Generally distributed.* 4-8.....**fuscipennis** Meigen.

Subgenus *Stictochironomus* Kieffer.

♂ antennae 14-segmented, abnormally 13, ♀ 6-segmented. Frontal tubercles absent. Pronotum reduced, not visible dorsally. Scutum with a slight hump (almost a tubercle) in the middle, situated at hind end of median stripe. Tibial combs fused, a single spur of moderate length on outer side of hind tibia and posterior side of middle tibia. Femora and tibiae usually ringed. Pulvilli rather small. Wings with at least a central black spot. $R_2 + 3$ distinct and ending well beyond tip of R_1 ; f.Cu just before or below r-m. ♂ hypopygium with longish styles; appendage 2 without a distinctly differentiated apical hair.

KEY TO SPECIES.

- 1 Legs uniformly dark brown ; wings without clouds on membrane, r-m and surrounding veins blackish ; body black, abdominal tergites with apical margins pale ; wing-length 3.5-4.5 mm. ♂ front tarsi without beard. *Westmorland (Windermere), Yorks (Leeds), S.W. Ireland (Killarney)*. 5-6, 8
rosenschöldi Zetterstedt.
Legs conspicuously variegated ; wings with distinct clouds on membrane, at least a small spot over r-m.....2
- 2 Extreme tips of femora and bases of tibiae pale ; femora with a yellowish pre-apical ring ; tibiae with three dark and two light rings ; wings with very distinct cloudy spots, one between m and Cu₁ ; body black, apical margins of tergites conspicuously whitish ; wing-length 4-5 mm. ♂ front tarsi with moderate beard. *Edinburgh, Notts (Thurgarton), Warwick (Rugby), Glos (Minchinhampton)*. 5.....**maculipennis** Meigen.
Extreme tips of femora and bases of tibiae dark.....3
- 3 Wings with faint cloudy markings, none between m and Cu₁ ; body and legs almost as in *maculipennis* ; wing-length 4-5 mm. ♂ front tarsi without beard. *Common. Generally distributed*. 4-8.....**piculus** Meigen.
Wings whitish with small black spot over r-m ; tergites with hind-margins more conspicuously silvery-white (at least in ♀) than in other British *Stictochironomus* ; femora black with a narrow yellow subapical ring ; four anterior tibiae whitish with the two ends black, hind tibiae with a dark ring in middle as well ; wing-length 4 mm. ♂ front tarsi bearded. *Yorks (Hawby)*. 7
histrio Fabricius.

Subgenus **Polypedilum** Kieffer.

♂ antennae 14-segmented, ♀ 6-segmented. Frontal tubercles absent. Pronotum much reduced, usually overhung by scutum and not visible from above. Scutum without a distinct hump in middle. Front tibia usually with a very short spur ; hind tibia with inner comb large and simple, outer small, with a longish spur ; middle tibia with long spur on posterior comb. Tibiae without distinct rings. Wings with or without dark clouds. R₂₊₃ rather faint and ending not far beyond tip of R₁ ; R₄₊₅ ending above tip of m as usual ; f.Cu slightly or considerably beyond r-m. ♂ hypopygium with styles usually rather long and slender ; appendage 2 with several curled hairs and usually one long apical hair.

KEY TO SPECIES.

- 1 Body mainly or all black.....2
Abdomen light green or yellowish (apical segments sometimes darkened in ♀)...12
- 2 Wings with spots or clouds.....3
Wings unmarked, at most some veins seamed with grey.....8
- 3 Halteres yellow.....4
Halteres with dark knob.....7
- 4 Wings with distinct spots.....5
Wings with faint clouds only, two in cell R₅ ; legs entirely pale yellow. ♂ A.R. nearly 2 ; front tarsal beard absent. *Yorks (Burley-in-Wharfedale)*. *Date not known*.....**leucopus** Meigen.
- 5 Wings (fig. 192m) with numerous spots, two large ones in cell R₅ ; femora brownish, usually with yellowish preapical band ; tibiae brownish, black-tipped ; tarsi uniformly light brownish ; L.R. about 1.85 ; wing-length 2 mm. ♂ tarsal beard absent ; hypopygium (fig. 197i) with styles long and slender, tergite 9 not trilobed. *Suffolk (Orford), Beds (Barton Hills), ? Dorset, ex C. W. Dale Collection*. 7-8.....**apfelbecki** Strobl.
- Wings with only three distinct spots, one in cell R₅.....6
- 6 Spot in cell R₅ at or close to base of cell ; legs pale ; wing-length 1.75-3.5 mm. ♂ tarsal beard absent ; tergite 9 trilobed, lateral lobes short. *Inverness (Aviemore), London (South Kensington), Surrey (Richmond and Putney)*. 5-8
scalaenus Schrank **Typical form.**

- Spot in cell R_5 well removed from base of cell; hind femora more or less darkened on basal two-thirds (especially in ♀), tip also rather broadly blackish; wing-markings stronger; a small dark spot present in cell M just distal to spot in cell R_5 (faint in ♂, distinct in ♀); otherwise resembles **Typical form**. *Westmorland* (Temple Sowerby), *Beds* (Cardington), *Herts* (Letchworth), *Wilts* (Salisbury). 6, 8. **scalaenus** var. ? **quadriguttatus** Kieffer.
- 7 Several wing-spots present, outer one in cell R_5 long and narrow; legs mainly brownish; wing-length 3-4 mm. ♂ tarsal beard very short; tergite 9 not trilobed. *Durham* (Penshaw), *Westmorland* (Temple Sowerby, etc.), *Yorks* (Ingleton, etc.), *Cheshire* (Skirwith), *Derbyshire* (Dovedale). 6-8
- Two rather faint clouds in cell R_5 , other markings indistinct; legs yellowish; largest British *Polypedium*; wing-length 3.5-4 mm. ♂ front tarsi with short beard; A.R. 2-2.5; tergite 9 not trilobed. *Common*. Generally distributed. 4-9. **nubeculosus** Meigen **Typical form**.
- 8 Halteres yellow. 9
Halteres with blackish knob. 10
- 9 ♂ antennal plume pale yellowish; A.R. about 1.7; tarsal beard absent; tergite 9 with long slender anal point, not trilobed. ♂♀ legs pale yellowish; L.R. about 1.4; wing-veins pale yellow; wing-length 2.25-3.5 mm. *Westmorland* (Windermere), *Yorks* (Whernside), *Derbyshire* (Dovedale), *Denbigh* (Llangollen), *Merioneth* (Dolgelly), *Oxford*, *Herts* (Watton), *Sussex* (Three Bridges). 5-8
- ♂ antennal plume light brownish; A.R. about 1.7; tarsal beard absent; tergite 9 trilobed; hypopygium as in fig. 197j. ♂♀ legs yellowish; L.R. about 1.5; costa and radial branches of wing-veins slightly darkened; wing-length 2.5-3 mm. (A var. has the legs much darker, and grey seams on wing-veins less distinct.) *Westmorland* (Windermere), *Lancs* (Hawkshead, Three Dubs Tarn), *Yorks* (Keighley), *Cheshire* (Rostherne), *Beds* (Biggleswade and Sandy), *Hants* (Netley). 5-7. **prolixitarsis** Lundstroem.
- 10 Wing-length 2-2.5 mm.; legs mainly yellowish; L.R. about 1.3. ♂ anal area of wing rather obtuse; tarsal beard very short; A.R. about 1.6; tergite 9 trilobed. *Lancs* (Manchester), *Beds* (Cardington), *Wilts* (Salisbury). 6
- ♂ anal area of wing better developed; tergite 9 not trilobed. 11
- 11 ♂ A.R. 1.2-1.5; front tarsal beard absent. ♂♀ legs light to dark brownish; wings greyish. *Westmorland* (Staveley and Witherslack), *Yorks* (Gormire), *Cambs* (Wicken), *Herts* (Radwell and Letchworth), *Essex* (Epping). 4, 6-7
- ♂ A.R. 2-2.5; front tarsi with short beard. ♂♀ legs more or less darkened; wings clearer. (Wing-length and distribution, see typical nubeculosus)
- ♂ thorax blackish or dark brownish; tarsal beard absent; A.R. about 1.5; tergite 9 not trilobed; hypopygium as in fig. 197k. ♀ thorax light brownish; scutal stripes and sternum slightly darker, scutellum lighter. ♂♀ legs pale yellowish, except for the black tibial combs; wing-length about 3.3 mm. *Westmorland* (Witherslack), *Yorks* (Gormire), *Essex* (Epping). 6-7
- ♂♀ thorax yellowish. 13
- 13 Legs shorter, L.R. about 1.5-1.7; legs yellowish; wing-length about 2.8 mm. ♂ A.R. 1.5-1.8; tarsal beard absent; hypopygium with appendage 1 (fig. 197l) much swollen at base, narrowed on the apical half, which faces inwards; appendage 2 with the usual long apical hair. *Frequent*. Generally distributed. 5-7, 9. **convictus** Walker.
- Legs longer, but L.R. only 1.3 (the increase in length being chiefly in tibia); general coloration as in *convictus*, but size larger; wing-length about 3.3 mm. ♂ A.R. about 1.4; tarsal beard very short; hypopygium (fig. 197m) with appendage 1 broader apically than at base, 2 without the usual long apical hair and at base with a small tubercle bearing some setae. *Westmorland* (Rydal). 6. **rydalensis** Edwards.

Subgenus *Pentapedilum* Kieffer.

Wings hairy, at least at tip, both on membrane and veins. Frontal tubercles absent. Pulvilli always distinct. ♂ hypopygium with appendage 1 chitinized and almost bare; 2 long, with long curved hairs distally.

KEY TO GROUPS OF SPECIES.

- 1 Hind tibial combs each with a short spur (fig. 194c).....2
One comb with a long spur, other unarmed (fig. 194d)
Group A (*Pentapedilum* Kieffer s.str.) (p. 194).
- 2 L.R. barely 1.....**Group B (*Sergentia* Kieffer)** (p. 194).
L.R. at least 1.25.....3
- 3 ♂ antennae 12-segmented.....**Group C (*Kiefferulus* Goetghebuer)** (p. 195).
♂ antennae 14-segmented.....**Group D (*Phaenopsectra* Kieffer)** (p. 195).

GROUP A.

(Pentapedilum s.str.)

Diagnosis as in key to groups. In addition: ♂ A.R. usually hardly exceeding 1. ♀ antennae 6-segmented. Pronotum reduced, not reaching up to front margin of scutum. Front tibia usually with very short spur; posterior comb of middle tibia and outer comb of hind tibia with long spur, other combs unarmed. Pulvilli moderate. Anal area of wing obtusely rounded. Wings hairy on most of the surface. f.Cu usually well beyond base of R_5 . ♂ styles with long hairs on inner side; appendage 1 usually with one or two long hairs; 2 with a long apical hair.

KEY TO SPECIES.

- 1 Wings (fig. 192o) with a slight, but distinct, grey cloud below tip of $R_4 + 5$ and another in anal cell (these markings more strongly defined in ♀); thorax blackish (or sometimes brownish in ♀) with grey reflections; abdomen blackish, hind-margins of tergites pale; halteres yellow; L.R. about 1.4; wing-length 2.5-3 mm. *Inverness (Loch an Eilean), Perthshire (Rannoch), Westmorland (Windermere), Lancs (Hawkshead, Three Dubs Tarn), S. Devon (Beesands), S.W. Ireland (Killarney)*. 5-6, 8.....**nubens** Edwards.
Wings unclouded; knob of halteres darkened.....2
- 2 Scutal stripes fused, blackish; L.R. 1.3-1.6; wing-length 2.5-3 mm. *Lancs (Hawkshead, Three Dubs Tarn), Yorks (Skipwith), Hunts (Wood Walton), Herts (Knebworth), Bucks (Burnham Beeches), Middlesex (Harrow)*. 5-7
uncinatus Goetghebuer.
- Scutal stripes separate. ♀ lighter than ♂.....3
- 3 Dark brown species; abdominal tergites with conspicuously pale hind-margins; L.R. about 1.2; wing-length 3-4 mm. *Frequent. Generally distributed*. 6-9
sordens van der Wulp.
Light brown species; smaller than *sordens*; L.R. 1.4-1.6; wing-length 2-3 mm. ♂ abdomen unicolorous. ♀ hind-margins of tergites vaguely pale; median scutal stripe often obsolete. *N. Wales (Newtown), Herts (Leitchworth), Essex (Epping), Middlesex (Ruislip), S. Devon (Beesands)*. 5-6, 8-9
tritius Walker.

GROUP B.

(Sergentia Kieffer.)

♂ antennae 14-segmented, A.R. at least 3; ♀ 7-segmented. Pronotum fairly well developed, reaching front margin of scutum and not divided in middle. Front tibia without spur. L.R. 0.95-1. Pulvilli broad. Wings hairy only towards tip. ♂ styles stout, with some short hairs at tip on inner side, appendages as in **Group D**.

KEY TO SPECIES.

- 1 Dull black species; wings whitish; legs dark; wing-length 4.5-6 mm. ♂ front tarsus with long beard; L.R. barely 1. *Inverness (Loch Erichi), Perthshire (Loch Rannoch, etc.), Midlothian (Glencorse), Westmorland (Rydal and Ullswater), Yorks (Eccup), N. Wales (R. Vyrnwy)*. 4, 6.....**coracinus** Zetterstedt.

GROUP C.

(*Kiefferulus* Goetghebuer.)

Diagnosis as in key to groups. In addition: ♂ A.R. over 3. ♀ antennae 6-segmented. Pronotum reaching up to front margin of scutum, but thin and bilobed. Front tibia without spur. Pulvilli broad. Wings broad, hairy towards tip. ♂ styles with a row of stiff bristles on inner side at tip; appendage 1 bare, 2 very broad, with long curved hairs, but without very long apical hair.

KEY TO SPECIES.

- 1 Greenish species, but abdomen at least darkened towards tip; wings grey; legs yellowish; wing-length 4.5-5 mm. ♂ front tarsus with very short beard; L.R. 1.3. *Norfolk (Waxham), Cambs (Wicken), Hunts (Wood Walton), Herts (Letchworth), Essex (Epping), Hants (Sowley Pond), Somerset (Shapwick).* 5-9 **tendipediformis** Goetghebuer.

GROUP D.

(*Phaenopsectra* Kieffer.)

Diagnosis as in key to groups. In addition: ♂ A.R. about 2; ♀ antennae 7- (sometimes 6-) segmented. Pronotum more or less reduced. L.R. 1.2-1.35. Front tibia without distinct spur; one of the two hind tibial spurs sometimes hardly distinguishable. Pulvilli broad. Anal area of wing well developed, membrane rather densely hairy. ♂ styles without long hairs on inner side; appendage 1 with median hair, 2 usually with two rather long apical hairs.

KEY TO SPECIES.

- 1 Abdomen blackish, at least dorsally; scutal stripes black, fused, shining; tibiae and tarsi pale yellowish; wing-length 3-4.5 mm. ♂ antennal plumes slightly brownish. *Common. Generally distributed.* 5-9..... **flavipes** Meigen.
Abdomen yellowish, often greenish-tinged; scutal stripes as in *flavipes*; tibiae and tarsi whitish; wing-length 3-3.5 mm. ♂ antennal plumes whitish. *Frequent. Generally distributed.* 6-9..... **punctipes** Wiedemann.

Subgenus **Lauterborniella** Bause.

♂ antennae 13-14 segmented, last one or two segments often very indistinct; ♀ 6-segmented. Pronotum reduced, not visible from above. Front tibia with shortish, slender spur; combs of posterior tibiae very unequal, larger unarmed, smaller with long spur. Pulvilli well developed. Squama without fringe, or at most with 1-3 short hairs. Costa often somewhat retracted; f.Cu well beyond r-m. ♂ hypopygium with tergite 9 normal; appendage 1 not pubescent, with one or two long hairs only; 2 normal, 2a absent.

KEY TO SPECIES.

- 1 ♀ only (♂ unknown, species sometimes, perhaps always, parthenogenetic). Front femora somewhat clubbed on apical half; wings with numerous grey spots; $R_4 + 5$ ending level with tip of M; femora and tibiae ringed; tarsi white, tips of segments dark-ringed; L.R. 2; blackish species; wing-length 2-2.5 mm. *Herts (Letchworth).* 6..... **marmoratus** van der Wulp ♀.
Front femora slender; wings unmarked; $R_4 + 5$ ending slightly but distinctly before level of M..... 2
- 2 Halteres and body blackish; antennae and legs brownish; L.R. 1.15; wing with anal area small, lobe obtusely rounded; wing-length 1.7 mm. ♂ A.R. 1.2; hypopygium (fig. 197n) with styles very short, half as long as coxites; anal point short, slender, pointed. *Cambridge.* 7..... **brachylabis** Edwards.
Halteres whitish..... 3
- 3 Very small black species; antennae and legs yellowish; L.R. about 1.25; wings with anal area very much reduced, lobe hardly indicated; wing-length 1.5 mm. ♂ antennal plumes whitish; A.R. about 1; styles slender, twice as long as coxites; anal point rather short and slender. *Essex (Epping).* 6-8 **agrayloides** Kieffer.

Black species, rather larger than *agrayloides*; antennae and legs light brownish; L.R. about 1.1; anal area of wing (fig. 192*n*) reduced, but lobe obvious; wing-length 2 mm. ♂ antennal plumes brownish; A.R. 1.5; styles slender, twice as long as coxites; hypopygium (fig. 197*o*) with anal point long and rather broad after base. *Inverness (Ben Nevis)*, *Perthshire (Loch Kinardochy)*, *Westmorland (Windermere)*, *Lancs (Hawkshead, Three Dubs Tarn)*, *Carnarvon (Llyn Gwynant)*, *S.W. Ireland (Killarney)*. 5-7. **orophilus** Edwards.

Genus *Tanytarsus* van der Wulp.

Wings with hairs on membrane, at least at extreme tip in cell R_5 , also on most of the veins. Squama bare. $r-m$ more or less horizontal (i.e. continuing direction of m) and usually very short, never distinct and oblique as in *Chironomus*. $R_4 + 5$ usually straight and running rather close to R_1 . An straight or almost so (not distinctly curved down at tip as in *Chironomus*), more divergent from Cu than in *Chironomus*, and reaching scarcely if at all beyond $f.Cu$. Anal area of wing small, lobe obtusely rounded or absent. ♂ antennae 11-14-segmented, ♀ 5-7-segmented. Pronotum reduced, never distinctly visible from above. ♂ hypopygium with appendage 1 short and broad; 1*a* nearly always present, usually finger-like; 2 reaching slightly beyond end of coxite and with long curved hairs; 2*a* nearly always present but variable in development, often with peculiarly modified hairs.

KEY TO SUBGENERA.

- 1 Tibial combs quite confluent ventrally, occupying more than half circumference of tibia; eyes bare; wings not very narrow. 2
Tibial combs at least narrowly separated ventrally, occupying at most half circumference of tibia. 3
- 2 Fused combs without spurs (fig. 194*i*). **Micropsectra** Kieffer (p. 196).
Fused combs with one or two short spurs (fig. 194*j, k*)
Lundstroemia Kieffer (p. 197).
- 3 At least one comb spurred (fig. 194*l, m*). 4
Neither comb spurred. **Phaenopelma** Kieffer (p. 204).
- 4 Eyes pubescent; wings cuneiform. **Zavrelia** Kieffer (p. 205).
Eyes bare as usual; wings sometimes cuneiform. 5
- 5 Scutellum with several long marginal hairs; both combs usually spurred; wings not cuneiform; $R_4 + 5$ usually ending just beyond tip of Cu ,
Tanytarsus van der Wulp s.str. (p. 199).
Scutellum with only two long marginal hairs; one comb without spur; wings often cuneiform; $R_4 + 5$ ending above or before tip of Cu ,
Stempellina Bause (p. 205).

Subgenus *Micropsectra* Kieffer.

Combs of the four posterior tibiae entirely confluent ventrally and devoid of spurs. L.R. about 1.5-1.7. ♂ antennae 14-segmented, A.R. usually 1.2-1.7. ♀ antennae 6-segmented, 2 strongly constricted and perhaps sometimes divided in middle, 6 and 7 separate. Wings (in all British species) hairy on the greater part of their surface; $r-m$ two or three times as long as the short basal section of R_5 ; $f.Cu$ below or even slightly before base of R_5 ; Cu_1 very gently curved, not bent down towards tip. Frontal tubercles absent.

KEY TO SPECIES.

- 1 Very small species; wing-length less than 2 mm. ♂ A.R. about 0.6. 2
Larger species; wing-length 2.4-3.4 mm. ♂ A.R. not less than 1. 3
- 2 Wings not unusually narrow, anal lobe distinct; pulvilli over half as long as the claws; legs pale yellowish; L.R. about 1.5; wing-length 2.2 mm. ♂ body extensively yellowish; scutal stripes dark brown, distinctly separated; segments 10-13 of antenna fully twice as long as broad and only indistinctly separated; hypopygium as in fig. 198*a*. ♀ body as in ♂; scutal stripes orange, hardly separated. *Arran (Corriegills)*, *Westmorland (Brothers Water)*. 6
monticola Edwards.

Wings unusually narrow, anal lobe hardly developed; pulvilli scarcely distinguishable; legs brownish; wing-length 1.5-1.7 mm. ♂ body brownish, shoulders paler; scutal stripes blackish, fused; antennae as in *monticola*; L.R. only 1.25. ♀ body and shoulders as in ♂; scutal stripes blackish or brownish, almost fused; L.R. barely 1.1. *Perthshire (Beinn Heasgarnich)*. 6

- chionophilus** Edwards.
- 3 ♂ thorax black, at most shoulders pale.....4
 ♂ thorax extensively pale; scutal stripes usually distinct.....6
- 4 ♂ shoulders pale, thorax otherwise black, extensively dusted, hardly shining; scutal stripes normally fused; halteres whitish; abdomen blackish; legs dark brownish; pulvilli absent; A.R. about 1.3-1.5; appendage 2a of hypopygium rather short, not reaching end of 1, hairs of brush with enlarged tips. ♀ thorax extensively yellowish; abdomen usually extensively brownish or blackish. ♂♀ wing-length 3-4 mm. *Common. Generally distributed.* 3-9
- brunnipes** Zetterstedt.
- 5 ♂ thorax entirely black.....5
 ♂ thorax undusted, moderately shining; halteres dark brownish; abdomen blackish; legs dark brownish; A.R. nearly 2. ♀ thorax somewhat dusted; entire body often brownish; legs paler brown. ♂♀ wing-length 3-4 mm. *Common on moors. Generally distributed.* 3, 5-8.....**fuscus** Meigen.
- ♂ Thorax extensively dusted, hardly shining; halteres yellowish; abdomen blackish; legs reddish-brown; A.R. about 2 only (♀ not seen); wing-length 3.5-4 mm. *Cheshire (Broadheath and Ringway)*. 4..**recurvatus** Goetghebuer. ♂
- 6 ♂ only (♀ not seen). Abdomen entirely pale green; scape, scutal stripes, postnotum and sternum brownish to black; legs yellowish; A.R. about 1; wing-length 2.5-3.5 mm. *Arran (Sannoxt), Lancs (Colne), Yorks (Ikley), Shropshire (Salop)*. 5, 7.....**retusus** Goetghebuer ♂.
- Abdomen partly brownish or blackish.....7
- 7 ♂ abdominal tergites 2-7 each with the posterior margin narrowly but distinctly brownish or blackish; body otherwise light to olive-green; scutal stripes light yellow to black, occasionally fused; legs light brownish; A.R. about 1.25. ♀ usually yellowish. ♂♀ wing-length 2.5-3.5 mm. *Common. Generally distributed.* 2-8.....**atrofasciatus** Kieffer.
- ♂ abdomen light to olive-green, last few segments brownish or blackish; scutal stripes light yellow to black, lateral ones usually darker; legs pale brownish; A.R. 1-1.25. ♀ usually mainly yellowish. ♂♀ wing-length 2.5-3.5 mm. *Frequent. Generally distributed.* 2-10.....**subviridis** Goetghebuer.

Subgenus **Lundstroemia** Kieffer.

Combs of four posterior tibiae entirely confluent ventrally, with one or two short spurs. L.R. 1.5 or less. ♂ antennae 14-segmented, A.R. 1-1.5. ♀ antennae 6-segmented, 2 strongly constricted in middle, 6 and 7 separate. Wings hairy on at least the apical half; r-m variable; f.Cu below or scarcely before base of R_s; Cu₁ rather more sinuous apically than in subgenus *Micropsectra*.

KEY TO SPECIES.

- 1 ♂ only (♀ unknown). Scutal stripes black, narrowly separated; head largely pale; small frontal tubercles present; small pulvilli present; abdomen clear green; legs clear yellow; L.R. about 1.2; A.R. about 1.2; hypopygium as in fig. 198c; wing-length about 2.3 mm. *Westmorland (Windermere)*. 6
- laccophilus** Edwards ♂
- ♂ thorax black, only the shoulders pale (normally); head blackish; frontal tubercles absent; pulvilli absent; abdomen olive-green to blackish; legs light to dark brownish.....2
- 2 Larger species; tibial combs with one short spur; L.R. only 1.2 or slightly less; r-m at least twice as long as basal section of R_s; wing-length 3-3.5 mm. ♂ front tarsi with short beard; A.R. about 1.2; anal cell of wing quite or almost bare. ♀ body extensively brownish. *Ross (Kinlochewe), Suffolk (Erning), Cambs (Shepreth), Herts (Radwell), Essex (Audley End)*. 1, 4-5
- praecox** Meigen.
- Smaller species; L.R. about 1.4. ♂ front tarsi without distinct beard.....3

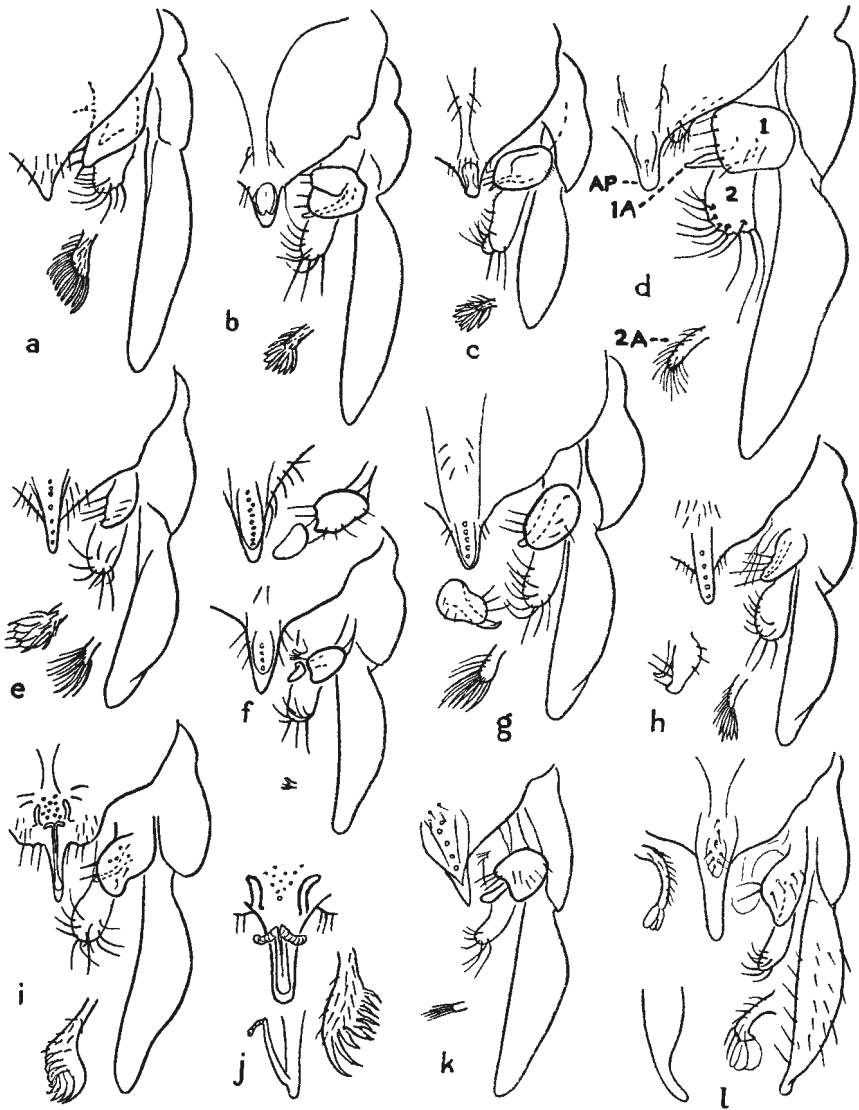


FIG. 198.—Male hypopygium of species of *Tanytarsus*. (a) *T. (Micropsectra) monticola* Edwards. (b) *T. (Lundstroemia) bituberculatus* Edwards. (c) *T. (L.) laccophilus* Edwards. (d) *T. (s.str.) inopertus* Walker. (e) *T. (s.str.) gregarius* Kieffer (with two forms of appendage 2a). (f) *T. (s.str.) curticornis* Kieffer (two specimens, showing variation in anal point). (g) *T. (s.str.) eminulus* Walker (with variation in appendage 1). (h) *T. (s.str.) holochlorus* Edwards (with variation in appendages 1 and 1a). (i) *T. (s.str.) richmondensis* Edwards. (j) *T. (s.str.) reflexens* Edwards (anal point, dorsal and lateral aspects, and appendage 2a). (k) *T. (s.str.) arduennensis* Goetghebuer. (l) *T. (s.str.) photophilus* Goetghebuer var. ? (with outline of style, lateral aspect, and two forms of appendage 2a). (AP = anal point. 1, 1a, 2, 2a = basal appendages.)

- 3 r-m short, scarcely longer than basal section of R_3 ; tibial combs with one short spur; wing-length 3 mm. ♂ A.R. about 1.4; thorax lightly pruinose, moderately shining; wings more uniformly hairy than in ♂ *praecox*; abdomen olive-green; hypopygium as in fig. 198b. ♀ entirely yellow. *Glos (Minchin-hampton), Oxford, Essex (Audley End), London (Kensington)*. 4-5, 9

bituberculatus Edwards.

- r-m long, usually about twice as long as basal section of R_3 ; tibial combs with two short spurs (occasionally one only); wing-length about 2.8 mm. ♂ A.R. about 1.7; thorax rather heavily pruinose, only slightly shining; wings hairy on apical half only, at most a few hairs in anal cell and cell Cu_1 ; abdomen dark olive-green. ♀ resembles ♂, but scutal stripes separate and wings almost entirely hairy. *Yorks (Bramhope), Cambs (Wicken)*. 4-5

penicillatus Goetghebuer.

Subgenus *Tanytarsus* s.str.

Combs of posterior tibiae at least narrowly separated ventrally, occupying at most half circumference of tibia; usually both combs with spur, outer always distinct and rather long, inner often shorter, more slender and difficult to detect, perhaps sometimes absent. ♂ antennae 14- (rarely 13-) segmented, ♀ 5-7 segmented. Wings with a variable amount of hair. r-m (except in *T. tenuis* and one or two other species) very short, scarcely if at all longer than basal section of R_3 ; $R_4 + 5$ ending above or beyond level of tip of Cu_1 ; f.Cu usually distinctly beyond base of R_3 ; tip of Cu_1 often slightly sinuous; anal area of wing always more or less developed. Scutellum with several long marginal hairs.

KEY TO GROUPS OF SPECIES.

- 1 Tibial combs almost confluent, with short spurs (fig. 194l).... **Group A** (p. 199). Tibial combs smaller and well separated, one or both spurs usually rather long (fig. 194m)..... 2
- 2 Pulvilli present, fully half as long as claws..... **Group B** (p. 200). Pulvilli absent, or very small..... 3
- 3 Wings more hairy. ♂ wing-cell Cu_1 with numerous hairs..... 4
Wings bare except at tip. ♂ cell Cu_1 without hairs, or with at most about six..... 5
- 4 ♂ styles with tip very narrow and pointed (fig. 198l)..... **Group C** (p. 200).
♂ styles not conspicuously narrowed at tip..... **Group D** (p. 201).
- 5 Large black species. ♂ L.R. only 1.2..... **Group E** (p. 204).
Small species. ♂ L.R. at least 1.7..... **Group F** (p. 204).

GROUP A.

Combs of posterior tibiae only very narrowly separated, distance between them very little wider than one of the tibial hairs; combs together occupying about half diameter of tibiae, each with a short spur. No obvious pulvilli present. Wings hairy on apical half or more. ♂ hypopygium with anal point short; appendage 1a present, 2a rather long. ♀ antennae 6-segmented, 2 and 3 fused, 6 and 7 separate.

KEY TO SPECIES.

- 1 Small, yellowish-green species, without definite markings; L.R. 2.2; wing-vein r-m short; legs yellowish; wing-length 2-2.5 mm. ♂ hypopygium with appendage 2a long, with long hairs swollen at their tips; anal point short, very narrow throughout. *Cambs (Wicken and Shelford), Beds (Arlesey and Cardington), Herts (Letchworth and Radwell)*. 5, 7-8..... **tenellulus** Goetghebuer.
♂ scutal stripes, postnotum and sternum normally reddish, brownish or blackish; L.R. 1.4-1.7; anal point rather short, broad, tip rounded. ♀ thorax yellowish; scutal stripes faint or absent; abdomen greenish..... 2
- 2 ♂ thorax, including scutellum and sternum, shining black; abdomen light green; legs whitish; L.R. 1.6-1.7; R-M short; appendage 2a with a clump of lamellae at tip. ♂♀ wing-length 1.75-2.25 mm. *Westmorland (Staveley and Witherlack), Essex (Epping), S. Devon (Beesands)*. 6..... **laetipes** Zetterstedt.
♂ at least shoulders paler, thorax usually more extensively pale..... 3

- 3 ♂ abdomen pale green ; scutal stripes blackish, reddish or rarely absent ; L.R. about 1·5 ; r-m long ; appendage 2a with a mass of broad, flattened bristles. ♂♀ wing-length 2·25-3 mm. *Frequent. Generally distributed.* 4-8, 10
tenius Meigen.
 ♂ abdomen olive-green ; scutal stripes blackish and almost fused ; L.R. 1·4-1·5 ; r-m long ; hypopygium (fig. 198d) with appendage 2a shorter than in *tenius*, with simple hairs only. ♂♀ wing-length 2-3 mm. (A ♂ var. differs in being pale green, with light orange scutal stripes, legs whitish, L.R. 1·7.) *Suffolk (Mildenhall), Beds (Cardington), Bucks (Burnham Beeches), Wilts (Salisbury), Hants (New Forest), S. Devon (Beesands).* 4-6, 8. *inopertus* Walker.

GROUP B.

(Calopsectra Kieffer.)

Combs well separated, each with a distinct spur, and each occupying less than a quarter circumference of tibia. Pulvilli at least half as long as claws. Frontal tubercles present. Wings rather densely hairy. r-m very short ; f.Cu well beyond r-m.

KEY TO SPECIES.

- 1 ♂ thorax yellow, scutal stripes hardly darker ; scape and postnotum sometimes slightly darkened ; abdomen entirely pale green ; legs whitish or pale yellow ; L.R. 2·4 ; hypopygium (fig. 198i) with anal point complicated as in *reflexens*. ♀ coloration as in ♂. ♂♀ very small ; wing-length 1·75-2·75 mm. *Inverness (Kinraig), Westmorland (Temple Sowerby), Carnarvon (Llyn Gwynant), Surrey (Richmond).* 6-7. *richmondensis* Edwards.
 ♂ scutal stripes distinct, brownish or blackish ; somewhat larger species. 2
 2 ♂ legs pale yellow (rarely darker) ; scutal stripes light to dark brownish ; palpi long, second segment distinctly longer than third ; abdomen normally pale green (a var. from *Inverness (Kinraig)* and *Argyllshire (Bonawe)* is darker green with pale greenish bands at incisures) ; L.R. 2 ; hypopygium (fig. 198e) with anal point simple, rather short, with a median row of dots. ♀ thorax yellow, with or without brownish stripes ; abdomen green. ♂♀ wing-length about 3 mm. *Northumberland (Crag Lough), Lancs (Hawkshead, Three Dubs Tarn), Cambs (Quy Fen), Herts (Letchworth), S. Devon (Beesands), W. Ireland (Co. Galway, Lough Mask).* 5-8. *gregarius* Kieffer.
 Legs brownish ; scutal stripes black or dark brownish, often almost or entirely fused. ♂ segments 2 and 3 of palpi subequal in length. 3
 3 ♂ hypopygium with anal point simple, rather short, with a median row of dots ; scutal stripes black ; thorax moderately dusted with grey between stripes, shoulders pale ; abdomen very dark olive-green without conspicuous light green bands at incisures ; L.R. 1·7-1·85. ♀ greenish, scutal stripes usually brownish. ♂♀ wing-length 2·5-3 mm. *Perthshire (Loch Kinardochy), Westmorland (Windermere), Lancs (Manchester), Carnarvon (Llyn Gwynant), London (Lea Valley).* 4-7. *lugens* Kieffer.
 ♂ hypopygium (fig. 198j) with anal point rather long with hinged, forked appendage near tip ; scutal stripes blackish or dark brownish ; thorax with light brown ground colour, prescutellar area and spaces between scutal stripes conspicuously dusted with grey ; abdomen dark olive green, with rather conspicuous narrow light green or pale yellowish bands at incisures ; L.R. 2·1-2·2. ♀ coloration usually lighter than in ♂. ♂♀ wing-length 2-2·75 mm. *Inverness (Kinraig and Aviemore), Perthshire (Loch Kinardochy), Carnarvon (Llyn Gwynant), London, S. Devon (Slapton and Gidleigh).* 5-7. *reflexens* Edwards.

GROUP C.

(Rheotanytarsus Bause.)

Combs distinctly separated, both spurred (inner spur longer than outer in British species). Pulvilli and frontal tubercles absent. Wings rather densely hairy ; r-m short ; $R_4 + 5$ ending just beyond level of tip of Cu_1 ; $R_3 + 3$ apparently absent, R_1 and $R_4 + 5$ running close together. ♀ antennae 7-segmented. ♂ anal point of hypopygium long and simple ; styles with apical third suddenly narrowed and pointed.

KEY TO SPECIES.

- 1 ♂ thorax with yellowish or pale green ground colour; scutal stripes light or dark brownish, sometimes obscure; abdomen pale green; legs whitish; A.R. about 1; hypopygium as in fig. 198l. ♀ pale yellowish; scutal stripes usually indistinct. ♂♀ L.R. 1.75; wing-length 2-2.5 mm. *Westmorland (Staveley), Derbyshire (Dovedale), Merioneth (Dolgelly), Cambs (Shelford), Herts (Leetchworth), Surrey (Richmond)*. 5-7..... **photophilus** Goetghebuer.

GROUP D.

(Tanytarsus s.str.)

Combs of posterior tibiae well separated, each occupying less than a quarter of tibial circumference; outer comb with a longish spur, inner often with a shorter and more slender spur, or unarmed. Pulvilli apparently absent. Wings more or less densely hairy on apical half, hairs always fairly numerous in cell CUI in ♂. R2 + 3 fairly distinct, and ending about midway between tips of R1 and R4 + 5, these veins well separated; R4 + 5 ending about opposite tip of CUI; R-M always short. L.R. usually 2 or more. ♀ antennae usually (perhaps always) 5-segmented (2-3 and 6-7 being fused). ♂ styles not suddenly narrowed near tip.

Series 1.

♂ anal point with longitudinal row of dots (usually single, rarely irregularly double) placed between two keels, as in *T. gregarius* and *T. lugens*. ♂♀ frontal tubercles usually present.

KEY TO SPECIES.

- 1 ♂ hairs in wing-cell M reaching back at least to r-m 2
 ♂ hairs in cell M not nearly reaching back to r-m 5
 2 Frontal tubercles rather large, conspicuous (both sexes)..... 3
 ♂ only (♀ not seen). Frontal tubercles apparently absent; hypopygium with forceps rather long, straight and slender, only slightly broadened at their middle; body and legs as in *eminulus*; wing-length about 2.5 mm. *Herts (Radwell)*. 6..... **verruculosus** Goetghebuer ♂.
 3 ♂ only (♀ not seen). Front tarsus with distinct beard; L.R. 2.2; A.R. about 1.5; frontal tubercles not slender; thorax yellowish-green; abdomen pale green; legs pale yellow; hypopygium with appendage 1 (fig. 198h) narrowed apically; wing-length 3 mm. *Westmorland (Witherslack), Lancs (Hawkshead, Three Dubs Tarn), Herts (Tring), London (Putney), Surrey (Mitcham)*. 6-7..... **holochlorus** Edwards ♂.
 ♂ front tarsus without distinct beard..... 4
 4 ♂ only (♀ not seen). Hypopygium with appendage 1 twice as long as broad; L.R. 2.4; A.R. about 1.2; frontal tubercles slender; coloration as in *holochlorus*; wing-length about 2.5 mm. *Denbigh (Llangollen), Herts (Radwell)*. 7-9..... **ejunceidus** Walker ♂.
 ♂ hypopygium (fig. 198g) with appendage 1 shorter, more or less oval, 1a relatively longer; thorax yellowish; abdomen pale green; legs pale yellow; L.R. 2.4-2.7. ♀ body and legs as in ♂; ♂♀ wing-length 2-2.5 mm. *Westmorland (Hale), Lancs (Hawkshead, Three Dubs Tarn), Surrey (Richmond), Hants (New Forest), S. Devon (Slapton)*. 5-9..... **eminulus** Walker.
 5 Frontal tubercles small, but distinct..... 6
 Frontal tubercles absent; thorax with greenish or light brownish ground colour; scutal stripes varying from light to dark brown or blackish; abdomen usually pale green, occasionally dark green or brownish; legs usually pale yellow, occasionally darker; L.R. 2; wing-length 1.75-2.5 mm. ♂ A.R. about 0.8; hypopygium (fig. 198f) with appendage 1 with a somewhat kidney-shaped or pyriform enlargement apically; 2a very minute. ♀ hairs in wing-cell M reaching back beyond r-m. *Arran (Correïn Lochan), Westmorland (Windermere), Carnarvon (Llyn Gwynant), Merioneth (Dolgelly), N. Wales (Newtown), Middlesex (Harlesden), Surrey (Richmond)*. 5-9..... **curticornis** Kieffer.

- 6 ♂ only (♀ not seen). Thorax with yellowish ground colour; scutal stripes reddish-orange, lateral pair darkened posteriorly (in British examples); postnotum pale at base, otherwise brownish; abdomen light green; legs whitish or pale yellowish; L.R. 2·2; A.R. about 1; hypopygium as in fig. 198k; wing-length 2 mm. *Surrey (Richmond)*. 7.....**arduennensis** Goetghebuer ♂.
- ♂ thorax with brownish or greenish ground colour; scutal stripes shining black, almost fused, very lightly dusted; postnotum blackish; abdomen olive-green, occasionally lighter; A.R. 1·2. ♀ body greenish-yellow; scutal stripes brownish; hairs in wing-cell M reaching back beyond r-m. ♂♀ legs light brownish; L.R. about 2·2; wing-length 2·5-3 mm. *Inverness (Ben Nevis), Westmorland (Windermere), Lancs (Manchester), Cheshire (Poynton), London (Putney), Surrey (Frensham Pond)*. 5-6.....**lestagel** Goetghebuer.

Series 2.

♂ anal point usually longer than in Series 1, without row of dots or dorsal keels. ♂♀ frontal tubercles apparently absent except in **glabrescens**.

KEY TO SPECIES.

- 1 Abdominal segments 3 and 7 black, other segments pale green; middle scutal stripe, and margins of scutum, posteriorly blackish or dark brownish; legs mainly yellowish, knees and tips of tibiae dark brownish; halteres with blackish knob; wing-length 2-2·5 mm. *Inverness (Corroul), Arran (Machrie and Catacol), Westmorland (Windermere and Hartsop), Yorks (Gormire), Cambridge, S.W. Ireland (Killarney)*. 6-8.....**signatus** van der Wulp.
- Abdomen uniformly green without black markings.....2
- 2 ♂ hairs in cell M reaching back at least to r-m.....3
- ♂ hairs in cell M not nearly reaching back to r-m.....8
- 3 ♂ only (♀ unknown). Thorax entirely shining black or dark brownish, any pale ground colour confined to shoulders; A.R. about 1·3; scape, sternum and postnotum black or dark brownish; abdomen clear grass-green or yellowish-green; legs pale yellowish or whitish; L.R. 2·1-2·2; wing-vein R1 two-thirds as long as R4 + 5; tergite 9 without a dorsal group of four hairs; hypopygium as in fig. 199d; wing-length 2·5 mm. *Yorks (Castile Howard), N. Wales (Newtown), S. Devon (Beesands)*. 6-7, 9.....**excavatus** Edwards ♂.
- ♂ thorax with extensive yellowish, greenish or light brown ground colour....4
- 4 ♂ only (♀ unknown). Front tarsal beard absent; A.R. 1·1-1·2; scape, scutal stripes, sternum and postnotum brownish; abdomen clear grass-green; legs pale yellow or whitish; L.R. 1·9; tergite 9 with a dorsal group of four longish hairs; hypopygium as in fig. 199b; wing-length about 2·5 mm. *Westmorland (Windermere), Staffs (Colwich Park)*. 6.....**samboni** Edwards ♂.
- ♂ front tarsal beard present, short but distinct.....5
- 5 ♂ anal point of hypopygium (fig. 199a) very slender and long; tergite 9 with a dorsal group of hairs; A.R. about 1·3; scape, scutal stripes, sternum and postnotum usually dark brownish, occasionally yellowish; abdomen dark olive-green or clear grass-green. ♀ thorax pale yellow; abdomen green. ♂♀ legs yellow or light brown; L.R. 1·8; wing-length about 2·7 mm. *Middlesex (Ruislip), S. Devon (Stapton)*. 9.....**verralli** Goetghebuer.
- ♂ anal point not very slender and of average length.....6
- 6 ♂ only (♀ not seen). Inner margin of styles strongly concave; A.R. about 1·3; scape, scutal stripes, sternum and postnotum brownish or blackish; abdomen dark olive-green; legs light brown or yellow; L.R. 1·8; wing-length 2·5-3 mm. *Westmorland (Stickle Tarn), Herts (Knebworth)*. 5-6....**junci** Meigen ♂.
- ♂ inner margin of styles slightly concave.....7
- 7 ♂ L.R. 1·9-2; scape, scutal stripes, sternum and postnotum yellowish or brownish; A.R. about 1·1; abdomen light green; legs light brown. (A male var. from *Oxford* and *Hunts (Wood Walton)* has scape, scutal stripes, sternum and postnotum blackish, abdomen dark olive-green and legs brown; L.R. 1·7) ♀ coloration as in ♂. ♂♀ wing-length 2·5-3·5 mm. *Carnarvon (Llandwrog), Cambs (Hauxton), Beds (Shefford)*. 4, 7-8....**pallidicornis** Walker.
- ♂ L.R. 2·2-2·5; thorax clear pale green, scutal stripes and postnotum scarcely darkened; A.R. about 1·3; scape dark brown; abdomen pale green; legs yellow; hypopygium as in fig. 199e; ♀ coloration as in ♂. ♂♀ wing-length 2·5 mm. *Lancs (Hawkshead, Three Dubs Tarn), Essex (Epping)*. 6-7
- nemorosus** Edwards.

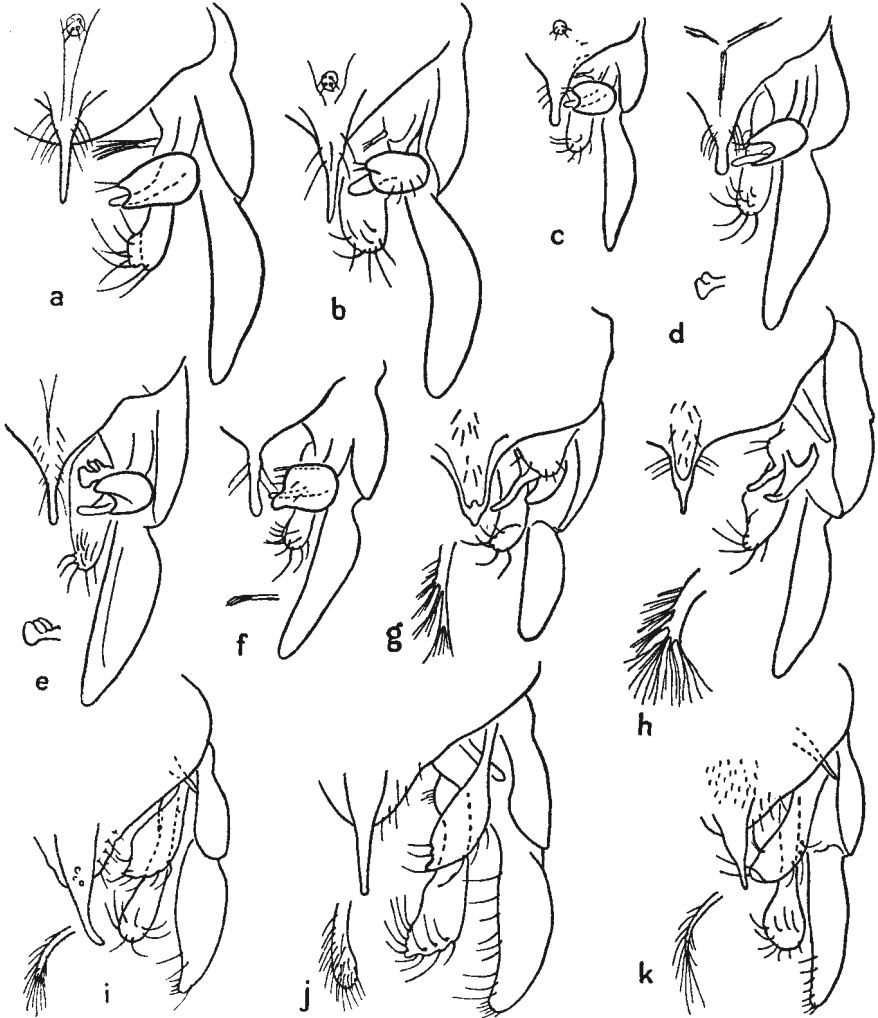


FIG. 199.—Male hypopygium of species of *Tanytarsus*, right half, dorsal aspect, with appendage 2a shown separately. (a) *T. (s.str.) verralli* Goetghebuer. (b) *T. (s.str.) samboni* Edwards. (c) *T. (s.str.) lactescens* Edwards. (d) *T. (s.str.) excavatus* Edwards. (e) *T. (s.str.) nemorosus* Edwards. (f) *T. (s.str.) glabrescens* Edwards. (g) *T. (s.str.) van-der-wulpi* Edwards. (h) *T. (s.str.) atridorsum* Kieffer. (i) *T. (Stempellina) brevis* Edwards. (j) *T. (S.) saltuum* Goetghebuer. (k) *T. (S.) minor* Edwards.

- 8 ♂ only (♀ unknown). Scutal stripes shining black, almost fused; A.R. about 0·8; scape, postnotum and sternum black; legs and halteres whitish; front tarsal beard moderate; L.R. 2·2; styles of hypopygium (fig. 199c) scarcely incurved; anal point moderately long; wing-length 1·6 mm. *Cambs (Quy Fen)*. 8.....*lactescens* Edwards ♂.
- ♂ only (♀ unknown). Scutal stripes narrowly, but distinctly, separated; A.R. about 1; scape and postnotum black; sternum dark brown; legs and halteres whitish; front tarsal beard absent; L.R. 2; hypopygium (fig. 199f) with styles distinctly incurved; anal point very long and slender; wing-length 1·8 mm. *Westmorland (Brothers Water)*. 6.....*glabrescens* Edwards ♂.

GROUP E.

Tibial combs and venation as in Group D. Wings hairy at the extreme tip only, no hairs in cells Cu_1 or An (at least in ♂); few or no hairs on R_1 and $R_4 + 5$, none on Cu. Frontal tubercles absent. Pulvilli absent.

KEY TO SPECIES.

- 1 ♂ body entirely black; A.R. 2; legs blackish or dark brown; L.R. 1·2; front tarsi with rather long beard; halteres light brown or whitish. ♀ thorax with light brown ground colour; scutal stripes black, very narrowly separated; scutellum brown; postnotum black; halteres, legs and abdomen as in ♂. ♂♀ wing-length 3·5–3·75 mm. *Lancs (Manchester)*, *Notts (Sherwood Forest)*, *Bucks (Burnham Beeches)*. 4.....*syvaticus* van der Wulp.

GROUP F.

Cladotanytarsus Kieffer.

Tibial combs and venation as in Group D. Wings hairy at the extreme tip only, normally no hairs in cell Cu_1 , nor on veins, except at tip of M and on costa (at least in ♂). Frontal tubercles absent. Pulvilli absent. L.R. 1·7 or more. ♂ A.R. under 1·5. Styles rather short, not narrowed at tip; appendage 2a long, with branched hairs. ♀ antennae 5–6 segmented, segments 2 and 3 sometimes separate, 6 and 7 fused.

KEY TO SPECIES.

- 1 ♂ only (♀ unknown). Antennal plumes and legs whitish; A.R. about 0·8; L.R. 2·2; scutal stripes blackish, dark brownish or yellowish-orange, distinctly separated; scape, postnotum and sternum black or dark brown; abdomen light green; hypopygium as in fig. 199g; legs whitish; wings (fig. 192p) very distinctly milky; wing-length about 2 mm. *Derbyshire (Dovedale)*, *Worcs (Bewdley)*, *Hants (New Forest)*. 6, 8.....*van-der-wulpi* Edwards ♂.
- ♂ antennal plumes and legs brownish.....2
- 2 ♂ thorax almost entirely shining black, light green or brown markings restricted to shoulders and pleural patch; scape, scutellum, postnotum and sternum black or dark brown; A.R. about 1·2; abdomen olive-green or (occasionally) brownish; legs light brown; L.R. 1·75; hypopygium as in fig. 199h. ♀ thorax yellowish; scutal stripes light brownish or absent; abdomen green or yellow; legs yellowish or light brown; L.R. 1·5. ♂♀ wings not milky; wing-length 2 mm. *Frequent. Westmorland southwards*. 5–8.....*airidorsum* Kieffer.
- ♂ thorax with extensive yellow or green ground colour; scutal stripes reddish-brown, brown or black, or median stripes reddish-brown and lateral pair black, distinctly separated; scape, postnotum and sternum black or dark brown; A.R. about 1·1; abdomen olive-green or grass-green; legs yellowish or light brown; L.R. 1·7. ♀ thorax, scape, postnotum and sternum light brown; scutal stripes brownish or absent; coloration of abdomen and legs as in ♂; L.R. 1·5. ♂♀ wings slightly milky; wing-length 2·5 mm. *Westmorland (Staveley)*, *Lancs (Hawkshead, Three Dubs Tarn)*, *Cambs (Shelford)*, *Herts (Tring)*, *Wilts (Salisbury)*, *Hants (Christchurch)*, *S. Devon (Slapton)*. 4–9
manus Walker.

Subgenus *Phaenopelma* Kieffer.

Combs of posterior tibiae small and well separated, spurs absent. Small pulvilli present. ♂ antennae 13–14-segmented, ♀ 6-segmented (segments 2 and 3 fused, 6 and 7 separate). Wings with rather scanty hair on outer half, very narrow, anal area

much reduced; r-m moderately long; $R_4 + 5$ ending above tip of Cu_1 ; f.Cu only slightly beyond base of R_5 ; posterior fringe long. Scutellum with several long marginal hairs.

KEY TO SPECIES.

- 1 ♂ thorax with extensive yellow or green ground colour; scutal stripes black or brown, or median stripes brown and lateral pair black, distinctly separated; scape, postnotum and sternum black or dark brown; antennal plumes brownish; A.R. about 0.9; abdomen olive-green. ♀ thorax with greenish-yellow ground colour; median scutal stripes light brown, lateral pair dark brown or black; sternum, scape and postnotum light brownish; abdomen light green. ♂♀ legs light brown; L.R. 1.25; wing-length 1.5-1.8 mm. *Herts (Offley)*. 5
intricatus Goetghebuer.

Subgenus **Zavrelia** Kieffer.

Eyes pubescent. ♂ antennae with only 11 distinct segments, ♀ with 5 segments. Small frontal tubercles present. Scutellum with several marginal hairs. Combs of posterior tibiae small, separate, one comb with slender bristly spur, the other unarmed. Pulvilli absent. Wings cuneiform, without anal angle; posterior fringe long; $R_4 + 5$ ending distinctly before level of tip of Cu_1 . ♂ appendage *1a* of hypopygium absent.

KEY TO SPECIES.

- 1 ♂ only (♀ not seen). Body entirely black, thorax lightly dusted whitish, slightly shining; scape brown or black; antennal plumes light brown; A.R. about 0.8; legs and halteres light brown; L.R. 1.25; wing-vein R_1 at least three-quarters as long as $R_4 + 5$; wing-length about 1.75 mm. *Cambis (Wicken), Essex (Epping)*. 7-8.....**nigritulus** Goetghebuer ♂.

Subgenus **Stempellina** Bause.

Eyes bare. ♂ antennae with only 11 distinct segments, traces of two more divisions usually distinguishable, making 13 segments in all; ♀ antennae 5-6-segmented, the last two segments sometimes fused, in which case the last segment bears a verticil; when 5 and 6 are separate 5 is without neck and 6 without verticil. Small frontal tubercles present. Scutellum with two long bristly hairs, placed close together at apex, other hairs (if present) short and inconspicuous. Combs of posterior tibiae small, separate, one comb with slender spur, the other unarmed. Wings without anal angle; posterior fringe long; $R_4 + 5$ ending before or above level of tip of Cu_1 . ♂ appendage *1a* of hypopygium absent.

GROUP A.

Pulvilli present, about half as long as claws. $R_4 + 5$ ending well before level of tip of Cu_1 . ♂ styles long, narrow and pointed.

KEY TO SPECIES.

- 1 ♂ thorax with extensive yellow or green ground colour; scutal stripes black, narrowly but distinctly separated; scape, sternum and postnotum dark brownish, latter pale at base; antennal plumes almost whitish; A.R. about 0.9; abdomen olive-green or brown; legs light brown; wings narrow, anal angle practically absent; R_1 almost three-quarters as long as $R_4 + 5$. ♀ body light green; scutal stripes yellowish-orange; legs yellow or light brown; wings as in ♂, but R_1 not quite two-thirds as long as $R_4 + 5$. ♂♀ L.R. 1.2; wing-length 1.75-2 mm. (A ♂ ? var. from *Westmorland (Windermere)* and *S.W. Ireland (Killarney)* has abdomen light green, wings slightly broader, with anal angle just indicated). *Westmorland (Witherslack), Beds (Barton Hills)*. 5-7.....**bausei** Kieffer.

GROUP B.

Pulvilli absent. Wings without trace of anal angle. $R_4 + 5$ ending above tip of Cu_1 . ♂ styles shorter and less pointed; usually the whole ♂ abdomen relatively shorter than in **Group A**.

KEY TO SPECIES.

- 1 ♀ only (♂ unknown). Hind-margin of wing (fig. 192r) with an enlargement near tip of Cu_2 , where wing is broadest; cell M with a row of hairs which do not nearly reach back to f.Cu; ground colour of thorax light brown;

- median scutal stripes brown, lateral black; postnotum dark brown; abdomen light brown (Edwards states "dull olive-green," which possibly describes the abdomen in life); legs light brown; L.R. about 1.6; wing-length 1.1 mm. *Herts (Letchworth)*. 7.....*cuneipennis* Edwards ♀.
- ♂♀ hind-margin of wing evenly rounded as usual. ♂ wing-cell M with row of hairs reaching back at least well beyond f.Cu..... 2
- 2 ♂ hairs in cell M reaching back almost to base of wing (fig. 192*g*); thorax with pale green or yellow ground colour; scutal stripes black or dark brown, distinctly separated; scape, postnotum and sternum dark brown or black; antennal plumes light brown; A.R. about 0.5; abdomen dull green; legs pale yellow; hypopygium as in fig. 199*i*. ♀ resembles ♂ in coloration, except scutal stripes light or dark brown. ♂♀ L.R. 1.6; wing-length 1.3–1.5 mm. *Inverness (Corrour), Arran (Sannox and Catacol), Westmorland (Windermere and Brothers Water), Cheshire (Goyt Valley), S.W. Ireland (Killarney)*. 5–6.....*brevis* Edwards.
- (*T. (S.) saltum* Goetghebuer, not yet found in Britain, differs from *brevis* as follows: size somewhat larger; wings narrower and slightly more hairy, row of hairs in cell R₅ doubled, except towards base; R₁ rather longer, fully two-thirds as long as R₄₊₅; A.R. 1.3; appendage 2*a* of hypopygium (fig. 199*j*) much stouter and with shorter pubescence.)
- ♂ hairs in cell M reaching back at most to slightly beyond R-M..... 3
- 3 ♂ antennal plumes whitish; A.R. about 1.5 (reckoning 11 segments); legs whitish; ground colour of thorax pale green, usually including prescutellar area and scutellum; scutal stripes black or dark brown, almost fused; scape, postnotum and sternum dark brown or black; abdomen pale yellowish-green. ♀ entirely pale yellow. ♂♀ L.R. 1.2; wing-length 1.3 mm. *Beds (Barton Hills), Berks (Cothill)*. 5–7.....*flavidulus* Edwards.
- ♂ antennal plumes pale brown; A.R. about 1.3 (reckoning 11 segments); legs pale brown; ground colour of thorax pale green, usually restricted to shoulders, whole thorax occasionally black; scutal stripes black, more or less completely fused; scape, postnotum and sternum dark brown or black; abdomen dark olive-green; hypopygium as in fig. 199*k*. ♀ thorax, sternum, scutellum and postnotum yellowish; scutal stripes light brown, indistinct; abdomen pale green. ♂♀ L.R. 1.3; wing-length 1.3 mm. *Perthshire (Loch Kinardochy), Westmorland (Windermere), Lancs (Manchester), N. Wales (Neutown)*. 6–7.....*minor* Edwards.

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