

IV. *British Limnobiidae: Some Records and Corrections.*
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PLATES I, II.

[Read March 16th, 1921.]

SINCE the late Mr. G. H. Verrall published his notes on the British Tipulidae (crane-flies) in the Entomologists' Monthly Magazine for 1885-7, very little work has been done on these insects in this country. Quite recently, however, Prof. de Meijere has undertaken a revision of the Dutch species, studying in particular the male hypopygium. His papers (published in the Tijdschrift von Entomologie, Deel lxii, 1919, pp. 52-97, pls. 2-10, Deel lxiii, 1920, pp. 46-86, pls. 2-10, and Deel lxiii, 1921, pp. 54-118, pls. 3-10) will be found indispensable to British students of the group, since the British and Dutch faunas are very nearly the same. With the following notes as a supplement to de Meijere's papers, the determination of the British Limnobiidae should now be comparatively easy. In the preparation of these notes the whole of the rather extensive collection in the British Museum has been studied, also the more limited material in the Cambridge and Edinburgh museums. The writer is further indebted to his friends Mr. H. Britten, Prof. J. W. Carr, Mr. A. E. J. Carter, Mr. C. A. Cheetham, Mr. J. E. Collin, and Mr. A. H. Hamm for the loan or presentation of material.

The result is that no fewer than 53 species are added to the British list, of which it has been found necessary to describe 14 as new. Unfortunately there are also a large number of changes in nomenclature to be made, all necessitated by a rigid application of the rule of priority. Though in the present writer's opinion there is much to be said against this principle, it seems at present the only way by which finality can be reached, and it is reasonable to hope that very few further changes will be needed in the future.

The present paper is in some sense a revision of the British Limnobiid fauna, but reference is omitted to those species which were satisfactorily dealt with by Verrall, and his papers must therefore be used in conjunction with this one. Treatment of the Tipulidae (in the restricted sense) is reserved for a future occasion.

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This manuscript was already completed when I received Messrs. Goetghebuer and Tonnoir's "Catalogue raisonné des Tipulidae de Belgique" (Bull. Soc. Ent. Belg. II, 1920, pp. 104-112 and 131-147, pls. i, ii, and III, 1921, pp. 47-58). In this work a number of species which I had figured as new are also described and figured; but since my figures give different views of the same structure they have been retained.

DICRANOMYIA.

Since some of the species of this genus were inadequately studied or inaccurately described by Verrall, and since moreover there are a number of additions to be made, a fresh table of the British species will not be out of place. The table has purposely been made without reference to the male hypopygium, but it should be noted that in some cases the species which are most alike in other characters are the most easily distinguished when reference is made to this organ.

1. Sc₁ extending considerably beyond the base of Rs 2.
 Sc₁ ending nearly opposite base of Rs 3.
2. Largish species; wing hairy on apical half . . . *pilipennis* Egg.
 Small species; wing bare; discal cell open . . . *aquosa* Verr.
3. Sc₂ close to tip of Sc₁ (frons silvery; wings spotted)
 *dumetorum* Mg.
 Sc₂ far before tip of Sc₁ 4.
4. Wings conspicuously spotted 5.
 Wings clear, or with stigma only (cross-veins and base and
 apex of Rs more or less clouded in *D. chorea*) 8.
5. Cu_{1a} about its own length before base of discal cell . . . *ornata* Mg. ✓
 Cu_{1a} close to base of discal cell 6.
6. Veins R₁ and Cu yellow, the rest dark; Cu usually with small
 dark spots along it *goritiensis* Mik. ✓
 Veins all dark, at least Cu not noticeably yellow 7.
7. Mesonotum shining yellowish, with a black longitudinal stripe;
 wing-tip conspicuously darkened; no dark spot in middle
 of Sc *lucida* Meij. ✓
 Mesonotum dull brown, unstriped; wing-tip but little dark-
 ened; a dark spot in middle of Sc . . . *didyma* Mg.
8. Mesonotum not all shining black; frons dull 9.
 Mesonotum, or at least the praescutum and scutum, entirely
 shining black; frons silvery 18.

9. Apical antennal joints elongate, with long bristles (thorax yellowish with three dark stripes) 10.
 Apical antennal joints rounded or shortly oval, with short bristles 11.
10. Discal cell open; ovipositor black at the base beneath *patens* Lundst.
 Discal cell closed; ovipositor all yellowish beneath . 10a.
- 10a. Antennae all black *ventralis* Schum.
 Basal joint of antennae yellow *modesta* Mg.
11. Cross-veins clouded (more or less); a dark spot at apex of Rs which extends obviously into the upper basal cell; legs very slender, the femora usually with distinct dark tips; abdominal segments pale posteriorly *chorea* Mg.
 Cross-veins not clouded, or only very indistinctly; apex of Rs without a dark spot, or with a very small one which does not extend into the basal cell; legs usually stouter, the tips of the femora less distinctly darkened; dorsum of abdomen nearly uniform in colour 12.
12. Thorax entirely yellow, without distinct grey pollinosity; basal joint of antennae usually yellow *lulea* Mg.
 Thorax dark, at least in the middle of the mesonotum, which usually has a distinct grey pollinosity 13.
13. Black or dark grey species, with greyish pleurae 14.
 Yellowish species, at least with yellowish pleurae 16.
14. Stigma absent or very faint 14a.
 Stigma distinct 15.
- 14a. Halteres extremely long (about as long as the greatest breadth of the wing), the whole knob and most of the stem dark *halterella* sp. n.
 Halteres much shorter, tip of knob only dark . . . *sericata* Mg.
15. Wings perfectly clear, scarcely longer than the abdomen; stigma squarish, black; central stripe of mesonotum scarcely shining *stigmatica* Mg.
 Wings slightly brownish tinged; considerably longer than the abdomen; stigma rather longer, brown to brownish-black; mesonotum with shining blackish central stripe *affinis* Schum.
16. Dorsum of abdomen mainly or entirely dark; thorax without distinct stripes; cross-veins and base and apex of Rs often slightly infuscated *mitis* Mg.
 Abdomen mainly yellow, at most with a blackish longitudinal stripe; three dark stripes on mesonotum; cross-veins and Rs never infuscated 17.

17. Antennae all black; stigma usually distinct; ovipositor all yellow *autumnalis* Staeg. ✓
First antennal joint yellow, at least at the base; stigma practically absent; ovipositor black at the base beneath
sera Walk. ✓
18. Scutellum and postnotum dull grey; abdomen almost entirely yellow; stigma very faint *rufiventris* Strobl. ✓
Scutellum and postnotum shining black; abdomen mainly black, at least dorsally; stigma distinct 19.
19. Ventral side of abdomen mainly black, with narrow yellowish rings *morio* F.
Ventral side of abdomen mainly yellow, with narrow black rings *pseudomorio* Alex. ✓

D. ornata Mg. Apparently a rare species; there are examples in the British Museum from Cusop, Hereford, taken by Lt.-Col. Yerbury on the undersides of butter-burr leaves, while Dr. W. Wallace informs me that he has taken it in the same situations near Grimsby. The species is easily distinguished by the position of the vein Cu_a (great cross-vein) and by the four large dark spots on the costa, the first and fourth being at the base and apex of the wing. The vein Cu is entirely dark and dark-bordered, not spotted; the species first recorded by Verrall as *D. ornata*, which has this vein spotted, is really *D. goritiensis*.

D. goritiensis Mik. Apparently common along the south coast from the Isle of Wight to Cornwall. I took it abundantly last June on wet cliffs and rocks on the shore at Sidmouth. An interesting aberration from Lelant, Cornwall (*Lt.-Col. Yerbury*) is in the British Museum. In this specimen (a male) the only dark spot on the wing, apart from the stigma, is a cloud in the upper basal cell beneath the base of Rs . The yellow veins R_1 and Cu and the structure of the hypopygium prove its identity.

D. lucida Meij. I first recognised this very distinct species from a female taken by Mr. A. H. Hamm at Hogley, Oxford, 10 viii. 1915, and presented by him to the British Museum; last June I found it at Weston Valley, near Sidmouth; I believe it was common there, though I only took away one specimen. There are other examples in the late Mr. F. C. Adams' collection in British Museum, collected by Dale, and named *D. ornata*, to which this species bears a considerable resemblance. All these specimens

are alike in their thoracic markings, and differ somewhat from de Meijere's description, but he had no hesitation in regarding as *D. lucida* a specimen which I sent him. There is a male in the Cambridge Museum from St. Merryn, Cornwall (*Lamb*).

D. patens Lundstr. I only know this as British from a female in the British Museum taken at Aviemore, Inverness, 10 viii. 1911 (*Lt.-Col. Yerbury*). This agrees in most details with a female from Finland named by Lundström, and I have very little doubt as to the determination. The open discal cell may possibly not be constant.

D. ventralis Schum. South Uist, Hebrides, 13 vi. 1906 (*B. Kinnear*); Freshfield, Lanes., 29 ix. 1920 (*H. Britten*). The hypopygium (Pl. I. fig. 2) differs slightly from de Meijere's figure, but there can be little doubt of the identification. The reduced palpi are diagnostic.

D. chorea Mg. Verrall and de Meijere both seem to me to have confused two quite distinct species under this name, both of them widespread and abundant. The one which I consider to be the true *D. chorea* is very variable in colour, but can be fairly easily recognised by the characters given in the key. In addition to these it differs slightly but constantly from the allied species in the structure of the hypopygium: the fleshy lower claspers are scarcely longer than broad, and the two spines on the "rostrum" (*i. e.* the inward projection of the fleshy claspers) are short, slightly shorter than the rostrum, just as in de Meijere's figure. A peculiarity of this species, which I have not noticed in its allies, is that the newly-emerged fly frequently has a green body.

D. mitis, Mg. This is the other common species which has been confused with *D. chorea*. The identification with Meigen's *mitis* is due to Goetghebuer and Tonnoir; it will be convenient to follow them and so avoid proposing a new name. Apart from the distinctions given in the key, which are usually, but perhaps not invariably applicable, this species differs from *D. chorea* in the male hypopygium: the fleshy lower claspers are much larger, and at least half as long again as broad, and the two spines on the "rostrum" are about twice as long as the rostrum itself. The hypopygium of *D. affinis* and *D. lutea* has an almost identical structure, and it is quite possible that these species are nothing more than the extreme dark and light forms of *D. mitis*; such at least is the opinion of de Meijere (in

letter). With this author's further opinion (also in letter) that all these three are mere varieties of *D. chorea*, I can, however, by no means agree.

D. affinis Schum. This, as mentioned above, may not be specifically distinct from *D. mitis* and *D. lutea*, but the colour differences are so extreme that I prefer to separate the three forms. *D. affinis* seems to be very common in hilly districts (Scotland and Welsh borders) and also in the New Forest. It is the species recorded as *D. stigmatica* by Verrall, and probably also the *D. stigmatica* of Bergroth. Meijere considers that *D. affinis* is the same as his *D. stigmatica*, but I consider that Schummel's description applies better to the species now under consideration; there appears to be no other name applicable to it.

D. stigmatica Mg. This is really an addition to the British list, which I have seen from Newtonmore, Inverness (*F. Jenkinson*), Perthshire (*A. E. J. Carter*), and Bonawe, Argyll (*J. Waterston*); it is well distinguished from other British species (in the male sex) by the greatly swollen and complicated hypopygium. Some discrepancies in the figures notwithstanding, de Meijere is probably right in regarding the *D. stigmatica* of Osten-Sacken as the same as the species figured by himself, and also *D. nigristigma* Nielsen. Meigen's description is inconclusive, but it will be as well to follow Osten-Sacken and de Meijere in their identification of the species.

D. autumnalis Staeg. This is the *D. mitis* Mg., of the British list; de Meijere, however, figures it as *D. autumnalis* and remarks that though *D. mitis* Mg., is hardly recognisable without an examination of the type, it is probably not the species so determined by Verrall. Probably Verrall himself had doubts on the point, since some of the specimens in his collection stood as *D. autumnalis*.

D. halterella sp. n. (Pl. I. fig. 1.)

A species somewhat resembling *D. sericata*, but smaller, more slender, the mesonotum less distinctly striped, and the halteres of a remarkable shape. *Head* dull dark brown; proboscis lighter; antennae and palpi entirely black; flagellar joints all about equal, oval, with short verticils not longer than a single joint. *Thorax* dark ochreous-brown, dull, pollinose; pleurae greyer; mesonotum with a rather indistinct dark central stripe. *Abdomen* blackish-brown above, pale beneath on the first three segments; hypopygium pale, with a very complicated structure (see fig. 1). *Legs* slender,

dark brown, coxae and bases of femora ochreous. *Wings* hyaline, iridescent; the stigma very faint; veins dark; in shape rather long and narrow, the narrow basal portion somewhat elongate, the anal angle very little prominent. Venation without any noteworthy peculiarity, practically as in *D. sericata*. *Halteres* very long and slender; if extended backwards they would reach to the middle of the third abdominal segment; knob elongate; colour blackish except for base of stem. Length of body, 6 mm.; wing 7 mm.; halteres 1.5 mm.

The British Museum collection contains only the type, a male from Catacol, Arran, Sept. 1920 (*J. Waterston*). A second male, from Kirkmichael, Perth, is in Mr. A. E. J. Carter's collection.

This interesting species shows much resemblance in the structure of its hypopygium to *D. ponojensis* Lundst.; there are, however, a number of small differences, and Lundström does not mention the long halteres. The North American *D. halterata* O.S., would seem to be allied, but can hardly be the same. In the shape of the wings *D. halterella* shows some approach to the tropical genus *Thrypticomys*, but the halteres are even longer than in that genus, and the antennae are quite different. The North European, *D. danica* Kuntze, is similar in several respects, but has halteres of the normal length.

D. sericata Mg. I find this species abundant on rather dry cultivated land in May and June. Though well distinguished in coloration, its hypopygium is very similar to that of *D. autumnalis*, both species having long hairy ventral processes from the side pieces.

D. sera Walk. This, according to Walker's type, is the species figured by de Meijere as *D. forcipula*. Other synonyms are *globata* Walk., *disjuncta* Walk., and *discors* Kuntze. It differs markedly from all its allies in the structure of the hypopygium, the fleshy lower claspers being long, narrow and bent in the middle; the only other British species bearing even the slightest resemblance to it being *D. morio*. Apart from Walker's types, I have only seen it from Aldeburgh, Suffolk (*Verrall*) and Wareham and Studland, Dorset (*Yerbury*).

D. rufiventris Strobl. This was added to the British list by Mr. A. E. J. Carter (*Ent. Mo. Mag.* 1913, p. 180). My colleague, the Rev. J. Waterston, took two males at Bonawe, Argyll, August 1919.

D. pseudomorio Alex. This has only very recently (Trans. Amer. Ent. Soc., xlv, p. 3, March 1920) been described by Alexander from Saitama, Japan. The hypopygium agrees closely with Alexander's description, and is very different from that of *D. morio*, so that I have no doubt, in spite of the wide geographical gap, that the species is correctly determined. The British Museum possesses three males and one female from Loch Assynt, Sutherland, vi. 1911 (*Lt.-Col. Yerbury*).

RHIPIDIA.

Two subgenera are represented among the British species. *R. maculata* is a true *Rhipidia* (the type of the genus) with the antennae bipectinate in the male and almost simple in the female. *R. ctenophora* Lw., and *R. uniseriata* Schin., belong to Alexander's subgenus *Monorhipidia*, with unipectinate antennae in the male, subpectinate in the female. The last named has not hitherto been recorded as British, but there is a female in Stephens' collection in the British Museum, and three females in the Cambridge Museum from Brockenhurst (*Sharp*). It differs slightly from *R. ctenophora* in the structure of the antennae, and in having no dark spot in the basal third of the wing. The British *Monorhipidia* both have the subcostal vein elongate, as in *Linnobia*.

LIMNOBIA.

L. dilutior sp. n.

Similar to *L. nubeculosa* and *L. flavipes*, and very closely resembling *L. hercegoviniae* Strobl, from all of which it appears to be distinct. Head dark grey, the frons lighter. Antennae blackish; first flagellar joint with its basal half conspicuously yellow; second and third also narrowly yellowish at the base. Proboscis and palpi black. Thorax much darker than in *L. flavipes*; the pleurae, scutellum and postnotum with a heavy grey dusting. Praescutum with an ill-defined, slightly shining dark brown median stripe; remainder of mesonotum dull. A blackish spot just in front of the wing-base, much smaller than the similar spot in *L. flavipes*; another small spot in the middle of the pleurae, which appears blackish when seen from above. Abdomen almost uniformly dark; the first three or four sternites yellowish towards base; hypopygium lighter, in structure practically identical with that of *L. flavipes*. Legs darker than in *L. flavipes*, especially the femora, which have two darker rings (both rather indistinct, owing to the dark ground-

colour, but of equal intensity) separated by a narrow paler ring. *Wings* resembling those of *L. flavipes*, but with the dark markings much *less* distinct; in particular the spots round the apex of Sc and the base of Rs are smaller; on the other hand, there are in the upper basal cell between the base of the wing and the base of Rs *two* faint clouds instead of only one (these are scarcely perceptible in the Nottinghamshire specimens), and there is another faint cloud over the middle of Rs. The wing is narrower than in *L. flavipes*, and differs somewhat in venation: Rs and $R_2 + 3$ are even more nearly in a straight line than in *L. flavipes*, Rs being longer and straighter than in *L. nubeculosa*; Cu_1a is about one-third of its length before the base of the discal cell; and the discal cell is somewhat longer than in *L. flavipes*, the two veins at its apex both straight and equal in length.

I took a male at Sandy, Beds., 10 v. 1910, and Prof. J. W. Carr has sent me a male and female taken at Woodborough, Notts., 11 ix, 1920, by sweeping broom bushes. The museum also possesses two males from Victoria Park, Manchester (*H. Britten*) and one from Aberlady, 24 v. 1904 (*J. Waterston*, pres. by *A. E. J. Carter*).

Most of the points of difference mentioned above between this species and *L. flavipes* are given by Strobl for *L. hercegoviniae*. I should have considered the species to be the same as Strobl's, had he not stated that (1) the wings are *more* spotted than in *L. flavipes*, almost identical with those of *L. nubeculosa*; and (2) the thorax has three shining blackish-brown stripes with two reddish-yellow triangles between them in front. This species is probably identical with *L. hercegoviniae* as identified by de Meijere (1921).

L. masoni sp. n.

Close to *L. nigropunctata* Schum., agreeing with it in antennae (structure and coloration) and wings (venation and markings), also in the structure of the hypopygium, but differing as follows:—*Thorax* much darker; praescutum entirely shining black, except for a small area on each side just in front of the suture; pleurae and postnotum dark brown. *Abdomen*, including hypopygium, shining black, with small yellowish areas at the base of the third and fourth tergites. Front femora resembling the others in having only a narrow black ring at the tip.

I took a female in Dovedale, Derbyshire, 25 vi. 1911; there is a male in the British Museum from King's Lynn,

vi. 1915 (*Atmore*), and Mr. Collin tells me he also possesses the species. The name is a manuscript one bestowed by Verrall; the type specimen is the male from King's Lynn.

L. decemmaculata Lw. This appears to be widely distributed, though nowhere common. I have seen examples from Nethy Bridge (*Lamb*), Leigh Woods, Bristol (*Hudd*); North Herts. (*F. W. E.*); South Herts. (*Austen*) and Henley-on-Thames (*Scott*). Small specimens have a rather strong resemblance to *Dicranomyia dumetorum* especially on account of the silvery frons, but the venation and other characters will distinguish them.

HELIUS (*Rhamphidia*).

For conformity with the rules of zoological nomenclature, the name *Helius* (St. Fargeau and Serville, 1828) must replace *Rhamphidia* (Meigen, 1830). Since Riedel has recently revived the alternative name *Megarhina* some explanation is necessary as to why this name is rejected in favour of *Helius*. According to Kertész's catalogue, both these names were published in 1825 (Encycl. Method. Zool. x, pp. 585 and 831), but, as shown by Sherborn (Ann. Mag. Nat. Hist. (7) xvii, p. 577), the date of the second half of the volume in which they appear was really 1828. In 1827 Robineau-Desvoidy had proposed *Megarhinus* for a genus of Culicidae, and for this (implied) reason St. Fargeau and Serville altered their name *Megarhina* to *Helius* in the index. Although the nomenclature rules allow the retention of two generic names differing only in termination, and I have elsewhere argued in favour of this, it would obviously be very inconvenient to have a *Megarhinus* in Culicidae and a *Megarhina* in Limnobiidae. The name *Megarhina* is therefore rejected; this course can be justified by the fact that both *Megarhina* and *Helius* were published on the same date by the same authors, whose desire was clearly that the latter should be used. *Helius* should not be considered preoccupied by *Helia* (Hübner, 1816, Lepidoptera).

I cannot agree with Verrall and de Meijere that the three described European species of this genus should be lumped together. We certainly seem to have three distinct species in this country, none of which can be satisfactorily identified with the descriptions of either *H. longirostris* or *K. inornatus*, nor yet with the Japanese species recently described by

Alexander. Two of these are therefore described below as new, though it is certain that the first at least occurs on the Continent (compare Riedel's remarks, Entom. Rundschau, xxxvi). All three are alike in venation. The pupae show slight specific differences.

H. pallirostris sp. n. (Pl. I. fig. 5.)

Mesonotum with three distinct dull black stripes on a light brown ground-colour. *Head* greyish-ochreous with a longitudinal black mark; proboscis light brown beneath, darker above. Antennae all black; basal flagellar joints about twice as long as broad; verticils long, as in the other two species. Stigma roundish, nearly black and very distinct. Legs rather dark brown, tips of femora nearly black. *Hypopygium*: ninth tergite with two little rounded hairy projections in the middle. Ninth sternite swollen and somewhat produced in the middle, bare at the sides. Side pieces with a large dorsal, basal membranous projection, serrate on its posterior edge. Upper (or inner) clasper bent before $\frac{1}{3}$, its terminal $\frac{2}{3}$ quite smooth. Lower clasper very short, ending in a single curved spine.

I have taken this species at Letchworth, Herts., and Slapton, S. Devon; in the former case it was reared from larvae found in rotting leaves of *Typha*. It can hardly be *H. longirostris*, which is described as having a blackish-brown proboscis; nor *H. inornata*, which is said to have reddish legs with a dark ring *before* the tips of the femora.

H. dubius sp. n. (Pl. I. fig. 3.)

Thorax, rather dark brown, pleurae more greyish, sometimes with an ochreous tinge; mesonotum slightly shining, with three broad but ill-defined darker brown stripes. *Head* dark grey, unmarked; proboscis black. Stigma rather elongate, light brown. Antennae all black, distinctly shorter than in *H. pallirostris*, the basal joints of the flagellum very little longer than broad. *Legs* dark brown, femora lighter at the base. *Hypopygium*: very similar to that figured by de Meijere for *H. longirostris*, but the claspers of a rather different shape; the upper (inner) pair have a much more pronounced hump at the bend, and the lower (outer) pair are bare and have the pale basal part very much broader, especially just before the middle. (In fig. 3 they are somewhat fore-shortened and do not show the full breadth.)

The British Museum series comprises specimens from Lymington and Tunbridge Wells (*Verrall*) and Radwell, Herts., and Corriegills, Arran (*F. W. E.*); Mr. Cheetham

has it from Gormire and Austwick, Yorks. Mr. K. G. Blair has reared it from larvae found in rotting stems of *Typha* at Hampstead. This cannot very well be *H. longirostris*, which according to the description of Meigen has a pale yellow head and a distinctly striped thorax.

H. flavus Walk. (Pl. I. fig. 4.)

Thorax almost uniformly yellow-ochreous, the mesonotum sometimes with an indistinct dark median stripe in front. *Head* blackish-grey, lighter round the eyes. Proboscis black. Antennae with the second joint reddish; flagellar joints intermediate in length between those of the two previous species. *Legs* rather lighter than in *H. dubius*, the femora without dark rings at the tips. Stigma absent. *Hypopygium*: much like that of *H. longirostris* (Meijere's figure), but the lower claspers with a scarcely perceptible pubescence; the upper claspers with four or five thick spine-like projections at the bend.

Besides Walker's type male, specimens are in the British Museum from Lymington (Verrall); Rickmansworth (*Dr. W. Wallace*) and the Hitchin district (*F. W. E.*); Finchley (*K. G. Blair*), reared from larvae found among decaying reeds.

ORIMARGA.

O. virgo was recorded by Verrall from "a little grassy slope against the river Torrigill at Inchnadamph in Sutherland." In June 1911 Col. Yerbury visited this exact locality, hoping to find the species again, and did in fact capture a single specimen of an *Orimarga*. However, on examination this proved to be not *O. virgo*, but *O. attenuata* Walk. (= *alpina* Zett.), and hence an addition to the British list. It differs from *O. virgo* in the grey thorax, darker legs, and the venation (*r-m* cross-vein beyond instead of before the first fork of the media, etc.). Of *O. virgo* it is worthy of note that there is a male in the British Museum from Seaton Hole, Devon (*Eaton*).

ANTOCHA.

Rondani's name *Taphrophila* cannot apply to this genus, since he says that the marginal cross-vein is absent; hence there is no reason for upsetting Osten-Sacken's name. The European species is now known as *A. vitripennis* Mg., since de Meijere has shown that it is distinct from the American *A. opalizans*.

G. abbreviata Lw. This easily recognised species is represented in the British Museum by two males, one taken many years ago by J. C. Dale; the other I took at Cambridge, 2 vi. 1910. Mr. F. Jenkinson has also taken a female at Cambridge.

G. lateralis Macq., is a common and well-marked species; *G. alboscuteolata* v. Ros. (= *G. scutellata* Egg.) on the other hand seems to be rare; I only know it from Herefordshire (*Wood*).

G. recta Tonn. Closely resembles *D. lucidula* Meij., but larger, and usually (perhaps not always) with a longer discal cell. Hypopygium as in Pl. I. fig. 6; note especially the peculiar structure of the aedoeagus. This is probably a fairly common and widespread species. Verrall's specimens were from Freshwater, I. of Wight. I have taken it at Hitchin, Herts., Snailbeach, Salop, and Sidmouth, S. Devon; in June and July.

G. lucidula Meij. Probably common. Bonawe, Argyll (*Waterston*); Ffrith, Flintshire; Snailbeach, Salop; Dartmouth (*F. W. E.*); Gormire and Austwick, Yorks (*Cheetham*).

G. tenella Mg. Probably common. British Museum material is from Herts., Beds., Hunts. and Dorset.

G. dentata Meij. Some British records are: Princetown and Lyndhurst (*Verrall*); Loch Assynt (*Yerbury*); Snailbeach, Salop (*F. W. E.*); Corrour, Inverness (*Grimshaw*); New Forest (*Sharp*).

G. simplex Tonn. A somewhat larger species than *G. dentata*, and with a dark proboscis, but otherwise extremely similar. Hypopygium similar to that of *G. dentata*, but differing in details, notably in the curious hook at the tip of the aedoeagus (see Pl. I. fig. 7). All the material examined is from hilly or mountainous districts. Various localities in Arran (*F. W. E.*); Inchnadamph, Sutherland (*Yerbury*); Ffrith, Flintshire (*F. W. E.*); Nethy Bridge, Inverness (*Lamb*).

RHABDOMASTIX.

As has recently been stated by Alexander, the European species *Gonomyia schistacea* and *G. laeta* belong to the subgenus *Sacandaga* of *Rhabdomastix*; they differ from *Gonomyia* in having Cu₁a in the middle of the small discal cell, the branches of M strongly divergent at the base; also in being devoid of yellow coloration.

EMPEDA.

I prefer to regard *Empeda*, and the other groups allied to *Erioptera*, as distinct genera, as has been done by most European writers, though not by Osten-Sacken and Alexander, the two leading authorities on this group in America. Rondani's *Hisophila* has been quoted as the same as *Empeda*, and his diagnosis certainly suggests that this may be so, but he gives "*Erioptera lutea* Mg." as the type, therefore his name can hardly be adopted.

ILISIA.

Rondani's name *Ilisia* must take the place of Osten-Sacken's *Acyphona*. We have two British species, the common *I. maculata* with spotted wings, and the rarer *I. areolata* Siebke, with plain wings and very small discal cell. The latter occurs at Glasgow (*Henderson*, Brit. Ass. Handb. Nat. Hist. Glasgow, 1901, p. 268); Rocester, Staffs. (*F. W. E.*); Shotover, Oxford (*Hamm*); Farnley, Leeds (*Cheetham*); Midlothian (*A. E. J. Carter*, Ent. Mo. Mag., 1913).

ERIOPTERA (s. str.).

1. Wing-veins inconspicuously hairy towards apex only; dark species; thorax with a narrow black central line 2.
Wing-veins conspicuously hairy for almost their entire length 3.
2. Larger species; wings broader; discal cell usually closed; wings clear *trivialis* Mg.
Smaller species; wings narrower; discal cell usually open; cross-veins often more or less clouded, sometimes also a cloud below tip of R_1 *diuturna* Walk.
3. A distinct brown cloud along apical half of costa; legs pale yellow *limbata* Lw.
Wings unicolorous 4.
4. Pale yellow species 5.
Brownish ochreous to blackish-brown species 6.
5. Palpi black; eyes very large, almost touching in the male
macrophthalma Lw.
Palpi brown; eyes much smaller, widely separated in both sexes *flavescens* Mg.; *meijerei* sp.n.
6. Blackish-brown species *fuscipennis* Mg.
Ochreous species, at least with ochreous pleurae 7.
7. Knob of haltere blackish, stem very pale; mesonotum darkened in the middle *lucionota* Mg.; *minor* Meij.
Knob of halteres scarcely darker than the stem, which is less pale; mesonotum not darkened in middle 8.

8. Large species; uniformly ochreous-brown, including the wings;
legs stout *squalida* Lw.
Smaller species; wings lighter; legs more slender 9.
9. Terminal flagellar joints elongate, especially in male, with long
verticils *nielseni* Meij.
All flagellar joints alike, oval, verticils shorter 10.
10. Abdomen concolorous with thorax *verralli* sp. n.
Abdomen more or less darkened, except for the tip
griseipennis Mg.

E. trivialis Mg. In this species the radial cross-vein is sometimes placed slightly before the fork of R_2 and R_3 ; such specimens might be mistaken for a *Cheilotrichia*, but the species is a true *Erioptera* with a long sinuous axillary vein.

E. diuturna Walk. The wings are narrower and the hair on the veins at the apex of the wings is even less noticeable than in *E. trivialis*, and there are a number of slight differences in the hypopygium: the upper (inner) clasper is broader, and has several long hairs on its lower apical margin which are absent in *E. trivialis*; the lower (outer) clasper is narrowed rather suddenly on its apical third instead of slightly and gradually from the base, this apical third only being black; there is no little projecting lobe at the base of the ventral side of the side pieces, and the aedoeagus is differently constructed. Walker's *diuturnus* included two species; I propose to fix his name for this one as there seems to be no other name available. The wing-markings of the darkest specimens are very suggestive of *Symplectomorpha stictica*.

Localities: Yarmouth, I. of W. and Winfrith, Dorset (Cockerell); Austwick, Yorks (*Cheetham*); Catacol, Arran (*Waterston*).

E. limbata Lw. There is a pair of this very distinct species in the British Museum, presented by J. C. Dale in 1864, and taken by him in Dorset. Another pair, also from Dale, is in Mr. Collin's collection, named by Verrall *E. lutea*.

E. macrophthalma Lw. This is probably fairly common and widely distributed. I have taken it at Hitchin (Herts.) and Snailbeach (Salop).

E. meijerei sp. n. (Pl. I. fig. 8).

Very similar to *E. flavescens*, differing only in the hypopygium (see fig. 8), which is more like, though not identical with, that of

E. macrophthalmus. Side pieces simple, without the hairy apical lobe of *E. macrophthalmus*. Upper clasper with a strong sharp black point, apically directed, just beyond the middle. Lower clasper long, strap like, black at the tip. *Parameres* very strong and thick, black.

I know this species only from a single male from Wicken, 17 vii. 1885 (*Verrall*). Prof. de Meijere informs me he has taken three males, all at the same locality in Holland. I therefore have pleasure in dedicating the species to him, in recognition of his invaluable work on European Limnobiidae.

E. taenionota Mg. I cannot follow de Meijere in using the name *E. lutea* Mg. for this species. *E. lutea* was described as having the abdomen entirely yellow, which is certainly not true of *E. taenionota*. No British species agrees accurately with Meigen's description of *E. lutea*, and this name should therefore be dropped from our list.

E. verralli sp. n. (Pl. I, fig. 9).

Whole body, including abdomen, legs, wing-veins and halteres, dull brownish-ochreous; palpi, vertex and flagellum of antennae darker; pronotal lobes yellowish. Joints of antennal flagellum all oval and approximately equal in size; verticils not very long. Wing-membrane transparent; hair on veins moderately long. Stem of cell R_2 rather shorter than that of cell M_2 . Cu_1 a straight, slightly oblique, reaching M just before the fork. *Hypopygium* (see fig. 9): side-pieces simple, nearly cylindrical, about three times as long as broad. Upper (inner) clasper pale throughout, simple, somewhat tapering a little beyond the enlarged base; tip rounded, with two apically directed hairs. Lower clasper darkened apically, enlarged and divided at tip (see figure). *Parameres* rather slender, each ending in two long sharp points, which are somewhat darkened.

A male and female from Dovedale, 14 vi. 1888 (*Verrall*) are in the British Museum.

E. griseipennis (Mg.) Meij. Probably a fairly common species. The British Museum has specimens from Frant, Sussex and Dullingham, Cambs. (*Verrall*) and Letchworth and Radwell, Herts. (*F.W.E.*). I have also seen specimens from Nottingham (*Carr*) and Cambridge (*Jenkinson*).

E. minor Meij. Major E. E. Austen took a pair of this species at Harrow, 4 vii. 1894. Its describer distinguishes it from *E. taenionota* by the colour of the thorax and the

venation, but our specimens do not differ from *E. taenionota* in any noticeable manner, apart from the structure of the hypopygium. Most of the species of this genus vary in the smaller details of the venation, and it seems unsafe to base any specific distinctions on these characters.

E. squalida Lw. This species is common at Norton Pond, Letchworth—a locality which has yielded quite a number of good things. It is of the size and build of *E. flavescens*, but of a brownish-ochreous colour, even on the wing-membrane. Mr. Cheetham has taken it at Gormire, Yorks.

E. nielseni Meij. (1921) (Pl. I. fig. 10).

Head, thorax, hypopygium and legs ochreous brown; palpi blackish; abdomen dingy greyish-ochreous; wings with the membrane clear, hairs light brown, moderately long; halteres uniformly dark brownish. Antennae of the male with the second scapal joint much swollen; first two flagellar joints almost globular; next three somewhat smaller and more elongate; remainder long and slender, with verticils about twice as long as each joint; in the female the second scapal joint is less swollen, and the terminal flagellar joints less elongate. Stem of cell R_2 considerably shorter than that of cell M_3 . *Hypopygium* (see fig. 10): side pieces simple, about three times as long as broad. Upper (inner) clasper scarcely darkened apically, with a hump some way before the rounded tip. Lower (outer) clasper somewhat swollen a little before the pointed black tip. *Parameres* short, simple, pointed, black-tipped.

Several males and one female from Austwick, nr. Ingleboro, 17 vii. and 27 viii. 1920 (*C. A. Cheetham*). The antennae resemble those of the *flavescens* group, but the body colour is not such a clear yellow.

MOLOPHILUS.

The species of this genus are often very similar, but can be readily recognised by the striking differences in the male hypopygium; in many cases these characters cannot be seen well in the dry specimen; the end of the abdomen must be removed, cleared in potash and mounted. The following key will show which species are distinguishable by other characters. Too much reliance should not be placed on the colour-differences indicated.

1. Blackish species 2.
Yellow or light brown species (at least the thorax) 5.
2. Thorax shining black 3.
Thorax dull blackish or dark brown 4.
3. Wings short and functionless in both sexes *ater* Mg.
Wings normal *bihamatus* Meij.
4. Whole body densely clothed with long hair, also the wing-membrane, thorax dark brown, somewhat shining *murinus* Mg.
Body short-haired (normal); wing-membrane bare, thorax dull blackish-brown *obscurus* Mg.
5. Very small species; cross-vein *r* less than twice its own length from the base of *R*₂; Ax ending before fork of Cu; wing-fringe on basal half of lower margin longer than the breadth of the cubital and two anal cells; legs pale *pusillus* sp. n.
Larger; cross-vein *r* generally 3 times its own length from the base of *R*₂, often more; Ax ending beyond fork of Cu; wing-fringe shorter; legs darkened except towards base of femora 6.
6. Thorax brown; head black or grey; wing-hair dark
bifidatus Verr.; *curvatus* Tonn.; *occultus* Meij.; *gladius* Meij.; *bifidus* Goet.
Thorax yellow (sometimes slightly brownish-tinged) 7.
7. Wing-hair yellow or pale, at least in large part; head and abdomen yellow
appendiculatus Stæg.; *armatus* Meij.; *medius* Meij. Wing hair all dark 8.
8. Head pale *pleuralis* Meij.
Head dark grey on vertex 9.
9. Abdomen orange-yellow *ochraceus* Mg.; *flavus* Goet.
Abdomen more or less darkened *propinquus* Egg.; *cinereifrons* Meij.

M. pusillus sp. n.

A very small species, allied to *M. murinus* Mg., in venation, but much less hairy, and of a brownish-yellow coloration; halteres pale.

Head, including palpi and antennae, blackish. Joints of flagellum sub-cylindrical, narrowed a little at each end, twice as long as broad, apical joints gradually becoming smaller; verticils nearly three times as long as each joint. *Thorax* uniformly dingy ochreous or brownish-yellow, slightly shining; praescutum with two rows of long brown hairs; a few similar hairs on the scutum. *Abdomen* (except for the last segment and the ovipositor) somewhat darker than the thorax, with shorter but denser hair. *Legs* rather pale ochreous, only the tarsi somewhat darker; hairs of femora about twice as long as the diameter of the legs. *Wings* with long dense

rather dark-brown hair on the veins; the fringe very long, in the middle of the hind margin nearly half as long as the breadth of the wing, or slightly longer than the distance from vein Cu to the wing margin. Radial cross-vein thick, scarcely twice its own length distant from the base of R_2 . Basal section of $R_1 + 5$ vertical, practically in one straight line with $r-m$, and about the same length. Cu_1 reaching M before the fork (two specimens) or just beyond it (one specimen). Ax rather short and nearly straight, ending slightly but distinctly before the fork of Cu. *Halleres* ochreous. Length of body 2.5 mm.; wing 3.5 mm.

This species, in venation, seems to connect the rather isolated *M. murinus* with the yellow group of species, but shows no trace of hairs on the wing-membrane. The peculiarities of venation, taken together, are probably sufficient to distinguish it from these latter species, though the venation is evidently subject to some variation. I took three females at Dreghorn, Ayrshire, 22 v. 1919.

M. bihamatus Meij. I have seen only one British example of this species, a female in the British Museum from the New Forest (*F. C. Adams*).

M. curvatus Tonn. I had intended to adopt Curtis' name *crassipes* for this species, but since Tonnoir has proposed a new name for it, it will be better to use the one that is certain. I have taken it in Arran and at Llangollen; it is also represented in the British Museum from the New Forest (*Adams*). Hypopygium, Pl. I. fig. 13.

M. occultus Meij. Brockenhurst (*Verrall*); Gidleigh, S. Devon (*F.W.E.*); Rannoch (*Grimshaw*).

M. gladius Meij. A single male from Oxtun Bogs, Notts., 11 v. 1918 (*Carr*), presented by the collector to the British Museum; two more from Austwick, Yorks, 7 vi. 20 (*Cheetham*).

M. bifidus Goet. Superficially identical with the above three species, but with a very different hypopygium. The ventral (morphologically dorsal) plate of the aedeagus is long, curved, and black, ending in a sharp point, and having at its base a pair of little black teeth (Pl. I. fig. 11*b*). The lower clasper also has a slightly bifid tip. Probably common: Hitchin, Radwell and King's Walden, Herts.; Snailbeach, Salop (*F.W.E.*); Humberton Marshes, Grimsby (*Dr. W. Wallace*); Austwick, Yorks (*Cheetham*).

M. appendiculatus Staej., *M. armatus* Meij., and *M. medius* Meij., are all common and are often found together.

M. pleuralis Meij., is evidently the species Verrall recorded as *M. ochraceus*, though he also had it under a manuscript name. Localities are Slapton and Dawlish (S. Devon), Wicken, and Arran.

M. ochraceus Mg., in the sense of de Meijere, seems to be a rare species with us. I have only seen one male (Bonawe, *Waterston*).

M. flavus Goet. (Pl. I. fig. 12).

Similar to *M. ochraceus*. *Thorax* and *abdomen* entirely orange. *Legs* blacker than in most other species of the group; femora orange at the base, somewhat swollen on the apical third. *Hypopygium* as in fig. 12; the upper clasper has a waved appearance when seen in side view.

Localities: Corriegills, Arran (*F.W.E.*); Catacol, Arran (*Waterston*); Snailbeach, Salop (*F.W.E.*); Pateley, nr. Leeds (*Cheetham*).

M. propinquus Egg., and *M. cinereifrons* Meij., are both common species, indistinguishable apart from the hypopygium, and frequently, though not invariably, found together.

RHYPHOLOPHUS.

The two groups of which this genus is composed in Europe and North America seem to me to be of at least subgeneric if not generic value. The genus has sometimes been divided on the presence or absence of a discal cell, and the mode of forking of the media; but a much better division is the one proposed by Verrall, based on the length of the axillary vein. If we regard the length and curvature of the axillary vein as a character of generic importance in *Erioptera*, it seems inevitable to take the same view of the parallel and equally constant condition in *Rhypholophus*. This name will then be restricted to those species with a long and sinuous axillary vein, of which we have only two in Britain, *R. haemorrhoidalis* and *R. varius*. Rondani's name, *Ormosia*, is available for the other group, in which the axillary vein is short and divergent from the anal.

ORMOSIA.

In this genus *O. fascipennis* Zett. (*pentagonalis* Lw.) is distinguished from the other British species by the possession of a closed discal cell; *O. pseudosimilis* Lundst., and *O. similis* Staeg., by their yellow colour; *O. lineata*

(Mg.) by the dark line down the middle of the thorax; and *O. uncinata* (Meij.) by the whitish pubescence on the hind metatarsus, contrasting with the dark tibia, which is very noticeable in life. The remaining three species are only distinguishable with certainty by the male hypopygium, but the differences in this organ are very striking.

O. uncinata (Meij.). This is a common and widespread species, probably the one which Verrall regarded as *O. nodulosa*. The character of the hind metatarsus seems to be diagnostic (but compare the two new species); it was not mentioned by Macquart, and therefore de Meijere may be justified in restricting Macquart's name to the next species, though *O. uncinata* is the species which has the male antennae most distinctly nodose.

O. nodulosa (Mcq.) Meij. This is the other common species noted by Verrall and Carter as occurring in this country.

O. hederae (Curt.) Meij. Curtis' description and figures would apply about equally well to *O. nodulosa*, but de Meijere's selection will fix this name definitely. All the specimens I have seen are from Scotland: Nairn and Loch Assynt (*Yerbury*); Kinlochewe, Ross (*Grant*); Arran (*F.W.E.*).

O. albitibia sp. n. (Pl. II. fig. 15).

With the characters of *O. nodulosa* (Mcq.), but the male antennae a little longer, the joints slightly more swollen in the middle, the verticils somewhat longer; mesonotum ochreous-tinged at the sides in front; hind tibiae and tarsi (in the one perfect specimen) with the pubescence almost entirely pale, but that on the metatarsus not strikingly paler than that on the tip of the tibia. *Hypopygium* very similar to that of *O. nodulosa* (as figured by de Meijere), but the long yellow hair on the ninth tergite (sternite of de Meijere) is in a larger and broader patch; the bifid tenth tergite (or terminal portion of the ninth) is shorter, and the upper claspers (fig. 15) are very long, curved backwards (caudally) and end in long sharp points.

Two males are before me, one (damaged) from Braemar, 27 vii. 76 (*Verrall*), and one (the type) from Church Stretton, Salop, 24 vi. 1920 (*F.W.E.*).

O. aciculata sp. n. (Pl. II. fig. 14).

Closely resembles *O. uncinata* Meij.; perhaps distinguishable by the colour of the pubescence on the hind leg, that on the hind tarsi being almost entirely whitish, not whitish on the metatarsus only;

the hind tibia has dark pubescence except at the extreme base. Hind femora slender (somewhat clubbed apically in *O. uncinata*). *Hypopygium* (fig. 14) very distinct: the tenth tergite (or apical portion of the ninth) is elongate (as in *O. nodulosa*) and in the specimens examined bent at right angles to the ninth; both pairs of claspers are horny, curved and sharp pointed, and there are also three horny sharp-pointed black processes on the aedocagus.

Stonesdale, Yorks, 22 v. 1920 (*C. A. Cheetham*); 2 ♂, type presented by the collector to the British Museum.

O. similis Staeg. Mr. F. Jenkinson has taken several examples of this species at Logie, Elgin, viii. 1903 and ix. 1913. It seems to be somewhat larger than *O. pseudosimilis*, but apart from this and the difference in hypopygia there is little to distinguish the two. Lundström's figure is not quite accurate; the terminal portion of the ninth tergite (morphologically the tenth) is really deeply divided in the middle as it is in *O. nodulosa*.

O. pseudosimilis Lundst. A male in the British Museum named by Verrall *R. similis*, and taken by him at Inveran, is really *O. pseudosimilis*. A second male from the Clifton collection in the British Museum was probably taken near London; another from Crag Wood, Yorks, is in Mr. Cheetham's collection.

HELOBIA.

This old name is now generally and correctly used in place of *Symplecta*. *H. hybrida* Mg. (the earlier and therefore correct name for *Symplecta punctipennis*) seems to be a rare insect in Britain. The British Museum possesses a male from the Scilly Is. (collector unknown) and one female from Felden, Herts. (*Piffard*). There is a specimen from Cambridge (*Jenkinson*) in the Cambridge Museum; and I have recently found it in numbers at Shelford, Cambs.

SYMPLECTOMORPHA.

I consider that Kuntze and de Meijere are justified in reviving this name for *Symplecta stictica* and *S. similis*, and I further agree with de Meijere that these two are not specifically distinct.

TRIMICRA.

Kuntze in his paper on Palaearctic Eriopterinae attempts to distinguish three species of this genus: *pilipes* F.,

hirsutipes Macq., and *andalusiaca* Strobl. I do not consider, however, that these are really distinct. I have seen British specimens which correspond fairly well to the three forms defined by Kuntze, and they all have identical male hypopygia, while the differences between them in other characters do not seem to be sharply marked, but are bridged by continuous variation. In general the small specimens seem to have less distinctly clubbed femora, somewhat shorter hair on the male tibiae, and less conspicuous dark borders to the cross-veins.

T. pilipes probably has a wider distribution than any other crane-fly. An examination of the hypopygia of a number of specimens in the British Museum shows that it occurs in Uruguay, Ecuador, Argentina, the Falkland Islands, South and East Africa, Victoria, Queensland, the Sandwich Islands, Madeira and Palestine; it is also known to occur in North Africa, the Canaries and North America, as well as throughout Europe. It may be doubted whether the genus really contains more than one cosmopolitan species; from an examination of types or other specimens I can say definitely that *haligena* Woll., *hirtipes* Walk., *inconspicua* Lw., *lateralis* Grim., and *reciproca* Walk., are all synonymous with *pilipes* F. It is not easy to account for the widespread occurrence. The larvae are said simply to live in "moist earth," hence there seems no special reason why the species should be spread by commerce.

GNOPHOMYIA.

A specimen of *G. tripudians* has been taken at Cambridge by Mr. F. Jenkinson. Other species of this genus may be expected to occur in Britain.

CRYPTERIA.

The most important distinguishing character of this genus is the fusion of the three or four basal segments of the antennal flagellum into a single large conical segment. A similar fusion takes place in the genera *Cladura*, *Pterochionca* and *Chionea*, all extra-British genera which differ from *Crypteria* in having only a single clasper, instead of two, on the side-piece of the male hypopygium.

C. limnophiloides Bergr. Since this was recorded (Proc. Ent. Soc. London, 1919, p. xlix), a male has turned up among the accessions in the British Museum from Middle Park, Pool, Glamorgan, 15 x. 1895 (Dr. J. H. Wood).

C. carteri, Tonm.* (Pl. II. fig. 16).

Closely allied to *C. bergrothi*, Kuntze, differing almost solely in the hypopygium (see fig. 16): the side pieces are more slender than in Kuntze's figure, the outer clasper hooked at the tip (straight in *bergrothi*), the inner clasper moderately stout and straight (slender and recurved in *bergrothi*). The venation is somewhat variable, particularly in regard to the position of Sc_2 (at or well before tip of Sc_1) and Cu_a (near base or almost in middle of discal cell). In some specimens the middle and hind tibiae show a single minute spur at the tip, which is apparently absent in others. Some specimens show 10, others 11 joints in the antennal flagellum beyond the fusion-joint. *C. bergrothi* and *C. carteri* both differ from *C. limnophiloides* as follows:—Marginal cross-vein present though usually very faint; R_2 not much longer than $R_2 + 3$, or even slightly shorter; Ax shorter and straighter; side pieces of hypopygium with a peculiar long stout spine (evidently a modified bristle) at the base.

Polton, Midlothian, 25 v. 1915 (*A. E. J. Carter*), one male and one female presented by the collector to the British Museum; Ffrith, Flintshire, 7–9 vi. 1919 (*F. W. E.*), 2 ♀; Snailbeach, Salop, 22–28 vii. 1920 (*F. W. E.*) 1 ♀; Victoria Park, Manchester, 22 viii. 1920 (*H. Britten*), 1 ♂.

IDIOPTERA.

I do not consider the differences between *Idioptera* and *Ephelia* to be of generic value, and propose to combine the groups; if the latter is regarded as distinct, it must take Rondani's name *Elacophila*, which is older than *Ephelia*. *Idioptera* as a whole differs from the other genera of the *Limnophila* group in possessing an extra cross-vein in the lower basal cell, but the distinction is not by any means a fundamental one. The cross-vein is occasionally absent on one or both wings in *I. pulchella* and *I. marmorata*. The following table will separate the British species (omitting *I. decora* Hal., which is doubtfully synonymous with *I. marmorata* Mg., and *I. submarmorata* Verr., which I cannot distinguish from *I. marmorata*):—

- | | |
|---|----|
| 1. Wings with complete or nearly complete transverse bands;
costal cell uniformly brown, darker than most of the wing;
male abdomen mostly orange | 2. |
| Wings without complete transverse bands; costal cell either | |

* This appears to be identical with the North American *Limnophila ultima* O.-S., which Alexander has recently made the type of *Necolimnophila*, a new subgenus of *Limnophila*.

- entirely pale, or pale with blackish markings; male abdomen entirely blackish 3.
2. Femora and tibiae yellow with black tips; wings of female normal *fasciata* L.
Legs black, except base of femora; wings of female rudimentary *pulchella* Mg.
3. Wings without dark markings, except over the cross-veins and at the base of Rs; male antennae longer than the thorax.
trimaculata Zett.
- Wings with at least a few additional dark spots, including one near tip of Ax; male antennae shorter than the thorax . 4.
4. Femora gradually darkened from base to tip; the dark spot at the tip of the costal cell almost equidistant from the one over the base of Rs and the one at the tip of R_1 ; dark spot over humeral cross-vein minute *dalei* sp. n.
Femora yellow with blackish tips; the dark spot at the tip of the costal cell much nearer the one at the tip of R_1 than to the one over the base of Rs; humeral spot generally quite large . 5.
5. Wing-veins entirely without small dark dots, except at their tips 6.
- Wing-veins with at least a few dark dots along them, in addition to the larger dark markings 7.
6. Wing-tip mostly dark, but basal half of R_{4+5} mostly pale.
apicata Lw.
- Wing-tip mostly pale, but R_{4+5} uniformly dark-margined.
mundata Lw.
7. Wing-veins with only a very few dark dots.

marmorata var. *verralli* Bergr.

Wing-veins with numerous dark dots . . . *marmorata* Mg.

I. *fasciata* L. There is a single specimen of this species, correctly named, in Stephens' collection in the British Museum. Mr. C. A. Cheetham has taken it at Austwick, near Ingleboro, which is the only recent record I know of.

I. *trimaculata* Zett. This species forms the connecting link between *I. fasciata* and *I. marmorata*, since although the male antennae are somewhat elongate and constructed as in *I. fasciata*, the outer clasper of the male hypopygium is flattened, black, and finely serrate on the outer edge as in the *marmorata* group. *I. trimaculata* is probably not uncommon in mountain districts; it was abundant at Taw Head, Dartmoor, in June 1920.

I. *dalei* sp. n. (*vide* de Meijere, 1921) (Pl. II. fig. 17).

Head dark grey, with a small black spot between the eyes. *Antennae* entirely dark, alike in the two sexes, shorter than the thorax,

basal joints of flagellum almost globular. *Thorax* almost uniformly dark greyish, the praescutum with two rather indistinct dark brown lines. *Abdomen* uniformly dark. Male hypopygium similar to that of *I. apicata*, but different in detail. Ninth tergite somewhat emarginate in the middle; side pieces without a trace of small teeth at the base; elaspers (fig. 17a) much as in *I. apicata* (fig. 18a) but the black outer pair have a longer and sharper median tooth on the outer margin, and the outer half of the outer margin is more distinctly serrate; inner elaspers short, almost oval; penis (fig. 17b) more than half as long as the side pieces (as in *I. apicata*, fig. 18b) but the basal plate is more elongate and pointed in the middle. *Legs* darker than in the allied species; femora pale at the base, gradually darkening towards the tips, which are almost black. *Wings* with a slightly smoky ground-colour, the base not conspicuously yellow. A small dark dot over the humeral cross-vein, and another over the cross-vein connecting Cu with An at the base. Five rather small dark spots along the costa, none of them extending much beyond R_1 , and all of them approximately equidistant: the first halfway between the humeral cross-vein and the base of R_s ; the second over the base of R_s ; the third over the apex of Sc ; the fourth and largest over $r-m$ and the apex of R_1 ; the fifth over the apex of R_2 . Small dark clouds at the tips of all the veins except R_{1+5} ; a small dark spot before the tip of Ax ; two or three along R_s ; veins otherwise without dots, but all the cross-veins and R_{1+5} dark margined. The wings are rather narrow, alike in the two sexes; additional cross-vein below one-third of R_s ; Cu_1a at one-third of discal cell; Sc ending slightly before the radial fork. *Halteres* pale yellow, with blackish knob.

Length of body 5-7 mm.; wing $7 \times 2 - 8 \times 2.3$ mm.

Two specimens (σ φ) in the British Museum collected by J. C. Dale, without stated locality, but probably from Dorset; the female bearing the date 29 v. 1861.

***I. mundata* Lw.** This is the species which has been recorded by Verrall as *miliaria* Egger. The agreement with Loew's description is perfect, but I agree with Loew that without the examination of Egger's type the significance of his name is too doubtful to allow of its use in place of the well-distinguished *mundata*. The available evidence suggests that the two are not the same. Claspers, Pl. II. fig. 19.

***I. marmorata* Mg.** This species is extremely variable in wing-markings, but it can always be recognised by the unusual breadth of the male wing, the hind margin coming almost to a point just before the tip of vein Ax ; this vein

also has nearly always (in the male only) a very distinct spur a little before the tip on the lower side, which is at most faintly indicated in the other species. A collection made at Brodick, Arran, shows almost the complete range of wing-markings, some being of the typical *marmorata* type, others like *submarmorata* and *verralli*; one has the markings identical with those of *mundata* except for the absence of a dark border to vein $R_4 + 5$; one exceptionally pale specimen has no markings except for the stigma, the clouded cross-veins, and a small spot near tip of Ax. All these have identical hypopygia; the claspers are shown in Pl. II. fig. 20.

LIMNOPHILA.

This genus has recently undergone some further subdivision. Alexander has revived the genus *Pilaria*, to which belong *L. discicollis* Mg., *L. fuscipennis* Mg., and *L. subtincla* Zett.; and has proposed the name *Pseudolimnophila* for the group which includes *L. lucorum* Mg., and *L. sepium* Verr. Both these innovations seem to be quite justified, and it is not unlikely that some further division may be made in the future; *L. ochracea* Mg. can hardly be left permanently in *Limnophila*. Of the two genera above mentioned, *Pilaria* is distinguished by peculiarities of venation and genital tube, and by the habits and morphology of the early stages; *Pseudolimnophila* chiefly by the shape of the head, the back part of which is narrowed and produced into a sort of neck, a character which it shares with *Poecilostola*; possibly *Poecilostola* and *Pseudolimnophila* may eventually be merged, but so far as the British species are concerned there are striking differences in the hypopygium and wings.*

L. abdominalis Stæg. Males of this species have occurred at Aberfoyle, Perth, 28 viii. 1906 (*Carter*), and Austwick, near Ingleborough, 5 vi. 1920 (*Cheetham*). The black thorax and black bands on the orange abdomen will distinguish it at once from *L. bicolor* and *L. punctum*.

L. robusta Wahlgren. There is a female of this species in the British Museum from Studland, Dorset, 1 ix. 1906 (*Yerbury*), and I have seen another from Blairgowrie, Perth, vi. 1913 (*Carter*). It is remarkable for its unusually

* In this connection it is worth mentioning that specimens of *P. punctata* are sometimes to be found without any trace of wing-markings.

short and stout legs, and broad abdomen. Although there is no trace of orange colour on the abdomen, I strongly suspect that it is nothing but the female of *L. abdominalis*; the differences, however, are so considerable that this assumption cannot be made without proof. It is perhaps significant that *L. abdominalis* is known only from the male, *L. robusta* only from the female.

L. leucophaea (Mg.) Meij. A small species somewhat resembling *L. nemoralis*, but with Sc_2 at the extreme tip of Sc_1 . Oxtou Bogs and Beauvale Woods, Notts. (Carr); Crag Wood, Yorks (*Cheetham*).

L. nemoralis Mg. As already mentioned by Verrall, this species is exceedingly variable; the variations are so well marked that I should have no hesitation in regarding them as distinct species, if the hypopygium were not identical in all. The following five forms may be distinguished:—

(a) Typical form. Thorax bluish-grey; abdomen somewhat ochreous; antennae generally yellow at the base; stigma rather faint and ill defined, two-thirds of it situate beyond the radial cross-vein; cross-veins quite clear; discal cell nearly twice as long as broad; basal section of M_3 (*i. e.* the upper of the two veins closing the discal cell) curved; cell M_1 not quite half as long as its petiole; Cu_1a at about two-fifths of discal cell. Body length 6·7·5 mm.

This seems to be the commonest form in the South of England.

(b) var. nov. *minuscule*. Thorax rather light grey, bluish tinge less distinct; antennae more or less pale at the base; stigma indistinguishable; cross-veins quite clear; discal cell nearly or quite twice as long as broad; basal section of M_3 quite straight, and of the same length as the cross-vein *m*; cell M_1 not a third as long as its petiole; Cu_1a at about one-third of discal cell. Body length 4·5 mm.

I have taken this at Bushy Heath and Knebworth, Herts.

(c) Var. nov. *collina*. Thorax dark brownish-grey; abdomen blackish; antennae generally all black; stigma rather faint, equally bisected by the radial cross-vein; cross-veins quite clear; venation and size as in the typical form.

Apparently the commonest form in Scotland; I have also taken it in North Wales.

(d) Var. nov. *quadrata*. Like var. *collina*, but the discal cell is very little longer than broad, and Cu_1a is situated exactly at its base.

Also a Scotch form. Arran (*F. W. E.*); Bonawe, Argyll (*J. Waterston*); Cromarty Point (*W. R. O. Grant*): in each case in company with the var. *collina*.

(e) Var. nov. *noscibilis*. Thorax dark brownish-grey; abdomen blackish; antennae generally pale at the base; stigma conspicuous and well defined, equally bisected by the radial cross-vein; cross-veins and base of Rs distinctly darkened; discal cell quite twice as long as broad; basal section of M_3 curved; cell M_1 as long as its petiole; Cu_1a at from one-fourth to one-half of discal cell. Body length 7-9 mm.

Widely distributed; the British Museum has specimens from Norfolk, Hants., Devon, N. Wales and Arran.

HEXATOMA (*Anisomera*).

I can only recognise two species of this genus in Britain: *H. fuscipennis* (Curt.) (= *Peronecera fuscipennis* Curt., = *Anisomera burmeisteri* of the British list, and perhaps of Loew) with the antennae short in both sexes, and *H. lucidipennis* (Curt.), with long antennae in the male. I think the latter will probably prove specifically identical with *nigra* Latr., *bicolor* Mg., and *aequalis* Lw.; if so, Latreille's name will have to replace Curtis'. The European species of this genus, however, require further study before their limits can be properly understood.

DICRANOTA and RHAPHIDOLABIS.

The British species may be distinguished thus:—

1. Radial cross-vein absent; only R_2 connecting R_1 and R_3 (genus *Rhaphidolabis*) (otherwise resembling *D. subtilis*)
exclusa Walk. (= *coelebs* Zett.).
- Radial cross-vein present, hence two veins connecting R_1 and R_3 (genus *Dicranota*) 2.
2. Stigma faint or absent; antennae alike in the two sexes . . . 3.
Stigma conspicuous; male antennae more or less elongate . . . 4.
3. M_1 simple; first flagellar joint rather long . . . *pavida* Hal.
 M_1 forked; first flagellar joint nearly globular . . . *subtilis* Lw.
4. A distinct dark spot over $r-m$; M_1 usually simple; male abdomen largely reddish . . . *guerini* Zett.
No dark spot over $r-m$, though the vein itself is darkened; M_1 always forked; male abdomen dark . . . *bimaculata* Schum.

D. subtilis Lw., is in the British Museum from Inchnadamph and Bettws-y-Coed (*Verrall*), and I have also seen it from Yorkshire (*Cheetham*).

D. guerini Zett. As recently shown by Lundström, this species is quite distinct from the common *D. bimaculata*, differing in the hypopygium as well as in other characters. Its inclusion now in the British list is due to Mr. C. A. Cheetham, who has taken several at Austwick, near Ingleboro.

TRICYPHONA (*Amalopsis*).

1. Rs more or less clouded at the base, and often angulated or spurred 2.
Wings quite clear; Rs never angulated or spurred 4.
2. Thorax dark grey, with four blackish stripes; a distinct brown band over the cross-veins *occulta* Mg.
Thorax uniformly yellow or orange 3.
3. Larger, browner species; femora and tibiae without distinct black tips *littoralis* Mg.
Smaller, yellow species; femora and tibiae with black tips *straminea* Mg.
4. Medium-sized species; pleurae and coxae ochreous 5.
Small species; pleurae and coxae black 6.
5. Pubescence on veins in apical part of wing fairly distinct; $R_2 + 3$ fully twice as long as R_3 * *lucidipennis* sp.n.
Pubescence on wing-veins barely perceptible; $R_2 + 3$ less than twice as long as R_3 *claripennis* Verr.
- 6 * $R_1 + 5$ much shorter than $r-m$; thorax with four distinct narrow shining black stripes *schummeli* sp. n.
 $R_1 + 5$ longer than $r-m$; thorax otherwise 7.
7. Femora not conspicuously yellow at the base; discal cell often present; middle thoracic stripe divided by a pale line *unicolor* Schum.
Femora conspicuously yellow at the base; discal cell never present; middle thoracic stripe entire, or obscurely divided by a dark line *immaculata* Mg.

T. lucidipennis, sp. n. (Pl. II. fig. 24).

Closely allied to *T. claripennis* Verr., and almost identical with it in size and coloration, but differing as follows: Wings somewhat broader (10×2.8 mm. instead of 9×2.1 mm.), the veins towards the apex with much more evident hair; $R_2 + 3$ a little more than twice as long as R_3 ; cell M_1 as long as its petiole, instead of only half as long; cell M_3 longer, its sides more parallel. *Hypopygium*

* Adopting Alexander's view that there are five branches to the radius present, the short vein connecting R_1 and R_3 being R, not r.

(fig. 24) showing several small differences, particularly in the form of the ninth tergite and the basal lobes of the side pieces. The hypopygium of *T. claripennis* is shown for comparison in Pl. II. fig. 23.

A single male in the British Museum from Grantown, Elgin, 17 viii. 1911 (*Lt.-Col. Yerbury*).

T. schummeli sp. n. This is the form which Verrall recorded as *T. unicolor*, but Schummel had two species under this name which he distinguished by the difference in venation. I propose the above name for Schummel's *unicolor* var. b, the hypopygium of which is shown in Pl. II. fig. 21. The type is a male from Brodick, Arran; other specimens in the British Museum are from Sussex, Bucks, Carnarvon and Sutherland.

T. unicolor Schum. This species, as now restricted, seems to be rarer in Britain than *T. schummeli*; I have seen only three specimens, all taken by Mr. C. A. Cheetham in Yorkshire. One of these is remarkable in having a cross-vein in the lower basal cell, as in the Scandinavian *T. varinervis* Zett. Hypopygium, Pl. II. fig. 22.

TRICHOCERA.

The work of Keilin and de Meijere on the early stages has shown that this genus has no relation with the Limnobiidae, but is, on the other hand, fairly closely related to *Anisopus* (*Rhyphus*) and it is now included in the Anisopodidae (Rhyphidae) as a separate sub-family. The adults differ from the Limnobiidae in the possession of ocelli; the shape of the scutum, which does not show the two rounded portions; the position of Cu_1a , always close to the outer margin of the discal cell; and also—perhaps a more important point than appears at first sight—in the fact that the legs do not at all readily break off. No doubt when the comparative morphology of the head and hypopygium has been studied in greater detail, important distinctions will be found in these organs. While accepting the position now assigned to *Trichocera* by Alexander, it will be convenient to deal with it in this paper. The British species at present known can be distinguished as follows:—

1. Wing-veins conspicuously hairy; Ax ending a little beyond the anal angle of the wing; eyes bare; last joint of palpi very long, whiplike; ovipositor very short and fleshy

Diazosma hirtipenne Siebke.

- Wing-veins not conspicuously hairy; Ax ending a little before the anal angle of the wing; eyes pubescent; last joint of palpi only moderately elongate; ovipositor rather long and horny (genus *Trichocera*) 2.
2. Abdomen conspicuously banded with ochreous *annulata* Mg.
Abdomen uniformly dark (except sometimes the genital segments) 3.
3. Cross-vein *r-m* with a distinct dark cloud round it 4.
Cross-vein *r-m* not clouded 5.
4. A distinct cloud on and below base of Rs *maculipennis* Mg.
No dark cloud on or near base of Rs *regulationis* L.
5. $R_2 +_3$ noticeably shorter than basal section of R_2 ; knob of halteres scarcely darkened *major* sp. n.
 $R_2 +_3$ as long as or longer than basal section of R_2 ; knob of halteres blackish 6.
6. Thorax almost entirely reddish; scape of antennae yellow *rufescens* sp. n.
Thorax more or less darkened; scape of antennae dark 7.
7. Wings slightly and uniformly infuscated; clasper of male hypopygium without basal tubercle *fuscata* Mg.
Wings almost perfectly clear; clasper of male hypopygium with small basal tubercle 8.
8. Smallish species; wings indistinctly pale at base; basal projections of side-pieces of male hypopygium forming a complete bridge *hiemalis* Deg.
Very small species; wings whitish at the base; basal projections of side-pieces of male hypopygium not meeting in the middle *parva* Meq.

As is evident from the above table, some of these species are distinguished by apparently trifling characters, but as I have never found a mixed swarm (adjacent swarms may be of distinct species), and the numerous pairs taken *in cop.* have always been similar, I think it probable that we are really dealing with distinct species.

D. hirtipenne (Siebke). I took a female of this species at Letchworth, vii. 1918. It flew in at an open window and settled on my arm while I was engaged in pinning some captures. The genus *Diazosma* appears to me to be amply distinct from *Trichocera*.

T. maculipennis Mg., has not, so far as I am aware, occurred in Britain outside the lowlands of Scotland.

T. major sp. n. (Pl. II. fig. 25).

A large, stoutly-built species, with entirely unspotted wings, but very distinct from the other members of the plain-winged group. *Head* blackish-grey; ocelligerous tubercle unusually large. *Antennae* in both sexes distinctly more elongate than usual, only the basal segment of the flagellum somewhat swollen, especially in the female. *Thorax* dark blackish-brown, scutellum and sometimes sides of praescutum reddish-tinged. *Abdomen* uniformly dark; genital segments lighter. *Hypopygium* as in fig. 25: the clasper without basal tubercle; basal projections of side pieces forming a complete bridge, which comes to a point in the middle; the paired appendages of the aedocagus (parameres?) very short. Ovipositor longer and more slender than in the other British species, six times as long as its greatest breadth. *Legs* rather stout, femora rather light brown except towards the tips; tibiae darker; tarsi blackish. *Wings* with a slight smoky tinge, in the female more yellowish. Sc_2 well beyond the base of R_s , in some specimens as far as the length of the discal cell; $R_2 +_3$ scarcely two-thirds as long as the basal section of R_2 ; cell M_1 much longer than its petiole; discal cell about twice as long as broad. *Halteres* rather longer than usual, entirely ochreous in the female, knob somewhat darkened in the male.

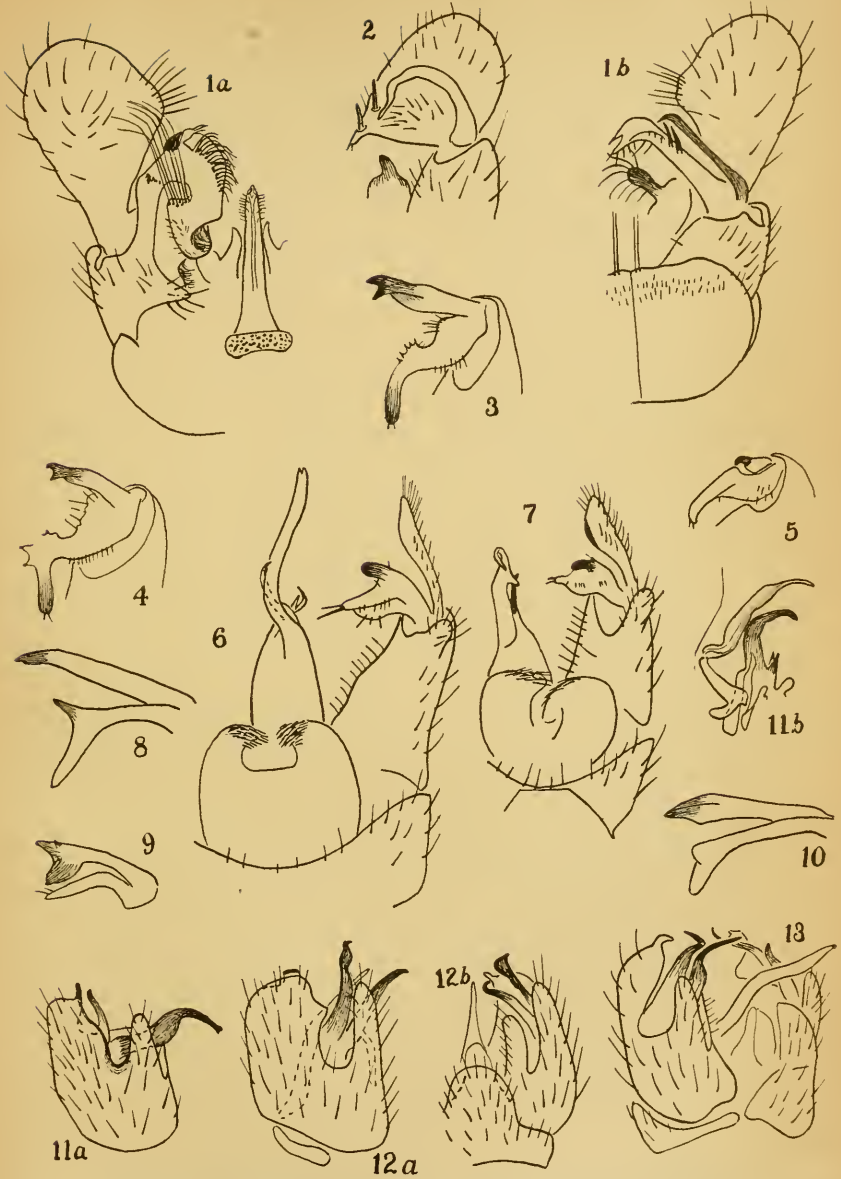
Length of body, ♂ 6-7, ♀ 8.5 mm.; wing, ♂ 7.5×2.8 , ♀ 9×3.2 mm.

Type and two other males from Shefford, Beds., 17 xi. 1917 (*F. W. E.*); one other male from Shotover, Oxford, 14 ix. 1914 (*A. H. Hamm*); one female from Letchworth Herts., 12 i. 1921 (*F. W. E.*).

T. rufescens sp. n.

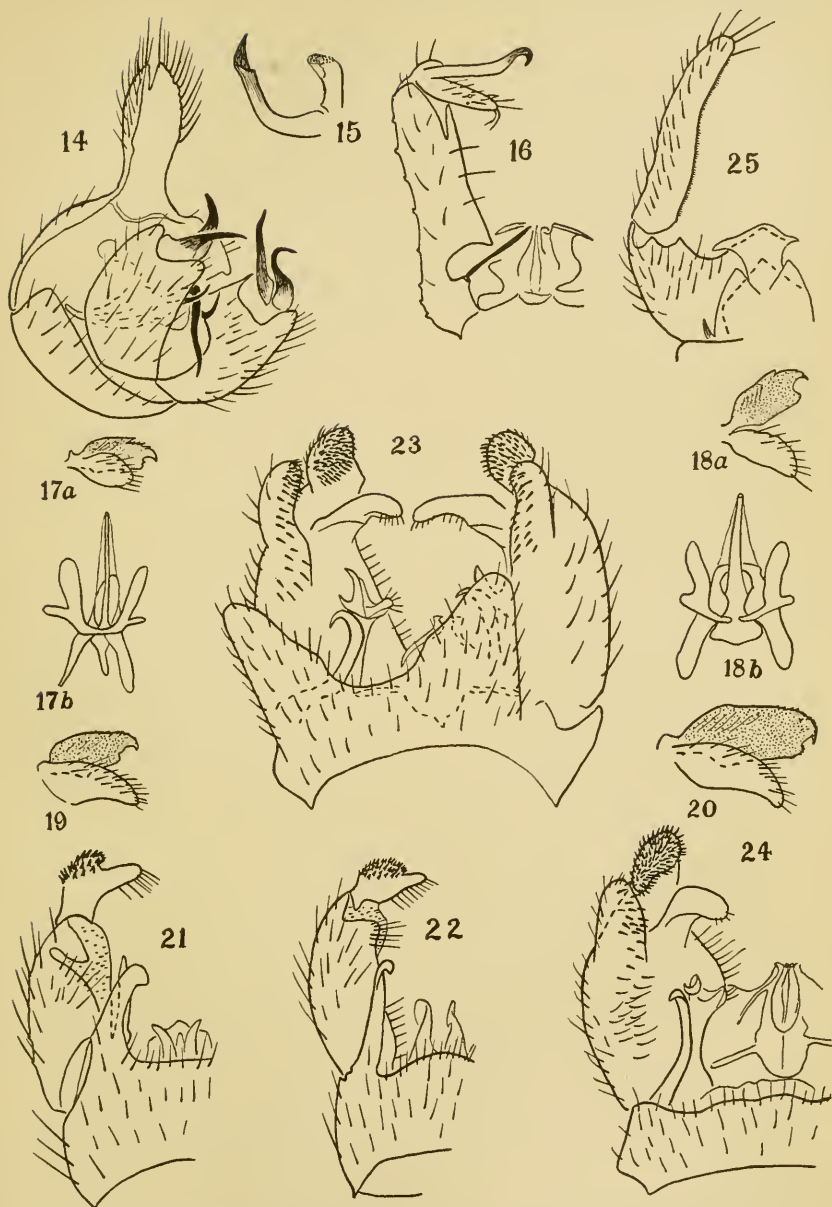
Allied to *T. fuscata* and *T. hiemalis*, and perhaps only a variety of one of them, but differs from both in the much redder thorax and in the structure of the hypopygium. The claspers, as in *T. fuscata*, have no basal tubercle; the basal projections of the side-pieces just touch in the mid-ventral line, but do not form a complete bridge as in *T. hiemalis*, and are rather differently shaped from those of *T. fuscata*; the curved parameres are very much shorter, less curved and less sharply pointed than those of *T. fuscata*, being shorter even than those of *T. hiemalis*. Length of body, 4 mm.; wing, 5 mm.

There are two males in the British Museum from Lelant, Cornwall, 28 viii. 1912 (*Lt.-Col. Yerbury*), and another in the Cambridge Museum from Logie, Elgin (*F. Jenkinson*).



BRITISH LIMNOBIIDAE: HYPOPYGIAL DETAILS.





BRITISH LIMNOBIIDAE: HYPOPYGIAL DETAILS.