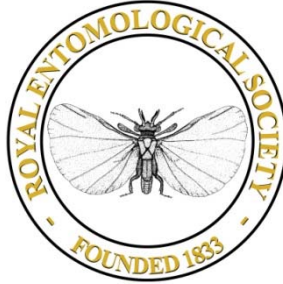


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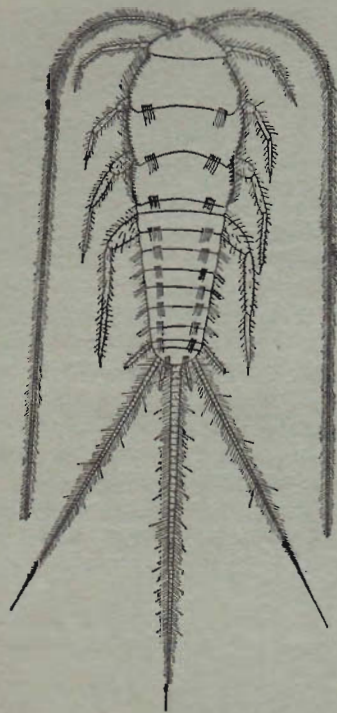
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ROYAL ENTOMOLOGICAL
SOCIETY OF LONDON

Vol. 1. Part 2.

HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



THYSANURA AND DIPLURA

By

M. J. DELANEY

LONDON

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| " 2. Thysanura. | " 10. Odonata. |
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THYSANURA AND DIPLURA.

By M. J. DELANY.

THE Thysanura and Diplura comprise two of the four Orders of primitively wingless insects or Apterygota. The Diplura, formerly known as the Entognatha, were formerly ranked as a Sub-Order of the Thysanura but have more recently been given full ordinate status. The Thysanura, *sensu stricto*, were at that time attributed to the Sub-Order Ectognatha.

The following are the characters of the British species of the two Orders :

- Abdomen terminating in a median caudal filament and a pair of cerci. Mouthparts exerted, normal. Medium sized insects, body length of adults never less than 9 mm. Bristle-tails (figs. 1 and 2).....THYSANURA (p. 3)
- Abdomen terminating in a pair of cerci. The median filament is absent. Mouthparts sunk within the head. Small insects, body length never exceeding 5 mm. (fig. 13).....DIPLURA (p. 5)

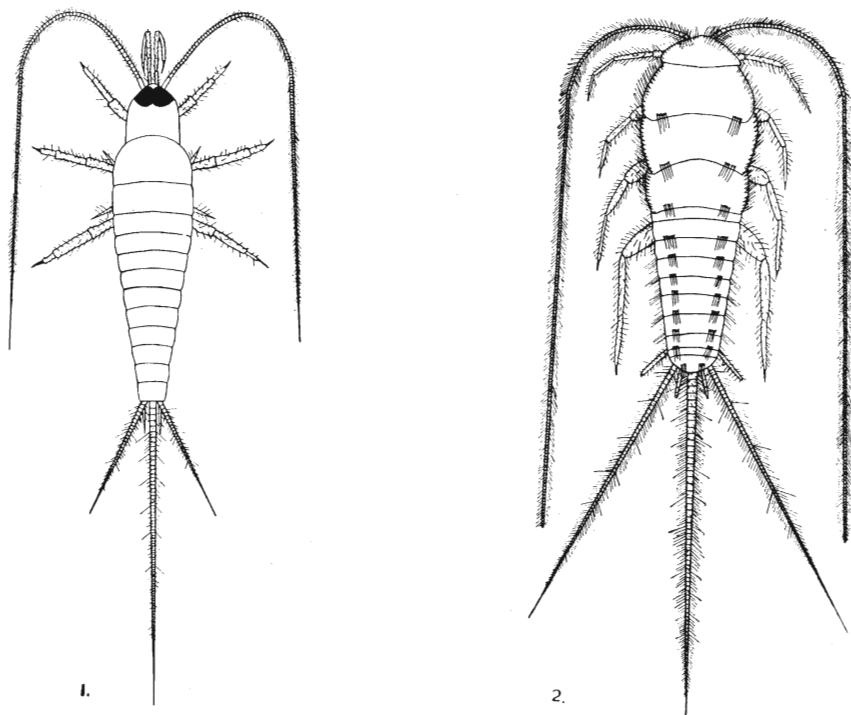
The Thysanura are not easy insects to identify as accurate determination is frequently based on the external characters of adult males. The genera *Petromachilis* and *Petrobius* can only be separated with certainty on such characters, as also can the species of the latter genus and *Dilta*.

Although one of the insect orders with few British representatives, there being no more than six genera and nine species, the Thysanura nevertheless display a remarkable range of habitat preferences. The two species of Lepismatids (*Lepisma* and *Thermobia*) are restricted to buildings, both species of *Petrobius* are petrophilous, being commonly found in coastal areas on rocks immediately above high-water mark, whilst *Dilta littoralis* is essentially a heathland species. The other common species, *Dilta hibernica*, has been recorded from a variety of habitats having a fairly dense vegetation cover. The remaining species are rare and information regarding their distribution is accordingly sparse.

Little is known of the biology of the Thysanura. In *Dilta*, *Petrobius* and *Trigoniophthalmus* the eggs are laid in groups between late summer and autumn and hatch the following spring and early summer. From then onwards, when the insects are approximately 2-3 mm. long, there is a close external resemblance between juvenile and adult. After the second instar the body is completely covered by scales, but prior to this stage they either form an incomplete covering or are entirely absent. Although, initially, growth is rapid and ecdyses frequent in *Dilta* and *Trigoniophthalmus*, maturity is not attained until at least twelve months after hatching. The developmental period of the firebrat (*Thermobia*) is much shorter. Eggs are found at all times of the year and hatch fourteen days after laying, whilst under optimal conditions maturity is attained twelve weeks later. The Machilids

feed upon the vegetation and detritus covering the floor of their habitats and derive much of their nourishment from various species of algae. The Lepismatids are reputed to favour the rather more starchy foods found in houses.

The British Diplura are small white insects 3-5 mm. long, occurring in soil, under stones, amongst leaf litter and in other habitats where plant debris is fairly thick. The British fauna is represented by a single fairly



FIGS. 1 and 2.—1. *Petrobius* sp. 2. The Fire Brat, *Thermobia domestica* Packard.

common genus (*Campodea*) comprising two subgenera and eleven out of a total of ninety-five known species. Identification is based, for the most part, on the disposition of the larger hairs (*macrosetae*) of the dorsal surface of the thorax and abdomen and care has to be taken to ensure that these are not removed prior to examination. Specimens can be kept alive for a few days if placed in a corked tube containing moist soil. They are very sensitive to low humidities and will shrivel and die within as short a period as half an hour in anything but a very moist atmosphere.

The life-history and ecology of this genus has been little studied and knowledge of the distribution of its species must be regarded as very incomplete.

REFERENCES.

The following are the more important works referred to in the composition of this key. They have been freely drawn upon for both figures and subject matter.

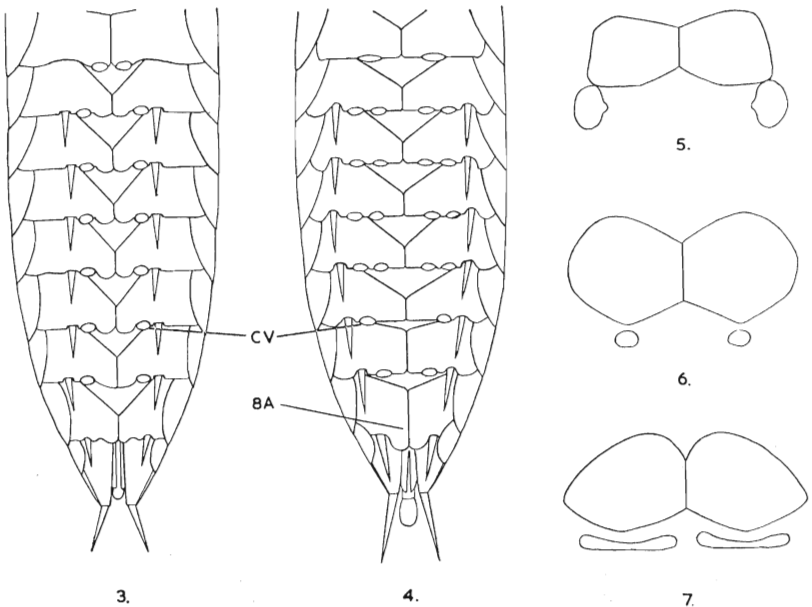
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Order THYSANURA.

Bristle-tails.

KEY TO FAMILIES, GENERA AND SPECIES.

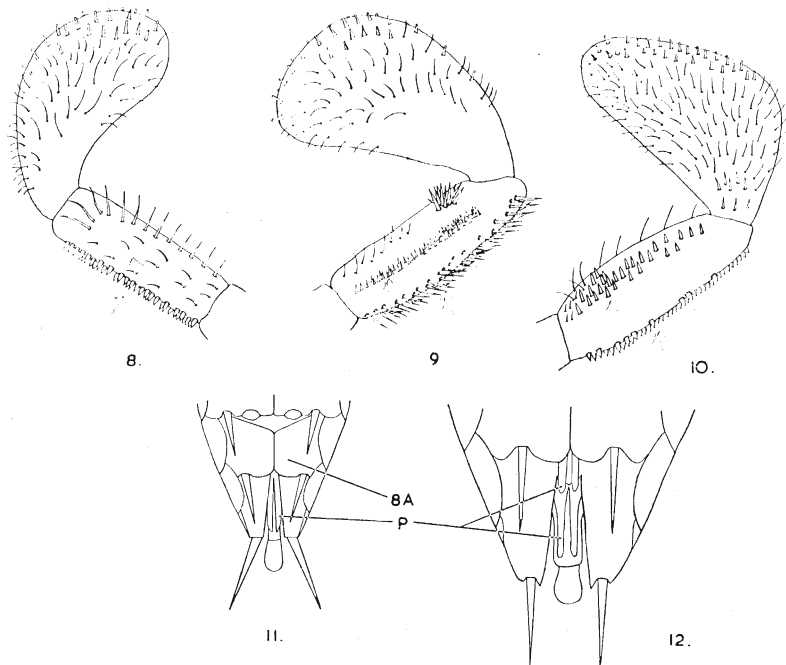
- 1 (18) Compound eyes large, close together, ocelli present. Small, movable appendages (styli) present on thoracic coxae. Body not flattened dorso-ventrally (fig. 1) MACHILIDAE



FIGS. 3-7.—3. Abdomen of *Dilta* sp., ♂, as seen ventrally. 4. Abdomen of *Petrobius maritimus* (Leach), ♂, as seen ventrally. 8A, eighth abdominal segment; CV, coxal vesicles. 5. Eyes and ocelli of *Dilta* sp. 6. Eyes and ocelli of *Trigoniophthalmus britannicus* (Wom.). 7. Eyes and ocelli of *Petrobius* sp.

- 2 (11) All abdominal sternites with only one pair of coxal vesicles (fig. 3); eyes rectangular; ocelli circular, sublateral to the eyes (fig. 5); antennae much shorter than the body.....*Dilta* Strand
 3 (8) Males.

- 4 (5) Lateral surface of 2nd segment of labial palp without spine-like setae; posterior border of 2nd segment of labial palp with short stout spines (fig. 8). Length 7-8 mm.....**saxicola** (Womersley)
Howth Head, Dublin.
- 5 (4) Lateral surface of 2nd segment of labial palp with spine-like setae.
- 6 (7) Setae of anterior border of 2nd segment of labial palp localised centrally into a group of approximately 10 well-developed spines; lateral surface and posterior border each with a longitudinal fascia of short spines (fig. 9). Length 10 mm.....**littoralis** (Womersley)
Cornwall, Devon, Hants. and I.O.W.



FIGS. 8-12.—8. Labial palp of *Ditta saxicola* (Wom.), ♂. 9. Labial palp of *Ditta littoralis* (Wom.), ♂. 10. Labial palp of *Ditta hibernica* (Carp.), ♂. 11. Posterior ventral abdomen of *Petrobius brevistylis* Carp., ♂. 12. Posterior ventral abdomen of *Petromachilis longicornis* Reilly, ♂. 8A, eighth abdominal segment; P, parameres.

- 7 (6) Strong spiniform setae of lateral surface of 2nd segment of labial palp restricted to an irregular fascia; posterior border with short stout spines (fig. 10). Length 11 mm.**hibernica** (Carpenter)
Derby, Durham, Herts., Lancs., Glos., Oxon., Som., Yorks., Cork, Dublin, Fermanagh, Galway, Roscommon and Wicklow.
- 8 (3) Females.
- 9 (10) Anterior gonapophyses (the pair of segmented processes arising from the inner borders of the coxopodites of the 8th abdominal segment and forming the two ventral valves of the tubular ovipositor) with not less than 47 segments. Length 10-11 mm.....**littoralis** (Womersley), **saxicola** (Womersley)
- 10 (9) Anterior gonapophyses with 37-45 segments. Length 11 mm.
hibernica (Carpenter)
- 11 (2) Abdominal sternites 2-5 with two pairs of coxal vesicles (fig. 4); eyes approximately as long as broad, ocelli not sublateral to eyes; antennae as long as or longer than body.

- 12 (13) Antennae completely scaled; ocelli small, submedian to eyes (fig. 6). Ocelli oval. Length 10 mm.
Trigoniophthalmus Verhoeff, *britannicus* (Womersley)
Very rare, only recorded from Berry Head, Devon.
- 13 (12) Antennae only scaled on two basal segments; ocelli large, extending almost the full length of the eyes (fig. 7).
- 14 (17) Parameres of male only present on abdominal segment 9....*Petrobius* Leach
- 15 (16) Subcoxae of 8th abdominal segment of male not prolonged into rounded lobes (fig. 4). Length 13-14 mm.....*maritimus* (Leach)
- 16 (15) Subcoxae of 8th abdominal segment of male prolonged into rounded lobes (fig. 11). Length 13-14 mm.....*brevistylis* Carpenter
Both species common round British coasts on rocks above high-water mark.
- 17 (14) Parameres of male on abdominal segments 8 and 9 (fig. 12). Length 13 mm. Only representative of the genus..*Petromachilis* Reilly, *longicornis* Reilly
Rare, Cumberland and Pembroke.
- 18 (1) Compound eyes small, widely separated, ocelli absent. Styli absent from thoracic coxae. Body flattened dorso-ventrally (fig. 2)....LEPISMATIDAE
- 19 (20) Larger hairs of dorsal surface localized into groups (combs) on the hinder edge of the thoracic and abdominal tergites (fig. 2); antennae as long as or longer than body. Length 11 mm.
Thermobia Bergroth, *domestica* (Packard)*
Cosmopolitan. Warmer parts of buildings. The Fire Brat.
- 20 (19) Larger hairs of dorsal surface evenly distributed; antennae approximately two-thirds body length. Length 11 mm.
Lepisma Linnaeus, *saccharina* Linnaeus
Cosmopolitan. The Silver Fish.

Order DIPLURA.

Family CAMPODEIDAE.

Genus *Campodea* Westwood.

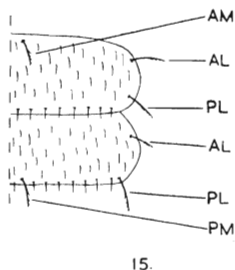
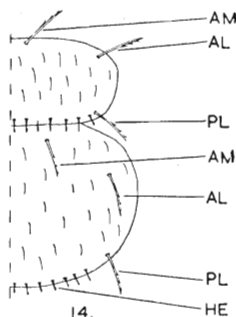
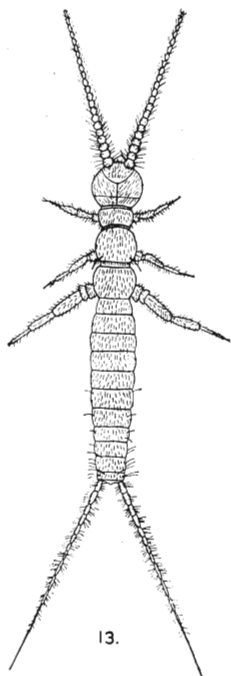
KEY TO SUBGENERA AND SPECIES.

(Figs. 13-15.)

- 1 (20) Mesonotum with postero-lateral macrosetae.....(subgen. *Campodea*)
- 2 (5) Metanotum without postero-lateral macrosetae.
- 3 (4) Abdominal tergites 6-9 with antero-lateral macrosetae. Length 3.9-4.6 mm. *staphylinus* Westwood
Common throughout British Isles.
- 4 (3) Only tergites 8 and 9 with antero-lateral macrosetae*grassii* Silvestri
Lancs.
- 5 (2) Metanotum with postero-lateral macrosetae.
- 6 (13) Abdominal tergites possessing either antero-median or postero-median macrosetae.
- 7 (12) Abdominal tergites with antero-median macrosetae.
- 8 (9) Antero-lateral macrosetae present on tergite 4. Length 5 mm.
lankesteri Silvestri
Durham, Herts., Northumberland, Oxford, Surrey and Yorks.
- 9 (8) Antero-lateral macrosetae present on tergite 5.
- 10 (11) Postero-lateral macrosetae present on tergites 1-9.....*lubbocki* Silvestri
Dorset, Durham, Herts., Northumberland and Oxford.
- 11 (10) Postero-lateral macrosetae only present on tergites 1-7. Length 3.5-4.2 mm.
meinerti Bagnall
Dorset, Durham and Lancs.

* There is some doubt about the earliest name for the fire brat, but, as it has been known as *Thermobia domestica* throughout an extensive economic and systematic literature since 1873, application is being made to the International Commission on Zoological Nomenclature to have this name placed on the Official List of Specific Names in Zoology for use for the fire brat, and that while this is under consideration by the Commission the name *Thermobia domestica* should be used.

- 12 (7) Abdominal tergites with postero-median macrosetae..... **giardi** Silvestri
Durham.
- 13 (6) Tergites with neither antero-median nor postero-median macrosetae.
- 14 (17) Postero-lateral macrosetae present on tergite 5.
- 15 (16) Short stout hairs at hinder edges of tergites. Length 1.9-2.3 mm.
plusiochaeta Silvestri
Antrim, Durham, Hants., Lancs., Northants., Northumberland and Yorks.
- 16 (15) Long slender hairs at hinder edges of tergites..... **wallacei** Bagnall
Northumberland.
- 17 (14) Postero-lateral macrosetae present on tergite 6.
- 18 (19) Distal segments of cerci with numerous, short, fine hairs..... **fragilis** Meinert
Antrim, Durham, Northumberland, Oxford, Tyrone and Yorks.



FIGS. 13-15.—13. *Campodea staphylinus* West. 14. The positions of the diagnostic setae on the pro- and meso-thorax of *Campodea*. 15. The positions of the diagnostic setae on the abdominal tergites of *Campodea*. AM, antero-median macrosetae; AL, antero-lateral macrosetae; PL, postero-lateral macrosetae; PM, postero-median macrosetae; HE, setae of the hinder edge.

- 19 (18) All segments of cerci with long hairs. Length 3.9-4.6 mm.
silvestrii Bagnall
Cornwall, Durham, Hants. and Northumberland.
- 20 (1) Mesonotum without postero-lateral macrosetae..... (subgen. **Dicampa**)
Postero-lateral macrosetae of pronotum robust. Length 3.5-5.0 mm.
westwoodi Bagnall
Hants.

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