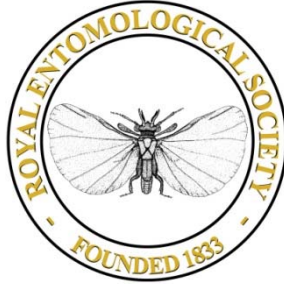


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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



COLEOPTERA TENEBRIONIDAE

By
M. J. D. BRENDILL

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

HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

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

- | | |
|------------------------------------|------------------------|
| I. Part 1. General Introduction. | Part 9. Ephemeroptera. |
| " 2. Thysanura. | " 10. Odonata. |
| " 3. Protura. | " 11. Thysanoptera. |
| " 4. Collembola. | " 12. Neuroptera. |
| " 5. Dermaptera and
Orthoptera. | " 13. Mecoptera. |
| " 6. Plecoptera. | " 14. Trichoptera. |
| " 7. Psocoptera. | " 15. Strepsiptera. |
| " 8. Anoplura. | " 16. Siphonaptera. |
- II. Hemiptera.
III. Lepidoptera.
IV. and V. Coleoptera.
VI. Hymenoptera : Symphyta and Aculeata.
VII. Hymenoptera : Ichneumonidae.
VIII. Hymenoptera : Cynipoidea, Chalcidoidea, and Serphoidea.
IX. Diptera : Nematocera and Brachycera.
X. Diptera : Cyclorrhapha.

Volumes II to X will be divided into parts of convenient size, but it is not possible to specify in advance the taxonomic content of each part.

Conciseness and cheapness are main objectives in this series, and each part is the work of a specialist, or of a group of specialists. Although much of the work is based on existing published keys, suitably adapted, much new and original matter is also included.

Parts are issued, separately paged and priced, as they become available.

A second (revised) edition of *A Check List of British Insects*, by G. S. Kloet and W. D. Hincks, is being issued as an extra, eleventh, volume in this series.

The Society is indebted to the Royal Society for a grant towards the cost of initiating this series of *Handbooks*.

A list of parts so far published appears on the inside and outside back covers.

COLEOPTERA

Family TENEBRIONIDAE

By M. J. D. BRENDILL

INTRODUCTION

THE single family covered by this handbook belongs to that part of the Heteromera (Cucujoidea, section ii of Crowson, 1955) composed of the families where both sexes have a tarsal formula of 5-5-4. It is the only family of this group not included by Buck (1954a). Considering the Tenebrionidae (or Darkling Beetles) on a world basis they are the largest family within the Cucujoidea, comprising over 15,000 species (Watt, 1967), and exhibit possibly more diversity of form than any other family of the Coleoptera. Although found throughout the world, the greater number of species occur in warmer climates, particularly in the more arid regions. Enormous numbers of species are found in such areas as the Namib and Gobi deserts, their many and varied adaptations enabling them to survive extremes of temperature and periods of prolonged drought. These facts have caused the Tenebrionidae to be regarded as the most highly evolved family of the Cucujoidea (Crowson, 1955).

The Tenebrionidae are, however, poorly represented in the British Isles; of the 34 species included here only just over half are indigenous.

ADULT CHARACTERS

Because of difficulties created by the diversity of adult form within the "Tenebrionidae" a satisfactory subfamily classification has not yet been constructed, and the limits of the family have been by no means finally settled. A sound morphological definition of the family is so far lacking but the following adult characteristics should enable members of the Tenebrionidae to be distinguished from other British Coleoptera:

Tarsal formula 5-5-4, penultimate segment not lobed below, claws simple; front coxal cavities closed behind; trochanters of heteromeroid type; first three visible abdominal sternites connate; head with genae expanded over antennal insertions, sometimes projecting backwards and forming a canthus that may divide the eyes almost completely; wings reduced or absent in some species; elytra sometimes fused along the suture.

BIOLOGY

The habitat and food requirements of the Tenebrionidae are as varied as their form. A great many species, especially the flightless ones, are omnivorous scavengers feeding on all manner of organic detritus; others may be found in nearly every type of terrestrial situation: in caves feeding on dead bats and guano, on desert sand dunes surviving on wind blown plant and insect remains, in dung, in bracket-fungi, under bark and in the tunnels of bark borers, etc.; some are semi-predators and others occasionally cannibalistic.

The British species can be split into two broad environmental groups.

First those which live in "wild" habitats, away from human habitation or influence. Second, those which are, in Britain at least, to a greater or lesser extent dependent upon the human element.

The members of the first group are, with the probable exceptions of *Corticeus frazini* and *C. linearis*, indigenous to Britain. The second group contains *Latheticus*, 1 species; *Tribolium*, 3 species; *Gnathocerus*, 2 species; *Palorus*, 2 species; *Alphitobius*, 2 species; *Alphitophagus*, 1 species; *Blaps*, 3 species; *Tenebrio*, 2 species. Their dependence upon man is varied. The first four genera are strongly synanthropic, the others could probably maintain much reduced populations in this country if the human factor were removed.

Within the first group are six psammophilous species found on beaches, sand dunes and in some cases inland sandy areas. Others are mycetophagous, usually showing specific preferences for the type of fungi in which they live and breed. *Cylindrinotus laevioctostriatus*, although the most common and widely distributed of the "wild" species, has a very specialized food requirement. It feeds at night, grazing on the alga *Pleurococcus* (*Protococcus*) growing on the bark of trees. It has also been shown to eat lichen when living in a tree-less situation and by so doing to obtain protococcoid algae in their associated state with the lichen (Green, 1951).

The biology of the British species of *Corticeus* is less well understood. With the exception of *C. unicolor*, each inhabits the burrows of a particular species of bark beetle (Scolytidae). Both adults and larvae are found in the burrows and it is generally accepted that they are predaceous on the early stages of the bark beetles (Palm, 1959 etc.). It has also been suggested that *Corticeus* species feed on fungus and detritus in the burrows (Beaver, 1966). A recent important study of the North American species *Corticeus substriatus* (Le Conte), which inhabits the burrows of the Mountain Pine Beetle (Scolytidae), has shown it to be a facultative predator, feeding in the adult and larval stages on the eggs, larvae and pupae of both the scolytid and other insects associated with it (cecidomyid and hymenopterous larvae, etc.). Both stages of *C. substriatus* were observed feeding on the scolytid frass and the blue stain fungus in the phloem tissue (Parker & Davis, 1971). It seems almost certain that the biology of three of the British species would prove to be comparable if studies were made. There is strong evidence that *C. frazini* was introduced into this country in pine pit-props from France earlier this century. It also seems likely that *C. linearis* is an adventive species, the first record of its capture in this country being as recent as 1898 (Heasler, 1898) at Oxshott, Surrey, an area already well collected by that date. There is no indication as to its mode of entry into this country from the continent.

The apparent dependence on human habitation and commerce of the second group of species suggests that they are introductions to Britain. Many of them are important cosmopolitan stored products pests and their respective countries of origin are known with some certainty. Much detailed work on their biology has already been published elsewhere and it would be out of place to repeat all that is known here. Some of these species are regularly introduced from tropical or subtropical regions and are not capable of maintaining populations in this country unless they find a suitable environment such as heated warehouses, maltings or bulk stored material which is heated as a result of microbiological or insect activity.

The native habitat of the flour beetles occurring in Britain appears to be under bark where they are possibly mycetophagous, or semi-predaceous on other subcortical insects. A number are known to feed on insect remains, and *Palorus* is associated with wood borers (Scolytidae and Bostrychidae) in its natural habitat (Halstead, 1967b). It is interesting to note here that the flour beetles all belong to the same tribe as *Corticus* (Ulomini). *Tribolium confusum* and *T. destructor* are thought to have originated in Africa and *T. castaneum* in India (Hinton, 1948). Both *Palorus* species included here almost certainly originated from Africa (Halstead, 1967a). *Gnatocerus cornutus* and *G. maxillosus* are probably of Central American origin (Lepesme, 1944). (All other species of this genus are from that area or the southern United States). *Latheticus oryzae* has been recorded from Egypt under the bark of trees and in rotten wood and also under bark in India, which according to Lepesme (1944) is probably the country of origin. Although regarded as of pest status, both the "British" *Alphitobius* and more importantly *Alphitophagus bifasciatus* have, in recent years, been found in the open (Allen, 1948; Verdcourt, 1948; O'Mahony, 1950; Jones, 1967 and Hammond, 1974), thus exhibiting a tendency to revert to more or less native habitats. An apparently unique instance of *Tribolium castaneum* breeding in the open in Somerset in a poultry house manure heap is recorded by Jones (1967). *Alphitobius diaperinus* has been recorded from birds' nests in Africa and America and from lava caves in Kenya where it feeds on moulds, bat guano, dead insects and mites. In this country it has been very successful in colonizing deep litter poultry houses. The genus *Blaps* contains more than 200 described species, the greater number of which live in open habitats in the countries stretching from the Mediterranean area eastward to China. The three "British" species are found with varying frequency through Europe from the Mediterranean to Scandinavia. In Britain at least, their presence is almost invariably linked with human habitation. The only "wild" record known to me is of a single example of *B. mucronata* from "deep inside a large rotten tree-stump", Surrenden Park, Pluckley, Kent, 1929 (Allen, 1971).

The larva of *Tenebrio molitor* was cited in literature by its current vernacular name, the Yellow Mealworm, as early as 1634, 124 years before Linnaeus gave it the scientific name that we know it by today. Cotton (1929, 1956) considers that both species of *Tenebrio* included here are in all probability of European or Asian origin. The tenacity for life possessed by so many tenebrionids is well illustrated by these last two genera. Adult *Blaps*, in the writer's experience, will live in captivity for many years with a minimum of attention, whilst *T. obscurus* larvae have been kept at room temperature for six to eight months without food or moisture, one even surviving for nine months under such conditions (Cotton, 1929). However, *Tenebrio* adults have a much shorter life, averaging 65 to 84 days (Butler, 1949).

Unless otherwise stated all species appearing in the following keys have the posterior pair of wings present. Usually they are well developed and the adults are known to be capable of flight. *Opatrum sabulosum* and *Cylindri-notus laevioctostriatus* have small wings which are not, or hardly, folded at rest and flight would seem impossible. However, the latter has on more than one occasion been captured on the wing (Ashe, 1954; Buck, 1954b). Its flight ability is discussed by Buck. The wings of *Helops caeruleus* and

Phaleria cadaverina are so much reduced that they are no more than narrow, membranous structures, almost without venation.

LARVAE

British tenebrionid larvae are usually found in the same situations as their adult stages. No special immature life histories occur except for the probably predatory development of *Corticeus* in the burrows of scolytid beetles. In contrast to the imagines the larvae of the Tenebrionidae exhibit very little diversity of form. They are usually elongate and more or less evenly cylindrical with all the segments except the last nearly straight-sided. Typical of the family is the larva of *Tenebrio molitor*, familiar as live pet food in this country for many years. There are of course exceptions; the larva of *Eledona* is much broader in relation to its length, whilst the abdominal segments of *Bolitophagus* and *Diaperis*, when viewed from above, are individually rounded at the sides.

The following larval characteristics of the family are taken principally from van Emden (1942) and Crowson (1955). As well as the cylindrical form already mentioned, the integument is usually hard, especially the upper surface which in some species is quite shiny; the first to ninth abdominal segments have pleural sutures; the ninth segment usually has in addition one or a pair of sharp urogomphi, or spines, or patches of dense hairs; the head has a well defined epicranial suture; the clypeus is separate, being delimited posteriorly by a well marked suture; the inner bases of the mandibles have a well developed and often roughened mola; the labial palpi are two-jointed.

Whole figure illustrations of many of the species are given by Schiödte (1877-8) and Korschefsky (1943). Except for *Palorus*, *Gnatocerus maxillosus*, *Blaps mortisaga* and *Corticeus unicolor* the larvae of all the species included here can be identified with the aid of the comprehensive keys provided by van Emden (1947). The identification of *Palorus* larvae is made possible by a supplementary work (van Emden, 1948). *G. maxillosus* has recently been reared for laboratory study; an early line drawing of the larva is reproduced by Cotton (1956). Supposed characteristics of *C. unicolor*, based on observations by earlier authors, are included by van Emden (1947) in his key to *Corticeus* (*Hypophloeus*) species.

NOTES ON THE KEYS

The following artificial key to genera is constructed solely for the purpose of identification; it does not reflect a systematic arrangement of the British Tenebrionidae. Thirteen genera are represented in this country by only one species. In these instances, the species is named in the generic key, the habitat and distribution data being given at the end of the relevant couplet. For the remaining genera, separate keys to species are provided. Efforts have been made to use only dorsal and lateral characters that are apparent with no more magnification than a $\times 10$ hand-lens. In this way it is hoped that the Handbook will be useful in the field, especially to those concerned with identifying pest species *in situ*.

The nomenclature agrees with that of Kloet & Hincks (1945) except as follows: *Corticeus* Piller & Mitterpacher 1783, as the senior name, replaces *Hypophloeus* Fabricius 1790 (Blaisdell, 1934).

Tribolium madens (Charpentier) is not included as it is only rarely imported into Britain from Europe in stored products (Halstead, 1969). However, the cosmopolitan *Tribolium confusum* Jacquelin du Val 1863, is included, having been a significant pest in Britain for many years. *Sitophagus hololeptoides* (Castelnau) is far too infrequently imported into this country to be included here or in a check list of British insects.

In the absence of verified records for this century, it would seem highly probable that *Blaps mortisaga* no longer occurs in these Islands. Twentieth century records, where specimens have been examined by the writer, have all proved to be of *B. mucronata*. Usually they have been poorly formed individuals (Brendell, 1971). However, the species is retained in the key in the hope of preventing future incorrect identifications.

Pentaphyllus testaceus is retained on the strength of a single British capture made in a then rural area in 1876 (Janson, 1903; Fowler & Donisthorpe, 1913). It could be argued that this example was not native to Britain, but to account for the presence of a non-pest species in Hornsey nearly 100 years ago would be difficult.

As well as the stored products pests included in this Handbook, a number of foreign Tenebrionidae are occasionally imported into Britain with various commodities. They are usually found as singletons or in small numbers. Species of *Gonocephalum*, *Lyphia*, *Mesomorphus*, *Curimosphena* and also *Coelopalorus foveicollis* (Blair) and other species of *Palorus*, *Tribolium* and *Tenebrio* are among those that have been recorded on more than one occasion. For practical reasons these and many other immigrant species have not been included in the keys that follow.

The distribution of each species within the British Isles is given by means of vice-county lists appended to the keys. These lists have been compiled from over 3000 records of British Tenebrionidae accepted as being authentic by the writer. They have come from British collections, local museums and collectors, from entomological journals and other literary sources. As nearly as possible the records cover a period of the last 80 years. Where it is thought to be particularly important, the dates of records are given, especially if they are pre-1900. For the same reason, in certain instances, more precise localities are recorded.

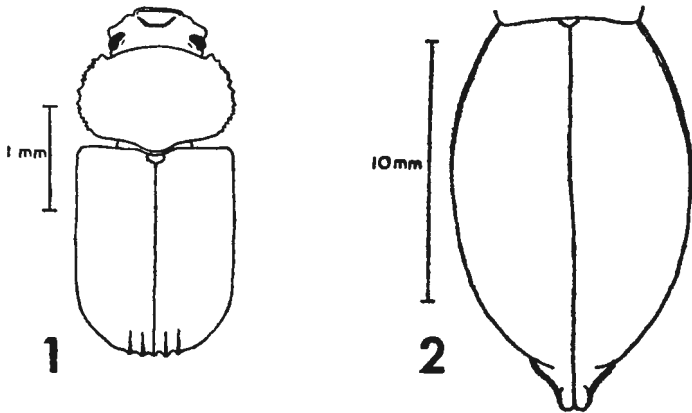
Terms descriptive of colour are after J. R. De La Torre-Bueno (1950). For the sake of consistency and correct interpretation when using this Handbook they are repeated here: *Castaneous*, chestnut brown, bright red-brown; *ferrugineous*, rusty red-brown; *fuscous*, dark brown approaching black, a plain mixture of black and red; *olivaceous*, olive green, the colour of green olives; *testaceous*, brownish-yellow; *violaceous*, violet-colour.

Common names that are generally accepted are included in the keys after the relevant specific names, as they are often used in stored products research and by health departments.

ACKNOWLEDGEMENTS

I acknowledge with grateful thanks all the advice and encouragement received from Mr. R. D. Pope, Mr. P. M. Hammond and Mr. R. T. Thompson of the British Museum (Nat. Hist.) throughout the preparation of this Handbook. I am also very much indebted to Dr. D. G. H. Halstead of the Pest Infestation Control Laboratory at Slough for his valuable criticism and

advice with regard to all the Tenebrionidae of commercial significance that are included here. My thanks are equally due to all those who have sent me data and specimens from collections in their care or from their own collections. Only with this help have I been able to include a comprehensive and up to date assessment of distributions within the British Isles. I am also grateful to my colleagues at the British Museum (Nat. Hist.) for testing the keys and to Mr. E. A. J. Duffy of The Commonwealth Institute of Entomology for his advice with the figures. Mr. P. W. James of the Botany Department, British Museum (Nat. Hist.), kindly supplied the present names for the fungi appearing in the following keys.



FIGS. 1-2.—1, *Eledona agricola*, dorsal view; 2, *Blaps mucronata*, dorsal view of elytra.

KEY TO GENERA

- 1 Lateral edges of pronotum irregularly crenulate eg. (fig. 1) 2
- Lateral edges of pronotum smooth 3
- 2 Eyes completely divided by canthus; sides of pronotum sharply constricted in the basal third. Length above 5 mm. **Bolitophagus** Illiger
One British species only, **Bolitophagus reticulatus** (Linnaeus).
Dull black, often becoming fuscous at the edges. Surfaces strongly sculptured. Length 5.25-8.0 mm., width 2.5-3.5 mm.
In old specimens of the fungus Polyporus fomentarius (L. ex Fr.) Kickx. on birch (Betula). Very local but not uncommon. Scotland: Rannoch, Mid. Perthshire; Braemar, S. Aberdeenshire; Glen Affric, Strathglass and Inverfarigaig districts of Inverness-shire; Loch Maree, Wester Ross.
- Eyes not divided; sides of pronotum evenly curved from anterior angles to base. Length below 5 mm. **Eledona** Latreille
One British species only, **Eledona agricola** (Herbst). (= *agricola* Herbst) (fig. 1).
Dull fuscous. Surfaces strongly sculptured. Length 2.5-4.0 mm., width 1.25-1.75 mm. Male with anterior edge of clypeus straight and flexed upwards, also with genae and supra-orbital ridges more produced than in the female.
In brackets of the fungi Laetiporus sulphureus (Bull. ex Fr.) Murr. and Polyporus squamosus Huds. ex Fr., on willow (Salix), oak (Quercus) and beech (Fagus). Fairly common. England: S. Devon, N. Somerset, Huntingdon, Shropshire, S. Lincolnshire, Leicestershire, Nottinghamshire. Wales: Glamorgan. Scotland: One unverified record of four examples from Carnallock Wood near Dumfries, Dumfriesshire (1892).

- 3 Pronotum and elytra clothed with fine, sparse golden pubescence, never with short, stout setae. Length 3 mm. or less.....4
- Pronotum and elytra without pubescence, if with short, stout setae then overall length above 3 mm.....5
- 4 Elytra striate-punctate; antennae reaching back to beyond base of pronotum; elytra fuscous with variable lighter markings. Male with clypeus greatly thickened at the sides; fronto-clypeus delimited posteriorly by a transverse groove which is partly hidden by upwardly flexed enlargements of the genae; mid-anterior part of vertex concave, with two short longitudinal ridges (fig. 3). Female with head simple. **Alphitophagus** Stephens
- One British species only, **Alphitophagus bifasciatus** (Say) (= *quadripustulatus* Stephens).

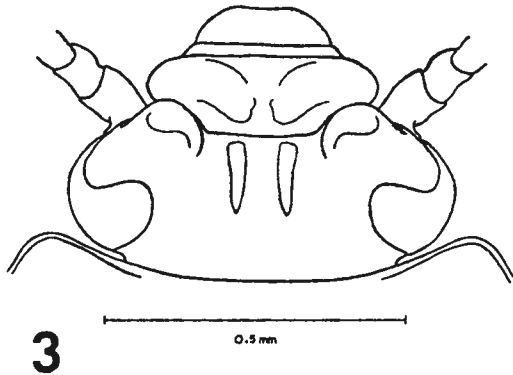
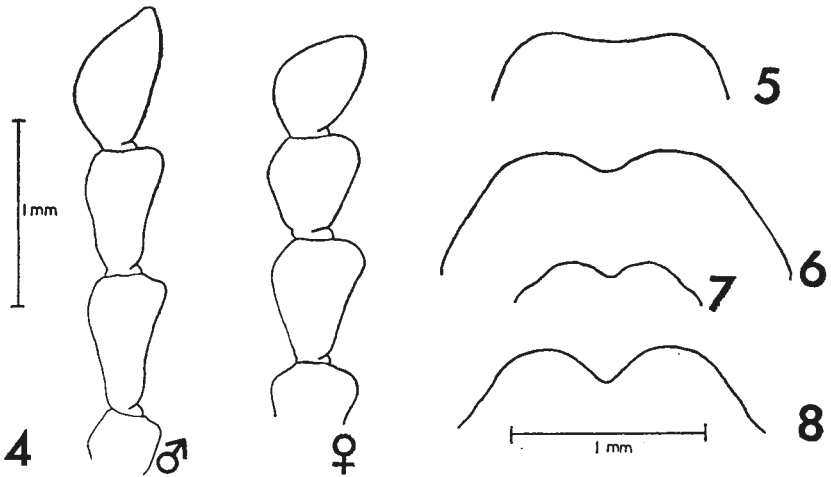


FIG. 3.—*Alphitophagus bifasciatus*, male, dorsal view of head.

- “The two-banded fungus beetle.” Length 2.25–3.0 mm., width 1.0–1.50 mm.
- A mould feeder which sometimes occurs in large numbers in granaries, warehouses, stables etc. on mouldy grain and other spillage, also found in decaying vegetable matter (e.g. haystack refuse, compost heaps, decaying tree stumps and brackets of the fungus *Polyporus squamosus* Huds. ex Fr.). [Nearly cosmopolitan]. Fairly common. England: I. of Wight, Kent, Surrey, Essex, Hertfordshire, Middlesex, Berkshire, Oxfordshire, E. Suffolk, Cambridgeshire, Bedfordshire, Huntingdon, W. Gloucestershire, Warwickshire, S. Lincolnshire, Leicestershire, Cheshire, N.E. Yorkshire.
- Elytra confusedly punctured; antennae not reaching back as far as base of pronotum; unicolorous testaceous to ferruginous. Head simple in both sexes. **Pentaphyllus** Dejean
- One British species only, **Pentaphyllus testaceus** (Hellwig).
Length 2.5 mm., width 1.2 mm.
- [Found in Sweden in decaying fungi, *Laetiporus sulphureus* (Bull. ex Fr.) Murr. usually on oak (*Quercus*). Also in deciduous leaf mould and worm-eaten decaying trees, especially red-rotten oak (*Quercus*).]
- One example only found in Britain in “*Polyporus squamosus*” placed as a trap in a “partially decayed oak”, Hornsey, N. London, 1876.
- 5 Length from front of head to apex of elytra 12 mm. or above.....6
- Length from front of head to apex of elytra less than 12 mm.....8
- 6 Elytral apices mucronate, as in (fig. 2). **Blaps** Fabricius (p. 12)
- Elytral apices not mucronate.....7
- 7 Antennae longer, reaching back to well past base of pronotum; sides of pronotum strongly sinuate; colour metallic violaceous. Front tibiae nearly straight. **Helops** Fabricius



Figs. 4-8.—4, *Helops caeruleus*, apical segments of left antenna of male and female; Clypeal outlines of: 5, *Alphetobius diaperinus*; 6, *Phylan gibbus*; 7, *Melanimon tibialis*; 8, *Opatrum sabulosum*.

One British species only, *Helops caeruleus* (Linnaeus).

Length 14.0-19.0 mm., width 5.5-7.5 mm. Male with apical segment of antennae elongate, almost twice as long as broad, female with apical segment of antennae almost quadrate (fig. 4).

In decaying trees, principally oak (*Quercus*), also in elm (*Ulmus*), willow (*Salix*) and rarely, pine. In prepared timber: posts, oak window frames etc. The adults are attracted to sugar traps. Not uncommon. England: S. Somerset, all coastal counties from S. Devon to E. Norfolk, Surrey, Hertfordshire, Cambridgeshire, W. Gloucestershire, Monmouthshire, S. Lincolnshire (pre. 1900), Carlisle, Cumberland (pre. 1907), I. of Man. Wales: Swansea, Glamorgan (pre. 1891).

- Antennae shorter, not reaching base of pronotum; sides of pronotum not sinuate; colour fuscous or ferruginous; front tibiae conspicuously curved.

Tenebrio Linnaeus (p. 13)

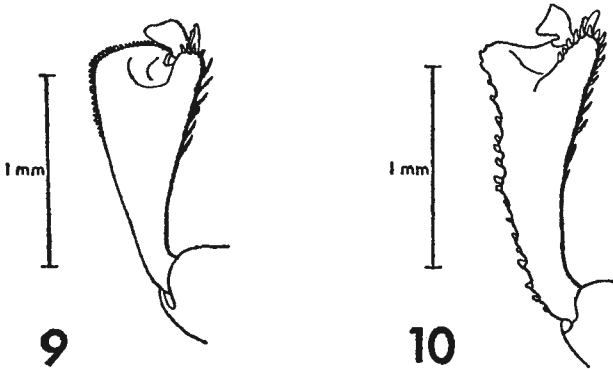
- 8 Antero-medial emargination of clypeus relatively deep, narrowly rounded at base (figs. 6, 7 and 8); dorsal surface coarsely sculptured, rugose, granulate or with dense, deep punctures; colour black 9
- Antero-medial emargination of the clypeus, if present, broad and shallow (fig. 5); dorsal surface smooth, not coarsely sculptured or rugose; colour varied 11
- 9 Outer edge of anterior tibiae broadly rounded at the apex and fringed with short stout setae (fig. 9). **Phylan** Stephens

One British species only, *Phylan gibbus* (Fabricius).

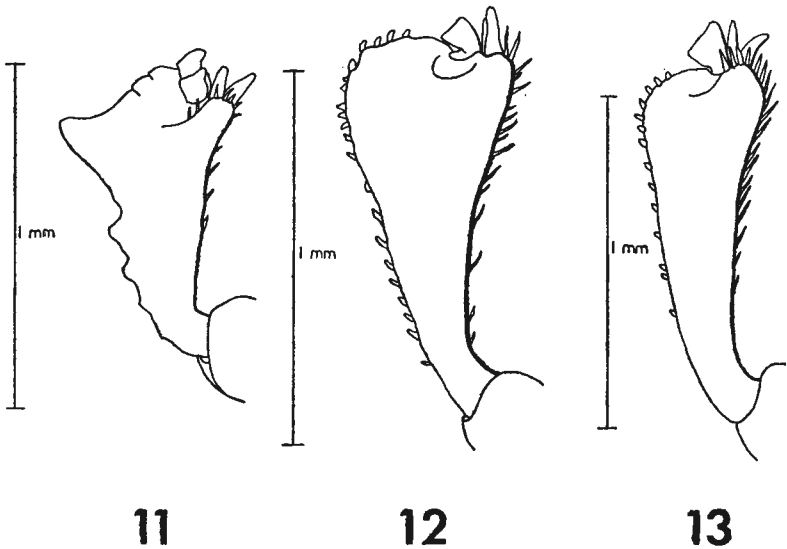
Black, usually shining despite close puncturation. Apterous. Length 7.0-8.25 mm., width 3.0-4.0 mm. Male with conspicuous tufts of long white hair on median and posterior femora; first three segments of anterior tarsus dilated and tomentose beneath; a depression present between posterior coxae. Female without these characters.

Sand dunes and sandy areas on the coast. Local but not uncommon. England: E. Kent to The Wash, S. Hampshire to Cumberland, N.E. Yorkshire. Wales: Glamorgan, Carmarthenshire, Pembrokeshire, Merioneth, Denbighshire, Anglesey. Scotland: Dumfriesshire to Ayrshire. Ireland: East and South coasts.

- Outer edge of anterior tibiae not broadly rounded, but terminating in a large blunt tooth (figs. 10 and 11) 10
- 10 Length less than 5 mm.; ground sculpture of large, coarse punctures; pronotum with at least three smooth, raised patches on the disc and with base almost straight; apical segment of maxillary palpi cylindrical; shape of anterior tibiae characteristic (fig. 11). **Melanimon** von Steven



FIGS. 9-10.—Left fore tibia of: 9, *Phylan gibbus*; 10, *Opatrum sabulosum*.



FIGS. 11-13.—Left fore tibia of: 11, *Melanimon tibialis*; 12, *Phaleria cadaverina*; 13, *Alpheutobius diaperinus*.

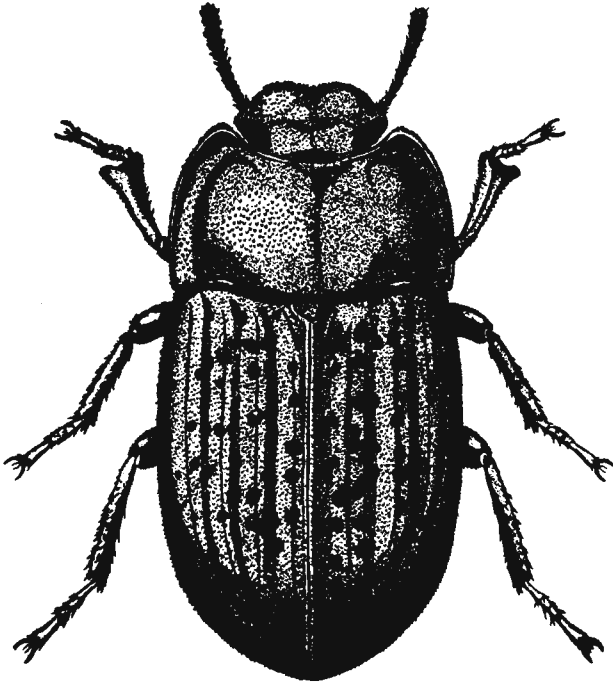
One British species only, ***Melanimon tibialis*** (Fabricius).

Dull black. Length 3.0-4.5 mm., width 1.5-2.1 mm.

Sand dunes and sandy areas, principally on the coast but also inland. Local but not uncommon. England: Along the coast from The Wash to Cumberland, inland records are from N. Somerset, Dorset, S. Hampshire, Surrey, Berkshire, W. Suffolk, Bedfordshire, Worcestershire, Lincolnshire, Mid. W. Yorkshire. Wales: Glamorgan, Cardiganshire, Merioneth, Anglesey and Denbighshire coasts. Ireland: Dublin coast.

- Length more than 6 mm.; ground sculpture of granules, most of which are setose; pronotum without discal patches and with base strongly bisinuate; apical segment of maxillary palpi triangular; shape of anterior tibiae characteristic (fig. 10).

Opatrum Fabricius



14

FIG. 14.—*Opatrum sabulosum*.

One British species only, *Opatrum sabulosum* (Linnaeus) (fig. 14).

Dull black, granules and elytral tubercles shining. Length 6·75–8·75 mm., width 3·5–4·5 mm. First three visible abdominal sternites of the male with a median impression, female without such an impression.

Sand dunes and sandy areas, principally on the coast. Usually amongst the roots of plants and under stones etc. Local. England: Along the coast from E. Suffolk to Cumberland. Rare inland records include Ditching, E. Sussex; Tilford, Surrey; Reading district, Berkshire; Bungay, E. Suffolk; Gamlingay, Cambridgeshire. Wales: Pembrokeshire and Caernarvonshire coasts. Ireland: S. Kerry coast.

- 11 Anterior tibiae greatly expanded apically, width at apex equal to half total length (fig. 12). (Surface testaceous, elytra usually each with a dark discal patch which is sometimes very small or absent, sometimes covering most of the elytra; pronotum widest at base; eye kidney-shaped and of almost even width.)

Phaleria Latreille

One British species only, *Phaleria cadaverina* (Fabricius).

Length 5·0–7·25 mm., width 2·5–3·75 mm.

Sand dunes and sandy beaches on the coast. Beneath seaweed and other rotting organic material including carrion, also at the roots of plants. Scarce. England: N. Somerset to W. Norfolk, Lancashire, S.E. Yorkshire, Cumberland. Wales: Glamorgan, Pembrokeshire, Merioneth, Flintshire, Anglesey. Scotland: Ayrshire. Ireland: E. Cork, Waterford, Wicklow, Dublin, Louth.

- Anterior tibiae not greatly expanded apically, width at most, equal to one third of total length (as in *Alphitobius diaperinus* (Panz.) (fig. 13)).....12

- 12 Basal hind tarsal segment almost as long as the next three together, excluding claws; longer hind tibial apical spur as long as maximum tibial width. (Pronotum wider or at least as wide as elytral base; anterior tibiae with dorsal edge fringed with short stout spines along the entire length). **Crypticus** Latreille
One British species only, **Crypticus quisquilius** (Linnaeus).
Black, shining upper surface quite densely punctured. Length 4.5–7.0 mm., width 2.1–3.4 mm. Male with apical segment of maxillary palpi greatly enlarged, distal edge being longest and with last abdominal sternite truncate. Female with apical segment of maxillary palpi not as enlarged, distal edge being no longer than outer edge and last abdominal sternite evenly rounded.
Sandy areas, principally on the coast. Local. England: Cornwall, Dorset, along the coast from E. Sussex to S.E. Yorkshire. Rare inland records include Tubney, N. Berkshire; Brandon and Freckenham districts, N.W. Suffolk; Devils Ditch, Cambridgeshire; Hanley, Staffordshire. Wales: Pembrokeshire, Flintshire, Anglesey coasts. Ireland: Dublin, Down, Antrim coasts.
- Basal hind tarsal segment shorter than next three together, excluding claws; longer hind tibial spur at most about half as long as maximum width of tibia, usually less 13
- 13 Third segment of antennae elongate, at least twice as long as second segment; antennae longer, reaching back well beyond base of pronotum; pronotum widest before base. **Cylindrinotus** Faldernann (p. 14)
- Third segment of antennae not elongate, less than twice as long as second segment; antennae not or scarcely reaching back to base of pronotum 14
- 14 Length less than twice greatest width 15
- Length more than twice greatest width 17
- 15 Apical segment of maxillary palpi broadly triangular; colour of upper surface shining violaceous. (Legs and antennae fuscous). **Platydemus** Castelnau & Brullé
One British species only, **Platydemus violaceum** (Fabricius) (= *dytiscoides sensu* Fowler 1890 not Rossi 1790).
Length 7.5–8.25 mm., width 4.1–4.5 mm.
[*Found in Sweden, Germany etc. in the fungi Auricularia auricula-judae* (Bull. ex St. Amana) Wettst. and *A. mesenterica* (Dicks. ex S. F. Gray) Pers. on elder (Sambucus) and elm (Ulmus). Also found under the bark and in fungi (ssp. ?) on oak (Quercus).] In Britain it has only been found "under bark of felled oak" and "at light". Very rare. *England: New Forest, S. Hampshire (circa 1860 and 1901); near Dorking, Surrey (1957).*
- Apical segment of maxillary palpi cylindrical; colour not violaceous 16
- 16 Pronotum with anterior angles acute and strongly projecting; upper surface metallic olivaceous, sometimes fuscous or ferruginous with metallic olive reflection; length less than 6 mm. **Scaphidema** Redtenbacher
One British species only, **Scaphidema metallicum** (Fabricius).
Length 3.9–5.4 mm., width 2.25–3.0 mm.
Under bark or beneath decaying wood, frequently on quite small sticks and branches, usually in very moist and fungoid conditions. Most often associated with elm (Ulmus) but also recorded from many other trees. Not uncommon. England: Recorded from all counties except Northamptonshire and Cumberland. Wales: Glamorgan, Denbighshire (pre. 1891).
- Pronotum with anterior angles evenly rounded, not projecting; upper surface shining black, elytra with two transverse orange bands and with apices orange; length more than 6 mm. **Diaperis** Müller
One British species only, **Diaperis boleti** (Linnaeus).
Length 7.0–8.0 mm., width 4.0–4.75 mm.
In brackets of the fungus Piptoporus betulinus (Bull. ex Fr.) Karst. on birch (Betula). Rare. *England: Early records (pre. 1891), Hastings, E. Sussex; Barham, E. Suffolk; Sherwood, Nottinghamshire; Dalston, Cumberland (also 1907). Rediscovered in the area of the S. Hampshire-Dorset border (Ringwood district 1952, Sopley 1956, West Parley 1953–55).*
- 17 Antennae shorter than length of head, with a clearly defined, five segmented club, the apical segment of which is quadrate, abruptly truncate apically and narrower than the penultimate segment. **Latheticus** Waterhouse
One British species only, **Latheticus oryzae** Waterhouse.
"The long-headed flour beetle". Weakly shining reddish-testaceous. Length

2.75–3.0 mm., width 0.9–1.0 mm. Mentum of male bearing a short, median, forwardly directed spine. Female with mentum simple.

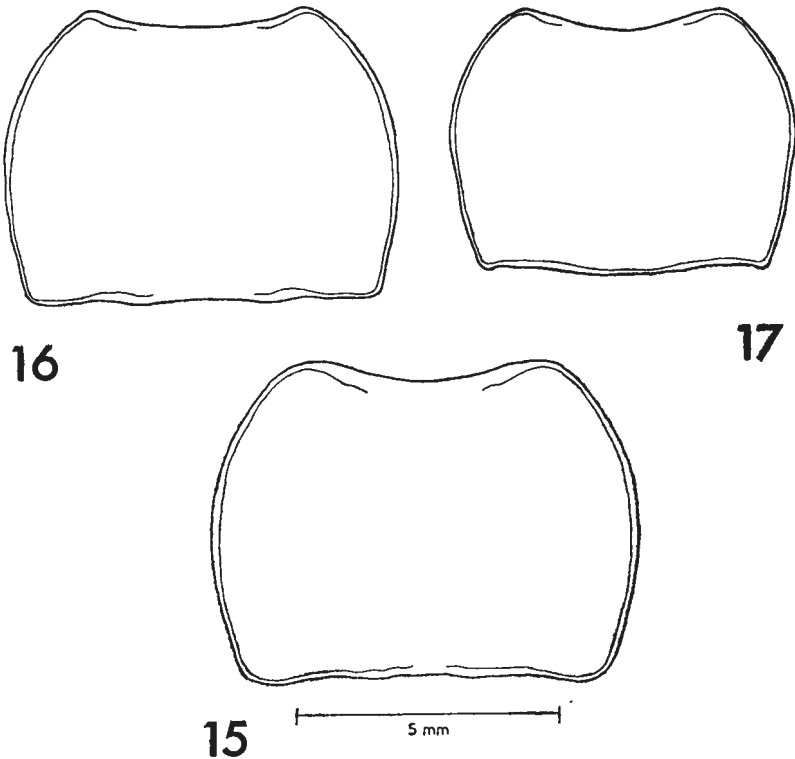
A frequently imported pest on a range of cereal and other products. It cannot survive in unheated premises and is rarely found except on imports in stores and ships. "Cosmopolitan".

- Antennae as long or longer than length of head (if antennae as long as head they do not have a five segmented club); apical segment rounded and usually wider than penultimate segment. 18
- 18 Genae well developed laterally, extending as a canthus which partially or almost completely, divides the eye. 19
- Genae not extending laterally to form a canthus, eyes entire, round or vertically elongate, sometimes slightly embracing antennal insertion, e.g. (figs. 20 and 21). 21
- 19 Pronotum transverse, about one and a half times as wide as long and measuring more than 2 mm. across. **Alphitobius** Stephens (p. 14)
- Pronotum sub-quadrate to slightly transverse and measuring distinctly less than 2 mm. across 20
- 20 Elytra with fine, shallowly raised, longitudinal carinae on interstices four to eight; striae ill defined on disc; males without mandibular horns or enlarged outgrowths of the genae. **Tribolium** Macleay (p. 15)
- Elytra without carinae, striae indicated by well defined rows of punctures; males with conspicuous mandibular horns and lateral outgrowths of the genae which may sometimes be greatly enlarged, (figs. 25 and 27). **Gnaticerus** Thunberg (p. 16)
- 21 Elytra truncate apically, exposing pygidium; eyes vertically elongate; head strongly narrowed from in front of eyes to anterior clypeal border; if anterior pronotal angles produced, then anterior border extends well beyond level of angles (fig. 32); dorsal surface sometimes bi-colourous.
(= *Hypophloeus* Fabricius) **Corticeus** Piller & Mitterpacher (p. 18)
- Elytra not truncate apically, pygidium not normally exposed; eyes circular in side view; head as in fig. 35 or 36; anterior pronotal angles produced in front of anterior border (figs. 35 and 36); dorsal surface ferruginous. **Palorus** Mulsant (p. 20)

Genus *Blaps* Fabricius

KEY TO SPECIES

- 1 Antennae not reaching back to base of pronotum, segments 4–7 almost quadrate; posterior angles of pronotum rounded (fig. 15); elytral surface, especially laterally, finely wrinkled, puncturation distinct. Second abdominal sternite of male with a basal fovea, about 2 mm. wide and containing a patch of dense, yellow hair. Female without fovea or hairs. Dull black. Apterous. Length 21.0–24.0 mm., width 10.0–11.5 mm. (= *similis* Latreille) **lethifera** Marsham
In cellars, outbuildings and granaries. Rare, occasionally imported. England: S. Somerset, Hampshire, Sussex, Kent, Surrey, Hertfordshire, Berkshire, Suffolk, Cambridgeshire, Leicestershire, S. Lancashire, Cumberland. Wales: Glamorgan. Scotland: "Solway". Records circa 1900 except the most recent from Mellis, E. Suffolk (1945).
- Antennae reaching back to base of pronotum or beyond, segments 4–7 longer than broad; posterior angles of pronotum almost sharply right-angled (figs. 16 and 17); elytral surface not wrinkled, punctures very fine. Secondary sexual characters differing between species. 2
- 2 Basal margin of pronotum interrupted for about the middle third; hind tibiae smooth on upper surface, with evenly spaced, small punctures only, each with a short golden hair; sides of pronotum arcuately narrowed from widest point to hind angles (fig. 16); pronotal punctures more or less evenly spaced; elytral outline typically as in fig. 2, with apical process short and blunt. Male with up to twelve median transverse ridges on the first abdominal sternite, but lacking a patch of hair on the second. Female with only faint median transverse lines on the first abdominal sternite. Black, almost shining. Apterous. Length 18.0–25.0 mm., width 8.0–10.5 mm. **mucronata** Latreille
In or near buildings, storehouses, sheds and cellars. A nocturnal omnivorous scavenger. Fairly common. "The churchyard or cellar beetle". Generally distri-



Figs. 15-17.—Pronotum of: 15, *Blaps lethifera*; 16, *B. mucronata*; 17, *B. mortisaga*.

buted throughout England and Wales. Scotland: Renfrewshire, Elgin, Dunbarton. Ireland: Kerry, Cork, Armagh, Down, Antrim.

- Basal margin of pronotum continuous; hind tibiae rough and setose on upper surface especially towards apex; sides of pronotum narrowed, but almost straight from widest point to hind angles (fig. 17); pronotal punctures more closely set on disc than elsewhere; elytral outline somewhat narrower than in *mucronata*, with apical process well developed and sharp. Secondary sexual characters as for *lethifera*. Black, upper surface shagreened. Apterous. Length 23.0-26.0 mm., width 8.5-9.0 mm. **mortisaga** (Linnaeus)

Almost certainly the same type of habitat and omnivorous diet as *mucronata*. The only records that I have been able to verify are those from N.E. Scotland during the last century (circa 1864). Published records include Hitchin, Hertfordshire circa 1884; Derbyshire circa 1905; Scarborough, N.E. Yorkshire 1951-2; Cumberland (no date).

Genus *Tenebrio* Linnaeus

KEY TO SPECIES

- 1 Upper surface with punctures numerous but small and well separated, those on elytra being more than a puncture's width apart; appearance shining. Anterior tibiae of male longer and more curved, ventral surface flattened and produced at apex. Anterior tibiae of female shorter and less curved without apical process and with ventral edge rounded. Fuscous, sometimes ferrugineous. Length 12.0-17.5 mm., width 4.5-6.0 mm. (= *laticollis* Stephens) **molitor** Linnaeus

Usually associated with buildings, being a minor stored-products and domestic pest. It is commonly found breeding in birds nests in attics etc. and is especially common in pigeons' nests (*Columba* sp.) where it may occur in vast numbers. It is also found in bat roosts in houses. Common. "The mealworm or yellow mealworm beetle". Cosmopolitan. Found throughout the British Isles.

- Upper surface with exceedingly dense puncturation, the punctures on elytra being so close that surface appears finely rugose and dull, matt. Secondary sexual characters as in *molitor*. Fuscous. Length 13.5-18.25 mm., width 4.5-6.0 mm.

obscurus Fabricius

Near or in buildings, principally flour-mills and grain stores, also stables. Uncommon. "The dark mealworm beetle". Cosmopolitan. England: E. Kent, Surrey, London, Essex, E. Suffolk, Cambridgeshire, Gloucestershire, S. Lancashire, N.E. Yorkshire. Wales: Glamorgan. Scotland: Lanarkshire, 1912. Ireland: Wicklow, Dublin.

Genus *Cylindrinotus* Faldermann

KEY TO SPECIES

- 1 Colour ferruginous to fuscous, usually with a bronze metallic reflection; sides of pronotum evenly rounded from anterior to hind angles (fig. 18); lateral borders of head before eyes evenly curved. Male with first three segments of anterior and mid tarsi dilated and pilose beneath. Female with all tarsi simple. Length 6.5-11.75 mm., width 3.0-5.0 mm.

(= *striatus* (Fourcroy) *laevioctostriatus* (Goeze)

Under loose bark, at the bases of trees, in rotten wood, at the roots of heather on heaths and under stones etc. on exposed cliffs and high ground. Common. Generally distributed throughout England and Wales. Scotland: Southern counties, scarce in the north, S. Aberdeenshire, Argyllshire, Arran. Ireland: South and east counties also Galway.

- Colour testaceous, upper surface with a translucent quality; sides of pronotum constricted in the basal third (fig. 19); lateral borders of head before eyes abruptly incised at junction of clypeus with genae. No apparent external secondary sexual characters. Apterous. Length 6.0-10.0 mm., width 2.75-4.75 mm.

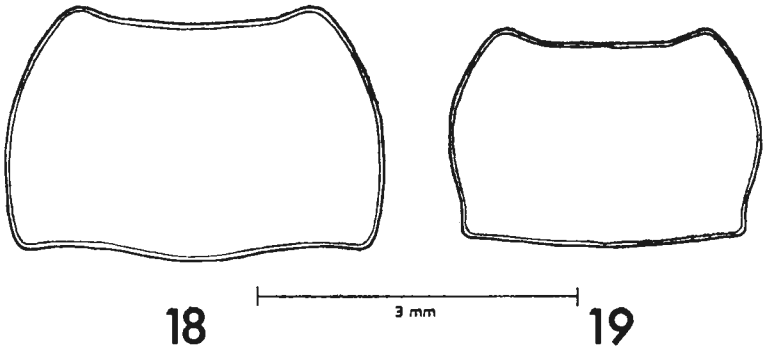
pallidus (Curtis)

Sand dunes and sandy areas on the coast, quite often at the roots of marram grass (*Ammophila* sp.). Local. England: N. Somerset to Dorset, I. of Wight, E. Sussex, N. Essex, W. Norfolk, Cheshire, S. Lancashire, S.E. Yorkshire. Wales: Glamorgan to Pembroke, Merioneth, Anglesey. Ireland: W. Cork, Waterford to Wicklow, Antrim.

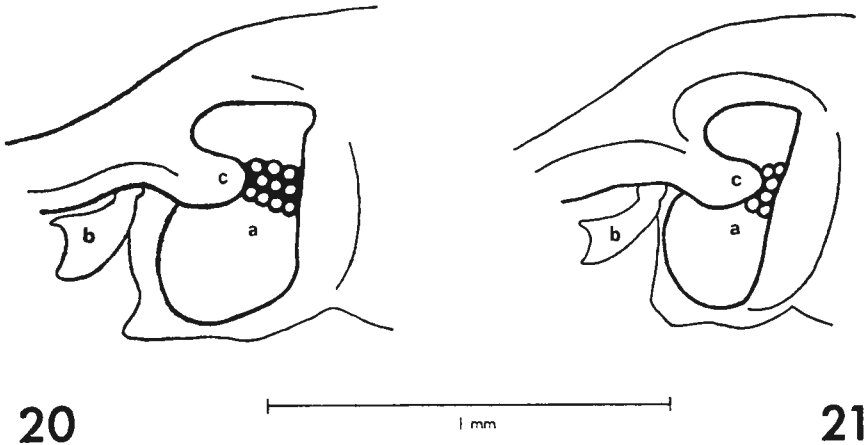
Genus *Alphitobius* Stephens

KEY TO SPECIES

- 1 Eye only partly divided by canthus, approximately 3-4 ommatidia wide at its narrowest point (fig. 20); antennae with segments 5-10 asymmetrically expanded;



FIGS. 18-19.—Pronotum of: 18, *Cylindrinotus laevioctostriatus*; 19, *C. pallidus*.



FIGS. 20-21.—Lateral view of head showing the left eye: 20, *Alphetobius diaperinus*; 21, *A. laevigatus*; [(a) eye; (b) basal segment of left antenna; (c) canthus].

anterior tibiae with apex more strongly broadened and rounded externally (fig. 13). Male mid tibiae with one spur of the apical pair curved inwards, the other straight. Female with mid tibial spurs straight. Shining fuscous. Length 5.5-6.75 mm., width 2.5-3.1 mm.

(= *ovatus* sensu auct. not (Herbst))
(= *piceus* sensu auct. partim not (Olivier))
diaperinus (Panzer)

An omnivorous feeder, found associated with a wide range of stored commodities, e.g. grains, flour, leather, bones, ground nuts etc. Tends to be cannibalistic. Sometimes occurs in large numbers in deep litter poultry houses. Common. "The lesser mealworm beetle". Cosmopolitan. Generally distributed throughout the British Isles.

- Eye nearly completely divided by canthus, approximately 1-2 ommatidia wide at its narrowest point (fig. 21); antennae with only segments 6-10 asymmetrically expanded; anterior tibiae with apex less strongly broadened and with apex obliquely truncated. Secondary sexual characters as in *diaperinus*. Fuscous. Length 4.5-6.25 mm., width 2.25-2.8 mm. (= *piceus* (Olivier)) **laevigatus** (Fabricius)

The same habits as diaperinus although less common and not occurring in poultry houses. Occasionally recorded away from buildings in garden refuse or near trees. "The black fungus beetle". Cosmopolitan. Generally distributed throughout the British Isles.

Genus *Tribolium* Macleay

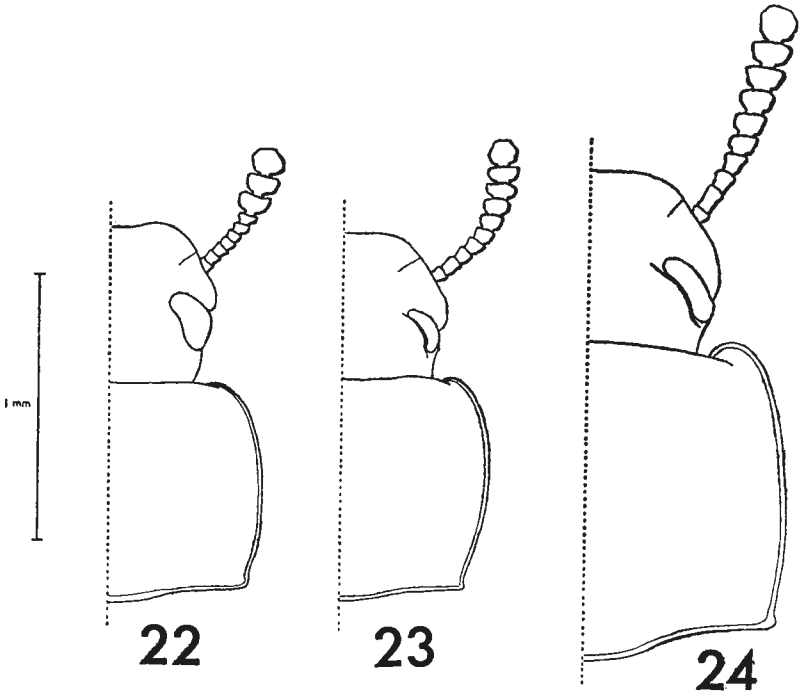
KEY TO SPECIES

- 1 Antennae with a distinct, moderately compact, three-segmented club; eye approximately 4 ommatidia wide at its narrowest point, as in *Alphetobius diaperinus* (fig. 20); head without a ridge above the eye (fig. 22). Male with a sub-basal setiferous puncture on ventral surface of anterior femora, female without such a puncture. Ferruginous. Length 2.3-4.4 mm., width 1.0-1.5 mm.

(= *ferrugineum* sensu auct. partim not (Fabricius)) **castaneum** (Herbst)

The most frequently imported beetle pest of stored products. A secondary pest of grains and an important pest on cereal products and many other commodities. It can only maintain itself through the winter and become permanently established in well heated buildings, e.g. provender mills and some bakeries. Rarely found in flour mills. "The rust-red flour beetle". Cosmopolitan. Occurs throughout the British Isles.

- Antennae with a loose, 5-6 segmented club or only gradually broadening towards apices; eye 1-2 ommatidia wide at its narrowest point, as in *Alphetobius laevigatus* (fig. 21); head with a prominent supra-orbital carina (figs. 23 and 24)..... 2



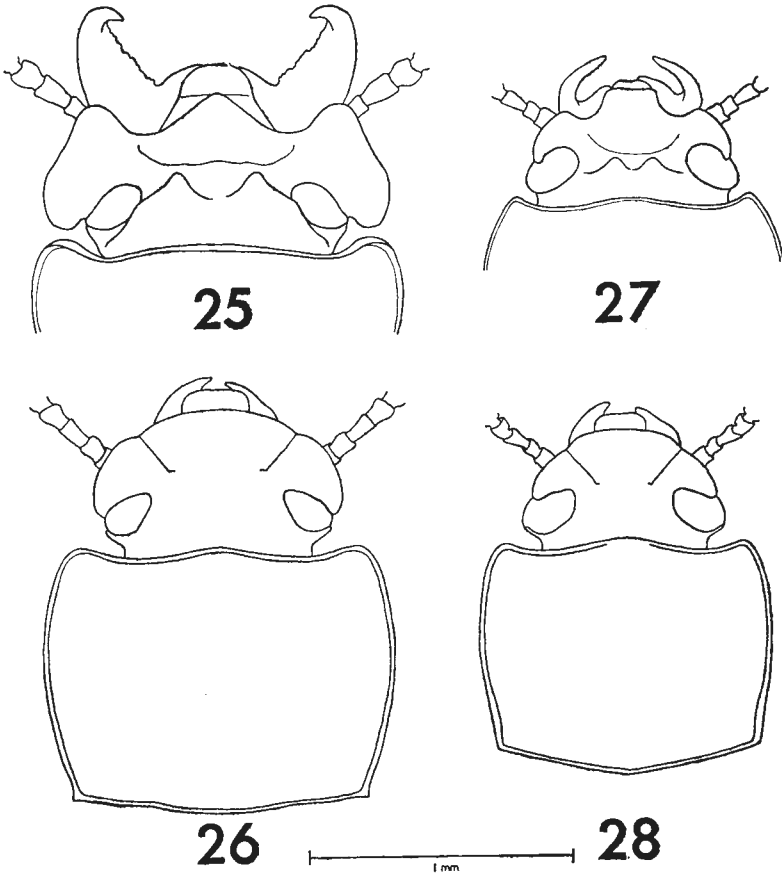
FIGS. 22-24.—Head and pronotum of: 22, *Tribolium castaneum*; 23, *T. confusum*; 24, *T. destructor*.

- 2 Length 2.6-4.4 mm., width 1.0-1.5 mm.; colour of upper surface ferrugineous; pronotum with base almost straight and with anterior angles hardly projecting (fig. 23); pronotum and head with rounded separate punctures which are not as long as the surface of a single ommatidium. Secondary sexual characters as for *castaneum*, male also with all elytral striae abbreviated before the apex. Female with elytral striae 4 and 6 and 7 and 3 entire, meeting at the apices.
 (= *ferrugineum* sensu auctt. partim not (Fabricius)) **confusum** Jacquelin du Val
A secondary pest of grains also occurring on cereal products etc., unlike castaneum it is far less frequently found on imports and is a common pest in flour mills. "The confused flour beetle". Cosmopolitan. Occurs throughout the British Isles.
- Length 4.5-5.75 mm., width 1.75-2.05 mm., colour of upper surface fuscous; pronotum with base strongly bisinuate and with anterior angles projecting well forward (fig. 24); sides of pronotum and middle of frons between eyes, with large and often confluent oval punctures, each as long or longer than the surface of a single ommatidium. Anterior femora of the male with basal third of ventral surface more setose and densely punctate than in the female. **destructor** Uyttenboogaart
A relatively minor pest of seeds and cereal products in stores and important as a domestic pest in Europe and Scandinavia. It has been found damaging insect specimens in museums. Infestations and importations are rare in the British Isles.

Genus *Gnatocerus* Thunberg

KEY TO SPECIES

- 1 Head broadest between lateral edges of the genae. Male with massive mandibular horns which are broadly flattened in section and have serrate inner edges, genae broadly explanate and flexed upwards, maximum width of head equal to or almost



FIGS. 25-28.—Head of: 25, *Gnatocerus cornutus*, male; 26, *G. cornutus*, female; 27, *G. maxillosus*, male; 28, *G. maxillosus*, female.

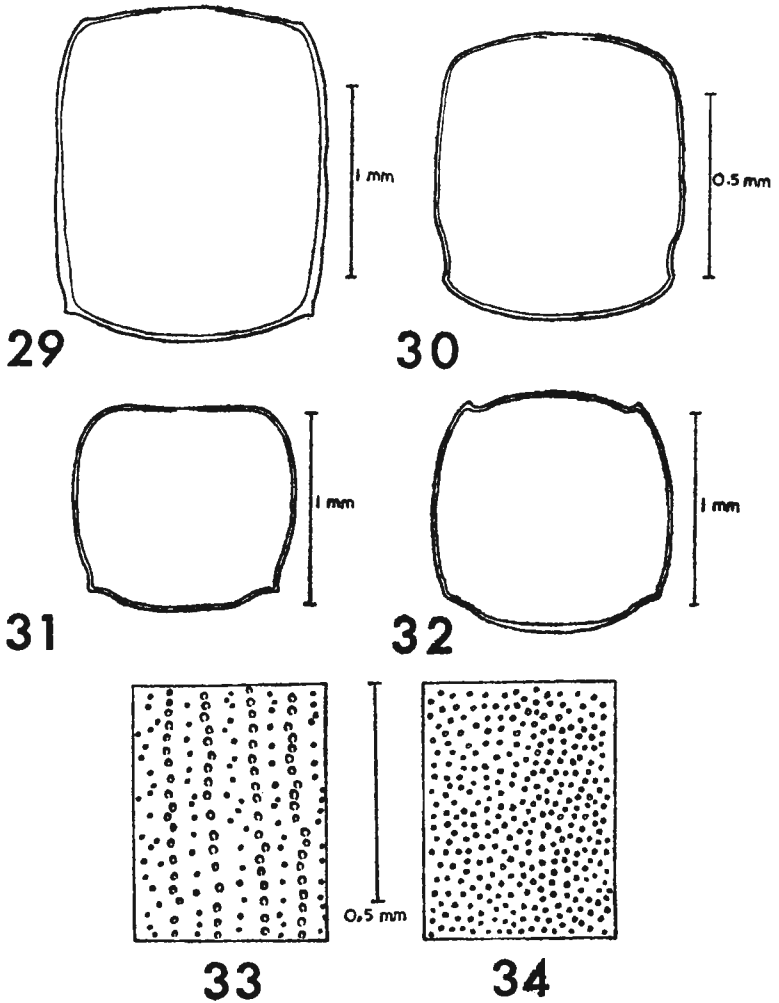
equal to anterior margin of pronotum, head between the eyes with two flattened, triangular horns, each larger than upper surface of an eye, anterior edge of clypeus strongly rounded (fig. 25). Female with genae quite well developed but without mandibular or frontal horns and clypeus about two and a half times as broad as long (fig. 26). Colour of upper surface ferruginous. Length 3.5-4.9 mm., width 1.4-1.5 mm.

cornutus (Fabricius)

In flour mills, also found in warehouses etc. as a minor pest of cereal and animal products, including meat-bone meal, flour, flaked rice and damaged grains. Tends to be cannibalistic. "The broad-horned flour beetle". Cosmopolitan. Fairly common in the British Isles.

- Head broadest across eyes. Male with mandibular horns simple and almost round in section, not toothed, genae relatively poorly developed, head not as broad as anterior edge of pronotum, frontal horns reduced, each smaller than upper surface of an eye, anterior edge of clypeus truncate (fig. 27). Female without enlarged genae, mandibular or frontal horns, clypeus being only about twice as broad as long (fig. 28). Colour of upper surface ferruginous. Length 3.0-4.0 mm., width 1.25-1.35 mm.

maxillosus (Fabricius)



FIGS. 29-34.—Pronotum of: 29, *Corticeus unicolor*; 30, *C. linearis*; 31, *C. bicolor*; 32, *C. frazzini*. Detail of elytra showing puncturation of: 33, *C. unicolor*; 34, *C. frazzini*.

In maize, wheat, ground-nuts, nutmeg etc. "The slender-horned flour beetle". Found in the British Isles only as an occasional import (normally restricted to warmer climates).

Genus *Corticeus* Piller & Mitterpacher

KEY TO SPECIES

- 1 Anterior angles of pronotum well defined and slightly projecting forwards (figs. 29 and 32); unicolorous castaneous or ferrugineous 2
- Anterior angles of pronotum rounded, not well defined or projecting forwards (figs. 30 and 31); usually bi-colorous [*bicolor* (O1.) may sometimes be unicolorous testaceous] 3

- 2 Elytral disc striate punctate, intervals between striae each with a single wavy line of smaller punctures (fig. 33); pronotum much longer than broad (fig. 29); colour of upper surface castaneous. Length 4.9–7.0 mm., width 1.3–1.9 mm.

(= *castaneus* (Fabricius)) **unicolor** Piller & Mitterpacher

Under decaying bark of beech (*Fagus*), oak (*Quercus*) and birch (*Betula*). Locally quite common. England: Plymouth, Devon (pre. 1900); S. Hampshire; Nottinghamshire; Cheshire (1916); S. Lancashire (1914); S.W. Yorkshire.

- Elytra confusedly punctured (fig. 34); pronotum only slightly longer than broad (fig. 32); colour of upper surface ferrugineous. Length 3.0–4.25 mm., width 1.1–1.5 mm.

fraxini (Kugelann)

Under the bark of pine (*Pinus*), nearly always in the burrows of the bark beetle *Ips sexdentatus* (Boerner), and very rarely in those of *Onthotomicus suturalis* (Gyllenhal) and *O. laricis* (Fabricius). Rare. England: N.E. Hampshire, W. Surrey, E. Berkshire, W. Gloucestershire. Wales: Glamorgan (circa 1923 in imported pine).

- 3 Head and pronotum black or fuscous, elytra ferrugineous. Length 2.5–3.0 mm., width 0.75–1.0 mm. Shape of pronotum characteristic (fig. 30). Pronotum slightly broader in male than female.

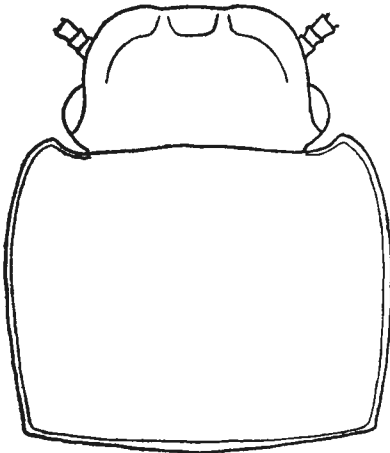
linearis (Fabricius)

Under the bark of smaller, upper branches of conifers, usually in the burrows of the bark beetle *Pityogenes bidentatus* Herbst. Local. England: S. Devon, S. Somerset, Dorset, I. of Wight, S. Hampshire, E. Sussex, Surrey, Berkshire, W. Suffolk, Staffordshire, Cheshire. Wales: Glamorgan.

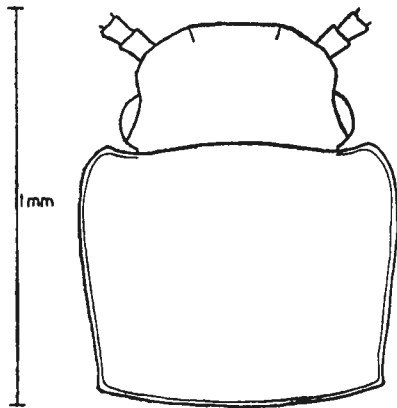
Head, pronotum and base of elytra ferrugineous, apical half to two-thirds of elytra shining black (sometimes the whole of the upper surface is unicolorous testaceous). Length 3.5–4.5 mm., width 1.25–1.5 mm. Shape of pronotum characteristic (fig. 31).

bicolor (Olivier)

Under bark of elm (*Ulmus*), usually in or near the burrows of the elm bark beetle *Scolytus scolytus* (Fabricius). Also, but very rarely, in or near the fungus *Daldinia concentrica* (Bolton ex Fr.) C. & DeNot. on old ash trees (*Fraxinus*) and from brackets of *Polyporus squamosus* Huds. ex Fr. Fairly common. England: S. Hampshire, S. Sussex, Kent, Surrey, Essex, Hertfordshire, Middlesex, Berkshire, Oxfordshire, E. Suffolk, Cambridgeshire, Bedfordshire, Huntingdon, Northamptonshire, E. Gloucester, Herefordshire, Worcestershire, S. Lincolnshire, Leicestershire, Cheshire, S. Lancashire, N.E. and S.W. Yorkshire. Wales: Monmouth.



35



36

FIGS. 35–36.—Head and pronotum of: 35, *Palorus subdepressus*; 36, *P. ratzeburgii*.

Genus *Palorus* Mulsant

KEY TO SPECIES

- 1 Genae enlarged and raised above clypeus, produced posteriorly with sides parallel and continuous in a straight line with supra-orbital carinae; pronotum with sides slightly rounded to almost parallel, usually widest across the middle (fig. 35). The form of head and shape of eye vary independently of sex or head size. Colour of upper surface ferrugineous. Length 2.7–3.0 mm., width 0.9–1.0 mm.
(= *depressus* sensu acutt. partim not (Fabricius))
subdepressus (Wollaston)
Habits similar to those of P. ratzeburgii but it is not established in the British Isles and is rarely found, even in heated premises. "The depressed flour beetle". Almost cosmopolitan. In the British Isles it is occasionally found on imports.
- Genae hardly enlarged, only slightly raised above antennal insertions and with sides not parallel but convergent posteriorly, meeting supra-orbital carinae obtusely above front of eyes; pronotum usually widest across the anterior quarter, sometimes almost parallel sided (fig. 36). Colour of upper surface ferrugineous. Length 2.4–3.0 mm., width 0.9–1.1 mm.
(= *ratzeburgi* (of authors)) **ratzeburgii** (Wissmann)
Found in stored cereal products and other commodities, particularly in mouldy grain residues previously attacked by grain weevils (Sitophilus sp.). Occasionally found on imports, more frequently in flour and provender mills, grain stores, maltings etc. "The small-eyed flour beetle". Cosmopolitan. Not common in the British Isles but may occur in large numbers.

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