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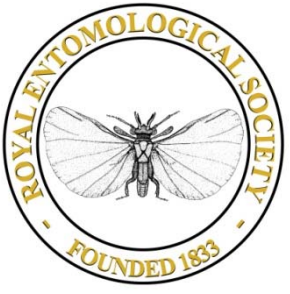

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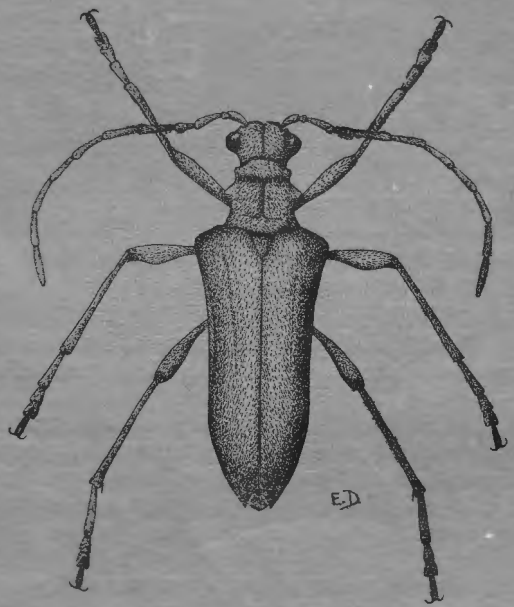

COLEOPTERA

CERAMBYCIDAE

By

E. A. J. DUFFY

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COLEOPTERA
(CERAMBYCIDAE)

KEYS TO GENERA AND SPECIES.

By E. A. J. DUFFY

INTRODUCTION.

THE family **Cerambycidae**, members of which are popularly known as "Longhorns," is of world-wide distribution and comprises well over 20,000 described species, of which just over 60 are listed as British. Owing to their comparatively large size, elegance, variety of colour and form and mimetic and protective resemblance to various other insects, this family of beetles is perhaps the best known and most popular amongst collectors and taxonomists alike.

ADULT CHARACTERISTICS.

The following are the main characteristics of this family : Form generally rather elongate, usually more or less depressed, with the elytra broader than the thorax, often considerably so. Eyes large, their extension around the bases of the antennae frequently pronounced ; the emargination of the inner edge is sometimes so deep that the eyes are divided or almost divided into two portions. The characteristic antennae, from which these beetles have gained their popular name, arise from conspicuous tubercles on the front of the head ; generally they are filiform, although occasionally they may be serrate or pectinate, or may bear tufts of ornamental hairs ; usually they are at least as long as the body, sometimes considerably longer, but on the other hand there are many species in which the antennae scarcely reach the shoulders of the elytra. The tarsi are actually five-segmented, although with few exceptions the fourth segment is considerably reduced so that they appear to be only four-segmented ; the third segment is always strongly bilobed. Many species superficially resemble the CHRYSOMELIDAE from which they may usually be distinguished by their more elongate form, proporionately longer legs and their pubescent elytra ; moreover there is a tendency for the epimera of the metathorax to extend to the sides of the ventral segments, whereas in the latter family the first ventral segment is prolonged forwards at the sides to meet the metathorax.

ECONOMIC IMPORTANCE.

Most Cerambycids live in the wood of various trees, some confining themselves to one host-plant, while others are not selective. Decaying, injured, or recently felled timber is generally the most vulnerable to attack.

Much damage is caused annually by these insects abroad. In this country damage is comparatively negligible and is usually confined to

plantations and scattered trees of ornamental value ; *Hylotrupes bajulus* (Linnaeus) (the " House Longhorn ") may prove to be a notable exception ; in many countries this species has caused severe and widespread damage, especially to structural timbers of houses. In this country, however, infestation so far appears to be confined to a few areas. Some species such as those of *Rhagium* and *Arhopalus*, however, are beneficial to forestry, as they speedily break down old stumps and logs.

Adult Habits.

Many species of Cerambycids appear to require a certain amount of nourishment in the adult stage. Most Lepturinae, for example, assemble on flower-heads to feed on pollen, whereas many Lamiids feed on leaves and stems.

Copulation usually occurs a day or so after the emergence of the adults from their pupal cells ; this usually takes place on the branches or boles of the host trees, although in the case of the Lepturinae it frequently takes place on flower heads, often some distance away from the host trees.

Oviposition is performed on bark, in cracks of bark or wood, in old emergence holes, in stems of plants, or even in the soil. Certain species excavate special egg cavities with their mandibles or bore holes with their ovipositor to accommodate the eggs.

When molested, many species stridulate audibly. This is accomplished usually by the striate area of the produced mesonotum being scraped by a series of sharp ridges on the posterior margin of the pronotum as the latter is raised or lowered.

A few species, particularly those of the Callichromini, possess the faculty of scent emission. The scent emitted is usually pleasant, as in *Aromia moschata* (Linnaeus) (the British " Musk beetle "), although in the case of *Agapanthia villosoviridescens* Degeer it is less agreeable, resembling the smell of snuffed candles. The scent glands are situated in the metathorax, the apertures being visible on the metasternum.

Eggs.

Cerambycid eggs are usually slender, cylindrical, fusiform or elongate ovoid, with rounded ends. The chorion may be smooth or rugose (often micro-reticulate), the usual colour being white or pale yellow. The incubation period for most species is approximately 14 days.

Larvae.

Cerambycid larvae are soft whitish grubs with powerful mandibles and are generally recognizable by their subcylindrical, elongate tapering form. The thoracic legs, when present, are short or vestigial, the ventral mouthparts are protracted and the mandibles are gouge-shaped or wedge-shaped. Some of the abdominal segments bear dorsal and ventral ampullae (i.e., tuberculate protuberances to assist in locomotion). Spiracles are of the annular bilabiate type. The terminal urogomphi, when present, are never segmented.

The first-instar larvae generally differ from those of later instars in that they possess biforous spiracles and abdominal egg-bursting spines (Duffy, 1949).

Larval Habits.

Cerambycid larvae feed in a great variety of hosts ranging from trees of considerable girth down to young slender saplings or bushes. Certain species prefer slender twigs or scaly bark, whereas others infest the sapwood or heartwood of the bole or sometimes the roots. It has been the writer's experience that, generally speaking, their successful development depends to a far greater extent on the nature and condition of the wood (i.e., thickness of bark, moisture content, state of decay) than on the species of tree concerned. Many exotic species feed in the pithy stems of herbaceous plants, cacti, orchids, roots of grasses and even seeds and cones.

For the digestion of wood most larvae apparently secrete cellulase (a cellulose-splitting enzyme) which enables them to digest the cellulose in wood. Some species, however, are unable to secrete cellulase but derive the necessary carbohydrates from soluble sugars and starch through the digestive action of saccharase and maltase.

The duration of the larval stage in this family is usually from two to three years, only a few species being able to complete their development in a shorter time. In the case of certain species which have a preference for seasoned wood or are able to withstand excessive desiccation the life-cycle may be considerably prolonged and records of from 5 to 20 or more years are to be found in literature. *Eburia quadrigeminata* Say, for example, has frequently been known to emerge from imported American oak several years after the latter has been converted into furniture. Some species are remarkably resistant to freezing and waterlogged conditions (Duffy, 1946).

Pupation usually takes place in or under the bark or in the outer sapwood, but occasionally in the heartwood or even in earthern cocoons around roots. The pupal cell often consists simply of an enlargement of the larval gallery which is partitioned off by a barrier of wooden shavings. In *Cerambyx* and allied genera the barrier consists of calcium carbonate which is secreted by the larva, and in some exotic species the entire cell may be lined with calcium. Many species pupate in the autumn and over-winter as adults in their pupal cells.

Explanation of Keys.

Owing to the enormous demand for foreign timber of recent years, many Cerambycids have been imported into this country from abroad and have sometimes emerged in large numbers from infested timber during its conversion or storage. As a consequence of this, North American or African species are often more frequently encountered than many of our less common British species. Moreover, imported specimens of such rare British species as *Acanthocinus aedilis* (Linnaeus) and *Plagionotus arcuatus* (Linnaeus) are frequently to be found, sometimes abundantly, in and around our timber-yards, whereas native specimens are seldom, if ever, seen nowadays. It is for these reasons that the more regularly imported species have been included in the key so that it may be of greater use, particularly to those connected with the timber trade.

The following keys are largely based on those of Fowler (1889) and Reitter (1912), but have been considerably adapted and modified. In general, characters which are readily visible have been used whenever possible in order to assist students in the field. Imported species have been marked

with an asterisk, *, and doubtfully indigenous species have been indicated by an asterisk enclosed in brackets (*). All figures have been prepared by the writer.

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Key to Subfamilies of Cerambycid Adults.

1 Sides of thorax distinctly margined, armed with three or more teeth (figs. 2 and 3). Front coxae transverse (fig. 4*a*). Prosternum appreciably produced in the form of a blunt process behind anterior coxae (fig. 4*a*). Length at least 23 mm. 1. Prioninae (p. 5).

– Sides of thorax not margined ; lateral teeth usually absent but sometimes one pair present only (fig. 1). Front coxae round (fig. 4*b*), oval, or conical (fig. 11). Prosternum not or scarcely produced behind anterior coxae (fig. 4*b*).....2.

2 Front of head vertically inclined to longitudinal axis of body or strongly inflexed. Anterior tibiae obliquely grooved on their inner side (fig. 25). Apical segments of labial palpi tapering or pointed .....5. Lamiinae (p. 13).

– Front of head obliquely or subvertically inclined to longitudinal axis of body. Anterior tibiae not grooved on their inner side. Apical segments of labial palpi enlarged .....3.

3 Anterior coxae distinctly conical (fig. 11). Sides of head strongly constricted behind temples, which are usually strongly protuberant. Elytra usually strongly tapering posteriorly (fig. 1) .....2. Lepturinae (p. 5).

– Anterior coxae round or oval but never conical. Sides of head never strongly constricted behind temples, which are scarcely protuberant .....4.

4 Femora distinctly clavate (fig. 18) or petiolate (fig. 14) apically, or thorax with lateral tubercles, or elytra mucronate apically. Hind femora usually extending beyond apices of elytra .....4. Cerambycinae (p. 9).

– Femora not or scarcely clavate apically. Thorax without lateral tubercles. Elytra never mucronate apically. Hind femora not extending beyond apices of elytra. Front coxae subcontiguous. Body entirely brown or black. *From Coniferae only* .....3. Aseminae (p. 8).

KEYS TO GENERA OF BRITISH AND IMPORTED CERAMBYCID ADULTS.

1. PRIONINAE.

1 Thorax with three pairs of lateral spines, the middle pair the longest (fig. 2). Third segment of antenna less than twice as long as first. Apices of elytra scarcely or slightly dentate at sutural angle. Length 23–40 mm. *From both coniferous and deciduous trees* .....**Prionus coriarius** (Linnaeus).

– Thorax with numerous spines distributed along entire lateral margin (fig. 3). Third segment of antenna more than twice as long as first. Apices of elytra distinctly mucronate at sutural angle. *From coniferous trees only* .....*** Ergates.**

* Ergates.

1 Lateral spines on thorax shortest at middle, becoming longer towards the front and hind margins (fig. 3*a*). Length 28–60 mm. *North American species*
*** E. spiculatus** Leconte.

– Lateral spines on thorax longest at middle and with one pair of much longer spines just behind middle (fig. 3*b*). Length 25–45 mm. *European species*
*** E. faber** (Linnaeus).

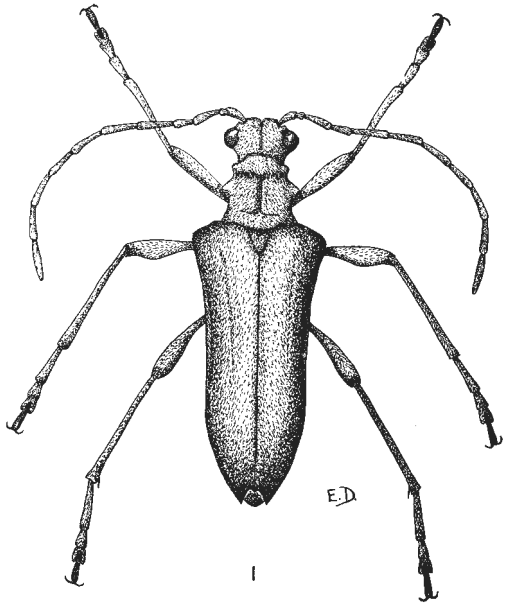

FIG. 1.—*Stenocorus meridianus* (L.), female.

2. LEPTURINAE.

Chiefly from rotten wood and on flowers of Umbelliferae, etc.

1 Thorax with a conspicuous pair of lateral, rather blunt, pubescent tubercles (fig. 1) .....**2.**

– Thorax without lateral tubercles .....**3.**

2 Antennae short, not extending as far as middle of elytra; third segment shorter than first. Prosternal process reaching posterior part of anterior coxae. Posterior tarsi with first segment depressed, strongly broadened apically, not longer than second and third together (fig. 5*b*) .....**Rhagium** (p. 6).

– Antennae longer, extending beyond middle of elytra ; third segment much longer than first (fig. 1). Prosternal process not nearly reaching posterior part of anterior coxae. Posterior tarsi with first segment subcylindrical, scarcely broadened apically, much longer than second and third together (fig. 5*a*). Length 15–24 mm. Elytra black or brown .....**Stenocorus meridianus** Linnaeus.

3 Posterior angles of thorax more or less right-angled or evenly rounded (fig. 6) .....4.

– Posterior angles of thorax acutely produced into a distinct spine-like process (fig. 7) .....5.

4 Elytra parallel-sided and broadly rounded apically. Thorax red. Elytra bluish-black. Length 7–9 mm. .....**Acmaeops collaris** (Linnaeus).

– Elytra slightly to strongly tapering posteriorly. Thorax usually black, but if red then elytra also red.....**Leptura** (p. 6).

5 Elytra broadly rounded apically (fig. 8) .....6.

– Elytra obliquely truncate and marginate or mucronate apically (fig. 9). Elytra always strongly tapering posteriorly .....**Strangalia** (p. 7).

6 Elytra distinctly tapering posteriorly ; yellow with black markings (fig. 8) **Judolia** (p. 8).

– Elytra parallel-sided ; yellow or black, never both .....7.

7 Antenna with first segment shorter than third segment. Eyes almost touching front margin of head. Elytra black.....**Grammoptera** (p. 8).

– Antenna with first segment as long as third. Eyes placed well behind front margin of head. Elytra yellowish-brown. Length 6–8 mm. **Alosterna tabacicola** (Degeer).

Rhagium.

1 Antennae long, extending well beyond shoulders of elytra ; very finely pubescent. Elytral pattern variable but usually consisting mainly of a pair of oblique yellow bands ; shoulders reddish-brown. Length 14–18 mm. **R. bifasciatum** Fabricius.*

– Antennae shorter, not or only just reaching shoulders of elytra ; with dense greyish pubescence. Elytral pattern never with oblique yellow bands ; shoulders black .....2.

2 Temples parallel-sided behind eyes (fig. 10). Head with a deep longitudinal median impression between eyes (fig. 10). Head and thorax covered with golden pubescence. Length 14–19 mm. .....**R. mordax** (Degeer).

– Temples distinctly converging behind eyes. Head without an impression between eyes. Head and thorax covered with greyish-white pubescence. Length 12–15 mm. *Northern species* .....**R. inquisitor** (Linnaeus).

Leptura.

1 Elytra shining, entirely testaceous; apices broadly rounded. Length 6–9 mm. **L. livida** Fabricius.

– Elytra dull, entirely black, red or yellow, or black and yellow ; apices obliquely truncate or emarginate .....2.

2 Elytra subparallel-sided ; black, each with three orange or yellow marks which are sometimes confluent. Length 8–11 mm. *Southern species* **L. sexguttata** Fabricius.

– Elytra distinctly tapering posteriorly ; never black with orange or yellow marks...3.

3 Elytra entirely black. Scutellum covered with very dense golden pubescence. Length 14–18 mm. *Chiefly from* Fagus. .....**L. scutellata** Fabricius.

– Elytra mainly or entirely red or yellow. Scutellum sparsely covered with fine greyish pubescence .....4.

4 Elytra yellow with apices broadly black. Length 10–14 mm....**L. fulva** Degeer.

– Elytra entirely yellow or red.....5.

5 Pubescence on elytra black. Legs entirely black ; first segment of hind tarsus more than four times as long as second. Length 9–12 mm. **L. sanguinolenta** Linnaeus.

– Pubescence on elytra pale yellow. Legs with tibiae and tarsi yellow ; first segment of hind tarsus less than four times as long as second. Length 12–20 mm. **L. rubra** (Linnaeus).

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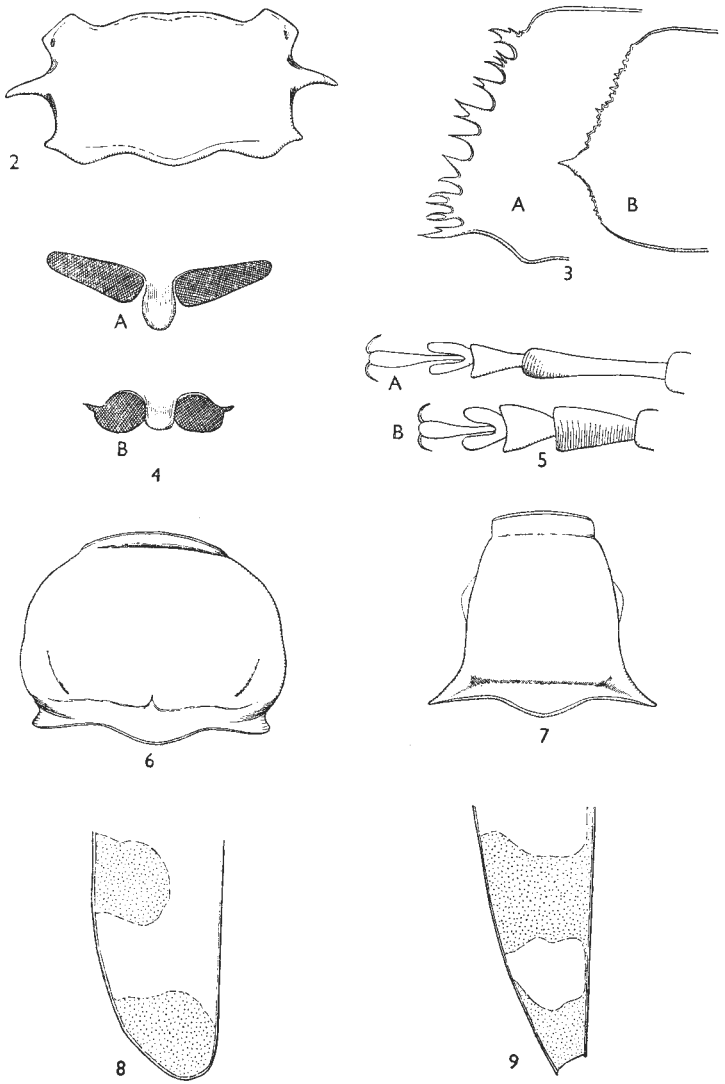
* For key to varieties, *see* Blair (1941), and Kaufmann 1944, 1945, 1946).



FIGS. 2–9.—2, *Prionus coriarius* (L.), pronotum. 3, Lateral margins of pronotum of (*a*) *Ergates spiculatus* Lec., and (*b*) *E. faber* (L.). 4, Anterior coxal cavities and prosternum of (*a*) *Prionus coriarius* (L.), and (*b*) *Cerambyx cerdo* (L.). 5, Hind tarsi of (*a*) *Stenocorus meridianus* (L.), and (*b*) *Rhagium bifasciatum* (F.). 6, *Leptura rubra* (L.), pronotum. 7, *Strangalia maculata* (Pod.), pronotum. 8, *Judolia cerambyciformis* (Schr.), apical part of left elytron. 9, *Strangalia maculata* (Pod.), apical part of left elytron.

Strangalia.

1 Elytra black, with four transverse yellow or orange bands.....2.
– Elytra entirely black or almost entirely black, red, or yellow ; never banded.....3.

2 Legs and basal segments of antennae red. Front and hind margins of thorax densely fringed with yellow pubescence. Length 13–18 mm.
S. aurulenta (Fabricius).
– Legs and basal segments of antennae black. Front and hind margins of thorax not densely fringed with yellow pubescence. Length 13–18 mm.
S. quadrifasciata (Linnaeus).
3 Antennal segments with basal third yellow and apical two-thirds black. Elytra yellow with black markings (fig. 9). Length 15–17 mm.
S. maculata (Poda).*
– Antennal segments entirely black or red. Elytra never yellow with black markings except at apex.....4.
4 Head, thorax and legs red. Thorax with a small minute pair of mediolateral protuberences. Length 9–15 mm..... **S. revestita** (Linnaeus).
– Head, thorax and legs black. Thorax without a pair of lateral protuberences...5.
5 Elytra entirely black. Length 7–9 mm.....**S. nigra** (Linnaeus).
– Elytra mainly yellow (male) or red (female). Length 7–9 mm.
S. melanura (Linnaeus).

Judolia.

1 Elytra subparallel-sided ; black, with three transverse yellow bands. Setae on head and prothorax grey and erect. Length 8–11 mm. *Northern species*
J. sexmaculata (Linnaeus).
– Elytra strongly tapering posteriorly ; yellow with black markings (fig. 8). Setae on head and prothorax yellow and decumbent. Length 7–11 mm. *Southern species* .....**J. cerambyciformis** (Schrank).

Grammoptera.

1 Femora and tibiae entirely reddish testaceous. Elytra densely covered with golden pubescence except at apex which is black and shining. Length 6–7 mm.
G. ustulata (Schaller).
– Femora and tibiae partly or entirely black. Elytra completely but sparsely covered with greyish-yellow pubescence .....2.
2 Front tibiae red. Segments of at least apical half of antennae red basally, black apically. Length 4·5–6 mm. .....**G. ruficornis** (Fabricius).†
– Front tibiae black. Segments of at least apical half of antennae unicolorous.....3.
3 Segments of at least apical half of antennae entirely black. Last three abdominal sternites of female black. Femora usually completely black. Length 4·5–6 mm.
G. ruficornis var. **holomelina** Poole.‡
– Segments of at least apical half of antenna entirely reddish-brown. Last three abdominal sternites of female red. Femora usually red basally, but occasionally completely black. Length 6–9 mm.....**G. variegata** (Germar).

3. Aseminae.

Chiefly from rotten or recently felled coniferous trees.

1 Eyes with inner margin extremely deeply emarginate so that they are almost divided into two parts (fig. 12). Elytra smooth, with striae indistinct or absent. Length 10–15 mm. *Chiefly from* Larix .....**Tetropium** (p. 9).
– Eyes not deeply emarginate ; reniform. Elytra rugose, striae distinct.....2.
2 Elytra with only two pairs of distinct striae. Head, thorax and elytra brown. Eyes very coarsely faceted (each facet distinctly visible with a × 15 lens)
Arhopalus (p. 9).
– Elytra with at least four pairs of distinct striae. Head and thorax black. Elytra normally black, but light brown in var. *agreste* Fabricius. Eyes finely faceted (each facet scarcely visible with a × 15 lens). Length 10–18 mm.
Asemum striatum (Linnaeus).

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* For key to varieties, *see* Kaufmann (1946).
† For key to varieties, *see* Kaufamann (1947).
‡ A long series of " *G. holomelina* " has been examined, and several intermediate forms between this " species " and *G. ruficornis* have been noticed. It is the writer's view that this " species " is no more than a variety of *G. ruficornis*, and is here treated as such.

Arhopalus (=Criocephalus).

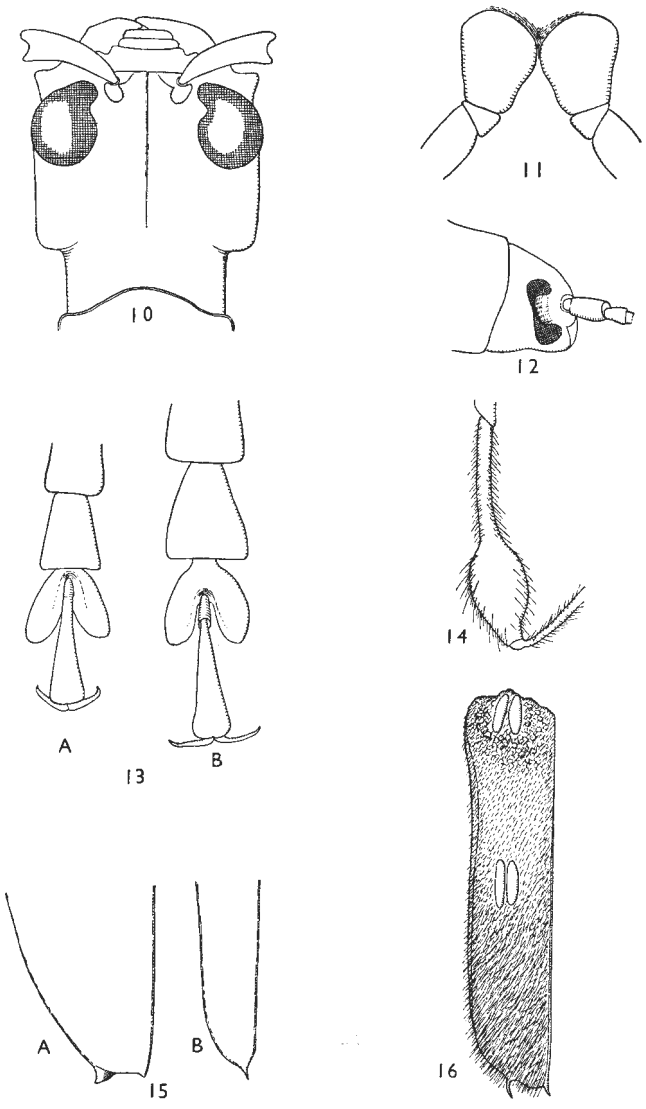
1 Eyes with numerous short setae. Third tarsal segment divided almost to base (fig. 13*a*). Length 12–16 mm. *Northern species*.....**A. rusticus** (Linnaeus).
– Eyes without setae. Third tarsal segment much less strongly divided (fig. 13*b*). Length 13–26 mm. *Southern species*.....**A. ferus** (Mulsant).

Tetropium.

1 Disc of thorax smooth, shining and finely punctured. Elytra black. Length 10–15 mm.....**T. gabrieli** Weise.
– Disc of thorax rugose, dull and coarsely punctured. Elytra reddish-brown. Length 10–14 mm.....* **T. fuscum** Fabricius.

4. CERAMBYCINAE.

1 Elytra much shorter than abdomen, the latter at least partly covered by the extended wings .....2.
– Elytra completely covering abdomen except sometimes the pygidium.....3.
2 Eyes oval. Thorax quadrate. Front and middle femora clavate and bearing a few short, silky setae. Length 3–5 mm. *Usually from wickerwork.*
Leptideella brevipennis (Mulsant).
– Eyes comma-shaped, their inner margins strongly emarginate. Thorax elongate. Front and middle femora petiolate apically and bearing numerous long bristly setae (fig. 14) .....**Molorchus** (p. 12).
3 Thorax with a conspicuous pair of lateral or dorso-lateral spines or tubercles. Length at least 20 mm.....4.
– Thorax without lateral spines or tubercles. Length usually much less .....9.
4 Elytra metallic green, blue or copper .....5.
– Elytra dull black, brown, or blue .....7.
5 Antennae serrate or pectinate. Elytra each with an apical tooth or spine (fig. 15). Legs and antennae red or black. *African species*.....6.
– Antennae simple and filiform. Elytra without apical teeth or spines. Legs and antennae greenish-blue. Length 20–32 mm. *Chiefly from* Salix
Aromia moschata (Linnaeus).
6. Femora strongly petiolate (as in *Molorchus*, fig. 14). Antennae strongly pectinate. Elytra tapering posteriorly and each bearing an apical spine (fig. 15*b*). *Chiefly from* Khaya .....* **Cordylomera** (p. 12).
– Femora not petiolate. Antennae serrate. Elytra parallel-sided and truncate and dentate apically (fig. 15*a*). *Chiefly from* Aucoumea *and* Khaya
* **Plocaederus** (p. 12).
7 Elytra pale blue, with black transverse bands and spots. Antennae blue, with apices of segments bearing conspicuous tufts of black hairs. Length 20–32 mm. *Chiefly from* Fagus.....* **Rosalia alpina** (Linnaeus).
– Elytra brown or black. Antennae brown or black and without tufts of black hairs .....8.
8 Elytra with apices each produced into a single short sutural spine or evenly rounded ; dark brown or black, shining and without markings. Thorax coarsely transversely rugose ; disc without a pair of tubercles. *European species. From deciduous trees* .....(*) **Cerambyx** (p. 12).
– Elytra with apices each produced into a pair of long spines (one on sutural angle, the other on outer angle) (fig. 16) ; light brown, with two pairs of paired, shining, white, elongate spots, one pair at base, the other just beyond middle. Thorax densely punctured and disc with a pair of paramedian dark brown tubercles. Length 18–26 mm. *North American species. Frequently from oak furniture, from which it emerges often several years after the timber has been utilised.*
* **Eburia quadrigeminata** Say.
9 Apices of elytra produced into one pair of conspicuous spines (fig. 17). Elytra never with yellow design .....10.
– Apices of elytra without apical spines (except Clytini *pars*, but then elytra with a yellow design) ..... 12.
10 Elytra with sutural angle produced apically into a single stout spine. Elytra shining and very strongly punctured. Length 16–30 mm. *Oriental species. From seasoned timbers of many kinds ; often in plywood packing-cases*
* **Stromatium barbatum** Fabricius



FIGS. 10–16.—10, *Rhagium mordax* (Deg.), head (dorsal view). 11, *Strangalia quadrifasciata* (L.), front coxae. 12, *Tetropium gabrieli* Weise, head, showing division of eye. 13, Hind tarsi of (*a*) *Arhopalus rusticus* (L.), and (*b*) *A. ferus* (Muls.). 14, *Molorchus minor* (L.), middle femur. 15, Apical parts of left elytra of (*a*) *Plocaederus viridipennis* Hope, and (*b*) *Cordylomera suturalis* (Chevr.). 16, *Eburia quadrigeminata* Say, left elytron.

– Elytra with apices each produced into a pair of stout spines (fig. 17). Elytra dull and indistinctly punctured.....11.

11 Elytra with outer apical spine shorter than sutural spine. Thorax deeply transversely rugose and finely punctured. Elytra with shining golden pubescence which is distributed in rather obscure patches arranged more or less in three transverse broad bands. Antennae with each segment serrate on outer margin. Length 24–46 mm. *East African species. Chiefly from* Afzelia
*** Pachydissus hector** Kolbe.

– Elytra with outer apical spine longer than sutural spine (fig. 17). Thorax not transversely rugose; coarsely punctured. Elytra with dull yellow pubescence evenly distributed over entire surface. Antennae with each segment with a short apical spine on inner margin. Length 20–30 mm. *North American species. Chiefly in* Quercus .....* **Romaleum rufulum** Haldeman.

12 Head broader than thorax. First abdominal sternite elongate, as long as remaining sternites combined. Anterior coxal cavities closed behind. Thorax elongate. Elytra brownish yellow.....**Obrium** (p. 12).

– Head narrower than thorax. First abdominal sternite less elongate, shorter than remaining sternites combined. Anterior coxal cavities open behind .....13.

13 Legs unusually short, with hind tibiae not more than two-thirds as long as femora, which are very strongly clavate (fig. 18). Body strongly depressed. Elytra testaceous, strongly punctured. Antennae much shorter than body. Length 7–10 mm. *North American species. Chiefly from seasoned* Quercus *and* Hickoria
*** Smodicum cucujiforme** Say.

– Legs of normal proportions, with hind tibiae at least as long as femora. Body never strongly depressed .....14.

14 Thorax distinctly elongate. Antenna with third segment not longer than fourth. Elytra light brown. Length 4·5–6 mm. *Chiefly from dead twigs and wickerwork*.....**Gracilia minuta** (Fabricius).

– Thorax quadrate to strongly transverse. Antenna with third segment longer than fourth .....15.

15 Anterior coxal cavities transverse, angulated externally (fig. 19*b*). Distance between inner margins of eyes above antennae slightly less than distance between bases of antennae (fig. 20). Elytra never with conspicuous yellow bands or grey at apex .....16.

– Anterior coxal cavities rounded, not angulated externally (fig. 19*a*). Distance between inner margins of eyes above antennae slightly more than distance between bases of antennae. Elytra with conspicuous yellow bands or grey at apex (except *Trinophylum*) .....20.

16 Anterior coxae separated by at least their combined width. Sides of thorax densely covered with long outstanding greyish-white hairs; disc with a conspicuous pair of round black, shining tubercles (fig. 21). Length 8–20 mm. *From dry, seasoned coniferous timbers, especially in attics of houses and in packing-cases*
Hylotrupes bajulus (Linnaeus).

– Anterior coxae subcontiguous. Sides of thorax sparsely covered with short, usually dark hairs; disc without black tubercles.....17.

17 Sides of thorax strongly angled medially. Elytra densely covered with scarlet pubescence. Length 9–11 mm.....(*) **Pyrrhidium sanguinem** (Linnaeus).

– Sides of thorax rounded. Elytra never covered with scarlet pubescence.....18.

18 Elytra and thorax metallic blue or violet. Disc of thorax dull and very strongly rugose. Length 11–13 mm. *From dead or seasoned coniferous timber*
Callidium violaceum (Linnaeus)

– Elytra never metallic, but if bluish, then thorax red. Disc of thorax shining and sparsely or finely punctured .....19.

19 Elytra uniformly yellow, blue or brown. Length at least 6 mm.
Phymatodes (p. 12).

– Elytra with basal third red and the remainder black with two oblique white stripes. Length at most 5 mm.....**Poecilium alni** (Linnaeus).

20 Elytra densely pubescent, with a conspicuous pattern of contrasting colour. Eyes finely faceted .....21.

– Elytra very sparsely setose, brown, shining; densely and coarsely punctured. Eyes coarsely faceted. Length 12–15 mm. *Indian species, but now possibly established in Britain. Chiefly from* Quercus
(*) **Trinophylum cribratum** Bates.

21 Pronotum with at least three short, transverse carinae on disc (fig. 22). Femora acutely spined apically. *North American species*.....**Neoclytus** (p. 13).
– Pronotum without carinae. Femora without apical spines .....22.
22 Apices of elytra each produced into a pair of spines and deeply emarginate between. Bases of elytra around scutellum yellow. Length 10–16 mm. *Oriental species. Chiefly from bamboo*.....* **Chlorophorus annularis** Fabricius.
– Apices of elytra not produced into spines. Bases of elytra around scutellum black or red .....23.
23 Thorax transverse, with sides strongly rounded ; with a yellow transverse band across middle (often incomplete). Hind margin of head with a transverse yellow band. Elytra black with yellow bands .....(*) **Plagionotus** (p. 13).
– Thorax quadrate to slightly elongate, with sides slightly rounded ; without a median transverse band. Hind margin of head without a transverse yellow band ..... 24.
24 Legs yellow. Elytra with conspicuous yellow markings ; apices covered with bright yellow pubescence. Thorax with front and hind margins yellow. Length 9–13 mm.....**Clytus arietis** (Linnaeus).
– Legs black or brown. Elytra without yellow markings ; apices covered with greyish pubescence. Thorax completely black.....**Anaglyptus** (p. 13).

Molorchus.

1 Elytra each with an oblique white line behind middle. Male antennae 12-segmented. Length 8–14 mm. *From coniferous trees*.....**M. minor** (Linnaeus).
– Elytra unicolorous. Male antennae 11-segmented. Length 5·5–8 mm. *From deciduous trees*.....**M. umbellatarum** (von Schreber).

* Cordylomera.

1 Femora almost completely red. Length 15–20 mm.
* **C. spinicornis** Fabricius.
– Femora entirely black. Length 15–20 mm.....* **C. suturalis** Chevrolat.

* Plocaederus.

1 Basal third of elytra closely and strongly punctured, the punctures as close and strong as those on median third. Prosternal process truncate posteriorly (fig. 23*b*). Pronotum with two distinct oblique impressions on disc. Length 20–30 mm.....* **P. basalis** Gahan.
– Basal third of elytra finely and very sparsely punctured, the punctures indistinct or at least finer and less numerous than those on median third. Prosternal process bearing posteriorly a distinct median tubercle (fig. 23*a*). Pronotum without oblique impressions on disc. Length 20–25 mm.
* **P. viridipennis** Hope.

(*) Cerambyx.

1 Elytra strongly tapering towards apex and with sutural angles with an apical spine ; black, with at least apical third reddish-brown. Length 23–50 mm.
(*) **C. cerdo** Linnaeus.
– Elytra not tapering towards apex and sutural angles without an apical spine ; entirely black. Length 16–28 mm.....(*) **C. scopoli** Füessly.

Obrium.

1 Disc of thorax shining, smooth. Elytra orange testaceous. Length 6–9 mm.
O. cantharinum (Linnaeus).
Disc of thorax dull, finely punctured. Elytra dark brown. Length 4·5–6 mm.
(*) **O. brunneum** (Fabricius).

Phymatodes.

1 Elytra finely and sparsely punctured. Antennae reddish-yellow. Sides of thorax yellow. Length 8–13 mm. ..... **P. testaceus** (Linnaeus).
– Elytra very strongly punctured, almost rugose. Antennae dark brown. Sides of thorax black. Length 6–8 mm. .....**P. lividus** (Rossi).

* Neoclytus.

1 Elytra each with a pair of apical spines. Thorax entirely red. Length 7–13 mm. ***N. acuminatus** Fabricius.

– Elytra without apical spines; evenly rounded. Thorax black with front margin yellow. Length 8·5–17 mm. .....*** N. caprea** Say.

(*) Plagionotus.

1 Apical third of elytra yellow with two transverse black bands (the posterior one often incomplete) and apex emarginate. Scutellum brown. Length 13–17 mm. *** P. detritus** (Linnaeus).

– Apical third of elytra black, with two transverse yellow bands and apex rounded. Scutellum bright yellow. Length 9–18 mm. .....*** P. arcuatus** (Linnaeus).

Anaglyptus.

1 Antenna with apex of third segment with a long spine. Femora brown, with a conspicuous thin white band of pubescence along inner and outer margins. Length 6–9 mm. *North American species* .....*** A. verrucosus** Olivier.

– Antenna without a spine. Femora unicolorous. Length 9–12 mm. Elytra with basal third red, but black in var. *hieroglyphicus* Hbst.....**A. mysticus** (Linnaeus).

5. Lamiinae.

1 Thorax with a single pair of lateral or dorso-lateral tubercles or spines 2

– Thorax without a single pair of lateral or dorso-lateral spines, but sometimes (*Coptops*) with two pairs of small tubercles one above the other.....8.

2 Elytra each with two conspicuous thorn-like tubercles on basal third, and with a strongly protuberant blade-like carina extending beyond middle (fig. 24). Thorax with a pair of paramedian conical tubercles as well as a pair of dorso-lateral tubercles. Elytra covered with light brown or greenish pubescence. Length 16–35 mm. *African species. From* Triplochiton

*** Ancylonotus tribulus** Fabricius.

– Elytra without thorn-like tubercles .....3.

3 Shoulders of elytra strongly protuberant and very coarsely punctured like a honeycomb. Elytra covered with light brown pubescence and each with a large triangular area of dark brown pubescence on outer half beyond middle. Length 24–35 mm. *African species. From* Chlorophora *and* Morus

*** Phryneta leprosa** Fabricius.

– Shoulders of elytra not or scarcely protuberant and never so coarsely punctured. Elytra without triangular areas of dark pubescence ..... 4.

4 Femora not clavate (fig. 26)..... 5.

– Femora strongly clavate ..... 6.

5 Antennae extending well beyond apex of elytra; first segment much shorter than third segment. Legs slender (fig. 26). *From coniferous timber*

(*) **Monochamus** (p. 15).

– Antennae not extending nearly as far as apices of elytra; first segment as long as third segment. Legs stout (fig. 27). Length 14–20 mm.

Lamia textor Linnaeus.

6 Antennae extending well beyond apices of elytra (often considerably) and covered with decumbent pubescence. Elytra without raised carinae .....7.

– Antennae not or scarcely extending beyond apices of elytra, and bearing numerous long erect setae. Elytra each with two to three longitudinal carinae. *Chiefly from dead twigs of fruit trees* .....**Pogonocherus** (p. 15).

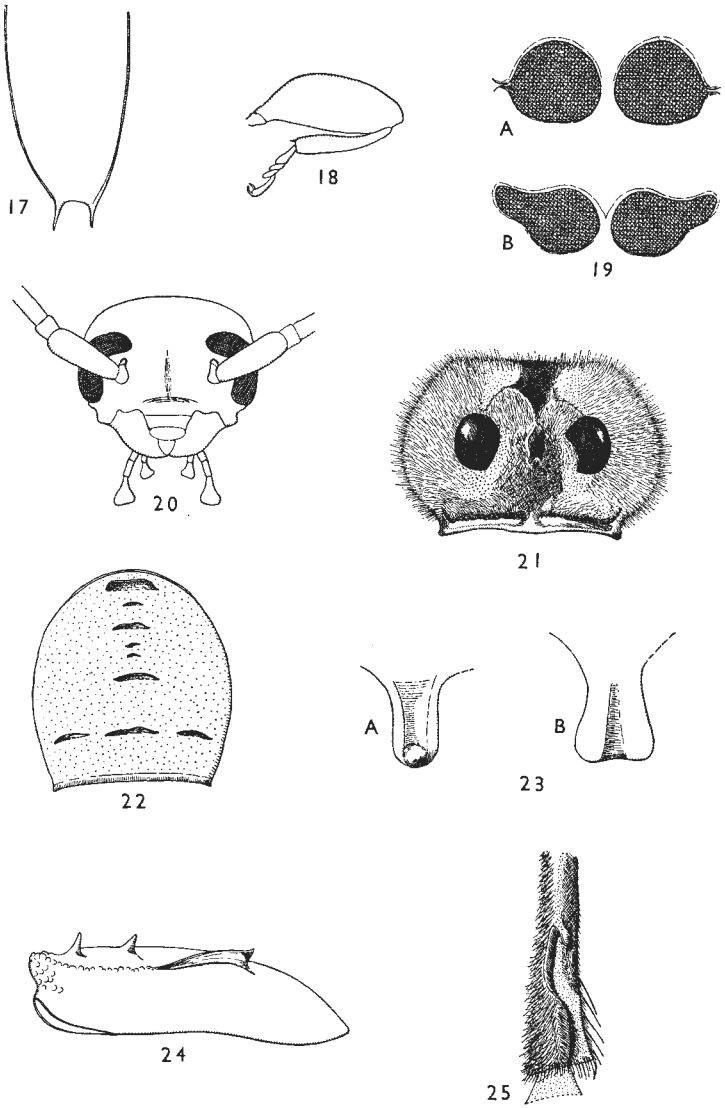
7 Antennae in the male about four times as long as body; in the female about twice as long. Pygidium of female strongly produced into a tubular process (fig. 28). Elytra with scattered reddish, bead-like granules showing through pubescence. Length 13–19 mm. *Northern species; scarce, but frequently imported in* Pinus

Acanthocinus aedilis (Linnaeus).

– Antennae less than twice as long as body in both sexes. Pygidium of female not produced. Elytra with deep punctures showing through pubescence. Length 6–10 mm. *Southern species. In deciduous trees, especially* Quercus

Leiopus nebulosus (Linnaeus).

8 Antennal segments unicolorous. Tarsal claws bifid, split, or toothed basally. Anterior coxae subcontiguous ..... 12.



FIGS. 17–25.—17, *Romaleum rufulum* Hald., apical part of left elytron. 18, *Smodicum cucujiforme* Say, hind leg. 19, Front coxal cavities of (*a*) *Plagionotus arcuatus* (L.), and (*b*) *Callidium violaceum* (L)., 20, *Callidium violaceum* (L.), head. 21, *Hylotrupes bajulus* (L.), pronotum. 22, *Neoclytus acuminatus* (F.), pronotum. 23, Prosterna of (*a*) *Plocaederus viridipennis* Hope, and (*b*) *P. basalis* Gah. 24, *Ancylonotus tribulus* F., left elytron (lateral view). 25, *Ancylonotus tribulus* F., front tibia (inner side).

– Antennal segments white, yellow or grey basally, and black or brown apically. Tarsal claws not bifid, split or toothed. Anterior coxae distinctly separated.....9.

9 Outer side of first antennal segment near apex with a thin transverse black carina (often partly obscured by pubescence) (fig. 29). Elytra short, less than twice as long as combined basal width. Mesosternum convex, protuberant between middle coxae .....10.

– Outer side of first antennal segment without a black carina. Elytra elongate, two and one-half to three times as long as combined basal width. Mesosternum flat, not protruding between middle coxae .....11.

10 Thorax with two pairs of lateral, short, blunt tubercles, one above the other. Elytra with scattered greyish-white patches of pubescence, especially at the base; shoulders very strongly prominent. Length 12–20 mm. *African species*
*** Coptops aedificator** Fabricius.

— Thorax without lateral tubercles. Elytra with greyish white patches confined to middle; shoulders slightly prominent. Length 10–15 mm. *Chiefly from* Quercus ..... **Mesosa nebulosa** (Fabricius).

11 Antennae 12-segmented. Hind tarsi as long as hind tibiae. Length 12–17 mm. *From herbaceous plants, especially* Carduus *and* Heracleum
Agapanthia villosoviridescens (Degeer).

— Antennae 11-segmented. Hind tarsi distinctly shorter than hind tibiae. *From deciduous trees*.....**Saperda** (p. 16).

12 Elytra yellow with apices black. Eyes completely divided into two parts. Thorax with a very deep transverse impression on each side near base. Length 3–5 mm.
Tetrops praeusta (Linnaeus).

— Elytra completely grey, dark or black. Eyes not completely divided into two parts. Thorax without a deep transverse impression near base .....13.

13 Thorax and abdomen yellow. Elytra strongly emarginate at apex (fig. 30). Hind tibiae not nearly reaching apices of elytra. Length 16–20 mm. *From* Salix
Oberea oculata (Linnaeus).

— Thorax and abdomen black. Elytra not or scarcely emarginate at apex. Hind tibiae reaching apices of elytra .....14.

14 Elytra each with one or two slightly raised longitudinal ridges and very gradually tapering posteriorly. Front femora and tibiae yellow. Length 6–10 mm. *From Umbelliferae* .....**Phytoecia cylindrica** (Linnaeus).

— Elytra without ridges and slightly broadened towards apices. Front femora and tibiae black. Length 9–12 mm. *Chiefly from* Tilia
Stenostola ferrea (Schrank).

(*) Monochamus.

1 Apices of elytra each produced at suture into a short spine. Elytra light reddish-brown with small scattered white markings. Length 22–30 mm. *North American species* ..... *** M. titillator** Fabricius.

– Apices of elytra rounded, without spines. Elytra black, usually with white or yellow markings .....2.

2 Antennae reddish-brown; segments usually obscurely ringed with white in the female .....3.

– Antennae black; segments distinctly ringed with white in the female ..... 5.

3 Elytra with apical third very densely and evenly covered with greenish-yellow pubescence. Scutellum completely and densely covered with yellow pubescence. Length 20–35 mm. *European species*.....*** M. rosenmülleri** (Cederhjelm).

– Elytra with apical third not covered with greenish-yellow pubescence; either with small white patches or with sparse brown, patchy pubescence. Scutellum not completely covered with pubescence .....4.

4 Pubescence of scutellum narrowly but distinctly interrupted by a narrow longitudinal median black line. Elytra with a slightly bronzed lustre. Length 13–23 mm. *North American species* ..... *** M. scutellatus** Say.

– Pubescence of scutellum broadly interrupted at base by a semicircular glabrous area, so that the pubescent area is U-shaped. Elytra without a bronze lustre. Length 13–23 mm. *European species* ..... *** M. galloprovincialis** (Olivier).

5 Elytra (viewed laterally) with a very shallow, rather broad transverse depression just before middle. Pubescent area completely covering scutellum. Length 26–32 mm. *European species* .....*** M. sartor** (Fabricius).

– Elytra without a transverse depression. Pubescent area of scutellum narrowly but completely divided longitudinally. Length 18–25 mm. *European species*
(*) M. sutor (Linnaeus).

Pogonocherus.

1 Elytra subtruncate at apex; not dentate or mucronate. Length 5–7 mm. *Northern species. From coniferous trees* ..... **P. fasciculatus** (Degeer).

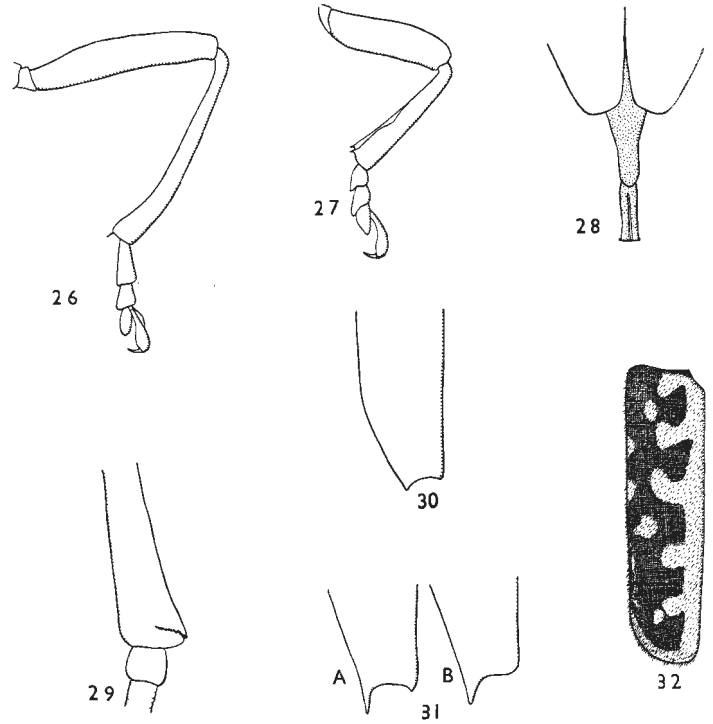
– Elytra emarginate at apex and dentate or mucronate at external angles. *Southern species. In deciduous trees, especially* Pyrus ..... 2.

2 Elytra each bidentate at apex, the sutural angle being produced into a short blunt tooth or spine. (fig. 31*a*). Scutellum covered with white pubescence. Length 6–7 mm. ..... **P. hispidulus** (Piller & Mitterpacher).

– Elytra each dentate at apex, the sutural angles not produced (fig. 31*b*). Scutellum dark brown or black. Length 4–6 mm. ..... **P. hispidus** (Linnaeus).

Saperda.

1 Thorax concave between bases of antennae. Elytra without bands or markings of a contrasting colour; covered with scattered coarse punctures and yellow or greyish pubescence; apices acutely pointed. Length 20–28 mm. *Chiefly from* Populus ..... **S. carcharias** (Linnaeus).



FIGS. 26–32.—26, *Monochamus sutor* (L.), front leg. 27, *Lamia textor* (L.), front leg. 28, *Acanthocinus aedilis* (L.), female pygidium. 29, *Coptops aedificator* (F.), first antennal segment. 30, *Oberea oculata* (L.), apical part of left elytron. 31, Apical parts of left elytra of (*a*) *Pogonocherus hispidulus* (Pill. & Mitt.), and (*b*) *P. hispidus* (L.). 32, *Saperda scalaris* (L.), left elytron.

– Thorax convex or flat between bases of antennae. Elytra with distinct bands or markings of a lighter colour; apices rounded ..... 2.

2 Thorax broadly and transversely depressed just before middle and hind margin. Elytra depressed black and with a broad bright yellowish-green longitudinal band of pubescence extending along suture and branching at intervals, and with a few scattered spots of similar pubescence (fig. 32). Length 14–18 mm. *Northern species. Chiefly from* Prunus, Pyrus, Quercus ..... **S. scalaris** (Linnaeus).

– Thorax scarcely or not transversely depressed. Elytra slightly convex, with rather scanty yellowish pubescence and with a few scattered patches of similar but denser pubescence forming conspicuous patches. Length 9–14 mm. *Southern species. From* Populus *and* Salix ..... **S. populnea** (Linnaeus).

INDEX

TO SUBFAMILIES, GENERA AND SPECIES OF COLEOPTERA (CERAMBYCIDAE).

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