

A review of the classification of Cerylonidae (Coleoptera, Clavicornia)

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With 240 text-figures

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SYNOPSIS

The family Cerylonidae is defined on adult and larval characters and classified down to generic level. Keys are given to the tribes and genera of the three subfamilies, Euxestinae, Murmidiinae and Ceryloninae.

In the Euxestinae, a new genus of Euxestini is erected for a new species from Queensland, and a new genus of Meta cerylonini is erected for four species from the Ethiopian and Neotropical regions, two of which are described as new. A new tribe of Murmidiinae is erected for the monotypic genus *Ostomopsis*. In the Ceryloninae, a new genus of Lapethini is erected for three new species from Central and North America; a new genus and species of Cerylonini are described from Liberia, two new species of *Philothermus* are described from Africa and the subgenus *Philothermopsis* is given generic status to contain six species, three of which are described as new from Africa; a new genus and species of Aculagnathini are described from Florida.

The hitherto unknown larvae of *Hypodacne bivulneratus*, *Philothermus bicavus* and *Cerylon histeroides* are described, and a key to the known cerylonid larvae is included.

I HISTORICAL

The oldest included genus in Cerylonidae is *Cerylon* Latreille (1802), and the oldest suprageneric group name in the family is Cerylini Erichson (1845), on which the present family name is based. The second oldest generic name is *Murmidius* Leach (1822), originally associated with Histeridae and transferred by C.G. Thomson (1868) to an independent family Murmidiidae; *Cerylon* was originally placed in Colydiidae and had been retained in that family by all authors previous to Crowson (1952). The genus *Euxestus* Wollaston (1858) was referred to Erotylidae, in which family the genus and its allies were retained by most English-language entomologists up to the time of Arrow (1925). Leconte & Horn (1883) transferred Murmidiinae to Colydiidae, next to Ceryloninae, and Grouvelle (1908) introduced a subfamily Euxestinae adjacent to them. In 1928 van Emden reduced Euxestinae to a tribe of Ceryloninae, while retaining Murmidiinae as a subfamily. The long-established subfamily Ceryloninae was split by Crowson (1952), leaving Deretaphrini, Dastarcini and Bothriderini in the Colydiidae, and defining a new family Cerylonidae for the residue (with the exception of Discolomini, for which a separate family had already been established by Horn (1878)). At that time the only known larva belonging to the new family was that of *Murmidius*; it is now possible to define the family on the basis of larval characters of *Euxestus*, *Hypodacne*, *Elytrotetrantus*, *Anommatus*, *Murmidius*, *Philothermus* and *Cerylon*.

II THE FAMILY CERYLONIDAE

(1) *Distinction of Cerylonidae from Colydiidae*

(a) Shape and vestiture of adults. Cerylonids have the upper surface nearly always more or less smooth and shining, and the shape usually rather broad and often ovate, never cylindrical or very elongate. Colydiids are usually either dull and more or less

roughly sculptured dorsally, or cylindrical and markedly elongate, very rarely markedly ovate.

(b) Adult mouth parts. Cerylonidae have the maxillary and labial palpi always markedly geniculate, and often aciculate, conditions never seen in Colydiidae.

(c) Adult tentorium. In Cerylonidae the corpotentorium bears a median anterior process, never present in Colydiidae.

(d) Adult trochanters. In Cerylonidae these are often more or less elongate, and never strongly heteromeroid; in Colydiidae they are always heteromeroid and often strongly so.

(e) Adult ventrites. In Cerylonidae the first of these is much longer than the second, and all five are movably articulated with each other; in Colydiidae the first is never markedly longer than the rest and the basal three or four are more or less connate.

(f) Form of aedeagus. In Cerylonidae this is never of the pseudotrilobe type characteristic of Colydiidae, and the tegmen often forms a complete ring round the penis proper.

(g) Wing venation. In Cerylonidae there is never a closed radial cell, and the front anal vein often runs into the sub-cubital fleck; Colydiidae often have a closed radial cell and never have the front anal vein running into the subcubital fleck.

(h) Larval head. Cerylonid larvae very rarely have distinct frontal sutures, and never have more than three ocelli on each side; Colydiid larvae nearly always have distinct frontal sutures and often five ocelli.

(i) Larval legs. Cerylonid larvae always have a single seta on the claw (tarsungulus), whereas in all known Colydiid larvae the claw has two setae.

(j) Larval pygopod. In Cerylonidae, the tenth abdominal segment forms a cylindrical pygopod of the clavicorn type; in Colydiidae it is a transverse bilabiate structure of heteromeran type.

(2) *Distinction of Cerylonidae from other families of the cerylonid group*

Many of the characters which separate Cerylonidae from Colydiidae are shared with other families forming the cerylonid group of Crowson (1955, 1960). The group is distinguished from other Clavicornia by having all tarsi 4 or 3-segmented; by the wings without a closed radial cell and, if with more than one anal vein, then with the front one running into the sub-cubital fleck; by the retracted aedeagus resting on one side, with either the tegmen very much reduced or the median lobe strongly curved and without median struts; by the larval claw with only one seta; by the sensory appendage of segment 2 of the larval antennae usually as long as segment 3; and by the nearly always annular larval spiracles.

Adult Cerylonidae differ from *Sphaerosoma* (at present placed in Endomychidae, but should form a separate family) in having a median process on the corpotentorium, in the different form of the palpi, and in the middle coxal cavities closed outwardly by the sterna. Unlike Cerylonidae, *Sphaerosoma* larvae have five ocelli on each side and bicameral spiracles. These adult characters also separate the family from Endomychidae and Coccinellidae, which in the adult stage also differ from Cerylonidae in having the front coxae more or less transverse, the tarsi commonly with segment 2 lobed below and the elytra very rarely with striae or rows of punctures. Endomychid larvae commonly have four ocelli on each side and the head usually with distinct frontal sutures, and Coccinellid larvae have in addition highly modified mouth parts.

Adult Corylophidae differ from Cerylonidae in the more or less geniculate antennae, reduced tentorium without corpotentorium, head in resting position usually concealed by pronotum, maxillary palpi usually with segment 2 very large, wings with very reduced venation and tarsal segment 2 often lobed below; Corylophid larvae have highly and characteristically modified head and mouth parts.

Discolomid adults differ from Cerylonidae in having only the mesal part of the hind coxae exposed, in the 3-segmented tarsi, the glandular openings at the sides of prothorax and elytra, the non-aciculate palpi, the corpotentorium without a median process, and in the wings (when present) lacking a sub-cubital fleck. The strongly onisciform larvae of Discolomidae differ from those of Cerylonidae in having only two well-developed segments to the maxillary palpi and in having paired dorsal glandular openings on more than one trunk segment, always including abdominal segment 4.

Unlike Cerylonidae, adult Merophysiidae have the antennal insertions partly hidden under the sides of the frons, the corpotentorium lacks a median process, the tarsal formula is 3-3-3, the palpi are not aciculate. Merophysiid larvae (according to Silvestri's description of *Coluocera* and to undescribed larvae of *Holoparamecus* collected by R.A. Crowson) are not at all onisciform, lack urogomphi or processes on any of the trunk segments, have a fully exerted head capsule and lack pigmented tergal sclerites on any of the trunk segments.

Lathridiid adults have 3-segmented tarsi, maxillae without a distinct lacinia, slender 11-segmented antennae with a loose 3-segmented club; their larvae have four ocelli on each side, mandibles with a membranous part between the sclerotised basal part and the apical teeth, maxillae with greatly reduced articulating area, and the body form not at all depressed or onisciform.

(3) Genera excluded from, and transferred to, Cerylonidae

Eidoreus Sharp (figs. 8c, 8d, 8e; 72-79) appears to be identical with (and prior to) *Eupsilobius* Casey (see p. 442). It differs from Cerylonidae in having the middle coxal cavities not closed outwardly by the sterna, the tentorium of endomychid type without a median process of the corpotentorium. It appears to belong in Endomychidae, within which it is aberrant in having well developed femoral lines on the metasternum and first ventrite. *Tyrtaeus* Champion (1913), attributed to Cerylonini, has the antennal insertions hidden under the sides of the frons and the first three ventrites connate; it probably belongs in or near Colydiidae.

A number of genera of Cerylonidae have been previously placed in families other than Colydiidae. Among them are *Aculagnathus* Oke, for which its describer proposed a separate family Aculagnathidae, and *Dolosus* Dajoz, on which Dajoz based a new family Dolosidae. *Ostomopsis* Scott was attributed, with some doubt, to Lathridiidae, and *Anommatus* Wesmael was erroneously attributed to Merophysiidae by Crowson (1955).

(4) Definition of the family

With the general characters of Polyphaga-Clavicornia.

General shape diverse, usually rather broad, never very elongate or cylindrical. Species usually small, length rarely more than 5 mm. Upper surface usually more or less shining and glabrous.

Head usually rather small, deeply inserted within prothorax. Frontoclypeal suture present or absent, transverse line on vertex sometimes present (fig. 96). Antennal inser-

tions always exposed, not at all hidden under sides of frons. Transverse groove on anterior gular region (fig. 54) and antennal grooves by lower margins of eyes (fig. 54) often present. Gular sutures widely separated. No stridulatory files on occipital region. Tentorium (figs. 21, 38, 54) complete, the narrow corpotentorium bearing a median anterior process. Antennae usually with less than 11 segments, club rarely distinctly 3-segmented. Mandibles normally with 2 or 3 apical teeth (fig. 60), a prosthecal fringe and a well developed mola, maxillae usually with normal galea and lacinia, latter often with 2 apical spines, palpi geniculate and with the apical segment more or less pointed or aciculate; a few genera have mouth parts more or less modified for piercing (figs. 121, 127, 128, 160, 200, 203).

Prothorax usually large, notum often with a pair of pre-basal impressions (fig. 19), front angles or hypomera sometimes with cavities (figs. 81, 159, 112) to receive antennae. Front coxae small, rounded, trochantins always completely concealed, internal and external closure of coxal cavities variable.

Mesothorax with coxal cavities closed outwardly by sterna (fig. 51), narrowly to moderately widely separated. Mesepisterna without pockets or pits. Elytra completely covering abdomen, epipleura distinct and complete (fig. 51), striae or regular rows of punctures usually present, scutellary striole absent. Junction of meso- and metasterna between coxae in a straight line (fig. 51).

Metathorax with episterna exposed, sternum transverse, its median impressed line usually short (fig. 120), femoral lines behind middle coxae sometimes present (fig. 159). Metendosternite with anterior tendons almost always widely separated (fig. 157), arising close together on a common stalk in *Ceryleuxestus* (fig. 23).

Legs with trochanters short-simple (fig. 117) or elongate-simple (fig. 120), or weakly heteromeroid (fig. 51). Tibial spurs usually present. Tarsi usually 4-, more rarely 3-segmented, usually with all segments simple (fig. 117), more rarely segment 1 lobed below (fig. 64). Claws always simple, empodium rarely (fig. 41) well developed.

Abdomen with 5 freely articulated ventrites (fig. 118), the first markedly longer than the second, and often with femoral lines (fig. 159). Seven or 5 pairs of functional spiracles, situated in membrane outside tergites of segments 1-5 or 6, in edges of tergite of 7 (when present). Aedeagus in retracted condition turned on one side (fig. 57), tegmen complete or incomplete, with or without parameres, median lobe rarely with basal struts. Female with spiculum gastrale on abdominal sternite 8, ovipositor short, often with distinct valvifers, coxites and styli.

(5) *Larval characters of Cerylonidae*

General shape more or less broadly elongate or oval, never cylindrical. Prothorax often large and partly or wholly covering head; trunk segments often with lateral expansions or processes (figs. 226, 219). Vestiture may include long spines or truncate setae as well as normal ones.

Head somewhat inclined to strongly hypognathous, never with well-marked frontal sutures. Ocelli, if present, 2 or 3 on each side. Antennae short, 3-segmented, sensory appendage of segment 2 longer than segment 3. Mouth parts either of normal clavicorn type (fig. 223, 232, 220, 234, 224) or head strongly hypognathous and mouthparts modified for piercing and sucking (figs. 230, 231). Mandibles rarely with distinct prostheca.

Legs normal, claws with a single tarsungular seta (fig. 233).

Abdomen with segment 9 short, with or without urogomphi (figs. 219, 236), pre-gomphal processes absent, pygopod short and simple.

Spiracles (fig. 239) all annular and situated on body surface.

(6) *Habits and habitats*

The limited available information indicates considerable diversity in modes of life of Cerylonidae. Adults of *Cerylon* and *Philothermus* (and probably of other Cerylonini) commonly occur under bark of dead trees, in which habitat Crowson also found larvae of *Philothermus*; *Cerylon* larvae appear to live in crevices of more or less fresh and sappy bark. Adults and larvae of one or two species of *Murmidius* have been found in stored rice. *Aculagnathus* is said to occur mainly in ants' nests in Australia, and Jeannel and Paulian described adults and larvae of a species of *Elytrotetrantus* (*Tachyorictidium* J. & P.) from nests of a mole-rat in Africa. Crowson collected adults and larvae of a *Euxestus* in a decaying pile of grass cuttings in Durban (South Africa), and adults and larvae of *Hypodacne* spp. in rain forest litter in Queensland, Australia. *Anommatus* adults and larvae have been found in more or less humus-rich soil. The family is well represented by endemic genera in all the main continental regions of the world (except Antarctica), but few endemic species of it have been recorded from truly oceanic islands.

(7) *The phylogenetic subdivision of the family*

The determination of which are the primitive and which the derived conditions in the main characters used in subdividing a taxon is a necessary preliminary to the construction of a natural system within it. The general criteria for this are: (i) palaeontology (conditions found in the earliest fossils of a taxon being taken as primitive); (ii) Dollo's Law; (iii) comparison with the most nearly related taxa. In the absence of a useful fossil record of Cerylonidae, we have had to rely on the second and third of these criteria. Some of the characters used in classifying the family (e.g. the numbers of antennal and tarsal segments, of anal veins and of abdominal spiracles in the adults, of ocelli in the larvae) are of types to which Dollo's law is usually applicable, and we have applied it in respect of them. In other cases, and particularly in the forms of the front coxal cavities of the adults, the application of the Dollo principle is far less clear, and we have placed more reliance on conditions in related families inside (e.g. Sphaerosomatidae, Endomychidae, Corylophidae) and outside (e.g. Cryptophilinae, Toraminae and Propalaticinae) the Cerylonid group.

The distribution of 18 selected characters among the tribes we have recognised in Cerylonidae is indicated in the accompanying chart, in which a white square indicates the presence of what we take as a primitive condition in all species of a tribe, a black square a supposedly derived condition in all members, a diagonally divided square indicates both primitive and derived conditions occurring within the tribe, and a cross-hatched square indicate a constant intermediate condition. From the chart alone, it is evident that some of the derived conditions must have arisen polyphyletically within the family, or have been subject to secondary loss, or both. Two fairly clear dividing lines are evident in this chart, separating the first three and the last three tribes from the middle two, and we have accordingly recognised three subfamilies: Euxestinae for the first three tribes, Murmidiinae for the next two, and Ceryloninae for the last three.

In the characters analysed in the chart, Euxestinae appear to possess most of the primitive conditions and Ceryloninae most of derived ones, with Murmidiinae occupying

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. EUKESTINI												▲			■			
2. METACERYLONINI										■	■	▲	?	?				
3. ANOMMATINI										×	×							
4. OSTOMOPSIINI	■	■	■	■	■	■	■	■					?	?				
5. MURMIDIINI	■	■	■	■	■	■	■	■										
6. LAFETHINI																		
7. CERYLONINI																		
8. ACULOGNATHINI																		

Characters used in the chart

1. *Adult abdominal spiracles*

- Seven pairs—□
- Five pairs—■

2. *Adult hind margin of last ventrite*

- Not crenulated—□
- Crenulated—■

3. *Adult apical spine of lacinia*

- Present—□
- Absent—■

4. *Adult maxillary palpi*

- Normal (fig. 56)—□
- Segment 2 larger than 3 (fig. 87)—☐
- Aciculate (fig. 128)—■

5. *Adult antennal cavities on front angles of prothorax*

- Absent—□
- Present—■
- Absent or present—▲

6. *Adult transverse line on vertex of head*

- Absent—□
- Present—■
- Absent or present—▲

7. *Adult frontoclypeal suture on head*

- Present—□
- Absent—■

8. *Adult mentum*

- Transverse or triangular—□
- Elongate—■

9. *Adult front coxal cavities internally*

- Closed—□
- Open—■

10. *Adult wing*

- With subcubital fleck—□
- Without subcubital fleck—■

11. *Adult wing*

- With anal vein—□
- Without anal vein—■
- With or without anal vein—▲

12. *Adult femoral lines on ventrite 1*

- Present—□
- Absent—■
- Present or absent—▲

13. *Larval urogomphi*

- Present—□
- Absent—■

14. *Larval mouthparts*

- Normal—□
- Modified—■

15. *Adult front coxal cavities externally*

- Open—□
- Closed—■
- Open or closed—▲

16. *Adult tarsal formula*

- 4-4-4—□
- 3-3-3—■
- 4-4-4 or 3-3-3—▲

17. *Adult labrum*

- Transverse—□
- Elongate—■

18. *Adult mandible*

- Triangular—□
- Elongate—■

x—Wing absent

an intermediate position. This suggests that our three subfamilies are not of equivalent phylogenetic rank; the Ceryloninae might well come from ancestors with the essential features of Murmidiinae.

It is noteworthy that the reduction of the functional abdominal spiracles to five pairs, characteristic of the Murmidiinae and Ceryloninae, is also found in Endomychidae and Coccinellidae, and that the genus *Eidoreus* Sharp (*Eupsilobius* Casey), transferred by us to Endomychidae, has particular resemblances to Murmidiinae among Cerylonidae.

A noteworthy feature of Cerylonidae is the apparently universal presence of a spiculum gastrale in front of the sternite of abdominal segment 8 in the female. In Euxestini this takes the form of a short non-articulated process, but in most other Cerylonidae it is much longer and more or less articulated with the sternite proper. The only other type in the cerylonid group which we have found to possess a similar structure is *Sphaerosoma* (family Sphaerosomatidae), but a spiculum of a similar kind is normal in females of Languriidae and related types among the Clavicorn groups which may be related to the Cerylonid group.

III KEYS TO SUBFAMILIES, TRIBES AND GENERA

Key to subfamilies of adult Cerylonidae

- 1 Frontoclypeal suture distinct (fig. 54). Mandible with 2 or 3 apical teeth; maxilla with normal broad galea and lacinia (fig. 87), palpal segments 2 and 3 subequal or 2 markedly larger than 3, last segment not markedly aciculate; mentum triangular (fig. 58), labial palpi not aciculate. Antennal grooves present by lower margins of eyes (fig. 54). Front coxal cavities usually internally closed behind (fig. 55). Wing usually with subcubital fleck2
- Frontoclypeal suture absent (fig. 123). Mandibles with single apical tooth, their inner margins serrated (fig. 127), or markedly modified for piercing (fig. 203); galea and lacinia elongate and slender (fig. 128), maxillary palpi aciculate at apex; mentum elongate (fig. 121), labial palpi aciculate. Front coxal cavities internally open behind (fig. 116). Wings without subcubital fleck.....(3) CERYLONINAE (p. 402)
- 2 Last ventrite with apical margin not or slightly inflexed and not crenulated (fig. 30). Front angles of prothorax without antennal cavities. Vertex of head without a transverse line. Maxillary lacinia with a pair of apical spines (fig. 56), palpi with segments 2 and 3 subequal. Abdomen with 7 pairs of function spiracles.....(1) EUXESTINAE (p. 378)
- Last ventrite with apical margin markedly inflexed and strongly crenulate (fig. 88). Front angles of prothorax with well developed antennal cavities (fig. 81). Vertex of head with a transverse line or, if not, side margins of prothorax serrated (fig. 44). Maxillary lacinia without apical spines, palpal segment 2 markedly larger than 3 (fig. 87). Tarsi 3-segmented and wing without subcubital fleck. Abdomen with 5 pairs of functional spiracles.....(2) MURMIDIINAE (p. 393)

Key to tribes and genera of adult Euxestinae

- 1 Wing with subcubital fleck (fig. 59). Front coxal cavities internally closed

- behind (fig. 55). Shape oval, convex and compact (figs. 50, 65). Spiculum gastrale of female short and non-articulate.....(1) **EUXESTINI** (p. 379) 2
- Wing never with subcubital fleck (fig. 16). Front coxal cavities internally open behind (fig. 9). Shape depressed, more or less parallel-sided, *Cerylon*-like9
- 2 Tarsal segment 1 not lobed below (fig. 51). Wings with anal veins characteristic (fig. 59).....3
- Tarsal segment 1 lobed below (fig. 62). Anal veins (fig. 61) not as above.....5
- 3 Antennae 11-segmented with 3-segmented club (fig. 51b). Metasternum without femoral lines behind middle coxae (fig. 51c). *Australian species*
(1) **Protoxestus** gen. n. (p. 379)
- Antennae usually 10-segmented, never with club of 3 distinct segments.....4
- 4 Antennae 11-segmented, the club distinctly 2-segmented, its apical segment truncate (fig. 52). Metasternum without femoral lines. *Indo-Malayan species*
(2) **Pseudodacne** Crotch (p. 382)
- Antennae 10-segmented, club formed of 1 large segment (fig. 54). Metasternum with femoral lines. *American and Australian species*
(3) **Hypodacne** Leconte (p. 380)
- 5 Antennae 10-segmented. Hypomera of prothorax not or slightly depressed.....6
- Antennae 8 or 9 segmented. Hypomera of prothorax strongly depressed and concave7
- 6 Hypomera of prothorax without antennal cavities. Segment 2 of antenna markedly shorter than 3. Elytra shining, glabrous, rows of punctures indistinct or absent.....(4) **Euxestus** Wollaston (p. 382)
- Hypomera with well defined antennal cavities (fig. 64). Antennal segment 2 slightly longer than 3 (fig. 64). Elytra dull, pubescent and with well-marked rows of punctures or striae.....(5) **Elytrotetrantus** John (p. 383)
- 7 Antennae 8-segmented (fig. 3). Elytra with impressed striae and regular rows of punctures. Front coxae widely separated, width of exposed part less than that of prosternal process between them (7) **Euxestoxenus** Arrow (p. 385)
- Antennae 9-segmented (fig. 67). Elytra without striae, puncturation irregular. Prosternal process much narrower than exposed part of front coxae (figs. 8, 71)8
- 8 Dorsal surface dull, elytral punctures coarse and distinct. Hind angles of prothorax not produced backwards over shoulders of elytra. Middle coxae much wider than the space between them (fig. 68)....(6) **Cycloxeenus** Arrow (p. 383)
- Dorsal surface smooth and shining, elytral puncturation indistinct. Hind angles of prothorax (fig. 71) produced backwards over shoulders of elytra. Middle coxae separated by a space about equal to their own width (fig. 8).
(8) **Bradycycloxeenus** Arrow (p. 386)
- 9 Tarsal formula 4-4-4. Front coxal cavities externally closed behind (fig. 55). Species normally with eyes and wings. *African and Neotropical species*
(2) **METACERYLONINI** (p. 386) 10
- Tarsal formula 3-3-3. Front coxal cavities externally open behind (fig. 36). Wingless and eyeless species. *From Palaearctic region* (3) **ANOMMATINI** (p. 391) 11
- 10 Prothorax parallel-sided, front coxae narrowly separated, shape of prosternal process characteristic (fig. 9). Pronotum without sublateral impressions.

- Ventrite 1 without femoral lines (fig. 12). Trochanters weakly heteromeroid (fig. 13).....(9) **Metacerylon** Grouvelle (p. 386)
- Prothorax slightly narrowed in front, front coxae widely separated, shape of prosternal process (fig. 22) not as above. Pronotum with sublateral impressions (fig. 19). Trochanters simple (fig. 23).....(10) **Ceryleuxestus** gen. n. (p. 389)
- 11 Antennal club 2-segmented. Front coxae moderately widely separated, prosternal process almost quadrate. Head as broad as prothorax
(12) **Abromus** Reitter (p. 393)
- Antennal club 1-segmented (fig. 38). Front coxae almost contiguous and prosternal process very narrow (fig. 36). Head narrower than prothorax
(11) **Anommatus** Wesmael (p. 392)

Key to tribes and genera of adult Murriniinae

- 1 Front angles of prothorax with antennal cavities (fig. 81), side margins of prothorax smooth. Vertex of head with a transverse line (fig. 96). Tarsi 4-segmented. Metasternum and first ventrite with femoral lines (fig. 100). Front coxal cavities internally closed behind (fig. 82) (1) **MURMIDIINI** (p. 394) 2
- Front angles of prothorax without antennal cavities, its side margins serrated (fig. 44). Vertex without a transverse line. Tarsi 3-segmented. Metasternum and first ventrite without femoral lines (fig. 49). Front coxal cavities internally open behind (fig. 44).....(2) **OSTOMOPSINI**. (4) **Ostomopsis** Scott (p. 400)
- 2 Antennae 8-segmented (fig. 96). Antennal cavities of prothorax (fig. 94) neither completely dorsal nor completely ventral. Prosternal process weakly notched in middle (fig. 94), its apex hidden under a rounded projection of mesosternum (fig. 91). No median impressed line on metasternum (fig. 91). Aedeagus with well developed parameres (fig. 93)
(1) **Botroderus** Casey (p. 396)
- Antennae 9- or 10-segmented (figs. 85, 101). Antennal cavities or prothorax completely dorsal or ventral. Prosternal process not notched in middle, its apex not hidden by a protuberance of mesosternum (figs. 80, 82). Metasternum with a complete median impressed line (fig. 86). Parameres not distinct (fig. 90).....3
- 3 Antennal cavities of prothorax completely dorsal (fig. 81). Antennae 10-segmented, segments 4-6 simple (fig. 85).....(2) **Murmidius** Leach (p. 395)
- Antennal cavities of prothorax completely ventral (fig. 100). Antennae 9-segmented, segments 4-6 characteristically modified (fig. 101)
(3) **Myhocerus** Erichson (p. 399)

Key to tribes and genera of adult Ceryloninae

Genus 11, *Anathilopus*, has not been included in the key as we have not been able to examine specimens.

- 1 Front angles of prothorax with antennal cavities (fig. 159), metasternum and first ventrite with well developed femoral lines (fig. 159). Vertex of head with a transverse line (fig. 163). Species shining and oval, elytra without ridges or striae.....(1) **LAPETHINI** (p. 404) 3
- If front angles of prothorax with antennal cavities, femoral lines absent. If

- vertex with a transverse line, pronotum with excavations or cavities.
 Species rarely shining or oval, elytra commonly with ridges or striae.....2
- 2 Mouth parts of normal non-piercing type (fig. 107), labrum (fig. 109) short and transverse, mandible not very elongate (fig. 127). Head without a transverse line, elytra rarely with longitudinal ridges (2) **CERYLONINI** (p. 413) 5
- Mouth parts of piercing type, labrum elongate and pointed at apex (fig. 214), mandible markedly modified and elongate (fig. 203). Mouth parts sometimes hidden by projection of prosternum (fig. 180), if so elytra with longitudinal ridges and vertex with a transverse line (fig. 181)
 (3) **ACULAGNATHINI** (p. 433) 15
- 3 Mouth parts not of piercing type, labrum (fig. 160) short and transverse, mandibles (fig. 166) normal.....4
- Mouth parts of piercing type, labrum (fig. 171) elongate and pointed at apex, mandible markedly modified and elongate (fig. 173)
 (3) **Lapecautomus** gen. n. (p. 409)
- 4 Front coxal cavities externally open behind (fig. 159), prosternal process not or weakly widened at apex.....(1) **Lapethus** Casey (p. 404)
- Front coxal cavities narrowly closed behind (fig. 162), prosternal process narrow at base, much widened to apex.....(2) **Lytopeplus** Sharp (p. 407)
- 5 Tarsal formula 4-4-4. Labium with ligula as figured (fig. 121). Ventricle 1 rarely with femoral lines. Antennal segments and club variable.....6
- Tarsal formula 3-3-3. Labium with ligula as figured (fig. 144). Ventricle 1 with well marked femoral lines (fig. 147). Antennae 10-segmented with 1-segmented club (fig. 150).....13
- 6 Antennal club 3-segmented (fig. 5). Shape broadly oval, sides of prothorax and elytra markedly explanate, head small (fig. 5). Front coxal cavities externally open behind (fig. 6), hypomera with antennal cavities (fig. 6)
 (12) **Coccilon** Hinton (p. 426)
- Antennal club 1- or 2-segmented. Shape not or less broadly oval, side margins not markedly explanate. If hypomera with antennal cavities, either tarsi with segment 1 lobed below or front coxal cavities externally closed behind (fig. 8b) or antennae 10-segmented.....7
- 7 Hypomera of prothorax with well developed antennal cavities (fig. 112).....8
- Hypomera without distinct antennal cavities.....9
- 8 Tarsal segment 1 lobed below (fig. 8b). Front coxal cavities closed behind externally (fig. 8b). Species broadly oval (fig. 8a), prothorax shaped as in figure 8a.....(7) **Gyrelon** Hinton (p. 418)
- Tarsal segment 1 simple (fig. 112). Front coxal cavities externally open behind (fig. 112). Species parallel sided (fig. 111), shape of prothorax as in figure 111.....(8) **Pachylon** Hinton (p. 418)
- 9 Shape ovate and convex dorsally (figs. 106, 114), elytral epipleura broad at base, strongly narrowed behind.....10
- Shape elongate, more or less depressed and parallel-sided (figs. 119, 125), elytral epipleura much less narrowed posteriorly.....12
- 10 Front coxal cavities externally open behind, prosternal process projecting markedly beyond the coxae, its apical margin deeply notched in middle (fig. 113).....(6) **Pseudocerylon** Grouvelle (p. 415)

- Front coxal cavities externally closed behind (fig. 107), prosternal process not projecting beyond the coxae, its apical margin not notched.....11
- 11 Front coxae small, rounded, narrower than the prosternal process (fig. 107). Species larger and more convex. Tarsal claws normal, paired
(5) **Ploeosoma** Wollaston (p. 415)
- Front coxae larger, much broader than prosternal process. Species smaller and less convex. Tarsal claws fused to beyond middle (4) **Pachyochthes** Reitter (p. 414)
- 12 Front coxae rather widely separated (fig. 116), prosternal process markedly widened behind front coxae and apically truncate, front coxal cavities visibly closed behind; antennae 10-segmented, club sometimes partly divided by a groove but never of 2 distinct segments.....(9) **Cerylon** Latreille (p. 420)
- Front coxae less widely separated (fig. 129), prosternal process not or scarcely widened behind coxae, its apex rounded or angulate, front coxal cavities often open behind; antennae often 11-segmented with 2 segmented club.....(10) **Philothermus** Aube (p. 423)
- 13 Front coxal cavities externally closed behind (fig. 115). Shape (fig. 153) short, broad and depressed.....(15) **Cerylonopsis** Heinze (p. 432)
- Front coxal cavities externally open behind (fig. 138). Shape (figs. 133, 141) more elongate, less depressed.....14
- 14 Each elytron with 2 longitudinal ridges (fig. 133). Shape of prothorax characteristic (fig. 133), its front margin strongly excavate. Metasternum with well developed femoral lines (fig. 136).....(13) **Suakokoia** gen. n. (p. 428)
- Elytra (fig. 141) without longitudinal ridges. Shape of prothorax (figs. 141, 142) not as above. Metasternum without femoral lines
(14) **Philothermopsis** Heinze (p. 429)
- 15 Front coxal cavities externally closed behind (fig. 2). Clypeus as figured (fig. 1). Antennal club 2-segmented. Pronotum with 2 lateral longitudinal ridges, its side margins serrated. Elytra with crenulated longitudinal ridges (fig. 1).....(20) **Acautomus** Heinze (p. 438)
- Front coxal cavities externally open behind (fig. 197). Clypeus not as above. If antennal club 2-segmented, pronotum without lateral longitudinal ridges and its side margins not or weakly serrate, and elytra without longitudinal crenulate ridges.....16
- 16 Elytra with longitudinal ridges (fig. 179). Pronotum with cavities (fig. 191) or excavations (fig. 179) or coarsely sculptured (fig. 189). Mouth parts hidden by projection of prosternum (fig. 180). Vertex with a transverse line.....17
- Elytra without longitudinal ridges (fig. 196). Pronotum smooth (fig. 205, without cavities or excavation. Mouth parts not hidden by prosternum. Vertex without a transverse line.....20
- 17 Antennae 11-segmented with 3-segmented club (fig. 190). Hypomera of prothorax without cavities; shape of prosternal process and prosternum as figured (fig. 190); pronotum (fig. 189) characteristically sculptured. Species large, length about 5 mm.....(19) **Glyptolopus** Erichson (p. 437)
- If antennae 11-segmented with 3-segmented club, pronotum and hypomera without cavities. Prosternum and prosternal process not as above. Species smaller18

- 18 Pronotum with characteristic deep excavations (fig. 179), cavities of hypomera as figured (figs. 180, 188). Antennae 6- or 9-segmented (figs. 181, 187). Shape broad, ovate and compact.....(16) **Axiocerylon** Grouvelle (p. 434)
- Pronotum with one or two pairs of cavities (fig. 191), cavities of hypomera not as above. Antennae 8-, 10- or 11-segmented. Shape narrower, elongate and almost parallel-sided.....19
- 19 Pronotum with 2 pairs of cavities (fig. 191). Antennae (fig. 192) 8-segmented with 1-segmented club.....(17) **Thyroderus** Sharp (p. 436)
- Pronotum with 1 pair of cavities. Antennae 10- or 11-segmented with 3-segmented club.....(18) **Dolosus** Dajoz (p. 437)
- 20 Antennal club 2-segmented (fig. 200). Side margin of prothorax finely serrate (fig. 197). Clypeus narrow in front (fig. 200). Antennal segments various21
- Antennal club 1-segmented (fig. 208). Side margins of prothorax smooth (fig. 205). Clypeus broad in front (fig. 205). Antennae 10-segmented (22) **Ceryleautomus** gen. n. (p. 439)
- 21 Tarsal formula 4-4-4. Elytra with about 13 rows of punctures (fig. 196). Antennae 8-, 10- or 11-segmented (fig. 200).....(21) **Cautomus** Sharp (p. 439)
- Tarsal formula 3-3-3. Elytra with rows of punctures less than 13 and slightly irregular (fig. 215). Antennae 9-segmented.....(23) **Aculagnathus** Oke (p. 441)

Key to subfamilies, tribes and genera of Cerylonid larvae

- 1 Mouth parts of normal biting type, mandibles triangular with well developed mola and apical teeth (fig. 223); maxillary mala with a dorsal row of setae, cardo and maxillary articulating area well developed (fig. 220). Urogomphi (fig. 219) and ocelli often present.....2
- Mouth parts piercing and suctorial, mandibles represented by narrow stylets (fig. 230) without mola or apical teeth, mala narrow and elongate, without dorsal row of setae (fig. 230); cardo and maxillary articulating area not distinct. Urogomphi and ocelli absentCERYLONINAE 6
- 2 Shape more or less elongate, not at all onisciform, abdominal segments without lateral tergal pores; urogomphi (fig. 219) well developed. Head (fig. 221) without endocarina. Mandible without prosthema (fig. 223); maxillary mala acute at apex or with an apical spine (fig. 220)
- Shape very broad and onisciform, abdominal tergites 1-8 each with a pair of lateral pores; urogomphi not distinct. Head (fig. 225) with endocarina; mandibles with a prosthema (fig. 232); mala obtuse, without apical spine (fig. 234).....MURMIDIINAE **Murmidius** Leach 3
- 3 Head with faint but traceable frontal sutures. Urogomphi short and hooked. General form elongate, somewhat cylindrical, lateral processes of abdominal segments hardly developed. 3 ocelli on each side
- No visible frontal sutures (fig. 221). Urogomphi long and projecting posteriorly (fig. 219). Maxillary mala acute (fig. 220). Lateral processes of abdominal segments well developed. Ocelli 2 or 0 on each side.....EUXESTINI 4
- ANOMMATINI, **Anommatus** Wesmael

- 4 Abdominal segments with paired dorsal processes as well as the lateral ones. Cutting edge of mandible with only a single tooth before apical one. Head prognathous, fully exposed, with 2 ocelli on each side.....**Euxestus** Wollaston
- Abdominal segments with only the lateral processes. Cutting edge of mandible with 2 or more teeth just behind the apical one. Head markedly deflexed, or without ocelli.....5
- 5 Head markedly deflexed, with 2 ocelli on each side. Lateral processes of trunk segments strongly branched.....**Hypodacne** Leconte
- Head little deflexed, without ocelli. Lateral processes of trunk segments not strongly branched.....**Elytrotetrantus** John
- 6 Hind margin of ninth abdominal segment crenulated and with median notch (fig. 226). Lateral processes of abdominal segments well developed (fig. 227). Head not visible from dorsal side, apical margin of pronotum rounded and with several short blunt setae (fig. 226). Labial palpi well developed, 2-segmented (fig. 231); maxillary mala and mandible as figured (fig. 230)
Philothermus Aube
- Hind margin of abdominal segment smooth (fig. 236), lateral processes of abdominal segments poorly developed (fig. 236). Head visible from dorsal side, apical margin of pronotum weakly sinuate in middle (fig. 236). Labial palpi minute, 1-segmented (fig. 237); maxillary mala and mandible as figured (fig. 237). Form of head characteristic (fig. 235).....**Cerylon** Latreille

IV SUBFAMILY EUXESTINAE

This is essentially a new taxon, bringing together not previously associated—the Euxestinae of Grouvelle (1908), the Anommatini of Ganglbauer (1899) and the genus *Metacerylon* Grouvelle 1906 (Cerylonini), for which Heinze (1944b) established the tribe Metacerylonini. Phylogenetically, it may not be a natural grouping, in that most if not all its distinguishing features could well be primitive ones for the family Cerylonidae as a whole. In wing venation at least, the Euxestini genera *Protoxestus* and *Hypodacne* are clearly more primitive than any other Cerylonidae studied, and manifest a pattern almost identical with the fundamental one of Endomychidae and with that seen in certain pentamerous Clavicornia which may be allied to the Cerylonid group, such as Cryptophilinae. It might well be more phylogenetically natural to make separate subfamilies of our tribes of Euxestinae.

The subfamily may be formally defined as follows: With general characters of Clavicornia-Cerylonidae.

Head with frontoclypeal suture distinct (fig. 54), without transverse line on vertex, antennal grooves by lower margins of eyes usually distinct (fig. 54). Antennae usually with less than 11 distinct segments, club usually 1-segmented. Mandibles with well developed mola and 2 or more apical teeth. Maxillary lacinia (fig. 56) usually with a pair of apical spines, palpi with segments 2 and 3 subequal. Labium with triangular mentum, palpi not aciculate (fig. 58).

Thorax. Pronotum usually without sublateral impressions, front coxae narrowly (fig. 9) to moderately widely separated (fig. 55), their cavities externally open or closed behind, usually internally closed. Middle coxae narrowly to moderately widely separated, metasternum behind them with (fig. 51) or without femoral lines. Wing venation variable

(figs. 59, 61, 70, 26). Legs with trochanters short and simple or slightly heteromeroid (figs. 23, 51), tarsi 4 or 3-segmented.

Abdomen with 7 pairs of functional spiracles. Ventrite 1 with or without femoral lines, hind margin of ventrite 5 smooth and not or slightly inflexed. Aedeagus (fig. 57) in retracted condition turned on one side, with or without articulated parameres.

Larvae with at least some trunk segments with lateral expansions or processes, but never onisciform, abdominal segment 9 with well developed pointed urogomphi. Mandibles triangular, with well developed mola, no prostheca and 2 or more apical teeth, maxillary mala with a dorsal row of setae, its apex often acute, cardo and maxillary articulating area well developed, labium with normal 2-segmented palpi.

(1) *Euxestini*

This grouping corresponds to the Euxestini of van Emden (1928), and includes the Cycloxenini and Tachyoryctidiini of Jeannel & Paulian (1945). It is distinguishable from other Euxestinae in the adult stage by the ovate and convex body form, the front coxal cavities closed behind externally as well as internally, the wings with distinct subcubital fleck, and the sternite of abdominal segment 8 in the female with a short non-articulated spiculum 3 gastrale. The known Euxestini larvae can be recognised by the spinose lateral tergal processes on the thoracic and abdominal segments, by the long very little upturned urogomphi, and by the 2 ocelli on each side of the head.

Despite the obvious similarities of *Hypodacne* to *Euxestus*, the former genus differs from the latter, and resembles *Protoxestus* and *Pseudodacne*, in characters which appear to us to be of considerable phylogenetic importance. It would be quite reasonable to segregate *Protoxestus*, *Pseudodacne* and *Hypodacne* in a distinct tribe, distinguished essentially by the lack of lobing of the basal tarsal segment, by the double tegmen of the aedeagus, the wing venation, the form of the metendosternite, and possibly by some of the larval features distinguishing *Hypodacne* from *Euxestus*. Such a tribe might be called Hypodacnini, *Hypodacne* being its most widespread and best known genus.

One of the most noteworthy features of the Euxestini is the presence in at least some of them of a double tegmen of the aedeagus (fig. 57), with the inner part appearing as a possible homologue of the "sipho" of Coccinellidae, a structure not known elsewhere in the cerylonid group. A direct affinity of Euxestini to the Coccinellidae could hardly be envisaged; any link between the two groups would probably have to be by way of more or less endomychid-like forms such as *Eupsilobius* (see p. 442). If the double tegmen of Euxestini and Coccinellidae is inherited from a common ancestor, we shall need to postulate the secondary loss of this characters on several different lines on the cerylonid group. The alternative hypothesis, that a double tegmen has evolved independently in the Euxestini and the Coccinellidae, seems on the face of it about equally improbable. Further investigation of this character is very desirable.

Protoxestus gen. n.

This genus, based on a single species from Queensland, may well be the most primitive known type of Euxestini, of the Euxestinae and even of the entire family Cerylonidae. It is most closely allied to *Hypodacne* and *Pseudodacne*, from which it differs mainly in antennal structure and in lacking femoral lines on the metasternum and first ventrite. The genus may be defined thus.

General shape (fig. 51a), head (fig. 51b) and mouth parts as in *Hypodacne*. Antennae 11-segmented, scape moderately large, pedicel short, segment 3 markedly longer than it, segments 4-8 short and almost equal, 9-11 forming a moderately broad 3-segmented club, segment 11 narrower than 10 and rounded at its apex (fig. 51b). Thoracic structures as in *Hypodacne* except for the lack of femoral lines, metasternum without median impressed line. Legs with trochanters weakly heteromeroid, femora moderately swollen in middle, tibiae weakly broadened to apex, tarsi 4-segmented, without lobes, segment 1 longer than 2, 2 and 3 equal, 4 slightly longer than previous 3 together, claws simple. Ventricle 1 (fig. 51c) without femoral lines, with intercoxal process short, broad and truncate. Aedeagus not dissected out, apparently with median lobe long and apically widened and tegmen without articulated parameres.

Type-species, *Protoxestus australicus* sp. n.

***Protoxestus australicus* sp. n.**

Dorsal surface uniformly black, shining and glabrous, ventral surface reddish-brown, legs, mouth parts and antennae yellowish. Vertex of head finely and sparsely punctured. Elytra broadest at middle, finely and indistinctly punctured, without rows of punctures of striae; scutellum small, triangular, impunctate. Ventral surface almost glabrous and very indistinctly and sparsely punctured.

Dimensions of holotype in (mm.): total length 2.80, width of head across eyes 0.65, length of antenna 0.70, width of prothorax at base 1.50, length of elytra along suture 1.90, width across middle of elytra 1.75.

Holotype and 1 *paratype*, AUSTRALIA: Mount Glorious, Brisbane, Queensland, 13. ix. 1966, from decayed plank buttresses of dead tree (*Laportea gigas*) (R.A. Crowson). Holotype in British Museum (Nat. Hist.).

Hypodacne Leconte, 1875 **gen. res.**

This genus, based on a single species from the southern parts of North America, was synonymised with *Euxestus* Wollaston by Fauvel (1895); van Emden (1928) and other authors followed Fauvel in this. The Australian and New Zealand species hitherto placed in *Euxestus* agree with *Hypodacne* in having the first tarsal segment not lobed below, no femoral lines on the metasternum and in wing venation (fig. 59), in all of which features they differ from the type of *Euxestus*.

The genus may be defined as follows.

With the general characters of Euxestinae and of Euxestini.

Head (fig. 54) with rather large and coarsely faceted eyes, clypeus broad in front with apical margin weakly rounded or almost straight, gular region anteriorly with well marked transverse groove, antennal grooves distinct by lower margins of eyes. Tentorium as figured (fig. 54). Antennae (fig. 54) 10-segmented, scape moderately large, pedicel smaller than it, segment 3 markedly longer than pedicel, segments 4-8 short and almost equal, 9 larger than 8, 10 forming a large apically rounded club. Labrum strongly transverse. Mandibles, maxillae and labium as figured (figs. 60, 56, 58).

Thorax with prothorax (fig. 55) strongly transverse, pronotum without sublateral impressions. Front coxae rather widely separated. Elytra broadest at middle, punctures usually weak, strial rows weak but usually traceable. Wings as figured (fig. 59). Middle coxae rather widely separated. Metasternum (fig. 51) with median impressed line short

or absent, femoral lines present behind middle coxae. Metendosternite (fig. 51) with anterior tendons fairly widely separated. Legs with weakly heteromeroid trochanters, femora swollen in middle, tibiae broadened to apex and with 2 apical spurs, tarsi simple, segment 1 longer than 2, 2 and 3 short and equal, 4 as long as previous 3 together. Claws simple.

Abdomen ventrally as broad as long. Ventrite 1 often with femoral lines distinct (fig. 51), intercoxal process short, broad and truncated. Aedeagus (fig. 57) with double tegmen, the outer part with a pair of small parameres at apex, inner one represented by a narrow tube, median lobe long, narrow and slightly curved.

Type-species, by monotypy, *H. punctata* Leconte.

Species studied. *H. punctata* Leconte, *H. bivulneratus* (Lea), **comb. n.**, and *H. rubripes* (Reitter), **comb. n.**, also unidentified spp. from Australia and New Zealand.

Adults of most of the species seem to have been found in and around dead trees or in forest litter; larvae of *H. bivulneratus* (described below) were collected by R.A. Crowson in forest litter.

Description of supposed larva of *Hypodacne bivulneratus* (Lea)

General shape somewhat obovate-elongate, narrowed posteriorly, dorsum somewhat flattened. Head rather small, deflexed, almost hidden under projecting front margin of the large pronotum, frontal sutures not distinct, no endocarina, setae on dorsal surface as figured (fig. 221), ocelli distinct in smaller (younger) larvae, becoming indistinct in larger ones, two on each side, one above the other. Antennae (fig. 221) very short, 3-segmented, lengths of segments 3 : 6 : 4, sensory appendage ventral and longer than segment 3. Mandible (fig. 223) triangular, with 2 apical teeth, the posterior one serrated on inner edge, mola well developed with about 14 dorsal transverse ridges and about 7 ventral rows of asperities, protheca absent, ventral crushing tubercle well developed. Maxillary mala (fig. 220) somewhat acute, with one apical spine and a dorsal inner row of 10 long setae; cardo well developed, at right angles to stipes and divided, maxillary articulating area well developed and oval. Labium with palpi 2-segmented (fig. 224), hypopharyngeal sclerome well developed. Pronotum markedly larger than head, longer than meso- and metanota its front margin rounded, not clearly distinct from side margins, front margin with 6 moderately long spines each with a long terminal seta, side margin with 3 or 4 stouter branched processes each bearing several long setae. Meso- and metanota strongly transverse, each with two branched stout lateral processes similar to those of sides of pronotum, granules and setae of thoracic terga as figured (fig. 218). Abdominal terga 1-8 progressively narrower, shorter than thoracic terga, each with a long lateral projections bearing several setiferous spines, dorsum without spines or processes but with granules and setae as figured (fig. 219). Abdominal segment 9 narrower than 8, elongate, with a pair of long backward-directed urogomphi each bearing several seta-bearing spines on each side, apices of urogomphi slightly upturned but not hooked. Pygopod small, transverse, little projecting. All spiracles annular, thoracic ones distinctly in the mesothorax, abdominal ones lying under the lateral tergal processes. Legs (fig. 218) moderately long, with coxae narrowly separated and setation as figured.

Measurements of largest larva (in mm.): total length 3.50, width of head 0.37, width of prothorax excluding lateral processes 0.75, width of ninth abdominal segment 0.28.

Larvae of this type were collected as follows: 3 in leaf-litter from Joalah National Park, Tamborine Mountain, Queensland, together with adults of *H.bivulneratus*, 11.ix.1966; 2 larvae in decayed wood from base of fallen tree, Mount Nebo (Boombana National Park), Brisbane, Queensland, 11.viii.1966; 1 larva in decayed wood from Dorrigo National Park, New South Wales, together with adults of *H.bivulneratus*, 1.x.1966.

This type of larva most resembles, though differing very distinctly from, larvae found with and very probably attributed to a species of *Euxestus* in Durban, Natal; we believe that its attribution to *Hypodacne* is open to little doubt. Several species of *Hypodacne* were represented in adult material collected by R.A.Crowson in the areas where the larvae were found, and it is possible that more than one of them may be represented in the larval material.

Pseudodacne Crotch, 1875

This monotypic genus is closely allied to *Hypodacne*, from which it can be distinguished by the shape of the antennal club and the much larger size. It may be defined as follows.

With the general characters of Euxestinae and Euxestini.

Head with moderately large coarsely faceted eyes, clypeus broad in front with rounded front margin, no distinct transverse groove in anterior gular region, antennal grooves present by lower borders of eyes. Antennae (fig. 52) 10-segmented, scape moderately large, pedicel much shorter than it, segment 3 much longer than pedicel, 4-8 short and equal, 9 slightly larger than 8, 10 forming a large flattened triangular club with truncate apex.

Prothorax without sublateral impressions on notum, front coxae rather widely separated, prosternal process broad with apical margin almost straight. Elytra with punctuation indistinct but with distinctly impressed striae. Metasternum transverse, without median impressed line or femoral lines. Legs more or less as in *Hypodacne*, but with tarsal segment 4 slightly longer than previous 3 together and a distinct empodium between claws.

Abdomen without femoral lines on first ventrite, otherwise as in *Hypodacne*.

Type-species, by monotypy, *P.admirabilis* Crotch.

Habitat unknown, larva undescribed. Geographical distribution: Sarawak (Borneo), Sumatra, Mindanao (Philippine Is.).

Species studied. *P.admirabilis* Crotch.

Euxestus Wollaston, 1858

This genus, with a rather uncertain number of species in the warmer regions of both Old and New Worlds, requires critical revision but has received none since the valuable but tentative effort of van Emden (1928). We define it as follows.

With general characters of Euxestinae and Euxestini.

Head and mouth parts as in *Hypodacne*. Antennae as in *Hypodacne*. *Prothorax* as in *Hypodacne*. *Wing* with only 1 anal vein, not running into subcubital fleck (fig. 61). *Elytra* with strial punctures indistinct or absent. *Metasternum* without femoral lines, median impressed line short or absent. *Metendosternite* (fig. 62) with anterior tendons more widely separated than in *Hypodacne*. *Legs* with tarsal segment 1 bearing a well marked ventral lobe (fig. 62), otherwise as in *Hypodacne*. *Abdomen* without femoral lines on first ventrite. *Ovipositor* well developed with all normal parts present.

Type-species, by monotypy, *E.parki* Wollaston, 1854.

Habitats various, but not usually in dead trees or forest litter; species in warmer parts of Old and New World, but apparently not in Australian region.

Species studied. *E.parki* and several unidentified ones.

Supposed larva of *E. sp.* (? *phalacroides* Woll.) from Natal

In a heap of decaying grass-cuttings etc. on the Howard College campus, Durban, Natal, South Africa, R.A.Crowson found a considerable number of adults of a *Euxestus* together with many larvae of all sizes, on 22.iii.1971. These larvae differed from the previously described ones of *Hypodacne* in having the lateral processes of the trunk tergites much shorter and not branched, in lacking the small tergal asperities, in having the urogomphi with no branches on their inner sides and with only one short one on the outer side, in the rather less deflexed head, and the mandibles with only 2 apical teeth.

Elytrotetrantus John, 1941 (= *Tachyoryctidium* Jeannel & Paulian, **syn. n.**)

John subsequently added some 36 species, all from tropical Africa, to the original one of this genus, and in 1964 defined a new subgenus *Anaulakos* within it. Heinze (1944*b*) placed it between Lapethini and Euxestini in his Ceryloninae. Jeannel & Paulian (1945) defined their genus *Tachyoryctidium* for the single species *T.chappuisi*, found in all stages in nests of mole-rats in Kenya, and erected for it a new tribe Tachyoryctidiini of Murmidiinae. From Jeannel & Paulian's description and figures, *T.chappuisi* appears to be congeneric with *Elytrotetrantus*, and we have confirmed this by examining a paratype of the species. We define the genus as follows.

With general characters of Euxestinae and Euxestini.

General shape more or less as in *Hypodacne*, but with dorsal surface more or less pubescent. Head with deep antennal grooves by lower margins of eyes, and a distinct transverse groove in the anterior gular region. Antennae (fig. 64) 10-segmented, scape rather large, pedicel smaller than it but slightly larger than segment 3, segments 3-9 short and almost equal, 10 forming a large club. Mouth parts as in *Hypodacne*. Front coxae small, widely separated, the prosternal process broad with its apical margin slightly concave (fig. 64). Hypomera with a large impression receiving retracted antennal club (fig. 64). Elytra broadest near middle, with 9 or 10 distinct rows of punctures often impressed to form striae. Wing venation as in *Euxestus* (fig. 61). Metasternum strongly transverse, without median impressed line or femoral lines. Legs short and rather stout, tarsal segment 1 strongly lobed below, segment 4 slightly longer than rest together, empodium not distinct. Abdomen with ventrite 1 without femoral lines, its intercoxal process short, broad and truncate (fig. 64). Aedeagus without distinct articulated parameres.

Type-species, by author's designation, *E.cardatus* John.

Habitat. Species of the genus have been found in ants' nests, decaying grass-piles, and nests of mole-rats. Larva described by Jeannel & Paulian (1945) resembles supposed *Euxestus* larva (*vide supra*).

Species studied. *E.cardatus* John, *E.chappuisi* (Jeannel & Paulian) and an unidentified species from Rhodesia.

Cycloxenus Arrow, 1925

Originally described under Erotylidae-Euxestinae, the genus was transferred by Jeannel

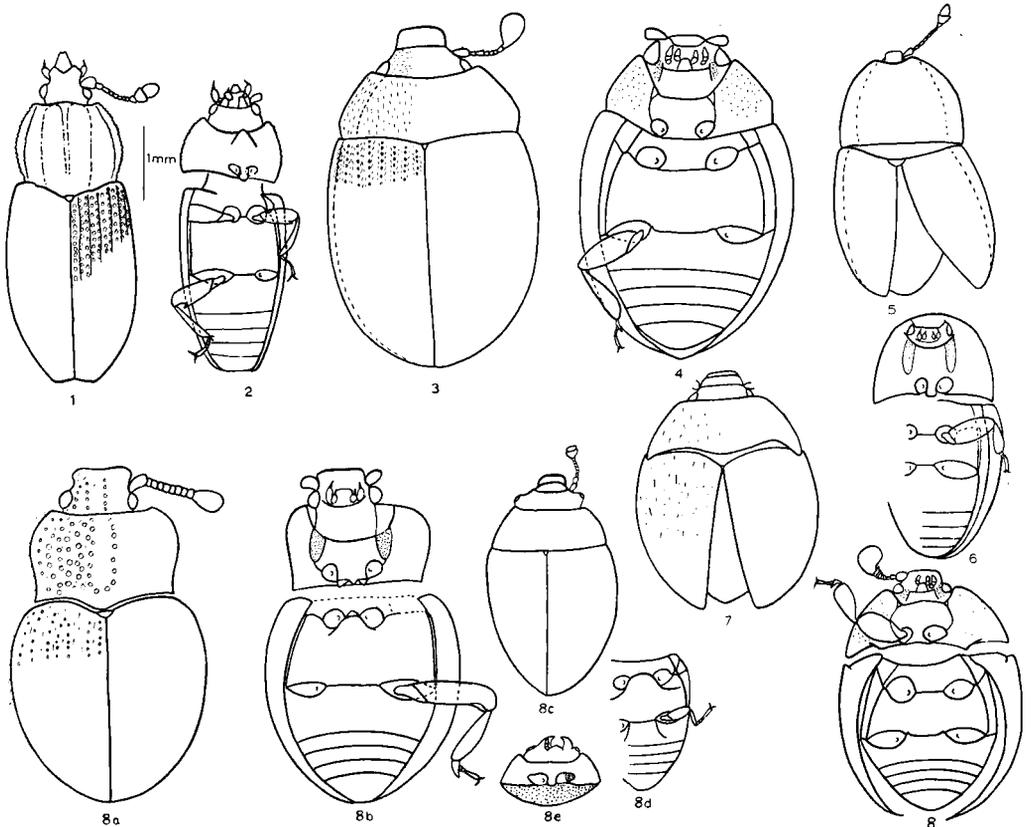
& Paulian (1945) to a new tribe Cycloxenini of Murmidiinae, but Crowson (1955) retained it in Cerylonidae-Euxestinae. We define it as follows.

With general characters of Euxestinae and Euxestini.

General shape (fig. 65) rather parallel-sided, broad and dorsally convex, dull, upper surface covered with short bristly setae.

Head with antennal grooves by lower margins of eyes and transverse groove of anterior gular region distinct (fig. 67). Antennae short, 9-segmented, scape large, pedicel smaller than it and slightly longer than segment 3, segments 3-8 short and progressively wider, 9 forming a large club. Mouth parts (fig. 67) as in *Hypodacne*.

Thorax with sides of prothorax more rounded than in previous genera, its hind margin produced into a distinct obtuse angle in middle; hypomera concave but without well-defined impressions, front coxae narrowly separated, prosternal process narrow between them and broadened at apex where it is truncate. Elytra almost parallel-sided,



Figs. 1-8e. (1-2) *Acautomus armatus*: (1) dorsal view; (2) ventral view. (3-4) *Euxestoxenus striatus*: (3) dorsal view; (4) ventral view. (5-6) *Coccilon charon*: (5) dorsal view; (6) ventral view. (7-8) *Bradycycloxenus lobicollis*: (7) dorsal view; (8) ventral view. (8a-8b) *Gyrelon mila*: (8a) dorsal view; (8b) ventral view. (8c-8e) *Eidoreus minutus*: (8c) dorsal view; (8d) meso and metathorax and ventrities, ventral view; (8e) head and prothorax, ventral view.

with no trace of striae or rows of punctures, epipleura rather broad for most of their length. Middle coxae rather narrowly separated, coxal junction between them in a curved line (fig. 68). Wing (fig. 70) with single anal vein, *r-m* cross-vein and subcubital fleck distinct. Metasternum with short median impressed line and no femoral lines, metendosternite with anterior tendons widely separated. Legs (fig. 68) short and stout, femora and tibiae much flattened, tibiae strongly broadened towards apex and with 2 normal spurs, tarsal segment 1 strongly lobed below, 2 and 3 short and subequal, 4 slightly longer than previous 3 together, empodium not distinct.

Abdomen with no femoral lines on ventrite 1, its intercoxal process (fig. 69) notched in middle. Ovipositor as figured (fig. 69).

Type-species, by monotypy, *C.hispidus* Arrow.

Habitat. Recorded from nests of fungus-eating termites, in United Provinces, N. India. Larva undescribed.

Species studied. *C.hispidus* Arrow.

Euxestoxenus Arrow, 1925

This genus has some similarities to *Elytrotetrantus*, from which it differs in the 8-segmented antennae and in the lack of sharply defined cavities in the hypomeron. Arrow (1926) subsequently attributed several African species, with 10-segmented antennae, to *Euxestoxenus*; these may be synonymous with some later described species of *Elytrotetrantus*. The single known species is considerably smaller than *Cycloxenus hispidus* or most species of *Hypodacne* or *Euxestus*. The genus can be defined thus.

With general characters of Euxestinae and Euxestini.

General shape oval and convex (fig. 3), with short antennae and rather slender legs, dorsal surface dull and finely pubescent.

Head with small, prominent, coarsely faceted eyes, clypeus short and transverse-rectangular, antennal grooves distinct by lower margins of eyes. Antennae (fig. 3) 8-segmented, scape large, pedicel shorter than segment 3, segments 4-7 short and equal, 8 forming a large club. Mouth parts as in *Hypodacne*.

Thorax with side margins of prothorax very finely serrate, hypomera (fig. 4) broadly hollowed and receiving front tibiae, front coxae widely separated (fig. 4), prosternal process broad with almost straight apical margin. Elytra broadest near base, with 8 distinct rows of punctures forming impressed striae. Middle coxae widely separated, "sternal fitting"¹ between them in an almost straight line (fig. 4). Metasternum strongly transverse, without median impressed line or femoral lines, hind coxae widely separated. Legs (fig. 4) rather elongate and slender, femora slightly broadened near base, tibiae weakly widened towards apex, tarsal segment 1 with rather short ventral lobe, segment 4 slightly longer than previous 3 together.

Abdomen slightly wider than long. Ventrite 1 without femoral lines, its intercoxal process broad and short with its apical margin slightly concave (fig. 4).

Type-species, by monotypy, *E.striatus* Arrow.

Habitat. Adults found in fungus garden of *Odontotermes obesus* in United Provinces area of India.

Species studied. *E.striatus* Arrow.

¹ Meso-metasternal junction between coxae.

Bradycyclo xenus Arrow, 1926

Arrow considered this genus to be most closely related to *Cyclo xenus*, from which it differs notably in the form of the hind angles of the prothorax and the shining glabrous upper surface. The genus is defined as follows.

With general characters of Euxestinae and Euxestini.

General shape (fig. 7) convex, subhemispherical, shining, dorsum with a few short semi-erect setae.

Head with moderately prominent coarsely faceted eyes, clypeus short with almost straight front margin, antennal grooves by lower margins of eyes distinct (fig. 8). Antennae 9-segmented, scape moderately large, pedicel slightly larger than segment 3, segments 4-8 short and progressively wider, 9 forming a large club. Mouth parts as in *Hypodacne*.

Thorax with prothorax strongly transverse, its side margins smooth, hind angles produced backwards as lobes over humeri of elytra (fig. 7), hypomera broadly hollowed and receiving front tibiae (fig. 8). Front coxae rather narrowly separated, prosternal process narrowed between them, its apical margin slightly emarginate (fig. 8). Elytra broadest near middle, without striae, punctures very fine and sparse. Middle coxae (fig. 8) moderately widely separated, sternal fitting between them in a straight line. Metasternum strongly transverse, without median impressed line or femoral lines, hind coxae rather widely separated. Legs short and stout, femora much swollen in middle, tibiae markedly broadened to apex (fig. 8), tarsal segment 1 moderately strongly lobed below, segment 4 slightly shorter than previous 3 together, empodium not distinct.

Abdomen with ventrite 1 as long as following 3 together, without femoral lines, its intercoxal process short, broad and apically emarginate (fig. 8).

Type-species, by monotypy, *B. lobicollis* Arrow.

Habitat. Adult found in leaf-litter on moist sand, United Provinces, India. Larva undescribed.

Species studied. *B. lobicollis* Arrow.

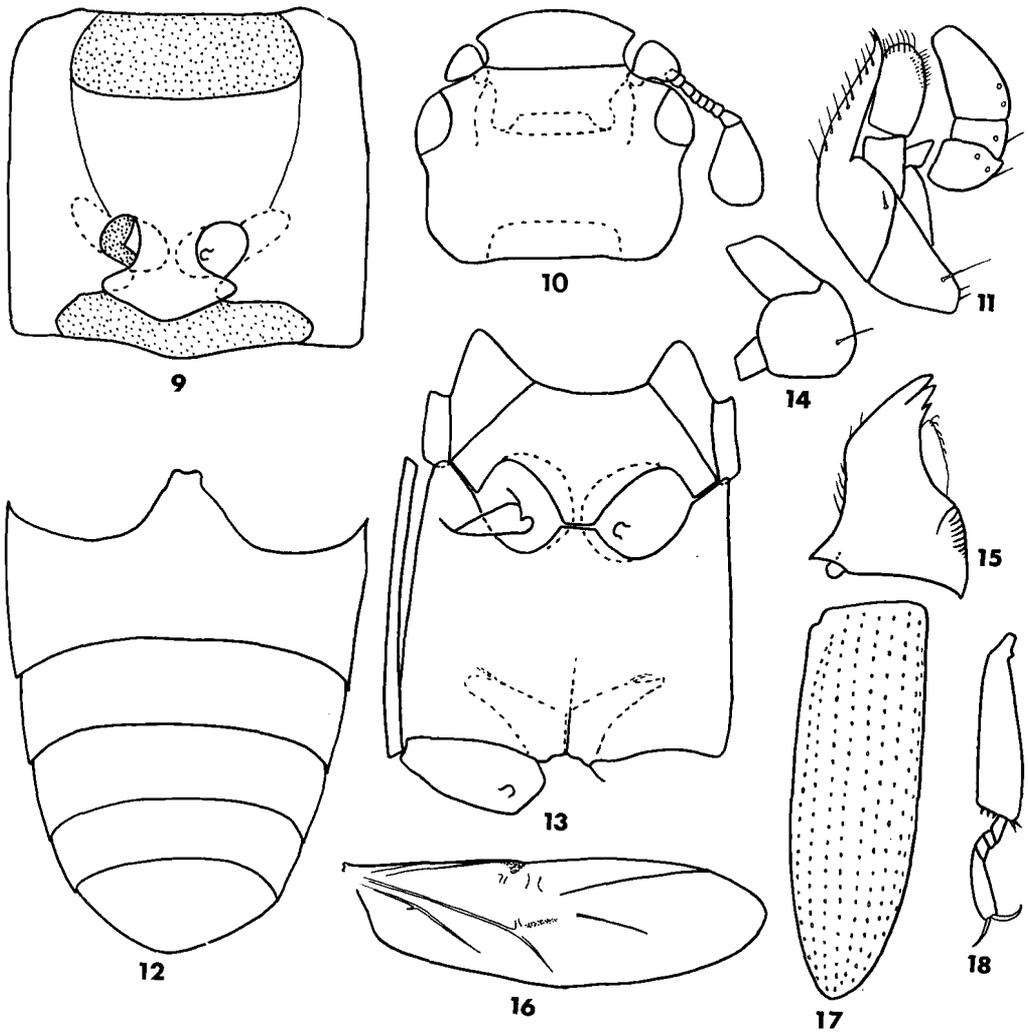
(2) *Metacerylonini*

Heinze (1944b) was the first author to separate the genus *Metacerylon* Grouvelle from *Cerylonini*; he based a separate tribe *Metacerylonini* essentially on the different form of the palpi as compared with those of *Cerylon*. Prior to Heinze, Hinton (1942) had already pointed out the difference in the palpi, but he had suggested transferring *Metacerylon* to *Bothriderini* (Colydiidae). In this work we add a new genus *Ceryleuxestus* to the tribe and redefine it.

The tribe *Metacerylonini* may be distinguished from other Euxestinae by the front coxal cavities internally open and externally closed behind, by the wing without a sub-cubital fleck, and the less convex more *Cerylon*-like body form. The known species of the group are from the Ethiopian and Neotropical regions. Larvae of the tribe are not yet known.

Metacerylon Grouvelle, 1906

Grouvelle based his genus on a single species from Madagascar, later adding another species from Guadeloupe (West Indies). *Cerylon conradti* Grouvelle and *C. wagneri* Grouvelle, transferred to this genus by Heinze (1944b) are here placed in the new



Figs. 9-18. *Metacerylon* species: (9) prothorax, ventral view; (10) head, dorsal view; (11) right maxilla, dorsal view; (12) ventrites; (13) meso and metathorax, ventral view; (14) labial palp; (15) left mandible, dorsal view; (16) wing; (17) elytron; (18) hind tibia and tarsus.

genus *Ceryleuxestus*. We have seen an undescribed species of the genus from Ukerewe Island, Tanganyika, Africa. According to Heinze (1944b) *M. dufau* Grouvelle from Guadeloupe can hardly be a true *Metacerylon*, as it has the front coxal cavities open behind.

The genus may be defined as follows.

With the general characters of Euxestinae and of Metacerylonini.

General shape elongate and parallel-sided, somewhat flattened.

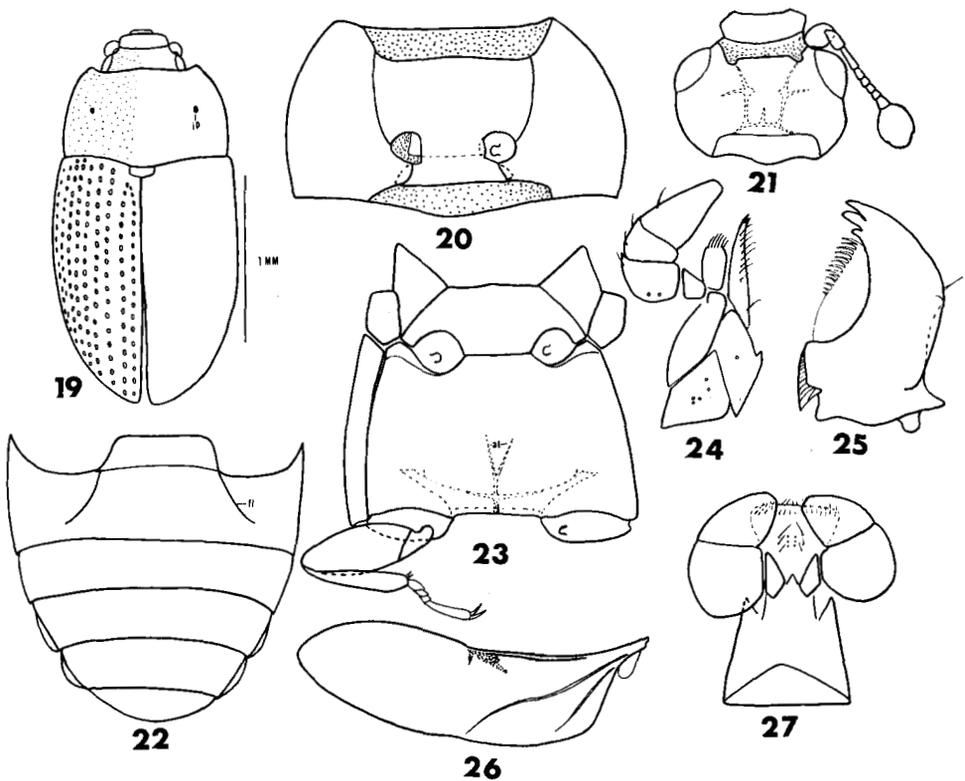
Head with moderately large rather coarsely faceted eyes (fig. 10), clypeus broadened with apex broadened and weakly rounded, transverse groove of anterior gular region and antennal grooves by lower margins of eyes distinct (fig. 10). Antennae 9-segmented,

scape moderately large, segments 2 and 3 shorter than scape and subequal, 4-7 short and equal, 8 slightly wider than 7, 9 forming a large apically rounded club. Mandibles, maxillae and labial palpi as figured (figs. 15, 11, 14).

Thorax with pronotum quadrate, its side margins smooth and almost parallel, sublateral impressions of notum absent, front coxae almost contiguous, prosternal process narrowed between them and markedly broadened behind. Elytra with 9 regular rows of punctures, epipleura rather narrow. Middle coxae narrowly separated, sternal fitting between them in a short straight line (fig. 13). Wing (fig. 16) with 1 anal vein, *r-m* cross vein weak but visible. Metasternum slightly elongate, median impressed line extending about half its length, femoral lines absent, hind coxae narrowly separated, metendosternite as figured (fig. 13). Legs short, trochanters weakly heteromeroid (fig. 13) tibiae moderately broadened to apex and with 2 normal spurs, tarsi simple, segment 1 slightly longer than 2, 2 and 3 short and subequal, 4 longer than previous 3 together, empodium not distinct.

Abdomen longer than wide, ventrite 1 shorter than 2 and 3 together, 2-5 short and equal in length, 1 without femoral lines, its intercoxal process narrow and weakly bilobed at apex (fig. 12). Aedeagus and ovipositor not studied.

Type-species, by monotypy, *M. parallelum* Grouvelle.



Figs. 19-27. *Ceryleuxestus brasiliensis*: (19) dorsal view; (20) prothorax, ventral view; (21) head, ventral view; (22) ventrites; (23) meso and metathorax, ventral view; (24) left maxilla, dorsal view; (25) right mandible, dorsal view; (26) wing; (27) labium, ventral view.

Habitat. Not recorded, larva undescribed; species from Madagascar, Tanganyika, Cameroons.

Species studied. *M. parallelum* Grouvelle and an unidentified species from Ukerewe Island, Tanganyika.

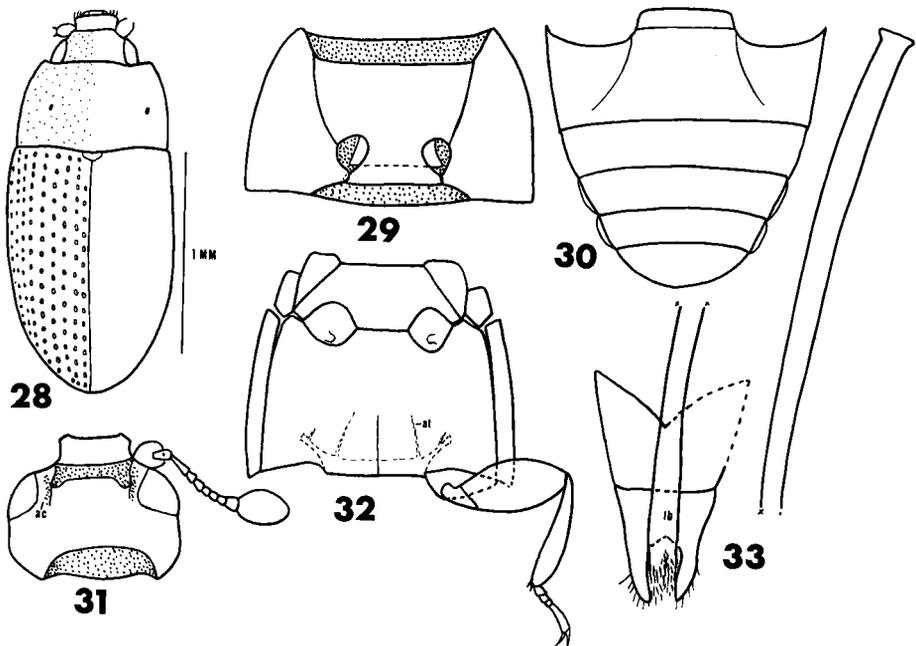
Ceryleuxestus gen. n.

We include in this genus two species described by Grouvelle as *Cerylon* (see p. 420) and probably *Cerylon omercooperi* Hinton from Abyssinia (which we have not studied), as well as the two new species described below. Despite notable resemblances to certain Cerylonini, the genus has the features which we regard as diagnostic for Euxestinae, and within Euxestinae its affinities are clearly to *Metacerylon* rather than to any other genus. In several of its differences from *Metacerylon*, e.g. the widely separated coxae, the slightly elongate trochanters, and in the presence of sublateral impressions on the pronotum, *Ceryleuxestus* resembles various Cerylonini. We define the genus thus.

With general characters of Euxestinae and Metacerylonini.

General shape rather flattened, broad and somewhat parallel-sided (figs. 19, 28), resembling some species of *Cerylon*.

Head with moderately large normally faceted eyes, clypeus as figured (fig. 21), no transverse groove in anterior gular region, antennal grooves by lower margins of eyes present or absent. Antennae 9- or 10-segmented, scape moderately large, larger than pedicel, segment 3 longer than pedicel, 4-8 short and subequal, 9 or 10 forming a large club. Mandible, maxilla and labium as figured (figs. 25, 24, 27), labrum (fig. 19) transverse.



Figs. 28-33. *Ceryleuxestus punctatus*: (28) dorsal view; (29) prothorax, ventral view; (30) ventrites; (31) head, ventral view; (32) meso and metathorax, ventral view; (33) aedeagus (distorted).

Thorax with pronotum strongly transverse, more or less narrowed in front, side margins smooth, more or less explanate, notum with a pair of sublateral impressions (fig. 19). Front coxae widely separated, prosternal process broad (figs. 20, 29). Elytra broad, parallel or slightly rounded at sides (fig. 19), epipleura narrow and complete 9 regular rows of punctures. Middle coxae widely separated, sternal fitting between them in a straight line (fig. 23). Wing (fig. 21) with single anal vein, no subcubital fleck, and distinct *r-m* cross-vein. Metasternum transverse, with short median impressed line and no femoral lines. Metendosternite various (figs. 23, 32).

Abdomen as long as wide. Ventrite 1 shorter than next 2 together, with a pair of femoral lines, its intercoxal process broad with almost straight apical margin. Ventrites 3 and 4 with characteristic lateral expansions (figs. 22, 30). Aedeagus (fig. 33) characteristic, median lobe long.

Type-species, *C. brasiliensis* sp. n.

Habitat. Adults found under bark, Larvae undescribed. Geographical distribution: Ethiopian and Neotropical regions.

Species studied. *C. brasiliensis* sp. n., *C. punctatus* sp. n. *C. conradti* (Grouvelle), *C. wagneri* (Grouvelle).

Key to species of *Ceryleuxestus*

- 1 Antennae 10-segmented. *Ethiopian species*.....2
- Antennae 9-segmented. *Neotropical species*.....3
- 2 Median impressed line of metasternum extending about half its length (fig. 32). Front angles of prothorax somewhat acute, hind margin of pronotum almost straight (fig. 32). Shape more flattened and parallel-sided, pronotum finely and densely punctured; dorsal surface reddish-brown **punctatus** sp. n.
- Median impressed line of metasternum extremely short. Front angles of prothorax rounded-obtuse, hind margin of pronotum distinctly convex in middle. Shape more convex and distinctly ovate, pronotum coarsely and diffusely punctured; dorsal surface dark piceous-brown..... **conradti** (Grouvelle)
- 3 Prothorax strongly transverse, broadest at middle, front angles acute (fig. 19). Side margins of pronotum evenly curved, scarcely explanate. General form broad **brasiliensis** sp. n.
- Prothorax weakly transverse, broadest at base, front angles rounded. Side margins explanate and nearly straight. Form narrower and more elongate **wagneri** (Grouvelle)

From the description, *Cerylon omercooperi* Hinton would trace to couplet 2 in the key but would not fit either of the alternatives, resembling *conradti* in general shape but *punctatus* in having a relatively long median impressed line on the metasternum.

***Ceryleuxestus brasiliensis* sp. n.**

With general characters of *Ceryleuxestus*.

General form rather broad and flattened, more or less parallel sided. Dorsal surface shining, with very minute sparse setae; head and pronotum chestnut-coloured, elytra lighter brown. Shape of prothorax characteristic (fig. 19), elytra distinctly broader than

pronotum and almost parallel-sided. Punctures of vertex of head minute but fairly close. Antennae 9-segmented, segments bearing moderately long simple setae like those of front edge of labrum. Side margins of pronotum scarcely explanate. Humeral angles of elytra not projecting, striae punctures small and close, the first 2 rows arising from a common stalk by scutellum, punctures on interstices not distinct. Scutellum glabrous, transverse, obtusely angled in middle (fig. 19), its borders dark. Ventral surface reddish-brown, ventrites and sterna glabrous.

Dimensions of holotype (in mm.): total length 2.10, width of head across eyes 0.45, length of antenna 0.50, width of prothorax at middle 0.95, length of elytra along suture 1.40, width across middle of elytra 1.10.

Holotype and 2 *paratypes* (one dissected and mounted on slide), BRAZIL: Nova Teutonia, Santa Catarina, 24.x.51 and 16.ix.57 (*F.Plaumann*); 2 *paratypes*, BRAZIL: Rondon, latitude 24° 38' S, longitude 54° 7' W. (*F.Plaumann*); 1 *paratype*, BRAZIL: latitude 27° 11' S, longitude 52° 23' W. (*F.Plaumann*). All type material in Field Museum of Natural History, Chicago.

Ceryleuxestus punctatus sp. n.

With general characters of *Ceryleuxestus*.

General shape markedly flattened, almost parallel-sided, form of prothorax characteristic (fig. 28). Dorsal surface shining, with extremely minute and sparse setae, uniformly reddish-brown, punctures of elytra darker. Punctures of vertex fine and fairly close. Antennae 10-segmented (fig. 31), reddish-brown, segments 8 and 9 darker than rest. Side margins of prothorax and elytra narrowly explanate. Punctuation of pronotum like that of vertex, striae punctures of elytra fine and close, striae 1 and 2 arising from a common stalk by scutellum, interstices not distinctly punctured. Scutellum glabrous, transverse, obtuse-angled behind. Ventral surface, epipleura and legs lighter yellowish-brown. Thoracic sterna almost glabrous, ventrites with moderately dense short recumbent pubescence.

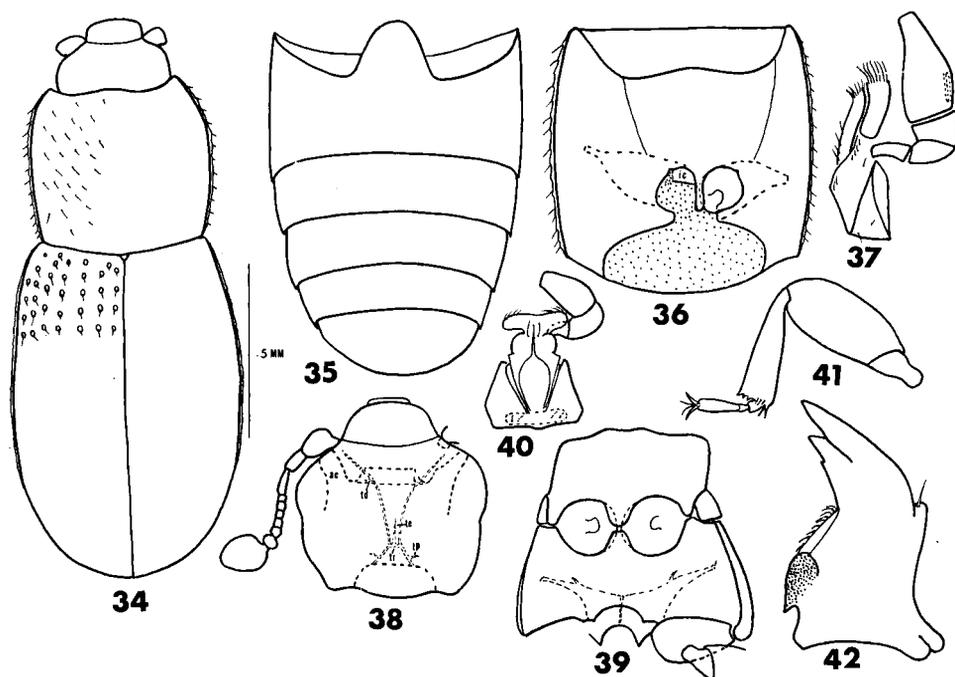
Dimensions of holotype (in mm.): total length 1.82, width of head across eyes 0.40, length of antenna 0.40, width of prothorax at middle 0.70, length of elytra along suture 1.10, width across middle of elytra 0.85.

Holotype and 1 *paratype* (dissected and mounted on slide), TANGANYIKA: Maboni, near Tanga, x.51 (*Krauss*); 1 *paratype*, CAMEROONS: Lolodorf, (*G.Schwab*). All type material in Museum of Comparative Zoology, Cambridge, Mass.

(3) *Anommatini*

This tribe was first defined by Ganglbauer (1899), who included two genera, *Anommatus* Wesmael and *Abromus* Reitter, and placed it in Ceryloninae despite the 3-segmented tarsi. Crowson (1952) erroneously referred it to Merophysyiidae. The larva of *Anommatus* was described by Dajoz (1968) and has subsequently been found by Crowson; it is clearly allied to the larvae of Euxestinae more than to any other known larvae of Clavicornia. The tribe is the only one of Cerylonidae which seems to be confined to the Palaearctic region. It may briefly be characterised as follows.

With general characters of Euxestinae and Cerylonidae. Tarsi 3-segmented, front coxae close together, their cavities internally as well as externally open behind, middle



Figs. 34-42. *Anommatus duodecimstriatus*: (34) dorsal view; (35) ventrites; (36) prothorax, ventral view; (37) right maxilla, dorsal view; (38) head, dorsal view; (39) meso and meta-thorax, ventral view; (40) labium, dorsal view; (41) hind leg; (42) left mandible, ventral view.

coxae close together, metasternum very short, without femoral lines, wings absent, first ventrite without femoral lines. Larvae with short hooked urogomphi, maxillary mala rather obtuse, mandibles without prostheca, 3 ocelli on each side, cucujoid-type frontal sutures traceable on top of head, general form narrower and more parallel-sided than in other Cerylonidae larvae, posterior trunk segments with distinct lateral tergal processes.

Anommatus Wesmael, 1835

A number of species, all occurring in Central Europe and the Mediterranean area, have been described, but there is doubt about the status of many of them (cf. Kaszab, 1947). The genus may be defined as follows.

With general characters of Euxestinae and Anommatini.

General form nearly parallel-sided (fig. 34), somewhat flattened and elongate, dorsum shining, pubescence sparse, short and inconspicuous.

Head markedly narrower than prothorax, without eyes, transverse groove in anterior gular region and antennal grooves ventrally distinct (fig. 38). Tentorium of normal cerylonid type. Antennae 10-segmented (fig. 38), scape moderately large, pedicel and segment 3 elongate and almost equal in length, segments 4-8 short and subequal, 9 slightly wider than 8, 10 forming a large club. Mandibles, maxillae and labium as figured (figs. 42, 37, 40).

Thorax with pronotum about as long as wide, side margins smooth or finely serrated, nearly parallel, no sublateral impressions on notum (fig. 36). Front coxae almost contiguous, prosternal process very narrow between them, its apical margin rounded (fig. 36). Elytra nearly parallel-sided, epipleura narrow but complete, 6 or 7 rows of striae punctures (fig. 34). Mesosternum rather long, middle coxae narrowly separated (fig. 39), sternal fitting between them in a short straight line. Wings absent. Metasternum strongly transverse, without femoral lines or median impressed line, hind coxae narrowly separated, metendosternite very short with anterior tendons widely separated. Legs with trochanters weakly heteromeroid (fig. 41), femora swollen in middle and tibiae widened towards apex and with 2 normal spurs, tarsi 3-segmented, segment 1 slightly longer than 2, 3 about twice as long as previous 2 together. Empodium well developed.

Abdomen longer than wide, ventrite 1 about as long as next 2 together, without femoral lines, its intercoxal process narrow and apically rounded (fig. 35). Ovipositor well developed with all normal parts.

Type-species, by monotypy, *A. duodecimstriatus* Müller, 1821 (= *A. terricola* Wesm., 1835).

Habitat. Adults recorded from rotten wood buried in earth, and under deeply buried stones; larva recorded by Dajoz (1968) from earth around base of old tree, found in damp leaf mould by R.A. Crowson.

Species studied. *A. duodecimstriatus* Müller.

Abromus Reitter, 1876

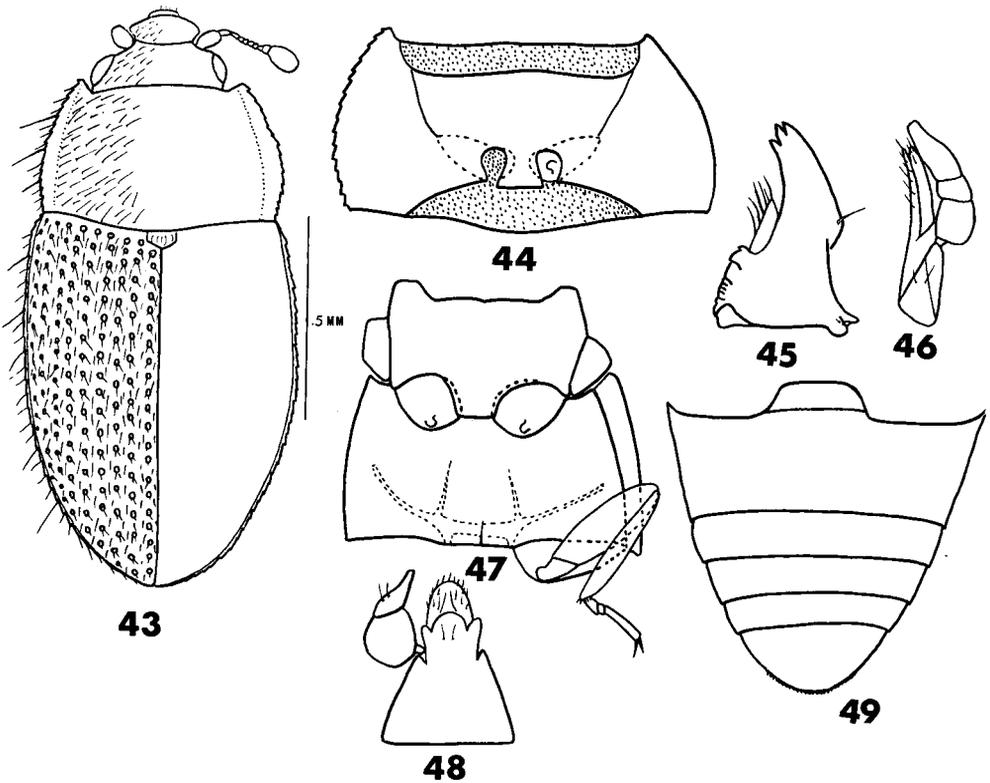
Type-species, by monotypy, *A. brucki* Reitter.

We have not been able to study specimens of this genus, which according to Ganglbauer (1899) is closely related to *Anommatus*, from which it differs mainly in the 2-segmented antennal club, the more widely separated front coxae, and the head as wide as the prothorax. In addition to the type species, from Central and Southern France, Hetschko (1930) lists two more, from the Iberian peninsula. We have seen no information on their habits or young stages.

The North African *Anathilopus* Falcoz (*A. theryi* Falcoz, 1921) seems, from the description and figure, probably a Cerylonid rather than a Cryptophagid (see p. 402); if it proves not to belong in Ceryloninae, it might well be akin to Anommagini.

V SUBFAMILY MURMIDIINAE

In the Junk catalogue Hetschko (1930) included three tribes, Murmidiini, Lapethini and Mychocerini, in Murmidiinae (Colydiidae). Jeannel & Paulian (1945) included Mychocerini in their Lapethini and added two more tribes, Tachyoryctidiini and Cyclo-xenini, for genera which we have included in Euxestini. We have transferred Lapethini to Ceryloninae, united Murmidiini and Mychocerini, and established a new tribe Ostomopsini, for the genus *Ostomopsis* Scott, previously placed in Lathridiidae. We consider that *Ostomopsis* is undoubtedly Cerylonid; within the family, the genus appears to have more in common with Murmidiini than with either Euxestinae or Ceryloninae. The only reasonable alternative we can see to making *Ostomopsis* a tribe in Murmidiinae would be to make an independent subfamily for it.



Figs. 43–49. *Ostomopsis* species: (43) dorsal view; (44) prothorax, ventral view; (45) left mandible, ventral view; (46) right maxilla, dorsal view; (47) meso and metathorax, ventral view; (48) labium, ventral view; (49) ventrites.

The subfamily is distinguished essentially by having only five pairs of functional abdominal spiracles (like *Ceryloninae*), the head with a distinct frontoclypeal suture (like *Euxestinae*), the maxillary lacinia without apical spines and not unusually narrow, the maxillary palpi with segment 2 larger than 3, the wings without a distinct anal vein, and the last ventrite with its hind margin more or less inflexed and crenulate (fig. 88). The only known larva is that of *Murmidius ovalis* Beck, described by Böving and Craighead. It is strongly flattened and onisciform, with the head normally hidden under the pronotum, abdominal tergites 1–8 each with a pair of lateral glandular openings, no urogomphi, the mandibles with a distinct prostheca, maxillae with well developed cardo and articulating area and a blunt mala.

The subfamily appears to have endemic representatives in most of the warmer parts of the world, with the possible exception of the Australian region. Some species of *Murmidius* have become widely distributed throughout the world in food cargoes, etc.

(1) *Murmidiini*

Hetschko (1930) included five genera, *Murmidius* Leach, *Botrodus* Casey, *Eupsilobius* Casey, *Cycloxeenus* Arrow and *Euxestoxenus* Arrow in *Murmidiini*, and two further

genera, *Mychocerus* Erichson and *Thyroderus* Sharp, in Mychocerini. Casey (1895) had defined a separate tribe for his genus *Eupsilobius* (= *Eidoreus* Sharp), which we have transferred to the family Endomychidae (see p. 442). Jeannel & Paulian (1945) placed *Cycloxenus* and *Euxestoxenus* in a separate tribe Cycloxenini (here included in Euxestini). We have transferred *Thyroderus* to Ceryloninae tribe Aculagnathini (see p. 433). Only three genera remain in Murmidiini, defined by us as follows.

Species small, of rather convex, ovate and Histerid-like form, with general characters of Cerylonidae and of Murmidiinae. Head small, with a transverse line on the vertex deeply retracted in prothorax, prothorax with sharply defined cavities near its front angles receiving the retracted antennal club, front coxal cavities internally closed and externally open behind (fig. 82), metasternum with femoral lines, wing with distinct subcubital fleck, tibial spurs not distinct, ventrite 1 with femoral lines. Larval characters as previously described.

Murmidius Leach, 1822

The number of species and distributional range of this genus are rather uncertain; Hinton (1942) distinguished five Old World species. A critical revision of the world species of the genus is much needed. We define the genus as follows.

With general characters of Cerylonidae, Murmidiinae and Murmidiini.

General shape (fig. 81) broadly oval and convex, species more or less shining, pubescence of dorsal surface inconspicuous.

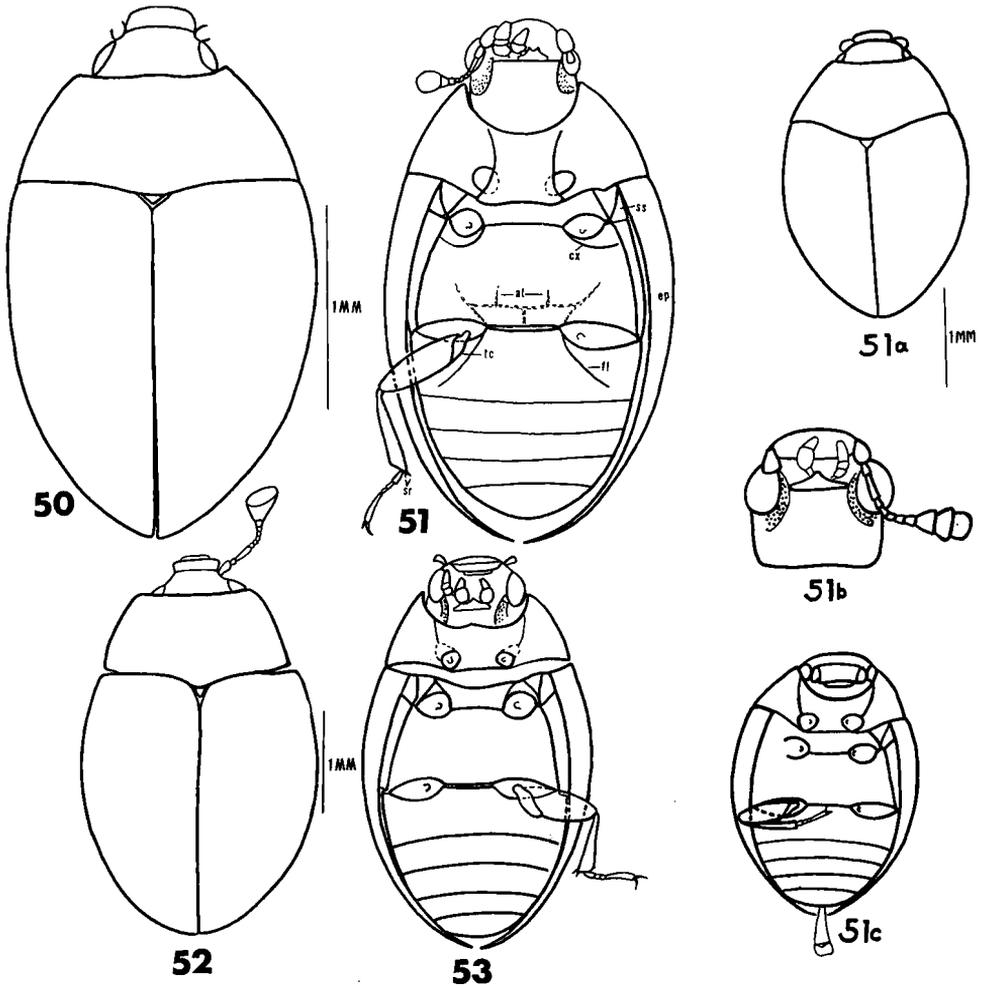
Head with moderately large coarsely faceted eyes, clypeus large with rounded front margin (fig. 81), antennal grooves well developed by lower margins of eyes (fig. 80). Antennae (fig. 85) 10-segmented, scape large, pedicel smaller than scape, larger than segment 3, segments 3-8 short and subequal, 9 elongate, 10 forming a large club. Mandible (fig. 83) with three apical teeth, mola well developed. Maxilla (fig. 87) with galea and lacinia of moderate length, the latter without apical spines, palpi with segment 2 inflated, much larger than 3, 4 elongate. Labium with triangular mentum, palpi with segment 2 larger than 3, ligula well developed and bilobed.

Thorax. Pronotum with deep antennal impressions at front angles, strongly narrowed in front, its side margins smooth; front coxae widely separated, prosternal process broad with apical margin slightly emarginate (fig. 82). Elytra broadest near middle, punctures irregular or in regular rows, epipleura rather narrow but complete. Middle coxae small, widely separated, sternal fitting between them in a straight line (fig. 86). Wings (fig. 84) without anal vein, *r-m* cross vein not distinct, subcubital fleck present. Metasternum strongly transverse, femoral lines well developed, median impressed line extending to apex, metendosternite with anterior tendons widely separated (fig. 86). Legs short, trochanters short and simple, femora swollen in middle, tibiae strongly broadened and obliquely truncate at apex, tibial spurs absent, tarsi simple, segment 1 longer than 2, 2 and 3 subequal, 4 as long as previous 3 together.

Abdomen slightly wider than long. Ventrite 1 about as long as next 3 together, with femoral lines, its intercoxal process broad with almost straight apical margin. Aedeagus as figured (fig. 90), without distinct parameres.

Type-species, by monotypy, *M.ovalis* Beck, 1817 (= *ferrugineus* Leach, 1822).

Habitat. Species recorded from dead leaves, cut grass piles, old rice, hay, stored products etc. Larva of *M.ovalis* described by Böving & Craighead (1931). Geographical



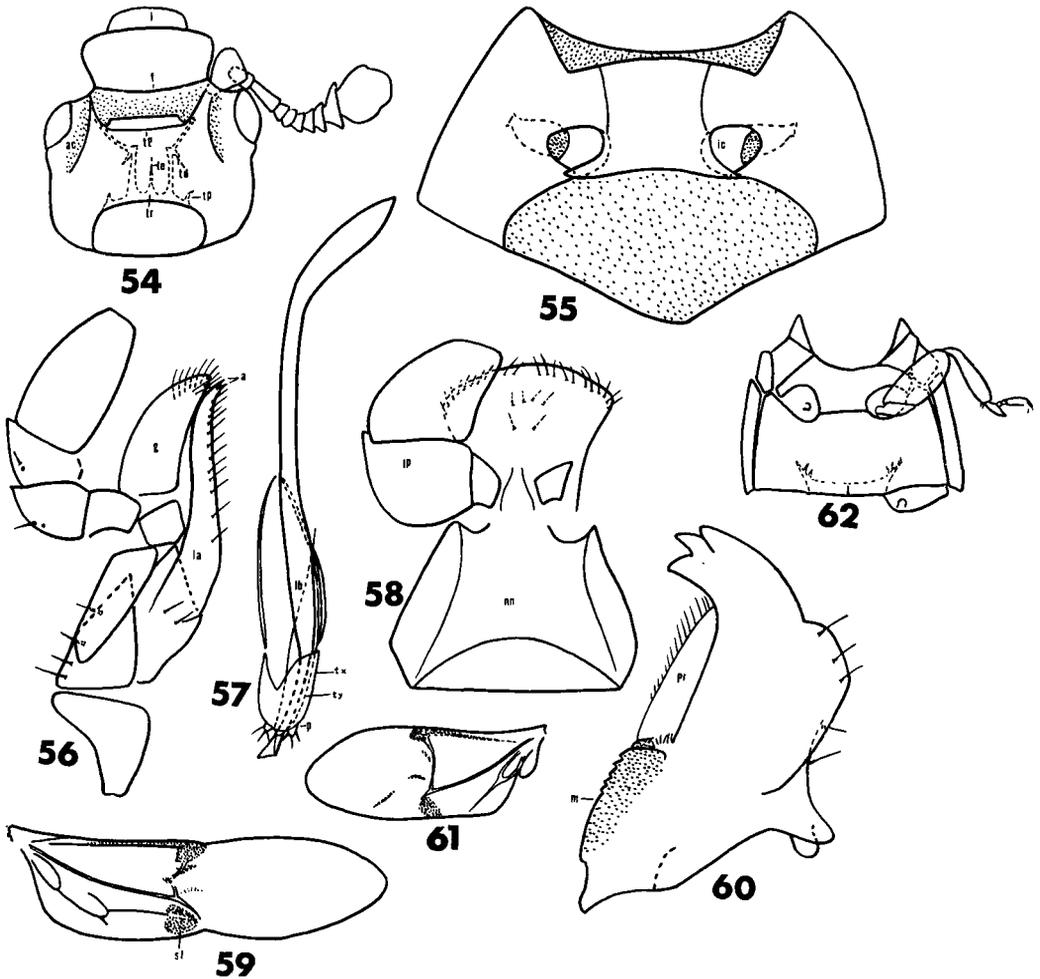
Figs. 50–53. (50–51) *Hypodacne bivulneratus*: (50) dorsal view; (51) ventral view; (51a–51c) *Protoxestus australicus*, dorsal view (51a), head, ventral view (51b), ventral view (51c). (52–53) *Pseudodacne admirabilis*: (52) dorsal view; (53) ventral view.

distribution: stored products species cosmopolitan, others from tropics and subtropics of New and Old World, one species from Chile.

Species studied. *M.ovalis* Beck and several unidentified species.

Botrodox Casey, 1890

Casey originally attributed this genus to Murmidiini, but in 1895 transferred it to a new tribe Mychocerini. Grouvelle (1912) added a second species, from Guadeloupe Is. (West Indies). The genus has certain similarities to *Lapethus* in the Ceryloninae, but differs from the latter in having the essential murmidiine features of the frontoclypeal suture, mouth parts and wing venation. It differs notably from *Murmidius* and *Mycho-*



Figs. 54–62. (54–60) *Hypodacne bivulneratus*: (54) head, ventral view; (55) prothorax, ventral view; (56) left maxilla, dorsal view; (57) aedeagus; (58) labium, ventral view; (59) wing; (60) left mandible, ventral view; (61–62) *Euxestus* species: (61) wing; (62) meso and metathorax, ventral view.

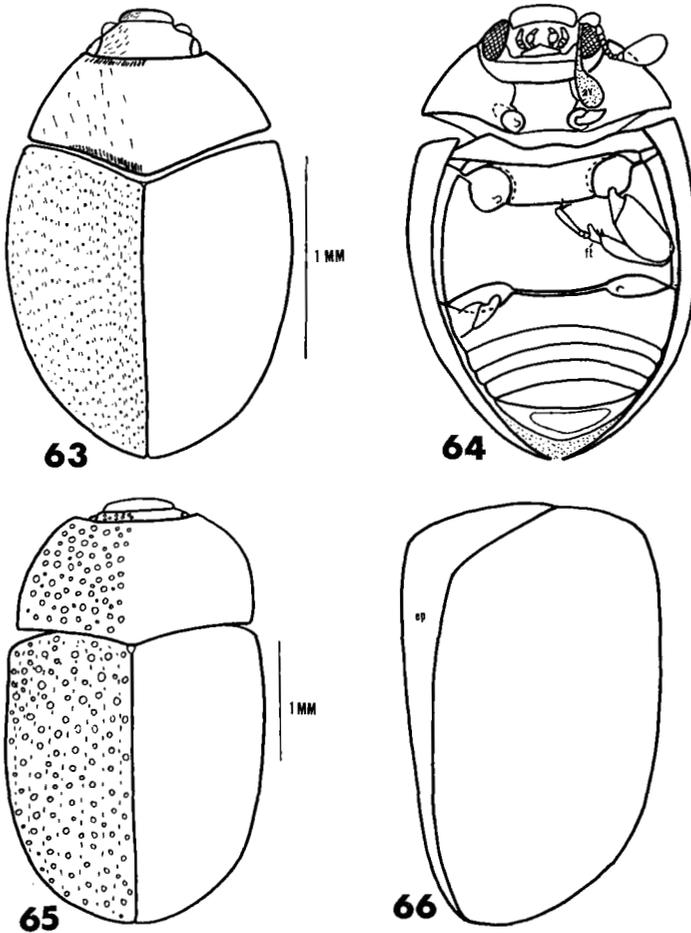
cerus in lacking the median impressed line of the metasternum and in having distinct articulated parameres in the aedeagus. It is definable as follows.

With general characters of Cerylonidae, Murmidiinae and Murmidiini.

General shape slightly more elongate than in *Murmidius*.

Head deflexed, eyes rather large and coarsely faceted (fig. 96), clypeus large with rounded apical margin, transverse groove in anterior gular region and antennal grooves by lower margins of eyes distinct. Antennae (fig. 96) short, 8-segmented, scape large, pedicel slightly longer than segment 3, 4–6 short and equal, 7 longer than 6, 8 forming a large club. Mouth parts as figured (figs. 95, 97, 98).

Thorax with antennal cavities at front angles of pronotum extending on to ventral side and visible from in front, pronotum without sublateral impressions; front coxae



Figs. 63–66. (63–64) *Elytrotetrantus chappuisi*: (63) dorsal view; (64) ventral view; (65–66) *Cyclozenus hispidus*: (65) dorsal view; (66) elytron, ventral view.

small and moderately widely separated, prosternal process short, broad with apical margin notched in middle (fig. 94). Elytra broadest near middle, epipleura rather narrow but complete, no trace of stria punctures. Middle coxae moderately widely separated, mesosternum between them to form a sharp curved margin overlying the tip of the prosternum, sternal fitting between the coxae in a straight line (fig. 91). Wing as in *Murmidius*. Metasternum transverse, with femoral lines but no median impressed line, hind coxae moderately widely separated. Legs (fig. 91) moderately long, less retractile than those of *Murmidius* or *Myhocerus*, trochanters short and simple, tibiae moderately broadened towards apex, tibial spurs absent, tarsi simple, segment 1 slightly longer than 2, 2 and 3 subequal, 4 slightly longer than preceding 3 together.

Abdomen slightly longer than wide. Ventricle 1 longer than next 2 together, with femoral lines, its intercoxal process broad and apically slightly emarginate (fig. 91) Aedeagus as figured (fig. 93), with well developed parameres.

Type-species, by monotypy, *B. estriatus* Casey.

Habitat. Unknown. Larva undescribed. Geographical distribution: southern U.S.A., Guadeloupe Island.

Species studied. *B. estriatus* Casey.

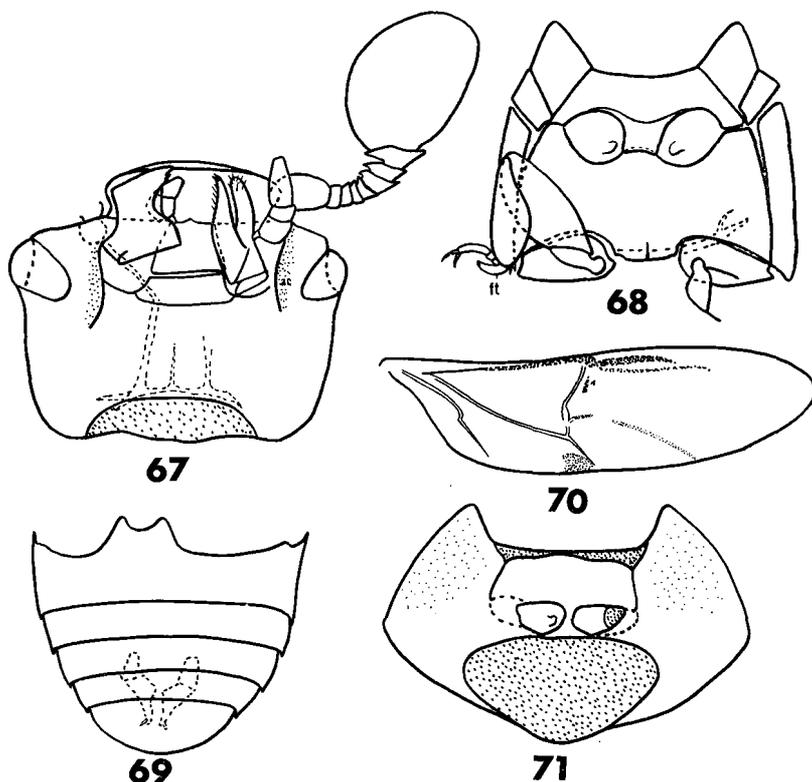
Mychocerus Erichson, 1845

Erichson defined this genus without including any named species in it; Leconte (1869) attributed to it the single species *Murmidius depressus* Leconte, 1866. Hetschko (1930) included in it four species from the New World and one from the Seychelles Islands. Casey (1895) made a tribe Mychocerini, separate from Murmidiini, and most later authors have followed him, but Hinton (1942) stated (of *Murmidius* and *Mychocerus*) "Taking into account only the structure of the adults, it would appear reasonable to regard these genera as constituting a tribe in the Ceryloninae". We agree with Hinton. The genus may be defined as follows.

With general characters of Cerylonidae, Murmidiinae and Murmidiini.

General shape similar to *Murmidius*, species small.

Head with moderate sized coarsely faceted eyes (fig. 104), transverse groove in anterior gular region and antennal grooves by lower margins of eyes distinct; antennae (fig. 101) 9-segmented, scape large, pedicel much smaller than scape and about twice



Figs. 67-71. *Cycloxenus hispidus*: (67) head, ventral view; (68) meso and metathorax, ventral view; (69) ventrites; (70) wing; (71) prothorax, ventral view.

as long as segment 3, 3-7 short and subequal, 9 forming a large club; mouth parts as figured (figs. 102, 103, 105).

Thorax with antennal cavities at front angles of prothorax distinctly ventral, not visible from above; front coxae small, moderately widely separated, prosternal process short and broad, its apical margin almost straight (fig. 100). Elytra broadest near middle, epipleura narrow but complete, 9 regular rows of punctures. Middle coxae widely separated, sternal fitting between them in a slightly curved line (fig. 100). Wing as in *Murmidius*. Metasternum strongly transverse, femoral lines well developed, median impressed line extending to apex, hind coxae widely separated, metendosternite with anterior tendons widely separated. Legs short, trochanters short and simple, tibiae scarcely broadened to apex, without tibial spurs, tarsal segment 1 as long as 2 and 3 together, 4 longer than previous 3 together.

Abdomen wider than long. Ventricle 1 about as long as next 3 together, femoral lines well developed, intercoxal process broad with straight apical margin (fig. 100). Aedeagus and ovipositor not studied.

Type-species, by monotypy (subsequent), *M. depressus* Leconte, 1869.

Habitat. Not recorded. Larvae undescribed. Geographical distribution: warmer parts of New World. The Seychelles species *Mychocerus alluaudi* Grouv. is probably a *Lapethus* (Ceryloninae).

Species studied. *M. depressus* Leconte.

(2) *Ostomopsini* trib. n.

Scott (1922) established for a single species from the Seychelles a new genus *Ostomopsis*, referred with some doubt to Lathridiidae, and compared it particularly with *Holoparamesus* and Merophysiinae. The genus *Ostomopsis* is distinguishable from Merophysiidae (Crowson, 1955; including *Holoparamesus*) by its exposed antennal insertions, abdomen with only five pairs of functional spiracles, wing without a subcubital fleck, front coxal cavities internally open behind, hind margin of last ventrite serrate; in all these respects it agrees with Murmidiinae. It has the essential features of Cerylonidae in the mouth parts, etc. Within the Cerylonidae, it appears to have most in common with Murmidiinae, but differs notably from the Murmidiini in lacking a transverse line on the vertex, in having 3-segmented tarsi, no antennal cavities at the front angles of the prothorax, no femoral lines, and the front coxal cavities externally as well as internally open behind. It shows some resemblances to Ceryloninae, and stands to Murmidiini in a relation rather similar to that of *Anommatus* to Euxestini.

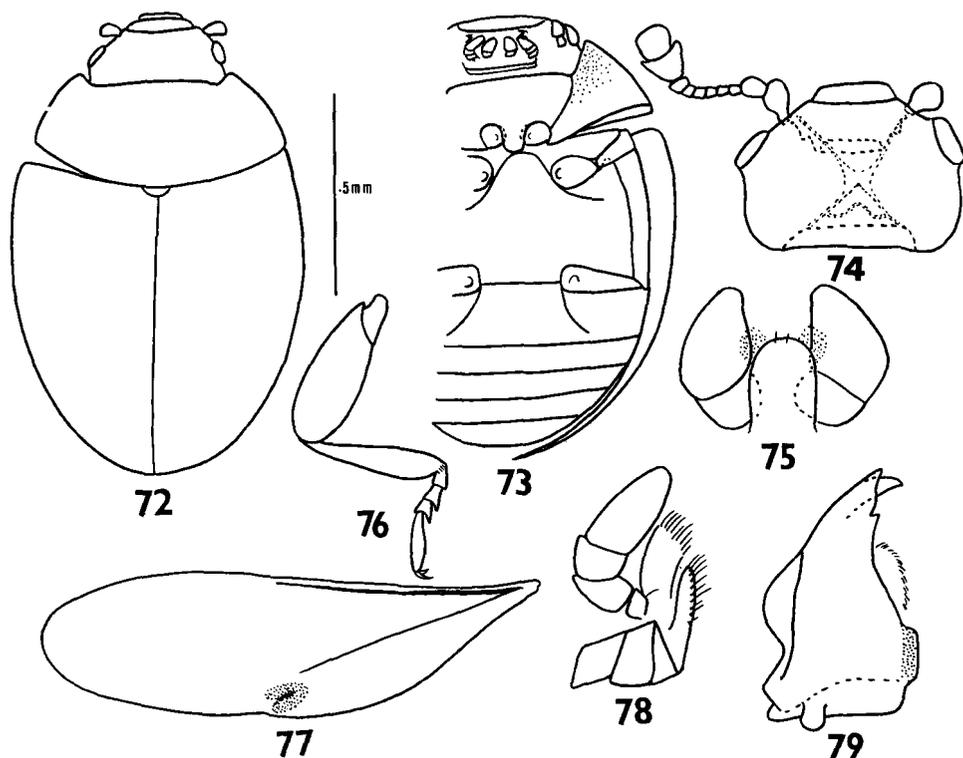
Ostomopsis Scott, 1922

In addition to Scott's unique holotype in the British Museum (Nat. Hist), we have studied specimens from New Caledonia, in the Field Museum of Natural History, which do not differ evidently from Scott's species, and one from Florida, U.S.A., also in the Field Museum collection, which may represent a new species.

The genus is definable as follows.

With general characters of Murmidiinae.

General shape broadly elongate, flattened, rather parallel-sided, resembling a minute *Ostoma*, dorsal surface somewhat shining but clearly pubescent.



Figs. 72-79. *Eidoreus* = *Eupsilobius* species: (72) dorsal view; (73) ventral view; (74) head, dorsal view; (75) labial palpi; (76) middle leg; (77) wing; (78) left maxilla, dorsal view; (79) right mandible, ventral view.

Head with moderate sized coarsely faceted eyes, clypeus large with rounded anterior margin, antennal grooves distinct by lower margins of eyes but no transverse groove in anterior gular region; antennae (fig. 43) 10-segmented, scape moderately large, pedicel and segment 3 narrow, elongate and almost equal in length, 4-8 short and equal, 9 slightly larger than 8, 10 forming a large club; mouth parts as figured (figs. 45, 46, 48).

Thorax with pronotum strongly transverse, broadest somewhat behind middle, side margins evenly curved and serrate, notum without impressions, no antennal cavities on hypomeron; front coxae small, rather narrowly separated, prosternal process short with straight apical margin (fig. 44); elytra broadest near middle, punctures in 10 regular rows, epipleura narrow and complete; middle coxae moderately large, well separated, sternal fitting between them in a straight line (fig. 47); wings without distinct anal vein, subcubital fleck or *r-m* cross vein; metasternum transverse, without femoral lines, median impressed line short, hind coxae moderately widely separated, metendosternite with anterior tendons widely separated (fig. 47). Legs with trochanters slightly elongate (fig. 47), tibiae not broadened to apex, with 2 normal spurs, tarsi simple, segment 1 longer than 2, 3 about twice as long as 1 and 2 together, claws simple, no distinct empodium.

Abdomen slightly longer than wide. Ventrite 1 about as long as next 2 together, without femoral lines, its intercoxal process moderately broad and truncate (fig. 49),

Aedeagus in retracted condition turned partly on one side, median lobe nearly straight, tegmen short and without parameres.

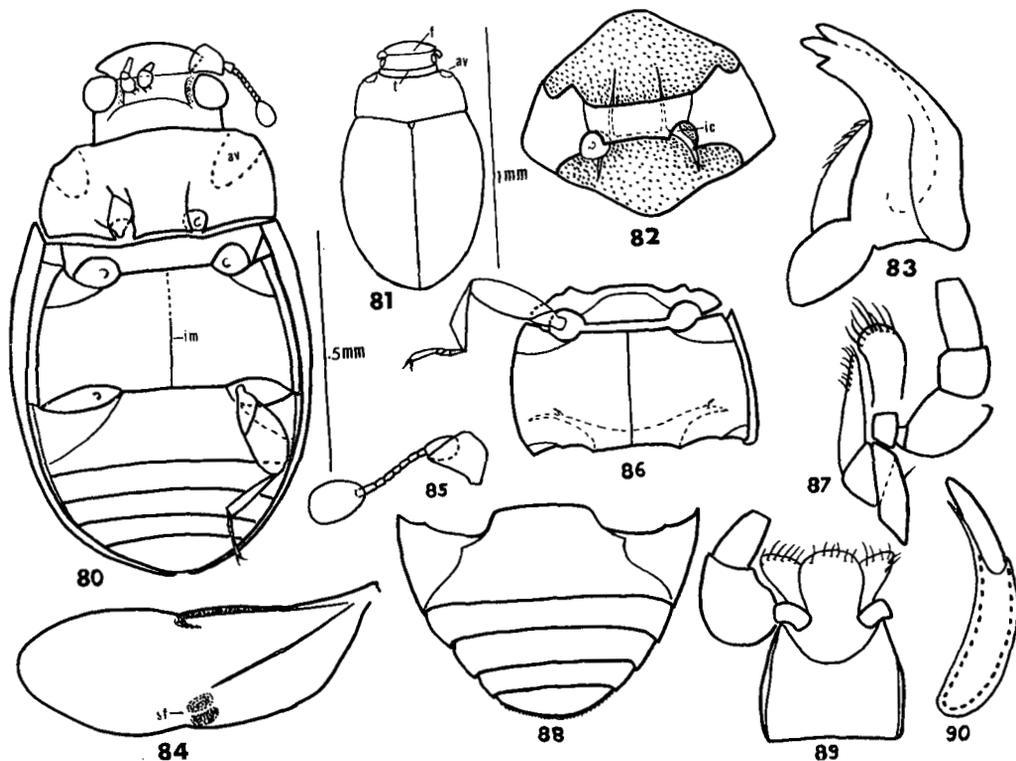
Type-species, by monotypy, *O.solitaria* Scott.

Habitat. Holotype of *O.solitaria* found under bark. Larva unknown. Geographical distribution: Seychelles, New Caledonia, Florida.

Species studied. *O.solitaria*; undetermined species from New Caledonia and Florida.

VI SUBFAMILY CERYLONINAE

Hetschko (1930) included six tribes in the Ceryloninae, then considered a subfamily of Colydiidae. Crowson (1952) excluded three of these tribes, including Cerylonini, from Colydiidae to incorporate them in the new family Cerylonidae. One of the three tribes, Anommatini, has already been dealt with under Euxestinae, as has the genus *Metacerylon* (Cerylonini of Hetschko). Hinton (1942) used the name Cerylonini for a grouping equivalent to our Ceryloninae, including the genus *Lapethus*, previously placed in Murmidiinae. Two genera belonging in this subfamily according to our criteria have previously been made the types of separate families: *Aculagnathus* Oke (Aculagnathidae) and *Dolosus* Dajoz (Dolosidae). Another genus, described under Cryptophagidae, but which according



Figs. 80-90. (80) *Murmidius* species, ventral view (81-90) *Murmidius ovalis*: (81) dorsal view; (82) prothorax, ventral view; (83) right mandible, dorsal view; (84) wing; (85) antenna; (86) meso and metathorax, ventral view; (87) right maxilla, dorsal view; (88) ventrites; (89) labium, ventral view; (90) aedeagus.

to the description may well belong in Ceryloninae-Cerylonini, is the Madagascan *Anathilopus* Falcoz. The only cerylonine larvae known to us are those of *Cerylon* and *Philothermus*, described below.

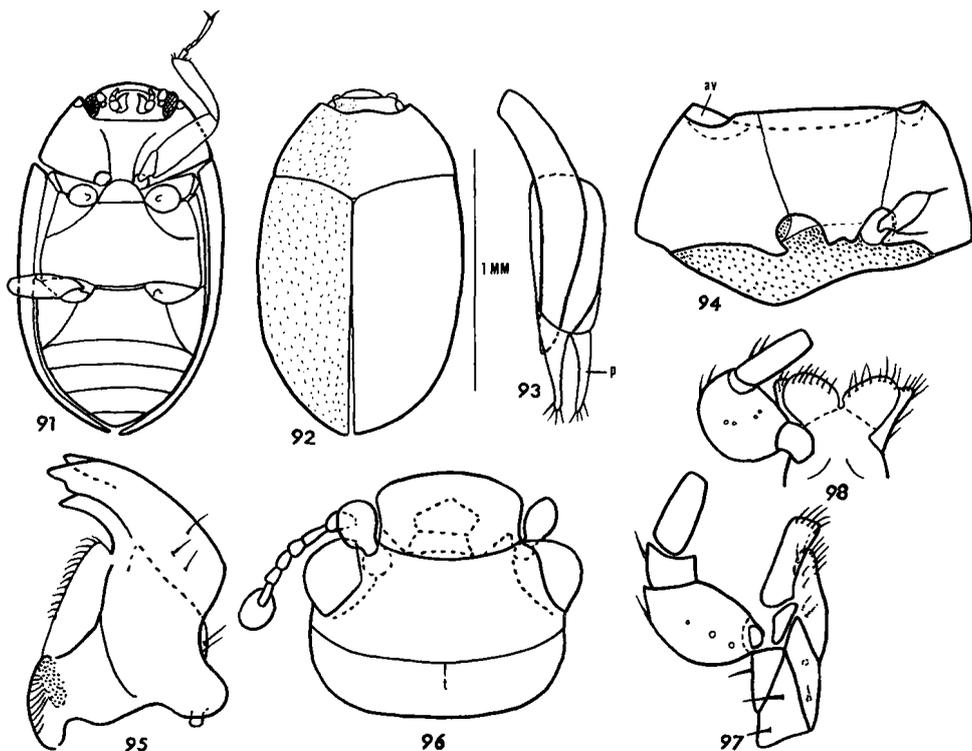
The subfamily may be characterised as follows.

With general characters of Cerylonidae.

General appearance usually shining, moderately elongate and depressed (fig. 119), more rarely oval and rather convex (fig. 114) or broadly convex and compact (fig. 189).

Head more or less inclined, narrower than pronotum, without fronto-clypeal suture, transverse groove in anterior gular region (fig. 181) and antennal grooves by lower margins of eyes rarely present; antennae variable; mandibles of normal form (fig. 127) or narrow and modified for piercing (fig. 203), maxillae with galea and lacinia long and slender, lacinia without apical spines, palpi aciculate (fig. 128); labium (fig. 121) with elongate mentum and aciculate palpi; labrum short and transverse (fig. 119) or elongate and pointed at apex (fig. 200).

Thorax. Pronotum usually with a pair of sublateral impressions (fig. 119) its front angles occasionally with cavities receiving antennal club (fig. 159), front coxal cavities more or less widely separated, internally open, externally open or closed behind (figs. 116, 129, 165). Elytra usually with regular rows of punctures. Wings without subcubital fleck or distinct *r-m* cross vein, anal veins absent except in Lapethini (fig. 169). Meta-sternum with or without femoral lines (fig. 159). Legs with trochanters simple or more



Figs. 91-98. *Botrodes estriatus*: (91) ventral view; (92) dorsal view; (93) aedeagus; (94) prothorax, ventral view; (95) right mandible, dorsal view; (96) head, dorsal view; (97) left maxilla, dorsal view; (98) labial palp.

or less elongate, rarely slightly heteromeroid (fig. 190); tarsi simple or with segment 1 very slightly lobed below, 4 or 3-segmented.

Abdomen with 5 pairs of functional spiracles, first ventrite with or without femoral lines, last ventrite with hind margin inflexed and crenulate. Aedeagus in resting condition turned on one side, median lobe usually markedly dilated towards apex (figs. 130, 164), tegmen with or without parameres, often incomplete.

Larvae with strongly deflexed head and mouth parts markedly modified for piercing and sucking, mandibles long and stylet-like, cardo and maxillary articulating area not distinct; general form rather broad and flattened, without distinct urogomphi (fig. 236).

(1) *Lapethini*

Sharp (1895) defined a subfamily Lapethinae in the family Colydiidae, including two genera *Lapethus* Casey and *Lytopeplus* Sharp; Ganglbauer (1899) treated the group as a tribe in Murmidiinae, and Jeannel & Paulian (1945) added the genus *Mychocerus* to the tribe Lapethini in Murmidiinae. We have transferred the group (excluding *Mychocerus*) to Ceryloninae, on account of similarities in the mouth parts and the absence of a frontoclypeal suture. The transference of *Lapethus* to Cerylonini had been proposed already by Hinton in 1942. Hinton synonymised *Lytopeplus* Sharp with *Lapethus*, and was followed in this by Heinze (1944b), but we have restored *Lytopeplus* to generic status; a third genus, *Lapecautomus*, is here defined as new, based on three new species from North and Central America.

Within the Ceryloninae, the main distinguishing features of Lapethini are the Murmidiinae-like shape, the prothorax with well marked antennal cavities at its front angles, well developed femoral lines on the metasternum and first ventrite, wings with a distinct anal vein, and the 8-segmented antennae.

We have seen no published information of the larvae of Lapethini, and little is recorded of their habits, though adults of a species of *Lapethus* were found by R.A. Crowson in forest litter in Queensland, Australia, and adults of an Abyssinian species of the same genus were found by sieving forest leaf-mould, according to Hinton (1942). Species of the group have been found in most of the warmer regions of both New and Old Worlds. A larva associated with adults of a *Lapethus* agreed in essential character with *Philothermus*, but has much longer lateral processes of the trunk tergites, resembling those of *Elytrotetrantus*.

Lapethus Casey, 1890

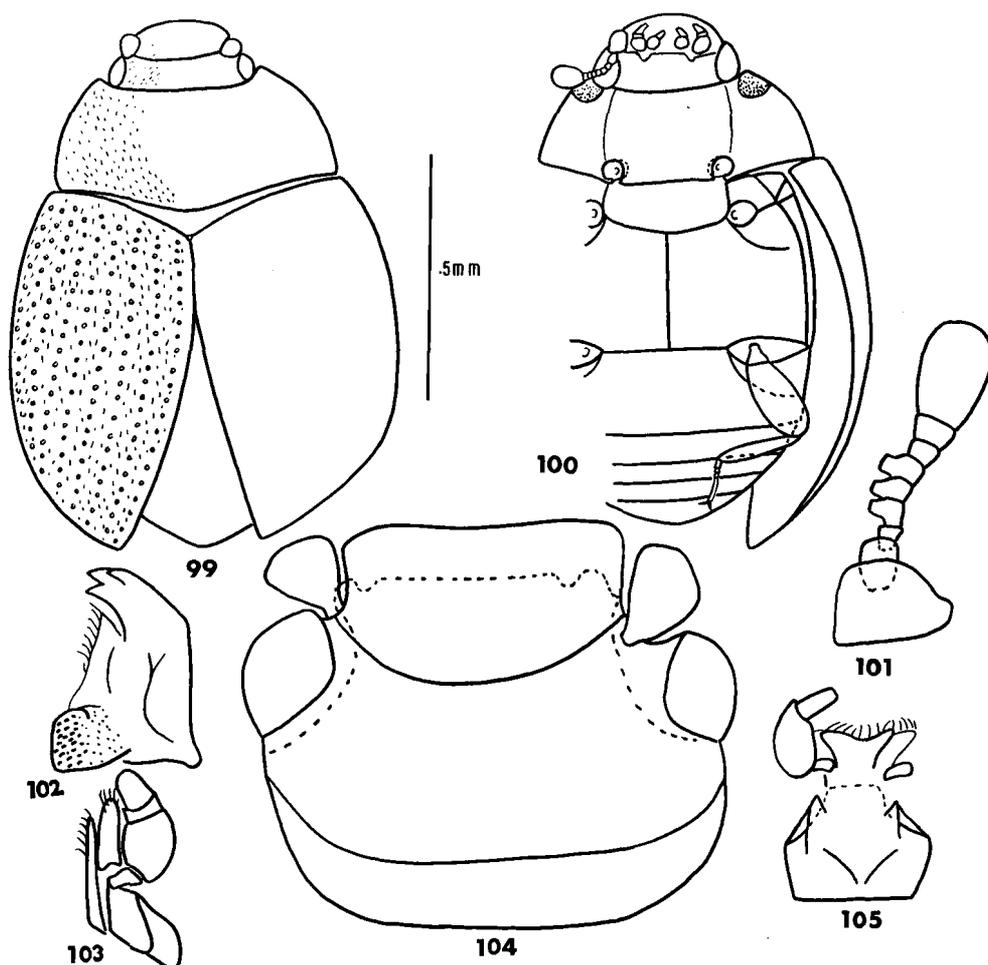
Casey (1890) based his genus on a single species from California, U.S.A. Hetschko (1930) included four described species from the New World, one (*L. crassus* Reitter) recorded from both South America and Madagascar. Hinton (1942) stated that 18 species had been described, 13 Neotropical, two New Caledonian, one from Madagascar, one from the Seychelles Islands, and one from Abyssinia, but he was including *Lytopeplus* in the genus. One of us (R.A. Crowson) recently collected specimens of a probably undescribed species of *Lapethus* from Queensland, Australia. The genus is moderately diverse, and there are probably many undescribed species of it in museum collections in various parts of the world; a critical revision of it would be valuable but difficult. We would define *Lapethus* as follows.

With general characters of Ceryloninae and Lapethini.

General shape (fig. 160) *Murmidius*-like, oval and convex with strongly deflexed head, dorsum shining and nearly or quite glabrous.

Head (fig. 163) with moderately large coarsely faceted eyes, without transverse groove in anterior gular region or antennal grooves by lower margins of eyes; antennae (fig. 163) 8-segmented, scape moderately large, pedicel and segment 3 various, segments 4-7 short and subequal, 8 forming a large club; mandibles, maxillae and labium as figured (figs. 166, 167, 168), labrum short and transverse.

Thorax with very transverse pronotum (fig. 160), hypomera with sharply defined antennal cavities by front angles; prosternum projecting forward to cover gular region of retracted head (fig. 159); front coxae small, moderately widely separated, their cavities internally and externally open behind (fig. 165), prosternal process moderately broad with apical margin curved, angulate or straight. Elytra broadest near base, with



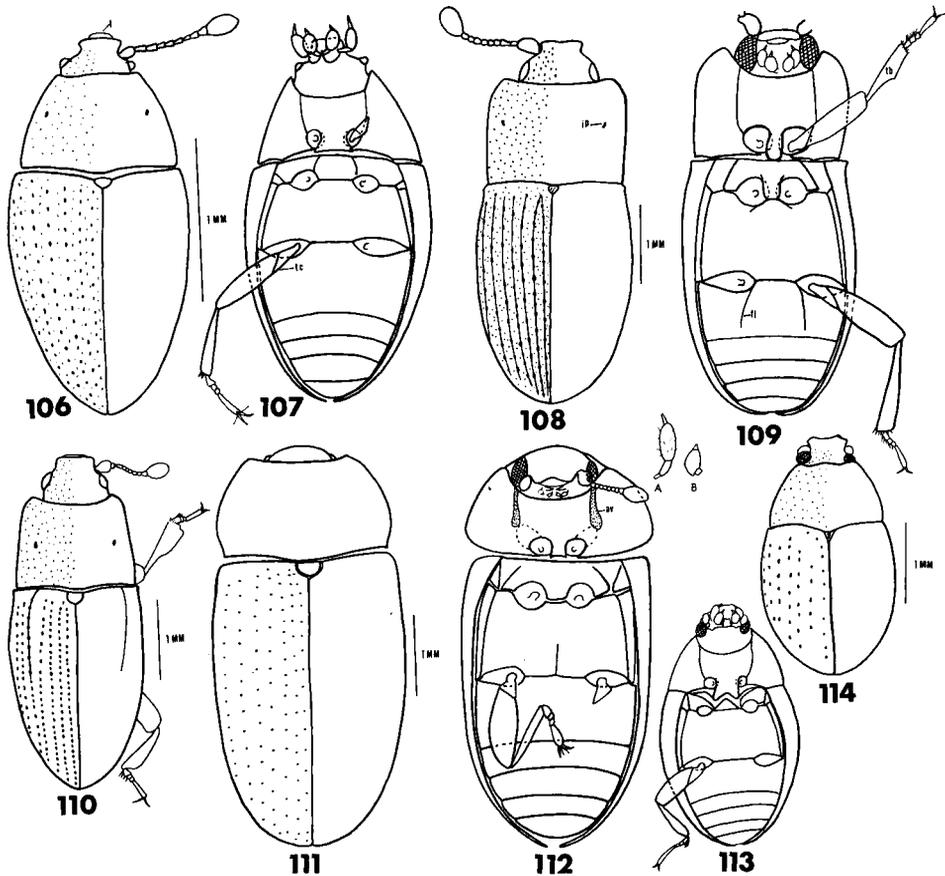
Figs. 99-105. *Mychocerus depressus*: (99) dorsal view; (100) ventral view; (101) antenna; (102) right mandible, ventral view; (103) right maxilla, dorsal view; (104) head, dorsal view; (105) labium, ventral view.

8 more or less distinct rows of punctures and complete narrow epipleura; middle coxae moderately separated, the sternal fitting between them in a weakly curved line (fig. 170). Wing as figured (fig. 169); metasternum moderately transverse, femoral lines strong, median impressed line very short or absent (fig. 170); metendosternite with anterior tendons widely separated. Legs with trochanters simple (fig. 159), tibiae weakly broadened to apex, with 2 normal spurs, tarsal segment 1 as long as 2 and 3 together, 4 longer than previous 3 together.

Abdomen about as long as wide; ventrite 1 with well developed femoral lines, intercoxal process broad, short, apically truncate (fig. 159), ventrite 1 about as long as next 2 together; aedeagus as figured (fig. 164), parameres absent.

Type-species, by monotypy, *L. discretus* Casey.

Habitat. In forest litter or humus, or under bark. Larva undescribed. Geographical distribution: New World, Australia, New Caledonia, Seychelles, Madagascar, Abyssinia.



Figs. 106–114. (106) *Ploesosoma ellipticum*, dorsal view. (107) *Ploesosoma ellipticum*, ventral view. (108) *Philothermus ugandense*, dorsal view. (109) *P. ugandense*, ventral view. (110) *P. canerunense*, dorsal view. (111) *Pachylon gorhami*, dorsal view. (112) *Pachylon gorhami*, ventral view. (113) *Pseudocerylon* species, ventral view. (114) *Pseudocerylon* species, dorsal view; (A and B) maxillary and labial palpi of *Pachylon gorhami*.

Species studied. *L. sharpi* Champion and several unidentified specimens from the New World, New Caledonia and Australia.

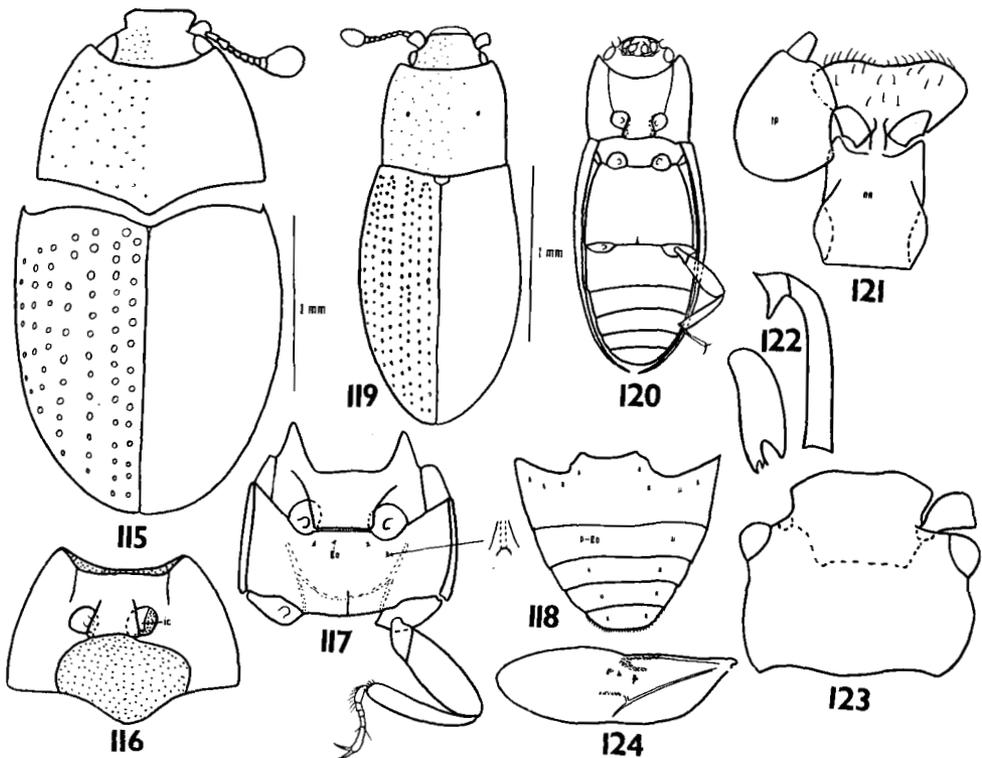
Lytopeplus Sharp, 1895

Sharp's original species was from Guatemala; later Grouvelle and Champion added another 9 species from the New World and New Caledonia. Close similarities between this genus and *Lapethus* have been noted by previous workers, none of whom gave satisfactory characters to separate the two genera; Hinton (1936) treated *Lytopeplus* as a synonym of *Lapethus*, and Heinze (1944b) retained it as a subgenus only. The only character we have found to separate the two is the visibly closed front coxal cavities of *Lapethus*, as compared with the more or less open ones of *Lytopeplus*. This character might well be of subgeneric rather than generic value, as suggested by Heinze. The genus (or subgenus) may be defined as follows.

With general characters of Cerylonidae-Ceryloninae-Lapethini.

General shape Murmidius-like.

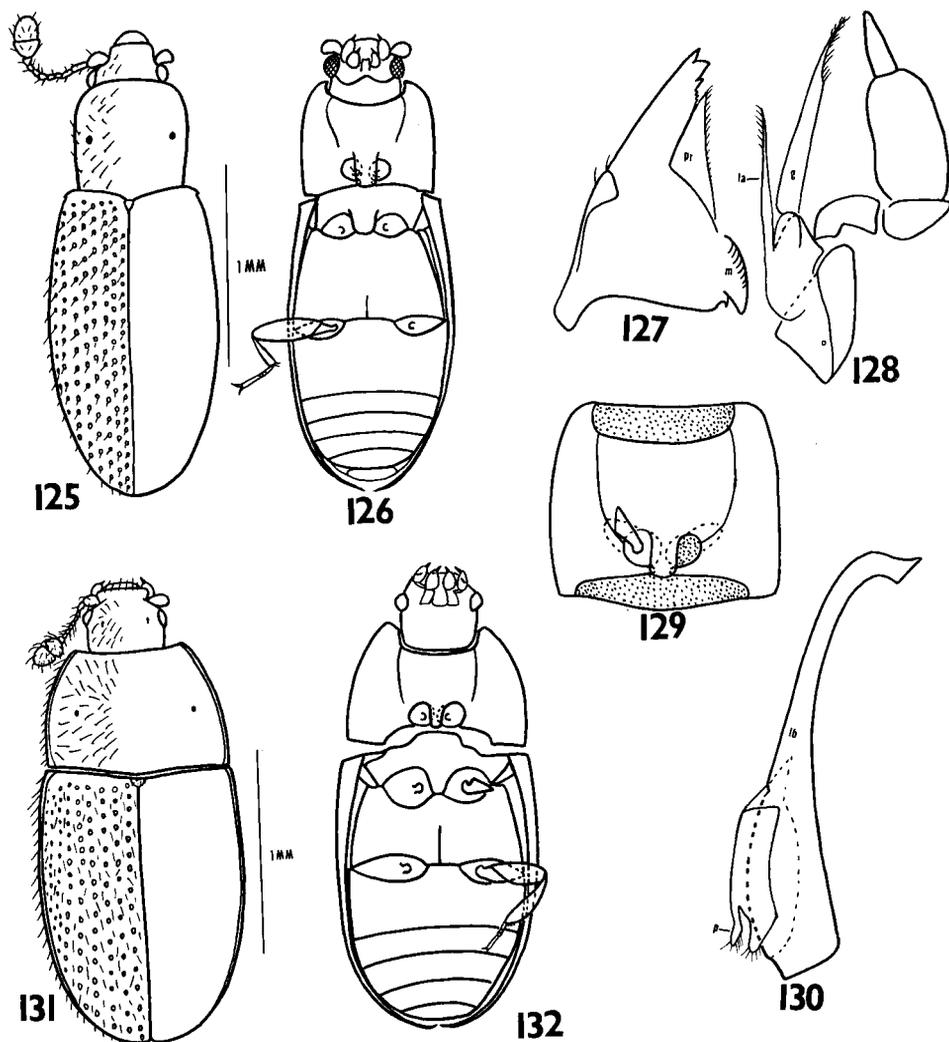
Head deflexed, eyes moderate-sized, rather coarsely faceted, clypeus transverse with almost straight apical margin, without transverse groove in anterior gular region or



Figs. 115-124. (115-118) *Cerylon* species; (115) dorsal view; (116) prothorax, ventral view; (117) meso and metathorax, ventral view; (118) ventrites. (119-124) *Cerylon histerooides*: (119) dorsal view; (120) ventral view; (121) labium, ventral view; (122) aedeagus; (123) head, dorsal view; (124) wing.

antennal grooves by lower margins of eyes; antennae (fig. 162) 8-segmented, scape moderately large, pedicel slightly shorter than segment 3, segment 8 forming a large 1-segmented club; mouth parts apparently as in *Lapethus*, palpi as figured (figs. 170C, D).

Thorax with prosternum as figured (fig. 162), front coxae moderately widely separated, well marked cavities receiving antennal club in anterior part of hypomeron, prosternal process with apical margin rounded-truncate. Elytra broadest near base, with 8 regular rows of punctures, complete narrow epipleura; middle coxae moderately widely separated, sternal fitting between them in a straight line (fig. 162). Metasternum with well developed femoral lines, very short median impressed line, and hind coxae widely



Figs. 125-132. (125-130) *Philothermus* species: (125) dorsal view; (126) ventral view; (127) left mandible, dorsal view; (128) right maxilla, dorsal view; (129) prothorax, ventral view; (130) aedeagus. (131-132) *Philothermus* species: (131) dorsal view; (132) ventral view, showing front coxal cavities externally open behind.

separated. Legs (fig. 162) with short simple trochanters, tibiae weakly broadened towards apex and with 2 normal spurs, tarsal segment 1 as long as 2 and 3 together, 4 slightly longer than previous 3 together.

Abdomen about as long as wide ventrally. Ventrite 1 about as long as next 2 together, with well developed femoral lines, intercoxal process broad, its apical margin slightly emarginate (fig. 162).

Type-species, by monotypy, *L.compactus* Sharp.

Habitat. Adults have been found under loose bark of trees. Geographical distribution: warmer parts of New World, ?New Caledonia.

Species studied. *L.curtulus* Champion.

Lapecautomus gen. n.

This genus, of which we have seen three species, all from Central America and the south of North America, is distinguishable from the two preceding by having piercing-type mouth parts very much like those of Aculagnathini in Ceryloninae. We define it provisionally as follows.

With general characters of Cerylonidae-Ceryloninae.

General shape oval and more or less convex, resembling *Murmidius* (figs. 171, 177, 178), shining and nearly glabrous.

Head with small to minute, more or less coarsely punctured, a distinct transverse line on vertex (fig. 176), without transverse groove in anterior gular region or antennal grooves by lower margins of eyes; antennae (fig. 178) 8-segmented, scape moderately large, pedicel slightly longer than segment 3, segments 4-7 short and equal, 8 forming a large ovate club; mandible (fig. 173) characteristic, with distinct mola and elongate narrow apical part; maxillae (fig. 174) with palpi rather large, elongate and projecting; labium with elongate mentum (fig. 175), palpi large and aciculate; labrum elongate, projecting, pointed at apex (fig. 171).

Thorax with prosternum projecting anteriorly to cover ventral side of head, hypomera anteriorly with well developed antennal cavities (fig. 172), prosternal process short, broad, its apical margin somewhat rounded, front coxal cavities internally and externally open behind; elytra with 8 or 9 more or less distinct rows of punctures, epipleura narrow, middle coxae fairly widely separated, sternal junction between them in a straight line (fig. 172); wing as in *Lapethus*, metasternum with well developed femoral lines, no median impressed line, hind coxae widely separated; metendosternite with anterior tendons widely separated; legs with short simple trochanters (fig. 172), tibiae moderately broadened towards apex and with 2 normal spurs, tarsal segment 1 as long as 2 and 3 together, 4 longer than previous 3 together.

Abdomen about as long as wide ventrally; ventrite 1 about as long as next 2 together, with well developed femoral lines, intercoxal process broad with almost straight apical margin (fig. 172); aedeagus with long curved and apically dilated median lobe.

Type-species, *L.dybasi* sp. n.

Habitat. Adults recorded from log debris, litter under logs, and flood detritus. Larvae undescribed. Geographical distribution: Tennessee (U.S.A.), Mexico, Panama.

Lapecautomus dybasi sp. n.

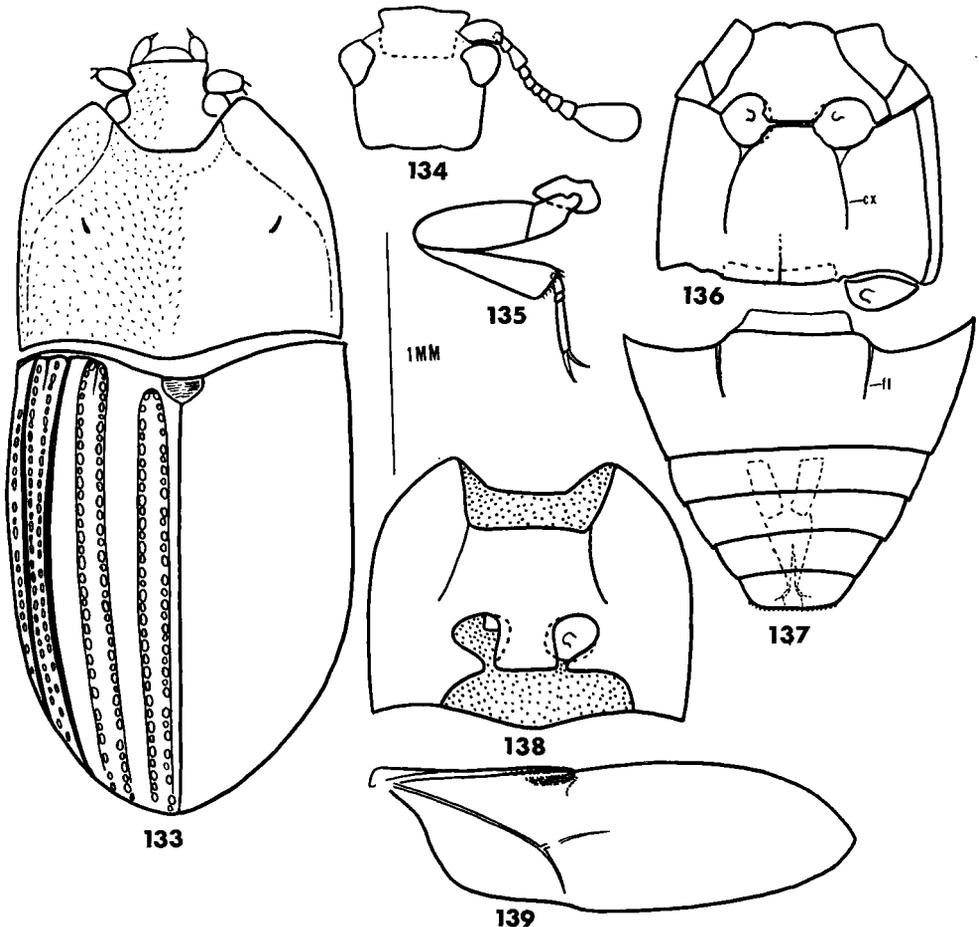
With general characters of the genus *Lapecautomus*.

General form (fig. 171) slightly narrower and smaller than in the other species of the genus, dorsal surface glabrous and dark castaneous.

Head slightly lighter coloured than pronotum, the punctures of the vertex sparse, fine and weak, front margin of clypeus slightly rounded and bearing moderately long simple setae.

Thorax with front and hind angles of pronotum obtuse, its dorsum with sparse rather indistinct punctures; elytra broadest near middle, with 8 well-marked rows of moderately strong punctures, the interstices punctured like the pronotum; scutellum small, triangular, glabrous, paler than elytra; ventral surface almost glabrous, considerably lighter coloured than dorsum; legs yellowish, hairy.

Abdomen ventrally coloured as thoracic sterna, almost glabrous, pubescence sparse and inconspicuous.



Figs. 133-139. *Suakokoia striata*: (133) dorsal view; (134) head, dorsal view; (135) hind leg; (136) meso and metathorax, ventral view; (137) ventrites; (138) prothorax, ventral view; (139) wing.

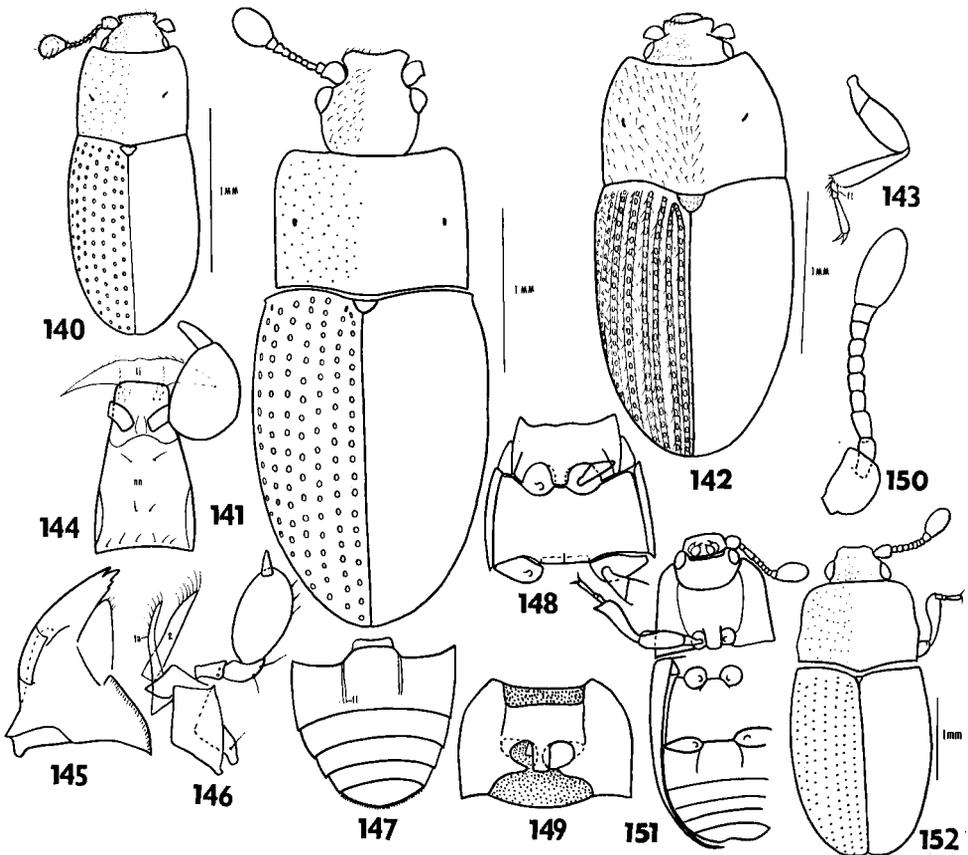
Dimensions of holotype (in mm.): total length 1.12, width of head including eyes 0.25, length of antennae 0.27, basal width of prothorax 0.52, length of elytra 1.00, their maximum width 0.68.

Holotype and 4 *paratypes* (one dissected and mounted on slide), PANAMA: Canal Zone, Barro Colorado Island, 24.i.1959; 1 *paratype*, PANAMA: El Valle, Coclé prov. (trail to Las Minas), 23.ii.59, (all *H.S.Dybas*); in Field Museum of Natural History, Chicago.

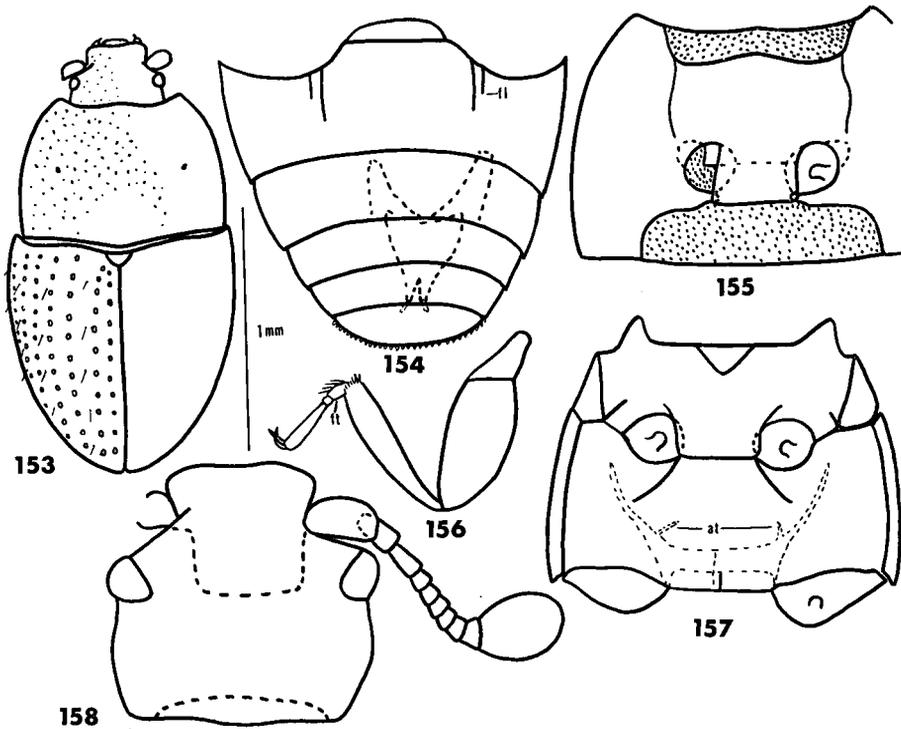
***Lapecautomus mexicanus* sp. n.**

With general characters of genus *Lapecautomus*.

General shape (fig. 177) rather broader and more rounded than in *L.dybasi*, dorsal surface glabrous and uniformly black.



Figs. 140–152. *Philothermopsis* species. (140) *P.liberiensis*, dorsal view. (141) *P.punctata*, dorsal view. (142–150) *P.pubescens*: (142) dorsal view; (143) hind leg; (144) labium, ventral view; (145) left mandible, ventral view; (146) right maxilla, dorsal view; (147) ventrites; (148) meso and metathorax, ventral view; (149) prothorax, ventral view; (150) antenna. (151) *P.laevigata*, ventral view. (152) *P.hamata*, dorsal view.



Figs. 153-158. *Cerylonopsis trifoveolatum*: (153) dorsal view; (154) ventrites; (155) prothorax, ventral view; (156) hind leg; (157) meso and metathorax, ventral view; (158) head, dorsal view.

Head with eyes rather more finely faceted than in *L.dybasi*, vertex finely, sparsely and indistinctly punctured, front margin of clypeus straight, with moderately long setae.

Thorax with front angles of pronotum acute, hind angles obtuse, minute and sparse punctures distinguishable on middle region only of pronotum; elytra broadest near middle, rows of punctures hardly distinguishable, dorsal surface with fine, sparse and irregular punctuation all over; scutellum (fig. 177) small, elongate, glabrous; ventral surface castaneous brown, almost glabrous, legs yellowish.

Abdomen ventrally with colour and pubescence as thoracic sterna.

Dimensions of holotype (in mm.): total length 1.70, width of head including eyes 0.35, length of antenna 0.40, basal width of pronotum 0.87, length of elytra 1.10, maximum width across elytra 1.12.

Holotype and 2 *paratypes*, MEXICO: Tezonapa, Veracruz, 8.viii.41 (*H.S.Dybas*); 1 *paratype*, MEXICO: Cordaba, Veracruz, 20.vii.36 (*C.H.Seevers*); in Field Museum of Natural History, Chicago.

This species can readily be separated from the other two of the genus by its more convex and rounded shape (fig. 177) and by the shape of the scutellum.

***Lapecautomus striatus* sp. n.**

With the general characters of the genus *Lapecautomus*.

General form (fig. 178) rather more depressed than in previous two species, narrower than *L.mexicanus*; dorsum light castaneous and distinctly pubescent.

Head with small eyes, each with a few large ommatidia, apical margin of clypeus straight and without setae, vertex glabrous without distinct punctures.

Thorax with sides of prothorax almost parallel in basal third, these side margins with short simple posteriorly-curved setae, front angles slightly projecting and acute, hind angles obtuse, pubescence of pronotum short, simple, semi-erect and bent posteriorly; elytra broadest near middle, with 9 distinct rows of punctures, general surface with pubescence arising from fine sparse punctures, tending to form rows on interstices; scutellum minute, strongly transverse, triangular, glabrous; ventral surface lighter coloured than dorsum, with fine close recumbent pubescence, legs yellowish.

Abdomen ventrally coloured and pubescent as thoracic sterna.

Dimensions of holotype (in mm.) total length 1.70, width of head including eyes 0.30, length of antenna 0.40, basal width of prothorax 0.75, length of elytra 1.00, maximum width of elytra 0.87.

Holotype, U.S.A.: Great Smoky Mountains National Park, Sevier County, Tennessee, below Ramsay Cascades, alt. 3500 feet, 18.x.52, litter under old log (*T.I.Wright*); 2 *paratypes*, Great Smoky Mountains National Park, Cherokee Orchard, alt. 2100 feet, 17.ix.53 (*H.S.Dybas*); in Field Museum of Natural History, Chicago.

(2) *Cerylonini*

As we define it, this grouping includes the genera *Ploeosoma* Wollaston, *Pseudocerylon* Grouvelle, *Gyrelon* Hinton, *Pachylon* Sharp, *Cerylon* Latreille, *Philothermus* Aube, *Cocillon* Hinton, *Suakokoia* gen. n., *Philothermopsis* Heinze, *Cerylonopsis* Heinze, and possibly the inadequately characterised *Pachyochthes* Reitter and *Anathilopus* Falcoz. Hetschko (1930) included several other genera in this tribe, *Metacerylon* Grouvelle, *Cautomus* Sharp, *Glyptolopus* Erichson, *Axiocerylon* Grouvelle, and *Tyrtaeus* Champion. *Metacerylon* was excluded from *Cerylonini* by Hinton (1942) and Heinze (1944b); it is here placed in Euxestinae, *Cautomus*, *Glyptolopus* and *Axiocerylon* all have markedly modified piercing mouth parts, and are here associated with *Aculagnathus* Oke in *Aculagnathini* (see p. 433). *Tyrtaeus* was shown to be a true Colydiid by Hinton (1942). We know *Anathilopus* only from the description; it was attributed by its describer to Cryptophagidae, but the simple 4-4-4 tarsi and the small rounded front coxae shown in Falcoz's figure should suffice to exclude it from that family and strongly suggest *Cerylonidae*. As Falcoz gives no information on its palpi or mouth parts, we are unable to decide whether its true affinities are to *Cerylonini* or to *Metacerylonini* or *Anommatini*.

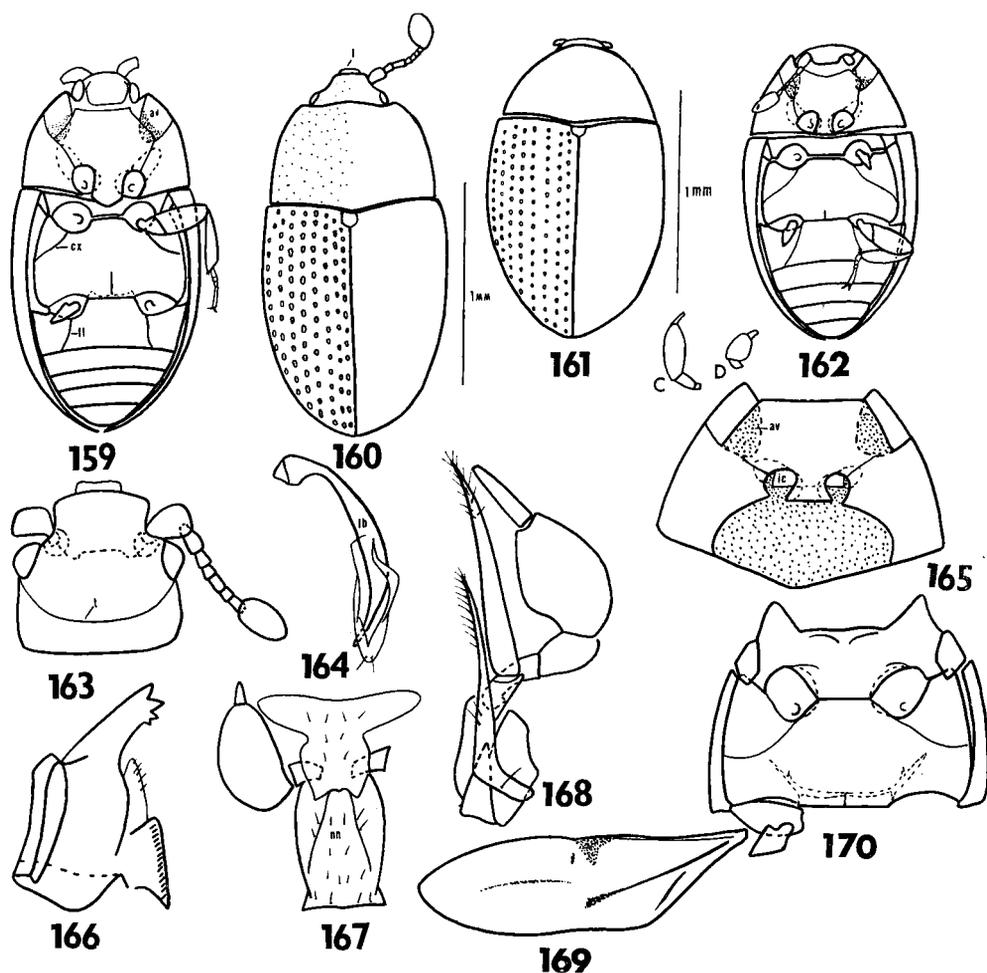
Our provisional definition of *Cerylonini* is as follows.

With general characters of *Cerylonidae-Ceryloninae*.

General shape diverse, but never as rounded and convex as typical *Lapethini*.

Head without occipital transverse line, transverse groove in anterior gular region or antennal grooves by lower borders of eyes; mouth parts not markedly modified for piercing, more or less as in *Lapethus*, mandible (fig. 127) with single apical tooth, serrated inner margin and moderately developed mola, maxillary galea and lacinia elongate, their apices usually bearing setae (fig. 128) labial palpi aciculate (fig. 121); labrum short and transverse (fig. 119).

Thorax with pronotum lacking marked grooves or ridges, its side borders smooth



Figs. 159–170. (159–160) *Lapethus sharpi*: (159) ventral view; (160) dorsal view. (161–162) *Lytopeplus curtulus*: (161) dorsal view; (162) ventral view. (163–170) *Lapethus* species: (163) head, dorsal view; (164) aedeagus; (165) prothorax, ventral view; (166) left mandible, dorsal view; (167) labium, dorsal view; (168) right maxilla, dorsal view; (169) wing; (170) meso- and metathorax, ventral view; (C and D) maxillary and labial palpi of *Lytopeplus curtulus*.

front angles without antennal cavities, front coxal cavities externally open (fig. 112) or closed (fig. 129) behind; wings (fig. 124) rarely with a distinct anal vein; femoral lines on metasternum and first ventrite, when present (figs. 136, 137) usually nearly straight; trochanters simple, more or less elongate; tarsal formula 4-4-4 or 3-3-3.

Abdomen. Aedeagus with tegmen incomplete, parameres present or absent.

Pachyochthes Reitter, 1897

Types-species by monotypy, *Pachyochthes edithae* Reitter.

We have seen no specimens of this genus, which is included here on the basis of the characterisations by Reitter (1897, 1922) and Jakobson (1915). Reitter (1897) provided an outline figure, and Jakobson a coloured one, but neither author furnished enough information about the mouth parts to make the position of the genus in Cerylonidae certain. We have included it here because, on the characters specified by Reitter and Jakobson, its greatest similarity appears to be to *Ploeosoma*. The single species was found in the mountains of Armenia.

Ploeosoma Wollaston, 1854

This genus was erroneously attributed to Euxestinae by Crowson (1955); the mouth parts, absence of frontoclypeal suture, distinctly elongate trochanters, and crenulate hind margin of the fifth ventrite, clearly separate *Ploeosoma* from *Euxestus* and its allies, and associate it with Ceryloninae. The genus may be defined thus.

With general characters of Ceryloninae and Cerylonini.

General shape (fig. 106) oval and rather convex, resembling some Euxestinae, upper surface shining and glabrous.

Head with very small, somewhat projecting (fig. 106), coarsely faceted eyes, clypeus short, its apical margin weakly rounded, anterior gular region without transverse groove, no distinct antennal grooves by lower margins of eyes (fig. 107). Antennae (fig. 106) 10-segmented, scape moderately large, pedicel and segment 3 elongate and about equal in length, segments 4–7 short and equal, 8 and 9 slightly larger than 7, 10 forming a large club. Mouth parts of Cerylonini type, maxillary and labial palpi aciculate (fig. 107), labrum short and transverse.

Thorax with pronotum rather weakly transverse, its side margins rather strongly converging in front (fig. 106), with a pair of sublateral impressions; front coxae (fig. 107) small, widely separated, their cavities narrowly externally closed behind, apical margin of prosternal process almost straight. Elytra broadest in basal half, evenly curved in outline (fig. 106) and profile, with 7 regular rows of punctures, epipleura evenly narrowed posteriorly; middle coxae rather widely separated, the sternal fitting between them in a straight line (fig. 107). Wing not studied; metasternum moderately transverse, without femoral lines or median impressed line; metendosternite not studied. Legs (fig. 107) moderately long, trochanters somewhat elongate, tibiae weakly broadened to apex, with 2 normal spurs, tarsal segment 1 as long as 2 and 3 together, 4 longer than previous 3 together, empodium well developed.

Abdomen longer than wide; ventrite 1 about as long as next 3 together, without femoral lines, intercoxal process short and broad with straight apical margin (fig. 107). Aedeagus not studied.

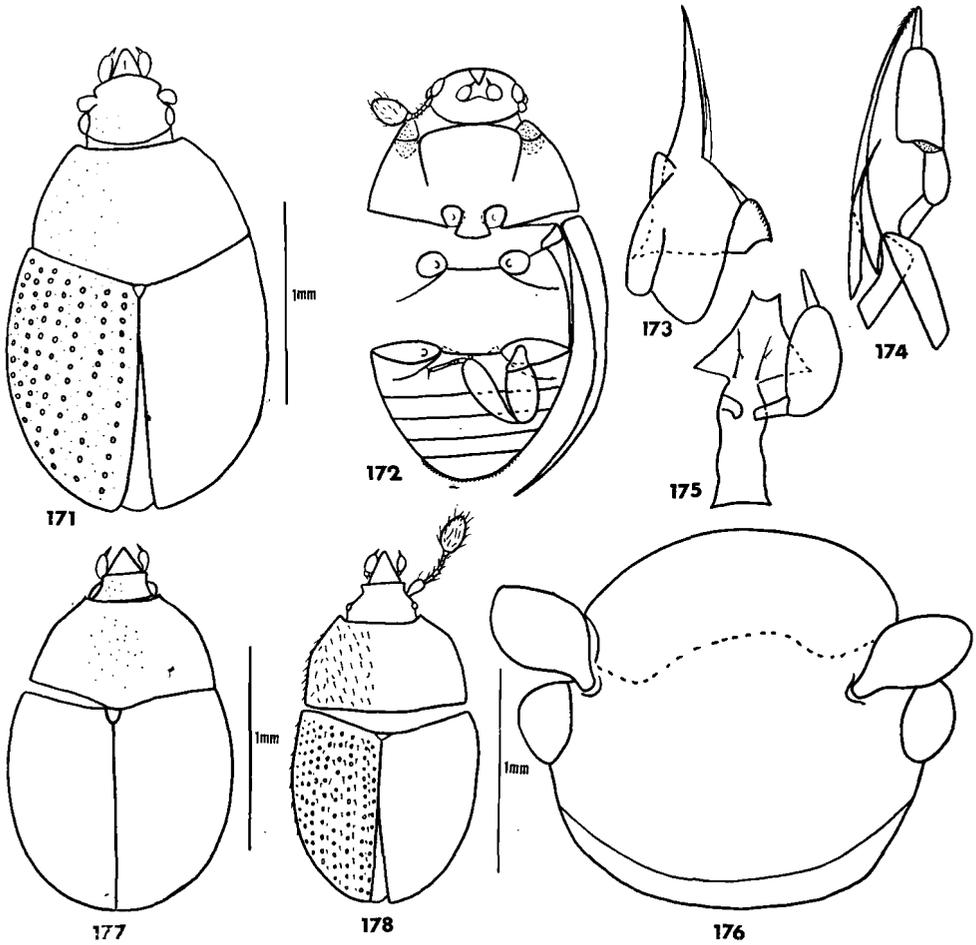
Type-species, by monotypy, *Ploeosoma ellipticum* Wollaston.

Habitat. Under bark, in rotten wood, and under sides of wet decaying logs in montane forests of Madeira.

Species studied. *P. ellipticum* Wollaston.

Pseudocerylon Grouvelle, 1897

Grouvelle (1897) based this genus on three species from Sumatra; later Hinton (1942) added one species from Borneo, and Heinze (1944b) one from Java and another from the



Figs. 171-178. *Lapecautomus* species. (171-176) *L. dybasi*: (171) dorsal view; (172) ventral view; (173) right mandible, ventral view; (174) right maxilla, ventral view; (175) labium, ventral view; (176) head, dorsal view. (177) *L. mexicanus*, dorsal view. (178) *L. striatus*, dorsal view.

Philippine Islands. *Pseudocerylon* is readily separable from *Ploeosoma* by the large eyes, the front coxal cavities externally open behind, and the apical margin of the prosternal process deeply notched. The genus may be defined thus.

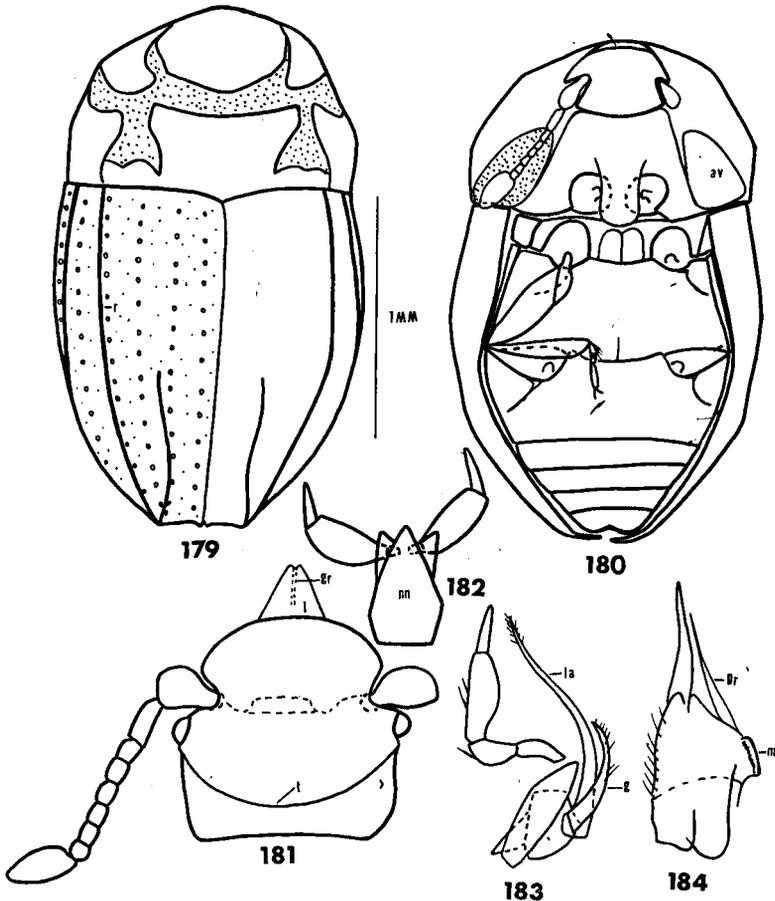
With general feature of Ceryloninae and Cerylonini.

General shape broadly ovate and rather convex, upper surface glabrous and shining (fig. 114).

Head with eyes moderately large, projecting and rather coarsely faceted; clypeus as figured (fig. 114); anterior gular region without transverse groove, no distinct antennal grooves by lower margins of eyes. Antennae 10-segmented, scape moderately large, pedicel short, segment 3 slightly longer than it, segments 4-9 short and progressively widened, segment 10 forming a large oval club; mouth parts (fig. 113) of normal Cerylonini type.

Thorax with pronotum moderately transverse, narrowed in front, without sublateral impressions; front coxae small and moderately widely separated, their cavities externally open behind, prosternal process projecting distinctly behind front coxae, its apical margin deeply notched (fig. 113). Elytra broadest near middle, with 7 rows of punctures, epipleura regularly narrowed posteriorly; scutellum small, triangular; middle coxae slightly more widely separated than front ones, sternal fitting between them in a straight line (fig. 113). Wing not studied; metasternum strongly transverse, without femoral lines or median impressed line, hind coxae widely separated; metendosternite not studied. Legs (fig. 113) moderately long, trochanters simple and slightly elongate, tibiae scarcely broadened to apex, tarsal segment 1 as long as 2 and 3 together, 4 much longer than previous 3 together, empodium not distinct.

Abdomen about as long as wide; ventrite 1 almost as long as next 3 together, without femoral lines, intercoxal process broad, short, with almost straight apical margin; aedeagus not studied.



Figs. 179-184. *Axiocerylon cavicolle*: (179) dorsal view; (180) ventral view; (181) head, dorsal view; (182) labium, dorsal view; (183) left maxilla, dorsal view; (184) right mandible, ventral view.

Type-species, by present designation, *P.trimaculatum* Grouvelle.

Habitat. Not recorded, larva undescribed. Geographical distribution: Sumatra, Java, Borneo and Philippines.

Species studied. *P.helleri* Heinze and an unnamed species from Sumatra.

Gyrelon Hinton, 1942

This genus differs from the preceding three in its less regularly ovate shape, with the prothorax margins not continuing those of the elytra; the slight but distinct ventral lobing of the first tarsal segment separates it from other Ceryloninae and is suggestive of Euxestini. It is definable as follows.

With general characters of Ceryloninae and Cerylonini.

General shape broad and somewhat convex (fig. 8a); upper surface shining, with sparse pubescence.

Head with rather large, prominent, fairly coarsely faceted eyes, clypeus short with front margin slightly emarginate, anterior gular region without a distinct transverse groove, no distinct antennal grooves by lower margins of eyes. Antennae (fig. 8a) 10-segmented, scape moderately large, segments 2-9 short and subequal, 10 forming a large club. Mouth parts as in *Cerylon*.

Thorax with pronotum strongly transverse, broadest in anterior third, side margins sinuate, without sublateral impressions, hypomera with well developed cavities (fig. 8b) receiving antennal club; front coxal cavities externally closed behind, prosternal process as figured (fig. 8b). Elytra broadest near middle, slightly rounded at sides, with 8 regular rows of punctures, epipleura rather broad in basal half; mesosternum short, middle coxae narrowly separated, sternal fitting between them in a straight line (fig. 8b), scutellum rather large, shield-shaped. Wings not studied. Metasternum moderately transverse, femoral lines and median impressed line absent, hind coxae widely separated; metendosternite not studied. Legs (fig. 8b) moderately long, femora and tibiae rather flattened, femora nearly parallel-sided, tibiae widest well before apex, without distinct spurs, tarsal segment 1 large, slightly lobed and pubescent below, 2 and 3 short, 4 slightly longer than previous 3 together, empodium not distinct.

Abdomen about as long as wide; ventrite 1 almost as long as next 3 together, without femoral lines, intercoxal process short and broad with straight apical margin; aedeagus not studied.

Type-species, by monotypy, *G.mila* Hinton.

Habitat. Not recorded. Larva undescribed. Geographical distribution: Borneo.

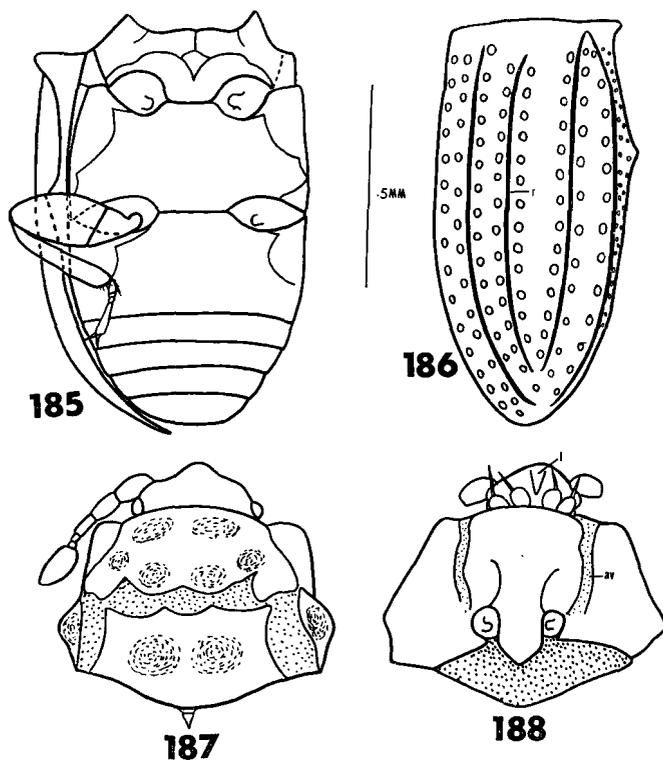
Species studied. *G.mila* Hinton.

Pachylon Sharp, 1885

Sharp (1885) established this genus for a species from the Andaman Islands, later Grouvelle (1897) added another from Sumatra. In having distinct antennal cavities on the hypomera it resembles the last genus, but in most other respects is nearer to *Cerylon*. It may be defined thus.

With general characters of Ceryloninae and Cerylonini.

General shape (fig. 111) broad, weakly convex, nearly parallel-sided, upper surface glabrous and shining.



Figs. 185–188. *Paraxiocerylon degeneratum*: (185) meso and metasterna and ventrites, ventral view; (186) elytron, dorsal view; (187) head and prothorax, dorsal view; (188) head and prothorax, ventral view.

Head rather deflexed, with normal sized moderately coarsely faceted eyes, clypeus with apical margin weakly emarginate (fig. 112); anterior gular region without distinct transverse groove, no distinct antennal grooves by lower margins of eyes. Antennae (fig. 112) short, 10-segmented, scape moderately large, segments 2–9 short, subequal in length and progressively widened, 10 forming a large club. Labrum short and transverse, maxillary (fig. 114A) and labial (fig. 114B) palpi aciculate.

Thorax with pronotum strongly transverse (fig. 111), somewhat narrowed in front, without sublateral impressions; hypomera with a well-defined elongate cavity on each side; front coxae small, rather narrowly separated, prosternal process small, its apical margin emarginate (fig. 112). Elytra (fig. 111) broad, nearly parallel-sided, with 7 regular rows of punctures; middle coxae more widely separated than front ones, sternal fitting between them in a curved line (fig. 112). Wing not studied. Metasternum strongly transverse, without femoral lines, median impressed line extending about half its length, hind coxae moderately widely separated; metendosternite not studied. Legs (fig. 112) moderately long, femora and tibiae not markedly flattened, femora broadened in middle, tibiae weakly broadened to apex, spurs apparently absent, tarsal segment 1 as long as next 2 together, 4 as long as previous 3 together, empodium well developed.

Abdomen distinctly longer than wide; ventrite 1 almost as long as next 2 together (fig. 112), without femoral lines, intercoxal process short and broad with truncate apical margin; aedeagus not studied.

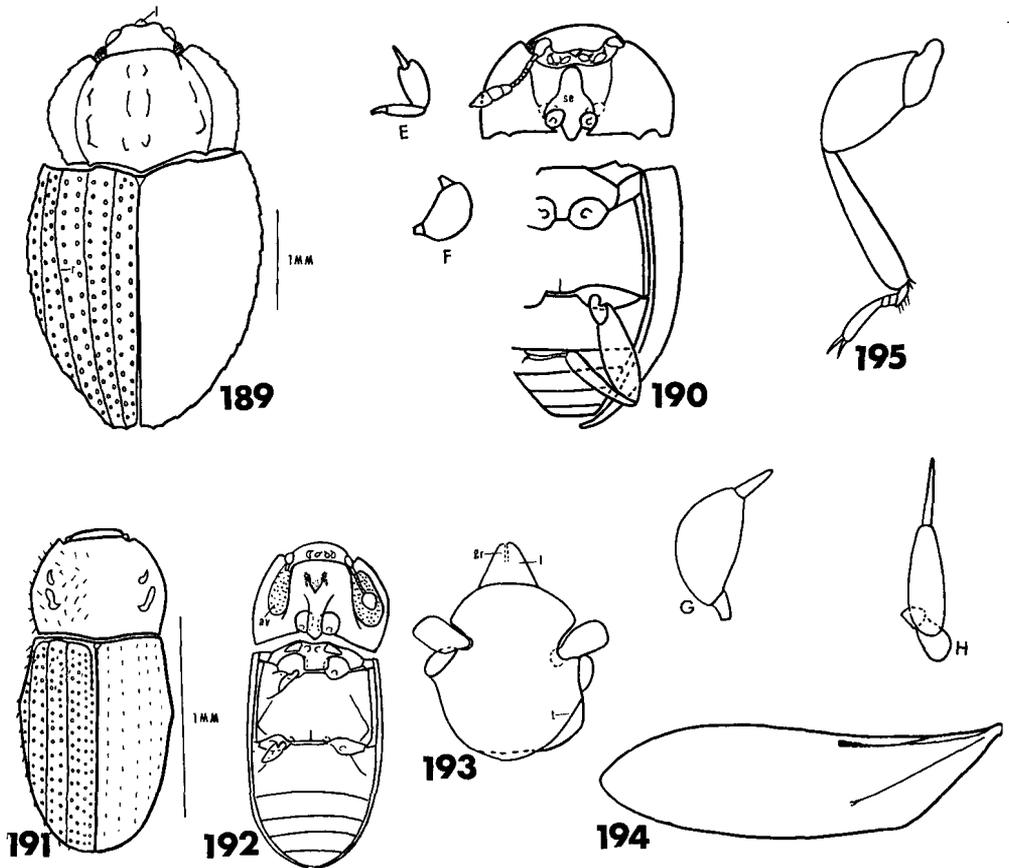
Type-species, by monotypy, *P.gorhami* Sharp.

Habitat. Unrecorded. Larva not described. Geographical distribution: Andaman Islands, Sumatra.

Species studied. *P.gorhami* Sharp.

Cerylon Latreille, 1802

Latreille (1802) initially defined this genus without naming any species; in 1807 he cited under it the species *Lyctus histeroides* Fabricius (1792), which thus became the type species. It is now the largest genus of the family, with 97 species listed by Hetschko (1930). The distinction of the genus from *Philothermus* is a matter of some difficulty; Heinze (1944b) showed that neither of the two characters previously relied on for the purpose, the 1-segmented as against 2-segmented antennal club and the externally closed as against open front coxal cavities, provided a satisfactory generic division. We have followed him in relying mainly on the form of the prosternum, according to which



Figs. 189-195 (189) *Glyptolopus histeroides*, dorsal view. (190) *Glyptolopus histeroides*, ventral view. (191-194) *Thyroderus porcatus*: (191) dorsal view; (192) ventral view; (193) head, dorsal view; (194) wing; (195) hind leg; (E and F) maxillary and labial palpi of *Glyptolopus histeroides*; (G and H) labial and maxillary palpi of *Thyroderus porcatus*.

criterion some of the species previously attributed to *Cerylon* will be transferred to *Philothermus*. Even after this restriction, *Cerylon* remains an extensive genus, manifesting considerable structural diversity. The following definition, based on the examination of only a limited series of species, is tentative only.

With general characters of Ceryloninae and Cerylonini.

General shape variable (figs. 108, 110, 115, 119); usually rather flattened and more or less parallel-sided.

Head with moderate-sized eyes, clypeus variable, its anterior margin straight, sinuate or notched, anterior gular region without transverse groove, no antennal grooves by lower margins of eyes. Antennae 10-segmented, scape moderately large, pedicel and segment 3 variable, segments 4-8 short and subequal, 9 usually distinctly larger than 8, 10 forming a large club, never clearly divided into 2 segments. Mandibles and maxillae as in *Philothermus*; labium with mentum elongate and palpi aciculate (fig. 121). Labrum short and transverse (fig. 119).

Thorax with pronotum weakly (fig. 119) to moderately strongly (fig. 115) transverse, usually with a pair of sublateral impressions (fig. 119); front coxae moderately widely separated, the prosternal process broad and markedly widened behind coxae, the coxal cavities externally closed behind (fig. 120). Elytra usually with 7 or 8 regular rows of punctures, epipleura usually rather narrow; middle coxal cavities moderately widely separated (fig. 120), sternal fitting between them in a straight line. Wing (fig. 124) without anal vein, subcubital fleck or *r-m* cross vein; metasternum variably transverse (figs. 117, 120), without femoral lines, median impressed line variable or absent; hind coxae moderately widely separated; metendosternite of "pair of arms" type, anterior tendons widely separated. Legs with trochanters more or less elongate (fig. 120), femora more or less swollen in middle, tibiae more or less widened to apex and with 2 normal spurs (fig. 120), tarsal segment 1 as long as 2 and 3 together, 4 longer than previous 3 together, empodium not distinct.

Abdomen usually longer than wide; ventrite 1 nearly or quite as long as next 2 together, with or without femoral lines, its intercoxal process short and broad, with straight or weakly convex front margin; aedeagus (fig. 122) with tegmen incomplete and parameres absent.

Type-species, *Cerylon histeroide*s Fabricius, 1792.

Habitat. Adults of several species found under bark of dead trees; larvae in crevices of bark of part-dead trees. Geographical distribution: Holarctic, Indo-Malayan and Ethiopian regions, Madagascar; not established to occur in Australian and Neotropical regions (the Neotropical species attributed to *Cerylon* by Grouvelle probably belong to *Ceryleuxestus* in the Metacerylonini).

Species studied. *C. histeroide*s F., *C. ferrugineum* Stephens, *C. castaneum* Say, *C. sylvaticum* Casey, *C. impressum* Erichson, *C. amplicolle* Fairmaire, *C. weisei* Grouvelle, *C. insulare* Grouvelle, and several unidentified species from various parts of the world.

Larva of *Cerylon histeroide*s F.

General shape (fig. 236) elongate and rather onisciform, dorsum flattened, body surface whitish without pigmented sclerites, dorsum finely and indistinctly granulated, with a few minute simple setae (fig. 236).

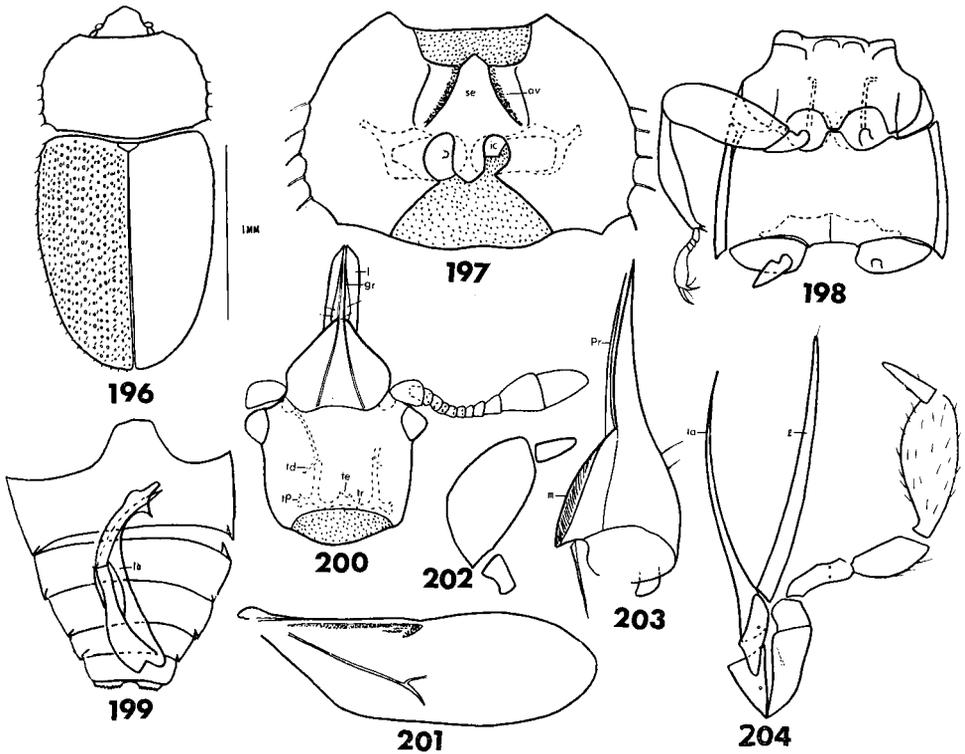
Head small, strongly hypognathous, largely hidden by front margin of prothorax,

characteristically shaped (figs. 235, 236); ocelli and frontal sutures absent; antennae (fig. 240) short, 3-segmented, lengths of segments in proportion 2 : 3 : 1, sensory appendage of pedicel ventral and about 3 times as long as segment 3; mandible and maxillary mala (fig. 237) each forming a narrow elongate blade, maxillary palpi large, tapered to apex; labium as figured (fig. 237), its palpi 1-segmented; cardo and maxillary articulating area not distinct.

Thorax with pronotum (fig. 236) strongly transverse, its front margin nearly straight, side margins converging in front and with 3 pairs of short setae; mesonotum slightly wider and shorter than pronotum, metanotum similar to it, side margins of each with 2 pairs of short setae; legs short, widely separated (fig. 235), claws (fig. 238) simple and with 1 tarsungular seta.

Abdomen with segments about as long as meso- and metathorax, progressively narrower posteriorly, segments 1-8 each with a pair of short setae on side edges of tergite, hind margin of tergite 9 truncate and with 4 setae; pygopod (fig. 239) short, rounded. All spiracles annuliform and situated on body surface.

Specimens received from reared material of H.E.Hinton; 3 larvae from under bark dead oak, Hamilton High Parks, Hamilton, Lanarkshire 14.viii.55 (R.A.Crowson)



Figs. 196-204. *Cautomus* species: (196) dorsal view; (197) prothorax, ventral view; (198) meso and metathorax, ventral view; (199) ventrites; (200) head, ventral view; (201) wing; (202) labial palp; (203) left mandible, ventral view; (204) right maxilla, dorsal view.

together with adults; 3 larvae found with adults, dead oak bark, Alice Holt, Farnham, Surrey, 20.vii.55 (*R.A.Crowson*); one larva with adults, under rather fresh dead beech bark, Polhill, Shoreham, Kent, 8.ix.62 (*R.A.Crowson*).

Philothermus Aube, 1843

In number of species this genus may be second only to *Cerylon* in the Cerylonidae; Hetschko (1930) listed 24 species, to which must be added several subsequently described species and several transferred to *Philothermus* from *Cerylon* following Heinze's (1944*b*) redefinition of the two genera. Heinze defined a new subgenus *Philothermopsis* (Heinze, 1944*c*), which we have treated as a full genus (see p. 429). Even so, the species remaining in *Philothermus* as redefined by us differ considerably among themselves; the New Zealand *P.bicavus* Sharp, for example, is remarkably unlike the European *P.montandoni* Aube. The two new species we describe below have *Cerylon*-like antennae and are related to species described by Grouvelle (and listed by Hetschko) under *Cerylon*. The definition below is tentative only, pending a critical revision of the genus and its allies.

With general characters of Ceryloninae and Cerylonini.

General shape resembling that of *Cerylon* spp. but tending to be rather narrower (figs. 125, 131). Upper surface shining, but usually with fine pubescence.

Head (fig. 123) more or less as in *Cerylon*. Antennae 11-segmented with club distinctly 2-segmented (fig. 125) or 10-segmented with 1-segmented club. Mandible and maxilla as figured (figs. 127, 128), labium as in *Cerylon*, labrum short and transverse.

Thorax with pronotum not or very slightly transverse, usually with a pair of sublateral impressions (fig. 129); front coxae narrowly separated, the prosternal process between them rather narrow and not or scarcely widened behind coxae, coxal cavities externally open (fig. 132) or closed (fig. 126) behind. Elytra with 7 or 8 regular rows of punctures, epipleura narrow; middle coxae rather narrowly separated, sternal fitting between them as figured (figs. 126, 132). Wing as in *Cerylon*, or with a single weak anal vein; metasternum more or less transverse, without distinct femoral lines, median impressed line always present, variable; hind coxae moderately widely separated; metendosternite with distinct short stalk, anterior tendons widely separated. Legs (fig. 126) with trochanters simple or more or less elongate, femora swollen in middle, tibiae weakly broadened to apex and with 2 normal spurs, tarsal segment 1 not quite as long as 2 and 3 together, 4 slightly longer than previous 3 together.

Abdomen (fig. 126) usually longer than wide; ventrite 1 about as long as next 2 together, with or without femoral lines, intercoxal process moderately broad, its front margin almost straight; aedeagus with tegmen incomplete but with a pair of short parameres (fig. 130).

Type-species, by monotypy. *P.montandoni* Aube.

The genus *Philothermus* has endemic species in all major zoogeographical regions.

Species studied *P.montandoni* Aube, *P.glabriculus* Leconte, *P.nitidus* Sharp, *P.bicavus* Sharp, *P.puberulus*. Schwarz, *P.cerylonoides* Reitter, *P.ugandense* sp. n., *P.camerunense* sp. n., and several unidentified species.

Larval characters (taken from supposed larvae of *P.bicavus* Sharp)

General shape (fig. 226) elongate and slightly onisciform, dorsally flattened, thoracic

and abdominal terga with lateral expansions, more marked on posterior abdominal segments; whole body surface yellowish-white, without evident sclerites, almost glabrous.

Head small, hypognathous, completely covered by rounded front margin of pronotum; clypeal region elongate and narrowed to apex, dorsal setae of head as figured (fig. 231); frontal sutures, endocarina and ocelli not visible; antennae (fig. 231) short, 3-segmented, segments of subequal length, sensory appendage of 2 ventral and considerably longer than segment 3; mandible (fig. 230) forming a piercing blade, without mola, prostheca or apical teeth; maxillary mala (fig. 230) long and slender, without apical spines or inner dorsal row of setae, palpi well developed, cardo and maxillary articulating area not distinct; labium (fig. 231) with rather long 2-segmented palpi, no distinct hypopharyngeal sclerome.

Thorax with almost semicircular pronotum (fig. 226), its front margin slightly notched in middle, and fringed with many short, blunt setae; mesonotum shorter and slightly broader than pronotum, metanotum similar to it, side margins of each with 3 pairs of short, blunt setae. Legs short, moderately widely separated, claws (fig. 229) simple, with single tarsungular seta.

Abdomen with segments about as long as metanotum, progressively narrower posteriorly; terga 1-8 with bluntly angled lateral expansions, relatively stronger on posterior segments, side margin of each with a pair of short blunt setae; tergite 9 narrower than 8. its hind margin characteristically crenulated and notched in middle (fig. 226), without distinct urogomphi; pygopod (fig. 227) well developed, somewhat cylindrical. All spiracles (fig. 228) annuliform and situated on body surface, abdominal ones below lateral tergal processes.

Measurements of larva (in mm.): total length 2.22, maximum width of head 0.25, width of prothorax 0.57, width of ninth abdominal tergite 0.32.

Three larvae under bark of a dead *Nothofagus* tree, with adults of *P. bicavus*, Arthur's Pass, Canterbury, New Zealand, 1.57 (R.A. Crowson); in Zoology Dept., Glasgow University.

***Philothermus ugandense* sp. n.**

This and the next species belong to a group including *Cerylon substriatum* Grouvelle, *C. crampeli* Grouvelle and *C. epistomale* Grouvelle, having *Cerylon*-like antennae with a 1-segmented club; the new species differ from the other named species in having well developed femoral lines on the first ventrite. *P. ugandense* can be defined thus.

With general characters of *Philothermus*.

Dorsal surface glabrous, shining, blackish brown.

Head with punctures of vertex moderately strong, diffuse and even. Antennae with segment 3 slightly longer than pedicel, flagellum with moderately long fine setae.

Thorax with pronotum almost parallel sided and quadrate, broadest about one-third from the front, front angles slightly rounded, hind angles weakly acute, front margin weakly emarginate, a depressed area on either side of middle line in basal third; pronotal punctuation like that of vertex; front coxal cavities closed behind. Elytra with humeral angles slightly callose and projecting (fig. 108), disc with 7 impressed rows of punctures, interstices finely and irregularly punctured; scutellum moderate sized, cordate, punctured. Front tibiae abruptly widened near middle (fig. 109). Ventral surface of thorax lighter castaneous, pro- and mesosterna rather coarsely and sparsely punctured, metasternum with fine dense punctuation.

Abdomen. Ventrites castaneous brown, punctured like metasternum, ventrite 1 with well-marked femoral lines (fig. 109).

Dimensions of holotype (in mm.): total length 4.40, width of head including eyes 0.90, length of antenna 1.35, maximum width of prothorax 1.75, length of elytra 2.70, maximum width of elytra 1.90.

Holotype and 1 *paratype*, UGANDA: alt. 2692 m., 1938 (*A. Holm*); in Field Museum of Natural History, Chicago.

***Philothermus camerunense* sp. n.**

With general characters of *Philothermus*.

Dorsal surface glabrous, shining, head and thorax dark castaneous, elytra reddish-brown.

Head with punctures of vertex moderately coarse and dense, uniform. Antennae with segment 3 slightly longer than pedicel, segments of flagellum with fine moderately long setae.

Thorax with pronotum quadrate, somewhat narrowed in front, front angles obtuse (fig. 110), hind angles slightly acute, front margin weakly emarginate, notum with a depressed area on either side of middle line near base, punctured like vertex. Front coxal cavities narrowly open behind. Elytra with humeral angles not callose or projecting, the 7 rows of punctures not at all impressed. Scutellum moderate sized, cordate, unpunctured. Sterna lighter coloured than dorsum, pro- and mesosterna more sparsely and coarsely punctured than metasternum. Legs with tibiae not abruptly broadened near middle (fig. 110).

Abdomen with ventrites coloured and punctured as metasternum, first ventrite with well developed femoral lines.

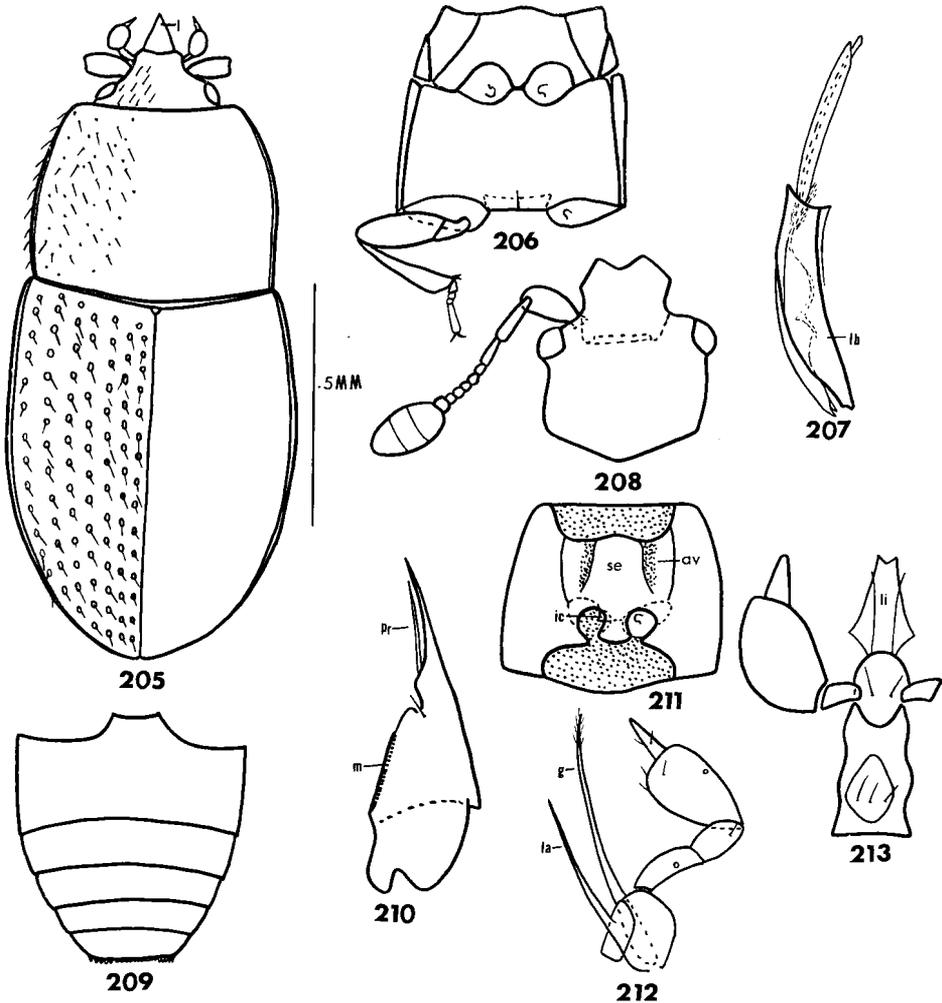
Dimensions of holotype (in mm.): total length 4.00, width of head across eyes 0.85, maximum width of prothorax 1.40, length of elytra 2.40, maximum width of elytra 1.60.

Holotype and 2 *paratypes*, CAMEROONS: Lolodorf, not dated (*G. Schwalb*); in Museum of Comparative Zoology, Chicago, U.S.A.

Anathilopus Falcoz, 1921

Types-species, by monotypy, *A. teryi* Falcoz.

Falcoz (1921) defined this genus for an Algerian species, referring it to the family Cryptophagidae and to the vicinity of *Micrambina* Reitter. We have not been able to examine specimens of *Anathilopus*, but from Falcoz's description and figures it is evident that it cannot belong in Cryptophagidae, having all its tarsi 4-segmented, the wrong form of the front coxae, and the elytra with rows of punctures. According to the characters recorded by Falcoz, it could well belong to Cerylonidae, and might be compared either with *Anommatus* or with some of the Cerylonini. In the absence of any data on the mouth parts, the position of the genus in Cerylonidae must remain in doubt. Its most unusual features are the 11-segmented antennae with a 3-segmented club, and the distinctly pubescent upper surface, both conditions being rare in Cerylonidae. Femoral lines appear to be lacking, and the front coxal cavities are externally open behind.



Figs. 205-213. *Cerylautomus floridensis*: (205) dorsal view; (206) meso and metathorax, ventral view; (207) aedeagus; (208) head, dorsal view; (209) ventrites; (210) left mandible, ventral view; (211) prothorax, ventral view; (212) right maxilla, dorsal view; (213) labium, ventral view.

Coccilon Hinton, 1942

This genus, established for a single species from Borneo, is readily distinguishable from other Cerylonini by the combination of 11-segmented antennae with a three-segmented club, well developed antennal cavities on the hypomera, small head, and explanate side margins of prothorax and elytra. It can be defined as follows.

With general characters of Ceryloninae and Cerylonini.

General shape (fig. 5) somewhat ovate and convex, dorsum glabrous.

Head small, with prominent rather finely faceted eyes, clypeus short with straight apical margin, anterior gular region without distinct transverse groove, no antennal grooves by lower margins of eyes. Antennae (fig. 5) 11-segmented, scape large, segments

2-5 elongate, 6-8 short, 9-11 forming an ovate club, 9 much smaller than 10. Mouth parts as in *Cerylon*.

Thorax with pronotum very large, almost semicircular, with small emargination in front above the head, broadest slightly before hind angles which project slightly backwards, hypomera with well-marked antennal cavities (fig. 6), front coxae narrowly separated, cavities externally open behind, prosternal process as figured (fig. 6). Elytra somewhat longer than combined width, broadest about one-third from base, without distinct rows of punctures, epipleura of moderate width; middle coxae moderately widely separated, sternal fitting between them in a straight line. Metasternum strongly transverse, without femoral lines and median impressed line, hind coxae moderately widely separated, metendosternite and wings not studied. Legs (fig. 6) rather short, stout, trochanters short, femora swollen in middle, tibiae markedly widened to apex, without distinct tibial spurs, tarsal segment 1 shorter than 2 and 3 together, 4 slightly longer than 1-3 together.

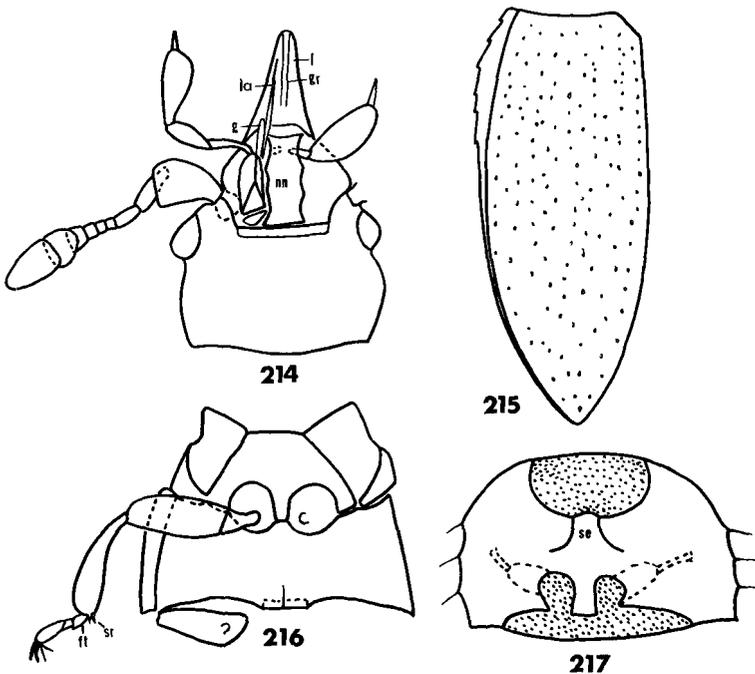
Abdomen longer than wide; ventrite 1 nearly as long as next 4 together, without femoral lines, intercoxal process moderately broad with almost straight front margin (fig. 6). Aedeagus not studied.

Type-species, by monotypy, *C.charon* Hinton.

Habitat. Unknown, larva undescribed. Geographical distribution: Borneo.

Species studied. *C.charon* Hinton.

The following three genera, *Suakokoia* gen. n., *Philothermopsis* Heinze, *Cerylonopsis* Heinze (the last two defined as subgenera of *Philothermus* and *Cerylon* respectively)



Figs. 214-217 *Aculagnathus mirabilis*: (214) head, ventral view; (215) elytron; (216) meso and metathorax, ventral view; (217) prothorax, ventral view.

form a distinct section within the tribe, characterised by the 3-segmented tarsi and the form of the ligula (fig. 144). The African *Suakokoia* and *Philothermopsis* are probably closer to each other than to *Cerylonopsis* (based on a New Guinea species but probably including also the widespread *Cerylon quadricolle* Sharp, according to the descriptions of Sharp (1885) and Hinton (1942)).

Suakokoia gen. n.

This genus, based on a single species from Liberia, is readily distinguishable by the presence of longitudinal ridges on the elytra, the shape of the prothorax (fig. 133), the femoral lines of the metasternum, and the 3-segmented tarsi. We define it as follows.

With general characters of Ceryloninae and Cerylonini.

General shape (fig. 133) broadly elongate, depressed, moderately shining and almost glabrous dorsally.

Head (fig. 134) somewhat deflexed, eyes moderately large and coarsely faceted, no transverse line on vertex, clypeus short with almost straight anterior margin; anterior gular region without transverse groove, no distinct antennal grooves by lower margins of eyes. Antennae (fig. 134) 10-segmented, scape moderately large, pedicel and segment 3 equal and slightly elongate, 4-7 short and subequal, 8 and 9 progressively wider, 10 forming a large club. Mouth parts as in *Philothermopsis*. Labrum short and transverse (fig. 133).

Thorax with pronotum weakly transverse (fig. 133), narrowed in front, side margins smoothly rounded, disc depressed, lateral parts raised, sublateral impressions distinct; hypomera without distinct antennal cavities; front coxae (fig. 138) moderately separated, cavities open behind, prosternal process short and moderately broad, apical margin straight. Elytra (fig. 133) somewhat elongate, punctured in 7 regular rows, strong longitudinal ridges between striae 4 and 5, and 6 and 7, epipleura broad in basal third, then rapidly narrowed; middle coxae slightly more widely separated than front coxae, sternal fitting between them in a straight line (fig. 136). Wing (fig. 139) without anal veins, subcubital fleck or *r-m* cross-vein; metasternum transverse, with distinct femoral lines (fig. 136), median impressed line short and indistinct, hind coxae moderately widely separated; metendosternite forming a pair of arms. Legs with trochanters elongate (fig. 135), femora swollen in middle, tibiae moderately widened to apex and with 2 normal spurs, tarsal segment about twice as long as 2, 3 more than twice as long as previous 2 together.

Abdomen about as long as wide; ventrite 1 nearly as long as next 3 together, with well marked incurved femoral lines (fig. 137), intercoxal process short, its apical margin weakly emarginate; ovipositor (fig. 137) with distinct paraprocts, coxites fused to valvifers, styli attached to apices of coxites.

Type-species, *Suakokoia striata* sp. n.

Habitat. Unknown; larva undescribed. Geographical distribution: Liberia (W. Africa).

Suakokoia striata sp. n.

With general characters of *Suakokoia*.

Dorsal surface uniformly dark reddish-brown, almost or quite glabrous. Punctures of vertex rather sparse and minute, front margin of clypeus with a fringe of moderately

long setae. Prothorax with front angles markedly projecting forwards, rather obtuse, hind angles weakly projecting backwards, sharp, pronotum punctured like vertex. Humeral angles of elytra weakly projecting, angled, striae punctures dark, moderately coarse, striae 1 and 2 arising from a common base by scutellum, interstices finely and diffusely punctured. Scutellum (fig. 133) moderately large, almost triangular, glabrous. Ventral surface almost glabrous, finely and sparsely punctured, slightly darker than dorsum; palpi yellowish.

Dimensions of holotype (in mm.): total length 3.00, width of head across eyes 0.55, length of antenna 0.88, width across middle of prothorax 1.30, length of elytra 1.81, width across middle of elytra 1.40.

Holotype and 2 *paratypes* (one dissected and mounted on slide), LIBERIA: Suakoko, 4.iv.52 and 2.iv.52 (*Blickenstaff*); 1 *paratype*, LIBERIA: Bendija (*Smithsonian Firestone Expedition* 1940); in United States National Museum, Washington D.C.

Philothermopsis Heinze, 1944 **stat. n.**

Heinze (1944c) established *Philothermopsis* as a subgenus of *Philothermus* for two new species from Cameroons (West Africa). We have raised it to the status of an independent genus, adding three new species from Africa and transferring from *Cerylon* *P.kolbei* (Grouv.), **comb. n.** *Philothermopsis* resembles the *Cerylon*-like group of species in *Philothermus* in its 10-segmented antennae with a 1-segmented club, and in the presence of femoral lines on the first ventrite, but differs from them in the 3-segmented tarsi. Two other African species described by Hinton (1941) and attributed to *Cerylon*, *C.nomia* and *C.serum*, have 3-segmented tarsi and femoral lines on the first ventrite, and may be allied to *Philothermopsis*.

The genus may provisionally be defined as follows.

With general characters of *Ceryloninae* and *Cerylonini*.

General shape rather diverse (figs. 140, 141, 142, 152), dorsal surface glabrous or pubescent.

Head moderately large, slightly projecting, eyes rather coarsely faceted, no transverse line on vertex, clypeus broad, its apical margin various; anterior gular region with or without a transverse groove, no antennal groove by lower margin of eye. Antennae (fig. 150) 10-segmented, scape moderately large, segment 3 equal to or slightly longer than pedicel, segments 4-9 short and subequal, 10 forming a large club. Mandible and maxilla as figured (figs. 145, 146), labium (fig. 144) with elongate mentum and aciculate palpi, ligula well developed and markedly transverse. Labrum short and transverse.

Thorax with pronotum weakly transverse, parallel-sided (fig. 141) or narrowed in front (fig. 142), usually with a pair of sublateral impressions (fig. 140); hypomera without antennal cavities; front coxae rather narrowly separated (fig. 149), their cavities clearly open behind, prosternal process narrow, its apical margin almost straight. Elytra with 7 or 8 regular rows of punctures, epipleura narrow; middle coxae rather narrowly separated (fig. 148), sternal junction between them in a straight line. Wing as in *Suakokoia*; metasternum transverse, without femoral lines, median impressed line short or absent; hind coxae moderately widely separated, metendosternite of pair of arms type. Legs with trochanters slightly elongate (fig. 143), femora swollen in middle, tibiae more or less markedly widened to apex, usually with 2 normal spurs, tarsal segment 1 about twice as long as 2, 3 more than twice as long as 1 and 2 together.

Abdomen about as long as wide (fig. 151); ventrite 1 about as long as next 2 together, with well developed femoral lines, intercoxal process short and broad with straight front margin; ovipositor with valvifers and coxites fused, styli attached to apices of coxites.

Type-species, by present designation, *P.hamata* Heinze.

Habitat. One specimen of *P.pubescens* recorded from forest litter in Rhodesia; larvae undescribed. Geographical distribution: tropical Africa.

Key to species of *Philothermopsis* studied

- 1 Dorsal surface pubescent, not very shining (fig. 142).....**pubescens** sp. n.
- Dorsal surface almost or quite glabrous, very shining.....2
- 2 Antennal segment 3 about one and a half times as long as pedicel (fig. 151).....3
- Antennal segment 3 about as long as pedicel (fig. 152).....4
- 3 Outer apical angle of front tibiae with 2 spines; basal two-thirds of pronotum parallel-sided, front margin of clypeus weakly emarginate (fig. 141).....**punctata** sp. n.
- Outer apical angles of front tibiae acute, without spines (fig. 151); basal two-thirds of pronotum narrowed in front, front edge of clypeus strongly emarginate, with a tooth in middle.....**laevigata** Heinze
- 4 Front half of prothorax narrowed in front, front angles acute, front margin strongly emarginate. Punctures of pronotum and elytra indistinct. Form strongly depressed.....**kolbei** (Grouvelle)
- Front half of prothorax almost parallel-sided, front angles obtusely rounded, front margin weakly emarginate. Punctures of pronotum and elytra distinct. Form less depressed.....5
- 5 Species large (length about 4.00 mm.), front tibiae with outer apical angles rounded (fig. 152). Dorsal surface nearly black, sublateral impressions of pronotum indistinct.....**hamata** Heinze
- Species smaller (about 2 mm. long); front tibiae with outer apical angles acute. Dorsal surface reddish-brown, pronotum with sublateral impressions well marked.....**liberiensis** sp. n.

***Philothermopsis pubescens* sp. n.**

With general characters of *Philothermopsis*.

Dorsal surface dark castaneous, shining, covered with dense semi-erect pubescence.

Head with clypeus as figured (fig. 142), vertex diffusely and moderately finely punctured, with moderately long semi-recumbent pubescence mostly directed towards central region, apical border of clypeus with a line of forward-directed setae. Pronotum weakly convex in middle, impressed on each side before base, front angles projecting forward and weakly acute, hind angles right angles, side margins narrowed in anterior third, discal punctures rather stronger and closer than those of vertex, pubescence semi-erect, directed posteromedially on disc, sublateral impressions of notum oblique. Elytra broadest near middle, their basal margin slightly wider than hind margin of pronotum, with 8 regular rows of punctures, the inner 2 rows arising from a common base, interstices lighter coloured and with sparse indistinct punctures, their pubescence moderately long, semi-erect, forming irregular rows and directed posteriorly. Scutellum

as figured (fig. 142), pubescent. Ventral surface sparsely but distinctly punctured, with fine recumbent pubescence. Legs with outer angles of front tibiae acutely produced, trochanters darker than rest of leg.

Dimensions of holotype (in mm.): total length 2.40, width of head across eyes 0.58, length of antenna 0.63, width of prothorax at middle 1.12, length of elytra 1.63, their maximum width 1.25.

Holotype and 7 *paratypes*, LIBERIA: Suakoko, 1952 (*Blickenstaff*), in United States National Museum, Washington; 1 *paratype* LIBERIA: Mt. Coffee, iii. 1897 (*Cook*), in United States National Museum; 1 *paratype* from forest litter, N. RHODESIA: Lunsemfwa R., Mposhi, N.E. Kapiri, 2.iv.61 (*I.M.Newell*), in Museum of Comparative Zoology, Cambridge, Mass.

***Philothermopsis punctata* sp. n.**

This species is readily distinguishable from the last by the almost glabrous dorsal surface and the emarginate front border of the pronotum leaving the head more exposed, also by the shape of the prothorax.

With general characters of *Philothermopsis*.

Dorsal surface dark castaneous, glabrous except for vertex. Vertex with sparse recumbent pubescence, distinctly punctured, rather more strongly and sparsely in posterior part, clypeus as figured (fig. 141). Pronotum (fig. 141) weakly convex in middle, weakly impressed on each side before base, side margins parallel in posterior two-thirds, anterior one-third rounded, hind angles semi-acute, notal punctures uniform, rather sparse, slightly larger than those of vertex, sublateral impressions small and rounded. Front margin of elytra slightly wider than base of prothorax, humeral angles slightly projecting and toothed (fig. 141); elytra with 7 regular rows of punctures, first 2 arising from a common stalk, interstices paler and finely punctured. Scutellum glabrous, slightly transverse, obtuse-rounded behind. Ventral surface evenly and moderately strongly punctured, pubescence inconspicuous. Outer apical angles of front tibiae projecting, with 2 spines.

Dimensions of holotype (in mm.): total length 3.38, width of head across eyes 0.63, length of antenna 0.80, width of prothorax at middle 1.10, length of elytra 2.00, their maximum width 1.30.

Holotype, KENYA: Kaptega estate, Mt. Elgon, east side, 2050 m., 1948 (*A.Holm*); 1 *paratype*, KENYA: Kitale, 2000 m., 1938 (*A.Holm*); in Field Museum of Natural History, Chicago.

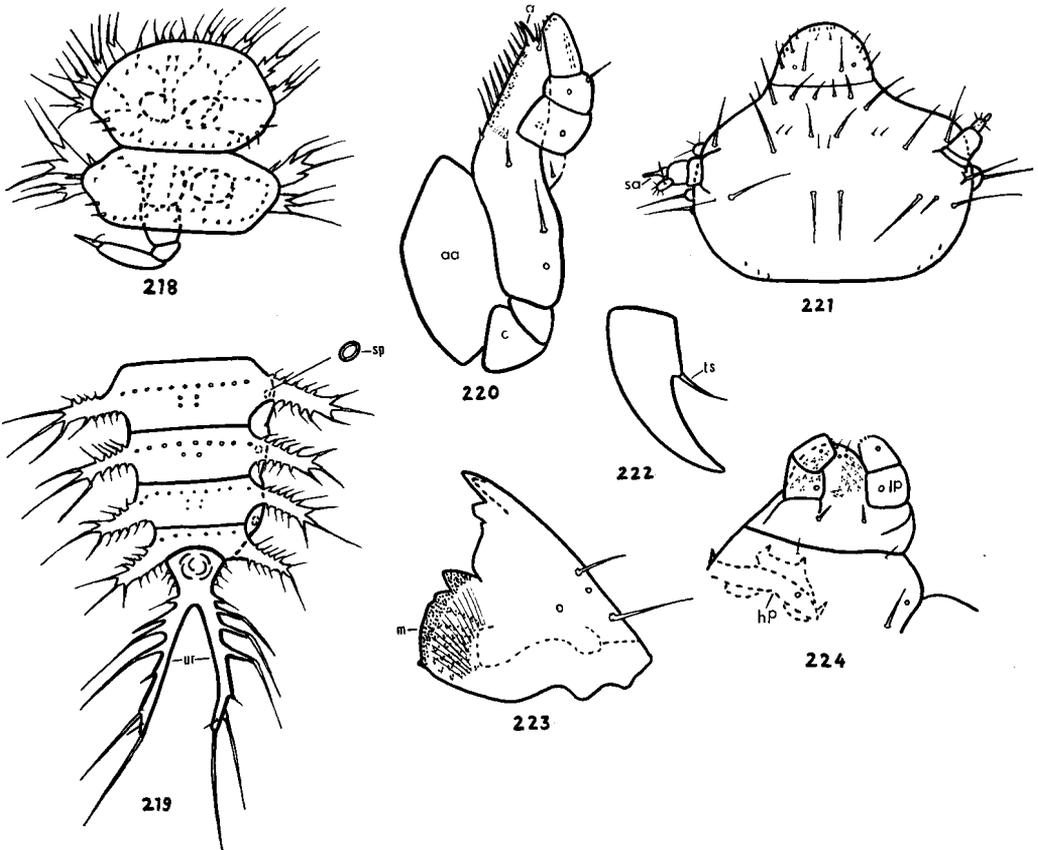
***Philothermopsis liberiensis* sp. n.**

The shape of the prothorax, form of the front edge of the clypeus, and small size, separate this species from the previous two.

With general characters of *Philothermopsis*.

Dorsal surface reddish-brown and glabrous.

Vertex finely and rather sparsely punctured, front margin of clypeus straight, with a fringe of moderately long setae. Pronotum slightly transverse (fig. 140), sides almost parallel, front angles slightly projecting and obtuse, hind angles right angles, notum without impressions in front of base, sublateral impressions well marked and oblique,



Figs. 218–224. Larva of *Hypodacne bivulneratus*: (218) pro and mesothorax, dorsal view; (219) posterior abdominal segments, dorsal view; (220) left maxilla, ventral view; (221) head, dorsal view; (222) claw; (223) left mandible, dorsal view; (224) labium, ventral view.

notal punctures even, rather sparse, slightly stronger than those of vertex. Front margin of elytra scarcely wider than hind margin of prothorax, humeral angles normal; 7 regular rows of punctures, the first 2 from a common stalk, interstices paler and not distinctly punctured. Scutellum small, transverse, obtusely rounded behind, glabrous (fig. 140). Ventral surface glabrous, metasternum with front half more coarsely punctured than posterior half and ventrites. Outer apical angles of front tibiae projecting, simply angled.

Dimensions of holotype (in mm.): total length 2.00, width of head across eyes 0.40, length of antenna 0.50, width of prothorax at middle 0.70, length of elytra 1.25, width across middle of elytra 0.85.

Holotype and 1 *paratype*, LIBERIA: Mt. Coffee, iii. 1897; in United States National Museum, Washington.

Cerylonopsis Heinze, 1944 **stat. n.**

Heinze originally (1944a) described *trifoveolatum* under *Cerylon*, and later (1944b) made it the type of a new subgenus. The single known species, from New Guinea,

differs from *Suakokoia* and *Philothermopsis* in the more widely separated front coxae with their cavities closed behind, but resembles these two genera in the form of the ligula and the 3-segmented tarsi. We define it thus.

With general characters of Ceryloninae and Cerylonini.

General appearance almost as in *Cerylon* (fig. 153), rather broad and depressed, dorsum glabrous and shining.

Head with eyes projecting, small, ommatidia large and few, no transverse line on vertex, clypeus broad and weakly emarginate in front (fig. 158), anterior gular region without transverse groove, no antennal grooves by lower borders of eyes. Antennae (fig. 158) 10-segmented, scape moderately large, pedicel and segment 3 equal in length and elongate, 4-8 short and subequal, 9 slightly larger than 8, 10 forming a large club. Labrum short and transverse, mouth parts as in *Philothermopsis*, with broad ligula.

Thorax with pronotum strongly transverse, narrowed in front, a pair of sublateral impressions on notum; front coxae widely separated, cavities externally closed behind, prosternal process broad with straight apical margin (fig. 155). Elytra broad and parallel-sided, epipleura broad at base, sharply narrowed behind, 7 regular rows of punctures; middle coxae widely separated, sternal fitting between them in a straight line (fig. 157). Wing as in *Suakokoia*; metasternum strongly transverse, femoral lines well marked, median impressed line short, hind coxae widely separated, metendosternite as figured (fig. 157). Legs moderately long (fig. 156), trochanters elongate, femora swollen in middle, tibiae not broadened to apex, with 2 normal spurs, tarsal segment 1 longer than 2, 3 almost twice as long as previous 2 together.

Abdomen about as long as wide; ventrite 1 nearly as long as next 2 together, with short femoral lines (fig. 154), intercoxal process short and broad with straight front margin. Ovipositor as figured (fig. 154), coxites fused to valvifers.

Habitat. Unknown; larva undescribed. Geographical distribution: New Guinea.

Type-species, by monotypy, *Cerylon trifoveolatum* Heinze.

Species studied. *C. trifoveolatum* Heinze.

(3) *Aculagnathini*

Oke (1932) defined a new family Aculagnathidae, based on a new genus *Aculagnathus* Oke from Australia. Oke's genus clearly belongs to Cerylonidae as defined by us, and to the subfamily Ceryloninae; we have associated it with a number of other genera, which share in greater or less degree the striking modifications of the mouth parts that Oke relied on to distinguish his new family. Dajoz (1963) defined a new family Dolosidae, based on a new genus *Dolosus*, for two new species from Tanganyika and the Congo. We have not been able to study specimens of *Dolosus*, but from Dajoz's descriptions and figures, it is almost certain that the genus belongs in Cerylonidae-Ceryloninae, and it appears to be related particularly to *Thyroderus*. Apart from *Aculagnathus*, the genera we have included in Aculagnathini were catalogued by Hetschko (1930) in Colydiidae, under Ceryloninae-Cerylonini (*Glyptolopus*, *Axiocerylon* and *Cautomus*) and Murmidiinae-Mychocerini (*Thyroderus*). Heinze (1944b) described *Acautomus* under Cerylonini, and we have added one more genus, defined below. The development of piercing mouth parts in the adults of this group is paralleled in *Lapecautomus*, which we have placed in Lapethini, on the assumption that the condition has developed independently in the two groups. It offers an apparent parallel also to the modification of the mouth parts in

the known cerylonine larvae. It is conceivable that in *Lapecautomus* and in Aculagnathini the adults have become adapted to a type of food and mode of feeding similar to that of their larvae; unfortunately we have as yet no information on the modes of feeding in any of these forms.

The main distinguishing features of Aculagnathini are the elongate, tapered labrum with a ventral longitudinal groove in which the slender apical stylets of the mandibles and maxillae rest (fig. 214); the front coxal cavities open behind; vertex often with a transverse line; elytra often with longitudinal ridges. The group is represented in all the main zoogeographical regions within the tropical and subtropical belts, including Madagascar and Australia.

The genera fall into two rather distinct groups, one, comprising the genera *Axiocerylon*, *Thyroderus*, *Dolosus* and *Glyptolopus*, distinguished by a "chin-piece" on the prosternum which covers the mouth parts of the retracted head, the head with a transverse line on the vertex, hypomera with more or less distinct antennal cavities, trochanters not or scarcely elongate, and the elytra with sharp longitudinal ridges; the other, including *Acautomus*, *Cautomus*, *Cerylcautomus* and *Aculagnathus*, with the front margin of the prosternum not forming a typical "chin-piece" but with an emargination on each side receiving part of the antenna, the occiput without a transverse line, hypomera without distinct antennal cavities, trochanters more or less elongate, and elytra without such sharp ridges. The genus *Aculagnathus* differs from the others in having 3-segmented tarsi.

Axiocerylon Grouvelle, 1918

Grouvelle (1918) based his genus on a new species from the Seychelles and on the Liberian *monstrosum* Grouvelle, transferred from *Cautomus*. Heinze (1944a) added two new African species, and defined a new subgenus *Paraxiocerylon* for a new species from New Guinea. *Paraxiocerylon*, which differs from typical *Axiocerylon* in having 6-segmented antennae (fig. 187), in the shape of the antennal cavities of the hypomeron (fig. 188), the form of the prosternal process and trochanters (fig. 185) and in the elytra each with only 2 sharp longitudinal ridges (fig. 186), might well be treated as a distinct genus.

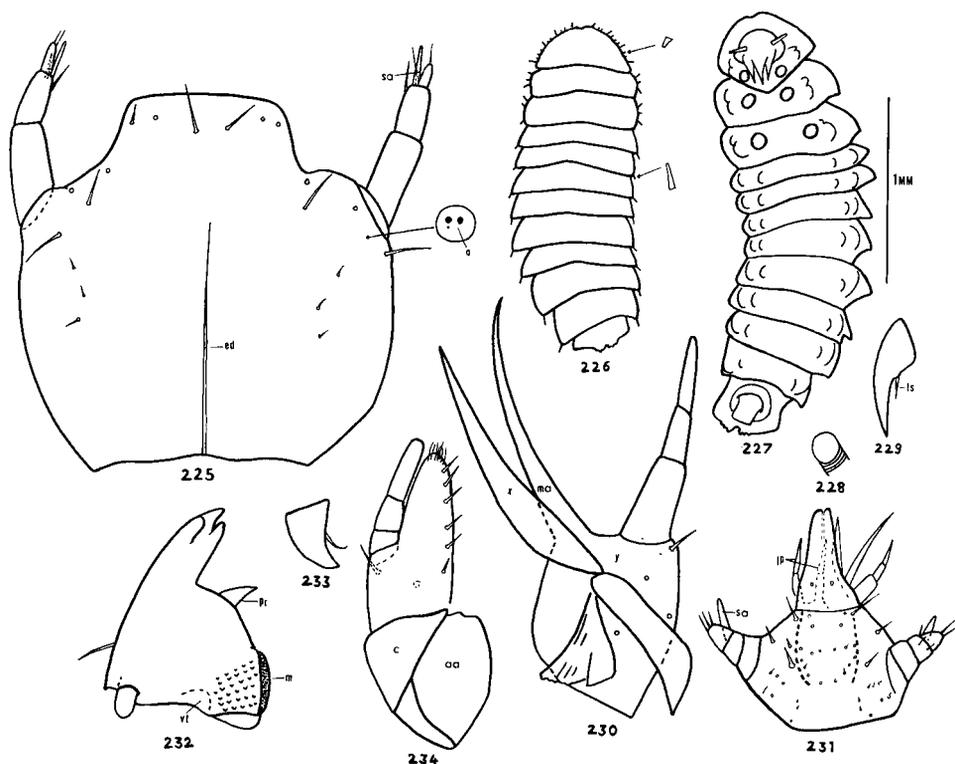
Axiocerylon may be defined as follows.

With general characters of Ceryloninae and Aculagnathini.

General shape (fig. 179) short and broad, convex, dorsal surface heavily sculptured and somewhat dull, glabrous.

Head (fig. 181) strongly deflexed, eyes small, projecting, moderately coarsely faceted, occiput with a transverse line; anterior gular region with a transverse groove, no distinct antennal grooves by lower margins of eyes; in resting condition ventral side of head almost completely hidden by chin-piece of prosternum (fig. 180); clypeus broad, with convex anterior margin (fig. 181). Antennae (figs. 181, 187) 9- or 6- segmented, scape moderately large, pedicel equal to or longer than scape, last segment forming a large club; mandible (fig. 184) narrow, elongate, apical part and prosthema slender, mola poorly developed; maxilla (fig. 183) with lacinia, galea and palpi long and slender; labium (fig. 182) with elongate mentum, ligula not distinguishable, palpi aciculate. Labrum slightly elongate, tapering anteriorly.

Thorax with pronotum large, transverse, narrowed in front, with smooth side margins, with characteristic deep excavations (fig. 179); hypomera with large lateral cavities receiving antennal club (figs. 180, 188); front coxae small, narrowly separated,



Figs. 225–234. (225) Head of *Murmidius ovalis* larva, dorsal view. (226–231) Larva of *Philothermus bicavus*: (226) dorsal view; (227) ventral view; (228) thoracic spiracle; (229) claw; (230) mandible and maxilla; (231) head, dorsal view. (232–234) *Murmidius ovalis* larva: (232) right mandible, ventral view; (233) claw; (234) left maxilla, dorsal view.

their cavities externally open behind, prosternal process of moderate breadth, its apex more or less rounded. Elytra broadest in basal half, slightly rounded at sides, short, dorsum with 2, 3 or 4 sharp longitudinal ridges and 6 or 8 rows of punctures (figs. 179, 186); mesosternum rather short, mesocoxae widely separated, sternal fitting between them slightly curved (fig. 185). Wings absent; metasternum short, transverse, its anterior lateral part weakly excavate to receive middle legs, median impressed line very short and indistinct, hind coxae widely separated, metendosternite of pair of arms type. Legs (fig. 185) moderately long, trochanters short, or weakly heteromeroid (figs. 185, 180), femora little swollen in middle, tibiae not broadened to apex, without spurs; tarsal segment 1 as long as 2 and 3 together, 4 longer than previous 3 together.

Abdomen about as long as wide; ventrite 1 almost as long as next 3 together, without femoral lines but with anterolateral part weakly excavate and receiving hind legs, intercoxal process broad, apical margin slightly emarginate (fig. 180); aedeagus with tegmen incomplete and reduced, without parameres; ovipositor with coxites fused to valvifers, styli attached to apices of coxites.

Type-species, by present designation, *A. cavicolle* Grouvelle.

Habitat. Adults recorded from decayed fallen palm trunk, from under leaf-bases

of a living palm, and from forest litter. Larva undescribed. Geographical distribution: species described from Seychelles, Liberia, East Africa, and New Guinea; undescribed specimens seen from Mozambique and S. Rhodesia in collection of Museum of Comparative Zoology, Cambridge, Mass. U.S.A.

Species studied. *A. cavicolle* Grouvelle, *A. monstrosum* (Grouvelle), *A. (Paraxiocerylon) degeneratum* Heinze.

Thyroderus Sharp, 1885

Sharp (1885) described this genus, in the tribe Cerylonini, for a new species from Japan. Later Grouvelle (1918) added a (doubtfully congeneric) species from the Seychelles, and Heinze (1944a) added a third species from Kilimandjaro (E. Africa). Hetschko (1930) and Heinze (1944a) attributed the genus to Mychocerini. Its closest affinities appear to be to *Axiocerylon* and probably to *Dolosus*; there may be some doubt whether *Thyroderus* is really generically distinct from *Axiocerylon*, the main difference being in the pronotal excavations. We define this genus as follows.

With general characters of Ceryloninae and Aculagnathini.

General shape (fig. 191) broad, convex, nearly parallel-sided.

Head deflexed, with small, rather coarsely faceted weakly projecting eyes, occipital transverse line distinct, clypeus broad, with convex front margin, no transverse groove in anterior gular region or antennal grooves by lower margins of eyes, antennal insertions distinctly dorsal. Antennae (fig. 192) 8-segmented, scape moderately large, pedicel longer than segment 3, 3-7 short and subequal, 8 forming a large club. Mandibles as in *Axiocerylon*; maxillae with very elongate galea and lacinia, palpi as figured (fig. 195 H); labium with elongate mentum, palpi as figured (fig. 195 G); labrum short and tapered in front (fig. 193).

Thorax with weakly transverse prothorax, pronotum convex, with 2 pairs of sublateral cavities, side margins smooth, converging in front; prosternum (fig. 192) large, projecting forward to cover ventral side of retracted head, hypomera with a pair of large antennal cavities; front coxae small, narrowly separated, their cavities open behind, prosternal process narrow, its apical margin obtusely angled. Elytra somewhat elongate, almost parallel-sided, with 3 distinct longitudinal ridges and 9 regular rows of punctures (fig. 191) epipleura narrow; middle coxae narrowly separated, sternal junction between them in a short straight line. Metasternum very transverse (fig. 192), its anterolateral part excavated to receive middle legs, femoral lines absent, median impressed line short; hind coxae rather widely separated; metendosternite of pair of arms type. Legs (fig. 195) with short trochanters, femora swollen in middle, tibiae weakly broadened to apex and with 2 normal spurs, tarsal segment 1 about as long as 2 and 3 together, 4 longer than previous 3 together.

Abdomen slightly longer than wide; ventrite 1 almost as long as next 3 together, its anterolateral part excavated to receive hind legs (fig. 192), femoral lines absent, intercoxal process short and broad, its apical margin slightly emarginate; aedeagus with long median lobe, tegmen much reduced and incomplete.

Type-species, by monotypy, *T. porcatus* Sharp.

Habitat. Adult found in a rotten tree, larva undescribed. Geographical distribution: Japan, Indonesia, Seychelles (?), East Africa.

Species studied. *T. porcatus* Sharp.

Dolosus Dajoz, 1963

Dajoz (1963) defined for this genus a new family Dolosidae, based on two species from Tanganyika and the Congo. We have not been able to examine specimens of *Dolosus*, but from Dajoz's relatively full description and figures, the genus is evidently akin to *Thyroderus*, with which it agrees in the form of the mouth parts, the transverse line on the occiput, the cavities of the pronotum and hypomera, the open front coxal cavities, the elytra with 9 rows of punctures and 3 longitudinal ridges, the wing venation, form of meso- and metasterna, leg segments, and ventrites. *Dolosus* appears to differ from *Thyroderus* in having only 1 sublateral impression on each side of pronotum and in having 2 keels on the pronotum, and most significantly in having antennae 10- or 11-segmented with a 3-segmented club.

Type-species, *D. leleupi* Dajoz.

Habitat. Adults of *D. leleupi* found in a hollow tree in a montane forest. Geographical distribution: Tanganyika, Congo.

Glyptolopus Erichson, 1845

In defining this genus, Erichson (1845) did not name any species, the first described species attributed to it being *G. histeroides* Pascoe from Brazil. Later Heinze (1944a) added another Brazilian species. The genus is readily distinguished by the 11-segmented antennae with a 3-segmented club and by the broad form and characteristic sculpture of the body. It may be defined thus.

With general characters of Ceryloninae and Aculagnathini.

General form (fig. 189) rather large, broad, convex, with heavily sculptured and somewhat dull dorsal surface.

Head deflexed, eyes normal-sized, weakly projecting, rather coarsely faceted, occipital transverse line not distinct, clypeus rather broad, its front margin slightly emarginate. Antennae (fig. 190) 11-segmented, scape moderately large, pedicel shorter than scape, slightly shorter than segment 3, latter longer than 4, 4-8 short and subequal, 9-11 forming a narrow elongate club, 11 somewhat pointed at apex. Maxillary and labial palpi as figured (figs. 195 E, F); labrum short and tapered (fig. 189).

Thorax with large transverse pronotum, its margins slightly serrated, slightly converging in front, pronotal disc strongly convex and sculptured as figured (fig. 189), its side edges broadly explanate; middle part of prosternum in front with a plate-like projection covering retracted head ventrally (fig. 190), front coxae narrowly separated, their cavities open behind, prosternal process narrow, broadest in middle, apex somewhat pointed. Elytra broadest near middle, with 9 regular rows of large punctures and 4 well developed longitudinal ridges extending to apex (fig. 189), epipleura broad basally, sharply narrowed behind; middle coxae narrowly separated, sternal fitting between them in a short straight line (fig. 190). Wing not studied. Metasternum strongly transverse, without femoral lines or impressions, median impressed line short and indistinct, hind coxae rather narrowly separated, metendosternite not studied. Legs rather slender (fig. 190), trochanters slightly heteromeroid, femora weakly swollen in middle, tibiae not broadened to apex, their spurs not visible, tarsal segment 1 about one and a half times as long as 2, 2 and 3 subequal, 4 slightly longer than previous 3 together.

Abdomen as long as wide, ventrite 1 almost as long as next 3 together, without femoral

lines, intercoxal process moderately broad with straight front margin. Aedeagus not studied.

Type species, by monotypy, *G.histeroides* Pascoe 1860.

Habitat. Not recorded; larva undescribed. Geographical distribution: Brazil.

Species studied. *G.histeroides* Pascoe.

Acautomus Heinze, 1944

In defining a new genus for *Cautomus armatus* Grouvelle, Heinze (1944b) suggested that it is intermediate between *Cautomus* and *Glyptolopus*. From the latter, *Acautomus* is distinguished by its 2-segmented antennal club and by the closed front coxal cavities; from the former by having lateral ridges on the pronotum, 6 raised longitudinal ridges on the elytra, the deeply notched apical margin of the clypeus, and the closed front coxal cavities. It is in fact the only genus of Aculagnathini with the front coxal cavities externally closed behind. The following is our definition of it.

With general characters of Ceryloninae and Aculagnathini.

General shape (fig. 1) elongate, somewhat depressed, dorsal surface closely sculptured and dull.

Head with moderately large and projecting coarsely faceted eyes, clypeus characteristic (fig. 1), no occipital transverse line, anterior gular region without transverse groove, no antennal grooves by lower borders of eyes. Antennae (fig. 1) 11-segmented, scape moderately large, pedicel and segment 3 slightly elongate and equal, 4-8 short and subequal, 9 slightly larger than 8, 10 and 11 forming 2-segmented club. Mouth parts apparently as in *Cautomus*, labrum elongate, tapered, its apical margin weakly notched in middle.

Thorax with pronotum moderately transverse (fig. 1), side margins rounded and serrated, lateral parts of notum depressed and with a pair of longitudinal ridges, disc with a longitudinal median impressed line; front margin of prosternum produced into a "chin-piece" which is angled in middle (Heinze, 1944b, figured the front margin of the chin-piece as distinctly bilobed, but this is not the case in the specimens seen by us, which had been determined by Heinze), hypomera without distinct antennal cavities, front coxae close together, their cavities closed behind, prosternal process narrow and apically rounded. Each elytron with 6 weak longitudinal crenulated ridges, alternating with 7 rows of large but shallow punctures (fig. 1), epipleura rather narrow; middle coxae close together, sternal fitting between them in a short straight line. Wing not studied; metasternum transverse, without femoral lines or median impressed line, hind coxae moderately widely separated (fig. 2), metendosternite not studied. Legs rather long, trochanters short, femora swollen in middle, middle and hind ones with a spine near apex of lower edge (fig. 2), tibiae not broadened to apex, with 2 normal spurs, tarsal segment 1 about one and a half times as long as 2, 2 and 3 short and equal, 4 longer than previous 3 together.

Abdomen slightly longer than wide; first ventrite almost as long as next 3 together, without femoral lines, intercoxal process short and broad with straight apical margin. Aedeagus not studied.

Type-species, by monotypy, *A.armatus* (Grouvelle, 1906).

Habitat. Unknown; larvae not described. Geographical distribution: Madagascar.

Species studied. *A.armatus* (Grouvelle).

Cautomus Sharp, 1885

This genus was defined by Sharp (1885) for a single species from Japan, in the tribe Cerylonini. Later Grouvelle added six species from the East Indies, Sumatra, Guadeloupe and Madagascar; the Madagascan species was later transferred to a new genus *Acautomus* by Heinze (1944b). In the same work, Heinze defined a new subgenus, *Paracautomus*, for a species from Java and added another species of *Cautomus* s. str. from New Guinea. Unfortunately the unique type of *Paracautomus* was destroyed in the bombing of the Zoological Museum, Hamburg during the Second World War. The main distinguishing feature of *Paracautomus* was the 8-segmented antennae. *Cautomus* differs from the 4 previous genera in lacking distinct raised ridges on its elytra and by the large number of rows of punctures on them. The genus may be defined thus.

With general characters of Ceryloninae and Aculagnathini.

General shape (fig. 196) rather short and broad, not very convex.

Head rather small, not strongly deflexed, eyes small and prominent with moderate sized facets, occiput without transverse line, clypeus elongate and tapered; anterior gular region without a transverse groove, no antennal grooves by lower margins of eyes; tentorium as figured (fig. 200). Antennae 11-, 10- or 8-segmented, scape moderately large, pedicel slightly longer than segment 3, 3 equal to or longer than 4, last 2 segments forming an elongate club, apical segment narrowed at apex. Mandible as figured (fig. 203), mola poorly developed; maxilla as figured (fig. 204); labium as in *Aculagnathus*; labrum narrow, elongate, nearly parallel-sided with apex pointed (fig. 200).

Thorax with pronotum large, transverse, narrowed in front, side margins curved and weakly serrate, notum without excavations (fig. 196); prosternum angularly expanded in front (fig. 197), front coxae narrowly separated, their cavities open behind, prosternal process narrow with pointed apex; hypomera without antennal cavities. Elytra (fig. 196) nearly parallel-sided, with about 13 regular rows of punctures, interstices not raised; epipleura rather narrow; middle coxae (fig. 198) rather narrowly separated, sternal fitting between them in a very short straight line. Wings (fig. 201) without anal vein, subcubital fleck or *r-m* cross vein; metasternum (fig. 198) transverse, without femoral lines or median impressed line, hind coxae moderately separated, metendosternite of pair of arms type. Legs (fig. 198) moderately long, trochanters short, femora swollen in middle, tibiae broadest near middle, narrowed to apex, with 2 normal spurs, tarsal segment 1 almost as long as 2 and 3 together, 4 longer than previous 3 together.

Abdomen slightly longer than wide; ventrite 1 longer than 2, without femoral lines, intercoxal process moderately broad, its apical margin slightly convex (fig. 199); aedeagus (fig. 199) with long median lobe, tegmen incomplete and poorly sclerotised.

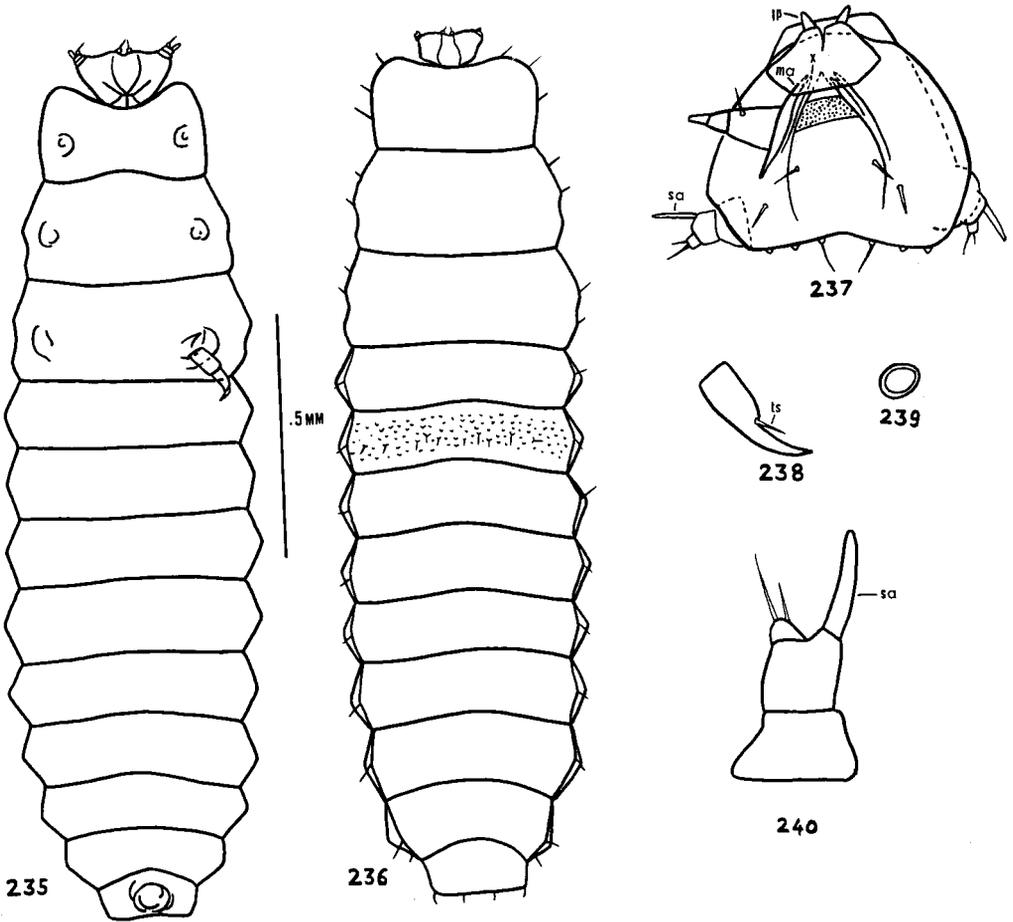
Type-species, by monotypy, *C.hystriculus* Sharp.

Habitat. Adult recorded from a rotten tree, larva unknown. Geographical distribution: Japan, New Guinea, Java, Sumatra, Guadeloupe Islands.

Species studied. *C.hystriculus* Sharp and an unidentified species from Sumatra.

Cerylcautomus gen. n.

In addition to the type species described below, from Florida, this genus will include at least five more species from Jamaica, the Dominican Republic, Guyana, Trinidad and El Yunque, of which we have seen specimens in the collection of the Museum of Compara-



Figs. 235-240. Larva of *Cerylon histerooides*: (235) ventral view; (236) dorsal view; (237) head, ventral view; (238) claw; (239) thoracic spiracle; (240) antenna.

tive Zoology at Harvard, but have been unable to describe from lack of time. It is possible that Grouvelle's *Cautomus infimus* from Guadeloupe Is. would be better placed in the present genus, which would then include all the New World *Cautomus*-like forms.

The new genus may be defined as follows.

With general characters of Ceryloninae and Cerylonini.

General shape (fig. 205) somewhat *Cerylon*-like, rather depressed.

Head (fig. 208) not markedly deflexed, with small prominent rather coarsely faceted eyes, without occipital transverse line, clypeus as figured (fig. 208), anterior gular region with a weak transverse groove, no antennal grooves by lower margins of eyes. Antennae (fig. 208) rather long and slender, 10-segmented, scape elongate and moderately large, pedicel and segment 3 narrow and elongate, pedicel longer than 3, 4-8 short and subequal, 9 slightly larger than 8, 10 forming an elongate club. Mouth parts not covered by prosternum in retracted head; mandibles as figured (fig. 210), their apices sometimes finely dentate, maxillae (fig. 212) as figured, labium as figured (fig. 213); labrum elongate and tapered (fig. 205).

Thorax with pronotum weakly transverse (fig. 205), slightly narrowed in front, notum without sublateral impressions; hypomera without antennal cavities; prosternum only slightly expanded in front (fig. 211), side margins of the projection not clearly defined; front coxae small, narrowly separated, their cavities open behind, prosternal process narrow with rounded apical margin. Elytra (fig. 205) somewhat elongate, with 7 regular rows of punctures, epipleura narrow; middle coxae narrowly separated, sternal fitting between them in a short straight line (fig. 206). Wing as in *Cautomus*; metasternum transverse, without femoral lines, median impressed line short and indistinct, metendosternite of pair of arms type. Legs (fig. 206) with trochanters slightly elongate, femora swollen in middle, tibiae broadened to apex and with 2 normal spurs, tarsal segment 1 about as long as next 2 together, 4 slightly longer than previous 3 together.

Abdomen slightly longer than wide; ventrite 1 about as long as next 2 together, without femoral lines, intercoxal process short and broad, its apex weakly emarginate (fig. 209); aedeagus with incomplete poorly sclerotised tegmen; ovipositor with distinct paraprocts, valvifers, coxites and apical styli.

Type-species, *C. floridanus* sp. n.

Habitat. Adults recorded from an old pile of sawdust. Geographical distribution: West Indies, southern part of U.S.A.

***Cerylcautomus floridensis* sp. n.**

With general characters of *Cerylcautomus*.

Dorsal surface uniformly reddish-brown, shiny, sparsely clothed with semi-recumbent setae.

Head with a few scattered setae on vertex, arising from indistinct punctures; antennal segments 3-9 with rather long setae.

Thorax with pronotum broadest at middle, its side margins bordered and fringed with erect setae, its front angles rounded-obtuse, hind angles slightly obtuse, notal punctures evenly and sparsely distributed, setae semi-erect and bent backwards. Elytra somewhat elongate, broadest near middle, humeral angles not projecting, outer edges bordered and fringed with setae projecting outwards and slightly backwards, with 7 dorsal rows of darker punctures, the two innermost ones from a common base by scutellum, elytral setae arising from the rows of punctures, bent backwards, interstices narrow and glabrous. Scutellum minute, transverse with obtuse angle behind, glabrous. Ventral surface finely and indistinctly punctured, without evident setae.

Abdomen ventrally punctured as thoracic sterna, pubescence sparse and indistinct. Aedeagus as figured (fig. 207).

Dimensions of holotype (in mm.): total length 1.23, width of head across eyes 0.25, length of antenna 0.33, width of prothorax at middle 0.47, length of elytra 0.73, width of elytra at middle 0.54.

Holotype and 140 *paratypes*, 20-year old sawdust pile, edge of cypress swamp, U.S.A.: Florida, Chaires, Leon County 17.vii.65 (*W.Suter*); in Field Museum of Natural History, Chicago.

Aculagnathus Oke, 1932

Oke's original spelling *Aculagnathus* (1932) was altered, illegitimately according to our current code of zoological nomenclature, to *Aculognathus* by Schenkling (1934) in

Junk's catalogue, but restored by Britton (1970) in *Insects of Australia*, where a good habitus picture of *A. mirabilis* is provided. The genus appears to be rather closely related to *Cautomus*, from which it differs mainly in the reduction of the antennal and tarsal segmentation, possibly connected with the unusually small size of the species. The genus is defined thus.

In a paper appearing after this text was completed, Besuchet (1972) revised the genus *Cautomus* and included *Aculagnathus* in it as a subgenus together with two new ones, *Leptoxycheilus* and *Paracautomus*, both of which would be traced to *Cautomus* in our key, although *Paracautomus* has 9-segmented antennae.

With general characters of Ceryloninae and Aculagnathini.

General shape resembling *Cerylcautomus*, but less parallel-sided and depressed, specise small.

Head (fig. 214) with small, prominent eyes, very little deflexed, no occipital transverse line, clypeus rather narrow in front with straight front margin, anterior gular region with a transverse groove but no antennal grooves by lower margins of eyes. Antennae (fig. 214) 9-segmented, scape rather large, pedicel and segment 3 elongate, 3 smaller than pedicel but longer than 4, 4-6 short and subequal, 7 rather larger than 6, 8 and 9 forming an elongate 2-segmented club, 9 longer than 8. Mouth parts not covered by prosternum when head is retracted, mandible as in *Cautomus*, maxilla, labium and labrum as figured (fig. 214).

Thorax with pronotum transverse, its side margins rounded and finely serrate, no sublateral impressions on notum; hypomera without antennal cavities; prosternum with a rather small but distinct projection of its anterior margin, front coxae small, narrowly separated, cavities open behind, prosternal process narrow with truncate apex (fig. 127). Elytra (fig. 215) with punctures forming irregular rows, epipleura rather narrow, side margins distinctly rounded; middle coxae narrowly separated, sternal fitting between them in a short straight line (fig. 216). Wing as in *Cautomus*; metasternum strongly transverse, without femoral lines, median impressed line short, metendosternite of pair of arms type. Legs (fig. 216) rather long, trochanters elongate, femora swollen in middle, tibiae broadened to apex and with 2 normal spurs, tarsal segment 1 about one and a half times as long as 2, 3 longer than previous 2 together.

Abdomen slightly longer than wide; ventrite 1 without femoral lines, intercoxal process rather narrow with almost straight apical margin. Ovipositor with valvifers and coxites indistinctly separated, styli attached at apex of coxites.

Type-species, by monotypy, *A. mirabilis* Oke.

Habitat. Nests of ants, *Amblyopone obscurus*; larva undescribed. Geographical distribution: Victoria, Australia.

Species studied. *A. mirabilis* Oke.

APPENDIX

Eidoreus Sharp, 1885

Sharp (1885) defined the genus *Eidoreus*, in the family Erotylidae, for a single species from Hawaii, *E. minutus* Sharp, which is thereby the type of the genus; later Casey (1895) defined a genus *Eupsilobius* in a separate tribe Eupsilobiini of Colydiidae-Murmidiinae; we have not been able to examine the type of Casey's species *Eupsilobius politus* (from Florida, U.S.A.), but Dr J.M.Kingsolver kindly lent three specimens, from Mexico

and British Honduras, which had been compared with Casey's type and found substantially identical with it. These Central American specimens are clearly congeneric with *Eidoreus*, but may represent a species distinct from *minutus* Sharp. We therefore regard *Eupsilobius* as a synonym of *Eidoreus* (**syn. n.**).

In 1910, H.J. Kolbe described a new genus and species from the Seychelles Islands, *Pseudalexia sechellarum* Kolbe, attributed by him to Endomychidae-Sphaerosominae. Arrow (1922), dealing with Seychelles specimens that appeared to agree with Kolbe's characterisation of his species, pointed out their apparent identity with *Eidoreus minutus*, and later (Arrow, 1927) recorded the same species from the Samoan Islands.

In 1928 van Emden studied and re-described an *Eidoreus* from the Seychelles, concluding that the genus could not be included in Erotylidae or Colydiidae, and suggesting comparison with primitive Coccinellidae—he seems to have been unaware of Kolbe's work.

From the characters recorded by previous authors, and from our study of the specimens sent by Kingsolver, it is clear that *Eidoreus* belongs to the cerylonid group and not to Erotylidae. The outwardly open middle coxal cavities and the form of the tentorium (figs. 73, 74) exclude the genus from Cerylonidae or Corylophidae, the presence of only 5 pairs of functional abdominal spiracles from the Sphaerosomatidae (Endomychidae-Sphaerosomatinae auctt.), and the mandibles with a well-developed molar part from the Coccinellidae, the 4-segmented tarsi from the Discolomidae, Merophysidae and Lathriidae—leaving only the Endomychidae as a possible repository for it. In fact *Eidoreus* agrees in all essential features of the adult, except for the presence of well-marked femoral lines on the metasternum and first ventrite, with Endomychidae; we predict that its larva will have not more than 4 ocelli, annuliform spiracles, a blunt maxillary mala, distinct frontal sutures, and urogomphi weak or absent. It may well represent the nearest surviving approach to the type of Endomychid from which Coccinellidae arose, and could well be made the type of a distinct subfamily.

The major part of this work, including all the figures and the formal description of the various taxa, was carried out by the senior author (*T. Sen Gupta*), partly in the Department of Zoology, Glasgow University but mainly in the Department of Entomology of the University of Alberta, with the assistance of a post-doctoral fellowship and the facilities and help provided by Prof. B. Hocking and Dr G.E. Ball. The materials on which the study was based were lent by the British Museum (Nat. Hist.) through the courtesy of Mr R.D. Pope, by the Museum of Comparative Zoology, Harvard, by courtesy of Dr J.F. Lawrence, and by the Field Museum of Natural History, Chicago, through the kindness of Dr H. Dybas; we also used adult and larval specimens collected by R.A. Crowson in New Zealand and Australia in 1956–57, and in Australia in 1966, with the aid of Leverhulme Research Grants, and British and European materials in the collections of the Hunterian Museum in the Department of Zoology, Glasgow University. Many other persons helped us by providing individual specimens, reprints, or information and advice; to all of them we offer our thanks and our apologies for the imperfect and tentative nature of the work to which they have so generously contributed.

EXPLANATION OF FIGURE LETTERING

<i>a</i> , apical spine	<i>o</i> , ocelli
<i>aa</i> , maxillary articulating area	<i>p</i> , paramere
<i>ac</i> , antennal cavity on head	<i>pr</i> , prostheca
<i>at</i> , anterior tendon	<i>pg</i> , pygopod
<i>av</i> , antennal cavity on front angles of prothorax or prosternum	<i>r</i> , longitudinal ridge
<i>c</i> , cardo	<i>sa</i> , sensory appendage
<i>cx</i> , mesocoxal line on metasternum	<i>se</i> , prosternal plate
<i>ed</i> , endocarina	<i>sf</i> , subcubital fleck
<i>ep</i> , epipleura	<i>sp</i> , spiracle
<i>f</i> , frontoclypeal suture	<i>sr</i> , spurs
<i>fl</i> , femoral line	<i>ss</i> , mesoepimera
<i>ft</i> first tarsal segment	<i>t</i> , transverse line on vertex of head
<i>g</i> , galea	<i>tb</i> , tibia
<i>gr</i> , groove on labrum	<i>tc</i> , trochanter
<i>go</i> , glandular pore	<i>td</i> , supratentorium
<i>hp</i> , hypopharynx	<i>te</i> , median tentorial process
<i>ic</i> , internal closure	<i>tg</i> , transverse groove or line on anterior part of gular region
<i>im</i> , median impressed line on metasternum	<i>tp</i> , post-tentorium
<i>ip</i> , impression on pronotum	<i>tr</i> , corpotentorium
<i>l</i> , labrum	<i>ts</i> , tarsangular seta
<i>la</i> , lacinia	<i>tt</i> , metasternal knob
<i>lb</i> , median lobe	<i>tx</i> , tegmen 1
<i>li</i> , ligula	<i>ty</i> , tegmen 2
<i>lp</i> , labial palpi	<i>ur</i> , urogomphi
<i>m</i> , mola	<i>vt</i> , ventral crushing tubercle
<i>ma</i> , maxillary mala	<i>x</i> , mandible
<i>ms</i> , median strut	<i>y</i> , maxilla
<i>nm</i> , mentum	

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