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A NEW KEY TO THE SUPRAGENERIC TAXA IN THE BEETLE FAMILY CETONIIDAE, WITH ANNOTATED LISTS OF THE KNOWN GENERA

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A revised key to the subfamilies, tribes and subtribes of the Cetoniidae (Coleoptera: Scarabaeoidea) is presented. Comments are given on the classification implied by the key, which includes several redefinitions. All the known genera (ca. 510) are listed under their tribe or subtribe, the position of several being different from that in Schenkling's catalogues (1921, 1922). References to recent synoptic literature are given. Eighteen new subtribes are proposed, the majority in the tribe Cremastocheilini. One new tribe is proposed, the Platygeniini. Attention is drawn to various new and neglected synonymies, original spellings, and other nomenclatural matters regarding family-group and genus-group names. The position of many genera is briefly discussed. Some striking features of the biogeography of the Cetoniidae are discussed, such as the high generic endemicity for the major biogeographical regions (for the Madagascan, Afrotropical and Australasian regions ca. 90% or more).

J. Krikken, Rijksmuseum van Natuurlijke Historie, P.O. Box 9517, 2300 RA Leiden, the Netherlands.

CONTENTS

1. INTRODUCTION

Purpose, limitations, cetoniid natural history

During the past few years some colleagues involved in rearranging collections of cetoniid beetles (Coleoptera: Scarabaeoidea: Cetoniidae) have been badgering me with questions on the supraspecific classification of this group, knowing of my continuing interest in the matter. Generally I replied that, although I had seen virtually all the genera (i.e. the majority of their species, including the type-species), decades of diligent research would be necessary to settle their classification. It is, however, obvious that the classification and nomenclature put forward by Schenkling (1921, 1922), in what is still considered the standard world catalogue of the Cetoniidae, is outdated, unfounded, and confusing, and all this to such a degree that something should be done. As a bibliography Schenkling's work undoubtedly remains useful, but from a taxonomic point of view the catalogue is rapidly becoming useless. My purpose here is to improve Schenkling's classification by giving a revised but still provisional key to the subfamilies, tribes and subtribes of the Cetoniidae, by adding condensed, hopefully heuristic comments to the classification implied by the key, and by giving lists of the ca. 510 known genera, all arranged under the respective tribes and subtribes. For me personally it is largely an attempt to delimit a number of problem areas to be dealt with in the years ahead. Additionally, it is a possibility to rectify irritating nomenclatural matters.

In tracing back the origins of Schenkling's classification I found that the argumentations of the 19th century authors in support of their views were poor, if not altogether absent. Certainly none surpassed that of Burmeister (as given in his "Handbuch", 1842) as far as the amount of detail is concerned. He already recognized the enormous degree of parallelism as a serious classificatory problem[1]). Much of Schenkling's 1921-1922 suprageneric classification seems to go back to Schoch, who published during the last decade of the 19th century various worldwide keys and catalogues (i.a. Schoch, 1894). Kraatz and Schoch (both in various papers) created many supraspecific taxa on the basis of their geographic distribution alone: they shared the view that a genus could not in principle occur in more than one continent, and extended this view (especially Schoch, e.g. 1894) to family-group taxa. After the publication of Schenkling's catalogues (l.c.) only regional keys and classifications were published (cf. under family diagnosis, chapter 2).

The present worldwide rearrangement of supraspecific taxa must, despite its progressive appearance, be qualified as conservative, in the sense that numerous further changes are anticipated as a result of further studies. A detailed comparative-morphological study of the adult exoskeleton has never been undertaken; very little is known of the immature stages; useful characters could possibly be found through comparative anatomical, cytological, biochemical studies etc.; the adult and larval ecology of Cetoniidae is usually only known in the most general terms. These neglected lines of research are, with the exception of the first, completely outside the current scope of my own work. Consequently I can only emphasize that my results cannot be considered final or authorative in any way, and I invite all workers interested in the group to provide new information and/or specimens serving to test and improve the classificatory statements and implications given below. Many of these can only be tested by establishing in detail the phylogenetic significance of the characters used. Moreover if indeed we wish to develop a comprehensive phylogeny of the Cetoniidae, many more synapomorphies will be needed to improve its hierarchical structure, and in this respect unconventional lines of research, such as those mentioned above, are indispensable. Meanwhile I hope that the present revised key and the lists of genera will serve their primary purpose: providing the non-specialist with some guidance in sorting and arranging collections of Cetoniidae.

Not only supraspecific matters present obstacles to persons working with collections of Cetoniidae. Although not of immediate concern in the context of this paper, it should be noted that the inexperienced collector is easily misled into uncritical species identification by comparing his material with pictures or with specimens not seen by specialists. Large size and adherent distinctive shapes and colour patterns are no guarantee for a correct species

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[1] "... dass jedes sich noch so augenfällige Gruppenmerkmahl nicht bloss bei allen wahren Mitgliedern der Gruppe vorkomme, sondern auch noch bei dieser oder jener Art, die entschieden nicht mit in die Gruppe gehört, deren Merkmal sie an sich trägt" (Burmeister, 1842: 147).

identification; the family is rife with parallelisms and equally deceptive variability. As a matter of fact, even the identification of the large Goliathini is fraught with problems, and frequently cannot be performed without a proper study of type-specimens. Misidentifications in both professional and amateur collections are therefore understandably numerous, and unfortunately continue to be published.

The total number of described cetoniid species amounts to about 3600 (Schenkling, 1921 + 1922, listed 2994 species). Thus during the past sixty years an average of 10 species were added each year, but this figure seems to show a tendency to decrease; only the exploration of certain poorly known regions and critical generic or species-group revisions sometimes yield novelties in numbers. The number of genera in the Cetoniidae currently increases very slowly, and seems to have reached the near-horizontal section of a sigmoid curve extending in time from 1758 to the present date.

Most adult Cetoniidae (in English sometimes called "flower beetles" or "rose chafers") appear to be nectar- and pollen-feeding flower visitors; they are also attracted to plant exudates; the larvae mostly live in decaying vegetable matter or in plain soil; in captivity both stages usually devour soft fruit. The greatest diversity, especially in terms of numbers of taxa, is found in tropical forests: the present-day destruction of these forests will undoubtedly lead, and probably has already led, to the extinction of numerous cetoniid species. Despite the fact that most cetoniids are agile flyers, many genera and species are known to have a rather limited range; this fact is not simply due to undercollecting, as many very local species are well-known, large, most attractive collector's items. Certain cetoniids are associated with social insects, some even preying on them (Cremastocheilini). Other groups have been recorded from dung; one African genus (*Paleopragma* in the Cetoniini) is known to be a cuckoo in the subterranean brood chambers of *Heliocopris* dung beetles (Scarabaeidae s. str.), depositing eggs in their dung balls. Cetoniid larvae are of the well-known scarabaeiform (white grub) type; those of several species have been described (synoptic works include Medvedev, 1952, and Ritcher, 1966), and will be described in the near future. The total information on larvae now available, however, is still too scanty to be of suprageneric classificatory importance. A few Cetoniidae are of minor economic importance, the adults damaging flowers, fruit and other plant parts above the ground, the larvae damaging roots, tubers, etc.

General taxonomic and nomenclatural comments

Some general points should be discussed in advance to justify the present arrangement of the suprageneric taxa, the status and position of the included genera, and the nomenclature used. Other points might, or even should be made, but these will be saved for another occasion. Moreover, many of the arguments for my classificatory or nomenclatural opinions follow directly from the diagnostic information contained in the key, or from a strict application of the nomenclatural rules, rendering extensive discussion unnecessary.

(i) The family status of the Cetoniidae is sometimes considered debatable, as is the case with other scarabaeoid family-group taxa[1]). My conclusions can be summarized as follows. (1) The Cetoniidae (including Cetoniinae, Trichiinae, and Valginae) constitute a monophyletic group, based on at least two synapomorphies; cf. family diagnosis in chapter 2. (2) The Dynastidae and/or Rutelidae are (or include) the most likely sister group of these Cetoniidae (cf. for instance Meinecke, 1975). (3) The Cetoniidae are so different from other scarabaeoid groups (take for instance *Scarabaeus* or *Geotrupes*) that they cannot simply be merged in to one large family Scarabaeidae s.l. (4) Elsewhere in the Coleoptera family rank has been accepted on lesser characters than those given in the family diagnosis below.

(ii) There are two recurrent, confusing, but phylogenetically most interesting morphoclines among the Cetoniidae: (1) the increasing separation of the middle coxae by the meso- and metasterna and the evolution of an intervening (mesometasternal) protrusion (cf. figs. 2, 43, etc.); and (2) the evolution of a posthumeral elytral emargination and other humeral-thoracic modifications. The function of the middle coxal separation is unknown, the posthumeral emargination enables the beetles to fly fast, with (nearly) closed elytra, their alae sliding through the emargination. Judged on the outgroup criterium (the outgroup being the remainder of the pleurostict Scarabaeoidea (or at least the Dynastidae and/or Rutelidae) the direction of the morphoclines is as

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[1]) Recently various phylogenies for the higher taxa of the Scarabaeoidea were proposed, the most recent (which includes the "major taxa") being that by Howden (1982). These phylogenies almost always leave out the numerous really critical groups (for the Cetoniidae e.g. the Cryptodontini) and rarely take into account unconventional (but sometimes highly relevant) information (e.g. in the paper by Meinecke, 1975). Howden's first apomorphy of the Cetoniidae (his Cetoniinae), the separation of the middle coxae, does not hold (unless he has an entirely different conception of the group): numerous Cetoniidae, and indeed some of the phylogenetically most interesting ones (cf. key and comments below), have (sub)contiguous middle coxae; the manner of implantation of the antenna on the side of the head, as mentioned by Howden, may indeed be an apomorphous feature; phylogenetic judgments on larval characters are tricky: only very few larvae are known.

suggested by the terms just chosen (unless other compelling evidence is indicative of the occasional reversal). Parallelisms do occur¹) (see also under v).

(iii) This means that the Trichiinae and Valginae, lacking the two above modifications, should be considered primitive relative to the Cetoniinae, which all possess the humeral modifications; and that within the Cetoniinae, groups without the mesometasternal modifications, should be considered primitive relative to the others (cf. Cremastocheilini and Xiphoscelidini). As far as these primitive groups have no synapomorphies of their own, their monophyly is not established, and a further segregation into smaller units, or a reallocation of components should be considered. The key framework (fig. 3) might be regarded as a gross, tentative phylogeny of the tribes.

(iv) My efforts to re-classify the Cetoniidae largely take the form of a "tidying-up operation" by introducing more subtribes for distinct, possibly monophyletic groups of genera. This has inevitably led to the increasing residual nature of other groups (including several of which the monophyly is not established). I will not pinpoint all the individual groups as to this, because the phylogenetically interested user of this paper can easily find out for himself (see also subfamilial and tribal comments, in chapter 3 after the key, and fig. 3).

(v) The present recognition of convergent morphoclines in some important characters warrants the segregation of some conventional groupings, the most drastic action taken here being the limitation of the Gymnetini to the forms that have the posterolateral pronotal angles shifted forward. The expansion of the basomedian margin of the pronotum apparently took place independently in many cetoniine tribes (on at least six different occasions). The abundance of parallelisms was, despite Burmeister's assertion (1842, see above), insufficiently recognized up till now.

(vi) In accepting an established conventional grouping I was sometimes forced to invoke the argument of "variable apomorphism", meaning that two or more derivative character states (1b, 2b) occur in individual units (genera or species) in different combinations (as 1b2b, or 1a2b, or 1b2a), which is i.a. the case with the "Madagascan features" of the Stenotarsiini (q.v.). Although not warranting the strict monophyly of the group, this phenomenon of a variable expression of rather unique, geographically limited derivative features sug-

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¹) In one tribe alone, the Cremastocheilini, the evolution of a mesometasternal protrusion has occurred at least three times: in *Problerhinus* (Genuchina), in a few species of *Coenochilus* (Coenochilina), and in *Rhagopteryx* (Cymophorina). If indeed the xiphoscelidine lineages (q.v.) should be attached to the phylogenetic bases of other tribes, the evolution of the mesometasternal protrusion has in many of them taken place independently. See also my remarks on Ichnestomina, Blaesiina, the genus *Euremina* (Taenioderini), etc.

gests a certain naturalness, a close phylogenetic relationship of its members, irrespective of cladistic detail. Whether we can ultimately do without this variable apomorphism remains to be seen. This phenomenon certainly occurs on lower levels as well, e.g. in various coryphocerine genera comprising species in which the characteristic male clypeal armature has not come to expression.

(vii) A moot point is always the ranking of the genus-group taxa, i.e. the question "genus, subgenus, or mere species-group?". Several of the genera (here alphabetically listed within their tribe or subtribe) are doubtless closely interrelated (in both phylogenetic and phenetic terms); their generic or subgeneric rank is arbitrary. My view is that, instead of lumping numerous genera, and in the process obliterating the evident complex diversity (cf. the suggestions made by Arrow, 1941), a maximum number of species-groups should be retained as genera or subgenera (hence my treatment of the Goliathina differs from that of Wiebes, 1968). Unfounded lumping would only result in shifting, not in solving classificatory problems. Where would Arrow's wholesale merging of genera have ended, had he carried through his ideas? I find that: (1) many supraspecifically useful characters have been studied insufficiently; (2) sexually dimorphic characters cannot be neglected where synapomorphies are involved; (3) any monophyletic species-group can, in principle, be ranked as genus or subgenus; (4) in the absence of arguments, convention should guide us in ranking supraspecific units; there simply is no other option; (5) the actual identity of several type-species is as yet obscure, i.e. not only from a nomenclatural point of view (type-species designation).

(viii) A most irritating matter is the purely nomenclatural instability of some of the currently used genus-group names: their spellings, publication dates, and type-species designations have so far not been considered critically, especially not for names published during the first half of the 19th century (e.g. in work of Westwood, 1841-1845, Burmeister, 1842, see under Goliathini and References). My efforts to rectify this, although far from perfect, have resulted in some inevitable changes in the application of a number of widely used names. A complete list of genus-group names is in preparation. I have also looked at questions regarding family-group names, and can only conclude that we still have some way to go before stability will be reached.

Technical explanation

Much of the morphological terminology concerning cetoniid beetles employed here and in my other papers is explained in two diagrams (figs. 1-2).

Under each subfamilial and tribal heading (in chapter 3 following the key to the higher taxa) brief phylogenetic, nomenclatural and other observations are given, and the included genera are listed alphabetically (in some cases the genera are grouped according to their occurrence in biogeographical regions).

Where a page number is given behind the author and year of a genus-group name, reference is made to the first publication, thus emphasizing nomenclatural matters. Some points are briefly mentioned in footnotes. New synonymies (syn. nov.), new names (nom. nov.), revised status (rank and/or delimitation) (stat. rev.), intertribal transfers (transl. nov.), are indicated as such. Terminations of family-group names are as usual: -inae (subfamily), -ini (tribe), -ina (subtribe).

Some terms (especially phylogenetic ones) cannot be explained here (cf. Lincoln et al., 1982, and elsewhere).

In the diagnostic information given in this paper the term "usually" means: in more than 95% of the cases encountered the qualification applies; the term "frequently" means: in more than 50% of the cases encountered the qualification applies; "occasionally" means: in less than 10% of the cases the qualification applies; "rarely" means: only one or two such cases seen. The use of these terms can only be avoided if one ignores known exceptions, parallelisms etc.!

In chapter 3, at the end of the generic information given for each genus, an indication is given of the number of included species. These numbers are based on the sum of the information contained in the Coleopterorum Catalogus volumes (Schenkling, 1921-1922), the Zoological Record volumes (from 1920 on), and recent synoptic work, occasionally corrected on my own experience. The figures may differ ± 1 from reality, or more (potentially greater deviations are preceded by the abbreviation ca.). Uncertainties arise from unrevised generic limitations, uncertain specific status (rank, synonymy, generic position), etc. In spite of these uncertainties I estimate that more than 90% of the species are placed in the correct genus and that more than 75% are correctly ranked.

Throughout the lists in chapter 3 references are given to the latest synopses for the respective groups, each with the prefix LS (after the species numbers); more comprehensive work is mentioned under the higher categories concerned. The synoptic work for some large genera (*Pachnoda*, *Protaetia*) is scattered and cannot be listed completely in this paper.

Indications "in press" mean that a manuscript has been submitted for publication; "in prep." means that the manuscript concerned is nearing completion. Some manuscript names are included in the checklists (chapter 3).

Symbols and further abbreviations in the lists of genera:

=	synonym to . . .
cf. =	possibly synonym, species-group, subgenus to . . . (to be studied)
+	heterogeneous; composite group (to be studied)
incl.	including (as a sub-genus)
SG	subgenera recognized (some may be mentioned)
P	position (in tribe or subtribe)
N	nomenclature (original spelling)
LS	latest synopsis (not in Schenkling)
!	confirmed
?	questionable1)
*	known to me from description and/or illustration only
Austr	Australasian
Or	Oriental (incl. Sulawesi)
Pal	Palearctic
Afr	Afrotropical (= Ethiopian)
Mad	Madagascan
Nearct	Nearctic
Neotr	Neotropical
( )	poorly represented in this region (insignificant transgression of species here not indicated)

Biogeographical summary

Although the table given below is primarily intended to summarize the generic situation on a worldwide scale, some biogeographical comment on the figures seems appropriate. The figures are, of course, approximate; however, they can only be expected to change greatly as a result of considerable changes in the suprageneric classification, but even then the endemicity totals for the respective biogeographical regions would remain high. Further uncertainties that might slightly affect the figures include the genus-subgenus question, the vagueness regarding transgressions of genera from one region to another, and the artificial nature of "averaged" biogeographical boundaries. In the present context it is impossible to elaborate on this.

The overall endemicity is extremely high: more than 90% of the cetoniid genera are limited to a single biogeographical region. The highest endemicity

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1) The indication P? behind the name of a taxon means that my study of specimens raised questions about its position which cannot now be answered. N! signifies a nomenclature different from current usage.

is reached in the Madagascan region (ca. 95%), the lowest in the Palearctic (ca. 41%; most Palearctic genera are confined to the eastern half of the region). The greatest diversity in terms of numbers of genera is reached in the Afrotropical region, with an endemicity virtually equalling that of the Madagascan region. Very significantly all the southern regions have their own dominant tribes, indicating a long-standing minimum of faunal exchange. Particularly the isolation of Madagascar with respect to continental Africa must have been enormous and the internal diversification considerable (cf. Stenotarsiini).

Inherently the similarity between the major biogeographical regions, in terms of the absolute number or percentage of genera shared, is extremely weak. The highest number of genera shared is between the Oriental and Palearctic regions, amounting to 12 (8%) on a total of 150 genera. Sharing these genera seems, with few exceptions, due to marginal transgression of relatively recent date, which is clearly illustrated by the Madagascan fauna: among the three genera shared with continental Africa (two genera) and Asia (one genus), only one species appears to have established itself on Madagascar proper (the home of the Stenotarsiini mentioned in the preceding paragraph); the other two genera occur on smaller nearby Indian Ocean islands.

In my view the figures in the table suggest a pre-Tertiary origin of the Cetoniidae, with considerable subsequent diversification, possibly in connection with the evolution of Tertiary forest biota on the respective southern (post-Gondwanian) land masses.

The fact that the non-endemic genera are usually derivative and seem to represent dispersal phenomena may be further exemplified by the Australasian fauna: of the six non-endemic cetoniid genera one may be an ancient Gondwanian element (*Microvalgus*, cf. remarks under Valginae); the others (*Charitovalgus, Glycyphana, Protaetia, Clinteria, Mecinonota*) are undoubtedly late-Tertiary or Quaternary invaders from the Oriental region. On the other hand, the Schizorhinini, which probably largely evolved "in situ" in Australia during the Tertiary, seem to have dispatched at least two derivative (lomapterine) groups (cf. *Agestrata, Macronota*) to the Oriental region, both reaching Ceylon (discussion in review of *Macronota*, Krikken, in prep.).

The present reclassification of portions of the Gymnetini sensu Schenkling (1921) clearly illustrates a point recently made again by Illies (1983), namely that much basic work on alpha and beta taxonomy has to be redone to arrive at better-founded biogeographical theories. Had the Lomapterina been left in the Gymnetini, completely separated from the Schizorhinina (cf. below, discussion under Schizorhinini), then one would have had a prima facie case for dispersal through Antarctica, or for some kind of more or less complex vicariance. Another conspicuous case in point is the revision (Morón & Krikken, in prep.) of the Cryptodontini, a tribe of which one heard rumours of "Cretaceous amphi-Atlantic relationships", i.e. between the Central American *Pantodinus* (now in the Incaini) and the two Afrotropical genera of Cryptodontini (q.v.).

The generic figures in the table below are supplemented with the total numbers of species included in the respective tribes, thus providing additional information on intratribal diversity. The largest tribe, the Cetoniini, with ca. 1045 described species, includes such large genera as *Protaetia* (Oriental and Palearctic regions, possibly ca. 240 species) and *Pachnoda* (Afrotropical region, ca. 130 species), two closely related genera needing a lot of revisionary work (especially with respect to the species-subspecies question). Again the remarkable nature of the Madagascan fauna is prominent, comprising ca. 330 endemic species (mostly Stenotarsiini), i.e. a number not far (possibly ca. 10%) below the total for the entire Western Hemisphere.

Such preliminary considerations show that the Cetoniidae constitute excellent material for the study of historical biogeography. Meaningful statements, however, can only be made if this study goes hand in hand with an improvement of the phylogenetic classification of the tribes and subtribes concerned.

2. FAMILY DIAGNOSIS AND KEY TO INCLUDED SUPRAGENERIC TAXA

Diagnosis of the Cetoniidae (adult external characters)[1])

Fore coxa protruding conically downward, distance to prothoracic side large, usually more than maximum diameter of coxal cavity (only in one tribe are the fore coxae transverse, cf. key diagnosis 4a, Cryptodontini). Humeral border of elytra usually resting on (or behind carina of) protruding mesepimeron. Mandibles covered by clypeus, never strongly thickened and visible (in repose covered by other mouthparts). Labrum more or less membraneous, externally invisible. Eye-canthus long and narrow, anterior side of eye-ball usually visible in full-face view. Antenna 10-segmented (scapus, pedicel, 5 flagellar segments, and 3 more or less elliptic, sometimes very elongate lamellae); implantation on more or less emarginate clypeal side exposed. Elytron usually with distinct humeral and anteapical umbone. Behind hind coxae usually 7 abdominal sternites distinct (frequently first juxtacoxal one only

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[1]) Consult the "composite cetoniid" (figs. 1-2).

Summary of taxa currently recognized/biogeographical region

Australasian/Oriental/Palearctic/Afrotropical/Madagascan/Nearctic/Neotropical

	number of		numbers of endemic (non-endemic) genera							number of
	subtribes	genera	Austr	Or	Pal	Afr	Mad	Nearct	Neotr	species ca.
Trichiinae										
Cryptodontini	-	2	0	0	0	2(0)	0	0	0	8
Incaini	-	4	0	0	0	0	0	0	4(0)	10
Osmodermini	-	2	0	1(0)	0(1)	0	0	0(1)	0	10
Platygeniini	-	1	0	0	0	1(0)	0	0	0	2
Trichiini	-	37	0	0(2)	3(2)	24(0)	0	1(2)	5(1)	210
Valginae										
Microvalgini	-	3	0(1)	0(1)	0	2(1)	0	0	0	50
Valgini	-	30	0(1)	13(6)	3(5)	7(0)	1(0)	1(1)	0	215
Cetoniinae										
Cremastocheilini	16	51	0	4(7)	0(4)	30(4)	0	3(1)	5(1)	385
Xiphoscelidini	-	16	1(0)	0	0	13(0)	2(0)	0	0	45
Stenotarsiini	10	49	0	0	0	0	49(0)	0	0	320
Schizorhinini	2	42	40(0)	2(0)	0	0	0	0	0	370
Goliathini	4	81	0	17(3)	6(4)	50(1)	1(0)	0	2(0)	390
Cetoniini	2	107	0(2)	21(3)	6(8)	66(6)	0(3)	3(1)	1(1)	1045
Gymnetini	2	29	0(1)	0(1)	0	3(1)	0	1(2)	22(2)	200
Diplognathini	-	21	0	2(0)	0	19(0)	0	0	0	100
Phaedimini	-	5	0	5(0)	0	0	0	0	0	30
Taenioderini	2	29	0(1)	26(3)	0(2)	0	0	0	0	210
total	38	509	47	118	44	230	56	17	44	3600
endemic (non-endemic)		468(41)	41(6)	91(27)	18(26)	217(13)	53(3)	9(8)	39(5)	
endemicity %		92%	87%	77%	41%	94%	95%	53%	89%	

narrowly visible!). Pygidium exposed. Propygidium immovably connected with anteanal sternite. Middle and hind tibiae with less than 3, usually with 1 external elevation (never fringed with numerous fossorial spines); tibial apices usually 2- or 3-lobate-dentate inferiorly. Tarsal claws paired, all more or less similar (two exceptions, *Platygenia*, *Callynomes*). — Almost worldwide, usually absent from oceanic islands (e.g. New Zealand) and subpolar to polar regions.

Comprehensive work not listed by Schenkling. — Useful synoptic work on non-European regions includes: Arnett, 1974 (North and Central America); Blackwelder, 1944, 1957 (Central and South America); Bourgoin, 1919, 1921 (East Africa); Basilewsky, 1956 (East Zaire); Burgeon, 1932 (Congo region); De Lisle, 1945, 1947 (Cameroun); Medvedev, 1960, 1964 (USSR); Mikšić, 1976-1983 (Cetoniinae Palearctic, Oriental regions); Paulian, 1960-1961 (Indochina); Pouillaude, 1917-1920 (Madagascan region); Schein, 1960 (South Africa).

There is additional regional work (usually in faunistic series) on the European fauna.

Key to subfamilies, tribes and subtribes (adults)[1]

1a. Posthumeral elytral emargination absent and mesepimeron only slightly protruding in front of antehumeral carina (dorsal view). Pronotal base never with strongly developed basomedian lobe; disc without any strong projections (except in *Pantodinus*, Incaini). Middle coxae only rarely separated by distinct mesometasternal protrusion 2

1b. Posthumeral elytral emargination usually distinct and mesepimeron more or less convex (fig. 1), protruding in front of antehumeral carina (dorsal view; sometimes covered by posterolateral corner of pronotum). Scutellum virtually always more or less elongate, never strongly transversely-semielliptic or transversely-subtriangular. — Almost worldwide .... CETONIINAE, 8

2a. Hind coxae widely separated (fig. 37). Fore tibia with 3-5 external denticles. Elytral disc flat (fig. 7), without longitudinal costae (apart from more or less abrupt disco-lateral transition). Propygidium broadly exposed (behind elytra) and not constricted at spiracular level. Length not exceeding 1.5 cm. — Widespread, not in Neotropics .... VALGINAE, 3

2b. Hind coxae approximated (fig. 2). Fore tibia with 1-3 external denticles. — Widespread, not in Australasia .... TRICHIINAE, 4

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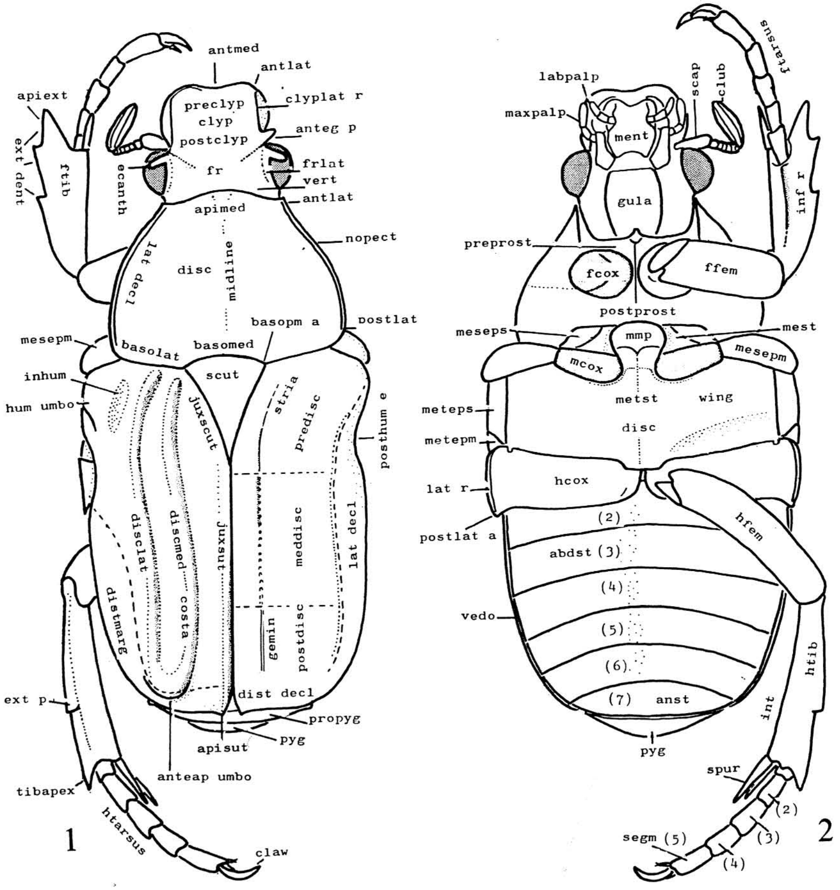
[1] Key framework down to tribes given in fig. 3.



Figs. 1-2. Some descriptive terms indicated on dorsal (1) and ventral (2) aspects of a "composite cetoniid". Key to abbreviations (some additional abbreviations given here are used in other figures):

a	angle
abdst	abdominal sternite
anst	anal sternite
anteap	anteapical
anteg p	antegenal protrusion
antlat	anterolateral
antmed	anteromedian
apiext	apico-external (denticle)
apimed	apicomedian
apisut	apicosutural (angle)
basolat	basolateral
basomed	basomedian
basopm a	basoparamedian angle
clyp	clypeus
clyplat r	clypeolateral ridge
clyppl	clypeopleuron
decl	declivity
dent	denticle
disclat	discolateral (costa of elytron)
discmed	discomedian (costa of elytron)
dist	distal
distmarg	distomarginal (area of elytron)
ecanth	eye-canthus
el	elytron
ext	external
fcox	fore coxa(l cavity)
ffem	fore femur
fr	frons

3a. Mesosternum posteriorly interposed between middle coxae (ventral view, fig. 38). Pronotum evenly convex. Body usually more sparsely squamose or setose. — Mainly Australasian and Afrotropical .... MICROVALGINI, p. 41

3b. Metasternum anteriorly interposed between middle coxae (ventral view, fig. 39). Pronotum with longitudinal ridge(s) and/or tubercles (fig. 7), occasionally with pattern of callosities and impressions. Body usually abundantly squamose and/or setose. — Mainly Oriental, Afrotropical, Holarctic .... VALGINI, p. 42

4a. Fore coxae transverse, space between coxal cavity and lateral border of prothorax narrow (fig. 31). Pronotum of males with strongly impressed or otherwise modified anterior part (fig. 4). Elytron with 11 or more (punctate) striae (which are indistinct in one species). — Afrotropical .... CRYPTODONTINI, p. 39

4b. Fore coxae projecting conically, space between coxal cavity and lateral border of prothorax broad (fig. 32). Anterior part of pronotum usually unmodified (apart from superficial impressions). Elytron with 10 or less (punctate) striae 5

5a. Fore tibia with basal-internal angle, adjacent femoral part with projection (fig. 33). Clypeus of males with variably shaped horn-like projec-

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frlat	frontolateral
ftarsus	fore tarsus
ftib	fore tibia
gemin	geminate (stria)
hcox	hind coxa
hfem	hind femur
htarsus	hind tarsus
htib	hind tibia
hum umbo	humeral umbone
inf r	inferior ridge (of fore tibia)
inhum	intrahumeral (impression)
int	internal (side)
juxscut	juxtascutellar (area of elytron)
juxsut	juxtasutural (margin of elytron)
labpalp	labial palpus
lat	lateral
maxpalp	maxillary palpus
mcox	middle coxa(l cavity)
meddisc	mediodiscal (area of elytron)
ment	mentum
mesepm	mesepimeron
meseps	mesepisternum
mest	mesosternum
metepm	metepimeron
meteps	metepisternum
metst	metasternum
mmp	mesometasternal protrusion
mmsut	mesometasternal suture
nopect	notopectoral (transition)
p	protrusion
postclyp	postclypeal (area)
postdisc	postdiscal (area of elytron)
posthum e	posthumeral emargination (of elytron)
postlat	posterolateral
postprost	postprosternum
preclyp	preclypeal (area)
predisc	prediscal (area of elytron)
prepa	preprosternal apophysis
preprost	preprosternum
pron	pronotum
propyg	propygidium
pyg	pygidium
r	ridge
scap	scapus (of antenna)
scut	scutellum
segm	segment
spir	spiracle
tibapex	tibial apex
umbo	umbone
vedo	ventro-dorsal (transition of abdomen)
vert	vertex

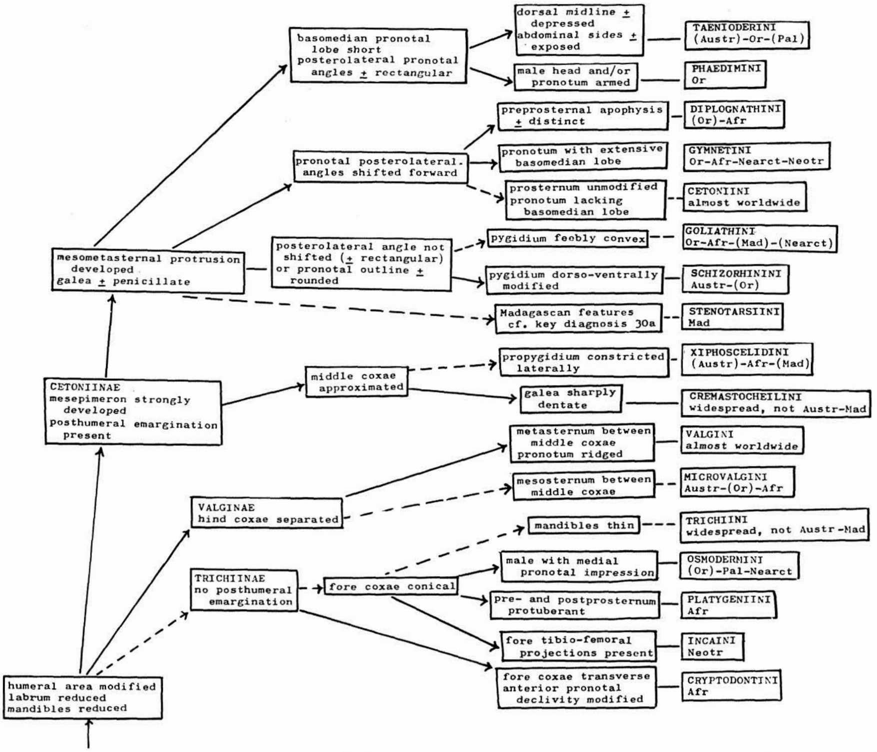


Fig. 3. Framework of key down to tribal level, with indication of some important characters (cf. actual key!) and distribution over biogeographical regions (cf. technical explanation). Uninterrupted lines: possibly monophyletic or near-monophyletic lineages (monophyly not always based on the character states here indicated!); interrupted lines: monophyly not established — no synapomorphies (cf. text).

tion(s). Eye-canthus angulate in front. — Neotropical ...... INCAINI, p. 39

5b. Fore tibia and femur without these projections. Clypeus never with long projection(s) 6

6a. Pre- and postprosternum with plump projection (fig. 34). Habitus remarkably deplanate. Length over 2.5 cm. Pronotum without protrusions and impressions. Male middle tibia strongly excavate or excised internally. Internal claw of male fore tarsus (fig. 36) strongly dentate. Eye-canthus evenly curved (fig. 35). — Afrotropical ...... PLATYGENIINI, p. 40

6b. Pre- and postprosternum without projection. Habitus not strongly deplanate. Tarsal claws unmodified. Eye-canthus usually straight, shorter 7

7a. Pronotum of males usually with distinct prediscal impression (fig. 5). Mandibles usually strongly sclerotized. Body size large (total length exceeding 1.5 cm). Dorsum uniformly black or brown. Fore tibia with 3 external denticles, middle tibia usually with 2 external spines. Scutellum usually elongate-subtriangular (fig. 5). — Mainly Holarctic .... OSMODERMINI, p. 39

7b. Pronotum evenly convex or with midline superficially impressed. Mandibles weakly sclerotized; maxillary galea frequently strongly penicillate (as in fig. 49). Fore tibia with 1-3 external denticles, middle tibia without or with single anteapical external elevation. — Widespread, not in Australasia .... TRICHIINI, p. 40

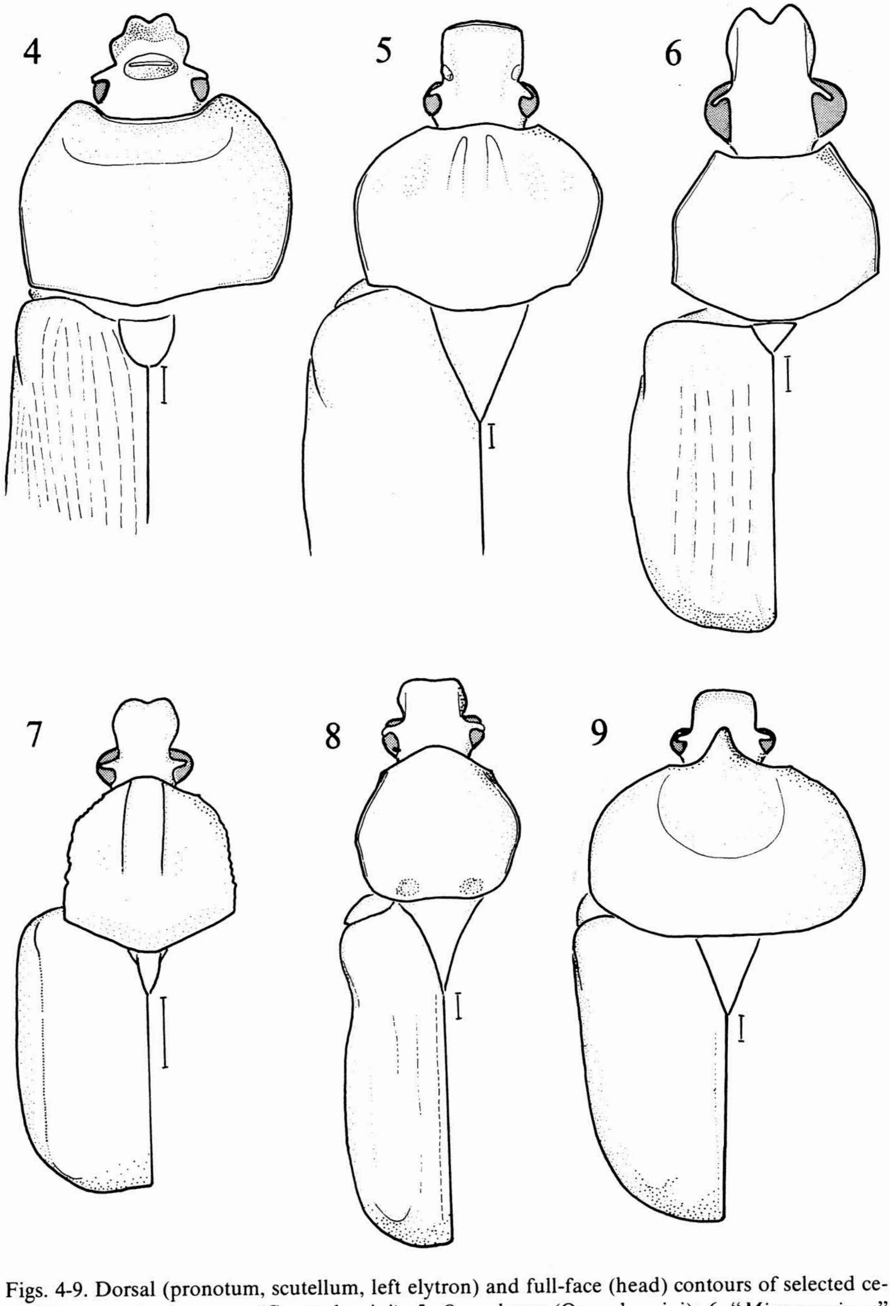
8a. Anteapical (propygidial) segment of abdomen not, or only very slightly, constricted at spiracular level (fig. 40). Middle coxae, with few exceptions (some Cymophorina, Genuchina, Macromina), strongly approximated (fig. 44), sometimes contiguous, never separated by a broad protrusion projecting greatly beyond middle coxae (lateral view). Mentum never narrowed in front, but frequently thickened and more or less expanded. Hind coxa laterally narrowing to single angle. Mandibles strongly sclerotized; maxillary galea and lacinia usually sharply dentate (fig. 48), rarely more or less setose, but never strongly penicillate. Parameres usually simple, nearly always more or less lobiform and lacking protrusions. Habitus usually "cremastochiliform": general body shape more or less elongate and colour never metallic or vitreous, mostly black or brown. — Widespread; not in Australasian, Madagascan, West Palearctic regions .... CREMASTOCHEILINI, 10

8b. Anteapical (propygidial) segment of abdomen more or less constricted at spiracular level. Middle coxae (the Xiphoscelidini and Ichnestomina are notable exceptions) separated, frequently by a broad protrusion (figs. 45-47) which projects beyond middle coxae (lateral view). Hind coxa laterally reflexed, in ventral view broad, frequently with distinct posterolateral angle (fig. 2). Mandibles usually weakly sclerotized, blade-like; maxillary galea usually lobiform and/more or less penicillate, lacinia setose (fig. 49) 9

9a. Pygidium modified: with pointed longitudinal crest, or with set of three protrusions or callosities (fig. 50). Basal margin of pronotum in some genera (Cymophorina) with pair of shallow impressions. Elytron in some genera (Macromina) with fine, sinuous transverse ridge limiting distal declivity. Pronotum without basomedian lobe. Scutellar apex always acute. Cetoniiform outsiders in the Cremastocheilini 10

9b. Pygidium not modified as indicated. Basal margin of pronotum even, or impressions different (e.g. not confined to base). Distal part of elytron never with fine transverse ridge 25

10a. Prosternum anteriorly with more or less perpendicular apophysis (late-



Figs. 4-9. Dorsal (pronotum, scutellum, left elytron) and full-face (head) contours of selected cetoniids. — 4, *Coelocorynus* (Cryptodontini); 5, *Osmoderma* (Osmodermini); 6, "*Mimognorimus*" (Trichiini); 7, *Dasyvalgus* (Valgini); 8, *Coenochilus* (Cremastocheilini); 9, *Rhinocoeta* (Xiphoscelidini). — Scale lines are 1 mm.

ral view, fig. 57); occasionally this preprosternal apophysis is greatly reduced in connection with strong expansion of mentum; in one group (Cymophorina, check couplet 17) the preprosternal apophysis is absent in some species 11

10b. Prosternum anteriorly simply tectiform; occasionally apex of median ridge protuberant, but then inclined rostrad. Mentum never strongly expanded, at most more or less thickened or folded in front. Head never with long peripheral projections ("antlers", horns), at most with reflexed apex. Base of pronotum without pair of shallow impressions 21

11a. Elytra and mesosternal declivity not peculiarly tuberculate. Derm not entirely favose 12

11b. Juxtascutellar area of elytra as well as mesosternal declivity peculiarly tuberculate (fig. 52). Derm entirely favose, i.e. with honey-comb-like sculpture. Head with evenly convex general surface, and with well-pronounced clypeopleuron, i.e. sharply defined deflexed clypeal apex. Tarsal segmentation "knotty". — Afrotropical .... TELOCHILINA, p. 45

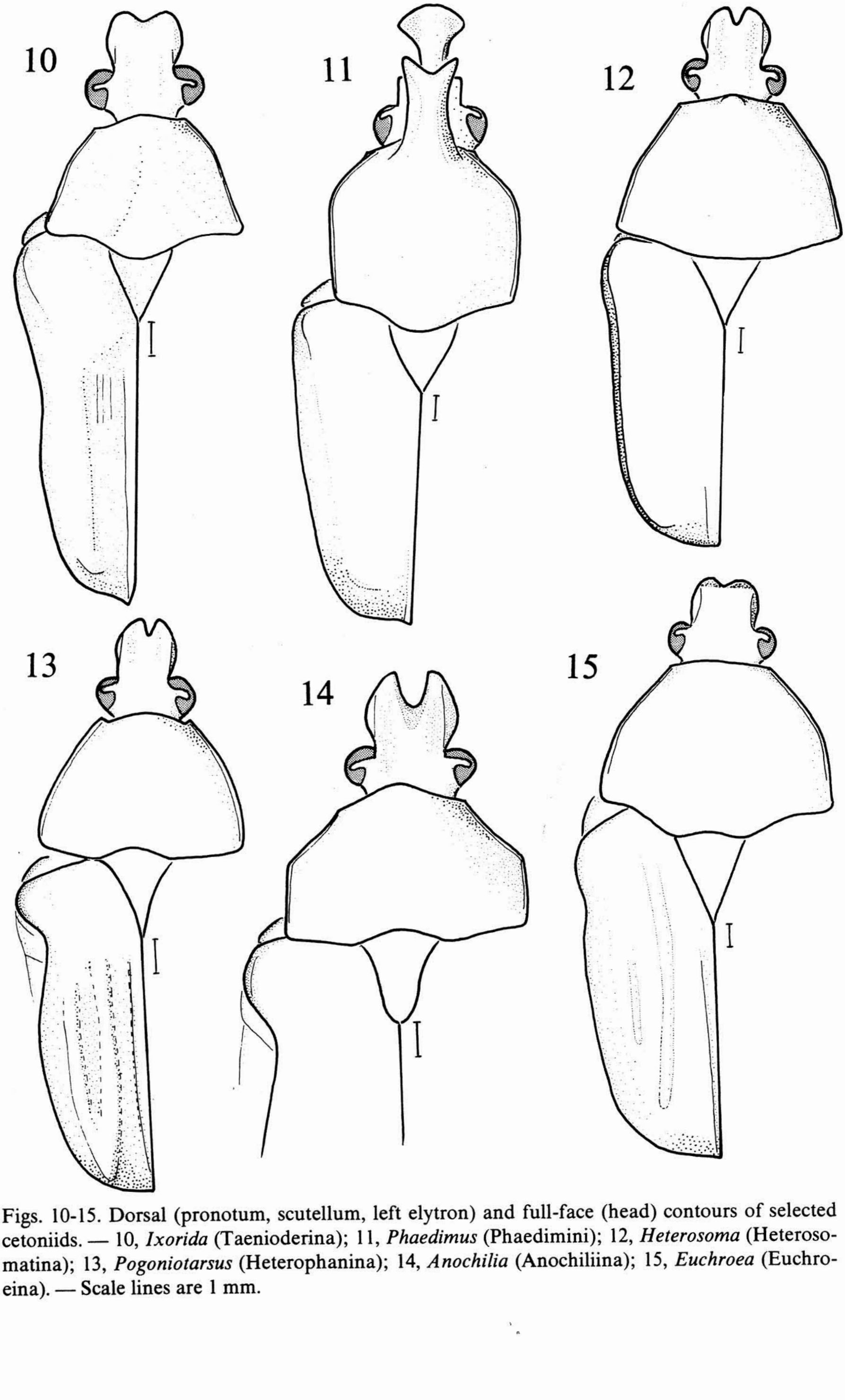
12a. Mentum not expanded, at most more or less thickened or folded in front. Antennal scapus usually simply claviform. Clypeus always lacking clypeopleuron 15

12b. Mentum more or less expanded, concealing the other mouthparts, usually to such an extent that only the apices of the palpi are exposed 13

13a. Clypeus usually unmodified, apart from clypeopleuron; very occasionally with longitudinal bar immediately behind clypeopleural ridge (some *Cremastocheilus*); in one genus (*Cyclidius*) with anteromedian protrusion. Antennal scapus, except in two genera (*Platysodes*, *Oplostomus*), expanded-dilated (fig. 60). Expanded plate of mentum usually transverse. Elytron without pattern of longitudinal striae. Middle coxae never separated by protrusion. Middle and hind tibiae usually with one external protrusion, never with two 14

13b. Clypeus and/or frons modified by one or more elevations, differing according to genus (e.g. as in fig. 70). Antennal scapus simply claviform, in one genus strongly "inflated" (*Problerhinus*). Underside of fore tibia with terminally dentate crest (fig. 62). Middle and hind tibiae frequently with two external protrusions (fig. 64). — Afrotropical .... GENUCHINA, p. 45

14a. Mentum expanded from anterior part as a broad plate (fig. 75); surface of expanded plate flat, concave, or cupuliform (occasionally with deep notches), its outline never pentagonal. Terminal segment of labial palpus rotund. Transition from clypeal disc to lateral declivity usually gra-



Figs. 10-15. Dorsal (pronotum, scutellum, left elytron) and full-face (head) contours of selected cetoniids. — 10, *Ixorida* (Taenioderina); 11, *Phaedimus* (Phaedimini); 12, *Heterosoma* (Heterosomatina); 13, *Pogoniotarsus* (Heterophanina); 14, *Anochilia* (Anochiliina); 15, *Euchroea* (Euchroeina). — Scale lines are 1 mm.

dual (fig. 55). Fore tibia usually with inferior longitudinal ridge (as in figs. 62, 63). — Eastern Asia and the Americas .. CREMASTOCHILINA, p. 45

14b. Mentum as a whole expanded, with produced, thick, angulate centre fitting between fore coxae when head is retracted (fig. 76). Terminal segment of labial palpus more or less complanate. Clypeolateral ridge (separating clypeal disc from lateral declivity) usually distinct. Fore tibia usually lacking inferior longitudinal ridge (as in fig. 61). — Afrotropical .... OPLOSTOMINA, p. 44

15a. Tarsi all five-segmented. General surface of pronotum more or less convex. Fore coxae laterally not dentate 16

15b. Tarsi all three-segmented (fig. 56). Pronotal disc concave or virtually flat. Middle and hind tibiae usually complanate, without non-apical external protrusions. Pygidium with transverse crest near base, or with stylus. Apex of preprosternal apophysis "knobbed". Fore coxa with lateral denticle. Maxillary galea with bifid apex. — Afrotropical .... TRICHOPLINA, p. 44

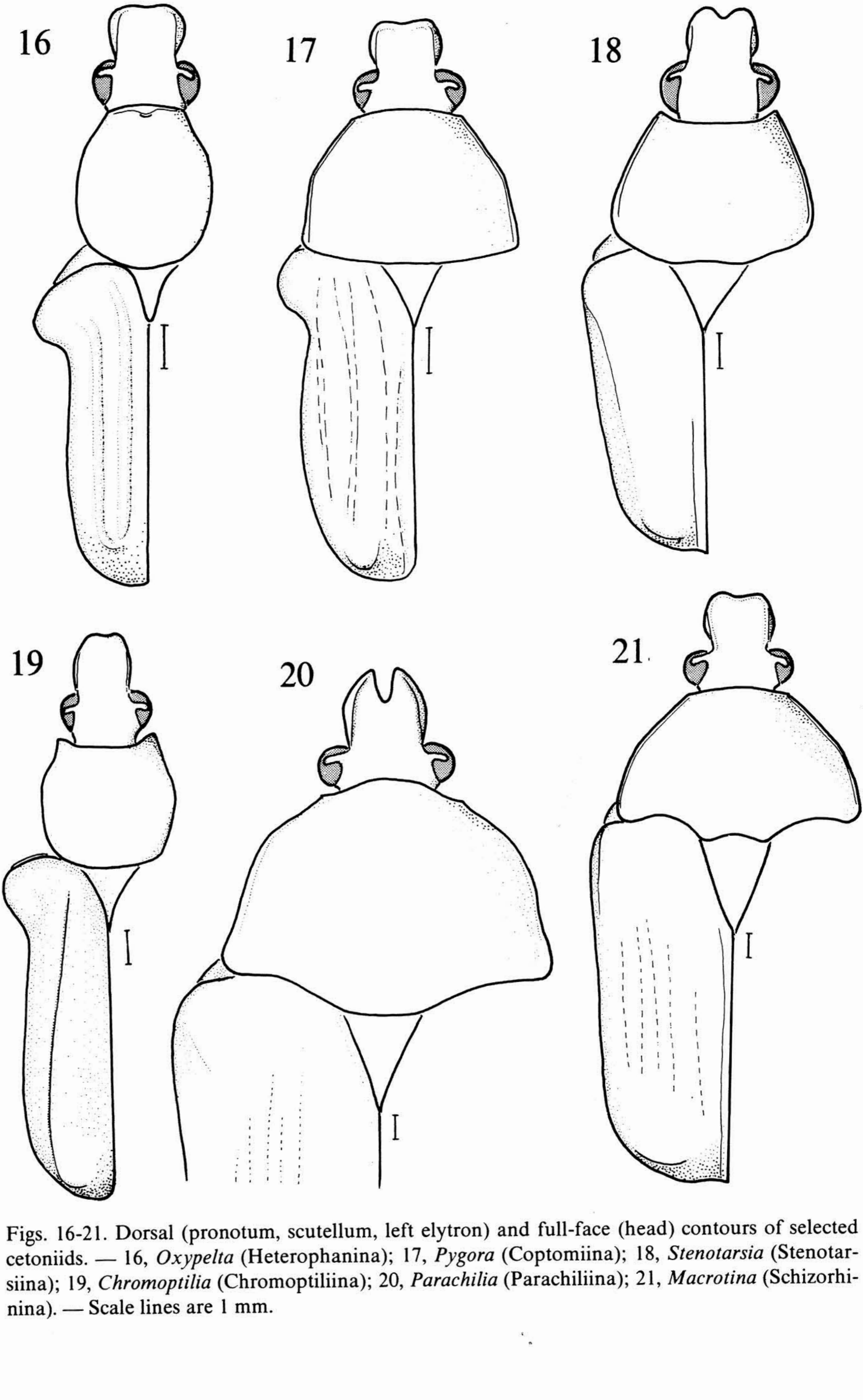
16a. Base of pronotum with pair of shallow, occasionally effaced (*Astoxenus*, *Basilewskynia*, some *Coenochilus*) impressions (fig. 8). Head with evenly convex general surface (in profile, fig. 72), without clypeopleuron; if different, elytron with broad, usually longitudinal costa and adjacent impressions (*Cymophorus*, fig. 53). Underside of fore tibia without terminally dentate crest (fig. 61) 17

16b. Base of pronotum without pair of impressions. Head never with evenly convex general surface. Elytron usually without broad longitudinal costa. Pygidium unmodified, except in Goliathopsidina (check diagnosis 20a) 18

17a. Elytral disc flat or evenly convex (in cross-section, e.g. as in fig. 66), without distinct lateral costa. General surface of head evenly convex (in profile, fig. 72), clypeus immarginate; frons sometimes with transverse callosity. General surface of pygidium variably convex; anal area occasionally concave. Preprosternal apophysis distinct (fig. 57). Derm usually without markings of scales and/or tomentum. Maxillary galea with bifid apex (fig. 48). — Afrotropical to eastern Asia . COENOCHILINA, p. 44

17b. Elytral disc with broad costa and with impressions (e.g. as in fig. 53). Head different; or evenly convex, with preprosternal apophysis absent. General surface of pygidium modified, i.e. with transverse or longitudinal crest, or entirely nasiform. Derm frequently with (markings of) scales and/or tomentum. Maxillary galea simply dentiform. — Afrotropical, Oriental .... CYMOPHORINA, p. 44

18a. General surface of elytral disc (in cross-section, as in fig. 66)) more or



Figs. 16-21. Dorsal (pronotum, scutellum, left elytron) and full-face (head) contours of selected cetoniids. — 16, *Oxypelta* (Heterophanina); 17, *Pygora* (Coptomiina); 18, *Stenotarsia* (Stenotarsiina); 19, *Chromoptilia* (Chromoptiliina); 20, *Parachilia* (Parachiliina); 21, *Macrotina* (Schizorhinina). — Scale lines are 1 mm.

less convex, with smoothly rounded sides. Elytron usually with pattern of longitudinal striae. Clypeus entirely marginate, general outline squarish with rounded anterolateral angles. Clypeus and frons without protrusions. — Afrotropical .... ASPILINA, p. 44

18b. General surface of elytral disc (in cross-section) strongly flattened (as in figs. 67, 68), with abruptly rounded sides. Elytron at most with juxtasutural striola. Clypeus different, except in one genus (*Pilinurgus*) 19

19a. Head with peculiar clypeofrontal protrusions (fig. 69), its apex medially excised. Underside of fore tibia with terminally dentate crest (as in fig. 62). — Afrotropical .... LISSOGENIINA, p. 45

19b. Head different; clypeus entirely marginate, or with reflexed apex (as in figs. 71. 73), in two genera with peripheral projections (*Goliathopsis* and *Centrognathus*). Tarsi slender, unmodified 20

20a. Abdominal sternites with ventro-dorsal ridge fitting against the elytral border. Anterior border of clypeus rounded, strongly marginate; males with horn in front of eyes. Pygidium with nasiform apex. — Eastern Asia .... GOLIATHOPSIDINA, p. 45

20b. Abdominal sternites laterally unmodified. Clypeus without antlers, at most with some kind of anteromedian projection. Pygidium with apex unmodified. — Aftrotropical to eastern Asia .... PILINURGINA, p. 45

21a. Underside of fore tibia with longitudinal ridge, usually ending in terminal denticle (as in fig. 62). Lateral parts of abdominal sternites indistinct from above. Pygidium without isolated protrusions 22

21b. Underside of fore tibia without longitudinal ridge. Lateral parts of abdominal sternites usually distinct from above, frequently more or less protuberant (fig. 51), longitudinally ridged in some genera. Pygidium with protrusions (figs. 50, 51), which may be vague in some species (Trogodina) 23

22a. Fore tibia with at least three external denticles. Pronotal base rounded. Narrow, elongate forms. — Afrotropical .... HETEROGENIINA, p. 44

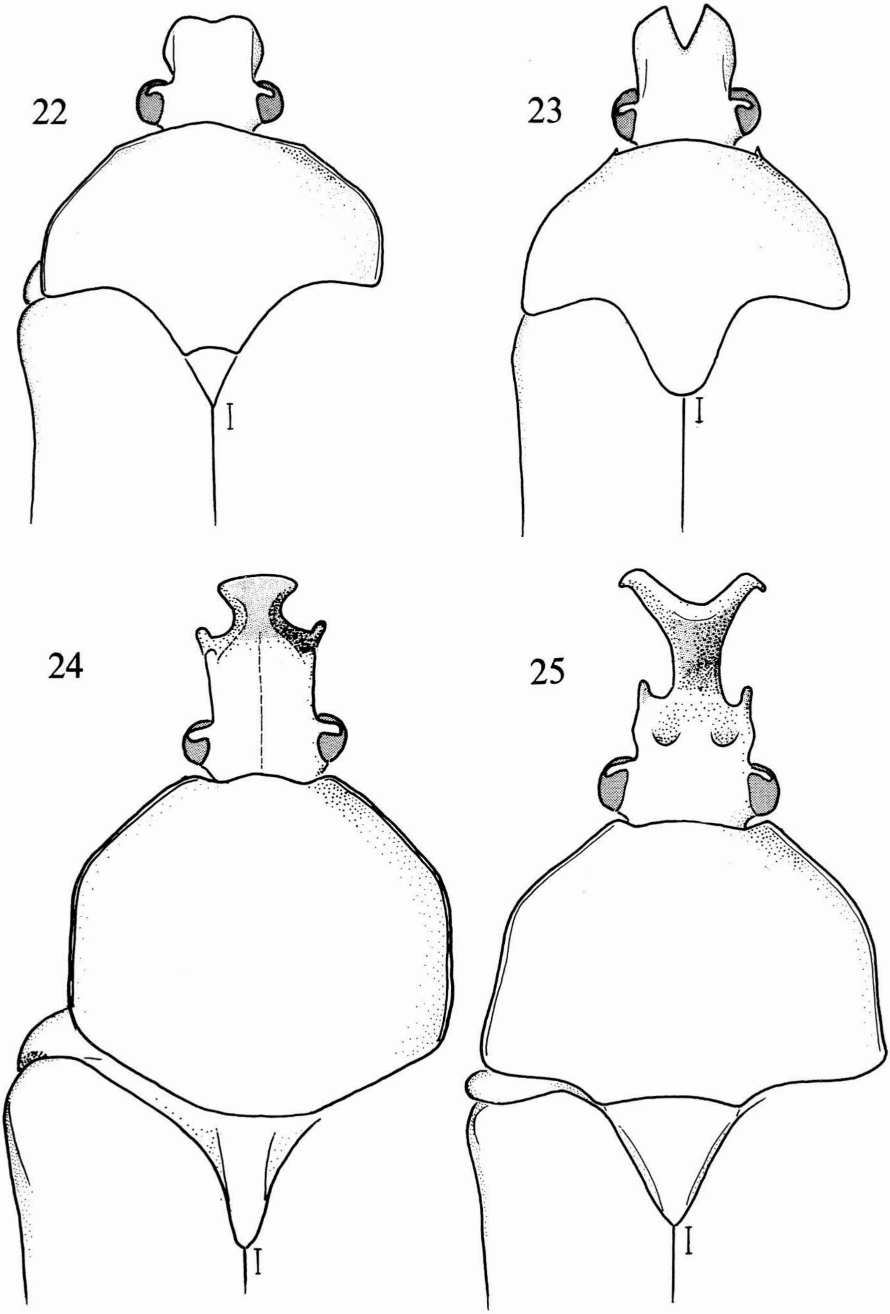
22b. Fore tibia with two external denticles. Pronotum cordiform, basomedially emarginate. Broad forms. — Afrotropical, India .... SPILOPHORINA, p. 43

23a. Elytron distally unmodified, or with fine, sinuous transverse ridge 24

23b. Elytron distally very strongly bulbous (fig. 59). Pygidium with peculiar protrusions but not with set of three protrusions. — Afrotropical .... NYASSININA, p. 44

24a. Pygidium with distinct set of three protrusions (figs. 50, 51). — Afrotropical, Oriental .... MACROMINA, p. 43

24b. Pygidium with slight median elevation only. — Afrotropical ....



Figs. 22-25. Dorsal (pronotum, scutellum, left elytral base) and full-face (head) contours of selected cetoniids. — 22, *Digenethle* (Schizorhinina); 23, *Lomaptera* (Lomapterina); 24, *Goliathus* (Goliathina); 25, *Eudicella* (Coryphocerina). — Scale lines are 1 mm.

.... TROGODINA, p. 44

25a. Pronotum with more or less extensive basomedian lobe (figs. 10, 11, 22, 23, 30), which is broadly rounded apically (apex in some species finely incised). Preprosternum at most with small, short apophysis (in some New World Gymnetini). Fore tarsal segment 1 not greatly elongated. Terminal spurs of hind tibia not extremely elongated. — Widespread, not Madagascan 26

25b. Pronotum without distinct basomedian lobe (except in some African genera with distinct preprosternal apophysis), at most with widely, evenly rounded base (without the basolateral sinus) 29

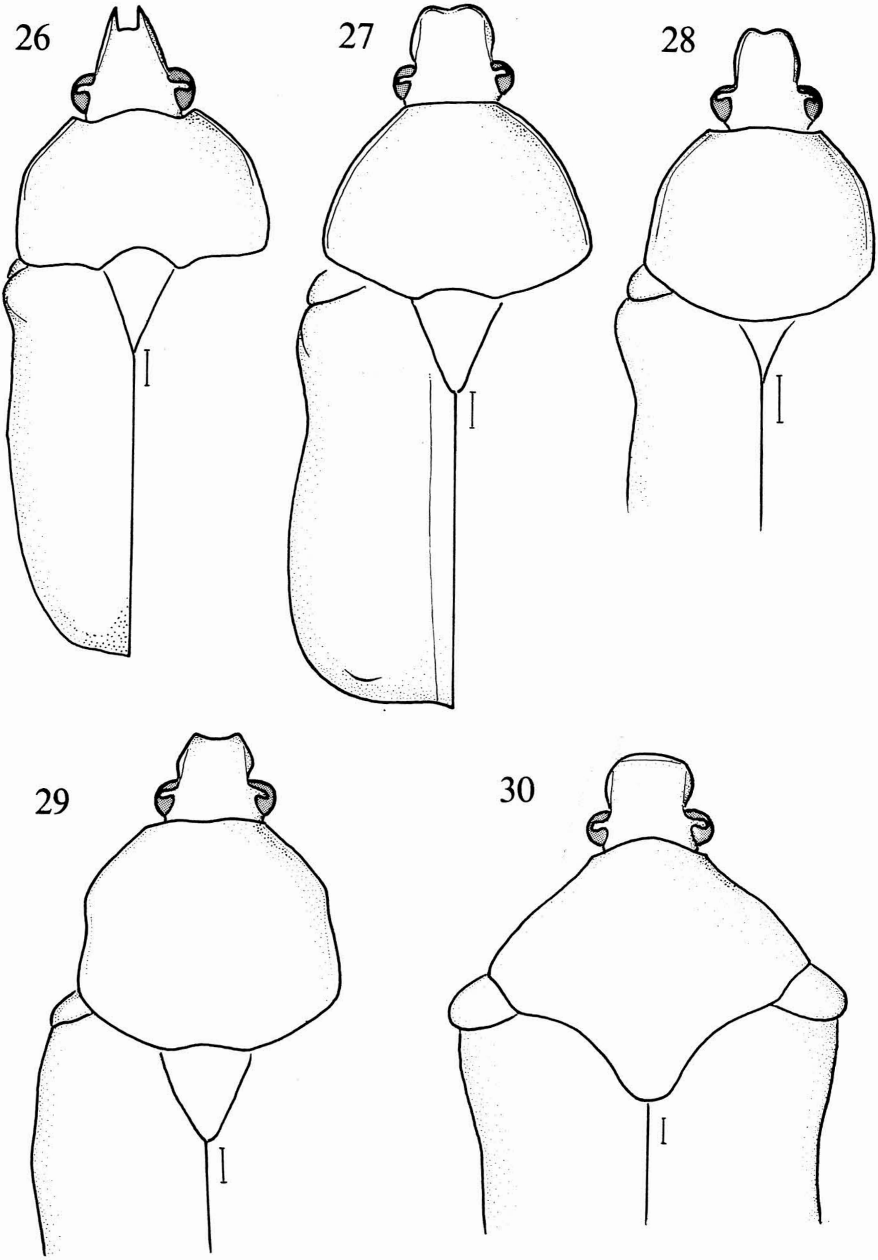
26a. Basomedian lobe of pronotum rounded, short, leaving most of scutellum exposed (figs. 10, 11). Scutellar sides straight or convex. Pronotal disc usually not simply, evenly convex, but depressed medially, flattened, with ridges, or with long anteromedian projection (figs. 10, 11, 81); combined elytral disc not simply, evenly convex, but flattened, frequently with superficial impressions, ridged, or with elongate juxtascutellar-sutural depression. Mesometasternal protrusion usually short. Mentum never deeply excised anteromedially. — Asia only 27

26b. Basomedian lobe of pronotum very extensive (figs. 23, 30), usually covering (most of) scutellum. Scutellar sides usually concave, ending in very sharp apex (fig. 22). Pronotal disc usually evenly convex, unmodified, not depressed medially; general surface of combined elytral disc usually evenly convex, transition to lateral declivities gradual. In the Oriental region clypeus deeply excised, or angulate anterolaterally, derm usually shiny, more or less metallic (*Agestrata*, *Macronota*); or clypeus rounded anterolaterally, derm usually more or less velutinous (*Clinteria*) 29

27a. Posthumeral emargination of elytron usually present (fig. 81); if not, abdominal sides frequently with ventro-dorsal ridge fitting against elytral border. Head and pronotum unarmed, dorsal midline of body (pronotum- scutellum-elytral base) frequently distinctly impressed (fig. 10). Abdominal sides frequently visible in dorsal view, one or two antepropygidial spiracles exposed (fig. 81).— Mainly Oriental . TAENIODERINI, 28

27b. Posthumeral emargination of elytron absent (fig. 78), abdominal sides without ventro-dorsal ridge against elytral border. Head and/or pronotum of males usually armed (fig. 11). Abdominal sides never visible in dorsal view, covered by elytra in repose. Derm never with velutinous and/or cretaceous cover. — Mainly Oriental ....
.... PHAEDIMINI, p. 62

28a. Elytron without juxtasutural striola. Body usually with extensive cover



Figs. 26-30. Dorsal (pronotum, scutellum, left elytron) and full-face (head) contours of selected cetoniids. — 26, *Gnathocera* (Coryphocerina); 27, *Cetonia* (Cetoniina); 28, *Oxythyrea* (Leucocelina); 29, *Poecilophila* (Diplognathina); 30, *Gymnetosoma* (Gymnetina). — Scale lines are 1 mm.

of tomentum and/or velutinous-cretaceous matter, occasionally densely setose .... TAENIODERINA, p. 63

28b. Elytron with juxtasutural striola. Dorsum glabrous or nearly so, without tomentum and/or velutinous-cretaceous matter. Abdominal sides never with ventro-dorsal ridge .... CHALCOTHEINA, p. 64

29a. Mesometasternal transition between middle coxae narrow, gradual, usually not strongly protuberant (fig. 43). Clypeus and legs unmodified (clypeus without dentation as in fig. 82, without extra lobes, without long projections). Habitus never strongly deplanate. Pronotum without basomedian lobe. Tarsal segments not greatly elongated. — Old World, mainly Aftrotropical .... XIPHOSCELIDINI, p. 46

29b. Middle coxae usually distinctly separated by mesometasternal protrusion (e.g. figs. 45-47), which may be bulbous, more strongly projecting, or more or less angulate (in lateral view) 30

30a. Parameral apex usually more or less setose. Metasternal protrusion frequently more or less reversed-prow-shaped (in ventral view, e.g. as in fig. 46, mesosternal part usually broad, with pointed anteromedian angle). Posthumeral elytral emargination frequently very deep (figs. 79-80, etc.)[1]). Head of males without long projections. — Madagascan region .... STENOTARSIINI, 31

30b. Parameral apex not setose, or else otherwise different from the aforesaid combination of characters. — Outside Madagascan region (with very few exceptions) 41

31a. Pronotal margin apicomedially callose or tuberculate (fig. 12). Elytron usually with variably sharp, long discolateral ridge, lateral declivity steep (fig. 12); disc deplanate, without further costae or striae. Clypeus deeply emarginate or excised anteromedially, clypeal tips angulate or rounded (fig. 12); disc with concave general surface; clypeolateral ridge very distinct. Posthumeral emargination moderately deep. Pronotal outline subtrapeziform (fig. 12), basomedian section at most vaguely emarginate. Derm not velutinous, always strongly microsculptured. Scutellum triangular. Middle coxae distinctly separated .... HETEROSOMATINA, p. 49

31b. Pronotal margin apicomedially even. Elytron without or with different costae 32

32a. Abdominal sternites laterally with upward, more or less cariniform ridge running along elytral border (e.g. as in fig. 84) 33

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[1]) Only a few Australian and Afrotropical genera have deeper posthumeral emarginations, but these genera remain recognizable as Schizorhinina (cf. pygidial shape) and Cetoniina (cf. pronotal shape), respectively.

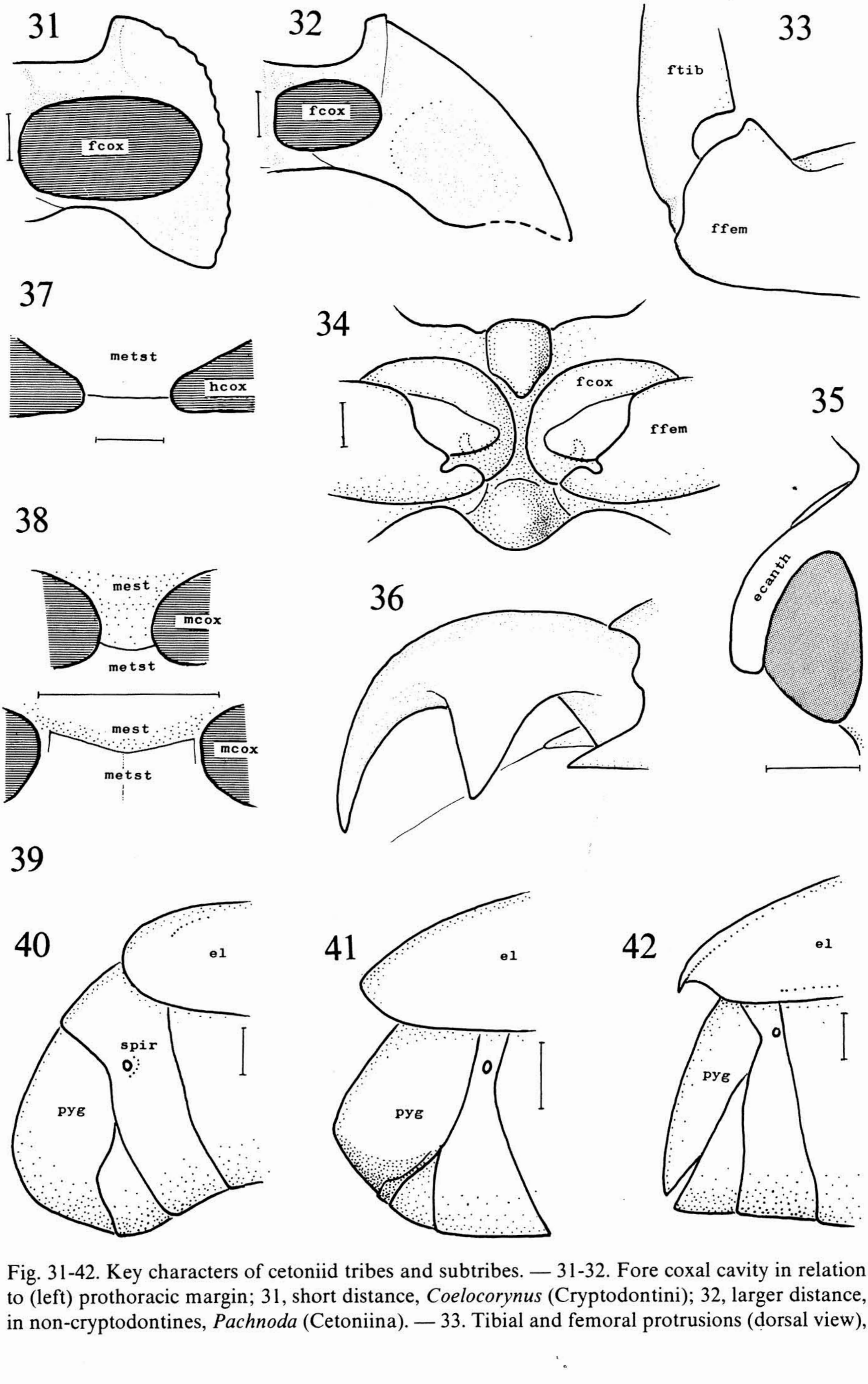


Fig. 31-42. Key characters of cetoniid tribes and subtribes. — 31-32. Fore coxal cavity in relation to (left) prothoracic margin; 31, short distance, *Coelocorynus* (Cryptodontini); 32, larger distance, in non-cryptodontines, *Pachnoda* (Cetoniina). — 33. Tibial and femoral protrusions (dorsal view),

32b. Abdominal sternites laterally without or with different ridge 36

33a. Elytra very long (total length more than 1.5 times humeral width), with distinct, complete discomedian costa, thence steeply declivous laterad (fig. 19). Hind tarsi plumose. Abdominal sternites each sharply, upwardly carinate; individual crests in lateral view arcuate (fig. 84). Pronotal sides and base fully rounded (fig. 19). Pygidium evenly convex, semielliptic, base limited by sinuate propygidial edge. Clypeus elongate, feebly bilobate in front (fig. 19) .... CHROMOPTILIINA, p. 49

33b. Elytra short, without or with different costae. Hind tarsi not plumose. Abdominal sternites with upward ridge more or less straight, continuous 34

34a. Scutellum tongue-shaped (sides sinuate, apex rounded, fig. 14). Posthumeral emargination deep (fig. 14), very well-defined posteriorly (by an angle). Abdominal sides, including more or less concave paracoxal sternite (1), broadly visible from above .... ANOCHILIINA, p. 48

34b. Scutellum triangular or nearly so (sides straight or concave, apex angulate) 35

35a. Elytral disc with set of 3 longitudinal costae (juxtasutural, discomedian, discolateral, figs. 13, 16). Pygidium usually visible from above .... HETEROPHANINA, p. 49

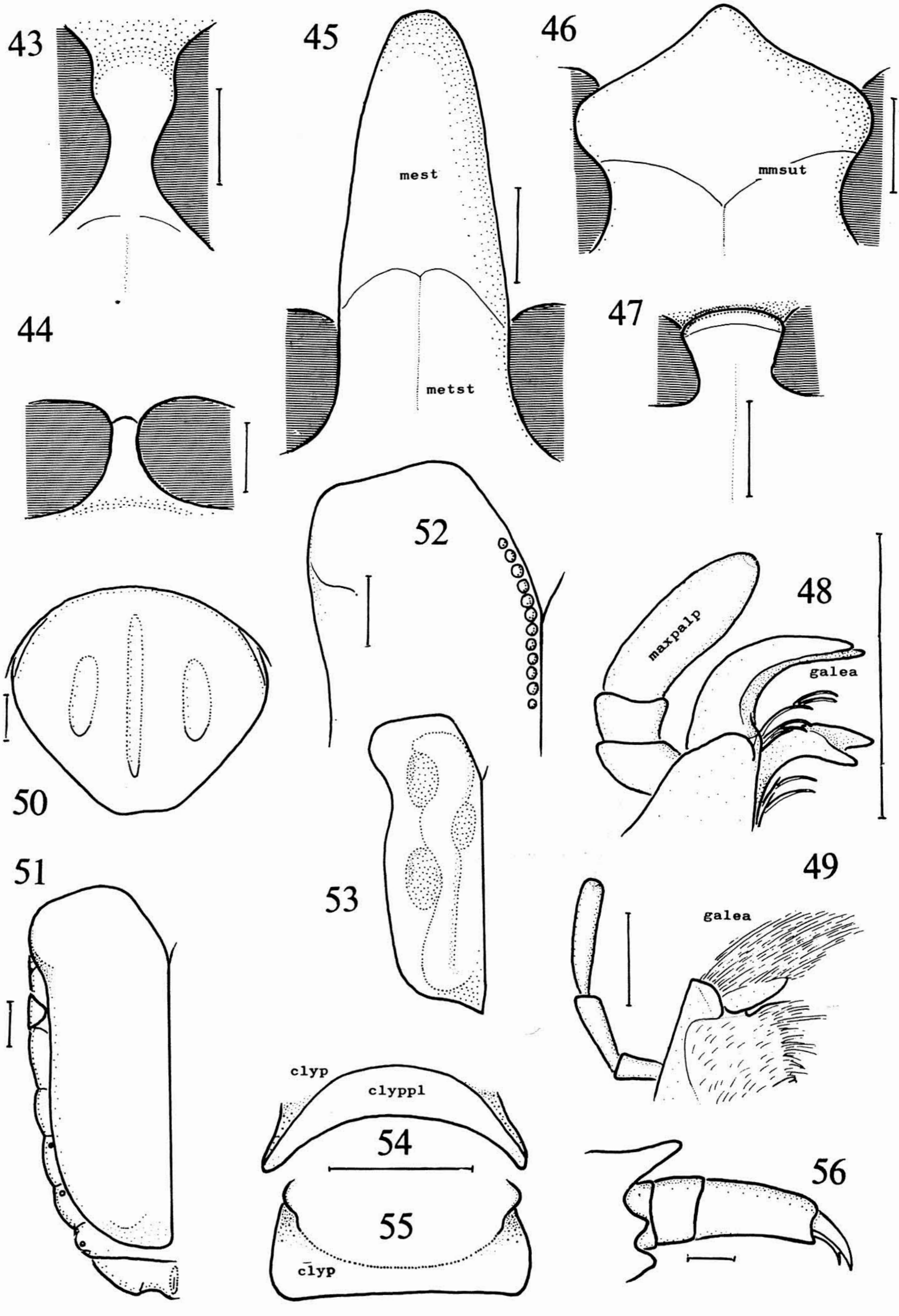
35b. Elytra without this set of costae, usually smooth or with a number of more or less impressed striae (fig. 17). Dorsum usually without velutinous cover .... COPTOMIINA (part), p. 48

36a. Tarsal segments 1 of middle and hind legs long (fig. 85, nearly as long as segments 2 and longer than tibial width). Pronotum lacking distinct basomedian emargination (fig. 18). Elytral disc deplanate, with few distinct striae, if any; discolateral transition usually (sub)abrupt. Posthumeral emargination shallow to moderately deep. Dorsum usually strongly velutinous (yellow, orange or brown, frequently with black, occasionally entirely black) 40

36b. Tarsal segments 1 of middle and hind legs short (fig. 86). Posterolateral angles of pronotum usually distinct 37

37a. Elytral disc with set of 3 longitudinal costae, without distinct striae (fig. 15); disco-lateral transition very gradual. Posthumeral emargination

Inca (Incaini). — 34-36. Platygeniine features; 34, prosternal protrusions; 35, arcuate eye-canthus; 36, dentate fore tarsal claw; all *Platygenia* (Platygeniini). — 37-39. Valgine features; 37, broad hind coxal separation, *Valgus* (Valgini); 38, mesometasternal transition, *Stenovalgus* (Microvalgini); 39, do., *Euryvalgus* (Valgini). — 40-42. Shape of distal sternites, propygidium, and pygidium; 40, propygidium broad at spiracular level, *Lissomelas* (Cremastocheilina); 41, reflexed anal surface of pygidium, *Eupoecila* (Schizorhinina); 42, evenly, feebly convex pygidium, *Rhabdotis* (Cetoniina). — Scale lines are 1 mm. Abbreviations cf. explanation figs. 1-2.



Figs. 43-56. Key characters of cetoniid tribes and subtribes. — 43-47. Mesometasternal transition (between middle coxal cavities); 43, feebly protuberant, coxae narrowly separated, *Aporecolpa*

very shallow, ill defined. Derm usually with extensive velutinous cover (frequently very colourful, yellow, orange, blue, greenish, with black). Clypeus with straight or feebly bisinuate anterior border (fig. 15) .... EUCHROEINA, p. 49

37b. Elytra without this set of costae, or otherwise different from the above combination of characters. Derm without or with different velutinous cover 38

38a. Posthumeral emargination very deep (figs. 17, 79-80). Elytron usually distinctly multistriate (fig. 17). Dorsum usually without velutinous cover .... COPTOMIINA (part), p. 48

38b. Posthumeral emargination shallow. Elytron usually with distinct juxtasutural stria only. Clypeus never deeply excised anteromedially 39

39a. Dorsum strongly velutinous (usually patterned, yellow, orange or brown, with black) .... DORYSCELINA, p. 49

39b. Dorsum smooth and shiny .... PANTOLIINA, p. 48

40a. Posterolateral angles of pronotum rounded, base more or less straight (fig. 18). Clypeus at most shallowly emarginate anteromedially (fig. 18). Small forms, less than 2 cm long .... STENOTARSIINA, p. 48

40b. Posterolateral angles of pronotum distinct, basomedian section usually more or less produced (fig. 20). Clypeus deeply emarginate or excised, anterior lobes angulate or rounded (fig. 20). Large forms, more than 2 cm long .... PARACHILIINA, p. 49.

41a. Pronotum usually of the *Eudicella*- or *Lomaptera*-type (figs. 21-23, 25-26); posterolateral angles usually 90° or less, very distinct, not shifted forward relative to scutellar base (i.e. discounting basomedian lobe in *Lomaptera*-type pronotum); mesepimera usually concealed under posterolateral corners. Posthumeral elytral emargination usually slight, occasionally indistinct 42

41b. Pronotum of the *Goliathus*-type (fig. 24); dorsal outline subcircular, subelliptic or polygonal; mesepimera very distinct. Posthumeral elytral emargination slight. Head of males armed with strong clypeal projec-

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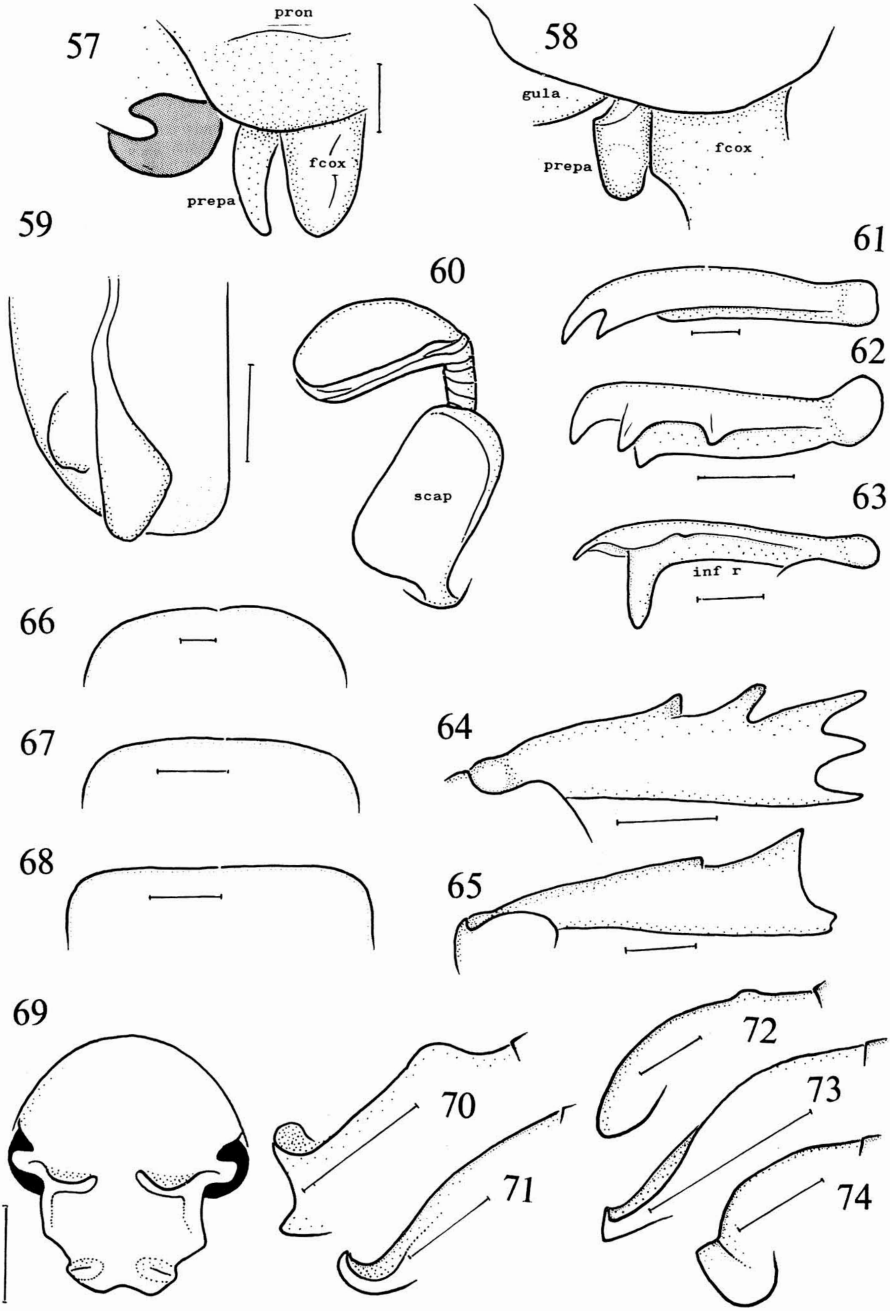
(Xiphoscelidini); 44, subcontiguous middle coxae, *Coenochilus* (Coenochilina); 45, long mesometasternal projection, *Lomapteroides* (Lomapterina); 46, "Madagascan type" projection, *Pantolia* (Pantoliina); 47, moderately strong projection, *Oxythyrea* (Leucocelina). — 48-49. Maxillary galea (ventral view); 48, dentiform, with (bifid) dentate lacinia, *Coenochilus* (Coenochilina); 49, penicillate, *Lomaptera* (Lomapterina). — 50-51. Macromine features; 50, pygidial protrusions, *Campsiura* (Macromina); 51, abdominal exposure (dorsal view) and pygidium, *Pseudopilinurgus* (Macromina). — 52. Juxtasutural row of elytral tubercles, *Telochilus* (Telochilina). — 53. Sinuous elytral costa, *Cymophorus* (Cymophorina). — 54-55. Cremastocheiline clypeus, showing (54) clypeopleuron under clypeal anterior margin; 55, clypeus (full-face view); both *Cremastocheilus* (Cremastocheilina). — 56. Three-segmented hind tarsus of *Lecanoderus* (Trichoplina). — Scale lines are 1 mm. Abbreviations cf. explanation figs. 1-2.



Figs. 57-74. Key characters of cetoniid tribes and subtribes. — 57-58. Preprosternal apophysis (lateral view); 57, slender, *Coenochilus* (Coenochilina); 58, plump, *Diplognatha* (Diplognathina).

tion(s) (fig. 24). Length of fore tarsal segment 1 usually equal to or exceeding that of segment 2 .... GOLIATHINI (part), 44

41c. Pronotum usually of the *Cetonia*-, *Oxythyrea*- or *Gymnetis*-type (figs. 27-30); posterolateral angles usually more than 90° or indistinct, more or less shifted forward relative to scutellar base (i.e. discounting basomedian lobe in *Gymnetis*-type pronotum); mesepimera usually very distinct. Posthumeral elytral emargination usually distinct. Head usually unarmed 46

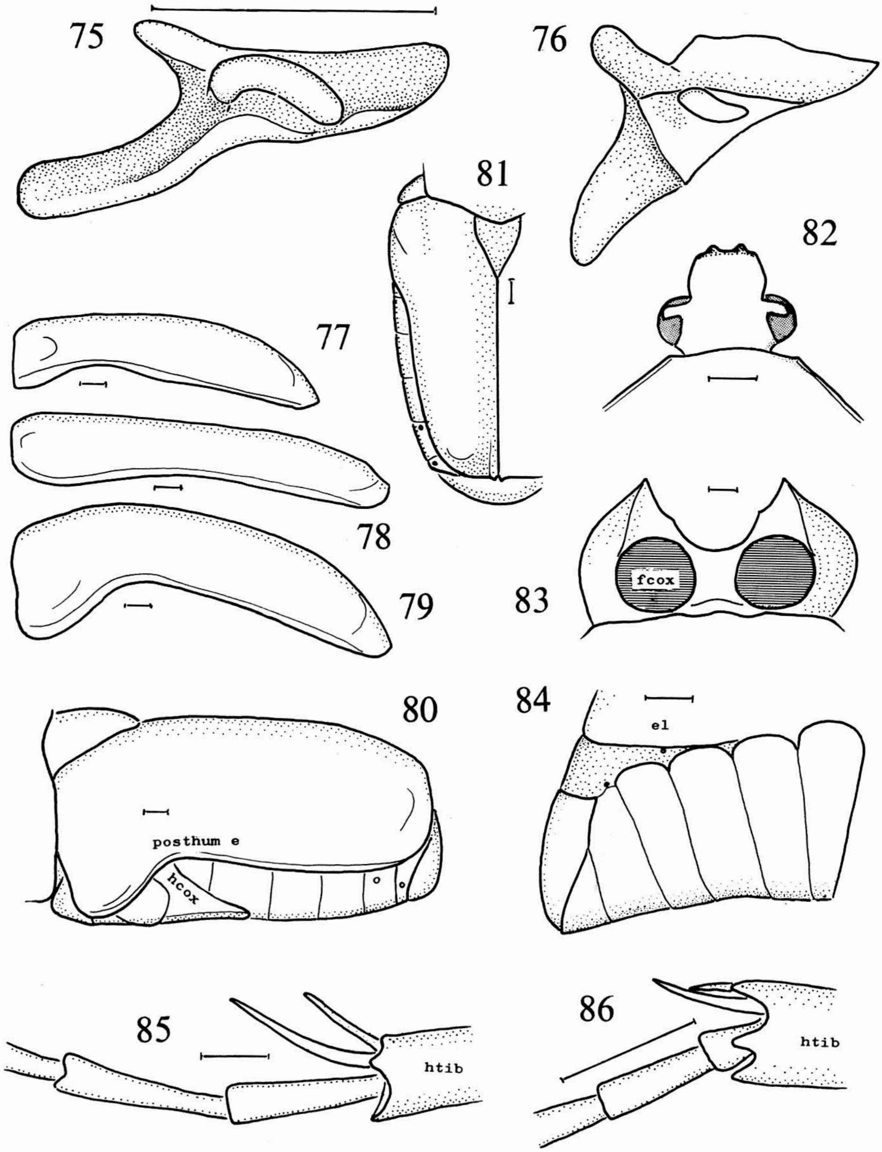
42a. Pygidium broadly subtriangular, general surface evenly feebly convex (as in fig. 42), visible from above (if not concealed by elytra in repose); derm without conspicuous subconcentric striolation. Head of males frequently armed with strong clypeal projection(s) (e.g. figs. 25, 26). Pronotum never with basomedian lobe. Parameres without basomedian extension. — Not in Australia and Papuasia .... GOLIATHINI (part), 45

42b. Pygidium usually very broad (width/length ratio usually exceeding 3), usually dorso-ventrally modified (anal zone more or less reflexed, invisible from above, fig. 41); derm usually with conspicuous, subconcentric striolation. Head unarmed. Parameres frequently with basomedian flap (which may be strongly modified!). — Australasian, Oriental .... SCHIZORHININI, 43

43a. Pronotum of the *Lomaptera*-type (fig. 23); basomedian lobe very extensive, usually covering most of scutellum. Clypeus usually very deeply excised anteromedially, projecting lateral angles always pointed (fig. 23); mentum deeply cleft in front, to about 0.4 of total length. Mesometasternal projection usually extending well in front of middle coxae (fig. 45). Scutellar sides (as far as distinct) concave, ending in acute apex. Derm never velutinous .... LOMAPTERINA, p. 51

43b. Pronotum usually without extensive basomedian lobe (if with lobe, figs. 21, 22, anterior border of clypeus bisinuate), scutellum largely exposed.

— 59. Bulbous distal part of elytron, *Nyassinus* (Nyassinina). — 60. Antenna with expanded scapus, *Laurentiana* (Oplostomina). — 61-63. Inferior-longitudinal ridge of fore tibia (lateral view); 61, slight, not dentate, *Coenochilus* (Coenochilina); 62, distinct, with terminal denticle, *Genuchus* (Genuchina); 63, with terminal "appendage", *Clinterocera* (Cremastocheilina). — 64-65. Hind tibial dentation (ventral view); 64, two external denticles, *Genuchus* (Genuchina); 65, one external denticle, *Coenochilus* (Coenochilina). — 66-68. Elytra combined on cross-section; 66, evenly strongly convex, *Coenochilus* (Coenochilina); 67, disc deplanate, disco-lateral transition subabrupt, *Cremastocheilus* (Cremastocheilina); 68, disc strongly deplanate, steep lateral declivities, *Lissogenius* (Lissogeniina). — 70-74. Approximate surface profile (left side view) of clypeus and frons (pronotal apex indicated at right); 70, with posterior elevation, clypeus marginate, *Genuchus* (Genuchina); 71, clypeal apex reflexed, *Parapilinurgus* (Pilinurgina); 72, clypeus without anterior ridge, evenly convex, *Coenochilus* (Coenochilina); 73, clypeus marginate, *Aspilus* (Aspilina); 74, convex (clypeal apex modified or not) (with clypeopleuron, cf. also figs. 54-55), *Cremastocheilus* (Cremastocheilina). — Scale lines are 1 mm. Abbreviations cf. explanation figs. 1-2.



Figs. 75-86. Key characters of cetoniid tribes and subtribes. — 75-76. Parallelisms in expansion of cremastocheiline mentum (right side view); 75, broad caudal expansion (downward left) and insertion of labial palpus concealed, *Genuchinus* (Cremastocheilina); 76, caudal (left) and lateral expansion (front), the latter with reduced labial palpus, *Scaptobius* (Oplostomina). — 77-80. Posthumeral emargination of elytron (left side view, 77-79); 77, normal, *Aethiessa* (Cetoniina); 78, virtually absent, *Theodosia* (Phaedimini); 79-80, very deep, also shown in situ (80, dorsolateral view), both *Coptomia* (Coptomiina). — 81. Scutellum and posthumeral exposure of abdomen (dorsal view), *Taeniodera* (Taenioderini). — 82 Head of *Anoplocheilus* with denticulate margin

Clypeus only occasionally deeply excised (but then pronotum without extensive basomedian lobe); mentum usually shortly bilobate in front .... SCHIZORHININA, p. 50

44a. Fore coxae of males distinctly separated (fig. 83). Mesometasternal protrusion small, narrow. Fore tibial underside apically with accrete spine (in addition to the normal tibial spur). Pronotum anteriorly with low paramedian ridges. — East Asia .... DICRONOCEPHALINA, p. 53

44b. Fore coxae of males approximated. Mesometasternal protrusion large, widely separating middle coxae. Fore tibial underside without accrete spine. Apico-internal spur of fore tibia frequently reduced, but with adjacent supplementary accrete spine. — Afrotropical .... GOLIATHINA, p. 53

45a. Middle coxae separated by slight, more or less convex protrusion, not distinctly projecting in front of middle coxae (lateral view). Derm dull grey, brown or black (with or without cretaceous markings). — Afrotropical .... ICHNESTOMINA, p. 53

45b. Middle coxae separated by broad mesometasternal protrusion, frequently projecting strongly in front of middle coxae (lateral view). Derm frequently with conspicuous coloration (metallic, vitreous, velutinous). — Mainly Oriental, Afrotropical .... CORYPHOCERINA, p. 53

46a. Pronotum without extensive basomedian lobe (except in the monospecific Afrotropical genus *Conradtia*, cf. Diplognathini), scutellum largely or entirely exposed 48

46b. Pronotum of the *Gymnetis*-type (fig. 30); basomedian lobe very extensive, usually covering most of scutellum, apex of lobe rounded. Clypeus never deeply excised anteromedially. Derm frequently velutinous. Preprosternal apophysis, if present at all, short and slender ... GYMNETINI, 47

47a. Middle coxae separated by a distinct mesometasternal protrusion (visible in lateral view). Abdominal sides (in cross-section) more or less gradually convex. Hind tibia of males unmodified, with two movable terminal spurs. — New World, Oriental, Aftrotropical .... GYMNETINA, p. 60

47b. Middle coxae strongly approximated, never separated by distinct mesometasternal protrusion. Abdominal sides (on cross-section) with distinct ventro-dorsal ridge. Hind tibia of males more or less hook-shaped, with one terminal spur. — Neotropical .... BLAESIINA, p. 61

48a. Preprosternum usually simply tectiform, protuberance usually absent, or at least very small. Posterolateral angles of pronotum, as far as dis-

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(Cetoniina). — 83. Separation of fore coxal cavities in *Dicronocephalus* (Dicronocephalina). — 84. Arcuate upward ventro-dorsal ridges on abdominal sternites (right side view), *Chromoptilia* (Chromoptiliina. — 85-86. Length proportions hind tarsal segments; 85, very long segment 1, *Stenotarsia* (Stenotarsiina); 86, short segment 1, *Epixanthis* (Doryscelina). — Scale lines are 1 mm. Abbreviations cf. explanation figs. 1-2.

tinct, moderately shifted forward relative to basomedian point. Anterolateral angles of clypeus usually rounded (figs. 27, 28) .... CETONIINI, 49

48b. Preprosternal protuberance usually present, frequently very plump (fig. 76). Posterolateral angle of pronotum greatly shifted forward relative to basomedian point (fig. 29). Anterolateral angles of clypeus usually angulate (fig. 29). Fore tibia usually with 3 external denticles. Mesometasternal protrusion usually short, medially pointed. Posthumeral elytral emargination usually extremely shallow, virtually absent. — Afrotropical, Oriental .... DIPLOGNATHINI, p. 61

49a. Sides of scutellum more or less concave, apex acute (fig. 28). Parameral tip usually more or less bifid. Pronotum usually of the *Oxythyrea*-type (fig. 28); base widely rounded, posterolateral angles rounded off. Mesometasternal protrusion usually with short mesosternal portion (ventral view, fig. 47), mesometasternal suture usually very distinct (frequently setose). — Africa, western Eurasia .... LEUCOCELINA, p. 59

49b. Sides of scutellum straight, convex or sinuate, apex frequently rounded. Parameres simple or complex, never distinctly bifid. Pronotum usually of the *Cetonia*-type (fig. 27), with distinct posterolateral angles. — Almost worldwide .... CETONIINA, p. 56

3. LISTS OF THE GENERA AND FURTHER COMMENTS

For each genus currently recognized the lists given after the comments provide the following information (cf. technical explanation in chapter 1): valid generic name, author, year; synonymies; recognition of any subgenera; occurrence in biogeographical regions; indications regarding uncertainties in nomenclature and classificatory status; approximate number of included species; references to latest synopses.

Subfamily TRICHIINAE

There are no synapomorphies warranting the monophyly of this subfamily, and, to put it in modern phylogenetic terms, the trichiine lineages represent grades rather than clades, which may find their continuation in certain cetoniine grades (cf. Xiphoscelidini). Since certain groups currently placed in the Cetoniinae do not have the cetoniine apomorphies maximally pronounced, the separation of the Trichiinae and Cetoniinae is not always easy. The Trichiinae as conceived here are very diverse, and a further fragmentation of the Trichiini (q.v.), a residual group, is anticipated.

Howden (1968) gave a useful review of the North and Central American Trichiinae; Burgeon (1946) treated the fauna of the Congo region.

CRYPTODONTINI stat. rev.

The species of the two African genera here included were (with *Pantodinus*, cf. Incaini) originally placed in the "Xylophila" or Dynastidae, on the basis of their habitus and their transversely oriented fore coxae. Kolbe (1909) revised the status of the genera, proposing a separate position among the "Melitophila" or Cetoniidae. Two characters in favour of Kolbe's treatment are the presence of protruding mesepimera and the cryptognathous state of the mouthparts. The relationships of the Cryptodontini with the following tribes, however, remain no less enigmatic and require further detailed study of the entire subfamily. Some of the cryptodontine features mentioned in the key under 4a might be synapomorphous for the two included genera.

Coelocorynus Kolbe, 1895. Afr. — 7. LS Krikken, in prep.
Cryptodontes Burmeister, 1847. Afr. N! — 1.

INCAINI stat. nov.

They share an undoubtedly synapomorphous character state in the shape of the fore legs (cf. key diagnosis 5a), which was the primary reason to remove three of the included genera from their previous positions in the Cryptodontini (*Pantodinus*) and Osmodermini (*Inca, Golinca*). This "tidying-up" does, however, not at all clarify the exact position of this strictly Neotropical tribe (cf. also Morón & Krikken, in prep.), and further study is needed.

"*Archedinus*" Morón & Krikken, in prep. Neotr. — 1.
Golinca J. Thomson, 1878. Neotr. — 2.
Inca Le Peletier & Serville, 1828. Neotr. — 6.
Pantodinus Burmeister, 1847 (=*Jeannelosis* Bourgin, 1945). Neotr. — 1.

OSMODERMINI stat. rev.

With the present removal of most of the genera (cf. key in Krikken, 1978a) to other tribes, only *Osmoderma* and the poorly known *Platygeniops* are left in this tribe. It would be most interesting to see whether the male sex of the latter genus, still unknown, sheds any light on the relationships between the trichiine tribes by showing apomorphies (in the shape of the head, pronotum, legs, or genitalia) and whether it in fact belongs in this tribe after all.

Osmoderma Le Peletier & Serville, 1828. Pal, Nearct. — 9.
Platygeniops Krikken, 1978. Or. — 1.

PLATYGENIINI trib. nov.

This new tribe is proposed to accommodate an odd Afrotropical genus associated with the oil palm (*Elaeis*). Two species are known. The larva of one of them was described by Jerath & Unny (1965).

Platygenia MacLeay, 1819. Afr. — 2.

TRICHIINI

This tribe forms a mixture of very different forms and a further subdivision seems inevitable (cf. subfamily comment). Krikken (in prep.) will propose a reclassification of the Palearctic and Oriental genera. The list of genera is here divided into an Afrotropical, Eurasian, and New World section (*Trichius* occurs on both sides of the Pacific). For a better understanding of the classification of the Trichiinae a detailed study of the Afrotropical Trichiini is urgently required.

Brachagenius Kraatz, 1890. Afr. — 1.
Calometopidius Bourgoin, 1917. Afr. — 1.
Calometopus Blanchard, 1850. Afr. — 12.
Campulipus Kirby, 1827 (= syn. nov. *Agenius* Le Peletier & Serville, 1828). Afr. N! — 9.
Chaetodermina Heller, 1921. Afr. — 1.
Clastocnemis Burmeister & Schaum, 1840. Afr. — 3.
Corynotrichius Kolbe, 1891. Afr. — 1.
Diploa Kolbe, 1892. Afr. — 5.
Diploeida Péringuey, 1907. Afr. — 1.
Elpidus Péringuey, 1907. Afr. — 1.
Endoxazus Kolbe, 1892 (= *Eudoxazus*, misspelling). Afr. N! — 3.
Eriopeltastes Burmeister & Schaum, 1840. Afr. — 1.
Glaphyronyx Moser, 1924. Afr. — 2.
Incala J. Thomson, 1857. Afr. Transl. nov (from Osmodermini). — ca. 20.
Incalidia Janson, 1907. Afr. Transl. nov. (from Osmodermini). (cf. = *Incala*). — 1.
Liotrichius Kolbe, 1892. Afr. — 1.
Myodermides Ruter, 1964. Afr. — 1.
Myodermum Burmeister & Schaum, 1840 (= *Myoderma*, misspelling). Afr. — 16.
Pileotrichius Bourgoin, 1921. Afr. — 4.
Polyplastus Janson, 1880. Afr. — 3.
Stegopterus Burmeister & Schaum, 1840. Afr. — 4.

Stripsipher Gory & Percheron, 1833. Afr. — 8.
Trichiomorphus Bourgoin, 1919. Afr. — 3.
Xiphoscelidus Péringey, 1907, Afr. — 1.

Gnorimus Le Peletier & Serville, 1828. Pal. — ca. 10.
"*Mimognorimus*" Krikken, in prep. (Pal), Or. — 1.
**Pseudagenius* Heller, 1923. Pal. — 1.
"*Pugilotrichius*" Krikken, in prep. Pal. — ca. 10.
Trichius Fabricius, 1775 (incl. *Paratrichius* Janson, 1881, also incl. *Trichinus* Kirby, 1827 = *Lasiotrichius* Reitter, 1898 = *Trichiotinus* Casey, 1915[1])). (Or), Pal, Nearct, Neotr. SG. N! — 55-60. LS Hoffman, 1935 (*Trichinus* = *Trichiotinus*); Krikken, 1972b (*bifasciatus* group).

Apeltastes Howden, 1968. Neotr. — 1.
Coelocratus Burmeister & Schaum, 1841. Neotr. — 1.
Dialithus Parry, 1849. Neotr. — 3.
Gnorimella Casey, 1915. Nearct. — 1.
Paragnorimus Becker, 1910. Neotr. — 4. LS Howden, 1970.
Peltotrichius Howden, 1968. Neotr. — 2.
Trigonopeltastes Burmeister & Schaum, 1840. Nearct, Neotr. — ca. 15.

Subfamily VALGINAE

The classification of this subfamily was recently treated by Krikken (1978b), who pointed out some "soft spots". The Valginae seem, judged from the Afro-Australian distribution of the presumably primitive Microvalgini, an ancient group, possibly dating back to the Cretaceous. The monophyly of the subfamily seems well-established: the widely separated hind coxae are undoubtedly autapomorphous (relative to the situation in the remainder of the Cetoniidae, or for that matter, to any potential sister group).

Synoptic work not listed by Schenkling (1922) includes Arrow (1944), Sawada (1939, 1941), Burgeon (1947), and Krikken (l.c.).

MICROVALGINI

These valgines are rather simply built termitophiles of Australia and Africa (one species in Asia), lacking evident synapomorphies. Some of the larger species are not unlike Trichiini, thus possibly representing something of the ancestral valgine type. Distinct synapomorphies seem to be wanting for this tribe.

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[1]) North American workers persist in using Casey's name (cf. my paper on the Palearctic and Oriental genera of Trichiinae, in prep.).

Ischnovalgus Kolbe, 1897. Afr. — 6.
Microvalgus Kraatz, 1883. Austr, (Or), Afr. — 37.
Stenovalgus Kolbe, 1892. Afr. — 9.

VALGINI

The peculiar shape of the pronotum, usually with two distinct ridges (fig. 7), is an easier character than is the mesometasternal configuration. Adults are flower-visitors, the larvae develop in rotten wood (with or without termites).

Acanthovalgus Kraatz, 1895. Or. — 5.
Bivalgus Paulian, 1961. Or. — 1.
Chaetovalgus Moser, 1914. Or. — 2.
Charitovalgus Kolbe, 1904. Austr, Or. — 12.
Chromovalgus Kolbe, 1897 (Or), Pal. — 4. LS Endrödi, 1956
Comythovalgus Kolbe, 1897. Afr. — 13.
Cosmovalgus Kolbe, 1897. Afr. — 3.
* *Dasyvalgoides* Endrödi, 1952. Pal. — 1.
Dasyvalgus Kolbe, 1904. Or, Pal. — ca. 85.
Euryvalgus Moser, 1908. Or. (cf. = *Acanthovalgus*). — 3.
Excisivalgus Endrödi, 1952. Pal. — 2.
Heterovalgus Krikken, 1978. Or. — 1.
Homovalgus Kolbe, 1897. Nearct. — 1.
Hoplitovalgus Kolbe, 1904. Or. (cf. = *Acanthovalgus*). — 1.
Hybovalgus Kolbe, 1904. Or, Pal. (cf. = *Dasyvalgus*). — 12.
Idiovalgus Arrow, 1910. Or. — 3.
Lepivalgus Moser, 1914. Or. — 3.
Lobovalgus Kolbe, 1897. Afr. — 5.
Mimovalgus Arrow, 1944. Or. — 1.
Oedipovalgus Kolbe, 1897. Afr. — 4.
Oreoderus Burmeister, 1842. Or. — ca. 20.
Oreovalgus Kolbe, 1904. Or. — 1.
Podovalgus Arrow, 1910. Or. — 2.
Pygovalgus Kolbe, 1884. Afr. 3.
Sphinctovalgus Kolbe, 1904. Afr. – 1.
Tibiovalgus Krikken, 1978. Afr. — 1.
Valgoides Fairmaire, 1899. Mad. — 2.
Valgus Scriba, 1790. Or, Pal, Nearct. — ca. 10.
Xenoreoderus Arrow, 1910. Or. — 3.
Yanovalgus Nomura, 1952. Pal. — 1.

Subfamily CETONIINAE

The monophyly of this subfamily has always been considered well established by the apomorphous configuration of the humeral region of the thorax, usually evident in the presence of a posthumeral elytral emargination. This emargination however, is variably pronounced, occasionally even absent, and this throws some doubt on the monophyly of the subfamily (cf. also comment under Trichiinae). Most Cetoniinae listed after the Xiphoscelidini have their middle coxae widely separated by a mesometasternal protrusion.

The Palearctic and Oriental Cetoniinae are currently being monographed by Mikšić (1976-1983); his family-group classification and nomenclature differs from the one given here (compare, for instance, my classification with the tables in Mikšić, 1976: 21-25).

CREMASTOCHEILINI

Their monophyly is based primarily on the variably dentate maxillary galea (fig. 48), a feature possibly related to a predatory way-of-life. Several of the included subtribes are newly proposed and their status will be discussed in my proposed treatment of the cremastocheiline genera¹). Many genera are associated with social insects, the ultimate adaptations being found in the North American *Cremastocheilus* (cf. Alpert, 1981). The prevailing opinion is that these specialized Cremastocheilini are, in some way or another, descendants from „normal" Cetoniinae (i.e. the better-known forms with mesometasternal protrusions). In my view this is not the case (cf. introduction, point iii under general comments). The larvae have, contrary to many other Cetoniinae, simply sickle-shaped claws on their legs.

Howden (1971) and Krikken (1976a, 1977b) published keys to the genera of New World and Asian Cremastocheilini.

SPILOPHORINA subtrib. nov.

Spilophorus Schaum, 1848 (= *Pseudospilophorus* Kraatz, 1899). Or. Afr. — 8

MACROMINA stat. rev.

Brachymacroma Kraatz, 1896. Afr. — 2.
Campsiura Hope, 1831 (= *Macroma* Gory & Percheron, 1833). Or, (Pal), Afr. — 28.
Macromina Westwood, 1873. Afr. — 1.
"*Macrominops*" Krikken, in prep. Afr. — 1.
Pseudopilinurgus Moser, 1918. Afr. — 3. LS Krikken, 1980a.

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¹) This treatment will include keys down to the genera listed here, full generic diagnoses, annotated lists of the known species, etc.

TROGODINA subtrib nov.
Pseudoscaptobius Krikken, 1976. Afr. — 1.
Trogodes Westwood, 1873. Afr. — 1.

NYASSININA subtrib. nov.
Nyassinus Westwood, 1879. Afr. — 1.

HETEROGENIINA subtrib. nov.
Heterogenius Moser, 1911. Afr. — 3.
Pseudastoxenus Bourgoin, 1921. Afr. — 2.

ASPILINA subtrib. nov.
Aspilus Schaum, 1848 (= *Anoplocarpus* Quedenfeldt, 1884). Afr. — 9.
Protochilus Krikken, 1976. Afr. — 3. LS Krikken, 1976b.

COENOCHILINA
Arielina Rossi, 1958 (= *Proxenus* Péringuey, 1907). Afr. (cf. = *Coenochilus*). — 5. LS Schein, 1954c.
+*Astoxenus* Péringuey, 1907. Afr. — 7. LS Basilewsky, 1950.
Basilewskynia Schein, 1957. Afr. — 2-3.
Coenochilus Schaum, 1841. Or, Afr. — ca. 75. LS Schein, 1953, 1954a.
Plagiochilus Wasmann, 1900. Afr. Stat. rev. — 6.

CYMOPHORINA
Cymophorus Kirby, 1827 (incl. *Anaspilus* Kolbe, 1892, *Clydonophorus* Kraatz, 1899, *Syntomopteryx* Kraatz, 1900). (Or), Afr. SG. — ca. 30. LS Schein, 1954.
Myrmecochilus Wasmann, 1900. Afr. P? — 2.
Rhagopteryx Burmeister, 1842. Afr. — 2. LS Schein, 1954.

TRICHOPLINA subtrib. nov.
Lecanoderus Kolbe, 1908. Afr. SG. — ca. 10. LS Krikken, in prep.
Trichoplus Burmeister, 1842. Afr. — 1.

OPLOSTOMINA subtrib. nov.
Anatonochilus Peringuey, 1907. Afr. — 4. LS Krikken, 1980 a.
Laurentiana Ruter, 1952. Afr. — 1.
Oplostomus MacLeay, 1838 (= *Hoplostomus* auctorum, unjustified emendation; = syn. nov. *Goniochilus* Harold, 1878, = syn. nov. *Macromoides* Schoch, 1896). Afr. N! — ca. 10.

Placodidus Péringuey, 1900. Afr. — 7. LS Krikken, 1979a.
Scaptobius Schaum, 1841. Afr. — ca. 10. LS Schein, 1957.

TELOCHILINA subtrib. nov.
Telochilus Krikken, 1974. Afr. — 1.

GENUCHINA subtrib. nov.
Genuchus Kirby, 1825 (= *Ogmothorax* Kraatz, 1900). Afr. — 23. LS Schein, 1955.
Meurguesia Ruter, 1969. Afr. — 1.
Problerhinus Deyrolle, 1864. Afr.N! — 2.

PILINURGINA subtrib. nov.
Callynomes Mohnike, 1873 (= *Praona* Westwood, 1873). Or. — 3. LS Krikken, 1980a.
Centrognathus Guérin, 1840. Or. — 2-3.
Parapilinurgus Arrow, 1910. Or. — 2.
Pilinurgus Burmeister, 1842. Afr. — 5.

GOLIATHOPSIDINA subtrib. nov.
Goliathopsis Janson, 1881. Or, (Pal). — 5.

CREMASTOCHEILINA stat. rev.
Centrochilus Krikken, 1976. Nearct. — 1.
Clinterocera Motschulsky, 1857 (= *Callynomes* Westwood, 1873). Or, E Pal. — ca. 21.
Cremastocheilus Knoch, 1801. Nearct. SG. — ca. 47. LS Potts, 1945; Krikken, 1982a (*Trinodia*); Alpert, 1981.
Cyclidiellus Krikken, 1976. Neotr. — 1.
Cyclidinus Westwood, 1873. Neotr. — 2.
Cyclidius MacLeay, 1838. Neotr. — 5. LS Krikken, in prep.
Genuchinus Westwood, 1873. (Nearct), Neotr. — 9. LS Krikken, 1981.
Lissomelas Bates, 1889. Neotr. — 1.
Paracyclidius Howden, 1971. Neotr. — 2.
Platysodes Westwood, 1873. Or. — 2-3.
Psilocnemis Burmeister, 1842. Nearct. — 1.

LISSOGENIINA subtrib. nov.
Chtonobius Burmeister, 1847 (= *Cyclidiosoma* Janson, 1912). Afr. Stat. rev. — 2.

Lissogenius Schaum, 1845. Afr. — 6.

XIPHOSCELIDINI[1]) stat. rev.

This tribe here includes the non-cremastocheiline Cetoniinae without a distinct mesometasternal protrusion that cannot be directly attached to any of the following tribes. A synapomorphy for the entire group is not available, and it may well be that most of the included groups (or even all of them) stand phylogenetically at the base of other tribes, which could ultimately lead to a complete dissolution of the tribe Xiphoscelidini. A secondary reduction of the mesometasternal protrusion can in some cases not be excluded. Some genera are in this paper united in the Ichnestomina, and this (redefined) subtribe is placed in the Goliathini (q.v.). The key caters (by means of some additions to diagnosis 29a) for some non-xiphoscelidine groups with approximated middle coxae. The Xiphoscelidini include some of the most primitive Cetoniinae, having subcontiguous middle coxae, an extremely shallow posthumeral emargination, and no evident derivative features at all (cf. *Aporecolpa*), thus constituting an outstanding problem area in cetoniid taxonomy.

Callophylla (formerly Cetoniini), *Plochiliana* (formerly "Coptomiini"), and *Scheinia* (formerly Cremastocheilini) fully agree with the present definition of the Xiphoscelidini and are transferred accordingly. Genus 1 (bottom of list) represents a group of odd Australian species formerly placed in the Schizorhinini (q.v.); I have seen additional Australian forms (representing unnamed genera!) with approximated middle coxae. *Mazoe* might actually be a primitive member of the Goliathini, but keys to the Xiphoscelidini on the lack of a strong "goliathine" sexual dimorphism (cephalic armature, etc.) and on its approximated middle coxae. Three or four other genera formerly (Schenkling, 1921) placed here seem to belong in the Cetoniini judged from the presence of a distinct mesometasternal protrusion: *Badizoblax*, *Lipoclita* and *Rhyxiphloea* have been transferred accordingly.

Several adult Xiphoscelidini are not simply flower visitors: some were found in dung, others in termite nests, but substantial ecological information is not available.

Aporecolpa Lansberge, 1886. Afr. — 1.
Callophylla Moser, 1916. Afr. Transl. nov. (from Cetoniini). — 1.
Haematonotus Kraatz, 1880, Afr. P? — 3.
Heteroclita Burmeister, 1842. Afr. — 6. LS Schein, 1960; Krikken, 1982b.
Ischnostomiella Krikken, 1978. Afr. — 1.

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[1]) Burmeister (1842: 613) made the name available (Xiphoscelideae).

Mazoe Péringuey, 1896 (= *Trapezorrhiña* Hauser, 1904). Afr. P? — 3.
Meridioclita Krikken, 1982. Afr. — 1.
Myodermidius Moser, 1919. Afr. — 1.
Oroclita Krikken, 1982. Afr. SG. — 2.
Phonopleurus Moser, 1919. Afr. P? — 1.
Plochiliana Ruter, 1978. Mad. Transl. nov. (from "Coptomiini"). P? — 1.
Protoclita Krikken, 1978. Afr. — 1.
Rhinocoeta Burmeister, 1842. Afr. — 3.
Scheinia Ruter, 1958. Mad. P? — 2.
Xiphoscelis Burmeister, 1842. Afr. — 5. LS Krikken, in prep.
Genus 1 (= *Pseudoclithria* auctorum). Austr. P? — 10.

STENOTARSIINI[1] (= COPTOMIINI auctorum)

Initially I considered this group a veritable hotchpotch of genera, merely united on the basis of their occurrence in the Madagascan region (as done by Schoch, 1894, and others). A closer look at the genera and the majority of the included species, however, showed that there is a high incidence of derivative "Madagascan features" (cf. key diagnosis 30a), which are rarely all jointly apparent in one genus or species (variable apomorphism, cf. introduction, point vi under general comments). The Madagascan cetoniid fauna is indeed extremely diverse and strongly endemic: Stenotarsiini do not occur outside the region, and only a few non-stenotarsiine genera range, with very few species, into the Madagascan region, or are oddities here transferred to others tribes (cf. also introduction, biogeographical summary). These oddities include *Plochiliana* and *Scheinia* (cf. Xiphoscelidini) and *Plaesiorrhina* (= *Bothrorrhina*; cf. Goliathini).

Whatever the status of the Stenotarsiini as a whole, several more or less distinct groups may be recognized. Parcelling of the "Madagassae" started with Schoch (1894). Pouillaude (1917-1920) already recognized many groups, but his groups are far from natural and bear French names. The subdivision of the "Madagassae" is here formally continued, in anticipation of a refined reclassification; consequently the delimitation, composition and arrangement of the various subtribes are extremely tentative.

I do not repeat here the generic synonymies put forward by Pouillaude (l.c.), which are not included in Schenkling's catalogue. Paulian et al. (1982) have recently treated the Euchroeina, including information on the larvae.

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[1]) As far as I can see, the name comes from Kraatz (1880: 182), and has priority over any other available family-group name for the "Madagassae".

COPTOMIINA stat. rev.
Bricoptis Burmeister, 1842. Mad. — 6.
Coptomia Burmeister, 1842. Mad. — ca. 47.
Coptomiopsis Pouillaude, 1919. Mad. — 2.
Euchilia Burmeister, 1842. Mad. — 15.
Euryomia Burmeister, 1842. Mad. — 1.
Heterocranus Bourgoin, 1919. Mad. — 1.
Hiberasta Fairmaire, 1901. Mad. — 1.
Hyphelithia Kraatz, 1880. Mad. 1.
Liostraca Burmeister, 1842. Mad. — 9.
Micreuchilia Pouillaude, 1917. Mad. — 2.
Micropeltus Blanchard, 1842. Mad. — 2.
Pareuchilia Kraatz, 1880. Mad. — 3.
Pseudeuryomia Kraatz, 1894. Mad. — 2.
Pygora Burmeister, 1842. Mad. — ca. 42.
Pyrrhopoda Kraatz, 1880. Mad. — 10.
Vieuella Ruter, 1964. Mad. — 1.

ANOCHILIINA subtrib. nov.
Anochilia Burmeister, 1842. Mad. — ca. 8.
Epistalagma Fairmaire, 1880. Mad. P? — 2.

PANTOLIINA subtrib. nov.
Bonoraella Ruter, 1978. Mad. — 1.
Celidota Burmeister, 1842. Mad. — ca. 8. LS Olsoufieff, 1933.
Cyriodera Burmeister, 1842. Mad. — 1.
Dirrhina Burmeister, 1842. Mad. — 1.
Hemilia Kraatz, 1880. Mad. — 3.
Lucassenia Olsoufieff, 1940. Mad. — 2.
Moriaphila Kraatz, 1880. Mad. — 9.
Pantolia Burmeister, 1842. Mad. — 1.
Tetraodorhina Blanchard, 1842. Mad. — 20.

STENOTARSIINA
Callipechis Burmeister, 1842. Mad. — 1.
Ischnotarsia Kraatz, 1880. Mad. — 7.
Rhadinotaenia Kraatz, 1900 (= *Malacotonia* Fairmaire, 1905). Mad. — 3.
Stenotarsia Burmeister, 1842. Mad. — 12.
Vadonidella Ruter, 1973. Mad. — 1.

EUCHROEINA

Euchroea Burmeister, 1842 (= *Stygnochroea* Kraatz, 1880). Mad. — 19. LS Paulian et al., 1982.

DORYSCELINA stat. rev.

Doryscelis Burmeister, 1842. Mad. — 3.
Epixanthis Burmeister, 1842. Mad. — 8.
Hemiaspidius Krikken, 1982 (= *Hemiaspis* Fairmaire, 1901, non Fitzinger, 1861). Mad. — 2.
Parepixanthis Kraatz, 1893. Mad. — 1.
Pseudepixanthis Kraatz, 1890. Mad. — 2.
Rhynchocephala Fairmaire, 1883. Mad. — 1.

PARACHILIINA subtrib. nov.

Parachilia Burmeister, 1842. Mad. — 8.

HETEROPHANINA stat. rev.

Heterophana Burmeister, 1842. Mad. — ca. 15.
Oxypelta Pouillaude, 1920. Mad. — 2.
Pogoniotarsus Kraatz, 1880. Mad. — 3.
Pogonotarsus Burmeister, 1842. Mad. — 4.
Zebinus Fairmaire, 1894. Mad. — 3.

CHROMOPTILIINA subtrib. nov.

Chromoptilia Westwood, 1842. Mad. — 6.
Descarpentriesia Ruter, 1964. Mad. — 1.

HETEROSOMATINA subtrib. nov.

Heterosoma Schaum, 1845. Mad. — ca. 15.
Plochilia Fairmaire, 1896. Mad. — 2.

SCHIZORHININI[1]) stat. rev.

In this group I include, with the Schizorhinini sensu Schenkling (1921), the Lomapterina, formerly placed in the Gymnetini (q.v.), because: (1) the expanded basomedian pronotal lobe of the Lomapterina shows transitions to the normally triconcave base of the Schizorhinina by way of *Digenethle*, *Scho-*

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[1]) The MS of this section was reviewed by M. E. Bacchus, who confirmed my suspicions about Schenkling's 1921 treatment of some of Kraatz's generic names.

chidia etc.; (2) they share a synapomorphy in the dorso-ventral modification of the pygidium; (3) certain genera in both subtribes share other synapomorphous features, such as the parameral flap; (4) both subtribes are Australasia-based (only two derivative genera outside the Australasian region, cf. also biogeographical summary in chapter 1). Schoch's (1894) and Schenkling's simple grouping of the genera in "Hemipharina" (long mesometasternal protrusion) and "Diaphonina" (short mesometasternal protrusion) is untenable: a future more sophisticated classification (including the proposal of new tribes and/or subtribes) seems necessary to cater for the great diversity among the Schizorhinina as conceived here. Which of the other Old World groups stands closest to (groups within) the Schizorhinini is not clear.

There are some oddities (including undescribed forms representing new genera) needing detailed study. Some (e.g. in *Lenosoma*, *Neoclithria*) are reminescent of the Stenotarsiini and may indeed have to be removed from the genuine Schizorhinina. The type-species of *Pseudoclithria* stands near or is congeneric with that of *Diaphonia*. The remainder of the "*Pseudoclithria*" species is here placed in the Xiphoscelidini (q.v.) under genus 1. For *Cacochroa* a replacement name wil be necessary if indeed the type-species is considered to be (sub)generically different from that of *Aphanesthes* and other groups. I have here re-instated some of Kraatz's genera. *Digenethle*, *Tafaia* and *Microlomaptera* will key to the Schizorhinina, and not to the Lomapterina, if the shape of the clypeus and the mentum are considered more important than the expansion of the basomedian lobe of the pronotum. Valck Lucassen (1961) gave a key to the genera of Lomapterina (including the three aforesaid genera).

SCHIZORHININA

Anacamphtorrhina Blanchard, 1842 (= *Anacamptorrhina* auctorum). Austr. N! — 4.
Aphanesthes Kraatz, 1880 (incl. *Cacochroa* Kraatz, 1880, non Heinemann, 1870). Austr. N? — 7.
Chalcopharis Heller, 1901. Austr. — 3.
Chlorobapta Kraatz, 1880. Austr. — ca. 5.
Chondropyga Kraatz, 1880. Austr. Stat. rev. — ca. 5.
Clithria Burmeister, 1842. Austr. — 3.
Diaphonia Newman, 1840. Austr. — ca. 7.
Dichrosoma Kraatz, 1885. Austr. (cf. = *Lyraphora*). — 1.
Digenethle J. Thomson, 1877. Austr. Transl. nov. (from Gymnetini). — 4.
Dilochrosis J. Thomson, 1878. Austr. — 17.
Dysdiatheta Kraatz, 1880 (= *Ablacopous* J. Thomson, 1880). Austr. Stat. rev. — 3.

Eupoecila Burmeister, 1842. Austr. — 5.
Hemichnoodes Kraatz, 1880. Austr. Stat. rev. — 4.
Hemipharis Burmeister, 1842. Austr. — 1.
+ *Lenosoma* Macleay, 1863. Austr. P? — 3.
Lethosesthes J. Thomson, 1880. Austr. — 1.
Lyraphora Kraatz, 1880. Austr. — 4.
Macrotina Strand, 1934 (= *Macrotis* Schürhoff, 1933, non Dejean, 1834). Austr. — 1.
Metallesthes Kraatz, 1880. Austr. — 3.
Microlomaptera Kraatz, 1885. Austr. Transl. nov. (from Gymnetini). — 3.
Micropoecila Kraatz, 1880. Austr. — 1.
Neoclithria Poll, 1886. Austr. P? — 1.
Panglaphyra Kraatz, 1880. Austr. — 1.
Peotoxus Krikken, 1983. Austr. — 1.
Phyllopodium Schoch, 1895. Austr. Stat. rev. — 1.
Poecilopharis Kraatz, 1880. Austr. — ca. 20. LS Schürhoff, 1936.
Polystigma Kraatz. 1880. Austr. — 4.
Pseudoclithria Poll, 1886. Austr. (cf. = *Diaphonia*). — 1.
Schizorhina Kirby, 1825. Austr. N! — 2.
Schochidia Berg, 1898 (= syn. nov. *Jolivetiella* Ruter, 1972). Austr. N! — 1.
Stenopisthes Moser, 1913. Austr. — 1.
Tafaia Valck Lucassen, 1939. Austr. Transl. nov. (from Gymnetini). — 4. LS Krikken, 1972.
Tapinoschema J. Thomson, 1880. Austr. — 3.
Trichaulax Kraatz, 1880. Austr. — 6.

LOMAPTERINA transl. nov. (from Gymnetini)
Agestrata Eschscholtz, 1829. Or. — 5.
Ischiopsopha Gestro, 1874 (incl. *Homoeopsopha* Schürhoff, 1934). Austr. — ca. 55. — LS Mikšić, 1978; Krikken, 1980b (*Homoeopsopha*).
Lomaptera Gory & Percheron, 1833. Austr. — ca. 145. LS Valck Lucassen, 1961.
Lomapteroides Schoch, 1898. Austr. — 1.
Macronota Wiedemann, 1817 (= *Thaumastopeus* Kraatz, 1885). Or. N! — ca. 22. LS Krikken, in prep.
Megaphonia Schürhoff, 1933. Austr. — 5. LS Valck Lucassen, 1940.
Morokia Janson, 1905. Austr. — 3.
Mycterophallus Poll, 1886. Austr. — 6. LS Schürhoff, 1934.

GOLIATHINI

This tribe includes the famous goliath beetles, i.e. the larger Goliathina and Coryphocerina, measuring up to about 10 cm[1]). Although usually very distinct as a group I could not point to a single synapomorphy applicable to all the Goliathini: the position in this tribe of the forms lacking the male cephalic ornamentation is usually based on a score of characters of minor importance and on the impossibility to place them elsewhere (e.g. in the Schizorhinini). In the present classification four subtribes are recognized, including a new one, the Dicronocephalina. Burmeister (1842), Schoch (1894), Schenkling (1921), etc. recognized various other groups, all based on insufficient characters, or purely on distribution (cf. introduction), which consequently are here abandoned. The name Coryphocerina Burmeister, 1842, takes priority over Heterorhinina Kraatz, 1880.

Whatever the exact position of *Dicronocephalus* (cf. also Mikšić, 1977), this genus cannot simply be included in any of the family-group taxa proposed so far, because it shows some unique derivative features. *Hypselogenia* is here formally transferred from the Ichnestomina to the Goliathina (cf. also Krikken, 1979b). The Ichnestomina (with approximated middle coxae) are here redefined and placed next to the Coryphocerina, leaving most of the remaining oddities in a group here provisionally ranked as a separate tribe, the Xiphoscelidini (q.v.).The American Goliathini consist of two definitely separate monospecific genera. Whether the Madagascan *Plaesiorrhina* are genuine Coryphocerina remains to be seen: they look like them, but some objections could be raised, i.a. their parameres being strongly modified and setose, and their posthumeral emargination being rather deep (cf. Stenotarsiini). The majority of the genera of Goliathini belongs to the Coryphocerina (= Heterorrhinina auctorum), and as it is in this group that some nasty name changes are inevitable, some explanation seems appropriate here (cf. also introduction, point vii under general comments).

The fact that Burmeister during the preparatory European tour for the 1842 volume of his "Handbuch" freely exchanged information from his manuscript with Westwood, Hope, Blanchard, and others, complicated the nomenclature considerably. Westwood used this information in his Arcana (1841-1845), partly antedating Burmeister, and sometimes misapplying the MS names, thus creating confusion. In the present list of genera the nomenclatural rules are rigidly applied. The publication date of Burmeister's Handbuch vol. 3 is most probably October 1842, because: (1) the "Vorrede" is dated September 1842; (2) the "Nachschrift", dated 6 December, is absent from some (? early issued)

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[1]) Lachaume (1983) recently published a lavishly illustrated treatise on the "genuine" goliath beetles (Goliathina, excluding *Hypselogenia*).

copies, and is evidently glued into other (? subsequently issued) copies; (3) the style of the "Nachschrift" and its absence from the "Inhalt" also suggest a separate issue; (4) comparison of Handbuch copies proves that there have been different printings on different kinds of paper; (5) Westwood (1 January 1843) can already cite (with page number) Burmeister's Handbuch; (6) Burmeister thus antedates Blanchard (November 1842), who later (1850) indeed has no hesitation in attributing names to Burmeister (this is contra Pouillaude, 1917: 49-50).

The genera of the Coryphocerina are listed according to their occurrence in biogeographical regions.

GOLIATHINA stat. rev. — LS Wiebes, 1969; Lachaume, 1983.
Fornasinius Bertoloni, 1853. Afr. — 4.
Goliathus Lamarck, 1801 (incl. *Argyrophegges* Kraatz, 1895). Afr. — 3.
Hegemus J. Thomson, 1881. Afr. — 3.
Hypselogenia Burmeister, 1840. Afr. — 4. LS Krikken, 1979b.

DICRONOCEPHALINA subtrib. nov.
Dicronocephalus Hope, 1831, emend. Hope, 1837 for *Dicranocephalus*, non Hahn, 1826 (= syn. nov. *Dicranoceps* Medvedev, 1972). Or, (Pal). N!(1)). — 5.

ICHNESTOMINA stat. rev. (= ISCHNOSTOMINA auctorum) P?
Gariep Péringuey, 1907. Afr. — 1.
Ichnestoma Gory & Percheron, 1833 (= *Ischnostoma* auctorum). Afr. N! — ca 8.

CORYPHOCERINA (= HETERORRHININA auctorum, = GNATHOCERINA)
Agnathocera Arrow, 1922. Afr. — 1.
Amaurodes Westwood, 1844. Afr. — 1.
Anisorrhina Westwood, 1842: 126 (= *Genyodonta* Burmeister, 1842). Afr. N! — 6.
Astenorhella Westwood, 1873. Afr. — 1.
Asthenorhina Westwood, 1844. Afr. N! — 4.
Brachymitra Kolbe, 1904 (= *Bettonia* Waterhouse, 1905). Afr. — 1.
Caelorrhina Hope, 1841: 33 (=syn. nov. *Eccoptocnemis* Kraatz, 1880). Afr. — See also *Cyprolais*. N! — 9.
Cheirolasia Westwood, 1843. Afr. — 1.

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1) Hope himself (1837), and subsequently Westwood (1842: 116), most emphatically, emended *Dicranocephalus*, rendering Medvedev's name superfluous.

Chelorrhina Burmeister, 1842. Afr. (cf. = *Mecynorhina*). — 3.

Chlorocala Kirby, 1828: 648 (= syn. nov. *Smaragdesthes* Kraatz, 1880). Afr. N! — ca. 15. LS Schauer, 1941a.

Chondrorrhina Kraatz, 1880. Afr. — 3.

Compsocephalus White, 1845. Afr. — 3.

Cyprolais J. Thomson, 1880: 294 (=syn. nov. *Coelorrhina* sensu Westwood, 1842: 70, etc., misspelling of *Caelorrhina* Hope, 1841: 33[1])). Afr. N! — 8. LS Simonis & Krikken, in prep.

Daedycorrhina Bates, 1880. Afr. — 3.

Dicellachilus C. O. Waterhouse, 1905. Afr. — 1.

Dicronorhina Hope, 1837 (= *Ceratorhina* Westwood, 1843, = *Dicranorrhina* auctorum). Afr.N! — 3. LS Lekkerkerk & Krikken, in prep.

Dymusia Burmeister, 1842. Afr. — 4.

Dyspilophora Kraatz, 1880. Afr. — 2.

Eudicella White, 1839. Afr. — ca. 16. LS Schein, 1952.

Eutelesmus C. O. Waterhouse, 1880 (= *Entelemus*, misspelling, = *Paraneptunides* Kraatz, 1899). Afr. — 1.

Gnathocera Kirby, 1825 (incl. *Gnathocerida* Péringuey, 1907). Afr, (Pal) — ca. 47. LS Schürhoff, 1939; Basilewsky, 1949 (Congo region).

Gnorimimelus Kraatz, 1880. Afr. — 1.

Inhambane Péringuey, 1907. Afr. — 1.

Lansbergia Ritsema, 1888 (= *Grypocnemis* Kraatz, 1897). Afr. — 1.

Lophorrhina Westwood, 1842: 126 (=syn. nov. *Chordodera* Burmeister, 1842; = *Aphanochroa* Kolbe, 1893). Afr. N! — 4.

Mecynorhina Hope, 1837. Afr. —4.

Megalorhina Westwood, 1847 Afr. (cf. = *Mecynorhina*). — 1.

Melinesthes Kraatz, 1880. Afr. — 8.

Neptunides J. Thomson, 1878. Afr. — 2.

Pedinorrhina Kraatz, 1880. Afr. (cf. = *Dyspilophora*). — 6.

Plaesiorrhinella nom. nov. (pro *Plaesiorrhina* Burmeister, 1842: 211, non Westwood, 1842: 126). Afr. N! — 7.

"*Priscorrhina*" Krikken, in press. Afr. — 1.

Ptychodesthes Kraatz, 1883. Afr. — 4.

Raceloma J. Thomson, 1877. Afr. — 2.

Rhamphorrhina Klug, 1855 (= *Ranzania* Bertoloni, 1855, non Nando, 1840, = *Neoranzania* Distant, 1911). Afr. N! — 2.

Scythropesthes Kraatz, 1880. Afr. — 1-2.

Smicorhina Westwood, 1847. Afr. N! — 2.

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[1]) Burmeister, who originally coined the name *Coelorrhina*, later implicitly admitted (1842: 204) the synonymy with *Caelorrhina* Hope, but gave (like Westwood) a different interpretation (in his Handbuch, 1842), i.e. he did not include the type-species, *Caelorrhina concolor* Hope.

Spelaiorrhina Lansberge, 1886 (= *Eutelesthes* Kolbe, 1892). Afr. — 3. LS Schürhoff, 1934.
Stephanocrates Kolbe, 1892. Afr. (cf. = *Compsocephalus*). — 4.
Stephanorrhina Burmeister, 1842. Afr. — 12. LS Schürhoff, 1942.
Taeniesthes Kraatz, 1880. Afr. (cf. = *Dyspilophora*). — 1.
Taurhina Burmeister, 1842. Afr. — 4.
Tmesorrhina Westwood, 1842. Afr. — 16. LS Burgeon, 1945.

Plaesiorrhina Westwood, 1842: 126 (= syn. nov. *Bothrorrhina* Burmeister, 1842: 200). Mad. Transl. nov. (from "Coptomiini"). P? N! — 5.

Anomalocera Westwood, 1842. Or. — 1.
Bietia Fairmaire, 1898 (= *Atropinota* Heller, 1923). Pal. — 2.
**Chloresthia* Fairmaire 1905. Pal. — 1.
Cosmiomorpha Saunders, 1852. Or. — 6.
Cosmiomorphomima Mikšić, 1976. Or. — 1.
Cyphonocephalus Westwood, 1842. Or. — 1.
Dicheros Gory & Percheron, 1833 (= *Diceros* auctorum, unjustified emendation, = *Coryphe* MacLeay, 1838, = *Coryphocera* Burmeister, 1842). Or. SG. — 13.
Euchloropus Arrow, 1907. Or. — 1.
Hemiheterorrhina Mikšić, 1974. Pal. — 2.
Herculaisia Seilliere, 1910. Pal. — 2.
Heterorhina Westwood, 1842. Or, (Pal), (Afr). N! — ca. 25.
Ingrisma Fairmaire, 1893. Or. — 11.
Jumnos Saunders, 1839 (= *Iumnos*, misspelling). Or. — 2.
Moseriana Ruter, 1965. Or. — 1.
Mystroceros Burmeister, 1842. Or. — 2.
Narycius Dupont, 1835. Or. — 1.
Neophaedimus Lucas, 1870. Pal. — 1.
Periphanesthes Kraatz, 1880 (= *Bonsiella* Ruter, 1965). Or. P! — 1.
Petrovitzia Mikšić, 1965. Pal. (cf. = *Bietia*). — 1-2.
Platynocephalus Westwood, 1854. Or. — 1.
Pseudodiceros Mikšić, 1974. Or. — 1.
Pseudotorynorrhina Mikšić, 1967. Or. — 2.
Rhinarion Ruter, 1965. Or. — 1.
Rhomborhina Hope, 1837. Or, Pal. SG.N! — ca. 15.
Torynorrhina Arrow, 1907. Or. — ca. 10.
Trigonophorinus Pouillaude, 1913. Or. — 1.
Trigonophorus Hope, 1831. Or. SG. — 10.

Ischnoscelis Burmeister, 1842. Nearct. P! — 1.

Neoscelis Schoch, 1897: 453 (= *Trichotarsus* Kraatz, 1897: 157). Nearct. Stat. rev. P! N! — 1.

CETONIINI

Apart from a number of (mainly Afrotropical) oddities (*Trymodera*, *Simorrhina*, the group around *Anoplocheilus*, etc.) this tribe is at first sight most homogeneous considering the abundance of genera recognized. Schoch (1894, etc.), and consequently Schenkling (1921), recognized various subtribes and sections based on insufficient characters or purely on distribution (cf. introduction). Somewhat reluctantly I retain here only two (Cetoniina and Leucocelina), awaiting a better founded subdivision of the Cetoniini.

A few genera had to be removed from the Cetonini: *Callophylla* to the Xiphoscelidini, *Anthracophora* and *Poecilophilides* to the Diplognathini. Some genera had to be removed from the "Ischnostomina" to the Cetoniina: *Badizoblax*, *Lipoclita* and *Rhyxiphloea*. These transfers are all based on the characters described in the key. The number of species included in the Cetoniini is enormous, two of the largest genera, *Protaetia* and *Pachnoda*, comprising a combined total of between 300 and 400 known species.

Cetoniini occur almost everywhere in the warmer parts of the world, being scarcer in the Australasian, Madagascan and Neotropical regions, and being virtually absent (like the rest of the Cetoniidae) from remote islands. The genera are here listed for each biogeographical region (there is some overlap). Especially the Afrotropical sections need a thorough revision, and consequently the species numbers given are very tentative, being based entirely on the current unsatisfactory situation.

CETONIINA

Aethiessa Burmeister, 1842 (incl. *Brachytricha* Reiche, 1871). Pal. — 6-7.

Anatona Burmeister, 1842. Or. — 3-4.

Cetonia Fabricius, 1775[1]). Or, Pal. SG. — ca. 25.

Chiloloba Burmeister, 1842. Or. — 1.

Enoplotarsus Lucas, 1859. Pal. — 1.

Euglypta Mohnike, 1873. Or. — ca. 10.

Gametis Burmeister, 1842 (= *Oxycetonia* Arrow, 1910). Or, (Pal), (Mad). — ca. 15?

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[1]) There is an obsolete genus-group name which threatens numerous other names because no type-species was designated: *Cetoninus* MacLeay (1838: 27); therefore type-species here designated *Cetonia aurata* (Linnaeus); herewith *Cetoninus* becomes a new junior synonym of *Cetonia* Fabricius, 1775.

Glycosia Schoch, 1896. Or. — ca. 12.

Glycyphana Burmeister, 1842. Austr., Or. SG. — ca. 70. LS Mikšić, 1970, 1971; Bacchus, 1974 (Australia).

**Gymnophana* Arrow, 1910. Or. — 1.

Hemiprotaetia Mikšić, 1963. Or. — 2.

Heterocnemis Albers, 1852 (incl. *Celidotella* Reitter, 1909). Pal. — 2.

Lawangia Schenkling, 1921. Or. — 1.

Lorkovitschia Mikšić, 1968. Or. — 2.

Paraprotaetia Moser, 1907. Or. — 1.

Pararhabdotis Kraatz, 1899. Or. — 1.

Podopogonus Moser, 1917. Or. — 1.

Pogonopus Arrow, 1910. Or. — 2.

+*Protaetia* Burmeister, 1842 (incl. *Potosia* Mulsant, 1871, *Dicranobia* Reitter, 1900, *Progastor* J. Thomson, 1880, *Pseudaplasta* Kraatz, 1898, *Pseudanatona* Kraatz, 1898, *Oxyperatex* Krikken, 1982 = *Oxyperas* J. Thomson, 1880, non Moerch, 1853). (Austr), Or, Pal, (Mad). SG — ca. 240? LS Mikšić, 1966, and preceding work.

Protaetiomorpha Mikšić, 1968. Or. — 2.

Reineria Mikšić, 1968 (incl. *Astraeella* Krikken, 1982 = *Astraea* Mohnike, 1873, non Bolten, 1798). Or. N? (cf. = *Euglypta*). — ca 15.

Rhabdotops Krikken, 1981. Or. — 1.

Ruteraetia Krikken, 1980. Or. — 1.

Stalagmosoma Burmeister, 1842 (= *Stalagmopygus* Kraatz, 1882). Pal, Afr. N! — 4.

Sternoplidius Moser, 1908. Or. (cf. = *Glycosia*). — 1.

Sternoplus Wallace, 1867. Or. — 1.

Svobia Mikšić, 1965. Or. — 2.

Thyreogonia Reitter, 1898. Pal. — 1.

Tropinota Mulsant, 1842 (incl. *Epicometis* Burmeister, 1842). Pal. SG — ca. 10.

Urbania Mikšić, 1963. Or. — ca. 7.

Anelaphinis Kolbe, 1912. Afr. — 6.

Anoplocheilus MacLeay, 1838. Afr. N! — 9.

Atrichelaphinis Kraatz, 1898. Afr. — 7-8.

Atrichiana Distant, 1911 (= *Atrichia* Schoch, 1896, non Schrank, 1803). Afr. — 1.

Badizoblax J. Thomson, 1877. Afr. Transl. nov. (from "Ischnostomina"). — 1.

Centrantyx Fairmaire, 1884. Afr. — 8. LS Valck Lucassen, 1935; Krikken, in prep.

Cosmesthes Kraatz, 1880. Afr. — 2.
Cosmiophaena Kraatz, 1898. Afr. — 6.
Diathermus Kraatz, 1897. Afr. — 2.
Dischista Burmeister, 1842. Afr. — 2.
Dolichostethus Kolbe, 1892. Afr. — 3.
Elaphinis Burmeister, 1842. Afr. — 3.
* *Erlangeria* Preiss, 1902. Afr. — 1.
Goraqua Péringuey, 1907. Afr. (cf. = *Atrichelaphinis*). — 1.
Jothochilus Kolbe, 1892. Afr. — 1.
Lamellothyrea Krikken, 1980. Afr. — 1.
Latescutella Ruter, 1972. Afr. — 1.
Lipoclita Péringuey, 1907. Afr. Transl. nov. (from "Ischnostomina"). — 1.
Manodema Moser, 1907. Afr. — 1.
Micrelaphinis Schoch, 1896. Afr. — 10.
Mireia Ruter, 1953. Afr. — 1.
Niphobleta Kraatz, 1880 (= *Macrelaphinis* Kraatz, 1880). Afr. — 5.
+ *Pachnoda* Burmeister, 1842 (= *Eupachnoda* Kolbe, 1892). (Pal), Afr. — ca. 130? LS Schürhoff, 1938; Ruter, 1958, 1963 (certain groups); Rigout, 1983, and preceding work.
Pachnodella Stichel, 1922 (= *Conostethus* Schoch, 1894, non Fieber, 1858). Afr. — 1.
Paleopragma J. Thomson, 1880. Afr. — 1.
Phaneresthes Kraatz, 1894. Afr. — 3.
Polybaphes Kirby, 1827 (syn. nov. = *Phonotaenia* Kraatz, 1880; = *Gametis* auctorum). Afr. — ca. 15.
Podopholis Moser, 1915. Afr. — 1.
Polystalactica Kraatz, 1882. Afr. — ca. 17. LS Schein, 1958.
Psadacoptera Kraatz, 1882 (= *Psacadoptera* auctorum). Afr. N! — 4.
Pseudoprotaetia Kraatz, 1882. Afr. — 6.
Pseudotephraea Kraatz, 1882. Afr. — 1.
Rhabdotis Burmeister, 1842. Afr. — 8.
Rhyxiphloea Burmeister, 1842. Afr. Transl. nov. (from "Ischnostomina"). — 1.
Simorrhina Kraatz, 1886. Afr. — 2.
Sisyraphora Kraatz, 1881. Afr. — 6.
Somalibia Lansberge, 1882. Afr. — 5.
Systellorrhina Kraatz, 1895. Afr. — 5.
Tephraea Burmeister, 1842. Afr. — 11.
Tetragonorhina Kraatz, 1896. Afr. N! — 1.
Trichocelis Moser, 1908. Afr. — 1.
Trichocephala Moser, 1916. Afr. — 2. LS Krikken, 1983.

Trichostetha Burmeister, 1842. Afr. — 7.
Trymodera Gerstaecker, 1867. Afr. — 1.
Xeloma Kraatz, 1881. Afr. — 1.

Anatropis Casey, 1915. Nearct. — 1[1]).
Chlorixanthe Bates, 1889. Neotr. — 2.
+*Euphoria* Burmeister, 1842. Nearct, Neotr. SG. — ca. 73.
Euphoriaspis Casey, 1915. Nearct. — 2.
Euphoriopsis Casey, 1915. Neotr. — 1.
Stephanucha Burmeister, 1842. Nearct. — 5.

LEUCOCELINA[2]) stat. rev.
Achromisetes Kraatz, 1880. Afr. — 1.
Acrothyrea Kraatz, 1882. Afr. — 2.
Alleucosma Schenkling, 1921. Afr. — ca. 15.
Amaurina Kolbe, 1895. Afr. (cf. = *Oxythyrea*). — ca. 15. LS Ruter, 1967.
Amauroleucocelis Bourgoin, 1913. Afr. — 1.
Cyclophorellus Krikken, 1982 (= *Cyclophorus* Kraatz, 1880, non Montfort, 1810). Afr. — 2.
Cyrtothyrea Kolbe, 1895. Afr. — 1.
Discopeltis Burmeister, 1842. Afr. — ca. 20.
Elassochiton Kolbe, 1895. Afr. — 9.
Glaucocelis Kraatz, 1896. Afr. —2.
Grammopyga Kolbe, 1895. Afr. — 4.
Heterostetha Moser, 1911. Afr. — 2.
Homalothyrea Kolbe, 1895. Afr. — 2.
Homothyrea Kolbe, 1895. Afr, (Pal). — 3.
Hyperastia Fairmaire, 1898. Afr. (cf. = *Discopeltis*). — 1.
Leptothyrea Kraatz, 1882. Afr. — 4.
Leucochilus Kraatz, 1896, non Boettger, 1880 (sic). Afr. (cf. = *Glaucocelis*). N? — 1.
Lonchothyrea Kolbe, 1895. Afr. — 1.
Mausoleopsis Lansberge, 1882. Afr, Mad. — 10.
Mecaspidius Bourgoin, 1921. Afr. Transl. nov. (from Cremastocheilini). — 2.
Molynoptera Kraatz, 1897. Afr. — 2.
Oxythyrea Mulsant, 1842 (= *Leucocelis* Burmeister, 1842, = *Erythroderma* Kolbe, 1895). Pal, Afr, Mad. N! SG. — ca. 110.

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[1]) The subtribal name Euphoriina (cf. Schoch, 1894, Schenkling, 1921, up to Arnett, 1974) for the American section of the Cetoniini is here abandoned.

[2]) Termination of the name based on Kraatz, 1882, "Leucoceliden".

Paleira Reiche, 1871. Pal. — 1.
Phoxomela Schaum, 1844. Afr. — 1.
Stichothyrea Kraatz, 1882. Afr. — 3.
Trichothyrea Kolbe, 1895. Afr. — 1.

GYMNETINI stat. rev.

To me these are Cetoniini with a strongly expanded basomedian pronotal lobe, and they may indeed ultimately have to be included, in some way or another, in that tribe. *Blaesia* is a most remarkable form, strongly modified, very similar to the South African *Xiphoscelis* (Xiphoscelidini), possibly also termitophilous, all in all a notable example of parallel evolution. *Blaesia* has its middle coxae approximated, and is so different from the other Gymnetini that the recognition of a separate subtribe Blaesiina seems justified. Two species of *Blaesia* are known from southern South America.

I have excluded the Lomapterina (cf. Schizorhinini) and the Taenioderini (see below), which, contrary to current views (e.g. Mikšić, 1976, etc.), have nothing to do with the Gymnetini, their expanded basomedian pronotal lobe being the result of parallel evolution.

The generic nomenclature of the New World Gymnetini was reviewed by Hardy (1975). Schürhoff (1937) gave a key to the genera, and to the species of *Gymnetis* (in his sense) and related genera.

GYMNETINA (= syn. nov. CLINTERIINA)
Amazula Kraatz, 1882. Afr. — 1.
Clinteria Burmeister, 1842. (Austr), Or, Afr. — ca. 30.
Clinteroides Schoch, 1898. Afr. — 3.
Stethodesma Bainbridge, 1840. Afr. — 3.

**Aemilius* Le Moult, 1939. Neotr. — 1.
Allorrhina Burmeister, 1842. Neotr. — 13.
Amithao J. Thomson, 1878. Neotr. — ca. 15.
Argyripa J. Thomson, 1878. Neotr. — 4. LS Ratcliffe, 1978.
Astrocara Schürhoff, 1937. Neotr. — 1.
Badelina J. Thomson, 1880. Neotr. — 2.
Balsameda J. Thomson, 1880. Neotr. — 2. LS Goodrich, 1965.
Chiriquiba Bates, 1889. Neotr. — 1.
Cineretis Schürhoff, 1937: 56, 80 (type-sp. here designated *Cetonia undulata* Vigors; syn. rev. = *Hologymnetis* Martínez, 1949). (Nearct), Neotr. N! — ca. 3. LS Schürhoff, 1937.
Corvicoana Strand, 1934 (= *Heteropodia* Schürhoff, 1933, non Loriol, 1887,

= *Heteropodetis* Schürhoff, 1937). Neotr. — 5. LS Schürhoff, 1933.
Cotinis Burmeister, 1842. Nearct, Neotr. SG. — ca. 20. LS Goodricht 1966.
Desicasta J. Thomson, 1878. Neotr. — ca. 8.
Guatemalica Poll, 1886. Neotr. — 3.
Gymnetina Casey, 1915. Nearct. — 3.
+ *Gymnetis* MacLeay, 1819 (= *Paragymnetis* Schürhoff, 1937, = *Gymnetoides* Martínez, 1949). (Nearct), Neotr. — ca. 10. LS Schürhoff, 1937.
Gymnetosoma Martinez, 1949 (= *Gymnetis* sensu Schürhoff, 1937, Blackwelder, 1944). Neotr. — ca. 12.
Hadrosticta Kraatz, 1892. Neotr. — 1.
Heterocotinis Martinez, 1948. Neotr. — 4.
Hoplopyga J. Thomson, 1880. Neotr. — ca. 23.
Hoplopygothrix Schürhoff, 1933. Neotr. — 2.
Jansonella Blackwelder, 1944 (= *Jansonia* Schürhoff, 1937, non Bates, 1891). Neotr. — 1.
Macrocranius Schürhoff, 1935. Neotr. — 1.
Marmarina Kirby, 1827 (= *Maculinetis* Schürhoff, 1937). Neotr. — 4.
Tiarocera Burmeister, 1842. Neotr. — 2.

BLAESIINA

Blaesia Burmeister, 1842. Neotr. — 2

DIPLOGNATHINI

The status of the Diplognathini is somewhat enigmatic, although they presumably are monophyletic, standing close to the Cetoniini and Gymnetini. On the one hand the tribe includes such unusual, evidently derivative forms as *Conradtia* (a monospecific endemic of the East African Usambara Mts); on the other hand there are some primitive genera, like *Apocnosis*, that might have something to do with forms currently placed in the Xiphoscelidini (cf. *Phonopleurus*). Another complication is the fact that the larva of *Diplognatha* has simply sickle-shaped claws on its legs, those of the Cetoniini and Gymnetini being more or less modified (usually conical in shape).

Uloptera and *Phymatopteryx* have long been considered to belong in the Cremastocheilini. Despite their somewhat aberrant appearance, however, they fully qualify as Diplognathini.

Anthracophora Burmeister, 1842. Or. SG. Transl. nov. (from Cetoniini). — 6.
Anthracophorides Moser, 1918 (= *Carretia* Ruter, 1949). Afr. — 1.
Apocnosis J. Thomson, 1878. Afr. — 3.
Charadronota Burmeister, 1842. Afr. — 5.

Conradtia Kolbe, 1892. Afr. — 1.
Diphrontis Gerstaecker, 1883. Afr. — 7. LS Schauer, 1941b.
Diplognatha Gory & Percheron, 1833. Afr. N! — ca. 17.
Eriulis Burmeister, 1842. Afr. — 1.
Hadrodiplognatha Kraatz, 1898. Afr. — 2.
Heteropseudinca Valck Lucassen, 1933. Afr. — 7. LS Valck Lucassen, 1933.
Metallopseudinca Valck Lucassen, 1933. Afr. — 1.
Niphetophora Kraatz, 1883. Afr. — 2.
Parapoecilophila Hauser, 1904. Afr. — 1.
Pilinopyga Kraatz, 1880. Afr. — 1.
Poecilophila Kraatz, 1893. Afr. — 3.
Poecilophilides Kraatz, 1898. Or. (cf. = *Anthracophora*). Transl. nov. (from Cetoniini). — 3.
Porphyronota Burmeister, 1842. Afr. — 7.
Pseudinca Kraatz, 1880. Afr. — ca. 25. LS Valck Lucassen, 1933.
Ruteroides Alves, 1973. Afr. — 1.
Stethopseudinca Valck Lucassen, 1933. Afr. — 1.
Uloptera Burmeister, 1842 (incl. *Phymatopteryx* Westwood, 1873). Afr. Transl. nov. (from Cremastocheilini). — 7.

PHAEDIMINI

I see no reason to keep this group in or near the Goliathini, with which it has very little in common. The absence of a posthumeral elytral emargination renders them (particularly the unarmed females) very similar to certain Trichiinae, but their present subfamily position is supported by the strongly protuberant mesepimeron and the mesometasternal protrusion. The pronotal shape and some other phaedimine features might be indicative of a close affinity to the Taenioderini (q.v.). The position of both tribes at the end of this chapter merely reflects our ignorance as to their affinities in the overall classification. The latest synopsis of the Phaedimini is included in Mikšić (1977).

The genus *Dicronocephalus* is here re-transferred to the Goliathini (q.v.).

Phaedimus Waterhouse, 1841 (incl. *Hemiphaedimus* Mikšić 1972). Or. — 8.
Philistina MacLeay, 1838 (= *Mycteristes* Castelnau, 1840) Or. SG. N?¹) — 10.
Prigenia Mohnike, 1871. Or. — 2.
Rhinacosmus Kraatz, 1895. Or. — 4. LS Krikken, 1979c.
Theodosia J. Thomson, 1880. Or. — 6.

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¹) Burmeister (1842: 173, footnote) alleged that Castelnau's proposal of *Mycteristes* appeared before *Philistina*, but he gave no specific date and I cannot confirm his allegation.

TAENIODERINI stat. rev. & transl. nov. (from Gymnetini)

These are the Macronotides sensu Schenkling (1921), who included them in the Gymnetini, Mikšić (1976) re-naming them Taenioderina and Chalcotheina. I consider these subtribes closely related, and join them in the tribe Taenioderini, which is characterized by the shape of pronotum, the scutellum, the elytra, etc. I suspect that these Taenioderini are closely related to the Phaedimini, sharing a number of derivative characters (cf. key diagnosis 26a) and occurring in the same region.

Euremina seems to be an outsider in the Taenioderini, having its middle coxae strongly approximated, and lacking a distinct basomedian pronotal lobe. In this connection it should be noted that the basomedian lobe may be absent in certain other genera (cf. *Gnorimidia*), and that the mesometasternal protrusion may be extremely small in other Taenioderina (cf. *Euselates*). *Euremina* is certainly not a member of the Cremastocheilini, as suggested by Mikšić (1976). However, *Euremina* might accidentally key out to the other tribe lacking a distinct mesometasternal protrusion, the Xiphoscelidini.

TAENIODERINA

Aurelia J. Thomson, 1880, non Lamarck, 1816 (sic). Or. (cf. = *Euselates*). — 1.
Bacchusia Mikšić, 1976. Or. — 1.
Bombodes Westwood, 1846. Or. — 2.
**Carneluttia* Mikšić, 1976. Or. — 1.
Coilodera Hope, 1831. Or. N! — 13.
Costinota Schürhoff, 1933 (= *Pseudoixorida* Mikšić, 1976). Or. — 1.
Eumacronota Mikšić,, 1976. Or. — 3.
Euremina Wallace, 1867: xcvii1). Or. P! — 1.
Euselates J. Thomson, 1880. Or, (Pal). SG. — ca. 35.
Gnorimidia Lansberge, 1887. Or. — 1.
Ixorida J. Thomson, 1880. Or. — 7.
Macronotops Krikken, 1977. Or. — 6. LS Krikken, 1977.
Mecinonota Kraatz, 1892. (Austr), Or. SG. — ca. 15.
Meroloba J. Thomson, 1880. Or. — 4.
Oncosterna J. Thomson, 1880. Or. — 6.
Pleuronota Kraatz, 1892 (= *Macronotiola* Mikšić, 1972). Or, (Pal). N! — 9. LS Krikken, 1977a.
Taeniodera Burmeister, 1842 (= *Macronota* auctorum). Or. — ca. 55.
Xenoloba Bates, 1889. Or. — 1.

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1) Although later attributed to Westwood, the original brief diagnosis of Wallace does not mention Westwood.

CHALCOTHEINA

Anocoela Moser, 1914. Or. — 1.
Chalcothea Burmeister, 1842. Or. — 3.
Chalcotheomima Mikšić, 1970. Or. — 2.
Clerota Burmeister, 1842. Or. — ca 15.
Glyptothea Bates, 1889. Or. — 3.
Glyptotheomima Mikšić, 1976. Or. — 1.
Hemichalcothea Mikšić, 1970. Or. — 1.
Microchalcothea Moser, 1910. Or. — 1.
Penthima Kraatz, 1892. Or. — 1.
Plectrone Wallace, 1867. Or. — ca. 10.
Pseudochalcothea Ritsema, 1882. Or. — 10.

Where have Schenkling's taxa gone?

In the lists given above most of the genera mentioned as valid in Schenkling's catalogues (1921, 1922) re-appear, either as valid genera (occasionally in a different spelling), or as synonyms. To summarize the major changes and to aid in tracing the whereabouts of Schenkling's groupings is the purpose of the following list, which compares Schenkling's family-group names with the present usage. Some important synonymies have already been indicated above, others appear from the list below; the Schenkling names preceded by an asterisk are here completely abandoned, the components of these taxa being included under the names listed on the right. Numbers between parentheses refer to page numbers in Schenkling's catalogue parts; see also index further below.

Schenkling's usage:	*present usage:*
Cetoniinae (pars 72)	
Goliathini (4)	Goliathina, Dicronocephalina, Coryphocerina, Phaedimini
*Mecynorrhinina (15)	Coryphocerina
*Ischnoscelina (34)	Coryphocerina
*Stephanorrhinina (35)	Coryphocerina
*Heterorrhinina (49)	Coryphocerina
*Rhomborrhinina (60)	Coryphocerina, Ichnestomina
*Gnathocerina (66)	Coryphocerina
*Tmesorrhinina (73)	Coryphocerina
*Ischnostomina (75)	Xiphoscelidini, Ichnestomina

Gymnetini (81)	
Gymnetina (81)	Gymnetina, Blaesiina
*Macronotina (102)	
*Clinteriides (102)	Gymnetina
Lomapterides (110)	Lomapterina, Schizorhinina
*Macronotides (128)	Taenioderini
Coptomiini (147)	
*Bothrorrhinina (147)	Coryphocerina
Doryscelina (148)	Doryscelina
Coptomiina (148)	Stenotarsiini (subtrib. div., q.v.)
Schizorrhinini (175)	
*Hemipharina (175)	Schizorhinina
*Diaphonina (183)	Schizorhinina
Cetoniini (194)	
Cetoniina (194)	Cetoniina, Leucocelina, Diplognathini
*Glycyphanina (251)	Cetoniina
*Elaphinina (284)	
*Pachnodides (284)	Cetoniina
*Elaphinides (303)	Cetoniina
*Tephraeides (313)	Cetoniina
Leucocelides (320)	Leucocelina, Cetoniina
*Euphoriina (334)	Cetoniina
Diplognathini (344)	Diplognathini
Cremastochilini (353)	
Macromina (353)	Cremastocheilini (subtrib. div., q.v.), Diplognathina
Cremastochilina (364)	Cremastocheilini (subtrib. div., q.v.)
Trichiinae (pars 75)	
Cryptodontini (2)	Cryptodontini, Incaini
Osmodermini (3)	Osmodermini, Trichiini, Incaini
Trichiini (9)	Trichiini, Platygeniini
Valginae (pars 75: 42)	
no subdivision	Microvalgini, Valgini

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6. INDEX OF TAXONOMIC NAMES

Including major synonyms, misspellings, etc. Asterisks denote new names. Parentheses denote invalid names.

Family-group names

Genus-group names