ISSN 0031-0301, Paleontological Journal, 2006, Vol. 40, No. 1, pp. 90–99. © Pleiades Publishing, Inc., 2006.
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On the Types of Mesozoic Archostematan Beetles (Insecta, Coleoptera, Archostemata) in the Natural History Museum, London

A. G. Ponomarenko

Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow, 117997 Russia

e-mail: aponom@paleo.ru

Received January 14, 2005

Abstract—About 40 type specimens of archostematan beetles from the Jurassic, Lower Cretaceous, and Paleogene of England, named by P. Brodie, J.O. Westwood, C. Giebel, A. Handlirsch, F. Zeuner, P. Whalley, and R. Crowson and stored in the Paleontological Department of the Natural History Museum (London) are redescribed. Nine genera and 11 species are recognized, three genera are assigned to Archostemata for the first time. One new species, *Tersus crowsoni* (Schizophoridae), is described.

DOI: 10.1134/S0031030106010102

Key words: Coleoptera, Archostemata, types, Jurassic, Lower Cretaceous, Paleogene, England.

INTRODUCTION

Some Mesozoic beetles from England are among the earliest described fossil insects in the world (Brodie, 1845). Most of them received binominal names somewhat later (Westwood, 1854; Giebel, 1856), and their taxonomic placement was usually far from natural, because, at that time, almost all Mesozoic beetles were assigned to extant genera. Handlirsch (1906) formally named nearly all remaining specimens (except for staphylinids), but virtually without discussion of their systematic position; he simply created for them special extinct genera, usually not assigned to any family. Since then nobody has reexamined these beetles; thus, Carpenter (1992) in the "Treatise on Invertebrate Paleontology" considered them as Coleoptera incertae sedis. No one has ever revised these genera or applied their names when describing other Mesozoic material; therefore, the names of many of the commonest Mesozoic beetles are junior synonyms. Only Crowson (1962) demonstrated that *Carabus elongatus* Brodie, 1845 from the Vale of Wardour (Purbeck) belongs to the family Cupedidae and assigned it to the extant genus *Omma*.

The type specimens of Westwood and Giebel, not originally labeled as such, were only recently designated by Dr. A.J. Ross, Natural History Museum (NHM), London. Not all the types were found and some possibility of incorrect designation still exists, but we cannot underestimate the importance of this painstaking work carried out by Dr. Ross.

Because of the time limitations, only some of these types were studied (ca. 40 specimens). This paper deals with part of them, belonging to the suborder Archostemata (including Schizophoroidea). Reexamination of these types causes some nomenclatural problems. Most of these specimens are isolated elytra. Characters of the elytra alone are usually not sufficient to determine the exact taxonomic position of a fossil. Beetles of different species, genera, and families may have very similar elytra. In Archostemata, isolated elytra can be identified up to the family Cupedidae or several genera (such as *Notocupes, Brochocoleus, Cionocoleus*), and often differentiated from other species of the same genus, but isolated elytra of advanced schizophoroids cannot be identified even to the family level. However, the possibility of identifying isolated elytra to the generic level causes further nomenclatural problems. For example, the elytra named *Kakoselia* and *Zygadenia* by Handlirsch are certainly congeneric with the complete fossil beetles subsequently described as *Notocupes*, thus, the latter name becomes a junior subjective synonym of one of the two former. The genus *Notocupes* comprising more than 50 species is recorded since the Middle Triassic up to the Early Paleocene. Its classification is based on the head, pronotum, and abdominal structure. If this genus is split, where can a type species described from an isolated elytron be placed? Despite a considerable increase in collecting, no more or less complete beetle conspecific with the type species of *Kakoselia* or *Zygadenia* has been found. Thus, the synonymy of *Notocupes* under *Zygadenia* (Ponomarenko, 2000) is fraught with obstacles to systematization of the genus. New problems arise when we try to consider the genera described from isolated elytra as organ-taxa. According to the current International Code of Zoological Nomenclature (ICZN), such taxa

are typified, and if its type species is synonymized, other species should be renamed, which hardly increases stability of the nomenclature. Possibly, the best solution would be a possibility to treat the organ-genera as nontypified groups, united by diagnosis rather than by the similarity to the type species.

The types reexamined are considered in systematic order below. When the original description is insufficient, new descriptions and diagnoses are provided. Assignment of the fossil in question to a higher taxon is explained in the *Discussion*.

SYSTEMATIC PALEONTOLOGY

Family Cupedidae Laporte, 1836

Subfamily Ommatinae Sharp et Muir, 1912

Tribe Ommatini Sharp et Muir, 1912

Genus *Liassocupes* Zeuner, 1962

Liassocupes: Zeuner, 1962, p. 167; Whalley, 1985, p. 166.

Type species. *Liassocupes parvus* Zeuner, 1962, Lower Jurassic of England, by primary monotypy.

Diagnosis. Relatively small beetle with short head without distinct constriction, very short temples, eyes displaced dorsad, so that interocular distance is less than eye diameter; rounded pronotum, elytron with rows of large tubercles along main veins, abdomen tapering from base of third ventrite, and last ventrite longest.

Species composition. The genus was established as monotypic. Whalley (1985) described two more species which, in my opinion, belong elsewhere.

Comparison. The genus is most similar to *Omma* in the very short temples, but distinct in most other characters listed in Diagnosis (except for rounded pronotum).

Discussion. The genus was described without comparison and diagnosed very briefly: "Cupedid with rounded pronotum" (Zeuner, 1962, p. 167). Whalley (1985) redescribed the genus, but retained its original diagnosis. Neither the diagnosis nor the species description allow the position of this genus within the family to be determined. In fact, the pronotum of *Liassocupes* is no more rounded than in the nearest genus *Omma*. *Liassocupes* may be placed in Ommatini on account of the contiguous fore coxae (not separated by prosternal process) and flat abdominal ventrites (without raised posterior margin overlapping the next ventrite).

Liassocupes (?) maculatus Whalley was provisionally assigned to the genus. It is indeed an elytron of a cupedid beetle, but it is devoid of a specific character of the type species, the rows of large tubercles along the main veins. Owing to the large number of cells in the row, it is more similar to the elytra of *Omma* or *Tetraphalerus*. However, it has a broader epipleural border unknown in the above genera but characteristic of members of the tribe Brochocoleini. Earlier, this tribe was considered to be monotypic; in this paper, *Tetraphalerites oligocenicus* Crowson, 1962 is transferred here. However, the latter genus is Cenozoic, and beetles with an abdominal structure like *Tetraphalerites* are unknown among Mesozoic Brochocoleini. Therefore, it seems possible to assign the *L. maculatus* holotype to the genus *Brochocoleus* Hong, 1982 (see below).

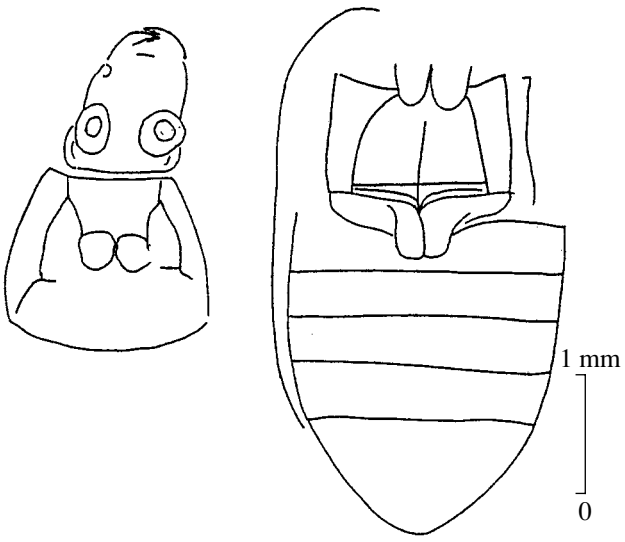


Fig. 1. *Liassocupes parvus* Zeuner, 1962, holotype NHM, In. 64008; England, Charmouth; Sinemurian.

Liassocupes? giganteus is also known from an isolated elytron. Contrary to the description, it has no specific characters of cupedids or taldycupedids. This elytron most probably belongs to a schizophoroid and is considered below in this group. Thus, *Liassocupes? giganteus* Whalley 1985 should be excluded from the genus *Liassocupes*.

In the Lower Jurassic (Newark Group, Towneco Formation) of Roseland Quarry, Essex, New Jersey, USA, a small (ca. 5 mm long) elytron (Peabody Museum, Yale, no. 35964) was found, which is very similar to that of *Liassocupes parvus*, but (so far as is visible on the photograph) differs in the somewhat entangled puncture rows on veins.

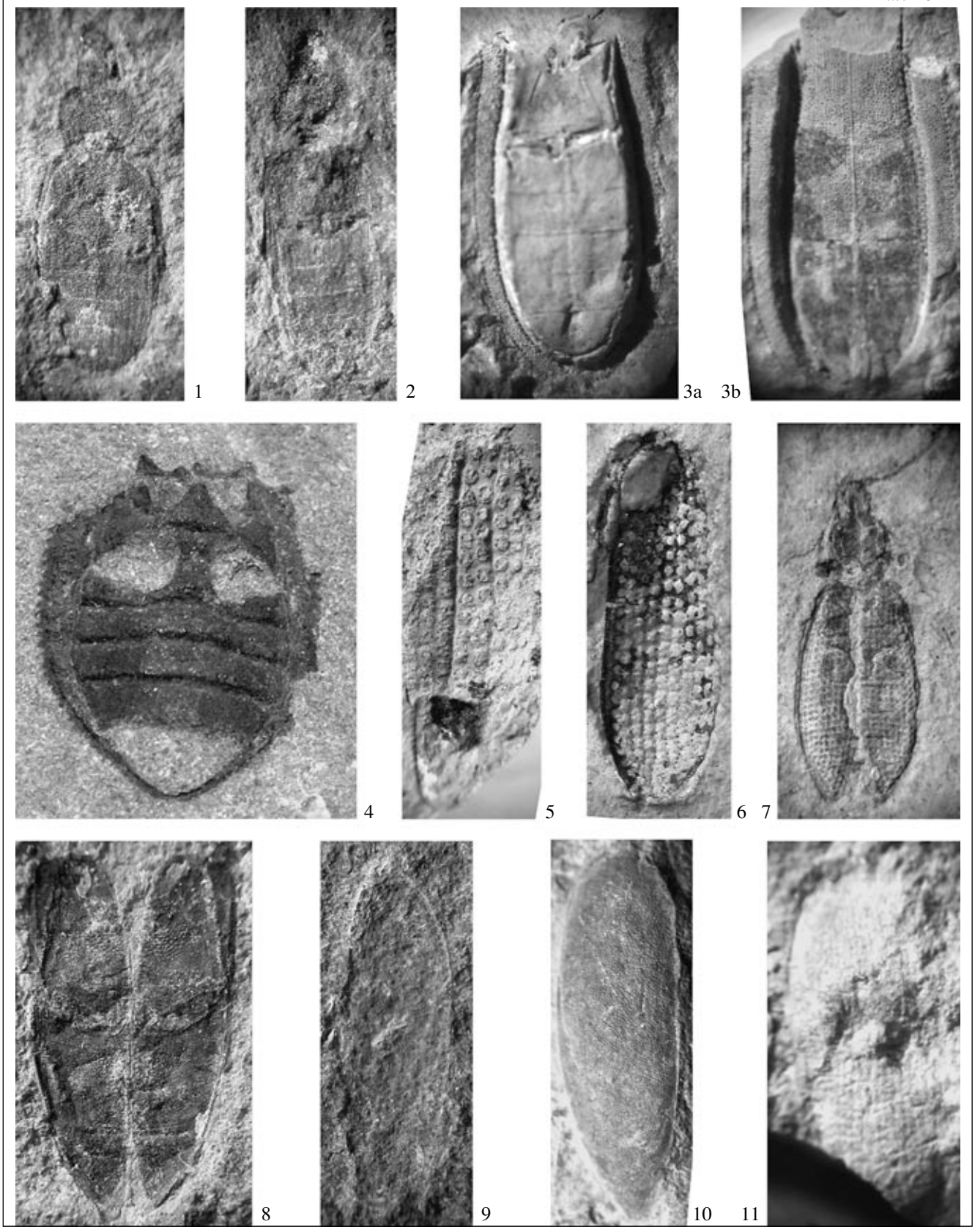
Liassocupes parvus Zeuner, 1962

Liassocupes parvus: Zeuner, 1962, p. 167, pl. 27, fig. 4; Whalley 1985, p. 166, text-figs. 63 and 64.

Holotype. NHM, In. 64008, head, prothorax, and rest of the body (legs missing); England, Dorset, Charmouth, Black Ven; Upper Sinemurian, *obtusum* Zone, Flatstones.

Description (Fig. 1). The head is somewhat longer than wide; the genae are long; the interocular distance is half the eye diameter; the temples are one-third of the length of the eyes. The prothorax is somewhat shorter than its width; its posterior and lateral margins are rounded; the prosternum is half the width of the pronotum. The fore coxae are small, rounded.

Plate 10



Explanation of Plate 10

Figs. 1 and 2. *Omma liassicum* Crowson, 1962, ×2.5: (1) holotype NHM, In. 11095; England, Brown's Wood; (2) paratype NHM, In. 11070; England, Binton; Upper Sinemurian.

Fig. 3. *Tetraphalerites oligocenicus* Crowson, 1962, holotype NHM, In. 8611, ×8.8: (3a) part and (3b) counterpart; England, Isle of Wight, Gurnet Bay; Upper Eocene or Lower Oligocene.

Fig. 4. *Blapsium egertoni* Westwood, 1854, holotype NHM, In. 34379, ×2; England, Stonesfield; Bathonian.

Fig. 5. *Zygadenia tuberculata* (Giebel, 1856), holotype NHM, In. 11959, ×5.8; England, Durlston Bay; Berriasian.

Fig. 6. *Zygadenia angliae* (Giebel, 1856), holotype NHM, In. 3523, ×12; England, Dinton; Berriasian.

Fig. 7. *Chalepocarabus elongatus* (Brodie, 1845), holotype NHM, In. 3527, ×10; England, Vale of Wardour; Berriasian.

Figs. 8 and 9. *Tersus crowsoni* sp. nov.: (8) holotype NHM, In. 53949, ×5.4; (9) paratype NHM, In. 51038, ×5.5; England, Charmouth; Sinemurian.

Fig. 10. *Mimema (?) giganteum* (Whalley, 1985), holotype NHM, In. 51026, ×3.2; England, Charmouth; Sinemurian.

Fig. 11. *Coleopteron rugosostriatum* (Giebel, 1856), holotype NHM, In. 11959, ×10; England, Vale of Wardour; Berriasian.

The metaventrite is shorter than its width, half as wide along the anterior margin as along the posterior margin; its lateral margins are rounded. The last abdominal ventrite is triangular, twice as long as the penultimate one. The elytron is widest posterior to its midlength; its cells are small, numerous (about 40). The intermediate veins are not much narrower than the main ones, these latter have large tubercles arranged in regular rows, tubercles on the intermediate veins are smaller and irregularly distributed. The epipleural border is narrow, not cellulate.

Measurements in mm: beetle length, about 8; elytron length, 4.8–5.0; elytron width, 1.2.

Material. In addition to the holotype, an isolated elytron NHM, In. 49210 from the same locality was assigned to this species by Whalley. In addition, there is a beetle mentioned by Whalley as "Species 12, In. 59132, cf. *Omma liassica* Crowson, from the Upper Lias, Warwickshire (fig. 81)." According to the caption to text-fig. 81, its size is 7.7 mm. It is too small for a specimen of *O. liassica*, and is similar in elytron structure to *Liassocupes* rather than to *Omma.* This specimen may belong to a large *L. ?arvus* or, more probably, to a new species of this genus.

Genus *Omma* Newman, 1839

Omma liassicum Crowson, 1962

Plate 10, figs. 1 and 2

Omma liassica: Crowson, 1962, p. 153, pl. 3, figs. 1–3; Ponomarenko, 1969, p. 103.

Holotype. NHM, In. 1095, Brodie collection; body without legs and antennae; England, Warwickshire, Brown's Wood; Lower Liassic.[1]

Description (Fig. 2). The necklike constriction is marked and abrupt (the head there just over half the width as at the temples). The pronotum is nearly twice as wide as long.

Measurements in mm: beetle length, about 15; elytron length, 9–10.

Comparison. Distinct from all extinct species of the genus in the marked necklike constriction, and from extant congeners in the short prothorax.

Discussion. The oldest genus among living beetles. Specimens assigned to *O. liassicum* are known from the Lower Jurassic and terminal Triassic of England. Surprisingly, in the head structure this earliest species of the genus is more similar to its modern than its ancient congeners.

Material. In addition to the holotype and paratype (NHM, In. 11070), seven additional, more or less incomplete specimens are assigned to the species. Possibly, they belong to different species. Thus, the

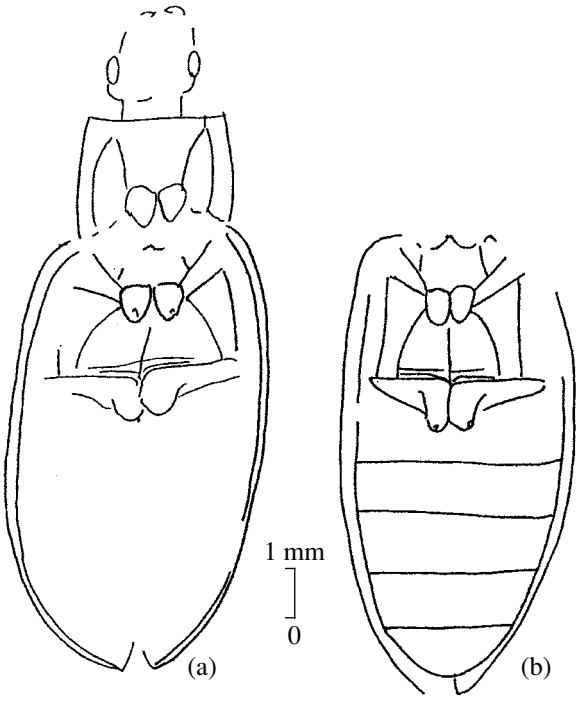


Fig. 2. *Omma liassicum* Crowson, 1962: (a) holotype NHM, In. 11095; England, Brown's Wood; (b) paratype NHM, In. 6679; England, Binton; Upper Liassic.

[1] All the material assigned to this species was described as originating from the Lower Liassic. Now some of these localities are dated Rhaetian. The exact stratigraphic position is not known for all specimens, so the original indication of the stratigraphic position is given.

holotype and specimen NHM, In. 6679 differ in metathoracic structure (Fig. 2).

Tribe Brochocoleini Hong, 1982

Genus *Brochocoleus* Hong, 1982

Brochocoleus maculatus (Whalley, 1985)

Liassocupes maculatus: Whalley, 1985, p. 167, text-fig. 66.

Holotype. NHM, In. 49577, Brodie collection, isolated elytron; England, Dorset, Charmouth, Black Ven; Upper Sinemurian, *obtusum* Zone, Flatstones.

Description. The elytron is widest in the distal third. The epipleural border is wide, with obscure, large cells margined with tubercles. The elytral veins bear irregular rows of relatively small tubercles.

Measurements in mm: elytron length, 12.5; width, 4.3

Discussion. The reasons to exclude *L. maculatus* from the genus *Liassocupes* and to assign it to the genus *Brochocoleus* are given above. Elytral characters are insufficient for reliable comparison of the species with its congeners. Remaining species of the genus are known only from Central and eastern Asia, no one beetle species in common is found between these faunas and those of England, so it is apparently a separate species and, if it is already named, there is no reason to consider it as *Brochocoleus* sp.

Material. Holotype and paratype NHM, In. 59133. Paratypes NHM, In. 53949 and 59038 do not belong to Cupedidae: these are beetles of the genus *Tersus* (Schizophoridae) (see below). Among beetles in the collection of Dr. R. Coram from the Purbeck stratotype, Durlston Bay, there are several isolated elytra (and no more complete specimens) that are possibly congeneric with *Brochocoleus*.

Genus *Tetraphalerites* Crowson, 1962

Tetraphalerites: Crowson, 1962, p. 154.

Type species. *Tetraphalerites oligocenicus* Crowson, 1962, Upper Eocene–Lower Oligocene, Isle of Wight, England, by monotypy.

Diagnosis. Metaventrite longer than wide along its posterior margin. Elytral veins almost invisible. Abdomen broadened towards third ventrite and tapering from base of fourth ventrite; posterior ventrite but slightly longer than penultimate one.

Species composition. Monotypic genus.

Comparison. Distinct from the type genus in the abdomen broadened towards the midlength, with a short last ventrite.

Discussion. The genus was described as similar in all respects to the genus *Tetraphalerus*, but possessing the elytral structure completely dissimilar to all cupedids. Since then, fossil cupedids became known with elytra lacking clear veins and with a wide epipleural border. The latter character, unique to Brochocoleini, allows *Tetraphalerites* to be placed in this tribe.

Tetraphalerites oligocenicus Crowson, 1962

Plate 10, fig. 3

Tetraphalerites oligocenicus: Crowson, 1962, p. 154, pl. 4, figs. 6 and 7.

Holotype. NHM, In. 8611, Brodie collection, body without head, pronotum and legs; England, Hampshire, Isle of Wight, Gurnet Bay; Upper Eocene or Lower Oligocene, Bouldnor Formation, Bembridge Marl Member.[2]

Description. The metaventrite is as long as wide along the posterior margin, its lateral margins are straight. The base of the fourth abdominal ventrite is distinctly wider than that of the first; the first and last ventrites are equal in length, one-third longer than others. The elytron is widened in the apical third; veins and cells are scarcely visible on the disc, but clearly traceable on the lateral, vertical area of the elytron. The epipleural border is almost one-third of the width of the whole elytron, and bears conspicuously larger tubercles than on the disc. Posterior two thirds of the elytron have large dark spots.

Measurements in mm: elytron length, about 8.5; width, 2.0; abdomen length, 4.6.

Material. Holotype.

Tribe Notocupedini Ponomarenko, 1966

Genus *Blapsium* Westwood, 1854

Blapsium: Westwood, 1854, p. 393; Handlirsch, 1906–1908, p. 546.

Blapsidium Phillips, 1871, p. 173.

Type species. *Blapsium egertoni* Westwood, 1854, Middle Jurassic of England, by monotypy.

Diagnosis. Very convex and broad beetle. Metaventrite very short, possibly the beetle was apterous. Abdomen markedly convex, with short ventrites, overlapping one another.

Species composition. Type species.

Comparison. In the broad body, the genus described is most similar to *Eurydictyon* Ponomarenko, 1969, but distinct in the very short metaventrite.

Discussion. The beetle is placed in the cupedid family owing to the metepimera reaching the midcoxal cavities and characteristic tuberculate integument, and in the tribe Notocupedini on account of the abdomen structure with characteristic relief.

Blapsium egertoni Westwood, 1854

Plate 10, fig. 4

Blapsium egertoni: Westwood, 1854, p. 393, pl. 14, fig. 13; Handlirsch, 1906, p. 546, pl. 45, fig. 19.

Blapsidium egertoni: Phillips, 1871, p. 173.

[2] In the original description, it was stated that the holotype was collected in the underlying Bembridge Limestone, but, in opinion of Dr. E. Jarzembowski, this is a mistake, because the latter bed yielded no insects and the rock of the holotype corresponds to the Bembridge Marl.

Holotype. NHM, In. 34379, body without head, pronotum, or legs; England, Oxfordshire, 8 km northeast of Witney, near the village of Stonesfield; Bathonian, Taunton Limestone Formation, Stonesfield Slate.

Description (Fig. 3). A large beetle, only about twice as long as wide. The body surface is densely covered with large tubercles. The metepimera are triangular, widened forwards. The mid coxae are large, contiguous. The metaventrite is four times as wide as long, with distinct longitudinal, paracoxal, and trochantinal sutures. The hind coxae are transverse, completely separating the abdomen from the thorax. The abdomen tapers at the base; the ventrites are uneven, depressed anteriorly and each overlapping the next with its raised posterior edge; the last ventrite is twice as long as the penultimate one.

Measurements in mm: beetle length, about 40; width, 20; elytron length, about 30; length as preserved, 26.

Material. Holotype. Among rather numerous beetles collected in the type locality, there are no other specimens of this species.

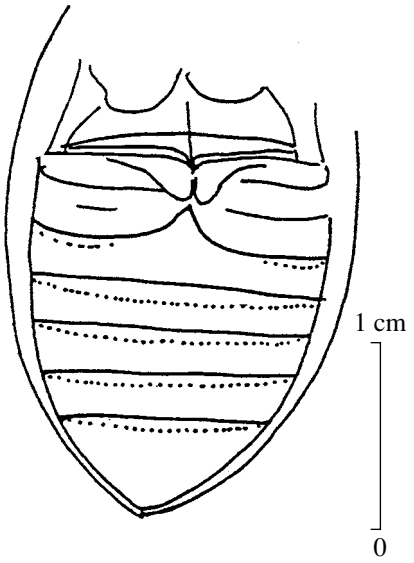


Fig. 3. *Blapsium egertoni* Westwood, 1854, holotype NHM, In. 34379; England, Oxfordshire, Stonesfield; Bathonian, Stonesfield Slate.

Genus *Zygadenia* Handlirsch, 1906

Innominatus: Brodie, 1845, p. 32; Westwood, 1854, p. 395.

Camtodontus: Giebel, 1856, pp. 56, 65.

Curculionites: Giebel, 1856, p. 148.

Zygadenia: Handlirsch, 1906, p. 55; Ponomarenko, 2000, p. S317.

Kakoselia: Handlirsch, 1906, p. 561, syn. nov.

Notocupes: Ponomarenko, 1964, p. 61; 1965, p. 141; 1966, p. 53; 1968, p. 120; 1969, p. 87; 1994, p. 87.

Sinocupes: Lin, 1976, p. 113, syn. nov.

Conexicoxa: Lin, 1986, p. 76, syn. nov.

Forticupes: Hong, 1990, p. 105, syn. nov.

Picticupes: Hong, 1990, p. 107, syn. nov.

Lupicupes: Ren, 1995, p. 74, syn. nov.

Type species. *Curculionites tuberculatus* Giebel, 1856, Lower Cretaceous of England, on primary monotypy.

Diagnosis. Head with longitudinal carinae and acute tubercles above eyes. Pronotum with flattened prominence split by longitudinal and transverse furrows in middle of disc; fore coxae contiguous. Metaventrite short. Abdominal ventrites overlapping tilelike next one; last ventrite not less than twice as long as penultimate one. Elytron relatively broad, convex. Four main veins nearly always well differentiated from intermediate ones, second and third ones connected before apex, common vein enters vein nearest to sutural margin; between veins two cell rows with 20–30 cells in row; epipleural border not very wide, with or without cell row. Elytral apex may have taillike process.

Species composition. More than 50 described species, known from the Triassic of Laurasia and Gondwana, later only in Laurasia. Isolated elytra are recorded from the Anisian to the Danian, more complete specimens, from the Carnian to the Turonian. Numerous species from China need reexamination. The genus is not known from the Lower Jurassic of England; three species occur in the Purbeck, and four occur in the Weald.

Comparison. Distinct from other genera of the tribe in the elongate body and elytral veins connected apically.

Discussion. The problems with the synonymy of the genera described based on isolated elytra and relatively complete beetle fossils were already discussed in the Introduction. Isolated elytra of this genus (Fig. 4) are easily recognizable owing to the elongate shape, large cells, and connection of the main veins; species differ in the structure of the head and pronotum and proportions of abdominal ventrites; elytra of different species are distinct almost exclusively in the structure of the epipleural border, but its peculiarities do not correlate with the body structure.

Zygadenia tuberculata (Giebel, 1856)

Plate 10, fig. 5

Innominatus: Brodie, 1845, p. 32, pl. 6, fig. 2; Westwood, 1854, p. 395, pl. 16, fig. 33.

Curculionites tuberculatus: Giebel, 1856, p. 148.

Zygadenia tuberculata: Handlirsch, 1906, p. 558, pl. 45, fig. 55; Jarzembowski, 1993, p. 179.

Holotype. NHM, In. 11959, incomplete elytron; England, Dorset, Durlston Bay; Berriasian, Lower Purbeck.

Description. The elytron is narrow. The main veins are raised, much higher than the zigzagged intermediate ones. Cells are large (some 20 cells in a row). The epipleural border is rather wide, with a cell row; the apex of the elytron is not taillike.

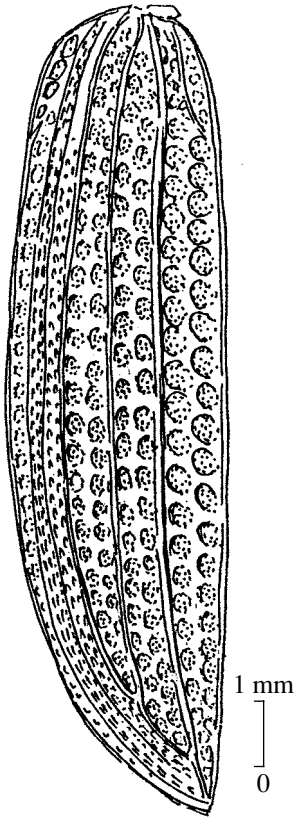


Fig. 4. Scheme of the elytron structure in *Zygadenia*.

Measurements in mm: beetle length, about 18; elytron length, 12–13; elytron width, 4.

Comparison. Distinct from its congeners of similar size in the broader epipleural border and larger cells of the elytron.

Material. Holotype. Apparently, numerous isolated elytra from the Purbeck and Weald of England belong to the same species.

***Zygadenia angliae* (Giebel, 1856)**

Plate 10, fig. 6

Innominatus: Brodie, 1845, p. 32, pl. 6, fig. 8.

Camtodontus angliae: Giebel, 1856, pp. 56, 65.

Kakoselia angliae: Handlirsch, 1906, p. 561, pl. 45, fig. 70.

Holotype. NHM, In. 3523, isolated elytron; England, Wiltshire, Dinton; Berriasian, Lower Purbeck.

Description. The elytron is narrow. The main veins are poorly differentiated from the weakly zigzagged intermediate ones. The cells are not large, some 25 cells in a row. The epipleural border is narrow, lacking cells; the apex of the elytron is not taillike.

Measurements in mm: beetle length, about 7; elytron length, 4–5.

Comparison. The smallest Cretaceous member of the genus, such size being previously known only in Jurassic beetles. Distinct from most small Jurassic species in the narrow epipleural border lacking cells, from *Z. picturata* (Ponomarenko, 1964) only in the somewhat larger size.

Material. In addition to the holotype, numerous very similar elytra in the Weald of southern England (localities Clockhouse, Smokejacks).

Subfamily Cupedinae Laporte, 1836

Tribe Mesocupedini Ponomarenko, 1964

Genus *Chalepocarabus* Handlirsch, 1906

Carabus: Brodie, 1845, p. 115.

Chalepocarabus: Handlirsch, 1906, p. 546.

Omma (?): Crowson, 1962, p. 154.

Cupedidae incertae sedis: Ponomarenko, 1969, p. 102.

Type species. *Carabus elongatus*: Brodie, 1845; Berriasian of England, Purbeck, by monotypy.

Diagnosis. Small terete beetle, head slightly longer than wide, with large tubercles between eyes and acute ones beyond eyes. Antenna longer than head and prothorax combined, filiform, second and third segments subequal. Prothorax transverse. Fore coxae separated by rather short prosternal process. Metaventrite transverse. Abdomen tapering from base of third ventrite and rounded apically, last ventrite short. Elytron widest posterior to midlength, with numerous cells, main veins poorly differentiated from intermediate ones.

Species composition. Monotypic genus.

Comparison. *Chalepocarabus* is most similar to the genus *Mesocupes* Martynov, 1926, differing in the acute tubercles posterior to the eyes, the elytra widest posterior to the midlength, and short last ventrite.

Discussion. The name was originally introduced without description and, according to Crowson (1962), became valid due to the figure by J.O. Westwood published in the same paper. Crowson (l.c.) assigned this species with some reservations to the genus *Omma*, from which it was later excluded (Ponomarenko, 1969) without examination of the type. On account of the structure of the prothorax and abdomen, it should be placed in the tribe Mesocupedini.

***Chalepocarabus elongatus* (Brodie, 1845)**

Plate 10, fig. 7

Carabus elongatus: Brodie, 1845, p. 115, pl. 2, fig. 1.

Chalepocarabus elongatus: Handlirsch, 1906, p. 546, pl. 45, fig. 21.

Omma (?) elongata: Crowson, 1962, p. 154, pl. 4, fig. 9.

Holotype. NHM, In. 3527, nearly complete beetle; England, Wiltshire, Vale of Wardour; Berriasian, Lower Purbeck.

Description (Fig. 5). The head is narrowed almost from the base; the genae are longer and the temples are shorter than the eyes. The eyes are on the sides of the head. The pronotum is slightly shorter than wide

at the base, with sides rounded. The prosternal process is about as wide as the coxa. The width of the metaventrite at its posterior margin is 1.5 times its length, and twice as wide as at the anterior margin, with the lateral margins rounded. The last abdominal ventrite is 1.4 times as long as the penultimate one. The elytron is widest posterior to the midlength, its main veins are scarcely higher than intermediate ones, and the cells are small (about 35 cells in a row). The epipleural border lacks cells and bears large tubercles.

Measurements in mm: beetle length, 6.5, antennae, 2.0; elytron length, 4.0; elytron width, 1.6.

Material. Holotype. Similar elytra are known only from the Lower Weald Clay Formation (Hauterivian) of Keymer tile works, Burgess Hill, Western Sussex, England (Booth Museum, nos. 020430, 020459(60)), although there is a considerable time difference between these finds.

Superfamily Schizophoroidea Ponomarenko, 1968

Family Schizophoridae Ponomarenko, 1968

Genus *Tersus* Martynov, 1926

***Tersus crowsoni* Ponomarenko, sp. nov.**

Plate 10, figs. 8 and 9

Liassocupes maculatus: Whalley, 1985, p. 167, text-fig. 66.

Etymology. The species is named in honor of the eminent coleopterist Roy A. Crowson.

Holotype. NHM, In. 53949, body without head, pronotum, or legs; England, Dorset, Charmouth, Black Ven; Upper Sinemurian, *obtusum* Zone, Flatstones.

Description (Fig. 6). A concave, rather elongate beetle. The metepisterna are markedly widened anteriorly, reaching the coxal cavities. The metaventrite is twice as wide as long. The paracoxal suture is not interrupted medially and displaced anteriorly towards the longitudinal one. The hind coxae are large, three times as wide as long. The abdomen tapers from the base; the last ventrite is twice as long as the penultimate one. The integument is densely covered with tubercles, the metaventrite anteriorly with much larger and sparser tubercles, the abdominal ventrites are densely tuberculate.

Measurements, in mm: beetle length, about 16; elytron length, 12; elytron width, 3.

Comparison. The new species is distinct from its congeners in the paracoxal suture not being interrupted medially.

Discussion. As mentioned above, the specimen in question was transferred from the genus *Liassocupes* and family Cupedidae to the genus *Tersus* on account of the characteristic metaventrite structure with very large tubercles and the paracoxal suture displaced anteriorly.

Material. In addition to the holotype, there is an isolated elytron (NHM, In. 59038), designated by P. Whalley as a paratype of *Liassocupes maculatus*, that owing to the size and overall similarity to the elytra of the holotype of *Tersus crowsoni*, may belong to a beetle of this species. An isolated elytron, listed by Whalley among the material of *Liassocupes maculatus*, but not included as a paratype, possibly belongs to the same species.

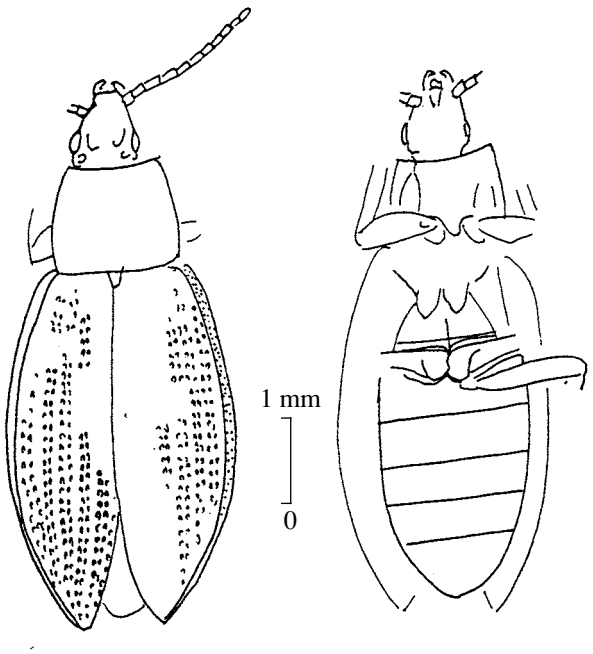


Fig. 5. *Chalepocarabus elongatus* (Brodie, 1845), holotype NHM, In. 3527; England, Vale of Wardour; Berriasian.

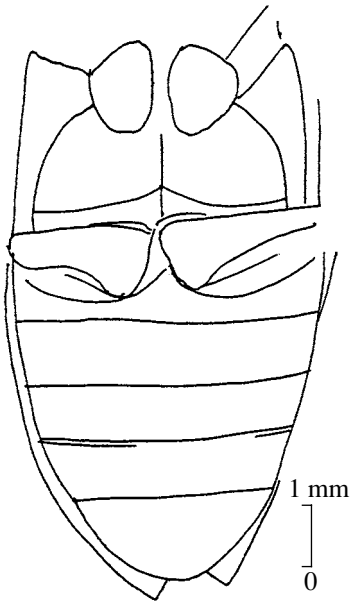


Fig. 6. *Tersus crowsoni* sp. nov., holotype NHM, In. 53949; England, Charmouth; Sinemurian.

FORMAL FAMILY SCHIZOCOLEIDAE ROHDENDORF, 1961

The family was proposed for isolated elytra with a tuberculate integument without cell traces bearing the "schiza", a slitlike depression on the lateral part of the elytral disc. In a nonfossilized elytron this structure apparently represented a prominence on the underside for coupling the elytron with the lateral edge of the abdomen. Such a locking device is known in some living water beetles. Among ancient beetles, this structure is found in the families Schizophoridae and Catiniidae, and also in some aquatic Adephaga, but the latter have no tuberculate integument characteristic of Archostemata.

The elytron described as *Liassocupes (?) giganteus* Whalley, 1985 can scarcely be attributed to the genus *Schizocoleus* Rohdendorf, that unites small elytra of flattened Permian beetles, whereas the elytron in question belonged to a large, markedly convex beetle. Among the isolated elytra described from the English Lias, there are no taxa to accommodate the species discussed, but, so far as one can judge from the figures and descriptions by Westwood, the genus *Mimema* Handlirsch, 1906 from the Middle Jurassic Stonesfield Slate may be used for it, which will then be treated as a formal taxon to unite isolated elytra.

Genus *Mimema* Handlirsch, 1906

***Mimema (?) giganteum* (Whalley, 1985)**

Plate 10, fig. 10

Liassocupes giganteus: Whalley, 1985, p. 167, text-fig. 67.

Holotype. NHM, In. 51026, isolated elytron; England, Dorset, Charmouth, Black Ven; Upper Sinemurian, *obtusum* Zone, Flatstones.

Description. The elytron is rounded basally and acute apically. The sutural margin is markedly convex, indicating the beetle was terete, quite strongly convex. The sutural and epipleural borders are narrow. The "schiza" is short and narrow. The surface of elytron is covered with subcontiguous, rather large tubercles.

Measurements in mm: beetle length, about 30; elytron length, 21.4; elytron width, 7.8.

Material. Holotype.

Remarks. As mentioned above, isolated elytra are quite numerous and were repeatedly described as belonging to the beetles of different modern families. Now we can be sure that they do not belong there, but there are no acceptable schemes for their classification. The situation is obstructed because the structure of the fossil elytron depends very strongly on the mode of preservation (Ponomarenko, 1969). Thus, the elytron illustrated in Pl. 10, fig. 11 probably looked, in life, very similar to the elytron on Pl. 10, fig. 10, whereas their fossil remains appear completely different. This specimen from the Purbeck of the Vale of Wardour was illustrated by Brodie (1845, p. 32, pl. 6, fig. 2). Later, it was named *Tenebrio rugosostriatum* Giebel, 1856 (p. 169). Handlirsch (1906, p. 567) agreed that the fossil looks like a "small *Tenebrio*", but named it *Coleopteron rugosostriatum* (Giebel, 1856). Several other Purbeck fossils: *Curculium syrichtum* Westwood, 1854, *Halticophana westwoodi* Westwood, 1854, *Epomenus rugosus* Handlirsch, 1906, *Ctenicerium valgus* Westwood, 1854 may also be elytra of this type.

ACKNOWLEDGMENTS

I am deeply indebted to Dr E. Jarzembowski (Maidstone Museum and Bentlif Art Gallery) and Dr A.J. Ross (Curator of Fossil Arthropods, NHM) for opportunity to examine the important collections of fossil insects in the course of studies on Cretaceous insects of southern England (Royal Society project, coordinator Dr E. Jarzembowski) and later the studies of fossil fauna and flora of the Insect Bed on the Isle of Wight (INTAS project no. 03-51-4367, coordinator Dr A.J. Ross). The study was also supported by the program of the Russian Academy of Sciences "Biosphere Origin and Evolution."

REFERENCES

1. P. B. Brodie, *A History of Fossil Insects in Secondary Rocks of England* (London, 1845).
2. F. M. Carpenter, *Treatise on Invertebrate Palaeontology: Part R. Arthropoda 4*, Vol. 3: *Superclass Hexapoda* (Geol. Soc. Am. and Univ. Kansas, Boulder, 1992).
3. R. A. Crowson, "Observations on the Beetle Family Cupedidae with Descriptions of Two New Fossil Forms and a Key to Recent Genera," Ann. Mag. Natur. Hist. Ser. 13 **5** (51), 147–157 (1962).
4. C. C. Giebel, *Die Insecten und Spinnen der Vorwelt: Fauna der Vorwelt* (Leipzig, 1856), Vol. 2.
5. A. Handlirsch, *Die fossilen Insekten und die Phylogenie der rezenten Formen* (Leipzig, 1906–1908).
6. You-Chong Hong, *Mesozoic Fossil Insects of Jiuquan Basin in Gansu Province* (Geol. Publ. House, Peking, 1982).
7. E. A. Jarzembowski, "A Provisional Checklist of Fossil Insects from the Purbeck Beds of Dorset," Proc. Dorset Natur. Hist. Archaeol. Soc. **114**, 175–179 (1993).
8. Qi-bin Lin, "The Jurassic Fossil Insects from Western Liaoning," Acta Palaeontol. Sin. **15**, 97–116 (1976).
9. Qi-bin Lin, "Early Mesozoic Fossil Insects from South China," Palaeontol. Sin., Ser. B **21**, 1–112 (1986)
10. J. Phillips, *Geology of Oxford and the Valley of the Thames* (Claredon, London, 1871).
11. A. G. Ponomarenko, "New Beetles of the Family Cupedidae from the Jurassic Beds of the Kara-Tau," Paleontol. Zh., No. 2, 49–62 (1964).
12. A. G. Ponomarenko, "New Beetles of the Family Cupedidae from the Mesozoic Beds of Transbaikalia," Entomol. Obozr., No. 1, 138–143 (1965).

13. A. G. Ponomarenko, "Beetles of the Family Cupedidae from the Lower Triassic of Central Asia," Paleontol. Zh., No. 4, 47–68 (1966).

14. A. G. Ponomarenko, "Archostemata Beetles from the Jurassic of the Kara-Tau," in *Jurassic Insects of the Kara-Tau* (Nauka, Moscow, 1968), pp. 118–138 [in Russian].

15. A. G. Ponomarenko, *Historical Development of the Archostemata Coleoptera* (Nauka, Moscow, 1969) [in Russian].

16. A. G. Ponomarenko, "New Beetles of the Family Cupedidae from the Mesozoic of Mongolia: Brochocoleini and Notosuredini," Paleontol. Zh., No. 3, 83–93 (1994).

17. A. G. Ponomarenko, "Beetles of the Family Cupedidae from the Lower Cretaceous Locality Semen, Transbaikalia," Paleontol. J. **34** (Suppl. 3), 317–322 (2000).

18. Dong Ren, "Fossil Insects," in *Faunae and Stratigraphy of Jurassic–Cretaceous in Beijing and Adjacent Area* (Seismic Publ. House, Beijing, 1995), pp. 47–121, 181–197.

19. J. O. Westwood, "Contributions to Fossil Entomology," Quart. J. Geol. Soc. London **10**, 378–396 (1854).

20. P. E. S. Whalley, "The Systematic and Palaeogeography of the Lower Jurassic Insects of Dorset, England," Bull. Brit. Mus. Natur. Hist., Ser. Geol. **39** (3), 107–189 (1985).

21. F. E. Zeuner, "Fossil Insects from the Lower Lias of Charmouth, Dorset," Bull. Brit. Mus. Natur. Hist., Ser. Geol. **7** (5), 155–171 (1962).