

## Division ENDOPTERYGOTA

Sharp, 1899

[Endopterygota SHARP, 1899, p. 248]

Immature stages (larvae) very different in form from the adults, typically living in equally different environments (except for social species), and feeding on distinctly different foods. Wings developing in an inactive pupal stage. *Perm.—Holo.*

Nine orders are usually recognized in this division, comprising nearly 88% of the existing species of insects. The relationships between certain of the orders (Hymenoptera, Trichoptera, Lepidoptera, Mecoptera, Siphonaptera, and Diptera) seem to be clear, but those of the remaining orders are uncertain (see Fig. 10). Only one extinct order, Glosselytrodea, is included in the Endopterygota.

## Order COLEOPTERA

Linné, 1758

[Coleoptera LINNÉ, 1758, p. 339]

Minute to large insects. Head strongly sclerotized and rigid, frequently recessed beneath pronotum. Antennal structure diverse, commonly with 11 segments, but ranging from 1 to 30 throughout the order; antennae frequently filiform, although all types (for example, geniculate, pectinate, clavate) occur; sexual dimorphism of antennae common. Mouthparts mandibulate, with few modifications except for sexual dimorphism of mandibles and rare fusion of labrum with clypeus. Prothorax well developed and usually freely movable (not rigidly attached to the mesothorax); pronotum diversely formed, commonly extending anteriorly over base of head, and usually with a marginal lateral carina.

In the more generalized suborders, Archostemata and Adephaga, the pronotum is clearly separated from the propleura by notopleural sutures, but in the Polyphaga those sutures are not visible. The prosternum is separated from the rest of the prothorax in the Archostemata, Adephaga, and most

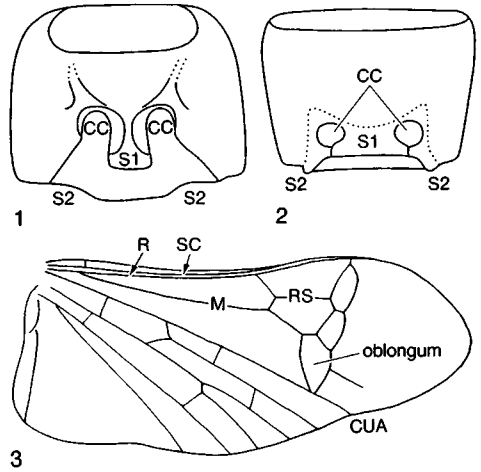


FIG. 173. Coleoptera; the open and closed coxal cavities and the hind wing (S1, prosternum; S2, mesosternum; CC, coxal cavity).—1. Diagram of a prosternum of *Thortus* sp., Cryptophagidae, with open coxal cavities (courtesy of Richard Leschen).—2. Diagram of a prosternum of *Loemophloeus* sp., Loemophloidae, with closed coxal cavities (courtesy of Richard Leschen).—3. Diagram of hind wing of *Priacma serrata* LE CONTE, Archostemata, Cupedidae (after Atkins, 1958).

of the Polyphaga by the prosternal sutures. The structural relationship between the coxal cavities of the prothorax and the prosternum is variable. In some species the prothoracic sclerites extend around the coxae and posteriorly to them; in these species the coxal cavities are considered to be closed (Fig. 173,2). In other species the prothoracic sclerites do not extend so far posteriorly, and the sternites behind the coxae are mesothoracic; in these species the coxal cavities are considered to be open (Fig. 173,1). The mesothorax and metathorax are not visible from above, except for the mesoscutellum, a small sclerite just posterior to the pronotum.

Legs typically cursorial, but sometimes fossorial and usually modified for swimming in aquatic species; coxae usually globose, but commonly elongate laterally; in some species, hind coxae are broad, flat plates that may cover part of femora; trochanters usually small; femora and tibiae of all legs usually similar in cursorial species; tarsi normally with

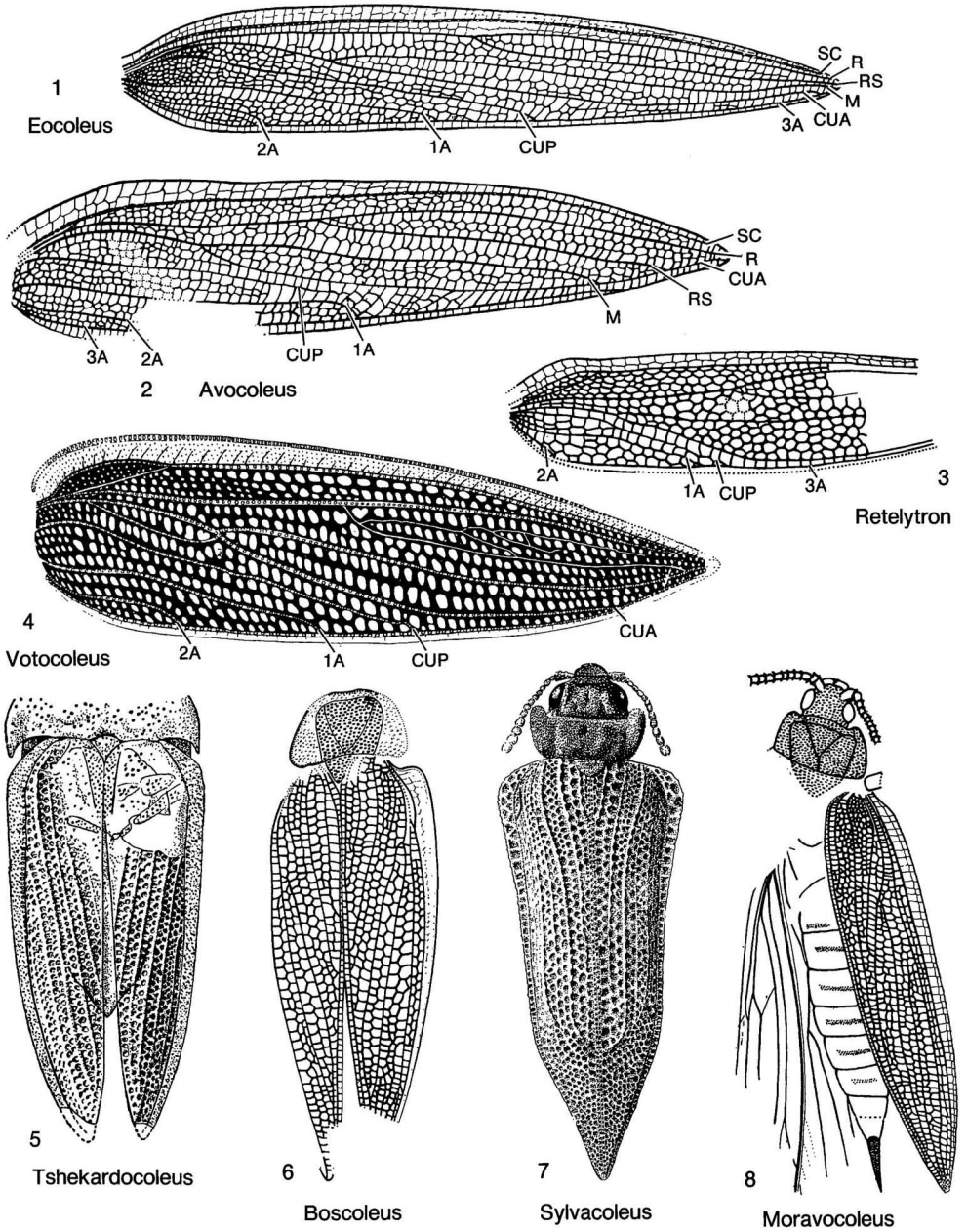


FIG. 174. Tshekardocoleidae (p. 283).

5 segments, but with 4 or less on one or more pairs of legs in a few families. Fore wings modified to rigid or semirigid elytra that fit over abdomen at rest, the sutural edges commonly meeting along medial line of body.

Elytra of the Archostemata, especially of

Permian species, have a definite venational pattern, the veins apparently being homologous with those of other insects (Fig. 174, 1). Elytra of the Adephaga and Polyphaga commonly have distinct longitudinal striae, some of which appear to correspond to the veins

of the Archostemata. Hind wings are membranous and at rest are usually folded both transversely and longitudinally beneath the elytra. The venational pattern in the hind wings has obviously been modified in relation to the folding, but the veins can apparently be homologized with those of other insects (Fig. 173,3). Veins C, SC, and R are close to the costal margin; CUA is well developed, along with several anal veins; M is commonly present, though weak (PONOMARENKO, 1969b). Ten abdominal segments are usually present, but segments 9 and 10 and the sternites of segments 1 and 2 are commonly modified and much reduced.

Most coleopterous larvae have a well-developed and heavily sclerotized head, 3 distinct thoracic segments, and usually 10 abdominal segments. The most generalized larvae, such as those of the Adephaga, are campodeiform and have a prognathous head, well-developed thoracic legs, and a pair of long, segmented processes (urogomphi) at the end of the abdomen. The eruciform, scarabaeiform, and apodous larvae among the Polyphaga clearly represent adaptations to the diverse environments in which development takes place. Pupae are commonly exarate and usually occur in soil or wood.

Environments and food of beetles are very diverse. Most larvae of the existing Archostemata and Polyphaga are phytophagous or saprophagous; those of the Adephaga are chiefly predaceous. *Perm.—Holo.*

Coleoptera comprise not only the largest order of the Insecta but the largest order within the animal kingdom. Estimates of the number of described species now existing exceed 300,000, comprising about 40 percent of the known insect fauna. The geological record indicates that they have held that dominant position in the Insecta since the early Jurassic (PONOMARENKO, 1969b; LAURENTIAUX, 1953).

Division of the order into three suborders, Archostemata, Adephaga, and Polyphaga, has been generally accepted since about the beginning of the present century. A fourth suborder, Myxophaga, tentatively proposed

by CROWSON (1967) for 4 small families, consists of species having a combination of certain features of the Adephaga and Archostemata; it has no geological record. In the recent fauna the Archostemata is the smallest suborder, including only 3 or possibly 4 families; the Adephaga is a larger and more diverse group, consisting of 11 families; the Polyphaga, by far the largest suborder, includes well over 100 families, which are usually grouped into 6 infraorders or series and about 20 superfamilies (CROWSON, 1981; LAWRENCE & NEWTON, 1982). The positions of many families within this hierarchy of the Polyphaga are by no means agreed upon by all students of the Coleoptera, and the placement of the extinct families of Polyphaga is even more uncertain. In the present treatment of the fossil Coleoptera the infraorders and superfamilies are omitted, and the sequence of families follows that of BRITTON (1970).

The most obvious and characteristic feature of the Coleoptera is the modification of the fore wing to a thick elytron. In the Archostemata, especially in Permian forms, the elytra show a distinct venational pattern, but in the Adephaga and Polyphaga no venation, at least as such, exists. For most of the Coleoptera, therefore, the main source of characters present in nearly all other fossil insects is eliminated (DARLINGTON, 1929, 1969). The classification of Coleoptera into suborders and families is based mainly on the presence and positions of certain sutures between sclerites and on details of such structures as antennae, mouthparts, coxae, and tarsi—details that are not usually preserved in fossil insects, except those in amber. Most fossil Coleoptera consist of isolated elytra or parts of elytra combined with crushed portions of the head and thorax. Nearly all beetles described from Mesozoic and Tertiary beds of Europe during the last century are very poorly preserved, and, with some exceptions, all were placed in recent genera that seemed to have similar body form. HANDLIRSCH (1906b, 1907, 1908a) made new generic names for the Mesozoic species,

although he was not able to assign them to families. These genera are cited below in the category Suborders and Families Uncertain.

A similar situation exists regarding the Tertiary Coleoptera described from North America in the early part of this century. SCUDDER and COCKERELL, who were excellent entomologists but not specialists in the Coleoptera, described many Tertiary species and assigned most of them to recent genera. WICKHAM, who was in fact a coleopterist and who described more fossil Coleoptera than all others combined, attempted to make the generic determinations within all families of the order. Subsequent examination of the type specimens by individuals specializing in the recent families concerned, however, indicates that on the average fully 90 percent of these extinct species either do not belong to the genera in which they have been placed or could equally well be assigned to several other genera. The very dubious records of such recent genera are cited below in the category Recent Genera of Coleoptera with Doubtfully Assigned Species.

In spite of the problems due to poor preservation of the fossils, the geological history of the Coleoptera is probably as extensive as that of such other large orders of insects as the Hymenoptera and Diptera. This is mainly due to the very large collections of pre-Tertiary beetles obtained by the staff of the Paleontological Institute of the Academy of Sciences in the Soviet Union and in particular to the monographs based on these collections by A. G. PONOMARENKO.

The archaic nature of the Archostemata is clearly supported by the geological records. The oldest known Coleoptera are from Permian beds, and all of these belong or could belong to the Archostemata: thirty genera in five families, all extinct. The known Triassic Coleoptera are mostly Archostemata also, some belonging to the existing family Cupedidae. In the Early Jurassic the Archostemata continued to be diverse, though less so; the family Cupedidae is represented by many genera, including the recent *Omma* and

*Tetraphalerus*. By the Late Jurassic the Archostemata comprised only about 10 percent of the Coleoptera and were well on the way to becoming the relict fauna they now are.

The Adephaga are first found in the Triassic, in which they are represented by many aquatic forms. Their diversity increased greatly by the early Jurassic, with at least the recent families Carabidae and Trachypachidae being present. In the Middle Jurassic they were the dominant group of the Coleoptera, but they lost that status in the Late Jurassic and now hold a very secondary position.

The Polyphaga are first known from the Early Jurassic, in which they have small representation, including elateroids. By the middle of the Jurassic the diversity was much greater, including some staphylinoids; by the later Jurassic they were clearly the dominant suborder, a position they still hold. The Early Cretaceous forms were essentially like Cenozoic and modern species.

The presence of several families of Coleoptera in the Middle and Upper Permian suggests that the order arose in the very Early Permian at least, quite possibly in the Late Carboniferous, and in any case before the origin of the Hymenoptera and Diptera. However, the ancestral stock is unknown. The generally accepted hypothesis is that they were derived from primitive endopterygotes, possibly related to the sialoid Neuroptera, but at present there is no fossil evidence to support or to refute that view.

## Suborder ARCHOSTEMATA Kolbe, 1908

[Archostemata KOLBE, 1908, p. 246]

Prothorax with distinct notopleural sutures; hind coxae attached to metasternum, slightly movable, not dividing first visible abdominal sternite; all tarsi with 5 segments; antennae filiform; hind wing with a closed cell (oblongum) between veins M and CUA distally, and at resting position with distal part spi-

rally rolled. Larvae eruciform, with a distinct labrum and 5-segmented legs; wood boring. *Perm.—Holo.*

### Family TSHEKARDOCOLEIDAE Rohdendorf, 1944

[Tshekardocoleidae ROHDENDORF, 1944, p. 252] [=Uralocoleidae ZALESSKY, 1947, p. 857]

Small to medium-sized beetles. Antennae with 13 moniliform segments and at most only slightly longer than head and pronotum combined; fore coxae small, rounded, widely separated; mesothorax almost as long as metathorax; abdomen with 5 visible sternites; elytra usually much longer than abdomen; all main veins usually present, including R; RS with 1 or 2 branches directed posteriorly; hind wing little known; SC and R close together; folds present between M and CUA and between CUA and CUP. *Perm.*

**Tshekardocoleus** ROHDENDORF, 1944, p. 252 [\**T. magnus*; OD]. Elytron with M and CUA without common stem, or at most with very short stem; RS with 2 posterior branches; CUP extending to margin of elytron. PONOMARENKO, 1963a, 1977a. *Perm.*, USSR (Asian RSFSR).—FIG. 174.5. \**T. magnus*; elytra and pronotum,  $\times 3.8$  (Rohdendorf, 1944).

**Avocoleus** PONOMARENKO, 1969b, p. 51 [\**Moravocoleus fractus* KUKALOVÁ, 1969a, p. 145; OD]. Elytron slender with small cells; area between R and RS with 3 rows of cells. *Perm.*, Europe (Czechoslovakia).—FIG. 174.2. \**A. fractus* (KUKALOVÁ); elytron,  $\times 16$  (Kukalová, 1969a).

**Boscoleus** KUKALOVÁ, 1969a, p. 149 [\**B. blandus*; OD]. Elytron with coarsely reticulate venation; 2 rows of cells above distal half of RS; stem M+CUA short; CUP distinct only for length of common stem of M+CUA. PONOMARENKO, 1969b. *Perm.*, Europe (Czechoslovakia).—FIG. 174.6. \**B. blandus*; elytra and pronotum,  $\times 5.5$  (Kukalová, 1969a).

**Eocoleus** KUKALOVÁ, 1969a, p. 147 [\**E. scaber*; OD]. Elytron with stem M+CUA long; CUP extending to sutural ridge. PONOMARENKO, 1969b. *Perm.*, Europe (Czechoslovakia).—FIG. 174.1. \**E. scaber*; elytron,  $\times 6$  (Kukalová, 1969a).

**Moravocoleus** KUKALOVÁ, 1969a, p. 141 [\**M. permianus*; OD]. Elytron with stem M+CUA long and strongly curved; CUA and 2A convergent distally, separated by only 1 row of cells. PONOMARENKO, 1969b. *Perm.*, Europe (Czechoslovakia).—FIG. 174.8. \**M. permianus*; elytron and body,  $\times 9$  (Kukalová, 1969a).

**Prosperocoleus** KUKALOVÁ, 1969a, p. 152 [\**P. prosperus*; OD]. Elytron with similar to that of *Retelytron*, but M with a distinct posterior branch; CUP obsolete. PONOMARENKO, 1969b. *Perm.*, Europe (Czechoslovakia).

**Retelytron** KUKALOVÁ, 1965, p. 78 [\**R. conopeum*; OD]. Elytron with area between R and M broad; M without a distinct posterior branch; area between M and CUA broad near mid-elytron; 2A short. PONOMARENKO, 1969b. *Perm.*, Europe (Czechoslovakia).—FIG. 174.3. \**R. conopeum*; elytron,  $\times 10$  (Kukalová, 1969a).

**Sylvacoleodes** PONOMARENKO, 1969b, p. 56 [\**S. admirandus*; OD]. Elytron similar to that of *Sylvacoleus*, but CUA curved along sutural edge. *Perm.*, USSR (European RSFSR).

**Sylvacoleus** PONOMARENKO, 1963a, p. 73 [\**S. richteri*; OD]. Elytron with M and CUA without common stem; RS unbranched; 3 or less rows of cells between RS and M; CUA bent abruptly toward sutural edge of elytron. *Perm.*, USSR (European RSFSR).—FIG. 174.7. *S. sharovi*; elytron and body,  $\times 7.2$  (Ponomarenko, 1969b).

**Umoricoleus** KUKALOVÁ, 1969a, p. 148 [\**U. perplexa*; OD]. Elytron little known; RS area apparently narrow; stem M+CUA very long. PONOMARENKO, 1969b. *Perm.*, Europe (Czechoslovakia).

**Uralocoleus** ZALESSKY, 1947, p. 858 [\**U. splendens*; OD]. Little-known genus. Main veins of elytron apparently parallel to longitudinal axis of elytron. [Family assignment doubtful.] PONOMARENKO, 1963b, 1969b. *Perm.*, USSR (European RSFSR).

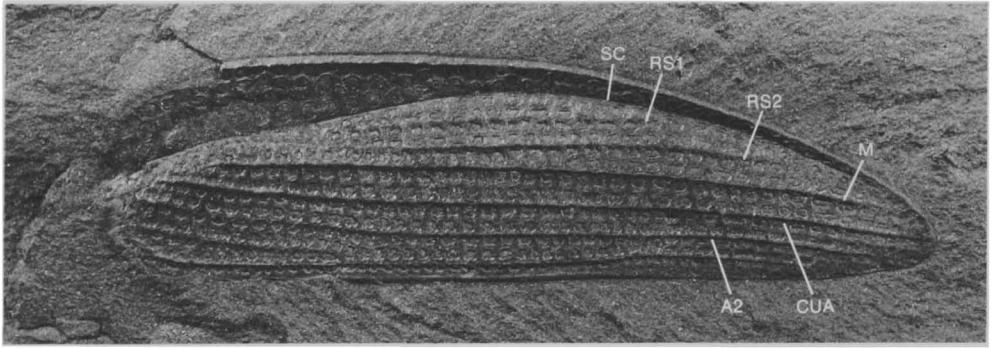
**Votocoleus** KUKALOVÁ, 1969a, p. 151 [\**V. submissus*; OD]. Similar to *Tshekardocoleus*, but CUP not extending to distal margin. PONOMARENKO, 1969b. *Perm.*, Europe (Czechoslovakia).—FIG. 174.4. \**V. submissus*; elytron,  $\times 8$  (Kukalová, 1969a).

### Family LABRADOROCOLEIDAE Ponomarenko, 1969

[Labradorocoleidae PONOMARENKO, 1969a, p. 307]

Similar to the Tshekardocoleidae, but vein CUP absent; all veins parallel to posterior elytral margin. *Cret.*

**Labradorocoleus** PONOMARENKO, 1969a, p. 309 [\**L. carpenteri*; OD]. Costal area narrowing to apex of elytron; 3A more than one-fourth length of elytron. *Cret.*, Canada (Labrador).—FIG. 175. \**L. carpenteri*; elytron,  $\times 9$  (Ponomarenko, 1969a).



**Labradorocoleus**

FIG. 175. Labradorocoleidae (p. 283).

**Family OBOROCOLEIDAE**

Kukalová, 1969

[Oborocoleidae KUKALOVÁ, 1969a, p. 155]

Similar to the Tshekardocoleidae, but veins CUA and M reduced; 1A long. *Perm.*

**Oborocoleus** KUKALOVÁ, 1969a, p. 155 [*\*O. rohdendorfi*; OD]. Elytron broad; costal margin strongly convex; CUA apparently absent. *Perm.*, Europe (Czechoslovakia).

**Liberocoleus** KUKALOVÁ, 1969a, p. 157 [*\*L. intactus*; OD]. Similar to *Oborocoleus*, but elytron narrow and costal margin nearly straight. *Perm.*, Europe (Czechoslovakia).

**Family PERMOCUPEDIDAE**

Martynov, 1933

[*nom. correct.* PONOMARENKO, 1963a, p. 72, *pro* Permocupidae MARTYNOV, 1933b, p. 85] [=Kaltanocoleidae ROHDENDORF, 1961b, p. 397]

Small to medium-sized beetles; usually elongate and flattened; elytron reticulate; most main veins clearly distinguishable, but RS absent; CUA arising independently of M; CUP usually present, sometimes indistinct; at least 4 rows of cells at base of cubital area between CU and R. *Perm.*

**Permocupes** MARTYNOV, 1933b, p. 85 [*\*P. semenovii*; OD] [=Permocupoides MARTYNOV, 1933b, p. 86 (type, *P. distinctus*)]. Elytron with R and M ending before apex; CUA and 2A coalesced before apex. PONOMARENKO, 1963b. *Perm.*, USSR (European RSFSR). — FIG. 176,6. *P. sojanensis* PONOMARENKO; elytron and body,  $\times 5$  (Ponomarenko, 1969b).

**Archicupes** ROHDENDORF, 1961b, p. 401 [*\*A. jacobsoni*; OD] [=Palaeocupes ROHDENDORF, 1961b, p. 404 (type, *P. kaltanicus*)]. Elytron

with 2A very short, running obliquely to sutural margin; CUP distinct. PONOMARENKO, 1969b. *Perm.*, USSR (Asian RSFSR).

**Cytocupes** ROHDENDORF, 1961b, p. 405 [*\*C. angustus*; OD]. Elytron with 3 rows of polygonal cells in subcostal area; R and M coalescing before apex; 6 rows of cells between CUA and 2A. *Perm.*, USSR (Asian RSFSR). — FIG. 176,3. *\*C. angustus*; elytron,  $\times 11$  (Ponomarenko, 1969b).

**Cytocupoides** PONOMARENKO, 1969b, p. 59 [*\*C. elongatus*; OD]. Similar to *Cytocupes*, but 2A long and parallel to hind margin of elytron. *Perm.*, USSR (Asian RSFSR).

**Eocupes** ROHDENDORF, 1961b, p. 400 [*\*E. lukjanoviitshi*; OD]. Elytron with 2 rows of cells in subcostal area; 2A longer than in *Archicupes*. *Perm.*, USSR (Asian RSFSR). — FIG. 176,2. *\*E. lukjanoviitshi*; elytron,  $\times 12$  (Ponomarenko, 1969b).

**Ichthyocupes** ROHDENDORF, 1961b, p. 415 [*\*I. tyzbnovi*; OD]. Elytron with 2A very short, less than half length of elytron. PONOMARENKO, 1969b. *Perm.*, USSR (Asian RSFSR, Kazakh).

**Kaltanicupes** ROHDENDORF, 1961b, p. 402 [*\*K. richteri*; OD]. Little-known genus; elytron similar to that of *Archicupes* but having 3 rows of cells in subcostal area. PONOMARENKO, 1963b, 1969b. *Perm.*, USSR (Asian and European RSFSR).

**Kaltanocoleus** ROHDENDORF, 1961b, p. 397 [*\*K. pospelovi*; OD]. Little-known genus, similar to *Kaltanicupes*. PONOMARENKO, 1969b. *Perm.*, USSR (Asian RSFSR).

**Protocupes** ROHDENDORF, 1961b, p. 406 [*\*P. martynovi*; OD]. Little-known genus, similar to *Kaltanicupes*. PONOMARENKO, 1969b. *Perm.*, USSR (Asian RSFSR).

**Protocupoides** ROHDENDORF, 1961b, p. 408 [*\*P. plavilstshikovii*; OD] [=Tomocupes ROHDENDORF, 1961b, p. 409 (type, *T. carinatus*); *Tricupes* ROHDENDORF, 1961b, p. 410 (type, *T. acer*)]. Elytron much as in *Ichthyocupes*, but 2A extending to its apex. *Perm.*, USSR (Asian

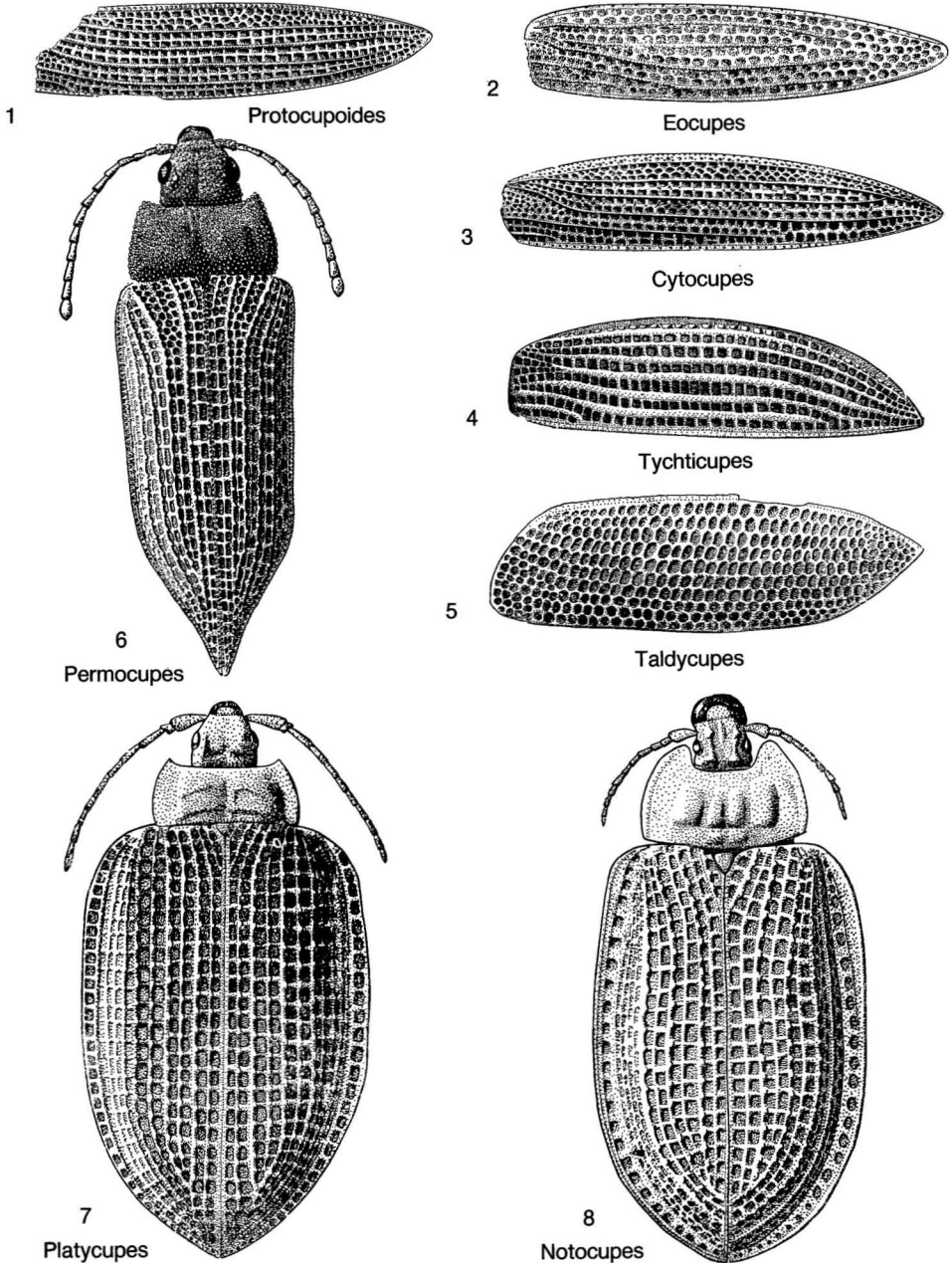


FIG. 176. Permocupedidae, Cupedidae, and Taldycupidae (p. 284–287).

RSFSR). — FIG. 176, 1. \**P. plavilstshikovi*; elytron,  $\times 10$  (Ponomarenko, 1969b).

*Uralocupes* Ponomarenko, 1969b, p. 60 [*\*Kaltanocupes major* Ponomarenko, 1963a, p. 78; OD]. Elytron with 3 rows of cells in medial area. Ponomarenko, 1963b. *Perm.*, USSR (European RSFSR).

Family CUPEDIDAE Lacordaire, 1857

[Cupedidae Lacordaire, 1857, p. 505]

Small to large beetles, usually elongate and flattened or cylindrical; antennae with 11 segments of diverse form and length; abdomen with 5 distinct sternites. Elytra with

- distinct venation, all main veins present except CUP and 1A; rows of cells present between main veins. *Trias.*—*Holo.*
- Cupes** FABRICIUS, 1801, p. 66. DE PEYERIMHOFF, 1909; IABLOKOV-KHNZORIAN, 1960b; PONOMARENKO, 1969b; GERSDORF, 1976. *Oligo.*, Europe (Baltic); *Plio.*, Europe (Germany)—*Holo.*
- Anaglyphites** PONOMARENKO, 1964, p. 55 [*\*A. clavatus*; OD]. Head broad at level of eyes, abruptly narrowed anteriorly; third antennal segment much longer than second. PONOMARENKO, 1966b, 1968b, 1969b. *Jur.*, USSR (Kazakh); *Cret.*, USSR (Asian RSFSR).
- Asimma** PONOMARENKO, 1966a, p. 58 [*\*A. rara*; OD]. Little-known genus; prothorax narrow, without lateral lobes. PONOMARENKO, 1969b. *Trias.*, USSR (Kirghiz).
- Cupesia** PONOMARENKO, 1966a, p. 57 [*\*C. monilicornia*; OD]. Antennae short, not extending beyond base of prothorax; main veins not fused distally. PONOMARENKO, 1969b. *Trias.*, USSR (Kirghiz).
- Cupidium** PONOMARENKO, 1968b, p. 126 [*\*C. abavum*; OD]. Second and third antennal segments about equal in length. PONOMARENKO, 1969b. *Jur.*, USSR (Kazakh).
- Cupoidea** MOTSCHULSKY, 1856, p. 27 [*\*C. tessellatus*; OD]. Very similar to *Priacma* (recent) but with eyes smaller and anterior angles of pronotum more acute. DE PEYERIMHOFF, 1909. *Oligo.*, Europe (Baltic).
- Eurydictyon** PONOMARENKO, 1969b, p. 96 [*\*E. conspicuum*; OD]. Large beetles, with very large cells along sutural ridge of elytron; radial area of elytron reduced. *Jur.*, USSR (Kazakh).
- Kirghizocupes** PONOMARENKO, 1966a, p. 59 [*\*K. cellulosus*; OD]. Little-known genus. Teeth of mandibles projecting vertically, not in plane of mandibles. PONOMARENKO, 1969b. *Trias.*, USSR (Kirghiz).
- Lithocupes** PONOMARENKO, 1966a, p. 65 [*\*L. incertus*; OD]. Little-known genus. Length and width of head subequal; first antennal segment swollen, third longest. PONOMARENKO, 1969b. *Trias.*—*Jur.*, USSR (Kirghiz).
- Mesocupes** MARTYNOV, 1926a, p. 6 [*\*M. primitivus*; OD]. Similar to *Mesocupoidea*, but pronotum without paranotal extensions. PONOMARENKO, 1964, 1968b, 1969b. *Jur.*, USSR (Kazakh).
- Mesocupoidea** PONOMARENKO, 1969b, p. 106 [*\*M. proporeius*; OD]. Head with vertex flat; tubercles on occiput and bases of antennae; antennae with last segment broad. Elytra with small cells; pronotum rectangular and with paranotal extensions. *Trias.*, USSR (Kirghiz).
- Mesothoris** TILLYARD in TILLYARD & DUNSTAN, 1916, p. 23 [*\*M. clathrata*; OD]. Little-known genus; elytron only. [Family assignment doubtful.] DUNSTAN, 1923; PONOMARENKO, 1969b. *Trias.*, Australia (Queensland).
- Miocupes** PONOMARENKO, 1973c, p. 102 [*\*M. ribai*; OD]. Similar to *Priacma* (recent), but head with prominent occipital lobes. *Mio.*, Europe (Czechoslovakia).
- Moltenocupes** ZEUNER, 1961, p. 304 [*\*M. townrowi*; OD]. Little-known genus. Last abdominal sternite short; mandibles large. PONOMARENKO, 1969b. *Trias.*, South Africa.
- Notocupes** PONOMARENKO, 1964, p. 61 [*\*N. picturatus*; OD]. Posterior veins of elytron coalesced distally before reaching posterior edge of elytron; second and third antennal segments equal; mandibles very large. PONOMARENKO, 1966a, 1966b, 1968b, 1969b, 1971b. *Trias.*, USSR (Kirghiz); *Jur.*, Europe (Germany), USSR (Asian RSFSR, Kazakh); *Cret.*, USSR (Asian RSFSR).—FIG. 176.8. *N. nigrimonticola* PONOMARENKO, *Jur.*, Kazakh; elytra and body,  $\times 3$  (Ponomarenko, 1969b).
- Notocupoides** PONOMARENKO, 1966a, p. 63 [*\*N. triassicus*; OD]. Antennae setiform, segments being smaller distally; ridges over eyes. DEICHMÜLLER, 1886; PONOMARENKO, 1969b, 1971b. *Trias.*, USSR (Kirghiz).
- Omma** NEWMAN, 1839, p. 303 [= *Procarabus* OPPENHEIM, 1888, p. 236 (type, *P. zitteli*, SD PONOMARENKO, 1971b, p. 68); *Ommamima* PONOMARENKO, 1964, p. 50 (type, *O. pilosum*)]. CROWSON, 1962; PONOMARENKO, 1968a, 1969b. *Jur.*, England, Europe (Germany), USSR (Kazakh); *Cret.*, USSR (Asian RSFSR)—*Holo.*
- Platycupes** PONOMARENKO, 1966a, p. 48 [*\*P. dolichoцерus*; OD]. Head short, generally transverse; antennae filiform, extending beyond base of pronotum; mandibles small. Posterior veins of elytron as in *Notocupes*. *Trias.*, USSR (Kirghiz).—FIG. 176.7. *\*P. dolichoцерus*; elytra and body,  $\times 9$  (Ponomarenko, 1969b).
- Priacmopsis** PONOMARENKO, 1966b, p. 142 [*\*P. adumbrata*; OD]. Similar to *Priacma* (recent), but prothorax about twice as wide as long. PONOMARENKO, 1969b. *Cret.*, USSR (Asian RSFSR).
- Procupes** PONOMARENKO, 1966a, p. 57 [*\*P. mandibularis*; OD]. Head about twice as long as wide; mandibles large, apical tooth much longer than others. PONOMARENKO, 1969b. *Trias.*, USSR (Kirghiz).
- Pterocupes** PONOMARENKO, 1966a, p. 55 [*\*P. antennatus*; OD]. Antennae with second and third segments equal. PONOMARENKO, 1969b. *Trias.*, USSR (Kirghiz).
- Rhabdocupes** PONOMARENKO, 1966a, p. 60 [*\*R. longus*; OD]. Antennae with third segment twice as long as second. PONOMARENKO, 1969b. *Trias.*, USSR (Kirghiz).
- Sinocupes** LIN, 1976, p. 111 [*\*S. validus*; OD]. Little-known genus. *Jur.*, China (Liaoning).
- Tetraphalerus** WATERHOUSE, 1901, p. 520 [= *Tetraphalerites* CROWSON, 1962, p. 154 (type, *T. oligocenicus*)]. PONOMARENKO, 1964, 1968a,



1969b. *Jur.*, USSR (Kazakh), England; *Cret.*, USSR (Asian RSFSR)—*Holo.*

**Triadocupes** PONOMARENKO, 1966a, p. 51 [*\*T. ferganensis*; OD]. Head about as wide as long; antennae setiform. CUA and 2A not joined distally. PONOMARENKO, 1969b. *Trias.*, USSR (Kirghiz).

### Family TALDYCUPIDAE Rohdendorf, 1961

[Taldycupidae ROHDENDORF, 1961b, p. 412]

Small, elongate, flattened beetles. Elytron with reticulate venation consisting of 9 thick, complete veins separated on each side by a row of cells, with a few additional cells basally. Head prognathous; antennae very slightly thickened apically; prothorax with small paranotals. *Perm.*—*Trias.*

**Taldycupes** ROHDENDORF, 1961b, p. 421 [*\*T. khalfini*; OD] [= *Taldycupidium* ROHDENDORF, 1961b, p. 424 (type, *T. bergi*); *Cryptocupes* ROHDENDORF, 1961b, p. 425 (type, *C. rjabini*)]. Elytron wide, nearly flat; longitudinal veins nearly straight; M terminating at apex of elytron; 2A terminating directly on sutural margin. *Perm.*, USSR (Asian RSFSR, Kazakh). — FIG. 176, 5. *\*T. khalfini*; elytron,  $\times 18$  (Ponomarenko, 1969b).

**Simmondsia** DUNSTAN, 1923, p. 35 [*\*S. subpyriformis*; OD]. Similar to *Tecticipes* but with only 2 rows of cells at base of cubital area. ROHDENDORF, 1961b; PONOMARENKO, 1969b. *Perm.*, USSR (European RSFSR); *Trias.*, Australia (Queensland).

**Tecticipes** ROHDENDORF, 1961b, p. 417 [*\*T. beckeri*; OD] [= *Stegocupes* ROHDENDORF, 1961b, p. 418 (type, *S. efremovi*)]. Base of cubital area of elytron with 3 rows of cells. PONOMARENKO, 1969b. *Perm.*, USSR (European RSFSR).

**Tychtipes** ROHDENDORF, 1961b, p. 426 [*\*T. radtschenkoi*; OD]. Vein 3A terminating on sutural edge of elytron without merging with another vein. *Perm.*, USSR (European RSFSR). — FIG. 176, 4. *\*T. radtschenkoi*; elytron,  $\times 22$  (Ponomarenko, 1969b).

**Tychtipoides** ROHDENDORF, 1961b, p. 430 [*\*T. grjasevi*; OD]. Little-known genus. Elytron with 3 posterior veins merging distally to form a composite vein. PONOMARENKO, 1969b. *Perm.*, USSR (European RSFSR).

### Family ADEMOSYNIDAE Ponomarenko, 1968

[Ademosynidae PONOMARENKO, 1968b, p. 128]

Small beetles. Body oval or elongate-oval; mandibles small; antennae filiform, usually

thin; prothorax broader than long, paranotal extensions small or absent. Elytra with 9 or 10 punctate grooves. Hind wings unknown. Front coxal cavities opening posteriorly. [Assignment of these genera to the Archostemata is doubtful since the structure of their hind wings and of their larvae is unknown.] *Trias.*—*Cret.*

**Ademosyne** HANDLIIRSCH, 1906b, p. 402 [*\*A. major*; SD PONOMARENKO, 1969b, p. 132]. Head orthognathous; prothorax narrowed anteriorly; hind coxae transverse. DUNSTAN, 1923. *Trias.*, Australia (Queensland), USSR (Kirghiz).

**Ademosynoides** DUNSTAN, 1923, p. 25 [*\*Ademosyne minor* HANDLIIRSCH, 1906b, p. 403; OD]. Little-known genus; small species, known by elytra only. MARTYNOV, 1936; ZEUNER, 1959b; FUJIYAMA, 1973. *Trias.*, Australia (Queensland, New South Wales), Antarctica (Graham Land), USSR (Asian RSFSR), Japan.

**Cephalosyne** PONOMARENKO, 1969b, p. 134 [*\*C. capitata*; OD]. Head orthognathous, large, much broader than long. *Trias.*, USSR (Kirghiz).

**Dolichosyne** PONOMARENKO, 1969b, p. 126 [*\*D. confragosa*; OD]. Head prognathous; mandibles large; hind coxae large; anterior part of thorax narrowed. *Trias.*, USSR (Kirghiz).

**Gnathosyne** PONOMARENKO, 1969b, p. 129 [*\*G. akkolensis*; OD]. Head prognathous; prothorax slightly narrowed anteriorly. *Jur.*, USSR (Kazakh).

**Grammositus** DUNSTAN, 1923, p. 37 [*\*Grammositum bilineatus*; OD]. Similar to *Ademosyne* but with apex of elytra distinctly blunt. *Trias.*, Australia (Queensland).

**Petrosyne** PONOMARENKO, 1969b, p. 135 [*\*P. liasica*; OD]. Elytron as in *Ademosyne*, but metasternum rectangular, not narrowed anteriorly. *Jur.*, USSR (Kirghiz).

**Platycrossos** DUNSTAN, 1923, p. 32 [*\*Ademosyne tumida* TILLYARD in TILLYARD & DUNSTAN, 1916, p. 21; OD]. Similar to *Ademosyne*, but elytra with more pronounced lateral or humeral borders. *Trias.*, Australia (Queensland).

**Polysitum** DUNSTAN, 1923, p. 40 [*\*Polysitum punctatus*; OD]. Similar to *Ademosyne*, but elytra uniformly granulate. *Trias.*, Australia (Queensland).

**Ranis** PONOMARENKO, 1968b, p. 129 [*\*R. ovalis*; OD]. Head prognathous, transverse; body broadly oval. *Jur.*, USSR (Kirghiz, Kazakh). — FIG. 177, 3. *\*R. ovalis*; elytra and body,  $\times 9$  (Ponomarenko, 1969b).

**Shepherdia** DUNSTAN, 1923, p. 38 [*\*S. quadrivittata*; OD]. Similar to *Ademosyne*, but elytron with strigose sculpturing. *Trias.*, Australia (Queensland).

**Sphaerosyne** PONOMARENKO, 1969b, p. 135 [*\*S. globosa*; OD]. Body broadly oval, strongly con-

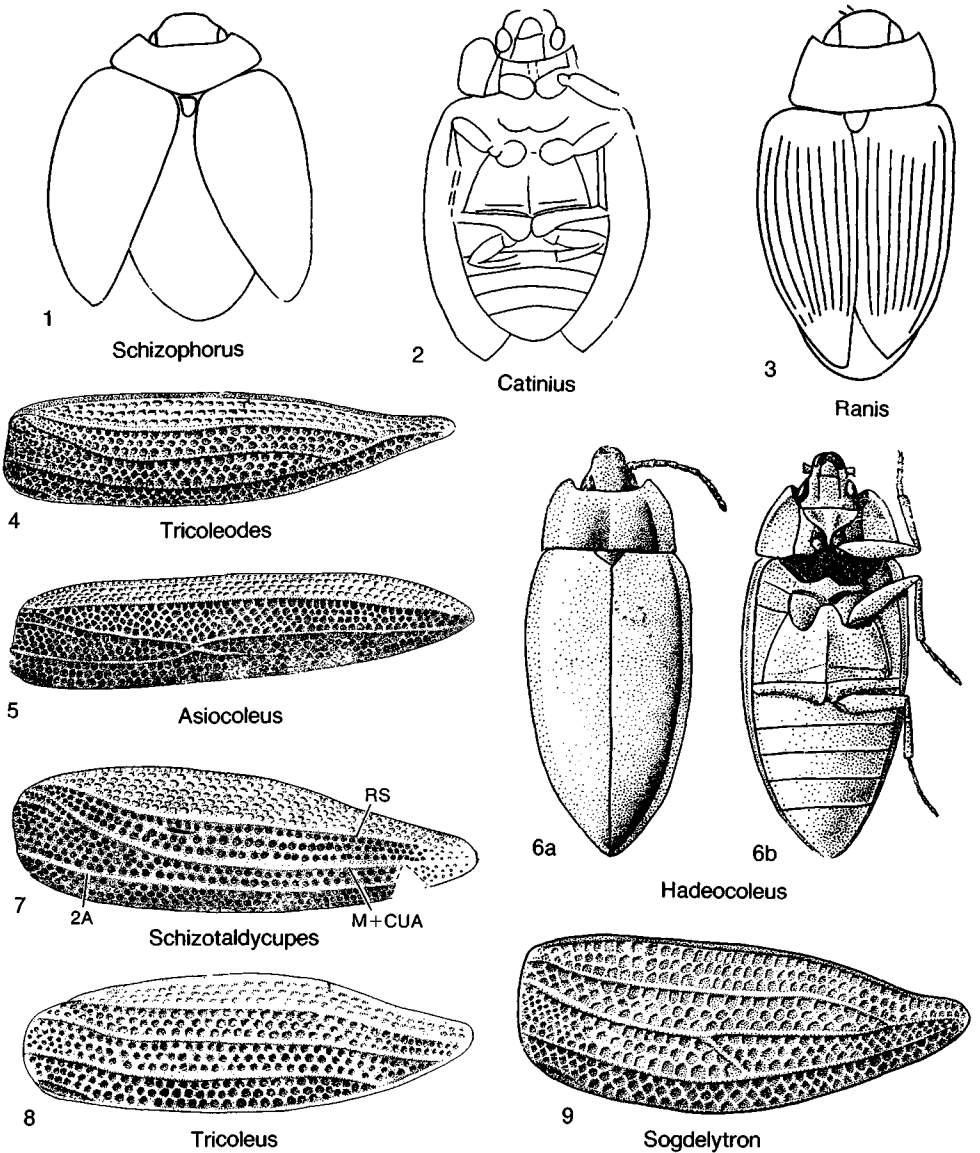


FIG. 177. Ademosynidae, Tricoleidae, Asiocolaeidae, Rhombocoleidae, Schizophoridae, and Catiniidae (p. 287–290).

vex; head prognathous. *Cret.*, USSR (Asian RSFSR).

**Family TRICOLEIDAE**  
**Ponomarenko, 1969**

[Tricoleidae Ponomarenko, 1969b, p. 138]

Elytron reticulate; 3 distinct main veins, RS, M+CUA, and 2A, each separated for

almost their entire lengths by 3 rows of cells. *Trias.-Jur.*

**Tricoleus** Ponomarenko, 1969b, p. 139 [*T. punctatus*; OD]. Elytron with RS terminating at apex. *Jur.*, USSR (Kazakh).—FIG. 177, 8. \**T. punctatus*; elytron, ×12 (Ponomarenko, 1969b).

**Sogdelytron** Ponomarenko, 1969b, p. 141 [*S. latum*; OD]. Elytron broad; RS terminating on

M just before apex; CUA ending on 2A near midwing. *Trias.*, USSR (Kirghiz). — FIG. 177,9. \**S. latum*; elytron,  $\times 7$  (Ponomarenko, 1969b).

**Tricoleodes** PONOMARENKO, 1969b, p. 140 [\**T. acutus*; OD]. Elytron acute distally; RS and M+CUA terminating on 2A distally. *Trias.*, USSR (Kirghiz). — FIG. 177,4. \**T. acutus*; elytron,  $\times 5.5$  (Ponomarenko, 1969b).

**Willcoxia** DUNSTAN, 1923, p. 62 [\**W. magnopunctata*; OD]. Little-known genus. Elytral cells weakly developed. [Family assignment doubtful.] PONOMARENKO, 1969b. *Trias.*, Australia (Queensland).

### Family ASIUCOLEIDAE Rohdendorf, 1961

[Asiucoleidae ROHDENDORF, 1961b, p. 396]

Elytron with veins SC, RS, and associated interstitial veins close together along anterior margin; stem M+CUA long, extending nearly to midwing and directed obliquely toward posterior margin; CUA directed toward sutural margin; 2A parallel to sutural margin basally, then merging with CUA at its separation from M. Body unknown. *Perm.*

**Asiucoleus** ROHDENDORF, 1961b, p. 396 [\**A. novojilovi*; OD]. Elytron with M terminating nearly at apex. *Perm.*, USSR (Asian RSFSR). — FIG. 177,5. \**A. novojilovi*; elytron,  $\times 7.5$  (Ponomarenko, 1969b).

### Family RHOMBOCOLEIDAE Rohdendorf, 1961

[Rhombocoleidae ROHDENDORF, 1961b, p. 432]

Elytron with main veins distinct or replaced by punctate grooves; in most genera main veins not distinguished from interstitial veins; anterior part of elytron with 4 to 6 rows of cells. Body not definitely known. *Perm.*

**Rhombocoleus** ROHDENDORF, 1961b, p. 432 [\**R. andreae*; OD]. Little-known genus. Anterior area of elytron with 5 rows of cells. PONOMARENKO, 1969b. *Perm.*, USSR (Asian RSFSR).

**Erunakicipes** ROHDENDORF, 1961b, p. 433 [\**E. kryshrovichii*; OD] [= *Schizocupes* ROHDENDORF, 1961b, p. 450 (type, *S. obrutshchevi*)]. Elytron with 3 rows of punctations in anterior area and 4 rows at base of middle area. PONOMARENKO, 1969b. *Perm.*, USSR (Asian RSFSR).

**Karakanocoleus** ROHDENDORF, 1961b, p. 451 [\**K. lebedevi*; OD; probably = *Erunakicipes venjukovi* ROHDENDORF, 1961b] [= *Karakanocoleodes* ROHDENDORF, 1961b, p. 455 (type, *K. latissi-*

*mus*)]. Elytron with 4 rows of cells in anterior area and 6 rows at base of middle area. PONOMARENKO, 1969b. *Perm.*, USSR (Asian RSFSR).

**Rhombocoleites** PONOMARENKO, 1969b, p. 147 [\**R. adumbratus*; OD]. Only head and thorax known. [Family assignment doubtful.] *Perm.*, USSR (European RSFSR).

**Rossocoleus** ROHDENDORF, 1961b, p. 456, *nom. subst. pro Curculiopsis* MARTYNOV, 1937b, p. 39, *non* HANDLIRSCH, 1907 [\**Curculiopsis ellipticus* MARTYNOV, 1937b, p. 39; OD]. Little-known genus. Elytron apparently without rows of cells and punctate grooves. PONOMARENKO, 1969b. *Perm.*, USSR (Asian RSFSR).

**Schizotaldycupes** ROHDENDORF, 1961b, p. 414 [\**S. ananjevi*; OD] [= *Carinicipes* ROHDENDORF, 1961b, p. 416 (type, *C. beckermigdisovae*)]. Elytron with RS, M+CUA, and 2A distinct; 10 rows of cells at base between M+CUA and 2A. *Perm.*, USSR (Asian RSFSR). — FIG. 177,7. \**S. ananjevi*; elytron,  $\times 7.4$  (Ponomarenko, 1969b).

### Family SCHIZOPHORIDAE Ponomarenko, 1968

[Schizophoridae PONOMARENKO, 1968b, p. 130]

Body flattened, oval; head usually hypognathous, rarely prognathous; antennae filiform, with 11 homonomous segments; eyes large, mostly lateral; mandibles usually three-toothed, small; pronotum transverse, with flat paranotals; abdomen with 5 visible sternites. Elytron without veins or cells; hind wings well developed. Body covered with dense tubercles. *Trias.*—*Jur.*

**Schizophorus** PONOMARENKO, 1968b, p. 130 [\**S. crassus*; OD]. Body broadly oval; head retracted under pronotum; propleura very wide. *Jur.*, USSR (Kirghiz). — FIG. 177,1. \**S. crassus*; elytra and body,  $\times 6$  (Ponomarenko, 1969b).

**Catabrycus** PONOMARENKO, 1969b, p. 176 [\**C. hoptitus*; OD]. Large beetles, with large head and projecting mandibles. *Trias.*, USSR (Kirghiz).

**Hadeocoleodes** PONOMARENKO, 1969b, p. 153 [\**H. calus*; OD]. Similar to *Hadocoleus* but with intercoxal process extending only as far as middle of front coxae. *Jur.*, USSR (Kazakh).

**Hadeocoleus** PONOMARENKO, 1969b, p. 150 [\**H. gigas*; OD]. Body convex; head and prothorax directed slightly downward; antennae thin; prothorax with anteriorly extended paranotals; fore coxae small, protruding posteriorly. *Trias.*, USSR (Kirghiz). — FIG. 177,6. \**H. gigas*; a, dorsal view, b, ventral view,  $\times 1.4$  (Ponomarenko, 1969b).

- Lethocoleus** PONOMARENKO, 1969b, p. 165 [\**L. sternalis*; OD]. Body slender; mesosternum long; head shorter than pronotum. *Trias.*, USSR (Kirghiz).
- Malmelater** HANDLIRSCH, 1906b, p. 541 [\**Elaterites priscus* OPPENHEIM, 1888, p. 241; SD PONOMARENKO, 1971b, p. 72]. Similar to *Schizophorinus* but with prominent, flat carina on prosternum; terminal abdominal sternite short. *Jur.*, Europe (Germany).
- Parathnesidius** PONOMARENKO, 1969b, p. 175 [\**P. oculatus*; OD]. Head long, prognathous; eyes displaced to dorsal surface; prothorax transverse, narrowed anteriorly, with narrow pronotals and low, flat keel; fore coxae round. *Jur.*, USSR (Kirghiz).
- Pesus** PONOMARENKO, 1969b, p. 155 [\**P. prognathus*; OD]. Little-known genus. Prothorax with narrow paranotals extending anteriorly and tapered; fore coxae large and transverse; head prognathous. *Trias.*, USSR (Kirghiz).
- Praesagus** PONOMARENKO, 1969b, p. 171 [\**P. capitatus*; OD]. Mandibles short, not projecting; head and thorax wide. *Trias.*, USSR (Kirghiz).
- Salebrocoleus** PONOMARENKO, 1969b, p. 161 [\**S. megacephalus*; OD]. Similar to *Praesagus*, but metasternum narrowed abruptly anteriorly; body with large tubercles. *Jur.*, USSR (Kirghiz).
- Salebroferus** PONOMARENKO, 1969b, p. 159 [\**S. confragosus*; OD]. Similar to *Triassocoleus*, but first antennal segment shorter than third. *Trias.*, USSR (Kirghiz).
- Schizophorinus** PONOMARENKO, 1969b, p. 167 [\**S. punctatus*; OD]. Pronotum with anterior edge straight; first abdominal sternite longer than others. *Trias.*, USSR (Kirghiz).
- Schizophoroides** PONOMARENKO, 1969b, p. 169 [\**S. tuberculatus*; OD]. Body convex, slightly elongate; head and pronotum directed obliquely forward and down; paranotals almost absent; fore coxae not protruding backward; fore femora much thickened. *Trias.*, USSR (Kirghiz).
- Tersoides** PONOMARENKO, 1968b, p. 134 [\**T. capitatus*; OD]. Similar to *Tersus*, but head longer and eyes more nearly lateral; femora thickened. PONOMARENKO, 1969b. *Jur.*, USSR (Kazakh, Kirghiz).
- Tersus** MARTYNOV, 1926a, p. 11 [\**T. crassicornis*; OD]. Paranotals wide, projecting anteriorly; metasternum very narrow; eyes displaced dorsally. PONOMARENKO, 1969b. *Jur.*, USSR (Kazakh).
- Thnesidius** PONOMARENKO, 1969b, p. 172 [\**T. xyphoborus*; OD]. Head almost prognathous; mandibles small, not projecting; basal segment of antennae slightly thickened, second segment very small, third segment largest; prosternum in form of flat keel without elevations on sides. *Trias.*, USSR (Kirghiz).
- Triassocoleus** PONOMARENKO, 1969b, p. 136 [\**T. sulcatus*; OD]. First antennal segment shorter than second and third together; sides of prothorax with a double notch. *Trias.*, USSR (Kirghiz).
- Xyphosternum** PONOMARENKO, 1968b, p. 134 [\**S. punctatum*; OD]. Head prognathous, not longer than wide and shorter than prothorax; sides of prosternum contiguous with keel, having flat, round, elevated areas. PONOMARENKO, 1969b. *Jur.*, USSR (Kazakh).

### Family CATINIIDAE Ponomarenko, 1968

[Catiniidae PONOMARENKO, 1968b, p. 137]

Body flattened, oval; head and pronotum directed slightly downward; head strongly retracted under pronotum; eyes lateral; paranotals with sides extending anteriorly; prosternum without a process extending between fore coxae. Elytra as in Schizophoridae. *Trias.—Jur.*

**Catinus** PONOMARENKO, 1968b, p. 137 [\**C. pelta*; OD]. Small beetles, broadly oval. Head strongly transverse; prosternum with pronounced longitudinal keel, having small extensions between fore coxae. *Jur.*, USSR (Kazakh).—FIG. 177, 2. \**C. pelta*; body and elytra, ventral view,  $\times 5$  (Ponomarenko, 1969b).

**Avocatinus** PONOMARENKO, 1969b, p. 178 [\**A. elongatus*; OD]. Small, elongate beetles, lacking keel on prosternum. *Trias.*, USSR (Kirghiz).

**Catinoides** PONOMARENKO, 1969b, p. 179 [\**C. rotundatus*; OD]. Small, broad beetles, without longitudinal keel. *Trias.*, USSR (Kirghiz).

**Macrocatinius** PONOMARENKO, 1969b, p. 180 [\**M. brachycephalus*; OD]. Large, elongate beetles; posterior edge of prosternum triangular, about twice as long in middle as on sides; propleura triangular. *Trias.*, USSR (Kirghiz).

**Triassocatinus** PONOMARENKO, 1969b, p. 182 [\**T. glabratus*; OD]. Similar to *Macrocatinius*, but propleura widened posteriorly. *Trias.*, USSR (Kirghiz).

### Family MICROMALTHIDAE Barber, 1913

[Micromalthidae BARBER, 1913, p. 185]

Very small beetles of uncertain affinities. Antennae with 11 segments, slightly moniliform; pronotum much smaller than head, not margined laterally; all tarsi with 5 segments; hind wings with distal half spirally rolled and with reduced venation. Larvae

diversely formed in the several instars. Adults and larvae occurring in decaying wood. *Oligo./Mio.—Holo.*

**Micromalthus** LE CONTE, 1878, p. 613. [Larvae of *M. debilis* LE CONTE, a recent species.] PONOMARENKO, 1969b; ROZEN, 1971. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*

## Suborder ADEPHAGA

### Emery, 1886

[Adephaga EMERY, 1886, p. 653]

Prothorax with distinct notopleural sutures, separating pronotum from propleura; hind coxae fused to metasternum, completely dividing first visible abdominal sternite; all tarsi with 5 segments; hind wing commonly with a closed cell between M and CUA distally; 6 abdominal sternites commonly visible, abdominal segments 2, 3, and 4 at least partly fused. Larvae lacking labrum; legs with 5 segments. Adults and larvae mostly predaceous. *Trias.—Holo.*

### Family CARABIDAE Latreille, 1802

[Carabidae LATREILLE, 1802a, p. 80]

Head prognathous; antennae with 10 or commonly 11 filiform or flattened segments, inserted under a frontal ridge between eyes and mandibles; mandibles and maxillae well developed; prothorax usually with conspicuous, inflexed lateral margins; legs cursorial; elytra striate, with setiferous punctures; abdomen with 6 visible sternites. Larvae usually campaniform and mostly predaceous. Adults and larvae occurring on ground, in trees, or near ponds and streams. *Trias.—Holo.*

**Carabus** LINNÉ, 1758, p. 413. *Holo.*

**Agatoides** MOTSCHULSKY, 1856, p. 26 [\**A. carinulatus*; OD]. Similar to *Agatus* (recent) but with elytra distinctly ribbed. *Oligo.*, Europe (Baltic).

**Arthropterillus** Wasmann, 1926b, p. 229 [\**Arthropterus helmi* STEIN, 1877, p. 28; OD]. Similar to *Arthropterus*, but body apparently longer. Wasmann, 1929a; Darlington, 1950. *Oligo.*, Europe (Baltic).

**Arthropterites** Wasmann, 1926a, p. 28 [\**A. klebsi*; OD]. Little-known genus, possibly related to *Pentaplatarthrus* (recent); at least 9 antennal seg-

ments present. Wasmann, 1929a; Darlington, 1950. *Oligo.*, Europe (Baltic).

**Arthropterus** M'LEAY, 1838, p. 75. Wasmann, 1926b, 1929a; Darlington, 1950; Statz, 1952. *Oligo.*, Europe (Baltic)—*Holo.*

**Carabites** HEER, 1852, p. 12 [collective group]. Isolated elytra resembling those of carabids. Heer, 1862a, 1868, 1870a; Scudder, 1892; Meunier, 1898c; Handlirsch, 1906b, 1907, 1908a; Cockerell, 1908a, 1920b, 1920c, 1920d, 1928a, 1936; Fiori, 1932; Zeuner, 1941a. *Jur.*, Europe (Switzerland); *Cret.*, USA (South Dakota); *Eoc.*, USA (Colorado, Wyoming), Greenland (Grinnell Land); *Oligo.*, Europe (France); *Mio.*, Iceland, Europe (Norway); *Paleoc.—Plio.*, Europe (Italy), Argentina (Jujuy).

**Carabopteron** MARTYNOV, 1926a, p. 2 [\**C. punctatolineatum*; OD]. Little-known genus. Outer elytral margins nearly straight and parallel to inner ones; 4 main tuberculate ridges usually present. [Family assignment doubtful.] *Jur.*, USSR (Kazakh).

**Cerapterites** Wasmann, 1926a, p. 27 [\**C. primaeus*; OD]. Similar to *Protocerapterus*, but body very broad, about 2.5 times as long as wide. Wasmann, 1929a; Darlington, 1950. *Oligo.*, Europe (Baltic).

**Conjunctia** PONOMARENKO, 1977b, p. 87 [\**C. prodroma*; OD]. Similar to *Mesorabus*, but mandibles not so long. *Cret.*, USSR (Asian RSFSR).

**Cordorabus** PONOMARENKO, 1977b, p. 78 [\**C. notatus*; OD]. Similar to *Protorabus*, but abdomen more pointed; tegmen smooth. *Jur.*, USSR (Kazakh).

**Cretorabus** PONOMARENKO, 1977b, p. 83 [\**C. capitatus*; OD]. Head large, strongly transverse; prothorax also transverse, widest before center; metepisternum narrowed posteriorly; apex of abdomen rounded. *Cret.*, USSR (Asian RSFSR).

**Elaphrotites** HAUPT, 1956, p. 37 [\**E. densus*; OD]. Little-known genus, based on elytral fragment, possibly related to *Elaphrus* (recent). [Family assignment doubtful.] *Eoc.*, Europe (Germany).

**Eodromeus** PONOMARENKO, herein [\**E. dissectus* PONOMARENKO, 1977b, p. 69; OD]. Mandibles shorter than head, triangular; antennae short, barely reaching pronotum, their segments thick; pronotum rectangular, weakly incised anteriorly. [In the original description of the genus, the name of the type species was given as *E. fasciatus*. However, Dr. PONOMARENKO has informed me that the name *fasciatus* was a printing error, there being no species of that name in his account of the genus. In order to validate the generic name, he has accordingly requested permission to designate in the present publication his species *dissectus* as the type of his genus, as originally intended.] *Jur.*, USSR (Kazakh); *Cret.*, USSR (Asian RSFSR).—FIG. 178, 5. *E. antiquus*, *Jur.*,

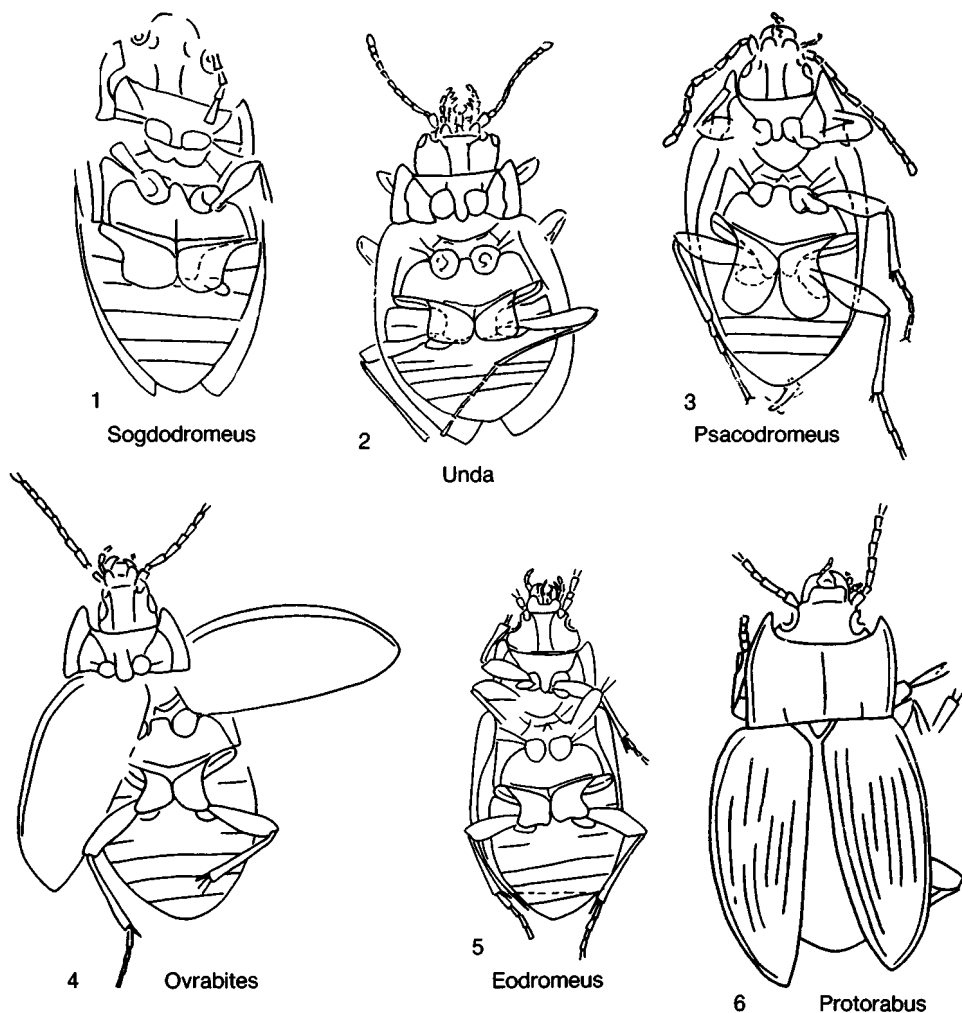


FIG. 178. Carabidae (p. 291–293).

- Kazakh; ventral view,  $\times 7$  (Ponomarenko, 1977b).
- Eopausus** Wasmann, 1926a, p. 29 [*E. balticus*; OD]. Little-known genus, apparently lacking transverse prothoracic suture; prosternal process separating fore coxae apparently present. Wasmann, 1929a; Darlington, 1950. *Oligo.*, Europe (Baltic).
- Karadromeus** Ponomarenko, 1977b, p. 62 [*K. rostratus*; OD]. Pronotum slightly narrowed anteriorly; legs not elongate. *Jur.*, USSR (Kazakh).
- Karatoma** Ponomarenko, 1977b, p. 59 [*K. agilis*; OD]. Pronotum almost rectangular; legs long. *Jur.*, USSR (Kazakh).
- Lithorabus** Ponomarenko, 1977b, p. 82 [*L. incertus*; OD]. Small, flat beetles; similar to *Cretorabus*, but posterior end of metepisternum blunt. *Jur.*, USSR (Kirghiz).
- Mesorabus** Ponomarenko, 1977b, p. 85 [*M. elongatus*; OD]. Mandibles large and protruding; both spurs of fore tibiae apical; hind margin of metathorax almost straight. *Jur.*, USSR (Kazakh).
- Neothanes** Scudder, 1890, p. 535 [*Cychnus testeus* Scudder, 1878b, p. 758; OD]. Little-known genus, possibly related to *Carabus. Eoc.*, USA (Wyoming).
- Ovrabites** Ponomarenko, 1977b, p. 76 [*O. ovalis*; OD]. Small, oval, flat beetles; prothorax transverse, but widest posteriorly, evenly narrowed anteriorly. *Jur.*, USSR (Kazakh).—FIG. 178.4. *O. ovalis*; elytra and body, ventral view,  $\times 7$  (Ponomarenko, 1977b).
- Pausoides** Motschulsky, 1856, p. 26 [*P. mengei*; OD]. Similar to *Pausus* (recent), but antennae with 7 segments. Wasmann, 1926a, 1929a; Bolow, 1940; Darlington, 1950. *Oligo.*, Europe (Baltic).

**Platycyxa** PONOMARENKO, 1977b, p. 47 [*\*P. armata*; OD]. Small, flat beetles; antennae long and thick; pronotum transverse, slightly narrowed anteriorly. *Jur.*, USSR (Kirghiz, Kazakh).

**Protocerapterus** Wasmann, 1926a, p. 27 [*\*P. primigenius*; OD]. Similar to *Cerapterus* (recent), but tibiae very broad; body not as broad as in *Cerapterites*. Wasmann, 1929a; Darlington, 1950. *Oligo.*, Europe (Baltic).

**Protorabus** PONOMARENKO, 1977b, p. 72 [*\*P. planus*; OD]. Clypeus not reaching base of antennae; fore coxal cavities open; metepisternum forming part of wall of middle coxal cavities; abdomen short, its apex blunt; last abdominal sternite only slightly narrower than base of abdomen. *Jur.*, USSR (Kazakh).—FIG. 178.6. *\*P. planus*; dorsal view,  $\times 3.5$  (Ponomarenko, 1977b).

**Protoscalidion** Schaufuss, 1888, p. 266 [*\*P. rugiae*; OD]. Similar to *Scalidion* (recent), but antennae filiform, their second segment minute; prothorax quadrate; first 4 tarsal segments bilobed. *Oligo.*, Europe (Baltic).

**Psacodromeus** PONOMARENKO, 1977b, p. 53 [*\*P. gutta*; OD]. Body streamlined, lateral outlines forming even curve from head to ends of elytra. *Jur.*, USSR (Kazakh).—FIG. 178.3. *\*P. gutta*; ventral view,  $\times 4.5$  (Ponomarenko, 1977b).

**Sinis** Heer, 1862a, p. 31 [*\*S. brevicollis*; OD]. Little-known genus. Heer, 1862b. *Mio.*, Europe (Germany).

**Sogdodromeus** PONOMARENKO, 1977b, p. 46 [*\*S. altus*; OD]. Small, flat beetles; antennae long and thick; clypeus not reaching antennal bases; pronotum transverse, broadened anteriorly. *Trias.*, USSR (Kirghiz).—FIG. 178.1. *\*S. altus*; ventral view,  $\times 5$  (Ponomarenko, 1977b).

**Tauredon** Handlirsch, 1910a, p. 23 [*\*T. borni*; OD]. Little-known genus. Pronotum transverse, nearly twice as wide as long, lateral edges projecting anteriorly, anterior margin with a slight median bulge. *Jur.*, Europe (Germany).

**Trechinites** Heer, 1862a, p. 34 [*\*T. clairvillei* Heer, 1862a, p. 34; SD Carpenter, herein]. Little-known genus. Heer, 1862b. *Mio.*, Europe (Germany).

**Trechoides** Motschulsky, 1856, p. 26 [*\*T. fasciatus*; OD]. Similar to *Trechus* (recent), but elytra distinctly truncate. *Oligo.*, Europe (Baltic).

**Unda** PONOMARENKO, 1977b, p. 49 [*\*U. micropilata*; OD]. Antennae long and thin; pronotum transverse, narrowed anteriorly. *Cret.*, USSR (Asian RSFSR).—FIG. 178.2. *U. cursoria*; ventral view,  $\times 7$  (Ponomarenko, 1977b).

### Family TRIAPLIDAE

#### Ponomarenko, 1977

[Triaplidae Ponomarenko, 1977b, p. 17]

Large, elongate beetles. Head orthognathous or opisthognathous; antennae appar-

ently thin; fore coxae not divided; hind coxae long, dividing metanotum; abdomen with 6 visible sternites. *Trias.*

**Triaplus** PONOMARENKO, 1977b, p. 17 [*\*T. macroplatus*; OD]. Head strongly bent under pronotum; pronotum transverse; hind coxae slightly shorter than wide; body punctate. *Trias.*, USSR (Kirghiz).—FIG. 179.3. *\*T. macroplatus*; a, dorsal view, b, ventral view,  $\times 6$  (Ponomarenko, 1977b).

### Family DYTISCIDAE Leach, 1815

[Dytiscidae Leach, 1815, p. 84]

Aquatic beetles, small to large; body smooth, streamlined; head prognathous; antennae with 11 filiform segments, inserted under frontal ridge; compound eyes reniform; pronotum with explanate lateral margins; hind coxae very large; hind legs modified to varying degrees for swimming, tarsi flattened and bearing flat hairs; abdomen with 6 visible sternites. Larvae elongate, head prognathous; aquatic and predaceous. *Jur.*—*Holo.*

**Dytiscus** LINNÉ, 1758, p. 411. *Holo.*

**Agabus** LEACH, 1817, p. 72. ŘIHA, 1960. *Mio.*, Europe (Czechoslovakia)—*Holo.*

**Angaragabus** PONOMARENKO, 1963b, p. 128 [*\*A. jurassicus*; OD]. Larva with head flat; mandibles twice as long as basal width; fourth antennal segment without processes; legs lacking swimming hairs; urogomphi short; eighth abdominal segment not elongate. *Jur.*, USSR (Asian RSFSR).—FIG. 179.2. *\*A. jurassicus*; larva,  $\times 7$  (Ponomarenko, 1963b).

**Colymbetes** SCHELLENBERG, 1806, p. 188. ŘIHA, 1974. *Mio.*, USSR (European RSFSR)—*Holo.*

**Copelatus** ERICHSON, 1832, p. 38. ŘIHA, 1974. *Mio.*, USSR (European RSFSR)—*Holo.*

**Cretodytes** PONOMARENKO, 1977b, p. 40 [*\*C. latipes*; OD]. Little-known genus. Hind tibiae much shorter than femora. [Family assignment doubtful.] *Cret.*, USSR (Kazakh).

**Cybister** CURTIS, 1827, p. 151. ŘIHA, 1974. *Mio.*, USSR (European and Asian RSFSR)—*Holo.*

**Graphoderus** DEJEAN, 1833, p. 54. ŘIHA, 1974. *Mio.*, USSR (European RSFSR)—*Holo.*

**Hydroporus** SCHELLENBERG, 1806, p. 182. ŘIHA, 1974. *Mio.*, USSR (European RSFSR)—*Holo.*

**Methles** SHARP, 1882, p. 489. ŘIHA, 1974. *Mio.*, USSR (European RSFSR)—*Holo.*

**Miodytiscus** WICKHAM, 1911, p. 54 [*\*M. hirtipes*; OD]. Similar to *Dytiscus* (recent); elytra with 9 striae, those near outer margin with fine punctation. *Oligo.*, USA (Colorado).

**Palaeogyrinus** SCHLECHTENDAL, 1894, p. 200 [*\*P.*

*strigatus*; OD]. Mesosternum apparently long; elytra short, not reaching end of abdomen; antennae with 11 segments. HATCH, 1927a; DARLINGTON, 1929; STATZ, 1939–1940. *Oligo.*, Europe (Germany).—FIG. 179, 1. \**P. strigatus*; ventral view,  $\times 10$  (Statz, 1939–1940).

*Procoelambus* THÉOBALD, 1937a, p. 389 [\**P. macrocephalus*; OD]. Little-known genus. [Family assignment doubtful.] *Oligo.*, Europe (France). *Schistomerus* PALMER, 1957, p. 259 [\**S. californense*; OD]. Larva similar to that of *Deronectes* (recent) but with distinct sternal plate on seventh abdominal segment. Adult unknown. *Mio.*, USA (California).

### Family GYRINIDAE Latreille, 1810

[Gyrinidae LATREILLE, 1810, p. 141]

Aquatic beetles, mainly surface swimmers, with streamlined body; head large, prognathous; antennae with 8 segments, first 2 segments very short, remainder forming a short club; compound eyes divided, an upper pair near dorsal surface of head, the lower pair smaller and ventral; middle and hind legs modified for swimming, broad and flat. Larvae elongate, aquatic, predaceous; adults scavengers. *Jur.*—*Holo.*

*Gyrinus* GEOFFROY, 1762, p. 193. *Holo.*

*Anagyrius* HANDLIRSCH, 1906b, p. 447 [\**Gyrinus atavus* HEER, 1865, p. 64; OD]. Little-known genus. HATCH, 1927a; STATZ, 1952. *Jur.*, Europe (Germany, Switzerland).

*Angarogyrus* PONOMARENKO, 1977b, p. 44 [\**A. minimus*; OD]. Similar to *Mesodineutes*, but mesothorax longer. *Jur.*, USSR (Asian RSFSR).

*Avitortor* PONOMARENKO, 1977b, p. 42 [\**A. primitivus*; OD]. Metathorax long and middle coxae narrow. *Cret.*, USSR (Asian RSFSR).

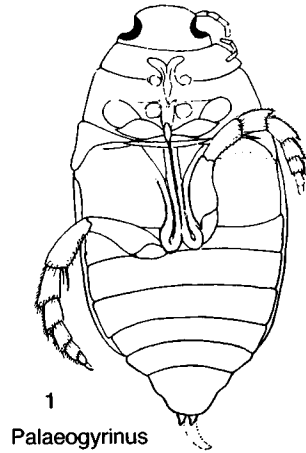
*Bassogyrus* PONOMARENKO, 1973b, p. 66 [\**B. savilovi*; OD]. Hind coxae transverse; tibiae long. PONOMARENKO, 1977b. *Cret.*, USSR (Asian RSFSR).

*Cretortor* PONOMARENKO, 1973b, p. 67 [\**C. zberichini*; OD]. Elytron with 9 prominent furrows and a sutural margin. PONOMARENKO, 1977b. *Cret.*, USSR (Kazakh).

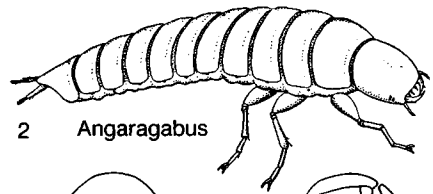
*Gyrinoides* MOTSCHULSKY, 1856, p. 26 [\**G. limbatus*; OD]. Similar to *Gyrinus* (recent), but elytra without striae. HATCH, 1925, 1927a. *Oligo.*, Europe (Baltic).

*Mesodineutes* PONOMARENKO, 1977b, p. 43 [\**M. amurensis*; OD]. Body smooth; hind coxae short and transverse; mesothorax wider than long; abdomen short and broad. *Cret.*, USSR (Asian RSFSR).

*Mesogyrus* PONOMARENKO, 1973b, p. 63 [\**M. striatus*; OD]. Hind coxae short; middle and hind femora and tibiae slightly dilated apically.



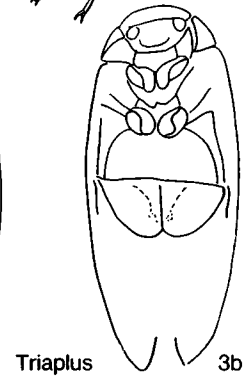
1  
Palaeogyrius



2  
Angaragabus



3a



3b

Triaplus

FIG. 179. Triaplidae and Dytiscidae (p. 293–294).

*Jur.*, USSR (Kazakh); *Cret.*, USSR (Asian RSFSR).

*Miodineutes* HATCH, 1927a, p. 91 [\**M. oeningensis*; OD]. Similar to *Enhydus* (recent), but body less broadly oval and with most elytral striae obsolete. *Mio.*, Europe (Germany).

*Protogyrius* HATCH, 1927a, p. 92 [\**Gyrinus confinis* SCUDDER, 1900, p. 80; OD]. Similar to *Gyrinus* (recent), but elytral striae extending independently nearly to apex, present as rows of punctures. *Pleist.*, Canada (Ontario).

### Family PARAHYGROBIIDAE Ponomarenko, 1977

[Parahygrobiidae PONOMARENKO, 1977b, p. 19]

Aquatic beetles, known only by larva; swimming legs; antennae with 4 segments;



mandibles strongly curved, inner margins with a small tooth; prothorax longer than other 2 thoracic segments combined; abdomen with prominent urogomphi. *Jur.*

**Parahydrobia** PONOMARENKO, 1977b, p. 20 [\**P. natans*; OD]. Urogomphi slightly shorter than abdomen. *Jur.*, USSR (Asian RSFSR).—FIG. 180,4. \**P. natans*; ventral view of larva,  $\times 9$  (Ponomarenko, 1977b).

### Family COPTOCLAVIDAE Ponomarenko, 1961

[Coptoclavidae PONOMARENKO, 1961, p. 68]

Medium-sized to large aquatic beetles. Adults with flat body; compound eyes divided; metepisternum not reaching middle coxae; hind coxae not widened anteriorly; middle and hind legs at least slightly modified for swimming. Larvae active swimmers; body cylindrical; urogomphi long; mandibles each with at least 1 prominent tooth; forelegs raptorial, slender, with numerous setae; middle and hind legs flattened; abdomen with 8 segments; spiracles metapneustic. PONOMARENKO, 1975b. *Jur.—Cret.*

**Coptoclava** PING, 1928, p. 39 [\**C. longipoda*; OD]. Middle and hind tibiae and tarsi very broad. ROHDENDORF, 1962a; PONOMARENKO, 1961, 1975b. *Jur.*, USSR (Asian RSFSR); *Cret.*, China (Shandong). — FIG. 180,1. \**C. longipoda*, restorations; *a, b*, adult, dorsal and ventral views, *c*, larva, all  $\times 1.5$  (Ponomarenko, 1961).

**Charonoscapha** PONOMARENKO, 1977b, p. 32 [\**C. grossa*; OD]. Large beetles with flat bodies; head transverse; middle and hind tibiae flattened; anterior margin of pronotum strongly emarginate. *Jur.*, USSR (Kazakh). — FIG. 180,2. \**C. grossa*; ventral view,  $\times 2.3$  (Ponomarenko, 1977b).

**Charonoscaphidia** PONOMARENKO, 1977b, p. 35 [\**C. elongata*; OD]. Similar to *Charonoscapha*, but pronotum not markedly emarginate. *Jur.*, USSR (Kazakh).

**Exedia** PONOMARENKO, 1977b, p. 28 [\**E. plana*; OD]. Similar to *Necronectes*, but pronotum broadened basally. *Jur.*, USSR (Kazakh).

**Necronectes** PONOMARENKO, 1977b, p. 22 [\**N. aquaticus*; OD]. Large, elongate beetles; pronotum extending anteriorly along sides of head; hind tarsi of adults long and thin. Larvae with single tooth on cutting edge of mandibles. *Jur.*, USSR (Asian RSFSR, Kazakh, Kirghiz); *Cret.*, Algeria (Sayda).

**Pseudohydrophilus** DEICHMÜLLER, 1886, p. 67 [\**P. longispinosus*; OD; = *Blabera avita* HEYDEN, 1847, p. 100] [= *Prodytiscus* OPPENHEIM, 1888, p. 237,

obj.]. Little-known genus, similar to *Necronectes*, with middle segments of fore tarsi not indented apically. PONOMARENKO, 1971b, 1977b. *Jur.*, Europe (Germany).

**Stygeonectes** PONOMARENKO, 1977b, p. 29 [\**S. jurassicus*; OD]. Larvae similar to that of *Coptoclava*, but forelegs shorter. *Jur.*, USSR (Asian RSFSR).

### Family LIADYTIDAE Ponomarenko, 1977

[Liadytidae PONOMARENKO, 1977b, p. 38]

Small aquatic beetles; head withdrawn into prothorax; metathorax with a longitudinal keel; hind coxae not widened anteriorly; legs slender and long; tibiae and tarsi with swimming hairs. *Jur.*

**Liadytes** PONOMARENKO, 1963b, p. 129 [\**L. avus*; OD]. Pronotum not covering scutellum. PONOMARENKO, 1977b. *Jur.*, USSR (Asian RSFSR). — FIG. 180,3. \**L. avus*; dorsal view,  $\times 8$  (Ponomarenko, 1963b).

### Suborder POLYPHAGA Emery, 1886

[Polyphaga EMERY, 1886, p. 655]

Prothorax without notopleural sutures; hind coxae only rarely fused to metasternum, not dividing first visible abdominal sternite; tarsal segmentation diverse; hind wing without a closed cell between veins M and CU distally; abdomen with 3 to 7 visible sternites. Larval legs with 4 segments. Adult and larvae with diverse feeding habits. *Trias.—Holo.*

### Family HYDROPHILIDAE Latreille, 1802

[Hydrophilidae LATREILLE, 1802a, p. 136]

Very small to large beetles. Adults usually aquatic, with smooth, oval form; maxillary palpi at least as long as antennae, usually longer; antennal club with fine hydrofuge pubescence; scape curved; each pair of coxae close together; all tarsi with 5 segments; abdomen typically with 5 visible sternites. Adults phytophagous. Larvae campodeiform, usually aquatic, and predaceous; pupae formed in mud cells near water. *Jur.—Holo.*

**Hydrophilus** GEOFFROY, 1762, p. 180. *Holo.*  
**Creniphilites** WICKHAM, 1913c, p. 8 [\**C. orpheus*;

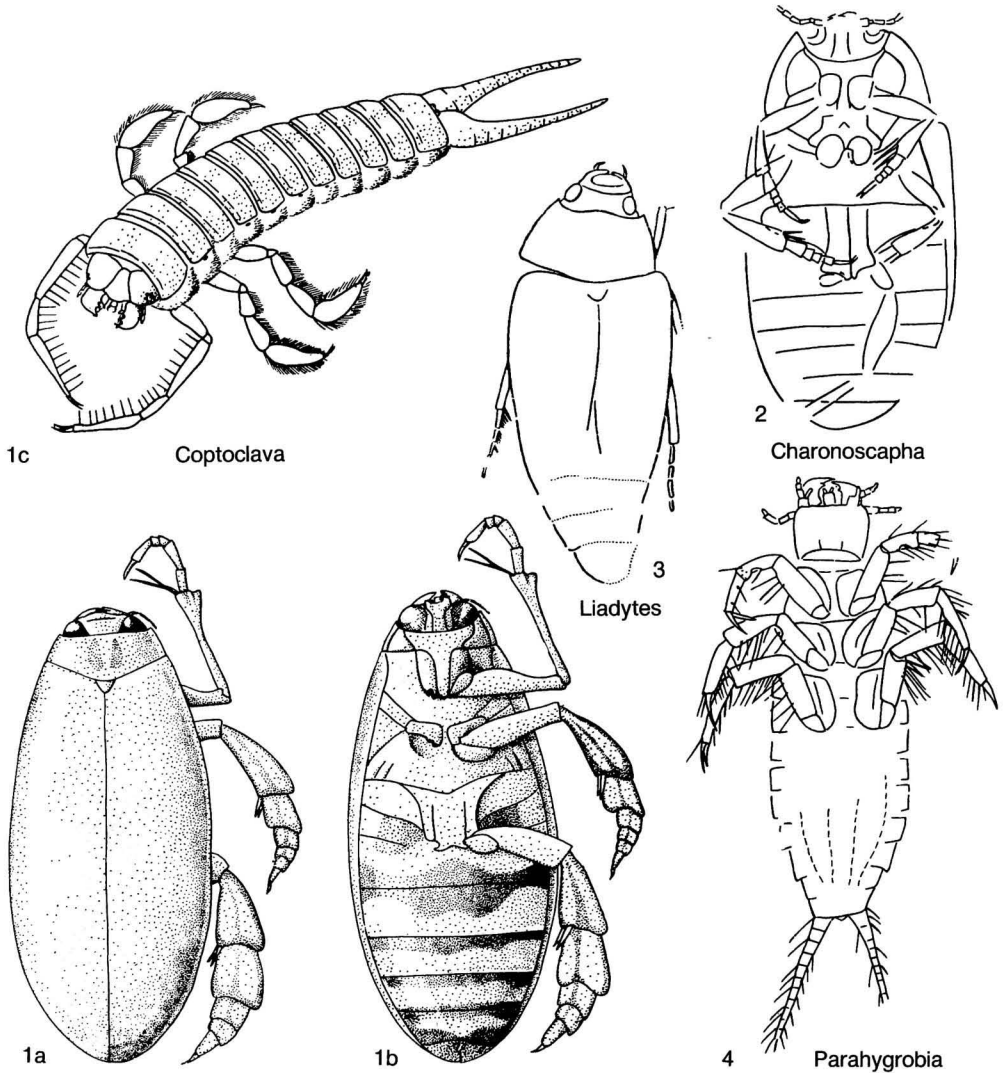


FIG. 180. Parahygrobiidae, Coptoclavidae, and Liadytidae (p. 294–295).

OD]. Similar to *Creniphilus* (recent), but metasternum more elongate; antennal club consisting of 4 segments, first and fourth smaller than second and third. *Oligo.*, USA (Colorado).

*Escheria* HEER, 1847, p. 57 [*\*E. ovalis*; OD]. Little-known genus. HEER, 1862a; FÖRSTER, 1891. *Oligo.*–*Mio.*, Europe (Germany).

*Hydrophilopsis* HEER, 1862a, p. 69 [*\*H. elongata*; OD]. Little-known genus. OUSTALET, 1874. *Oligo.*, Europe (France); *Mio.*, Europe (Germany).

*Mesochelophorus* PONOMARENKO, 1977c, p. 113 [*\*M. sibiricus*; OD]. Similar to *Helophorus* (recent), but pronotum with straight sides and angular corners. *Cret.*, USSR (Asian RSFSR).

*Mesosperchus* PONOMARENKO, 1977c, p. 108 [*\*M. tarsalis*; OD]. Small, flat beetles; pronotum transverse; antennal scrobes on prothorax; last tarsal segment much longer than others combined. *Cret.*, USSR (Asian RSFSR). — FIG. 181. *\*M. tarsalis*; *a*, dorsal and *b*, ventral views, ×12 (Ponomarenko, 1977c).

*Mesydra* PONOMARENKO, 1977c, p. 111 [*\*M. elongata*; OD]. Small, elongate beetles; antennae with a short, 3-segmented club; abdomen with 6 visible sternites; legs short. *Cret.*, USSR (Asian RSFSR).

*Parasperchus* PONOMARENKO, 1977c, p. 114 [*\*P. asiaticus*; OD]. Large, flat beetles, with 5 visible

abdominal segments; integument coarsely punctate. *Jur.*, USSR (Kazakh); *Cret.*, USSR (Asian RSFSR).

### Family SCYDMAENIDAE Leach, 1815

[Scydmaenidae LEACH, 1815, p. 92]

Small beetles; body generally with heavy pubescence; marked constriction between thorax and abdomen; penultimate segment of maxillary palpi much larger than terminal segment; elytra usually entire; all tarsi with 5 segments; basal 4 abdominal tergites membranous. Adults and larvae carnivorous, occurring in leaf mold, moss, and other damp places. *Oligo.*—*Holo.*

*Scydmaenus* LATREILLE, 1802, p. 116. *Holo.*

*Clidicus* LAPORTE, 1833, p. 396. SCHAUFUSS, 1896.

*Oligo.*, Europe (Baltic)—*Holo.*

*Cryptodiodon* SCHAUFUSS, 1890c, p. 564 [*\*C. corticaroides*; OD]. Antennae straight, with 11 segments and with a club distally; prothorax subquadrate; third segment of maxillary palpi short and oval, fourth short and awl-shaped; hind coxae flattened. *Oligo.*, Europe (Baltic).

*Cyrtoscydmus* MOTSCHULSKY, 1869, p. 260.

SCHAUFUSS, 1890c. *Oligo.*, Europe (Baltic)—*Holo.*

*Electrosydmaenus* SCHAUFUSS, 1890c, p. 584 [*\*E. pterostichoides*; OD]. Similar to *Heuretus*, but coalesced third and fourth segments of maxillary palpi much shorter and drop-shaped; prothorax subcordate, margined laterally. *Oligo.*, Europe (Baltic).

*Euconnus* THOMSON, 1859, p. 87. FIORI, 1932. *Mio.*, Europe (Sicily)—*Holo.*

*Hetereuthia* SCHAUFUSS, 1890c, p. 579 [*\*H. elegans*; OD]. Similar to *Palaeomastigus*, but coalesced third and fourth segments of maxillary palpi forming an oval club. *Oligo.*, Europe (Baltic).

*Heuretus* SCHAUFUSS, 1890c, p. 583 [*\*H. coriaceus*; OD]. Similar to *Palaeothia*, but coalesced third and fourth segments of maxillary palpi forming a long, cylindrical club. *Oligo.*, Europe (Baltic).

*Palaeomastigus* SCHAUFUSS, 1890c, p. 575 [*\*P. helmi*; OD]. Related to *Clidicus* (recent). Antennae geniculate, with 11 segments; third and fourth segments of maxillary palpi coalesced, forming a wedge-shaped club; elytra striate; tarsi with first segment elongate. *Oligo.*, Europe (Baltic).

*Palaeothia* SCHAUFUSS, 1890c, p. 581 [*\*P. tenuitarsis*; OD]. Antennae straight, terminating in a club; third and fourth segments of maxillary palpi forming a short, oval club; prothorax margined laterally; elytra short. *Oligo.*, Europe (Baltic).

*Scydmaenoides* MOTSCHULSKY, 1856, p. 27 [*\*S.*



Mesosperchus

FIG. 181. Hydrophilidae (p. 296).

*nigrescens*; OD]. Similar to *Scydmaenus* (recent), but antennae with a club composed of 4 segments. *Oligo.*, Europe (Baltic).

*Semnodioceras* SCHAUFUSS, 1890c, p. 573 [*\*S. balticaeforme*; OD]. Similar to *Cryptodiodon*, but hind coxae elevated; fourth segment of maxillary palpi oval and pointed. *Oligo.*, Europe (Baltic).

### Family PTILIIDAE Heer, 1843

[Ptiliidae HEER, 1843, p. 60]

Minute beetles, body and elytra pubescent. Antennae with 11 segments, the 3 distal ones forming a weak club; each antennal segment with a whorl of long setae; fore coxae globular, contiguous; all tarsi with 3 segments, the 2 basal ones very small; elytra usually entire but commonly truncate; hind wing very narrow, with fringe of long hairs; abdomen with 6 or 7 visible sternites. Larvae

elongate, with well-developed thoracic legs; adults and larvae apparently fungivorous, usually occurring in decaying vegetation or dung. *Oligo.*—*Holo.*

- Ptilium* GYLLENHAL, 1827, p. 292. *Holo.*  
*Microptilium* MATTHEWS, 1872, p. 107. DYBAS, 1961. *Oligo.*, Europe (Baltic)—*Holo.*  
*Ptinella* MOTSCHULSKY, 1844, p. 820. PARSONS, 1939. *Oligo.*, Europe (Baltic)—*Holo.*

### Family SILPHIDAE Latreille, 1807

[Silphidae LATREILLE, 1807, p. 1]

Beetles of small to moderate size, body usually flattened; antennae with 10 or 11 segments, terminal 3 to 4 segments forming a pubescent club; pronotum large, transverse, lateral borders margined; elytra usually entire; all tarsi with 5 segments; abdomen with 5 to 6 visible sternites. Larvae campodeiform. Adults and larvae carrion feeders. *Jur.*—*Holo.*

- Silpha* LINNÉ, 1758, p. 359. *Holo.*  
*Eosilphites* HAUPT, 1950, p. 53 [*\*E. decoratus*; OD]. Little-known genus; pronotum transverse, with curved lateral margins. [Family assignment doubtful.] *Eoc.*, Europe (Germany).  
*Mesecanus* NEWTON, 1982, p. 335, *nom. subst. pro Mesagyrtes* PONOMARENKO, 1977c, p. 117, *non* BROUN, 1895 [*\*Mesagyrtes communis* PONOMARENKO, 1977c, p. 117; OD]. Antennae with weakly formed club; elytra with punctate grooves. *Jur.*, USSR (Asian RSFSR).  
*Miosilpha* WICKHAM, 1912a, p. 9 [*\*M. necrophiloides*; OD]. Similar to *Silpha* (recent), but middle coxae contiguous or at least closely approximate. *Oligo.*, USA (Colorado).  
*Palaeosilpha* FLACH, 1890, p. 107 [*\*P. fraasii*; OD]. Similar to *Ptomascopus* (recent), but thorax emarginate laterally. *Oligo.*, Europe (Baltic).  
*Ptomaphagus* ILLIGER, 1798, p. 84. SCHLECHTENDAL, 1888. *Oligo.*, Europe (Baltic)—*Holo.*  
*Ptomascopus* KRAATZ, 1877, p. 102. FLACH, 1890. *Oligo.*, Europe (France)—*Holo.*

### Family STAPHYLINIDAE Latreille, 1802

[Staphylinidae LATREILLE, 1802a, p. 124]

Small to large beetles, with long body and very short elytra; antennae usually with 11 segments, ordinarily filiform or moniliform; exposed abdominal tergites heavily sclerotized; hind wings usually well developed; 6 or 7 abdominal sternites visible. Adults usu-

ally feeding on carrion or decaying vegetation. Larvae campodeiform and usually carrion feeders, though some are predaceous. *Jur.*—*Holo.*

- Staphylinus* LINNÉ, 1758, p. 421. *Holo.*  
*Abolescus* TIKHOMIROVA, 1968, p. 139 [*\*A. glabratus*; OD]. Similar to *Piestus* (recent), but elytron longer and abdomen narrowed distally. *Jur.*, USSR (Kazakh).  
*Abscondus* TIKHOMIROVA, 1968, p. 151 [*\*A. regularis*; OD]. Similar to *Mesotachinus* but with lateral margins of pronotum curved ventrally, and with longer antennae. *Jur.*, USSR (Kazakh).  
*Aleocharopsis* WICKHAM, 1913b, p. 286 [*\*A. caseyi*; OD]. Similar to *Maseochara* (recent) but with shorter antennae; pronotum with long setae. *Oligo.*, USA (Colorado).  
*Archodromus* TIKHOMIROVA, 1968, p. 143 [*\*A. comptus*; OD]. Similar to *Porrbodromus*, but head larger, broader behind middle, and not markedly narrowed posteriorly; elytra with parallel sides. *Jur.*, USSR (Kazakh).  
*Bembicidiodes* SCHAUFUSS, 1888, p. 267 [*\*B. inaequicollis*; OD]. Similar to *Holisus* (recent), but head shorter. *Oligo.*, Europe (Baltic).  
*Globoides* TIKHOMIROVA, 1968, p. 144 [*\*G. oculatus*; OD]. Similar to *Porrbodromus*, but head strongly transverse; pronotum with rounded corners. *Jur.*, USSR (Kazakh).  
*Laasbium* SCUDDER, 1900, p. 49 [*\*L. agasizi* SCUDDER, 1900, p. 49; SD CARPENTER, herein]. Little-known genus, resembling *Lathrobium* (recent), but head broadly sessile upon thorax. *Oligo.*, USA (Colorado).  
*Lathrobium* GRAVENHORST, 1802, p. 53. ABDULLAH, 1968. *Oligo.*, Europe (Baltic)—*Holo.*  
*Lithoplanes* SCUDDER, 1886a, p. 81, *nom. subst. pro Erinnyis* OUSTALET, 1874, p. 145, *non* SHRANK, 1801 [*\*Erinnyis elongata* OUSTALET, 1874, p. 145; SD CARPENTER, herein]. Little-known genus. [Family position doubtful.] *Oligo.*, Europe (France).  
*Mesotachinus* TIKHOMIROVA, 1968, p. 148 [*\*M. major*; OD]. Similar to *Tachinus* (recent), but hind margin of sixth visible abdominal sternite without indentations and teeth. *Jur.*, USSR (Kazakh).  
*Mesozytelus* TIKHOMIROVA, 1968, p. 146 [*\*T. parvus*; OD]. Very similar to *Oxytelus* (recent), but elytra longer and tibiae without spines. *Jur.*, USSR (Kazakh).  
*Micropeplus* LATREILLE, 1809, p. 377. MATTHEWS, 1970. *Plio.*, USA (Alaska)—*Holo.*  
*Miolithocharis* WICKHAM, 1913b, p. 289 [*\*M. lithographicus*; OD]. Similar to *Lithocharis* (recent) but with more rounded head and lack of long setae on posterior margin of head. *Oligo.*, USA (Colorado).  
*Oxypoda* MANNERHEIM, 1831, p. 483. SEEVERS, 1971. *Oligo.* (*Mio.*, Mexico (Chiapas)—*Holo.*

- Palaeopsenius** SEEVERS, 1971, p. 78 [*\*P. mexicanus*; OD]. Similar to *Termitopsenius* (recent) and *Neocapritermes* (recent) but without pronotal and elytral setae; pronotal sculpturing reticulate; maxillary palpi long. *Mio.*, Mexico (Chiapas).
- Paracyptus** SEEVERS, 1971, p. 82 [*\*P. minutissima*; OD]. Similar to *Anacyptus* (recent), but antennae with 11 segments; mandibles long and hook-shaped. *Mio.*, Mexico (Chiapas).
- Porrhodromus** ТИХОМИРОВА, 1968, p. 141 [*\*P. communis*; OD]. Similar to *Porrhodites* (recent) but with the second antennal segment shorter. *Jur.*, USSR (Kazakh).
- Protractus** HEER, 1847, p. 28 [*\*P. erichsoni*; OD]. Little-known genus. [Family assignment uncertain.] *Mio.*, Europe (Germany).
- Protostaphylinus** LIN, 1976, p. 114 [*\*P. mirus*; OD]. Little-known genus. *Jur.*, China (Liaoning).
- Pseudolesteva** SCHAUFUSS, 1890b, p. 69 [*\*P. insinuans*; OD]. Similar to *Lesteva* (recent) but smaller; penultimate antennal segment lenticular, the last segment thick. *Oligo.*, Europe (Baltic).
- Seniaulus** HEYDEN & HEYDEN, 1866, p. 137 [*\*S. scaphioides*; OD]. Little-known genus. [Family position doubtful.] *Oligo.*, Europe (Germany).
- Subcelytrinus** ТИХОМИРОВА, 1968, p. 153 [*\*S. antiquus*; OD]. Apparently related to *Staphylinus* (recent) but with deep sculpturing on elytra. *Jur.*, USSR (Kazakh).
- Tachyporoidea** ТИХОМИРОВА, 1968, p. 150 [*\*T. villosus*; OD]. Similar to *Mesotachinus*, but elytra shorter and with a dense hair cover. *Jur.*, USSR (Kazakh).
- Trigites** HANDLIRSCH, 1907, p. 731, *nom. subst. pro Triga* SCUDDER, 1900, p. 78, *non* FAUVAL, 1878 [*\*Triga coeni* SCUDDER, 1900, p. 78; OD]. Little-known genus. *Oligo.*, USA (Colorado).
- Tunicopterus** ТИХОМИРОВА, 1968, p. 153 [*\*T. sigara*; OD]. Similar to *Staphylinus*, but elytra with broadly rounded posterolateral corners, inner margins being much longer than lateral margins. *Jur.*, USSR (Kazakh).

### Family PSELAPHIDAE Latreille, 1802

[Pselaphidae LATREILLE, 1802a, p. 239]

Small beetles, with very short elytra; body relatively short, abdomen oval and stout; antennae usually with 11 segments; maxillary palpi diversely developed. Adults and larvae mostly carnivorous, occurring in decaying vegetation, under bark, and even in nests of ants and termites. *Oligo.*—*Holo.*

**Pselaphus** HERBST, 1792, p. 106. *Holo.*

**Barybryaxis** SCHAUFUSS, 1890a, p. 121 [*\*B. lata*; OD]. Similar to *Bryaxis* (recent), but maxillary palpi smaller; antennae with 11 segments, filiform, barely clavate. *Oligo.*, Europe (Baltic).

**Batrissus** AUBÉ, 1833, p. 45. SCHAUFUSS, 1890a. *Oligo.*, Europe (Baltic)—*Holo.*

**Bryaxis** KUGELANN, 1794, p. 580. SCHAUFUSS, 1890a. *Oligo.*, Europe (Baltic)—*Holo.*

**Bythinus** LEACH, 1817, p. 80. SCHAUFUSS, 1890a. *Oligo.*, Europe (Baltic)—*Holo.*

**Ctenistodes** SCHAUFUSS, 1890a, p. 142 [*\*C. claviger*; OD]. Similar to *Ctenistes* (recent). Maxillary palpi with second segment elongate, clavate, its base petiolate; antennae with segments 3 to 8 very small, segments 9 to 11 elongate. *Oligo.*, Europe (Baltic).

**Cymbalizon** SCHAUFUSS, 1890a, p. 138 [*\*C. tyroides*; OD]. Little-known genus. Antennae geniculate, with 11 segments; maxillary palpi with third segment very slender, slightly clavate. *Oligo.*, Europe (Baltic).

**Dantiscanus** SCHAUFUSS, 1890a, p. 143 [*\*D. castalis*; OD]. Resembling *Aphodea* (recent), but maxillary palpi lacking stalked penultimate segment; hind coxae not globose. *Oligo.*, Europe (Baltic).

**Deuterotyrrus** SCHAUFUSS, 1890a, p. 131 [*\*D. redivivus*; OD]. Similar to *Tyrrus* (recent); maxillary palpi with 3 distinct segments, the first elongate, curved, and slightly enlarged distally. *Oligo.*, Europe (Baltic).

**Euplectus** LEACH, 1817, p. 80. SCHAUFUSS, 1890a. *Oligo.*, Europe (Baltic)—*Holo.*

**Eupsinoides** MOTSCHULSKY, 1856, p. 26 [*\*E. glabrellus*; OD]. Similar to *Eupsinus* (recent); antennal club composed of 6 distal segments. *Oligo.*, Europe (Baltic)—*Holo.*

**Faronus** AUBÉ, 1844, p. 157. SCHAUFUSS, 1890a. *Oligo.*, Europe (Baltic)—*Holo.*

**Greys** SCHAUFUSS, 1890a, p. 113 [*\*G. conciliator*; OD]. Similar to *Goniacerus* (recent), but antennae not geniculate and elytra ecarinate. *Oligo.*, Europe (Baltic).

**Hagnometopias** SCHAUFUSS, 1890a, p. 134 [*\*H. pater*; OD]. Similar to *Metopias* (recent); maxillary palpus elongate, its second segment long, third broadly oval; antennae with 11 segments, geniculate. *Oligo.*, Europe (Baltic).

**Heteroeuplectus** SCHAUFUSS, 1890a, p. 156 [*\*H. retrorsus*; OD]. Similar to *Euplectus* (recent), but pronotum smooth; first segment of maxillary palpus slender; antennae with 11 segments. *Oligo.*, Europe (Baltic).

**Monyx** SCHAUFUSS, 1890a, p. 129 [*\*M. spiculatus*; OD]. Little-known genus. Maxillary palpus with last segment conical; antennae with 11 segments. *Oligo.*, Europe (Baltic).

**Nugaculus** SCHAUFUSS, 1890a, p. 148 [*\*M. calcitrans*; OD]. Similar to *Faronus* (recent), but antennal club composed of 3 segments; angles of pronotum very prominent. *Oligo.*, Europe (Baltic).

**Nugator** SCHAUFUSS, 1890a, p. 149 [*\*N. stricticollis*; OD]. Similar to *Nugaculus*, but thorax cordate dorsally, not angular. *Oligo.*, Europe (Baltic).

**Pammiges** SCHAUFUSS, 1890a, p. 144 [*\*P. spectrum*; OD]. Little-known genus. Antennae with 11 segments, slightly clavate; second segment of maxillary palpus elongate, third and fourth transverse. *Oligo.*, Europe (Baltic).

**Pantobatriscus** SCHAUFUSS, 1890a, p. 145 [*\*P. censor*; OD]. Little-known genus. Body elongate, cylindrical; antennae inserted in lateral fossae and with 11 segments. FLACH, 1890. *Oligo.*, Europe (Baltic).

**Tmesiphoroides** MOTSCHULSKY, 1856, p. 26 [*\*T. cariniger*; OD]. Similar to *Tmesiphorus* (recent), but antennae with club composed of 3 very large segments, other segments strongly serrate. SCHAUFUSS, 1890a. *Oligo.*, Europe (Baltic).

**Tychus** LEACH, 1817, p. 81. SCHAUFUSS, 1890a. *Oligo.*, Europe (Baltic)—*Holo.*

**Tyrus** AUBÉ, 1833, p. 15. SCHAUFUSS, 1890a. *Oligo.*, Europe (Baltic)—*Holo.*

### Family LUCANIDAE Latreille, 1806

[Lucanidae LATREILLE, 1806, p. 241]

Medium-sized to large beetles, with conspicuously lamellate antennal clubs, the lamellae thick; head small but mandibles often large, with marked sexual dimorphism; scutellum conspicuous; abdomen with 5 visible sternites. Larvae developing in decaying wood. *Oligo.*—*Holo.*

**Lucanus** SCOPOLI, 1763, p. 1. *Holo.*

**Ceruchites** STATZ, 1952, p. 5 [*\*C. habnei*; OD]. Little-known genus, similar to *Ceruchus* (recent). *Oligo.*, Europe (Germany).

**Dorcasoides** MOTSCHULSKY, 1856, p. 27 [*\*D. bilobus*; OD]. Similar to *Dorcas* (recent), but head strongly bilobed. SCUDDER, 1885b. *Oligo.*, Europe (Baltic).

**Paleognathus** WAGA, 1883, p. 191 [*\*P. succini*; OD]. Similar to *Lamprima* (recent) and *Sphenognathus* (recent) but with antennae, mandibles, and legs less modified. HANDLIRSCH, 1908b, 1920. *Oligo.*, Europe (Baltic).—FIG. 182, 1. *\*P. succini*; dorsal view,  $\times 1.4$  (Waga, 1883).

### Family ACANTHOCNEMIDAE Crowson, 1964

[Acanthocnemidae CROWSON, 1964, p. 317]

Antennae with a club of 3 segments; prothorax with large pits on edges of sternopleuron; claws simple; tibiae with short, stout spines. *Cret.*—*Holo.*

**Acanthocnemus** PERRIS, 1866, p. 187. *Holo.*

**Acanthocnemoides** ZHERIKHIN, 1977a, p. 135 [*\*A. sukatshevae*; OD]. Body flat; antennal segments

4 through 8 elongate. *Cret.*, USSR (Asian RSFSR).—FIG. 182, 6. *\*A. sukatshevae*; a, dorsal and b, ventral views,  $\times 25$  (Zherikhin, 1977a).

### Family PASSALIDAE Leach, 1815

[Passalidae LEACH, 1815, p. 100]

Body flat, sides parallel; head prognathous; antennae with 10 segments, the last 3 free but forming a loose club; mandibles large, toothed, blunt; pronotum much broader than head; elytra with well-developed longitudinal striae; abdomen with 5 visible sternites. Larvae active; first 2 pairs of legs long, hind pair much reduced and forming a stridulatory structure. Adults and larvae in decaying logs and stumps. *Oligo.*—*Holo.*

**Passalus** FABRICIUS 1792, p. 240. REYES-CASTILLO, 1977. *Oligo.*, USA (Oregon)—*Holo.*

### Family SCARABAEIDAE Latreille, 1802

[Scarabaeidae LATREILLE, 1802a, p. 144]

Medium-sized to large beetles. Antennae with a lamellate club, lamellae very thin; mandibles small and thin, adapted for feeding on soft or liquid food; head and pronotum often showing sexual dimorphism; abdomen usually with 6 visible sternites. Larvae usually in soil, feeding on plant roots, decaying vegetation, or dung. *Jur.*—*Holo.*

**Scarabaeus** LINNÉ, 1758, p. 345. *Holo.*

**Anomalites** FRITSCH, 1884b, p. 163 [*\*A. fugitivus*; OD]. Little-known genus. *Paleoc.*—*Plio.*, Europe (Germany).

**Ateuchites** MEUNIER, 1898c, p. 114 [*\*A. grandis*; OD]. Little-known genus. *Oligo.*, Europe (France).

**Geotrupoides** HANDLIRSCH, 1906b, p. 545 [*\*Geotrupes lithographicus* DEICHMÜLLER, 1886, p. 69; OD]. Little-known genus. Flat beetles; labrum and mandibles projecting far beyond clypeus; pronotum transverse, sides curved; elytra with punctate grooves. PONOMARENKO, 1977c. *Jur.*, Europe (Germany); *Cret.*, USSR (Asian RSFSR).

**Heliocopris** HOPE, 1837, p. 23. FUJIYAMA, 1968b. *Mio.*, Japan—*Holo.*

**Holcoribeus** NIKRITIN, 1977, p. 127 [*\*H. vittatus*; OD]. Little-known genus. Mandibles projecting well beyond clypeus; hind tibiae with terminal spurs. [Family assignment doubtful.] *Cret.*, USSR

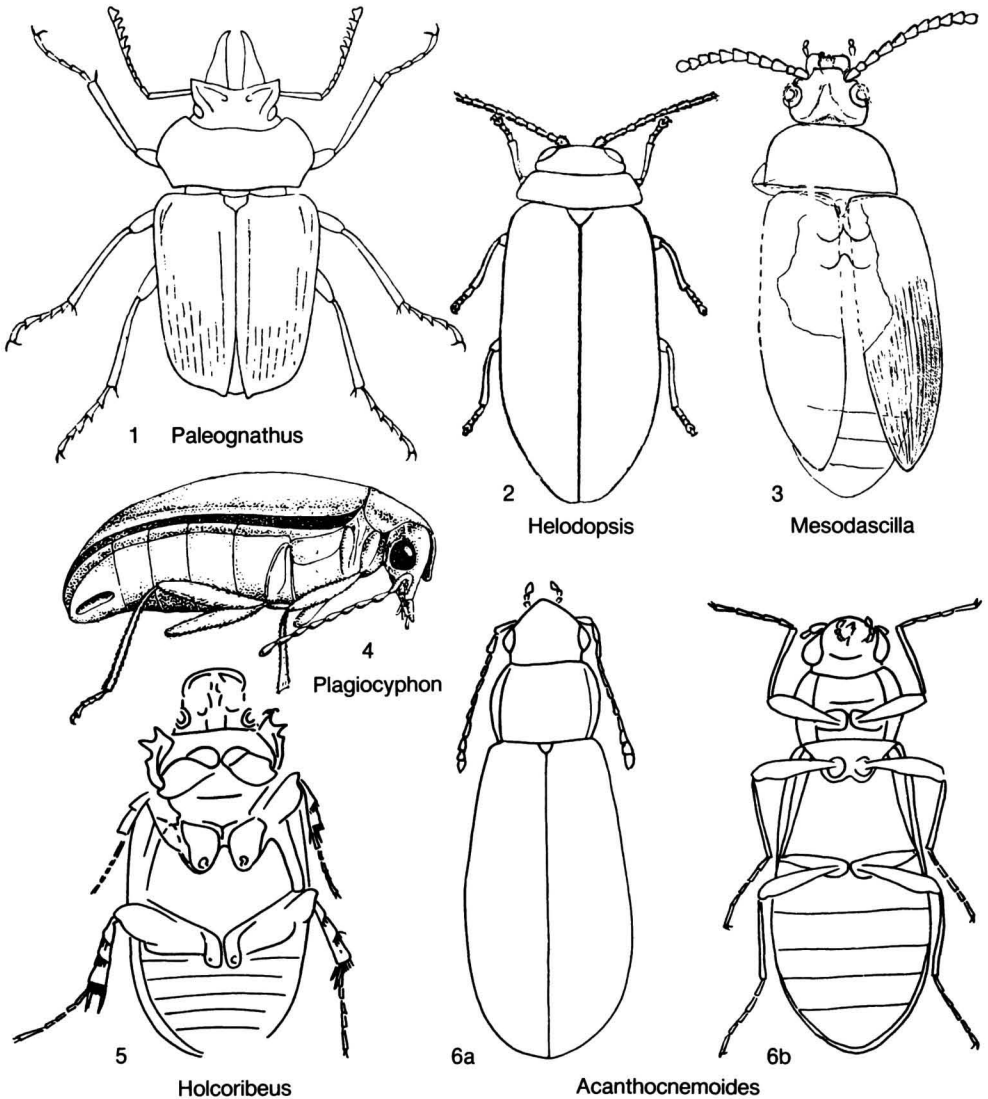


FIG. 182. Lucanidae, Acanthocnemidae, Scarabaeidae, Helodidae, and Dascillidae (p. 300–302).

(Asian RSFSR). — FIG. 182, 5. \**H. vittatus*; ventral view,  $\times 4.5$  (Nikritin, 1977).

*Miolachnosterna* WICKHAM, 1914a, p. 458 [\**M. tristoides*; OD]. Similar to *Lachnosterna* (recent), but hind tarsi with simple claws. *Oligo.*, USA (Colorado).

*Pelidnotites* COCKERELL, 1920b, p. 462 [\**P. atavus*; OD]. Little-known genus, apparently related to *Pelidonta* (recent). STRAND, 1936. *Eoc.*, England.

*Proteroscarabeus* GRABAU, 1923, p. 175 [\**P. yeni*; OD]. Little-known genus, apparently related to *Geotrupes* (recent). PONOMARENKO, 1977c. *Cret.*, China (Shandong), USSR (Asian RSFSR).

**Family HELODIDAE Le Conte, 1861**

[Helodidae LE CONTE, 1861 in LE CONTE, 1861–1862, p. 179]

Small, convex beetles, with slender, fili-form antennae consisting of 11 segments; pronotum very broad and short; fore coxal cavities opening posteriorly; all tarsi with 5 segments, only fourth bilobed. Adults occurring in damp places. Larvae aquatic, campodeiform, with multisegmented antennae and rectal tracheal gills. *Oligo.*—*Holo.*

**Helodes** LATREILLE, 1796, p. 44. KLAUSNITZER, 1976. *Oligo.*, Europe (Baltic)—*Holo.*

**Brachelodes** IABLOKOV-KHNZORIAN, 1961c, p. 109 [\**B. motschulskyi*; OD]. Similar to *Microcara* (recent) but with shorter tarsal claws, broader tarsal segments, and without femoral grooves. *Oligo.*, Europe (Baltic).

**Cyphon** PAYKULL, 1799, p. 117. IABLOKOV-KHNZORIAN, 1961a. *Oligo.*, Europe (Baltic)—*Holo.*

**Cyphonogenius** IABLOKOV-KHNZORIAN, 1961c, p. 112 [\**C. zakhratkini*; OD]. Similar to *Helodopsis*, but fore coxae contiguous. *Oligo.*, Europe (Baltic).

**Helodopsis** IABLOKOV-KHNZORIAN, 1961c, p. 110 [\**H. solskyi*; OD]. Head weakly indented ventrally and not completely recessed within prothorax; fore coxae separated. *Oligo.*, Europe (Baltic). —FIG. 182,2. \**H. solskyi*; dorsal view,  $\times 15$  (Iablokov-Khnzorian, 1961c).

**Miocyphon** WICKHAM, 1914a, p. 436 [\**M. punctulatus*; OD]. Little-known genus. *Oligo.*, USA (Colorado).

**Plagiocyphon** IABLOKOV-KHNZORIAN, 1961c, p. 113 [\**P. plavilshchikovi*; OD]. Similar to *Cyphon* (recent), but fore coxae contiguous; body broad. *Oligo.*, Europe (Baltic). —FIG. 182,4. \**P. plavilshchikovi*; lateral view,  $\times 23$  (Iablokov-Khnzorian, 1961c).

### Family DASCILLIDAE Guérin-Méneville, 1823

[Dascillidae GUÉRIN-MÉNEVILLE, 1823, p. 121]

Similar to Helodidae, but body more slender and elongate; antennae slightly serrate; all tarsi with 5 segments, second, third, and fourth bilobed. Adults on foliage near water; larvae in soil. *Jur.*—*Holo.*

**Dascillus** LATREILLE, 1796, p. 43. *Holo.*

**Mesodascilla** MARTYNOV, 1926a, p. 9 [\**M. jacobsoni*; OD]. Similar to *Dascilla* (recent); elytra long, convex, densely clothed with short hairs, indistinctly striped. *Jur.*, USSR (Kazakh). —FIG. 182,3. \**M. jacobsoni*; dorsal view,  $\times 7$  (Martynov, 1926a).

**Protacnaeus** WICKHAM, 1914a, p. 435 [\**P. tenuicornis*; OD]. Little-known genus; head large; antennae filiform; fore coxae contiguous. [Family assignment doubtful.] *Oligo.*, USA (Colorado).

### Family PTILODACTYLIDAE Le Conte, 1861

[Ptilodactylidae LE CONTE, 1861 IN LE CONTE, 1861–1862, p. 179]

Small beetles, body covered with fine pubescence; antennae long and pectinate; hind margin of pronotum crenulate; all tarsi with

5 segments; abdomen with 5 visible sternites. Adults on vegetation, near water. Larvae aquatic, with prominent setae and tufts of tracheal gills on several abdominal segments. *Oligo.*—*Holo.*

**Ptilodactyla** ILLIGER, 1807, p. 342. *Holo.*

**Ptilodactyloides** MOTSCHULSKY, 1856, p. 26 [\**P. stipulicornis*; OD]. Similar to *Ptilodactyla*, but antennae longer than body and with a vertical process on each of its segments. *Oligo.*, Europe (Baltic).

### Family DRYOPIDAE Erichson, 1848

[Dryopidae ERICHSON, 1848, p. 509]

Elongate-oval beetles; body usually covered with water-repelling hairs; head retracted into prothorax; antennae short, pectinate, with 6 terminal segments forming a loose, laminate club; fore coxae transverse; pronotum larger than head; all tarsi with 5 segments. Adults and larvae mostly aquatic, a few terrestrial. *Eoc.*—*Holo.*

**Dryops** OLIVIER, 1791, p. 297. *Holo.*

**Lutrochites** WICKHAM, 1912a, p. 16 [\**L. lecontei*; OD]. Little-known genus, perhaps similar to *Lutrochus* (recent), but head with strong, longitudinal striations. *Oligo.*, USA (Colorado).

**Palaeorhodelmis** BOLLOW, 1940, p. 117 [\**P. samlandica*; OD]. Similar to *Lathelmis* (recent), but body more slender. *Oligo.*, Europe (Baltic).

**Potamophilites** HAUPT, 1956, p. 49 [\**P. angustifrons*; OD]. Little-known genus. *Eoc.*, Europe (Germany).

### Family ARTEMATOPIDAE Lacordaire, 1857

[Artematopidae LACORDAIRE, 1857, p. 260]

Small beetles; antennae moniliform or filiform, rarely pectinate; fore coxae transverse or projecting slightly, with cavities open posteriorly; apex of elytra with a tongue-shaped lobe ventrally; tarsal segments 3 and 4 with membranous lobes ventrally; empodia absent or small. Adults and larvae apparently occurring under lichens. *Oligo.*—*Holo.*

**Artematopus** PERTY, 1832, p. 115. *Holo.*

**Electricrus** CROWSON, 1973, p. 231 [\**E. oligocenicus*; OD]. Similar to *Ctesibius* (recent), but pronotum with deep, oblique impressions near hind angles; labrum small, exposed. *Oligo.*, Europe (Baltic).

**Protartematopus** CROWSON, 1973, p. 233 [\**P. elec-*



*tricus*; OD]. Similar to *Carcinognathus* (recent), but mandibles not prominent and antennae somewhat moniliform, not serrate. SLEEPER, 1969. *Oligo.*, Europe (Baltic).

### Family ELECTRAPATIDAE Iablokov-Khnzorian, 1962

[Electrapatidae IABLOKOV-KHNZORIAN, 1962, p. 87]

Apparently related to Arrematopidae. All coxae flat, elongate; second through fourth tarsi bilobed; abdomen with 6 visible sternites. *Oligo.*

**Electrapate** IABLOKOV-KHNZORIAN, 1962, p. 87 [\**E. martynovi*]; OD]. All tibiae flattened. *Oligo.*, Europe (Baltic).

### Family BUPRESTIDAE Leach, 1815

[Buprestidae LEACH, 1815, p. 85]

Small to large species, usually elongate and heavily sclerotized. Head hypognathous, retracted into prothorax; antennae usually serrate, with 11 segments; pronotum slightly broader than head; elytra usually strongly striate; fore coxal cavities open posteriorly; abdomen with 5 visible sternites, the basal 2 being fused. Adults on foliage. Larvae apodous, with soft bodies and with prothorax very broad and usually flattened; mostly wood borers. *Trias.—Holo.*

**Buprestis** LINNÉ, 1758, p. 408. *Holo.*

**Archelater** CARPENTER, herein [\**A. major* PONGRÁČZ, 1935, p. 549; OD]. Little-known genus (elytron only). [Family assignment doubtful. The original generic name, *Archelater*, was a *nomen nudum* (PONGRÁČZ, 1935).] *Eoc.*, Europe (Germany).

**Brachyspathus** WICKHAM, 1917, p. 466 [\**B. curiosus*]; OD]. Little-known genus. Prosternal process spatulate and emarginate; prothorax and head with rough punctations. *Oligo.*, USA (Colorado).

**Chlorodema** HAUPT, 1950, p. 70 [\**Iridotaenia primordialis* PONGRÁČZ, 1935, p. 559; OD]. Little-known genus, possibly related to *Evides* (recent). OBENBERGER, 1957. *Eoc.*, Europe (Germany).

**Eoanthaxites** HAUPT, 1950, p. 66 [\**Coroebus carniolicus* PONGRÁČZ, 1935, p. 565; OD]. Little-known genus. HAUPT, 1956; OBENBERGER, 1957. *Eoc.*, Europe (Germany).

**Eochalophora** HAUPT, 1950, p. 94 [\**E. abbreviata*]; OD]. Little-known genus, possibly related to *Gyascutus* (recent). *Eoc.*, Europe (Germany).

**Eolampetis** PONGRÁČZ, 1935, p. 561 [\**E. weigelti*]; OD]. Little-known genus, based mainly on elytron. HAUPT, 1950; OBENBERGER, 1957. *Eoc.*, Europe (Germany).

**Fuesslinia** HEER, 1847, p. 123 [\**F. amoena*]; OD]. Little-known genus. [Family assignment doubtful.] *Mio.*, Europe (Germany).

**Glaphyroptera** HEER, 1852, p. 13 [\**G. insignis*]; SD HANDLIRSCH, 1906b, p. 452]. Little-known genus. [Family assignment doubtful.] *Jur.*, Europe (Switzerland).

**Mesostigmodera** ETHERIDGE & OLLIFF, 1890, p. 9 [\**M. typica*]; OD]. Little-known genus apparently related to *Stigmodera* (recent). TILLYARD & DUNSTAN, 1916; HAUPT, 1950. *Trias.*, Australia (Queensland).

**Microjulodis** HAUPT, 1950, p. 64 [\**M. auratus*]; OD]. Little-known genus, possibly related to *Sponsor* (recent). OBENBERGER, 1957. *Eoc.*, Europe (Germany).

**Protogenia** HEER, 1847, p. 118 [\**P. escheri*]; OD]. Little-known genus. *Mio.*, Europe (Germany).

**Rhabdoglyptus** HAUPT, 1950, p. 74 [\**R. viridistriatus*]; OD]. Little-known genus, possibly related to *Evides* (recent). OBENBERGER, 1957. *Eoc.*, Europe (Germany).

**Stizonotus** HAUPT, 1950, p. 77 [\**Ancylocheira acroptera* PONGRÁČZ, 1935, p. 556; OD]. Little-known genus, possibly related to *Psiloptera* (recent). HAUPT, 1956; OBENBERGER, 1957. *Eoc.*, Europe (Germany).

**Taenionotus** HAUPT, 1950, p. 84 [\**T. fasciatus*]; OD]. Little-known genus. *Eoc.*, Europe (Germany).

### Family PRAELATERIIDAE Dolin, 1973

[Praelateriidae DOLIN, 1973, p. 78]

Body elongate, shaped as in the Elateridae; head short; pronotum with well-developed but relatively broad projections on posterior corners; mesoepisterna exceptionally narrow; elytron with 9 rows of pits. *Jur.*

**Praelaterium** DOLIN, 1973, p. 78 [\**P. prolematicum*]; OD]. Head very small; pronotum broadest at middle. *Jur.*, USSR (Kirghiz).

**Elaterocoleus** DOLIN, 1973, p. 79 [\**E. oculatus*]; OD]. Similar to *Praelaterium*, but head much broader; pronotum broadest posteriorly, narrowed anteriorly. *Jur.*, USSR (Kirghiz).

### Family ELATERIDAE Leach, 1815

[Elateridae LEACH, 1815, p. 85]

Small to large, elongate beetles, body usually slightly flattened. Antennae usually serrate, less commonly filiform or pectinate; pronotum large with a pronotal process fitting into a cavity (click mechanism) on mesosternum; hind angles of pronotum acute

and projecting posteriorly; fore coxal cavities open posteriorly; all tarsi with 5 segments; abdomen with 5 visible sternites. Adults on foliage; larvae mainly phytophagous on roots, some carnivorous. *Jur.*—*Holo.*

- Elater** LINNÉ, 1758, p. 404. *Holo.*
- Abrotus** DOLIN, 1980, p. 62 [\**A. sepultus*; OD]. Similar to *Hypnomorphus*, but prothorax bell-shaped, much narrower anteriorly, and indented before posterior corners; antennae filiform, first segment well developed. *Jur.*, USSR (Kazakh).
- Adiagnostus** DOLIN, 1980, p. 44 [\**A. cardiophorinus*; OD]. Body narrow, elongate; antennae filiform, segments homonomous; pronotum narrow; scutellum narrow, cordate; hind coxal plates very broad. *Jur.*, USSR (Kazakh).
- Adocetus** SCUDDER, 1900, p. 97 [\**A. buprestoides*; OD]. Little-known genus, apparently related to *Scaptolenus* (recent) but with apical segments of antennae less enlarged. *Eoc.*, USA (Wyoming).
- Ageratus** DOLIN, 1980, p. 72 [\**A. ponomarenkoi*; OD]. Similar to *Composferus*, but prothorax longer than broad; antennal segments elongate, nearly filiform. *Jur.*, USSR (Kazakh).
- Agriotes** ESCHSCHOLTZ, 1829, p. 34. BECKER, 1963. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*
- Alaodima** DOLIN, 1980, p. 74 [\**A. grandis*; OD]. Similar to *Cryptocardius*, but prothorax shorter, wider than long. *Jur.*, USSR (Kazakh).
- Archeonus** DOLIN, 1980, p. 20 [\**A. abbreviatus*; OD]. Related to *Protagrypnus*, but elytra short. *Jur.*, USSR (Kazakh).
- Codemus** DOLIN, 1980, p. 35 [\**C. synaptoides*; OD]. Similar to *Adiagnostus*, but scutellum suboval. *Jur.*, USSR (Kazakh).
- Composferus** DOLIN, 1980, p. 71 [\**C. priscus*; OD]. Anterior corners of prothorax extending anteriorly; femoral plates of hind coxae wide. *Jur.*, USSR (Kazakh).
- Crioraphes** IABLOKOV-KHNZORIAN, 1961a, p. 93 [\**C. robdendorphi*; OD]. Similar to *Paracardiophorus* (recent) but with propleura extending further medially. *Oligo.*, Europe (Baltic).
- Cryptagriotes** WICKHAM, 1916a, p. 512 [\**C. minisculus*; OD]. Similar to *Cryptobypnus* (recent), but prosternum short and with a small subtruncate lobe. *Oligo.*, USA (colorado).
- Cryptocardius** DOLIN, 1980, p. 74 [\**C. mirabilis*; OD]. Antennae short, nearly filiform, first 5 segments elongate, the rest shorter; first segment longest and thickest. *Jur.*, USSR (Kazakh).
- Desmatus** DOLIN, 1975, p. 60 [\**D. lapidarius*; OD]. Similar to *Protagrypnus*, but femoral plates of hind coxae much larger and triangular. DOLIN, 1980. *Jur.*, USSR (Kazakh).
- Diaraphes** IABLOKOV-KHNZORIAN, 1961a, p. 89 [\**D. kozhantshikovi*; OD]. Similar to *Elastrus* (recent), but first tarsal segment longer. *Oligo.*, Europe (Baltic).
- Elateridium** TILLYARD, 1918b, p. 751, *nom. subst. pro Elaterites* TILLYARD in TILLYARD & DUNSTAN, 1916, p. 41, *non* HEER, 1847 [\**Elaterites wianamitensis*; OD]. Little-known genus; elytron elongate-oval, apparently without sculpturing. MARTYNOVA, 1954. *Jur.*, Australia (New South Wales).
- Elaterophanes** HANDLIRSCH, 1906b, p. 436 [\**Elater socius* GIEBEL, 1856, p. 91; SD CARPENTER, herein]. Little-known genus, apparently related to *Protagrypnus*. COCKERELL, 1915; HAUPT, 1956; DOLIN, 1973. *Jur.*, England.
- Elatron** IABLOKOV-KHNZORIAN, 1961a, p. 90 [\**E. semenovi*; OD]. Similar to *Elater*, but hairs on pronotum directed forward. *Oligo.*, Europe (Baltic).
- Eopyrophorus** HAUPT, 1950, p. 101 [\**E. mixtus*; OD]. Little-known genus, apparently similar to *Pyrophorus* (recent). HAUPT, 1956. *Eoc.*, Europe (Germany).
- Ganestrius** DOLIN, 1976, p. 69 [\**G. stibicki*; OD]. Similar to *Protoquasimus*, but prothorax not wider than long; elytra with thin, long furrows. DOLIN, 1980. *Jur.*, USSR (Kazakh).
- Glyphonyx** CANDÈZE, 1863, p. 451. BECKER, 1963. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*
- Graciolacón** DOLIN, 1980, p. 61 [\**G. aeternus*; OD]. Similar to *Idiomorphus*, but body more elongate; femoral plates of hind coxae transverse, triangular, and narrowed anteriorly. *Jur.*, USSR (Kazakh).
- Holopeurus** IABLOKOV-KHNZORIAN, 1961a, p. 86 [\**H. succineus*; OD]. Little-known genus. Antennae serrate beyond third segment; pronotum with lateral margins entire. *Oligo.*, Europe (Baltic).
- Hypnomorphoides** DOLIN, 1980, p. 54 [\**H. catachtonius*; OD]. Prothorax transverse; middle part of pronotum strongly broadened anteriorly; body short, oval. *Jur.*, USSR (Kazakh).
- Hypnomorphus** DOLIN, 1975, p. 54 [\**H. robdendorfi*; OD]. Similar to *Protagrypnus*, but prosternal sutures closed; pronotum with parallel, longitudinal furrows. DOLIN, 1980. *Jur.*, USSR (Kazakh).
- Idiomerus** DOLIN, 1980, p. 47 [\**I. inflatus*; OD]. Pronotum with curved lateral margins and very short posterior projections. *Jur.*, USSR (Kazakh).
- Idiomorphus** DOLIN, 1980, p. 60 [\**I. singularis*; OD]. Prothorax transverse, with strongly convex lateral margins and sharp, diverging, posterolateral projections. *Jur.*, USSR (Kazakh).
- Lapidiconides** DOLIN, 1980, p. 43 [\**L. excellens*; OD]. Similar to *Hypnomorphus*, but prothorax narrowed anteriorly and femoral plates of hind coxa slender. *Jur.*, USSR (Kazakh).
- Lapidostenus** DOLIN, 1980, p. 30 [\**L. infossus*;

- OD]. Similar to *Hypnomorphus*, but fourth and fifth antennal segments the largest. *Jur.*, USSR (Kazakh).
- Lithocoelus** DOLIN, 1975, p. 53 [\**L. detrusus*; OD]. Prosternum divided into 3 sclerites by longitudinal grooves; mesosternum divided by transverse suture into pre- and post-episternum; femoral plates of hind coxae short; prothorax prominent and transverse. DOLIN, 1980. *Jur.*, USSR (Kazakh).
- Litholacon** DOLIN, 1980, p. 67 [\**L. derumpens*; OD]. Body elongate-oval; prothorax transverse, fore corners not projecting anteriorly; distal antennal segment widened. *Jur.*, USSR (Kazakh).
- Lithomerus** DOLIN, 1980, p. 23 [\**L. cockerelli*; OD]. Similar to *Lithocoelus*, but prosternal sutures entirely open. *Jur.*, USSR (Kazakh).
- Lithoptychus** DOLIN, 1980, p. 57 [\**L. handlirschi*; OD]. Similar to *Idiomorus* but with longer metanotum; pronotum weakly narrowed anteriorly, sides almost straight; body slender. *Jur.*, USSR (Kazakh).
- Lithosomus** DOLIN, 1980, p. 46 [\**L. erosus*; OD]. Middle coxal cavities closed; posterior pronotal projections unusually strong. *Jur.*, USSR (Kazakh).
- Ludiophanes** WICKHAM, 1916a, 522 [\**L. hayden*; OD]. Similar to *Megapenthes* (recent), but coxal plates narrow, with little distal dilation; punctuation of pronotum close and deep. *Oligo.*, USA (Colorado).
- Micragrypnites** DOLIN, 1973, p. 76 [\**G. issykiensis*; OD]. Similar to *Protagrypnus*, but pronotum almost square, its posterior corners only slightly extended. *Jur.*, USSR (Kirghiz).
- Mionelater** BECKER, 1963, p. 125 [\**M. planatus*; OD]. Similar to *Horistonotus* (recent), but frons strongly margined, pronotum emarginate basally, and last segment of maxillary palpus acutely pointed. *Oligo./Mio.*, Mexico (Chiapas).
- Necrocelus** DOLIN, 1980, p. 58 [\**N. aselloides*; OD]. Similar to *Idiomorphus* but with posterolateral projections of pronotum more strongly developed; hind coxae short. *Jur.*, USSR (Kazakh).
- Negastrioides** DOLIN, 1980, p. 52 [\**N. tenuis*; OD]. Similar to *Hypnomorphus*, but antennae serrate, long; middle coxal cavities closed by articulation of meso- and metathorax. *Jur.*, USSR (Kazakh).
- Orthoraphes** IABLOKOV-KHNZORIAN, 1961a, p. 86 [\**O. reichardti*; OD]. Similar to *Ischnodes* (recent), but third antennal segment simple; metathorax without oblique suture. *Oligo.*, Europe (Baltic).
- Paragrypnites** DOLIN, 1980, p. 22 [\**P. jagemanni*; OD]. Similar to *Lithocoelus* but with short pronotum. *Jur.*, USSR (Kazakh).
- Parahypnomorphus** DOLIN, 1980, p. 33 [\**P. jurasicus*; OD]. Similar to *Hypnomorphus*; antennal segments nearly homonomous, but second segment slightly broadened. *Jur.*, USSR (Kazakh).
- Plagiographes** IABLOKOV-KHNZORIAN, 1961a, p. 84 [\**P. fasciatus*; OD]. Similar to *Alaeotyplus* (recent), but frons flat, without indentations; first antennal segment short and straight; first segment of hind tarsus short. *Oligo.*, Europe (Baltic).
- Platyelata** DOLIN, 1980, p. 40 [\**P. reflexicollis*; OD]. Femoral plates of hind coxae strongly developed along entire width of coxae. *Jur.*, USSR (Kazakh).
- Plesiorhaphes** DOLIN, 1980, p. 65 [\**P. scabei*; OD]. Similar to *Desmatus*, but distal antennal segment not broadened. *Jur.*, USSR (Kazakh).
- Protagrypnus** DOLIN, 1973, p. 75 [\**P. exoletus*; OD]. Small species, with slender, convex body; head strongly transverse; mesosternum divided by a suture; pronotum broadly conical, narrowed anteriorly, its posterior corners extended as narrow projections. *Jur.*, USSR (Kirghiz).
- Protocardiophorus** DOLIN, 1976, p. 71 [\**P. ancestralis*; OD]. Prothorax strongly transverse, broadened basally; mid-coxae oval. DOLIN, 1980. *Jur.*, USSR (Kazakh).
- Protoquasimus** DOLIN, 1976, p. 69 [\**P. brevicollis*; OD]. Similar to *Quasimus* (recent), but prothorax short, about twice as wide as long; elytra with long furrows. DOLIN, 1980. *Jur.*, USSR (Kazakh).
- Pseudocardiophorites** DOLIN, 1976, p. 73 [\**P. fragilis*; OD]. Prothorax about as long as wide, not broadened basally; middle coxae nearly circular. DOLIN, 1980. *Jur.*, USSR (Kazakh).
- Sinoelaterium** PING, 1928, p. 22 [\**S. melanovolor*; OD]. Little-known genus. Head triangular; antennae serrate; elytra narrow. [Family assignment doubtful.] *Cret.*, China (Liaoning).
- Tetraraphes** IABLOKOV-KHNZORIAN, 1961a, p. 95 [\**T. ebersini*; OD]. Little-known genus. Elytra without furrows or pitted rows, but covered with dense hairs; lateral border of pronotum entire. *Oligo.*, Europe (Baltic).

### Family EUCNEMIDAE Latreille, 1824

[Eucnemidae LATREILLE, 1824, p. 426]

Elongate beetles of moderate size, resembling the Elateridae. Head strongly deflexed, resting on prosternum; labrum absent; prosternum without median lobe; antennae with 11 segments, moniliform, filiform, or serrate; all tarsi with 5 slender segments; abdomen with 5 visible sternites. Larvae slender, subcylindrical, apparently predaceous, occurring with adults under bark in wood infested with borers. *Eoc.—Holo.*

*Eucnemis* AHRENS, 1812, p. 38. *Holo.*

*Potergites* BRITTON, 1960, p. 34 [*\*P. senectus*; OD].

Related to *Epipleurus* (recent); lateral margins of pronotum broadly rounded, posterior angles acute; scutellum transverse, quadrate; elytra with 9 longitudinal striae. *Eoc.*, England.

### Family CEROPHYTIDAE

Latreille, 1834

[Cerophytidae LATREILLE, 1834, p. 119]

Small beetles, body elongate and slightly depressed; antennae with 11 segments, pectinate or serrate; labrum short, concealed; pronotum transverse; hind coxae transverse; femoral plate absent; hind trochanters very long, all tarsi with 5 segments. Adults and larvae in rotting wood. *Cret.—Holo.*

*Cerophytum* LATREILLE, 1809, p. 375. *Holo.*

*Aphytocerus* ZHERIKHIN, 1977a, p. 131 [*\*A. communis*; OD]. Antennae of male weakly serrate; first segment very large; head withdrawn into prothorax, almost invisible from above. *Cret.*, USSR (Asian RSFSR).

### Family CANTHARIDAE

Latreille, 1802

[Cantharidae LATREILLE, 1802a, p. 185]

Elongate beetles of small to moderate size; body weakly sclerotized, with fine though dense pubescence; antennae filiform, typically with 11 segments; pronotum oval or nearly quadrate and flat; fourth tarsal segment bilobed. Adults omnivorous feeders, commonly found on flowers and foliage; larvae campodeiform, mostly predaceous. *Oligo.—Holo.*

*Cantharis* LINNÉ, 1758, p. 400. *Holo.*

*Cacomorphocerus* SCHAUFUSS, 1892, p. 58 [*\*C. cerambyx*; OD]. Apparently related to *Dysmorphocerus* (recent). Antennae long, with 12 segments, first segment elongate, cylindrical, second very short, third very large; elytra elongate. KORSCHESKY, 1939. *Oligo.*, Europe (Baltic).

### Family LYCIDAE Castelnau, 1840

[Lycidae CASTELNAU, 1840, p. 261]

Elongate beetles of moderate size; body soft; head partly concealed from above by pronotum; antennae long, thick, usually serrate, with 11 segments; pronotum broader than head; elytra very long and slender, usu-

ally broadened distally; all tarsi with 5 segments; abdomen with 7 or 8 visible sternites. Larvae elongate, usually occurring under bark; adults and larvae predaceous. *Oligo.—Holo.*

*Lycus* FABRICIUS, 1787, p. 163. *Holo.*

*Miocaenia* WICKHAM, 1914a, p. 443 [*\*M. pectinicornis*; OD]. Similar to *Caeniella* (recent) but with antennae pectinate distally. *Oligo.*, USA (Colorado).

*Pseudoplatopterus* KLEINE, 1940, p. 179 [*\*P. scheelei*; OD]. Similar to *Dictyopterus* (recent), but elytra with 8 distinct ridges, those in basal half strong, with distinct sculpturing between them. *Oligo.*, Europe (Baltic).

### Family TRIXAGIDAE Seidlitz, 1888

[Trixagidae SEIDLITZ, 1888, p. xliiv]

Small, oval beetles, with fine pubescence; head retracted into pronotum; antennae with 11 segments, serrate or with last 3 segments forming weak club; pronotum transverse, narrowed anteriorly, posterior angles projecting; all tarsi with 5 segments; prothorax fused with metathorax. Adults on flowers; larvae in decaying vegetation. *Oligo.—Holo.*

*Trixagus* KUGELANN, 1794, p. 534. *Holo.*

*Palaeothroscus* IABLOKOV-KHNZORIAN, 1962, p. 83 [*\*P. sosnovskiyi*; OD]. Antennal pits large; furrows of metathorax reaching only to its center; lateral margins of hind coxae parallel basally; antennae clubbed. *Oligo.*, Europe (Baltic).

*Throscites* IABLOKOV-KHNZORIAN, 1962, p. 84 [*\*T. tschitscherini*; OD]. Furrows of metathorax reaching its apical margin; hind corners of pronotum with sharp projections. *Oligo.*, Europe (Baltic).

*Throscogenius* IABLOKOV-KHNZORIAN, 1962, p. 81 [*\*T. takhtajani*; OD]. Prothorax without antennal grooves; antennae with 11 thick segments, the first very long, the second very short; elytra without rows of pits or furrows. *Oligo.*, Europe (Baltic).

### Family MELYRIDAE Leach, 1815

[Melyridae LEACH, 1815, p. 87]

Small beetles, with slender, flattened bodies; antennae with 11 or 12 segments; pronotum quadrate; fore coxae prominent, almost contiguous; all tarsi with 5 segments; abdomen with 5 or 6 visible sternites. Larvae elongate, subcylindrical. Adults and larvae usually carnivorous. *Oligo.—Holo.*

**Melyris** FABRICIUS, 1775, p. 58. *Holo.*

**Eudasytites** WICKHAM, 1912a, p. 19 [collective group]. Dasytine species, with slender body and coarse sculpturing. *Oligo.*, USA (Colorado).

### Family DERMESTIDAE Latreille, 1807

[Dermestidae LATREILLE, 1807, p. 3]

Small, ovoid species; body usually with dense covering of fine hairs; antennae with 5 to 11 segments, having loose club of 3 to 8 segments; pronotum narrowed anteriorly; hind coxae usually grooved to receive femora; all tarsi with 5 segments. Adults commonly on flowers. Larvae subcylindrical, with dense cover of long setae; mostly scavengers, commonly feeding on dried animal tissue. *Oligo.*—*Holo.*

**Dermestes** LINNÉ, 1758, p. 354. *Holo.*

**Cryptorhopalum** GUÉRIN-MÉNEVILLE, 1838, p. 42. BEAL, 1972. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*

**Micryptorhopalum** PIERCE, 1960, p. 46 [\**M. kirkbyae*; OD]. Little-known genus (larva only); apparently related to *Cryptorhopalum*. *Mio.*, USA (California).

### Family ANOBIIDAE Westwood, 1838

[Anobiidae WESTWOOD, 1838, p. 44]

Small ovoid species, body covered with fine setae; head strongly deflexed; antennae with 9 to 11 segments, 3 terminal segments long; fore coxal cavities open posteriorly; hind coxae with concavity for femora; all tarsi with 5 segments; abdomen with 5 visible sternites. Adults commonly occurring in wooded regions. Larvae with curved body, anterior and posterior portions larger than central region; phytophagous, on dried wood. *Eoc.*—*Holo.*

**Anobium** FABRICIUS, 1775, p. 62. *Holo.*

**Eucrada** LE CONTE, 1861, p. 202 [= *Crichtonia* ABDULLAH & ABDULLAH, 1967, p. 23 (type, *C. macheani*)]. WHITE, 1969. *Oligo.*, Europe (Baltic)—*Holo.*

**Gastrallanobium** WICKHAM, 1914b, p. 261 [\**G. subconfusum*; OD]. Similar to *Gastrallus* (recent); prothorax strongly projecting over head with side margins less oblique than in *Gastrallus* (recent). *Oligo.*, USA (Colorado).

**Stichtoptychus** FALL, 1905, p. 258. SPILMAN, 1971. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*

**Venablesia** BRITTON, 1960, p. 31 [\**V. colluvium*; OD]. Similar to *Stagetus* (recent), but pronotum

with a shallow emargination at junction of lateral and posterior margins. *Eoc.*, England.

**Xyletinites** HEYDEN & HEYDEN, 1866, p. 142 [\**X. tumbicolus*; OD]. Little-known genus. [Family assignment uncertain.] *Oligo.*, Europe (Germany).

### Family BOSTRYCHIDAE Latreille, 1802

[Bostrychidae LATREILLE, 1802a, p. 202]

Cylindrical species, with heavy sclerotization. Head small, deflexed, not visible from above; antennae with 8 to 10 segments, having a loose club of 3 to 4 segments; fore coxae projecting, the cavities opening posteriorly; hind coxae with concavity for femora; elytra usually having apical spines; all tarsi with 5 segments. Adults commonly found in wooded areas; larvae curved, with head small; all wood boring. *Oligo.*—*Holo.*

**Bostrychus** GEOFFROY, 1762, p. 301. *Holo.*

**Protapate** WICKHAM, 1912a, p. 20 [\**P. contorta*; OD]. Similar to *Apatides* (recent), but eyes from above much larger; prothorax without recurved processes. *Oligo.*, USA (Colorado).

### Family TROGOSSITIDAE Latreille, 1802

[Trogossitidae LATREILLE, 1802a, p. 159]

Ovoid beetles, small to moderate-sized. Head prognathous; antennae with 10 or 11 segments, including a club of 1 to 3 segments; fore coxae transverse; all tarsi with 5 segments, first segment much shorter than second; abdomen with 5 visible segments. Adults and larvae occurring under bark, in fungi growing on wood, and in stored vegetable products. *Jur.*—*Holo.*

**Trogossita** OLIVIER, 1790, no. 19. *Holo.*

**Lithostoma** MARTYNOV, 1926a, p. 13 [\**L. expansum*; OD]. Similar to *Ostoma* (recent), but without a distinct antennal club. *Jur.*, USSR (Kazakh).

### Family CLERIDAE Klug, 1842

[Cleridae KLUG, 1842 in KLUG, 1840–1842, p. 259]

Body elongate, convex; head strongly deflexed; antennae with 8 to 11 segments and diverse in form but usually clubbed or capitate; pronotum not broader than head; femora slightly swollen; tarsi with 5 segments; abdomen with 5 or 6 visible sternites.

Larvae elongate; head usually prognathous; antennae with 3 segments. Adults and larvae predaceous, usually occurring under bark, in tunnels in wood, or on foliage. *Oligo.*—*Holo.*

*Clerus* GEOFFROY, 1762, p. 303. *Holo.*

*Orthrius* GORHAM, 1876, p. 74. MENIER, 1983. *Oligo.*, Europe (Baltic)—*Holo.*

### Family NITIDULIDAE Latreille, 1802

[Nitidulidae LATREILLE, 1802a, p. 131]

Small, flat species; head prognathous; antennae with 11 segments, the last 3 forming a large club; pronotum strongly transverse; fore coxal cavities closed posteriorly; tarsi usually with 5 segments, the 3 basal segments usually broad; abdomen with 5 visible sternites. Adults and larvae omnivorous, feeding mostly on vegetable products, pollen, and fungi. *Jur.*—*Holo.*

*Nitidula* FABRICIUS, 1775, p. 77. *Holo.*

*Cychramites* WICKHAM, 1913c, p. 14 [\**C. birtus*; OD]. Similar to *Cychramus* (recent), but scutellum smaller; terminal segment of abdomen closely punctate dorsally. *Oligo.*, USA (Colorado).

*Epanurea* SCUDDER, 1900, p. 86 [\**E. ingenita*; OD]. Related to *Epuraea* (recent), but head larger and antennae shorter than width of body; antennae with 10 segments beyond scape, the first 5 segments forming short, slender stem for the club. SCUDDER, 1893a. *Oligo.*, USA (Colorado).

*Meligethiella* MEDVEDEV, 1969, p. 119 [\**M. soroniformis*; OD]. Related to *Nitidula* (recent), but with oblique grooves along sides of metathorax; antennae with a conspicuous club consisting of 3 segments. *Cret.*, USSR (Asian RSFSR).

*Miophenolia* WICKHAM, 1916b, p. 7 [\**M. cilipes*; OD]. Similar to *Phenolia* (recent), but legs stouter; middle tibiae strongly curved along posterior margins. *Oligo.*, USA (Colorado).

*Nitidulina* MARTYNOV, 1926a, p. 15 [\**N. eclavata*; OD]. Similar to *Nitidula* (recent), but antennal club weakly formed. *Jur.*, USSR (Kazakh).

*Omositoidea* SCHAUFUSS, 1892, p. 55 [\**O. gigantea*; OD]. Little-known genus, apparently related to *Omosita* (recent). KORSCHESKY, 1939. *Oligo.*, Europe (Baltic).

*Procarpophilus* DE JONG, 1953, p. 44 [\**P. macgillavryi*; OD]. Similar to *Carpophilus* (recent) but with relatively longer elytra and more attenuate scutellum; lateral margins of pronotum apparently entire. *Paleoc.*—*Plio.*, Sumatra.

### Family CUCUJIDAE Latreille, 1802

[Cucujidae LATREILLE, 1802a, p. 210]

Moderate-sized to small beetles, with prognathous head and very flat body; anten-

nae with 11 segments, filiform or nearly moniliform, inserted near base of mandibles; all tarsi usually with 5 segments, rarely with 4 on some pairs of legs; pronotum margined, often serrate; abdomen with 5 visible sternites. Adults and larvae with diverse feeding habits, occurring under bark, in decaying vegetation, or in dried cereals. *Oligo.*—*Holo.*

*Cucujus* FABRICIUS, 1775, p. 204. *Holo.*

*Lithocoryne* SCUDDER, 1900, p. 83 [\**L. gravis*; OD]. Similar to *Lathropus* (recent), but head narrower; antennae about as long as head and half of thorax combined, first segment large and stout, segments 9 to 11 forming a distinct club. *Oligo.*, USA (Colorado).

### Family CRYPTOPHAGIDAE Erichson, 1848

[Cryptophagidae ERICHSON, 1848, p. 341]

Very small beetles. Head prognathous; antennae moniliform, with 11 segments, the 3 terminal ones forming a conspicuous club; fore coxae globular, coxal cavities open posteriorly; tarsi with 5 segments. Adults and larvae mainly fungivorous, occurring in such diverse environments as flowering plants, stored food products, and nests of social insects. *Cret.*—*Holo.*

*Cryptophagus* HERBST, 1792, p. 172. *Holo.*

*Nganasania* ZHERIKHIN, 1977a, p. 138 [\**N. rheticca*; OD]. Similar to *Ootypus* (recent), but body with conspicuous hair covering. *Cret.*, USSR (Asian RSFSR).

### Family ENDOMYCHIDAE Leach, 1815

[Endomychidae LEACH, 1815, p. 116]

Beetles of moderate size and convex form. Antennae with conspicuous club composed of 3 terminal segments; head recessed into cavity of pronotum; fore coxal cavities open posteriorly; all tarsi with 4 segments, third very small, concealed in second; 5 visible abdominal sternites. Larvae and adults fungivorous, occurring in dung, under bark, or in decaying vegetation. *Oligo.*—*Holo.*

*Endomychus* PANZER, 1795, p. 175. *Holo.*

*Phymaphoroides* MOTSCHULSKY, 1856, p. 27 [\**P. antennatus*; OD]. Similar to *Phymaphorus* (recent), but ninth antennal segment abruptly enlarged. *Oligo.*—Europe (Baltic).

**Family LATHRIDIIDAE**  
**Redtenbacher, 1845**

[Lathridiidae REDTENBACHER, 1845, p. 123]

Very small beetles. Antennae with 8 to 11 segments, last 2 or 3 forming club; pronotum commonly narrower than combined width of elytra at base; elytra commonly coarsely ribbed; all tarsi commonly with 3 simple segments; abdomen with 5 or 6 visible sternites. Adults and larvae fungivorous, living in vegetable debris. *Cret.—Holo.*

**Lathridius** [BECK], 1817, p. 14, *nom. subst. pro Latridius* HERBST, 1793, p. 3. *Holo.*

**Succinimontia** ZHERIKHIN, 1977a, p. 140 [\*S. *inflata*; OD]. Similar to *Corticarkna* (recent), but elytra without distinct hair cover; 5 visible abdominal sternites. *Cret.*, USSR (Asian RSFSR).

**Family MYCETOPHAGIDAE**  
**Leach, 1815**

[Mycetophagidae LEACH, 1815, p. 110]

Small, oval beetles, with pubescent body; antennae with 11 segments and with a club of 2 or 3 segments; fore coxae with cavities open posteriorly; fore tarsi with 3 (males) or 4 segments; mid- and hind tarsi with 4 segments; abdomen with 5 visible sternites. Adults and larvae fungivorous. *Oligo.—Holo.*

**Mycetophagus** HELLWIG, 1792, p. 394. *Holo.*

**Crowsonium** ABDULLAH, 1964, p. 334 [\*C. *succinum*; OD]. Antennal club with 3 segments, the last tapering; eyes entire; lateral margins of pronotum and elytra bordered by spinelike hairs; elytral punctures arranged in at least 10 long rows. *Oligo.*, Europe (Baltic).

**Family CIRCAEIDAE**  
**Iablokov-Khnzorian, 1961**

[Circaeidae IABLOKOV-KHNZORIAN, 1961b, p. 209]

Related to Mycetophagidae. All tarsi with 4 segments; first 3 segments of fore tarsi transverse and nearly identical; first segment of middle tarsi very long, third bilobed; first segment of hind tarsi much larger than other 3 segments combined, second bilobed, third very small. *Oligo.*

**Circaeus** IABLOKOV-KHNZORIAN, 1961b, p. 209 [\*I. *borisjaki*; OD]. Antennae with 11 segments, with 5 distal segments forming a club; first 4 club segments transverse, and fifth large and long. *Oligo.*, Europe (Baltic).

**Family COLYDIIDAE** Erichson, 1848

[Colydiidae ERICHSON, 1848, p. 251]

Small to medium-sized beetles; body cylindrical or flattened, with coarse sculpturing or ridges; antennae with a short club formed by 2 or 3 terminal segments; fore coxal cavities closed posteriorly; all tarsi with 4 segments. Adults mostly phytophagous or fungivorous; larvae little known, but some ectoparasites on other Coleoptera. *Oligo.—Holo.*

**Colydium** FABRICIUS, 1792, p. 495. *Holo.*

**Rhagoderidea** WICKHAM, 1914a, p. 430 [\*R. *striata*; OD]. Similar to *Rhagodera* (recent), but side margins of pronotum entire or nearly so; elytral striae weak. *Oligo.*, Europe (Colorado).

**Family TENEBRIONIDAE**  
**Latreille, 1802**

[Tenebrionidae LATREILLE, 1802a, p. 165]

Small to large beetles, with body form diverse but strongly sclerotized, the head prognathous; antennae stout, usually moniliform but rarely clubbed; fore coxal cavities closed posteriorly; elytra entire, often curving over sides of abdomen; fore and middle tarsi with 5 segments, hind pair with 4 segments; claws simple; abdomen with 5 visible sternites, the 3 basal segments fused. Adults commonly on ground, under bark, or in rotting wood. Larvae elongate and strongly sclerotized, with short legs. Adults and larvae mainly scavengers. *Trias.—Holo.*

**Tenebrio** LINNÉ, 1758, p. 417. *Holo.*

**Anthracohelepus** HAUPT, 1950, p. 128 [\*A. *gigas*; OD]. Little-known genus. [Family assignment doubtful.] *Eoc.*, Europe (Germany).

**Miostenosis** WICKHAM, 1913b, p. 297 [\*M. *lacordairei*; OD]. Similar to *Stenosis* (recent), but anterior and middle coxae closely approximate; hind coxae meeting on median line. *Oligo.*, Europe (Colorado).

**Proteleates** WICKHAM, 1914b, p. 267 [\*P. *centralis*; OD]. Similar to *Eleates* (recent), but fore coxae round; third and fourth ventral segments of abdomen short, their combined lengths not longer than second. *Oligo.*, USA (Colorado).

**Protoplaticera** WICKHAM, 1914a, p. 484 [\*P. *lari-cornis*; OD]. Little-known genus. Antennae with basal 2 or 3 segments slender, the rest broad and flat. [Family assignment doubtful.] *Oligo.*, USA (Colorado).

**Pyrochalcaspis** HAUPT, 1950, p. 115 [\*P. *giselta-*

*lensis*; OD]. Little-known genus. [Family assignment doubtful.] *Eoc.*, Europe (Germany).

**Tenebrionites** COCKERELL, 1920d, p. 67 [collective group]. Isolated elytra resembling those of tenebrionids. COCKERELL, 1925f, 1927e. *Eoc.*, England; *Oligo.*, USA (Colorado); *Paleoc.-Plio.*, Argentina (Jujuy).

**Uromites** TILLYARD in TILLYARD & DUNSTAN, 1916, p. 22 [\**U. willcoxi*; OD]. Elytron similar to that of *Uroma* (recent). [Family assignment doubtful.] DUNSTAN, 1923. *Trias.*, Australia (Queensland).

### Family SALPINGIDAE Leach, 1815

[Salpingidae LEACH, 1815, p. 106]

Small, elongate beetles, sides nearly parallel; head prognathous; antennae filiform, with 11 segments; pronotum quadrate, not margined laterally; fore coxal cavities open posteriorly; fore and middle tarsi with 5 segments, hind tarsi with 4 segments; abdomen with 5 visible sternites. Adults and larvae occurring under bark. *Oligo.-Holo.*

**Salpingus** ILLIGER, 1812, p. 301. *Holo.*

**Neopolypria** ABDULLAH, 1964, p. 336 [\**N. nigra*; OD]. Similar to *Polypria* (recent). Antennae slightly serrate; eyes large, hairy, slightly emarginate near antennal insertion; pronotum slightly wider than long, coarsely punctate toward lateral margins. *Oligo.*, Europe (Baltic).

### Family PYTHIDAE Mulsant, 1856

[Pythidae MULSANT, 1856, p. 26]

Elongate beetles of moderate size; head prognathous; antennae with 11 segments, segments gradually thickened toward distal end of antennae; fore coxae projecting and contiguous, cavities opening posteriorly; fore and middle tarsi with 5 segments, hind tarsi with 4; abdomen with 5 visible sternites. Larvae elongate; larvae and adults carnivorous. *Oligo.-Holo.*

**Pytho** LATREILLE, 1796, p. 23. *Holo.*

**Pythoceroopsis** WICKHAM, 1913c, p. 20 [\**P. singularis*; OD]. Similar to *Lecontia* (recent), but antennae more slender, their lengths about 1.3 times head width. *Oligo.*, USA (Colorado).

### Family ALLECULIDAE Seidlitz, 1891

[Alleculidae SEIDLITZ, 1891, p. xlix]

Slender beetles of moderate size; head subprognathous; antennae long, filiform, with 11 segments; pronotum strongly margined;

fore and middle tarsi with 5 segments, hind pair with 4; claws pectinate; abdomen with 5 visible sternites. Adults occurring on flowers and foliage, feeding chiefly on pollen; larvae in plant debris. *Jur.-Holo.*

**Allecula** FABRICIUS, 1801, p. 21. *Holo.*

**Hymenorus** MULSANT, 1851, p. 201. WICKHAM, 1914a; CAMPBELL, 1964. *Oligo.*, USA (Colorado); *Oligo./Mio.*, Mexico (Chiapas)-*Holo.*

**Isomira** MULSANT, 1856, p. 52. SEIDLITZ, 1896. *Oligo.*, Europe (Baltic)-*Holo.*

**Jurallecula** MEDVEDEV, 1969, p. 123 [\**J. grossa*; OD]. Head elongate; eyes large, reniform; fore coxal cavities closed; fore and middle tarsi with first and fifth segments long. *Jur.*, USSR (Kazakh).

**Mycetocharoides** SCHAUFUSS, 1888, p. 269 [\**M. baumeisteri*; OD]. Similar to *Mycetochares* (recent), but antennae and legs more slender; pronotum not margined; antennae with first, third, and fourth segments longest. *Oligo.*, Europe (Baltic).

### Family PYROCHROIDAE

Latreille, 1807

[Pyrochroidae LATREILLE, 1807, p. 201]

Head strongly constricted behind eyes, forming prominent neck; antennae serrate, pectinate, or plumose; pronotum much narrower than width across elytral bases; fore coxae with cavities opening posteriorly; fore and middle tarsi with 5 segments, hind tarsi with 4; abdomen with 5 visible sternites. Adults occurring on flowers and foliage; larvae predaceous, usually found under bark of trees. *Oligo.-Holo.*

**Pyrochroa** GEOFFROY, 1762, p. 338. *Holo.*

**Palaeopyrochroa** ABDULLAH, 1965, p. 40 [\**P. crowsoni*; OD]. Similar to *Techmessa* (recent) and *Exocalopus* (recent) with appendiculate tarsal claws. *Oligo.*, Europe (Baltic).

### Family MELANDRYIDAE Leach, 1815

[Melandryidae LEACH, 1815, p. 104]

Elongate beetles of small to moderate size; head strongly deflexed, not constricted behind eyes; antennae usually with 11 filiform segments, a small club sometimes present; pronotum strongly arched anteriorly; fore coxae projecting, contiguous, cavities closed posteriorly; fore and middle tarsi with 5 segments, hind tarsi with 4, second segment longest. Adults and larvae occurring in



decaying wood, mostly carnivorous. *Cret.*—*Holo.*

*Melandrya* FABRICIUS, 1801, p. 163. *Holo.*

*Abderina* SEIDLITZ, 1898, p. 576 [\**A. belmsi*; OD].

Similar to *Serropalpus* (recent), but antennae long and penultimate tarsal segment simple; elytra densely punctate. *Oligo.*, Europe (Baltic).

*Archaeoxylita* NIKITSKY, 1977, p. 141 [\**A. zberichini*; OD]. Similar to *Rushia* (recent), but fourth to seventh antennal segments not broadened and third segment of hind tarsus relatively longer. *Cret.*, USSR (Asian RSFSR).

*Cicindelopsis* COCKERELL, 1920c, p. 254 [\**C. eopbilus*; OD]. Little-known genus (elytron only), apparently related to *Prothalpia* (recent). COCKERELL, 1924a. *Eoc.*, USA (Colorado).

*Pseudohallomenus* NIKITSKY, 1977, p. 142 [\**P. cretaceous*; OD]. Similar to *Hallomenus* (recent), but scutellum rectangular. *Cret.*, USSR (Asian RSFSR).

### Family SCRAPTIIDAE Latreille, 1807

[Scaptiidae LATREILLE, 1807, p. 199]

Small, elongate-oval beetles; body pubescent. Head deflexed, constricted behind eyes; antennae filiform, usually with 11 segments; fore coxae long, projecting, the bases widely separated and cavities closed posteriorly; legs very long; fore and middle tarsi with 5 segments; hind tarsi with 4, basal segments very long. Adults commonly on flowers, larvae in decaying wood. *Cret.*—*Holo.*

*Scaptia* LATREILLE, 1807, p. 199. ERMISCH, 1941. *Oligo.*, Europe (Baltic)—*Holo.*

*Anaspis* GEOFFROY, 1762, p. 315. ABDULLAH, 1964. *Oligo.*, Europe (Baltic)—*Holo.*

*Archescaptia* ABDULLAH, 1964, p. 340 [\**A. emarginata*; OD]. Similar to *Palaescaptia*, but pronotum only slightly wider than long. *Oligo.*, Europe (Baltic).

*Palaescaptia* ABDULLAH, 1964, p. 339 [\**P. elongata*; OD]. Related to *Scaptia* (recent), but pronotum more transverse and eyes lacking setae. *Oligo.*, Europe (Baltic).

*Scaptiomima* MEDVEDEV, 1969, p. 121 [\**S. brachycornis*; OD]. Antennae short, segments broader than long; tibiae with long spines, especially long on hind legs. *Cret.*, USSR (Asian RSFSR).

### Family MORDELLIDAE Latreille, 1802

[Mordellidae LATREILLE, 1802a, p. 103]

Small to moderate-sized beetles. Head and prothorax strongly deflexed, head covering fore coxae; antennae with 11 segments, distal

segments frequently forming a serrate club; fore and middle tarsi with 5 segments, hind tarsi with 4; claws serrate; terminal abdominal segment produced to form a stout spine; abdomen with 5 or 6 visible sternites. Adults phytophagous, on flowers; larvae phytophagous, predaceous, or parasitic. *Jur.*—*Holo.*

*Mordella* LINNÉ, 1758, p. 420 [= *Mordellina* GERMAR, 1813, p. 14 (type, *M. inclusa*)]. SCHLECTENDAL, 1888. *Oligo.*, Europe (Baltic)—*Holo.*

*Praemordella* SHCHEGOLEVA-BAROVSKAYA, 1929, p. 27 [\**P. martynovi*; OD]. Abdomen with at least 7 distinct segments; hind tarsi as long as tibiae; pygidium pointed. *Jur.*, USSR (Kazakh).

### Family OEDEMERIDAE Latreille, 1810

[Oedemeridae LATREILLE, 1810, p. 216]

Slender beetles of moderate size, the integument soft and finely pubescent. Head small, narrower than prothorax; antennae with 11 segments, long, filiform; fore coxae projecting, contiguous, cavities open posteriorly; legs long and slender; fore and middle tarsi with 5 segments, hind tarsi with 4; 5 visible abdominal sternites. Larvae elongate, weakly sclerotized; mandibles unusually long. Adults phytophagous, on flowers; larvae developing in timber, especially in driftwood along coasts. *Jur.*—*Holo.*

*Oedemera* OLIVIER, 1789, p. 31. *Holo.*

*Eumecoleus* HAUPT, 1950, p. 109 [\**E. tenuis*; OD]. Little-known genus. [Family assignment doubtful.] *Eoc.*, Europe (Germany).

*Necromera* MARTYNOV, 1926a, p. 18 [\**N. baeckmanni*; OD]. Similar to *Ischnomera* (recent) but with shorter and thicker antennae. *Jur.*, USSR (Kazakh).

*Paloedemera* WICKHAM, 1914a, p. 487 [\**P. cresipes*; OD]. Little-known genus. Legs stout, hind femora strongly thickened and toothed. [Family assignment doubtful.] *Oligo.*, USA (Colorado).

### Family ANTHICIDAE Latreille, 1825

[Anthicidae LATREILLE, 1825, p. 383]

Slender beetles, small to moderate in size; head strongly deflexed and constricted behind eyes; antennae filiform or moniliform, slightly broadened distally; fore coxae elongate, cavities usually open posteriorly; pronotum narrow; fore and middle tarsi with 5 segments, hind tarsi with 4; abdomen with 5 visible sternites. Larvae elongate, subcylindrical.

Adults on flowers and foliage; larvae in vegetable debris. *Oligo.-Holo.*

**Anthicus** PAYKULL, 1798, p. 253. *Holo.*

**Lithomacratia** WICKHAM, 1914a, p. 490 [\**L. mirabilis*; OD]. Little-known genus. Similar to *Protomacratia* and *Macratia* but the 3 apical antennal segments much longer than the rest; pronotum short, transverse. WICKHAM, 1920. *Oligo.*, USA (Colorado).

**Macratia** NEWMAN, 1838, p. 377. ABDULLAH, 1965. *Oligo.*, Europe (Baltic)-*Holo.*

**Protomacratia** ABDULLAH, 1964, p. 332 [\**P. appendiculata*; OD]. Similar to *Macratia* but lacking pubescence on tibial spurs. *Oligo.*, Europe (Baltic).

### Family CERAMBYCIDAE Latreille, 1802

[Cerambycidae LATREILLE, 1802a, p. 211]

Small to large, flat beetles; antennae long, usually at least as long as body and inserted on frontal prominences; fore coxal cavities open or narrowly closed posteriorly; all tarsi with 5 segments, fourth segment often minute; abdomen with 5 visible sternites. Larvae diverse in form, elongate or robust; legs very minute or short. Adults phytophagous, on stems, roots, leaves, or pollen; larvae borers in wood or roots. *Eoc.-Holo.*

**Cerambyx** LINNÉ, 1758, p. 388. *Holo.*

**Aenictosoma** SCHAUFUSS, 1892, p. 58 [\**A. doenitzi*; OD]. Little-known genus. KORSCHESKY, 1939. *Oligo.*, Europe (Baltic).

**Anelaphus** LINSLEY, 1936, p. 464. WICKHAM, 1914a; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Arhopalus** SERVILLE, 1834, p. 77. COCKERELL, 1927d; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Callidiopsites** WICKHAM, 1913a, p. 363 [\**C. grandiceps*; OD]. Similar to *Callidium* (recent), but head much larger; mesosternum between middle coxae much narrower. *Oligo.*, USA (Colorado).

**Callimoxys** KRAATZ, 1863, p. 105. COCKERELL, 1911b; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Dorcadionoides** MOTSCHULSKY, 1856, p. 27 [\**D. subaeneus*; OD]. Similar to *Dorcadion* (recent), but elytra and body metallic, with a green pubescence; antennae a little longer than body. *Oligo.*, Europe (Baltic).

**Eocallidium** HAUPT, 1950, p. 143 [\**E. rugulosum*; OD]. Little-known genus (elytron only). [Family assignment doubtful.] *Eoc.*, Europe (Germany).

**Grammoptera** SERVILLE, 1835, p. 215. WICKHAM, 1914a; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Hylurgops** LE CONTE, 1876, p. 389 [= *Myelophilites* SCHEDL, 1947, p. 39 (type, *M. dubius*; Baltic amber)]. HAGEDORN, 1906. *Oligo.*, Europe (Baltic)-*Holo.*

**Megacyllene** CASEY, 1912, p. 351. WICKHAM, 1914a; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Mesosites** DEICHMÜLLER, 1881, p. 319 [\**M. macrophthalmus*; OD]. Little-known genus. *Mio.*, Europe (Czechoslovakia).

**Palaeossemum** ABDULLAH, 1967, p. 148 [\**P. crowsoni*; OD]. Similar to *Megasemum* (recent), but pronotum nearly rectangular and constricted at base. *Oligo.*, Europe (Baltic).

**Palaeoncoderes** PITON & THÉOBALD, 1937, p. 84 [\**P. eocenicus*; OD]. Little-known genus, apparently belonging to subfamily Lamiinae. PITON, 1940a. *Eoc.*, Europe (France).

**Palaeosmodicum** WICKHAM, 1914b, p. 264 [\**P. hamiltoni*; OD]. Similar to *Smodicum* (recent), but front coxal cavities meeting. *Oligo.*, USA (Colorado).

**Parmenops** SCHAUFUSS, 1892, p. 60 [\**P. longicornis*; OD]. Little-known genus. KORSCHESKY, 1939. *Oligo.*, Europe (Baltic).

**Phymatodes** MULSANT, 1839, p. 47. COCKERELL, 1908p; WICKHAM, 1914a; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Pidonia** MULSANT, 1863, p. 186. WICKHAM, 1913a, 1914a; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Prolamioides** PITON & THÉOBALD, 1937, p. 85 [\**P. bituminosus*; OD]. Similar to *Palaeoncoderes*, but last antennal segment less swollen. PITON, 1940a. *Eoc.*, Europe (France).

**Protipochus** WICKHAM, 1914a, p. 467 [\**P. vandykei*; OD]. Similar to *Ipochus* (recent), but antennal segments 3 to 5 not abruptly decreasing in length. LINSLEY, 1942. *Oligo.*, USA (Colorado).

**Protoncideres** WICKHAM, 1913c, p. 18 [\**P. primus*; OD]. Similar to *Oncideres* (recent). Antennae of male about 2.5 times body length; forelegs not elongate. *Oligo.*, Europe (Colorado).

**Protospondylis** LINSLEY, 1942, p. 19 [\**Spondylis florissantensis* WICKHAM, 1920, p. 359; OD; *nom. subst. pro Spondylis tertiaris* WICKHAM, 1917, p. 469, *non* GERMAR, 1849, p. 58]. Similar to *Scaphinus* (recent), but tibiae longitudinally carinate and pronotum with straight sides. HAUPT, 1956. *Oligo.*, USA (Colorado).

**Psapharochrus** THOMSON, 1864, p. 18. WICKHAM, 1914b; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Saperda** FABRICIUS, 1775, p. 184. SCUDDER, 1900; COCKERELL, 1916c; WICKHAM, 1916b, 1920; STATZ, 1938a; LINSLEY, 1942. *Oligo.*, USA (Colorado)-*Holo.*

**Scaptolenopsis** WICKHAM, 1914b, p. 263 [\**S. wilmatiae*; OD]. Antennae with 12 segments, slightly serrate, second segment very short; elytra

closely striate. [Family assignment doubtful.] *Oligo.*, USA (Colorado).

*Semanotus* MULSANT, 1839, p. 54. WICKHAM, 1914b; LINSLEY, 1942. *Oligo.*, USA (Colorado)—*Holo.*

## Family CHRYSOMELIDAE

Latreille, 1802

[Chrysomelidae LATREILLE, 1802a, p. 220]

Small to moderate in size, usually robust, with much structural diversity; very similar in most respects to the Cerambycidae. Head hypognathous; antennae filiform, relatively short, not more than half length of body, inserted on front of head, not on a prominence. Larvae also very diverse in form. Larvae and adults phytophagous. *Trias.*—*Holo.*

*Chrysomela* LINNÉ, 1758, p. 368. *Holo.*

*Acassidites* HAUPT, 1950, p. 155 [\**A. separandus*; OD]. Little-known genus (elytron only). *Eoc.*, Europe (Germany).

*Airaphilus* REDTENBACHER, 1858, p. 999. ERMISCH, 1942. *Oligo.*, Europe (Baltic)—*Holo.*

*Cerambyomina* MEDVEDEV, 1968, p. 160 [\**C. longipennis*; OD]. Similar to *Protoscelis*, but antennae very long, the individual segments much enlarged distally. *Jur.*, USSR (Kazakh).

*Chrysomelites* HEER, 1865, p. 89 [collective group]. Elytra resembling those of Chrysomelidae. [Family assignment doubtful.] HEER, 1868, 1869, 1870a, 1870b, 1877; OPPENHEIM, 1888; COCKERELL, 1920d, 1926b; STRAND, 1936. *Trias.*, Europe (Switzerland); *Jur.*, Europe (Germany, Switzerland); *Eoc.*, USA (Alaska), England; *Mio.*, Europe (Norway), Greenland; *Paleoc.*—*Plio.*, Argentina (Jujuy).

*Clythrina* PITON, 1940a, p. 211 [\**C. eocenica*; OD]. Little-known genus, possibly related to *Clythra* (recent). [Family assignment doubtful.] *Eoc.*, Europe (France).

*Crepidodera* (Chevrolat MS.) DEJEAN, 1835, p. 391. GRESSITT, 1971. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*

*Crioceridea* WICKHAM, 1912a, p. 27 [\**C. dubia*; OD]. Similar to *Crioceris* (recent) but with fine elytral sculpturing and a longer second antennal segment. *Oligo.*, USA (Colorado).

*Electrolema* SCHAUFUSS, 1892, p. 63 [\**E. baltica*; OD]. Little-known genus. KORSCHESKY, 1939. *Oligo.*, Europe (Baltic).

*Eochrysomela* HAUPT, 1950, p. 151 [\**E. ornata*; OD]. Little-known genus, possibly similar to *Chrysomela* (recent). HAUPT, 1956. *Eoc.*, Europe (Germany).

*Eodonacia* HAUPT, 1956, p. 54 [\**E. goeckei*; OD]. Little-known genus (elytral fragments). *Eoc.*, Europe (Germany).

*Eoemolpinus* HAUPT, 1950, p. 149 [\**E. azureovirdis*; OD]. Little-known genus, apparently similar to *Eomolpinus* (recent). *Eoc.*, Europe (Germany).

*Eosagra* CARPENTER, herein [\**E. subparallela* HAUPT, 1950, p. 144; OD]. Little-known genus, apparently similar to *Sagra* (recent), but hind femora more enlarged. [The original generic name, *Eosagra*, was a *nomen nudum* (HAUPT, 1950).] *Eoc.*, Europe (Germany).

*Gonocelis* HAUPT, 1950, p. 152 [\**G. natatus*; OD]. Little-known genus (elytra only). [Family assignment doubtful.] *Eoc.*, Europe (Germany).

*Oligocassida* THÉOBALD, 1937a, p. 121 [\**O. melaena*; OD]. Similar to *Laccoptera* (recent) but with elytra less rugose and apex of scutellum rounded. *Oligo.*, Europe (France).

*Oposispa* UHMANN, 1939, p. 21 [\**O. schleeli*; OD]. Similar to *Wallaceana* (recent). Antennae filiform, the 2 basal segments short, the rest longer and cylindrical and with numerous hairs; prothorax subquadrate. *Oligo.*, Europe (Baltic).

*Paracassida* HAUPT, 1956, p. 76 [\**P. punctillata*; OD]. Little-known genus (elytron only). [Family assignment doubtful.] *Eoc.*, Europe (Germany).

*Phloeonemites* WICKHAM, 1912a, p. 14 [\**P. miocenius*; OD]. Similar to *Phloeonemus* (recent) but with antennal club not so abruptly formed; prothorax without sharp, raised lines. *Oligo.*, USA (Colorado).

*Plectrotetrophanes* WICKHAM, 1914a, p. 477 [\**P. hageni*; OD]. Little-known genus. Similar to *Plectrotetra* (recent) but with shorter antennae and prosternum. *Oligo.*, USA (Colorado).

*Profidia* GRESSITT, 1963, p. 108 [\**P. nitida*; OD]. Similar to *Fidia* (recent) but flatter dorsally; pronotum smooth, not ridged; femora toothed. *Oligo./Mio.*, Mexico (Chiapas).

*Protanisodera* QUIEL, 1910, p. 50 [\**P. glaesi*; OD]. Similar to *Anisodera* (recent), but antennae only a little longer than prothorax and legs short. *Oligo.*, Europe (Baltic).

*Protoscelis* MEDVEDEV, 1968, p. 156 [\**P. jurassicus*; OD]. Body elongate; head prognathous; eyes oval; antennae attached to lateral margins of head between lower edges of eyes and base of mandibles; flagellum slender, with distal part of the segments only moderately enlarged; elytra covering entire abdomen; abdomen with 5 visible sternites. *Jur.*, USSR (Kazakh).

*Protosceloides* MEDVEDEV, 1968, p. 159 [\**P. nitidicornis*; OD]. Similar to *Pseudomegamerus* but with longer antennae and larger eyes and pronotum. *Jur.*, USSR (Kazakh).

*Pseudomegamerus* MEDVEDEV, 1968, p. 158 [\**P. grandis*; OD]. Similar to *Protoscelis* but distal parts of antennal segments not so enlarged; elytra with longitudinal ridges. *Jur.*, USSR (Kazakh).

*Sucinagonia* UHMANN, 1939, p. 18 [\**S. javetana*; OD]. Similar to *Oposispa*, but antennae elongate,

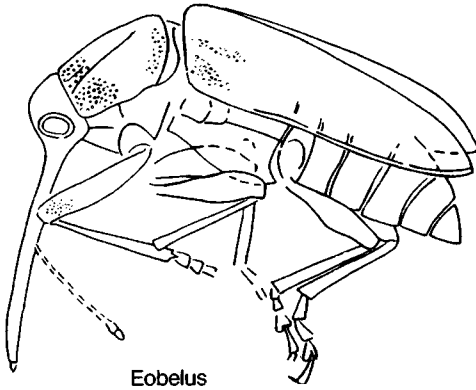


FIG. 183. Eobelidae (p. 314).

filiform, with third segment much the longest. *Oligo.*, Europe (Baltic).

### Family ANTHRIBIDAE Billberg, 1820

[Antribidae BILLBERG, 1820, p. 39]

Small to moderate-sized beetles with flat rostrum; antennal scape shorter than pedicel; antennae not elbowed; antennal club occasionally present; maxillary palpi flexible; abdomen with 5 visible sternites. Adults and larvae fungivorous. *Oligo.—Holo.*

**Antribus** GEOFFROY, 1762, p. 306. *Holo.*

**Pseudomecorhis** VOSS, 1953, p. 121 [*\*P. similator*; OD]. Similar to *Mecorhis* (recent); first tarsal segment elongate, obconical, 3 times as long as thick; second segment slightly shorter, triangular, broadened distally. *Oligo.*, Europe (Baltic).

**Saperdirhynchus** SCUDDER, 1893a, p. 160 [*\*S. priscotitillator*; OD]. Little-known genus, with immensely long antennae, inserted on sides of rostrum; possibly related to *Cerambyrhynchus* (recent). *Oligo.*, USA (Colorado).

**Straderes** SCUDDER, 1893a, p. 163 [*\*S. conradi*; OD]. Apparently related to *Trodideres* (recent), but prebasal ridge of prothorax slightly anterior to middle of prothorax. *Oligo.*, USA (Colorado).

### Family EOBELIDAE Arnoldi, 1977

[Eobelidae ARNOLDI, 1977, p. 144]

Head rounded or transverse; frons convex; antennae usually with 11 segments and with a blunt club; first antennal segment not greatly modified and not more than twice the length of the second; pronotum with a distinct notopleural ridge. *Jur.*

**Eobelus** ARNOLDI, 1977, p. 147 [*\*E. longipes*; OD]. Frons strongly convex; eyes large; rostrum long, cylindrical, slightly curved; elytra flattened; femora thin and straight. *Jur.*, USSR (Kazakh). — FIG. 183. *\*E. longipes*; lateral view,  $\times 7$  (Arnoldi, 1977).

**Ampliceps** ARNOLDI, 1977, p. 166 [*\*A. dentitibia*; OD]. Similar to *Oxycorynoides*, but femora conspicuously thickened; tibiae straight. *Jur.*, USSR (Kazakh).

**Archaeorrhynchus** MARTYNOV, 1926a, p. 23 [*\*A. tenuicornis*; OD]. Rostrum almost straight; fore femora strongly thickened; fore tibiae straight. ARNOLDI, 1977. *Jur.*, USSR (Kazakh).

**Belonotaris** ARNOLDI, 1977, p. 154 [*\*B. punctatissimus*; OD]. Elytra definitely convex, conspicuously punctate. *Jur.*, USSR (Kazakh).

**Brenthorrhinus** ARNOLDI, 1977, p. 172 [*\*B. mirabilis*; OD]. Rostrum short, thick, much widened at apex; antennae attached near apex; first antennal segment strongly curved; legs long, fore femora larger than middle and hind. *Jur.*, USSR (Kazakh).

**Distenorhynchus** ARNOLDI, 1977, p. 170 [*\*D. angulatus*; OD]. Antennae attached to basal one-third of rostrum; rostrum about as long as head and pronotum combined; only femora thickened. *Jur.*, USSR (Kazakh).

**Eccoptarthrus** ARNOLDI, 1977, p. 169 [*\*E. crasipes*; OD]. First tarsal segment much enlarged; legs short, femora thickened. *Jur.*, USSR (Kazakh).

**Eccoptothorax** ARNOLDI, 1977, p. 158 [*\*E. latipennis*; OD]. Rostrum short, moderately thick; pronotum strongly transverse; legs not thickened. *Jur.*, USSR (Kazakh).

**Nanophydes** ARNOLDI, 1977, p. 173 [*\*N. ovatus*; OD]. Rostrum curved; antennae attached near middle of rostrum; metathorax very short. *Jur.*, USSR (Kazakh).

**Oxycorynoides** ARNOLDI, 1977, p. 159 [*\*O. similis*; OD]. Rostrum moderately long; antennae attached near middle of rostrum; pronotum with distinct longitudinal, lateral ridge; femora only slightly thickened, tibiae straight. *Jur.*, USSR (Kazakh).

**Paroxycorynoides** ARNOLDI, 1977, p. 168 [*\*P. elegans*; OD]. Body long and narrow; pronotum small, short. *Jur.*, USSR (Kazakh).

**Probelopsis** ARNOLDI, 1977, p. 153 [*\*P. acutiapex*; OD]. Fore femora only slightly thickened; rostrum almost straight. *Jur.*, USSR (Kazakh).

**Probelus** ARNOLDI, 1977, p. 151 [*\*P. curvispinus*; OD]. Hind tibiae with large apical spur. *Jur.*, USSR (Kazakh).

**Procurculio** ARNOLDI, 1977, p. 157 [*\*P. fortipes*; OD]. Rostrum short, thick, narrowest at its proximal third; sides of pronotum strongly curved. *Jur.*, USSR (Kazakh).

**Scelocampus** ARNOLDI, 1977, p. 164 [\**S. tenuirostris*; OD]. Similar to *Oxycorynoides*, but tibiae curved. *Jur.*, USSR (Kazakh).

### Family ATTELABIDAE

Schoenherr, 1833

[Attelabidae SCHOENHERR, 1833, p. 4]

Small beetles, resembling the Anthribidae, but maxillary palpi rigid and antennae with a distinct club. Elytra not strongly convex. Adults and larvae phytophagous. *Cret.*—*Holo.*

**Attelabus** LINNÉ, 1758, p. 387. *Holo.*

**Baisorhynchus** ZHERIKHIN, 1977b, p. 176 [\**B. tarsalis*; OD]. Head short, transverse; rostrum long, thin, strongly curved; elytra weakly convex; femora short, broad; tarsi with 2 lobes. *Cret.*, USSR (Asian RSFSR).

**Car** BLACKBURN, 1897, p. 35. Voss, 1953. *Oligo.*, Europe (Baltic)—*Holo.*

**Docirhynchus** SCUDDER, 1893a, p. 24 [\**D. terebrans* SCUDDER, 1893a, p. 24; SD CARPENTER, herein]. Similar to *Isothea*, but body much broader. WICKHAM, 1912a. *Oligo.*, USA (Colorado).

**Involvulus** SCHRANK, 1798, p. 360. Voss, 1972. *Oligo.*, Europe (Baltic)—*Holo.*

**Isothea** SCUDDER, 1893a, p. 20 [\**I. alleni*; OD]. Similar to *Paltorhynchus* but with tapered body. *Oligo.*, USA (Colorado).

**Masteutes** SCUDDER, 1893a, p. 12 [\**M. rufis*; OD]. Little-known genus, apparently related to *Rhynchites* (recent); head small and conical; antennae with similar, slender segments. *Oligo.*, USA (Colorado).

**Paltorhynchus** SCUDDER, 1893a, p. 18 [\**P. narubal* SCUDDER, 1893a, p. 18; SD CARPENTER, herein]. Related to *Rhynchites* (recent), but antennae inserted before middle of proximal half of rostrum. *Oligo.*, USA (Colorado).

**Steganus** SCUDDER, 1893a, p. 28 [\**S. baranei*; OD]. Similar to *Isothea*, but head very short; elytron coarsely sculptured. *Eoc.*, USA (Colorado).

**Teretrum** SCUDDER, 1893a, p. 25 [\**T. primulum* SCUDDER, 1893a, p. 25; SD CARPENTER, herein]. Related to *Rhynchites* (recent), but legs unusually slender; fore femora swollen apically. *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado).

**Toxorhynchus** SCUDDER, 1893a, p. 26 [\**T. minusculus* SCUDDER, 1893a, p. 26; SD CARPENTER, herein]. Little-known genus. Head conical, nearly as long as broad; rostrum slender, very slightly arcuate, nearly as long as head; elytra strongly carinate. WICKHAM, 1911, 1912b. *Oligo.*, USA (Colorado).

**Trypanorhynchus** SCUDDER, 1893a, p. 21 [\**T. corruptivus* SCUDDER, 1893a, p. 21; SD CARPENTER,

herein]. Little-known genus. Head large basally, strongly tapered; rostrum stout, straight, longer than head; antennae as long as rostrum; fore femora only slightly enlarged distally. WICKHAM, 1913c. *Oligo.*, USA (Colorado).

### Family APIONIDAE Schoenherr, 1833

[Apionidae SCHOENHERR, 1833, p. 247]

Very small to moderate-sized beetles, usually with long, curved, slender rostrum; maxillary palpi rigid; antennae not elbowed, scape shorter than 3 following segments combined; elytra strongly convex. Adults and larvae phytophagous, developing in seeds, roots, and stems of plants. *Oligo.*—*Holo.*

**Apion** HERBST, 1797, p. 100. WAGNER, 1924; VOSS, 1953, 1972. *Oligo.*, Europe (Baltic); *Mio./Plio.*, Mexico (Chiapas)—*Holo.*

**Phyllobius** SCHOENHERR, 1824, p. 447. Voss, 1972. *Oligo.*, Europe (Baltic)—*Holo.*

### Family CURCULIONIDAE Latreille, 1802

[Curculionidae LATREILLE, 1802a, p. 195]

Small to large beetles, strongly sclerotized; rostrum diversely formed, often relatively short; antennae inserted on rostrum anterior to eyes, distinctly elbowed, with scape at least as long as next 3 segments combined and flagellum with a distinct club composed of 3 or 4 segments; maxillary palpi rigid; elytra convex. Larvae apodous, curved. Adults and larvae phytophagous. *Trias.*—*Holo.*

**Curculio** LINNÉ, 1758, p. 377. *Holo.*

**Adipocephalus** WICKHAM, 1916b, p. 18 [\**A. hydropticus*; OD]. Little-known genus, similar to *Scolytus* (recent) but with a much larger head. *Oligo.*, USA (Colorado).

**Ampharthropelma** VOSS, 1972, p. 176 [\**A. decipiens*; OD]. Tibiae broad and compressed, especially those of forelegs. *Oligo.*, Europe (Baltic)—*Holo.*

**Anchorthorrhinus** VOSS, 1953, p. 131 [\**A. incertus*; OD]. Similar to *Orthorrhinus* (recent), but rostrum thin and attenuate; anterior margin of pronotum not emarginate. *Oligo.*, Europe (Baltic).

**Anthribites** HEER, 1847, p. 177 [collective group]. Little-known genus, apparently a curculionid. KOLBE, 1888. *Oligo.*—*Mio.*, Europe (Germany).

**Antliarhinites** HEER, 1865, p. 374 [\**A. gracilis*; OD]. Little-known genus. HEYDEN, 1856. *Mio.*, Europe (Germany).

- Calandrites** SCUDDER, 1893a, p. 150 [*\*C. defessus* SCUDDER, 1893a, p. 150; SD CARPENTER, herein]. Little-known genus; elytron only. Similar to *Calandra* (recent), but elytra with 10 punctured striae. COCKERELL, 1916c, 1918. *Eoc.*, USA (Colorado, Wyoming).
- Camptorrhinites** BRITTON, 1960, p. 43 [*\*C. orarius*; OD]. Similar to *Pachyonyx* (recent), but prothorax and elytra lacking tubercles. *Eoc.*, England.
- Cenocephalus** CHAPUIS, 1866, p. 325. SCHEDL, 1962. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*
- Centron** SCUDDER, 1893a, p. 69 [*\*C. moricollis*; OD]. Little-known genus, similar to *Alophus* (recent) but with first abdominal segment nearly twice as long as second. *Oligo.*, USA (Colorado).
- Charphoborites** CARPENTER, herein [*\*C. keilbachi* SCHEDL, 1947, p. 32; OD]. Similar to *Charphoborus* (recent), but front margin of prothorax armed with tubercles. [The original generic name, *Charphoborites*, was a *nomen nudum* (SCHEDL, 1947).] *Oligo.*, Europe (Baltic).
- Cleonolithus** BASSI, 1841, p. 401 [*\*C. antiquus*; OD]. Little-known genus. *Plio.*, Europe (Italy).
- Cretonanophyes** ZHERIKHIN, 1977b, p. 178 [*\*C. longirostris*; OD]. Rostrum very long; frons wide; second tarsal segment with 2 lobes. *Cret.*, USSR (Asian RSFSR).
- Cryphalites** COCKERELL, 1917g, p. 368 [*\*C. rugosissimus*; OD]. Related to *Cryphalus* (recent); thorax and elytra strongly tuberculate and bearing small, clavate hairs; tarsal segments bearing long, flat hairs. *Mio.*, Burma.
- Cryptorhynchus** ILLIGER, 1807, p. 330. ZIMMERMAN, 1971. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*
- Cryptorhynchites** HAUPT, 1950, p. 159 [*\*C. sculpturatus*; OD]. Little-known genus, elytral fragments. *Eoc.*, Europe (Germany).
- Dorotheus** KUSCHEL, 1959, p. 50 [*\*D. guidensis*; OD]. Little-known genus; elytron with seventh and ninth striae entire. *Cret.*, Chile.
- Eccoptus** DEJEAN, 1821, p. 86. ZIMMERMAN, 1971; O'BRIEN & WIBMER, 1982. *Oligo./Mio.*, Mexico (Chiapas)—*Holo.*
- Electrotribus** HUSTACHE, 1942, p. 108 [*\*E. thergi*; OD]. Similar to *Phytotribus* (recent), but scape shorter, not reaching base of rostrum. *Oligo.*, Europe (Baltic).
- Eocleonus** SCUDDER, 1893a, p. 95 [*\*E. subjectus*; OD]. Little-known genus, related to *Lixus* (recent), but head much larger; rostrum relatively short. *Oligo.*, USA (Colorado).
- Erirrhinites** BRITTON, 1960, p. 40 [*\*E. bognoensis*; OD]. Anterior coxae globular, almost contiguous; prothorax without anterior ventral emarginations. *Eoc.*, England.
- Eudomus** SCUDDER, 1893a, p. 62 [*\*E. robustus* SCUDDER, 1893a, p. 62; SD CARPENTER, herein]. Similar to *Promecops* (recent) but with larger size and heavier body. *Oligo.*, USA (Colorado).
- Eugnamptidea** WICKHAM, 1912b, p. 42 [*\*E. tertiaria*; OD]. Similar to *Eugnamptus* (recent), but antennal club with 4 segments. *Oligo.*, USA (Colorado).
- Euvopes** SCUDDER, 1893a, p. 53 [*\*E. veneratus* SCUDDER, 1893a, p. 53; SD CARPENTER, herein]. Little-known genus, similar to *Lachnopus* (recent), but elytron with coarser punctures on striae. *Oligo.*, USA (Colorado).
- Geralophus** SCUDDER, 1893a, p. 72 [*\*G. anti-quarius* SCUDDER, 1893a, p. 72; SD CARPENTER, herein]. Related to *Trichalophus* (recent). Body compact and stout; head short, smaller than thorax; elytra broad. *Oligo.*, USA (Colorado).
- Hipporhinops** COCKERELL, 1926b, p. 314 [*\*H. sternbergi*; OD]. Large weevils, related to *Hipporhinus* (recent) but with more slender rostrum. *Oligo.*, USA (Colorado).
- Hylastes** ERICHSON, 1836, p. 47. BLAIR, 1943; SCHEDL, 1947. *Oligo.*, Europe (Baltic)—*Holo.*
- Hylescierites** SCHEDL, 1947, p. 29 [*\*H. granulatus*; OD]. Similar to *Scierus* (recent); flagellum of antenna with 7 segments; antennal club short and weakly developed. *Oligo.*, Europe (Baltic).
- Hylesinites** GERMAR, 1813, p. 15 [*\*H. electrinus*; OD]. Little-known genus. *Oligo.*, Europe (Baltic).
- Isalcidodes** VOSS, 1953, p. 134 [*\*I. macellus*; OD]. Similar to *Alcidodes* (recent), but tarsal claws free, without denticles, and undivided. *Oligo.*, Europe (Baltic).
- Korystina** BRITTON, 1960, p. 42 [*\*K. gracilis*; OD]. Middle of anterior margin of pronotum projecting anteriorly over head and curving downward. *Eoc.*, England.
- Laccopygus** SCUDDER, 1893a, p. 93 [*\*L. nilesii*; OD]. Related to *Hylobius* (recent) but with funiculus of antenna consisting of 7 similar, elongate segments; antennal club stout and oval. *Oligo.*, USA (Colorado), Europe (Germany).
- Lithophthorus** SCUDDER, 1893a, p. 153 [*\*L. rugosicollis*; OD]. Related to *Dryophthorus* (recent), but funiculus with not more than 3 segments. VOSS, 1953. *Oligo.*, USA (Colorado).
- Lithopissodes** BEIER, 1952, p. 132 [*\*L. luschtzensis*; OD]. Little-known genus, possibly related to *Pissodes* (recent). *Oligo.*, Europe (Austria).
- Lutago** BRITTON, 1960, p. 38 [*\*L. fetosus*; OD]. Similar to *Pissodites* but much broader across elytra. *Eoc.*, England.
- Metrioxena** PASCOE, 1870, p. 442 [= *Archimetrioxena* VOSS, 1953, p. 123 (type, *A. electrica*, Baltic amber)]. MARSHALL, 1955; VOSS, 1957. *Oligo.*, Europe (Baltic)—*Holo.*
- Miogeraeus** WICKHAM, 1916b, p. 16 [*\*M. recurrens*; OD]. Similar to *Geraeus* (recent), but elytral striae confluent at base. *Oligo.*, USA (Colorado).
- Mononychites** HAUPT, 1956, p. 83 [*\*M. rotunda-*

- tus*; OD]. Little-known genus (elytron only), apparently similar to *Mononychus* (recent). *Eoc.*, Europe (Germany).
- Necrodryophthorus** VOSS, 1953, p. 135 [\**N. inquilinus*; OD]. Similar to *Psilodryophthorus* (recent), but rostrum elongate and curved. *Oligo.*, Europe (Baltic).
- Numitor** SCUDDER, 1893a, p. 103 [\**N. claviger*; OD]. Related to *Erirhinus* (recent) with very stout body and long legs; antennae strongly clavate. *Oligo.*, USA (Colorado).
- Oligocryptus** CARPENTER, 1986, p. 577, *nom. subst. pro* *Eucriptus* SCUDDER, 1893a, p. 63, *non* HALDEMAN, 1842 [\**Eucriptus sectus* SCUDDER; OD]. Similar to *Eudomus* but with rostrum stouter and body more slender. *Oligo.*, USA (Colorado).
- Ophryastites** SCUDDER, 1893a, p. 38 [collective group]. Elytra similar in general appearance to those of *Ophryastes* (recent). WICKHAM, 1912b; COCKERELL, 1916c, 1918, 1920b. *Eoc.*, USA (Colorado, Utah), England; *Oligo.*, USA (Colorado).
- Oryctorhinus** SCUDDER, 1893a, p. 149 [\**O. tenuirostris*; OD]. Related to *Sphenophorus* (recent), but antennae unusually small; antennal club oval. *Oligo.*, USA (Colorado).
- Otioryhynchites** FRITSCH, 1882, p. 5 [collective group]. Little-known group of curculionids resembling *Otioryhynchus* (recent) but usually larger. SCUDDER, 1878a, 1890, 1900; WICKHAM, 1911, 1912b, 1929; TURNER, 1912; PITON & RUDEL, 1936; CROWSON, 1960; ZIMMERMAN, 1971. *Cret.*, Europe (Czechoslovakia); *Cret.-Eoc.*, Hong Kong (Peng Chau Island); *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado), Europe (France); *Paleoc.-Plio.*, Argentina (Jujuy).
- Palaeotanymericides** MANI, 1947a, p. 55 [\**P. hislopi*; OD]. Little-known genus (elytral fragment). [Family assignment doubtful.] *Paleoc.-Plio.*, India (Nagpur).
- Paleopissodes** ULKE, 1947, p. 1 [\**P. weigangae*; OD]. Similar to *Pissodes* (recent), but rostrum more slender and with less angular slope. *Oligo.*, Europe (Baltic).
- Paonaupactus** VOSS, 1953, p. 127 [\**P. sitonitoides*; OD]. Similar to *Naupactus* (recent), but eyes larger and rostrum more slender. *Oligo.*, Europe (Baltic).
- Phloeosinites** HAGEDORN, 1906, p. 118 [\**P. rebi*; OD]. Similar to *Phloeosinus* (recent), but fore coxae very slender. SCHEDL, 1947. *Oligo.*, Europe (Baltic).
- Pissodes** GERMAR, 1817, p. 340. VOSS, 1972. *Oligo.*, Europe (Baltic)—*Holo.*
- Pissodites** BRITTON, 1960, p. 37 [\**P. argillosus*; OD]. Similar to *Pissodes*, but body more slender; punctuation more dense. *Eoc.*, England.
- Pityophthoridaea** WICKHAM, 1916b, p. 18 [\**P. diluvialis*; OD]. Similar to *Pityophthorus* (recent) but with shorter and stouter body. *Oligo.*, USA (Colorado).
- Pliocleonus** GERSDORF, 1976, p. 122 [\**P. gibbosus*; OD]. Little-known genus. *Plio.*, Europe (Germany).
- Polydrosus** GERMAR, 1817, p. 341. PITON, 1939; VOSS, 1953. *Plio.*, Europe (France)—*Holo.*
- Pristorhynchus** HEER, 1847, p. 190 [\**P. ellipticus*; OD]. SCUDDER, 1885b. *Mio.*, Europe (Germany).
- Rhyncolus** GERMAR, 1824, p. 341. SLEEPER, 1968. *Plio.*, USA (Nevada)—*Holo.*
- Rhysosternum** SCUDDER, 1893a, p. 124 [\**R. longirostre* SCUDDER, 1893a, p. 124; SD CARPENTER, herein]. Similar to *Rhysomatus* (recent), but rostrum unusually long and elytra having punctate striae but lacking carinae. PITON, 1940a. *Oligo.*, USA (Colorado), Europe (France).
- Sciabregma** SCUDDER, 1893a, p. 146 [\**S. rugosa*; OD]. Related to *Calandra* (recent), with dorsal-anterior part of prothorax extended to form an overarching frontal guard for head, guard nearly as long as rest of prothorax. COCKERELL, 1921e. *Eoc.*, USA (Colorado).
- Sitonitellus** CARPENTER, 1986, p. 577, *nom. subst. pro* *Sitonites* HAUPT, 1956, p. 80, *non* HEER, 1865 [\**Sitonites egregius* HAUPT; OD]. Little-known genus, apparently similar to *Sitona* (recent). *Eoc.*, Europe (Germany).
- Slonik** ZHERIKHIN, 1977b, p. 180 [\**A. sibiricus*; OD]. Antennae apparently without elbow; rostrum long, curved; trochanter short; femora alike, not thickened. [Family assignment doubtful.] *Cret.*, USSR (Asian RSFSR).
- Smicrorhynchus** SCUDDER, 1893a, p. 104 [\**S. mageei*; OD]. Similar to *Smicronyx* (recent), but with 3 basal segments of funiculus equal. *Oligo.*, USA (Colorado).
- Spodotribus** SCUDDER, 1893a, p. 152 [\**S. terrulentus*; OD]. Apparently related to *Dryophthorus* (recent), but funiculus of antenna consisting of at least 7 segments; eyes not prominent, composed of relatively few facets; head very long. *Oligo.*, USA (Colorado).
- Synommatius** WOLLASTON, 1873, p. 508. VOSS, 1953. *Oligo.*, Europe (Baltic)—*Holo.*
- Taphramites** SCHEDL, 1947, p. 41 [\**T. gnathotrichus*; OD]. Similar to *Thamnurgus* (recent) but with fore tibiae strongly dilated. *Oligo.*, Europe (Baltic).
- Taphrorychus** EICHHOFF, 1878, p. 204. SCHEDL, 1947. *Oligo.*, Europe (Baltic)—*Holo.*
- Taylorius** BRITTON, 1960, p. 41 [\**T. litoralis*; OD]. Related to *Cryptorhynchus* (recent); apical part of rostrum enclosed laterally by flangelike processes of pro- and mesosternum; elytra smooth. *Eoc.*, England.
- Tenillus** SCUDDER, 1893a, p. 35 [\**T. firmus*; OD]. Little-known genus, apparently related to *Tri-*

- gonoscuta* (recent); rostrum long and stout. *Oligo.*, USA (Colorado).
- Thryogenosoma** VOSS, 1953, p. 138, *nom. subst. pro Eribrhinoides* MOTSCHULSKY, 1856, p. 27, *non* BLANCHARD, 1851, p. 385 [*\*Eribrhinoides caringer* MOTSCHULSKY, 1856, p. 27; OD]. Similar to *Eribrhinus* (recent), but rostrum and body long; elytra with a longitudinal ridge. *Oligo.*, Europe (Baltic).
- Tillyardiopsis** DUNSTAN, 1923, p. 64 [*\*T. tuberculata*; OD]. Little-known genus. Elytron as in *Etheridgea* but much larger. *Trias.*, Australia (Queensland).
- Xyleborites** WICKHAM, 1913c, p. 26 [*\*X. longipennis*; OD]. Little-known genus; similar to *Xyleborus* (recent), but body more elongate; thoracic sculpturing finer and more nearly uniform. *Oligo.*, USA (Colorado).
- Xylechinites** HAGEDORN, 1906, p. 120 [*\*X. anceps*; OD]. Similar to *Dendroctonus* (recent), but eyes long and slender. SCHEDL, 1947. *Oligo.*, Europe (Baltic).

## SUBORDERS AND FAMILIES UNCERTAIN

The following extinct genera are based on species known only from isolated elytra or body fragments. Their family relationships and in many instances their subordinal positions are uncertain. Since most of the fossils are from Mesozoic deposits, some of the species may belong to unrecognized, extinct families. Most of these genera were not assigned to families by their original describers, chiefly HANDLIRSCH (1906b, 1907, 1908a) and BODE (1953).

- Actea** GERMAR, 1842, p. 85 [*\*A. sphinx*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, Europe (Germany).
- Adelidium** TILLYARD, 1918b, p. 752 [*\*A. cordatum*; OD]. Little-known genus, based on elytron. *Trias.*, Australia (New South Wales).
- Adikia** HANDLIRSCH, 1906b, p. 558 [*\*A. punctulata*; OD]. Little-known genus. *Jur.*, England.
- Adynasia** HANDLIRSCH, 1906b, p. 449 [*\*Buprestites lyelli* HEER, 1865, p. 88; OD]. Little-known genus, based on elytron. *Jur.*, Europe (Switzerland).
- Agrilium** WESTWOOD, 1854, p. 395 [*\*A. stomphax* WESTWOOD, 1854, p. 395; SD CARPENTER, herein]. Little-known genus. GIEBEL, 1856; HANDLIRSCH, 1906b. *Jur.*, England.
- Allognosis** HANDLIRSCH, 1906b, p. 450 [*\*Nebria nitens* GEINITZ, 1894, p. 74; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Allopliosilpha** GERSDORF, 1970, p. 631 [*\*A. inclavata*; OD]. Little-known genus. *Plio.*, Europe (Germany).
- Amarodes** HANDLIRSCH, 1906b, p. 545 [*\*Amara pseudozabrus* DEICHMÜLLER, 1886, p. 64; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Amblycephalonius** BODE, 1953, p. 228 [*\*A. tenuistriatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Amphoxyne** BODE, 1953, p. 217 [*\*A. lineata*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Anancaeon** HANDLIRSCH, 1939, p. 71 [*\*A. microcephalum*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Anapiptus** HANDLIRSCH, 1906b, p. 552 [*\*A. brodiei*; OD]. Little-known genus. *Jur.*, England.
- Anepismus** HANDLIRSCH, 1906b, p. 450 [*\*Elater vanus* GIEBEL, 1856, p. 92; OD]. Little-known genus. DOLIN, 1973. *Jur.*, England.
- Angelinella** HANDLIRSCH, 1906b, p. 401 [*\*Elytridium angelini* HEER, 1878, p. 196; OD]. Little-known genus; elytron only. *Trias.*, Europe (Sweden).
- Anhydrophilus** HANDLIRSCH, 1906b, p. 455 [*\*A. brodiei*; OD]. Little-known genus. COCKERELL, 1915. *Jur.*, England.
- Anobichnium** LINCK, 1949, p. 180 [*\*A. simile*; OD]. Boring in fossil wood, apparently caused by beetles. *Trias.*, Europe (Germany).
- Anomerus** HANDLIRSCH, 1939, p. 67 [*\*A. punctifer*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Anypostatus** HANDLIRSCH, 1939, p. 66 [*\*A. taurus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Apheloodes** DUNSTAN, 1923, p. 70 [*\*A. obliquum*; OD]. Little-known genus; elytron only. *Trias.*, Australia (Queensland).
- Aphodiites** HEER, 1865, p. 90 [*\*A. protogaeus*; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Apicasia** BODE, 1953, p. 237 [*\*A. inolata*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Apioderes** HANDLIRSCH, 1939, p. 65 [*\*A. punctatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Apiopyrenides** BODE, 1953, p. 220 [*\*A. trigeminus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Apistotes** HANDLIRSCH, 1906b, p. 559 [*\*Elater purbeccensis* GIEBEL, 1856, p. 92; OD]. Little-known genus. *Jur.*, England.
- Aposphinctus** BODE, 1953, p. 223 [*\*A. conservatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Apsychus** HANDLIRSCH, 1939, p. 71 [*\*A. alutaceus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Aptilotus** CARPENTER, 1986, p. 577, *nom. subst. pro Aptilotus* BODE, 1953, p. 237, *non* MIK, 1898 [*\*Aptilotus capitecarens* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).



- Archiorhynchus** HEER, 1874b, p. 91 [\**A. angusticollis*; OD]. Little-known genus. HANDLIRSCH, 1907. *Cret.*, Greenland.
- Ataktosites** HAUPT, 1956, p. 37 [\**A. palustris*; OD]. Little-known genus, based on elytral fragments. *Eoc.*, Europe (Germany).
- Auchenophorites** CARPENTER, 1986, p. 577, *nom. subst. pro Auchenophorus* BODE, 1953, p. 229, *non* TURNER, 1907 [\**Auchenophorus sculpturatus* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Bareus** HANDLIRSCH, 1939, p. 66 [\**B. strigipennis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Barocephalus** CARPENTER, 1986, p. 577, *nom. subst. pro Barycephalus* BODE, 1953, p. 228, *non* GUENTHER, 1860 [\**Barycephalus nudatus* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Bathygerus** HANDLIRSCH, 1906b, p. 456 [\**Cistelites bellus* GEINITZ, 1894, p. 75; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Bellingera** HEER, 1852, p. 12 [\**B. ovalis*; OD]. Little-known genus; pronotum and elytra. *Jur.*, Europe (Switzerland).
- Bellingeropis** HANDLIRSCH, 1906b, p. 440 [\**Bellingera laticollis* HEER, 1865, pl. 8, fig. 5; OD]. Little-known genus; pronotum and elytra. *Jur.*, Europe (Switzerland).
- Biadelater** HANDLIRSCH, 1906b, p. 559 [\**Elater werneri* GIEBEL, 1856, p. 92; OD]. Little-known genus. DOLIN, 1973. *Jur.*, England.
- Blapsium** WESTWOOD, 1854, p. 393 [\**B. egertoni*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, England.
- Blaptoides** FRITSCH, 1901, p. 172 [\**B. dubius*; OD]. Little-known genus. *Cret.*, Europe (Czechoslovakia).
- Bothroptera** HANDLIRSCH, 1906b, p. 558 [\**Curculionites westwoodi* GIEBEL, 1856, p. 147; OD]. Little-known genus. *Jur.*, England.
- Bothynophora** HEER, 1865, pl. 7, fig. 20 [\**B. elegans*; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Brachinites** FRITSCH, 1882, p. 5 [\**B. truncatus*; OD]. Little-known genus. FRITSCH, 1901. *Cret.*, Europe (Czechoslovakia).
- Brachylaimon** BODE, 1953, p. 208 [\**B. striatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Brachytrachelites** BODE, 1953, p. 235 [\**B. striatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Brodiola** HANDLIRSCH, 1906b, p. 441 [\**B. nana*; OD]. Little-known genus. *Jur.*, England.
- Bucklandula** HANDLIRSCH, 1906b, p. 556 [\**B. striata*; OD]. Little-known genus. *Jur.*, England.
- Buprestites** HEER, 1847, p. 128 [collective group]. Elytra resembling those of buprestids; other structures unknown. GERMAR, 1849; HEER, 1862b, 1865, 1883; SCUDDER, 1900; MEUNIER, 1920c; PITON, 1940a. *Eoc.*, Greenland, England, Europe (France, Germany); *Oligo.*, Europe (France, Germany); *Mio.*, Europe (Germany).
- Buprestium** WESTWOOD, 1854, p. 393 [\**B. gorgus*; SD HANDLIRSCH, 1906b, p. 561]. Little-known genus. *Jur.*, England.
- Byrrhydium** HEER, 1865, p. 89 [\**B. arcuatum* HEER, 1865, p. 89; SD CARPENTER, herein]. Little-known genus. *Jur.*, Europe (Switzerland).
- Callistaspis** HAUPT, 1950, p. 153 [\**C. punctatus*; OD]. Little-known genus, based on elytra. *Eoc.*, Europe (Germany).
- Camaricopterus** BODE, 1953, p. 217 [\**C. ovalis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Carabidium** WESTWOOD, 1854, p. 396 [\**C. dejeanianum*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, England.
- Carabocera** BRAUER, REDTENBACHER, & GANGLBAUER, 1889, p. 18 [\**C. prisca*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, USSR (Asian RSFSR).
- Cardioides** BODE, 1953, p. 221 [\**C. incisus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Caryosoma** HAUPT, 1950, p. 125 [\**C. rugosus*; OD]. Little-known genus; body robust and strongly arched dorsally. [Possibly a tenebrionid.] *Eoc.*, Europe (Germany).
- Cerambycinus** GERMAR, 1839, p. 208 [\**C. dubius*; OD]. Little-known genus. HANDLIRSCH, 1906b; PONOMARENKO, 1971b. *Jur.*, Europe (Germany).
- Cerylonopsis** HANDLIRSCH, 1906b, p. 547 [\**Cerylon striatum* BRODIE, 1845, p. 32; OD]. Little-known genus. *Jur.*, England.
- Chalepocarabus** HANDLIRSCH, 1906b, p. 546 [\**Carabus elongatus* BRODIE, 1845, p. 32; OD]. Little-known genus. *Jur.*, England.
- Chlaeniopsis** HANDLIRSCH, 1906b, p. 548 [\**Chlaenius solitarius* DEICHMÜLLER, 1886, p. 65; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Chrysomelidium** HANDLIRSCH, 1907, p. 665 [\**Chrysomelites simplex* FRITSCH, 1901, p. 175; OD]. Little-known genus. *Cret.*, Europe (Czechoslovakia).
- Chrysomelophana** HANDLIRSCH, 1906b, p. 549 [\**Chrysomela rara* WEYENBERGH, 1869, p. 287; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Chrysomelopsis** HANDLIRSCH, 1906b, p. 445 [\**Chrysomela andraei* GIEBEL, 1856, p. 119; OD]. Little-known genus. *Jur.*, England.
- Cistelites** HEER, 1865, p. 89 [\**C. insignis*; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Clathropenna** FUJIIYAMA, 1973, p. 373 [\**C. rugosa*; OD]. Little-known genus, based on elytral fragment, probably related to Cupedidae. *Trias.*, Japan.
- Clinomerus** CARPENTER, 1986, p. 577, *nom. subst. pro Catomerus* HANDLIRSCH, 1939, p. 67, *non* PILSBRY, 1916 [\**Catomerus laticollis* HAND-

- LIRSCH; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Coccinellophana** HANDLIRSCH, 1906b, p. 566 [\**C. marchisoni*; OD]. Little-known genus. *Jur.*, England.
- Coilotrachelus** BODE, 1953, p. 209 [\**C. lineatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Colymbetopsis** HANDLIRSCH, 1906b, p. 445 [\**Colymbetes arcuatus* HEER, 1852, p. 12; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Coptogyrinus** HANDLIRSCH, 1906b, p. 448 [\**C. scutellatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Coreoeicos** BODE, 1953, p. 236 [\**C. dilatatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Cretotaenia** PONOMARENKO, 1977b, p. 97 [\**C. pallida*; OD]. Little-known genus. Larvae aquatic, with walking legs and modified, long urogomphi; head almost square; ninth abdominal segment with distinct tergite. *Cret.*, USSR (Asian RSFSR).
- Cricotrachelites** BODE, 1953, p. 210 [\**C. rotundatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Critoderma** CARPENTER, 1986, p. 578, *nom. subst. pro Cycloderma* HEER, 1865, p. 89, *non* PETERS, 1854 [\**Cycloderma deplanatum* HEER; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Critotrachelus** CARPENTER, 1986, p. 578, *nom. subst. pro Cyclotrachelus* BODE, 1953, p. 222, *non* DE CHAUDOIR, 1838 [\**Cyclotrachelus exsecutus* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Cryptauchenia** BODE, 1953, p. 218 [\**C. simplex*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Cryptocephalites** HAUPT, 1956, p. 66 [\**C. auratus*; OD]. Little-known genus, based on elytron. *Eoc.*, Europe (Germany).
- Ctenicerium** WESTWOOD, 1854, p. 395 [\**C. blissus* WESTWOOD, 1854, p. 395; SD CARPENTER, *herein*]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, England.
- Curculidium** HANDLIRSCH, 1907, p. 665 [\**Curculionites senonicus* KOLBE, 1888, p. 135; OD]. Little-known genus. *Cret.*, Lebanon.
- Curculionites** HEER, 1847, p. 199 [collective group] [= *Curculionites* GIEBEL, 1856, p. 14, homonym and synonym]. Elytra resembling those of Curculionidae. HEER, 1856, 1870a; ASSMANN, 1870; OUSTALET, 1870; COCKERELL, 1920b, 1920c, 1926a, 1936; NORTHROP, 1928; HAUPT, 1950. *Cret.*, USA (South Dakota); *Eoc.*, England, Europe (Germany); *Oligo.*, Europe (France, Germany); *Mio.*, Europe (Yugoslavia), Spitsbergen; *Paleoc.-Plio.*, Argentina (Jujuy).
- Curculiopsis** HANDLIRSCH, 1907, p. 663 [\**Curculionites cretaceus* HEER, 1874b, p. 92; OD]. Little-known genus. *Cret.*, Greenland.
- Curculium** WESTWOOD, 1854, p. 393 [\**C. syrictibus*; OD]. Little-known genus. GIEBEL, 1856; HANDLIRSCH, 1906b. *Jur.*, England.
- Cyphospheron** BODE, 1953, p. 220 [\**C. virgatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Diachoristes** BODE, 1953, p. 209 [\**D. collinus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Diatarastus** HANDLIRSCH, 1906b, p. 559 [\**Carabus westwoodi* GIEBEL, 1856, p. 60; OD]. Little-known genus. *Jur.*, England.
- Diatrypamene** BODE, 1953, p. 231 [\**D. angulocollis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Dicyphelus** CARPENTER, 1986, p. 578, *nom. subst. pro Dicyphus* BODE, 1953, p. 234, *non* FIEBER, 1858 [\**Dicyphus concameratus* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Dinoharpalus** HANDLIRSCH, 1906b, p. 450 [\**Harpalus liasinus* GIEBEL, 1856, p. 62; OD]. Little-known genus. *Jur.*, England.
- Diphymation** BODE, 1953, p. 209 [\**C. corrosum*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Diplocelides** BODE, 1953, p. 211 [\**D. minutus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Diplothece** BODE, 1953, p. 216 [\**D. scissa*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Ditomoptera** GERMAR, 1839, p. 203 [\**D. dubia*; OD] [= *Cerambycites* DEICHMÜLLER, 1886, p. 75 (type, *C. dubius*)]. Little-known genus. HANDLIRSCH, 1906b; PONOMARENKO, 1971b. *Jur.*, Europe (Germany).
- Doggeria** HANDLIRSCH, 1906b, p. 555 [\**D. siberica* HANDLIRSCH, 1906b, p. 555; SD CARPENTER, *herein*]. Little-known genus. MANTELL, 1844. *Jur.*, England, USSR (Asian RSFSR).
- Doggeriopsis** HANDLIRSCH, 1906b, p. 556 [\**D. stonessfieldiana*; OD]. Little-known genus. *Jur.*, England.
- Dysarestus** HANDLIRSCH, 1906b, p. 451 [\**Elaterites vetustus* HEER, 1865, p. 88; OD]. Little-known genus. DOLIN, 1973. *Jur.*, Europe (Switzerland).
- Dysmorphus** BODE, 1953, p. 228 [\**D. molestus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Echthlimma** HANDLIRSCH, 1939, p. 69 [\**E. forficuloides*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Elateridopsis** ZALESSKY, 1929, p. 29 [\**E. permien-sis*; OD]. Little-known genus, probably in Archostemata. ROHDENDORF, 1957; PONOMARENKO, 1963a; DOLIN, 1973. *Perm.*, USSR (European RSFSR).
- Elaterina** GARDINER, 1961, p. 87 [\**E. liasina*; OD]. Little-known genus, based on elytron with bluntly rounded apex. *Jur.*, England.
- Elaterites** HEER, 1847, p. 141 [collective group].

- Little-known genus. COCKERELL, 1926b; PONOMARENKO, 1971b; DOLIN, 1973. *Eoc.*, England; *Paleoc.-Plio.*, Argentina (Jujuy).
- Elaterium** WESTWOOD, 1854, p. 387 [*\*E. pronaeus*; SD HANDLIRSCH, 1907, p. 748]. Little-known genus. *Jur.*, England.
- Elytridium** HEER, 1870a, p. 77 [*\*E. undecimstriatum*; SD HANDLIRSCH, 1907, p. 663]. Little-known genus. *Mio.*, Spitsbergen.
- Elytrulum** HANDLIRSCH, 1907, p. 663 [*\*Elytridium multipunctatum* HEER, 1883, p. 143; OD]. Little-known genus. *Cret.*, Greenland.
- Enamma** HANDLIRSCH, 1906b, p. 451 [*\*E. striatum*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Entomocantharus** BODE, 1953, p. 212 [*\*E. convexus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Eoallognosis** HAUPT, 1950, p. 137 [*\*E. undulatus*; OD]. Little-known genus. *Eoc.*, Europe (Germany).
- Eocassida** HAUPT, 1950, p. 155 [*\*E. longula*; OD]. Little-known genus, based on elytra. *Eoc.*, Europe (Germany).
- Eocoleopteron** HANDLIRSCH, 1906b, p. 400 [*\*E. roemeri*; OD]. Little-known genus; elytron only. *Trias.*, Europe (Germany).
- Eodromus** PONGRÁCZ, 1935, p. 538 [collective group]. Elytron with prominent ridges. HAUPT, 1950. *Eoc.*, Europe (Germany).
- Eogaleruca** HAUPT, 1956, p. 74 [*\*E. punctipennis*; OD]. Little-known genus; elytron only. *Eoc.*, Europe (Germany).
- Eohelaeus** HAUPT, 1950, p. 135 [*\*E. sublaevus*; OD]. Little-known genus. *Eoc.*, Europe (Germany).
- Eomelasoma** HAUPT, 1956, p. 73 [*\*E. incostata*; OD]. Little-known genus, based on elytral fragments. *Eoc.*, Europe (Germany).
- Episcepes** BODE, 1953, p. 208 [*\*E. rotundatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Epomenus** HANDLIRSCH, 1906b, p. 562 [*\*E. rugosus*; OD]. Little-known genus. *Jur.*, England.
- Erotylites** COCKERELL, 1920d, p. 71 [*\*E. wallacei*; OD]. Little-known genus, based on elytral fragment. *Eoc.*, England.
- Etheridgea** HANDLIRSCH, 1906b, p. 402 [*\*E. australis*; OD]. Little-known genus; elytra only. ETHERIDGE & OLLIFF, 1890; TILLYARD & DUNSTAN, 1916; DUNSTAN, 1923. *Trias.*, Australia (Queensland, New South Wales).
- Euenarthrus** BODE, 1953, p. 223 [*\*E. mandibulatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Eumolpites** HEER, 1865, p. 89 [*\*E. liberatus*; OD]. Little-known genus; pronotum and elytra. HANDLIRSCH, 1906b. *Jur.*, Europe (Switzerland).
- Eurynotellus** CARPENTER, 1986, p. 578, *nom. subst. pro Eurynotus* BODE, 1953, p. 207, *non* KIRBY, 1819 [*\*Eurynotus brevicollis* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Eurynucha** HANDLIRSCH, 1906b, p. 446 [*\*E. pseudobuprestis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Eurysphinctus** BODE, 1953, p. 224 [*\*E. latesulcatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Eurythyreites** HANDLIRSCH, 1906b, p. 542 [*\*Eurythyrea grandis* DEICHMÜLLER, 1886, p. 70; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Eusarcantarus** BODE, 1953, p. 212 [*\*E. compactus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Feronites** FRITSCH, 1884a, p. 205 [*\*F. velenovskiy*; OD]. Little-known genus. FRITSCH, 1901. *Cret.*, Europe (Czechoslovakia).
- Flichea** HANDLIRSCH, 1906b, p. 402 [*\*Glaphyrop-tera lotharingiaca* FLICHE, 1901, p. 650; OD]. Little-known genus; elytron only. *Trias.*, Europe (France).
- Gastrodelus** BODE, 1953, p. 238 [*\*G. decapitatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Gastroratus** BODE, 1953, p. 238 [*\*G. dispertitus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Glaphoptera** HANDLIRSCH, 1906b, p. 557 [*\*G. anglica*; OD]. Little-known genus. *Jur.*, England.
- Glaphyopterites** HANDLIRSCH, 1906b, p. 437 [*\*Glaphyoptera depressa* HEER, 1852, p. 14; OD]. Little-known genus; body fragments. *Jur.*, Europe (Switzerland).
- Glaphyopterodes** HANDLIRSCH, 1906b, p. 437 [*\*Glaphyoptera gebreti* HEER, 1852, p. 14; OD]. Little-known genus; prothorax and elytron. DOLIN, 1973. *Jur.*, Europe (Switzerland).
- Glaphyopterula** HANDLIRSCH, 1906b, p. 437 [*\*Glaphyoptera gracilis* HEER, 1852, p. 14; OD]. Little-known genus; pronotum and elytra. *Jur.*, Europe (Switzerland).
- Grahamelytron** ZEUNER, 1959b, p. 408 [*\*G. croftii*; OD]. Little-known genus; elytron only. *Jur.*, Antarctica.
- Grasselites** BODE, 1953, p. 229 [*\*G. pusillus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Gyrinites** HEER, 1852, p. 12 [*\*G. troglodytes*; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Gyrinopsis** HANDLIRSCH, 1906b, p. 446 [*\*Gyrinites antiquus* HEER, 1865, p. 91; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Gyrinulopsis** HANDLIRSCH, 1906b, p. 455 [*\*G. nanus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Hadrocephalus** HANDLIRSCH, 1906b, p. 444 [*\*H. anglicus* HANDLIRSCH, 1906b, p. 444; SD CARPENTER, herein]. Little-known genus. *Jur.*, England.
- Halocoleus** HAUPT, 1950, p. 152 [*\*H. cameratus*;

- OD]. Little-known genus, based on elytral fragments. *Eoc.*, Europe (Germany).
- Halticophana** HANDLIRSCH, 1906b, p. 552 [\**H. westwoodi*; OD]. Little-known genus. *Jur.*, England.
- Harpalidium** WESTWOOD, 1854, p. 393 [\**H. anactus*; SD HANDLIRSCH, 1906b, p. 560]. Little-known genus. GIEBEL, 1856. *Jur.*, England.
- Harpalomimus** HANDLIRSCH, 1906b, p. 562 [\**Harpalus burmeisteri* GIEBEL, 1856, p. 63; OD]. Little-known genus. *Jur.*, England.
- Heeriaopsis** CARPENTER, 1986, p. 578, *nom. subst. pro Heeriella* HANDLIRSCH, 1906b, p. 401, *non* MEUNIER, 1904a [\**Elytridium laevigatum* HEER, 1878, p. 196; OD]. Little-known genus; elytron only. *Trias.*, Europe (Sweden).
- Helophoropsis** HANDLIRSCH, 1906b, p. 543 [\**Helophorus brodiei* GIEBEL, 1856, p. 51; OD]. Little-known genus. *Jur.*, England.
- Helopides** ROEMER, 1876, p. 351 [\**H. hildesiensis*; OD]. Little-known genus. ZEUNER, 1930. *Trias.*, Europe (Germany).
- Helopidium** WESTWOOD, 1854, p. 395 [\**H. neorides*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, England.
- Helopium** WESTWOOD, 1854, p. 393 [\**H. agabus*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, England.
- Hemidonacia** HAUPT, 1956, p. 60 [\**H. involuta*; OD]. Little-known genus, based on elytral fragments. *Eoc.*, Europe (Germany).
- Hemisphaericosites** HAUPT, 1956, p. 71 [\**H. sphaericus*; OD]. Little-known genus; elytral fragments. *Eoc.*, Europe (Germany).
- Hexameristus** BODE, 1953, p. 210 [\**H. inflatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Holcoelytrum** HANDLIRSCH, 1906b, p. 453 [\**Harpalus gebeli*; OD]. Little-known genus. ZEUNER, 1962a. *Jur.*, Europe (Germany).
- Holcoptera** HANDLIRSCH, 1906b, p. 453 [\**Harpalus schlotbeimi* GIEBEL, 1856, p. 63; OD]. Little-known genus. *Jur.*, England.
- Hydrobiites** HEER, 1865, p. 91 [\**H. veteranus*; OD]. Little-known genus. GIEBEL, 1856. *Jur.*, Europe (Germany), England.
- Hydroicetes** BODE, 1953, p. 232 [\**H. affictus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Hydrophilites** HEER, 1865, p. 91 [collective group]. Little-known group. HEER, 1883. *Jur.*, Europe (Switzerland); *Mio.*, Greenland.
- Hydroporopsis** HANDLIRSCH, 1906b, p. 559 [\**Hydroporus neptuni* GIEBEL, 1856, p. 58; OD]. Little-known genus. *Jur.*, England.
- Hylobiites** SCUDDER, 1895b, p. 30 [\**H. cretaceus*; OD]. Little-known genus. HANDLIRSCH, 1907. *Cret.*, Canada (Manitoba).
- Hyperomima** HANDLIRSCH, 1906b, p. 567 [\**Hypera antiqua* GIEBEL, 1856, p. 140; OD]. Little-known genus. MEUNIER, 1899b. *Jur.*, England.
- Ironicus** HANDLIRSCH, 1906b, p. 558 [\**Harpalidium notbrus* WESTWOOD, 1854, p. 386; OD]. Little-known genus. *Jur.*, England.
- Kakoselia** HANDLIRSCH, 1906b, p. 561 [\**Camptodontus angliae* GIEBEL, 1856, p. 65; OD]. Little-known genus. *Jur.*, England.
- Kamaroma** HANDLIRSCH, 1906b, p. 565 [\**K. breve*; OD]. Little-known genus. *Jur.*, England.
- Katapiptus** HANDLIRSCH, 1906b, p. 558 [\**K. striolatus*; OD]. Little-known genus. *Jur.*, England.
- Katapontisus** HANDLIRSCH, 1906b, p. 565 [\**Elmis brodiei* GIEBEL, 1856, p. 50; OD]. Little-known genus. *Jur.*, England.
- Keleusticus** HANDLIRSCH, 1906b, p. 450 [\**Buprestites zirkeli* GEINITZ, 1894, p. 75; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Kelidus** HANDLIRSCH, 1906b, p. 556 [\**Buprestium bolbus* WESTWOOD, 1854, p. 386; OD]. Little-known genus. *Jur.*, England.
- Kibdelia** HANDLIRSCH, 1906b, p. 559 [\**Prionus ooliticus* BRODIE, 1845, p. 47; OD]. Little-known genus. *Jur.*, England.
- Laimocenos** BODE, 1953, p. 235 [\**L. striatogranulatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Lamiites** FRITSCH, 1889, p. 8 [\**L. similimus*; OD]. Little-known genus. FRITSCH, 1901. *Cret.*, Europe (Czechoslovakia).
- Lamiophanes** HANDLIRSCH, 1906b, p. 557 [\**Lamia schroeteri* GIEBEL, 1856, p. 131; OD]. Little-known genus. *Jur.*, England.
- Latridiites** HEER, 1865, p. 89 [\**L. schaumii*; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Leptomites** BODE, 1953, p. 237 [\**L. procerus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Leptosolenophorus** BODE, 1953, p. 231 [\**L. brevicollis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Leprynticus** BODE, 1953, p. 221 [\**L. procerus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Liassocarabites** BODE, 1953, p. 226 [\**L. praefricatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Loxocamarotus** BODE, 1953, p. 216 [\**L. virgatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Loxostelidorus** BODE, 1953, p. 218 [\**L. minutus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Macrotrachelites** BODE, 1953, p. 216 [\**M. longus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Masselytron** HANDLIRSCH, 1939, p. 68 [\**M. quinquestriatum*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Megacentrus** HEER, 1852, p. 14 [\**M. tristis*; OD]. Little-known genus, based on body fragments. DOLIN, 1973. *Jur.*, Europe (Switzerland).
- Megachorites** BODE, 1953, p. 229 [\**M. brevicollis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Megelytrites** BODE, 1953, p. 227 [\**M. mutilatus*;

- OD]. Little-known genus. *Jur.*, Europe (Germany).
- Melanocantharis** BODE, 1953, p. 234 [*\*M. bicornuta*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Melanophilites** HANDLIRSCH, 1906b, p. 453 [*\*Melanophila sculptilis* HEER, 1852, p. 14; OD]. Little-known genus. HEER, 1865. *Jur.*, Europe (Switzerland).
- Melanophilopsis** HANDLIRSCH, 1906b, p. 452 [*\*Melanophila costata* HEER, 1865, p. 88; OD]. Little-known genus. HEER, 1852. *Jur.*, Europe (Switzerland).
- Melolonthites** HEER, 1847, p. 71 [*\*M. aciculatus* HEER, 1847, p. 71; SD CARPENTER, herein]. *Mio.*, Europe (Germany).
- Memptus** HANDLIRSCH, 1906b, p. 563 [*\*M. braueri* HANDLIRSCH, 1906b, p. 563; SD CARPENTER, herein]. Little-known genus. *Jur.*, USSR (Asian RSFSR).
- Menephioides** FUJUYAMA, 1973, p. 378 [*\*M. minensis*; OD]. Little-known genus, based on elytron. *Trias.*, Japan.
- Mesalocistus** BODE, 1953, p. 222 [*\*M. constrictus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Meseumalpit** PONOMARENKO in ROHDENDORF, 1962a, p. 266, *nom. subst. pro Eumalpit* MARTYNOV, 1926a, p. 38, *non* HEER, 1865 [*\*Eumalpit jurassicus* MARTYNOV; OD]. Head not visible from above; pronotum with anterior margin convex, posterior angles acute. MEDVEDEV, 1968. *Jur.*, USSR (Kazakh).
- Mesoagrites** MARTYNOV, 1935b, p. 42 [*\*M. multipunctatus*; OD]. Elytra elongate, resembling those of *Donacia* (recent) but with 14 narrow rows of small pits. *Jur.*, USSR (Asian RSFSR).
- Mesolobites** CARPENTER, 1986, p. 578, *nom. subst. pro Lobites* DUNSTAN, 1923, p. 53, *non* MOJISOVICIS, 1873 [*\*Lobites tuberculatus* DUNSTAN; OD]. Little-known genus, based on isolated elytra. *Trias.*, Australia (Queensland).
- Mesoncus** CARPENTER, 1986, p. 578, *nom. subst. pro Loxoncus* BODE, 1953, p. 218, *non* SCHMIDT-GOEBEL, 1846 [*\*Loxoncus procerus* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Mesorhynchophora** TILLYARD in TILLYARD & DUNSTAN, 1916, p. 42 [*\*M. dunstani*; OD]. Little-known genus, based on elytral fragment. *Jur.*, Australia (Queensland).
- Mesotyrites** BODE, 1953, p. 233 [*\*M. marginatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Metacupes** GARDINER, 1961, p. 88 [*\*M. harrisi*; OD]. Little-known genus, based on elytral fragment. *Trias.*, England.
- Metagriliium** HANDLIRSCH, 1906b, p. 553 [*\*M. westwoodi*; OD]. Little-known genus. WESTWOOD, 1854. *Jur.*, England.
- Micranthaxia** HEER, 1852, p. 14 [*\*M. rediviva*; OD]. Little-known genus. HEER, 1865. *Jur.*, Europe (Switzerland).
- Micrelaterium** HANDLIRSCH, 1906b, p. 554 [*\*Elaterium triopas* WESTWOOD, 1854, p. 389; OD]. Little-known genus. DOLIN, 1973. *Jur.*, England.
- Microcoleopteron** HANDLIRSCH, 1906b, p. 550 [collective group]. Small beetles of uncertain family position. WEYENBERGH, 1869; OPPENHEIM, 1888; MEUNIER, 1898b; ALTENA, 1958. *Jur.*, Europe (Germany).
- Mikrocarpides** BODE, 1953, p. 232 [*\*M. lineatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Mimelater** HANDLIRSCH, 1906b, p. 449 [*\*Elater angulatus* GIEBEL, 1856, p. 92; OD]. Little-known genus. DOLIN, 1973. *Jur.*, England.
- Mimemala** STRAND, 1936, p. 169, *nom. subst. pro Mimema* HANDLIRSCH, 1906b, p. 557, *non* WOLLASTON, 1861 [*\*Mimema punctatum* HANDLIRSCH; OD]. Little-known genus, possibly a buprestid. *Jur.*, England.
- Mimohelops** HAUPT, 1950, p. 130 [*\*M. venosus*; OD]. Little-known genus. *Eoc.*, Europe (Germany).
- Nannocurculionites** HANDLIRSCH, 1906b, p. 401 [*\*Curculionites carlsoni* HEER, 1878, p. 195; OD]. Little-known genus; elytron only. *Trias.*, Europe (Sweden).
- Nannoodes** HANDLIRSCH, 1906b, p. 446 [*\*N. pseudocistela*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Nebrioides** HANDLIRSCH, 1906b, p. 455 [*\*Nebria dobertinensis* GEINITZ, 1894, p. 77; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Necronectulus** PONOMARENKO, 1977b, p. 90 [*\*N. avus*; OD]. Little-known genus of aquatic species. Antennae thin and short, reaching only to base of pronotum; metepisternites reaching to cavities of middle coxae. *Jur.*, USSR (Kazakh).
- Nitidulites** HEER, 1865, p. 90 [*\*N. argoviensis*; OD] [= *Parnidium* GEINITZ, 1894, p. 77, obj.]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, Europe (Germany, Switzerland).
- Notokistus** HANDLIRSCH, 1906b, p. 444 [*\*N. brodiei*; OD]. Little-known genus. *Jur.*, England.
- Ochtebiites** PONOMARENKO, 1977c, p. 106 [collective group]. Little-known genus, possibly related to the Hydraenidae. *Jur.*, USSR (Kazakh); *Cret.*, USSR (Asian RSFSR).
- Oligovarus** CARPENTER, 1986, p. 578, *nom. subst. pro Varus* SCHLECHTENDAL, 1894, p. 209, *non* STÅL, 1865 [*\*Varus ignotus* SCHLECHTENDAL; OD]. Little-known genus. *Oligo.*, Europe (Germany).
- Omogonylus** BODE, 1953, p. 213 [*\*O. ovatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Onkedodimus** HANDLIRSCH, 1939, p. 70 [*\*O. discicollis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Ooidellus** CARPENTER, 1986, p. 579, *nom. subst. pro Ooides* BODE, 1953, p. 234, *non* AGASSIZ, 1846

- [\**Ooides denudatus* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Ooperiglyptus** BODE, 1953, p. 219 [\**O. contractus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Ooperioristus** BODE, 1953, p. 220 [\**O. applanatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Opiselleipon** BODE, 1953, p. 230 [\**O. gravis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Opsis** HANDLIRSCH, 1906b, p. 544 [\**O. bavarica*; OD]. Little-known genus. ALTEHA, 1958. *Jur.*, Europe (Germany).
- Otiorrhynchites** HAUPT, 1956, p. 81 [\**O. densepunctatus*; OD]. Little-known genus, based on elytral fragment. *Eoc.*, Europe (Germany).
- Oxycephalites** BODE, 1953, p. 207 [\**O. curculioides*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Oxytrotiptera** HANDLIRSCH, 1939, p. 68 [\**O. mediocris*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Pachycoleon** HANDLIRSCH, 1906b, p. 560 [\**Buprestim woodlei* WESTWOOD, 1854, p. 393; OD]. Little-known genus. *Jur.*, England.
- Pachypleurites** HAUPT, 1952, p. 247 [\**P. nodosus*; OD]. Little-known genus; elytral fragment. *Perm.*, Europe (Germany).
- Palaeobelostoma** MEUNIER, 1896, p. 95 [\**P. hartingi*; OD]. Little-known genus, possibly a synonym of *Pseudohydrophilus* (Coptoclavidae). HANDLIRSCH, 1906b. *Jur.*, Europe (Germany).
- Palaeotrachys** BODE, 1953, p. 215 [\**P. laticollis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Paleobuprestis** WALKER, 1938, p. 138 [\**P. maxima*; OD]. Tunnels in fossil wood, apparently made by beetle larvae. *Trias.*, USA (Arizona).
- Paleoipidus** WALKER, 1938, p. 140 [\**P. perforatus*; OD]. Tunnels in fossil wood, apparently made by beetle larvae. *Trias.*, USA (Arizona).
- Paleoscolytus** WALKER, 1938, p. 139 [\**P. divergens*; OD]. Tunnels in fossil wood, apparently made by beetles. *Trias.*, USA (Arizona).
- Pallax** HANDLIRSCH, 1906b, p. 560 [\**P. prevosti*; OD]. Little-known genus. *Jur.*, England.
- Pantodapus** HANDLIRSCH, 1906b, p. 564 [\**Harpalus knorri* GIEBEL, 1856, p. 62; OD]. Little-known genus. MEUNIER, 1899b. *Jur.*, England.
- Parabuprestites** HANDLIRSCH, 1906b, p. 400 [\**Buprestites rugulosus* HEER, 1878, p. 194; OD]. Little-known genus; elytron only. *Trias.*, Europe (Sweden).
- Parabuprestium** HANDLIRSCH, 1906b, p. 554 [\**Buprestium teleas* WESTWOOD, 1854, p. 386; SD CARPENTER, herein]. Little-known genus. GIEBEL, 1856. *Jur.*, England.
- Paracurculionites** HANDLIRSCH, 1906b, p. 401 [\**Curculionites parvulus* HEER, 1878, p. 195; OD]. Little-known genus; elytron only. *Trias.*, Europe (Sweden).
- Paracurculium** HANDLIRSCH, 1906b, p. 455 [\**Curculionites punctatus* GEINITZ, 1894, p. 77; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Paradoggeria** HANDLIRSCH, 1906b, p. 556 [\**P. acuminata*; OD]. Little-known genus. *Jur.*, England.
- Paragrillium** HANDLIRSCH, 1906b, p. 553 [\**Elaterium barypus* WESTWOOD, 1854, p. 389; OD]. Little-known genus. *Jur.*, England.
- Paragyrrinus** HANDLIRSCH, 1906b, p. 448 [\**Gyrrinus dubius* GIEBEL, 1856, p. 56; OD]. Little-known genus. *Jur.*, England.
- Parakeleusticus** HAUPT, 1950, p. 126 [\**P. posthumus*; OD]. Little-known genus. *Eoc.*, Europe (Germany).
- Parandrexia** MARTYNOV, 1926a, p. 19 [\**P. parvula*; OD]. Little-known genus. MEDVEDEV, 1969. *Jur.*, USSR (Kazakh).
- Parasilphites** HANDLIRSCH, 1906b, p. 547 [\**Silphites angusticollis* OPPENHEIM, 1888, p. 239; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Parnosoma** CARPENTER, 1986, p. 579, *nom. subst. pro Pedinosoma* BODE, 1953, p. 235, *non* REIBISCH, 1893 [\**Pedinosoma detectum* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Paropiophorus** HAUPT, 1950, p. 132 [\**P. nitidulus*; OD]. Little-known genus. *Eoc.*, Europe (Germany).
- Pausopsia** COCKERELL, 1911b, p. 71 [\**P. nearctica*; OD]. Little-known genus, possibly belonging to the Carabidae. WICKHAM, 1912a; Wasmann, 1926a, 1929a; DARLINGTON, 1950. *Oligo.*, USA (Colorado).
- Peltsosyne** PONOMARENKO, 1977c, p. 105 [\**P. triasica*; OD]. Little-known genus; metepisternum not reaching cavities of middle coxae; abdomen with 5 visible sternites. *Trias.*, USSR (Kirghiz).
- Periboloptera** HANDLIRSCH, 1939, p. 67 [\**P. rotunda*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Peridosoma** CARPENTER, 1986, p. 579, *nom. subst. pro Perosoma* BODE, 1953, p. 217, *non* BRONN, 1862 [\**Perosoma praecisum* BODE; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Petrorophus** HEER, 1852, p. 12 [\**P. truncatus*; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Phanerogramma** COCKERELL, 1915, p. 479 [\**Akicera heeri* GIEBEL, 1856, p. 30; OD]. Little-known genus, based on elytral fragment. *Jur.*, England.
- Phaulogyrrinus** HANDLIRSCH, 1906b, p. 448 [\**Gyrrinites minimus* HEER, 1865, p. 91; OD]. *Jur.*, Europe (Switzerland).
- Pholipheron** BODE, 1953, p. 206 [\**P. articulatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Phytopleision** BODE, 1953, p. 236 [\**P. ovatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Pimeliodes** FRITSCH, 1901, p. 172 [\**P. parvus*; OD]. Little-known genus. *Cret.*, Europe (Czechoslovakia).

- Plastelater** HANDLIRSCH, 1906b, p. 438 [*\*Elater neptuni* GIEBEL, 1856, p. 91; OD]. Little-known genus; pronotum and elytra. DOLIN, 1973. *Jur.*, England.
- Plastobuprestites** HANDLIRSCH, 1906b, p. 444 [*\*Buprestites elegans* GEINITZ, 1894, p. 76; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Plastonebria** HANDLIRSCH, 1906b, p. 444 [*\*Nebria scudderi* GEINITZ, 1894, p. 74; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Pleuralocista** BODE, 1953, p. 213 [*\*P. insculpta*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Pliosilpha** GERSDORF, 1969, p. 307 [*\*P. strausi*; OD]. Little-known genus. *Plio.*, Europe (Germany).
- Polypamon** HANDLIRSCH, 1906b, p. 456 [*\*Cistelites byrrhoides* GEINITZ, 1894, p. 76; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Prionophana** HANDLIRSCH, 1906b, p. 557 [*\*Prionus antiquus* GIEBEL, 1856, p. 126; OD]. Little-known genus. *Jur.*, England.
- Procalosoma** MEUNIER, 1895a, p. 207 [*\*P. giardi*; OD]. Little-known genus. HANDLIRSCH, 1906b; BREUNING, 1928b; ALTENA, 1958. *Jur.*, Europe (Germany).
- Procarabites** HANDLIRSCH, 1906b, p. 440 [*\*Carabites bellus* HEER, 1865, p. 90; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Prochrysomela** HANDLIRSCH, 1906b, p. 550 [*\*Chrysomelites jurassicus* OPPENHEIM, 1888, p. 242; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Proctobuprestis** HANDLIRSCH, 1906b, p. 439 [*\*Glaphyoptera brevicollis* HEER, 1865, p. 88; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Proheuristes** BODE, 1953, p. 225 [*\*P. striatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Prophasis** HANDLIRSCH, 1906b, p. 566 [*\*Chrysomela ignota* GIEBEL, 1856, p. 120; OD]. Little-known genus. *Jur.*, England.
- Prosthenostictus** HANDLIRSCH, 1906b, p. 562 [*\*Crypticus ungeri* GIEBEL, 1856, p. 110; OD]. Little-known genus. *Jur.*, England.
- Prosynactus** BODE, 1953, p. 224 [*\*P. scissus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Protocuneus** COCKERELL, 1915, p. 477 [*\*P. punctatus*; OD]. Little-known genus; elytral fragment. *Jur.*, England.
- Prototoma** HEER, 1852, p. 12 [*\*P. striata*; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Pseudobuprestites** HANDLIRSCH, 1906b, p. 399 [*\*Glaphyoptera pterophylli* HEER, 1853b, p. 133; OD]. Little-known genus. *Trias.*, Europe (Germany).
- Pseudocarabites** HANDLIRSCH, 1906b, p. 401 [*\*Carabites deplanatus* HEER, 1878, p. 197; OD]. Little-known genus; elytron only. *Trias.*, Europe (Sweden).
- Pseudochrysomelites** HANDLIRSCH, 1906b, p. 400 [*\*Chrysomelites rothenbachi* HEER, 1877, p. 76; OD]. Little-known genus; elytron only. *Trias.*, Europe (Switzerland).
- Pseudocurculionites** HANDLIRSCH, 1906b, p. 399 [*\*Curculionites prodromus* HEER, 1853b, p. 134; OD]. Little-known genus. *Trias.*, Europe (Germany).
- Pseudocymindis** HANDLIRSCH, 1906b, p. 560 [*\*Cymindis antiqua* GIEBEL, 1856, p. 69; OD]. Little-known genus. *Jur.*, England.
- Pseudocyphon** HANDLIRSCH, 1906b, p. 446 [*\*Cyphon vetustus* GEINITZ, 1894, p. 78; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Pseudoelateropsis** HANDLIRSCH, 1906b, p. 399, *nom. subst. pro Elateropsis* ROEMER, 1876, p. 351, *non* CHEVOLAT, 1862 [*\*Elateropsis infraliassica* ROEMER; OD]. Little-known genus; elytra only. DOLIN, 1973. *Trias.*, Europe (Germany).
- Pseudohydrophilites** HANDLIRSCH, 1906b, p. 400 [*\*Hydrophilites nathorsti* HEER, 1878, p. 193; OD]. Little-known genus; elytron only. *Trias.*, Europe (Sweden).
- Pseudopronites** HANDLIRSCH, 1906b, p. 453 [*\*Prionus liasinus* GEINITZ, 1894, p. 72; OD]. *Jur.*, Europe (Germany).
- Pseudorhynchophora** HANDLIRSCH, 1906b, p. 402 [*\*P. olliffi*; OD]. Little-known genus; elytron only. *Trias.*, Australia (Queensland).
- Pseudosilphites** ZEUNER, 1930, p. 462 [*\*P. triassicus*; OD]. Little-known genus; elytra and abdominal fragments. ZEUNER, 1961. *Trias.*, Europe (Germany), South Africa.
- Pseudotelephorus** HANDLIRSCH, 1906b, p. 454 [*\*Telephorus baueri* GIEBEL, 1856, p. 101; OD]. Little-known genus. COCKERELL, 1915. *Jur.*, England.
- Pseudotenebrio** HANDLIRSCH, 1906b, p. 550 [*\*Tenebrio innominatus* WEYENBERGH, 1869, p. 285; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Pseudothyrea** HANDLIRSCH, 1906b, p. 541 [*\*P. oppenheimi*; OD]. Little-known genus, possibly a buprestid. OPPENHEIM, 1888; DOLIN, 1973. *Jur.*, Europe (Germany).
- Pseudus** HANDLIRSCH, 1906b, p. 563 [*\*P. purbecensis*; OD]. Little-known genus. *Jur.*, England.
- Pyrochroophana** HANDLIRSCH, 1906b, p. 542 [*\*Pyrochroa breviplex* DEICHMÜLLER, 1886, p. 72; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Reeveana** DUNSTAN, 1923, p. 48 [*\*R. minor*; OD]. Little-known genus, elytron only. *Trias.*, Australia (Queensland).
- Rhabdotus** BODE, 1953, p. 223 [*\*R. cingulatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Rhinohelaeites** HAUPT, 1950, p. 140 [*\*R. longipes*; OD]. Little-known genus. [Family assignment doubtful.] *Eoc.*, Europe (Germany).
- Rhomaleus** BODE, 1953, p. 228 [*\*R. ornatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).

- Rhysopsalis** BODE, 1953, p. 214 [\**R. distorta*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Scalopoides** BODE, 1953, p. 225 [\**S. incisus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Scaphidiopsis** HANDLIRSCH, 1906b, p. 550 [\**Scaphidium hageni* WEYENBERGH, 1869, p. 281; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Semiglobus** HANDLIRSCH, 1906b, p. 566 [\**S. jurasicus*; OD]. Little-known genus. *Jur.*, England.
- Siderosemion** BODE, 1953, p. 211 [\**S. punctolineatum*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Silicernius** HEYDEN, 1859a, p. 6 [\**S. spectabilis*; OD]. Little-known genus, possibly belonging to the Elateridae. HEYDEN, 1858. *Oligo.*, Europe (Germany).
- Silphites** FRITSCH, 1869a, p. 188 [\**S. priscus*; OD] [= *Silphidium* HANDLIRSCH, 1907, p. 664, obj.]. Little-known genus. FRITSCH, 1901. *Cret.*, Europe (Czechoslovakia).
- Sitonites** HEER, 1865, p. 90 [\**S. melanarius*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, Europe (Switzerland).
- Smodicoptera** HANDLIRSCH, 1906b, p. 452 [\**Euchroma lasina* HEER, 1852, p. 13; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Spalacoides** BODE, 1953, p. 214 [\**S. simplex*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Sphaericites** BODE, 1953, p. 233 [\**S. concameratus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Sphaerocantharis** BODE, 1953, p. 213 [\**S. defossa*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Stenelytron** HANDLIRSCH, 1906b, p. 451 [\**Elater redtenbacheri* GIEBEL, 1856, p. 92; OD]. Little-known genus. DOLIN, 1973. *Jur.*, England.
- Stictulus** HANDLIRSCH, 1906b, p. 562 [\**S. brodiei*; OD]. Little-known genus. *Jur.*, England.
- Stigmenamma** HANDLIRSCH, 1906b, p. 451 [\**Harpalus heeri* GIEBEL, 1856, p. 63; OD]. Little-known genus. *Jur.*, England.
- Streblocardioides** BODE, 1953, p. 210 [\**S. striatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Strongylites** HEER, 1865, p. 89 [\**S. stygicus* HEER, 1865, p. 89; SD CARPENTER, herein]. Little-known genus. *Jur.*, Europe (Switzerland).
- Syntomopteris** BODE, 1953, p. 209 [\**S. latus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Telephorium** WESTWOOD, 1854, p. 395 [\**T. abgarus*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, England.
- Tentyridium** WESTWOOD, 1854, p. 393 [\**T. peleus*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, England.
- Tetragonides** BODE, 1953, p. 225 [\**T. magnus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Tetragonotrachelus** BODE, 1953, p. 224 [\**T. gracilis*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Theornithion** BODE, 1953, p. 217 [\**T. striatum*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Thoracotes** HANDLIRSCH, 1906b, p. 438 [\**T. dubius*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Thurmannia** HEER, 1852, p. 11 [\**T. punctata*; OD]. Little-known genus. HEER, 1865. *Jur.*, Europe (Switzerland).
- Timarchopsis** BRAUER, REDTENBACHER, & GANGLBAUER, 1889, p. 17 [\**T. czekanowskii*; OD]. Little-known genus. HANDLIRSCH, 1906b. *Jur.*, USSR (Asian RSFSR).
- Tolype** BODE, 1953, p. 212 [\**T. rotundata*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Trapezotrachelus** BODE, 1953, p. 215 [\**T. longus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Triadocoleopteron** ZEUNER, 1930, p. 466 [\**T. spectabile*; OD]. Little-known genus, possibly belonging to Silphidae. *Trias.*, Europe (Germany).
- Triadogyrus** PONOMARENKO, 1977b, p. 95 [\**T. sternalis*; OD]. Little-known genus. Adults apparently aquatic, possibly related to Gyrinidae. Hind coxae short; abdomen with 6 visible segments. *Trias.*, USSR (Ukraine).
- Trichelepturgetes** BODE, 1953, p. 227 [\**T. procerus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Tricyrtus** BODE, 1953, p. 230 [\**T. tenuistriatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Trigonocephalites** BODE, 1953, p. 239 [\**T. sulcatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Tripsalis** BODE, 1953, p. 208 [\**T. praecisa*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Trixagites** HEER, 1865, p. 90 [\**T. floralis*; OD]. Little-known genus. *Jur.*, Europe (Switzerland).
- Trochiscites** BODE, 1953, p. 215 [\**T. capitapertus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Trochmalus** BODE, 1953, p. 214 [\**T. compressus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Tryoniopsis** DUNSTAN, 1923, p. 52 [\**T. punctata*; OD]. Little-known genus, elytron only. *Trias.*, Australia (Queensland).
- Tychon** HANDLIRSCH, 1906b, p. 563 [\**Helophorus antiquus* GIEBEL, 1856, p. 51; OD]. Little-known genus. *Jur.*, England.
- Umkomaasia** ZEUNER, 1961, p. 305 [\**U. depressa*; OD]. Little-known genus, based on elytron, possibly belonging to Carabidae. *Trias.*, South Africa.
- Velenovskya** FRITSCH, 1889, p. 8 [\**V. inornata*; OD]. Little-known genus. K. W. FRITSCH, 1901. *Cret.*, Europe (Czechoslovakia).



- Wollastonia** HEER, 1852, p. 13 [*\*W. ovalis*; OD] [= *Wollastonites* HEER, 1865, p. 91, obj.]. Little-known genus. *Jur.*, Europe (Switzerland).
- Xenogyrinus** HANDLIRSCH, 1906b, p. 448 [*\*Gyrinus natanus* BRODIE, 1845, p. 101; OD]. Little-known genus. HEER, 1852. *Jur.*, England.
- Xyloconites** HAUPT, 1950, p. 143 [*\*X. proavus*; OD]. Little-known genus; elytron only. *Eoc.*, Europe (Germany).
- Xylotupia** HANDLIRSCH, 1906b, p. 557 [*\*X. brodiei*; OD]. Little-known genus. *Jur.*, England.
- Zetemenos** BODE, 1953, p. 230 [*\*Z. sexlineatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).
- Zygaenia** HANDLIRSCH, 1906b, p. 558 [*\*Curculionites tuberculatus* GIEBEL, 1856, p. 148; OD]. Little-known genus. *Jur.*, England.

### RECENT GENERA OF COLEOPTERA WITH DOUBTFULLY ASSIGNED SPECIES

Extinct species belonging to the recent genera listed below have been described from diverse strata, nearly all within the Tertiary. Many of the species were named and assigned to the genera before 1900 (e.g., by GERMAR, HEER, HEYDEN, and GEINITZ), well before the present concepts of coleopterous genera were reached. Many other fossil beetles were described and placed in existing genera during the early part of the present century by individuals who had little knowledge of the order (e.g., COCKERELL and MEUNIER) or who did not appreciate the difficulties of making generic assignments on the basis of isolated elytra (e.g., WICKHAM), as pointed out by DARLINGTON (1929, 1969). Several contemporary coleopterists, specialists in various families, have examined type specimens of such Coleoptera from the Eocene and Oligocene of Colorado and have reported that they were unable to discern sufficient structural details to permit generic determinations or in some instances even family positions. It seems likely, therefore, that the great majority of the genera listed below, probably as many as 90 percent, can only very doubtfully be associated with the fossils described. To emphasize the dubious nature of these generic assignments, generic names have been

enclosed in quotation marks in the following list, which is arranged by families and includes some families not otherwise known in the fossil record.

### Family Carabidae

- "Abax," *Plio.*, England. LESNE, 1926a.
- "Agonum," *Eoc.*, Europe (France). PITON, 1940a.
- "Amara," *Oligo.*, USA (Colorado). WICKHAM, 1912a; EMERSON, 1942.
- "Anchromenus," *Oligo.*, Europe (France); *Mio.*, Europe (Yugoslavia). HEER, 1847; FÖRSTER, 1891.
- "Argutor," *Mio.*, Europe (Germany); *Plio.*, England. HEER, 1847; GIEBEL, 1856; LESNE, 1926b; IABLOKOV-KHNZORIAN, 1961c.
- "Badister," *Mio.*, Europe (Germany). HEER, 1847, 1862b.
- "Bembidion," *Eoc.*, USA (Colorado), Europe (France); *Oligo.*, USA (Colorado); *Mio.*, USA (California). SCUDDER, 1900; WICKHAM, 1913c; PITON, 1940a; PIERCE, 1944.
- "Brachinus," *Oligo.*, USA (Colorado). SCUDDER, 1900.
- "Calosoma," *Plio.*, Europe (Germany). GERSDORF, 1969, 1976.
- "Carabus," *Eoc.*, Europe (Italy); *Oligo.*, USA (Colorado); *Mio./Plio.*, Europe (France). OMBONI, 1886; SCUDDER, 1900; PITON & THÉOBALD, 1935.
- "Chlaenius," *Oligo.*, Europe (France). GRESSITT, 1963.
- "Cratacanthus," *Oligo.*, USA (Colorado). WICKHAM, 1917.
- "Cymindis," *Mio.*, Europe (Germany). HEER, 1847.
- "Dichotrichus," *Mio.*, Europe (Germany). HEER, 1862b.
- "Dromius," *Oligo.*, Europe (Baltic). GERMAR & BERENDT, 1856.
- "Elaphrus," *Plio.*, Europe (France). PITON, 1939.
- "Ergates," *Mio.*, Europe (Germany). COCKERELL, 1922g.
- "Evarthrus," *Oligo.*, USA (Colorado). SCUDDER, 1900.
- "Feronia," *Mio.*, Europe (Germany). HEER, 1847.
- "Galerita," *Eoc.*, USA (Colorado). SCUDDER, 1900.
- "Glenopterus," *Mio.*, Europe (Germany). HEER, 1847.
- "Harpalus," *Eoc.*, USA (Colorado), Europe (France); *Oligo.*, USA (Colorado), Europe (France). SCUDDER, 1900; WICKHAM, 1911, 1917; COCKERELL, 1920c; THÉOBALD, 1937a; PITON, 1940a.
- "Helluomorpha," *Oligo.*, Europe (Baltic). GIEBEL, 1862.
- "Lebia," *Eoc.*, USA (Colorado); *Oligo.*, Europe (Germany); *Plio.*, Europe (France); *Paleoc.-Plio.*, Argentina (Jujuy). HEYDEN & HEYDEN, 1866; COCKERELL, 1913a, 1921a, 1936.
- "Myas," *Oligo.*, USA (Colorado). SCUDDER, 1900.

- "Nebria," *Paleoc.*, Canada (British Columbia); *Oligo.*, USA (Colorado), Europe (France); *Mio.*, Europe (Germany); *Mio./Plio.*, Europe (France). HEER, 1862a; SCUDDER, 1879a, 1900; PITON & THÉOBALD, 1935.
- "Nomaretus," *Oligo.*, USA (Colorado). SCUDDER, 1900.
- "Nothopus," *Oligo.*, USA (Colorado). SCUDDER, 1900.
- "Ophonus," *Mio.*, Europe (France). PITON, 1937b.
- "Panagaeus," *Oligo.*, Europe (France). OUSTALET, 1874.
- "Peocillus," *Eoc.*, Europe (Hungary). PONGRÁCZ, 1935.
- "Petrobius," *Paleoc.-Plio.*, USSR (Asian RSFSR). COCKERELL, 1925g.
- "Platynus," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado). SCUDDER, 1890; TILLYARD & DUNSTAN, 1916; WICKHAM, 1917.
- "Plochionus," *Oligo.*, USA (Colorado). SCUDDER, 1900.
- "Polystichus," *Oligo.*, Europe (France). OUSTALET, 1874.
- "Pterosticus," *Oligo.*, USA (Colorado), England, Europe (France); *Mio.*, USA (Washington); *Paleoc.-Plio.*, Europe (Sweden). SCUDDER, 1900; WICKHAM, 1910, 1931; HATCH, 1927b; KOLBE, 1933.
- "Rembus," *Oligo.*, USA (Colorado). SCUDDER, 1890; WICKHAM, 1920.
- "Scarites," *Oligo.*, Europe (France); *Mio.*, Europe (Yugoslavia). HEER, 1861; THÉOBALD, 1937a.
- "Stenoplus," *Oligo.*, USA (Colorado). SCUDDER, 1900.
- "Stomis," *Oligo.*, Europe (France). OUSTALET, 1874.
- "Tachys," *Oligo.*, USA (Colorado). WICKHAM, 1913c.
- "Trechus," *Oligo.*, USA (Colorado), Europe (France); *Plio.*, England. FÖRSTER, 1891; WICKHAM, 1912a, 1912b; LESNE, 1926b.
- Family Dytiscidae**
- "Acilus," *Oligo.*, USA (Colorado). WICKHAM, 1909.
- "Agabus," *Oligo.*, USA (Colorado), Europe (Germany). HEYDEN & HEYDEN, 1866; WICKHAM, 1912b, 1913b.
- "Bidessus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.
- "Coelambus," *Oligo.*, USA (Colorado). WICKHAM, 1912a.
- "Colymbetes," *Mio.*, Europe (Yugoslavia). HEER, 1847.
- "Cybister," *Mio.*, Europe (Germany). HEER, 1862a, 1865.
- "Cymatopterus," *Oligo.*, Europe (France). HEER, 1847.
- "Dytiscus," *Oligo.*, Europe (France); *Mio.*, USA (Washington), Europe (Germany); *Plio.*, Europe (Germany). HEER, 1847; WICKHAM, 1931; KOLBE, 1932; THÉOBALD, 1937a.
- "Hydaticus," *Mio.*, Europe (Germany). HEER, 1861.
- "Hydroporus," *Oligo.*, USA (Colorado), Europe (Germany); *Plio.*, England. HEER, 1862a; WICKHAM, 1914a; LESNE, 1926a; THÉOBALD, 1937a; STATZ, 1939–1940.
- "Laccophilus," *Mio.*, Europe (Germany). HEER, 1862a.
- "Necticus," *Oligo.*, USA (Colorado). AYMARD, 1854.
- "Oreodites," *Oligo.*, Europe (Germany). STATZ, 1937, 1939–1940.
- "Pelobius," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.
- Family Gyrinidae**
- "Dineutes," *Mio.*, Europe (Germany). HEER, 1861, 1862a.
- Family Georyssidae**
- "Georyssus," *Eoc.*, Europe (Germany); *Plio.*, Europe (France). PITON, 1939; HAUPT, 1956.
- Family Hydrophilidae**
- "Berosus," *Eoc.*, USA (Wyoming); *Oligo.*, Europe (Germany). SCUDDER, 1878a; STATZ, 1939–1940.
- "Cercyon," *Paleoc.*, Canada (British Columbia). SCUDDER, 1879a.
- "Creniphilites," *Oligo.*, USA (Colorado). WICKHAM, 1913c.
- "Cymbisdyta," *Oligo.*, Europe (Germany). STATZ, 1939–1940.
- "Gymnochila," *Mio.*, Europe (Germany). HEER, 1862b.
- "Helophorus," *Mio.*, Europe (Germany). HEER, 1862b.
- "Hydraena," *Plio.*, England. LESNE, 1920.
- "Hydrobius," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado), Europe (France); *Mio.*, Europe (Yugoslavia, Germany). HEER 1847, 1856, 1862b, 1870a; SCUDDER, 1890; WICKHAM, 1911, 1913c; THÉOBALD, 1937a.
- "Hydrochus," *Eoc.*, USA (Wyoming). SCUDDER, 1890.
- "Hydrophilus," *Oligo.*, USA (Colorado), Europe (Germany, France); *Mio.*, Europe (Germany); *Paleoc.-Plio.*, Europe (Roumania). HEER, 1847, 1862b, 1865; HEYDEN, 1862; OUSTALET, 1874; SCUDDER, 1900; WICKHAM, 1920; ZEUNER, 1931, 1938; PROTESCU, 1938; PITON & THÉOBALD, 1939; STATZ, 1939–1940.
- "Hydrous," *Oligo.-Mio.*, Europe (Germany). HEER, 1847, 1862b; HEYDEN, 1859b, HEYDEN & HEYDEN, 1866; STATZ, 1939–1940.
- "Iacobius," *Eoc.*, USA (Wyoming); *Oligo.*, Europe (Germany, France). HEYDEN & HEYDEN, 1866; OUSTALET, 1870, 1874; SCUDDER, 1878b; STATZ, 1937; THÉOBALD, 1937a.
- "Ochthebius," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.
- "Paracymus," *Oligo.*, Europe (Germany). STATZ, 1939–1940.
- "Peltis," *Oligo.*, Europe (Germany). HEER, 1862b.

- "Philydrus," *Eoc.*, Europe (France); *Oligo.*, USA (Colorado), Europe (Germany). HEYDEN & HEYDEN, 1866; WICKHAM, 1909; THÉOBALD, 1937a.  
 "Tropisternus," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado). SCUDDER, 1878a, 1900.

#### Family Histeridae

- "Hister," *Mio.*, Europe (Germany); *Mio./Plio.*, Europe (France). HEER, 1862b; PITON & THÉOBALD, 1935.  
 "Onthophilus," *Paleoc.-Plio.*, Europe (France). HANDSCHIN, 1944.

#### Family Ptiliidae

- "Ptilium," *Oligo.*, Europe (Germany). STATZ & HORION, 1937.

#### Family Silphidae

- "Agyrtes," *Oligo.*, USA (Colorado). HATCH, 1927b.  
 "Necrodes," *Oligo.*, USA (Colorado). COCKERELL, 1908p.  
 "Necrophorus," *Plio.*, Europe (Germany). GERSDORF, 1969.  
 "Peltis," *Mio.*, Europe (France). PITON & THÉOBALD, 1935.  
 "Silpha," *Oligo.*, USA (Colorado), Europe (Germany); *Mio.*, Europe (Germany, France, Yugoslavia), Spitsbergen. GERMAR, 1837; HEER, 1847, 1862b, 1870a; WICKHAM, 1914a; ALTENA, 1958.  
 "Xylodrepa," *Plio.*, Europe (Germany). GERSDORF, 1969.

#### Family Scaphidiidae

- "Scaphidium," *Mio.*, Europe (Germany). HEER, 1847.  
 "Scaphisoma," *Mio.*, Europe (Germany). HEER, 1862b.

#### Family Staphylinidae

- "Acylophorus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Atheta," *Oligo.*, USA (Colorado). WICKHAM, 1913c.  
 "Bledius," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany). HEER, 1862b; SCUDDER, 1878b, 1900.  
 "Bolitobius," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Delester," *Oligo.*, USA (Colorado). WICKHAM, 1912a.  
 "Geodomiscus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Gyrophæna," *Eoc.*, USA (Colorado). SCUDDER, 1876a.  
 "Heterothrops," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Homalium," *Mio.*, Europe (Yugoslavia). HEER, 1847.

- "Homalota," *Eoc.*, USA (Colorado). SCUDDER, 1890.  
 "Hygronoma," *Oligo.*, Europe (France). OUSTALET, 1874.  
 "Lathrobium," *Eoc.*, USA (Colorado); *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany). HEER, 1862b; SCUDDER, 1876a, 1890; WICKHAM, 1913c.  
 "Leptacinus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Lithocharis," *Oligo.*, USA (Colorado), Europe (France). HEER, 1856; SCUDDER, 1900.  
 "Micropeplus," *Plio.*, Europe (Germany). GERSDORF, 1976.  
 "Mycetoporus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Ocybus," *Oligo.*, Europe (Germany). OUSTALET, 1874.  
 "Omalius," *Oligo.*, USA (Colorado). WICKHAM, 1913c.  
 "Ontholestes," *Eoc.*, USA (Colorado). SCUDDER, 1876a.  
 "Oxyporus," *Eoc.*, Europe (France), USA (Colorado); *Mio.*, Europe (Germany). HEER, 1862b; HEYDEN & HEYDEN, 1866; PITON, 1940a.  
 "Oxytelus," *Eoc.*, USA (Colorado); *Oligo.*, USA (Colorado), Europe (Germany, France); *Mio.*, Europe (Germany). HEER, 1862b; SCUDDER, 1876a; FÖRSTER, 1891; WICKHAM, 1913c.  
 "Paederus," *Oligo.*, USA (Colorado). WICKHAM, 1913c.  
 "Philonthus," *Oligo.*, USA (Colorado), Europe (Germany). HEER, 1856; HEYDEN & HEYDEN, 1866; SCUDDER, 1900.  
 "Platystethus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Quedius," *Oligo.*, USA (Colorado), Europe (Germany, France). OUSTALET, 1874; SCUDDER, 1890; WICKHAM, 1912a.  
 "Staphylinites," *Eoc.*, USA (Wyoming). SCUDDER, 1890.  
 "Staphylinus," *Oligo.*, USA (Colorado), Europe (France); *Mio.*, Europe (Germany). HEER, 1862a; OUSTALET, 1874; SCUDDER, 1900; WICKHAM, 1913c.  
 "Stenus," *Oligo.*, Europe (Baltic, Germany, France), USA (Colorado). HEER, 1856; MOTSCHULSKY, 1856; FÖRSTER, 1891; SCUDDER, 1900; MEUNIER, 1920a, 1920c; BENICK, 1943.  
 "Sunius," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.  
 "Tachinus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Tachyporus," *Oligo.*, USA (Colorado), Europe (Germany). GEINITZ, 1886; SCUDDER, 1900.  
 "Triga," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Xantholinus," *Oligo.*, USA (Colorado), Europe (France). HEER, 1856; SCUDDER, 1900.

#### Family Pselaphidae

- "Europepines," *Paleoc.-Plio.*, Australia (Victoria). OKE, 1956.

## Family Lucanidae

- "Ceruchus," *Oligo.*, USA (Colorado). WICKHAM, 1911.  
 "Corticaria," *Oligo.*, Europe (Germany, France). HEER, 1856; SCHLECHTENDAL, 1894.  
 "Dorcus," *Mio.*, England. DEICHMÜLLER, 1881.  
 "Lucanus," *Oligo.*, USA (Colorado). WICKHAM, 1913b.  
 "Platycerus," *Oligo.*, Europe (Germany). GERMAR, 1837.

## Family Scarabaeidae

- "Aegialia," *Eoc.*, USA (Wyoming). SCUDDER, 1890.  
 "Amphicomma," *Oligo.*, USA (Colorado). WICKHAM, 1910.  
 "Anomala," *Oligo.*, USA (Colorado), Europe (Germany, France); *Mio.*, Europe (Germany). HEER, 1862b; HEYDEN & HEYDEN, 1866; WICKHAM, 1914a; MEUNIER, 1923c; GRESSITT, 1963.  
 "Anomalites," *Paleoc.-Plio.*, Europe (France). FRITSCH, 1884b.  
 "Anoplognathus," *Oligo.*, Europe (Germany). HEYDEN, 1862.  
 "Aphodius," *Oligo.*, Europe (Baltic, Germany), USA (Colorado); *Mio.*, Europe (Germany); *Plio.*, Europe (Germany). ROBERT, 1838; HEER, 1847, 1862b; HEYDEN & HEYDEN, 1866; WICKHAM, 1911, 1912a, 1913b, 1913c, 1914a, 1914b; GERSDORF, 1970.  
 "Ataenius," *Oligo.*, USA (Colorado). SCUDDER, 1893a; WICKHAM, 1912a.  
 "Bolboceras," *Mio.*, Europe (Czechoslovakia). DEICHMÜLLER, 1881.  
 "Coprins," *Mio.*, Europe (Germany); *Plio.*, England. HEER, 1862b; CURTIS, 1840.  
 "Coprologus," *Mio.*, Europe (Germany). HEER, 1847.  
 "Diplotaxis," *Oligo.*, USA (Colorado). WICKHAM, 1912a, 1913b.  
 "Geotrupes," *Oligo.*, Europe (Germany, France); *Mio.*, Europe (Germany). GERMAR, 1837, 1849; HEER, 1862b; OUSTALET, 1874.  
 "Glaphyrus," *Mio.*, Europe (Germany). HEER, 1862b.  
 "Gymnopleurus," *Mio.*, Europe (Germany). HEER, 1847, 1862b.  
 "Hoplina," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Hybosurus," *Mio.*, Europe (Germany). HEER, 1862b.  
 "Lepitrix," *Mio.*, Europe (Germany). HEER, 1862b.  
 "Ligyryus," *Oligo.*, USA. WICKHAM, 1911, 1914a.  
 "Listrochelus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Macroductylus," *Oligo.*, USA (Colorado). WICKHAM, 1912a.  
 "Melolontha," *Oligo.*, Europe (Germany, Czechoslovakia). HEER, 1847; NOVÁK, 1877.  
 "Onitis," *Oligo.*, Europe (Germany). HEYDEN, 1862.

- "Onthophagus," *Oligo.*, Europe (France); *Mio.*, Europe (Germany). HEER, 1847, 1862b; OUSTALET, 1874.  
 "Oryctes," *Plio.*, Europe (Germany). GERSDORF, 1970.  
 "Oxyomus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Pentodon," *Oligo.*, Europe (Germany); *Mio.*, Europe (Germany). HEER, 1865; HEYDEN & HEYDEN, 1866.  
 "Phyllophaga," *Oligo.*, USA (Colorado). WICKHAM, 1916b.  
 "Rhizotrogus," *Mio.*, Europe (Germany). HEER, 1847.  
 "Scarabaeus," *Mio.*, Europe (Germany). HEER, 1862b.  
 "Serica," *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany). HEER, 1862b; WICKHAM, 1912a, 1914b.  
 "Strategus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Trichius," *Mio.*, Europe (Germany). HEER, 1847, 1862b, 1865.  
 "Troz," *Paleoc.*, Canada (British Columbia). SCUDDER, 1879a; WICKHAM, 1909.  
 "Valgus," *Mio.*, Europe (Germany). HEER, 1862b.

## Family Dascillidae

- "Ectopria," *Oligo.*, USA (Colorado). BREUNING, 1928a.  
 "Protacnaeus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.

## Family Byrrhidae

- "Amphicyrta," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Byrrhus," *Oligo.*, USA (Colorado), Europe (Germany). HEYDEN, 1859b; HEYDEN & HEYDEN, 1866; SCUDDER, 1895b, 1900.  
 "Cytillus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Nosodendron," *Eoc.*, USA (Colorado). SCUDDER, 1890.  
 "Nosotetocus," *Oligo.*, USA (Colorado). SCUDDER, 1900.

## Family Psephenidae

- "Psephenus," *Oligo.*, USA (Colorado). SCUDDER, 1900.

## Family Dryopidae

- "Helichus," *Oligo.*, USA (Colorado). WICKHAM, 1911, 1912a.

## Family Chelonariidae

- "Chelonarium," *Oligo.*, USA (Colorado). WICKHAM, 1914a.

## Family Buprestidae

- "Acmaeodera," *Mio.*, Europe (Germany). HEER, 1862b.  
 "Agrilus," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1865; WICKHAM, 1914a.  
 "Ancyclocheira," *Oligo.-Mio.*, Europe (Germany). HEER, 1847, 1865; HEYDEN, 1859b, 1862.  
 "Anthaxia," *Oligo.-Mio.*, Europe (Germany). HEER, 1862b; HEYDEN & HEYDEN, 1865; ASSMANN, 1870; FÖRSTER, 1891; WICKHAM, 1913b.  
 "Brachyspathus," *Oligo.*, USA (Colorado). WICKHAM, 1917.  
 "Buprestis," *Eoc.*, Canada (British Columbia); *Oligo.*, Europe (Germany), USA (Colorado). HEYDEN, 1858, 1859b; SCUDDER, 1879a, 1890; WICKHAM, 1914a.  
 "Capnodis," *Mio.*, Europe (Germany). HEER, 1847, 1862b.  
 "Chalcophora," *Mio.*, Europe (Germany). HEER, 1862b.  
 "Chrysobothris," *Oligo.*, USA (Colorado). SCUDDER, 1876a; COCKERELL, 1911b; WICKHAM, 1914a.  
 "Dicera," *Oligo.*, Europe (Germany), USA (Colorado); *Mio.*, Europe (Germany). HEER, 1847; HEYDEN, 1856, 1859b; ASSMANN, 1870; WICKHAM, 1914a.  
 "Lampra," *Oligo.*, Europe (France). BRUYANT, 1902.  
 "Lomatus," *Paleoc.-Plio.*, India (Nagpur). GERMAR, 1842.  
 "Melanophila," *Oligo.*, USA (Colorado). WICKHAM, 1912a, 1914b.  
 "Perotis," *Oligo.-Mio.*, Europe (Germany). HEER, 1847; MASSALONGO, 1855; HEYDEN, 1862.  
 "Ptosima," *Oligo.*, USA (Colorado). WICKHAM, 1912a, 1914a.  
 "Sphenoptera," *Oligo.*, Europe (Germany). HEER, 1847; HEYDEN & HEYDEN, 1865.

## Family Elateridae

- "Adelocera," *Mio.*, Europe (Germany). HEER, 1847.  
 "Agriotes," *Oligo.*, USA (Colorado). WICKHAM, 1916a.  
 "Alaus," *Mio.*, Europe (Germany). HEER, 1865.  
 "Ampedus," *Mio.*, Europe (Germany). HEER, 1847.  
 "Anchastus," *Oligo.*, USA (Colorado). WICKHAM, 1916a.  
 "Athous," *Oligo.*, USA (Colorado). WICKHAM, 1916a.  
 "Campso sternus," *Mio.*, Europe (Germany). DEICHMÜLLER, 1881.  
 "Cardiophorus," *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany). HEER, 1847; WICKHAM, 1916a.  
 "Corymbites," *Mio.*, Europe (Germany). HEER, 1861.  
 "Cryptohypnus," *Paleoc.*, Canada (British Columbia); *Oligo.*, USA (Colorado). SCUDDER, 1879a; WICKHAM, 1916a.  
 "Elater," *Oligo.*, Europe (Baltic), USA (Colorado);

- Mio.*, Europe (Spitsbergen). GIEBEL, 1856; HEER, 1870a; WICKHAM, 1916a.  
 "Horizonotus," *Oligo.*, USA (Colorado). WICKHAM, 1916a.  
 "Ischnodes," *Mio.*, Europe (Germany). HEER, 1847.  
 "Lacon," *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany). HEER, 1847; WICKHAM, 1916a.  
 "Limonius," *Paleoc.*, Canada (British Columbia); *Oligo.*, USA (Colorado), Europe (Germany). HEER, 1847; HEYDEN, 1862; SCUDDER, 1895b; WICKHAM, 1916a.  
 "Ludius," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado). SCUDDER, 1876a; WICKHAM, 1908, 1916a.  
 "Megapenthes," *Oligo.*, USA (Colorado). WICKHAM, 1916a.  
 "Melanactes," *Oligo.*, USA (Colorado). WICKHAM, 1908.  
 "Monocrepidius," *Oligo.*, USA (Colorado). WICKHAM, 1916a.  
 "Oxygonus," *Eoc.*, USA (Colorado); *Oligo.*, USA (Colorado). SCUDDER, 1876a; WICKHAM, 1916a.

## Family Eucnemidae

- "Deltometopus," *Oligo.*, USA (Colorado). WICKHAM, 1916a.  
 "Epiphanis," *Eoc.*, USA (Colorado). SCUDDER, 1876a.  
 "Eucnemis," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Fornax," *Oligo.*, USA (Colorado). WICKHAM, 1916a.  
 "Microrhagus," *Oligo.*, USA (Colorado). WICKHAM, 1916a.

## Family Trixagidae

- "Pactopus," *Oligo.*, USA (Colorado). WICKHAM, 1914b.

## Family Cantharidae

- "Cantharis," *Oligo.*, USA (Colorado), Europe (Germany); *Mio.*, Europe (Germany, Yugoslavia). HEER, 1847; HEYDEN & HEYDEN, 1866; WICKHAM, 1913a, 1914a.  
 "Chauliognathus," *Oligo.*, USA (Colorado). SCUDDER, 1876a.  
 "Malthodes," *Oligo.*, Europe (Germany). FÖRSTER, 1891; MEUNIER, 1915b.  
 "Podabrus," *Oligo.*, USA (Colorado). WICKHAM, 1909, 1914a, 1917.  
 "Polemius," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Trypherus," *Oligo.*, USA (Colorado). WICKHAM, 1913a.

## Family Lampyridae

- "Lampyris," *Mio.*, Europe (Germany). HEER, 1865.  
 "Lucidota," *Oligo.*, USA (Colorado). WICKHAM, 1912a.

**Family Melyridae**

- "Collops," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Malachus," *Oligo.*, USA (Colorado). WICKHAM, 1917.  
 "Trichochrus," *Oligo.*, USA (Colorado). WICKHAM, 1912a.

**Family Dermestidae**

- "Attagenus," *Oligo.*, USA (Colorado). SCUDDER, 1900; WICKHAM, 1913a.  
 "Dermestes," *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany). HEER, 1847; WICKHAM, 1912a.  
 "Orphilus," *Oligo.*, USA (Colorado). WICKHAM, 1912a.

**Family Anobiidae**

- "Anobium," *Eoc.*, USA (Wyoming). SCUDDER, 1878a, 1893a.  
 "Ernobius," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Oligomerus," *Oligo.*, USA (Colorado). WICKHAM, 1914a, 1916b.  
 "Ptinus," *Oligo.*, Europe (Germany). HEYDEN, 1859b; HEYDEN & HEYDEN, 1866.  
 "Sitodrepa," *Eoc.*, USA (Wyoming). SCUDDER, 1876a.  
 "Vrilletta," *Oligo.*, USA (Colorado). WICKHAM, 1913a.  
 "Xestobium," *Oligo.*, USA (Colorado). WICKHAM, 1913a.

**Family Bostrychidae**

- "Amphicerus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Dinoderus," *Oligo.*, USA (Colorado). WICKHAM, 1913c.  
 "Xylobiops," *Oligo.*, USA (Colorado). WICKHAM, 1912a.

**Family Trogossitidae**

- "Ostoma," *Oligo.*, USA (Colorado). WICKHAM, 1910.  
 "Tenebroides," *Oligo.*, USA (Colorado). WICKHAM, 1910.  
 "Trogossita," *Eoc.*, Greenland; *Oligo.-Mio.*, Europe (Germany). GERMAR, 1837, 1849; HEER, 1847, 1862b, 1868.

**Family Cleridae**

- "Clerus," *Oligo.*, Europe (Baltic); *Mio.*, Europe (Germany). HEER, 1847; GIEBEL, 1862.  
 "Enoclerus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Hydnocera," *Oligo.*, USA (Colorado). WICKHAM, 1913c.

- "Necrobia," *Oligo.*, USA (Colorado). WICKHAM, 1914a, 1914b.

**Family Lymexylidae**

- "Hylecaetus," *Oligo.*, Europe (Germany). HEER, 1865.  
 "Melittoma," *Oligo.*, USA (Colorado). WICKHAM, 1911.

**Family Nitidulidae**

- "Amartus," *Oligo.*, USA (Colorado). WICKHAM, 1912a.  
 "Amphotis," *Mio.*, Europe (Germany). HEER, 1847, 1862b.  
 "Carpophilus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Colopterus," *Oligo.*, USA (Colorado). WICKHAM, 1913c.  
 "Meligethes," *Oligo.*, Europe (Germany). FÖRSTER, 1891.  
 "Nitidula," *Oligo.*, Europe (Germany); *Mio.*, Europe (Yugoslavia). HEER, 1847, 1862b; MEUNIER, 1923c.  
 "Phenolia," *Oligo.*, USA (Colorado). SCUDDER, 1876a.  
 "Prometopia," *Paleoc.*, Canada (British Columbia). SCUDDER, 1877b.

**Family Cryptophagidae**

- "Antherophagus," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado). SCUDDER, 1876a; TILLYARD, 1918a.  
 "Cryptophagus," *Oligo.*, USA (Colorado). WICKHAM, 1913b, 1914a, 1916b.

**Family Cucujidae**

- "Laemophloeus," *Eoc.*, USA (Wyoming). SCUDDER, 1890.  
 "Pediacus," *Oligo.*, USA (Colorado). SCUDDER, 1900.

**Family Erotylidae**

- "Atomaria," *Mio.*, Europe (Germany). HEER, 1862b.  
 "Triplax," *Oligo.*, USA (Colorado). WICKHAM, 1912a, 1914a, 1916b.  
 "Tritoma," *Eoc.*, USA (Wyoming). SCUDDER, 1878a.

**Family Phalacridae**

- "Olibrus," *Mio.*, Europe (Germany). FÖRSTER, 1891.

**Family Coccinellidae**

- "Adalia," *Oligo.*, USA (Colorado), Europe (Germany). FÖRSTER, 1891; SCUDDER, 1900.

- "Anatis," *Oligo.*, USA (Colorado). WICKHAM, 1917.  
 "Chilocorus," *Oligo.*, USA (Colorado). SCUDDER, 1900.  
 "Coccinella," *Oligo.*, USA (Colorado), Europe (Germany); *Mio.*, Europe (Germany). HEER, 1847, 1865; HEYDEN, 1859b, 1862; HEYDEN & HEYDEN, 1866; SCHLECHTENDAL, 1894; HAGEDORN, 1906; WICKHAM, 1913a.  
 "Scymnus," *Oligo.*, Europe (Germany). FÖRSTER, 1891.

#### Family Lathridiidae

- "Corticaria," *Oligo.*, USA (Colorado). WICKHAM, 1913c, 1914a, 1914b.

#### Family Cisidae

- "Cis," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.

#### Family Mycetophagidae

- "Mycetophagus," *Oligo.*, USA (Colorado). WICKHAM, 1913c.

#### Family Colydiidae

- "Bothrideres," *Oligo.*, Europe (Baltic). STEIN, 1881.  
 "Eucicones," *Oligo.*, USA (Colorado). WICKHAM, 1913c.

#### Family Tenebrionidae

- "Blapstinus," *Oligo.*, USA (Colorado). WICKHAM, 1912a.  
 "Bolitophagus," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.  
 "Ephalus," *Oligo.*, USA (Colorado). SCUDDER, 1893a.  
 "Gonocephalum," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.  
 "Helops," *Eoc.*, Greenland; *Oligo.-Mio.*, Europe (Germany). HEYDEN & HEYDEN, 1865; SCUDDER, 1895b; MEUNIER, 1914a.  
 "Meracantha," *Oligo.*, USA (Colorado). WICKHAM, 1909.  
 "Pactostoma," *Oligo.*, USA (Colorado). WICKHAM, 1910.  
 "Platydema," *Oligo.*, USA (Colorado), Europe (Germany). HEYDEN & HEYDEN, 1866; WICKHAM, 1912a, 1913b.  
 "Protoplatycera," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Tenebrio," *Paleoc.*, Canada (British Columbia); *Oligo.*, Europe (Germany). GERMAR, 1837; HEYDEN, 1859b; SCUDDER, 1879a.  
 "Ulnus," *Oligo.*, USA (Colorado). WICKHAM, 1914b.  
 "Uloma," *Oligo.*, Europe (Germany). HEYDEN, 1862.

#### Family Alleculidae

- "Capnochroa," *Oligo.*, USA (Colorado). WICKHAM, 1913a.  
 "Cistela," *Mio.*, Europe (Germany). HEER, 1847.  
 "Isomira," *Oligo.*, Europe (Baltic), USA (Colorado). WICKHAM, 1914a, 1914b.  
 "Pseudocistela," *Oligo.*, Europe (Germany), USA (Colorado). FÖRSTER, 1891; WICKHAM, 1913a, 1913b.

#### Family Melandryidae

- "Synchroa," *Oligo.*, USA (Colorado). WICKHAM, 1911.

#### Family Scraphiidae

- "Scraptia," *Oligo.*, Europe (Baltic); *Mio.*, Europe (Germany). HEER, 1847.

#### Family Mordellidae

- "Mordella," *Oligo.*, USA (Colorado). WICKHAM, 1908, 1914a.  
 "Mordellistena," *Oligo.*, USA (Colorado). WICKHAM, 1912a, 1913c, 1914b.  
 "Tomoxia," *Oligo.*, USA (Colorado). WICKHAM, 1914a.

#### Family Rhipiphoridae

- "Macrosiagon," *Oligo.*, USA (Colorado). SCUDDER, 1890.  
 "Rhipidius," *Oligo.*, Europe (Baltic). STEIN, 1877.  
 "Rhipiphorus," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.

#### Family Oedemeridae

- "Brachymycterus," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.  
 "Copidita," *Oligo.*, USA (Colorado). WICKHAM, 1914b.  
 "Ditylus," *Oligo.*, Europe (France). THÉOBALD, 1937a.  
 "Mycterus," *Mio.*, Europe (Germany). HEER, 1847.

#### Family Meloidea

- "Epicauta," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Gnathium," *Oligo.*, USA (Colorado). SCUDDER, 1893a.  
 "Lytta," *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany). HEER, 1847; WICKHAM, 1914a.  
 "Meloe," *Mio.*, Europe (Yugoslavia). HEER, 1847.  
 "Mylabris," *Eoc.*, Europe (France); *Oligo.*, Europe (Germany); *Mio./Plio.*, Europe (France). HEYDEN & HEYDEN, 1866; PITON & THÉOBALD, 1935; PITON, 1940a.  
 "Nemognatha," *Oligo.*, USA (Colorado). WICKHAM, 1912a.

- "Tetraonyx," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Zonabris," *Eoc.*, Europe (France). PITON, 1940a.  
 "Zonitis," *Mio.*, Europe (Germany). HEER, 1865.

### Family Cerambycidae

- "Acanthocinus," *Plio.*, Europe (Germany). GERSDORF, 1976.  
 "Acanthoderes," *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany, Yugoslavia). HEER, 1847, 1865; WICKHAM, 1914b.  
 "Anaesthetis," *Oligo.*, Europe (Germany); *Paleoc.-Plio.*, Argentina (Jujuy). COCKERELL, 1926b; STATZ, 1938a.  
 "Anthicus," *Paleoc.-Plio.*, Argentina (Jujuy). COCKERELL, 1926b.  
 "Astynomus," *Oligo.*, Europe (Germany). KOLBE, 1888.  
 "Callidium," *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany); *Mio./Plio.*, Europe (Germany). HEER, 1865; WICKHAM, 1917; PITON & THÉOBALD, 1935.  
 "Callimoxys," *Oligo.*, USA (Colorado). WICKHAM, 1911.  
 "Chlorida," *Eoc.*, Europe (France). PITON, 1940a.  
 "Clytus," *Oligo.*, Europe (Baltic, France). HEER, 1847, 1865; OUSTALET, 1874; WICKHAM, 1914a; PITON, 1940b.  
 "Dorcadion," *Oligo.*, Europe (Germany); *Paleoc.-Plio.*, Europe (France). HEYDEN, 1862; HANDSCHIN, 1944.  
 "Dorcaschema," *Oligo.*, Europe (Baltic). ZANG, 1905b.  
 "Dryobius," *Oligo.*, USA (Colorado). COCKERELL, 1908p; LINSLEY, 1942.  
 "Elaphidion," *Oligo.*, USA (Colorado). WICKHAM, 1911, 1914a.  
 "Ergates," *Mio.*, Europe (Germany). COCKERELL, 1922g.  
 "Gaurotus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Haplocnemias," *Oligo.*, Europe (Germany). STATZ, 1938a.  
 "Haruspex," *Paleoc.-Plio.*, Argentina (Jujuy). COCKERELL, 1926a.  
 "Hesthesis," *Oligo.*, Europe (Germany). GERMAR, 1837; HEYDEN, 1862.  
 "Hylotrupes," *Oligo.*, USA (Colorado), Europe (Germany). HEYDEN, 1859b.  
 "Lamia," *Oligo.*, Europe (Germany); *Mio.*, Europe (Germany). HEYDEN, 1859b.  
 "Leptostylus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Leptura," *Eoc.*, England; *Oligo.*, USA (Colorado), Europe (Germany). WICKHAM, 1912a, 1913a, 1913b, 1914a; COCKERELL, 1920b; STATZ, 1938a.  
 "Megopsis," *Eoc.*, Europe (France). PITON, 1940a.  
 "Mesosa," *Mio.*, Europe (Germany). HEER, 1847.  
 "Notorrhina," *Oligo.*, Europe (Baltic). ZANG, 1905b.

- "Oberea," *Oligo.*, Europe (Germany). HEYDEN, 1862.  
 "Phymatodes," *Oligo.*, USA (Colorado). COCKERELL, 1908p; WICKHAM, 1914a.  
 "Pogonocherus," *Oligo.*, Europe (Baltic). ZANG, 1905b.  
 "Prionus," *Eoc.*, Europe (France); *Oligo.-Mio.*, Europe (Germany). GERMAR, 1837; GIEBEL, 1856; HEER, 1865; COCKERELL, 1922g.  
 "Saperda," *Eoc.*, Europe (France); *Oligo.*, Europe (Germany, France); *Mio.*, Europe (Yugoslavia, Switzerland). GERMAR, 1837; HEER, 1847, 1856; COCKERELL, 1908j; WICKHAM, 1916b; THÉOBALD, 1937a; PITON, 1940a.  
 "Spondylis," *Oligo.*, Europe (Baltic), USA (Colorado). GIEBEL, 1856; WICKHAM, 1917, 1920.  
 "Stenophenus," *Oligo.*, USA (Colorado). WICKHAM, 1914a.  
 "Strangalia," *Oligo.*, Europe (Baltic). ZANG, 1905b.  
 "Tetrops," *Oligo.*, Europe (Germany). STATZ, 1938a.  
 "Trachyderes," *Oligo.*, Europe (Germany). HEYDEN, 1859b.

### Family Bruchidae

- "Bruchus," *Eoc.*, USA (Colorado); *Oligo.*, USA (Colorado), Europe (Germany). GERMAR, 1837; HEER, 1847; HEYDEN, 1858; FÖRSTER, 1891; WICKHAM, 1912a, 1913b, 1913c, 1914a, 1917.  
 "Caryoborus," *Oligo.*, Europe (Germany); *Mio.*, Europe (Germany). HEYDEN, 1859b; HEER, 1861.  
 "Choragus," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.  
 "Spermophagus," *Oligo.*, USA (Colorado). SCUDDER, 1876a; WICKHAM, 1914a.  
 "Urodon," *Oligo.*, Europe (Germany). HEYDEN, 1862; FÖRSTER, 1891; SCHLECHTENDAL, 1894.

### Family Chrysomelidae

- "Cryptocephalus," *Eoc.*, USA (Wyoming), Europe (France); *Oligo.*, USA (Colorado), Europe (France, Germany). SCHLECHTENDAL, 1894; WICKHAM, 1913c, 1914b; THÉOBALD, 1937a; PITON, 1940a.  
 "Diabrotica," *Oligo.*, USA (Colorado). WICKHAM, 1911, 1914a.  
 "Donacia," *Eoc.*, Europe (Germany); *Oligo.*, USA (Colorado), Europe (Germany, France); *Mio.*, Europe (Germany), Spitsbergen; *Mio./Plio.*, Europe (France). ASSMANN, 1870; SCUDDER, 1890; FÖRSTER, 1891; WICKHAM, 1912a; PITON & THÉOBALD, 1935; THÉOBALD, 1937a; GOECKE, 1943; HAUPT, 1956.  
 "Galeruca," *Mio.*, Europe (Germany, Yugoslavia). HEER, 1858, 1865; HEYDEN, 1859b.  
 "Galerucella," *Paleoc.*, Canada (British Columbia); *Oligo.*, Europe (France, Germany). MEUNIER, 1918; THÉOBALD, 1937a.  
 "Goniocena," *Oligo.*, Europe (Germany, France);



- Mio.*, Europe (Germany). HEER, 1847; ASSMANN, 1870; OUSTALET, 1974.
- "Haltica," *Eoc.*, Europe (France); *Oligo.*, USA (Colorado), Europe (Germany). FÖRSTER, 1891; WICKHAM, 1914a; PITON, 1940a.
- "Labidostomis," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.
- "Lema," *Eoc.*, USA (Colorado); *Oligo.*, USA (Colorado), Europe (Germany); *Mio.*, Europe (Germany). HEER, 1865; HEYDEN & HEYDEN, 1865; FÖRSTER, 1891; WICKHAM, 1910, 1914a, 1914b; COCKERELL, 1920c.
- "Lina," *Oligo.*, Europe (Germany); *Mio.*, Europe (Germany). HEER, 1847; HEYDEN & HEYDEN, 1866; MEUNIER, 1918.
- "Luperodes," *Oligo.*, USA (Colorado). WICKHAM, 1914b.
- "Luperus," *Oligo.*, Europe (Germany). MEUNIER, 1923b.
- "Melasoma," *Mio./Plio.*, Europe (France). PITON & THÉOBALD, 1935.
- "Metachroma," *Oligo.*, USA (Colorado). WICKHAM, 1912a.
- "Oreina," *Oligo.*, Europe (Germany); *Mio.*, Europe (Germany). HEER, 1847; FÖRSTER, 1891.
- "Phytodecta," *Plio.*, England. LESNE, 1926a.
- "Plagioderia," *Oligo.*, Europe (Germany, France). HEYDEN & HEYDEN, 1866; THÉOBALD, 1937a.
- "Plateumaris," *Eoc.*, Europe (Germany). HAUPT, 1956.
- "Psylliodes," *Oligo.*, Europe (France). THÉOBALD, 1937a.
- "Systema," *Oligo.*, USA (Colorado). WICKHAM, 1913b.
- "Trirhabda," *Oligo.*, USA (Colorado). WICKHAM, 1914a.
- Family Anthribidae**
- "Anthribus," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Brachytarsus," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado). SCUDDER, 1876a; WICKHAM, 1913c.
- "Choragus," *Eoc.*, USA (Wyoming). SCUDDER, 1890.
- "Euparius," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado). SCUDDER, 1878b, 1893a; WICKHAM, 1911.
- "Ormiscus," *Eoc.*, USA (Wyoming). SCUDDER, 1890.
- "Tropideres," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado), Europe (Germany). HEYDEN, 1859b; SCUDDER, 1893a.
- Family Curculionidae (sensu lato)**
- "Acalles," *Oligo.*, USA (Colorado). HEYDEN & HEYDEN, 1866; WICKHAM, 1913c.
- "Acalyptus," *Oligo.*, USA (Colorado). FRITSCH, 1869b.
- "Anisorhynchus," *Oligo.*, Europe (France); *Mio.*, Europe (Czechoslovakia). OUSTALET, 1870; DEICHMÜLLER, 1881.
- "Anthonomus," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado); *Mio.*, USSR (Asian RSFSR); *Paleoc.-Plio.*, Argentina. SCUDDER, 1876a, 1890, 1893a; WICKHAM, 1912b; COCKERELL, 1925g.
- "Apion," *Oligo.*, USA (Colorado); *Mio.*, Europe (Germany). HEER, 1865; HEYDEN & HEYDEN, 1866; FÖRSTER, 1891; SCUDDER, 1893a; WICKHAM, 1911, 1916b.
- "Argotochus," *Oligo.*, Europe (France). THÉOBALD, 1937a.
- "Artipus," *Eoc.*, USA (Colorado). SCUDDER, 1893a.
- "Attelabus," *Mio.*, Europe (Germany). HEER, 1865.
- "Auletes," *Oligo.*, USA (Colorado). SCUDDER, 1893a; WICKHAM, 1913c.
- "Aulobaris," *Eoc.-Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Bagous," *Oligo.*, Europe (Germany, France). OUSTALET, 1870; FÖRSTER, 1891.
- "Balaninus," *Eoc.*, Europe (France); *Oligo.*, USA (Colorado), Europe (France); *Mio.*, Europe (Czechoslovakia). HOPE, 1847; DEICHMÜLLER, 1881; SCUDDER, 1893a; WICKHAM, 1911, 1912b; COCKERELL, 1918; PITON, 1940a.
- "Baris," *Eoc.*, England; *Oligo.*, USA (Colorado). SCUDDER, 1893a; WICKHAM, 1912b, 1913c, 1916b, 1917; COCKERELL, 1920b.
- "Barypeithes," *Eoc.*, USA (Colorado). SCUDDER, 1893a.
- "Brachycerus," *Oligo.*, Europe (Germany, France); *Mio.*, Europe (Germany). GERMAR, 1837; HEER, 1847, 1865; OUSTALET, 1870.
- "Brachyderes," *Oligo.*, Europe (France). OUSTALET, 1874.
- "Brachyrhinus," *Eoc.*, USA (Wyoming, Colorado); *Oligo.*, USA (Colorado). SCUDDER, 1876a, 1878b, 1890, 1893a.
- "Centrinus," *Eoc.*, USA (Wyoming), Europe (France); *Oligo.*, USA (Colorado). SCUDDER, 1893a; WICKHAM, 1912b, 1916b; PITON, 1940a.
- "Ceutorhynchus," *Eoc.*, USA (Colorado); *Oligo.*, USA (Colorado), Europe (France, Germany); *Mio./Plio.*, Europe (France). HEYDEN & HEYDEN, 1866; FÖRSTER, 1891; SCUDDER, 1893a; WICKHAM, 1916b; COCKERELL, 1920b; PITON & THÉOBALD, 1935; THÉOBALD, 1937a.
- "Chalcodermus," *Mio.*, Europe (Czechoslovakia). DEICHMÜLLER, 1881.
- "Cleonus," *Oligo.*, USA (Colorado), Europe (France, Germany); *Mio.*, Europe (Germany), USSR (Asian RSFSR). HEER, 1847, 1856, 1865; GIEBEL, 1856; OUSTALET, 1870, 1874; SCUDDER, 1885a, 1893a; FÖRSTER, 1891; WICKHAM, 1911, 1912b; COCKERELL, 1925g.
- "Coelidius," *Oligo.*, Europe (France), USA (Colorado). OUSTALET, 1874; SCUDDER, 1893a.
- "Coniatus," *Eoc.*, USA (Colorado); *Oligo.*, USA (Colorado), Europe (France); *Mio./Plio.*, Europe

- (France). OUSTALET, 1874; SCUDDER, 1893a; WICKHAM, 1912b.
- "Conotrachelus," *Eoc.-Oligo.*, USA (Colorado). WICKHAM, 1912b.
- "Corimalis," *Oligo.*, Europe (France). THÉOBALD, 1937a.
- "Cossonus," *Eoc.*, USA (Colorado); *Oligo.*, USA (Colorado), Europe (Germany); *Mio.*, (Germany); *Paleoc.-Plio.*, Argentina (Jujuy). HEER, 1847; SCUDDER, 1893a; MEUNIER, 1915b; COCKERELL, 1925f.
- "Cremastorhynchus," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Cryptorhynchus," *Eoc.*, USA (Colorado, Wyoming); *Oligo.*, USA (Colorado), Europe (Germany, France). OUSTALET, 1874; SCUDDER, 1876a, 1893a; FÖRSTER, 1891; WICKHAM, 1912b.
- "Cyphus," *Oligo.*, USA (Colorado). WICKHAM, 1911, 1914a.
- "Dorytomus," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Dryvoetes," *Eoc.*, USA (Wyoming). SCUDDER, 1876a, 1878b; HOPKINS, 1900.
- "Endiagogus," *Eoc.*, USA (Wyoming). SCUDDER, 1878b.
- "Entomus," *Eoc.*, USA (Colorado). SCUDDER, 1893a; COCKERELL, 1911b.
- "Epicaerus," *Oligo.*, USA (Colorado). SCUDDER, 1876a.
- "Erirhinoides," *Oligo.*, Europe (Baltic). MOTSCHULSKY, 1856.
- "Erirhinus," *Oligo.*, USA (Colorado), Europe (France). OUSTALET, 1874; SCUDDER, 1893a.
- "Eugnamptus," *Eoc.*, USA (Wyoming). SCUDDER, 1876a, 1878b.
- "Euychirus," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.
- "Grypidius," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Gymnetron," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado), Europe (Germany). SCUDDER, 1878b, 1893a; FÖRSTER, 1891.
- "Hipporhinus," *Eoc.*, Europe (France); *Oligo.*, Europe (France); *Mio./Plio.*, Europe (France); *Plio.*, Europe (France). GERMAR, 1849; HEER, 1856; PITON, 1935b, 1940a; PITON & THÉOBALD, 1935, 1936; PITON & RUDEL, 1936; THÉOBALD, 1937a.
- "Hormorus," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Hylastes," *Cret.*, England; *Oligo.*, USA (Colorado). WICKHAM, 1913c; BLAIR, 1943.
- "Hylesinus," *Oligo.*, USA (Colorado), Europe (Germany, France). HEER, 1856; FÖRSTER, 1891; HOPKINS, 1900.
- "Hylobius," *Eoc.*, USA (Wyoming); *Oligo.*, Europe (Germany, France); *Mio.*, Europe (Italy); *Plio.*, Europe (Germany). HOPE, 1847; GIEBEL, 1856; HEER, 1856; HEYDEN & HEYDEN, 1866; OUSTALET, 1870, 1874; PONZI, 1876; SCUDDER, 1876a, 1893a; GERSDORF, 1970.
- "Hylurgops," *Oligo.*, USA (Colorado). WICKHAM, 1913c.
- "Lachnopus," *Oligo.*, USA (Colorado), Europe (France); *Mio./Plio.*, Europe (France). SCUDDER, 1893a; PITON & THÉOBALD, 1935; THÉOBALD, 1937a.
- "Larinus," *Oligo.-Mio.*, Europe (Germany); *Mio./Plio.*, Europe (France). HEER, 1861; HEYDEN & HEYDEN, 1866; FÖRSTER, 1891; PITON & THÉOBALD, 1935.
- "Leperisinus," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Lepyrus," *Eoc.*, USA (Wyoming). SCUDDER, 1893a.
- "Listronotus," *Eoc.*, USA (Wyoming). SCUDDER, 1890.
- "Lixus," *Eoc.*, Europe (France); *Mio.*, Europe (Germany). PITON, 1940a.
- "Macrorhoptus," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Magdalis," *Oligo.*, USA (Colorado), Europe (Germany). HEYDEN & HEYDEN, 1866; SCHLECHTENDAL, 1894.
- "Meristos," *Paleoc.-Plio.*, India (Nagpur). MURRAY, 1860.
- "Molytes," *Oligo.*, Europe (Germany). HEYDEN, 1858.
- "Nanophyes," *Oligo.*, Europe (Germany). HEYDEN & HEYDEN, 1866.
- "Naupactus," *Mio.*, Europe (Germany). HEER, 1865.
- "Notaris," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Omileus," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Ophryastes," *Eoc.*, USA (Wyoming, Colorado); *Oligo.*, USA (Colorado). SCUDDER, 1878b, 1893a; WICKHAM, 1912b.
- "Orchestes," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Otiorrhynchus," *Mio.*, Europe (Germany). ZEUNER, 1931.
- "Pachybaris," *Oligo.*, USA (Colorado). WICKHAM, 1912a.
- "Pachylobius," *Eoc.*, USA (Colorado); *Oligo.*, Europe (France); *Paleoc.-Plio.*, Europe (France). SCUDDER, 1893a; PITON & RUDEL, 1936.
- "Pandeleteius," *Oligo.*, USA (Colorado). WICKHAM, 1917.
- "Phthorophloeus," *Oligo.*, USA (Colorado). WICKHAM, 1916b.
- "Phyllobius," *Eoc.*, USA (Colorado); *Mio./Plio.*, Europe (France). SCUDDER, 1893a; PITON & THÉOBALD, 1935.
- "Phytonomus," *Eoc.-Oligo.*, Europe (France); *Mio./Plio.*, Europe (France). OUSTALET, 1874; PITON & THÉOBALD, 1935; PITON, 1940a.
- "Phyxelis," *Eoc.*, USA (Wyoming, Colorado). SCUDDER, 1893a.
- "Pissodes," *Oligo.*, Europe (Germany). HEYDEN, 1858; FÖRSTER, 1891.
- "Platypus," *Oligo.*, Europe (Baltic); *Mio.*, Europe

- (Sicily). BURMEISTER, 1831; GUÉRIN-MÉNEVILLE, 1838.
- "Plinthus," *Oligo.*, Europe (France). OUSTALET, 1870, 1874.
- "Polygraphus," *Eoc.*, USA (Colorado). SCUDDER, 1893a.
- "Prionomerus," *Eoc.*, USA (Wyoming); *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Procas," *Eoc.-Oligo.*, USA (Colorado). FRITSCH, 1869b.
- "Rhinocyllus," *Oligo.*, Europe (Germany); *Mio./Plio.*, Europe (France). HEYDEN & HEYDEN, 1866; PITON & THÉOBALD, 1935.
- "Rhynchites," *Oligo.*, USA (Colorado), Europe (Germany); *Mio.*, Europe (Germany). HEER, 1847, 1865; HEYDEN & HEYDEN, 1866; SCUDDER, 1893a; SCHLECHTENDAL, 1894; WICKHAM, 1916a; MEUNIER, 1920a, 1920d.
- "Ryssematus," *Eoc.*, USA (Colorado). FRITSCH, 1869b.
- "Sciaphilus," *Oligo.*, Europe (France). THÉOBALD, 1937a.
- "Scyphophorus," *Oligo.*, USA (Colorado). SCUDDER, 1893a; WICKHAM, 1911.
- "Scythropus," *Eoc.*, USA (Colorado, Wyoming). FRITSCH, 1869b.
- "Sibynes," *Oligo.*, Europe (France). OUSTALET, 1874.
- "Sitona," *Eoc.*, USA (Colorado, Wyoming); *Oligo.*, Europe (France, Germany); *Mio.*, Europe (Germany). HEER, 1847; GERMAR, 1849; HEYDEN & HEYDEN, 1866; OUSTALET, 1874; SCUDDER, 1893a; THÉOBALD, 1937a.
- "Smicromyx," *Oligo.*, Europe (Germany). FÖRSTER, 1891.
- "Sphenophorus," *Oligo.*, Europe (Germany); *Mio.*, Europe (Germany); *Mio./Plio.*, Europe (France). HEER, 1847; HEYDEN & HEYDEN, 1866; PITON & THÉOBALD, 1935.
- "Strophosomus," *Oligo.*, Europe (France). THÉOBALD, 1937a.
- "Syntomostylus," *Eoc.*, USA (Colorado, Wyoming). SCUDDER, 1893a; COCKERELL, 1909l.
- "Tanymecus," *Eoc.*, USA (Colorado); *Oligo.*, Europe (France). SCUDDER, 1890; PITON & RUDEL, 1936.
- "Tanysphyrus," *Oligo.*, Europe (France). OUSTALET, 1874.
- "Thylacites," *Mio.*, Europe (Czechoslovakia). DEICHMÜLLER, 1881.
- "Trigonoscuta," *Oligo.*, USA (Colorado). SCUDDER, 1893a.
- "Tychius," *Oligo.*, USA (Colorado), Europe (Germany). FÖRSTER, 1891.

## Order STREPSIPTERA

### Kirby, 1815

[Strepsiptera KIRBY, 1815a, p. 86]

Small order of insects with marked sexual dimorphism and complicated reproductive

development. Males winged; females larviform in imaginal stage. Males (Fig. 184) with head strongly transverse, eyes very prominent; antennae with 4 to 7 segments, third segment and commonly some following segments distinctly flabellate; mouthparts usually reduced, mandibles very narrow, almost bristlelike; prothorax and mesothorax small, metathorax very large; tarsal segments variable but usually with a large adhesive pad; fore wings club-shaped; hind wings large with only a few, radiating veins. Females apodous, apterous, and larviform, encased in larval cuticle; head and thorax fused; antennae and eyes absent; mouthparts vestigial. Larvae of both sexes endoparasites of other insects; females continuing as endoparasites in the imaginal stage; adults of males free-living. This parasitism does not kill hosts but causes them to lose some secondary sexual characteristics. *Oligo.-Holo.*

The only fossil Strepsiptera known are preserved in ambers. The family Mengeidae, now considered to be extinct, is represented in the Baltic amber (Oligocene), and the families Elenchidae and Myrmecolacidae occur in the Dominican amber (Oligocene/Miocene).

The phylogenetic position of the Strepsiptera is uncertain. They are considered by most students of the group to represent a separate order of uncertain affinities and by others to be highly specialized members of the Coleoptera (CROWSON, 1967; KINZELBACH, 1971a, 1971b, 1978).

### Family MENGEIDAE Pierce, 1907

[Mengeidae PIERCE, 1907, p. 76]

Only males known. Antennae with 7 segments, the third and fourth segments flabellate; all tarsi with 5 segments and with claws; labial palpi present. [This family was originally based on an extinct species. A few existing species were subsequently assigned to it. Recently the concept of the family has been more restricted, and it is now considered to be extinct.] KINZELBACH, 1971a, 1971b, 1978. *Oligo.*

Mengea GROTE, 1886, p. 100, *nom. subst. pro Triaena* MENGE, 1866, p. 2, *non* HUEBNER, 1818

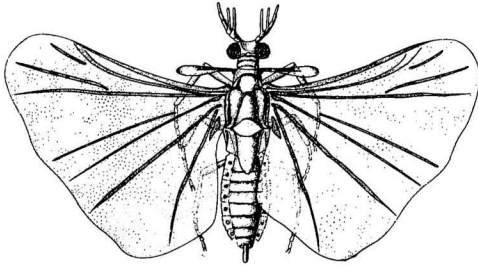


FIG. 184. Strepsiptera; dorsal view of male, *Eoxenos laboulbenei* PEYERIMHOFF, Holocene,  $\times 8.5$  (Parker & Smith, 1934).

[\**Triaena tertiaria* MENGE, 1866, p. 2; OD]. Hind wings with MA1 strongly developed; RS1 very short; CUA1 well developed basally, frequently coalescing with MA2 near middle of wing. PIERCE, 1907; ULRICH, 1937; KINZELBACH, 1939; KINZELBACH, 1971a, 1979. *Oligo.*, Europe (Baltic).—FIG. 185, 1. \**M. tertiaria* (MENGE); a, dorsal view of holotype,  $\times 20$  (Ulrich, 1937); b, antenna,  $\times 80$ ; c, hind wing,  $\times 23$  (both Kinzelbach, 1978).

#### Family ELENCHIDAE Perkins, 1905

[Elenchidae PERKINS, 1905, p. 98]

Only males known. Antennae with 5 segments, a flabellum on segment three only; all tarsi with 2 segments and without claws; hind wings with vein RS1 short and MA1 absent. *Oligo./Mio.—Holo.*

*Elenchus* CURTIS, 1831, no. 385. *Holo.*  
*Protelencholax* KINZELBACH, 1979, p. 5 [\**P. schleei*; OD]. Fourth antennal segment completely fused with the third. *Oligo./Mio.*, Dominican Republic.—FIG. 185, 2. \**P. schleei*; ventral view of holotype,  $\times 50$  (Kinzelbach, 1979).

#### Family MYRMECOLACIDAE Saunders, 1872

[Myrmecolacidae SAUNDERS, 1872, p. 34]

Only males known. Antennae with 7 segments, only third segment flabellate, the fourth very short; tarsi with 4 segments, without claws; hind wing with MA1 absent or very short and MA2 long. *Oligo./Mio.—Holo.*

*Myrmecolax* WESTWOOD, 1861, p. 420. KINZELBACH, 1983. *Oligo./Mio.*, Dominican Republic—*Holo.*

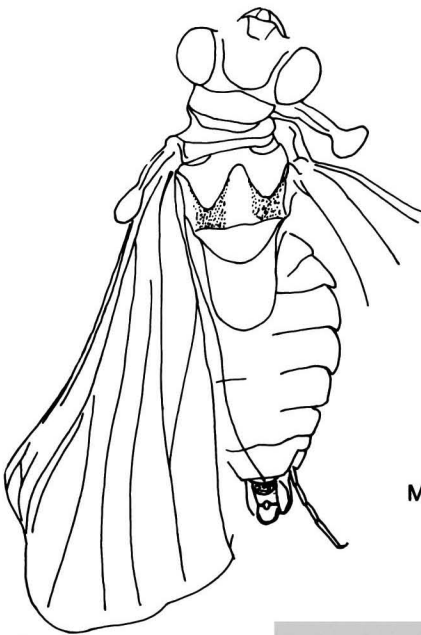
### Order NEUROPTERA Linné, 1758

[Neuroptera LINNÉ, 1758, p. 543]

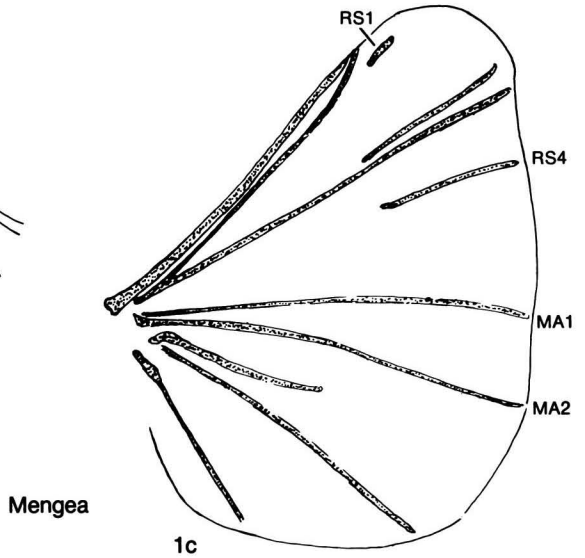
Small to large insects, mostly with soft, weakly sclerotized body. Compound eyes prominent in many; ocelli present in generalized species, absent in others; antennae prominent, commonly long and filiform, clubbed in a few; mouthparts mandibulate, hypognathous; maxillae and labium normal, with well-developed palpi. Prothorax usually well developed, about as long as mesothorax, much longer in the Mantispidae and Raphidioidea. Two pairs of membranous wings, generally subequal and typically with many veins, many forming numerous cells. Venation markedly diverse in the 3 suborders, but typically consisting of all main veins, including MA and MP; vein RS generally coalesced with MA in both wings (Fig. 186). Legs mostly slender and cursorial, with 5 tarsal segments. Abdomen with 10 distinct segments, last segment variously formed but divided into a pair of lateral plates, each bearing a group of sensilla (trichobothria).

Eggs are usually laid on foliage, bark, or the ground, or, rarely, in fresh water. The larvae are very different in the 3 suborders, but all have well-developed mandibles and are predaceous; some are aquatic and possess tracheal gills, but most are terrestrial, occurring on foliage or the ground. Pupae exarate and in leaf litter and crevices of bark; many are enclosed by silken cocoons. *Perm.—Holo.*

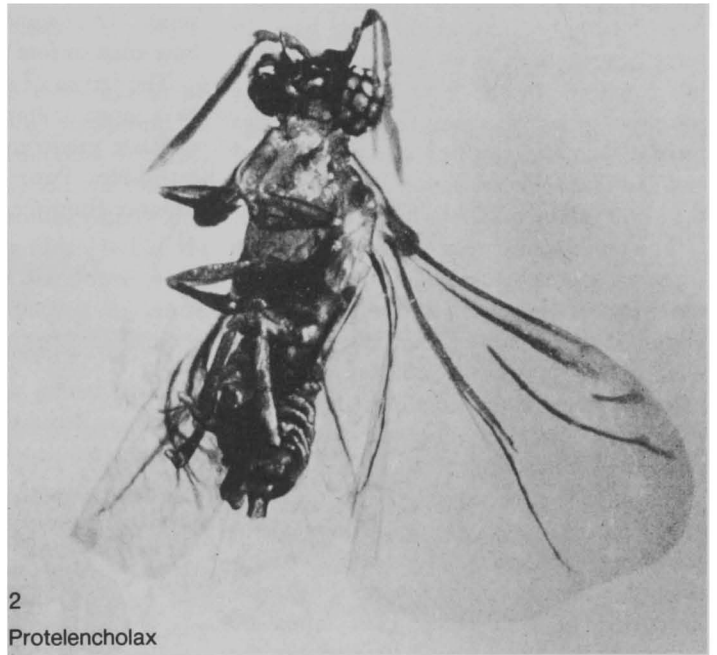
The Neuroptera include, in the suborder Sialodea, apparently the most primitive of living holometabolous insects. Precise relationships between the Neuroptera and Mecoptera are uncertain; the most that can be said is that the two orders were derived from a common ancestral stock, presumably in the Late Pennsylvanian. Some evidence has been advanced indicating that the Sialodea gave rise to the Coleoptera and Hymenoptera, but the neuropterous affinities of both of these orders are much less obvious than those of the Mecoptera.



1a



1b



2  
Protelencholax

FIG. 185. Mengeidae and Elenchidae (p. 337-338).

Evidence for the present interpretation of the venation of the Neuroptera has been acquired in part from the fossil record (CARPENTER, 1936, 1940a; ADAMS, 1958; RIEK,

1970a). The coalescence of vein MA with R+RS or RS apparently took place independently in several and perhaps nearly all families. In the fore wing, the basal piece of

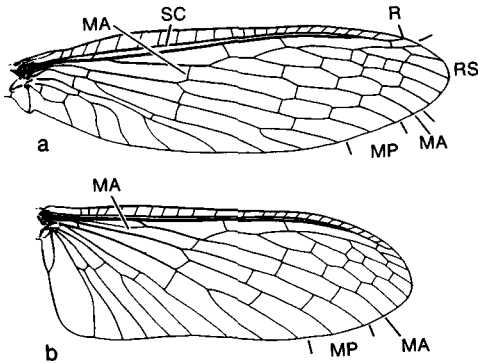


FIG. 186. Neuroptera; *a*, fore and *b*, hind wings of a recent *Archichauliodes* sp. (suborder Sialodea, family Corydalidae), indicating the usual differences between the fore and hind wings (from CSIRO, 1970).

MA (between M and R or RS) has assumed a transverse position and resembles a cross-vein, or it has been entirely lost, the coalescence having occurred at the wing base. In some genera, there is no evidence that MA has persisted. In the hind wings of more primitive genera of many families, the free piece of MA has persisted as a longitudinal or sigmoidal vein connecting M to RS (as in the recent genus *Archichauliodes*, Fig. 186*b*).

The order Neuroptera is here divided into three suborders: Sialodea, Raphidiodea, and Planipennia. These are often treated as separate orders, or, as an alternative, the Sialodea and Raphidiodea are considered to belong together in the order Megaloptera and the Planipennia to constitute the Neuroptera *sensu stricto*. However, the presence of trichobothria on the tenth tergite of all members of these three groups and the strikingly similar history of MA in their hind wings strongly suggest a common origin despite adaptive differences of their larvae. The latter are aquatic in the Sialodea and terrestrial in the Raphidiodea and Planipennia. The larvae of the Planipennia are distinguished by a groove along the inner surface of the mandibles that forms a canal for passage of fluids sucked from the bodies of their victims.

The oldest Raphidiodea and Planipennia

are found in Permian deposits. The Sialodea have a relatively poor geological record and are first found in the Jurassic. The Planipennia and possibly the Raphidiodea were apparently more extensively developed and diverse during the Jurassic than at present.

## Suborder SIALODEA Hagen, 1861

[*nom. correct.* BRUES, MELANDER, & CARPENTER, 1954, p. 204, *pro* Sialina HAGEN, 1861, p. 187]

Moderate-sized to large insects with normal prothorax; legs homonomous, cursorial; wings with markings in many; veins without marginal twigs. Fore wing commonly with costal area slightly broadened near midwing; pterostigma absent; veins MA and MP present; MA either coalesced with RS for a short distance or free; CUA forked. Hind wing somewhat broadened basally, markedly so in some; MA of some genera arising nearer wing base than in fore wing. *Jur.—Holo.*

The larvae of sialodeons are aquatic and have seven or eight pairs of abdominal gills; they are predaceous, with normal, chewing mandibles. Pupae are formed in soil a short distance from the water.

## Family CORYDALIDAE Leach, 1815

[*nom. transl.* BURMEISTER, 1839 in BURMEISTER, 1838–1839, p. 757, *ex* Corydalida LEACH, 1815, p. 138]

Large insects with ocelli; vein MA commonly coalesced with RS for a short distance in both fore and hind wings. *Oligo.—Holo.*

*Corydalus* LATREILLE, 1802, p. 290. *Holo.*

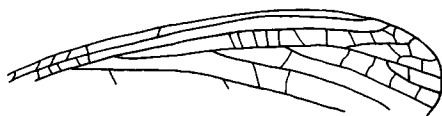
*Chauliodes* LATREILLE, 1796, p. 182. PICTET, 1854. *Oligo.*, Europe (Baltic)—*Holo.*

## Family UNCERTAIN

The genus described below, apparently belonging to the order Neuroptera, suborder Sialodea, is too poorly known to permit family assignment.

*Nematophlebia* COCKERELL, 1915, p. 475 [\**N. plicata*; OD]. Little-known hind wing; anal area well developed but folded over most of remigi-

um; SC long, closer to C than to R. *Jur.*, England.  
—FIG. 187. \**N. plicata*; hind wing, folded  
anal area not shown,  $\times 4.6$  (Cockerell, 1915).



Nematophlebia

FIG. 187. Uncertain (p. 340–341).

## Suborder RAPHIDIOIDEA

### Burmeister, 1838

[Raphidioidea BURMEISTER, 1838 in BURMEISTER, 1838–1839, p. 757]

Neuroptera with elongate prothorax, mostly as long as meso- and metathorax combined; legs homonomous, cursorial. Wings hyaline, without markings. Fore wings with costal area usually broadened near its middle; vein SC terminating at about midwing; pterostigma generally present and distinct; MA arising from M or MP and coalesced with RS for a short distance (Fig. 190, *a*). Hind wing similar to fore wing, but costal area narrow; MA in some genera arising nearer base than in fore wing, approximately at point of divergence of M from R. Ovipositor of female long and curved. CARPENTER, 1936. *Perm.—Holo.*

The raphidiodeons are terrestrial in all growth stages, larvae being predaceous on small insects, mainly Hemiptera, suborder Homoptera, and occurring on the bark of trees, in rotting wood and similar places. They have normal chewing mandibles, unlike the larvae of the Planipennia. The pupae, which have free appendages, develop in crude, unlined, oval cells in crevices of bark or decayed wood.

### Family SOJANORAPHIDIIDAE

#### Martynova, 1952

[Sojanoraphidiidae MARTYNOVA, 1952b, p. 225]

Vein SC of fore(?) wing close to costa; costal area very narrow; pterostigma seemingly absent; RS arising near wing base; MA apparently coalesced with RS; ovipositor long and curved. [Ordinal position doubtful.] *Perm.*

*Sojanoraphidia* MARTYNOVA, 1952b, p. 226 [\**S. rossica*; OD]. Fore(?) wing with SC long, extending nearly to end of R; veins straight, with few irregularities. CARPENTER, 1967b. *Perm.*, USSR (European RSFSR).—FIG. 188,3. \**S. rossica*;

fore(?) wing and part of body,  $\times 11$  (Martynova, 1952b).

### Family MESORAPHIDIIDAE

#### Martynov, 1925

[Mesoraphidiidae MARTYNOV, 1925a, p. 234]

Fore wing slender; vein SC extending to about midwing; costal area more slender; R long, nearly parallel to costal margin; MA arising at or before origin of MP, coalesced with RS for a short distance near midwing; CU forked basally, CUA diverging anteriorly and coalesced with stem of M briefly; 1A barely touching CUP; main veins nearly straight, with few irregularities. Hind wing venation resembling that of fore wing, but costal area narrower; MA with longer free basal piece, before the coalescence with RS. Prothorax long and curved. *Jur.*

*Mesoraphidia* MARTYNOV, 1925a, p. 235 [\**M. grandis*; OD]. Fore wing: costal area with 8 to 10 veinlets; pterostigma weakly developed but very long. MARTYNOVA, 1947a; 1952b. *Jur.*, USSR (Kazakh).—FIG. 188,1*a,b*. *M. inaequalis* MARTYNOV; *a*, fore and *b*, hind wings,  $\times 3.5$  (Martynov, 1925b).—FIG. 188,1*c*. *M. pterostigmalis* MARTYNOVA; whole insect,  $\times 4$  (Martynova, 1947a).

*Proraphidia* MARTYNOVA, 1947a, p. 636 [\**P. turkestanica*; OD]. Hind wing as in *Mesoraphidia* but broader; pterostigma very short and strongly developed. *Jur.*, USSR (Kazakh).—FIG. 188,4. \**P. turkestanica*; hind wing,  $\times 5$  (Martynova, 1947a).

### Family BAISSOPTERIDAE

#### Martynova, 1961

[Baissopteridae MARTYNOVA, 1961a, p. 80]

Fore wing much as in Mesoraphidiidae but with more cells between branches of veins RS and MA. MA of hind wing with long free basal piece before coalescence with RS. *Jur.*

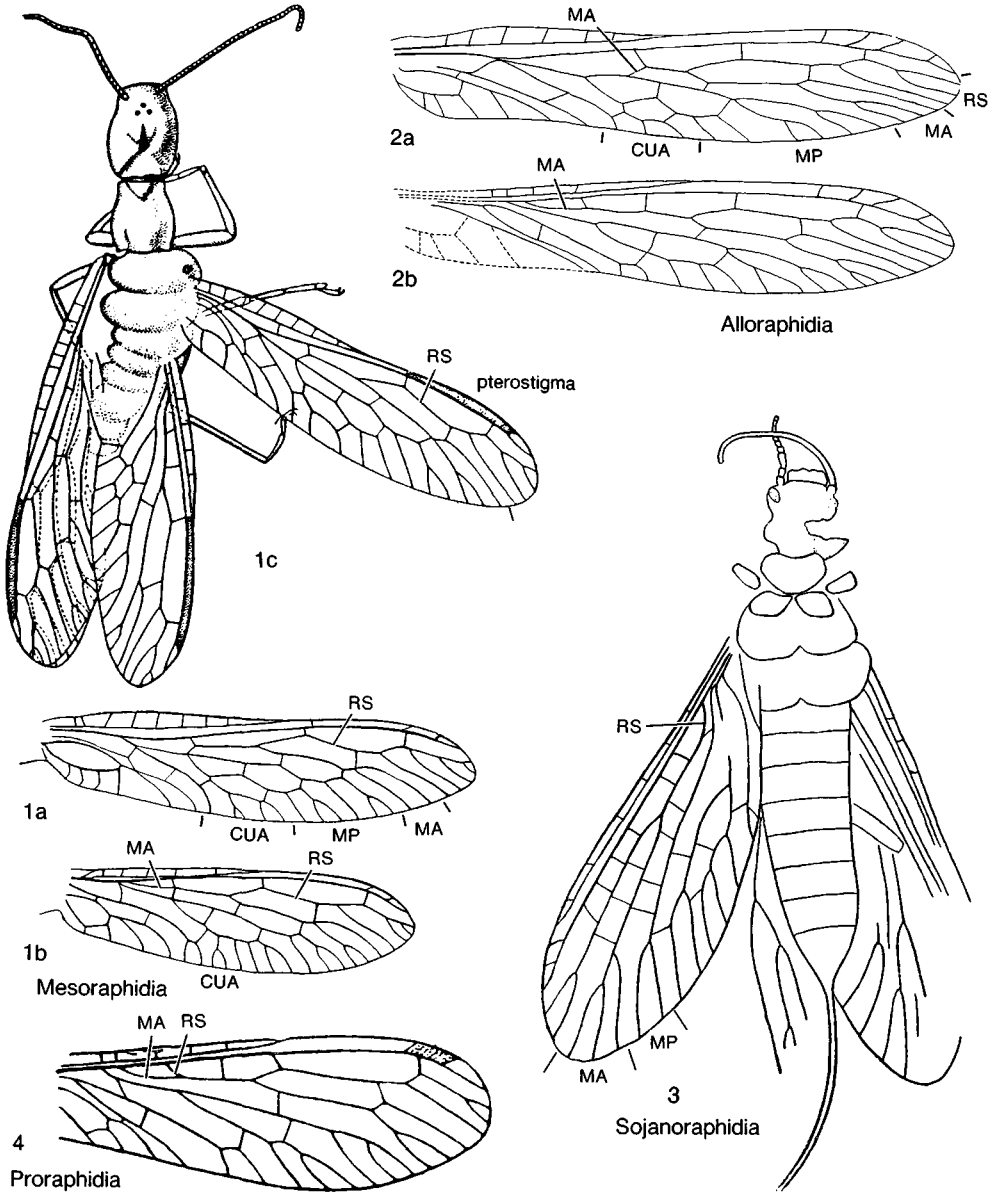


FIG. 188. Sojanoraphidiidae, Mesoraphidiidae, and Alloraphidiidae (p. 341-343).

Baissoptera MARTYNOVA, 1961a, p. 80 [*\*B. martinsoni*; OD]. RS of fore wing forked before end of SC; each primary branch of RS with several forks. *Jur.*, USSR (Asian RSFSR). — FIG. 189, *a*. *\*B. martinsoni*; fore wing,  $\times 4.3$  (Martyanova, 1961a). — FIG. 189, *b*. *B. kolosnitsynae* MARTYNOVA; hind wing,  $\times 4.3$  (Martyanova, 1961a).

**Family ALLORAPHIDIIDAE**  
**Carpenter, 1967**

[Alloraphidiidae CARPENTER, 1967b, p. 270]

Similar to Mesoraphidiidae. Fore wing very long and slender; pterostigma well developed; vein MA arising well after origin of



MP and coalesced with RS for a short distance; CUA connected to M at its point of separation from R. Hind wing nearly same size and shape as fore wing, but costal area narrower. Body unknown. *Cret.*

**Alloraphidia** CARPENTER, 1967b, p. 271 [\**A. dorfi*; OD]. RS and MA each with 3 well-defined branches apart from marginal fork; CUA with 1 or 2 closed submarginal cells. *Cret.*, Canada (Labrador).—FIG. 188, 2. \**A. dorfi*; a, fore and b, hind wings, X3 (Carpenter, 1967b).

### Family RAPHIDIIDAE

Latreille, 1810

[*nom. transl.* STEPHENS, 1829b, p. 314, *ex* Raphidiinae LATREILLE, 1810, p. 277]

Fore wing with vein SC terminating at midwing or slightly beyond; costal area broad, widest near its middle; pterostigma with crossveins; RS arising at midwing; MA arising from MP shortly after the origin of MP; CUA diverging anteriorly and coalesced initially with stem of M; most veins slightly irregular; crossveins few and regular in position. Hind wing similar to fore wing, but costal area narrow. Antennae slender, prothorax generally elongate; male abdomen terminating dorsally in hood-shaped epiproct; female with curved ovipositor about as long as thorax. *Oligo.*—*Holo.*

**Raphidia** LINNÉ, 1758, p. 552 [= *Megaraphidia* COCKERELL, 1907c, p. 607 (type, *M. elegans*); *Dictyroraphidia* HANDLIRSCH, 1910b, p. 103 (type, *Inocellia veterana* SCUDDER, 1890, p. 156)]. CARPENTER, 1936, 1956. *Oligo.*, Europe (Baltic), USA (Colorado)—*Holo.*

### Family INOCELLIIDAE Navás, 1913

[*nom. transl.* NAVÁS, 1916, p. 509, *ex* Inocellini NAVÁS, 1913c, p. 11]

Fore and hind wings as in Raphidiidae, but pterostigmal crossveins lacking; vein MP2 branched; ocelli absent (Fig. 190). *Oligo.*—*Holo.*

**Inocellia** SCHNEIDER, 1843, p. 84. CARPENTER, 1956. *Oligo.*, Europe (Baltic)—*Holo.*

**Fibla** NAVÁS, 1915, p. 477. CARPENTER, 1936, 1956. *Oligo.*, Europe (Baltic), USA (Colorado)—*Holo.*

### Family UNCERTAIN

The genus described below, apparently

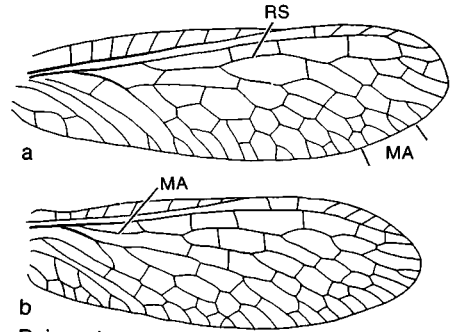


FIG. 189. Baissopteridae (p. 342).

belonging to the order Neuroptera, suborder Raphidiodea, is too poorly known to permit family assignment.

**Archiinocellia** HANDLIRSCH, 1910b, p. 100 [\**A. oligoneura*; OD]. Little-known wing (fragments), possibly belonging to Inocelliidae. CARPENTER, 1936. *Oligo.*, Canada (British Columbia).

## Suborder PLANIPENNIA

Latreille, 1817

[*nom. correct.* HEYMONS, 1915, p. 194, *pro* Planipennes LATREILLE, 1817, p. 430]

Minute to large Neuroptera, usually with short prothorax and cursorial legs; wings subequal, commonly with markings; veins almost invariably with marginal twigs. Fore wing with costal area generally broad or very broad, but narrow exceptionally; pterostigma present only in the existing family Mantispidae; veins MA and MP present but not separable in some; MA mostly coalesced for a short distance with R and RS; SC terminating distally on C or R, commonly with dense cluster of veinlets near wing apex. Hind wing typically narrower than fore wing; MA arising nearer wing base than in fore wing, its free basal piece commonly sigmoidal or nearly longitudinal. *Perm.*—*Holo.*

Planipennian larvae are terrestrial (except for the Sisyridae) and have prominent, grooved mandibles, in many very long; all are predaceous and use their grooved man-

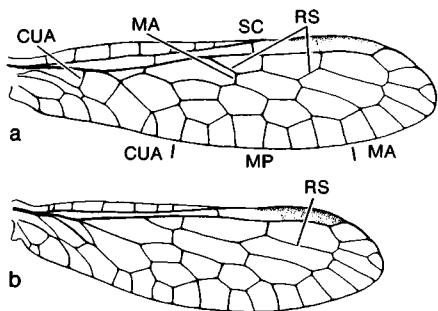


FIG. 190. Neuroptera; *a*, fore and *b*, hind wings of a recent inocelliid, *Inocellia* sp. (suborder Raphidioidea, family Inocellidae), showing the similarity of the fore and hind wings (Carpenter, new).

dibles for sucking the blood of their victims.

The existing families of Planipennia are usually grouped into several superfamilies, although considerable difference of opinion exists as to the number of these taxa and relations of some of the families (ADAMS, 1958; MACLEOD, 1964; SHEPARD, 1967). Since several extinct families from Permian and Jurassic deposits do not appear to belong to any recognized superfamily, all families are arranged herein according to their apparent phylogenetic relationships but without arrangement of them in superfamily groups.

### Family PALAEMEROBIIDAE

Martynov, 1928

[Palaemerobiidae MARTYNOV, 1928b, p. 87]

Fore wing oval with costal area narrowed basally, broader near middle; vein SC terminating on C; RS with at least 4 main branches; MA free from stem of RS; MA and MP forked at least once; CUA with a short fork; crossveins irregularly arranged, not forming a series. Hind wing unknown. *Perm.*

*Palaemerobius* MARTYNOV, 1928b, p. 86 [*\*P. proavitus*; OD]. Fore wing: RS with 5 or 6 branches; M dividing at about level of origin of RS. MARTYNOVA, 1952b, 1961c. *Perm.*, USSR (European and Asian RSFSR).—FIG. 191.1. *\*P. proavitus*, European RSFSR; fore wing,  $\times 7$  (Martynov, 1928b).

*Bianchia* MARTYNOVA, 1952b, p. 214 [*\*B. spectabilis*; OD]. Fore wing with long SC extending

almost to end of R; only single veinlet from R to C; RS with 7 branches. MARTYNOVA, 1962d. *Perm.*, USSR (European RSFSR).—FIG. 191.2. *\*B. spectabilis*; fore wing,  $\times 5$  (Martynova, 1952b).

*Tychtobius* MARTYNOVA, 1958, p. 79 [*\*T. brevicostatus*; OD]. Fore wing similar to that of *Palaemerobius*, but SC shorter; more veinlets from R to C; RS with 6 main branches. MARTYNOVA, 1961c. *Perm.*, USSR (Asian RSFSR).—FIG. 191.3. *\*T. brevicostatus*; fore wing,  $\times 5$  (Martynova, 1958).

### Family SIALIDOPSIDAE

Zalesky, 1928

[Sialidopsidae ZALESSKY, 1928a, p. 693]

Fore wing with vein SC about as long as in Palaemerobiidae, but costal veinlets unbranched; RS with 4 primary branches; crossveins few and scattered. Hind wing unknown. *Perm.*

*Sialidopsis* ZALESSKY, 1926, p. 76 [*\*S. kargalensis*; OD]. Fore wing oval, costal margin curved; R with 6 veinlets to costal margin. ZALESSKY, 1928a; MARTYNOVA, 1952b. *Perm.*, USSR (European RSFSR).—FIG. 191.4. *S. sojanensis* MARTYNOVA; fore wing,  $\times 5.5$  (Martynova, 1952b).

*Permosisyra* MARTYNOV, 1933a, p. 72 [*\*P. latipennis*; OD]. Fore(?) wing margin apparently straight; costal area narrow and uniform in width. [Family assignment doubtful.] MARTYNOVA, 1962d. *Perm.*, USSR (European RSFSR).—FIG. 191.5. *\*P. latipennis*; fore(?) wing,  $\times 5.5$  (Martynov, 1933a).

### Family PERMITHONIDAE

Tillyard, 1922

[Permithonidae TILLYARD, 1922a, p. 289] [=Permeagalomidae MARTYNOVA, 1952b, p. 201; Permopsychopsidae RIEK, 1953, p. 83]

Fore wing with moderately broad costal area and numerous, somewhat irregular veinlets, some branched; vein SC terminating on R distally; few to many crossveins between R and RS, which has at least 4 primary branches; MA not coalesced with RS basally, but M commonly connected to it by a short crossvein; CUA with distal fork. Hind wing and body unknown. *Perm.*

*Permithone* TILLYARD, 1922a, p. 289 [*\*P. belmontensis*; OD] [=Permosmylus TILLYARD, 1926b, p. 279 (type, *P. pinocombeae*)]. Fore wing with costal area much broader basally than

distally, at least some veinlets branched; RS with 5 primary branches. *Perm.*, Australia (New South Wales).—FIG. 192,5. \**P. belmontensis*; fore wing,  $\times 6$  (Tillyard, 1922a).

**Eopsychops** MARTYNOV, 1933a, p. 69 [\**E. sojanensis*; OD]. Fore wing very broad, almost triangular, with very broad costal area; M dividing well in front of fork of CU. MARTYNOVA, 1952b. *Perm.*, USSR (European and Asian RSFSR).—FIG. 192,7. \**E. sojanensis*, European RSFSR; fore wing,  $\times 4.2$  (Martynova, 1952b).

**Permegalomus** MARTYNOV, 1931c, p. 186 [\**P. regularis*; OD]. Fore wing with costal area markedly narrowed basally; RS with at least 7 primary branches. MARTYNOVA, 1952b. *Perm.*, USSR (European and Asian RSFSR).—FIG. 192,6. *P. maculipennis* MARTYNOVA, European RSFSR; fore wing,  $\times 5.5$  (Martynova, 1952b).

**Permithonopsis** MARTYNOV, 1933a, p. 67 [\**P. ivensis*; OD]. Fore wing as in *Permegalomus*, but costal area not so narrow basally. MARTYNOVA, 1952b, 1961c. *Perm.*, USSR (European and Asian RSFSR).—FIG. 192,4. *P. cellulosa* MARTYNOVA, European RSFSR; fore wing,  $\times 5$  (Martynova, 1952b).

**Permopsychops** TILLYARD, 1926e, p. 281 [\**P. belmontensis*; OD]. Fore wing much as in *Permithone*; costal veinlets and branches of RS somewhat more numerous. *Perm.*, Australia (New South Wales).—FIG. 192,8. \**P. belmontensis*; fore wing,  $\times 4.3$  (Riek, 1953).

**Permorapisma** TILLYARD, 1926e, p. 278 [\**P. biserialis*; OD]. Venation of fore wing as in *Permithone*, but with many more crossveins and branches; costal area with reticulated veinlets; RS with 7 or more primary branches; MA and MP with many marginal branches. RIEK, 1953. *Perm.*, Australia (New South Wales).—FIG. 192,2. \**P. biserialis*; fore wing,  $\times 3$  (Tillyard, 1926e).

## Family MESOPOLYSTOECHOTIDAE

Martynova, 1949

[Mesopolystoechotidae MARTYNOVA, 1949a, p. 160]

Fore wing with pointed apex; vein SC joined to R distally and gradually, before apex; MA apparently coalesced with RS basally; 2 distinct rows of crossveins. *Jur.*

**Mesopolystoechus** MARTYNOV, 1937a, p. 38 [\**M. apicalis*; OD]. Fore wing incompletely known; MA unbranched; MP with 2 branches; branches of RS with only distal forking. MARTYNOVA, 1949a. *Jur.*, USSR (Asian RSFSR).—FIG. 192,1. \**M. apicalis*; distal part of fore wing,  $\times 2.5$  (Martynova, 1949a).

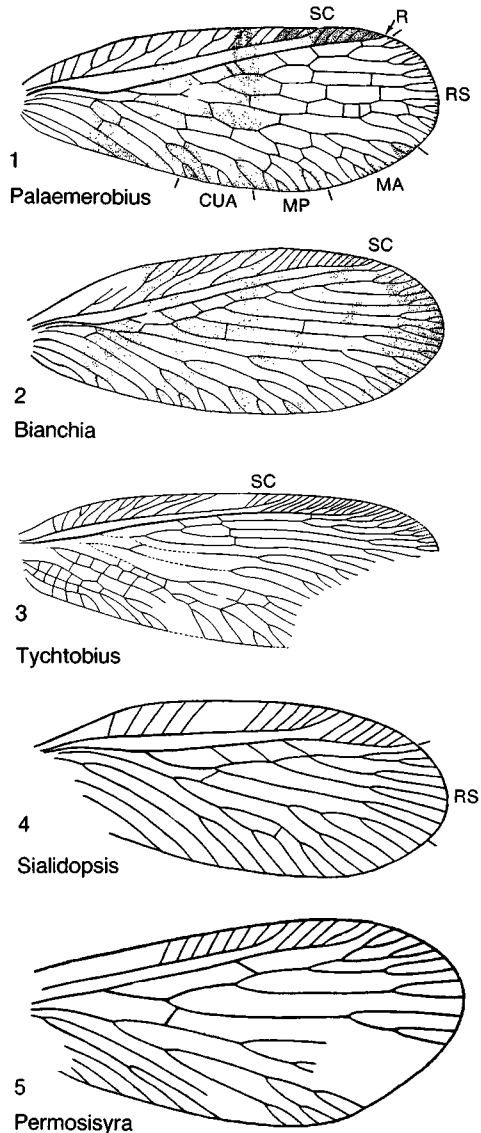


FIG. 191. Palaemerobiidae and Sialidopsidae (p. 344).

## Family OSMYLITIDAE

Martynova, 1949

[Osmylitidae MARTYNOVA, 1949a, p. 159]

Vein SC of fore wing terminating on R near wing apex; RS with numerous primary branches; MA free from RS basally or coalesced with RS for a short distance. Hind

wing and body unknown. [Possibly related to the Polystoechotidae.] *Jur.*

*Osmylites* HAASE, 1890a, p. 22 [*\*Chrysopa protogaea* HAGEN, 1862, p. 108; OD]. Fore wing little known; apex pointed, slightly falcate; MA deeply forked, apparently not coalesced with RS basally. *Jur.*, Europe (Bavaria).

*Kirgisellodes* MARTYNOV, 1937a, p. 39, *nom. subst. pro Kirgisella* MARTYNOV, 1925b, p. 594, *non* BEKLEMICHEV, 1922 [*\*Kirgisella ornata*; OD]. Fore wing with SC and R merging abruptly; RS with about 15 primary branches. [Family assignment doubtful.] MARTYNOVA, 1962d. *Jur.*, USSR (Kazakh).—FIG. 192,3. *\*K. ornata*; fore wing,  $\times 2.7$  (Martynova, 1962d).

*Mesomylina* BODE, 1953, p. 246 [*\*M. exornata*; OD]. Fore wing with numerous crossveins distributed uniformly over wing. *Jur.*, Europe (Germany).

### Family SISYRIDAE Banks, 1905

[*nom. transl.* HANDLIRSCH, 1907, p. 908, *ex* Sisyriinae BANKS, 1905, p. 23]

Wings subequal, oval. Fore wing with costal area generally narrow, especially proximally; pterostigmal crossveins numerous; costal crossveins mostly unbranched; vein SC weak distally; RS with 1 or 2 primary branches arising from a single stem; CUA with almost parallel branches leading to wing margin; gradate crossveins present in some species. Hind wing with MA coalesced with MP at base, separating as a free, weak vein, then coalescing with RS for a short distance. Larvae aquatic, predaceous on freshwater sponges. *Oligo.*—*Holo.*

*Sisyr* BURMEISTER, 1839, p. 975. BANKS, 1905; COCKERELL, 1917b. *Oligo.*, England—*Holo.*

*Rophalis* HAGEN, 1866d, p. 459 [*\*Sisyr relicta* HAGEN in PICTET & HAGEN, 1856, p. 87; OD]. Fore wing with SC terminating on wing margin; costal area with numerous veins in front of pterostigma; inner and outer gradate series of crossveins present. PARFIN & GURNEY, 1956. *Oligo.*, Europe (Baltic).

### Family HEMEROBIIDAE Leach, 1815

[*nom. correct.* KRÜGER, 1922, p. 138, *pro* Hemerobida LEACH, 1815, p. 138]

Fore wing with costal space usually broadest before midwing; vein SC terminating on C; 2 or more branches of RS arising from apparently fused stems of R and RS. Hind

wing with R not fused with RS beyond points of origin of any branches of RS; MA coalesced with RS for a short distance. Larvae terrestrial, predaceous. *Eoc.*—*Holo.*

*Hemerobius* LINNÉ, 1758, p. 549. JARZEMBOWSKI, 1980. *Paleog.*, England—*Holo.*

*Megalomus* RAMBUR, 1842, p. 418. HENRIKSEN, 1922b. *Eoc.*, Europe (Denmark)—*Holo.*

*Prolachlanius* KRÜGER, 1923, p. 88 [*\*Hemerobius resinatus* HAGEN in PICTET & HAGEN, 1856, p. 88; OD]. Similar to *Hemerobius*, but SC of fore wing terminating well before wing apex. *Oligo.*, Europe (Baltic).

*Prophlebonema* KRÜGER, 1923, p. 85 [*\*P. resinata*; OD]. Little-known hemerobiid, apparently related to *Megalomus*. *Oligo.*, Europe (Baltic).

*Prospadobius* KRÜGER, 1923, p. 90 [*\*Hemerobius moestus* HAGEN in PICTET & HAGEN, 1856, p. 88; OD]. Similar to *Symphorobius* (recent), but MA of fore wing not so deeply forked. *Oligo.*, Europe (Baltic).

### Family MESOCHRY SOPIDAE Handlirsch, 1906

[Mesochrysopidae HANDLIRSCH, 1906b, p. 612]

Fore wing similar to that in Chrysopidae, but both branches of vein MP leading directly to hind margin; pseudomedia apparently well defined. [Possibly a synonym of Chrysopidae.] *Jur.*

*Mesochrysopa* HANDLIRSCH, 1906b, p. 613 [*\*Hageniotes zitteli* MEUNIER, 1898b, p. 118; OD]. Little-known fore wing with costal space of uniform width; RS straight, with about 10 primary branches. ADAMS, 1967. *Jur.*, Europe (Germany).

*Mesopochrysa* MARTYNOV, 1927b, p. 764 [*\*M. latipennis*; OD]. Fore wing much broader than in *Mesochrysopa*; RS zigzagged, with about 7 primary branches. [Family assignment doubtful.] MARTYNOVA, 1962d; ADAMS, 1967. *Jur.*, USSR (Kazakh).—FIG. 193,1. *\*M. latipennis*; fore wing and body fragments,  $\times 4$  (Martynov, 1927b).

### Family CHRYSOPIDAE Hagen, 1866

[Chrysopidae HAGEN, 1866d, p. 371]

Wings subequal, oval. Costal area of fore wing with many unbranched crossveins; vein RS+MA arising about halfway between wing base and midwing, with a series of branches arising from zigzagged stem; 2 gradate series of crossveins generally present, one (pseudomedia) continuing the line of MP1+2 and the other (pseudocubitus) that of CUA. Hind

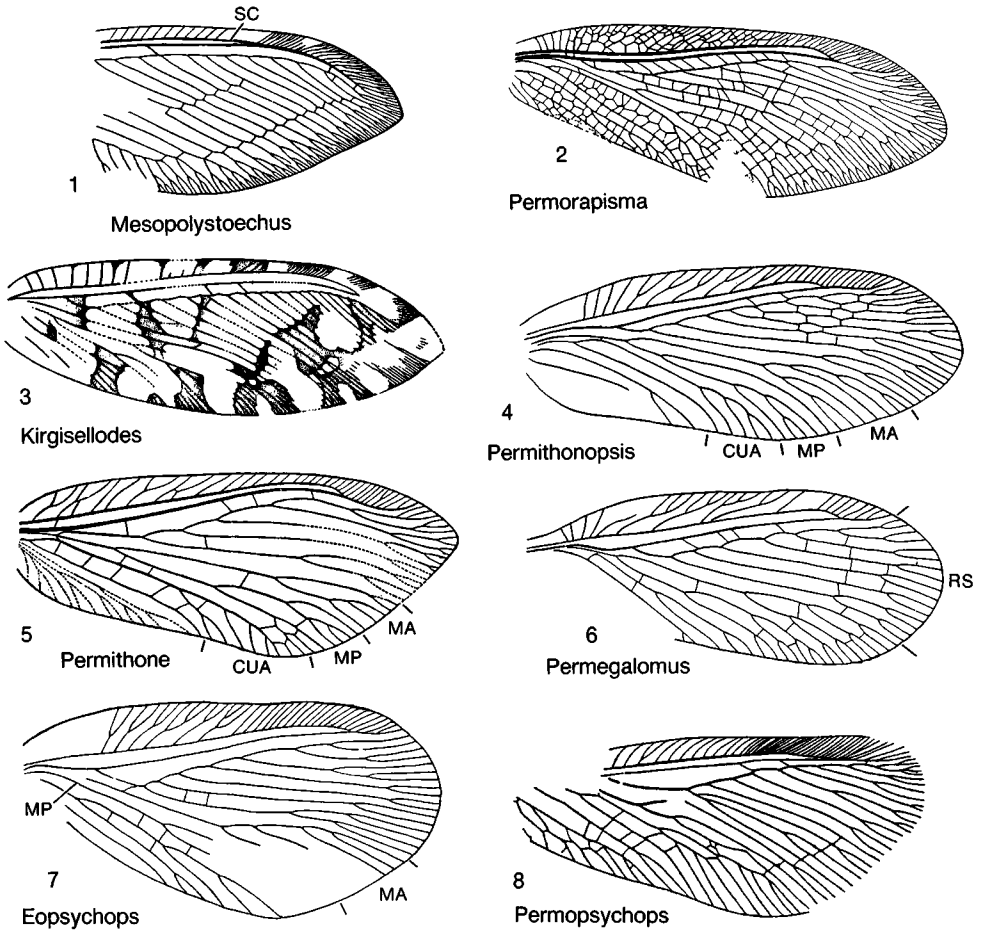


FIG. 192. Permithonidae, Mesopolystoechotidae, and Osmylitidae (p. 344–346).

wing with MP1 commonly coalesced with MA for a short distance and 2 gradate series of crossveins, mostly less irregular than in fore wing. ADAMS, 1956. *Oligo.*—*Holo.*

*Chrysopa* LEACH, 1815, p. 138. HANDSCHIN, 1937. *Mio.*, Europe (Germany)—*Holo.*

*Archaeochrysa* ADAMS, 1967, p. 229 [\**Paleochrysa creedei* CARPENTER, 1935c, p. 265; OD]. Fore wing with basal subcostal crossvein distal to origin of RS+MA; MA, after leaving RS, not coalesced with MP1; pseudomedia strongly zig-zagged. Hind wing with MA not coalesced with MP1. *Oligo.*, USA (Colorado).—FIG. 193,2.

\**A. creedei* (CARPENTER); *a*, fore and *b*, hind wings,  $\times 4.2$  (Adams, 1967).

*Cimbrochrysa* SCHLÜTER, 1982, p. 258 [\**C. moleriensis*; OD]. Fore wing nearly triangular in shape; costal margin with a cluster of short hairs basally;

two crossveins between C and SC; MP deeply forked. *Eoc.*, Europe (Denmark).

*Dyspetochrysa* ADAMS, 1967, p. 229 [\**Tribochrysa vetuscula* SCUDDER, 1890, p. 170; OD]. Fore wing as in *Archaeochrysa*, but MA coalesced with MP1 after leaving RS. *Oligo.*, USA (Colorado).

*Nothochrysa* MACLACHLAN, 1868, p. 195. STATZ, 1936a. *Oligo.*, Europe (Germany)—*Holo.*

*Paleochrysa* SCUDDER, 1890, p. 166 [\**P. stricta*; OD] [= *Litochrysa* CARPENTER, 1935c, p. 265 (type, *Paleochrysa wickhami* COCKERELL, 1914d, p. 717)]. Venation as in *Archaeochrysa*, but in fore wing distal part of MA (after leaving RS) shorter. MA coalescing with MP1 in hind wing. ADAMS, 1967. *Oligo.*, USA (Colorado).

*Tribochrysa* SCUDDER, 1885b, p. 777 [\**T. inaequalis*; OD]. Fore wing with RS+MA arising slightly basal of first fork of MP; inner gradate series of crossveins irregular. Hind wing with MA coalescing with MP1; pseudocubitus less

well developed than in fore wing. CARPENTER, 1935c; ADAMS, 1967. *Oligo.*, USA (Colorado). — FIG. 193,3. \**T. inaequalis*; fore wing,  $\times 4.5$  (Carpenter, 1935c).

### Family ARCHEOSMYLIDAE

Riek, 1953

[Archeosmylidae RIEK, 1953, p. 85]

Fore wing apparently as in Osmylidae but lacking regularly arranged gradate crossveins; vein CUP deeply forked but not pectinately branched. *Perm.*–*Trias.*

*Archeosmylus* RIEK, 1953, p. 85 [\**A. pectinatus*; OD]. Fore wing with distal costal veinlets unbranched; pterostigma long and well developed; RS with at least 8 pectinate branches. RIEK, 1955. *Perm.*, Australia (New South Wales); *Trias.*, Australia (Queensland). — FIG. 193,4. *A. stigmatus* RIEK, *Trias.*; fore wing,  $\times 5.5$  (Riek, 1955).

### Family OSMYLIDAE Leach, 1815

[*nom. correct.* BRAUER, 1868, p. 5, *pro* Osmylida LEACH, 1815, p. 138]

Moderate-sized to large insects with ocelli; wings covered by microtrichia; nygmata present. Fore wing with costal area only moderately broad; numerous simple veinlets from vein SC to costal margin; SC terminating on R before apex of wing; RS arising near wing base, with many branches; MA coalesced with R and RS basally and diverging as separate vein before midwing; MP having at least one fork, with division commonly basal; crossveins numerous, generally forming 1 or 2 gradate series distally. Hind wing similar to fore wing; free basal piece of MA short and sigmoidal. Larvae mainly terrestrial, some semiaquatic. *Paleoc.*–*Holo.*

*Osmylus* LATREILLE, 1802, p. 289. *Holo.*

*Euporismites* TILLYARD in TILLYARD & DUNSTAN, 1916, p. 44 [\**E. balli*; OD]. Hind wing as in *Euporismus* (recent) but with basal branches of RS more widely spaced. RIEK, 1952a. *Paleoc.*, Australia (Queensland).

*Lithosmylus* CARPENTER, 1943c, p. 758 [\**Osmylus columbianus* COCKERELL, 1908r, p. 342; OD]. Related to *Kempynus* (recent). Fore wing not falcate; M forking near wing base; MP branching distally of level of separation of MA from RS; only 1 series of gradate crossveins (outer). Hind

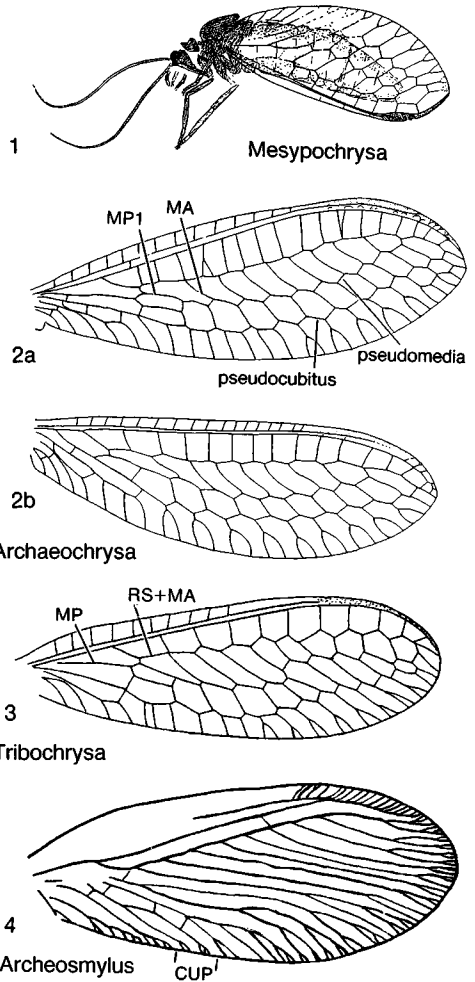


FIG. 193. Mesochrysopidae, Chrysopidae, and Archeosmylidae (p. 346–348).

wing with proximal piece of MA fully developed. *Oligo.*, USA (Colorado). — FIG. 194,4. \**L. columbianus* (COCKERELL); a, fore and b, hind wings,  $\times 2$  (Carpenter, 1943c).

*Osmylidia* COCKERELL, 1908r, p. 342 [\**Osmylus requietus* SCUDDER, 1890, p. 34; OD] [= *Oligosmylus* KRÜGER, 1913, p. 19, obj.]. Related to *Gryposmylus* (recent). Fore wing more slender and pointed than hind wing and with about 10 crossveins between R and RS; radial-medial crossveins in 2 gradate series, inner of about 7 and outer of about 9; MP forked in proximal region of wing. WALTHER, 1904. *Oligo.*, USA (Colorado). — FIG. 194,2. \**O. requietus* (SCUDDER); fore wing,  $\times 3.7$  (Carpenter, 1943c).

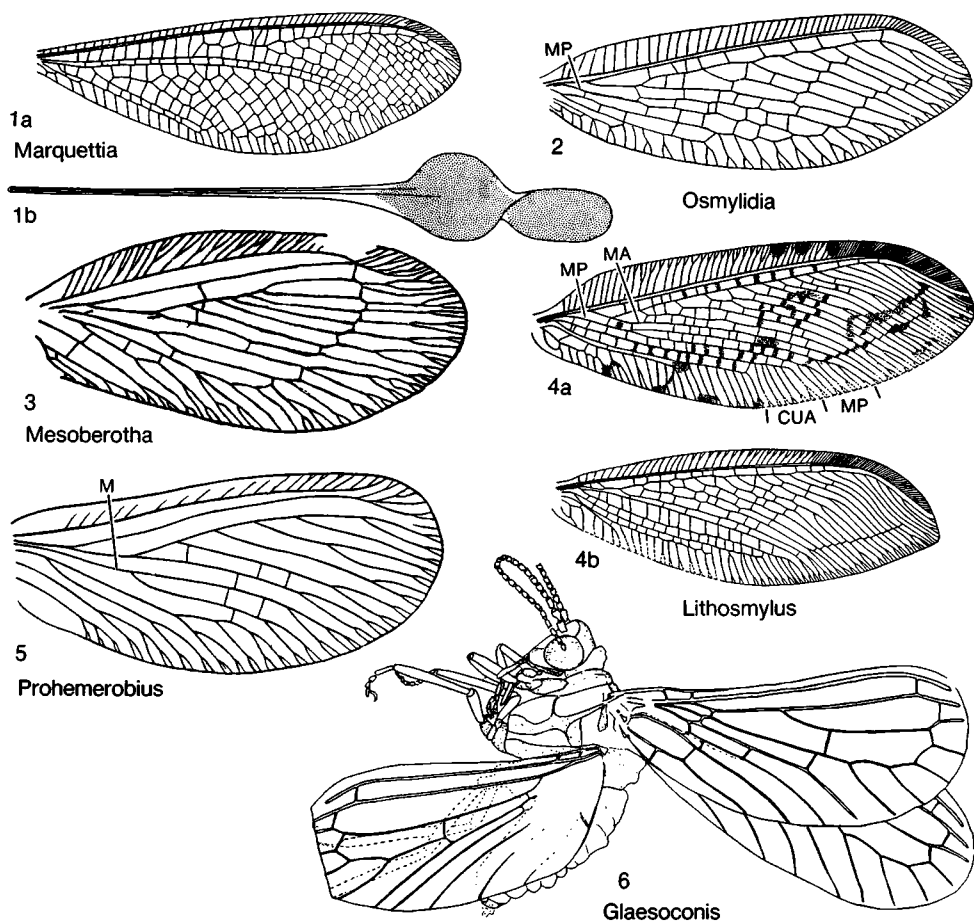


FIG. 194. Osmylidae, Mesoberothidae, Prohemerobiidae, Coniopterygidae, and Nemopteridae (p. 348–351).

**Family MESOBEROTHIDAE**  
Carpenter, 1991

[Mesoberothidae CARPENTER, 1991, p. 87] [=Proberothidae RIEK, 1955, p. 674]

Little-known family, apparently related to Berothidae, but with more crossveins between branches of veins RS and M. *Trias.*

*Mesoberotha* CARPENTER, 1991, p. 87, *nom. subst. pro Proberotha* RIEK, 1955, p. 674, *non* KRÜGER, 1923 [\**Proberotha superba*; OD]. Fore wing with costal area strongly widened at middle; MA and RS apparently joined by a crossvein, not coalesced. *Trias.*, Australia (Queensland).—FIG. 194,3. \**M. superba* (RIEK); fore wing, ×8 (Riek, 1955).

*Proberothella* RIEK, 1955, p. 676 [\**P. elongata*; OD]. Fore wing as in *Mesoberotha* but with MA

and RS coalesced basally for a short distance. *Trias.*, Australia (Queensland).

**Family BERTHIDAE**  
Handlirsch, 1906

[*nom. transl.* HANDLIRSCH, 1908a, p. 1251, *ex* Berothinae HANDLIRSCH, 1906b, p. 42]

Wings subequal. Fore wing commonly falcate; vein RS with at least 4 branches, all arising from a single stem; MA coalesced with RS for a short distance proximally; single series of gradate veins. Hind wing with basal free piece of MA appearing as transverse crossvein, not longitudinal. Larvae terrestrial, with long and straight mandibles. *Cret.—Holo.*

- Berotha** WALKER, 1860, p. 186. *Holo.*  
**Banoberotha** WHALLEY, 1980a, p. 160 [*\*B. enigmatica*; OD]. Fore wing with costal veinlets unbranched; R terminating on SC very close to wing apex; RS with several terminal branches; MP deeply forked. *Cret.*, Lebanon.  
**Paraberotha** WHALLEY, 1980a, p. 161 [*\*P. acra*; OD]. Similar to *Rhachiberotha* (recent) but with a shorter pronotum; SC of fore wing terminating on R well before wing apex. *Cret.*, Lebanon.  
**Proberotha** KRÜGER, 1923, p. 81 [*\*P. prisca*; OD]. Little-known berothid. *Oligo.*, Europe (Baltic).

### Family MANTISPIDAE

Westwood, 1840

[Mantispidae WESTWOOD, 1840, p. 58]

Wings slender, subequal; pterostigma well developed; both pairs of wings with 2 gradate series of crossveins. Antennae short; pronotum slender; forelegs very long, raptorial. All species predaceous in larval and adult stages. *Paleog.*—*Holo.*

- Mantispa** ILLIGER, 1798, p. 499. *Holo.*  
**Promantispa** JARZEMBOWSKI, 1980, p. 255 [*\*Mantispa relicta* COCKERELL, 1921d, p. 477; OD]. Wings apparently similar to those of *Mantispa* but with much longer pterostigma. *Paleog.*, England.

### Family PROHEMEROBIIDAE

Handlirsch, 1906

[Prohemerobiidae HANDLIRSCH, 1906b, p. 473]

Fore wing small, oval; costal area not very broad; vein SC ending on C, not markedly curved; RS arising near wing base, with pectinate series of branches having small terminal forks; M with 2 branches. Hind wing unknown. [Probably related to the Dilariidae.] *Jur.*

- Prohemerobius** HANDLIRSCH, 1906b, p. 474 [*\*P. dilaroides*; OD]. Fore wing with costal margin straight or nearly so; costal area of moderate width; RS with 6 to 8 branches; CU forked more deeply than M. *Jur.*, Europe (Germany).—FIG. 194,5. *\*P. dilaroides*; fore wing,  $\times 7$  (Handlirsch, 1906a).

### Family CONIOPTERYGIDAE

Burmeister, 1838

[Coniopterygidae BURMEISTER, 1838 in BURMEISTER, 1838–1839, p. 701]

Very small to minute insects. Wings usually subequal, lacking marginal forks of veins characteristic of other Planipennia. Fore wing

with costa reduced, present only near base; costal area very narrow, traversed by only 1 or 2 crossveins; vein SC unbranched; RS arising near midwing, generally with 2 terminal branches; M not coalesced with RS, commonly with 2 terminal branches; CUA and CUP diverging from stem CU near base, both unbranched; 1A and 2A present. Hind wing with RS arising very near wing base, mostly forked distally; CU forked basally; CUA either very close to M or remote. Adults with wax glands, wax secreted tending to cover legs and wings. Larvae terrestrial, predaceous, feeding on aphids, scale insects, mites, etc.; mandibles straight and sharply pointed.

*Jur.*—*Holo.*

- Coniopteryx** CURTIS, 1834, pl. 528. MEINANDER, 1972. *Oligo.*, Europe (Baltic)—*Holo.*  
**Archiconiocompsa** ENDERLEIN, 1910b, p. 675 [*\*A. prisca*; OD]. Fore wing as in *Coniocompsa* (recent); hind wing as in *Aleuropteryx* (recent); 16 antennal segments. MEINANDER, 1972. *Oligo.*, Europe (Baltic).  
**Archiconiopteryx** ENDERLEIN, 1909, p. 774 [*\*A. liasina*; OD]. Fore wing with thickenings on M, as in *Aleuropteryx* (recent). MEINANDER, 1972. *Jur.*, Europe (Germany).  
**Archiconis** ENDERLEIN, 1930, p. 111 [*\*A. electrica*; OD]. Fore wing as in *Fontellenea* (recent); plicaturae (paired organs) on several abdominal segments. MEINANDER, 1972. *Oligo.*, Europe (Baltic).  
**Glaesoconis** MEINANDER, 1975, p. 54 [*\*G. cretica*; OD]. Head dorsoventrally elongate. Fore wing with 2 crossveins between RS and M; M with 4 terminal branches in both pairs of wings. WHALLEY, 1980a. *Cret.*, USSR (Asian RSFSR), Lebanon.—FIG. 194,6. *\*G. cretica*, wings and body,  $\times 20$  (Meinander, 1975).  
**Heminiphethia** ENDERLEIN, 1930, p. 105 [*\*H. fritschii*; OD]. Fore wing much as in *Neosemidalis* (recent). MEINANDER, 1972. *Oligo.*, Europe (Baltic).  
**Hemisemidales** MEINANDER, 1972, p. 290. MEINANDER, 1975. *Oligo.*, Europe (Baltic)—*Holo.*  
**Juraconiopteryx** MEINANDER, 1975, p. 53 [*\*J. zberichini*; OD]. Little-known genus, based on incomplete specimen; wing venation not preserved. Head capsule elongate; antennae with 28 segments. *Jur.*, USSR (Kazakh).

### Family NEMOPTERIDAE

Rambur, 1842

[*nom. correct.* HAGEN, 1866d, p. 374, *pro* Nemopterides RAMBUR, 1842, p. 332]

Fore wing broadly oval or subtriangular; costal area with numerous undivided cross-



veins; vein SC coalesced with R distally; RS arising near midwing, with several irregular branches; MA coalesced with RS near origin of RS; MP1 a straight vein; MP2+CUA with several long branches to posterior margin; crossveins regularly distributed over wing but not forming a gradate series. Hind wing highly reduced, usually consisting of a long, slender petiole, terminating in 1 or 2 dilations. Larvae terrestrial, commonly with an elongate cervix. *Oligo.—Holo.*

**Nemoptera** LATREILLE, 1802, p. 296. *Holo.*

**Marquettia** NAVÁS, 1913c, p. 7 [*\*Halter americana* COCKERELL, 1907f, p. 446; OD] [= *Olivierina* PIERCE & KIRKBY, 1959, p. 47 (type, *O. metzeli*)]. Head shaped as in *Lertha* (recent); rostrum not elongate. RS of fore wing with 10 or more main branches; pterostigma small. Hind wing slender, with 2 dilations. CARPENTER, 1959. *Oligo.*, USA (Colorado, Montana). — FIG. 194, I. *\*M. americana* (COCKERELL, Colorado; *a*, fore and *b*, hind wings,  $\times 1.8$  (Carpenter, 1959).

### Family KALLIGRAMMATIDAE Handlirsch, 1906

[*nom. correct.* MARTYNOVA, 1947c, p. 2055, *pro* Kalligrammatidae HANDLIRSCH, 1906b, p. 610]

Large insects, related to the Psychopsidae. Fore wing with costal area of moderate width; vein SC joining R near wing apex; MA branched only near wing margins; MP extensively branched, sending several main branches anteriorly; crossveins very numerous over entire wing. Hind wing nearly as long as fore wing and at least as broad, with narrower costal area; venational pattern as in fore wing. Body little known. *Jur.*

**Kalligramma** WALTHER, 1904, p. 184 [*\*K. haeckeli*; OD]. RS of fore wing with about 12 primary branches; hind wing much broader than fore; wings with a conspicuous eye-spot. HANDLIRSCH, 1906b; MARTYNOVA, 1947c; PANFILOV, 1968. *Jur.*, Europe (Germany), USSR (Kazakh). — FIG. 195, 4. *\*K. haeckeli*, Germany; *a*, fore and *b*, hind wings,  $\times 0.5$  (Handlirsch, 1906b).

**Kalligrammula** HANDLIRSCH, 1919a, p. 62 [*\*K. senckenbergiana*; OD]. Similar to *Kalligramma*, but RS with only 5 to 8 primary branches; wing eye-spot absent. HANDLIRSCH, 1906b; MARTYNOVA, 1947c. *Jur.*, Europe (Germany), USSR (Kazakh).

**Lithogramma** PANFILOV, 1968, p. 172 [*\*L. oculatum*; OD]. Fore wing broad, almost oval; cos-

tal area unusually broad; MA with numerous branches arising basally. *Jur.*, USSR (Kazakh). **Meioneurites** HANDLIRSCH, 1906b, p. 612 [*\*M. schlosseri*; OD]. Fore wing with first branch of RS remote from wing base; crossveins more widely spaced than in *Kalligramma*. MARTYNOVA, 1947c; PANFILOV, 1968. *Jur.*, Europe (Germany), USSR (Kazakh).

### Family PSYCHOPSIDAE Handlirsch, 1906

[*nom. transl.* HANDLIRSCH, 1908a, p. 1170, *ex* Psychopsinae HANDLIRSCH, 1906b, p. 42]

Moderate-sized to large insects, almost mothlike in appearance. Fore wing generally very broad; costal area very wide, with numerous forked veinlets; veins SC, R, and RS close together and parallel, forming the *vena triplica*; numerous branches arising pectinately from RS; M apparently deeply forked, MA and MP not clearly identifiable; crossveins not numerous, mainly restricted to a few gradate series. Hind wing shorter than fore wing; costal area nearly as broad as in fore wing; *vena triplica* present. Larvae terrestrial. *Trias.—Holo.*

**Psychopsis** NEWMAN, 1842, p. 415. *Holo.*

**Angaropsychops** MARTYNOVA, 1949a, p. 163 [*\*A. turgensis*; OD]. Little-known fore wing; SC, R, and RS forming smooth curve; crossveins numerous, irregularly distributed. *Jur.*, USSR (Asian RSFSR). — FIG. 195, 3. *\*A. turgensis*; fore wing fragment,  $\times 1.6$  (Martynova, 1949a).

**Embaneura** ZALESSKY, 1953a, p. 164 [*\*E. vachrameevi*; OD]. Fore wing as in *Angaropsychops*, but branches of RS more numerous and closer together. MARTYNOVA, 1962d. *Cret.*, USSR (Kazakh). — FIG. 195, 2. *\*E. vachrameevi*; fore wing,  $\times 1.2$  (Martynova, 1962d).

**Grammopsychops** MARTYNOVA, 1954, p. 1167 [*\*G. lebedevi*; OD]. Fore wing very similar to that of *Embaneura*, but crossveins arranged in several concentric rows. [Probably a synonym of *Embaneura*.] *Cret.*, USSR (Asian RSFSR). — FIG. 195, 1. *\*G. lebedevi*; fore wing,  $\times 1.3$  (Martynova, 1954).

**Propropsychops** KRÜGER, 1923, p. 84 [*\*P. helmi*; OD]. Fore wing apparently with no anastomosis between branches of MP or between posterior parts of MP and CUA. Hind wing with free basal piece of MA longitudinal in position. MACLEOD, 1970. *Oligo.*, Europe (Baltic).

**Triassopsychops** TILLYARD, 1922b, p. 467 [*\*T. superba*; OD]. Fore wing triangular in shape, almost as broad as long; crossveins not forming a definite series. *Trias.*, Australia (Queensland).

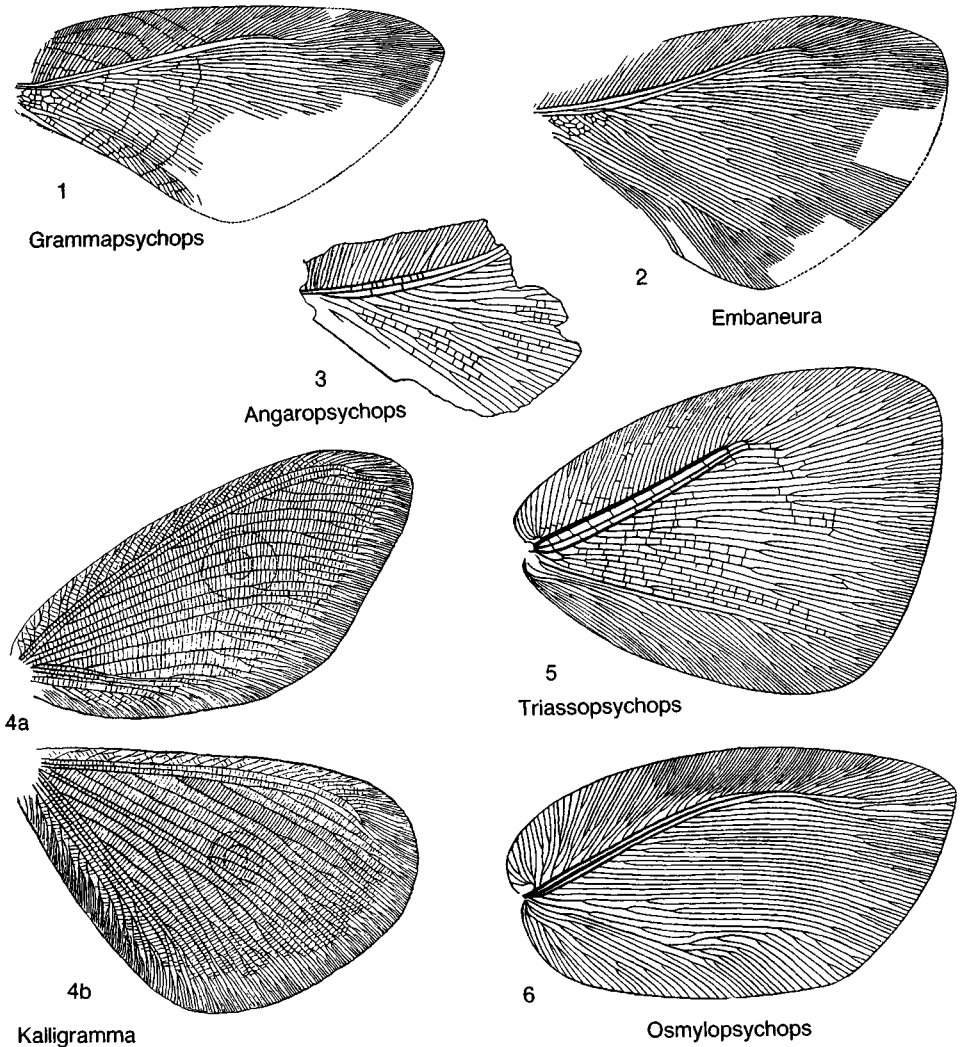


FIG. 195. Kalligrammatidae, Psychopsidae, and Osmylopsychopidae (p. 351–352).

—FIG. 195,5. \**T. superba*; fore wing, partially restored,  $\times 1.7$  (Tillyard, 1922b).

#### Family OSMYLOPSYCHOPIDAE Martynova, 1949

[*nom. correct.* MARTYNOVA, 1962d, p. 277, *pro* Osmylopsychopidae MARTYNOVA, 1949a, p. 166] [=Osmylopsychopidae RIEK, 1955, p. 680, junior synonym and homonym]

Fore wing as in Psychopsidae, but veins SC and R joined well before apical region; crossveins few and very weakly developed. Hind wing unknown. *Trias.*

**Osmylopsychops** TILLYARD, 1923b, p. 496 [\**O. spilleriae*; OD]. Fore wing with costal veinlets mostly forked and connected by scattered cross-

veins. RIEK, 1955. *Trias.*, Australia (Queensland), Europe (France). — FIG. 195,6. \**O. spilleriae*; fore wing, partially restored,  $\times 2$  (Tillyard, 1923b).

**Petropsychops** RIEK, 1956, p. 104 [\**P. superba*; OD]. Fore wing similar to that of *Osmylopsychops*, but M much more extensive, with many anterior, pectinate branches. *Trias.*, Australia (Queensland).

#### Family BRONGNIARTIELLIDAE Martynova, 1949

[Brongniartiellidae MARTYNOVA, 1949a, p. 165]

Fore wing as in Osmylopsychopidae, but costal area narrowed markedly by vein SC

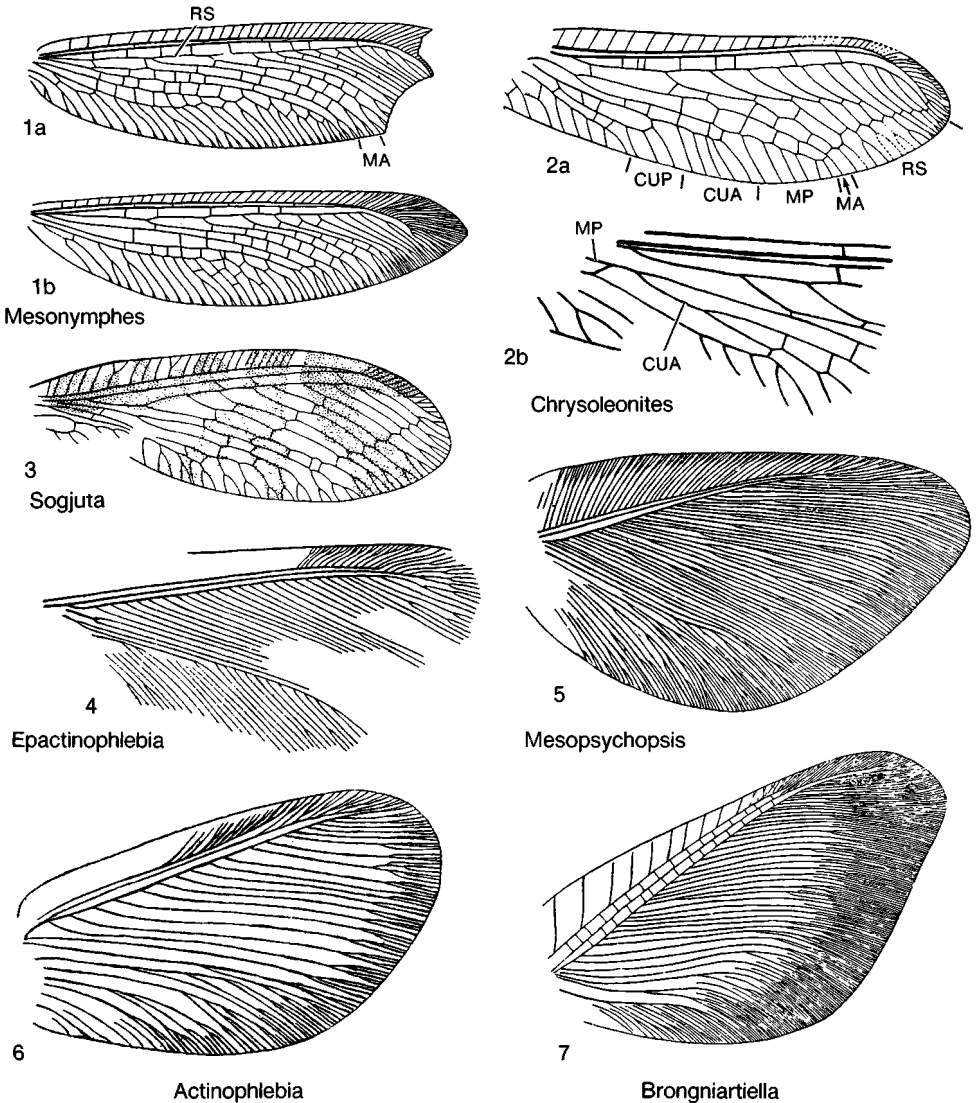


FIG. 196. Brongniartiellidae, Nymphidae, and Nymphitidae (p. 352-354).

terminating on C; distal branches of R and RS mostly straight, only a few curved posteriorly. Hind wing unknown. *Jur.*

**Brongniartiella** MEUNIER, 1898a, p. 237 [*\*B. problematica*; OD]. Fore wing with branches of RS forking at about half their lengths. MARTYNOVA, 1949a. *Jur.*, Europe (Germany).—FIG. 196,7. *B. inconditissimi* HANDLIRSCH; fore wing,  $\times 0.8$  (Handlirsch, 1906b).

**Actinophlebia** HANDLIRSCH, 1906b, p. 476 [*\*Pterinoblattina megapolitana* GEINITZ, 1887, p. 198; OD]. Fore wing as in *Brongniartiella*, but terminal branches of RS shorter. TILLYARD, 1933;

MARTYNOVA, 1949a. *Jur.*, Europe (Germany), England. — FIG. 196,6. *\*A. megapolitana* (GEINITZ); fore wing,  $\times 3.7$  (Handlirsch, 1906b). **Epactinophlebia** MARTYNOV, 1927b, p. 766 [*\*E. karabasicca*; OD]. CUA of fore wing straight, with several pectinate branches distally, directed posteriorly; crossveins apparently absent. MARTYNOVA, 1962d. *Jur.*, USSR (Kazakh).—FIG. 196,4. *\*E. karabasicca*; fore wing,  $\times 2.5$  (Marty-nov, 1927b).

**Mesopsychopsis** HANDLIRSCH, 1906b, p. 607 [*\*Ricania hospes* GERMAR, 1839, p. 220; OD]. Similar to *Brongniartiella*, but costal area much broader; forks of branches of RS long. MARTYNOVA, 1949a. *Jur.*, Europe (Germany).—FIG.

196,5. \**M. hospes* (GERMAR); fore wing,  $\times 2.5$  (Handlirsch, 1906b).

### Family NYMPHIDAE Rambur, 1842

[*nom. correct.* BRAUER, 1868, p. 5, *pro* Nymphides RAMBUR, 1842, p. 412]

Insects of moderate size, similar in general appearance to Osmylidae, but lacking ocelli, and wings without nygmata and covering of microtrichia. Wings similar to those of Osmylidae, but costal area of fore wing narrower; hind wing with basal piece of vein MA apparently absent. Larvae terrestrial, resembling those of Myrmeleontidae. *Jur.*—*Holo.*

*Nymphes* LEACH, 1814, p. 101. *Holo.*

*Mesonymphes* CARPENTER, 1929a, p. 191 [\**M. bageni*; OD]. Wings as in *Nymphes* (recent) but wider basally and with fewer crossveins. ADAMS, 1958. *Jur.*, Europe (Germany).—FIG. 196,1. \**M. bageni*; *a*, fore and *b*, hind wings,  $\times 1.4$  (Carpenter, 1929a).

*Pronymphes* KRÜGER, 1923, p. 75 [\**Nymphes mengeanus* HAGEN in PICTET & HAGEN, 1856, p. 85; OD]. Fore wing as in *Nesydrion* (recent), but fork of CUA apparently distal of level of separation of MA from RS. MACLEOD, 1970. *Oligo.*, Europe (Baltic).

### Family NYMPHITIDAE

#### Handlirsch, 1906

[Nymphitidae HANDLIRSCH, 1906b, p. 608]

Wings as in Nymphidae but with 2 series of gradate crossveins; vein CUA of hind wing coalesced with CUP for short distance. *Trias.*—*Jur.*

*Nymphites* HAASE, 1890a, p. 23 [\**Hemerobius priscus* WEYENBERGH, 1869, p. 264; OD]. Fore wing subtriangular with pointed apex; costal area nearly uniform in width. MARTYNOVA, 1949a. *Jur.*, Europe (Germany).

*Chrysoleonites* MARTYNOV, 1925b, p. 591 [\**C. ocellatus*; OD]. Fore wing with costal area somewhat narrowed distally; tornus of hind margin less pronounced than in *Nymphites* and apex more rounded. Hind wing with costal area much narrower than in fore wing; CUA coalesced with MP for a short distance basally. MARTYNOVA, 1949a, 1962d. *Jur.*, USSR (Kazakh).—FIG. 196,2. \**C. ocellatus*; *a*, fore wing,  $\times 3.5$ ; *b*, hind wing,  $\times 5.0$  (Martynova, 1949a).

*Sialium* WESTWOOD, 1854, p. 396 [\**S. sipylus*; OD]. Fore wing with venation similar to that of *Nymphites*, but wing more elongate, not trian-

gular. HANDLIRSCH, 1906b. *Jur.*, Europe (Germany).

*Sogjuta* MARTYNOVA, 1958, p. 77 [\**S. speciosa*; OD]. Fore wing as in *Chrysoleonites* but more oval; costal area nearly uniform in width; RS with fewer branches. *Trias.*, USSR (Kirghiz).—FIG. 196,3. \**S. speciosa*; fore wing,  $\times 4.6$  (Martynova, 1958).

### Family SOLENOPTILIDAE

#### Handlirsch, 1906

[Solenoptilidae HANDLIRSCH, 1906b, p. 478]

Similar to Nymphitidae; vein R not parallel to costal margin distally; crossveins numerous and regularly distributed over wing. *Jur.*

*Solenoptilon* HANDLIRSCH, 1906b, p. 478 [\**Abia kochi* GEINITZ, 1887, p. 200; OD]. Little-known wing; both SC and R slightly curved posteriorly in apical region. MARTYNOVA, 1949a. *Jur.*, Europe (Germany), USSR (Kazakh).

### Family MYRMELEONTIDAE

#### Latreille, 1804–1805

[*nom. correct.* BURMEISTER, 1838 in BURMEISTER, 1838–1839, p. 757, *pro* Myrmeleonides LATREILLE, 1804–1805, p. 22]

Fore wing with veins SC and R coalesced at apex for considerable distance; subcostal crossveins almost entirely absent; CUA branching to form large triangle; wing bordered by dense series of marginal veinlets; MP2 and CUA coalesced proximally, base of MP2 appearing as oblique crossvein. Antennae at least slightly clavate, short. Larvae terrestrial, flattened. *Oligo.*—*Holo.*

*Myrmeleon* LINNÉ, 1767, p. 913. *Holo.*

*Dendroleon* BRAUER, 1866, p. 42. STATZ, 1936a. *Oligo.*, Europe (Germany)—*Holo.*

### Family ASCALAPHIDAE

#### Lefebure, 1842

[*nom. correct.* SCHNEIDER, 1845, p. 341, *pro* Ascalaphides LEFEBURE, 1842, p. 10]

Similar to Myrmeleontidae, but antennae strongly clavate and at least half as long as fore wing. Larvae terrestrial, with prominent processes (scoli) along sides of thorax and abdomen. *Oligo.*—*Holo.*

*Ascalaphus* FABRICIUS, 1775, p. 313. *Holo.*

*Borgia* NAVÁS, 1913a, p. 132 [\**Ascalaphus proavus* HAGEN, 1858b, p. 125; OD]. Fore wings with

very few veins in apical region. *Oligo.*, Europe (Germany).—FIG. 197,1. \**B. proavus* (HAGEN); *a*, antenna and *b*, fore wing,  $\times 2.6$  (Hagen, 1858b).

**Neadelphus** MACLEOD, 1970, p. 153 [\**N. protae*; OD]. First stage larva: head capsule quadrate with cordate posterolateral margins; meso- and metathorax with 2 elongate setigerous scoli on each lateral margin; abdominal segments 1 to 8 with bilateral pair of similar scoli. HENRY, 1976. *Oligo.*, Europe (Baltic).—FIG. 197,2. \**N. protae*; larva,  $\times 15$  (MacLeod, 1970).

### Family UNCERTAIN

The following genera, apparently belonging to the order Neuroptera, suborder Planipennia, are too poorly known to permit assignment to families.

**Archedilaropsis** MARTYNOV, 1935b, p. 39 [\**A. furcata*; OD]. Little-known wing fragments; possibly related to Prohemerobiidae. *Jur.*, USSR (Asian RSFSR).

**Archepsycho**s TILLYARD, 1919a, p. 205 [\**A. triassica*; OD]. Little-known wing fragment, possibly related to Psychopsidae. RIEK, 1955, 1956. *Trias.*, Australia (New South Wales, Queensland).

**Bothriomicromus** SCUDDER, 1878d, p. 462 [\**B. lachlani*; OD]. Little-known fore wing with very broad costal area basally and numerous branches of RS; 2 rows of crossveins. [Probably belonging either to Psychopsidae or Hemerobiidae.] SCUDDER, 1890. *Oligo.*, Canada (British Columbia).

**Creagroptera** HANDLIRSCH, 1906b, p. 605 [\**C. schwertschlagerei*; OD]. Little-known fore wing, possibly related to Prohemerobiidae. *Jur.*, Europe (Germany).

**Dicranoptila** HANDLIRSCH, 1906b, p. 608 [\**D. deichmulleri*; OD]. Little-known insect; venation unknown. [Ordinal position doubtful.] *Jur.*, Europe (Germany).

**Dilarites** MARTYNOV, 1925b, p. 596 [\**D. incertus*; OD]. Little-known wing fragment. *Jur.*, USSR (Kazakh).

**Epigambria** HANDLIRSCH, 1939, p. 76 [\**E. longipennis*; OD]. Little-known, small, oval wing, with strongly curved cubitus and anal veins. [Type of family Epigambridae.] *Jur.*, Europe (Germany).

**Glottidia** BODE, 1953, p. 268 [\**G. multivenosa*; OD]. Little-known oval wing with wide costal area at base; SC apparently extending nearly to wing apex. *Jur.*, Europe (Germany).

**Hondelagia** BODE, 1953, p. 269 [\**H. reticulata*; OD]. Little-known wing, with several anal veins. [Possibly belonging to Raphidiodea.] *Jur.*, Europe (Germany).

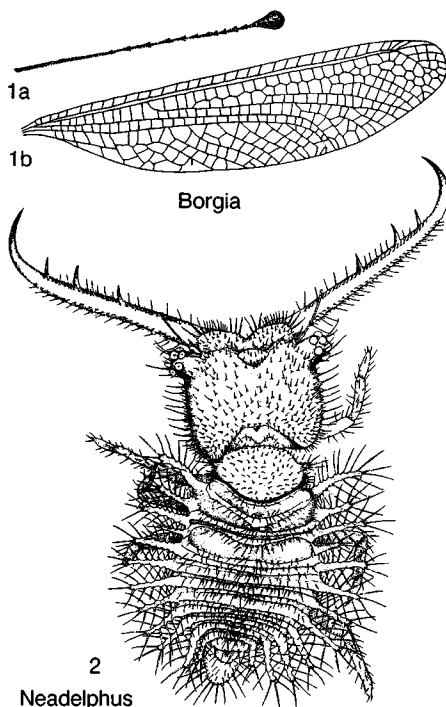


FIG. 197. Ascalaphidae (p. 354–355).

**Ineptia** HANDLIRSCH, 1906b, p. 614 [\**I. meunieri*; OD]. Little-known insect with wing-length of 40 mm; numerous crossveins. *Jur.*, Europe (Germany).

**Liassopsychops** BODE, 1953, p. 248 [\**L. curvata*; OD]. Little-known wing fragments; several veins with numerous marginal branches. *Jur.*, Europe (Germany).

**Lithosmylidia** RIEK, 1955, p. 678 [\**L. lineata*; OD]. Little-known wing fragment, possibly related to Polysotechotidae. *Trias.*, Australia (Queensland).

**Loxophleps** HANDLIRSCH, 1939, p. 76 [\**L. costalis*; OD]. Little-known wing fragment, possibly belonging to Solenoptilidae. *Jur.*, Europe (Germany).

**Megapolystoechus** TILLYARD, 1933, p. 11 [\**M. magnificus*; OD]. Little-known wing fragment; RS with numerous branches; SC not fused with R distally. *Jur.*, England.

**Melamnus** HANDLIRSCH, 1939, p. 77 [\**M. indistinctus*; OD]. Little-known wing fragment; SC terminating on R distally, both directed posteriorly in distal region. MARTYNOVA, 1961c. *Jur.*, Europe (Germany).

**Melaneimon** HANDLIRSCH, 1939, p. 77 [\**M. dubium*; OD]. Small wing fragment. MARTYNOVA, 1961c. *Jur.*, Europe (Germany).

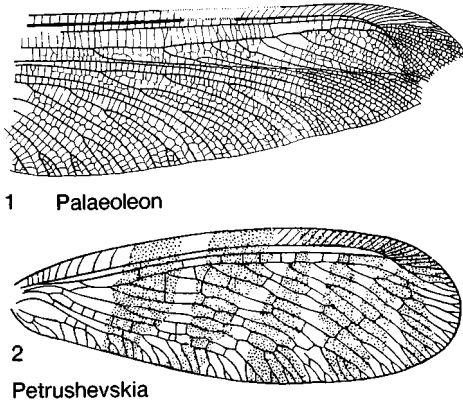


FIG. 198. Uncertain (p. 356).

**Mesoleon** HANDLIRSCH, 1906b, p. 477 [*\*M. dobertinianus*; OD]. Little-known wing fragment. *Jur.*, Europe (Germany).

**Osmylopsis** HANDLIRSCH, 1906b, p. 614 [*\*Abia duplicata* GIEBEL, 1856, p. 264; OD]. Little-known wing, about 10 mm long. *Jur.*, Europe (Germany).

**Palaeoleon** RICE, 1969, p. 3 [*\*P. ferrogeticus*; OD]. Little-known wing with myrmeleontoid features; intercalary veins well developed along posterior border. [Possibly related to the Stilbopterygidae.] *Cret.*, Canada (Labrador).—FIG. 198,1. *\*P. ferrogeticus*; apical half of wing,  $\times 1.5$  (Rice, 1969).

**Palparites** HANDLIRSCH, 1906b, p. 614 [*\*P. deichmulleri*; OD]. Little-known insect with fore wing 80 mm long. *Jur.*, Europe (Germany).

**Paractinophlebia** HANDLIRSCH, 1906b, p. 477 [*\*Pterinoblattina curtisii* SCUDDER, 1886b, p. 471; OD]. Little-known wing fragment. *Jur.*, England.

**Parasisyra** ZALESSKY, 1933, p. 143 [*\*P. kargalica*; OD]. Little-known fragment, possibly related to Sialidopsidae. [Type of family Parasisyridae.] MARTYNOV, 1937b. *Perm.*, USSR (European RFSR).

**Parhemerobius** BODE, 1953, p. 260 [*\*P. dilatatus*; OD]. Fore wing nearly as broad as long; SC relatively short; R and RS strongly curved posteriorly in distal region. *Jur.*, Europe (Germany).

**Petrushevskia** MARTYNOVA, 1958, p. 76 [*\*P. borisi*; OD]. Fore wing(?) with rounded apex; MA coalesced with RS for short distance basally. [Probably representing an undescribed family.] *Trias.*, USSR (Kirghiz).—FIG. 198,2. *\*P. borisi*; fore wing(?),  $\times 3.5$  (Martynova, 1958).

**Protopsychoopsis** TILLYARD, 1917a, p. 178 [*\*P. venosa*; OD]. Little-known wing, possibly related to Osmylopsychoptidae. TILLYARD, 1919b; RIEK, 1956. *Trias.*, Australia (Queensland).

**Pseudomyrmeleon** HANDLIRSCH, 1906b, p. 614

[*\*Myrmeleon extinctus* WEYENBERGH, 1869, p. 265; OD]. Little-known insect, with wing 36 mm long. [Possibly related to Mesochrysopidae.] *Jur.*, Europe (Germany).

**Pterinoblattina** SCUDDER, 1885f, p. 105 [*\*Blatta pluma* GIEBEL, 1856, p. 322; SD HANDLIRSCH, 1906b, p. 607]. Little-known wing fragment. [Possibly related to Psychoptidae.] BODE, 1953. *Jur.*, Europe (Germany).

**Ricartus** NAVÁS, 1913a, p. 133 [*\*Ascalaphus edwardsi* OUSTALET, 1870, p. 93; OD]. Wing fragments. *Oligo.*, Europe (France).

**Trichophlebia** BODE, 1953, p. 263 [*\*T. multistriata*; OD]. Little-known fore wing, very broad and subtriangular, with short SC. *Jur.*, Europe (Germany).

## Order GLOSSELYTRODEA Martynov, 1938

[Glosselytrodea MARTYNOV, 1938c, p. 189]

Small insects, apparently related to the Neuroptera. Wings subequal, fore wing in some species tegminous. Fore wing with precostal area commonly well developed, forming a prominent bulge at base of wing margin; vein R extending to or nearly to apex of wing, even forming a submarginal vein along anterior wing border; RS with 2 or more branches; MA coalesced with RS basally, then branching off as a nearly straight vein, often with a posterior branch; MA and MP often very close together and almost coalesced; CUA coalesced basally with MP, usually long, extending at least to midwing, often continuing as a submarginal vein nearly to apex; CUP usually straight; anal veins close together. Crossveins numerous or very numerous, forming many regular or, in a few genera, irregular cells over wing, including anal area; veins, in some species at least, with numerous setae. Hind wing slightly smaller than fore wing; precostal area apparently absent; SC short; R long, extending nearly to apex as a submarginal vein; RS, MA, and MP much as in fore wing; CUP extending only to about midwing. Body structure poorly known; head small, hypognathous; legs slender; cerci (possibly in female only) very short, with 1 to 4 segments (ZALESSKY, 1932b).

Some difference of opinion exists about the homologies of the wing venation (CAR-

PENTER, 1943a; ROHDENDORF, 1962a). The family Permoberothidae, which appears to be the most generalized of the families, provides the best evidence for interpretation of venation. In the fore wing of *Permoberotha* (see Fig. 199,2a), veins R and MA are readily identifiable as convex veins; the longitudinal veins between these two are concave and are presumably RS. The vein just below MA is concave and is therefore regarded as MP; its basal branch is weakly concave and is considered to be MP2. CUA is easily recognized as a strongly convex vein and the anal veins present no difficulty. Between MA and MP there is a faint but distinct groove, extending nearly from the wing base to the apex; the functional significance of this groove is unknown, but a similar groove occurs in the wings of the Hemerobiidae and other Neuroptera. The foregoing interpretation of the venation is different from those previously suggested; it assumes no unusual structure of the veins other than the partial coalescence of MA with RS and MP with CUA, a condition that occurs in many orders and families of insects.

The Archoglossopteridae appear to represent a somewhat more specialized stage than the Permoberothidae in the evolution of the wings of the Glosselytrodea: the precostal area is weakly developed, R terminates before the wing apex, and the cells of the wings are relatively large. In most other families, such as the Jurinidae, the precostal area is more pronounced, R terminates at the very apex of the wings, and the crossveins are usually more numerous and small.

The affinities of the Glosselytrodea are uncertain. Originally considered by MARTYNOV (1938c) to be orthopteroid, the order has more recently been regarded as endopterygote and most closely related to the Neuroptera (ZALESSKY, 1932b; CARPENTER, 1964c). In this connection it should be noted that TILLYARD (1932a) originally placed the Permoberothidae in the Neuroptera (Planipennia). It now seems certain that the Permoberothidae are, in fact, members of the Glosselytrodea; nonetheless, it seems prob-

able that TILLYARD was correct in detecting neuropterous traits in the Permoberothidae. Neuropterous traits now found in most of the other Glosselytrodea are the rows of setae on the wing veins, crossveins, and wing margins; as well as the general structure of the thorax and the position of the wings at rest. The evidence is certainly suggestive, though not conclusive, for the endopterygote position of the Glosselytrodea. *Perm.—Jur.*

### Family PERMOBEROTHIDAE Tillyard, 1932

[Permoberothidae TILLYARD, 1932a, p. 23]

Wings subequal. Fore wing membranous, with setae on main veins; costa marginal; anterior border of wing with only a slight bulge proximally; vein R strongly curved distally, not quite reaching apex of wing; RS with 2 long branches; MA unbranched, straight; a distinct groove, apparently bearing a spurious vein, between MA and MP; MP coalesced basally with CUA for a short distance, giving rise to basal branch after the separation of CUA; stem of CU free at base, dividing shortly into CUA and CUP, both of which are unbranched; 3 anal veins; crossveins numerous, forming irregular network between branches of RS. Hind wing slightly smaller than fore wing; costal margin straight or smoothly curved; SC shorter than in fore wing, terminating on R before midwing; rest of venation as in fore wing. Body structure little known; abdomen with short cerci, composed of 4 or 5 segments. *Perm.*

*Permoberotha* TILLYARD, 1932a, p. 24 [\**P. villosa*; OD] [= *Dictyobiella* TILLYARD, 1937a, p. 104 (type, *D. nervosa*)]. RS forked just before midwing; 2A in fore wing terminating on 3A. *Perm.*, USA (Kansas).—FIG. 199,2. \**P. villosa*; a, fore and b, hind wings, ×6 (Carpenter, 1943a).

### Family ARCHOGLOSSOPTERIDAE Martynova, 1958

[Archoglossopteridae MARTYNOVA, 1958, p. 74]

Fore wing with costa submarginal; pre-costal area present, forming a small bulge; vein R nearly straight, terminating just before apex of wing; MP without basal branch; 2

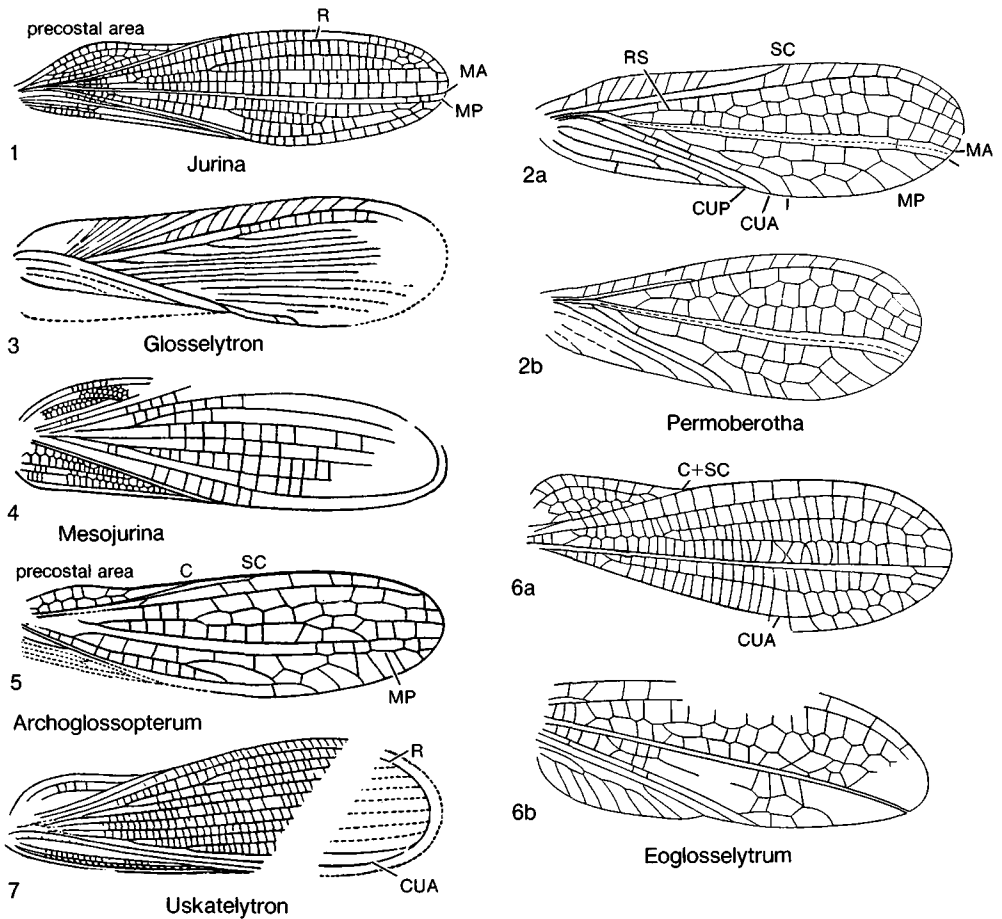


FIG. 199. Permoberothidae, Archoglossopteridae, Glosselytridae, Jurinidae, and Uskatelytridae (p. 357-359).

rows of cellules in precostal area; crossveins about as numerous as in *Permoberotha*. Hind wing and body unknown. *Perm.*

**Archoglossopterm** MARTYNOVA, 1958, p. 74 [\**A. shoricum*; OD]. RS forked before midwing; MP diverging from CU before origin of RS. *Perm.*, USSR (Asian RSFSR). — FIG. 199,5. \**A. shoricum*; fore wing, ×7 (Martynova, 1958).

**Family GLOSSELYTRIDAE**  
Martynov, 1938

[Glosselytridae MARTYNOV, 1938c, p. 204]

Anterior margin of fore wing nearly straight; precostal area with numerous radiating veins, and vein RS with at least 5 branches. *Perm.*

**Glosselytron** MARTYNOV, 1938c, p. 204 [\**G. multivenosum*; OD]. Little-known genus. Fore wing: branches of RS very close together and parallel. *Perm.*, USSR (European RSFSR). — FIG. 199,3. \**G. multivenosum*; fore wing, ×3 (Martynov, 1938c).

**Family JURINIDAE** Zalessky, 1929

[Jurinidae ZALESSKY, 1929, p. 28] [=Anorthoneuridae MARTYNOV, 1938c, p. 197; Eoglosselytridae MARTYNOVA, 1952a, p. 191]

Fore wing: precostal area prominent, with at least 4 rows of cells; vein R following curvature of wing margin nearly to wing apex; RS with 2 or 3 branches; MA and MP very close together; anal veins straight and parallel; MP with a basal branch; CUA extending as a submarginal vein nearly to wing



apex. Hind wing venation as in fore wing, but branches of RS irregular and crossveins less numerous and less regular. *Perm.*

*Jurina* ZALESSKY, 1929, p. 28 [*\*J. scutulata*; OD] [= *Anorthoneura* MARTYNOV, 1938c, p. 198, *nom. nud.*]. Crossveins of fore wing very numerous, close together, and straight. *Perm.*, USSR (European and Asian RSFSR). — FIG. 199, 1. *J. marginata* MARTYNOV, Asian RSFSR; fore wing,  $\times 5.5$  (Martynova, 1938c).

*Eoglosselytrum* MARTYNOVA, 1952a, p. 191 [*\*E. kondomense*; OD]. C and SC of fore wing fused; RS with 2 branches; posterior branch of MP simple; cells somewhat larger than in *Jurina*. Hind wing with cells more irregular than in fore wing. *Perm.*, USSR (Asian RSFSR). — FIG. 199, 6. *\*E. kondomense*; a, fore and b, hind wings,  $\times 9$  (Martynova, 1952a).

*Permoberothella* RIEK, 1953, p. 80 [*\*P. perplexa*; OD]. Little-known fore wing, with most cells irregular in shape, not with straight sides, as in *Jurina*. [Family position doubtful.] MARTYNOVA, 1952a. *Perm.*, Australia (New South Wales).

*Protojurina* MARTYNOVA, 1958, p. 75 [*\*P. cellulosa*; OD]. Little-known fore wing, similar to that of *Jurina* but with crossveins even closer together and cells of precostal area smaller. *Perm.*, USSR (Asian RSFSR).

*Surijoka* MARTYNOVA, 1958, p. 75 [*\*S. grandicella*; OD]. Little-known fore wing, similar to that of *Eoglosselytrum*, but RS with 3 branches. *Perm.*, USSR (Asian RSFSR).

### Family USKATELYTRIDAE

Martynova, 1952

[Uskatelytridae MARTYNOVA, 1952a, p. 190]

Precostal area of fore wing with a submarginal vein; vein RS with 2 to 4 branches. *Perm.*—*Jur.*

*Uskatelytron* MARTYNOVA, 1952a, p. 190 [*\*U. sibiricum*; OD]. Little-known fore wing; RS with 4 branches; crossveins numerous; anal area long. *Perm.*, USSR (Asian RSFSR). — FIG. 199, 7. *\*U. sibiricum*; fore wing,  $\times 3.5$  (Martynova, 1952a).

*Mesojurina* MARTYNOVA, 1943, p. 285 [*\*M. sogjutensis*; OD]. RS with 2 branches; crossveins not so numerous as in *Uskatelytron*. *Jur.*, USSR (Kirghiz). — FIG. 199, 4. *\*M. sogjutensis*; fore wing,  $\times 12$  (Martynova, 1943).

### Family UNCERTAIN

The genus described below, apparently belonging to the order Glosselytrodea, is too poorly known to permit family assignment.

*Polycytella* TILLYARD, 1922b, p. 460 [*\*P. triasica*; OD]. Little-known fore wing; crossveins very numerous over entire wing; MA and MP apparently very close together. [Type of family Polycytellidae MARTYNOVA, 1952a.] *Trias.*, Australia (Queensland).

## Order TRICHOPTERA

Kirby, 1815

[Trichoptera Kirby, 1815b, p. 88]

Small or moderate-sized insects, commonly known as caddis flies, usually with slender body. Antennae filiform, generally about as long as fore wings. Mouthparts mandibulate, but mandibles weakly formed or absent in some species; maxillae and labium normal; both pairs of palpi ordinarily well developed, terminal segments commonly modified. Prothorax small, meso- and metathorax well developed. Two pairs of membranous wings, fore pair having a somewhat heavier texture than hind pair; at rest wings held roof-wise over abdomen; hind wings generally shorter than fore wings, in some species possessing an expanded anal area. Fore wings, almost without exception, covered with hairs (micro- and macrotrichia), pubescence extending beyond wing margin as a fringe. Scales in certain wing areas in some. Wing venation in general similar to that of Mecoptera, but veins 2A and 3A of fore wing typically terminating on 1A, instead of directly on wing margin. In fore wing, SC usually long, not uncommonly with 1 or more veinlets leading to costal margin; R generally without branches and ordinarily terminating on costa; RS typically forked dichotomously, its two main branches simple or forked; M similarly formed; CUA generally deeply forked; CUP unbranched; 3 anal veins, 1A best developed, usually receiving termination of 2A, 2A usually receiving termination of 3A. Crossveins generally few and weakly developed. A crossvein between RS1+2 and RS3+4 (or branches of these veins) may close radial (discoidal) cell and a comparable crossvein between M1+2 and M3+4 may close median cell (see Fig. 203, *Electrodipteron*); presence or absence of these cross-

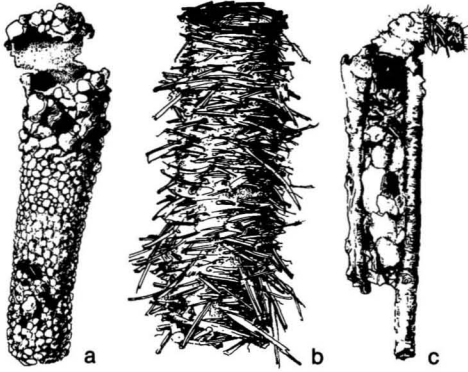


FIG. 200. Trichoptera, larval cases of recent genera; *a*, *Hesperophylax*, *b*, *Platycentropus*, and *c*, *Pycropsyche* (Orcutt, 1934).

veins, their locations, and shapes of radial and median cells diagnostic. Hind wing venation similar to that of fore wing in some, many displaying differences in branching of RS and M and in radial and median cells; anal veins better developed than in fore wing and not looped. Legs cursorial, generally long; tibiae ordinarily with apical and preapical spurs, typically arranged in pairs; tarsi with 5 segments. Abdomen with 9 or 10 distinct cerci and rarely with a prominent ovipositor. *Perm.*—*Holo.*

Eggs of Trichoptera are laid in or near water. The larvae are aquatic, some species occurring in rapidly flowing water and others in quiet ponds. Many larvae are active swimmers, but most are more sedentary and construct silken webs or cases composed of sand or plant debris fastened together by silk (Fig. 200, *a-c*). Most larvae possess a pair of terminal hooks by which they may be anchored to their webs or cases. Although many are carnivorous, most larvae appear to feed on vegetable material. Pupae are formed in cases similar to those of larvae.

The Trichoptera are clearly close relatives of the Lepidoptera. This relationship is indicated by the structure of the mouthparts and body in general as well as by the wing venation and occurrence of female heterogamety in both orders. The relationship between Tri-

choptera and Mecoptera is somewhat more remote, the similarities being chiefly in wing venation. Indications are that the Trichoptera and Lepidoptera arose from common mecopteroid stock.

Twenty-four existing families of the order are generally recognized (FISCHER, 1960, 1971), but several of these are small. The family classification is based on such diverse features as wing venation, antennae, tibial spurs, palpi, and ocelli. Grouping of families into two suborders on the basis of the maxillary palpi of males, which frequently has been done in the past, almost certainly does not represent actual evolution of the order. Convergence has obviously been most important in the history of caddis flies. The fossil record, although extending into the Permian, contributes little to our understanding of their evolution. Members of the Permian family Microptysmatidae have a more extensive branching of vein RS but otherwise show nothing remarkable. The Jurassic Necrotauliidae, except for development of the pterostigma and weak crossveins, closely resemble some existing genera. Several caddis larval cases are known from Tertiary deposits. Adults preserved in Baltic amber and described in detail by ULMER (1912) represent an essentially modern fauna.

#### Family MICROPTYSMATIDAE Martynova, 1958

[Microptysmatidae MARTYNOVA, 1958, p. 92]

Fore wing with vein SC joined by a distal crossvein to R; R forking distally; RS arising about one-quarter wing length from base, with 4 primary and 6 terminal branches. Hind wing unknown. *Perm.*

**Microptysma** MARTYNOVA, 1958, p. 92 [\**M. sibiricum*; OD]. Stem of M nearly straight; M4 coalesced with anterior branch of CUA. *Perm.*, USSR (Asian RSFSR).—FIG. 201, 1. \**M. sibiricum*; fore wing,  $\times 14$  (Martynova, 1958).

**Microptysmodes** MARTYNOVA, 1958, p. 93 [\**M. uralicus*; OD]. Stem of M strongly curved; M4 not joined with anterior branch of CUA. ROHDENDORF, 1962a. *Perm.*, USSR (European RSFSR).—FIG. 201, 4. \**M. uralicus*; fore wing,  $\times 12$  (Martynova, 1958).

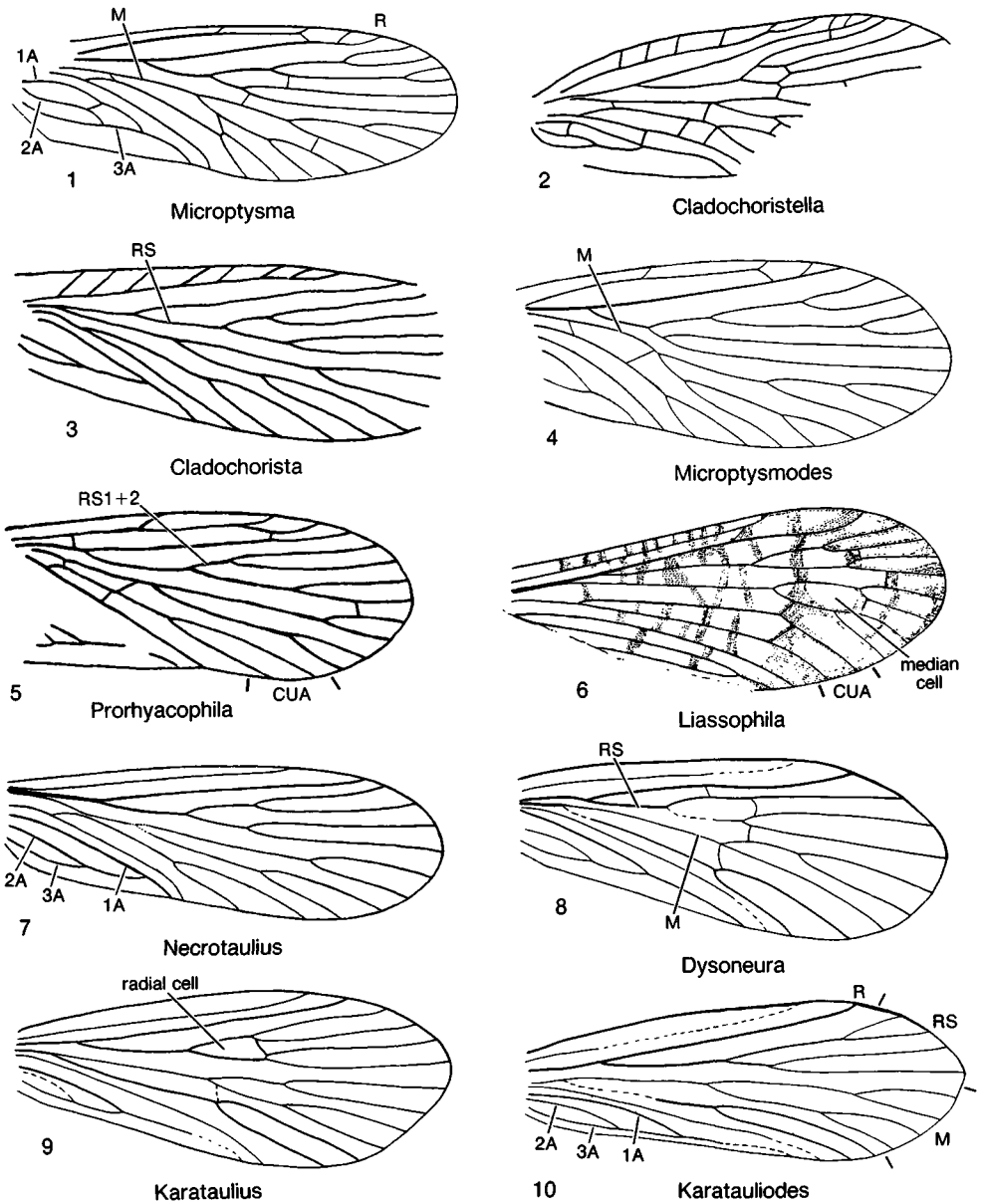


FIG. 201. Microptysmatidae, Cladochoristidae, Prorhyacophilidae, Liassophilidae, Necrotauliidae, and Dysoneuridae (p. 360-362).

**Family CLADOCHORISTIDAE**

**Riek, 1953**

[Cladochoristidae RIEK, 1953, p. 78]

Fore wing with veins RS and M with 4 branches; at least several crossveins in costal area. Hind wing little known. [Considered

by WILLMANN (1978) to belong to the ancestral stock of the Trichoptera and Lepidoptera.] *Perm.-Trias.*

**Cladochorista** TILLYARD, 1926e, p. 272 [*\*C. belmontensis*; OD]. Costal area of fore wing with numerous oblique veinlets. SUKATSheVA, 1973;

WILLMANN, 1979. *Perm.*, Australia (New South Wales); *Trias.*, USSR (Kirghiz).—FIG. 201,3. \**C. belmontensis*; fore wing,  $\times 7$  (Riek, 1953).  
**Cladochoristella** RIEK, 1955, p. 671 [\**C. bryani*; OD]. Costal area of fore wing with only 4 veinlets. *Trias.*, Australia (Queensland).—FIG. 201,2. \**C. bryani*; fore wing,  $\times 5.3$  (Riek, 1955).

### Family PRORHYACOPHILIDAE

Riek, 1955

[Prorhyacophilidae RIEK, 1955, p. 672]

Vein SC of fore wing with prominent distal fork and single veinlet to C; CUA with deep fork. Hind wing unknown. *Trias.*

**Prorhyacophila** RIEK, 1955, p. 673 [\**P. colliveri*; OD]. Fore wing with RS1+2 forking well before RS3+4. SUKATSheVA, 1973. *Trias.*, Australia (Queensland), USSR (Kirghiz).—FIG. 201,5. \**P. colliveri*; fore wing,  $\times 11$  (Riek, 1955).

### Family LIASSOPHILIDAE

Tillyard, 1933

[Liassophilidae TILLYARD, 1933, p. 551]

Fore wing with costal space narrow; complete series of veinlets from SC to costal margin; veins RS and M each with 4 branches; CUA very deeply forked, forking slightly basad of origin of RS. Hind wing unknown. *Jur.*

**Liassophila** TILLYARD, 1933, p. 56 [\**L. hydromanicoidea*; OD]. Fore wing with costal area with about 9 veinlets; crossveins between branches of RS and M1+2; median cell closed. *Jur.*, England. —FIG. 201,6. \**L. hydromanicoidea*; fore wing,  $\times 2.5$  (Tillyard, 1933).

### Family NECROTAULIIDAE

Handlirsch, 1906

[Necrotauliidae HANDLIRSCH, 1906b, p. 483]

Fore wing with vein SC long, extending into pterostigmal region; pterostigma variously developed; RS with 4 primary branches; M usually with 4, rarely 3 branches; crossveins weakly developed or absent. Hind wing little known; M with apparently only 3 branches; anal veins not joined. *Jur.*

**Necrotaulius** HANDLIRSCH, 1906b, p. 483 [\**N. dobertinensis*; SD TILLYARD, 1933, p. 60]. Very small Trichoptera. Fore wing slender, with rounded apex; branches of RS1+2 and RS3+4 nearly equal in length; fork of CUA at about same level

as first fork of RS. SUKATSheVA, 1973. *Jur.*, England, Europe (Germany), USSR (Kirghiz). —FIG. 201,7. *N. westwoodi* TILLYARD, England; fore wing,  $\times 13$  (Tillyard, 1933).  
**Epididontus** HANDLIRSCH, 1939, p. 98 [\**E. geinitzianus*; OD]. Fore wing: M with 3 branches; CUA with very shallow fork. [Family assignment doubtful.] *Jur.*, Europe (Germany).

**Karatauliodes** SUKATSheVA, 1968, p. 176 [\**K. minutus*; OD]. Fore wing similar to that of *Necrotaulius*, but CUP much longer; basal part of 3A and portions fused with 2A and 1A forming straight line. [Possibly a synonym of *Necrotaulius*.] *Jur.*, USSR (Kazakh). —FIG. 201,10. \**K. minutus*; fore wing,  $\times 20$  (Sukatsheva, 1968).

**Karataulius** SUKATSheVA, 1968, p. 175 [\**K. aeternus*; OD]. Fore wing much as in *Necrotaulius*, but radial cell closed. *Jur.*, USSR (Kazakh). —FIG. 201,9. \**K. aeternus*; fore wing,  $\times 8.6$  (Sukatsheva, 1968).

**Liadoptilia** HANDLIRSCH, 1939, p. 98 [\**L. misera*; OD]. Fore wing: RS3+4 with a very shallow fork; M with 3 branches. *Jur.*, Europe (Germany).

**Liadotaulius** HANDLIRSCH, 1939, p. 97 [\**L. acutipennis*; OD]. Fore wing as in *Necrotaulius*, but M4 connected to CUA; 1A terminating on CUP. *Jur.*, Europe (Germany).

**Metarchitaulius** HANDLIRSCH, 1939, p. 96 [\**M. longus*; OD]. Fore wing little known, slender; apex rounded; RS with 4 branches, M with 3. *Jur.*, Europe (Germany).

**Palaeotaulius** HANDLIRSCH, 1939, p. 95 [\**P. vicinus*; OD]. Fore wing with broad costal area; R deeply forked; RS and M each with 4 branches. *Jur.*, Europe (Germany).

**Pararchitaulius** HANDLIRSCH, 1939, p. 95 [\**P. ovalis*; OD]. Fore wing with broad costal area; RS with 4 branches, M apparently with 3; CUA deeply forked. *Jur.*, Europe (Germany).

**Parataulius** HANDLIRSCH, 1939, p. 96 [\**P. jurasicus*; OD]. SC of fore wing with prominent veinlet to C; strong crossvein between RS3 and RS4 and between RS5 and M1. *Jur.*, Europe (Germany).

**Phryganeidium** WESTWOOD, 1854, p. 396 [\**P. pytho*; OD]. Little-known fore wing; RS with 4 branches, M with 3. *Jur.*, Europe (Germany).

### Family DYSONEURIDAE

Sukatsheva, 1968

[Dysoneuridae SUKATSheVA, 1968, p. 178]

Fore wing as in Necrotauliidae, but both veins RS and M with only 3 branches. *Jur.*

**Dysoneura** SUKATSheVA, 1968, p. 178 [\**D. trifurcata*; OD]. Fore wing with first fork of M far distal of first fork of RS. *Jur.*, USSR (Kazakh). —FIG. 201,8. \**D. trifurcata*; fore wing,  $\times 10$  (Sukatsheva, 1968).

### Family PROSEPIDIDONTIDAE Handlirsch, 1920

[Prosepididontidae HANDLIRSCH, 1920, p. 200]

Fore wing with very wide costal area; vein SC short, terminating slightly beyond mid-wing; R without fork; RS with 2 primary and 3 terminal branches; M with 4 branches; CUA deeply forked, apparently arising from stem M. Hind wing unknown. *Jur.*

*Prosepididontus* HANDLIRSCH, 1920, p. 200 [\**P. calopteryx*; OD]. Fore wing with fork of M1+2 very shallow and marginal, at wing apex. HANDLIRSCH, 1939. *Jur.*, Europe (Germany).—FIG. 202,3. \**P. calopteryx*; fore wing,  $\times 5.3$  (Handlirsch, 1920).

### Family RHYACOPHILIDAE Stephens, 1835

[Rhyacophilidae STEPHENS, 1835, p. 154]

Antennae about equal in length to wings or slightly longer, generally slender; tibial spurs variable but middle and hind tibiae each with 4 spurs; hind tibia very long. Radial and median cells open in both wings. Larvae in moving, clear water, without portable cases. *Cret.—Holo.*

*Rhyacophila* PICTET, 1834, p. 181. ULMER, 1912; ROSS, 1944; BOTOSANEANU & WICHARD, 1983. *Cret.*, USSR (Asian RSFSR); *Oligo.*, Europe (Baltic)—*Holo.*

### Family GLOSSOSOMATIDAE Wallengren, 1891

[Glossosomatidae WALLENGREN, 1891, p. 163]

Similar to Rhyacophilidae, but radial cell in fore wing closed. Larvae in portable cases. *Oligo.—Holo.*

*Glossosoma* CURTIS, 1834, p. 216. *Holo.*

*Electragapetus* ULMER, 1912, p. 33 [\**E. scitulus*; OD]. Similar to *Catagapetus* (recent), but SC about as long as R and parallel to it; RS1+2 forked. *Oligo.*, Europe (Baltic).—FIG. 202,4. \**E. scitulus*; hind wing,  $\times 16$  (Ulmer, 1912).

### Family HYDROBIOSIDAE Ulmer, 1905

[Hydrobiosidae ULMER, 1905b, p. 72]

Antennae slender, about as long as fore wings, basal segment thick; ocelli present; venation irregular, commonly with accessory crossveins. *Cret.—Holo.*

*Hydrobiosis* McLACHLAN, 1870, p. 206. *Holo.*  
*Palaeohydrobiosis* BOTOSANEANU & WICHARD, 1983, p. 191 [\**P. siberambra*; OD]. Fore wing similar to that of *Hydrobiosis*, but RS forked basally, radial cell open, and anal area broad. *Cret.*, USSR (Asian RSFSR).

### Family ELECTRALBERTIDAE Botosaneanu & Wichard, 1983

[Electralbertidae BOTOSANEANU & WICHARD, 1983, p. 192]

Small insects, without ocelli; antennae shorter than fore wing. Fore wing elongate; vein RS1+2 not forked. Hind wing only slightly narrower than fore wing. *Cret.*

*Electralberta* BOTOSANEANU & WICHARD, 1983, p. 193 [\**E. cretatica*; OD]. With the characters of the family. *Cret.*, Canada (Alberta).

### Family PHILOPOTAMIDAE Stephens, 1829

[Philopotamidae STEPHENS, 1829a, p. 316]

Antennae stout, relatively short; ocelli present; tibial spur formula 2,4,4. Wing fringes not unusually long. Fore wing with radial and median cells closed. Hind wing with radial cell closed, median cell open. Larvae in silken nets, in rapidly flowing streams. *Cret.—Holo.*

*Philopotamus* STEPHENS, 1829a, p. 317. ULMER, 1912; KIMMINS, 1950. *Oligo.*, Europe (Baltic)—*Holo.*

*Dolophilus* McLACHLAN, 1868, p. 301. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

*Electracanthinus* ULMER, 1912, p. 54 [\**E. klebsi*; OD]. Similar to *Dolophilus*, but RS1+2 of hind wing more deeply forked. COCKERELL, 1916c. *Cret.*, USA (Kentucky); *Oligo.*, Europe (Baltic).—FIG. 202,7. \**E. klebsi*, *Oligo.*; hind wing,  $\times 9$  (Ulmer, 1912).

*Prophiloptamus* SUKATSHEVA, 1973, p. 101 [\**P. asiaticus*; OD]. Apparently similar to *Electracanthinus*. RS of fore wing with 4 branches, but M with only 3. *Trias.*, USSR (Kirghiz).

### Family HYDROPTILIDAE Stephens, 1835

[Hydroptilidae STEPHENS, 1835, p. 148]

Antenna shorter than fore wing; wings long, narrow, usually with acute apex, very long fringes; veins weakly formed, commonly reduced; tibial spurs variable. Larvae with portable cases, at least in late instars. *Oligo.—Holo.*

- Hydroptila** DALMON, 1819, p. 125. *Holo.*  
**Agraylea** CURTIS, 1834, p. 217. WESTWOOD, 1840; ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*  
**Allotrichia** McLACHLAN, 1880, p. 508. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*  
**Electrotrichia** ULMER, 1912, p. 42 [*\*E. subtilis*; OD]. Similar to *Allotrichia*, but RS1+2 unbranched in fore wing; wings very pointed. *Oligo.*, Europe (Baltic).  
**Palaeagapetus** ULMER, 1912, p. 35. FISCHER, 1970. *Oligo.*, Europe (Baltic)—*Holo.*

### Family STENOPSYCHIDAE

Martynov, 1924

[Stenopsychidae MARTYNOV, 1924b, p. 19]

Similar to Philopotamidae, but antenna longer than fore wing; tibial spur formula 3,4,4; hind wing with expanded anal lobe. *Oligo.*—*Holo.*

- Stenopsyche** McLACHLAN, 1866, p. 264. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

### Family POLYCENTROPIDAE

Ulmer, 1906

[*nom. correct.* BRUES & MELANDER, 1915, p. 47, *pro* Polycentropidae ULMER, 1906, p. 83]

Antenna stout; length variable, but only a little shorter or longer than fore wing; tibial spur formula 3,4,4; ocelli absent. Fore wing with radial and median cells closed; all main branches of veins RS and M forked. Hind wing with radial cell open or closed. Larvae usually in moving water, with silken nets. *Cret.*—*Holo.*

- Polycentropus** CURTIS, 1835, p. 544. SCUDDER, 1890; COCKERELL, 1907c. *Oligo.*, USA (Colorado)—*Holo.*

**Archaeoneureclipsis** ULMER, 1912, p. 69 [*\*A. fortis*; OD]. Similar to *Phylocentropus*, but forking of RS1+2 of fore wing more acute; radial cell slender. *Oligo.*, Europe (Baltic).

**Archaeopolycentra** BOTOSANEANU & WICHARD, 1983, p. 198 [*\*A. zberikbini*; OD]. Little-known genus. Body of male similar to that of *Polycentropus*, but R of fore wing joining costal margin at level of crossvein closing radial cell; radial cell very short; medial cell apparently open; oblique crossvein connecting the apex of radial cell to M1. *Cret.*, USSR (Asian RSFSR).

**Holocentropus** McLACHLAN, 1878, p. 400. ULMER, 1912; BOTOSANEANU & WICHARD, 1983. *Cret.*, USSR (Asian RSFSR); *Oligo.*, Europe (Baltic)—*Holo.*

**Neureclipsis** McLACHLAN, 1864, p. 30. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

**Nyctiophylacodes** ULMER, 1912, p. 172 [*\*N. curtula*; OD]. Similar to *Nyctiophylax*, but radial cell of hind wing as large as that of fore wing. *Oligo.*, Europe (Baltic).—FIG. 202.8. *\*N. curtula*; hind wing,  $\times 12$  (Ulmer, 1912).

**Nyctiophylax** BRAUER, 1865, p. 419. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

**Phylocentropus** BANKS, 1907, p. 130. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

**Plectrocnemia** STEPHENS, 1836, p. 168. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

**Tinodes** CURTIS, 1834, p. 216. SCUDDER, 1890; COCKERELL, 1907c. *Oligo.*, USA (Colorado)—*Holo.*

### Family PSYCHOMYIDAE

Curtis, 1835

[Psychomyidae CURTIS, 1835 in CURTIS, 1823–1840, pl. 561]

Antenna stout, not longer than fore wing; tibial spur formula 2,4,4 or 3,4,4; ocelli absent. Wing fringes not unusually long. Fore wing with radial cell short, usually about one-quarter length of vein RS; median cell at least twice as long as radial cell. Larvae either free or with cases. *Oligo.*—*Holo.*

**Psychomyia** PICTET, 1834, p. 222. ULMER, 1912. *Holo.*

**Archaeotinodes** ULMER, 1912, p. 178 [*\*Rhyacophila prisca* PICTET in PICTET & HAGEN, 1856, p. 116; OD]. Similar to *Ecnomus* (recent), but radial cell of hind wing closed; M1+2 forked. [Family position uncertain.] BOTOSANEANU & WICHARD, 1983. *Oligo.*, Europe (Baltic).—FIG. 202.9. *A. grossa* (HAGEN); hind wing,  $\times 7$  (Ulmer, 1912).

**Lype** McLACHLAN, 1878, p. 409. PITON, 1936a; ROSS, 1944. *Oligo.*, Europe (Baltic)—*Holo.*

### Family HYDROPSYCHIDAE

Curtis, 1835

[Hydropsychidae CURTIS, 1835 in CURTIS, 1823–1840, pl. 544]

Antennae usually slender, at least as long as wings; ocelli absent; terminal segment of maxillary palpus multiarticulate, longer than all others combined. Fore wing with radial cell short, not more than half length of its stem, vein RS; median cell slightly longer than radial. Larvae in rapidly flowing water, usually forming silken net attached to stones or wood. *Oligo.*—*Holo.*

**Hydropsyche** PICTET, 1834, p. 199. COCKERELL, 1909h; ULMER, 1912; ROSS, 1944. *Oligo.*, Europe (Baltic), USA (Colorado)—*Holo.*

**Diplectrona** WESTWOOD, 1840, p. 49. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

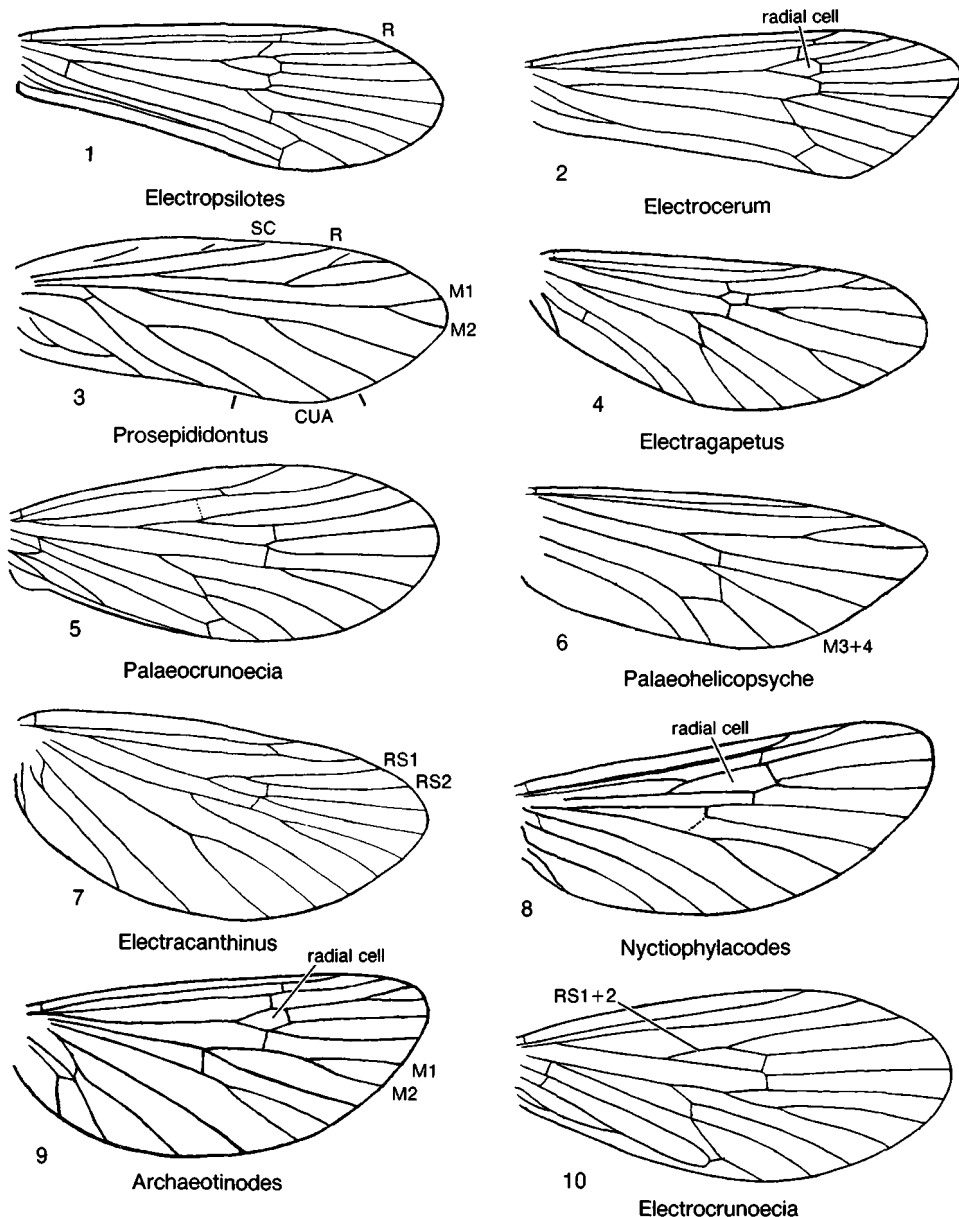


FIG. 202. Prosepidodontidae, Glossosomatidae, Philopotamidae, Polycentropodidae, Psychomyidae, Odontoceridae, Lepidostomatidae, and Helicopsychidae (p. 363–368).

**Electrodipletrona** ULMER, 1912, p. 216 [*\*E. decipiens*; OD]. Similar to *Dipletrona*, but last segment of maxillary palpus longer than third and fourth together. *Oligo.*, Europe (Baltic).—

FIG. 203. *\*E. decipiens*; *a*, fore and *b*, hind wings,  $\times 5.5$  (Ulmer, 1912).

**Potamyia** BANKS, 1900, p. 259. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

**Family TAYMYRELECTRONIDAE**  
**Botosaneanu & Wichard, 1983**

[Taymyrelectronidae BOTOSANEANU & WICHARD, 1983, p. 202]

Male: ocelli absent; radial and median cells of fore wing absent; area between veins RS

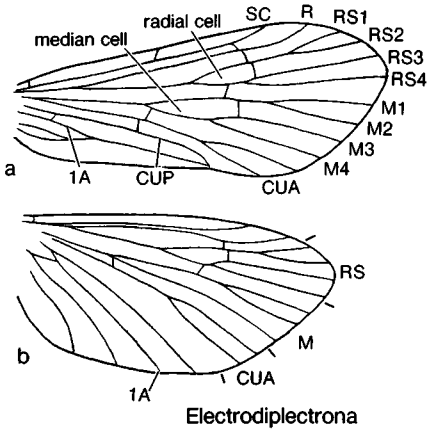


FIG. 203. Hydropsyichidae (p. 365).

and M unusually large; CUP and anal veins absent. *Cret.*

**Taymyrelectron** BOTOSANEANU & WICHARD, 1983, p. 202 [*\*T. sukatshevae*; OD]. With the characters of the family. *Cret.*, USSR (Asian RSFSR).

### Family PHRYGANEIDAE

Leach, 1815

[*nom. correct.* BURMEISTER, 1838 in BURMEISTER, 1838–1839, p. 922, *pro* Phryganides LEACH, 1815, p. 136]

Antenna not longer than fore wing, generally shorter; legs usually stout; tibial spur formula usually 2,4,4. Fore wing with radial cell closed and at least as long as stem of vein RS; RS1+2 forking before distal end of radial cell. Larvae in quiet water, larval cases of plant material. *Eoc.*–*Holo.*

**Phryganea** LINNÉ, 1758, p. 547. CURTIS, 1836 in CURTIS, 1823–1840; ULMER, 1912; FISCHER, 1963. *Eoc.*, Europe (Denmark); *Oligo.*, Europe (Germany), USA (Colorado); *Mio.*, Europe (Germany, France), USSR (Asian RSFSR)–*Holo.*

**Oligotricha** RAMBUR, 1842, p. 472. STATZ, 1936a. *Oligo.*, Europe (Germany)–*Holo.*

### Family MOLANNIDAE

Wallengren, 1891

[Molannidae WALLENGREN, 1891, p. 116]

Antenna at least as long as fore wing; tibial spur formula 2,4,4. Wings usually very hairy; fore wing with open radial cell and vein RS

usually touching M1+2 for short distance. Larval cases of sand. *Oligo.*–*Holo.*

**Molanna** CURTIS, 1834, p. 214. ULMER, 1912. *Oligo.*, Europe (Baltic)–*Holo.*

**Molannodes** McLACHLAN, 1866, p. 178. ULMER, 1912. *Oligo.*, Europe (Baltic)–*Holo.*

### Family CALAMOCERATIDAE

Ulmer, 1905

[Calamoceratidae ULMER, 1905, p. 80]

Antenna longer than fore wing, in some species only slightly so; fore tibial spurs 2, middle tibial spurs 4, hind tibial spurs variable (2 to 4). Fore wing generally broad; vein R ending on RS1; radial cell about as long as its stem, RS. Hind wing much shorter than fore. Larval cases of plant fragments. *Oligo.*–*Holo.*

**Calamoceras** BRAUER, 1865, p. 417. *Holo.*

**Ganonema** McLACHLAN, 1866, p. 253 [*\*G. pallicorne*; OD]. ULMER, 1912. *Oligo.*, Europe (Baltic).

**Georgium** FISCHER, 1964, p. 106. ULMER, 1912. *Oligo.*, Europe (Baltic)–*Holo.*

### Family ODONTOCERIDAE

Wallengren, 1891

[Odontoceridae WALLENGREN, 1891, p. 12]

Antennal length variable, commonly very long; ocelli absent; tibial spur formula generally 2,4,4. Fore wing typically with radial cell longer than its stem, vein RS; median cell open; venation variable in genera and commonly also in sexes. Larval cases of fine sand. *Oligo.*–*Holo.*

**Odontocerus** LEACH, 1815, p. 136. *Holo.*

**Electrocera** ULMER, 1912, p. 243 [*\*E. pedestre*; OD]. Similar to *Marilia*, but radial cell of both wings much shorter. *Oligo.*, Europe (Baltic). —FIG. 202.2. *\*E. pedestre*; fore wing,  $\times 5.5$  (Ulmer, 1912).

**Electropsilotes** ULMER, 1912, p. 246 [*\*E. rara*; OD]. Similar to *Marilia*, but R terminating on costal margin. *Oligo.*, Europe (Baltic). —FIG. 202.1. *\*E. rara*; fore wing,  $\times 4.6$  (Ulmer, 1912).

**Marilia** MÜLLER, 1880, p. 127. ULMER, 1912; MOSELY & KIMMINS, 1953. *Oligo.*, Europe (Baltic)–*Holo.*

**Phenacopsyche** COCKERELL, 1909h, p. 385 [*\*P. vexans*; OD]. Little-known fore wing, with long radial cell. [Family assignment doubtful.] *Oligo.*, USA (Colorado).



## Family LEPTOCERIDAE

Leach, 1815

[*nom. correct.* STEPHENS, 1829a, p. 319, *pro* Leptocerides LEACH, 1815, p. 136]

Antenna very long and slender, 2 or 3 times as long as fore wing; tibial spurs variable. Fore wing long and narrow; radial cell closed, median cell open; veins RS3+4 and M1+2 without forks. Larval cases usually of fine sand, rarely of detritus. *Cret.*—*Holo.*

*Leptocerus* LEACH, 1815, p. 136. SCUDDER, 1890; THÉOBALD, 1937a. *Oligo.*, USA (Colorado), Europe (France)—*Holo.*

*Erotesis* McLACHLAN, 1877, p. 325. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

*Praeathripsodes* BOTOSANEANU & WICHARD, 1983, p. 209 [*\*P. jantar*; OD]. Little-known genus, based on incomplete female. Both RS and M with 3 branches, those of M very long. *Cret.*, USSR (Asian RSFSR).

*Setodes* RAMBUR, 1842, p. 515. ULMER, 1912; MILNE, 1934. *Oligo.*, Europe (Baltic)—*Holo.*

*Triplectides* KOLENATI, 1858, p. 169. ULMER, 1912; MOSELY, 1936. *Oligo.*, Europe (Baltic)—*Holo.*

## Family GOERIDAE Ulmer, 1903

[*nom. transl.* ROSS, 1944, p. 256, *ex* Goerinae ULMER, 1903, p. 81]

Similar to Lepidostomatidae, but vein M1+2 forked in hind wing. *Oligo.*—*Holo.*

*Goera* STEPHENS, 1829, p. 28. WESTWOOD, 1840; ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

*Lithax* McLACHLAN, 1876, p. 242. ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

*Silo* CURTIS, 1830, p. 136. WESTWOOD, 1840; ULMER, 1912. *Oligo.*, Europe (Baltic)—*Holo.*

## Family LIMNOPHILIDAE

Rambur, 1842

[*nom. correct.* BRAUER, 1857, p. 45, *pro* Limnophilides RAMBUR, 1842, p. 470]

Antenna about as long as fore wing; tibial spurs variable. Fore wing generally broad; radial cell long, median cell open; vein M with 3 branches. Hind wing with expanded anal area. Larval cases of sand or vegetable debris. *Eoc.*—*Holo.*

*Limnophilus* LEACH, 1815, p. 136 [= *Miopsyche* CARPENTER, 1931d, p. 320 (type, *M. alexanderi*)]. COCKERELL, 1920c, 1925g, 1926b. *Eoc.*,

USA (Colorado); *Mio.*, Burma, USSR (Asian RSFSR), USA (Washington)—*Holo.*

*Chilostigma* McLACHLAN, 1876, p. 187. BRADLEY, 1924. *Eoc.*, USA (Wyoming)—*Holo.*

*Tricheopteryx* COCKERELL, 1927f, p. 184, *nom. subst. pro* *Eopteryx* COCKERELL, 1907c, p. 608, *non* MEYER, 1887 [*\*Eopteryx florissantius* COCKERELL; OD]. Fore wing as in *Platyphylax* (recent), but R straight and radial cell very long. *Oligo.*, USA (Colorado).

## Family LEPIDOSTOMATIDAE

Ulmer, 1903

[*nom. transl.* ROSS, 1944, p. 258, *ex* Lepidostomatinae ULMER, 1903, p. 89]

Antenna about as long as fore wing; tibial spur formula generally 2,4,4. Fore wing of male bearing thick hairs, commonly broad and bearing scales; M3+4 without fork; venation variable in genera and often different in sexes. Hind wing with M1+2 and M3+4 unbranched. Larval cases of sand or plant fragments. *Oligo.*—*Holo.*

*Lepidostoma* RAMBUR, 1842, p. 493. *Holo.*

*Archaeocrunoecia* ULMER, 1912, p. 288 [*\*A. tenuicornis*; SD FISCHER, 1970, p. 32]. Similar to *Crunoecia* (recent). First antennal segment much longer than head; antenna about 1.5 times as long as fore wing; subapical outer spur of middle tibia minute. *Oligo.*, Europe (Baltic).

*Electraulax* ULMER, 1912, p. 296 [*\*E. breviscula*; SD FISCHER, 1971, p. 83]. Fore wing with RS4 arising very close to origin of M1. *Oligo.*, Europe (Baltic).

*Electrocrunoecia* ULMER, 1912, p. 293 [*\*E. turbata*; OD]. Similar to *Archaeocrunoecia*, but subapical outer spur of middle tibia normal in size; RS1+2 of fore wing forking before end of radial cell. *Oligo.*, Europe (Baltic). — FIG. 202,10. *\*E. turbata*; fore wing,  $\times 10$  (Ulmer, 1912).

*Maniconeurodes* ULMER, 1912, p. 302 [*\*M. conventzi*; OD]. Similar to *Electrocrunoecia*, but fork of RS1+2 distal to radial cell. *Oligo.*, Europe (Baltic).

*Palaeocrunoecia* ULMER, 1912, p. 282 [*\*P. crenata*; SD FISCHER, 1970, p. 70]. Similar to *Crunoecia* (recent) but with first antennal segment shorter. *Oligo.*, Europe (Baltic). — FIG. 202,5. *\*P. crenata*; fore wing,  $\times 11$  (Ulmer, 1912).

*Palaeolepidostoma* ULMER, 1912, p. 297 [*\*Trichostomum proavum* HAGEN in PICTET & HAGEN, 1856, p. 103; OD]. Similar to *Palaeocrunoecia*, but first antennal segment much longer than head; antenna only about as long as fore wing. *Oligo.*, Europe (Baltic).

## Family BRACHYCENTRIDAE

Ulmer, 1903

[*nom. transl.* Ross, 1944, p. 260, *ex* Brachycentrinae ULMER, 1903, p. 85]

Similar to Lepidostomatidae, but middle tibia with 2 or 3 spurs. *Oligo.-Holo.*

**Brachycentrus** CURTIS, 1834, p. 215. ULMER, 1912.

*Oligo.*, Europe (Baltic)-*Holo.*

**Micrasema** McLACHLAN, 1876, p. 259. ULMER, 1912. *Oligo.*, Europe (Baltic)-*Holo.*

## Family BERAEEIDAE

Wallengren, 1891

[Beraeidae WALLENGREN, 1891, p. 111]

Antenna about as long as fore wing; tibial spur formula 2,2,4. Wings very hairy. Fore wing generally oval; vein RS touching M1+2 for a short distance. Larval cases of sand. *Oligo.-Holo.*

**Beraea** STEPHENS, 1833, p. 118. *Holo.*

**Bereodes** EATON, 1867, p. 400. COCKERELL, 1921d; FISCHER, 1969. *Oligo.*, England, Europe (Baltic)-*Holo.*

## Family HELICOPSYCHIDAE

Ulmer, 1906

[*nom. transl.* Ross, 1944, p. 266, *ex* Helicopsychinae ULMER, 1906, p. 104]

Antenna not longer than fore wing. Fore wing with radial cell closed, long; veins RS1+2 and M3+4 generally with forks. Hind wing considerably shorter and smaller than fore wing; radial cell open. Larval cases of sand. *Oligo.-Holo.*

**Helicopsyche** VON SIEBOLD, 1856, p. 38. ULMER, 1912; FLINT, 1964. *Oligo.*, Europe (Baltic)-*Holo.*

**Electrohelicopsyche** ULMER, 1912, p. 310 [*\*E. taeniata*; OD]. Fore wing as in *Helicopsyche*, but radial cell very long and with very short stem; RS3+4 arising near origin of RS. *Oligo.*, Europe (Baltic).

**Palaeohelicopsyche** ULMER, 1912, p. 308 [*\*P. serricornis*; OD]. Similar to *Helicopsyche*, but M3+4 of hind wing unbranched. *Oligo.*, Europe (Baltic).—FIG. 202,6. *\*P. serricornis*; hind wing,  $\times 11$  (Ulmer, 1912).

## Family UNCERTAIN

The following genera, apparently belonging to the order Trichoptera, are too poorly

known to permit family assignment. Included also are fossil caddis cases, which are very common in some deposits. For many years the collective group names, *Indusia* (BOSC, 1803) and *Folindusia* (BERRY, 1927), have been used for these fossil cases, but recently SUKATSHEVA (1982), in a review of the historical development of the Trichoptera, has added many other generic names. These are not included in the present account.

**Adelomyia** ULMER, 1912, p. 331 [*\*A. exularis*; OD]. Fore wing with RS3+4 and M1+2 unbranched; radial cell open; M dividing very near base of wing; tibial spur formula 2,2,4. *Oligo.*, Europe (Baltic).

**Archiptilia** HANDLIRSCH, 1939, p. 97 [*\*A. ovata*; OD]. Fore wing broad and oval; SC short, ending slightly beyond midwing; RS and M with 4 branches. [Probably represents an undescribed family.] *Jur.*, Europe (Germany).

**Aulacomyia** ULMER, 1912, p. 321 [*\*A. infuscata*; OD]. Fore wing with RS3+4 unbranched; M1+2 very long, arising near wing base, unbranched; tibial spur formula of male 0,4,4; antenna as long as fore wing. *Oligo.*, Europe (Baltic).

**Calamodontus** BOTOSANEANU & WICHARD, 1983, p. 206 [*\*C. grandaevus*; OD]. Little-known genus, apparently related to the recent Calamoceratidae and Odontoceridae. R of fore wing not merging with RS1 but joined to it by a crossvein near fork of RS1+2; radial and median cells closed. *Cret.*, USSR (Asian RSFSR).

**Derobrochus** SCUDDER, 1885b, p. 779 [*\*D. frigescens*; OD]. Little-known trichopteron, possibly belonging to the Polycentropodidae. SCUDDER, 1890. *Oligo.*, USA (Colorado).

**Folindusia** BERRY, 1927, p. 1 [*\*F. urilcoxiana*; OD]. Larval cases composed mainly of leaf fragments, not referable to established family or genus. BERRY, 1928. *Eoc.*, USA (Tennessee); *Mio.*, USA (Washington).

**Indusia** BOSC, 1803, p. 397 [*\*I. tubulosa*; OD]. Larval cases composed mainly of pebbles and not referable to established family or genus. SCUDDER, 1890; COCKERELL, 1910c, 1924b, 1925g; FISCHER, 1968. *Eoc.*, USA (Colorado, Wyoming); *Oligo.*, USA (Colorado), Europe (France); *Mio.*, Asia (Mongolia), USSR (Asian RSFSR).

**Mesotrichopteridium** HANDLIRSCH, 1906b, p. 485 [*\*M. pusillum*; SD FISCHER, 1960, p. 4]. Fore wing with costal area very narrow; pterostigma well developed; RS with 4 branches, M with 3. [Possibly a synonym of *Phryganeidium*.] *Jur.*, Europe (Germany).

**Metatrichopteridium** HANDLIRSCH, 1939, p. 98

- [\**M. confusum*; OD]. Little-known wing; RS with 4 branches, M with 3. *Jur.*, Europe (Germany).
- Nannotrichopteron** HANDLIRSCH, 1906b, p. 486 [\**N. gracile*; OD]. Fore(?) wing very broad; SC short; RS with 4 branches. [Ordinal position doubtful.] *Jur.*, Europe (Germany).
- Ocnertes** OPPENHEIM, 1885, p. 347 [\**O. macroceraticus*; OD]. Little-known insect with very small wings. STATZ, 1936a. [Possibly a pupa.] *Oligo.*, Europe (Germany).
- Ogmomyia** ULMER, 1912, p. 333 [\**O. cuspidata*; OD]. Fore wing with RS arising well before midwing, unbranched; radial cell closed, very long; M1+2 unbranched; tibial spur formula 2,4,4. *Oligo.*, Europe (Baltic).
- Paratrichopteridium** HANDLIRSCH, 1906b, p. 486 [\**P. areatum*; OD]. Hind(?) wing broad; RS with 4 branches, M with 3; radial cell closed. [Probably representing an undescribed family.] *Jur.*, Europe (Germany).
- Perissomyia** ULMER, 1912, p. 328 [\**P. sulcata*; OD]. Antenna twice as long as fore wing, very thin. Fore wing with RS1+2 and RS3+4 forked; radial cell closed; M1+2 unbranched. Hind wing with radial cell open. FISCHER, 1969. *Oligo.*, Europe (Baltic).
- Pseudoberaeodes** ULMER, 1912, p. 323 [\**P. mira*; OD]. Antenna not longer than fore wing, its first segment as long as head; fore wing with RS1+2 and M1+2 unbranched; tibial spur formula of male 2,2,4. *Oligo.*, Europe (Baltic).
- Pseudorthophlebia** HANDLIRSCH, 1906b, p. 485 [\**P. platyptera*; OD]. Fore wing very broad; SC short; pterostigma large; RS with 5 branches, M with 2. *Jur.*, Europe (Germany).
- Sphaleropalpus** ULMER, 1912, p. 318 [\**S. pumicatus*; OD]. Fore wing with RS1+2 unbranched; RS3+4 forking from radial cell; radial cell long. Tibial spur formula 2,4,4. *Oligo.*, Europe (Baltic).
- Stenoptilomyia** ULMER, 1912, p. 314 [\**Sericostoma hyalinum* HAGEN in PICTET & HAGEN, 1856, p. 106]. Antenna at least as long as fore wing; fore wing with RS3+4 unbranched, radial cell long, RS1+2 forking after radial cell; tibial spur formula of male apparently 2,2,2. *Oligo.*, Europe (Baltic).
- Tipulidites** WIELAND, 1925, p. 25 [\**T. affinis*; OD]. Small wing fragment with closed radial cell. WIELAND, 1926. *Trias.*, South America (Argentina).
- Trichopterella** COCKERELL, 1924b, p. 140 [\**T. torta*; OD]. Little-known wing. *Cret.*, Asia (Mongolia).
- Trichopteridium** GEINITZ, 1880, p. 528 [\**T. gracile*; OD]. Little-known hind(?) wing; RS arising near wing base. HANDLIRSCH, 1906b. [Ordinal position doubtful.] *Jur.*, Europe (Germany).

## Order LEPIDOPTERA

### Linné, 1758

[Lepidoptera LINNÉ, 1758, p. 458]

Very small to very large insects, commonly known as moths, skippers, and butterflies. Antennae generally much shorter than fore wing, usually with partial scale covering; filiform but often modified (clubbed, serrate, or pectinate). Mouthparts of adults diverse but most commonly haustellate. Mandibles present in more primitive suborders (Zeugloptera and Dacnonypha) but entirely absent in the great majority of Lepidoptera. Maxillae also more generalized in these primitive suborders but extensively modified in others, the laciniae being vestigial or absent and the galeae typically elongate and joined together to form a tubular proboscis, the haustellum. Maxillary palpi usually well developed, with diverse segmentation and commonly with a covering of scales. Labium usually small but palpi prominent. Prothorax small and weakly sclerotized; mesothorax well developed; metathorax somewhat smaller than the mesothorax, especially in suborder Ditrysia. Fore and hind wings membranous, similar to one another in the Zeugloptera and Dacnonypha, but different in size and venation in most other Lepidoptera. Both wing surfaces covered with overlapping scales, which may contain pigments or produce iridescence by interference. Basic venational pattern in some Zeugloptera and Dacnonypha as in Trichoptera (Fig. 204,1): veins SC and R with 2 branches, RS with 4 branches, and M with 3 branches; CUP present and anal veins commonly looped distally. Venational pattern in the Ditrysia reduced by coalescence or loss of veins, with many modifications occurring independently in several superfamilies and also independently in fore and hind wings. In the more primitive Ditrysia (e.g., Cossidae), separate radial and medial areas present in proximal half of fore wings (Fig. 204,2); in more specialized families (e.g., Nymphalidae), proximal parts of veins RS3+4 and M3 lost, resulting in the formation of a

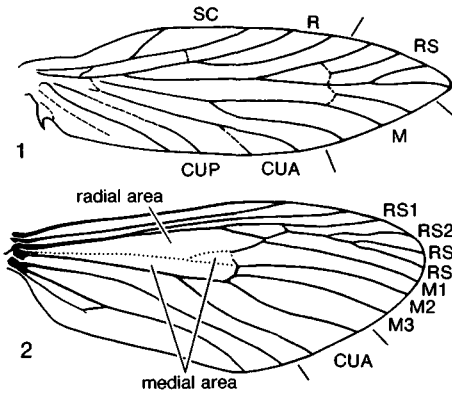


FIG. 204. Wing venation in the Lepidoptera.—  
1. Generalized wing venation of the suborder Zeugloptera, family Micropterygidae (*Sabatina*); diagram of fore wing (after CSIRO, 1970).—  
2. Modified wing venation of the suborder Ditryisia, family Cossidae; diagram of fore wing of *Prionoxystus robiniae*. If the basal parts of veins M1 + M2 and M3 are absent (dotted in figure), the entire area is usually termed the discal cell (courtesy of Prof. G. W. Byers).

single, large area (commonly termed the discal cell; see Fig. 208,1). Legs typically adapted for walking, but 1 or more pairs may be reduced and nonfunctional (as in most Nymphalidae). Middle and hind tibiae usually bearing spurs; tarsi with 5 segments. Abdomen with 10 segments, lacking cerci; a true, exserted ovipositor absent, although sclerotized papillae at genital pore may function as ovipositor. *Cret.—Holo.*

The eggs of the Lepidoptera are ordinarily deposited on or near the source of food for the larvae, usually plants. The larvae have chewing mouthparts and are mainly phytophagous, though some are predaceous; a few feed on animal products. Pupae are either naked or encased in a cocoon of silk or of a combination of silk and leaves.

With nearly 100,000 described species, the Lepidoptera constitute one of the larger orders of insects. Their higher classification has been controversial for nearly a century, but during the past 20 years there has been a more general agreement on a subordinal classification, based mainly on evolution of the adult mouthparts, of the female reproductive system, and of the wing venation, as

well as on the structure of larvae and pupae. Four suborders are recognized: Zeugloptera, Dacnonypha, Monotryisia, and Ditryisia.

The Zeugloptera, consisting of a single family (Micropterygidae), are the most primitive of the series. The functional mandibles and normal maxillae of these insects are indicative of their primitive position and of the origin of the Lepidoptera from mandibulate insects. The Dacnonypha and Monotryisia, although probably not in the direct line of ancestry leading to the Ditryisia, show intermediate conditions of the mouthparts, with slight to moderate modification of the mandibles and maxillae. The Ditryisia, which include by far most of the Lepidoptera, have complete loss of mandibles and full development of the tubelike proboscis. The female reproductive system and the wing venation show a comparable series of changes throughout the suborders. This subordinal classification, which has recently been reviewed in detail by COMMON (1970, 1975), is used here.

The family classification is still controversial, with 90 to 120 families recognized by different specialists. The family classification presented by COMMON, which is relatively conservative, is also adopted here. Distinguishing family traits are usually found in the detailed structure of the maxillary palpi, external genitalia, and wing venation.

Fossils have contributed little to our present understanding of the evolution of the Lepidoptera. Ordinarily, little more than one wing is preserved in the fossils, excepting, of course, those in amber. The oldest unquestionable record of the order consists of an exceptionally well-preserved micropterygid (Fig. 205,2c, *Undopteryx*) from the Lower Cretaceous of the Soviet Union (SKALSKI, 1979a). A second species, also a micropterygid, has been found in amber from a slightly younger Cretaceous formation in Lebanon (WHALLEY, 1978). However, the suborder Zeugloptera is the only suborder of the Lepidoptera definitely known to have existed in the Mesozoic. The Dacnonypha and Monotryisia extend to the lower Oligocene and the

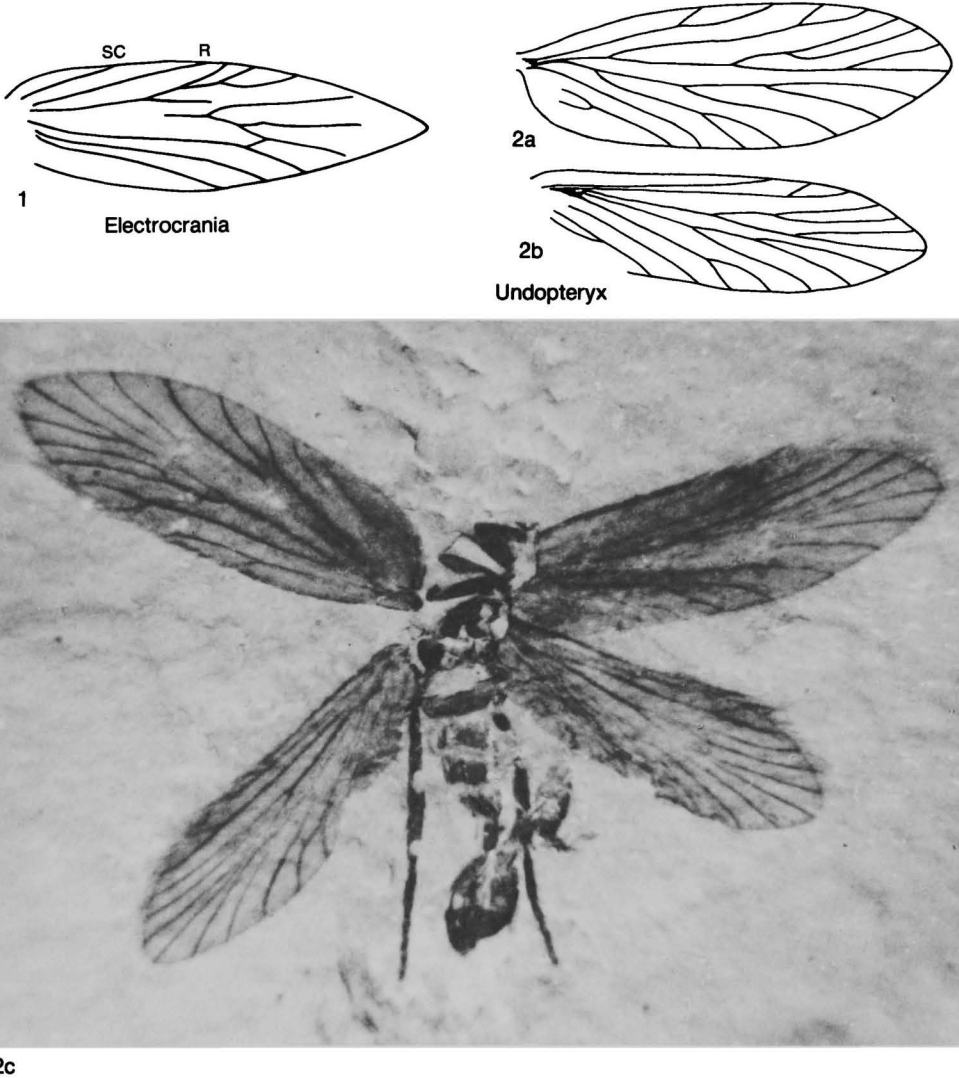


FIG. 205. Micropterygidae and Eriocraniidae (p. 372).

Ditrysia to the Eocene, but since the first records are representatives of existing families, both suborders will almost certainly eventually be found in the Cretaceous or Upper Jurassic. The Tertiary record of the Lepidoptera is very meager, at least relative to those of other existing orders of insects now of comparable size, probably because the Lepidoptera normally inhabit environments that are not conducive to their preservation as fossils. Nevertheless, the Tertiary record, small as it is, includes about 22 exist-

ing families, among which the Nymphalidae and Pieridae predominate. About 80 percent of the Tertiary genera are extinct, but in general they are not less specialized than their existing relatives, differing only about as much as existing genera do among themselves. Lepidopterous larvae, although rare, have been found in several Tertiary deposits, including Baltic amber (COCKERELL, 1907a; KUSNEZOV, 1941); and a head capsule of a small larva, apparently a micropterigid, has been reported from Cretaceous amber in Canada (MACKEY,

1970). Also, evidence of leaf mining in Miocene plants by larvae of Eriocraniidae, Nepitculidae, Lyonetiidae, and Gracillariidae has been recorded (OPLER, 1973, 1974).

The presence of Jurassic and Triassic Lepidoptera in the known geological record is controversial. TINDALE (1945, 1980) has described two genera from the Triassic of Australia that he considers to belong here; but as pointed out by RIEK (1955), the evidence for that is far from convincing. During the late Permian and early Mesozoic, the mecopteroid orders, especially the Trichoptera and Mecoptera, were extraordinarily diverse, producing a population that contained many homeomorphs suggestive of existing Trichoptera, Mecoptera, and Lepidoptera. In the present state of our knowledge, based almost entirely on wings, it seems advisable to consider these controversial homeomorphs as members of the Trichoptera or Mecoptera, which have a clear and continuous record as far back as the Permian, until better-preserved specimens have been found.

### Suborder ZEUGLOPTERA

#### Chapman, 1917

[Zeugloptera CHAPMAN, 1917, p. 312]

Small moths with functional and dentate mandibles; laciniae present, galeae normal. Venation similar in fore and hind wings. Female with single, common opening for reproductive duct and rectum. Larvae with paired groups of 5 ocelli. Adults pollen feeders; larvae apparently feeders on moss and liverworts, although some may be detritus feeders. *Cret.—Holo.*

#### Family MICROPTERYGIDAE

##### Cotes, 1889

[Micropterygidae COTES in SWINHOE & COTES, 1889, p. 706]

Only known family of suborder; characters of suborder. *Cret.—Holo.*

*Micropterix* HÜBNER, 1826, p. 426. WHALLEY, 1978; JARZEMBOWSKI, 1980. *Paleoc.*, England—*Holo.*

*Parasabatinca* WHALLEY, 1978, p. 73 [*\*P. affimacra*; OD]. Similar to *Sabatinca* (recent) but with unusually large spines on legs; ocelli absent. *Cret.*, Lebanon.

*Sabatinca* WALKER, 1863, p. 54. REBEL, 1935, 1936; WHALLEY, 1978; SKALSKI, 1979c. *Oligo.*, Europe (Baltic); *Mio.*, Burma—*Holo.*

*Undopteryx* SKALSKI, 1979a, p. 91 [*\*U. sukatshevae*; OD]. Similar to *Sabatinca* (recent), but vein R forked in hind wing. SKALSKI, 1979b. *Cret.*, USSR (Asian RSFSR).—FIG. 205,2. *\*U. sukatshevae*; *a*, fore and *b*, hind wings,  $\times 12$  (Skalski, 1979a); *c*, entire insect,  $\times 12.7$  (Carpenter, new, courtesy of A. W. Skalski).

### Suborder DACNONYPHA

#### Hinton, 1946

[Dacnonypha HINTON, 1946, p. 4]

Small moths, with or without mandibles and laciniae; galeae either normal or forming a short haustellum. Venation similar in fore and hind wings. Female with a single genital opening. Larvae apodous; leaf miners or feeders within seeds. *Oligo.—Holo.*

#### Family ERIOCRANIIDAE

##### Meyrick, 1927

[Eriocraniidae MEYRICK, 1928, p. 870]

Mandibles present. *Oligo.—Holo.*

*Eriocrania* ZELLER, 1851, p. 323. *Holo.*

*Dyseriocrania* SPULER, 1910, p. 483. COCKERELL, 1919d; SKALSKI, 1973b. *Mio.*, Burma—*Holo.*

*Electrocrania* KUSNEZOV, 1941, p. 19 [*\*E. immensipalpa*; OD]. Similar to *Dyseriocrania* but without supplementary branches on veins SC and R. SKALSKI, 1976. *Oligo.*, Europe (Baltic).—FIG. 205,1. *\*E. immensipalpa*; fore wing,  $\times 11.4$  (Kusnezov, 1941).

### Suborder MONOTRYZIA

#### Börner, 1939

[Monotryzia BÖRNER, 1939, p. 1401]

Very small to large moths, lacking mandibles and laciniae; galeae usually in form of short haustellum. Venation usually similar in fore and hind wings but sometimes reduced in hind wings and even in both pairs of wings. Female with 1 or 2 genital openings. Most larvae miners in leaves, stems, or roots. *Oligo.—Holo.*

Family INCURVARIIDAE  
Spuler, 1910

[Incurvariidae SPULER, 1910, p. 464]

Small moths, without ocelli; haustellum scaled basally. Hind wing with strong frenulum. *Oligo.*—*Holo.*

*Incurvaria* HAWORTH, 1828, p. 559. *Holo.*

*Adelites* REBEL, 1934, p. 15 [\**A. electrella*; OD]. Little-known adult. REBEL, 1935. *Oligo.*, Europe (Baltic).

*Incurvarites* REBEL, 1934, p. 14 [\**I. alienella*; OD]. Little-known genus. [Family assignment uncertain.] *Oligo.*, Europe (Baltic).

*Prophalonia* REBEL, 1935, p. 167 [\**P. gigas*; OD]. Little-known incurvariid with costal area of fore wing abruptly narrowed at midwing. SKALSKI, 1973c. *Oligo.*, Europe (Baltic).

Suborder DITRYZIA

Börner, 1939

[Ditryzia BÖRNER, 1939, p. 1401]

Small to very large moths, skippers, or butterflies, with mandibles and laciniae absent; galeae forming a haustellum; venation differing in fore and hind wings. Female with 2 genital openings. Most larvae phytophagous but very diverse. *Paleoc.*—*Holo.*

Family COSSIDAE Leach, 1815

[Cossidae LEACH, 1815, p. 131]

Haustellum very short; maxillary palpi minute. Larvae wood-boring. *Oligo.*—*Holo.*

*Cossus* FABRICIUS, 1793, pl. 1. *Holo.*

*Adelopsyche* COCKERELL, 1926c, p. 16 [\**A. frustans*; OD]. Similar to *Macrocyttara* (recent), but radial cell of fore wing very short; RS2 not forked; M2 fully developed. *Oligo.*, USA (Colorado).

*Xyleutites* KOZHANCHIKOV, 1957, p. 675 [\**X. miocenicus*; OD]. Radial cell of fore wing elongate; RS2 forked; M2 obsolescent proximally. MARTYNOVA, 1960. *Mio.*, USSR (European RSFSR).—FIG. 206,3. [\**X. miocenicus*; fore wing,  $\times 2.5$  (Martynova, 1960)].

Family TORTRICIDAE Latreille, 1802

[Tortricidae LATREILLE, 1802a, p. 415]

Small moths; maxillary palpi very small, with 2 to 4 segments. Costal margin of fore wing often strongly arched. *Oligo.*—*Holo.*

*Tortrix* LINNÉ, 1758, p. 530. [Generic assignment of fossils doubtful.] COCKERELL, 1907h, 1916c. *Oligo.*, USA (Colorado)—*Holo.*

*Electresia* KUSNEZOV, 1941, p. 62 [\**E. zaleskii*; OD]. Close to *Laspeyresia* HÜBNER (recent); differing in minor venational details. SKALSKI, 1973c. *Oligo.*, Europe (Baltic).—FIG. 206,2. [\**E. zaleskii*; fore wing,  $\times 12$  (Kusnezov, 1941)].

*Tortricidrosis* SKALSKI, 1973c, p. 339 [\**T. inclusa*; OD]. Little-known genus, probably belonging to the Olethreutinae (recent). *Oligo.*, Europe (Baltic).

Family TINEIDAE Latreille, 1810

[Tineidae LATREILLE, 1810, p. 347]

Small moths, without ocelli; antennae usually simple; haustellum short or even absent; head rough and hairy; vein M often present in fore wing. Larvae sometimes case bearing. *Paleoc.*—*Holo.*

*Tinea* LINNÉ, 1758, p. 534. *Holo.*

*Architinea* REBEL, 1934, p. 10 [\**A. balticella*; OD]. Little-known adult. *Oligo.*, Europe (Baltic).

*Dysmasites* KUSNEZOV, 1941, p. 28 [\**D. carpenteri*; OD]. Similar to *Ateliotum* (recent) but without intercalary cell in hind wing; proboscis reduced. *Oligo.*, Europe (Baltic).—FIG. 206,4. [\**D. carpenteri*; entire insect,  $\times 18$  (Kusnezov, 1941)].

*Ethmia* HÜBNER, 1819, p. 163. [Generic assignment of fossil doubtful.] SCUDDER, 1890. *Oligo.*, USA (Colorado)—*Holo.*

*Glossocardia* KUSNEZOV, 1941, p. 39 [\**G. gerasimovi*; OD]. Larva with chaetotaxy much as in *Scardia* (recent). *Oligo.*, Europe (Baltic).

*Martynea* KUSNEZOV, 1941, p. 24 [\**M. rebeli*; OD]. Similar to *Nemapogon* (recent), but RS3+4 fully developed. *Oligo.*, Europe (Baltic).

*Monopibaltia* SKALSKI, 1974, p. 98 [\**M. ignitella*; OD]. Similar to *Monopis* (recent); fore wing oval; median cell small, about three-fifths length of wing; SC extending to level of distal end of median cell; R, RS1, RS2 parallel; RS2 arising close to origin of RS3+4; R4 terminating at wing apex. *Oligo.*, Europe (Baltic).

*Palaeoscardiites* KUSNEZOV, 1941, p. 36 [\**P. mordvilkoii*; OD]. Similar to *Scardia* (recent), but vestiges of mandibles present; antennal scape not pectinate. *Oligo.*, Europe (Baltic).

*Paratriaxomasia* JARZEMBOWSKI, 1980, p. 267 [\**P. solentensis*; OD]. Similar to *Triaxomasia* (recent) but with broader fore wing; hind wing lacking marginal indentation near end of SC+R. *Paleoc.*—*Oligo.*, England.

*Proscardiites* KUSNEZOV, 1941, p. 33 [\**P. mar-*

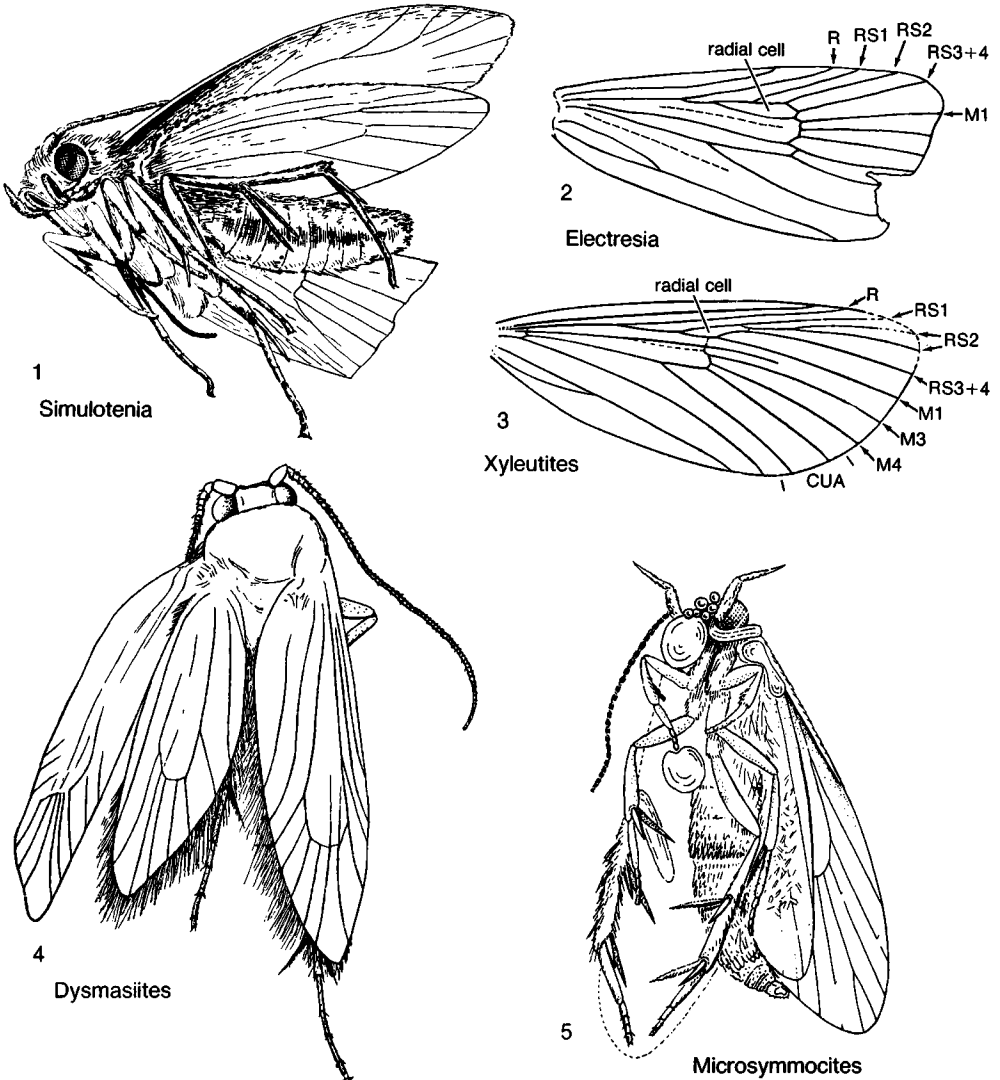


FIG. 206. Cossidae, Tortricidae, Tineidae, and Oecophoridae (p. 373–375).

*tynovi*; OD]. Similar to *Palaeoscardiites*, but antennae and proboscis shorter. *Oligo.*, Europe (Baltic).  
**Scardiites** KUSNEZOV, 1941, p. 30 [*\*P. meyricki*; OD]. Similar to *Palaeoscardiites*, but vestiges of mandibles absent; veins M1 and M2 of hind wing forming a long stalk, M1+2. *Oligo.*, Europe (Baltic).  
**Simulotenia** SKALSKI, 1977, p. 16 [*\*S. intermedia*; OD]. Fore wing moderately ovate; hind wing as broad as fore wing, apex rounded; M1 terminating on costal margin; maxillary palpus about twice as long as labial palpus; metatibia with

pair of long spurs near middle of segment. *Oligo.*, Europe (Baltic). — FIG. 206, 1. *\*S. intermedia*; lateral view,  $\times 15$  (Skalski, 1977).  
**Tillyardinea** KUSNEZOV, 1941, p. 22 [*\*T. eocaenica*; OD]. Similar to *Phylloporia* (recent), but RS of fore wing with 4 branches; labial palpi as long as maxillary palpi. SKALSKI, 1974. *Oligo.*, Europe (Baltic).  
**Tineolamima** REBEL, 1934, p. 13 [*\*T. aurella*; OD]. Little-known adult. *Oligo.*, Europe (Baltic).  
**Tineosemopsis** SKALSKI, 1974, p. 97 [*\*T. decurtatus*; OD]. Similar to *Tillyardinea*, but maxillary palpi longer than labial palpi; RS1+2 more



than half as long as RS3 + 4. *Oligo.*, Europe (Baltic).

### Family PSYCHIDAE Boisduval, 1828

[Psychidae BOISDUVAL, 1828, p. 44]

Usually small moths; head with roughened hairs; haustellum vestigial or absent. Larvae case bearing. *Oligo.*—*Holo.*

**Psyche** SCHRANK, 1801, p. 156. [Generic assignment of fossil doubtful.] HEER, 1849. *Mio.*, Europe (Germany)—*Holo.*

**Sterrhopteryx** HÜBNER, 1825, p. 399. [Generic assignment of fossil doubtful.] REBEL, 1934. *Oligo.*, Europe (Baltic)—*Holo.*

### Family PROLYONETIIDAE

Kusnezov, 1941

[Prolyonetiidae KUSNEZOV, 1941, p. 45]

Related to Lyonetiidae but having long labial palpi, fully developed maxillary palpi, and less reduced venation of both wings. [Probably a synonym of Lyonetiidae.] *Oligo.*

**Prolyonetia** KUSNEZOV, 1941, p. 43 [*\*P. cockerelli*; OD]. R and RS3 + 4 present in fore wing; proboscis fully developed. *Oligo.*, Europe (Baltic).

### Family OECOPHORIDAE

Bruand, 1849

[Oecophoridae BRUAND, 1849, p. 45]

Small moths. Scale covering of head usually smooth; ocelli commonly absent; antennae simple; maxillary palpi with 4 segments; labial palpi recurved. In fore wing, vein RS3 + 4 commonly forked to about half its length. Larvae usually leaf rollers. *Oligo.*—*Holo.*

**Oecophora** LATREILLE, 1796, p. 146. *Holo.*

**Borkhausenites** REBEL, 1934, p. 6, non *Borkhausenites*, *lapsus calami* [*\*B. bachofeni*; OD]. Similar to *Borkhausenia* (recent) but differing in venational details; R not parallel to RS1. *Oligo.*, Europe (Baltic).

**Depressarites** REBEL, 1935, p. 175 [*\*D. levipalpella*; OD]. Similar to *Schistodepressaria* (recent) but differing in scale covering of maxillary palpi. *Oligo.*, Europe (Baltic).

**Epiborkhausenites** SKALSKI, 1973a, p. 153 [*\*E. obscuroidrimaculatus*; OD]. Similar to *Paraborkhausenites* but with different spacings of origins of R, RS1, and RS2. *Oligo.*, Europe (Baltic).

**Glesseumeyrickia** KUSNEZOV, 1941, p. 47 [*\*G. henrikseni*; OD]. Similar to *Eumeyrickia* (recent) but in fore wing SC terminating well beyond midwing. *Oligo.*, Europe (Baltic).

**Microsymmocites** SKALSKI, 1977, p. 18 [*\*M. kuznetzovi*; OD]. Fore wing broadly ovate, with costal margin strongly curved; hind wing with apex rounded; labial palpus long, recurved; metatibia with a pair of spurs at middle. *Oligo.*, Europe (Baltic).—FIG. 206,5. *\*M. kuznetzovi*; lateral view,  $\times 15$  (Skalski, 1977).

**Neoborkhausenites** SKALSKI, 1977, p. 20 [*\*Borkhausenites incertella* REBEL, 1935, p. 178; OD]. Similar to *Microsymmocites*. Fore wing broadly ovate, 3 times as long as broad; apex very broadly rounded. *Oligo.*, Europe (Baltic).

**Paraborkhausenites** KUSNEZOV, 1941, p. 49 [*\*Borkhausenites vicinella* REBEL, 1935, p. 181]. Similar to *Borkhausenites* but with R, RS1, and RS2 parallel and RS3 and RS4 with a long stalk. SKALSKI, 1977. *Oligo.*, Europe (Baltic).

**Schiffermuelleria** HÜBNER, 1826, p. 421. SKALSKI, 1977. *Oligo.*, Europe (Baltic)—*Holo.*

### Family ELACHISTIDAE Stainton, 1854

[Elachistidae STAINTON, 1854, p. 244]

Very small moths. Head scaling smooth; haustellum almost always present; in hind wing vein RS straight, extending along wing axis to apex. Larvae leaf miners. *Oligo.*—*Holo.*

**Elachista** TREITSCHKE, 1833, p. 177. *Holo.*

**Anybia** STAINTON, 1854, p. 244. [Family assignment of fossil doubtful.] REBEL, 1934. *Oligo.*, Europe (Baltic)—*Holo.*

### Family COPROMORPHIDAE

Meyrick, 1905

[Copromorphidae MEYRICK, 1905, p. 606]

Wings broad, venation not reduced, or wings deeply cleft, hind wing divided into at least 6 plumes; vein M in hind wing with 3 branches and RS and M1 parallel. *Paleoc.*—*Holo.*

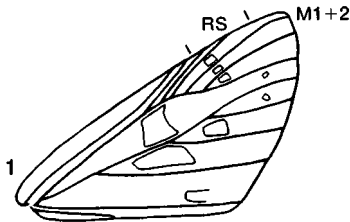
**Copromorpha** MEYRICK, 1886, p. 281. JARZEMBOWSKI, 1980. *Paleoc.*, England—*Holo.*

### Family SYMMOCIDAE

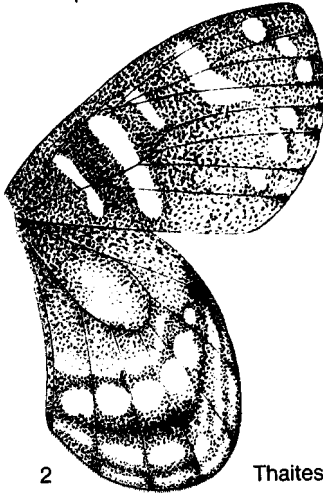
Gozmány, 1957

[Symmocidae GOZMÁNY, 1957, p. 326]

Similar to the Gelechiidae (recent), but hind wing without a projecting apex above a deeply arcuate termen, and with less com-



Pamphilites



2 Thaites

FIG. 207. HesperIIDae and PapilionIDae (p. 376–377).

plicated genital structures. Larvae feeding on vegetable debris. *Oligo.*—*Holo.*

*Symmoca* HÜBNER, 1825, p. 403. *Holo.*

*Oegoconites* KUSNEZOV, 1941, p. 51 [*\*O. borisjaki*; OD]. Similar to *Oegoconia* (recent), but stem of M3 + CUA long. *Oligo.*, Europe (Baltic).

### Family ZYGAENIDAE Latreille, 1809

[Zygaenidae LATREILLE, 1809, p. 189]

Small moths with dilated antennae, bipectinate in male; maxillary palpi with 1 or 2 segments; vein CUP present in both fore and hind wings; in hind wing SC + R coalescing for a short distance with RS beyond middle of discal cell. Larvae with dense covering of short setae; foliage feeders. *Mio.*—*Holo.*

*Zygaena* FABRICIUS, 1775, p. 550. REISS, 1936; BURGEFF, 1951. *Mio.*, Europe (Germany)—*Holo.*

*Zygaenites* BURGEFF, 1951, p. 3 [*\*Z. controversus*; OD]. Similar to *Zygaena* but with basal wing spots nearer wing apex. *Mio.*, Europe (Germany).

### Family PYRALIDAE Latreille, 1809

[Pyralidae LATREILLE, 1809, p. 192]

Small to large moths. Antennae usually simple; haustellum commonly densely covered with scales near base; vein CUP usually absent in fore wing, present in hind wing. Larvae commonly in shelters of leaves, stems, or galls; feeding habits diverse. *Paleoc.*—*Holo.*

*Pyralis* LINNÉ, 1758, p. 533. *Holo.*

*Glendotricha* KUSNEZOV, 1941, p. 64 [*\*G. olgae*; OD]. Similar to *Endotricha* (recent) but having a narrower fore wing, with strongly acute apex. *Oligo.*, Europe (Baltic).

*Pyralites* HEER, 1856, p. 30 [*\*P. obscurus*; OD]. Little-known genus, based on wing fragments; venation apparently similar to that of several recent genera of Pyralidae. JARZEMBOWSKI, 1980. *Paleoc.*—*Oligo.*, England; *Oligo.*, Europe (France).

### Family THYRIDIDAE Herrich-Schaeffer, 1846

[Thyrididae HERRICH-SCHAEFFER, 1846, p. 81]

Small to large moths; ocelli usually absent; haustellum without scales; maxillary palpi very small, with 1 or 2 segments. Vein CUP absent in fore wing, vestigial in hind wing. Larvae usually in stems or twigs. *Eoc.*—*Holo.*

*Thyris* LASPEYRES, 1803, p. 39. *Holo.*

*Hexerites* COCKERELL, 1933b, p. 480 [*\*H. primalis*; OD]. Similar to *Hexeris* (recent), but labial palpi shorter and fore wings more obtuse and less falcate distally. *Eoc.*, USA (Colorado).

### Family HESPERIIDAE Leach, 1815

[HesperIIDae LEACH, 1815, p. 128]

Small to medium-sized skippers. Antennae dilated apically and terminating in a hook; widely separated at base. Maxillary palpi and ocelli absent. Vein CUP absent in both wings. Larvae foliage feeders, usually occurring in rolled leaves. *Oligo.*—*Holo.*

*Hesperia* FABRICIUS, 1793, p. 258. *Holo.*

*Pamphilites* SCUDDER, 1875a, p. 66 [*\*P. abdita*; OD]. Fore wing similar to that of *Atalopedes* (recent) but with M1+2 terminating on outer wing margin just below wing apex. *Oligo.*, Europe (France).—FIG. 207.1. *\*P. abdita*; fore wing,  $\times 2.5$  (Scudder, 1875a).

*Thanatites* SCUDDER, 1875a, p. 62 [*\*Vanessa vetula* HEYDEN, 1859a, p. 12; OD]. Similar to *Erynnis*

(recent) but with more numerous small spots on the fore wing. [Possibly a synonym of *Erynnis*.] *Oligo.*, Europe (Germany).

### Family PAPILIONIDAE

Latreille, 1802

[Papilionidae LATREILLE, 1802a, p. 387]

Large butterflies with maxillary palpi vestigial; forelegs normal; fore wing with normal apex; discal cell of both wings closed. Larvae foliage feeders. *Eoc.*—*Holo.*

*Papilio* LINNÉ, 1758, p. 458. [*P. maachii* MÉNÉTRIÉS occurs in the Pleistocene and Holocene of Japan.] FUJIYAMA, 1968a. *Pleist.*—*Holo.*

*Luehdorfia* KRÜGER, 1878, p. 128 [= *Dorites* REBEL, 1898, p. 734 (type, *D. bosniaskii*); *Luehdorfia* BRYK, 1912, p. 53 (type, *Dorites bosniaskii* REBEL, 1898, obj.)]. REBEL, 1898; BRYK, 1934. *Mio.*, Europe (Italy)—*Holo.*

*Praepapilio* DURDEN & ROSE, 1978, p. 5 [*P. colorado*; OD]. Fore wing with costa concave at end of SC; labial palpi longer than head; R terminating on costal margin. *Eoc.*, USA (Colorado).

*Thaites* SCUDDER, 1875a, p. 57 [*\*T. ruminianus*; OD] Similar to *Thais* (recent), but fore wing markings without crescentic spots. *Mio.*, Europe (Germany). — FIG. 207,2. *\*T. ruminianus*; fore and hind wings,  $\times 2$  (Scudder, 1875a).

### Family PIERIDAE Boisduval, 1836

[Pieridae BOISDUVAL, 1836, p. 163]

Medium-sized butterflies, lacking maxillary palpi; forelegs normal; vein RS in fore wing with 3 branches or less. Larvae foliage feeders. *Oligo.*—*Holo.*

*Pieris* SCHRANK, 1801, p. 152. *Holo.*

*Aporia* HÜBNER, 1819, p. 90. Fossil consists of a small fragment of wing. [Generic assignment doubtful.] KERNBACH, 1967; BRANSCHIED, 1969. *Plio.*, Europe (Germany)—*Holo.*

*Coliades* SCUDDER, 1875a, p. 52 [*\*C. proserpina*; OD]. Similar to *Delias* (recent), but anterior border of discal cell straight. *Oligo.*, Europe (France).

*Mylothrites* SCUDDER, 1875a, p. 44 [*\*Vanessa pluto* HEER, 1849, p. 179; OD]. Venation similar to that of *Mylothris* (recent), but wing form as in *Hebomoia* (recent). *Mio.*, Europe (Yugoslavia).

*Oligodonta* F. M. BROWN, 1976, p. 1 [*\*O. florissantensis*; OD]. Little-known genus, based on specimen with folded wings. *Oligo.*, USA (Colorado).

*Pontia* FABRICIUS, 1807, p. 283 [= *Pierites* HEER, 1849, p. 182 (type, *P. freyeri*)]. HEER, 1849; SCUDDER, 1875a. *Mio.*, Europe (Germany)—*Holo.*

*Stolopsyche* SCUDDER, 1889, p. 467 [*\*S. libytheoides*; OD]. Similar to *Pieris* (recent) but with longer labial palpi and shorter basal antennal segments. *Oligo.*, USA (Colorado).

### Family NYMPHALIDAE

Swainson, 1837

[Nymphalidae SWAINSON in RICHARDSON, SWAINSON, & KIRBY, 1837, p. 289]

Small to large butterflies. Maxillary palpi with 1 segment; forelegs reduced, nonfunctional; vein RS in fore wing with 4 or more branches. Larvae foliage feeders. *Paleoc.*—*Holo.*

*Nymphalis* LINNÉ, 1758, p. 473. *Holo.*

*Aglais* DALMAN, 1816, p. 56. SCUDDER, 1878a; MARTYNOVA, 1960; NEKRUTENKO, 1965a. *Mio.*, USSR (Asian RSFSR)—*Holo.*

*Apanthesis* SCUDDER, 1889, p. 459 [*\*A. leuce*; OD]. Allied to *Cirrochroa* (recent) but differing in venational details and in greater sinuosity of inner margin of fore wing. *Oligo.*, USA (Colorado). — FIG. 208,1. *\*A. leuce*; fore wing,  $\times 1.5$  (Scudder, 1889).

*Chlorippe* DOUBLEDAY, 1844, p. 108. COCKERELL, 1907g. *Oligo.*, USA (Colorado)—*Holo.*

*Eugonia* HÜBNER, 1819, p. 36. SCUDDER, 1875a. *Mio.*, Europe (Yugoslavia)—*Holo.*

*Jupitellia* CARPENTER, 1986, p. 579, *nom. subst. pro Jupitertia* SCUDDER, 1889, p. 448, *non* BELLARDI, 1875 [*\*Jupitertia charon* SCUDDER, 1889, p. 450; OD]. Similar to *Lithodryas*, but fore wing narrower and SC closer to costal margin; hind wing relatively longer. *Oligo.*, USA (Colorado). — FIG. 208,3. *\*J. charon* (SCUDDER); *a*, fore and *b*, hind wings,  $\times 1.9$  (Scudder, 1889).

*Lethites* SCUDDER, 1875a, p. 34, *nom. subst. pro Satyrites* SCUDDER, 1872, p. 66, *non* BLANCH-BRULLÉ, 1871 [*\*Satyrites reynesii* SCUDDER, 1872, p. 66; OD]. Similar to *Lethe* (recent) but with RS1+2 and RS3+4 arising before distal end of discal cell. *Oligo.*, Europe (France). — FIG. 208,2. *\*L. reynesii* (SCUDDER); fore wing,  $\times 1.8$  (Scudder, 1875a).

*Lithodryas* COCKERELL, 1909c, p. 79, *nom. subst. pro Lithopsyche* SCUDDER, 1889, p. 454, *non* BUTLER, 1889 [*\*Lithopsyche styx* SCUDDER, 1889, p. 454; OD]. Similar to *Jupitellia* but having much broader fore wing with less pointed apex. *Oligo.*, USA (Colorado).

*Neorinopis* BUTLER, 1873, p. 127 [*\*Cyllo sepulta* BOISDUVAL, 1840, p. 371; OD]. Similar to *Neorina* (recent) but with different form and markings of hind wing. SCUDDER, 1875a. *Oligo.*, Europe (France).

*Nymphalites* SCUDDER, 1889, p. 457 [*\*N. obscurum*; OD]. Little-known genus, apparently sim-

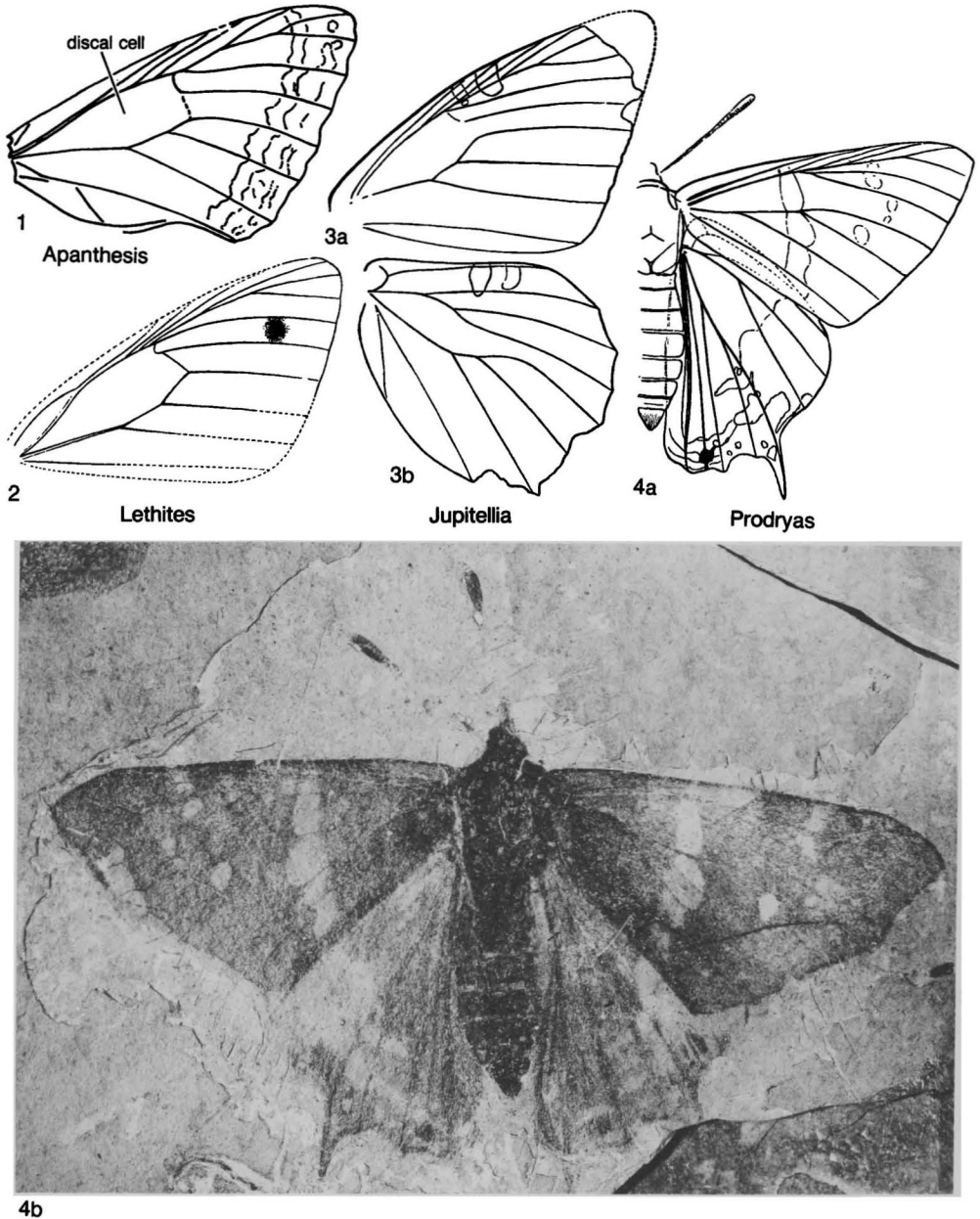


FIG. 208. Nymphalidae (p. 377-378).

ilar to such recent nymphalid genera as *Neurosigma* and *Abrota*, but M2 of fore wing more remote from M1 basally; hind wing with relatively narrow anterior area. JARZEMBOWSKI, 1980. *Paleoc.-Oligo.*, England; *Oligo.*, USA (Colorado).

**Prodryas** SCUDDER, 1878a, p. 520 [*\*P. persephone*; OD]. Similar to *Hypanartia* (recent), but fore

wing more elongate; costal and outer margins uniformly straight; discal cell open. FORBES, 1932. *Oligo.*, USA (Colorado). — FIG. 208.4. *\*P. persephone*; *a*, wings and body,  $\times 1.6$  (Scudder, 1878a); *b*, whole insect,  $\times 2$  (Carpenter, new). **Vanessa** FABRICIUS, 1807, p. 281. NEKRUTENKO, 1965a, 1965b. *Mio.*, USSR (European RSFSR)–*Holo.*

## Family LIBYTHEIDAE

Boisduval, 1836

[Libytheidae BOISDUVAL, 1836, p. 167]

Medium-sized butterflies; maxillary palpi vestigial; forelegs reduced in male only; fore wing truncate apically. Larvae foliage feeders. *Oligo.*—*Holo.*

*Libythea* FABRICIUS, 1807, p. 284. *Holo.*

*Barbarothea* SCUDDER, 1892, p. 21 [*\*B. florissanti*; OD]. Similar to *Libythea* (recent), but hind wing much broader relative to its length. *Oligo.*, USA (Colorado). — FIG. 209,2. *\*B. florissanti*; *a*, fore and *b*, hind wings,  $\times 1.8$  (Scudder, 1892).

*Prolibythea* SCUDDER, 1889, p. 465 [*\*P. vagabunda*; OD]. Similar to *Dichora* (recent) but with costal margin of hind wings not lobed. *Oligo.*, USA (Colorado). — FIG. 209,1. *\*P. vagabunda*; *a*, fore and *b*, hind wings,  $\times 1.7$  (Scudder, 1889).

## Family LYCAENIDAE Leach, 1815

[Lycaenidae LEACH, 1815, p. 129]

Small to medium-sized butterflies, lacking maxillary palpi; forelegs slightly reduced in male, normal in female; fore wing with normal apex but often lacking 1 or 2 branches of RS. Larvae mostly foliage feeders, some predaceous. *Paleoc.*—*Holo.*

*Lycaena* FABRICIUS, 1807, p. 285. *Holo.*

*Aquisextana* THÉOBALD, 1937b, p. 160 [*\*A. irenaei*; OD]. Similar to *Curetis* (recent) but with a smaller thorax. *Oligo.*, Europe (France).

*Lithopsyche* BUTLER, 1889, p. 294 [*\*L. antiqua*; OD] [= *Calospilites* VAN SCHEPDAEL, 1974, p. 15, obj.]. Little-known genus, based on wing fragments, apparently similar to *Mesene* and *Anteros* and other recent genera of subfamily Riodininae, but fork of RS3+4 of fore wing apparently absent. JARZEMBOWSKI, 1980. *Paleoc.*—*Oligo.*, England.

*Riodinella* DURDEN & ROSE, 1978, p. 15 [*\*R. nympha*; OD]. Venation as in *Ancyluris* (recent), but RS4 terminating distinctly posterior of wing apex. *Eoc.*, USA (Colorado).

## Family GEOMETRIDAE Leach, 1815

[Geometridae LEACH, 1815, p. 134]

Small to large moths. Antennae simple or pectinate; maxillary palpi commonly with 1 segment; ocelli usually absent. Wings broad, venation very diverse. In fore wing partial coalescence of radial veins often forming narrow accessory cells (areoles); veins RS3 and

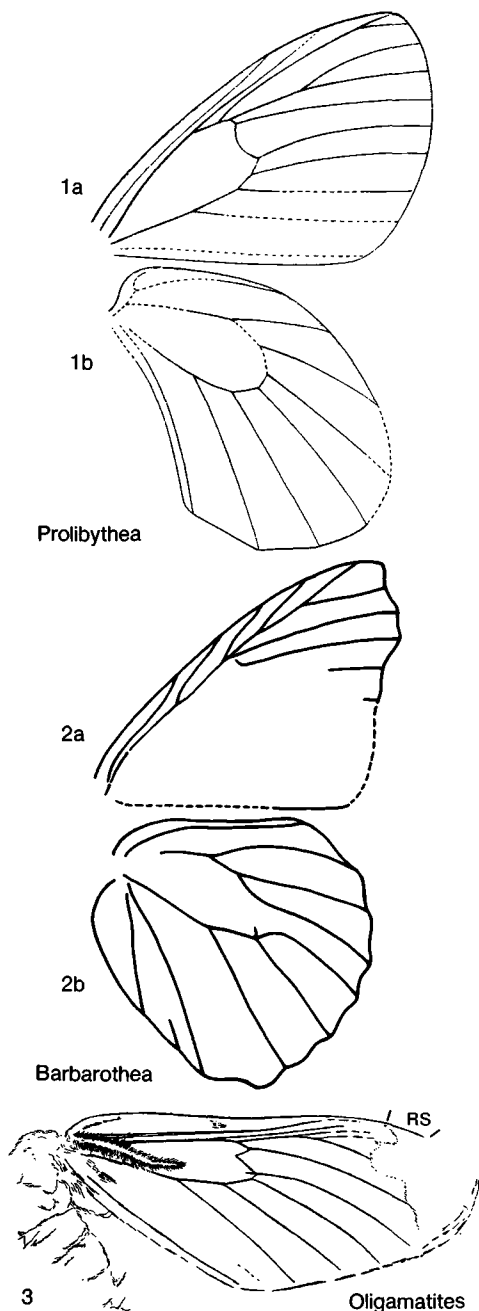


FIG. 209. Libytheidae and Ctenuchidae (p. 379–380).

RS4 stalked. In hind wing SC usually strongly bent basally. Larvae with anterior 2 or 3 pairs of ventral prolegs much reduced or even absent; foliage feeders. *Paleoc.*—*Holo.*

- Geometra** LINNÉ, 1758, p. 326. *Holo.*  
**Geometridites** CLARK & others, 1971, p. 582 [*\*G. repens* KERNBACH, 1967, p. 107]. Little-known genus, based on larva; additional wing fragments also placed here. KERNBACH, 1967; JARZEMBOWSKI, 1980. *Paleoc.-Oligo.*, England; *Plio.*, Europe (Germany).  
**Hydriomena** HÜBNER, 1825, p. 322. [Generic assignment of fossil doubtful.] COCKERELL, 1922c. *Oligo.*, USA (Colorado)—*Holo.*

### Family CTENUCHIDAE Kirby, 1837

[Ctenuchidae Kirby in RICHARDSON, SWAINSON, & KIRBY, 1837, p. 305]

Small to medium-sized moths; antennae simple or complex; maxillary palpi with only 1 segment. Fore wing narrow, areole absent; hind wing with vein SC+R completely coalesced with RS. Larvae with dense setal cover; mostly foliage feeders. *Oligo.-Holo.*

- Ctenucha** KIRBY, 1837, p. 305. *Holo.*  
**Oligamatites** KUSNEZOV, 1928, p. 431 [*\*O. martynovi*; OD]. Similar to *Ctenucha* (recent), but costal margin of fore wing concave in basal half; branches of RS arising very close together; RS3 strongly diverging from RS2. *Oligo.*, USSR (Kazakh).—FIG. 209,3. *\*O. martynovi*; fore wing,  $\times 1.3$  (Kusnezov, 1928).

### Family UNCERTAIN

The following genera, apparently belonging to the order Lepidoptera, suborder Ditrysia, are too poorly known to permit assignment to families.

- Arctiites** REBEL, 1898, p. 732 [*\*A. deletus*; OD]. Little-known adult moth. *Mio.*, Europe (Italy).  
**Argyresthites** REBEL, 1934, p. 5 [*\*A. succinella*; OD]. Little-known adult, possibly an yponomeutid. *Oligo.*, Europe (Baltic).  
**Cerurites** KERNBACH, 1967, p. 107 [*\*C. wagneri*; OD]. Little-known genus, based on poorly preserved specimen. *Plio.*, Europe (Germany).  
**Chionaemopsis** COCKERELL & LEVEQUE, 1931, p. 354 [*\*C. quadrifasciatus*; OD]. Little-known moth, possibly belonging to the Yponomeutidae. FORBES, 1931. *Eoc.*, USA (Colorado).  
**Epinomeuta** REBEL, 1935, p. 172 [*\*E. truncatipennella*; OD]. Little-known adult, possibly a tineid. *Oligo.*, Europe (Baltic).  
**Eriocranites** KERNBACH, 1967, p. 104 [*\*E. hercynicus*; OD]. Little-known genus, based on a poorly preserved wing. *Plio.*, Europe (Germany).  
**Gallerites** KERNBACH, 1967, p. 106 [*\*G. keleri*; OD]. Little-known genus, based on poorly preserved specimen. *Plio.*, Europe (Germany).  
**Gurnetia** COCKERELL, 1921d, p. 472 [*\*G. durranti*;

- OD]. Little-known genus, based on wing fragments. JARZEMBOWSKI, 1980. *Paleoc.-Oligo.*, England.  
**Lycaenites** REBEL, 1898, p. 734 [*\*L. gabbroensis*; OD]. Little-known adult. *Mio.*, Europe (Italy).  
**Miopieris** ZEUNER, 1942c, p. 409 [*\*M. talboti*; OD]. Little-known butterfly; probably a lycaenid. *Mio.*, Europe (Germany).  
**Phylledestes** COCKERELL, 1907a, p. 188 [*\*P. vorax*; OD]. Little-known larva, with several stout hairs on body segments 2 through 10. *Oligo.*, USA (Colorado).  
**Prohepialus** PITON, 1940a, p. 217 [*\*P. incertus*; OD]. Little-known genus, based on wing fragments. [Placed in the Hepialidae by PITON (1940a) and JARZEMBOWSKI (1980).] *Paleoc.-Oligo.*, Europe (France), England.  
**Scythropites** REBEL, 1935, p. 169 [*\*S. balticella*; OD]. Little-known adult, possibly an yponomeutid. *Oligo.*, Europe (Baltic).  
**Sphingidites** KERNBACH, 1967, p. 108 [*\*S. weidneri*; OD]. Little-known genus, based on several segments of a larva with a posterior horn. *Plio.*, Europe (Germany).  
**Symmocites** KUSNEZOV, 1941, p. 54 [*\*S. robdendorfi*; OD]. Little-known genus, with maxillary palpi much reduced. [Placed in Symmocidae by KUSNEZOV (1941) and in Oecophoridae by SKALSKI (1976).] *Oligo.*, Europe (Baltic).

### Suborder UNCERTAIN

The following genera, apparently belonging to the order Lepidoptera, are too poorly known to allow assignment to suborders.

- Noctuites** HEER, 1849, p. 185 [*\*N. effossus* HEER, 1849, p. 185; SD CARPENTER, herein]. Little-known adult moths; venation not preserved. HEER, 1849; OUSTALET, 1870; KERNBACH, 1967. *Oligo.*, Europe (France); *Mio.*, Europe (Yugoslavia); *Plio.*, Europe (Germany).  
**Stigmellites** KERNBACH, 1967, p. 104 [*\*S. heringi*; OD]. Form genus, based on mines in foliage. *Plio.*, Europe (Germany).

### Order MECOPTERA

#### Packard, 1886

[Mecoptera COMSTOCK & COMSTOCK, 1895, p. 184, *nom. correct. pro* Mecaptera PACKARD, 1886, p. 808] [=Paratrichoptera TILLYARD, 1919a, p. 194; Paramecoptera TILLYARD, 1919b, p. 231]

Small or moderate-sized insects, usually with slender body. Compound eyes prominent; ocelli usually present; antennae filiform, with 15 to 50 segments. Head produced into a rostrum; rostrum often elongate

and normally held in a vertical position; mouthparts with chewing mandibles situated at distal end of rostrum; maxillae and labium normal, with well-developed palpi. Prothorax typically small, meso- and metathorax well developed. Two pairs of similar wings, a distinct pterostigma usually present; branching of veins typically dichotomous. Vein SC usually conspicuous, commonly submarginal, but more remote from costal margin in some families, the costal area being broad, containing oblique veinlets; in some genera SC apparently bearing 1 or more branches; R strongly convex, usually with short veinlets in pterostigmal area; RS typically arising at or before midwing, with 3 to 18 terminal branches; media (M) showing no convexity or concavity, with 4 to 12 branches; CU dividing near wing base into CUA and CUP. In fore wing, CUA usually unbranched, rarely forked; shortly after its origin CUA either connected to stem of M by a crossvein (formerly termed M5) or actually coalesced with M for a short distance; the free basal piece of CUA (before connection to M by crossvein or coalescence) very short or long. In hind wing, CUA coalesced with M near base, commonly continuing the straight line of stem of M beyond coalescence. Three anal veins typically present in both fore and hind wings. Legs usually slender, with 5 tarsal segments. Abdomen showing 10 distinct segments; ninth abdominal segment of male variously modified with copulatory structures, often in form of genital bulb, including large claspers; in female, last 3 abdominal segments cylindrical, slender, apical segment terminating in a pair of very short cerci with 2 segments. *Perm.—Holo.*

The eggs of Mecoptera are usually laid in damp soil. The larvae are caterpillarlike but possess groups of ocelli on each side of the head; they are saprophagous or phytophagous (rarely predaceous), usually living in soil. The pupae are formed in earthen cells in the ground.

The Mecoptera appear to occupy a central position in the evolution of the Endopterygota. There is reasonably good evidence that

the Trichoptera, Lepidoptera, and Diptera have evolved from ancestral stock close to the Mecoptera or even within the order itself. The relationship of the Mecoptera with the Neuroptera is more obscure; mecopterons apparently share many adult features with the suborder Planipennia (TILLYARD, 1929, 1933, 1935d; MARTYNOVA, 1948a; RIEK, 1953, 1955).

Although nine existing families of Mecoptera are usually recognized, three of these (Notiothaumidae, Meropeidae, and Apteropanorpidae) include only one or two species; another family, the Boreidae, are flightless species and live in the cooler parts of the Holarctic region. The Panorpidae and Bittacidae are the largest existing families. The family classification is based mainly on the nature of the rostrum, the terminal abdominal structures of the male, and the wing venation.

The geological record of the Mecoptera is a long one, extending into the Lower Permian. It is obvious from the geological record of the order that the existing Mecoptera are only a small remnant of a very diverse series of families that lived during the Permian and into the Jurassic.

The evolution of the Mecoptera has clearly centered on such body structures as the rostrum and the terminal abdominal structures of the male and also on the wing venation (PENNY, 1975). Unfortunately, little is known about the body structures in the Paleozoic and Mesozoic genera, except for a very few species. Since the rostrum is well developed in the existing Meropeidae and Notiothaumidae, which appear to be the most generalized of the recent species, the long rostrum is probably an archaic trait in the order; the shortened rostra of the Panorpididae and Choristidae are presumably specializations and independently evolved. The modification of the terminal abdominal segments in the male has apparently reached a peak in Panorpidae, in some genera of which the entire abdomen has become very attenuate (see Fig. 214,1, *Holcorpa*). In the males of some Permian Mecoptera there is slight enlarge-

ment of the terminal abdominal segments but no evidence of the discrete genital bulb of the Panorpidae.

Evolution of the wing venation in the Mecoptera has involved extensive convergence. In general there seems to have been a definite trend toward reduction in the number of branches of main veins, especially the radius and media. However, it is clear that this reduction has occurred independently in a number of lines of evolution within families and genera. It is not realistic, therefore, to set family limits by definite and restricted patterns of venation without considering all other available characteristics.

Of special interest is the structure of CUA in the fore wing. As noted above, in some families (e.g., Permochoristidae) this vein is entirely independent of M except for a connecting crossvein (formerly termed M5). This is presumably the original or primitive condition. In other families (e.g., Nannochoristidae), CUA diverges anteriorly shortly after its origin and then coalesces for a short distance with M before branching off again as a separate vein. The free basal piece of CUA, before the coalescence, appears in a variety of forms and seems to be a useful taxonomic character at the generic level. However, the coalescence with M seems to have taken place independently in several families and genera of Mecoptera, and it does not by itself indicate close phylogenetic relationship. In a few families (e.g., Agetopanorpidae), the coalescence of CUA with M seems to have taken place near the wing base, there being no free piece of CUA remaining.

The family classification of the Mecoptera has been complicated by the existence of Permian and Mesozoic species that are mecopteroid but not apparently closely related to the existing families. At various times three separate orders were established for these families. The order Protomecoptera was erected by TILLYARD (1917a) for a fragmentary Triassic fossil (*Archipanorpa*); subsequently (1935d), TILLYARD considered the Protomecoptera to be a suborder of the

Mecoptera, assigning to it the recent families Meropeidae and Notiothaumidae. The genus is now considered to be of uncertain ordinal position (WILLMANN, 1978). The remaining families of Mecoptera were placed in the suborder Eumecoptera. A second order, the Paramecoptera, was erected by TILLYARD (1919b) for *Belmontia*, which had a forked CUA in the fore wing; this group has subsequently been treated as a suborder of Mecoptera. The third order, Paratrichoptera, was erected by TILLYARD (1919a) for several Triassic genera; this has also been regarded as a suborder. As more Permian, Triassic, and Jurassic Mecoptera have been found, it has become increasingly difficult to distinguish among these suborders. For example, the well-branched SC and the forked CUA, supposedly characteristic of the Protomecoptera, have turned up in species that, in other respects, belong to the Eumecoptera. The evidence now suggests that these supposed suborders do not represent divergent evolutionary lines within the Mecoptera. There has apparently been so much convergent evolution of the wing venation of the Mecoptera that subordinal divisions on this basis are not meaningful. The separation of the order into the suborders Protomecoptera and Eumecoptera works out satisfactorily for the existing families but not for the entire geological record of the order as it now stands. Obviously, greater knowledge of body structures of the extinct species is necessary before the main phylogenetic lines can be derived.

#### Family KALTANIDAE Martynova, 1958

[Kaltanidae MARTYNOVA, 1958, p. 79]

Fore wing with costal area of moderate width and with few to many veinlets; pterostigma absent; basal piece of vein CUA transverse or oblique; anal veins reaching wing margin independently, not looped. Hind wing unknown. *Perm.*

*Altajopanorpa* MARTYNOVA, 1948b, p. 113 [\**A. kaltanica*; OD] [= *Kaltana* MARTYNOVA, 1958, p. 80 (type, *K. pilosa*)]. M with 6 branches; RS



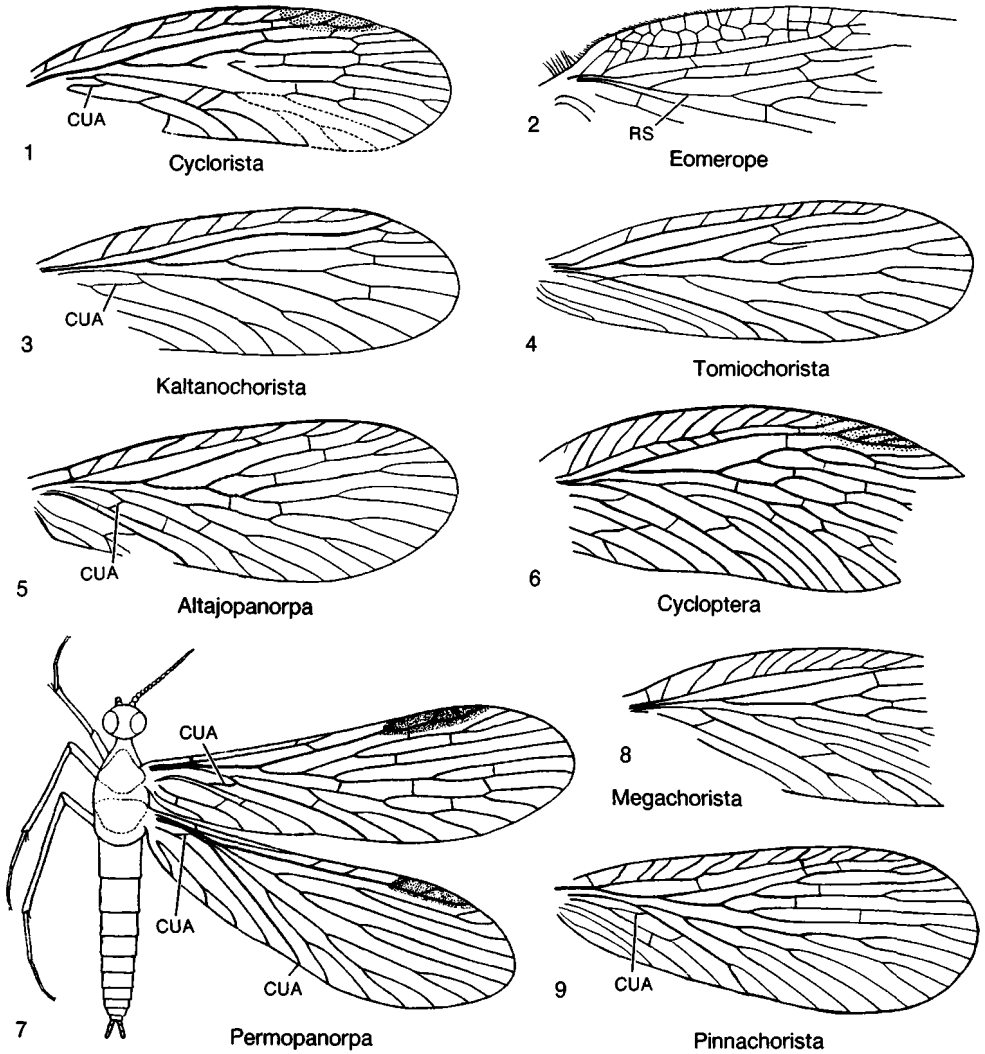


FIG. 210. Kaltanidae, Cycloristidae, Cyclopteridae, Tomiochoristidae, Permopanorpidae, and Eomeropidae (p. 382–384).

and proximal portions of its main branches with tubercles. MARTYNOVA, 1961d, 1962e. *Perm.*, USSR (Asian RSFSR).—FIG. 210,5. *A. pilosa* (MARTYNOVA); fore wing,  $\times 8$  (Martyanova, 1961d).

**Megachorista** MARTYNOVA, 1958, p. 81 [*\*M. khal-fni*; OD]. M with 6 branches; longitudinal veins without tubercles. MARTYNOVA, 1961d, 1962e. *Perm.*, USSR (Asian RSFSR).—FIG. 210,8. *\*M. khal-fni*; fore wing,  $\times 4$  (Martyanova, 1961d).  
**Pinnachorista** MARTYNOVA, 1958, p. 80 [*\*P. sar-balensis*; OD]. M with more than 6 branches. MARTYNOVA, 1961d. *Perm.*, USSR (Asian

RSFSR).—FIG. 210,9. *\*P. sarbalensis*; fore wing,  $\times 9$  (Martyanova, 1961d).

**Family CYCLORISTIDAE**  
**Martyanova, 1958**

[Cycloristidae MARTYNOVA, 1958, p. 84]

Fore wing with costal margin strongly convex; pterostigma present; costal area only slightly broader than subcostal; some main veins with tubercles; anal veins not looped distally. Hind wing unknown. *Perm.*

**Cyclorista** MARTYNOVA, 1958, p. 84 [*\*C. convexicosta*; OD]. M with 6 branches; basal piece of CUA short but sigmoidal and longitudinal. *Perm.*, USSR (Asian RSFSR). — FIG. 210,1. *\*C. convexicosta*; fore wing,  $\times 8$  (Martynova, 1958).

### Family CYCLOPTERIDAE Martynova, 1958

[Cyclopteridae MARTYNOVA, 1958, p. 84]

Fore wing shaped as in Cycloristidae; costal area much wider than subcostal; pterostigma present; anterior branches of vein RS curved anteriorly near wing margin; anal veins not looped distally. Hind wing unknown. *Perm.*

**Cycloptera** MARTYNOVA, 1958, p. 85 [*\*C. autumnale*; OD]. M with 8 branches; basal piece of CUA transverse. *Perm.*, USSR (Asian RSFSR). — FIG. 210,6. *\*C. autumnale*; fore wing,  $\times 10$  (Martynova, 1958).

### Family TOMIOCHORISTIDAE Martynova, 1958

[Tomiochoristidae MARTYNOVA, 1958, p. 85]

Fore wing with costal margin only slightly curved; pterostigma absent; numerous costal veinlets; tubercles on some longitudinal veins; vein CUA with a shallow fork; anal veins not looped. Hind wing unknown. *Perm.*

**Tomiochorista** MARTYNOVA, 1958, p. 85 [*\*T. nubila*; OD]. Costal area about as wide as subcostal; basal piece of CUA short and straight; M with 4 to 7 branches. MARTYNOVA, 1961d. *Perm.*, USSR (Asian RSFSR). — FIG. 210,4. *T. minuta* MARTYNOVA; fore wing,  $\times 12$  (Martynova, 1961d).

**Kaltanochorista** MARTYNOVA, 1958, p. 86 [*\*K. grjasevi*; OD]. Fore wing with costal area about twice as wide as subcostal; basal piece of CUA long and sigmoidal; M with 4 branches. MARTYNOVA, 1961d. *Perm.*, USSR (Asian RSFSR). — FIG. 210,3. *\*K. grjasevi*; fore wing,  $\times 6.5$  (Martynova, 1961d).

### Family PERMOPANORPIDAE Tillyard, 1926

[Permopanorpidae TILLYARD, 1926c, p. 139]

Small insects, with wings commonly slender. Fore wing with costal space traversed by 1 to a few veinlets; vein SC extending to about midwing; pterostigma well developed; RS with 4 to 9 terminal branches; basal piece

of CUA joined to M by a prominent crossvein; CUA unbranched. Hind wing slightly smaller than fore wing; SC short; CUA fused basally with M. Head with a very short rostrum; tarsi with 5 segments; female with vestigial cerci; male with terminal abdominal structures resembling those of the Bittacidae (recent). *Perm.*

**Permopanorpa** TILLYARD, 1926c, p. 143 [*\*P. formosa*; OD]. Fore wing with costal area narrow or moderately broad, with few veinlets; M with 6 branches; basal piece of CUA sigmoidal. Hind wing with SC much shorter than in fore wing. WILLMANN, 1978. *Perm.*, USA (Kansas), USSR (European RSFSR). — FIG. 210,7. *P. inaequalis* TILLYARD, Kansas; whole insect,  $\times 10$  (Carpenter, 1930b).

### Family EOMEROPIDAE Cockerell, 1909

[*nom. transl.* PONOMARENKO & RASNITSYN, 1974, p. 68, ex Eomeropinae COCKERELL, 1909h, p. 384]

Wing venation reticulate. Fore wing with costal area very broad, traversed by numerous veinlets and crossveins; stems of veins R and M coalesced basally but each distinct; RS with 12 to 18 terminal branches; M with 10 to 12 terminal branches; CUA forked distally. Hind wing slightly smaller than fore wing and costal area narrower, with fewer veinlets; RS and M with 10 to 14 terminal branches. Male with terminal abdominal segments forming a small but distinct bulb. PONOMARENKO & RASNITSYN, 1974; WILLMANN, 1978. *Paleoc.*—*Holo.*

**Eomerope** COCKERELL, 1909h, p. 381 [*\*E. tortriciformis*; OD]. Fore wing as in *Notiothauma* (recent), but costal area narrower and with fewer cellules. PONOMARENKO & RASNITSYN, 1974. *Paleoc.*, USSR (Asian RSFSR); *Oligo.*, USSR (Asian RSFSR), USA (Colorado)—*Holo.* — FIG. 210,2. *\*E. tortriciformis*; basal part of fore wing,  $\times 5.6$  (Cockerell, 1909h).

### Family PERMOCHORISTIDAE Tillyard, 1918

[Permochoristidae TILLYARD, 1918b, p. 732] [=Mesochoristidae TILLYARD, 1926e, p. 267; Idelopanorpidae ZALESSKY, 1932b, p. 192; Xenochoristidae RIEK, 1953, p. 69]

Fore wing with vein SC long, extending at least to midwing, usually prominently forked or branched; pterostigma distinct; R

commonly unbranched, rarely with a terminal twig; RS with 4 to 10 terminal branches; M usually with 5 or 6 terminal branches; CUA connected to M by crossvein, not coalesced with it. Hind wing similar to fore wing, but SC slightly shorter; R with distal twigs; RS arising near base. *Perm.-Jur.*

**Mesochorista** TILLYARD in TILLYARD & DUNSTAN, 1916, p. 29 [*\*M. proavita*; OD] [= *Permochorista* TILLYARD, 1918b, p. 732 (type, *P. australica*); *Caenoptilon* ZALESSKY, 1933, p. 141 (type, *C. minutum*)]. Fore wing with costal space no wider than subcostal; SC long, extending to pterostigma; branching of RS and M diverse but stem RS3+4 shorter than stem of RS. *Perm.*, USSR (Asian and European RSFSR), Australia (New South Wales); *Trias.*, Australia (Queensland).—FIG. 211,1a. *M. fedotovi* MARTYNOVA, *Perm.*, USSR; fore wing,  $\times 8$  (Martynova, 1961d). — FIG. 211,1b. *M. australica* (TILLYARD), *Perm.*, New South Wales; fore wing,  $\times 5$  (Tillyard, 1918b).

**Agetochorista** MARTYNOV, 1933a, p. 24 [*\*A. ornata*; OD] [= *Neoageta* RIEK, 1953, p. 67 (type, *N. elongata*); *Agetochoristella* RIEK, 1953, p. 68 (type, *A. adscita*)]. Fore wing with costal area at its maximum much wider than subcostal; veinlets from SC long and usually curved; RS with 5 branches; basal piece of CUA short but distinct. MARTYNOVA, 1948a, 1962e. *Perm.*, USSR (Asian and European RSFSR), Australia (New South Wales). — FIG. 211,2. *\*A. ornata*, USSR; a, fore and b, hind wings,  $\times 5$  (Martynov, 1933a).

**Asiachorista** MARTYNOVA, 1958, p. 87 [*\*A. neuburgae*; OD]. RS with 4 branches; stem RS1+2 and stem RS3+4 of same length. PINTO, 1972a. *Perm.*, USSR (Asian RSFSR), Brazil. — FIG. 211,3. *\*A. neuburgae*; fore wing,  $\times 6$  (Martynova, 1958).

**Calliethira** MARTYNOVA, 1958, p. 90 [*\*C. khalfini*; OD]. Fore wing as in *Asiachorista*, but apex more pointed and asymmetrical. *Perm.*, USSR (Asian RSFSR). — FIG. 212,3. *\*C. khalfini*; fore wing,  $\times 7$  (Martynova, 1958).

**Liassochorista** TILLYARD, 1933, p. 21 [*\*L. anglicana*; OD]. Fore wing as in *Mesochorista* but oval in shape; basal piece of RS straight. [Family assignment doubtful.] MARTYNOVA, 1961d; WILLMANN, 1978. *Trias.*, USSR (Kirghiz); *Jur.*, England. — FIG. 212,7. *L. asiatica* MARTYNOVA, *Trias.*; fore wing,  $\times 8$  (Martynova, 1948a).

**Parachorista** TILLYARD, 1926e, p. 273 [*\*P. pincombeae*; OD] [= *Tillyardina* HANDLIRSCH, 1937, p. 110 (type, *Parachorista splendida* TILLYARD, 1926e); *Phipoides* RIEK, 1953, p. 66 (type, *P. elegans*)]. In fore wing, RS with RS1+2 directed anteriorly, with its branches arising pectinately,

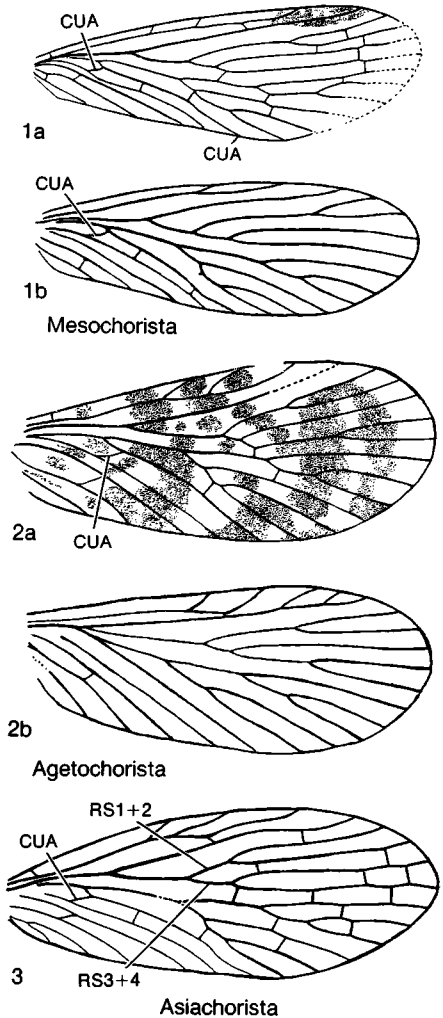


FIG. 211. Permochoristidae (p. 385).

or nearly so; RS and M with 6 branches; basal piece of CUA straight. MARTYNOVA, 1962e. *Perm.*, Australia (New South Wales). — FIG. 212,1. *\*P. pincombeae*; fore wing,  $\times 4$  (Riek, 1953).

**Petrochorista** MARTYNOV, 1931c, p. 182 [*\*P. elegantula*; OD] [= *Neopetromantis* RIEK, 1953, p. 67 (type, *N. australis*)]. Fore wing with SC long, costal area narrow; stem R diverging from SC to a marked extent; RS with 4 branches; M with 6 branches; basal piece of CUA long and straight. MARTYNOVA, 1962e. *Perm.*, USSR (Asian and European RSFSR), Australia (New South Wales). — FIG. 212,2. *\*P. elegantula*; fore wing,  $\times 8$  (Martynov, 1931c).

**Petromantis** HANDLIRSCH, 1904b, p. 5 [*\*P. rossica*; OD] [= *Idelopanorpa* ZALESSKY, 1929, p. 18 (type, *I. elegans*); *Martynowiella* HANDLIRSCH, 1937, p.

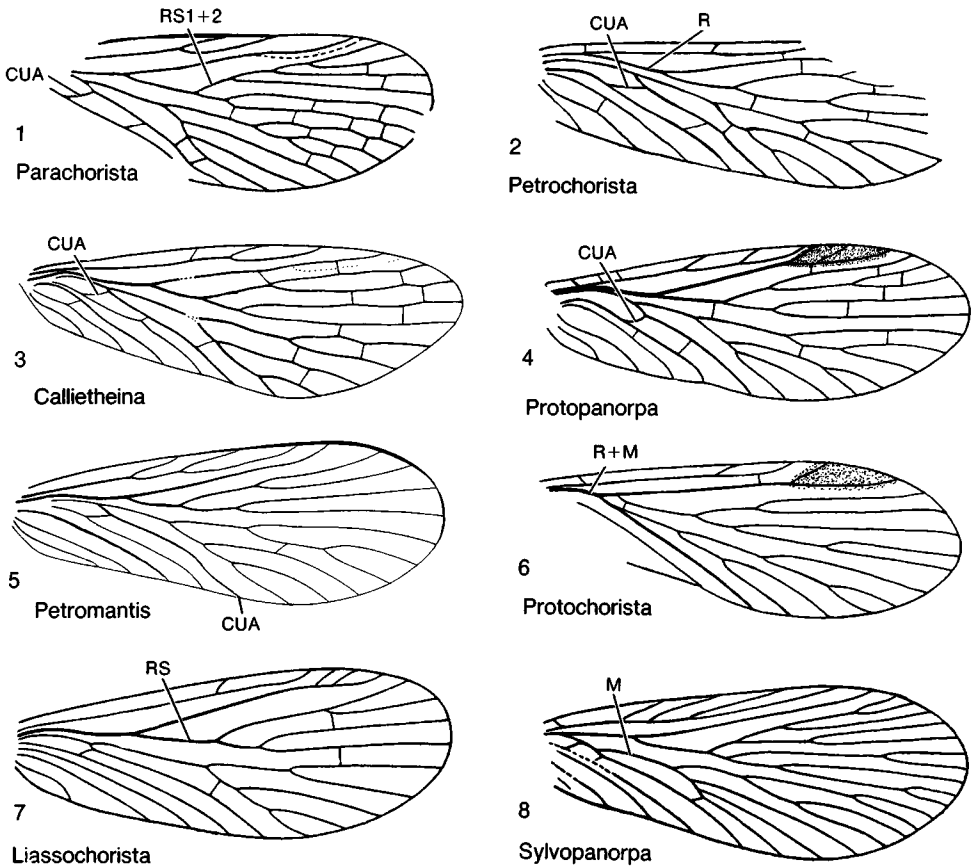


FIG. 212. Permochoristidae (p. 385–386).

109, *nom. nud.*]. Fore wing with branches of SC long, both arising before midwing; stem RS1+2 usually longer than stem RS3+4; CUA curved and irregular. MARTYNOVA, 1948a, 1961d, 1962e; PINTO, 1972a. *Perm.*, USSR (Asian and European RSFSR), Brazil. — FIG. 212, 5. *P. grandis* MARTYNOVA; fore wing,  $\times 5.5$  (Martynova, 1961d).

**Protochorista** TILLYARD, 1926c, p. 140 [*\*P. tetraclada*; OD]. Hind wing oval; SC parallel to R; stem R+M very short, RS arising close to wing base; CUA coalesced with M for a short distance basally. *Perm.*, USA (Kansas). — FIG. 212, 6. *\*P. tetraclada*; hind wing,  $\times 10$  (Carpenter, 1930b).

**Protopanorpa** TILLYARD, 1926c, p. 151 [*\*P. permiana*; OD]. Fore wing oval in shape, broad; venation very similar to that of *Petrochorista*; SC with 3 terminal branches; basal piece of CUA curved. *Perm.*, USA (Kansas). — FIG. 212, 4. *\*P. permiana*; fore wing,  $\times 10$  (Carpenter, 1930b).

**Stigmorista** MARTYNOVA, 1958, p. 87 [*\*S. captiosa*;

OD]. Little-known fore(?) wing; M1 long and unbranched; pterostigma unusually large, almost touching RS1+2. *Perm.*, USSR (Asian RSFSR). **Sylvopanorpa** MARTYNOV, 1940, p. 42 [*\*S. carpenteri*; OD]. Fore wing: SC with 3 long, oblique branches; RS with 10 branches; basal part of M strongly arched. [Probably representing a distinct family.] *Perm.*, USSR (Asian RSFSR). — FIG. 212, 8. *\*S. carpenteri*; fore wing,  $\times 5.5$  (Martynov, 1940).

**Xenochorista** RIEK, 1953, p. 69 [*\*X. splendida*; OD]. Fore wing as in *Agetochochista*, but RS with only 4 branches (possibly an individual variation). [Type of family Xenochoristidae RIEK, 1953.] MARTYNOVA, 1962e. *Perm.*, Australia (New South Wales).

### Family AGETOPANORPIDAE Carpenter, 1930

[Agetopanorpidae CARPENTER, 1930b, p. 97]

Fore wing somewhat broader than in Permochoristidae; vein SC remote from costal

margin, with long branches; RS with 5 to 6 branches; M with 6 branches; CUA coalesced with M from wing base to near level of origin of RS; no free basal piece of CUA present. Hind wing unknown. *Perm.*

**Agetopanorpa** CARPENTER, 1930b, p. 97 [*\*A. maculata*; OD]. Stems of RS1+2 and RS3+4 subequal. *Perm.*, USA (Kansas).—FIG. 213,4. *\*A. maculata*; fore wing,  $\times 6$  (Carpenter, 1930b).  
**Oochorista** MARTYNOV, 1933a, p. 32 [*\*O. gunderseni*; OD]. Stem of RS1+2 much longer than stem of RS3+4. *Perm.*, USSR (European RSFSR).—FIG. 213,6. *\*O. gunderseni*; fore wing,  $\times 4.5$  (Martynov, 1933a).

**Family LITHOPANORPIDAE**  
**Carpenter, 1930**

[Lithopanorpidae CARPENTER, 1930b, p. 95]

Fore wing similar to that of Permopanorpidae, but free basal piece of vein CUA very long, sigmoidal, and coalesced with M near its origin. *Perm.*

**Lithopanorpa** CARPENTER, 1930b, p. 95 [*\*Protopanorpa pusilla* TILLYARD, 1926c, p. 153; OD]. SC not extending to pterostigma, with only 1 distal veinlet; costal area very narrow; RS with 4 branches. [The species described as *L. kuznetskiensis* from the Permian of USSR (Asian RSFSR) by MARTYNOVA (1961d) almost certainly does not belong to *Lithopanorpa*.] MARTYNOVA, 1962e. *Perm.*, USA (Kansas).—FIG. 213,3. *\*L. pusilla* (TILLYARD); fore wing,  $\times 14$  (Carpenter, 1930b).

**Family TYCHTOPSYCHIDAE**  
**Martynova, 1958**

[Tychtopsychidae MARTYNOVA, 1958, p. 91]

Fore wing broadly oval, about twice as long as wide; stem of vein R + M curved away from SC; RS and M each with 4 branches; CUA almost touching M, connected by a short crossvein. *Perm.*

**Tychtopsyche** MARTYNOVA, 1958, p. 91 [*\*T. beljanini*; OD]. Veins RS1+2 and RS3+4 forking at about same level. MARTYNOVA, 1962e. *Perm.*, USSR (Asian RSFSR).—FIG. 213,10. *\*T. beljanini*; fore wing,  $\times 10$  (Martynova, 1958).

**Family MESOPANORPODIDAE**  
**Tillyard, 1918**

[Mesopanorpodidae TILLYARD, 1918c, p. 436]

Fore wing relatively broad; vein SC extending to pterostigmal area; M coalesced

with CUA basally and diverging anteriorly at its separation from CUA; RS and M with 4 branches. Hind wing little known. MARTYNOVA, 1962e; RIEK, 1953; WILLMANN, 1978. *Perm.*—*Trias.*

**Mesopanorpodes** TILLYARD, 1918c, p. 435, *nom. subst. pro Mesopanorpa* TILLYARD, 1918b, p. 747, *non* HANDLIRSCH, 1906b [*\*Mesopanorpa wianamattensis*; OD]. CUA of fore wing straight, continuing the line of CUA + M. *Perm.*—*Trias.*, Australia (New South Wales).—FIG. 213,2. *M. belmontensis* RIEK; fore wing,  $\times 6.3$  (Riek, 1953).  
**Afristella** RIEK, 1974c, p. 22 [*\*A. delicatula*; OD]. Little-known genus, based on incomplete wing. Similar to *Prochoristella*, but SC touching R distally and M and CUA in brief contact beyond wing base. WILLMANN, 1978. *Trias.*, South Africa.

**Prochoristella** RIEK, 1953, p. 72 [*\*P. megaloprepia*; OD]. Fore wing as in *Mesopanorpodes*, but SC remote from R distally; M and CUA separating very near wing base. MARTYNOVA, 1962e; WILLMANN, 1978. *Perm.*, Australia (New South Wales).

**Family LAURENTIPTERIDAE**  
**Martynova & Willmann, 1978**

[Laurentipteridae MARTYNOVA & WILLMANN in WILLMANN, 1978, p. 61, *nom. subst. pro Pseudodipteridae* MARTYNOVA in KOLOSITSYNA & MARTYNOVA, 1961, p. 163]

Fore wing triangular in form, much narrowed basally; vein SC extending much beyond midwing; costal area narrow; RS and M with 4 branches; CUA apparently coalesced with stem of M basally. Hind wing much shorter than fore wing. WILLMANN, 1978. *Trias.*—*Jur.*

**Laurentiptera** MARTYNOVA & WILLMANN in WILLMANN, 1978, p. 61, *nom. subst. pro Pseudodiptera* LAURENTIAUX & GRAUVOGEL in LAURENTIAUX, 1953, p. 488, *non* KAYE, 1918 [*\*Pseudodiptera gallica* LAURENTIAUX & GRAUVOGEL in LAURENTIAUX, 1953, p. 488; OD]. Fore wing with very narrow costal area; SC and R very close together; crossveins apparently absent from costal area; CUA not branched. Hind wing about half as long as fore wing. *Trias.*, Europe (France).—FIG. 213,11. *\*L. gallica*; fore wing and part of hind wing,  $\times 10$  (Martynova, 1962e).

**Ijapsyche** KOLOSITSYNA & MARTYNOVA, 1961, p. 163 [*\*I. sibirica*; OD]. Fore wing similar to that of *Laurentiptera*, but costal area broader and including several crossveins. Hind wing unknown. WILLMANN, 1978. *Jur.*, USSR (Asian RSFSR).

## Family PERMOCENTROPIDAE

Martynov, 1933

[Permocentropidae MARTYNOV, 1933a, p. 49]

Fore wing much as in Agetopanorpidae, but vein SC close to costal margin, with a short branch; costal margin slightly concave; RS with 4 branches; M with 6 branches; CUA coalesced with M from wing base, as in Agetopanorpidae. *Perm.*

**Permocentropus** MARTYNOV, 1933a, p. 49 [*\*P. philopotamoides*; OD]. Forks of RS1+2 and RS3+4 of subequal length; R with a short veinlet in pterostigmal area. *Perm.*, USSR (European RSFSR). — FIG. 213,9. *\*P. philopotamoides*; fore wing,  $\times 8$  (Martynov, 1933a).

## Family DINOPANORPIDAE

Carpenter, 1972

[Dinopanorpidae CARPENTER, 1972, p. 83]

Large Mecoptera, similar to Orthophlebiidae and Panorpidae. Hind wing with several strong crossveins between vein SC and costal margin; R extending almost to wing apex, curving posteriorly near its termination; RS with at least 8 terminal branches; CUA coalesced with M for short distance; CUP coalesced with 1A; crossveins more numerous than in Panorpidae or Orthophlebiidae. Fore wing and body unknown. *Mio.*

**Dinopanorpa** COCKERELL, 1924a, p. 2 [*\*D. megarche*; OD]. Hind wing with costal space relatively broad, with 5 to 6 strong veinlets from SC to margin. CARPENTER, 1972; WILLMANN, 1978. *Mio.*, USSR (Asian RSFSR). — FIG. 213,7. *\*D. megarche*; hind wing,  $\times 2$  (Cockerell, 1924a).

## Family ORTHOPHLEBIIDAE

Handlirsch, 1906

[*nom. correct.* HANDLIRSCH, 1920, p. 196, ex Orthophlebiidae HANDLIRSCH, 1906b, p. 479]

Fore wing slightly broader than in Panorpidae; vein SC with only 1 branch to costal margin; R not forked; RS with 5 to 9 branches; M with 5 branches (rarely more); CUA not fused with M basally, but connected to it by short crossvein. Hind wing similar to fore wing but slightly smaller and SC a little shorter; CUA coalesced with M

basally for short distance, free piece of CUA resembling crossvein. Rostrum little known, apparently a little shorter than in Panorpidae; tarsi with 5 segments; abdominal structure of male unknown. *Trias.*—*Jur.*

**Orthophlebia** WESTWOOD in BRODIE, 1845, p. 102 [*\*O. communis*; OD] [= *Orthophlebioides* HANDLIRSCH, 1906b, p. 481, *nom. nud.*; *Orthophlebiites* HANDLIRSCH, 1939, p. 83 (type, *O. radialis*); *Synorthophlebia* HANDLIRSCH, 1939, p. 84, *nom. nud.*]. Fore wing with RS1+2 and RS3+4 forking at about same level; RS1 forking at least 3 times. Hind wing with distal crossvein between M4 and CUA absent. TILLYARD, 1933; MARTYNOV, 1937a; MARTYNOVA, 1948a, 1962e; BODE, 1953; WILLMANN, 1978. *Trias.*, USSR (Kirghiz); *Jur.*, England, Europe (Germany), USSR (Kazakh). — FIG. 213,1. *O. liassica* (MANTELL), England; *a*, fore and *b*, hind wings,  $\times 3.5$  (Tillyard, 1933).

**Mesopanorpa** HANDLIRSCH, 1906b, p. 615 [*\*Panorpa hartungi* BRAUER, REDTENBACHER, & GANGLBAUER, 1889, p. 16; OD]. Fore wing as in *Protorthophlebia*, but stem RS1+2 twice as long as stem RS3+4. MARTYNOV, 1927a; MARTYNOVA, 1948a, 1962e; RIEK, 1950; WILLMANN, 1978. *Trias.*, USSR (Kirghiz); *Jur.*, USSR (Asian RSFSR, Kazakh, Kirghiz, Tadzhik), Europe (Germany), England. — FIG. 213,8. *\*M. hartungi* (BRAUER, REDTENBACHER, & GANGLBAUER), *Jur.*, USSR; fore wing,  $\times 5$  (Martynov, 1927a).

**Protorthophlebia** TILLYARD, 1933, p. 28 [*\*P. latipennis*; OD] [= *Choristopanorpa* RIEK, 1950, p. 254 (type, *C. bifasciata*)]. Similar to *Orthophlebia*, but RS1 with only 2 branches. MARTYNOVA, 1948a, 1962e; BODE, 1953; WILLMANN, 1978. *Trias.*, USSR (Kirghiz), Australia (Queensland); *Jur.*, England. — FIG. 213,5. *\*P. latipennis*, England; fore wing,  $\times 6$  (Tillyard, 1933).

## Family NANNOCHORISTIDAE

Tillyard, 1917

[Nannochoristidae TILLYARD, 1917b, p. 289] [= Robinjohniidae MARTYNOVA, 1948a, p. 42]

Rostrum very slender. Fore wing venation as in Choristidae (recent), but vein RS with 3 branches; M usually with 4 branches; CUA coalesced with M for a considerable distance basally. Hind wing similar to fore wing, but SC shorter and CUA coalesced with M for a greater distance. *Perm.*—*Holo.*

**Nannochorista** TILLYARD, 1917b, p. 292. *Holo.*

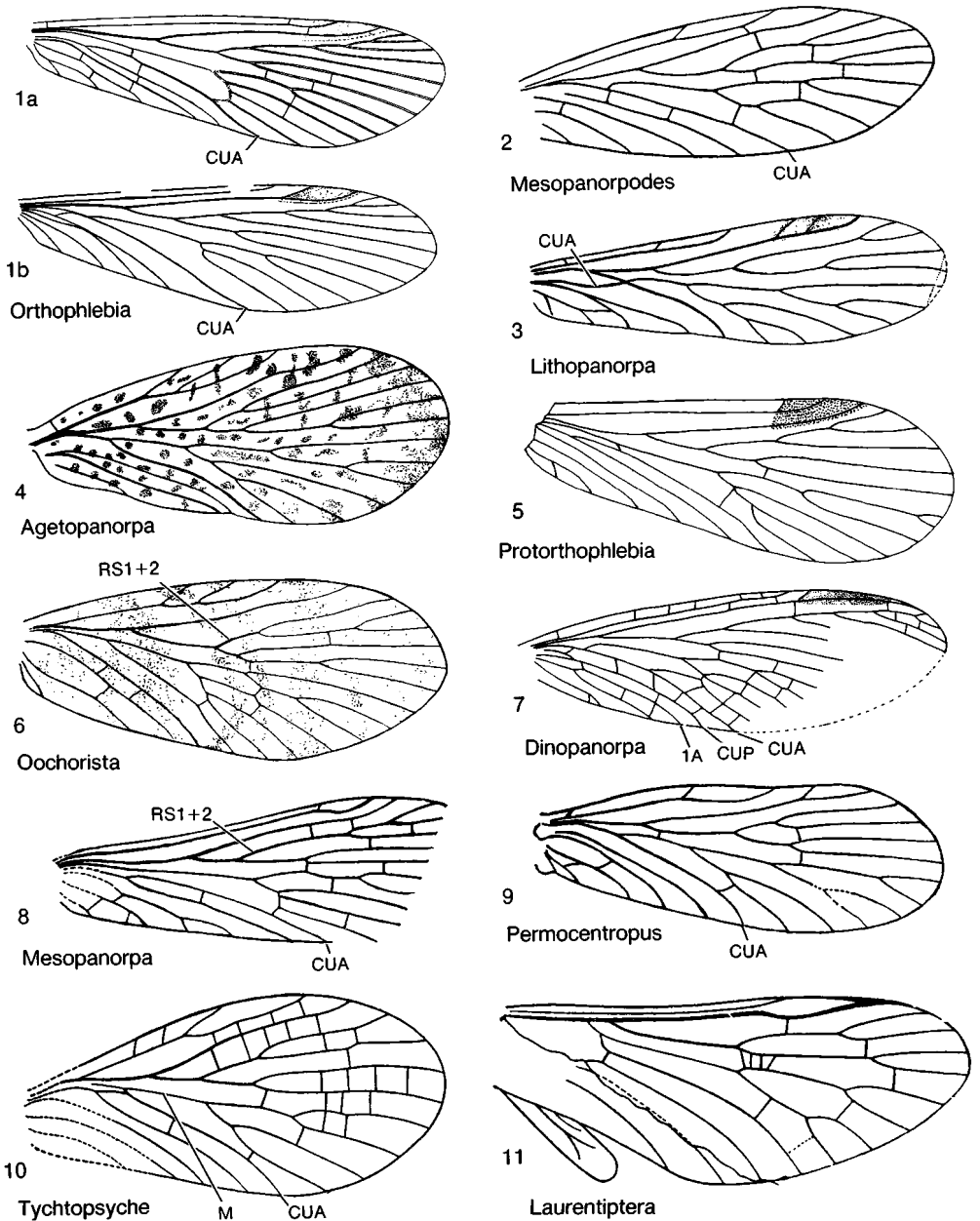


FIG. 213. Agetopanorpidae, Lithopanorpidae, Tychtopsychidae, Mesopanorpididae, Laurentipteridae, Permocentropidae, Dinopanorpidae, and Orthophlebiidae (p. 387–388).

*Nannochoristella* RIEK, 1953, p. 74 [*\*N. reducta*; OD]. Fore wing as in *Neochoristella*, but M with 3 branches. *Perm.*, Australia (New South Wales). — FIG. 214,8. *\*N. reducta*; fore wing,  $\times 10$  (Riek, 1953).

*Neochoristella* RIEK, 1953, p. 74 [*\*N. optata*; OD].

Fore wing with SC long; R unbranched; M with 4 branches. *Perm.*, Australia (New South Wales). — FIG. 214,9. *\*N. optata*; fore wing,  $\times 14$  (Riek, 1953).

*Robinjohnia* MARTYNOVA, 1948a, p. 42 [*\*R. tillyardi*; OD]. Fore wing as in *Nannochoristella*,

but SC very short, not reaching to midwing; M with 4 branches. Hind wing slightly smaller than fore wing. [Family assignment doubtful.] *Perm.*, Australia (New South Wales).—FIG. 214.7. \**R. tillyardi*; *a*, fore and *b*, hind wings,  $\times 11$  (Riek, 1968a).

### Family PANORPIDAE Latreille, 1804–1805

[*nom. correct.* LEACH, 1815, p. 137, *pro* Panorpidae LATREILLE, 1804–1805, p. 19]

Rostrum well developed. Fore wing slender; vein SC long, extending to pterostigmal region; RS usually with 5 branches; M usually with 4 branches, rarely 5; CUA not coalesced with M, but joined to it by a short crossvein. Hind wing: SC extending to about midwing; CUA coalesced with M basally. *Paleoc.*—*Holo.*

*Panorpa* LINNÉ, 1758, p. 551. COCKERELL, 1908p; STATZ, 1936a; CARPENTER, 1954. WILLMANN, 1976. *Oligo.*, Europe (Baltic, Germany), England, USA (Colorado)—*Holo.*

*Holcorpa* SCUDDER, 1878a, p. 540 [\**H. maculosa*; OD]. Related to *Neopanorpa* (recent); sixth to eighth abdominal segments very elongate; genital bulb of male large, with long forceps. Fore wing: RS with 5 to 6 branches; M with 5 branches. *Oligo.*, USA (Colorado).—FIG. 214.1. \**H. maculosa*; whole insect,  $\times 1.6$  (Carpenter, 1931c).

### Family PANORPODIDAE Handlirsch, 1920

[*nom. transl.* BYERS, 1965, p. 123, *ex* Panorpoquinae HANDLIRSCH, 1920, p. 842]

Wing venation as in Panorpidae, but rostrum much shorter. *Oligo.*—*Holo.*

*Panorpodes* MACLACHLAN, 1875, p. 188 [= *Electropanorpa* CARPENTER, 1931c, p. 409 (type, *Panorpa brevicauda* HAGEN in PICTET & HAGEN, 1856)]. CARPENTER, 1954. *Oligo.*, Europe (Baltic)—*Holo.*

### Family NEORTHOPHLEBIIDAE Handlirsch, 1939

[Neorthophlebiidae HANDLIRSCH, 1939, p. 86]

Fore wing more slender than in Orthophlebiidae; vein SC ending near midwing, without branches to front margin; pterostigma usually weak; RS1 forked at about level of pterostigma; RS and M usually with 4 branches; terminal branches of RS and M

straight; CUA coalesced with M basally. *Trias.*—*Jur.*

*Neorthophlebia* HANDLIRSCH, 1906b, p. 479 [\**N. maculipennis*; OD] [= *Mesobittacus* HANDLIRSCH, 1939, p. 88 (type, *M. minutus*); *Pleobittacus* BODE, 1953, p. 289 (type, *P. retroflexus*)]. SC not quite reaching midwing; M and CUA coalesced basally, diverging close to wing base; pterostigma small. MARTYNOVA, 1948a; WILLMANN, 1978. *Jur.*, Europe (Germany), USSR (Asian RSFSR, Kirghiz).—FIG. 214.5. \**N. maculipennis*, Germany; fore wing,  $\times 5$  (Handlirsch, 1906b).

*Auxobittacus* BODE, 1953, p. 285 [\**A. praeacutus*; OD]. Fore wing as in *Protobittacus*, but forks of RS1+2 and M4 very shallow. [Probably a synonym of *Protobittacus*.] *Jur.*, Europe (Germany).

*Bittacopanorpa* ZALESSKY, 1935, p. 688 [\**B. javorskii*; OD]. Little-known wing, with SC not reaching midwing. [Probably a synonym of *Neorthophlebia*.] *Trias.*, USSR (Asian RSFSR).

*Haplobittacus* BODE, 1953, p. 291 [\**H. parvus*; OD]. Little-known fore wing, similar to that of *Neorthophlebia* but M1+2 apparently unbranched. *Jur.*, Europe (Germany).

*Protobittacus* TILLYARD, 1933, p. 48 [\**P. liassicus*; OD] [= *Metaxybittacus* BODE, 1953, p. 287 (type, *M. vittatus*); *Polydicrobittacus* BODE, 1953, p. 290 (type, *P. lingula*); *Archebittacus* RIEK, 1955, p. 666 (type, *A. exilis*)]. Fore wing as in *Neorthophlebia*, but SC extending slightly beyond midwing; pterostigma large. MARTYNOVA, 1949c, 1962e; RIEK, 1953. *Trias.*, Australia (Queensland); *Jur.*, England, Europe (Germany), ?China (Xinjiang).—FIG. 214.3. \**P. liassicus*, England; fore wing,  $\times 3.5$  (Tillyard, 1933).

### Family BITTACIDAE Handlirsch, 1906

[*nom. correct.* ENDERLEIN, 1910a, p. 387, *pro* Bittacidae HANDLIRSCH, 1906b, p. 43]

Wings usually very narrow basally, broadened distally; pterostigma commonly well developed. Fore wing with vein SC extending beyond midwing; RS and M usually with 4 somewhat zigzagged branches; CUA coalesced with M basally, at least for a short distance. *Jur.*—*Holo.*

*Bittacus* LATREILLE, 1805, p. 19 [= *Electrobittacus* CARPENTER, 1931c, p. 410 (type, *B. antiquus* PICTET, 1854)]. CARPENTER, 1954, 1955; JARZEMBOWSKI, 1980. *Eoc.*, USA (Utah); *Oligo.*, England, Europe (Baltic)—*Holo.*

*Palaeobittacus* CARPENTER, 1928, p. 242 [\**P. eocenicus*; OD]. Fore wing as in *Bittacus* but with more diffuse pterostigma and crossvein between stem of RS and stem of M. MARTYNOVA,



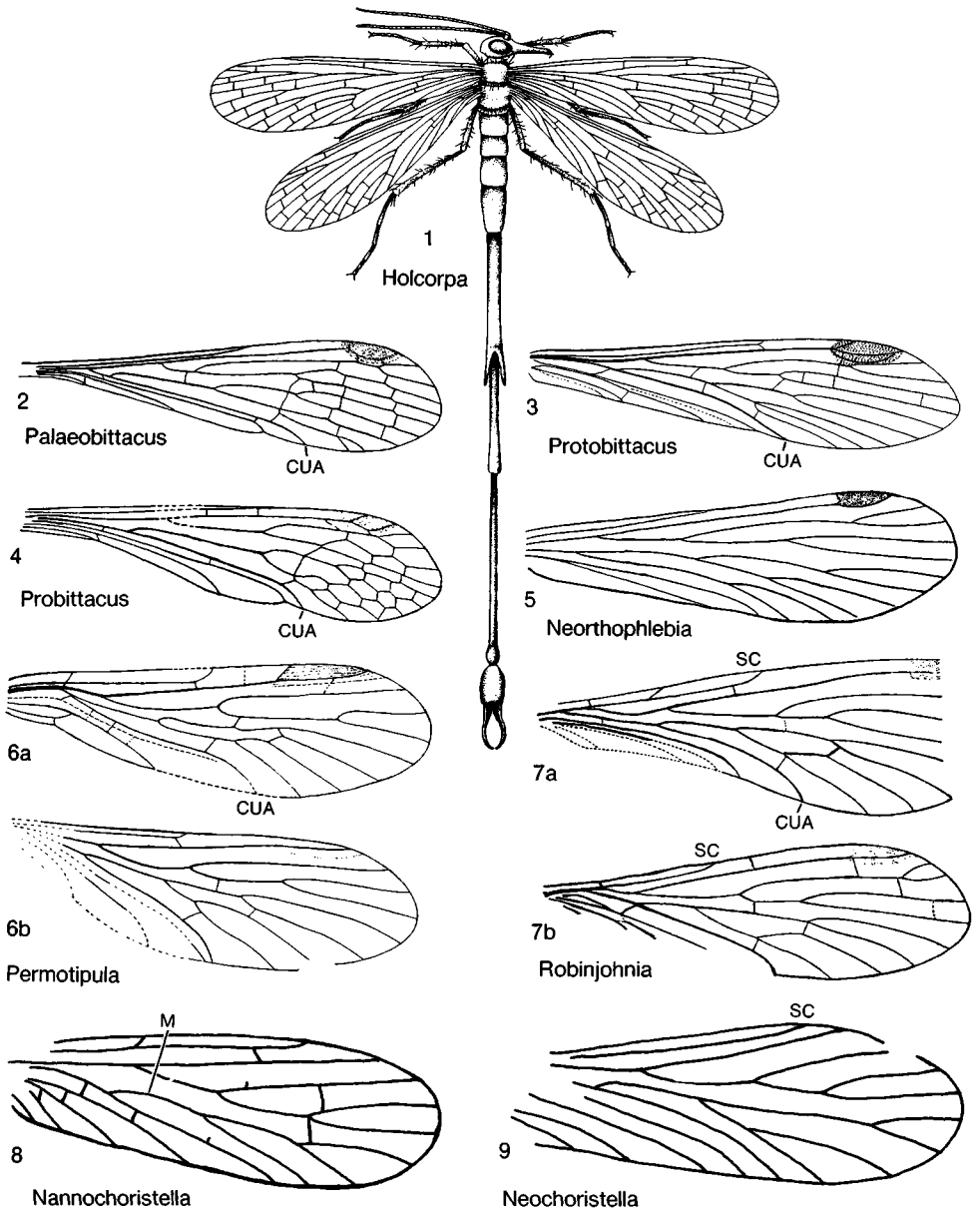


FIG. 214. Nannochoristidae, Panorpidae, Neorthopplebiidae, Bittacidae, and Permotipulidae (p. 389–392).

1949c. *Eoc.*, USA (Colorado). — FIG. 214, 2. \**P. eocenicus*; fore wing,  $\times 4.5$  (Carpenter, 1928). *Probittacus* MARTYNOV, 1927a, p. 658 [\**P. avitatus*; OD]. Fore wing with branches of M strongly zigzagged; marked incision of wing margin at end of CUP. CARPENTER, 1931c; ROHDENDORF, 1962a. *Jur.*, USSR (Kazakh). — FIG. 214, 4. \**P. avitus*; fore wing,  $\times 3.5$  (Martynov, 1927a).

**Family CHORISTIDAE**  
**Esben-Petersen, 1915**

[*nom. transl.* TILLYARD, 1926d, p. 300, *ex* Choristinae  
 ESSEN-PETERSEN, 1915, p. 232]

Fore wing as in Panorpidae, but costal margin convex basally; vein CUA coalesced

for short distance with M; RS with 4 branches; M usually with 5 branches. *Paleoc.*—*Holo.*

Chorista KLUG, 1836, p. 87. RIEK, 1952a. *Paleoc.*, Australia (Queensland)—*Holo.*

### Family PERMOTIPULIDAE

Tillyard, 1929

[Permotipulidae TILLYARD, 1929, p. 779]

Fore wing subpetiolate; vein RS with 3 branches; M with 4 branches; CUA unbranched, touching M shortly after its origin; CUP obsolete. Hind wing unknown. [Ordinal position uncertain.] *Perm.*,

*Permotipula* TILLYARD, 1929, p. 779 [\**P. patricia*; OD]. M forking before RS. *Perm.*, Australia (New South Wales), USSR (Asian RSFSR).—FIG. 214,6a. \**P. patricia*, Australia; fore wing,  $\times 11$  (Tillyard, 1935d).—FIG. 214,6b. *P. borealis* MARTYNOVA, USSR; fore wing,  $\times 12.5$  (Tillyard, 1929).

### Family PSEUDOPOLYCENTROPIDAE

Handlirsch, 1920

[Pseudopolycentropidae HANDLIRSCH, 1920, p. 198]

Fore wing broad distally, nearly triangular in shape; hind wing only about half size of fore wing; costal margins of both wings nearly straight. Fore wing with pterostigma present but weak; vein SC very short; RS with 4 branches; M coalesced with CUA for very short distance basally; M with 4 branches; CUA and CUP unbranched. *Jur.*

*Pseudopolycentropus* HANDLIRSCH, 1906b, p. 482 [\**Phryganidium perlaeforme* GEINITZ, 1884, p. 575; OD]. R very straight; fork of RS1 + 2 much shorter than that of RS3 + 4. MARTYNOV, 1927a; HANDLIRSCH, 1939. *Jur.*, Europe (Germany); USSR (Kazakh).—FIG. 215,2. *P. latipennis* MARTYNOV, USSR; *a*, fore and *b*, hind wings,  $\times 7$  (Martynov, 1927a).

### Family CHORISTOPSYCHIDAE

Martynov, 1937

[Choristopsychidae MARTYNOV, 1937a, p. 26]

Fore wing broadly oval; vein SC long, with 2 long anterior branches; RS with 4 branches; M with 5 branches; CUA coalesced with M basally, strongly bent at about its midpoint. *Perm.*

*Choristopsyche* MARTYNOV, 1937a, p. 26 [\**C. tenuinervis*; OD]. Origin of RS at about same level

as separation of M from CUA; several crossveins between CUP and CUA and between CUP and 1A. MARTYNOVA, 1962e. *Perm.*, USSR (Tadzhik).—FIG. 215,7. \**C. tenuinervis*; fore wing,  $\times 6$  (Martynov, 1937a).

### Family MESOPSYCHIDAE

Tillyard, 1917

[Mesopsychidae TILLYARD, 1917a, p. 180] [=Aristopsychidae JEANNEL, 1949, p. 73]

Fore wing slender and oval; vein SC extending beyond midwing; pterostigma apparently absent or very weak; R straight at origin of RS; RS and M with 4 branches; CUA unbranched, anastomosed with M basally. RIEK, 1956; MARTYNOVA, 1962e; WILLMANN, 1978. *Trias.*

*Mesopsyche* TILLYARD, 1917a, p. 181 [\**M. triareolata*; OD] [=Triassopsyche TILLYARD, 1917a, p. 182 (type, *T. dunstani*); *Aristopsyche* TILLYARD, 1919a, p. 200 (type, *A. superba* TILLYARD); *Neuropsyche* TILLYARD, 1919a, p. 203 (type, *N. elongata* TILLYARD)]. Fore wing usually with several costal veinlets; RS and M forking at about same level; several crossveins commonly present between branches of RS. RIEK, 1956; WILLMANN, 1978. *Trias.*, Australia (Queensland).—FIG. 215,6. *M. superba*; fore wing,  $\times 2.3$  (Tillyard, 1919a).

### Family UNCERTAIN

The following genera, apparently belonging to the order Mecoptera, are too poorly known to permit assignment to families.

*Anormochorista* TILLYARD, 1926c, p. 155 [\**A. oligoclada*; OD]. Little-known genus, based on incomplete fore wing; RS with 4 branches; pterostigma present; M with at least 3 branches; basal parts of M and CUA unknown. [Type of family Anormochoristidae TILLYARD, 1926c.] CARPENTER, 1930b; WILLMANN, 1978. *Perm.*, USA (Kansas).

*Austropanorpa* RIEK, 1952a, p. 11 [\**A. australis*; OD]. Little-known fore wing, similar to that of *Panorpa*, but RS apparently having 8 or 9 terminal branches arising pectinately. [Placed in new family Austropanorpidae by WILLMANN (1977a, p. 12).] *Paleoc.*—*Plio.*, Australia (Queensland).

*Belmontia* TILLYARD, 1919b, p. 234 [\**B. mitchelli*; OD] [=Parabelmontia TILLYARD, 1922a (type, *P. permiana*)]. Fore wing with long SC; RS with 6 branches; M with 4 branches; CUA with prominent basal piece and shallow fork. [Type of family Belmontiidae TILLYARD, 1922a (=Parabelmontiidae TILLYARD, 1922a)]. RIEK,

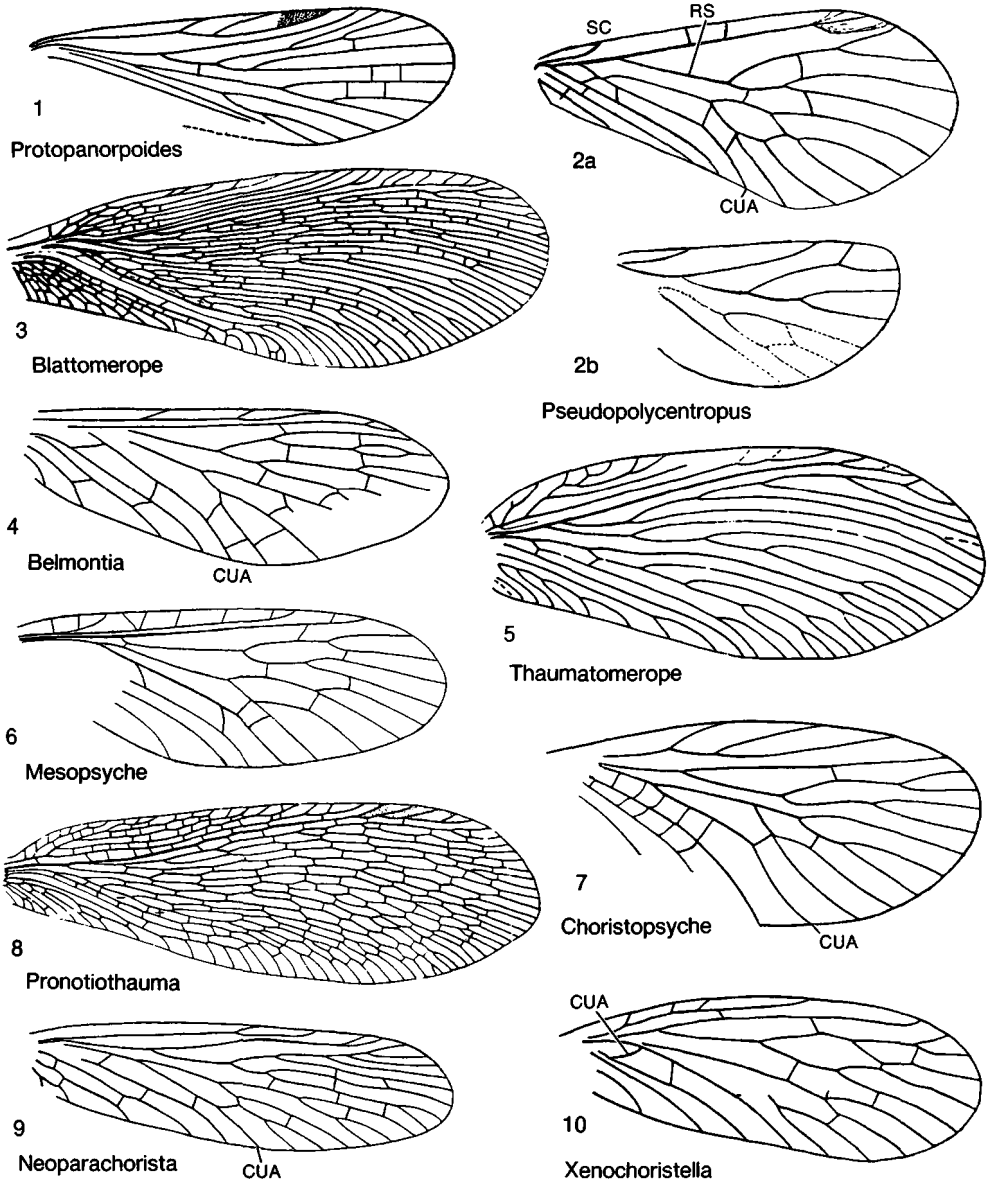


FIG. 215. Pseudopolycentropidae, Choristopsychidae, Mesopsychidae, and Uncertain (p. 392–395).

1953; WILLMANN, 1978. *Perm.*, Australia (New South Wales). — FIG. 215.4. *B. permiana* (TILLYARD); fore(?) wing,  $\times 3.3$  (Riek, 1953).

**Blattomerope** RASNITSYN in PONOMARENKO & RASNITSYN, 1974, p. 67 [*B. polyneura*; OD]. Fore wing similar to that of *Pronotiothauma*, but costal margin nearly straight basally, SC terminating more distally, and branches of M and CUA more regular and nearly parallel. [Placed in family Meropeidae (recent) by PONOMARENKO and RASNITSYN (1974) and in the family Eome-

ropidae (recent) by WILLMANN (1978).] *Trias.*, USSR (Kirghiz). — FIG. 215.3. *\*B. polyneura*; fore wing,  $\times 5.5$  (Ponomarenko & Rasnitsyn, 1974).

**Choristotanyderus** RIEK, 1953, p. 76 [*\*C. nanus*; OD]. Hind(?) wing with SC short, close to costal margin; rest of venation much as in *Permotanyderus*. [Possibly based on hind wing of *Permotanyderus*.] WILLMANN, 1978. *Perm.*, Australia (New South Wales).

**Cimbrophebia** WILLMANN, 1977b, p. 736 [*\*C. bit-*

- taciformis*; OD]. Little-known genus, apparently related to Bittacidae. Wings long and slender, but RS with 4 or 5 branches and 2A with several branches. [Placed in new family Cimbrophlebiidae.] *Eoc.*, Europe (Denmark).
- Dobbertinia** HANDLIRSCH, 1920, p. 198 [\**D. reticulata*; OD]. Little-known fore wing with long SC; RS and M with 4 branches; CUA with 3 branches. WILLMANN, 1978. [Ordinal position uncertain; type of family Dobbertinidae HANDLIRSCH, 1939.] *Jur.*, Europe (Germany).
- Ferghanopsyche** MARTYNOV, 1937a, p. 29 [\**F. rotundata*; OD]. Little-known hind(?) wing with long SC; R forked distally; RS and M with 4 branches; CUA unbranched, apparently coalesced with M basally. MARTYNOVA, 1962e. *Trias.*, USSR (Tadzhik).
- Liassopanorpa** MARTYNOV, 1937a, p. 24 [\**L. crassinervis*; OD]. Little-known wing (base only); CUA not touching M, its basal piece longitudinal. *Jur.*, USSR (Tadzhik).
- Limfjordia** WILLMANN, 1977b, p. 740 [\**L. breineri*; OD]. Wings broad and relatively short. Fore wing with an unusual increase in branching; R1 terminating close to pterostigma. [Placed in new family, Limfjordidae WILLMANN, 1977b.] *Eoc.*, Europe (Denmark).
- Mesotanyderus** RIEK, 1955, p. 670 [\**M. jonesi*; OD]. Fore wing with SC close to costal margin as in *Permotanyderus*, but CUA coalesced with M basally. WILLMANN, 1978. *Trias.*, Australia (Queensland).
- Neoparachorista** RIEK, 1955, p. 662 [\**N. perkinsi*; OD]. Fore wing slender; R with 2 or 3 branches; CUA coalesced with M briefly basally; M with 6 terminal branches. Hind wing: M with 4 branches. [Type of family Neoparachoristidae WILLMANN, 1978, p. 53.] MARTYNOVA, 1962e. *Trias.*, Australia (Queensland).—FIG. 215,9. \**N. perkinsi*; fore wing,  $\times 2.5$  (Riek, 1955).
- Neopermopanorpa** RIEK, 1955, p. 658 [\**N. mesembria*; OD]. Little-known genus, based on wing fragments; SC longer than in *Permopanorpa*. WILLMANN, 1978. *Trias.*, Australia (Queensland).
- Parabittacus** HANDLIRSCH, 1939, p. 91 [\**P. analis*; OD]. Little-known wing (base only); wing apparently slender, narrow basally; CUA coalesced with M at base of wing. WILLMANN, 1978. *Jur.*, Europe (Germany).
- Parorthophlebia** BODE, 1953, p. 275 [\**P. gras-selensis*; OD]. Little-known fore wing; SC long, with numerous costal veinlets; R forked; RS with 5 branches; M with 4 branches; CUA forked. WILLMANN, 1978. *Jur.*, Europe (Germany).
- Permotanyderus** RIEK, 1953, p. 75 [\**P. ableptus*; OD]. Fore wing with SC long and very close to costal margin; pterostigma distinct; RS and M with 4 branches; CUA not coalesced with M. [Ordinal position uncertain; type of family Permotanyderidae RIEK.] WILLMANN, 1978. *Perm.*, Australia (New South Wales).
- Pronotiothauma** WILLMANN, 1978, p. 15 [\**Thaumatomerope neuropteroides* RASNITSYN in PONOMARENKO & RASNITSYN, 1974, p. 65; OD]. Fore wing as in *Thaumatomerope*, but costal area broader basally, with more extensive series of reticulate veins. [Placed in the family Meropeidae (recent) by PONOMARENKO & RASNITSYN (1974) and in the family Eomeropidae (recent) by WILLMANN (1978).] *Trias.*, USSR (Kirghiz). —FIG. 215,8. \**P. neuropteroides*; fore wing,  $\times 5$  (Ponomarenko & Rasnitsyn, 1974).
- Protopanorpoides** MARTYNOVA, 1962e, p. 287 [\**Protopanorpa elongata* MARTYNOV; OD]. SC of fore wing long, with long branches; R and RS1 curved and remote from costa; RS with 5 branches; M with 6 branches; structure of CUA unknown. [Possibly belonging to *Permochoristidae*.] WILLMANN, 1978. *Perm.*, USSR (European RSFSR). —FIG. 215,1. \**P. elongata* (MARTYNOV); fore wing,  $\times 6$  (Martyanova, 1962e).
- Ptychopteropsis** MARTYNOV, 1937a, p. 35 [\**P. mirabilis*; OD]. Hind(?) wing little known, oval; SC extending to midwing; R straight, not forked; RS with 3 branches; CUA at least touching M basally. MARTYNOVA, 1962e; WILLMANN, 1978. *Trias.*, USSR (Tadzhik).
- Sogdopsyche** MARTYNOV, 1937a, p. 32 [\**S. elongata*; OD]. Fore wing little known, very slender; SC extending at least to midwing; R unbranched; RS and M with 4 branches; CUA apparently coalesced with M for a considerable distance. MARTYNOVA, 1962e; WILLMANN, 1978. *Trias.*, USSR (Tadzhik).
- Stenopanorpa** HANDLIRSCH, 1906b, p. 616 [\**Panorpa gracilis* GIEBEL, 1856, p. 258; OD]. Little-known genus, based on incomplete wing. WILLMANN, 1978. *Jur.*, Europe (Germany).
- Thaumatomerope** RASNITSYN in PONOMARENKO & RASNITSYN, 1974, p. 61 [\**T. sogdiana*; OD]. Fore wing broadly oval; SC with 2 to 3 branches; RS and M with a total of 18 to 33 terminal branches. Venational patterns of fore and hind wings similar, except for CUA. [Placed in family Meropeidae (recent) by PONOMARENKO and RASNITSYN (1974) and in Eomeropidae (recent) by WILLMANN (1978).] *Trias.*, USSR (Kirghiz). —FIG. 215,5. \**T. sogdiana*; fore wing,  $\times 6.5$  (Ponomarenko & Rasnitsyn, 1974).
- Turanopsyche** MARTYNOV, 1937a, p. 37 [\**T. venosa*; OD]. Little-known hind(?) wing; SC not reaching midwing; RS with 3 main branches; RS2+3 forking at wing margin; CUA straight, not coalesced with M. WILLMANN, 1978. *Trias.*, USSR (Tadzhik).
- Xenochoristella** RIEK, 1955, p. 668 [\**X. billae*; OD]. SC of fore wing with short branches; CUA coalesced with M basally for a short distance. MARTYNOVA, 1962e; WILLMANN, 1978. *Perm.*,

Australia (New South Wales).—FIG. 215, 10.  
 \**X. billae*; fore wing,  $\times 5.5$  (Riek, 1955).  
*Xenopanorpa* RIEK, 1955, p. 659 [\**X. didymovena*; OD]. Little-known wing; RS and M each with 7 or 8 branches. MARTYNOVA, 1962e; WILLMANN, 1978. *Trias.*, Australia (Queensland).

## Order SIPHONAPTERA Latreille, 1825

[Siphonaptera LATREILLE, 1825, p. 334]

Small, apterous insects, body laterally compressed. Head sessile on prothorax; compound eyes absent, but 2 lateral ocelli frequently present; antennae short in female, longer in male; mouthparts modified for piercing-sucking, maxillae in form of long, cutting blades; maxillary and labial palpi well developed; prothorax and mesothorax small, metathorax large; legs well developed, hind pair long and used for jumping; abdomen with 10 distinct segments, terga with rows of setae. Combs (ctenidia) in the form of rows of thick, flattened bristles present in some on genital area, pronotum, and, rarely, metanotum. *Oligo.*—*Holo.*

The adults are blood-sucking, mostly parasites on mammals, especially rodents, and rarely on birds. The larvae are free-living and feed on organic debris, largely the feces of adult fleas.

The fleas constitute a relatively small order of ectoparasites. The only known fossils are two congeneric species in Baltic amber, belonging to a family that is considered to be among the more specialized families of the order (HOLLAND, 1964).

Two apterous insects from the Lower Cretaceous of Australia have been noted by RIEK (1970) and considered by him to belong to the order, but they have not been fully described and remain unnamed. Specialists who have examined the fossils are of the opinion that they are not fleas. Another wingless insect from the Cretaceous (*Saurophthirus longipes* PONOMARENKO, 1976) has also been placed in the Siphonaptera (RASNITSYN, 1980e), but since the specimen has long, slender legs and lacks any indication of the

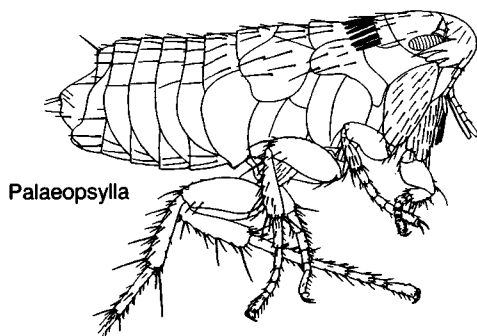


FIG. 216. Hystrichopsyllidae (p. 395).

characteristic lateral compression of the body, its placement in the Siphonaptera is very dubious. It is herein assigned to the category Order Uncertain.

The origin of the Siphonaptera is by no means clear. Several authors have suggested the derivation of the fleas from the Coleoptera, Diptera, or Mecoptera, but the evidence for each of these is weak and inconclusive (KRISTENSEN, 1975, 1981; HENNIG, 1981). About all that can be said with confidence at the present time is that they are members of the Endopterygota.

### Family HYSTRICHOPSYLLIDAE Tiraboschi, 1904

[Hystrichopsyllidae TIRABOSCHI, 1904, p. 242]

Pronotal ctenidium usually present; hind margin of metanotum without spines; hind coxae without spinelike setae on inner surface. Mostly parasites on moles and shrews. [Extinct species of moles and shrews are known from the Oligocene of Europe.] *Oligo.*—*Holo.*

*Palaeopsylla* WAGNER, 1903, p. 137. DAMPF, 1911; HENNIG, 1939; HOPKINS & ROTHSCHILD, 1966; PEUS, 1968. *Oligo.*, Europe (Baltic)—*Holo.*—FIG. 216. *P. klebsiana* DAMPF; lateral view,  $\times 30$  (Dampf, 1911).

## Order DIPTERA Linné, 1758

[Diptera LINNÉ, 1758, p. 584]

Very small to medium-sized insects. Head commonly large. Most of head surface except