Diptera

Australia (New South Wales).—Fig. 215, 10. *X. hillae*; fore wing, ×5.5 (Riek, 1955).


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 genal 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 (*Saurophilius 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 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 & ROTHSCHEIDER, 1966; PEUS, 1968. *Oligo., Europe* (Baltic)–Holo. — Fig. 216. *P. klebsiana* DAMPF; lateral view, ×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...
**Hexapoda**

The relatively large compound eyes generally bearing prominent bristles, bristle arrangement useful in generic and family classification (Fig. 217,1). Antennae diverse; filiform in more generalized members of order (Nematocera), shorter and with fewer segments in more specialized members (Brachycera). Mouthparts of adults suctorial, forming a proboscis that may include stylets for piercing. Mandibles present only in some nematocerous females. Maxillae commonly highly modified, though segmented palpi may be present. Labium forming proboscis, bearing distally a pair of fleshy lobes (labella). Hypopharynx long and slender. Prothorax and metathorax small, metathorax more or less fused with large mesothorax; thorax generally with prominent bristles, especially in higher Brachycera.

Fore wings membranous, with a distinct venation resembling that of generalized Mecoptera though commonly much reduced or otherwise modified. Venational homologies clear in generalized families but uncertain in some specialized families.

Several widely different terminologies have been used for venation in the past, but in recent years most dipterists have agreed on the terminology and the homologies employed here, which are those used by Colless and McAlpine (1970). In the tipuloids (suborder Nematocera, Fig. 217,2), which appear to have the least specialized wings among recent Diptera, veins SC and R are straight, independent, and long; RS is dichotomously forked and its branches terminate in the apical region of the wings; M, apparently coalesced with CUA basally, shows neither convexity nor concavity but divides into four terminal and nearly parallel branches; CUA is a strong vein and (in the present interpretation) terminates without forking. CUP is a weak vein, arising from the base of 1A and becoming obsolescent before the wing margin. Vein 1A is nearly straight or gently curved, reaching the hind margin remote from the wing base; 2A is short and independent of 1A. In these tipuloids and other generalized families, the wings tend to be slenderly oval, often petiolate.

In the more highly specialized families, such as the muscoids (suborder Brachycera, Fig. 217,3), veins SC and R are greatly shortened and may be coalesced; they often terminate before the wing apex. Vein M tends to fork near the base and its branches in general are reduced; CUA commonly diverges posteriorly just beyond the end of CUP and
coalesces with 1A, forming a compound vein, CUA+1A, which may extend to the wing margin or be very short or virtually absent. Vein 2A is most commonly much reduced or absent. In these specialized families the wings tend to be broad, especially basally, with the development of one or two lobes (calypteres and alulae) along the inner posterior margin.

In all known alate Diptera the hind wings have been modified to halteres, each consisting of a small, slender stalk terminating in a knob; these structures oscillate in flight and function as balancing organs.

With some exceptions, only a few crossveins (humeral, r-m, and m-cu) occur in dipterous wings, although additional crossveins may be present near the points of origin of distal branches of the veins. In some species, parts of the longitudinal veins have become transverse in position and resemble crossveins. Ordinarily, however, there are only a few closed cells in the wings; the discal cell, formed by the forking of M, is the one most commonly present (Fig. 217,2,3).

The legs of the Diptera are basically cursorial, though the fore pair may be more or less raptorial in some species. The tarsi typically have five segments.

The abdomen in its generalized form, as seen in the tipuloids, consists of 10 or possibly 11 segments. In the more specialized Diptera the first two segments tend to coalesce, at least externally, and the posterior ones often show distinct telescoping. Trias.—Holo.

Adult Diptera occur in virtually all terrestrial habitats, from rain forests to deserts. All are limited to liquid food, which in addition to water may include blood and other tissue fluids of animals, decomposed organic matter, and plant and animal secretions.

The larvae, which typically develop from eggs deposited near the food source, lack true legs in all stages. The body form is diversely modified throughout the order. In the Nematocera the head capsule is distinct, and the mouthparts are normal (Fig. 218,1). In the Brachycera the head capsule is reduced to a few minute rods or plates retracted within the thorax, or is completely absent (Fig. 218,2), and the mandibles may be retained or replaced by mouthhooks. Most larvae are terrestrial, obtaining oxygen from the atmosphere; others are aquatic, absorbing dissolved oxygen from the water or obtaining air from plant tissues; and still others are endoparasites of other invertebrates (chiefly insects) or occasionally of vertebrates. Pupation occurs in a variety of environments. The pupae of many Nematocera are free (not enclosed in a case), but others are formed within a silken cocoon. The pupae of most Brachycera are also free, but in the highly specialized families, they are enclosed in the hardened exuviae of the larvae (puparia).

The Diptera comprise one of the large and highly diversified orders of insects. Nearly 100,000 existing species have been described, and about half as many more probably remain to be described (Colless & McAlpine, 1970). Their general evolutionary development, from the lower to the higher flies, is fairly clear, but the translation of that sequence into a phylogenetic system of classification has proven difficult. The classification most widely used for many years has recognized two suborders, Nematocera and Brachycera, with the latter divided into two sections, the Orthorrhapha and Cyclorrhapha. Within the past two decades, however, doubts have been expressed about some of these taxa as phy-
logenetic categories (ROHDENDORF, 1964; COLLESS & McALPINE, 1970; HENNIG, 1973; STEYSKAL, 1974; OLDROYD, 1977), and the diversity of the classifications now being proposed indicates the degree of differences of opinion that still exists on this subject among students of Diptera. COLLESS and McALPINE (1970), for example, follow the traditional system mentioned above; the families of the suborder Nematocera are grouped into four major divisions, and those of the Brachycera are grouped into Orthorrhapha and Cyclorrhapha. On the other hand, OLDROYD (1977) has proposed the division of the Diptera into three suborders, Superstata, Medescata, and Arescata, based on general ecology and habits, rather than directly on structure. ROHDENDORF (1961c) has proposed two suborders, Archidiptera and Eudiptera, the former to include certain extinct (Triassic) families, the latter to comprise all other families, grouped into 13 infraorders (see below, under the suborder Archidiptera). HENNIG (1973), following the completion of his extensive studies on the morphology of existing Diptera, adopted still another course, recognizing the two suborders Nematocera and Brachycera, with the latter divided into three infraorders, Homoeodactyla, Asilomorpha, and Cyclorrhapha. RICHARDS and DAVIES (1977) introduced a division into three suborders, the Nematocera, Brachycera (=Orthorrhapha), and Cyclorrhapha.

In the present treatment of the Diptera, three suborders are recognized: Archidiptera (including only the Triassic families discussed below), Nematocera, and Brachycera. In view of the arguments presented by ROHDENDORF (1961c) and OLDROYD (1977), the brachycerous families are not divided into the Orthorrhapha and Cyclorrhapha. The number of existing families recognized in the order Diptera ranges from 115 to 140 (COLLESS & McALPINE, 1970; HENNIG, 1973). About 80 percent of these families are members of the suborder Brachycera. Although family groupings such as superfamilies and infraorders are usually employed to indicate relationships of the families, there is much difference of opinion about the assignment of certain families to these higher categories. Inclusion of extinct families and genera in the classification adds to the difficulty, because some of them appear to be intermediate between family groups, especially in the Brachycera. In the present treatment of the Diptera, superfamilies and comparable family groupings are omitted, but the sequence of families, as well as the family nomenclature, follows that of COLLESS & McALPINE (1970).

As pointed out by ROHDENDORF (1964), the fossil record of the Diptera has contributed substantially to our understanding of their evolution. Flies are not only numerous as fossils, but their wing venation, which usually provides a basis for family or generic identification, is almost always clearly preserved. The earliest known Diptera have been found in Upper Triassic beds of Kirghiz in the Soviet Union (ROHDENDORF, 1961c, 1962a, 1964). All of these belong to extinct families. Some of the families, assigned to the Archidiptera, appear to have only remote affinities with even the most generalized Nematocera; others seem clearly to belong to existing family groups of the Nematocera (i.e., superfamilies Tipulomorpha and Bibiomorpha). The earliest known Brachycera occur in Jurassic deposits and include, in addition to several extinct families, representatives of the Acroceridae, Nemestrinidae, and Rhagionidae. The few Cretaceous flies that are known support the conclusion based on the lower Tertiary record that by the end of the Mesozoic most of the living families were already in existence. Numerous recent genera have been recognized in lower Tertiary deposits; the specimens in amber are of special interest in this connection, since their excellent preservation allows positive determination of their generic affinities. As might be expected, the percentage of existing genera known from the lower Tertiary varies considerably from family to family: in general, it is higher for the Nematocera than for the Brachycera. For example, about 75 percent of the tipulid and mycetophilid genera of the lower Tertiary are extant, whereas only about 40 percent of the bombyliid and sypid genera are still existing. Many species
in the Baltic amber are strikingly similar to existing species and one of them, according to HENNIG'S very careful study (1966a), seems to be identical with an existing muscid, *Fannia scalaris* FABRICIUS.

The evidence now available indicates that the Diptera were derived from generalized Mecoptera or from ancestral mecopteroid stock, probably during the Permian. By the late Permian the mecopteroid complex had differentiated into three well-defined ordinal lines, the Neuroptera, Trichoptera, and Mecoptera, in addition to a series of little-known families with obscure relationships to those orders. The precise position in this complex of the evolutionary line leading to the Diptera, with reduction of the hind wings and their modification to halteres, is not yet certain.

**Suborder ARCHIDIPTERA**

Rohdendorf, 1961

[Archidiptera Rohdendorf, 1961c, p. 154]

Very small flies. Wings normally developed; veins of unequal thickness and development: C, R, and CUA commonly strong; RS, M, CUP, and 1A weak or obsolescent; numerous crossveins present in all areas but often weak or forming a network. Halteres, body structure, and immature stages unknown. Rohdendorf, 1961c, 1961d, 1962a, 1964. *Trias*.

This suborder was originally based on several Triassic specimens consisting of isolated wings (Rohdendorf, 1961d, 1962a) and belonging to four extinct families. The diagnosis of the suborder was therefore limited to the venational features cited above. In a subsequent publication, however, Rohdendorf (1964) also placed in the suborder Archidiptera the recent family Nymphomyiidae and redefined the suborder by assigning to it the characteristics of that family. His entire revised definition reads as follows (Rohdendorf, 1964, translated edition): "Head of pupa directed forward, prognathous. Ocelli very large, two in number. Prothorax large, well isolated. Wings of pupa parallel-margined, elongate." Since the Triassic species on which the suborder was based originally are known only by isolated wings, this revised definition has no meaning without the assumption, for which there is no evidence, that the Triassic species had body structures and pupae like those of the Nymphomyiidae.

At the time when Rohdendorf's revised definition was published, the recent family Nymphomyiidae was known only by a single species, *Nymphomyia alba* TUKUNAGA, from Japan. Since then several other species belonging to different genera have been found in widely scattered localities: New Brunswick and Alberta in Canada, West Bengal, and Primorsk Kray in the eastern Soviet Union (Ike, 1964, 1965; Cutten & Kevan, 1970; Rohdendorf & Kalugina, 1974; Kevan & Cutten-Ali-Khan, 1975). These nymphomyiids collectively show a remarkable combination of generalized and specialized features. They are very small, with a body length of less than 2 mm; their wings are elongate and slender and have only minute vestiges of veins at the wing bases and a marginal fringe of very long hairs. The larvae and pupae are aquatic, and the adults, presumably after nuptial flight, shed their wings and return to water.

Although there is no close agreement among dipterists about the affinities of these remarkable flies (Kevan & Cutten-Ali-Khan, 1975), there has been a general tendency to accept Rohdendorf's hypothesis that the family Nymphomyiidae is a member of the suborder Archidiptera (see, however, Kevan & Cutten, 1981). Although the Nymphomyiidae may represent a suborder distinct from the Nematocera and Brachycera, assignment of the family to the suborder Archidiptera as that was defined by Rohdendorf from the Triassic fossils (1964) is insupportable: the fossils show none of the characteristics of the recent Nymphomyiidae.
Family DICTYODIPITERIDAE  
Rohdendorf, 1961

Small species; wings less than 3.5 mm long and broad basally; veins R and CUA very strong; RS, M, and CUP weak; base of stem R with a prominent bend; RS and M with few branches; crossveins numerous over most of wing including anal area. *Trias.*


Family HYPERPOLYNEURIDAE  
Rohdendorf, 1961

Wing: stem of vein R with sharp break, developed into a short projection towards base of M; SC long, parallel to R and terminating just before end of R; RS apparently with 3 branches; M with 6 branches; crossveins weak and absent from anal area. *Trias.*


Family DYSPOLYNEURIDAE  
Rohdendorf, 1961

Wing: stem of vein R with sharp break, forming a strong strut joined to base of M; SC short, terminating before midwing; R terminating well before apex of wing. *Trias.*

and the nymphomyiids show none of the features known in the fossils. Accordingly, it seems advisable to consider the subordinal position of the existing family Nymphomyiidae as uncertain and to restrict the suborder Archidiptera, at least for the present, to the Triassic species, as originally proposed by Rohdendorf. Because our knowledge of these Triassic families is limited to isolated wings, all of which possess a venation quite unlike that postulated for the early dipteran stock, even their assignment to the Diptera should probably be considered uncertain, especially since there is no evidence that they possessed only two wings and halteres.
Diptera–Nematocera

Dyspolyneura Rohdendorf, 1961d, p. 96 [*D. longipennis; OD]. Little-known wing, with all branches of RS directed anteriorly. Rohdendorf, 1964. Trias., USSR (Kirghiz).—Fig. 219,1. *D. longipennis; wing, ×18 (Rohdendorf, 1964).

Suborder NEMATOCERA

Latreille, 1825

[nom. IranJI. Brauer, 1883, p. 4, ex Nemocera Latreille, 1825, p. 482]

Antennae of adults usually filiform, at least as long as thorax, differentiated into scape, pedicel, and flagellum of 6 or more segments; maxillary palpi commonly with 3 to 5 segments; wings very commonly slender; vein CUA not coalesced with LA and rarely diverging toward it. Larvae with head capsule usually distinct and complete; mandibles typically generalized, dentate and opposite, their chewing movements in horizontal plane of head. Pupae free, usually capable of some movement. Hennig, 1973. Trias.–Holo.

Family DIPLOPOLYNEURIDAE

Rohdendorf, 1961

[Diplopolyneuridae Rohdendorf, 1961d, p. 98]

Wing with crossveins restricted to distal third of wing; veins SC and R very short, terminating about one-quarter wing length from base. Body unknown. [Subordinal position uncertain.] Trias.

Diplopolyneura Rohdendorf, 1961d, p. 98 [*D. mirabilis; OD]. Little-known wing; characters as in family. Rohdendorf, 1964. Trias., USSR (Kirghiz).—Fig. 220,1. *D. mirabilis; wing, ×12.5 (Rohdendorf, 1964).

Family TIPULODICTYIDAE

Rohdendorf, 1962

[Tipulodictyidae Rohdendorf, 1962a, p. 310]

Very small insects. Wing with costal area narrow; vein SC terminating beyond midwing; R smoothly curved basally; RS apparently arising close to wing base, branches usually parallel and terminating on apical margin; CUA, CUP, and posterior branch of M close together and parallel. Body unknown. Trias.

Tipulodictya Rohdendorf, 1962a, p. 311 [*T. minima; OD]. Costal area with several weak crossveins; main branch of RS arising just before end of SC. Rohdendorf, 1964. Trias., USSR (Kirghiz).—Fig. 220,6. *T. minima; wing, ×22 (Rohdendorf, 1964).

Family EOPOLYNEURIDAE

Rohdendorf, 1962

[Eopolyneuridae Rohdendorf, 1962a, p. 311]

Very small insects. Wing broader than in Tipulodictyidae; costal area broad; vein SC weakly formed; stem R with a small break, struts absent; RS arising well before midwing, dividing into 3 branches at midwing; anal area broad. Body unknown. Trias.

Eopolyneura Rohdendorf, 1962a, p. 311 [*E. tenuinervis; OD]. Termination of RS+2 remote from end of R; no crossveins between SC and R. Rohdendorf, 1964. Trias., USSR (Kirghiz).—Fig. 220,3. *E. tenuinervis; wing, ×18 (Rohdendorf, 1964).


Family MUSIDOROMIMIDAE

Rohdendorf, 1962

[Musidoromimidae Rohdendorf, 1962a, p. 311]

Very small insects. Wing with narrow costal area; vein SC extending almost to midwing; RS with 2 apparent origins from R, one near midwing, the other basal; crossveins mostly weak. Body unknown. Trias.

Musidoromima Rohdendorf, 1962a, p. 311 [*M. crassinervis; OD]. Branches of M nearly equally spaced; CUA nearly straight for most of its length, with an abrupt bend distally. Rohdendorf, 1964. Trias., USSR (Kirghiz).—Fig. 220,5. *M. crassinervis; wing, ×18 (Rohdendorf, 1964).

Family ARCHITIPULIDAE

Handlirsch, 1906

[Architipulidae Handlirsch, 1906b, p. 490]

Small flies. Wing slightly narrowed basally; costal area narrow; stem of vein R without an abrupt bend or break; RS usually arising slightly before midwing; branches of RS and M arising distad of midwing; CUA generally straight for most of its length; CUP weak or absent, parallel to CUA; commonly 3 anal veins, 2 of them long. Body unknown. Trias.–Jur.
Architipula HANDLIRSCH, 1906b, p. 490 [*A. seebachiana; SD ROHDENDORF, 1962a, p. 313]
[*Protipula HANDLIRSCH, 1906b, p. 491 (type, P. crassa); Mesotipula HANDLIRSCH, 1939, p. 107 (type, M. brachypiera); Paratipula BODE, 1953, p. 304 (type, P. acuta)]. Subcostal area narrow; RS1+2 with a long fork; M with 4 branches; crossvein r-m present. HANDLIRSCH, 1939. Trias., USSR (Kirghiz); Jur., Europe (Germany), USSR (Kazakh).—Fig. 220,7. *A. seebachiana, Jur., Germany; wing, ×8 (Handlirsch, 1907).


Diplarchitipula ROHDENDORF, 1962a, p. 313 [*D. multimedialis; OD]. Costal area without crossveins; 1 or 2 weak veins, in addition to RS, arising from R near midwing; M with an apparent second main branch arising from wing base, close to and paralleling anterior branch. ROHDENDORF, 1964. Trias., USSR (Kirghiz).—Fig. 220,8. *D. multimedialis; wing, ×12 (Rohdendorf, 1964).

Eotipula HANDLIRSCH, 1906b, p. 491 [*E. parva; OD]. Similar to Architipula, but much smaller and with less branching of M. ROHDENDORF, 1964. Jur., Europe (Germany).

Haplotipula BODE, 1953, p. 311 [*H. majalis; OD]. Similar to Architipula, but RS1+2 with a very shallow, marginal fork. Jur., Europe (Germany).


Liasotipula TILLYARD, 1933, p. 74 [*L. anglicana; OD]. Similar to Architipula, but disal cell longer; fork of M1+2 much longer than that of M3+4. PIERSNER, 1924. Jur., England.

Ozotipula BODE, 1953, p. 313 [*O. torda; OD] [=Mikrotipula BODE, 1953, p. 314 (type, M.
dixaerformis)). Similar to Architipula, but RS2 and RS3 forked. *Jur.*, Europe (Germany).

**Family EOLIMNOBIIDAE**

Rohdendorf, 1962

{Eolimobiidae Rohdendorf, 1962a, p. 313}

Wing base slightly narrowed; vein SC long, ending on costa; discal cell absent; crossvein r-m at center of wing; 2 anal veins. Body unknown. *Jur.*

Eolimobius Handlirsch, 1906b, p. 489 [*E. geinitzii; OD*]. Wing length 3.2 times width. Martynov, 1938c; Rohdendorf, 1962a. *Jur.*, Europe (Germany). — Fig. 220,4. *E. geinitzii*; wing, X4.6 (Rohdendorf, 1962a).

**Family TANYDERIDAE**

Osten-Sacken, 1879

{Tanyderidae Osten-Sacken, 1879, p. 517}

Wing similar to that of Tipulidae, but vein RS with 4 parallel branches; only 1 anal vein. *Oligo.*—Holo.

Tanyderus Philippi, 1865, p. 780. *Holo.*

Macrochile Loew, 1850, p. 37 [*M. spectrum; OD*] [=Idioplasta Meunier, 1906a, p. 390, obj.]. SC terminating a little beyond level of fork of RS1+2; crossvein m-cu at fork of M3+4. Maxillary palp very long. Alexander, 1931. *Oligo.* Europe (Baltic). — Fig. 220,2. *M. spectrum*; whole insect, X5.3 (Alexander, 1931).

**Family TIPULIDAE**

Leach, 1815

{Tipulidae Leach, 1815, p. 161}

Wing long; vein RS commonly with 3 branches reaching wing margin; discal cell usually present; 2 anal veins leading to wing margin. Ocelli absent; mesonotal suture prominent and V-shaped; legs very long and slender. Larvae aquatic or subaquatic. *Paleoc.*—Holo.

Tipula Linné, 1758, p. 585 [=Tipulidae Scudder, 1894, p. 238 (type, *T. consumpta*); Micrapsis Scudder, 1894, p. 242 (type, *M. paludis*)]. Handlirsch, 1910b; Meunier, 1914a, 1915a; Cockrell, 1921d; Henrikсен, 1922a; Alexander, 1931; Thöbald, 1937a; Carpenter & others, 1938; Zeuner, 1938; Piton & Thöbald, 1939; Statz, 1944b; Drake & Runoff, 1960; Popov, 1961; Hennig, 1967c; Lewis, 1973; Wighton, 1980. *Paleoc.*, Canada (Alberta); *Eoc.*, USA (Colorado), Europe (Denmark); *Oligo.*, USA (Colorado), Montana, Canada (British Columbia), England, Europe (Baltic, France, Germany); *Mio.*—*Plio.*, Europe (France); *Mio.*, Europe (Germany)—Holo.


Cladoneura Scudder, 1894, p. 212 [*C. willistoni; OD*]. Similar to *Cladura*, but RS arising more basally; crossvein between R and RS1 near end of SC. *Oligo.*, USA (Colorado).


Cyttaromyia Scudder, 1877a, p. 751 [*C. fenertrata; OD*]. Little-known genus (wing fragment). Cockrell, 1920c, 1924a; Cockrell & Haines, 1921; Séguy, 1934. *Paleoc.—Plio.*, Europe (France); *Eoc.*, USA (Colorado).


Dicanomyia Stephens, 1829, p. 53. Scudder, 1894; Cockrell, 1908a, 1922a; Meunier, 1916b; Cockrell & Haines, 1921. *Oligo.*, England, USA (Colorado)—Holo.


Electrolabis Alexander, 1931, p. 58 [*E. extinta; OD*]. Stem of RS aligned with RS3+4; antennae with 16 segments. *Oligo.*, Europe (Baltic).


Eriocera Macquart, 1838, p. 74. Henrikсен, 1922b; Alexander, 1931; Statz, 1944b. *Eoc.*, Europe (Denmark); *Oligo.*, Europe (Baltic, Germany)—Holo.

Erioptera Meigen, 1803, p. 262. Alexander, 1931; Thöbald, 1937a (as Illisia Rondani, generic

© 2009 University of Kansas Paleontological Institute
assignment of fossil doubtful); Statz, 1944b. Oligo., Europe (Baltic, Germany, France)—Holo.


Gonomyia Meigen, 1818, p. 147. Cockrell & Haines, 1921a; Cockrell & Haines, 1921; Statz, 1944b. Oligo., USA (Colorado). England, Europe (Baltic, Germany)—Holo.


Helius Lepeletier & Servelle, 1828, p. 831. Alexander, 1931; Statz, 1944b. Oligo., Europe (Baltic, Germany)—Holo.


Hexapoda


Limnophila Macquart, 1834, p. 95. Cockrell, 1921d; Cockrell & Haines, 1921; Alexander, 1931; Théobald, 1937a. Oligo., England, Europe (Germany, France)—Holo.

Limnocera Scudder, 1894, p. 201 [*L. marcescens* Scudder, 1894, p. 201; SD Carpenter, herein]. Similar to Limnobia but with a crossvein between R and RS1 near wing apex. Oligo., USA (Colorado).

Limnophilia Macquart, 1834, p. 95. Cockrell, 1921d; Cockrell & Haines, 1921; Alexander, 1931; Théobald, 1937a; Statz, 1944b; Carpenter, 1951; Wighton, 1980. Paleoc. Canada (Alberta); Oligo., England, Europe (France, Germany, Baltic)—Holo.


Manapsis Scudder, 1894, p. 222 [*M. anomala*; OD]. Similar to Tipula, but vein M1+2 not forked. Carpenter & others, 1938. Oligo., USA (Colorado).


Oryctogma Scudder, 1894, p. 194 [*O. sackenii*; OD]. Similar to Cylindrotoma, but SC deflected distally and ending on R; discal cell short. Oligo., USA (Colorado).


Pronophlebia Scudder, 1877a, p. 750 [*P. rediviva*; OD]. Little-known genus; venation obscure. Scudder, 1890. Eoc., USA (Colorado).


Rhadinobrochus Scudder, 1894, p. 223 [*R. extinctus*; OD]. Similar to Tipula, but basal cell between M1 and M2 unusually narrow. Carpenter & others, 1938. Oligo., USA (Colorado).


Spiladomyia Scudder, 1877a, p. 749 [*S. simplex*; OD]. Little-known genus, similar to Dicranomyia. Scudder, 1890. Eoc., USA (Colorado).

Stibadocerella Zeuner, 1941a, p. 96 [*S. europeus*; OD]. Similar to Stibadocerella (recent), but SC almost reaching to wing apex. Eoc., Scotland.

Tanymera Alexander, 1931, p. 75 [*T. fritschii*; OD]. SC and RS relatively short; RS in alignment with RS1+2. Oligo., Europe (Baltic).

Tanysphyra Loew, 1850, p. 38 [*T. gracilis*; OD]. SC terminating at level of fork of RS; RS1 and RS2 parallel for their entire lengths. Alexander, 1931. Oligo., Europe (Baltic).


Trichocera Meigen, 1803, p. 262. Statz, 1934a. Oligo., Europe (Germany)—Holo.

Trichoneura Loew, 1850, p. 36 [*T. vulgaris*; OD]. Alexander, 1931. Oligo., Europe (Baltic)—Holo.


Family PSYCHODIDAE

Newman, 1835

[Psychodidae Newman, 1835, p. 388]

Very small flies; wings commonly very hairy, held roof-wise over abdomen; vein R5 usually with 4 branches; M usually with 3 branches; CIA with 2 branches, CIA2 commonly very short; anal veins reduced. V-shaped suture on mesonotum absent. Larvae usually in moist, freshwater habitats. Cret.—Holo.


**Euphlebotomus** Cockerell, 1920e, p. 212 (*E. connectens; OD). Similar to Horaiella (recent), but RS1 + 2 forked; RS3 + 4 forked at about level of origin of RS1 + 2. Edwards, 1929; Hennig, 1972b. *Mio., Burma. —Fig. 221, 8. *E. connectens; wing, X49 (Edwards, 1929).


**Nemopalpus** Macquart, 1840, p. 101 (=*Palaesycorax* Meunier, 1905b, p. 50 (type, *P. tertiaria*)). Edwards, 1929; Hennig, 1972b; Schüter, 1978b. *Oligo., Europe (Baltic); *Oligo./Miocene, Dominican Republic–Holo.


Phlebotomiella Meunier, 1906b, p. 103. [*Phlebotomus tipuliformis* Meunier, 1905c, p. 254; OD]. Similar to *Phlebotomus*, but crossvein r-m and origin of RS4 near center of wing; wing apex rounded; fifth segment of palpus very short; 4 spines on male genital style. [Probably a synonym of *Phlebotomus.*] Oligo., Europe (Baltic).

Phlebotomites Hennig, 1972b, p. 39. [*P. brevifilis*; OD]. Similar to *Phlebotomia*, but with 5 spines on male genital style. Cret., Lebanon. -- Fig. 221,2. *P. brevifilis*; wing, x40 (Hennig, 1972b).


Trichomyia Haliday, 1839, no 745. Meunier, 1905c; Cockerell, 1917c, 1917g; Quate, 1963; Hennig, 1972b. Oligo./Mio. Europe (Baltic); Oligo./Mio., Mexico; Mio., Burma-Holo.

Family EOPTYCHOPTERIDAE

Handlirsch, 1906

[Eoptychopteridae Handlirsch, 1906b, p. 488]

Wing with uniformly strong veins; vein SC terminating near midwing; branches of RS not close together distally; discal cell large. Jur.

Eoptychoptera Handlirsch, 1906b, p. 489. [*Phryganidium simplex* Geinitz, 1887, p. 203; OD] [*Propychoptera Handlirsch, 1906b, p. 489 (type. *P. lissina*)]. Wing very broadly basally; R nearly straight; RS1+2 not forked; RS3+4 with deep fork. Handlirsch, 1920; Bode, 1953. Jur., Europe (Germany). -- Fig. 221,4. *E. maculata* (Handlirsch); wing, x11 (Handlirsch, 1920).

Family TANYDEROPHRYNEIDAE

Rohdendorf, 1962

[Tanyderophryneidae Rohdendorf, 1962a, p. 314]

Wing narrowed basally; vein SC terminating before midwing, with a crossvein connecting to R distally; stem of M much reduced or absent, its posterior branches coalesced in part with those of CU. Antennae apparently short; legs thin; tibial spurs present; abdomen long. Jur.


Family DIXAMIMIDAE

Rohdendorf, 1962

[Dixamimidae Rohdendorf, 1962a, p. 314]

Wing broad; venation poorly known; vein RS arising in basal third of wing; male antennae 15-segmented; maxillary palpi 3-segmented. Jur.


Family DIXIDAE van der Wulp, 1877

[Dixidae van der Wulp, 1877, p. 336]

Small flies, similar to the Culicidae. Wing veins without scales; RS1+2 strongly arched; halteres long. Mouthparts not forming a long proboscis. Larvae aquatic. Oligo.—Holo.


Family CULICIDAE Billberg, 1820

[Culicidae Billberg, 1820, p. 122]

Small flies. Wing veins bearing elongate or slender scales; vein RS1+2 strongly arched; halteres long. Mouthparts not forming a long proboscis. Larvae aquatic. Cret.—Holo.


Anopheles Meigen, 1818, p. 10. [Generic assignment of fossil uncertain.] Statz, 1944b. Oligo., Europe (Germany)—Holo.

Chaoborus Lichtenstein, 1800, p. 174 [=*Culicites* Heiden, 1862, p. 79 (type. *C. tertiarius*)].
[Fossils are pupae and adults.] Meunier, 1904b; Hennig, 1966b, 1972b. Oligo., Europe (Baltic, Germany)—Holo.


Mansonia BLANCHARD, 1901, p. 1046. STATZ, 1944b; R. longitudinal veins mainly concentrated in anterior half of wing; main fork of RS at midwing; nearly straight; costal area moderately wide, between Rand M, and between M and CUA. Body unknown. *Trias.*


Small insects. Wing with costal margin nearly straight; costal area moderately wide, with some crossveins; vein SC very close to R; longitudinal veins mainly concentrated in anterior half of wing; main fork of RS at midwing; M very weak; crossveins present between R and M, and between M and CUA. Body unknown. *Trias.*

Rohdendorf, 1962a, p. 317 [*A. tchernovskijii; OD]. Middle of costal area with several crossveins; basal part of M apparently coalesced with RS. Rohdendorf, 1964. *Trias.* USSR (Kirghiz).—Fig. 221.5. [*A. tchernovskijii; wing, X12 (Rohdendorf, 1964).*


Family ARCHITENDIPEDIDAE Rohdendorf, 1962

Wing hairy; venation unknown; head small; female antenna with at least 7 segments. *Jur.*


Family PROTENDIPEDIDAE Rohdendorf, 1962

Small flies. Wings long and slender; microtrichia ordinarily present, scales absent; vein SC free but rarely well developed; RS1+2 commonly weak or absent; RS3+4 well developed and ordinarily coalesced with C near wing apex; M1+2 unbranched, extending nearly to wing apex; CUA forked. Body slender; mouthparts not piercing; legs long and thin. *Cret.—Holo.*

Meunier, 1904a; Theobald, 1937a; Coun, 1944, 1947b; Melander, 1949. Paleoc.—Plio., India, Eoc., USA (Colorado, Wyoming); Oligo., USA (Colorado), Europe (Baltic, Germany, France); Mio.—Plio., Europe (France); Mio., Europe (Germany)—Holo.

Family CHIRONOMIDAE Macquart, 1838


Sendelia DUISBERG, 1868, p. 23. Meunier, 1904a. Oligo., Europe (Baltic)—Holo.

Smittia HOLMGREN, 1869, p. 47. Meunier, 1904a. Oligo., Europe (Baltic)—Holo.
Small to very small flies. Similar to Chironomidae but wings broader; vein M1+2 forked; RS3+4 terminating on costal margin nearer to midwing than to apex; anal area reduced. Mouthparts of females modified for piercing and sucking. Larvae aquatic or sub-aquatic. Cret.-Holo.

**Family CERATOPOGONIDAE**

Skuse, 1890

[Ceratopogonidae Skuse, 1890, p. 222]

**Family SIMULIIDAE**

Newman, 1835

[Simuliidae Newman, 1835, p. 387]

Small, stout flies. Wings very broad, anal area forming a lobe; vein M1+2 forked; M3+4 arising at wing base, obsolescent. Body stout; proboscis short, females blood-sucking. Larvae in running water. Oligo.-Holo.

**Family RHAETOMYIIDAE**

Rohdendorf, 1962

[Rhaetomyiidae Rohdendorf, 1962a, p. 318]

Small insects. Wing broad, with broadly rounded apex; vein SC extending to midwing; RS arising just before midwing, with 3 branches; CUP obsolescent and close to CUA; no anal veins. Body unknown. Trias.

**Family MESOPHANTASMATIDAE**

Rohdendorf, 1962

[Mesophantasmatidae Rohdendorf, 1962a, p. 319]

Wing narrow and petiolate; veins C, SC, and R close together; SC and R long; RS arising at midwing; M apparently with 3 branches; CUA and CUP close together. Jur.

**Family BLEPHAROCERIDAE**

**Loew**, 1862

[Blepharoceridae *Loew*, 1862, p. 6]

Flies similar in general form to the Tipulidae, but wing membranes with a complicated network of veinlike markings caused, apparently, by folds within pupal wing cases. V-shaped mesonotal suture commonly absent; mouthparts elongate. Larvae and pupae in flowing water. Eoc.–Holocene.

**Blepharocera** **Macquart**, 1843, p. 61. Holocene.

**Paltoptomopsis** **Cockerell**, 1915, p. 489 [*P. ciliiatus; OD*. Little-known genus, apparently similar to *Paltoptoma* (recent), but CUA unbranched; anal vein absent. [Family assignment doubtful.] Oligo., England.

**Philorites** **Cockerell**, 1908a, p. 264 [*P. johannseni; OD*. RS 1 + 2 arising from RS3 + 4 a short distance beyond origin of RS and terminating below wing apex; proboscis longer than palpi. Cockerell, 1920c. Eoc., USA (Colorado).

**Family PLECIDICTYIDAE**

**Rohdendorf**, 1962

[Pleciodictyidae *Rohdendorf*, 1962a, p. 319]

Very small insects. All wing veins weak except R and base of RS; R with basal break; RS arising about one-third wing length from base, with several short branches directed anteriorly to R; M very weak, branched. Body unknown. **Trias**.

**Pleciodictya** **Rohdendorf**, 1962a, p. 319 [*P. modesta; OD*. Anterior margin of wing straight to midwing; R straight beyond break. **Rohdendorf**, 1964. **Trias**., USSR (Kirghiz). — Fig. 222.1. *P. modesta*; wing, X22 (Rohdendorf, 1964).

**Family PALAEOPLECIIDAE**

**Rohdendorf**, 1962

[Palaeoplecidae *Rohdendorf*, 1962a, p. 319]

Wing elongate; basal part of vein R without break or bend; RS arising one-quarter wing length from base, with long anterior branch, parallel to end of R; crossveins present between R and C, RS1 + 2 and R, and between RS and M. **Trias**.

**Palaeoplecia** **Rohdendorf**, 1962a, p. 319 [*P. rhaetica; OD*. SC ending about one-third wing length from base; RS3 + 4 with a narrow fork; branches of M irregular and weak. **Rohdendorf**, 1964. **Trias**., USSR (Kirghiz). — Fig. 222.2. *P. rhaetica*; wing, X14 (Rohdendorf, 1962a).
Family PLECOFUNGIVORIDAE
Rohdendorf, 1946

Plecofungivoridae (p. 410).

Fig. 223. Plecofungivoridae (p. 410).

Wing broad; vein SC about one-third of wing length, terminating on costa; RS arising in basal third of wing, with at least 1 branch, usually more; no strong crossveins between R and RS; posterior branch of M not thicker than other branches of M. Antennae with about 15 segments, not longer than head and thorax combined; legs slender; abdomen large, about twice length of head and thorax combined. Trias.—Jur.

Plecofungivora Rohdendorf, 1938, p. 42 [*P. latipennis; OD]. RS with a single weak and straight (or nearly so) branch, terminating on costal margin just beyond end of R; SC terminating slightly beyond level of origin of RS. Trias., 1962a, 1964. Jur., USSR (Kazakh).—Fig. 223. P. major Rohdendorf; a, wing, ×18.5; b, body, ×14 (both Rohdendorf, 1962a).


Archihesperinus Rohdendorf, 1962a, p. 321 [*A. phryneoides; OD]. Wing broad; SC branched; RS with a sigmoidal branch ending on costa. Rohdendorf, 1964. Trias., USSR (Kirghiz).—Fig. 224, 1. *A. phryneoides; wing, ×21 (Rohdendorf, 1962a).

Archiplecofungivora Rohdendorf, 1962a, p. 321 [*A. binerva; OD]. Wing as in Archihesperinus; SC unbranched; strong crossvein in costal area. Trias., USSR (Kirghiz).


Palaeohesperinus Rohdendorf, 1962a, p. 323 [*P. longipennis; OD]. RS1 + 2 arising close to crossvein r-m; M3 + 4 nearly straight. Trias., USSR (Kirghiz).—Fig. 224, 2. *P. longipennis; wing, ×19 (Rohdendorf, 1962a).


Polyneurisca Rohdendorf, 1946, p. 52 [*P. atavina; OD]. Wing broadly oval; RS with several branches leading to R and costa; base of RS curved abruptly away from R. Trias., 1962a, 1964. Jur., USSR (Kazakh).—Fig. 224, 7. *P. atavina; wing, ×32 (Rohdendorf, 1962a).

Prohesperinus Rohdendorf, 1946, p. 56 [*P. abdominalis; OD]. Wing as in Palaeohesperinus, but M3 + 4 strongly curved. Trias., 1962a, 1964. Jur., USSR (Kazakh).—Fig. 224, 5. *P. abdominalis; wing, ×17 (Rohdendorf, 1962a).

Protaclactoneura Rohdendorf, 1962a, p. 321 [*P. turanica; OD]. Little-known wing, similar to Rhaetofungivors, but branches of RS reticulate and weak. Trias., USSR (Kirghiz).

Rhaetofungivora Rohdendorf, 1962a, p. 320 [*R. reticulata; OD]. Wing broad; no distinct crossvein in costal area; SC and M weak; R and RS strong; branches of RS variable, from 1 to several or even to a network of weak veins. Trias., USSR (Kirghiz).—Fig. 224, 6. *R. reticulata; wing, ×29 (Rohdendorf, 1964).
Rhaetofungivorella Rohdendorf, 1962a, p. 320 [*R. subcosta; OD]. Wing moderately slender. SC with distal branches or short crossveins; RS sigmoidal, with several weak, variable branches, leading either to R or wing margin; one strong crossvein between M and RS, others weak. Rohdendorf, 1964. Trias., USSR (Kirghiz); Jur., USSR (Kazakh).—Fig. 224, 3. *R. subcosta; wing, X28 (Rohdendorf, 1964).


Transversiplecia Rohdendorf, 1946, p. 53 [*T. transversinervis; OD]. Wing broadly oval; 1 strong crossvein in subcostal area, 1 oblique crossvein between R and costal margin, and 2 between posterior branch of M and CUA. Rohdendorf, 1962a, 1964. Jur., USSR (Kazakh).—Fig. 224, 8. *T. transversinervis; wing, X16 (Rohdendorf, 1962a).

Family FUNGIVORITIDAE Rohdendorf, 1946
[nom. transl. Rohdendorf, 1957, p. 91, ex Fungivoritinae Rohdendorf, 1946, p. 79]

Wing with vein R extending nearly to apex; RS arising abruptly from R, without distinct, longitudinal branches; all branches of M equally strong. Jur.

Family PLECIOMIMIDAE Rohdendorf, 1946

Wing broad; vein SC present but usually weak, extending to about one-third of wing length; RS with strong base and without branches; crossveins absent between branches of M and between M and CUA. Jur.


Mesosciophila Rohdendorf, 1946, p. 76 [*M. venosa; OD]. Wing very broad; RS with a weak anterior branch leading to R; crossvein r-m longer than in Fungivorites. Rohdendorf, 1962a. Jur., USSR (Kazakh).


Family ARCHIZELMIRIDAE Rohdendorf, 1962

Wing with vein R long, extending nearly to apex of wing; RS with 2 anterior branches, 1 distal, terminating on C near end of R, the other near midwing, short and terminating on R; crossvein r-m very short. Head large; antennae not longer than thorax. Jur.

Family TIPULOPLECIIDAE
Rohdendorf, 1962

Wing much longer than abdomen; vein R straight; RS with at least 2 anterior branches, 1 ending on R. Legs very slender. *Jur.*


Family SINEMEDIIDAE
Rohdendorf, 1962

Similar to Tipulopleciidae, but wings more narrow and vein RS without branches; legs stout. *Jur.*


Family PARAXYMYIIDAE
Rohdendorf, 1946

Wing with vein SC short, not extending to midwing; RS with 2 long branches, 1 arising basad of crossvein r-m. *Jur.*


Family EOPLECIIDAE
Rohdendorf, 1946

Wing with vein SC long, extending beyond midwing; RS with 2 long, well-developed branches to anterior margin of wing. Body unknown. *Jur.*

Eoplecia Handlirsch, 1920, p. 203 [*E. primitiva*; OD]. M3 + 4 apparently anastomosed with ante-
rior branch of CUA. Handlirsch, 1939; Rohdendorf, 1946, 1962a; Bode, 1953. Jur., Europe (Germany). — Fig. 226,3. *E. primi-
tiva; wing, X18 (Handlirsch, 1939).

Family PROTOPLECIIDAE
Rohdendorf, 1946

[Wing with vein SC short, commonly ending before midwing; RS with an oblique anterior branch, terminating near end of R. Jur.]

Protoplecia Handlirsch, 1906b, p. 488 [*Macro-
pes a l i a s i n a Geinitz, 1884, p. 582; OD]. M1+2 forking distally of fork on RS. Rohdendorf, 1964. Jur., Europe (Germany). — Fig. 226,1. *P. l i a s i n a (Geinitz); wing, X16 (Handlirsch, 1907).

Mesoplecia Rohdendorf, 1938, p. 49 [*M. jurassi-
ca; OD]. SC extending to about midwing; M1+2 forking proximally of fork RS. Rohdendorf, 1964. Jur., USSR (Kazakh).

Mesopleciella Rohdendorf, 1946, p. 43 [*M. minor;

Family PROTOBIBIONIDAE
Rohdendorf, 1946

[Very small insects. Wing with vein RS with 1 short branch leading directly to R near midwing; anterior veins strong. Jur.]

Protobibio Rohdendorf, 1946, p. 47 [*P. jurassi-
cus; OD]. SC extending almost to midwing; crossvein r-m long, oblique. Rohdendorf, 1962a. Jur., USSR (Kazakh). — Fig. 226,5. *P. juras-
scus; wing, X36 (Rohdendorf, 1962a).

Family PROTOSCATOPSIDAE
Rohdendorf, 1946

[Wing with anterior veins very strong, veins in rest of wing weak or obsolescent; RS with 2 very short anterior branches leading directly into C just beyond end of R. Antenna short. Jur.]

Protoscatopse Rohdendorf, 1946, p. 49 [*P. ju-
rassica; OD]. CUA almost straight, weak dis-

Family SCATOPSIDAE Newman, 1835

[Small to very small flies. Wings with veins R and RS very strong, other veins much weaker; SC vestigial; RS reduced to RS3+4 and unbranched, commonly extending only to midwing. Larvae saprophagous, usually found in rotting vegetation. Oligo.—Holo.]

Scatopse Geoffroy, 1762, p. 450. [Generic assign-
ment of fossils doubtful.] Meunier, 1904d; Melander, 1949. Oligo., USA (Colorado), Europe (Baltic)—Holo.

Family BIBIONIDAE Newman, 1835

[Small to moderate-sized flies. Wings without dis
cal cell; vein SC well developed, usually extending to midwing; RS forked into RS1+2 and RS3+4 or reduced to unbranched RS3+4; M with 2 branches; CUA1 and CUA2 extending to hind margin of wing. Antennae typically short; eyes of male holoptic. Larvae mostly saprophagous, in soil. Cret.—Holo.]

Bibio Geoffroy, 1762, p. 568. Butler, 1889; CockereII, 1909); 1921d; Meunier, 1915b; Pongrácz, 1928; Piton & Théobald, 1935; Maneval, 1936; James, 1937; Théobald, 1937a; Statz, 1943; Melander, 1949; Dürrenfeldt, 1968. Oligo., Europe (France), England, USA (Colorado); Mio., Europe (Croa-
tia); Plio., Europe (Germany)—Holo.

Bibiodes Coquillette, 1904, p. 171. James, 1937. Oligo., USA (Colorado)—Holo.

Bibidiotes Cockerell, 1915, p. 493 [*B. confusius;
OD]. Similar to Bibiodes (recent), but RS in very brief contact with M1+2. Oligo., England.


Penthetria Meigen, 1803, p. 264 [=Bibiopsis Heer, 1849, p. 228 (type, B. cimicoides); Protomyia Heer, 1849, p. 231 (type, Bibio lygaeoides Unger)]. Handlirsch, 1910b; Meunier, 1917c, 1918; Pongrácz, 1928; Statz, 1944b; Melander, 1949; Lewis, 1971b. Eoc., Canada
(British Columbia); *Oligo.*, Europe (Germany), USA (Colorado, Montana); *Mio.*, Europe (Croatia)—*Holo.*

**Plecia Wiedemann, 1828, p. 72. Cockerell, 1914f, 1917b, 1921d; Théobald, 1937b; Carpenter & others, 1938; Zeuner, 1941a; Peterson, 1975. Grec., Canada (Manitoba); Paleoc.—*Pio.*, Europe (France); Eoc., Scotland; *Oligo.*, Europe (Germany, France), England, USA (Colorado)—*Holo.*

**Family SCIARIDAE Billberg, 1820**

Small flies. Wings with vein R short, usually not extending beyond midwing; RS arising from R as a short, transverse vein and connected to M1+2 by the longitudinally arranged crossvein r-m. Coxae enlarged; eyes commonly touching above antennae; tibiae without prominent spines. Larvae mostly saprophagous, in decaying vegetation. Eoc.—*Holo.*

**Sciara Meigen, 1803, p. 263. Scudder, 1878d; Cockerell, 1910b, 1915, 1916c, 1917c; Meunier, 1917c; Théobald, 1937b; Armbruster, 1938; Quévreux, 1938; Statz, 1944c; Melander, 1949. Eoc., Canada (British Columbia); *Oligo.*, Europe (Baltic, France, Germany), England, USA (Colorado); *Mio.*, Burma, Europe (Germany)—*Holo.*

**Protosciara Quévreux, 1938, p. 83 [*P. alatica; OD].** Little-known genus; M3+4 apparently forked. [Family assignment doubtful.] *Oligo.*, Europe (Baltic).


**Ruebsamteniella Meunier, 1903a, p. 165 [*R. semibrachyptera; OD].** Similar to *Lycoriella* (recent), but female with reduced venation as well as small wings. Frey, 1942. *Oligo.*, Europe (Baltic).


**Family MYCETOPHILIDAE Newman, 1835**

**[Mycetophilidae Newman, 1835, p. 386]***

Small to very small flies. Wings with diverse venation. Vein RS1+2 either absent or reduced to short, transverse vein leading to costal margin; stem of RS usually arising as transverse crossvein and joined to M1+2 by crossvein r-m, or coalesced with M1+2 for a short distance; IA absent. Antennae much longer than head, eyes not touching dorsally; tibiae commonly with strong spines. Larvae typically associated with fungi, developing in their fruiting bodies; some larvae making webs or tubes. Paleoc.—*Holo.*


**Acnemia Winnertz, 1863, p. 798. Cockerell, 1921d, 1924a. Eoc., USA (Colorado); *Oligo.*, England—*Holo.*


**Archaebotetina Meunier, 1904a, p. 160 [*A. tipuliformis; OD].** Similar to *Speokepta* (recent) but with SC2 only slightly before RS; separation of M3+4 from CUA almost below crossvein r-m; macrotrichia absent from wing membrane and forks of veins. Meunier, 1904d; Edwards, 1940. *Oligo.*, Europe (Baltic).

**Archaemacrocera Meunier, 1917a, p. 88 [*A. concinna; OD].** Similar to *Macrocerca,* except in minor venational details. [Probably a synonym of *Macrocera.*] *Oligo.*, Europe (Baltic).

**Asindu1um Latreille, 1805, p. 290. [Generic assignment of fossil doubtful.] Statz, 1944a. *Oligo.*, Europe (Baltic)—*Holo.*

**Burmacrocera Cockerell, 1917h, p. 326. [Centrocnemis.] Paleoc.—Eoc., Australia (Queensland)—*Holo.*


**Burmacrocera Cockerell, 1917h, p. 326 [*B. petiolata; OD].** Similar to *Palaeophlaeatrya,* but crossvein r-m absent; thorax strongly setose. *Mio.*, Burma.

**Coelosis Winnertz, 1863, p. 796 [*=Palaeophthi­noria Meunier, 1904a, p. 160 (type, *P. aberrans*).*]
McUnier, 1917a; Edwards, 1940. Oligo., Europe (Baltic)—Holotype.

Cordyla Meigen, 1803, p. 263; McUnier, 1917a, 1923b; Statz, 1944a. Oligo., Europe (Baltic, Germany)—Holotype.

Dianepsia Loew, 1850, p. 33 ["D. bissa; OD]. Similar to Docosia, but wings short and broad, with very short SC; SC2 present; macrotrichia absent on wing membrane and forks of veins. McUnier, 1899a; Edwards, 1940. Oligo., Europe (Baltic).


Dziedzickia Johansson, 1909, p. 44. [Generic assignment of fossils doubtful.] McUnier, 1917b, 1922, 1923a; Statz, 1944a. Oligo., Europe (Baltic, Germany)—Holotype.

Ectrepesthoneura Endelein, 1910, p. 155, nom. subst. pro Willistoniella McUnier, 1904a, p. 85, nom. nov. Mik, 1895, Edwards, 1940; Statz, 1944a. Oligo., Europe (Baltic, Germany)—Holotype.

Exechia Winnertz, 1863, p. 879. Cockrell, 1908a; Pongrácz, 1928. Oligo., Europe (Baltic, Germany)—Holotype.

Exechia Winnertz, 1863, p. 879. Cockrell, 1908a; Pongrácz, 1928. Oligo., Europe (Baltic, Germany)—Holotype.


Leia Meigen, 1818, p. 253. Cockrell, 1911b; McUnier, 1917a, 1918; Statz, 1944a; Snyder, 1950. Oligo., USA (Colorado), Europe (Baltic, Germany, France); Mio., Europe (Scotland, France)—Holotype.

Leptomorphus Curtis, 1831, pl. 365. McUnier, 1917a; Cockrell, 1920c. Oligo., USA (Colorado); Oligo., Europe (Baltic)—Holotype.

Loewiella Meigen, 1894, p. 2x1 ["L. incompleta; SD Johanssenn, 1909, p. 44]. Similar to Dziedzickia, but stem of M1+2 longer than crossvein r-m; RS3+4 straight or nearly so. Edwards, 1940. Oligo., Europe (Baltic).—Fig. 227. *L. incompleta; wing, X16 (Johanssenn, 1909).

Macrocerca Meigen, 1803, p. 261. Cockrell, 1910b; Statz, 1944a. Oligo., Europe (Baltic, Germany)—Holotype.

Manota Williston, 1896, p. 260 ["Cerato Meien, 1904a, p. 87 (type, C. longipalpis)]. Johanssenn, 1909; Statz, 1944a. Oligo., Europe (Baltic, Germany)—Holotype.

Mycetopaethus Scudder, 1892, p. 20 ["M. intermedius; OD]. Similar to Sciofila (recent), but stem of M connected to R by crossvein near wing base. Oligo., USA (Colorado).

Mycomya Rondani, 1856, p. 194. Johanssenn, 1912; Cockrell, 1914f, 1921d, 1923b; Theobald, 1937a; Rohdenendorf, 1961c. Oligo., USA (Colorado), Europe (Baltic, Germany, France); Paleocene—Pliocene, South America (Colombia)—Holotype.

Necromyzza Scudder, 1895a, p. 121 ["N. pedata; OD]. Little-known genus; SC appears to terminate on R just beyond origin of RS. Mio., Europe (Germany).


Neuratelia Rondani, 1856, p. 195 ["Proanaclinia McUnier, 1904a, p. 156 (type, P. gibbosa; SD Edwards, 1940)]. Statz, 1944a. Oligo., Europe (Baltic, Germany)—Holotype.

Palaeoanaclinia McUnier, 1904a, p. 154 ["P. distincta; SD Johanssenn, 1909, p. 86]. Similar to Boletina; wings without macrotrichia on membrane and forks of veins; SC2 absent; stem of M1+2 short. Edwards, 1940. Oligo., Europe (Baltic).


Palaeodocosia Meigen, 1803, p. 172 ["P. brachypezoides; OD] [=Palaebirochonta Meien, 1904a, p. 179 (type, P. brachycampiters); Paleosystemna Meien, 1922, p. 119 (type, P. brachypezoides); Sciofilomorpha Meien, 1923a, p. 25, nom. nud.]. Johanssenn, 1909; Edwards, 1940. Oligo., Europe (Baltic).


Palaeognoriste McUnier, 1904a, p. 87 ["P. sciariforme; OD]. Proboscis elongate; wing venation little known. [Possibly a sciarid.] Johanssenn, 1909; McUnier, 1912b. Oligo., Europe (Baltic).

Paraleia Armbruster, 1938, p. 120 ["P. rhynorides; OD]. Little-known genus. Mio., Europe (Germany).
Diptera—Nematocera

Phronia Wintertz, 1863, p. 857. Meunier, 1917a; Cockerell, 1921d; Théobald, 1937a. Oligo., England (Europe (Baltic, France))-Holo.


Proallodia Armbuster, 1938, p. 121 [*P. rhombosides; OD]. Little-known genus. Mio., Europe (Germany).

Proapemon Melander, 1949, p. 9 [*P. infernus; OD]. Venation as in Hesperodex (recent) but the 3 ocelli distinct and antennal scape long. Oligo., USA (Colorado).

Proapolephthisa Armbuster, 1938, p. 162 [*P. syntenformis; OD]. Oligo., Europe (Baltic).

Probolechina Meunier, 1904a, p. 162 [*P. syntenformis; OD]. Oligo., Europe (Baltic).

Probolechis Armbuster, 1938, p. 122 [*P. epicyptides; OD]. Little-known genus. Mio., Europe (Germany).

Prodelopsis Armbuster, 1938, p. 120 [*P. ron- daniellides; OD]. Little-known genus. Mio., Europe (Germany).

Proepicypta Armbuster, 1938, p. 121 [*P. obesa; OD]. Little-known genus. Mio., Europe (Germany).


Proleria Armbuster, 1938, p. 120 [*P. landrocki; OD]. Little-known genus. Mio., Europe (Germany).


Prooneoglyphropera Meunier, 1904a, p. 169 [*P. eocenica; OD]. Related to Leia and most similar to Paraleia but with the 3 ocelli arranged in a straight line, lateral ones touching eyes. Cockerell, 1926c; Edwards, 1940. Oligo., Europe (Baltic).

Proovovakia Armbuster, 1938, p. 120 [*P. incerta; OD]. Little-known genus. Mio., Europe (Germany).

Prophronia Armbuster, 1938, p. 121 [*P. dynatosomides; OD]. Little-known genus. Mio., Europe (Germany).

Prophthinia Armbuster, 1938, p. 119 [*P. coe-
Vein R with a well-developed strut (phragma), connecting base of R with CUA; basal parts of RS and M reduced; RS unbranched. Body unknown. *Trias.*


**Family ANISOPIDAE** *Knab, 1912* [*Anisopidae* *Knab, 1912, p. 111]

Flies of moderate size. Wings: vein SC usually extending about to midwing; discal cell present; RS1+2 terminating on R or C. Body stout; antennae longer than head. Larvae saprophytic, in decaying vegetation. *Jur.*—*Holoc.*

**Sylvicola** *H**arris, 1776, p. 100 [*Anisopus* *Meigen, 1803, p. 264 (type, *A. fusci*); Heer, 1849; Meunier, 1904d; Cockerell, 1921d; Edwards, 1928; Pongrác, 1928. *Oligo.*, England, Europe (Balric); *Mio.*, Europe (Europea)—*Holoc.*


**Family PROTORHYPIDAE** *Handlirsch, 1906* [*Protorhyphidae* *Handlirsch, 1906b, p. 487]

Wing with vein SC strong, ending before midwing; RS with 2 long, curved branches, directed anteriorly; crossvein r-m midway between origins of these 2 branches; discal cell small. *Trias.*—*Jur.*


Family CECIDOMYIDAE
Newman, 1835

[Cecidomyidae Newman, 1835, p. 386]

Small to very small flies. Wings weak, hairy, with a reduced venation, sometimes consisting of only 1 or 2 longitudinal veins; SC usually absent; RS typically arising from R as in the Sciaridae; M weakly developed or absent; 1A commonly absent. Antennae typically long and moniliform; tibial spurs absent. Larvae mostly in plant galls; some scavengers in decaying debris; a few predators and parasites. Cret.—Holo.

Cecidomyia Meigen, 1803, p. 261. LOEW, 1850; MEUNIER, 1899a; KIEFFER, 1913; NAORA, 1933a. Oligo., Europe (Baltic), USA (Colorado); Paleoc. — Plio., China (Manchuria) — Holo.


Camptomyia KIEFFER, 1894, p. 323. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Campylomyza Meigen, 1818, p. 101. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Colpodia WINNERTZ, 1853, p. 185. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Cretocatocha GAGNE, 1977, p. 58 [*C. mcalpinei; OD]. Related to Anocha (recent), but male antenna setiform, with 8 flagellomeres, distal ones tapering to a bristletike tip; RS3 + 4 terminating on costa before wing apex. Cret., Canada (Alberta). — Fig. 229,5. *C. mcalpinei; wing, X40 (Gagne, 1977).

Cretocordylomyia GAGNE, 1977, p. 58 [*C. quadrirseries; OD]. Similar to Cordylomyia (recent); flagellomeres of male antenna with 4 crenulate whorls of long setae; R3 + 4 terminating on costa at wing apex; fork of M3 + 4 and CUA acute. Cret., Canada (Manitoba). — Fig. 229,3. *C. quadrirseries; wing, X55 (Gagne, 1977).

Cretomiastor GAGNE, 1977, p. 60 [*C. ferrejunctus; OD]. Similar to Leptomyia (recent), but wing broader and without macrotrichia; 5 tarsomeres present; M absent. Cret., Canada (Alberta, Manitoba). — Fig. 229,1. *C. ferrejunctus; holotype female, X55 (Gagne, 1977).

Cretowinnertzia GAGNE, 1977, p. 60 [*C. angustalsa; OD]. Similar to Parawinnertzia (recent), but wings broader; maxillary palpi with 4 segments. Cret., Canada (Manitoba). — Fig. 229,4. *C. angustalsa; holotype female, X38 (Gagne, 1977).

Dicroneurus KIEFFER, 1895, p. 122. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Epidosis LOEW, 1850, p. 38. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Frirenia KIEFFER, 1894, p. 201. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Heteropeza WINNERTZ, 1846, p. 13. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Lasioraptera MEIGEN, 1818, p. 88. SCUDDER, 1890; KIEFFER, 1913. Eoc., USA (Colorado) — Holo.

Ledomyiella MEUNIER, 1904a, p. 44 [*L. succini MEUNIER, 1904a, p. 44; SD CARPENTER, herein]. Similar to Brachyneura (recent), but M3 + 4 separating from CUA distally. KIEFFER, 1913. Oligo., Europe (Baltic). — Fig. 229,2. *L. succini; wing, X90 (Meunier, 1904a).

Lestremia MACQUART, 1826, p. 173. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Lithomyza SCUDDER, 1877a, p. 746 [*L. condita; OD]. Little-known genus, apparently similar to Anarete (recent), but wings broader beyond middle and tapering more basally. SCUDDER, 1890; KIEFFER, 1913. Eoc., USA (Colorado).

Meunieria KIEFFER, 1904, p. 408 [*Miaistor succini MEUNIER, 1901a, p. 191; OD]. Similar to Miaistor (recent), but maxillary palpi with 4 segments. MEUNIER, 1904a. Oligo., Europe (Baltic).

Monardia KIEFFER, 1895, p. 111. MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Monodicrana LOEW, 1850, p. 32. KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Neostenoptera MEUNIER, 1902c, p. 102, nom. subst. pro Stenoptera MEUNIER, 1901a, p. 200, non DUPONCHEL, 1838. KIEFFER, 1913. Pleist., Africa — Holo.

Palaeocolpodia MEUNIER, 1904a, p. 29 [*P. eocentrica; OD]. Similar to Holoneurus (recent), but transverse part of RS straight and not oblique. KIEFFER, 1913. Oligo., Europe (Baltic).

Peromyia KIEFFER, 1894, p. 205. LOEW, 1850; MEUNIER, 1904a; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.

Porricondyia RONDANI, 1840, p. 13. LOEW, 1850; KIEFFER, 1913. Oligo., Europe (Baltic) — Holo.


Family UNCERTAIN

The following genera, apparently belonging to the order Diptera, suborder Nema-
tocera, are too poorly known to permit family assignment.


**Amianta** Bode, 1953, p. 327 [*A. eurycephala*; OD]. Little-known genus. *Jur.*, Europe (Germany).


**Apistogrypothes** Bode, 1953, p. 329 [*A. inflexa*; OD]. Little-known genus. *Jur.*, Europe (Germany).

**Chironomopsis** Handlirsch, 1906b, p. 631 [*Chironomus arrogans* Giebel, 1856, p. 250; OD]. Little-known genus. *Plioc.*, England; *Cret.*, Mongolia, China (Liaoning).

**Cormophora** Bode, 1953, p. 329 [*C. arcaiformis*; OD]. Little-known genus. *Jur.*, Europe (Germany).

**Culiciscocolex** Bode, 1953, p. 322 [*C. gibberatus*; OD]. Little-known genus. *Jur.*, Europe (Germany).

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.

**Cymatomyia** Cua, are too poorly known to permit family assignment.
Suborder BRACHYCERA
Zetterstedt, 1842
[Brachycera Zetterstedt, 1842, p. 1]

Antennae of adults shorter than thorax, commonly consisting of less than 6 segments (total) and terminating in a style or arista; maxillary palpi with 1 or 2 segments; wings often broadly oval; vein CUA diverging toward 1A and often coalescing with it. Larvae with head capsule incomplete or absent; mandibles strongly curved, not opposite, their movements vertical to plane of head. Pupae obtect or coarctate. Hennig, 1973. Jur.—Hol.

Family PROTOBRACHYCERONTIDAE
Rohdendorf, 1962

Little-known family, of dubious validity. Small flies; wings with all veins equally strong; M3 and M4 converging distally; discal cell elongate. Hennig, 1967a; Kovalev, 1981. Jur.

Protobrachyceron Handlirsch, 1920, p. 205 [*P. liasinum; OD]. Terminations of SC, R, and RS1+2 about equally spaced; RS3+4 with a prominent terminal fork. Handlirsch, 1939; Rohdendorf, 1962a, 1964. Jur., Europe (Germany).—Fig. 230, 3. *P. liasinum; wing, X12 (Handlirsch, 1939).

Family ARCHISARGIDAE
Rohdendorf, 1962
[Archisargidae Rohdendorf, 1962a, p. 334]

Wings long and narrow, subpetiolate; veins SC and R strong, other veins weak; R5 with 3 terminal branches. Kovalev, 1981. Jur.


Family PALAEOSTRATIOMYIIDAE
Rohdendorf, 1938
[nom. transl. Rohdendorf, 1962a, p. 334, ex Palaeostatiomyiinae Rohdendorf, 1938, p. 31]


Family EOMYIIDAE
Rohdendorf, 1962
[Eomyiidae Rohdendorf, 1962a, p. 334]


Family XYLOPHAGIDAE Fällén, 1810
[Xylophagidae Fällén, 1810, p. 6]

Antennal flagellum typically with 8 or 20 to 36 segments (flagellomeres), commonly subpetiolate or serrate; maxillary palpus
prominent, with two segments; legs slender; tibiae with one or two spurs; wing veins commonly uniformly strong. Oligo.—Holoth.


Family XYLOMYIIDA Verrall, 1909

[Xylomyiidae Verrall, 1909, p. 217]

Similar to Stratiosmyiidae, but vein M3 coalesced with M4 distally, closing cell 3m. Oligo.—Holoth.

Xylomya Rondani, 1861, p. 11. Cockerell, 1914b; Melander, 1949. Oligo., USA (Colorado)—Holoth.


Family STRATIOSMYIIDA Newman, 1835

[Stratiosmyiidae Newman, 1835, p. 313]

Costa extending only to about wing apex; veins R and RS crowded toward anterior margin of wing and usually stronger than other veins; RS usually arising at level of m-cu crossvein (or slightly beyond); discal cell commonly small; RS3+4 diverging anteriorly, RS4 terminating on margin before apex. Flagellum elongate, usually annulate; tibiae commonly without apical spurs. Larvae elongate, occurring in damp soil or rotting vegetation. Cret.—Holoth.


Cretaceogaster Teskey, 1971, p. 1659 [*C. pygmaea; OD]. Similar to Birkshiria (recent) but with RS3+4 long and ending near wing apex. Cret., Canada (Manitoba).—Fig. 230,2. *C. pygmaeus; wing, X27 (Teskey, 1971).

Cyphomyia Wiedemann, 1819, p. 54. Cockerell, 1916c; James, 1937. Oligo., USA (Colorado)—Holoth.

Hermetiella Meunier, 1908d, p. 264 [*H. bifurcata; OD]. Similar to Campreprosopa (recent), but third antennal segment with 7 distinct divisions. Oligo., Europe (Baltic).


Moyamiya Melander, 1949, p. 26 [*M. limigena; OD]. Citellariine flies with pterostigma prominent, discal to discal cell. Oligo., USA (Colorado).

Nemotelus Geoffroy, 1762, p. 450. [Generic assignment of fossils doubtful.] Cockerell, 1921e. Eoc., USA (Colorado)—Holoth.


Protoberis Cockerell, 1915, p. 494 [*P. obliteratorius; OD]. Similar to Beris (recent); wings long; RS3 straight and slightly oblique. Oligo., England.


Family EOOSTRATIOSMYIIDAE

Rohdendorf, 1962

[EOOstratiomyiidae Rohdendorf, 1962a, p. 336]

Costa extending around wing apex; discal cell large; several crossveins present between veins RS3+4 and M. Kovalev, 1981. Jur.

EOOstratiomyia Rohdendorf, 1962a, p. 336 [*E. avia; OD]. Crossveins between RS3+4 and M at midwing; a single crossvein between R and base of RS1+2; anterior border of discal cell convex. Rohdendorf, 1964. Jur., USSR (Kazakh).—Fig. 231,7. *E. avia; wing, X7.5 (Rohdendorf, 1962a).

Family ARTHERICIDAE

Stuckenberg, 1973

[Arthericidae Stuckenberg, 1973, p. 669]

Similar to Rhagionidae but with RS1+2 curved anteriorly and joining costa at end of R; crossvein r-m joining discal cell near its proximal end. Oligo.—Holoth.
Protovermileo

~ Archirhagio

Probolomyia

Palaeobolbomyia

Rhagiophryne

Palaeobrachyceron

Eostratiomyia

Fig. 231. Eostratiomyiidae and Rhagionidae (p. 422-424).


Succinatherix STUCKENBERG, 1974, p. 281 [*S. Jes-tifera; OD]. Related to ibisia (recent). Female: hairs on frons arranged in 2 sublateral series; third antennal segment narrowly reniform; tibial spur formula 1,2,2. Wing with discal cell remote from wing margin. Oligo., Europe (Baltic).

Family RHAGIONIDAE

Latreille, 1804-1805


Vein SC extending at least to midwing; RS1+2 joining costa beyond end of R; RS3+4 commonly deeply forked. Flagellum with 8 segments in generalized forms, fewer segments in more specialized species; basal flagellar segment becoming swollen and bearing a style. Larvae very diverse, occurring in damp soil, rotting wood, or sand. KOVAL-LEY, 1982. Jur.–Holo.

Rhagio Fabricius, 1775, p. 761 [=Palaeobilarimorpha Meunier, 1902b, p. 400 (type, P. bifurcata)]. Cockerell, 1909b; Théobald, 1937b; Melander, 1949; Hennig, 1967a. Oligo., Europe (Baltic, France), USA (Colorado)–Holo.

Archirhagio Rohdendorf, 1938, p. 35 [*A. obscurus; OD]. Wing narrow and long; fork of RS3+4 shallow and broad; main fork of M just beyond

**Attrichops** **Verrall**, 1909, p. 291. **Cockerell**, 1914b. **Oligo.** USA (Colorado)—**Holo.**


**Chrysopilus** **Macquart**, 1826, p. 403. **Cockerell**, 1921d; **Statz**, 1940; **Hennig**, 1967a. **Oligo.** Europe (Baltic, Germany), England, USA (Colorado)—**Holo.**

**Dialysis** **Walker**, 1850, p. 4. **Cockerell**, 1908b. **Oligo.** USA (Colorado)—**Holo.**

**Ija** **Kovalev**, 1981, p. 93 [*I. problematica*; OD].

Little-known genus; vein 1A obsolescent distally, not reaching wing margin. [Family assignment doubtful.] *Jur.*, USSR (Asian RSFSR). —Fig. 231.5. "P. sibirica; wing, X20 (Kovalev, 1982).

**Palaeobolbomyia** **Kovalev**, 1982, p. 94 [*P. sibirica*; OD]. Similar to *Palaeobrachyceron*. Arista of antenna not segmented; RS1 + 2 slightly sigmoidal; RS4 aligned with stem of RS3 + 4; sides of discal cell not parallel. *Jur.*, USSR (Asian RSFSR). —Fig. 231.4. "P. handlirschi; wing, X17 (Kovalev, 1981).

**Palaeobrachyceron** **Kovalev**, 1981, p. 87 [*P. handlirschi*; OD]. Wing: M with 4 branches; RS3 and RS4 almost parallel; SC terminating almost at midwing. *Jur.*, USSR (Asian RSFSR). —Fig. 231.4. "P. sibirica; wing, X20 (Kovalev, 1982).


**Probolbomyia** **Ussatchov**, 1968, p. 620 [*P. modesta*; OD]. Related to *Bolbomyia*. RS1 + 2 nearly straight, arising at level of middle of stem of M; stem of M well developed, not coalesced with CUA; discal cell pentagonal; CUA curving in an arc to 1A at wing margin. *Jur.*, USSR (Kazakh). —Fig. 231.3. "P. modesta; wing, X18 (Ussatchov, 1968).


**Protovermileo** **Hennig**, 1967a, p. 26 [*P. electrus*; OD]. Similar to *Vermileo* (recent), but arista with 6 distinct segments. **Oligo.** Europe (Baltic). —Fig. 231.7. "P. electrus; whole insect, X5 (Hennig, 1967a).


**Symphoromyia** **Frauenfeld**, 1867, p. 497. **Paragon**, 1936; **Théobald**, 1937b; **Hennig**, 1967a; **Stuckenberg**, 1974. **Oligo.** Europe (Baltic, France)—**Holo.**

**Ussatchovia** **Kovalev**, 1982, p. 91 [*U. juratica*; OD]. Similar to *Probolbomyia*; stem of RS3 + 4 much longer than stem of RS and nearly 3 times as long as fork of RS3 + 4; RS3 and RS4 diverging at a nearly symmetrical angle. Arista of antenna segmented distally. *Jur.*, USSR (Asian RSFSR).

**Family** **TABANIDAE** **Leach**, 1815

[Tabanidae **Leach**, 1815, p. 161]

Fork of vein RS3 + 4 shorter than in Rhagionidae; RS3 and RS4 widely divergent distally, including wing apex between them; 1A nearly straight, usually coalesced with CUA distally. Mandibles absent in males; fore tibiae with spurs. Larvae in rotting vegetation or wood. *Eoc.—Holo.**

**Tabanus** **Linne**, 1758, p. 601. **Cockerell**, 1909b; **Dürrenfeldt**, 1968. **Oligo.** USA (Colorado); **Plio.** Europe (Germany)—**Holo.**

**Chrysops** **Meigen**, 1800, p. 23. **Cockerell**, 1921d; **Piton**, 1940a. *Eoc.* Europe (France); **Oligo.** England—**Holo.**

**Silvius** **Meigen**, 1820, p. 27. [Generic assignment of fossils doubtful.] *Meunier*, 1902b; *Mellander*, 1946; **Hennig**, 1967a. **Oligo.** Europe (Baltic), USA (Colorado)—**Holo.**

**Family** **ACROCERIDAE** **Leach**, 1815

[Acroceridae **Leach**, 1815, p. 162]

Venation diversely modified, often reduced. Head small; eyes holoptic in both sexes; flagellum not divided. Larvae, in early stages, parasitic on spiders. *Jur.—Holo.**

**Acrocerina** **Meigen**, 1803, p. 266. *Holo.**

**Archocyrtus** **Ussatchov**, 1968, p. 622 [*A. gibbous*; OD]. RS1 + 2 absent (apparently completely coalesced with R); RS3 + 4 with a short distal fork; RS3 just meeting end of R; M with 3 branches. Antennae large, flagellum at least as long as first and second antennal segments combined. *Jur.*, USSR (Kazakh). —Fig. 232.4. "A.
**FIG. 232.** Acroceridae, Nemestrinidae, and Bombyliidae (p. 424–427).

*Glaesoncodes* HENNIG, 1968, p. 4 [*G. completinervis; OD]. Similar to *Ogcodes* (recent); eyes naked; wing venation more nearly complete than in *Ogcodes*. Oligo., Europe (Baltic). — Fig. 232.3. *G. completinervis*; wing, X11 (Hennig, 1968).

*Prophilopota* HENNIG, 1966e, p. 9 [*P. succinea; OD]. Similar to *Philopota* (recent), but face

---

**Diptera—Brachycera**

*Amictites*

*Rhagionemestrius*

*Archinemestrius*

*Prophilopota*

*Rhagionemestrius*

*Protonemestrius*

*Eohirmoneura*

*Archinemestrius*
Wing with fork of vein RS3 + 4 very narrow; RS3 and RS4 nearly parallel and terminating on wing margin before apex; M1 and M2 also parallel and terminating on margin before apex; stem of RS3 + 4 and stem of M1 + 2 aligned to form a diagonal vein near midwing. Larvae parasitic on Orthoptera and certain coleopterous larvae. J ur.—Holo.


Archinemestrius Rohdendorf, 1968, p. 181 [*A. karatavicus; OD]. Wing tip slightly falcate; M1, M2, and RS4 curved distally and terminating on hind margin of wing, below apex; RS3 + 4 briefly touching M1 + 2; M2 short. Head short, apparently lacking a long proboscis. J ur., USSR (Kazakh).—Fig. 232.9. *A. karatavicus; whole insect, X5 (Rohdendorf, 1968).

Eohirmoneura Rohdendorf, 1968, p. 187 [*E. carpenteri; OD]. Similar to Hirmoneura and belonging to subfamily Hirmoneurinae; diagonal vein incomplete, not reaching posterior wing margin. J ur., USSR (Kazakh).—Fig. 232.8. *E. carpenteri; whole insect, X3.5 (Rohdendorf, 1968).


Neorhynchocephalus Lichtwardt, 1909, p. 512. Cockerell, 1908g; Bequaert & Carpenter, 1936; Bernardi, 1974. Oligo., USA (Colorado)—Holo.


Prosoea Schiner, 1867, p. 311 [*P. florigennus]. Meunier, 1903a; Bequaert & Carpenter, 1936. Oligo., USA (Colorado)—Holo.

Protonemestrius Rohdendorf, 1968, p. 182 [*P. martynovi; OD]. Similar to Archinemestrius, but RS4 slightly curved and terminating on anterior margin at apex. Proboscis sometimes elongate. J ur., USSR (Kazakh).—Fig. 232.7.
Diptera—Brachycera

mali; OD]. Similar to *Geron* (recent), but cross-vein r-m situated well before middle of discal cell. *Oligo*, USA (Colorado).


Glaesaemictus *Hennig*, 1966f, p. 12 [*P. hafniensis*; OD]. Similar to *Amictites*, but vertex much broader and tiabia with fewer and weaker spines; auxiliary area of wing small. *Oligo*, Europe (Baltic).


Pachysystropus *Cockerell*, 1909d, p. 56 [*P. rolleri*; OD]. Similar to *Systropus*, but RS4 and M1 as well as CUA and 1A coalesced just before wing margin. *Cockerell*, 1910c. *Oligo*, USA (Colorado).


Palaeogerontia *Meunier*, 1914a, p. 195 [*P. vetustus*; OD]. Similar to *Geron*, but cell between CUA and 1A open. *Oligo*, Europe (France).

Paracorsomyza *Hennig*, 1966f, p. 4 [*P. crassisirostris*; OD]. Similar to *Callynthroboaphora* and *Gnumyia* (both recent) but differing by its longer proboscis and long and uniformly slender first antennal segment. RS1+2 strongly sigmoidal. *Oligo*, Europe (Baltic).—Fig. 232.1. *P. crassisirostris*; wing, x9 (Hennig, 1966f).


Praeocythera *Théobald*, 1937b, p. 168 [*P. sadidi*; OD]. Similar to *Cytbera* (recent), but RS forking basad of fork of M. *Oligo*, Europe (France).


Proplarypygus *Hennig*, 1969b, p. 58 [*P. succinens*; OD]. Similar to *Platypygus* (recent) but with proboscis relatively short and occlusi open only slightly arched. *Oligo*, Europe (Baltic).

Protepacmus *Cockerell*, 1916c, p. 94 [*P. setosus*; OD]. Similar to *Alepidophora*, but wings much longer. *Oligo*, USA (Colorado).


Verrallites *Cockerell*, 1913f, p. 230 [*V. claudutus*; OD]. Somewhat similar to *Lepadophora* (recent), but CUA and 1A widely separated on wing margin. *Oligo*, USA (Colorado).


Family THEREVIDAE *Newman, 1835*

[Therevidae *Newman, 1835*, p. 391]

Vein M with 4 branches, all terminating on wing margin; anal cell closed; 1A and CUA meeting before wing margin. Larvae predaceous, usually found in soil. *Oligo.*—Holo.


Family MYDIDAE *Latreille, 1806*

[Mydidae *Latreille, 1806*, p. 293]

All branches of veins RS, M1, and M2 terminating on wing margin before apex; antennae long and conspicuously clubbed. Larvae in rotting wood; apparently predaceous on Coleoptera. *Oligo.*—Holo.
Mydas Fabricius, 1794, p. 252. Cockrell, 1913d. Oligo., USA (Colorado)–Holotype.

Family PROTOMPHRALIDAE
Rohdendorf, 1957

[Protomphralidae Rohdendorf, 1957, p. 91]

Little-known flies. Vein RS with 4 branches, all terminating on costal margin, its stem remote from costal margin. Jar.


Family ASILIDAE Latreille, 1804–1805

[Asilidae Latreille, 1804–1805, p. 305]

Wing venation generalized, close to basic pattern in Brachycera; veins RS3 and RS4 only slightly divergent distally; M3+4 unbranched. Vertex of head usually concave; flagellum with a terminal style; mouthparts forming a straight proboscis, commonly long. Larvae in soil or rotting wood. Eoc.–Holotype.

Asilus Linne, 1758, p. 605. Heer, 1849; Loew, 1850; Meunier, 1908c, 1915a; Cockrell, 1909b, 1911b, 1914f, 1921d, 1921e; James, 1939; Melander, 1946. Eoc., USA (Colorado); Oligo., Europe (Baltic), USA (Colorado); Mio., Europe (Germany)–Holotype.

Asilopsis Cockrell, 1920c, p. 250 [*A. fusculus; OD]. Little-known genus; marginal cell (below R) closed well before wing apex. [Family assignment doubtful.] Eoc., USA (Colorado).

Ceranargus Wiedemann, 1824, p. 12. James, 1939. Oligo., USA (Colorado)–Holotype.

Cophura Osten-Sacken, 1887, p. 181. Cockrell, 1913c; James, 1939. Oligo., USA (Colorado)–Holotype.


Leptogaster Meigen, 1803, p. 269. Unger, 1841; Melander, 1946. Oligo., USA (Colorado); Mio., Europe (Croatia)–Holotype.


Palaeomolobra Hull, 1962, p. 23 [*Senoprosopis antiquus James, 1939, p. 43; OD]. Similar to Lestomyia but with only a weak spine on anterior tibia; marginal cell (below R) widely open at margin. Oligo., USA (Colorado).

Philonicus Loew, 1849, p. 144. James, 1939. Oligo., USA (Colorado)–Holotype.

Procacanthus Macquart, 1838, p. 120. Cockrell, 1921d. Oligo., England–Holotype.

Pseudophirsson Dürenfeldt, 1968, p. 45 [*P. primus; OD]. Little-known genus, apparently similar to Antiphirsson (recent). Plio., Europe (Germany).


Stenocinclus Scudder, 1878b, p. 751 [*S. anomala; OD]. Similar to Ditoctria; marginal cell (below R) open; RS3+4 arising directly from R before origin of RS1+2. [Family assignment doubtful.] Scudder, 1890. Eng., USA (Wyoming).

Taracticus Loew, 1872, p. 64. Cockrell, 1910c, 1911b. Oligo., USA (Colorado)–Holotype.

Family EREMOCHAETIDAE
Ussatchov, 1968

[Eremochaetidae Ussatchov, 1968, p. 617]

Costa extending along wing margin nearly to vein RS4; SC extending beyond midwing; RS1+2 terminating on R; middle portion of RS3+4 forming part of anterior side of discal cell; CUA with a strong angle at crossvein m-cu; 1A present. Antenna with a large flagellum, clearly segmented. Jur.

Eremochaetus Ussatchov, 1968, p. 618 [*E. asilicus; OD]. RS1+2 terminating on R near wing apex; RS3+4 forked distally; M with 4 branches; 1A extending to wing margin. Jur., USSR (Kazakh).—Fig. 233,2. *E. asilicus; whole specimen, X7.3 (Ussatchov, 1968).

Pareremochaetus Ussatchov, 1968, p. 619 [*P. minor; OD]. Similar to Eremochaetus, but RS1+2 coalesced with R shortly after origin of RS; M with 4 branches; 1A not reaching wing margin. Jur., USSR (Kazakh).—Fig. 233,1. *P. minor; whole specimen, X10 (Ussatchov, 1968).

Family PROTEMPIDIDAE
Ussatchov, 1968

[Protempididae Ussatchov, 1968, p. 623]

Wing broad, with very narrow base; vein RS3 short; discal cell present; M with 3
Eremochaetaeidae, Protempididae, and Empididae (p. 428–430).

Family EMPIDIDAE Latreille, 1804–1805

In generalized species veins M1+2 and RS3+4 forked, in more specialized species either or both veins may be unbranched; CUA short, commonly recurved distally and terminating on 1A. Proboscis usually straight and elongate. Larvae in decaying vegetation or aquatic. Negrobov, 1978. Cret.—Holotype.

Empis Linné, 1758, p. 603. Statz, 1940; Melander, 1949. Oligo., USA (Colorado), Europe (Baltic, Germany)—Holotype.


Archiplatypalpus Kovaly, 1974, p. 84 [*A. cretaceus; OD]. Similar to Platypalpus but with holoptic eyes in male, and only a single longitudinal row of spinules on ventral surface of middle femora. Cret., USSR (Asian RSFSR).


Cretomicrophorus Negrobov, 1978, p. 82 [*C. rohdendorfi; OD]. Similar to Microphorites but with antennae on apical third of head; wing with RS3+4 terminating at wing apex. Cret., USSR (Asian RSFSR).


Drapetella Meunier, 1908h, p. 97 [*D. definita; OD]. Little-known genus, possibly close to Euthyneura (recent); discal cell open. Melander, 1927. Oligo., Europe (Baltic)—Holotype.


© 2009 University of Kansas Paleontological Institute
Hexapoda


Eecomycodromia Schützer, 1978a, p. 103 ["E. difficilis", OD]. Little-known genus; costa extending to end of M1+2; SC and R much reduced; RS3+4 not forked. Cret., Europe (Germany).


Euthyneuriella Meunier, 1908h, p. 112 ["E. longirostris", OD]. Little-known genus, possibly a synonym of Trichina (recent). Oligo., Europe (Baltic)-Holo.

Hilara Meigen, 1822, p. 1. Collado, 1926; Melander, 1927. Oligo., Europe (Baltic, Spain); Mio., Europe (Germany)-Holo.


Micromyrtus Hennig, 1971b, p. 16 ["M. extinctus", OD]. Similar to Microleptus but with anal angle of wing margin rounded. Cret., Europe (Lebanon).—Fig. 233.3. "M. extinctus", wing, ×46 (Hennig, 1971b).

Microphorus Macquart, 1827, p. 139. Handlirsch, 1910b; Hennig, 1971b. Eoc., Canada (British Columbia); Oligo., Europe (Baltic)-Holo.


Palaéoleptopeza Meunier, 1908h, p. 111 ["P. gracilis", OD]. Similar to Leptopeza but with spine hind femora. Melander, 1927. Oligo., Europe (Baltic).

Palaecoparasia Meunier, 1902d, p. 98 ["P. proosti", OD]. Little-known genus, probably a synonym of Climevara (recent). Meunier, 1908d; Melander, 1927. Oligo., Europe (Baltic).

Parathalassia Meunier, 1908h, p. 106 ["P. problematica", OD]. Little-known genus; RS3+4 forked; discal cell present; arista as long as rest of antenna. Melander, 1927. Oligo., Europe (Baltic).


Progloma James, 1937, p. 247 ["P. robustus", OD]. Similar to Gloma (recent), but fork of RS3+4 distal to end of RS1+2 and discal cell relatively shorter. James, 1939. Oligo., USA (Colorado).

Protoedalea Cockerell, 1920c, p. 252 ["P. brachystoma", OD]. Similar to Oedalea, but R and RS1+2 longer, discal cell narrower, and M1+2 abbreviated. Melander, 1927. Eoc., USA (Colorado).


Rhamphomyia Meigen, 1822, p. 42. Cockerell, 1921e; Meander, 1927, 1949; Statz, 1940. Eoc., USA (Colorado); Oligo., USA (Colorado). Europe (Baltic, Germany)-Holo.


Trichites Hennig, 1970, p. 7 ["T. cretaceus", OD]. Related to Trichina and Trichinomyia (recent), but with 3 branches of M arising from closed discal cell; arista longer than third antennal segment. Cret., Europe (Lebanon).—Fig. 233.5. "T. cretaceus", wing, ×34 (Hennig, 1970).


Family DOLICHOPODIDAE

Latreille, 1809

[Dolichopodidae Latreille, 1809, p. 290]

Costa extending along wing margin as far as vein M1 (or M1+2); RS1+2 and RS3+4 unbranched; SC very short, ending on R, or in subcostal space; 1A very short, not reaching wing margin. Flagellum usually with long, thin arista. Larvae in rotting vegetation, under bark, etc.; mostly predaceous. Cret.-Holo.

Dolichopus Latreille, 1796, p. 159. [Generic assignment of fossils doubtful.] Meunier, 1907-1908, 1908i; Theobald, 1937a; Statz, 1940. Oligo., Europe (France, Germany, Baltic)-Holo.


Gheynius Meunier, 1907-1908, p. 8 [*G. bifurcatus; OD]. Little-known genus; third antennal segment with a long, median arista between 2 projections from segment. Oligo., Europe (Baltic).


Lyroneurus Loew, 1857, p. 38. [Generic assignment of fossil doubtful.]


Nematoproctus Loew, 1857, p. 40. [Generic assignment of fossil doubtful.]


Neurigona Rondani, 1856, p. 142. [Generic assignment of fossil doubtful.]

Oncopygus Loew, 1857, p. 44. [Generic assignment of fossil doubtful.] Meunier, 1907-1908. Oligo., Europe (Baltic)-Holo.

Oligo., Europe (Germany)-Holo.


Prosystenus Negrovob, 1976, p. 122 [*P. zherichini; OD]. Cret., USA (Colorado).-Holo.


Reinitius Negrovob, 1978, p. 86 [*R. nervosus; OD]. Wing with SC reduced, terminating on R remote from costal margin; RS3+4 terminating at wing apex; basal crossvein between RS3+4 and M1+2 absent. [Generic assignment of fossil doubtful.] Cret., USSR (Asian RSFSR).

Sciaenetus Loew, 1857, p. 34. [Generic assignment of fossil doubtful.] Meunier, 1907-1908. Oligo., Europe (Baltic)-Holo.


Thrypticus Gerstäcker, 1864, p. 43. [Generic assignment of fossil very doubtful.]

Wheelerenomia Meunier, 1907-1908, p. 58 [*P. veccenica; OD]. Affinities of genus uncertain; first antennal segment cylindrical; second nearly spherical; third enlarged basally, tapering distally. Oligo., Europe (Baltic).

Xanthochlorus Loew, 1857, p. 2. [Generic assignment of fossil doubtful.]

Xiphandrius Loew, 1857, p. 36. [Generic assignment of fossil doubtful.]

Family PLATYPEZIDAE

Family PLATYPEZIDAE

Fallén, 1815

Small flies, with covering of short hairs; wings broad; vein SC complete and separate from R; RS3+4 unbranched, the cell below open; M1+2 usually forked distally; head broad; eyes large; antennae prorect, 2 basal segments short, third with a terminal arista; thorax broad; legs short; hind tarsi with at least basal segment flattened or bearing prominent projections. Larvae fungivorous. Eor.-Holo.


Eucallimyia Cockerrell, 1911b, p. 82 [*E. fortis; OD]. Similar to Callomyia, but R terminating on costal margin midway between ends of SC and RS1+2. Oligo., USA (Colorado).

Family SCIADOCERIDAE

Schmitz, 1929

[Sciadoceridae Schmitz, 1929, p. 3]

Similar to Platypezidae and Phoridae, but vein SC fused with R for most of its length; RS1+2 not coalesced with RS3+4; third antennal segment with a subterminal arista. Larval history unknown. Cret.-Holo.


Prioriphora McAlpine & Martin, 1966, p. 332 [*P. canadambra; OD]. Costa ending near...
at wing apex; discal cell absent; mesopleuron with bristles. Cret., Canada (Manitoba).—Fig. 234, 2. *S. bostoni; wing, X36 (McAlpine & Martin, 1966).

**Family PALAEOPHORIDAE**

Rohdendorf, 1951

(Palaeophoridae Rohdendorf, 1951, p. 106, nom. subst. pro Archiphoridae Rohdendorf, 1938, p. 40)

Little-known family, apparently related to the Phoridae. Antennae short, with 3 segments, and bearing a segmented arista; prothorax dilated anteriorly, covering the small head. Wings with vein SC apparently absent; R and RS strong and thick; RS3+4 unbranched. Jur.


**Family PHORIDAE** Newman, 1835

(Phoridae Newman, 1835, p. 396)

Minute to small flies. Wings relatively large, rarely greatly reduced or absent; in normal wings, veins R and RS short and thick, other veins weak; M1, M2, and M3+4 widely separated and appearing to arise from RS. Head typically small, flattened, with small eyes; thorax large and usually arched; legs short but well developed, hind femora laterally flattened. Larvae mostly scavengers, some parasitic. Oligo.—Holo.

**Phora** Latreille, 1796, p. 169. Brues, 1908a; Meunier, 1912c; Melander, 1949. Oligo., USA (Colorado), Europe (Baltic)—Holo.

**Anevrina** Lioy, 1864, p. 77. Brues, 1939a. Oligo., Europe (Baltic)—Holo.

**Aphiochaeta** Brues, 1903, p. 337. Brues, 1908a; Meunier, 1912c. Oligo., Europe (Baltic)—Holo.

**Chaetocnemistolopera** Borgmeier, 1923, p. 51. Brues, 1939a. Oligo., Europe (Baltic), USA (Colorado)—Holo.

**Coniceria** Meigen, 1830, p. 226. Meunier, 1912c; Brues, 1939a. Oligo., Europe (Baltic)—Holo.

**Diplonevra** Lioy, 1864, p. 77. Brues, 1923b, 1939a; Dürrenfeldt, 1968. Oligo., Europe (Baltic)—Holo.

**Electrophora** Brues, 1939a, p. 426. Oligo., Europe (Baltic)—Holo.

**Hypoceridites** Brues, 1939a, p. 428 [*H. dubitatis; OD]. Tibiae with isolated bristles near...
basal third; postantennal bristles procline; wing venation similar to that of Nosibea (recent). Oligo., Europe (Baltic).

**Megaselia** Rondani, 1856, p. 137. Brues, 1939a.

Oligo., Europe (Baltic)—Holo.


Oligo., Europe (Baltic)—Holo.

**Phalacroctotricha** Enderlein, 1912, p. 21. Statz, 1940. Oligo., Europe (Germany)—Holo.

**Protophorites** Brues, 1939a, p. 430 [*P. fimbriatius;* OD]. RS1 + 2 forked and bearing prominent setae over its entire length; 8 scutellum bristles present. Oligo., Europe (Baltic).

**Protoplatystethora** Brues, 1939a, p. 431 [*P. teretiaria;* OD]. Similar to *Aenigmatisia* (recent), but scutellum with bristles and fore tarsus only slightly thickened. Oligo., Europe (Baltic). —— Fig. 234.1. [*P. teretiaria*; whole specimen, X15 (Brues, 1939a).


Oligo., Europe (Baltic)—Holo.

**Family IRONOMYIIDAE**

McAlpine & Martin, 1966

[Ironomyiidae McAlpine & Martin, 1966, p. 528]

Vein SC coalesced with R for most of its length, but free basally and as it joins costal margin; RS3 + 5 terminating at wing apex; R and RS not markedly stronger than other veins. Cret.—Holo.

**Ironomyia** White, 1917, p. 216. Holo.

**Cretonomyia** McAlpine, 1973, p. 106 [*C. prisrina;* OD]. Similar to *Ironomyia* (recent), but mouthparts shorter and labellae apparently broader and padlike; postcervical bristles strongly developed; front and hind tibiae lacking preapical dorsal bristles. Cret., Canada (Manitoba).

**Family PIPUNCULIDAE**

Zetterstedt, 1842

[Pipeunculidae Zetterstedt, 1842, p. 4]

Small flies. Wings relatively long; vein M1 free from RS3 + 4 at its termination; M2 not reaching wing margin; cell below R + RS elongate. Head large, broader than thorax, and nearly spherical; eyes very large; antennae small, with dorsal arista. Larvae parasitic on Hemiptera (Homoptera). Oligo.—Holo.

**Pipunculus** Latreille, 1802, p. 463. Holo.


**Metaneprocerus** Aczel, 1948, p. 120 [*Protaneurocerus collini* Carpenter & Hull, 1939, p. 13; OD]. Similar to *Protaneurocerus* but with short and fine ocellar bristles. Oligo., Europe (Baltic).


**Protoneprocerus** Collins, 1931, p. 52. Carpenter & Hull, 1939; Aczel, 1948. Oligo., USA (Colorado)—Holo.

**Verrallia** Mix, 1899, p. 137. Meunier, 1903b; Carpenter & Hull, 1939; Aczel, 1948. Oligo., Europe (Baltic)—Holo.

**Family SYRPHIDAE** Leach, 1815

[Syrphidae Leach, 1815, p. 162]

Small to large flies. Wings of moderate size; vein M1 coalesced with RS3 + 4 distally; a veinlike fold present between RS and M. Head variable in shape; third antennal segment with a short dorsal arista, rarely a terminal style. Larvae in rotting vegetation or liquid media; some predaceous. Eoc.—Holo.

**Syrius** Fabricius, 1775, p. 762. Hull, 1945, 1949, 1960. Eoc., USA (Colorado); Oligo., USA (Colorado). Europe (Baltic); Mio., Europe (Croatia), USA (Montana)—Holo.

**Archiala** Hull, 1945, p. 305 [*A. femorata;* OD]. Allied to *Rhingia* (recent). Crossvein r+ m situated well before middle of discal cell; apical crossvein sigmoidal, joining RS3 + 4 well back from wing apex. Hind femora massive. Hull, 1949. Oligo., USA (Colorado).

**Archisyrius** Hull, 1960, p. 270 [*A. opacus;* OD]. Similar to *Cheilosia* but RS3 + 4 nearly straight; cell below RS3 + 4 with a sharply acute angle distally; M1 + 2 nearly straight distally, at end of discal cell. Mio., USA (Montana).


**Cacogaster** Hull, 1945, p. 297 [*C. novumaculata;* OD]. Related to *Rhingia*. Cell below R open; RS3 + 4 straight, ending at wing apex; crossvein r+ m situated well before middle of discal cell. Meunier, 1908b, Oligo., USA (Colorado).

**Cheilosia** Meigen, 1822, p. 296. Cockrell, 1909b, 1916c; Cockrell & LeVeque, 1931; Théobald, 1937a; Statz, 1940; Timon-David, 1944a; Hull, 1945, 1949; Röder, 1980. Eoc., USA (Wyoming, Colorado); Oligo., Europe (Baltic, France, Germany), USA (Colorado)—Holo.

**Cheilosialepta** Hull, 1945, p. 285 [*C. baltica;* OD]. Venation as in *Myiolepta*; face (frons) non-tuberculate; hind femora without spines. Oligo., Europe (Baltic).

**Chrysochilus** Meigen, 1800, p. 32. Hull, 1945, 1949. Oligo., USA (Colorado)—Holo.

**Doliomyia** Hull, 1945, p. 328 [*D. chalybee;* OD]. Similar to *Eumerus* (recent); hind femora slender
and without spines; eyes bare. Oligo., Europe (Baltic).

**Eoxylota** Hull, 1945, p. 324 [*Xylota pulchra* Meunier, 1904c, p. 207; OD]. Related to Xylota, but crossvein r-m less sigmoidal and face somewhat tuberculate. Hull, 1949. Oligo., Europe (Baltic).

**Epistrope** Walker, 1852, p. 242. Statz, 1940. Oligo., Europe (Germany)—Holo.


**MegaXylota** Hull, 1945, p. 340 [*M. magnifemur*; OD]. Similar to Xylota; hind femora greatly thickened, without spines; face concave. Hull, 1949. Oligo., Europe (Baltic).


**Palaeoascia** Meunier, 1893, p. clix [*P. uniappendiculata*; OD]. Similar to *Sphegina* (recent); marginal crossveins straight; eyes holoptic; face (frons) tuberculate; hind femora of discal cell. Handlirsch, 1908b; Hull, 1945, 1949. Oligo., Europe (Baltic).

**Palaeoeristalis** Hull, 1945, p. 333 [*P. tesselatus*; OD]. Similar to *Eristalis*, but RS3 + 4 with only slight curve. Hull, 1949. Eoc., USA (Colorado).

**Palaeopipiza** Meunier, 1902d, p. 103 [*P. xenor*; OD]. Related to *Aspeyia* (recent); RS3 + 4 convex, diverging from RS1 + 2 apically; face flat; hind femora short and slender. Hull, 1945, 1949. Oligo., Europe (Baltic).

**Palaeosphegina** Meunier, 1904c, p. 204 [*P. eleganita*; OD]. Venation as in *Sphegina*, but vena spuria absent; face tuberculate. Hull, 1945, 1949. Oligo., Europe (Baltic).


**Platycheirus** Lepeletier & Serville, 1825, p. 513. Carpenter & others, 1938; Hull, 1945; Melander, 1949. Oligo., USA (Colorado); Mio., Europe (Croatia)—Holo.

**Protochrysothoxum** Hull, 1945, p. 326 [*P. sphinx*; OD]. Similar to *Chrysothoxum* (recent); RS3 + 4 straight; crossvein r-m situated well before middle of discal cell. Hull, 1949. Oligo., USA (Colorado).


Diptera—Brachycera


Family TEPHRITIDAE
Newman, 1835

[TEPHRITIDAE Newman, 1835, p. 396]

Small to moderate-sized flies. Wings commonly spotted or banded; vein SC abruptly bent anteriorly near its distal end and joining costa at right angles; costal break commonly present, before termination of R; R setose; cell behind CUP acute distally. Larvae phytophagous. Mio.—Hol.


Family RICHARDIIDAE
Loew, 1868

[Richardiidae Loew, 1868, p. 2]

Similar to Oritidae, but cell below vein CUP without pointed apex; costal break present. Larvae apparently saprophagous. Oligo.—Hol.

Pachysomites Cockerell, 1916c, p. 95 [*P. inermis; OD]. Venation much as in Richardia (recent), but R extending nearly to wing apex; RS1+2 curving anteriorly just before terminating. Oligo., USA (Colorado).
Urotralis Cockerell, 1917b, p. 378 [*U. caudatus; OD]. Ovipositor very long and tapering; wing without markings; RS1+2 straight distally, not curved as in Richardia (recent). Oligo., USA (Colorado).

Family CYPSELOSOMATIDAE
Hendel, 1931

[CYPSELOSOMATIDAE Hendel, 1931, p. 3]

Small flies. Wings of moderate size; costal break present at end of vein SC; CUA+1A typically short, not reaching wing margin; M3+4 not usually continuing beyond end of discal cell; third antennal segment with a short spinelike arista; vibrissae typically present. Larvae, so far as known, developing in bat dung in caves. Henning, 1958. Oligo.—Hol.

Cypselosoma Hendel, 1913, p. 105. *Holo.
Cypselosomatites Henning, 1965, p. 38 [*C. succini; OD]. Costa with a distinct break at end of SC, terminal parts of RS3+4 and M1+2 convergent; CUA+1A reaching wing margin; ocellar bristles stout. Oligo., Europe (Baltic).—Fig. 234,4. *C. succini; wing, ×15 (Henning, 1965).

Family PSEUDOPOMYZIDAE
McAlpine, 1966

[Pseudopomyzidae McAlpine, 1966, p. 683]

Similar to Cypselosomatidae but with the postvertical bristles convergent. Larvae saprophagous. Oligo.—Hol.
Bopsseudopomyza Henning, 1971c, p. 7 [*E. kuehmei; OD]. Similar to Pseudopomyzella (recent) but with larger eyes and relatively smaller genae; mesopleural setae absent. Oligo., Europe (Baltic).

Family MICROPEZIDAE Loew, 1862

[Micropezidae Loew, 1862, p. 38]

Flies of moderate size, usually slender. Wings long; costal break absent; cell below vein RS3+4 at least narrowed apically, often closed; basal piece of CUA straight; fronto-orbital bristles and oral vibrissae absent; antennae short, third segment with a dorsal arista; legs long and slender. Larvae saprophagous, often in rotting wood. Oligo.—Hol.

Calobata Meigen, 1803, p. 276. [Generic assignment of fossil doubtful.] Statz, 1940. Oligo., Europe (Germany)—Hol.
Electrobata Henning, 1965, p. 41 [*E. myrmecia; OD]. Similar to Crepidochetus (recent) but without thickened bases of middle and hind femora; arista without long hairs; ocellar setae absent. Henning, 1966c, 1967b, 1969a. *Holo., Europe (Baltic).—Fig. 235,1. *E. myrmecia; head, oblique view from above, ×33 (Henning, 1965).

Family MEGAMERINIDAE
Hendel, 1913

[MEGAMERINIDAE Hendel, 1913, p. 90]

Similar to Psilidae; fronto-orbital bristles reduced, usually only 1 pair; hind femora thickened and spiny. Oligo.—Hol.

Family DIOPSIDAE Billberg, 1820
[Diopsidae BILLBERG, 1820, p. 115]
Small to medium-sized flies, allied to the Megamerinidae. Vein SC coalesced at least partially with R; basal crossvein between M1+2 and M3+4 absent; eyes typically stalked; fore femora thickened and spiny on ventral surface; postvertical bristles absent; only 1 pair of fronto-orbital and 1 pair of vertical bristles present. Oligo.—Holo.

Diopsis LINNÉ, 1775, p. 5. Holo.
Prosphyracephala HENNIG, 1965, p. 63 [*Sphyra-cephala succini LOEW, 1873, p. 102; OD]. Anal cell short, not narrow; CUA+1A continuing as straight line the posterior border of anal cell; notopleural bristles absent. HENNIG, 1969a; LEWIS, 1971a. Oligo., Europe (Baltic), USA (Montana).—Fig. 235,4. *P. succini (LOEW); a, whole insect, ×15; b, wing, ×18 (both Hennig, 1965).

Family PSILIDAE Walker, 1853
[Psilidae WALKER, 1853, p. 148]
Small to medium-sized flies; costal break prominent; vein SC incomplete, not extending beyond costal break; antennae usually long; arista pubescent; oral vibrissae absent; pleural bristles of thorax absent. Larvae phytophagous, occurring in stems or roots or under bark. Oligo.—Holo.

Psila MEIGEN, 1803, p. 278. Holo.
Electrochyliza HENNIG, 1965, p. 69 [*E. succini;
Family SEPSIDAE Walker, 1833

Small flies, similar to Sciomyzidae, but with at least 1 bristle on lower margin of metathoracic spiracle; palpi vestigial; abdomen elongate, constricted basally. Larvae saprophagous. Oligo.—Holo.

Sepsis Fallén, 1810, p. 17. [Generic assignment of fossil doubtful.] Statz, 1940. Oligo., Europe (Baltic).

Protorygma Hennig, 1965, p. 83 [*P. electricum; OD]. Generalized sepsids, close to stem of family; third antennal segment about as long as broad, decidedly oval; terminal part of M1 + 2 parallel to RS3 + 4; CUA + 1A reaching hind margin of wing. Oligo., Europe (Baltic).—Fig. 235,3. *P. electricum; wing, X16 (Hennig, 1965).


Family DRYOMYZIDAE Schiner, 1864

Flies of moderate size, similar to the Sciomyzidae but without femoral bristles. Larvae saprophagous or fungivorous. Paleoc.—Holo.

Dryomyza Fallén, 1820, p. 15. [Generic assignment of fossils doubtful.] Cockerell, 1923b; Statz, 1940. Oligo., Europe (Germany); Paleoc.—Plio., South America (Colombia)—Holo.

Palaeotimia Meunier, 1908d, p. 266 [*P. loesti; OD]. Dryomyzids with 2 pairs of fronto-orbital bristles; third antennal segment short, elliptical. Wings broad basally; RS3 + 4 and M1 + 2 convergent distally. Hennig, 1940, 1969a. Oligo., Europe (Baltic).—Fig. 235,2. *P. loesti; wing, X9 (Hennig, 1940).

Prodryomyza Hennig, 1965, p. 73 [*P. electrica; OD]. Similar to Palaeotimia, but terminal portions of RS3 + 4 and M1 + 2 not converging, and R with prominent setae distally. Oligo., Europe (Baltic).

Family SCIOMYZIDAE Fallén, 1820

[Sciomyzidae Fallén, 1820, p. 1]

Costal break absent; vein SC independent of R and terminating on costa well before end of R; cell cup short, not produced into an acute angle distally; vibrissae absent; no bristle on lower margin of metathoracic spiracle. Larvae chiefly predaceous on snails. Oligo.—Holo.

Sciomyza Fallén, 1820, p. 11. Scudder, 1878d; Cockerell, 1909a. Eoc., Canada (British Columbia); Oligo., USA (Colorado)—Holo.

Palaeoheteromyza Meunier, 1904f, p. 26 [*P. crassicornis; OD]. Sciomyzines with very large third antennal segment. Hennig, 1965, 1969a. Oligo., Europe (Baltic).—Fig. 236,2. *P. crassicornis; whole specimen, X12 (Hennig, 1965).


Prosalticella Hennig, 1965, p. 92 [*P. succini; OD]. Similar to Salticella (recent), but propleural bris-
Hexapoda


_Sepedonites_ Hennig, 1965, p. 102 [*S. baltica; OD]. Related to _Sepedon_ (recent). SC strong for its entire length, terminating well before end of R; CUA + 1A reaching margin of wing. Oligo., Europe (Baltic). — Fig. 236, 1. *S. baltica; wing, ×7.5 (Hennig, 1965).

_Tetanocera_ Duméril, 1800, p. 439. [Generic assignment of fossil doubtful] Théobald, 1937a. Oligo., Europe (France).—Fig. 236, 1. "S. baltica; wing, X7.5 (Hennig, 1965).

_Tetanocera_ Duméril, 1800, p. 439. [Generic assignment of fossil doubtful] Théobald, 1937a. Oligo., Europe (France).—Fig. 236, 1. "S. baltica; wing, X7.5 (Hennig, 1965).

<table>
<thead>
<tr>
<th>Family CHAMAEMYIIDAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hendel, 1910</td>
</tr>
</tbody>
</table>

Small flies. Costa without break; vein SC complete, in some species coalesced with R for a short distance; CUA + 1A not reaching wing margin; cell cup closed; postvertical bristles convergent or absent; oral vibrissae absent; fore and hind tibiae without preapical bristles. Larvae predaceous on Coccidae and other Homoptera. Oligo.—Holo.

_Chamaemyia_ Meigen, 1803, p. 278. _Holo._

_Procromefania_ Hennig, 1965, p. 116 [*P. electrica; OD]. Similar to _Cremefania_ (recent), but wings with cell below R relatively broader; head with larger, rounded eyes and with correspondingly narrow genae. Oligo., Europe (Baltic). — Fig. 236, 3. *P. electrica; whole specimen, ×18 (Hennig, 1965).

<table>
<thead>
<tr>
<th>Family LAUXANIIDAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macquart, 1835</td>
</tr>
</tbody>
</table>

Small flies. Wings with vein SC complete; costal break absent; cell cup closed; CUA + 1A short; oral vibrissae very poorly developed or absent; postvertical bristles convergent; only 2 fronto-orbital bristles. Larvae saprophagous or phytophagous. Oligo.—Holo.

_Lauxania_ Latreille, 1804, p. 196. _Holo._

_Chamaelauxania_ Hennig, 1965, p. 106 [*C. succini; OD]. Head rounded; eyes vertically elliptical; third antennal segment oval, somewhat longer than broad. Oligo., Europe (Baltic). — Fig. 236, 4. *C. succini; whole specimen, ×10.5 (Hennig, 1965).

_Hemilauxania_ Hennig, 1965, p. 109 [*H. incurvista; OD]. Similar to _Chamaelauxania_, but costal margin (to level of Rs1 + 2) with short, thick spines among fine hairs; second segment of arista relatively shorter and third with slightly longer pubescence. Oligo., Europe (Baltic).

_Sapromyza_ Fallén, 1810, p. 18. _Melander, 1949. Oligo., USA (Colorado)—Holo._

_Family HELEOMYZIDAE |
| Low, 1862 |

Medium-sized flies. Costal break present, costal margin usually with short bristles; cell behind stem of vein M and cell behind vein CUP closed; vibrissae well developed; postvertical bristles convergent; antennae short, third segment usually rounded. Larvae saprophagous or phytophagous. Oligo.—Holo.

_Heleomyza_ Fallén, 1810, p. 19. [Generic assignment of fossils doubtful] Meunier, 1914b; Théobald, 1937a; Timon-David, 1944a. Oligo., Europe (Germany, France).—Holo.

_Chaerohelomyza_ Hennig, 1965, p. 148 [*C. electrica; OD]. Little-known genus with 2 pairs of stout setae on prothorax, 3 dorsal setae on middle tibiae, and 3 stout sternopleural setae on thorax. Oligo., Europe (Baltic).

_Electroeria_ Hennig, 1965, p. 150 [*L. alacris Meunier, 1904f, p. 25; OD]. Related to _Loria_ (recent), but CUA + 1A extending to wing margin; propleural setae absent. Oligo., Europe (Baltic).


_Trixoscelis_ Rondani, 1856, p. 134. _Melander, 1949. Oligo., USA (Colorado).—Holo._

_Family CHYROMYIDAE |
| Frey, 1921 |

Very small, stout flies. Wings with vein SC free, ending on costa; costal break typically present, though weak; cell behind stem of M closed; CUA + 1A not reaching wing margin. Palpi typically reduced; postvertical bristles always present, convergent and short; alula only slightly developed. Larvae scav-
engers, in bird or rodent nests or in rotting wood. Oligo.–Holo.

Chyromya Robineau-Desvoidy, 1830, p. 621. Holo.

Gephyromyiella Henning, 1965, p. 158 [*G. electrica; OD]. Costal break absent; costal margin evenly pubescent; SC and R parallel; RS3 + 4 and M1 + 2 nearly parallel, with slight convergence distally; crossvein r-m at about level of end of SC. Oligo., Europe (Baltic).

Family PALLOPTERIDAE

Loew, 1862

[Pallopteridae Loew, 1862, p. 56]

Similar to Lonchaeidae, but postvertical bristles present and propleural bristles commonly absent; wings with vein SC complete, terminating very close to R. Larvae saprophagous or phytophagous. Oligo.–Holo.


Pallopterites Henning, 1967b, p. 4 [*P. electrica; OD]. Similar to Palloptera (recent) but with only 1 pair of scutellar bristles. Oligo., Europe (Baltic).

Family LONCHAEIDAE

Rondani, 1856

[Lonchaeidae Rondani, 1856, p. 118]

Stout flies, small to moderate in size. Wings with vein SC complete, ending on costal margin; oral vibrissae absent; 1 pair of fronto-orbital bristles; postocular bristles divergent; anterior and posterior tibiae without preapical bristles. Larvae saprophagous or phytophagous. Oligo.–Holo.

Lonchaea Fallén, 1820, p. 25. Holo.

Glaesolonchaea Henning, 1967b, p. 15 [*G. electrica; OD]. Hind margin of mesopleura with a single bristle. Oligo., Europe (Baltic).


Family PIOPHILIDAE

Macquart, 1835

[Piophilidae Macquart, 1835 in Macquart, 1834–1835, p. 531]

Small flies. Wing with costal break at end of SC; cell behind stem of vein M and cell behind vein CUP complete; CUA + 1A not reaching wing margin; oral vibrissae strongly developed; postvertical bristles well developed, at least slightly divergent; mesopleural bristles absent. Larvae saprophagous, usually in dead animal tissue. Oligo.–Holo.

Piophila Fallén, 1810, p. 20. Holo.


Family PRONEOTTIOPHILIDAE

Henning, 1969

[Proneottiophilidae Henning, 1969a, p. 11]

Similar to Piophilidae but with 3 strong, reclinate fronto-orbital bristles; terminations of veins SC and R widely separated on costal margin. Oligo.

Proneottiophilum Henning, 1969a, p. 15 [*P. extinctum; OD]. Head rounded in profile; eyes higher than long; third antennal segment elongate-oval. Costa with stout setae on dorsal surface. Oligo., Europe (Baltic). —— Fig. 237,2. *P. extinctum; wings and body, X7 (Henning, 1969a).

Family OPOMYZIDAE

Fallén, 1810

[Opomyzidae Fallén, 1810, p. 10]

Small, slender flies. Costal break at end of vein SC; cell behind stem of M and cell behind CUP complete; oral vibrissae absent; only 1 pair of fronto-orbital bristles; postvertical bristles divergent. Larvae in stems of grasses. Oligo.–Holo.

Opomyza Fallén, 1820, p. 10. [Generic assignment of fossil doubtful.] Statz, 1940. Oligo., Europe (Germany)–Holo.

Family CLUSIIDAE Frey, 1921

[Clusiidae Frey, 1921, p. 220]

Small flies, similar to the Agromyzidae; second antennal segment with an outer, angular projection; 2 to 4 fronto-orbital bristles. Larvae in moist, rotting wood. Oligo.–Holo.

Clusia Haliday, 1838, p. 188. Holo.

Clusiodes Coquillett, 1904, p. 93. [Generic assignment of fossil doubtful.] Statz, 1940. Oligo., Europe (Germany)–Holo.

Electroclusiodes Henning, 1965, p. 136 [*Agromyza meunieri Hendel, 1923, p. 145; OD]. Head with 4 pairs of fronto-orbital setae; tibiae lacking apical spines; wing with crossvein r-m not very remote from crossvein between M1 + 2 and
Hexapoda


---Fig. 237.4. *E. meunieri* (Hendel); whole insect, X7.8 (Hennig, 1965).

**Family ACARTOPHTHALMIDAE**

Czerny, 1928

[Acartophthalmidae Czerny, 1928, p. 3]

Similar to Clusiidae, but postvertical bristles remote from each other; eyes pubescent; arista short, only a little longer than rest of antenna. Wing with veins SC and R divergent; costa broken only near wing base. Oligo.—Holo.

*Acartophthalmus* Czerny, 1902, p. 256. Holo.

*Acartophthalmites* Hennig, 1965, p. 130 [*A. tertiaria*; OD]. Similar to *Acartophthalmus* (recent), but insects about twice as large as those of *Acartophthalmus*; thorax with a distinct color pattern. Oligo., Europe (Baltic). ---Fig. 237.5. *A. tertiaria*; wing, X5 (Hennig, 1965).

**Family ODINIIDAE**

Hendel, 1918

[Odiniidae Hendel, 1918, p. 112]

Similar to Agromyzidae. Wings with costa weakly developed or absent between terminations of veins RS3 + 4 and M1 + 2; fore and hind tibiae with short preapical bristles. Larvae saprophagous, living in galleries of wood-boring insects. Oligo.—Holo.


*Protodinia* Hennig, 1965, p. 124 [*P. electrica*; OD]. Related to *Odinia* (recent). Costal break at end of SC; costa extending to termination of RS3 + 4; CUA + 1A reaching to hind margin of wing. Eyes vertically elliptical; third antennal segment approximately square in general form. Oligo., Europe (Baltic).

**Family AGROMYZIDAE**

Bigot, 1852

[Agromyzidae Bigot, 1852, p. 486]

Small flies. Wings with costal break at end of vein SC; cell below stem of M complete; costa strongly developed as far as end of M1 + 2; preapical tibial bristles absent. Larvae leaf-miners or gall-makers. Oligo.—Holo.


**Family CARNIDAE**

Frey, 1921

[Carnidae Frey, 1921, p. 149]

Similar to Milichiidae, but labella rounded, not elongate, and proboscis not geniculate. Larvae saprophagous. Oligo.—Holo.


*Meoneurites* Hennig, 1965, p. 185 [*M. enigmatica*; OD]. Similar to *Meoneurites* (recent), but margin of mouth not protruding; longitudinal axis of eye vertical, not oblique; distance between ends of RS1 + 2 and RS3 + 4 clearly shorter than that between ends of RS3 + 4 and M1 + 2. Hennig, 1972a. Oligo., Europe (Baltic).

**Family PERISCELIDIDAE**

Oldenberg, 1914

[Periscelididae Oldenberg, 1914, p. 41]

Costa without break and extending beyond end of vein RS3 + 4; SC very short, not reaching wing margin; 1 pair of fronto-orbital bristles; postvertical bristles divergent. Larvae in fermenting tree sap or in leaf mines of weevils. Oligo./Mio.—Holo.


**Family NEUROCHAETIDAE**

McAlpine, 1978

[Neurochaetidae McAlpine, 1978, p. 274]

Related to the Periscelididae but with 3 or more fronto-orbital bristles; vibrissae not displaced high above projecting lower ridge of face (epistoma). Wings with costal break present at end of vein SC. Larvae apparently feeding on microorganisms associated with araceous plants. Oligo.—Holo.


*Anthoclusia* Hennig, 1965, p. 165 [*A. gephryea*; OD]. Wings unusually broad; SC weak; terminations of RS1 + 2 and RS3 + 4 nearer together than terminations of RS3 + 4 and M1 + 2; CUA + 1A not reaching wing margin; third antennal segment of male oval, directed ventrally. Hennig, 1967b, 1969a, 1971a. Oligo., Europe (Baltic). ---Fig. 237.6. *A. gephryea*; a, whole insect, X20; b, male antenna, arista incomplete, X150 (both Hennig, 1965).
Fig. 237. Proneottiophilidae, Clusiidae, Acartophthalmidae, Neurochaetidae, Aulacigastridae, and Asteiidae (p. 439-442).
Family ANTHOMYZIDAE  
Bigot, 1852  

[Anthomyzidae Bigot, 1852, p. 486]

Small, slender flies, with much structural diversity. Oral vibrissae present; frons usually desclerotized; postvertical bristles divergent when present; usually 3 pairs of fronto-orbital bristles present, at least 1 pair of which are reclinate. Larvae saprophagous, some probably phytophagous. HENNIG, 1971a. Oligo.–Holo.

Anthomyza FALLEN, 1810, p. 20. (Generic assignment of fossil doubtful.) STATZ, 1940; HENNIG, 1971a. Oligo., Europe (Germany)–Holo.


Xenanthomyza HENNIG, 1967b, p. 19 [*X. larssoni; OD]. Arista of antenna with only short hairs. Oligo., Europe (Baltic).

Family AULACIGASTRIDAE  
Duda, 1924  

[Aulacigastridae Duda, 1924, p. 173]

Similar to the Periscelididae, but costal break usually present; vein SC coalesced with R distally; ocellar bristles and usually postvertical bristles absent. Larvae saprophagous, as far as known, in fermenting tree sap. Oligo.–Holo.


Protaulacigaster HENNIG, 1965, p. 162 [*P. electrica; OD]. Similar to Aulacigaster (recent) but without costal break at end of SC; CUA+1A extending to hind wing margin. Oligo., Europe (Baltic).—Fig. 237,1. *P. electrica; wing, X22 (HENNIG, 1965).

Family ASTEIIDAE Rondani, 1856  

[Asteiidae Rondani, 1856, p. 27]

Small to minute flies. Wings long; costal break absent; vein SC incomplete, not reaching costal margin; RS1+2 diverging anteriorly shortly after its origin, usually terminating on costa before midwing; CUA+1A absent; oral vibrissae well developed; only 1 or 2 pairs of fronto-orbital bristles present. Larvae fungivorous. Oligo.–Holo.

Asteia MEIGEN, 1830, p. 88. Holo.

Succinasteia HENNIG, 1969a, p. 31 [*S. carpenteri; OD]. Termination of RS1+2 on costa about equidistant between terminations of R and RS3+4; 2 reclinate fronto-orbital bristles present. Oligo., Europe (Baltic).—Fig. 237,3. *S. carpenteri; whole insect, X24 (HENNIG, 1969a).

Family CAMILLIDAE Frey, 1921  

[Camillidae Frey, 1921, p. 65]

Small flies, similar to Drosophilidae, but vein CUA+1A very short or absent. Larvae saprophagous, usually in rodent nests. Oligo.–Holo.

Camilla HALIDAY, 1836, p. 281. Holo.

Protocamilla HENNIG, 1965, p. 195 [*P. succini; OD]. Costal margin with 2 breaks; basal crossvein present; CUA+1A absent; dorsal preapical bristles on all tibiae. Oligo., Europe (Baltic).

Family DIASTATIDAE  
Frey, 1921  

[Diastatidae Frey, 1921, p. 220]

Similar to Ephydridae (recent) but with only 1 costal break and with convergent postvertical bristles present. Larvae apparently saprophagous, in rotting wood. Oligo.–Holo.

Diastata MEIGEN, 1830, p. 94. Holo.

Pareuthychaeta HENNIG, 1965, p. 191 [*P. electrica; OD]. Venation much as in Euthychaeta (recent); third antennal segment oval; 1 pair of reclinate and 1 pair of procline fronto-orbital bristles, latter fairly remote from former. HENNIG, 1967b. Oligo., Europe (Baltic).

Family DROSOPHILIDAE  
Rondani, 1856  

[Drosophilidae Rondani, 1856, p. 27]

Small flies. Costal break present; vein SC incomplete or coalesced with R distally; CUA+1A short. Procline fronto-orbital bristles located near eye margins; mesopleural bristles absent. Larvae mostly fungivorous. Oligo.–Holo.

Drosophila FALLEN, 1823, p. 4. (Generic assignment of fossil doubtful.) COCKERELL, 1923b. Oligo., South America (Colombia)–Holo.

Curtonotum MACQUART, 1842, p. 350. (Generic assignment of fossil doubtful.) THÉOBALD, 1937a. Oligo., Europe (France)–Holo.

Electrophorctica HENNIG, 1965, p. 202 [*E. succini; OD]. Similar to Amiota (recent); 3 pairs of fronto-orbital bristles; costa extending to M1+2; distal portions of RS3+4 and M1+2 nearly parallel. Oligo., Europe (Baltic).
Family MILICHIIDAE Schiner, 1864

(Milichiidae Schiner, 1864, p. 296)
Small flies. Costa with 2 breaks, 1 at end of vein SC, the other near humeral vein; cell behind stem of M and cell behind CUP closed; oral vibrissae present; postvertical bristles not divergent; labella elongate. Larvae saprophagous in various habitats. Oligo.—Holo.

Milichia Meigen, 1830, p. 131. Holo.
Pseudodesmometopa Hennig, 1971c, p. 14 [*P. succineum; OD]. Similar to Desmometopa (recent), but labellae shorter and cerci of female cuspidate. Oligo., Europe (Baltic).

Family CRYPTOCHAETIDAE
Brues & Melander, 1932

(Cryptochaetidae Brues & Melander, 1932, p. 342)
Small flies. Costa with 2 breaks; cell behind stem of vein M open to discal cell; CUA + 1A absent; 2A well developed; third antennal segment much enlarged; fronto-orbital bristles and ocellar bristles absent. Larvae endoparasitic on certain Homoptera. Oligo.—Holo.

Cryptochaetum Rondani, 1875, p. 167. Holo.

Family CHLOROPIDAE
Rondani, 1856

(Chloropidae Rondani, 1856, p. 26)
Small flies. Vein CUA + 1A and cell behind CUP absent; proboscis with elongate labella; procline and reclinate fronto-orbital bristles absent. Larval habits very diverse: parasitic, saprophagous, or phytophagous. Oligo.—Holo.

Chloropa Meigen, 1803, p. 278. [Generic assignment of fossil doubtful.] Statz, 1940. Oligo., Europe (Germany)—Holo.
Oscinella Becker, 1910, p. 150. [Generic assignment of fossil doubtful.] Statz, 1940. Oligo., Europe (Germany)—Holo.
Protoscinella Hennig, 1965, p. 203 [*P. electricus; OD]. Head higher than long; eyes vertically elliptical; third antennal segment large and rounded; arista short, with short hairs; labellae of proboscis slender and long; costa extending to termination of M1 + 2. Oligo., Europe (Baltic).

Family SCATOPHAGIDAE
Robineau-Desvoidy, 1830

(Scatophagidae Robineau-Desvoidy, 1830, p. 614)
Similar to Anthomyidae but with silky hairs below occiput. Larvae saprophagous or phytophagous, including a few leaf-miners. Oligo.—Holo.

Scatophaga Fabricius, 1803, p. 277. Statz, 1940. Oligo., Europe (Germany)—Holo.
Norellisoma Hennel, 1910, p. 308. Statz, 1940. Oligo., Europe (Germany)—Holo.

Family GASTEROPHILIDAE
Girschner, 1896

(Gasterophilidae Girschner, 1896, p. 63)
Muscoid flies, with mouthparts vestigial in adults. Vein M1 + 2 extending nearly straight to wing margin, not curved abruptly toward RS3 + 4. Larvae parasitic in alimentary tract of mammals. Pleist.—Holo.

Gasterophilus Leach, 1817, p. 162. Holo.
Cobboldia Brauer, 1887, p. 218. [Fossils are larvae from frozen mammoth; living species of Cobboldia are parasites of elephants.] Grunin, 1973. Pleist., USSR (Asian RSFSR)—Holo.

Family MUSCIDAE Latreille, 1802

(Muscidae Latreille, 1802a, p. 453)
Small to large flies. Vein M1 + 2 with an abrupt bend toward RS3 + 4 in midwing area; CUA + 1A not reaching hind margin; antennae with dorsal arista. Larvae saprophagous, phytophagous, or predaceous. Oligo.—Holo.

Fannia Robineau-Desvoidy, 1830, p. 567. [Fossil record is of F. scalaris, a widely distributed extant species.] Hennig, 1966a. Oligo., Europe (Baltic)—Holo.

Family GLOSSINIDAE
Malloch, 1929

(Glossinidae Malloch, 1929, p. 553)
Flies of moderate size, similar to Muscidae, but vein M1 + 2 nearly straight in
midwing area; proboscis in both sexes strongly sclerotized and elongate, its base bulbous. Larval development completed in abdomen of adult female. *Oligo.—Holo.*

**Glossina** **Wiedmann, 1830,** p. 253 [=*Paloestrus Scudder, 1892,* p. 18 (type, *P. oligocenus*); *Cockereilitha Townsend, 1938,* p. 166 (type, *Glossina osborni Cockerell, 1909e*); *Lithoglossina Townsend, 1938,* p. 166 (type, *Glossina armatisipes Cockerell, 1917a*)). **Cockerell, 1907d,** 1916b; **Bequaert, 1930b; Townsend, 1942. Oligo., USA (Colorado)—Holo.**

**Family EOPHLEBOMYIIDAE**

**Cockerell, 1925**

[In ephlebomyiidae Cockerell, 1925c, p. 230]

Little-known flies, apparently related to the Anthomyiidae. *Eoc.*

**Eophlebomyia** **Cockerell, 1924a,** p. 4 [*E. claripennis; OD*]. Cell below vein M3 + 4 open; tibiae smooth. **Cockerell, 1925c. Eoc., USA (Colorado).**

**Family CALLIPHORIDAE**

**Brauer & von Bergenstamm, 1889**

[Calliphoridæ Brauer & von Bergenstamm, 1889, p. 156]

Flies medium-sized to large. Similar to Sarcophagidae (recent), but arista plumose to its tip; commonly with 2 notopleural bristles. Larvae mostly scavengers, usually in carrion; some parasitic on snails or earthworms, and a few causing cutaneous myiasis in mammals. *Cret.—Holo.*

**Calliphora** **Robineau-Desvoidy, 1830,** p. 433. *Holo.*

**Cretaphormia** **McAlpine, 1970,** p. 345 [*C. fouleri; OD*]. Puparium about 13 mm long; flies shaped as in *Protaphormia* (recent). *Cret., Canada (Alberta).**

**Family HIPPOBOSCIDAE**

**Samouelle, 1819**

[Hippoboscidæ Samouelle, 1819, p. 302]

Wings long; veins SC, R, and RS strong, ending on anterior margin well before apex; M1 + 2, M3 + 4, and CUA + 1A usually reaching wing margin but weakly developed; cell behind stem of M open to discal cell; body dorsoventrally flattened; proboscis porkert. Adults ectoparasites on mammals and birds. Larval development completed in abdomen of adult female. *Oligo.—Holo.*

**Hippobosca** **Linne, 1758,** p. 607. *Holo.*


**Family UNCERTAIN**

The following genera, apparently belonging to the order Diptera, suborder Brachycera, are too poorly known to permit assignment to families.

**Acanthomyites** **Cockerell, 1921e,** p. 33 [*A. aldrichi; OD*]. Little-known genus of stout flies, with many large bristles on head, abdomen, and legs. [Wing unknown; probably a muscoid.] *Eoc., USA (Colorado).**

**Adipterites** **Townsend, 1938,** p. 166 [*Dipterites obovatus Heer, 1865,* fig. 323; OD]. Little-known larva. *Heer, 1849; Townsend, 1942. Mio., Europe (Germany).**

**Anthracida** **Germar, 1849,** p. 64 [*A. xylotona; OD*]. Little-known genus. *Oligo., Europe (Germany).**

**Arthropiella** **Meunier, 1908d,** p. 262 [*A. eocenia; OD*]. Little-known genus, possibly related to the Xylophagidae. *Hennig, 1967a. Oligo., Europe (Baltic).**

**Burmitempis** **Cockerell, 1917g,** p. 367 [*B. hateralis; OD*]. Little-known genus. Discal cell open; structure of RS and M uncertain; halteres enormous. Head broad, dichoptic. *Melandier, 1927. Mio., Burma.**

**Dipterites** **Heer, 1849,** p. 254 [*D. obsoletus; OD*]. Little-known genus, probably belonging to suborder Brachycera. *Mio., Europe (Germany).**

**Electrotachina** **Townsend, 1938,** p. 166 [*E. smithii; OD*]. Little-known genus (adult). *Townsend, 1942. Oligo., Europe (Baltic).**

**Eoisalidea** **Bode, 1953,** p. 315 [*E. fragmentosa; OD*]. Little-known genus, based on wing fragment; placed in new family Eoisalidæ, without diagnosis. *Jur., Europe (Germany).**

**Eomyza** **Cockerell, 1924d,** p. 200 [*E. holoptera; OD*]. Little-known genus, based on wing fragment. *Hennig, 1965. Eoc., USA (Colorado).**

**Epidia** **Weyenbergh, 1889,** p. 258 [*E. wulpi; OD*]. Little-known genus. *Jur., Europe (Germany).**

**Homoeopychopteris** **Bode, 1953,** p. 317 [*H. incerta; OD*]. Little-known genus, based on wing fragment. *Jur., Europe (Germany).**

**Liassonympha** **Bode, 1953,** p. 331 [*L. compacta; OD*]. Little-known genus, based on pupa. *Jur., Europe (Germany).**

**Liathexorista** **Townsend, 1921,** p. 133 [*L. scudder; OD*]. Little-known genus (adult). *Townsend, 1942. Eoc., USA (Wyoming).**

**Lithohypoderma** **Townsend, 1916,** p. 129 [*Musca ascaridea Scudder, 1877a,* p. 756; OD*]. Genus known only from larvae and pupae; larvae with well-developed mouth-hooks; integument setose.
Hymenoptera

[Probably subaquatic and saprophagous.]
Scudder, 1890; Cockerell, 1907f, 1916c; Townsend, 1942; Bradley, 1931. Eoc., USA (Colorado, Utah).


Order HYMENOPTERA

Linne, 1758

[Hymenoptera Linne, 1758, p. 353]

Minute to medium-sized insects. Head free and usually very motile; compound eyes large, often holoptic in males; antennae diversely formed, especially so within the suborder Symphyta; sexual dimorphism of the antennae common in the suborder Apocrita; mouthparts of most species mandibulate and adapted for chewing, but labrum, in some Apocrita, modified to form a proboscis. Prothorax small; metathorax small and fused with the large mesothorax; abdomen broadly attached to thorax in the Symphyta, but in the Apocrita first abdominal segment fused with metathorax, with distinct constriction present between modified first abdominal segment (propodeum) and remaining segments (collectively termed the gaster, see Fig. 240), and with first gastral segment typically reduced to a narrow neck (petiole); female abdomen usually with an ovipositor. Wings membranous, hind pair much smaller than fore pair; in some species females (and more rarely males) apterous. Wing venation highly specialized, even the most generalized members of the order (Xyelidae) showing some reduction and coalescence of main veins.

Attempts to homologize the wing veins with those of other insects have resulted in several interpretations. The one proposed by Ross (1936) is now generally accepted and is used here, with slight changes in terminology suggested by Rasnitsyn (1969, 1975). In the family Xyelidae (suborder Symphyta, Fig. 238), which seems to have the least specialized venation among the Hymenoptera, all main veins are present, but the basal parts of veins M and CUA are fused to near midwing, and M diverges anteriorly and coalesces with RS for a short distance; RS has two branches; CUA is long but very irregular; CUP is short, obsolescent, or absent; 1A is long and strong; 2A is irregular and close to the posterior border of the wing; R is the strongest vein in the wing and terminates at a conspicuous pterostigma; a distinct break or interruption of the sclerotization may occur just before the pterostigmal area, and the pterostigma itself may have a clear or white spot near its center. The size and shape of the pterostigma, the extent and nature of the coalescence of RS and M, and the positions of the several crossveins are structural features usually employed in the diagnoses of genera and families of the Symphyta and many of the Apocrita. Within the Apocrita, however, there is a much greater diversity of venational patterns than within the Symphyta. In the Tiphidae, for example, the venation is sufficiently similar to that of the xyelids to enable the determination of the homologies without difficulty (Fig. 239,1); but in other families of parasitic wasps the venation may be reduced to one or two veins, with stumps of a few others. In these the homologies are not clear, and different terms are usually applied to such veins (Fig. 239,2). The venation of the hind wing of the Hymenoptera is generally much more reduced than that of the fore wing, and since the hind wing is very rarely preserved...
LONGITUDINAL VEINS

CROSSVEINS

CELLS OF FORE WING

Fig. 238. Hymenoptera; suborder Symphyta, venational pattern of the fore wing of Angaridyela vitimica Rasnitsyn, Xyelidae, from the Cretaceous of the USSR; a, terminology of the longitudinal veins; b, terminology of the crossveins; c, terminology of the cells. The symbols for crossveins are hyphenated to avoid confusion with those for the cells. SC, subcosta; pt, pterostigma; R, radius; RS, radial sector (dotted line); M, media (dashed line); CUA, anterior cubitus (dot-and-dash line); A, anal (adapted from Rasnitsyn, 1969).

in fossils, it is not used here in the taxonomic diagnoses.

The legs of the Hymenoptera are basically cursorial, but in some, as in certain wasps, they are adapted for digging or nest building. In others, the fore tibiae and basal segments of the fore tarsi combine to form a comblike structure, used for cleaning the antennae; and in the bees the hind legs may have structures in the form of a brush (scopa) or a basket (corbicula) for carrying pollen.

Larvae develop from eggs usually depos-
Hymenoptera

LONGITUDINAL VEINS

CROSSVEINS

CELLS OF FORE WING

VEINS OF FORE WING

Fig. 239. Hymenoptera; fore wing venation in the suborder Apocrita.—1a–c. Venational pattern of the fore wing of Myzinum sp., Tiphiiidae; a, veins; b, crossveins; c, cells. Terms are as in Figure 238 with the addition of C, costa. Note the slight reduction of the venation with the apparent loss of the subcosta, the absence of the fork in the radial sector, and the loss of crossvein 1r-rs.—2. Fore wing of Meraporus sp., Pteromalidae, showing the terminology of the reduced venation (from Brues, Melander, & Carpenter, 1954).
Fig. 240. Hymenoptera; lateral view of the thorax and basal abdominal segments of Myrmica sp., suborder Apocrita, Formicidae; PRO, propodeum or first abdominal segment; ABD2, second abdominal segment; ABD3 and ABD4, third and fourth abdominal segments (adapted from Brues, Melander, & Carpenter, 1954).

Hymenoptera are found in specific environments and show even greater diversity of form than those of the Diptera. The larvae of the Symphyta, with a strongly sclerotized head capsule, well-developed mandibles, and three pairs of thoracic legs, resemble caterpillars (Fig. 241,b). These are mostly foliage feeders and apparently represent the primitive type of hymenopterous larvae. The larvae of the Apocrita, on the other hand, have at most a weakly sclerotized head and are apodous (Fig. 241,a). Most of them are parasitoid or predaceous; only a few are phytophagous, feeding on pollen and nectar. Pupation occurs in various environments, and in most species the pupae are exarate and encased in a cocoon.

Adults are very diverse in habitat. Most feed to some extent on nectar and are therefore important pollinators. Trias.-Holo.

The order Hymenoptera is at least as large and diverse as the Diptera, and probably even more of its recent species remain undescribed. Nearly 90 existing families are generally recognized. The present division of the order into two suborders, Symphyta and Apocrita, extends well back into the last century, and the general evolutionary implications of that division still seem valid. Some existing families of the Symphyta, such as the Xyelidae, are far more generalized than any family of the Apocrita. Morphological and geological evidence suggests that the Apocrita may have been derived from unknown ancestors related to the Siricidae, early in the Jurassic Period. The Apocrita is by far the larger and more complex of the two suborders at the present time, but attempts to group its families into two categories have resulted in only informal sections. One of these includes the parasitic wasps (previously termed the Terebrantia) and the other, the ants, wasps, bees, and their relatives, collectively referred to as the aculeates. However, there are no characteristics, morphological or behavioral, that actually delimit these sections.

The families of both suborders are usually grouped into superfamilies, but there is much difference of opinion about the positions of certain families in this hierarchy and the degrees of relationship between the superfamilies. Grouping of the families becomes even more difficult when the Mesozoic genera are added, because many of the Jurassic families, often represented by few genera, do not fall into existing superfamilies as defined on recent species. The most detailed and significant account of the evolution of the Hymenoptera is that of Dr. A. P. Rasnitsyn (1980b), who is responsible for most of our knowledge of the Mesozoic Hymenoptera.

The earliest appearance of the order is in the Triassic of Australia and the Soviet Union. All of these Triassic fossils appear to belong to the existing family Xyelidae (suborder Sympyta), and their diversity is remarkable, especially in comparison with the small size of the family at present. Not until the Upper Jurassic are other existing families known: the Pamphiliidae, Anaxyelidae, and Siricidae of the Symphyta and the Megalyridae and Heloridae of the Apocrita. In the Cretaceous many existing families appear, including the highly specialized chalcidoid families Trichogrammatidae, Mymaridae, and Tetracamptidae among the parasitic wasps, and the family Formicidae among the aculeates. At present 78 families of the order are represented in the fossil record; 22 of them are extinct, but of that number only two are aculeates.

The diversity of the Xyelidae in the Triassic is an indication that the order probably arose in the early Triassic or possibly the very...
late Permian. Study of some 40,000 Permian insects from the Soviet Union, United States, and Australia has failed to turn up any recognizable members of the order, but most of the Permian specimens are from the middle Permian or later. In the absence of evidence to the contrary, the Hymenoptera are generally assumed to have arisen from primitive neuropteroid stock, probably unknown terrestrial relatives of the sialoid Neuroptera. RASNITSYN (1980b) has recently proposed that the ancestral line was within the extinct order Miomoptera, which is known from the Upper Carboniferous and Permian. This order has previously been considered to belong to the orthopteroid complex, but RASNITSYN believes it to have been endopterygote and closely related to the Neuroptera. Whether or not the Miomoptera are in fact reasonable candidates for the ancestors of the Hymenoptera, however, will not really become clear until we have more information than we do now about the structure and life history of the members of that order.

Suborder SYMPHYTA
Gerstaecker, 1867

[Symphyta Gerstaecker, 1867, p. 2]

Adults with abdomen broadly attached to thorax, without pronounced constriction between the first and second segments of abdomen. Larvae with thoracic legs. Trias.-Holo.

Family XYELIDAE Newman, 1835
[Xyelidae Newman, 1835, p. 379]

Fore wing with vein RS usually having 2 branches; basal section of RS at least slightly slanted toward wing apex; crossveins 1r-rs always present; crossvein 2r-rs attached to RS proximally to crossvein 2r-m; crossveins 3r-m and 2m-cu always present. Antennae with many segments, third segment compound, much longer and thicker than remaining flagellar segments; fore tibiae with 2 apical spurs; ovipositor well developed, usually flat. Larvae living in plant tissues or on foliage. Trias.-Holo.


Xyela Dalman, 1819, p. 122. Statz, 1936b. Oligo., Europe (Germany)–Holo.

Angaridxyela RASNITSYN, 1966, p. 75 [*A. vitimica; OD]. Fore wing with pterostigma sclerotized basally and membranous distally; SC connected to R (by a short crossvein or branch of SC) just before origin of RS; basal section of RS slightly shorter than basal section of M. RASNITSYN, 1969. Cret., USSR (Kazakh). — Fig. 242,6. *A. vitimica; wings and body, ×7 (Rasnitsyn, 1969).

Anomoxyela RASNITSYN, 1966, p. 72 [*Anaxyela incerta RASNITSYN, 1963, p. 95; OD]. Fore wing similar to that of Lydooxyela, but RS3 + 4 only slightly curved distally and without a sharp angle at crossvein 3r-m; termination of RS1 + 2 closer to pterostigma than to end of RS3 + 4. RASNITSYN, 1969. Jur., USSR (Kazakh). — Fig. 242,5. *A. incerta (Rasnitsyn); wings and body, ×5.5 (Rasnitsyn, 1966).

Anthoxyela RASNITSYN, 1977a, p. 99 [*S. baissensis; OD]. Fore wing with pterostigma sclerotized basally only; SC connected to R only a very short distance beyond origin of RS; basal section of RS 1.5 times length of basal section of M; crossvein 2m-cu slightly basad of middle of cell 3rm. KRASSILOV & RASNITSYN, 1982. Cret., USSR (Asian RSFSR). — Fig. 242,1. *A. baissensis; fore wing, ×4 (Rasnitsyn, 1977a).

Archexyela RIEK, 1955, p. 657 [*A. croskyi; OD]. Fore wing with crossvein 1r-rs running into base of pterostigma; pterostigma sclerotized at base only; crossvein 2m-cu situated slightly before apex of cell 3rm; crossvein 2r-rs meeting RS1 + 2 close to fork of RS. RASNITSYN, 1969. Trias., Australia (Queensland). — Fig. 242,2. *A. croskyi; fore wing, ×4 (Riek, 1955).

Asioxyela RASNITSYN, 1964, p. 92 [*A. smilodon;
OD]. Fore wing with prerostigma sclerotized, but with center membranous; basal section of RS about 1.5 times length of basal section of M; crossvein 2r-rs joined to RS just beyond its fork. Head with large, crescent-shaped mandibles. RASNITSYN, 1969. Trias., USSR (Kirghiz).

Ceroxyela RASNITSYN, 1966, p. 80 (*C. dolichocera; OD). Fore wing with pterostigma sclerotized but with membranous area basally; SC connected to R beyond origin of RS; basal section of RS slightly shorter than basal section of M; cell 1mcu very narrow. RASNITSYN, 1969. Cret., USSR (Kazakh).

--- Fig. 242.3. *C. dolichocera; wings and body, ×6 (Rasnitsyn, 1969).

Chaetoxyela RASNITSYN, 1966, p. 82 (*C. birsutsa; OD). Fore wing with pterostigma fully sclerotized; SC connected to R at origin of RS; basal section of RS slightly shorter than basal section of M. RASNITSYN, 1969. Cret., USSR (Kazakh).

--- Fig. 242.4. *C. birsutsa; wings and body, ×4 (Rasnitsyn, 1969).


--- Fig. 243.1. *E. crassicauda; wings and body, ×9 (Rasnitsyn, 1969).

Euroxyela RASNITSYN, 1964, p. 94 (*E. euryptera; OD). Fore wing unusually broad; pterostigma fully sclerotized; basal section of RS longer than basal section of M; wing with pterostigma well sclerotized; end of RS1+2 much closer to RS+3+4 than to pterostigma; 2 crossveins between RS1+2 and RS3+4. Trias., USSR (Kirghiz).—Fig. 243.7. *E. euryptera; fore wing, ×5.8 (Rasnitsyn, 1969).

Ferganoxyela RASNITSYN, 1969, p. 47 (*F. sogdiana; OD). Fore wing broadly triangular; pterostigma large; RS1+2 terminating halfway between pterostigma and RS3+4. Trias., USSR (Kirghiz).—Fig. 243.6. *F. sogdiana; fore wing, ×8.5 (Rasnitsyn, 1969).


Leioxyela RASNITSYN, 1969, p. 49 (*L. mollis; OD). Fore wing with pterostigma fully sclerotized; crossvein 2r–rs much nearer to apex of pterostigma than to crossvein 1r–rs; cells 1r and 2r of about same length. Trias., USSR (Kirghiz).


Lithoxyela RASNITSYN, 1969, p. 43 (*L. fenestralis; OD). Fore wing with uniformly narrow costal area; pterostigma not fully sclerotized; end of RS1+2 closer to end of RS3+4 than to pterostigma. Trias., USSR (Kirghiz).—Fig. 243.4. *L. fenestralis; fore wing, ×5.5 (Rasnitsyn, 1969).

Lydoxyela RASNITSYN, 1966, p. 71 (*L. excellens; OD). Fore wing with SC connected to R proximal of origin of RS; basal section of RS about half as long as basal section of M; crossvein 1r–rs longer than 2r–rs; RS3+4 with an abrupt anterior bend at crossvein 3r–m; RS1+2 apparently absent. RASNITSYN, 1969. Jur., USSR (Kazakh).—Fig. 243.5. *L. excellens; wings and body, ×6 (Rasnitsyn, 1966).

Madygella RASNITSYN, 1969, p. 51 (*M. analoga; OD). Fore wing with pterostigma well sclerotized; SC distinct and well developed; R straight; basal section of RS shorter than RS+M. Trias., USSR (Kirghiz).—Fig. 243.3. *M. analoga; fore wing, ×12. (Rasnitsyn, 1969).

Madygenius RASNITSYN, 1969, p. 45 (*M. extra radius; OD). Fore wing with costal area narrow; pterostigma sclerotized; end of RS1+2 much closer to RS+3+4 than to pterostigma; 2 crossveins between RS1+2 and RS3+4. Trias., USSR (Kirghiz).—Fig. 244.7. *M. extraradius; fore wing, ×7.5 (Rasnitsyn, 1969).


Nigrimonricola RASNITSYN, 1966, p. 77 (*N. longicornis; OD). Little-known genus. Fore wing as in Ophthalmoxyela, but basal section of RS half as long as basal section of M; RS1+2 terminating closer to pterostigma than to end of RS3+4. RASNITSYN, 1969. Jur., USSR (Kazakh).


Orthodoxyela RASNITSYN, 1983a, p. 91 (*O. radiata; OD). Related to Kirghizoxyela, but fore wing with SC well developed; R conspicuously thickened at base of pterostigma. Jur., USSR (Asian RSFSR).

Oryctoxyela RASNITSYN, 1969, p. 45 (*O. anomala; OD). Fore wing with costal area narrow; RS1+2...
about twice as far from pterostigma as from RS3+4. Trias., USSR (Kirghiz).—Fig. 244,3. *O. anomala; fore wing, X5 (Rasnitsyn, 1969).

Pnicolites Meunier, 1920c, p. 896 [*P. grasius; OD]. Similar to Pleroneura (recent), but SC in fore wing extending beyond level of origin of RS. Statz, 1936b; Rasnitsyn, 1969. Oligo., Europe (Germany).

Sirecomina Rasnitsyn, 1969, p. 51 [*S. xiphophora; OD]. Fore wing with pterostigma weakly sclerotized and narrow; basal section of RS much longer than RS+M. Trias., USSR (Kirghiz).—Fig. 244,6. *S. xiphophora; fore wing, X16 (Rasnitsyn, 1969).

Spathoxyela Rasnitsyn, 1969, p. 53 [*Eoxyla fossili RASNITSYN, 1965, p. 487; OD]. Fore wing with R straight; distance between R and costal margin narrow and uniform; SC free from R; termination of RS1+2 slightly closer to end of RS3+4 than to pterostigma; crossvein 21-rs distal to center of pterostigma. Krassilov & Rasnitsyn, 1982. Cret., USSR (Kazakh, Asian
Hymenoptera—Symphyta

Fig. 244. Xyelidae (p. 451–454).

Xyelites

Triassoxyela

Oryctoxyela

Uroxyela

Sirecomima

Madygenius

RSFSR).—Fig. 245, 2. *S. fossilis (Rasnitsyn); wings and body, ×10 (Rasnitsyn, 1977a).

Triassoxyela Rasnitsyn, 1964, p. 89 [*T. foveolata; OD]. Fore wing similar to that of Xyelinus, but cell 3r short. Rasnitsyn, 1969. Trias., USSR (Kirghiz).—Fig. 244, 2. *T. foveolata; fore wing, ×9.5 (Rasnitsyn, 1969).

Uroxyela Rasnitsyn, 1966, p. 84 [*U. sicicauda; OD]. Fore wing with center of pterostigma not sclerotized; termination of SC before origin of RS; basal section of RS obsolescent; RS3 + 4 directed anteriorly beyond crossvein 3r-m. Cret., USSR (Kazakh).—Fig. 244, 4. *U. sicicauda; fore wing, ×11 (Rasnitsyn, 1966).
Hexapoda

Xiphoxyla Rasnitsyn, 1969, p. 46 [*X. procrusta; OD]. Fore wing with pterostigma fully sclerotized; SC terminating just before origin of RS; basal section of RS very short; end of RS1+2 slightly closer to end of RS3+4 than to pterostigma; RS3+4 straight or nearly so; crossvein 1m-cu very short. Rasnitsyn, 1969. Cret., USSR (Kirghiz).—Fig. 244,1. *X. trigeminus; fore wing, X7 (Rasnitsyn, 1969).

Xyelula Rasnitsyn, 1969, p. 52 [*X. hybrida; OD]. Fore wing with pterostigma very broad; R strongly curved; basal section of RS more than twice as long as basal section of M. Jur., USSR (Kazakh).—Fig. 245,1. *X. hybrida; head, thorax, and fore wings, X10 (Rasnitsyn, 1969).

Family XYELOTOMIDAE
Rasnitsyn, 1968

[Xyelotomidae Rasnitsyn, 1968, p. 224]

Fore wing: vein RS developed between M and crossvein 1r-rs; 2r-rs present; cell 3r closed at wing apex. Antennae as in Xyelidae but with fewer (not more than 8) and thicker segments, third segment fully as large as in Xyelidae. Rasnitsyn, 1969. Jurr.—Cret.


Pseudoxyela Rasnitsyn, 1968, p. 227 [*P. heteroclita; OD]. Fore wing with pterostigma sclerotized basally only, mostly membranous; SC connected to R well before origin of RS; basal section of RS about half as long as basal section of M. Rasnitsyn, 1969. Jurr., USSR (Kazakh).

Undatoma Rasnitsyn, 1977a, p. 100 [*U. dahurica; OD]. Fore wing with pterostigma very large and center membranous; SC apparently absent; RS not forked; basal section of RS very short, about one-eighth length of basal section of M; cell 1r very small. Cret., USSR (Kazakh).—Fig. 246,1. *U. dahurica; fore wing, X8.5 (Rasnitsyn, 1977a).

Xyelocerus Rasnitsyn, 1968, p. 226 [*X. admirandus; OD]. Fore wing with pterostigma sclerotized but with clear area in center; SC apparently not connected to R; basal section of M about 5 times as long as that of RS. Rasnitsyn, 1969. Jur., USSR (Kazakh).—Fig. 246,2. *X. admirandus; fore wing, X7 (Rasnitsyn, 1968).

Family TENTHREDINIDAE
Latreille, 1804—1805

[Tenthredinidae Latreille, 1804—1805, p. 109]

Fore wing: vein RS usually unbranched; crossvein 2r-rs sometimes present; M joining RS near its origin or joining directly to R

© 2009 University of Kansas Paleontological Institute
near origin of RS; crossvein 2m-cu present. Antennae filiform, rarely with more than 9 segments, third segment short; pronotum with hind border deeply emarginate; fore tibiae with 2 apical spurs; ovipositor short, flat. Larvae foliage feeders. Eoc.–Holo.

**Tenthredo** LINNÉ, 1758, p. 555. BRUES, 1908b; ROHWER, 1908c; COCKERELL, 1914a, 1917f, 1927d; MEUNIER, 1923c; STATZ, 1936b; PITON, 1940a. Oligo., USA (Colorado)–Holo.


**Caliroa** COSTA, 1859, p. 59. COCKERELL, 1909n, 1916b, 1917f. Oligo., USA (Colorado)–Holo.

**Cladius** ILLIGER, 1807, p. 190. COCKERELL, 1914f. Oligo., USA (Colorado)–Holo.

**Dineura** DAHLBOM, 1835, p. 5. BRUES, 1908b; ROHWER, 1908b, 1908c. Oligo., USA (Colorado)–Holo.

**Dolerus** PANZER, 1801, pl. 11. MEUNIER, 1923b.
Hexapoda

Oligo., Europe (Germany); Mio., Europe (France)—Holo.


Eriocampa Hartig, 1837, p. 279. Brues, 1908b; Cockerell, 1910c, 1911b, 1914f, 1922d; Theobald, 1937a. Oligo., USA (Colorado), Europe (France)—Holo.


Florissantinus Zhelekovtsev & Rasnitsyn, 1972, p. 320 [*F. angulatus; OD]. Similar to Hemichroa, but M of fore wing straight, not bent at crossveins 2r-m and 3r-m. Oligo., USA (Colorado).


Hoplocampa Hartig, 1837, p. 276. Cockerell, 1927c; Statz, 1936b. Oligo., Europe (Germany), USA (Colorado)—Holo.


Nortonella Rohwer, 1908c, p. 592 [*N. typica; OD]. Fore wing as in Macrophya (recent) but SC absent. Oligo., USA (Colorado)—Holo.

Palaeotaxonus Brues, 1908b, p. 266 [*P. typicus; OD]. Fore wing as in Taxonus, but cell 1cu not longer than cell 1rm; cell 3r long, pointed apically; crossvein 2r-rs strongly oblique. Rohwer, 1908b; Cockerell, 1917f. Oligo., USA (Colorado).—Fig. 246, 7. *P. typicus; fore wing, X5.2 (Brues, 1908b).

Pseudosiobla Ashmead, 1898, p. 308. [Generic assignment of fossil doubtful.] Rohwer, 1908b. Oligo., USA (Colorado)—Holo.


Selandria Leach, 1817, p. 126. Cockerell, 1910c. Oligo., USA (Colorado)—Holo.

Taeniurites Cockerell, 1917b, p. 382 [*T. fortes; OD]. Fore wing as in Macrophya (recent), but body structure as in Strongylogaster (recent). Cockerell, 1927d. Oligo., USA (Colorado).

Taxonus Hartig, 1837, p. 297. Heer, 1849; Konow, 1897; Pongracz, 1928. Eoc., USA (Wyoming); Mio., Europe (Germany)—Holo.


Family ELECTROTOMIDAE Rasnitsyn, 1977

[Electrotomidae Rasnitsyn, 1977b, p. 1304]

Little-known family, apparently related to the Argidae, and based on mature larva (pupae). Head relatively large, as in Blastoceromidae; tenth abdominal tergite conical, as in Xyelidae; antennae not contiguous with ocelli; false legs absent from ninth abdominal segment. Oligo.

Electrotoma Rasnitsyn, 1977b, p. 1307 [*E. succini; OD]. Head capsule with 15 to 20 long setae; body with short pubescence. Oligo., Europe (Baltic).

Family ARGIDAE Konow, 1890

[Argidae Konow, 1890, p. 229]

Fore wing with crossvein 2r-rs absent; vein M joined to R before origin of RS; RS joined or nearly joined to R distally near wing apex. Antennae with 3 segments, the last compound and very long; fore tibiae with 2 apical spurs. Larvae foliage feeders. Oligo.—Holo.

Arge Schrank, 1802, p. 209. Holo.


Family CIMBICIDAE Kirby, 1837

[Cimbicidae Kirby in Richardson, Swainson, & Kirby, 1837, p. 254]

Fore wing with crossvein 2r-rs present. Antennae clubbed but third segment not enlarged; pronotum with hind border deeply emarginate. Larvae foliage feeders. Eoc.—Holo.

Cimbex Olivier, 1790, p. 762. Cockerell, 1922d. Oligo., USA (Colorado)—Holo.


Trichiosomites Brues, 1908b, p. 259 [*T. oblitosus; OD]. Similar to Zeraea (recent); cell 3r long; cell 1cu only a little longer than cell 1rm. Antennae with 6 segments. Oligo., USA (Colo-

© 2009 University of Kansas Paleontological Institute
rado). — Fig. 246, 5. *T. obliviosus*; fore wing, X 5.5 (Brues, 1908b).

**Family BLASTICOTOMIDAE**

Thomson, 1871

[Blasticotoomidae Thomson, 1871, p. 13]

Fore wing with vein R close to and nearly coalesced with costa; M extending distally beyond crossvein 3r-m; CUA extending distally beyond crossvein 2m-cu. Antennae with 3 or 4 segments, third very long, fourth short or absent. Larvae stem borers. Oligo.—Holo.

Blasticotoma Klug, 1834, p. 251. Holo.


**Family DIPRIONIDAE** Rohwer, 1911

[Diprionidae Rohwer, 1911, p. 220]

Fore wing with crossvein 2r-rs absent. Antennae with at least 13 segments and almost always serrate or pectinate; third segment not elongate, shorter than total length of all other flagellar segments. Larvae on coniferous foliage. Oligo.—Holo.


**Family XYELYIDAE**

Rasnitsyn, 1968

[XYelyidae Rasnitsyn, 1968, p. 192]

Fore wing: vein SC with 2 branches, posterior branch joining R basad of origin of RS; crossvein 1m-cu much shorter than half length of section of M distal to it; cell 1mcu large; M+CUA only slightly curved. Antennae multisegmented; third segment commonly much enlarged and elongate, more than a third length of antenna. Jur.

XYelyda Rasnitsyn, 1968, p. 193 [*X. excellens*; OD]. Fore wing with posterior branch of SC strongly oblique; cells 1r and 1mcu narrow and long; cell 1r longer than cell 2r-m; length of cell 1mcu more than twice its width; pterostigma fully sclerotized; crossvein 1m-cu much shorter than the section of CUA adjoining it distally. Rasnitsyn, 1969, 1983b. Jur., USSR (Kazakh). —Fig. 246, 8. *X. excellens*; fore wing, X 5.6 (Rasnitsyn, 1969).

Ferganolyda Rasnitsyn, 1983b, p. 61 [*F. cubitalis*; OD]. Similar to XYelyda, but cell 1r shorter than cell 2r-m; anterior border of cell 1mcu almost straight. Jur., USSR (Kazakh).

Mesolyda Rasnitsyn, 1963, p. 86 [*M. jurassica*; OD]. Fore wing with basal section of RS very short and almost perpendicular to longitudinal axis of wing; posterior branch of SC only slightly oblique; cell 3rm not widened distally, shorter than cell 2mcu. Rasnitsyn, 1969, 1983b. Jur., USSR (Kazakh). —Fig. 246, 3. *M. jurassica*; fore wing, X 6 (Rasnitsyn, 1969).


**Family PARAPAMPHILIIDAE**

Rasnitsyn, 1968

[Parapamphiliidae Rasnitsyn, 1968, p. 191]

Fore wing with vein SC apparently absent; area between R and costal margin broad, widest at origin of RS; basal section of RS much longer than basal section of M; cell 3r very narrow and long. Jur.


**Family PAMPHILIIDAE**

Cameron, 1890

[Pamphilidae Cameron, 1890, p. 84]

Fore wing with vein SC absent or obsolescent; RS unbranched; crossvein 2r-rs present. Antennae with at least 13 segments, third not elongate; pronotum with hind margin straight or only slightly concave; fore tibiae with 2 apical spurs; ovipositor short. Larvae foliage feeders, usually in rolled leaves. Jur.—Holo.


Atocus Scudder, 1892, p. 25 [*A. defexus*; OD].

Similar to Neurotoma (recent), but antennae very
short and with a small number of segments; basal section of RS in fore wing longer than in Neurotoma. Brues, 1908b; Cockerell, 1908c; Zhelechovtzev & Rasnitsyn, 1972; Rasnitsyn, 1983b. Oligo., USA (Colorado).

Juralyda Rasnitsyn, 1977a, p. 102 [*J. udensis; OD]. Fore wing with pterostigma narrow, only margins sclerotized; basal section of RS about equal in length to crossvein 1r-rs; cross vein 3r-m nearly perpendicular to longitudinal axis of wing; cell 1mcu very short. Jur., USSR (Kazakh). — Fig. 246,9. *J. udensis; fore wing, ×5 (Rasnitsyn, 1977a).

Family CEPHIDAE Newman, 1835

[Cephidae Newman, 1835, p. 411]

Fore wing with vein SC absent; RS unbranched; basal section of RS very short; crossvein 2r-rs joined to RS proximally to 2r-m; cell 2r short; cell 1mcu large. Antennal segments little differentiated; prothorax large; fore tibiae with 1 apical spur; abdomen somewhat constricted between first and second segments; ovipositor flat. Larvae stem or twig borers. Jur.—Holo.


Electrocephus Konow, 1897, p. 37 [*E. stralen-dorffi; OD]. Similar to Janus, but 18-segmented antennae much shorter and thicker; third antennal segment almost a third longer than fourth, penultimate segment shorter than broad. Oligo., Europe (Baltic).


Family GIGASIRICIDAE Rasnitsyn, 1968

[Gigasiricidae Rasnitsyn, 1968, p. 197]

Fore wing: vein SC well developed; basal section of RS slanted toward apex of wing, longer than basal section of M; crossveins 2r-m, 3r-m, and 2m-cu well developed. Antennae with third segment enlarged and elongate. Jur.


Liassirex Rasnitsyn, 1968, p. 198 [*L. sodianus; OD]. Fore wing with pterostigma incompletely sclerotized; section of R between base of RS and pterostigma strongly arched; basal section of RS more than twice as long as basal section of M. Rasnitsyn, 1969. Jur., USSR (Kazakh). — Fig. 247,1. *L. sodianus; fore wing, ×6 (Rasnitsyn, 1969).

Protosirex Rasnitsyn, 1969, p. 62 [*P. xyelopterus; OD]. Fore wing with SC contiguous with R; pterostigma narrow, strongly sclerotized; basal section of RS less than twice as long as basal section of M; RS+M longer than basal section of RS. Jur., USSR (Kazakh). — Fig. 247,4. *P. xyelopterus; fore wing, ×6 (Rasnitsyn, 1969).

Family KARATAVITIDAE Rasnitsyn, 1963

[Karatavitidae Rasnitsyn, 1963, p. 96]

Fore wing with vein SC apparently absent; basal section of RS directed toward wing apex and longer than basal section of M; crossvein 2r-rs situated before center of pterostigma. Antennae setaceous; ovipositor very slender. Jur.

Karatavites Rasnitsyn, 1963, p. 97 [*K. angustus; OD]. Fore wing with basal section of RS 1.5 times as long as basal section of M; cell 2rm longer than cell 1r but shorter than cell 3rm. Antennae thin, setaceous, with long segments. Rasnitsyn, 1968, 1969. Jur., USSR (Kazakh). — Fig. 247,4. K. medi-us Rasnitsyn; fore wing, ×6 (Rasnitsyn, 1969).

Family SEPULCIDAE Rasnitsyn, 1968


Fore wing with basal section of vein RS slanting toward wing apex; cell 1mcu large, with basal-posterior margin sigmoidal. Jur.

Sepulca Rasnitsyn, 1968, p. 210 [*S. mirabilis; OD]. Fore wing with pterostigma completely sclerotized; SC coalesced with R, only distal end of SC free, appearing like a crossvein. Rasnitsyn,
Hymenoptera—Symphyta

1969. Jur., USSR (Kazakh).—Fig. 247, 3. *S. mirabilis; fore wing, X7 (Rasnitsyn, 1969).


Family ANAXYELIDAE
Martynov, 1925

(Anaxyelidae Martynov, 1925d, p. 754) [=Syntexidae Benson, 1935, p. 539]

Fore wing: vein SC coalesced with R, at most appearing as a crossvein proximal to origin of RS; basal section of RS slanted toward wing apex and longer than basal section of M; crossveins 3r-m and 2m-cu present; cell 1mcu with 5 or 6 corners. No recent genera of the family are known as fossils. Jur.—Holotypic.


Anasyntexis Rasnitsyn, 1968, p. 208 ["A. strophandra; OD]. Fore wing with pterostigma sclerotized; basal section of RS 1.5 times longer than basal section of M; RS+M shorter than basal section of M. Rasnitsyn, 1969. Jur., USSR (Kazakh).—Fig. 249, 5. *A. strophandra; fore wing, X6.5 (Rasnitsyn, 1969).

Brachysyntexis Rasnitsyn, 1969, p. 70 ["Syntaxis brachyura Rasnitsyn, 1968, p. 202; OD]. Fore wing with pterostigma sclerotized, not extending to middle of cell 3r; RS+M shorter than section of CUA between its divergence from M and its union with crossvein cu-a; basal section of RS more than twice as long as basal section of M. Antennae broad basally, much narrowed distally. Jur., USSR (Kazakh).—Fig. 248, 2. *B. brachyura (Rasnitsyn); wings and body, X8 (Rasnitsyn, 1969).

Dolichostigma Rasnitsyn, 1968, p. 200 ["D. tenuiipes; OD]. Fore wing with pterostigma sclerotized, extending at least to center of cell 3r; RS and M joined at a single point of contact; cell 1mcu narrowed distally. Rasnitsyn, 1969. Cret., USSR (Kazakh).—Fig. 249, 4. *D. tenuiipes; wings and body, X4.5 (Rasnitsyn, 1969).

Kempendaja Rasnitsyn, 1968, p. 207 ["K. jacu-
Sphenosyntexis RASNITSYN, 1969, p. 67 [*Anaxyela antonovi RASNITSYN, 1963, p. 90; OD]. Fore wing with pterostigma weakly sclerotized; basal section of RS aligned with RS + M, forming a straight line. Antennae filiform, with dark basal

cu-a

Fig. 248. Anaxyelidae (p. 459–461).

tensis; OD]. Similar to Brachysyntexis, but pterostigma not sclerotized. RASNITSYN, 1969. Cret., USSR (Kazakh).—Fig. 249, 2. *K. jacutensis; fore wing, ×7.3 (Rasnitsyn, 1969).

Kulbastavia RASNITSYN, 1968, p. 207 [*Anaxyela macrura RASNITSYN, 1963, p. 92; OD]. Fore wing with pterostigma sclerotized; basal section of RS more than twice as long as basal section of M and slightly longer than RS + M; crossvein cu-a nearly at level of center of cell 1mcu. Ovipositor longer than body. RASNITSYN, 1969. Jur., USSR (Kazakh).—Fig. 249, 1. *K. macrura (Rasnitsyn); wings and body, ×4 (Rasnitsyn, 1969).

Sphenosyntexis RASNITSYN, 1969, p. 67 [*Anaxyela antonovi RASNITSYN, 1963, p. 90; OD]. Fore wing with pterostigma weakly sclerotized; basal section of RS aligned with RS + M, forming a straight line. Antennae filiform, with dark basal

© 2009 University of Kansas Paleontological Institute
and apical segments. Rasnitsyn, 1968. Jur., USSR (Kazakh).—Fig. 248.1a. *S. pallicornis* Rasnitsyn; wings and body, ×6 (Rasnitsyn, 1969).—Fig. 248.1b. *S. antonovi* (Rasnitsyn); fore wing, ×10 (Rasnitsyn, 1969).

**Syntexyela** Rasnitsyn, 1968, p. 201 [*Anaxyela media* Rasnitsyn, 1963, p. 94; OD]. Fore wing with pterostigma sclerotized; section of M between crossveins 2m-cu and 3r-m about equal in length to crossvein 2m-cu. Rasnitsyn, 1969. Jur., USSR (Kazakh).—Fig. 249.3. *S. media* (Rasnitsyn); fore wing, ×7 (Rasnitsyn, 1969).


**Family PRAESIRICIDAE** Rasnitsyn, 1968


Antennal segmentation nearly homonomous, third segment usually slightly longer than following segments; head large, mandibles long and narrow. Fore wing with vein SC apparently absent; origin of RS remote from pterostigma; cell 3r not broadened distally; M + CUA arcuate. Jur.—Cret.


**Aulidontes** Rasnitsyn, 1983b, p. 64 [*A. mandibulatus*; OD]. Similar to *Praesirex*. Fore wing with basal section of RS long; cell 1mcu relatively large and long. Jur., USSR (Kazakh).

**Xyelydontes** Rasnitsyn, 1983b, p. 64 [*X. sculpturnatus*; OD]. Similar to *Praesirex*. Fore wing with basal section of RS short and inclined toward wing apex; cell 1mcu small. Cret., USSR (Mongolia).

**Family PSEUDOSIRICIDAE** Handlirsch, 1906

[Pseudosiricidae Handlirsch, 1906b, p. 574] [=Myrmiciidae Maa, 1949, p. 17; Megapteritidae Mal, 1949, p. 77]

Fore wing with venation reduced; crossveins 3r-m and 2m-cu absent; vein SC either present or obsolete; basal section of RS slanted toward wing apex or wing base. Jur.—Eoc.
Myrmicium Westwood, 1854, p. 396 [*M. heeri; OD] [=Hagensia Weyenbergh, 1869, p. 250 (type, Sphinx Schroetelii Gémar, 1839, p. 193); Pseudosirex Weyenbergh, 1873, p. 238 (type, P. darwini); Rhipidorhabdus Oppenheim, 1883, p. 344 (type, Sphinx Schroetelii Gémar, 1839, p. 193); Fabelovena Oppenheim, 1883, p. 344 (type, F. karschi)]. Fore wing with basal section of RS strongly slanted toward wing apex and only slightly longer than basal section of M; RS+M very short, touching only a corner of cell 1mcu. Maa, 1949; Rasnitsyn, 1968, 1969; Smith, 1978. Jur., England, Europe (Germany).


Megapterites Cockerell, 1920a, p. 278 [*M. mirabilis; OD]. Fore wing with basal section of RS perpendicular to R and about half as long as basal section of M; cell 1r shorter than cell 2r. Cockerell, 1921b; Maa, 1949; Rasnitsyn, 1969, 1980. Eoc., England. — Fig. 250,6. *M. mirabilis; fore wing, ×1 (Cockerell, 1921b).

Shurabisca Rasnitsyn, 1968, p. 217 [*S. liassica; OD]. Fore wing with basal section of RS almost twice as long as basal section of M; cell 1mcu much wider distally than basally. Rasnitsyn, 1969. Jur., USSR (Kazakh). — Fig. 250,7. *S. liassica; fore wing, ×3.8 (Rasnitsyn, 1969).

Family SIRICIDAE Billberg, 1820

[Siricidae Billberg, 1820, p. 98]

Fore wing with vein SC short or absent; crossveins 1r-t, 3r-m, and 2m-cu present;
basal section of RS perpendicular to R or slanted toward wing base. Antennae with many segments, not markedly differentiated; pronotum with hind margin deeply emarginate; fore tibiae with 1 of the 2 apical spurs small or absent; abdomen terminating in a spine or horn. Larvae wood boring. Jur.-Holo.


Aulisca RASNITSYN, 1968, p. 212 [*A. odontura; OD]. Fore wing with basal section of RS about equal in length to RS+M and directed posteriorly; crossvein 2r-s more distal than crossvein 2r-m. RASNITSYN, 1969, Jur., USSR (Kazakh).

Eosirex PITON, 1940a, p. 229 [*E. ligniticus; OD]. Little-known genus. Fore wing with cell 2rm broad; crossvein 2r-m sigmoidal. Eoc., Europe (France).

Aulisca RASNITSYN, 1968, p. 212 [*A. odontura; OD]. Fore wing with basal section of RS about equal in length to RS+M and directed posteriorly; crossvein 2r-s more distal than crossvein 2r-m. RASNITSYN, 1969, Jur., USSR (Kazakh).

Eosirex PITON, 1940a, p. 229 [*E. ligniticus; OD]. Little-known genus. Fore wing with cell 2rm broad; crossvein 2r-m sigmoidal. Eoc., Europe (France).


Paroryssus MARTYNOV, 1925d, p. 756 [*P. extensus; OD]. Little-known genus, similar to Praeoryssus. Fore wing with R sharply curved between origin of RS and pterostigma. Prothorax elongate; ovipositor straight and longer than body. RASNITSYN, 1963, 1968. Jur., USSR (Kazakh).—Fig. 250,5. *P. extensus; wings and body, X5.5 (Rasnitsyn, 1969).


Praeoryssus RASNITSYN, 1968, p. 219 [*P. venosus; OD]. R straight between origin of RS and pterostigma; crossvein 2r-m present. Prothorax short; ovipositor shorter than body, curved forward. RASNITSYN, 1969. Jur., USSR (Kazakh).—Fig. 250,3. *P. venosus; wings and body, X8 (Rasnitsyn, 1969).

Family UNCERTAIN

The following genera, apparently belonging to the order Hymenoptera, suborder Symphyta, are too poorly known to permit assignment to families.

Phenacoperga COCKERELL, 1908c, p. 113 [*Perga coloradensis COCKERELL, 1907f, p. 446; OD]. Little-known genus, probably related to the Cimbicidae; cell 3r of fore wing with very smoothly curved posterior margin. ROHWER, 1908b. Oligo., USA (Colorado).

Pseudocimbex ROHWER, 1908b, p. 526 [*P. clavata; OD]. Similar to Phenacoperga, but cell 3r with very irregular posterior margin. Oligo., USA (Colorado).

Sogutia RASNITSYN, 1977a, p. 101 [*S. liassica; OD]. Fore wing with pterostigma fully sclerotized; basal section of vein RS slightly longer than RS+M, which is about as long as basal section of M; M+CUA sigmoidally curved. [Probably related to Xyelydidae.] Jur., USSR (Kirghiz).—Fig. 246,4. *S. liassica; fore wing, X17 (Rasnitsyn, 1977a).

Suborder APOCRITA

Gerstaecker, 1867

[Apocrita Gerstaecker, 1867, p. 1]

Adults: first abdominal segment (propodeum) fused to metathorax and structurally a part of it (see Fig. 240); deep constriction between propodeum and second abdominal segment; gaster often petiolate. Larvae apodous. Jur.—Holo.

Family EPHALITITIDAE

Handlirsch, 1906

[Ephalitidae Handlirsch, 1906b, p. 577]

Fore wing with crossvein 2r-m present; crossvein 1r-rs obsolescent, occasionally reaching pterostigma; cell 2a often closed. Antennae diverse, setaceous or clubbed, with 12 to 30 segments; propodeum commonly large, flat or weakly convex, often not ele-


**Asiephialtites** RASNITSYN, 1975, p. 29 [*A. niger; OD*]. Fore wing similar to that of *Stephanogaster* but not more than 4 mm long. Gaster widest at middle. Jur., USSR (Kazakh). — Fig. 251, 7. *A. niger*, wing and body, X9 (Rasnitsyn, 1975).

**Karataviola** RASNITSYN, 1975, p. 51 [*K. micrura; OD*]. Fore wing with basal section of RS arising near pterostigma and directed toward wing base; crossvein 1r-rs absent; crossvein 2r-m not slanted and situated distally to 2r-rs; cell 3rm shorter than cell 2rm. Antennae setaceous, with at least

**Fig. 251.** Ephialtitidae (p. 464–466).
15 segments; ovipositor very short. Jur., USSR (Kazakh).—Fig. 251,2. *K. micrura; wings and body, X3.6 (Rasnitsyn, 1975).

**Leptephialtites** RASNITSYN, 1975, p. 33 [*L. caudatus; OD*]. Fore wing with basal section of RS arising close to pterostigma and directed toward wing base; proximal border of cell 2rm distal of base of pterostigma; cell 3rm shorter than 2mcu; crossvein 1r-rs missing in some species. Antennae with from 16 to 30 segments; ovipositor longer than gaster, often much longer than body; gaster usually broadest distally. Jur., USSR (Kazakh).—Fig. 251,6. *L. caudatus; body and wings, X6 (Rasnitsyn, 1975).

**Mesephialtites** RASNITSYN, 1975, p. 32 [*M. paurocerus; OD*]. Fore wing with basal section of RS arising close to base of pterostigma and directed obliquely toward wing base; proximal border of cell 2rm slightly distal of pterostigma; cell 3rm shorter than cells 2rm and 2mcu; crossvein 1r-rs absent. Antennae with 15 segments; gaster widest along middle. Jur., USSR (Kazakh).—Fig. 252,4. *M. paurocerus; wings and body, X9 (Rasnitsyn, 1975).

**Micrephialtites** RASNITSYN, 1975, p. 48 [*M. minor; OD*]. Fore wing with basal section of RS remote from pterostigma and directed toward wing base; crossvein 1r-rs absent; cells 2rm and 3rm long.
Ovipositor very short, barely projecting beyond end of gaster. Jur., USSR (Kazakh).—Fig. 251,3. *M. minor; wings and body, ×8 (Rasnitsyn, 1975).

**Family STEPHANIDAE Leach, 1815**

[Stephanidae Leach, 1815, p. 142]

Fore wing with costal space broad; distal veins weak or obsolete. Antennae multi-segmented, with at least 20 segments; head spherical, with a circular row of 5 teeth around median ocellius; cervix long; hind coxae long, hind femora swollen. Larvae parasitic on wood-boring insects, mostly Coleoptera. Oligo.—Holo.

**Stephanus** Panzer, 1805, p. 77. Holo.

Electrostephanus Brues, 1933, p. 12 [*E. brevicornis; OD]. Fore wing similar to that of *Stephanus* (recent), but basal section of M directed slightly anteriorly. Antennae with not more than 23 segments. Oligo., Europe (Baltic).—Fig. 253,6. *E. brevicornis; wings and body, ×10 (Brues, 1933).


**Family MEGALYRIDAE**

Schletterer, 1890

(Megalyridae Schletterer, 1890, p. 198)

Similar to the Stephanidae, but antennae commonly with fewer segments, segments long and narrow; gaster subsessile. Larvae apparently parasitic on certain wood-boring beetles. Jur.—Holo.

**Megalyra** Westwood, 1832, p. 790. Holo.

Brachycleistogaster Rasnitsyn, 1975, p. 64 [*B. karatavica; OD]. Fore wing with basal section of R shorter than basal section of M; crossveins 3r-m and 2m-cu absent; crossvein 2r-m present. Antennae filiform, with 13 to 15 segments; ovipositor short. Jur., USSR (Kazakh).—Fig. 253,1. *B. karatavica; wings and body, ×13 (Rasnitsyn, 1975).

**Cleistogaster** Rasnitsyn, 1975, p. 53 [*C. buriatica; OD]. Fore wing with pterostigma slender; basal section of R shorter than basal section of M; crossveins 3r-m and 3r-m present. Jur., USSR (Kazakh); Cret., USSR (Asian RSFSR).—Fig. 253,5. *C. buriatica; wings and body, ×6 (Rasnitsyn, 1975).

**Cretocleistogaster** Rasnitsyn, 1975, p. 72 [*C. viitimica; OD]. Fore wing with pterostigma very short and broad at middle; basal section of R longer than basal section of M; crossveins 3r-m, 5r-m, and 2m-cu absent. Antennae with about 15 segments; ovipositor short. Cret., USSR (Asian RSFSR).
Cretodinapsis Rasnitsyn, 1977a, p. 106 [*C. caucasicca; OD]. Fore wing with RS, as it connects to crossvein 2r-rs, perpendicular to it; RS obsolescent, but distinct between cells 1r+2r and 3r; R curved at origin of RS. Head broader than thorax; ovipositor shorter than body. Cre., USSR (Azerbaijan). — Fig. 253,4. *C. caucasicca; wings and body, X24 (Rasnitsyn, 1977a).

Mesaulacinus Martynov, 1925d, p. 757 [*M. oviformis; OD]. Fore wing with basal section of RS shorter than basal section of M; crossvein 3r-m absent or obsolescent, with stubs present. Antennae apparently with 12 to 20 segments, distal ones shortened. Rasnitsyn, 1975. Jur., USSR (Kazakh). — Fig. 253,3. M. areolatus

Leptocleistogaster Rasnitsyn, 1975, p. 57 [*L. pallida; OD]. Fore wing as in Cleistogaster, but crossvein 2m-cu absent or reduced to only stubs. Antennae with 10 to 21 segments. Jur., USSR (Kazakh).

Cleistogaster Prodinapsis Rasnitsyn, 1975, p. 57 [*C. caucasicca; OD]. Fore wing with RS, as it connects to crossvein 2r-rs, perpendicular to it; RS obsolescent, but distinct between cells 1r+2r and 3r; R curved at origin of RS. Head broader than thorax; ovipositor shorter than body. Cre., USSR (Azerbaijan). — Fig. 253,4. *C. caucasicca; wings and body, X24 (Rasnitsyn, 1977a).

Fig. 253. Stephanidae and Megalyridae (p. 466–468).
Hexapoda

Rasnitsyn; wings and body, X11 (Rasnitsyn, 1975).

**Microcleistogaster** Rasnitsyn, 1975, p. 69 [*M. parvula*; OD]. Fore wing with pterostigma narrow; basal section of RS shorter than basal section of M; crossveins 2r-m, 3r-m, and 2m-cu absent. Body stout; antennae with less than 15 segments; distal section shorter than others. Jur., USSR (Kazakh). —Fig. 253.2. *M. parvula*; wings and body, X18 (Rasnitsyn, 1975).

**Prodinapsis** Brues, 1923c, p. 31 [*P. succinalis*; OD]. Similar to *Dinapis* (recent). Fore wing with pterostigma small, elongate; RS short, curved. Antennae filiform, with 14 segments; antennal grooves (scrobes) present; hind coxae very large; ovipositor long. Brues, 1923a, 1933. Oligo., Europe (Baltic). —Fig. 253.7. *P. succinalis*; wings and body, X16 (Brues, 1933).

**Family TRIGONALIDAE** Cresson, 1887

[Trigonidae Cresson, 1887, p. 37]

Fore wing: venation generalized, with pterostigma, veins RS2 and RS3 (usually), RS+M, and cells 2rm and 3rm present; costal space open. Antennae multisegmented. Larvae mostly hyperparasites on other Hymenoptera or Diptera. Cret.—Holo.

**Trigonolys** Westwood, 1835, p. 52. [Generic assignment of fossils doubtful.] Cockerell, 1917c; Statz, 1938b. Oligo., Europe (Germany); Mio., Burma–Holo.

**Cretogonalis** Rasnitsyn, 1977a, p. 106 [*C. tai-myricus*; OD]. Fore wing wit basal section of RS nearly perpendicular to R; cell 1mcu very short, much shorter than cell 2rm. Head narrow, with large, protruding eyes; antennae with 16 segments. Cret., USSR (Asian RSFSR).

**Family MAMMETSHIDAE** Rasnitsyn, 1975

[Mammessidhae Rasnitsyn, 1975, p. 73]

Fore wing with costal area distinct; pterostigma narrow; basal section of vein RS slanted slightly toward wing base; distal part of RS (beyond crossvein 2r-rs) curved, closing cell 3r; crossvein 2r-m present. Hind wing with venation reduced; RS very short; abdomen with second segment short and narrow; ovipositor well developed. Cret.

**Mammetsia** Rasnitsyn, 1975, p. 74 [*M. arctica*; OD]. Fore wing with basal section of RS arising far from pterostigma; cell 3r short, broad; cross-veins 3r-m and 2m-cu obsolescent. Gaster broadly oval. Cret., USSR (Asian RSFSR). —Fig. 254.4. *M. arctica*; a, body, lateral view, b, wings and body, dorsal view, both X22 (Rasnitsyn, 1975).

**Family STIGMAPHRONIDAE** Kozlov, 1975

[Stigmaphronidae Kozlov, 1975, p. 75]

Fore wing widest distally, venation greatly reduced; veins C and R thick; pterostigma long. Antennae with 11 segments; posterior ocelli almost contiguous with compound eyes; hind tibiae broad and flattened; tibial spurs long; tarsi long, with 5 segments. Cret.

**Stigmaphron** Kozlov, 1975, p. 77 [*S. orphne*; OD]. Fore wing with RS absent. Antennae clubbed; tibial spur formula 1,2,3; spurs long and thin; hind coxae as long as wide; all femora strongly broadened; hind legs twice as long as forelegs. Cret., USSR (Asian RSFSR). —Fig. 254.1. *S. orphne*; wings and body, X50 (Kozlov, 1975).

**Allocotidus** Musebeck, 1963, p. 129 [*A. bruesi*; OD]. Female similar to those of *Stigmaphron*, but antenna short, not clubbed, and flagellar segments (except the last) broader than longer. Rasnitsyn, 1975. Cret., USA (Alaska).

**Elasmomorpha** Kozlov, 1975, p. 78 [*E. melpomene*; OD]. Fore wing with RS almost reaching wing apex. Tibial spur formula 2,2,2. Antennal scape 3 times as long as maximum width and as long as following 5 segments combined. Cret., USSR (Asian RSFSR). —Fig. 254.3. *E. melpomene*; wings and body, X38 (Kozlov, 1975).

**Hippocoon** Kozlov, 1975, p. 80 [*H. evadne*; OD]. Fore wing with RS almost reaching wing margin. Tibial spur formula 2,2,2. Antennae not clubbed, length of antennal scape only about 1.3 times its greatest width and equal to 2 following segments combined. Cret., USSR (Asian RSFSR). —Fig. 254.5. *H. evadne*; wings and body, X50 (Kozlov, 1975).

**Family MEGASPILIDAE** Ashmead, 1888

[MegaspiIidae Ashmead, 1888, p. 49]

Fore wing with pterostigma large, linear, or absent. Antennae with same number of segments in both sexes; middle tibiae with 2 spurs; sixth gastric tergite lacking a net-like area Larvae parasitic on braconids and chalcids. Masner & Dessart, 1967. Cret.—Holo.
Megaspilus Westwood, 1829, p. 37. Holo.

Family MESOSERPHIDAE
Kozlov, 1970


Similar to Proctotrupidae, but cells 1mcu and 2cua present in fore wing; gaster of female with 7 visible tergites; antennae of female with 15 or more segments. Jur.


Mesohelorus Martynov, 1925d, p. 758 [*M. muchini; OD]. Similar to Mesoserphus, but cell
1mcu nearly triangular in fore wing; M straight distally. Rasnitsyn, 1975, Jur., USSR (Kazakh).

Udaserphus Rasnitsyn, 1983a, p. 91 [*U. transbaticulus; OD]. Similar to Mesoserphus, but much smaller; antennal segments broadened apically. Fore wing with RS + M, basal section of RS, and crossvein 1mcu complete; basal section of M reduced. Jur., USSR (Asian RSFSR).

Family SERPHITIDAE Brues, 1937

[Serphitidae Brues, 1937, p. 33]

Male: fore wing with pterostigma very large, extending to center of wing; vein SC remote from C; other veins reduced; M and CU nearly obsolete. Fore wing with RS + M, basal section of RS, and crossvein 1mcu complete; basal section of M reduced. Jur. (Baltic); Oligo., Europe (Baltic).--Fig. 254, 2. Serphites Brues., 1937, p. 33 [*S. paradoxus; OD]. Right mandible with 3 long, curved teeth directed inward; antennae inserted below middle of frons; femora slightly thickened near middle. Cret. Cryptoserphus Kieffer, 1907, p. 288. Brues., 1940a. Oligo., Europe (Baltic).--Helorus Latreille, 1802, p. 309. Statz, 1938b. Oligo., Europe (Baltic).--Protohelorus Koslov, 1968, p. 237 [*P. mesozoicus; OD]. Fore wing with cell 1mcu more than 3 times as long as its maximum width. Antennae with 20 segments. Jur., USSR (Kazakh).

Family DIAPRIIDAE Haliday, 1833

[Diapriidae Haliday, 1833, p. 274]


Family JURAPRIIDAE Rasnitsyn, 1983

[Jurapriidae Rasnitsyn, 1983a, p. 92]

Similar to Diapriidae; venation much reduced. Antennal scape relatively small, only slightly longer than twice its width; cells 1 + 2r + 1mcu forming an undivided compound cell. Jur.

Family PELECINOPTERIDAE
Brues, 1933

(Pelecinopterae Brues, 1933, p. 17)

Fore wing similar to that of Peculianidae (recent). Antennae with 13 segments; hind tibiae clavate; hind tarsus with fourth segment short; female abdomen with 6 tubular segments, male abdomen with 7 tubular segments. [Probably a synonym of Peculianidae.]


Family SCELIONIDAE
Thomson, 1858

(Scelionidae Thomson, 1858, p. 417)

Fore wing with venation much reduced, without closed cells, and with a distinct compound vein along anterior margin of wing; costal space often open; stigmal vein usually present, but often thin or obsolete. Antennae with 10 to 12 segments, rarely the distal 4 or 5 segments fused to form a club; middle tibia with 1 spur. Larvae parasitic on eggs of diverse insects. Cret.—Holo.


Aneurobaeus Kieffer, 1912, p. 87. Brues, 1940b.

Archaeoscelio Brues, 1940b, p. 88 [*A. rugosus; OD]. Male: fore wing with SC apparently remote from costal margin, several thickening associated with its termination. Body very short and stout; antennae with 14 segments, geniculate and filiform; legs slender, femora and tibiae clavate. Female: similar to male, but segments of flagellum thick, forming a long club. [Family assignment doubtful.] Oligo., Europe (Baltic).


Brachyscelio Brues, 1940b, p. 76 [*B. cephalotes; OD]. Female: fore wing with venation present; basal section of M strong, nearly perpendicular to costal margin of wing; pterostigma absent; SC free from C. Head about twice as wide as long; antennae with 12 segments, geniculate; legs slender. [Family assignment doubtful.] Oligo., Europe (Baltic).

Ceratobaeoides Dodd, 1913, p. 337. Brues, 1940b.


Electroteleia Brues, 1940b, p. 80 [*E. stigmatica; OD]. Female: fore wing with pterostigma forming a thick ridge on wing margin; RS terminating on wing margin just beyond pterostigma but well before wing apex. Antennae long, with 12 segments, terminal 7 or 8 segments shorter and thicker than others. Male: similar to female, but antennae filiform, distal segments not thickened. Oligo., Europe (Baltic).


Palaeoteleia Cockerell, 1914f, p. 637 [*P. oxyura; OD]. Similar to Chromoteleia, but SC well developed; antennae inserted very close to middle line of frons; gaster broader. Oligo., USA (Colorado).


Proplatyctes Brues, 1940b, p. 85 [*P. depressus; OD]. Female: similar to those of Platyscelio (recent), but fore wing with SC submarginal and extending beyond midwing; pterostigma reduced to a thickening beyond end of SC. Oligo., Europe (Baltic).

Sembilanocera Brues, 1940b, p. 70 [*S. clavata; OD]. Related to Baenus (recent), but antennae of female with 9 segments and strongly clubbed. Wing veins present but reduced. Oligo., Europe.
(Baltic). — Fig. 255,6. *S. clavata*; female, wings and body, X40 (Brues, 1940b).


Trachelopteron Brues, 1940b, p. 86 [*T. angulipenne*; OD]. Male: fore wing apparently bent sharply upward near base, basal part narrow and strap-shaped. Head, thorax, and abdomen flattened; antennae with 10 segments; scape short.

Family assignment doubtful. Oligo., Europe (Baltic). — Fig. 255,4. *T. angulipenne*; male, wings and body, X57 (Brues, 1940b).

Uroteleia Brues, 1940b, p. 87 [*U. synthetica*; OD]. Female: SC of fore wing extending beyond midwing; pterostigma reduced to a thickened marginal vein extending well beyond end of SC; part of basal section of RS apparently present. Antennae with 12 segments; scape long and slen-
der, 6 terminal segments forming a large club; prothorax long; gaster narrowed basally; apical segments also narrow, tip with a tubular process extending straight backward. [Family assignment doubtful.] oligo, Europe (Baltic).—fig. 255,7. *U. synthetica; wings and body, X17 (Brues, 1940b).

Family PRAEAULACIDAE
Rasnitsyn, 1972

Related to Aulacidae but with fuller venation, especially of hind wing. Fore wing: basal section of vein Rs long, about equal to basal section of M; crossvein 1r-3rs obsolescent or absent; crossveins 2r-m, 3r-m, and 2m-cu always present; crossvein 1m-cu reaching cell 2rm. Hind wing: costa not developed but R strong, extending to level of end of Rs as a distinct vein. Antennae with 14 to 27 segments; ovipositor long. Jur.

Praeaulacus Rasnitsyn, 1972, p. 72 [*P. ramosus; OD]. Fore wing with basal section of Rs at least half its length from pterostigma; crossvein 2r-3rs about as long as maximum width of cell 2rm. Jur., USSR (Kazakh).—fig. 256,4. *P. ramosus; wings and body, X5 (Rasnitsyn, 1972).

Aulacogastrinus Rasnitsyn, 1983c, p. 103, nom. subst. pro Aulacogaster Rasnitsyn, 1972, p. 85, non Agassiz, 1846 [*Aulacogaster ater Rasnitsyn, 1972, p. 85; OD]. Fore wing with basal section of Rs separated from pterostigma by less than half its length; crossvein 2r-3rs distinctly longer than width of cell 2rm; crossvein 3r-m not slanted. Distal part of first gastral segment dilated. Jur., USSR (Kazakh).

Evaniogaster Rasnitsyn, 1972, p. 85 [*E. petiolatus; OD]. Similar to Aulacogastrinus, but first gastral segment narrow, tubular. Jur., USSR (Kazakh).

Evaniops Rasnitsyn, 1972, p. 85 [*E. rostratus; OD]. Fore wing with basal segment of Rs separated from pterostigma by a distance greater than its length; crossvein 2r-3rs much longer than width of cell 2rm; crossvein 3r-m not oblique; gaster broad; second segment of abdomen forming a cylindrical petiole. Jur., USSR (Kazakh).


Praeaulacites Rasnitsyn, 1972, p. 83 [*P. pachygaster; OD]. Similar to Praeaulicops, but crossvein 3r-m slightly oblique. Jur., USSR (Kazakh).

Praeaulacocon Rasnitsyn, 1972, p. 79 [*P. elongatum; OD]. Similar to Praeaulacus, but base of gaster broadly rounded, nearly sessile. Jur., USSR (Kazakh).

Praeaulicops Rasnitsyn, 1972, p. 83 [*P. lucidus; OD]. Fore wing with basal section of Rs separated from pterostigma by a distance less than its length; crossvein 3r-m strongly slanted. Jur., USSR (Kazakh).

Family CRETEVANIIDAE
Rasnitsyn, 1975

Similar to Aulacidae and Evaniidae. Fore wing with costal area relatively broad; basal section of vein Rs remote from pterostigma, very short and perpendicular to R; cell 3r very narrow. Hind wing very short, about half as long as fore wing. Antennae with 12 segments; hind tibiae thickened. Crete.

Cretevania Rasnitsyn, 1975, p. 84 [*C. minor; OD]. Head without sculpturing; mandibles with 4 teeth; maxillary palpi apparently with 5 segments; labial palpi with 3 segments. Crete, USSR (Asian RSFSR).

Family ANOMOPTERELLIDAE
Rasnitsyn, 1975

Fore wing with costal area broad; basal section of vein Rs directed toward base of wing; crossvein 2r-3rs situated at apex of pterostigma; crossvein 2r-m present; cells 1mcu and 2mcu narrow. Antennae with at least 15 segments. Jur.

Anomopterella Rasnitsyn, 1975, p. 90 [*A. mirabilis; OD]. Fore wing with basal section of Rs very close to pterostigma; cell 3r very broad; gaster widest beyond its middle; ovipositor short. Jur., USSR (Kazakh).—fig. 256,6. *A. mirabilis; wing and body, X9 (Rasnitsyn, 1975).

Family EVANIIDAE Leach, 1815

Fore wing with pterostigma present, commonly small; costal space open and wide; crossveins 2r-m, 3r-m, and 1m-cu commonly present; crossvein 2m-cu absent; venation greatly reduced in some species. Antennae with 13 or 14 segments; gaster short, oval, with long petiole, arising abruptly just pos-
terior to scutellum. Larvae parasitic on eggs of Blattaria. Oligo.—Holo.


Family AULACIDAE Shuckard, 1841

[Aulacidae Shuckard, 1841, p. 115] [=Gasteruptionidae Ashmead, 1901, p. 7; Kotujellidae Rasnitsyn, 1975, p. 87; Baissidae Rasnitsyn, 1975, p. 90]

Gaster attached very high on propodeum; first and second segments of gaster partially or completely fused; male with 13 antennal segments, female with 14. Veneration of fore wing very diverse, relatively complete in some genera, apically reduced in others. Larvae mostly parasitic on wood-boring Coleoptera or bees and wasps nesting in wood. Townes, 1950; Rasnitsyn, 1980b. Cret.—Holo.

Aulacus Jurine, 1807, p. 89. Holo.


Electrofoenus Cockerell, 1917g, p. 364 [*E. gracilipes; OD]. Similar to Gasteruption (recent). Fore wing with basal section of RS very long, directed toward wing base; cell 3r large, its face on cell 2rm about equal in length to crossvein 2r-ts. Head large and broad, with prominent eyes; legs very long and slender. Mio., Burma. —Fig. 256,1. *E. gracilipes; fore wing, X10 (Cockerell, 1917g).

Hypiogastrites Cockerell, 1917c, p. 19 [*H. elektrinus; OD]. Similar to Hypiogaster (recent), but crossvein 2r-ts in fore wing perpendicular to front margin of wing. Antennae long, filiform; hind tibiae thickened. Mio., Burma.


Praeichneumonidae Rasnitsyn, 1983d, p. 259.*P. townesi; OD]. Female with head transverse, eyes moderately large; pronotum short centrally; mesonotum transverse; legs apparently short. Cret., Asia (Mongolia). —Fig. 257. *P. townesi; fore wing and body, X9 (Rasnitsyn, 1983d).

Family ICHNEUMONIDAE Latreille, 1802

[*Ichneumonidae Latreille, 1802b, p. 309]

Fore wing with pterostigma distinct, usually triangular; vein R marginal; costal space closed; RS+M typically absent; cell 2rm commonly very small or absent; cell 2mcu usually present. Body generally slender; antennae long, with at least 16 segments; trochanters with 2 segments; ovipositor long, often longer than body. Larvae parasitic on diverse groups of insects and a few other arthropods. Cret.—Holo.

Ichneumon Linné, 1758, p. 343. Brues, 1910; Cockerell, 1921a; Théobald, 1937a. Oligo., USA (Colorado), England, Europe (France)—Holo.

Absyrtus Holmgren, 1858, p. 32. Brues, 1910. Oligo., USA (Colorado)—Holo.

Acoenites Latreille, 1810, p. 300. Giebel, 1856; Brues, 1906; Meunier, 1923b. Oligo., USA (Colorado), Europe (Germany); Mio., Europe (Yugoslavia)—Holo.

Acourtia Cockerell, 1921a, p. 11 [*A. perplexa; OD]. Little-known genus. Fore wing with pterostigma triangular; RS+M apparently absent; cell 2rm absent. [Family assignment doubtful.] Oligo., England.—Fig. 256,2. *A. perplexa; fore wing, X8 (Cockerell, 1921a).

Amblyteles Wesmael, 1845, p. 114. Cockerell, 1927e. Oligo., USA (Colorado)—Holo.

Anomalon Panzer, 1804, pl. 15. Brues, 1910; Cockerell, 1919b; Théobald, 1937a. Oligo., USA (Colorado), Europe (France)—Holo.


Campoplex Gravenhorst, 1829, p. 453. [Generic assignment of fossil doubtful.] Statz, 1938b. Oligo., Europe (Germany)—Holo.
Fig. 256. Praeaulacidae, Anomopterellidae, Aulacidae, and Ichneumonidae (p. 473–477).

Catachora Townes, 1973b, p. 284 [*C. minor; OD].
Related to Grypocentrus (recent), but cell 3r very broad. *C. minor; wings and body, X28 (Townes, 1973b).


Cubocephalus Ratzeburg, 1848, p. 121. Statz, 1936b. Oligo., Europe (Germany)–Holo.

Demophorus Thomson, 1890, p. 1457. [Generic assignment of fossils uncertain.] Brues, 1910; Théobald, 1937a. Oligo., USA (Colorado), Europe (France)–Holo.

Eopimpla Cockerell, 1920c, p. 257 [*E. grandis;
Hexapoda

**Praeichneumon**

[FIG. 257. **Praeichneumonidae** (p. 474).]

Little-known genus, apparently related to *Pimpla*. Large species; fore wing with crossvein 2r-rs connected to middle of pterostigma; cells r+2r and m-cu combined to form a large cell projecting distally well beyond pterostigma. *Eoc.*, USA (Colorado).


**Exenterus** Hartig, 1837, p. 156. Cockerell, 1924c. *Oligo.*, USA (Colorado)-Holo.

**Exetastes** Gravenhorst, 1829, p. 395. Brues, 1910; Naora, 1933a; Statz, 1936b. *Oligo.*, Europe (Germany); Pleist., Asia (Mongolia)-Holo.


**Hemiteles** Gravenhorst, 1829, p. 780. Brues, 1910; Statz, 1936b. *Oligo.*, USA (Colorado), Europe (Germany)-Holo.

**Hiattensor** Brues, 1910, p. 73 [*H. semirurus*; JD]. Apparently related to *Campoplex* (recent). Fore wing with pterostigma elongate, nearly linear; cell 3r long. Hind legs elongate, tip of femora extending beyond end of abdomen. Townes, 1966. *Oligo.*, USA (Colorado).—Fig. 256,3. *H. semirurus*; a, fore wing, X10; b, hind leg and abdomen, X5 (Brues, 1910).


**Lamprona** Curtis, 1832, p. 407. Brues, 1910; Cockerell, 1921a. *Oligo.*, USA (Colorado)-Holo.

**Lapton** Nees, 1815, p. 46. Brues, 1910. *Oligo.*, USA (Colorado)-Holo.


**Megatryphon** Cockerell, 1924c, p. 9 [*M. montiferus*; OD]. Little-known genus, apparently similar to *Tryphon*. Fore wing with pterostigma very long, narrowly lanceolate; cell 2rm very small, triangular. Metathorax truncate posteriorly, but dorsal surface straight in lateral view. *Oligo.*, USA (Colorado).


**Mesopimpla** Cockerell, 1919b, p. 376 [*M. sequoiarum*; OD]. Little-known genus, apparently related to *Theronia* (recent). Fore wing with basal section of M slightly curved, joined to very base of pterostigma; pterostigma narrow, elongate. Hind femora very stout. *Oligo.*, USA (Colorado).


**Orthocentrus** Gravenhorst, 1829, p. 780. Brues, 1910; Statz, 1936b. *Oligo.*, USA (Colorado), Europe (Germany)-Holo.

**Orthopelma** Taschenberg, 1865, p. 137. Statz, 1936b. *Oligo.*, Europe (Germany)-Holo.

Parapimpla Théobald, 1937a, p. 191 [*P. rheumata*; OD]. Little-known genus. Similar to *Apechtis* (recent), but crossvein 1m-cu close to posterior margin of wing. *Oligo.*, Europe (France).


**Phygadeuon** Gravenhorst, 1829, p. 635.
Hymenoptera—Apoidea

Cockerell, 1920c; Statz, 1936b. Eoc., USA (Colorado); Oligo., Europe (Germany)—Holo.

Pimpla Fabricius, 1804, p. 112. Brues, 1906, 1910; Cockerell, 1919c; Henriksen, 1922b; Statz, 1936b; Theobald, 1937a. Eoc., USA (Colorado), Europe (Denmark); Oligo., USA (Colorado)—Holo.

Plectocicadae Viebeek, 1914, p. 118. Eoc., USA (Colorado)—Holo.

Polysphincta Gravenhorst, 1829, p. 112. Brues, 1910; Cockerell, 1921a; Statz, 1936b. Oligo., USA (Colorado), England—Holo.


Protarchus Förster, 1868, p. 201. Statz, 1936b. Oligo., Europe (Germany)—Holo.


Spudaeus Gistel, 1848, p. 11. Brues, 1910; Cockerell, 1941. Oligo., USA (Colorado)—Holo.

Stenomacrus Förster, 1868, p. 160. Brues, 1910; Statz, 1936b. Oligo., Europe (Baltic), USA (Colorado)—Holo.


Tanychora Townes, 1973a, p. 216 [*T. petiolata; OD]. Fore wing with RS+M present, separating cells 1r+2r from 1mcu; cell 2rm relatively large. Cret., USSR (Asian RSFSR), Asia (Mongolia).—Fig. 256,7. [*T. petiolata; wings and body, X4.3 (Rasnitsyn, 1975).

Tanychorella Rasnitsyn, 1975, p. 91 [*T. parvula; OD]. Similar to Tanychora, but cell 2rm of fore wing shorter. Cret., USSR (Asian RSFSR).


Tiglidopsis Cockerell, 1921e, p. 37 [*T. baestans; OD]. Little-known genus. Fore wing with pterostigma lanceolate, narrow; cell 3r pointed posteriorly; crosseein 2r-st slightly sigmoidal. Eoc., USA (Colorado).

Trachysphyrus Haliday, 1836, p. 317. Brues, 1910; Meunier, 1920a; Statz, 1936b, 1938b. Oligo., Europe (Baltic), USA (Colorado)—Holo.


Tryphon Fallén, 1813, p. 16. Brues, 1910; Grisell, 1976. Eoc., USA (Colorado); Oligo., USA (Colorado)—Holo.


Xorides Latreille, 1809, p. 4. Brues, 1910; Handlirsch, 1910b. Eoc., Canada (British Columbia); Oligo., USA (Colorado)—Holo.

Family ICHNEUMONOMIMIDAE Rasnitsyn, 1975

[Ichneumonomimidae Rasnitsyn, 1975, p. 92]

Fore wing with costal space broad; vein R+M weak; crosseeins 2r-st and 3r-st present; cell 2rm longer than 3rm; cell 3rm short and high. Cret.

Ichneumonomima Rasnitsyn, 1975, p. 92 [*I. paradoxa; OD]. Fore wing with crosseein 2r-st short; cell 3rm higher than its width. Antennae apparently with 13 to 14 segments. Schmidt, 1963. Cret., USSR (Asian RSFSR).—Fig. 258,2. [*I. paradoxa; wings and body, X4.3 (Rasnitsyn, 1975).

Family BRACONIDAE Latreille, 1829

[Braconidae Latreille, 1829, p. 289]

Adults small. Fore wing with costal area obsolescent or closed; basal sections of vein RS and RS+M usually present; crosseeins 2m-cu and sometimes 1m-cu absent; veins in distal part of wing often obsolescent. Body stout; antennae usually long. Larvae parasitic on diverse types of insects. Cret.—Holo.

Bracoon Fabricius, 1805, p. 102. [Generic assignment of fossils doubtful.] Heyden, 1858; Förster, 1891; Brues, 1910; Meunier, 1915b; Cockerell, 1919b. Oligo., USA (Colorado), Europe (Germany)—Holo.


Alysia Latreille, 1804, p. 173. Brues, 1910; Theobald, 1937a; Statz, 1938b. Oligo., Europe (Germany, France), USA (Colorado)—Holo.

Anacanthobracon Brues, 1939b, p. 251 [*A. femorator; OD]. Apparently related to Doryctes. Male with hind legs greatly thickened; coxae large; tibiae stout and thickened distally; gastral tergites forming a dorsal shield. Oligo., USA (Colorado).

Apanteles Förster, 1862, p. 245. Statz, 1938b. Oligo., Europe (Germany)—Holo.

Aphidius Nees, 1818, p. 302. Brues, 1933; Pérez, 1940. Oligo., Europe (Baltic, France)—Holo.


Asculopus Wesmael, 1838, p. 155. Brues, 1933; Statz, 1938b. Oligo., Europe (Baltic, Germany)—Holo.

Aspisalpa Förster, 1862, p. 268. Statz, 1938b. Oligo., Europe (Germany)—Holo.

Hexapoda

Protoibalia

Ichneumonomimidae, Cynipidae, Ibaliidae (p. 477-482).


**Calyptoideus** Cockerell, 1921a, p. 13 [*C. veterum; OD]. Little-known genus, apparently related to Eubazus. Fore wing with pterostigma large and triangular; gaster slender basally. Oligo., England.

**Cantharocnus** Vierck, 1912, p. 617. Brues, 1933; Statz, 1936b. Oligo., Europe (Baltic, Germany)—Holotype.

**Chelonus** Haliday, 1833, p. 616 ["C. mirabundus; OD]. Fore wing with RS terminating on costa before wing apex; crossvein 2r-3rs situated slightly distal of middle of pterostigma; basal section of RS less than half as long as basal section of M. Eyes large, extending nearly to base of mandibles; mandibles long, curved, and bidentate; antennae with 21 segments, as long as body; basal segment of flagellum enlarged; gaster narrow, elongate; tergites fused to form carapace; fore and hind femora stout. Oligo., Europe (Baltic).—Fig. 259,6. *C. mirabundus*; wings and body, ×6.5 (Brues, 1933).


**Clinoecrinites** Haliday, 1833, p. 266. Brues, 1933; Statz, 1938b. Oligo., Europe (Baltic, Germany)—Holotype.

**Coeolectoideus** Roman, 1910, p. 112. Brues, 1933. Oligo., Europe (Baltic)—Holotype.

**Colastes** Haliday, 1833, p. 266. Brues, 1910. Oligo., USA (Colorado)—Holotype.

**Cremnops** Förster, 1862, p. 246. Cockerell, 1919b; Brues, 1933. Oligo., USA (Colorado)—Holotype.

**Dacnusites** Cockerell, 1921a, p. 19 [*D. sepultus; OD]. Similar to Polemon (recent), but RS of fore wing bent posteriorly just beyond its contact with crossvein 2r-3rs; cells 2rm and 3rm absent. Oligo., England.—Fig. 260,1. *D. sepultus*; fore wing, ×17 (Cockerell, 1921a).

**Diaereti** Förster, 1862, p. 249. Pérez, 1940. Oligo., Europe (France)—Holotype.

**Digastrotheca** Brues, 1933, p. 39 [*D. mirabilis; OD]. Related to the Rhogadininae (recent), but basal abdominal tergites fused into long plates, forming carapace over abdomen; basal plate with 2 pairs of longitudinal ridges, second pair widely separated. Oligo., Europe (Baltic).—Fig. 260,6. *D. mirabilis*; body, ×9 (Brues, 1933).

**Diodontogaster** Brues, 1933, p. 59 [*D. bidentata; OD]. Related to Chelonus. Fore wing with cell 3r acute apically; cells 1r+2r and 1mcu present. Head large; eyes bare, oval; antennae with about 30 segments; abdomen elongate, with apex rounded above but ventrally projecting posteriorly to form a pair of prolongations. Oligo., Europe (Baltic).—Fig. 259,4. *D. bidentata*; wings and body, ×6 (Brues, 1933).

**Diospiloides** Cockerell, 1921a, p. 14 [*D. boekeyi; OD]. Little-known genus, apparently related to Diospilus. Fore wing with pterostigma broad, triangular; crossvein 2r-3rs at middle of pterostigma; RS terminating almost at wing apex. Antennae less than half length of body, with about 30 segments; propodeum rugose; gaster short and broad, smooth above. Oligo., Europe (Baltic).—Fig. 259,5. *D. boekeyi*; wings and body, ×15 (Brues, 1933).

**Diospiloides** Cockerell, 1921a, p. 14 [*D. boekeyi; OD]. Little-known genus, apparently related to Diospilus. Fore wing with pterostigma of moderate size, its posterior border smoothly curved; crossvein 2r-3rs slightly distal of middle of pterostigma; basal section of M distinctly curved. Oligo., England.

**Diospilus** Haliday, 1833, p. 262. Brues, 1910; Cockerell, 1921a; Carpenter & others, 1937; Mason, 1976. Cret., Canada (Manitoba); Oligo., USA (Colorado), England—Holotype.

© 2009 University of Kansas Paleontological Institute
Doryctes Haliday, 1836, p. 45. Brues, 1933; Statz, 1938b. **Oligo.**, Europe (Baltic, Germany)—Holo.


Electrohelcon Brues, 1933, p. 62 [*E. grandis*; OD]. Similar to *Chelonohelcon*, but gastral tergites separated and articulated. **Oligo.**, Europe (Baltic).

Eobracon Cockerell, 1920c, p. 258 [*E. cladurus*; OD]. Fore wing as in *Diospilus*, but gaster as in *Chelonus*; wing base sessile but narrow, apex enlarged. Eoc., USA (Colorado).

Eobraconus Rasnitsyn, 1985, p. 163, nom. subst. pro *Eobracon* Rasnitsyn, 1983d, p. 263, non Cockerell, 1920c [*Eobracron inopinatus* Rasnitsyn, 1983d; OD]. Fore wing with R extending only a short distance beyond pterostigma and without a distinct break at base of pterostigma; basal section of RS only slightly shorter than basal section of M; M and CU almost reaching wing margin; crossvein 1m-cu reduced apically; cell 3rm closed. Antennae with about 16 segments. Cret., Mongolia.

Eocardiochiles Brues, 1933, p. 92 [*E. fritschi*; OD]. Similar to *Cardiochiles* (recent), but antennae with only 18 segments, first 12 flagellar seg-
ments at least twice as long as thick; cell 2rm very short. Oligo., Europe (Baltic).


Eubazus Nees, 1814, p. 214. Brues, 1910, 1923a; Burks, 1979; Achterberg, 1982. Oligo., Europe (Baltic), USA (Colorado)—Holo.

Eumacrocentrus Ashmead, 1901, p. 120. Brues, 1933. Oligo., Europe (Baltic)—Holo.


Holocnomus Pérez, 1940, p. 50 [*H. braconiformis; OD]. Fore wing with RS extending to wing apex. Antennae with 13 or 14 segments, all almost equal in length and thickness. Oligo., Europe (France).


Iphiaulax Förster, 1862, p. 234. Brues, 1910;
Hymenoptera—Apocrita

481

Cockerell, 1919b, 1921a. Oligo., USA (Colorado); England—Holotype.

Lithapechis Cockerell, 1921a, p. 6 [*L. fumosus; OD]. Little-known genus, apparently related to *Apechis* (recent). Fore wing with basal section of M nearly straight; crossvein 2r-rs straight; crossvein 2r-m very short. Oligo., England. — Fig. 260.4. *L. fumosus*; fore wing, X6 (Cockerell, 1921a).

Meteoricus Brues, 1939b, p. 258 [*M. inopinata; OD]. Similar to *Meteorus*, but fore wing lacking crossveins 2r-m and 3r-m. Oligo., Europe (Baltic). — Fig. 260.5. *M. inopinata*; wings and body, X20 (Brues, 1939b).


Microplitis Förster, 1862, p. 245. Brues, 1910. Oligo., USA (Colorado); Europe (France)—Holotype.


Miraecoides Brues, 1933, p. 98 [*M. proteus; OD]. Fore wing: cell 1rm slightly longer than cell 1cu; RS obsolete beyond pterostigma and diverging posteriorly. Antennae with 16 or 17 segments, shorter than body; 6 basal segments of flagellum long; head large, twice as broad as thick; legs slender. Oligo., Europe (Baltic).

Neoblacus Ashmead, 1901, p. 122. Brues, 1933; Carpenter & others, 1937; Achterberg, 1982. Cret., Canada (Manitoba); Oligo., Europe (Baltic)—Holotype.


Oligoneurodus Brues, 1910, p. 103 [*O. destructus; OD]. Similar to *Oligoneurus* (recent), but cell 2rm nearly triangular, its posterior side about as long as RS + M. Antennae with about 25 segments. Oligo., USA (Colorado). — Fig. 260.2. *O. destructus*; fore wing, X17 (Brues, 1910).

Onychandra Brues, 1933, p. 105 [*O. petiolata; OD]. Fore wing with pterostigma triangular. Eyes large, extending to base of mandibles; antennae short, with oval segments; gaster petiolate, swollen; ovipositor short, stout, terminating in very slender hook. Oligo., Europe (Baltic).


Palaeoblacus Statz, 1936b, p. 277 [*P. aculeatus; OD]. Little-known genus. Fore wing with RS + M apparently absent; pterostigma broad; ovipositor about as long as body; antennae with 17 segments. Oligo., Europe (Germany). — Fig. 259.3. *P. aculeatus*; wings and body, X18 (Statz, 1936b).

Palaeorhysalus Brues, 1933, p. 37 [*P. dubito; OD]. Probably related to the Rhodadinae. First 4 gastral segments irregularly striated, second much longer than third and separated from it by a deep furrow. Oligo., Europe (Baltic).

Palaeorhysalus Brues, 1933, p. 91 [*P. ludens; OD]. Similar to *Syrbizus* (recent) but with deep grooves on lateral parts (parapsides) of scutum. Oligo., Europe (Baltic). — Fig. 259.2. *P. ludens*; wings and body, X13 (Brues, 1933).


Prochremylus Brues, 1933, p. 26 [*P. brevicornis; OD]. Similar to *Chremylus* (recent). Fore wing with basal section of RS at least half as long as basal section of M. Antennae with 11 segments; legs stout, especially femora; ovipositor less than half length of gaster. Oligo., Europe (Baltic). — Fig. 259.1. *P. brevicornis*; wings and body, X20 (Brues, 1933).

Promonolexis Brues, 1933, p. 34 [*P. klebsi; OD]. Similar to *Monolexis* (recent), but RS arising at very base of pterostigma; cell 1mcu triangular; ovipositor thick and strongly curved. Oligo., Europe (Baltic). — Fig. 260.3. *P. klebsi*; wings and body, X20 (Brues, 1933).

Proproaen Brues, 1933, p. 108 [*P. cellularis; OD]. Fore wing: venation as in *Proaen*. Antennae longer than body; eyes small; legs slender, hind coxae long; gaster lanceolate. Oligo., Europe (Baltic).


Pygostolus Haliday, 1833, p. 263. Brues, 1933; Carpenter & others, 1937. Cret., Canada (Manitoba); Oligo., Europe (Baltic)—Holotype.

Rhanconitus Ruthe, 1854, p. 349. [Generic assignment of fossil doubtful.] Scudder, 1890; Brues, 1910. Oligo., USA (Colorado)—Holotype.

Rhysopolis Dalla Torre, 1898, p. 4. Théobald, 1937a. Oligo., Europe (France)—Holotype.
Sinobracon Hong, 1974, p. 135 [*S. speeiosus; OD]. Fore wing as in Daenusites, but cell I much larger, and vein M ending well beyond wing apex. Antennae of female with 12 segments. Eoc., China (Liaoning).
Spathius Nées, 1818, p. 301. Statz, 1938b. Oligo., Europe (Germany)–Holo.
Tanycarpa Förster, 1862, p. 265. Statz, 1936b. Oligo., Europe (Germany)–Holo.

Family CYNIPIDAE Leach, 1815
[Cynipidae Leach, 1815, p. 142]
Fore wing (sometimes absent): pterostigma and basal part of costa absent; venation much reduced, but cell 2r+3r usually present and closed. Antennae filiform, with from 13 to 19 segments; second gastral tergite usually at least half as long as entire gaster. Larvae mainly gall makers; a few parasitic on other Hymenoptera and Diptera. Cret.–Holo.

Cynips Linné, 1758, p. 553. Holo.
Protimaspis Kinsey, 1937, p. 22 [*P. costalis; OD]. Similar to Timaspis (recent) and Aulacidea (recent), but abdomen more lenticulate in profile and its second segment larger; R and SC fused and submarginal, lacking a terminal process leading to C; costal margin much thickened near termination of RS; distal part of RS very straight. Cret., Canada (Manitoba).—Fig. 258.3. *P. costalis; wings and body, X22 (Carpenter & others, 1937).

Family FIGITIDAE Förster, 1869
[Figitidae Förster, 1869, p. 329]
Similar to Cynipidae, but second gastral tergite less than half as long as gaster. Larvae parasitic on certain Diptera and Neuroptera. Oligo.–Holo.

Figites Latreille, 1802, p. 307. Brues, 1910; Statz, 1938b. Oligo., USA (Colorado), Europe (Germany)–Holo.

Family IBALIIDAE Förster, 1869
[Ibaliidae Förster, 1869, p. 329]
Similar to Cynipidae, but cell 2r+3r very narrow, at least 9 times as long as wide; sixth gastral tergite larger than others. Oligo.–Holo.

Protoibalia Brues, 1910, p. 15 [*P. convexa; OD]. Similar to Ibalia (recent), but fore wing with cell 3r much shorter and broader. Oligo., USA (Colorado).—Fig. 258.1. *P. convexa; wings and body, X10 (Brues, 1910).

Family AGAONTIDAE Walker, 1871
[Agaontidae Walker, 1871, p. 58]
Adults with marked sexual dimorphism. Males usually wingless; antennae with 3 to 9 segments. Females with fore wing broadened distally; venation much reduced; submarginal vein weak and very close to wing margin, or entirely absent; pterostigma and postmarginal vein absent. Females with 11 or 12 antennal segments; front and hind legs stout; fore tibiae short, without spurs; middle tibiae with a single spur. Larvae developing in figs. Oligo.–Holo.

Agaon Dalman, 1818, p. 69. Holo.
Tetrapus Mayr, 1885, p. 156. Brues, 1910. Oligo., USA (Colorado)–Holo.

Family TORYMIDAE Walker, 1833
[Torymidae Walker, 1833a, p. 115]
Minute insects. Venation of fore wing much reduced; submarginal vein weakly developed...
and commonly short; stigmal vein usually small; prerostigma obsolescent or absent. Mandibles well developed, with 3 or 4 teeth; hind coxae very large, at least 5 times length of fore coxae; tarsi with 5 segments; ovipositor usually long and exserted. Larvae mostly parasitic on gall-making Diptera and Hymenoptera. Oligo.—Holo.

Torymus Dalman, 1820, p. 135. Förster, 1891; Brues, 1910, 1923a; Grisell, 1976. Oligo., Europe (Baltic, France), USA (Colorado)—Holo.


Family CHALCIDAE Leach, 1815

[Chalcidae Leach, 1815, p. 144]

Similar to Torymidae, but ovipositor usually short and stout; hind coxae cylindrical in cross section; hind femora much swollen, denticulate. Oligo.—Holo.

Chalcis Fabricius, 1789, p. 272. Cockerell, 1907c; Brues, 1910. Oligo., USA (Colorado)—Holo.

Eterochalcis Burks, 1939, p. 184. Oligo., USA (Colorado)—Holo.

Family EURYTOMIDAE Walker, 1833

[Eurytomidae Walker, 1833a, p. 12]

Similar to Chalcidae, but hind coxae not enlarged and hind femora without teeth; thorax usually coarsely punctate. Larvae parasitic on diverse types of insects; some phytophagous, on grasses. Oligo.—Holo.


Family PTEROMALIDAE Haliday, 1833

[Ptromalidae Haliday, 1833, p. 267]

Very small insects. Fore wing as in Chalcidae, with much diversity; thorax usually not coarsely punctate; hind coxae normal, not enlarged; hind femora without teeth; tarsi with 5 segments. Larvae parasitic on diverse types of insects. Oligo.—Holo.

Pteromalus Swederus, 1795, p. 201. [Generic assignment of fossils doubtful.] Brues, 1910; Cockerell, 1921a; Statz, 1938b. Oligo., England, Europe (Germany), USA (Colorado)—Holo.

Bruesica Hequist, 1961, p. 93 [*Cleonymus submersus Brues, 1910, p. 27; OD]. Little-known genus, resembling Cleonymus (recent), but head shape and venation of fore wing different. Oligo., USA (Colorado).

Ferrierelus Théobald, 1937a, p. 311 [*P. bernardi; OD]. Similar to Lamprotus (recent), but antennae much shorter. Oligo., Europe (France).

Heydeniopsis Hequist, 1961, p. 94 [*H. cleonymoides; OD]. Similar to Heydenia (recent). Wings unknown. Head subglobular; antennae with 12 segments, inserted near clypeus; ocelli in an equilateral triangle; propodeum long, with median carina. Oligo., Europe (Baltic).

Ormyrodes Brues, 1907, p. 46. Brues, 1910. Oligo., USA (Colorado)—Holo.

Family ENCYRTIDAE Förster, 1856

[Encyrtidae Förster, 1856, p. 18]

Very small insects. Fore wing with submarginal vein usually short; stigmal vein near midwing. Middle tibia modified for jumping, with enlarged spur and commonly with patch of modified setae on ventral surface; hind tibiae usually with 2 spurs, 1 often reduced. Larvae parasitic on diverse insects. Oligo.—Holo.

Encyrtus Latreille, 1809, p. 31. [Generic assignment of fossils doubtful.] Statz, 1938b. Oligo., Europe (Germany)—Holo.

Propelma Trjapitzin, 1963, p. 89 [*P. robdendorfii; OD]. Similar to Metapelma (recent), but hind tibiae normal, not flattened and broad. Oligo., Europe (Baltic).

Family EULOPHIDAE Haliday, 1833

[Eulophidae Haliday, 1833, p. 268]

Fore wing with submarginal vein close to wing margin and commonly concurrent with it; stigmal vein present but often very short and situated well toward apex of wing. Fore tibial spur short and straight; fore basitarsus with an oblique comb basally. Larvae parasitic on diverse types of insects. Oligo.—Holo.

Eulophus Geoffroy, 1762, p. 312. [Generic assignment of fossils doubtful.] Statz, 1938b. Oligo., Europe (Germany)—Holo.

© 2009 University of Kansas Paleontological Institute
Family TRICHOGRAMMATIDAE
Fürster, 1856

[Trichogrammatidae Fürster, 1856, p. 20]

Minute insects. Fore wing broad and fringed with hairs; venation greatly reduced, the veins not developed beyond midwing; proximal veins forming a short marginal compound vein; stigmal vein absent. Larvae parasitic on insect eggs. *Cret.—Holo.*

Trichogramma Westwood, 1833, p. 444. *Holo.*

Enneagusm YOSHIMOTO, 1975, p. 512 [*E. pristinus; OD.*] Fore wing long and narrow, as long as body and hyaline; longest cilia at distal end of wing; cilia on anterior and posterior margins gradually shorter toward base of wing. Antennae with 9 segments, funicle with 4; tarsi with 3 segments; all tibiae with a single spur; gaster short, broadly sessile. *Cret., Canada (Alberta).*

Family MYMARIDAE Haliday, 1833

[Mymaridae Haliday, 1833, p. 269]

Minute insects. Fore wing usually with a long marginal fringe, venation commonly limited to basal third of wing; basal portion of wing often reduced to a single, thin vein, forming a stalk for the broader distal part. Hind wings linear, often threadlike. Larvae parasitic on eggs of insects. *Cret.—Holo.*

Mymar CURTIS, 1832, p. 411. *Holo.*

Alaptus Westwood, 1839, p. 79. [Fossils are specimens of *A. globosicornis* and *A. psocidivorus,* both recent.] DOUTT, 1973b; ?Mio., Mexico—Holo.

Anaphes Haliday, 1833, p. 269. MUNIERN, 1901b. *Oligo., Europe (Baltic)—Holo.*

Archaeomma YOSHIMOTO, 1975, p. 503 [*Octonius minutissimus* BRUES, 1937, p. 44; OD.*] Similar to *Palaeomymar.* Fore wing not reticulate; antennal club with 4 segments in both sexes; scape short. CARPENTER & others, 1937. *Cret., Canada (Manitoba, Alberta).*

Arescon Walker, 1846, p. 50. MUNIERN, 1901b, 1903a; DOUTT, 1973b. *Oligo., Europe (Baltic)—Holo.*

Carpenteriana YOSHIMOTO, 1975, p. 510 [*C. tumida; OD.*] Female as in *Octonius,* but antennae with 10 segments, funicle with 7 segments; gaster elongate-oval. Pterostigmena of fore wing well defined. *Cret., Canada (Manitoba).*

Galloromma SCHÜTTER, 1978a, p. 74 [*G. beazonnaiseniis; OD.*] Little-known genus, similar to *Archaeromma.* Antennae with 14 segments, 4 terminal segments forming a club. (Probably a synonym of *Archaeromma.* *Cret., Europe (Germany).*


Litus Haliday, 1833, p. 269. MUNIERN, 1901b; DOUTT, 1973b. *Oligo., Europe (Baltic); Oligo./Mio., Mexico (Chiapas)—Holo.*

Macalpinia YOSHIMOTO, 1975, p. 527 [*M. canadensis; OD.*] Fore wing elongate, about 3.5 times as long as broad; stigmal vein very large, subtriangular; anterior marginal setae about half as long as posterior ones; gaster conical at base, elongate-oval in dorsal view; antennae with 13 segments, pedicel enlarged, about twice as long as broad. *Cret., Canada (Alberta).*

Malfartia MUNIERN, 1901b, p. 285 [*M. molitorae; OD.*] Little-known genus. Tarsi with 5 segments, antennae with 9 segments. DOUTT, 1973b; YOSHIMOTO, 1975. *Oligo., Europe (Baltic).*


Protooctonus YOSHIMOTO, 1975, p. 511 [*D. marneri; OD.*] Similar to *Carpenteriana,* but antennae of female with 13 segments; gaster subpetiolar. Antennae of male with 12 segments. *Cret., Canada (Manitoba).*

Triadomerus YOSHIMOTO, 1975, p. 508 [*T. bulbosus*; OD.*] Fore wing elongate-spatulate, about 3 times as long as broad. Antennae of female with 13 segments; scape not greatly elongate, unusually swollen and flattened; tarsi with 5 segments; gaster elongate-oval. *Cret., Canada (Manitoba, Alberta).*

Family TETRACAMPIDAE
Fürster, 1856

[Tetracampidae Fürster, 1856, p. 79]

Minute insects. Antennae with 11 or 12 segments, often clubbed; pronotum usually large, bell-shaped; anterior tibiae with a single furcate spur or with 2 small spurs. Legs slender and long. Larvae endoparasites of eggs or larvae of Coleoptera, Hymenoptera, or Diptera. *Cret.—Holo.*

Tetracampe FÖRSTER, 1841, p. 34. *Holo.*

Bacromorpha BRUES, 1937, p. 41 [*B. dubitata; OD.*] Antennae with 12 segments, scape broad

© 2009 University of Kansas Paleontological Institute
Bethylonymus Rasnitsyn, 1975, p. 98 [*B. cervicalis; OD]. Fore wing with crossveins 2r-m and 2m-cu absent or obsolete; cell 2a absent. Antennae with 8 to 12 segments; pronotum long. Jur., USSR (Kazakh).—Fig. 261,8. *B. cervicalis; wing and body, ×12 (Rasnitsyn, 1975).

Leptogastrella Rasnitsyn, 1975, p. 103 [*L. leptogastrea; OD]. Fore wing with crossveins 1r-s and 3r-m absent; crossveins 2r-m and 2m-cu and cell 2a present. Antennae with 17 to 19 segments. Jur., USSR (Kazakh).

Family CHRYSIDIDAE Latreille, 1802

Chrysis Linné, 1761, p. 414. Cockerell, 1907c; Rohwer, 1909c. Oligo., USA (Colorado)—Holo.

Hypocleptes Evans, 1973, p. 175 [*H. rasnitsyni; OD]. Female similar to those of Procleptes, but lacking dentiform processes on propodeum and apical processes on front coxae; scapes short. Cret., USSR (Asian RSFSR).—Fig. 261,3. *H. rasnitsyni; body, ×20 (Evans, 1973).


Procleptes Evans, 1969, p. 257 [*P. carpenteri; OD]. Similar to Cleptes (recent), but mandibles broad and with 3 or 4 teeth apically; scape long and slender. Cret., Canada (Manitoba).—Fig. 261,4. *P. carpenteri; dorsal view, ×15 (Evans, 1969).

Protamisega Evans, 1973, p. 176 [*P. khatanga; OD]. Female similar to those of Hypocleptes, but venation less reduced and scape longer. Cret., USSR (Asian RSFSR).

Protochrysisid Carpenter, 1986, p. 577, nom. subst. pro Protochrysis Bishop, 1917, p. 139, nom. Pascher, 1911 [*Protochrysis succinalis; OD]. Little-known genus. Head flattened; postcuticellum extending as a horizontal lamella as long as scutellum and mesonotum combined; 6 visible gastral tergites present; all legs very short; femora flattened and very broad; coxae excavated for femora. [Family assignment doubtful.] Brues, 1933. Oligo., Europe (Baltic).—Fig. 261,7. *P. succinalis (Bischoff); body and wings, ×5.5 (Brues, 1933).

Family KARATAIDAE Rasnitsyn, 1977

[Karataidae Rasnitsyn, 1977a, p. 103]

Fore wing as in Ephialtitidae, but vein 2A complete or nearly complete and reaching base of wing. Jur.

Karataus Rasnitsyn, 1977a, p. 103 [*K. pedalis; OD]. Fore wing with basal segment of RS long, directed toward wing base; crossvein 1r-s absent; crossvein 2r-m closer to 2m-cu than to 2r-s; cell 2rn very long. Antennae with many segments; hind femora very thick. Jur., USSR (Kazakh).—Fig. 261,1. *K. pedalis; wings and body, ×5 (Rasnitsyn, 1977a).

Family BETHYLONYMIDAE Rasnitsyn, 1975

[Bethylonymidae Rasnitsyn, 1975, p. 94]

Fore wing with costal area broad; basal section of vein RS directed slightly basally; antennae filiform, with 8 to 27 segments; legs short; abdomen spindle-shaped, segments nearly alike. Jur.

Bethylonymellus Rasnitsyn, 1975, p. 94 [*B. curtipes; OD]. Fore wing with crossvein 2m-cu present; cell 2a absent. Antennae with 11 to 13 segments; pronotum short. Jur., USSR (Kazakh, Asian RSFSR).—Fig. 261,5. *B. curtipes, Kazakh; body and base of wing, ×10 (Rasnitsyn, 1975).

Arthrogaster Rasnitsyn, 1975, p. 103 [*A. seticornis; OD]. Fore wing with prerostigma broad; basal section of RS short; cell 2a absent. Antennae setaceous, with more than 25 segments; pronotum short. Jur., USSR (Kazakh).—Fig. 261,6. *A. seticornis; wing and body, ×5.5 (Rasnitsyn, 1975).
Fig. 261. Karataidae, Bethylonymidae, Chrysididae, and Scolebythidae (p. 485–487).
Family SCOLEBYTHIDAE Evans, 1963

[Scolebythidae H. E. EVANS, 1963, p. 71]

Small wasps, without marked sexual dimorphism. Labial palpi short, with 4 segments; maxillary palpi with 6 segments; antennae with 13 segments, scape flattened; hind wing without closed cells; no constriction between first and second gastric segments. Cret.—Holo.

Cretabythus EVANS, 1973, p. 171 [*C. sibiricus; OD]. Male with fore wing similar to that of pemphredomines (Sphecidae), but mandibles broad and with 4 teeth; 2 midtibial spurs present. [Family position doubtful.] Cret., USSR (Asian RSFSR).—Fig. 261,2. *C. sibiricus; wings and body, X16 (Evans, 1973).

Family BETHYLIDAE Förster, 1856

[Bethylidae FORSTER, 1856, p. 95]

Antennae with 11 to 13 segments; pronotum extending back to tegulae; gaster with 7 or 8 exposed segments; wings present in some species but reduced or absent in others, especially in females. Larvae parasitic on immature stages of Coleoptera and Lepidoptera. Cret.—Holo.

Bethylus LATREILLE, 1802, p. 315. Holo.
Archaepyris EVANS, 1973, p. 174 [*A. minutus; OD]. Male with antennae simple, with 13 segments; eyes large, protruding; mandibles short, broad, with apical teeth; legs not spinose. Fore wing with RS+M present only as short, basal stub. Cret., USSR (Asian RSFSR).—Fig. 262,1. *A. minutus; fore wing, X35 (Evans, 1973).

Artiepyris KIEFFER, 1913, p. 108. BRUES, 1933. Oligo., Europe (Baltic)—Holo.

Bethylitella COCKERELL, 1917g, p. 365 [*B. cylindrella; OD]. Fore wing as in Mesitius (recent); head elongate; eyes very small; mandibles large, with 5 small teeth on apical margin; antennae with 13 segments, scape stout; petiole short. Mio., Burma.

Bethylopteron BRUES, 1933, p. 121 [*B. ambiguum; OD]. Head large, globose; antennae with 13 segments; compound eyes large, ocelli very large; propodeum very short, truncate posteriorly; petiole lacking; legs stout. [Family position doubtful.] Oligo., Europe (Baltic).

Calyoza WESTWOOD, 1837, p. 56. BRUES, 1923a. Oligo., Europe (Baltic)—Holo.

Celonophamia EVANS, 1973, p. 175 [*C. taimyria; OD]. Similar to Cephalonomia (recent), but female having broader wings with fuller venation. Cret., USSR (Asian RSFSR).—Fig. 262,3. *C. taimyria; wings and body, X25 (Evans, 1973).

Ctenobethylus BRUES, 1939b, p. 261 [*C. succinialis; OD]. Female apterous; thorax nearly normal. Similar to Apenesia, but mandibles with at
least 7 teeth. Oligo., Europe (Baltic). — Fig. 262,2. *C. succinatia; body, X14 (Brues, 1939b).


Palaeobethylus Brues, 1923a, p. 334 [*P. longicollis; OD]. Similar to Palaeobethylus, but head of female much longer and narrower. Oligo., Europe (Baltic).


Avodyrinus Ponomarenko, 1981, p. 139 [*A. canadensis; OD]. Female with well-developed wings; pterostigma narrow; prothorax longer than broad, narrower than mesothorax; propodeum with distinct areolation. Cret., Canada (Alberta).

Cretodyrinus Ponomarenko, 1975c, p. 104 [*C. zherichini; OD]. Similar to Thaumatodryinus but with well-developed parapsidal furrows, short trochanters, and coarse rugosity of propodeum; tibial spur formula 1,1,2. Wings well developed. Cret., USSR (Asian RSFSR). — Fig. 263,4. *C. zherichini; thorax and abdomen, X11 (Ponomarenko, 1975c).


Electrodryinus Ponomarenko, 1975a, p. 126 [*E. areolatus; OD]. Similar to Hesperodryinus (recent), but enlarged claw of fore tarsus unarm ed and pronotum short. Oligo., Europe (Baltic). — Fig. 263,6. *E. areolatus; wing and body, X10 (Ponomarenko, 1975a).


Family BAISSODIDAE

Rasnitsyn, 1975

[BAISSODIDAE Rasnitsyn, 1975, p. 122]

Little-known family, possibly related to the Sphecidae. Female: antennae with 12 segments; mesonotum with prominent sutures; legs without special modifications, grooming structures absent from hind legs; abdomen short, weakly sclerotized; ovipos-
itor short. Fore wing venation relatively primitive; crossvein 1m-cu close to end of vein RS+M. Cret.


Archisphex Evans, 1969, p. 252 [*A. crowsoni; OD]. Similar to Baissodes, but crossvein 1m-cu close to base of cell 2rm; crossvein 2m-cu close to apex of cell 2rm; crossvein 3r sigmoidal. Rasnitsyn, 1975. Cret., England.—Fig. 263, 1. *A. crowsoni; fore wing, X9 (Evans, 1969).

Oryctobaissodes Rasnitsyn, 1975, p. 125 [*O. armatus; OD]. Fore wing with cell 3r truncate apically; femora thick. Cret., USSR (Asian RSFSR).

Trichobaissodes Rasnitsyn, 1975, p. 126 [*T. antennatus; OD]. Similar to Baissodes, but cell
3r rounded apically; femora not thickened. *Cret.*, USSR (Asian RSFSR).

**Family TIPHIIDAE Leach, 1815**

[Tippiidae Leach, 1815, p. 118]

Similar to Mutillidae but second gastral tergite without lateral bands of dense, appressed hairs; thorax and propodeum not fused into a single plate; females often apterous. Larvae ectoparasites of immature insects, usually Coleoptera, Orthoptera, or Hymenoptera. *Oligo.–Holo.*

*Tiphi a Fabricius, 1775, p. 353. Holo.*

*Anthobosca Guérin-Ménéville, 1838, p. 236 [*=Geotipha Cockerell, 1906b, p. 49 (type, *G. foxiana*). Turner, 1912; Cockerell, 1926a; Illies, 1941. Oligo., USA (Colorado)–Holo.*

*Myrm osa Latreille, 1796, p. 118. [*=Geotipha Cockerell, 1906b, p. 49 (type, *G. foxiana*). Turner, 1912; Cockerell, 1926a; Illies, 1941. Oligo., USA (Colorado)–Holo.*


*Protomutilla Bischoff, 1917, p. 142 [*=P. succinialis; OD]. Little-known genus, apparently related to *Myrm osa*. Thoracic dorsum with a single transverse suture; first gastral sternite with a median carina; front femora strongly thickened. All known specimens apterous. Brues, 1933. Oligo., Europe (Baltic).—Fig. 263,3. *P. succinialis; dorsal view, X6.5 (Brues, 1933).*

**Family MUTILLIDAE Latreille, 1802**

[Mutillidae Latreille, 1802b, p. 347] [*=Cretavidae Sharov, 1957a, p. 943]*

Second gastral tergite with lateral bands of dense, appressed hairs; thorax and propodeum usually fused to form a single plate; body with prominent pubescence; females apterous. Larvae mostly ectoparasites of larvae and pupae of other Hymenoptera. *Cret.–Holo.*

*Mutilla Linne, 1802, p. 582. Holo.*

*Cretavus Sharov, 1957a, p. 943 [*=C. sibiricus; OD]. Little-known genus. Fore wing with basal sections of RS and of M forming a straight, oblique line. Rasnitsyn, 1975. *Cret.*, USSR (Asian RSFSR).—Fig. 263,2. *C. sibiricus; fore wing, X6 (Rasnitsyn, 1975).*

**Family FALSIFORMICIDAE**

[Rasnitsyn, 1975]

Female: fore wing venation reduced as in bethiyloids; hind wing without veins, but apparently with jugal lobe. Head prognathous; pronotum very long, with several small humeral protuberances; metapleural gland apparently absent; abdomen apparently shorter than head and thorax combined; gaster shorter than head and thorax combined, second tergite forming a high triangle, resembling a formicid node. Male: head hypognathous; antennae with 13 segments, not elbowed; pronotum relatively short. *Cret.*

*Falsiformica Rasnitsyn, 1975, p. 112 [*=F. cretica; OD]. Fore wing (known in female only) with pterostigma relatively narrow; crossvein *2r-rs* and distal section of RS forming a single, curved vein; basal section of RS about half as long as basal section of M; RS+M obsolescent; crossvein *1m-cu* present. Male with antennae filiform, scape short; maxillary palpi apparently with 6 segments. *Cret.*, USSR (Asian RSFSR).—Fig. 263,5. *F. cretica; a, wing of female, X20; b, thorax and abdomen of female, X19; c, head and thorax of male, X22 (all Rasnitsyn, 1975).*

**Family FORMICIDAE Latreille, 1802**


Antennae distinctly elbowed in females and workers, often less so in males; first gastral segment (and sometimes second) a nodiform or scalelike petiole (and postpetiole) separated from rest of gaster; males and females usually winged, but wings shed by females after nuptial flight; workers apterous. Social insects (ants); nests diverse, usually in ground. [The subfamily Sphecomyrminae is included in the Formicidae as originally proposed by Wilson, Carpenter, and Brown (1967a).] *Cret.–Holo.*

*Formica Linne, 1758, p. 579. Wheeler, 1914; Meunier, 1915b, 1917c; Cockerell, 1920a, 1923c; Carpenter, 1930a; Piton & Theobald, 1935; Theobald, 1937a; Russek, 1981. Eoc., USA (Texas); Oligo., USA (Colorado); Mio., Europe (France), USSR (European RSFSR)–Holo.*

*Agroecomyrmex Wheeler, 1910a, p. 265 [*=Myrmica dubisburgi Mayr, 1868; OD]. Worker and female: similar to those of *Lachnomyrmex* (recent), but funicular of antennae without a 2-segmented club, eyes near posterior corners of head, and tip of gaster directed forward. Wheeler, 1914. Oligo., Europe (Baltic).*

*Ameghinoa Viana & Haedo Rossi, 1957, p. 109 [*=A. piatnitzkyi; OD]. Little-known genus, pos-
sibly related to Myrmeciinae; tibiae apparently without spurs. *Oligo.*/*Mio.*, Argentina.

**Aphaenogaster** Mayr, 1853, p. 107. *Wheeler, 1914; Carpenter, 1930a; Théobald, 1937a. Oligo., Europe (Baltic), USA (Colorado); Mio., Europe (France)—Holotype.

**Archaeopone** Dlussky, 1975, p. 120 [*A. kzylysharica*; OD]. Male: third antennal segment about 5 times as long as second; thorax distinctly segmented. [Family assignment doubtful.] Dlussky, 1983. *Cret.*, USSR (Kazakh).


**Archiponera** Carpenter, 1930a, p. 27 [*A. wheelleri*; OD]. Closely related to *Gnamptogenys*. *Worker: head large, with convex sides; mandibles linear; anterior margin of clypeus with a median incision, posterior margin with large median lobe; ocelli absent; antennae with 12 segments; petiole cuneiform. Wheeler, 1930; Brown, 1958. Oligo., USA (Colorado).—Fig. 264. *A. wheelleri; worker, *X4.6 (Carpenter, 1930a).

**Armania** Dlussky, 1983, p. 67 [*A. robusta*; OD]. Similar to *Sphecomyrma*. Female: petiole large, its width about equal to its length, its posterior part elevated and forming a node. *Cret.*, USSR (Asian RSFSR).


**Asymphylomyrmex** Wheeler, 1914, p. 96 [*A. balticus*; OD]. A dolichoderine genus. *Worker: head suborbicular, slightly flattened anteriorly; thorax short and compact; spurs absent on middle and hind tibiae. Oligo., Europe (Baltic).*

**Brachyponera** Emery, 1901, p. 43. [Generic assignment of fossil doubtful.] Théobald, 1937a. *Oligo., Europe (France)—Holotype.*

**Bradoponera** Mayr, 1868, p. 73 [*B. meieri*; OD]. A ponerine genus, closely related to *Discothrea* (recent). *Worker: antennae with 9 segments; eyes minute. Wheeler, 1914. Oligo., Europe (Baltic).*

**Camponotites** Dlussky, 1981, p. 76 [collective group]. *Little-known species; fore wing lacking cells 2rm and 3rm; cell 2+3r closed. Mio., USSR (European RSFSR).*

**Camponotus** Mayr, 1861, p. 25. Mayr, 1868; Wheeler, 1914; Donisthorpe, 1920; Carpenter, 1930a; Naora, 1933a; Piton & Théobald, 1935; Théobald, 1937a. *Oligo., Europe (Baltic, France), England, USA (Colorado); Mio., Europe (France); Paleoc.–Plio., China (Fushun)—Holotype.*

**Cephalomyrmex** Carpenter, 1930a, p. 37 [*C. rotundatus*; OD]. *Little-known genus, apparently a myrmicine. Female: head exceedingly large; thorax short; gaster small; funiculus of antennae apparently with only 5 or 6 segments; petiole pedunculate; venation unknown. Oligo., USA (Colorado).*


**Cretomyrma** Dlussky, 1975, p. 115 [*C. arnoldii*; OD]. *Worker: similar to that of *Sphecomyrma* but with a short, median epinotal spine and a short sting. Cret., USSR (Asian RSFSR).*

**Dolichoderus** Lund, 1831, p. 130. Mayr, 1868; Cockerell, 1915; Wheeler, 1914; Donisthorpe, 1920; Carpenter, 1930a; Théobald, 1937a. *Oligo., Europe (Baltic, France), England, USA (Colorado)—Holotype.*

**Dolichomymyrma** Dlussky, 1975, p. 121 [*D. longiceps*; OD]. *Little-known genus. Female: head elongate; thorax similar to that of *Sphecomyrma*; petiole short. [Family assignment doubtful.] Dlussky, 1983. Cret., USSR (Kazakh).*

**Drymomyrmex** Wheeler, 1914, p. 135 [*D. fuscipennis*; OD]. *Related to *Aphomomyrmex* (recent), but female with 11-segmented antennae. Théobald, 1937a. Oligo., Europe (Baltic, France).*

**Elaeomyrmex** Carpenter, 1930a, p. 48 [*E. gracilis*; OD]. *Related to *Iridomyrmex*. Female: head much longer than broad, lateral margins nearly straight; mandibles prominent; posterior margin of clypeus with a prominent median prolongation; clypeus striated. Worker: smaller but very similar. *Oligo., USA (Colorado).*

---

**Archiponera**

Fig. 264. Formicidae (p. 491).
Electromyrmex Wheeler, 1910b, p. 167 [*E. klabri; OD]. A myrmicine genus, close to Podomyrma (recent). Worker: mandibles very long, sublinear; antennae with 12 segments; thorax narrower than head; prothorax greatly elongated; petiole slender, cylindrical, with only a faint indication of a node. Wheeler, 1914. Oligo., Europe (Baltic).

Electroponera Wheeler, 1914, p. 34 [*E. dubia; OD]. A ponerine genus, apparently related to Ectatoma (recent). Worker: head subrectangular, with rounded sides, and weakly excised posterior border; antennae with 12 segments; thorax constricted in mesoepinotal region; petiole with a concave anterior face. Oligo., Europe (Baltic).


Eoforrmica Cockerell, 1921e, p. 38 [*E. eocenica; OD; = Leptothorax pingue Scudder, 1877a, p. 742]. Little-known genus of uncertain relationships. Scudder, 1890; Wheeler, 1928; Carpenter, 1930a. Eoc., USA (Colorado, Wyoming, Utah).

Eomyrmex Hong, 1974, p. 138 [*E. quchengziensis; OD]. Worker (subfamily position uncertain): antennae with 13 segments; scape of moderate length; mandibles relatively small, with 3 denticles, the terminal one being longest; petiole slender; gaster with prominent constriction of a node. WHEELER, 1914.

Eulithomyrmex Carpenter, 1935b, p. 91, nom. subst. pro Lithomyrmex Carpenter, 1930a, p. 34, non Clark, 1928 [*Lithomyrmex rugosus Carpenter, 1930a, p. 35; OD]. A myrmicine genus, related to Agroecomyrmex, but all castes with small mandibles and a larger antennal club. Oligo., USA (Colorado).


Glaphyromyrmex Wheeler, 1914, p. 131 [*G. oligocenica; OD]. Close to Formica (recent), but worker with large, flat eyes; subquadrate head; short, thickset thorax; and large, convex pronotum. Theobald, 1937a. Oligo., Europe (Baltic, France).


Iridomyrmex Mayr, 1862, p. 702. Wheeler, 1914; Carpenter, 1930a; Theobald, 1937a. Oligo., Europe (Baltic, France); USA (Colorado)—Holo.


Lasius Fabricius, 1805, p. 415. Wheeler, 1914; Cockerell, 1927b; Pongrácz, 1928; Carpenter, 1930a; Popov, 1933; Piton & Theóbald, 1935; Theobald, 1937a; Zalesky, 1949; Wilson, 1955; Dlussky, 1981. Oligo., Europe (Baltic, France), USA (Colorado); Mio., Europe (France, Croatia), USSR (European RSFSR)—Holo.


Leptomyrmex Emery, 1891, p. 16 [*Leptomyrmex maravignae Emery, 1891, p. 578; OD]. Similar to Leptomyrmex, but cell 3r of fore wing much larger. Mio., Europe (Italy).


Liometopum Mayr, 1861, p. 25. Wheeler, 1914; Pongrácz, 1928; Carpenter, 1930a; Dlussky, 1981. Oligo., Europe (Baltic, USA (Colorado); Mio., Europe (Croatia), USSR (European RSFSR)—Holo.

Lianaeurtes Carpenter, 1930a, p. 38 [*M. mirabilis; OD]. Close to Paraneurites. Worker: eyes large, ocelli present; mandibles triangular, with blunt teeth; antennae slender, with 11 subequal segments; petiole much longer than broad, with a small node. Oligo., USA (Colorado).

Miomyrmex Carpenter, 1930a, p. 51 [*Formica impactus Cockerell, 1927b, p. 165; OD]. Apparently a dolichoderine. Female: antennae inserted close to clypeus, exceedingly short, but 12-segmented; scape not over half length of head; funiculus only a little longer than scape. Oligo., USA (Colorado).


Myrmica Latreille, 1804, p. 179. Wheeler, 1914; Meunier, 1915b. Oligo., Europe (Baltic, Germany)—Holo.

Nothomyrmica Wheeler, 1910b, p. 171 [*Macromischa rudis Mayr, 1868, p. 85; OD]. Related to Tetramorium (recent). Worker: head and thorax coarsely rugose; antennae with 12 segments; middle and hind tibiae without spurs. Oligo., Europe (Baltic).


Oligomyrmex Mayr, 1867, p. 110. Wheeler, 1914; Piton & Theobald, 1935; Theobald, 1937a. Oligo., Europe (Baltic, France); Mio., Europe (France)—Holo.
Hymenoptera—Apocrita

Fig. 265. Formicidae, Pompilidae, Sphecidae, and Uncertain (p. 493–498).


Palaeomyrmex Dlussky, 1975, p. 118 [*P. zherichini; OD]. Apparently related to Sphecomyrma. Male: fore wing with cells 1r+2r, 3r, 2rm, and 1mcu closed; mandibles narrow, without teeth; antennae with 13 segments; scape very short; middle and hind tibiae with 2 spurs. Cret., USSR (Asian RSFSR).—Fig. 265,4. *P. zherichini; male, wing and body, X12 (Dlussky, 1975).

Parameranoplus Wheeler, 1914, p. 69 [*P. primaeus; OD]. Apparently similar to Meranoplus (recent), but worker with much shallower antenal scrobes. Oligo., Europe (Baltic).

Paraneuretus Wheeler, 1914, p. 73 [*P. tormquisitii; OD]. Similar to Aneuretus (recent) but worker much more slender; petiole with peduncle very short and with anterior slope of node more gradual than posterior slope. Oligo., Europe (Baltic).


Petaeomyrmex Carpenter, 1930a, p. 55 [*P. minimus; OD]. Little-known genus, apparently a dolichoderine, possibly close to Forelius (recent). Female small, head quadrate, scape short and thick, petiole very small. Oligo., USA (Colorado).


Pheidole Westwood, 1840, p. 87. Carpenter, 1930a. Oligo. USA (Colorado)—Holotype.

Pityomyrmex Wheeler, 1914, p. 98 [*P. tormquisitii; OD]. Little-known genus, apparently a dolichoderine. Worker: body slender, with very
long legs and antennae; eyes large; mandibles inserted far apart, with numerous denticles; petiole much longer than broad, with a small node; middle and hind tibiae with pectinated spurs. \textit{Oligo.}, Europe (Baltic).

\textit{Plagiolepis} \textsc{mayr}, 1861, p. 26. \textsc{mayr}, 1868; \textsc{wheeler}, 1914. \textit{Oligo.}, Europe (Baltic)--\textit{Holo.}

\textit{Platygryrea} \textsc{roger}, 1863, p. 172. \textsc{wheeler}, 1914; \textsc{théobald}, 1937a. \textit{Oligo.}, Europe (Baltic, France)--\textit{Holo.}

\textit{Pogonomymyx} \textsc{mayr}, 1868, p. 169. \textsc{carpenter}, 1930a. \textit{Oligo.}, USA (Colorado)--\textit{Holo.}

\textit{Ponera} \textsc{latreille}, 1804, p. 179. \textsc{mayr}, 1868; \textsc{emery}, 1891; \textsc{wheeler}, 1914; \textsc{oks}, 1936; \textsc{taylor}, 1964. \textit{Oligo.}, Europe (Baltic); \textit{Mio.}, Europe (Italy); \textit{Pleist.}, Australia (Victoria)--\textit{Holo.}

\textit{Poneropsis} \textsc{heer}, 1867, p. 19 [collective group] (=\textit{Ponerites} \textsc{dlussky}, 1981, p. 67 [collective group]). Little-known species, based mainly on fore wings. Cell 2r + 3r open or closed; cells 2rm and 3rm always closed. [A diverse group of species probably belonging to the subfamily Ponerinae.] \textsc{cocke}, 1915; \textsc{meunier}, 1917c, 1923; \textsc{taylor}, 1964; \textsc{dlussky}, 1981. \textit{Oligo.}, England, Europe (Germany); \textit{Mio.}, USSR (European RSFSR).

\textit{Poneropterus} \textsc{dlussky}, 1983, p. 73 [*\textit{P. sphecoides}; OD]. Male: second antennal segment elongate, third segment nearly 3 times as long as second; posterior part of petiole forming a distinct node. \textit{Creat.}, USSR (Asian RSFSR).

\textit{Prenolepis} \textsc{mayr}, 1861, p. 26. \textsc{wheeler}, 1914. \textit{Oligo.}, Europe (Baltic)--\textit{Holo.}

\textit{Prionomyrmex} \textsc{mayr}, 1868, p. 77 [*\textit{P. longiceps}; OD]. Closely related to \textit{Myrmecia} (Myrmecinae). Mandibles of worker elongate and with a distinct, uniformly denticulate, masticatory border; clypeus triangular, well developed; petiole and gaster resembling those of the Ponerinae. \textsc{wheeler}, 1914; \textsc{taylor}, 1978. \textit{Oligo.}, Europe (Baltic).

\textit{Prodromymyrnomyrmex} \textsc{wheeler}, 1914, p. 112 [*\textit{P. primigenius}; OD]. Related to \textit{Aphomomyrmex} (recent), but antennae with 10 segments; eyes small. \textit{Oligo.}, Europe (Baltic).


\textit{Protaneuretus} \textsc{wheeler}, 1914, p. 71 [*\textit{P. succinensis}; OD]. Related to \textit{Aneuretus} (recent), but worker with less cordate head and with large eyes; antennae and legs much less slender. \textit{Oligo.}, Europe (Baltic).

\textit{Protazteca} \textsc{carpenter}, 1930a, p. 41 [*\textit{P. elongata}; OD]. Related to \textit{Azteca} (recent), but worker with eyes small and more posteriorly situated; node of petiole less inclined. \textit{Oligo.}, USA (Colorado).

\textit{Pseudoarmania} \textsc{dlussky}, 1983, p. 69 [*\textit{P. rasmussen}; OD]. Similar to \textit{Armania}, but petiole small, somewhat broader than long, and not forming a node. \textit{Creat.}, USSR (Asian RSFSR).

\textit{Pseudocamponotus} \textsc{carpenter}, 1930a, p. 22 [*\textit{P. elcoatitus}; OD]. Little-known genus, apparently related to \textit{Camponotus}, but female with eyes and antennal insertions farther forward on head and antennae with 12 segments. \textit{Mio.}, USA (Nevada).

\textit{Pseudolasius} \textsc{emery}, 1887, p. 244. \textsc{wheeler}, 1914. \textit{Oligo.}, Europe (Baltic) --\textit{Holo.}

\textit{Pseudomyrmex} \textsc{lund}, 1831, p. 137. \textsc{carpenter}, 1930a. \textit{Oligo.}, USA (Colorado)--\textit{Holo.}

\textit{Rhopalomyrmex} \textsc{mayr}, 1868, p. 41 [*\textit{R. pygmaeus}; OD]. Similar to \textit{Plagiolepis}, but worker with 10-segmented antennae, the 4 terminal segments forming a club. \textsc{wheeler}, 1914. \textit{Oligo.}, Europe (Baltic).

\textit{Sicilomyrmex} \textsc{wheeler}, 1914, p. 111 [*\textit{Gesomyrmex} corniger \textsc{emery}, 1891, p. 581; OD]. A formicine genus of uncertain affinities; worker with bicorneate head and 2-spined propodeum. \textsc{wheeler}, 1926; \textsc{brown} & \textsc{carpenter}, 1978. \textit{Mio.}, Europe (Italy).

\textit{Solenusis} \textsc{westwood}, 1840, p. 86. \textsc{pogonarcz}, 1928; \textsc{théobald}, 1937a. \textit{Oligo.}, Europe (France); \textit{Mio.}, Europe (Croatia)--\textit{Holo.}

\textit{Sphenocysta} \textsc{wilson} & \textsc{brown} in \textsc{wilson}, \textsc{carpenter}, & \textsc{brown}, 1967a, p. 8 [*\textit{S. freyi}; OD]. Worker: mandibles wasplike, short, narrow, bidentate; antennae 12-segmented; scape relatively short, funiculus long; eyes large, convex, near middle of sides of head; occeli present; distinct sutures between thoracic segments; petiole with a distinct node; gaster without a constriction behind first segment; middle and hind tarsi with 2 spurs; sting excertile. \textsc{taylor}, 1978. \textit{Creat.}, USA (New Jersey). —Fig. 265,7. *S. freyi* worker, ×14 (Wilson, Carpenter, & Brown, 1967b).

\textit{Stenamma} \textsc{westwood}, 1840, p. 83. \textsc{wheeler}, 1914. \textit{Oligo.}, Europe (Baltic)--\textit{Holo.}

\textit{Stigmomyrmex} \textsc{mayr}, 1868, p. 95. \textsc{wheeler}, 1914. \textit{Oligo.}, Europe (Baltic)--\textit{Holo.}

\textit{Stiphromyrmex} \textsc{wheeler}, 1914, p. 67 [*\textit{S. robustus}; OD]. Similar to \textit{Pristomyrmex} (recent), but worker with 12-segmented antennae, terminal 3 segments forming a club; middle and hind tibiae with spurs; mandibles short and convex. \textsc{mayr}, 1868. \textit{Oligo.}, Europe (Baltic).

\textit{Syntaphus} \textsc{donisthorpe}, 1920, p. 84 [*\textit{S. wheeleri}; OD]. Little-known genus. Female: apparently similar to that of \textit{Ectatomma} (recent) but with epinotal spines. \textsc{carpenter} & others, 1937. \textit{Oligo.}, England.

\textit{Tetraponera} \textsc{smith}, 1852, p. 44. \textsc{wheeler}, 1914; \textsc{théobald}, 1937a. \textit{Oligo.}, Europe (Baltic, France)--\textit{Holo.}

\textit{Trachymyrmex} \textsc{forel}, 1893, p. 600. \textsc{baroni}
Hymenoptera—Apocrita


Family EUMENIDAE Leach, 1815

[Eumenidae Leach, 1815, p. 153]

Similar to Vespidae, but tarsal claws bifid and middle tibiae with 1 apical spur. Solitary wasps, mostly fossorial or mud-daubers. Larvae predaceous on larvae of other insects. Eoc.—Holo.


Alastor Lepeletier, 1841, p. 668. [Generic assignment of fossils doubtful.] Scudder, 1890; Meunier, 1915b; Statz, 1936b; Evans, 1966. Eoc., USA (Wyoming); Oligo., Europe (Germany)—Holo.


Eunortonia Carpenter, 1986, p. 576, nom. subst. pro Pseudonortonia Timon-David, 1944b, p. 41, non Soika, 1936 [*Pseudonortonia sepulta Timon-David, 1944b, p. 41; OD]. Similar to Nortonia (recent) but with very different abdominal markings. Oligo., Europe (France).

Euspinula Spinola, 1806, p. 84. Théobald, 1937a; Piton, 1940a. Eoc., Europe (France)—Holo.

Family VESPIDAE Leach, 1815

[Vespidae Leach, 1815, p. 153]

Pronotum extending back to tegulae; antennae with 11 to 13 segments; middle tibiae with 2 apical spurs; tarsal claws simple; mandibles short and broad; fore wing with cell Imcu very long; hind wing with closed cells. Social wasps, with queens, workers, and males; larvae mostly predaceous on other insects. Eoc.—Holo.


Palaeevespa Cockerell, 1906b, p. 54 [*P. baltica; OD]. Little-known genus, apparently related to Vespa but with differences in venational details. [Family assignment doubtful.] Cockerell, 1907c, 1909a, 1911b, 1914f, 1923e; Bequaert, 1930a; Oligo., Europe (Baltic), USA (Colorado).

Polistes Latreille, 1802, p. 363. [Generic assignment of fossils doubtful.] Cockerell, 1914f; Statz, 1936b; Théobald, 1937a; Piton, 1940a. Eoc., Europe (Germany); Oligo., Europe (Germany, France); Mio., Europe (Germany)—Holo.


Family POMPILIDAE Leach, 1815

[Pompilidae Leach, 1815, p. 149]

Pronotum produced back to tegulae, forming a lobe over anterior thoracic spiracle; mesopleuron with an oblique groove; legs long, especially posterior pair; fore wings not longitudinally folded; hind wing with at least 1 closed cell and with a small anal lobe; first segment of gaster not forming a node or scale. Solitary, fossorial wasps; larvae predaceous on spiders. Cret.—Holo.


Anoplus Dufour, 1834, p. 484. Statz, 1936b. Oligo., Europe (Germany)—Holo.

Cryptopelma Panzer, 1806, p. 120. Cockerell, 1906b, 1914d; Rohwer, 1909a; Théobald, 1937a. Oligo., USA (Colorado), Europe (France)—Holo.

Dipogon Fox, 1897, p. 241. Cockerell, 1908e; Rohwer, 1909a. Oligo., USA (Colorado)—Holo.

Pepsis Fabricius, 1805, p. 207. Cockerell, 1941. Oligo., USA (Colorado)—Holo.

Pompilopterus Rasnitsyn, 1975, p. 106 [*P. ciliatus; OD]. Fore wing thickly pubescent, especially in costal area; origin of RS remote from pterostigma; basal section of RS and M aligned to form a slightly curved oblique vein; crossvein 3-r-m apparently present; crossvein 2rs slanted toward wing apex; crossvein lm-cu strongly slanted; cell 3r narrow and long. [Family position doubtful.] Cret., USSR (Asian RSFSR).—Fig. 265,3. [*P. ciliatus; fore wing, X6 (Rasnitsyn, 1975).

Priocnemis Schiöde, 1837, p. 324. Brues, 1926; Statz, 1936b. Oligo., Europe (Germany)—Holo.

Family SPHECIDAE Leach, 1815

[Sphecidae Leach, 1815, p. 148] [=Angarosphecidae Rasnitsyn, 1975, p. 109]

Pronotum not extending as far back as tegulae; males with 13 antennal segments, females with 12; hind wing with an anal lobe and closed cells. Solitary, fossorial wasps; larvae predaceous on various insect larvae and on spiders. Cret.—Holo.
Sphex Linné, 1758, p. 569. Pongrácz, 1928; Zeuner, 1931; Statz, 1936b. Oligo., Europe (Germany); Mio., Europe (Germany, Yugoslavia)—Holo.

Angarosphex Rasnitsyn, 1975, p. 110 [*A. myrmicoperius; OD]. Fore wing with vestiges of crossvein 1r-3rs very short; crossvein 2r-3rs shorter than width of pterostigma; cells 2rm and 3rm elongate. Head quadrangular; pronotum moderately long. Rasnitsyn, 1980b. Cret., USSR (Asian RSFSR).


Chalybion Dahlbom, 1844, p. 21. Hagen, 1858a. Oligo., USA (Colorado)—Holo.

Ectemnus Dahlbom, 1845, p. 389. Meinert, 1912e; Cockerell, 1910a; Bohart & Menke, 1976. Oligo., Europe (Germany), USA (Colorado)—Holo.

Gallosphex Schützer, 1978a, p. 83 [*G. cretaceus; OD]. Apparently an ampulicine. Fore wing with pterostigma very small, triangular; basal section of M slightly longer than basal section of RS; crossvein 2r-3rs very short; crossveins 2r-m and 3r-m well developed; cell 2rm larger than cell 3rm. Cret., Europe (Germany).


Harpactostigma Ashmead, 1899, p. 299. Cockerell, 1922h, 1924a; Evans, 1966; Bohart & Menke, 1976. Oligo., Europe (Germany), USA (Colorado)—Holo.

Larrophanes Handlirsch, 1907, p. 888 [*L. ophthalmicus; OD]. Little-known genus, possibly belonging to the Larrinae. [Family assignment doubtful.] Mio., Europe (Italy).

Lisponema Evans, 1969, p. 255 [*L. singularis; OD]. Similar to Spilomema (recent) but with pterostigma slightly longer and veins 3-rm and 2m-cu absent; tibial spur formula 1,1; 2 legs very slender, smooth. Cret., Canada (Manitoba). —Fig. 265.1. *L. singularis; fore and hind wings, X3 (Evans, 1969).

Mellinus Fabricius, 1790, p. 226. Rohwer, 1908d. Oligo., USA (Colorado)—Holo.

Passaloecus Shuckard, 1837, p. 188. Rohwer, 1909b. Oligo., USA (Colorado)—Holo.

Philanthus Fabricius, 1790, p. 224. Rohwer, 1909c; Théobald, 1937a. Oligo., USA (Colorado), Europe (France)—Holo.


Pison Jurine, 1808, p. 255. Rohwer, 1908a; Cockerell, 1909d. Oligo., USA (Colorado), Europe (Baltic)—Holo.

Pitiroecus Evans, 1973, p. 170 [*P. pauper; OD]. Male similar to Passaloecus. Head broad, with large eyes; antennae short, with 12 segments; mandibles straight, not dentate; tibial spur formula 1,1,2; claws dentate. Cret., USSR (Asian RSFSR).

Propilanthus Cockerell, 1906b, p. 46 [*P. destructus; OD]. Similar to Philoponites, but cells 1r+2r and 1mcu at least twice as long as wide. Oligo., USA (Colorado).


Taimyr sphex Evans, 1973, p. 167 [*T. pristinus; OD]. Male: antennae short, with 13 segments; scape only slightly longer than thick; eyes and oceli large; pronotum with small, rounded posterior lobes nearly reaching tegulae; venation more generalized than in Archisphex (recent). [Family position uncertain, possibly related to Falsiformicidae.] Rasnitsyn, 1980b. Cret., USSR (Asian RSFSR).——Fig. 265.2. *T. pristinus; fore and hind wings, X20 (Evans, 1973).


Family ANDRENIDAE Latreille, 1802

[Andrenidae Latreille, 1802b, p. 369]

Glossa pointed; labial palpi with all segments similar, or first segment elongate and flattened; 2 subantennal sutures below each antennal socket. Solitary bees, nests sometimes colonial. Oligo.—Holo.

Andrena Fabricius, 1775, p. 376. Cockerell, 1906b, 1908n, 1911b, 1914f. Oligo., Europe (Baltic), USA (Colorado); Mio., Europe (Germany)—Holo.

Libellulapis Cockerell, 1906b, p. 42 [*L. antiquorum; OD]. Apparently close to Panurgus (recent), but eyes very prominent. Cockerell, 1909c, 1913b; Zeuner & Manning, 1976. Oligo., USA (Colorado).


Family HALICHTIDAE Ashmead, 1899

[Haliclidae Ashmead, 1899, p. 90]

Labial palpi with 4 equal segments; glossa pointed; mesepisternum with anterior-dorsal
groove; fore wing with basal section of vein M strongly arched and crossvein 2m-cu slightly arched. Mostly solitary, fossorial bees, some social. Oligo.—Holo.

**Family MELLITIDAE** Schenk, 1860

Segments of labial palpi similar and cylindrical; glossa acute, often elongate; dorsal mesepisternal groove absent; fore wing with 2 or 3 submarginal cells. Solitary bees. Oligo.—Holo.

**Family MEGACHILIDAE** Kirby, 1837

Segments of labial palpi similar and cylindrical; glossa acute, often elongate; dorsal mesepisternal groove absent; fore wing with 2 or 3 submarginal cells. Solitary bees. Oligo.—Holo.

**Family ANTHOPHORIDAE** Kirby, 1837

Glossa long; labrum broader than long; clypeus protuberant; fore coxae slightly broader than long; hind tibia with a scopa and 2 apical spurs; pollen basket (corbicula) absent. Solitary bees, nesting in ground. Eoc.—Holo.

**Family APIDAE** Leach, 1815

Similar to Anthophoridae, but workers and most females with a corbicula on hind tibiae; spurs absent (except in Bombicinae). Mostly social bees. Eoc.—Holo.

**Lithanthidium** Cockerell, 1911a, p. 225 [*L. pertriste; OD]. Apparently related to Anthidium. Fore wing with cells 1r and 2rm present; basal part of M strongly arched. Oligo., USA (Colorado)—Holo.

**Anthidium** Cockerell, 1910m, p. 315. Little-known genus, apparently related to Anthophora. Heer, 1867; Zeuner & Manning, 1976. Oligo., Europe (France); Mio., Europe (Germany)—Holo.

**Osmia** Panzer, 1806, p. 230. Heer, 1849; Heyden, 1862; Statz, 1936b; Zeuner & Manning, 1976. Oligo., Europe (Germany); Mio., Europe (Germany)—Holo.
Hexapoda

**Family UNCERTAIN**

The following genera, apparently belonging to the order Hymenoptera, suborder Apocrita, are too poorly known to permit assignment to families.

**Baiusobius** Rasnitsyn, 1975, p. 128 [*B. parvus*; OD]. Fore wing with venation much reduced; no closed cells distal to level of basal sections of RS and M, except for cell 3r; pterostigma elongate. Head large and wide, with small eyes. **Cret.**, USSR (Asian RSFSR).

**Cenomanscelio** Schütler, 1978a, p. 78 [*C. pulcher*; OD]. Little-known genus, based on body; venation unknown. Antennae with 11 segments, apical 5 enlarged and forming a club; lateral ocelli relatively close to compound eyes. [Possibly related to Scelionidae.] **Cret.**, Europe (Germany).

**Cretopone** Dlusovsky, 1975, p. 119 [*C. magna*; OD]. Little-known genus, possibly a formicid. Female: middle and hind tarsi with single spurs; petiole apparently very large. **Cret.**, USSR (Kazakh).

**Cretosphex** Rasnitsyn, 1975, p. 106 [*C. incertus*; OD]. Fore wing with basal sections of RS and M aligned to form straight, oblique line; crossvein 1r-s obsolescent; crossvein 2r-s directed toward wing apex; apex of cell 3r acute; crossvein 1m-cu at base of cell 2r. Pronotum of moderate length, projecting at sides; legs short; femora very short and thick; first segment of hind tarsus not broadened; abdomen long, strongly sclerotized. [Possibly related to the Sphecoidea.] **Rasnitsyn, 1980a, 1980b. Cret.**, USSR (Asian RSFSR).—**Fig. 265,5. *C. incertus*; wings and body,×25 (Rasnitsyn, 1975).

**Curiosivespa** Rasnitsyn, 1975, p. 113 [*C. curiosa*; OD]. Fore wing with RS arising from R at base of pterostigma; pterostigma narrow; apex of cell 3r submarginal; crossvein 1m-cu far basal of cell 2rm. [Possibly related to Masaridae.] **Cret.**, USSR (Kazakh).—**Fig. 265,5. *C. curiosa*; fore wing,×5.5 (Rasnitsyn, 1975).

**Diapriites** Statz, 1938b, p. 104 [*D. insignicornis*; OD]. Little-known genus, possibly a proctotrupoid. Antennae with 12 segments. **Oligo.**, Europe (Germany).

**Isocinus** Kozylov, 1974, p. 145 [*I. baistiric*; OD]. Antennae with at least 15 segments; cell 3r closed; segments of gaster short, transverse. [Possibly related to Pelecinidae.] **Cret.**, USSR (Asian RSFSR).

**Platygasterites** Carpenter, herein [*P. femoralis* Statz, 1938b, p. 106; OD]. Little-known genus; wing venation apparently absent. [The original generic name, Platygasterites, was a nomen nudum (Statz, 1938b).] **Oligo.**, Europe (Germany).
Neoptera—Order Uncertain

Proctotrypites MEUNIER, 1918, p. 145 [*P. rotten­sis; OD]. Little-known genus. Antennae with 11 segments; venation much reduced. Oligo., Europe (Germany).

Scelionites STATZ, 1938b, p. 107 [*S. capitatus; OD]. Little-known genus, possibly a proctotru­poid. Oligo., Europe (Germany).


Suborder UNCERTAIN

The following genera, apparently belonging to the order Hymenoptera, are too poorly known to permit assignment to suborders.

Proapocritus RASNITSYN, 1975, p. 22 [*P. praecur­ror; OD]. Little-known genus, based on fore wing fragment; SC absent; area between R and costal margin narrow; basal section of RS straight and shorter than basal section of M, with slight slope toward wing apex; crossvein 1r-­rs weakly developed; crossvein 2r-­rs situated at center of prerostigma; cell 1mcu long. [Possibly related to Karataviidae, suborder Symphyta.] Jur., USSR (Kirghiz).


Infraclass NEOPTERA

Order UNCERTAIN

The following genera, apparently belonging to the infraclass Neoptera, are too poorly known to permit assignment to orders.

Aleuronympha RIEK, 1974b, p. 272 [*A. bibulla; OD]. Little-known genus, based on small nymph with wing buds. [Originally placed in the Hemiptera (Homoptera, family Permaleruo­di­ae) but probably belonging to the Blattaria. The supposed eyes are cuticular protuberances on pronotum; see Roth, 1982, figs. 16-­20. Also see note under Permaleruroids.] Perm., South Africa.

Aphelonympha RIEK, 1976, p. 365 [*A. minuta­sisima; OD]. Little-known genus, based on complete wings and parts of body. [Type of the family Aphelonymphidae RIEK, 1976.] Perm., USA (Kansas).

Aphryganoneura TILLYARD, 1926e, p. 276 [*A.

anormala; OD]. Little-known genus. [Placed in the Mecoptera by TILLYARD (1926e) and MARTYNOWA (1962e) but considered by HANDLIRSCH (1939) to belong to the Neuroptera.] RIEK, 1953; WILLMANN, 1978. Perm., Australia (New South Wales).

Archipanorpa TILLYARD, 1917a, p. 191 [*A. mag­nifica; OD]. Little-known genus, based on wing fragments. [Type of the family Archipanorpidae TILLYARD, 1917a; assigned by TILLYARD (1917a) to a new order, Protomecoptera.] RIEK, 1953; WILLMANN, 1978. Trias., Australia (Queensland).

Austroidealia RIEK, 1954c, p. 161 [*A. perplexa; OD]. Little-known genus, based on proximal fragment of wing. [Originally placed in the Prot­orthoptera (family Ideliidae.)] Trias., Australia (New South Wales).

Choristosialis TILLYARD, 1932a, p. 19 [*C. enigmat­ica; OD]. Little-known genus, based on wing fragment. [Type of the family Choristosialidae TILLYARD, 1932a. Originally placed by TILLYARD in the Neuroptera, but transferred to the Mecoptera by CARPENTER (1943a); ordinal position considered by WILLMANN (1978) to be uncertain.] Perm., USA (Kansas).

Climaconeura PRUVOST, 1912, p. 327 [*C. remauxi; OD]. Little-known genus, based on fragment of wing. [Type of the family Climaconeuridae HANDLIRSCH, 1919b. Originally placed in the Proto­orthoptera by PRUVOST (1912, 1919); transferred to HANDLIRSCH (1919b, 1922) to the order Mixotermitoidea, by HAUPT (1952) to the Mecoptera, and by SHAROV (1962d) to the Prot­orthoptera (Paraplecoptera.)] WILLMANN, 1978. U. Carb., Europe (France).

Crosphis EVANS, 1971, p. 146 [*C. anomala; OD]. Little-known genus, based on wing. [Placed in the Hemiptera (Aphidoidea) by EVANS (1971) and in the Hemiptera (Coccoidea) by HEIE (1981); transferred to Diptera by KOVALEV (1983).] Trias., Australia (Queensland).


Elmothone CARPENTER, 1976, p. 353 [*E. marty­nova; OD]. Little-known genus, based on incomplete fore wing. [Originally placed in the order Neuroptera.] Perm., USA (Kansas).

Eopanorpella SCHMIDT, 1962, p. 849 [*E. ernsti; OD]. Little-known genus, based on incomplete wing. [Originally placed in the Mecoptera (fam­ily Permochristidae), but assignment to that order has been seriously questioned by HENNIG (1969c) and WILLMANN (1978).] U. Carb., Europe (Germany).

© 2009 University of Kansas Paleontological Institute
Eukuloja Rohdendorf, 1962a, p. 72 [*Kuloja cubitalis Martynov, 1932, p. 5; OD] [=Parakuloja Rohdendorf, 1962a, p. 72 (type, Kuloja pana­rovensa Martynov, 1932, p. 3)]. Little-known genus, based on isolated wings. [Originally placed by Rohdendorf (1962a) in the order Diaphanopteroidea, but transferred to the order Hypoperlida (allied to the Pscoptera) by SINITSHENKOVA (1981b).] Perms., USSR (European RSFSR).

Gelasopteron Carpenter, 1976, p. 372 [*G. gracile; OD]. Little-known genus, based on a very elongate wing. [Type of the family Gelasopteridae Carpenter, 1976.] Perms., USA (Kansas).

Geroneura Matthew, 1889, p. 57 [*G. wilsoni; OD]. Little-known genus. [Originally placed in the order Uncertain; transferred to the new order Mixotermitoidea by HANDLIRSCH (1906a, 1919b).] Pruvost, 1919. U. Carb., Canada (New Brunswick).

Glessaria Koch & Berendt, 1854, p. 117 [*G. rostrata; OD]. Little-known genus. [Originally placed in Thysanura, but considered by HANDLIRSCH (1906b) to be a coleopterous larva.] Oligo., Europe (Baltric).

Hypoperla Martynov, 1928b, p. 57 [*H. elegans; OD]. Little-known genus, based on isolated wings. [Type of the family Hypoperlidae Martynov, 1928b. Included in the Protorthoptera by MARTYNOVA (1962e); transferred to the Protorthoptera-Mecoptera complex by Willmann (1978).] Perms., USSR (Asian RSFSR).


Mesacridites Riek, 1954c, p. 163 [*M. elongata; OD]. Little-known genus, based on wing fragment. [Originally placed in the Hemiptera (Homoptera), family Ignotalidae.] Perms., South Africa.

Metropatorites Keller, 1934, p. 45 [*M. kassenbergensis; OD]. Little-known genus, based on fragment of wing. [Considered by Keller to be closely related to Metropator (Miomoptera, Metropatoridae), but placed by SCHMIDT (1962) and HENNIG (1969c) in incertae sedis at the ordinal level.] Wilmann, 1978. U. Carb., Europe (Germany).


Mixotermes Sterzel, 1881, p. 273 [*M. lagauensis; OD]. Little-known genus. [Originally placed in the existing order Isoptera and considered to be a subgenus of Termes; transferred to the Orthoptera by BRONGNIART (1885a), to the new order Mixotermitoidea by HANDLIRSCH (1906a, 1919b, 1920), and to the extinct order Haplalopteroidea by Pruvost (1919).] U. Carb., Europe (Germany).


Nugonioneura Tillyard, 1937a, p. 92 [*N. problematica; OD]. Little-known genus, based on isolated wings. [Type of the family Nugoni­oneuridae Carpenter, 1976. Originally placed
in the Psocoptera by TILLYARD (1937a); transferred to the Protorthoptera by CARPENTER (1976.) Perm., USA (Kansas).

Ocellia OLTERS, 1907, p. 7 [*O. articulicornis; OD]. Little-known genus. [Originally placed in order Zygentoma, but considered by SILVESTRI (1913a) to be based on an immature specimen of the order Dermaptera.] Oligo., Europe (Baltic).


Palaeomantisca MARTYNOV, 1940, p. 34 [*P. latula; OD]. Little-known genus, based on wing fragment. [Placed in the order Miotreta (family Palaeomantidae) by MARTYNOV (1940) and MARTYNova (1962a); transferred to the new family Palaeomantisicidae by RASNITSYN (1977c). See discussion under the order Miotreta.] Perm., USSR (Asian RSFSR).


Permaphaphus MARTYNOV, 1931c, p. 211 [*P. venosus; OD]. Little-known genus, based on incomplete wing. [Type of the family Permaphaphidae MARTYNOV, 1931c. Placed in the Coleoptera by MARTYNOV (1931c) and by ROHDENDORF and PONOMARENKO (in ROHDENDORF, 1962b); transferred to the order Palearcoleoptera by LAURENTIAUX (1953), and to the order Hypo­ledoidea by RASNITSYN (1980f.)] Zalesky, 1943. Perm., USSR (European RSFSR).

Permembia TILLYARD, 1928f, p. 479 [*P. delicata­ula; OD]. Little-known genus, based on poorly preserved wing. [Type of the family Permembiidae TILLYARD, 1937a. Originally placed by TILLYARD (1928f, 1937a) in the family Delop­teridae, then considered to belong to the order Psocoptera; subsequently transferred with some uncertainty by MARTYNova (1962a) to the Miomoptera. CARPENTER (1976), following study of the type specimen of Permembia, placed the genus in incertae sedis at the ordinal level.] CAR­PENTER, 1935a; RIEK, 1973, 1976a. Perm., USA (Kansas).

Permomerope TILLYARD, 1926e, p. 275 [*P. austral­ia; OD]. Little-known genus. [Type of the family Permomeropidae HANDLIRSCH, 1937. Originally placed in the Miotreta by TILLYARD (1926e); transferred to the Trichoptera by SUKATSHEVA (1976); and assigned by WILLMANN (1978) to the Miotreta-Trichoptera complex, order Unknown.] Perm., Australia (New South Wales); USSR (Kazakh).

Permonia KUKALOVÁ, 1963a, p. 43 [*P. permoni­ki; OD]. Little-known genus, based on several isolated wings. [Originally placed in the order Miotreta (family Permembiidae); transferred to the order Uncertain by CARPENTER (1976).] Perm., Europe (Czechoslovakia).


Permosialis MARTYNOV, 1928b, p. 94 [*P. pauci­nervis; OD]. Little-known genus. [Type of the family Permosilidae MARTYNOV (1928b). Placed in the order Neuroptera by MARTYNOV (1928b) and MARTYNova (1962a), but transferred to the Miotreta by RASNITSYN (1977c, and in ROHDENDORF & RASNITSYN, 1980.)] Perm., USSR (European RSFSR).

Platychorista TILLYARD, 1926c, p. 154 [*P. venosa; OD] [=Protomerope TILLYARD, 1926c, p. 157 (type, P. permiana)]. Little-known genus. [Type of the family Protomeropidae TILLYARD, 1926c. Placed in the Mecoptera by TILLYARD (1926c), MARTYNova (1962e), and HENNIG (1969c). Transferred to the Trichoptera by SUKATSHEVA (1976) and to the Trichoptera-Lepidoptera complex by WILLMANN (1978).] CARPENTER, 1930b. Perm., USA (Kansas).

Protoblattinopsis LAURENTIAUX, 1953, p. 447 [*P. stubbilefieldi; OD]. Little-known genus, based on
proximal fragment of wing. [Type of the family Protoblatinopsidae Laurentiaux, 1966. Originally placed in the order Protorthoptera, but transferred by Rasnitsyn (1980f) to the order Blattinopsidea, considered to be related to the order Caloneuroidea.] Kukalová, 1959b; Carpenter, 1966. *U. Carb.*, England.


**Sphalmatoblattina** Handlirsch, 1906b, p. 392 (*Blattina latineris* Heer, 1864, p. 288; OD). Little-known genus, based on isolated wing. [Considered by Handlirsch to be orthopteroid, but placed by Haupt (1952) in the Mecoptera; assigned by Willmann (1978) to the category of order Uncertain.] Perm., Europe (Germany).

**Stereochorista** Tillyard, 1919a, p. 196 (*S. frustrata*; OD). Little-known genus, based on wing fragment. [Placed in the Mecoptera by Tillyard (1919a) and Laurentiaux (1953), but considered by Riek (1956) and Willmann (1978) to be more closely related to the Trichoptera.] Trias., Australia (Queensland).

**Sycopteron** Bolton, 1917a, p. 6 (*S. symmetricum*; OD). Little-known genus. [Originally placed in the Mecoptera by Bolton (1917a), but transferred to the Psocoptera by Tillyard (1918f) and to the Caloneuroidea by Lameere (1917c).] Handlirsch, 1922; Willmann, 1978. *U. Carb.*, Europe (France).

**Tillyardites** Handlirsch, 1937, p. 110 (*Archipanorpa bairdai* Tillyard, 1922a, p. 284; OD). Little-known genus, based on wing fragment. [Type of the family Tillyarditidae Handlirsch, 1937. Placed in the Mecoptera by Tillyard (1922a, 1926e), Martynova (1948a), and Handlirsch (1937); ordinal position considered uncertain by Carpenter (1954a) and Willmann (1978).] Perm., Australia (New South Wales).

**Trachopteryx** Carpenter, 1976, p. 356 (*T. martynovi*; OD). Little-known genus, based on well-preserved wing. [Type of the family Trachopterygidae Carpenter, 1976.] Perm., USA (Kansas).


### Subclass Pterygota

#### Order Uncertain

The following genera, apparently belonging to the subclass Pterygota, are too poorly known to permit assignment to orders.

**Merlebachia** Waterlot, 1934, p. 162 (*M. grimaldi*; OD). Little-known genus, based on wing fragment. [Originally placed in the Megasecoptera (family Megynopteridae), but transferred to order Uncertain by Kukalová-Peck (1975).] *U. Carb.*, Europe (France).

**Pteronepionites** Bolton, 1921, p. 27 [collective group]. Includes nymphal wings that cannot be assigned to a known genus of Pterygota. *U. Carb.*, England.
Class INSECTA
Subclass UNCERTAIN

The genus described below, apparently belonging to the class Insecta, is too poorly known to permit assignment to subclasses.

Xiphenax Cockerell, 1931a, p. 96 [*X. jurassicus; OD]. Little-known genus, based on a very poorly preserved specimen; possibly an immature insect, but not assigned to any order. Jur., USA (New Mexico).

Superclass HEXAPODA
Class UNCERTAIN

The genus described below, apparently belonging to the superclass Hexapoda, is too poorly known to allow assignment to classes.

Onycholepisma Pierce, 1951, p. 45 [*O. arizonae; OD]. Little-known genus, based on poorly preserved specimen. [Originally placed in the class Insecta (Zygentoma), but transferred to the class Diplura by Pacht (1967).] Tert., USA (Arizona).
THE SUPERCLASS HEXAPODA

OUTLINE OF CLASSIFICATION

The following outline of the superclass Hexapoda summarizes taxonomic relationships, geologic occurrence, and numbers of recognized genera of fossils in each superfamilial group.

Superclass Hexapoda, 5188, Dev.–Holo.
Class and Order Collembola, 14, Dev.–Holo.
Class and Order Protura, 0, Holo.
Class and Order Diplura, 4, Paleoc.–Holo.
Class Insecta, 5169, U. Carb.–Holo.
  Subclass Apterygota, 8, U. Carb.–Holo.
    Order Archaeognatha, 5, U. Carb.–Holo.
    Order Zygentoma, 3, Oligo.–Holo.
  Subclass Pterygota, 5160, U. Carb.–Holo.
  Infraclass Palaeoptera, 502, U. Carb.–Holo.
    Order Ephemeroptera, 59, U. Carb.–Holo.
    Order Palaedictyoptera, 125, U. Carb.–Perm.
    Order Megasecoptera, 34, U. Carb.–Perm.
    Order Diaphanopterodea, 20, U. Carb.–Perm.
    Order Protodonata, 13, U. Carb.–Perm.
    Order Odonata, 204, Perm.–Holo.
  Infraclass Palaeoptera, Order Uncertain, 47
  Infraclass Neoptera, 4656, U. Carb.–Holo.
  Division Exopterygota, 1393, U. Carb.–Holo.
    Order Perlaria, 28, Perm.–Holo.
    Order Protorthoptera, 236, U. Carb.–Trias.
    Order Blattaria, see p. 134, U. Carb.–Holo.
    Order Isoptera, 33, Cret.–Holo.
    Order Manteodea, 4, Oligo.–Holo.
    Order Protelytroptera, 29, Perm.–Cret.
    Order Dermaptera, 16, Jur.–Holo.
    Order Orthoptera, 166, U. Carb.–Holo.
    Order Grylloblattodea, 0, Holo.
    Order Titanoptera, 8, Trias.
  Order Phasmatoidea, 13, Trias.–Holo.
  Order Embioptera, 5, Oligo.–Holo.
  Order Pscoptera, 58, Perm.–Holo.
  Order Zoraptera, 0, Holo.
  Order Mallophaga, 0, Holo.
  Order Anoplura, 0, Holo.
  Order Caloneurodea, 16, U. Carb.–Perm.
  Order Mimoptera, 10, U. Carb.–Perm.
  Order Thysanoptera, 43, Perm.–Holo.
  Order Hemiptera, 728, Perm.–Holo.
Division Endopterygota, 3203, Perm.–Holo.
  Order Coleoptera, 1397, Perm.–Holo.
  Order Strepsiptera, 4, Oligo.–Holo.
  Order Neuroptera, 125, Perm.–Holo.
  Order Glosselytrodea, 11, Perm.–Jur.
  Order Trichoptera, 112, Perm.–Holo.
  Order Lepidoptera, 111, Cret.–Holo.
  Order Mecoptera, 82, Perm.–Holo.
  Order Siphonaptera, 1, Oligo.–Holo.
  Order Diptera, 708, Trias.–Holo.
  Order Hymenoptera, 652, Trias.–Holo.
  Infraclass Neoptera, Order Uncertain, 60
  Subclass Pterygota, Order Uncertain, 2
  Infraclass Neoptera, Order Uncertain, 1
  Superclass Hexapoda, Class Uncertain, 1

RANGES OF TAXA

The stratigraphic distribution of classes, orders, and families of Hexapoda recognized in this volume of the Treatise is shown graphically in Table 2, which follows (compiled by Jack D. Keim, computer software by Kenneth C. Hood and David W. Foster).
### Table 2. Stratigraphic Distribution of the Hexapoda.

<table>
<thead>
<tr>
<th>Subclass</th>
<th>Infraclass</th>
<th>Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexapoda</td>
<td>Insecta</td>
<td>Apterygota</td>
</tr>
<tr>
<td>Collembola</td>
<td>Archaeognatha</td>
<td>Monura</td>
</tr>
<tr>
<td>Collembola</td>
<td>Machiloida</td>
<td>Zygentoma</td>
</tr>
<tr>
<td>Collembola</td>
<td>Lepidoditiida</td>
<td>Lepismatida</td>
</tr>
<tr>
<td>Collembola</td>
<td>Pterygota</td>
<td>Neoptera</td>
</tr>
<tr>
<td>Collembola</td>
<td>Caloneuroidea</td>
<td>Protorthoptera</td>
</tr>
<tr>
<td>Collembola</td>
<td>Mioptoptera</td>
<td>Metroporidae</td>
</tr>
<tr>
<td>Collembola</td>
<td>Protorthoptera</td>
<td>Archaemiopterida</td>
</tr>
<tr>
<td>Collembola</td>
<td>Protorthoptera</td>
<td>Palaeomanteida</td>
</tr>
<tr>
<td>Collembola</td>
<td>Protorthoptera</td>
<td>Adeloneurida</td>
</tr>
<tr>
<td>Collembola</td>
<td>Protorthoptera</td>
<td>Aenigmatodida</td>
</tr>
<tr>
<td>Collembola</td>
<td>Protorthoptera</td>
<td>Anthracoptilida</td>
</tr>
<tr>
<td>Collembola</td>
<td>Protorthoptera</td>
<td>Anthracothremmida</td>
</tr>
<tr>
<td>Collembola</td>
<td>Protorthoptera</td>
<td>Apithanida</td>
</tr>
</tbody>
</table>

**EXPLANATION OF TABLE 2**

- **SUPERCLASS**
- **CLASS**
- **SUBCLASS**
- **INFRACLASS**
- **DIVISION**
- **ORDER**
- **SUBORDER**
- **Family**
<table>
<thead>
<tr>
<th>Family</th>
<th>Lower Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Palaeocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pleistocene</th>
<th>Holocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cacurgidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cnemidolestidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epideigmatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eucaenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geraridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hadentomidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hapalopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herbstialidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herdinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homalophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischnoneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narkemidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omaliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pachytylopsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paoliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protokollariidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protophasmatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanioideridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stenoneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stenoneuritidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stygnidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thoronysididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blattinopsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idelidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strephocladidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archiprobnidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atactophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camptoneuritidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chelopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cymbopsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epimastacidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euremiscidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euryptilonidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Havlatiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heteroptilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homoeodictyidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jabloniidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemmatophoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liomopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Megakhosaridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permotermopsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probnidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. (Continued.)

<table>
<thead>
<tr>
<th>Family</th>
<th>Devonian</th>
<th>Lower Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Paleocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Pleistocene</th>
<th>Holocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protembiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psoropteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skalicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stegopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stereopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strephoneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sylvaphlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tillyardembilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tococladidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLATTARIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORTHOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENSIFERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oedischiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anelcanidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kamiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permelcanidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permoraphidiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tcholmanvissiida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tettavidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proparagryllacrididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triassomanteidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bintoniellidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitimiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grylliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hagliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elcandiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phasmomimidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gryllacrididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tettigoniiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gryllotalpidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAELIFERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locustavidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locustopectidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eumastacidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetrigidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tridactyliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promastacidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acrididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNCERTAIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROTELYTROPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period</td>
<td>Permian</td>
<td>Triassic</td>
<td>Jurassic</td>
<td>Cretaceous</td>
<td>Paleocene</td>
<td>Eocene</td>
<td>Oligocene</td>
<td>Miocene</td>
<td>Pliocene</td>
<td>Holocene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>-----------</td>
<td>--------</td>
<td>----------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Devonian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apachelytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archelytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermelytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elytroneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labidelytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Megelytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permophiliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planelytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protelytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocoleidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Umenocoleidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THYSANOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEREBRANTIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permothripidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aeolothripidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterothripidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merothripidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thripidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TUBULIFERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phlaeothripidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNCERTAIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liassothripidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEMIPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HETEROPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progonocimicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archegocimicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cuneocoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesopentacoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pachymeridiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scaphocoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shurabellidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alydidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belostomatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coreidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corixidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lygaeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nabidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naucoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notonecidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saldidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower Carboniferous</td>
<td>Pennsylvanian</td>
<td>Permian</td>
<td>Triassic</td>
<td>Jurassic</td>
<td>Cretaceous</td>
<td>Palaeocene</td>
<td>Eocene</td>
<td>Oligocene</td>
<td>Miocene</td>
<td>Pliocene</td>
<td>Pleistocene</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------</td>
<td>---------------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>------------</td>
<td>---------</td>
<td>-----------</td>
<td>---------</td>
<td>----------</td>
<td>------------</td>
</tr>
<tr>
<td>Enicocoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesotrophidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cydnidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gerridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrometridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pentatomomidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scutelleridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthocoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aradidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berytidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nepidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyrrhocoridida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduviidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tingidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vellicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dipsocoridida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enicocephalidida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOMOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archescytinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boreoscytidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cicadopsyllidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coleoscytidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mundidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pincombeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eoscartereilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ipsviciidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pereborridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prosbolidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scytinopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palaeontinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protopsyllidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cixiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cicadoprosbolidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunstanidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hylicellidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesogereonidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysmorphoptilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procercopidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biturritidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cecropidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cicadellidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eurymelidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Membracidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexapoda</td>
<td>Table 2. (Continued.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ricaniiidae</strong></td>
<td><strong>Archijassidae</strong></td>
<td><strong>Fulgoridae</strong></td>
<td><strong>Genaphididae</strong></td>
<td><strong>Issidae</strong></td>
<td><strong>Lophopidae</strong></td>
<td><strong>Psyllidae</strong></td>
<td><strong>Canadaphididae</strong></td>
<td><strong>Oviparasiphidae</strong></td>
<td><strong>Palaeoaphididae</strong></td>
<td><strong>Shaposhnikoviiidae</strong></td>
<td><strong>Tajmyraphididae</strong></td>
<td><strong>Elektraphididae</strong></td>
</tr>
</tbody>
</table>
## Stratigraphic Distribution

<table>
<thead>
<tr>
<th>Period</th>
<th>Platyperlidae</th>
<th>Siberioperlidae</th>
<th>Notonemouridae</th>
<th>Perlidae</th>
<th>Leuctridae</th>
<th>Perlodidae</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Carboniferous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Carboniferous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triassic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jurassic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cretaceous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cenozoic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TITANOPTERA

<table>
<thead>
<tr>
<th>Gigatitanidae</th>
<th>Mesotitanidae</th>
<th>Paratitanidae</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PHASMATODEA

<table>
<thead>
<tr>
<th>Aeroplanaeidae</th>
<th>Prochresmodidae</th>
<th>Xiphopteridae</th>
<th>Aerophasmatidae</th>
<th>Cretophasmatidae</th>
<th>Phasmatidae</th>
<th>Phyllidae</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DERMAPTERA

<table>
<thead>
<tr>
<th>Archidermaptera</th>
<th>Protodiplatyidae</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2. (Continued.)

<table>
<thead>
<tr>
<th>Hexapoda</th>
<th>Lower Carboniferous</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Palaeocene</th>
<th>Eocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Pleistocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORFICULINA</td>
<td>Pygidicranidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labiduridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forficulidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNCERTAIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hodotermitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kalotermitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mastotermitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rhinotermitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Termitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMBIOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Embididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Notoligotomidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MANTEODEA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chaeteessidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manteidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANOPLURA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRYLLOBLATTODEA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MALLOPHAGA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZORAPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENDOPTERYGOTA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GLOSSELYTRODEA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Archoglossopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glosselytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jurinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Permoberothidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uskatelytridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLEOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCHOSTEMATA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asiocoleidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oborocoleidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Permocopedidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rhombocoleidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tshekardocoleidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Talacycupidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Catiniidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schizophoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tricoledae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ademosynidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cupedidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labradorocoleidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2. (Continued.)

<table>
<thead>
<tr>
<th>Family</th>
<th>Devonian</th>
<th>Lower Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Paleocene</th>
<th>Eocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Holocene</th>
<th>Pleistocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micromalthidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADEPHAGA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triaplidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carabidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lladylidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parahygrobiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coptoclavidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dytiscidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyrinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POLYPHAGA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buprestidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chrysomelidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curculionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenebrionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eobelidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Praelateridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alleculidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dascillidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elateridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrophilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mordellidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitidulidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oedemeridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scarabaeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silphiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staphylinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trogossitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acanthocnemididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attelabidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerophylidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cryptophagidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lathridiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melandryidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scraptidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anobiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerambycidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dryopidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eucnemidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circaelidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrapatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthribidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artematopidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© 2009 University of Kansas Paleontological Institute
<table>
<thead>
<tr>
<th>Hexapoda</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table 2. (Continued.)</strong></td>
</tr>
<tr>
<td><strong>Bostrychidae</strong></td>
</tr>
<tr>
<td><strong>Cantharidae</strong></td>
</tr>
<tr>
<td><strong>Cleridae</strong></td>
</tr>
<tr>
<td><strong>Colydiidae</strong></td>
</tr>
<tr>
<td><strong>Cucujidae</strong></td>
</tr>
<tr>
<td><strong>Dermestidae</strong></td>
</tr>
<tr>
<td><strong>Endomychidae</strong></td>
</tr>
<tr>
<td><strong>Helodidae</strong></td>
</tr>
<tr>
<td><strong>Lucanidae</strong></td>
</tr>
<tr>
<td><strong>Lycidae</strong></td>
</tr>
<tr>
<td><strong>Melyridae</strong></td>
</tr>
<tr>
<td><strong>Mycetophagidae</strong></td>
</tr>
<tr>
<td><strong>Passalidae</strong></td>
</tr>
<tr>
<td><strong>Pselaphidae</strong></td>
</tr>
<tr>
<td><strong>Ptiliidae</strong></td>
</tr>
<tr>
<td><strong>Ptilodactylidae</strong></td>
</tr>
<tr>
<td><strong>Pyrochroidae</strong></td>
</tr>
<tr>
<td><strong>Pythidae</strong></td>
</tr>
<tr>
<td><strong>Salpingidae</strong></td>
</tr>
<tr>
<td><strong>Scydmaenidae</strong></td>
</tr>
<tr>
<td><strong>Trixagidae</strong></td>
</tr>
<tr>
<td><strong>UNCERTAIN</strong></td>
</tr>
<tr>
<td><strong>Uncertain</strong></td>
</tr>
<tr>
<td><strong>MECOPTERA</strong></td>
</tr>
<tr>
<td><strong>Agetopanorpidae</strong></td>
</tr>
<tr>
<td><strong>Choristopsycheidae</strong></td>
</tr>
<tr>
<td><strong>Cyclopteridae</strong></td>
</tr>
<tr>
<td><strong>Cycloristidae</strong></td>
</tr>
<tr>
<td><strong>Kaltanidae</strong></td>
</tr>
<tr>
<td><strong>Lithopanorpidae</strong></td>
</tr>
<tr>
<td><strong>Permocentropidae</strong></td>
</tr>
<tr>
<td><strong>Permopanorpidae</strong></td>
</tr>
<tr>
<td><strong>Permotipulidae</strong></td>
</tr>
<tr>
<td><strong>Pseudopolycentropidae</strong></td>
</tr>
<tr>
<td><strong>BiUacidae</strong></td>
</tr>
<tr>
<td>Lower Carboniferous</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Choristidae</td>
</tr>
<tr>
<td>Eomeropidae</td>
</tr>
<tr>
<td>Panorpidae</td>
</tr>
<tr>
<td>Panorpodidae</td>
</tr>
<tr>
<td>Dinopanorpidae</td>
</tr>
<tr>
<td>Uncertain</td>
</tr>
<tr>
<td>NEUROPTERA</td>
</tr>
<tr>
<td>RAPHIDIODEA</td>
</tr>
<tr>
<td>Sojanoraphidiiida</td>
</tr>
<tr>
<td>Baissopteridae</td>
</tr>
<tr>
<td>Mesoraphidiiida</td>
</tr>
<tr>
<td>Alloraphidiiida</td>
</tr>
<tr>
<td>Inocelliiida</td>
</tr>
<tr>
<td>Raphidiiida</td>
</tr>
<tr>
<td>Uncertain</td>
</tr>
<tr>
<td>PLANIPENNIA</td>
</tr>
<tr>
<td>Palaemerobiiidae</td>
</tr>
<tr>
<td>Permithonidae</td>
</tr>
<tr>
<td>Sialidopsidae</td>
</tr>
<tr>
<td>Archeosmylidae</td>
</tr>
<tr>
<td>Mesoberothidae</td>
</tr>
<tr>
<td>Osmylopsychopidae</td>
</tr>
<tr>
<td>Nymphitidae</td>
</tr>
<tr>
<td>Psychopsidae</td>
</tr>
<tr>
<td>Brongniartellidae</td>
</tr>
<tr>
<td>Kalligrammatidae</td>
</tr>
<tr>
<td>Mesochrysopidae</td>
</tr>
<tr>
<td>Mesopolystoechotidae</td>
</tr>
<tr>
<td>Osmylitidae</td>
</tr>
<tr>
<td>Prohemerobiidae</td>
</tr>
<tr>
<td>Solenoptilidae</td>
</tr>
<tr>
<td>Coniopterygidae</td>
</tr>
<tr>
<td>Nymphitidae</td>
</tr>
<tr>
<td>Berothidae</td>
</tr>
<tr>
<td>Mantispidae</td>
</tr>
<tr>
<td>Osmylidae</td>
</tr>
<tr>
<td>Hemerobiidae</td>
</tr>
<tr>
<td>Ascalaphidae</td>
</tr>
<tr>
<td>Chrysopidae</td>
</tr>
<tr>
<td>Myrmecoontidae</td>
</tr>
<tr>
<td>Nemopteridae</td>
</tr>
<tr>
<td>Sisyridae</td>
</tr>
<tr>
<td>Uncertain</td>
</tr>
<tr>
<td>SIALODEA</td>
</tr>
</tbody>
</table>
### Table 2. (Continued.)

<table>
<thead>
<tr>
<th>Order</th>
<th>Devonian</th>
<th>Lower Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Paleocene</th>
<th>Eocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Holocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corydalidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRICHOPTERA</td>
<td>Microptysmatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cladocoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prorhychophiliida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysooneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liassophiliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Necrotauliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prosepididontidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electralbertidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taymyrelectronidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrobiosidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leptoceridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philopotamidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polycentropodidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhyacophilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limnophilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phryganeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beraeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brachycentridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calamoceratidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glossosomatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goeridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopsychidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydropsychidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydroptilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lepidostomatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molannidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odontoceridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychomyidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stenopsychidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCHIDIPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dictyodipteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyspolyneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperpolyneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEMATOCERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architendipedidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diplopolyneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epolyneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Musidorumimidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oligophrynidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© 2009 University of Kansas Paleontological Institute
Table 2. (Continued.)

<table>
<thead>
<tr>
<th>Family</th>
<th>Lower Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Palaeocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Pleistocene</th>
<th>Holocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palaeopleciidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phragmoligoneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plecidictyidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protoblogastridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protoligoneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhaetomyiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tipulodictyidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architipulidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleciomimidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protendipedidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protobibionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protoplecidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocatopsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sinemididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanyderophryneida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tipulopleciidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anisopidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bibionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cecidomyiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceratopogonidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chironomidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychodidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mycetophilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tipulidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blepharoceridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scleridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dixidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scatopsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simulidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanyderidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BRACHYCERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archisargidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© 2009 University of Kansas Paleontological Institute
**Table 2. (Continued.)**

<table>
<thead>
<tr>
<th>Devonian</th>
<th>Lower Carboniferous</th>
<th>Upper Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Paleocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Pleistocene</th>
<th>Holocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order</td>
<td>Devonian</td>
<td>Lower Carboniferous</td>
<td>Upper Carboniferous</td>
<td>Permian</td>
<td>Triassic</td>
<td>Jurassic</td>
<td>Cretaceous</td>
<td>Paleocene</td>
<td>Eocene</td>
<td>Oligocene</td>
<td>Miocene</td>
<td>Pliocene</td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
<td>---------------------</td>
<td>---------------------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>-----------</td>
<td>--------</td>
<td>-----------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>Heleomyzidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hippoboscidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lauxaniidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lonchaeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Megamerinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micropezidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milichiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mydidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurochaetidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opomyzidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otiiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pallopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periscelididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piophilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipunculidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudopomyzidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richardillidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scatophagidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scomyzidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sepsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therevidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xyomyidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xylophagidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tephritidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gasterophilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HYMENOPTERA**

**SYMPHYTA**

- Xyelidae
- Gigasiricidae
- Karatavitidae
- Parapamphiliidae
- Paroryssidae
- Sepulcidae
- Xyelydidae
- Xyelyridae
- Praesiricidae
- Xyelotomidae
- Pseudosiricidae
- Anaxyelidae
- Cephidae
<table>
<thead>
<tr>
<th>Order</th>
<th>Devonian</th>
<th>Lower Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Palaeocene</th>
<th>Eocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Pleistocene</th>
<th>Holocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pamphilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siricidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cimbicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenthradinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ectrotomidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blastocotomidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diprionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APOCRITA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anomopterellida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bethylonymidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ephyllitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jurapriidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karataidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesoserphidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Praeaulacidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heloridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Megalyridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baissodidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cretevanilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falsiformicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ichneumonomimidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maimetsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Praeichneumonida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serphitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stigmaphronidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aulacidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bethylidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braconidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chrysidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cynipidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dryinidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formicidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ichneumonidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Megaspliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutillidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mymaridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pompilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scelionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scolebythidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphecidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetracampidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichogrammatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Name</td>
<td>Lower Carboniferous</td>
<td>Permian</td>
<td>Triassic</td>
<td>Jurassic</td>
<td>Cretaceous</td>
<td>Paleocene</td>
<td>Eocene</td>
<td>Miocene</td>
<td>Pliocene</td>
<td>Pleistocene</td>
<td>Holocene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>-----------</td>
<td>--------</td>
<td>---------</td>
<td>----------</td>
<td>-------------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trigonidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthophoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eumenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vespidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pelcinopteraida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agaonidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andrenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chalcididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diaprididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encyrtidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eulophidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eurytomidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaniidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halictidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibaliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Megachilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melittidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proctotrupidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pteromalidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stephanidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiphidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torymidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain LEPIDOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZEUGLOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micropterygidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DITRYSIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copromorphidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geometridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lycaenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nymphalidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyralidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tineidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Papilionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyrididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protopterygidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cossidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ctenuchidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elachistidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hesperiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Libytheidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Devonian</td>
<td>Lower Carboniferous</td>
<td>Permian</td>
<td>Triassic</td>
<td>Jurassic</td>
<td>Cretaceous</td>
<td>Paleocene</td>
<td>Oligocene</td>
<td>Miocene</td>
<td>Pliocene</td>
<td>Pleistocene</td>
<td>Holocene</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>----------</td>
<td>---------------------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>-----------</td>
<td>-----------</td>
<td>---------</td>
<td>----------</td>
<td>-------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Oecophoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pieridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symmocidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tortricidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zygaenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DACNONYPHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eriocraniidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MONOTRYSIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incurvariidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNCERTAIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIPHONAPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hystrichopsyllidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STREPSIPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mengeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elenchidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myrmecolacidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PALAEOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIAPHANOPTEROIDEA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diaphanopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parabrodiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prochoropteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhaphidiopsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthenohymenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biamnohymenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elmoidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martynoviidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parelmoidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEGASECOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anchineuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspidothoracidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brodiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brodiopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corydaloididae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foririidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischnoptilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mischopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphecopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vorkutiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alectoneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ancopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arcloneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Devonian</td>
<td>Lower Carboniferous</td>
<td>Permian</td>
<td>Triassic</td>
<td>Jurassic</td>
<td>Cretaceous</td>
<td>Palaeocene</td>
<td>Oligocene</td>
<td>Miocene</td>
<td>Pliocene</td>
<td>Pleistocene</td>
<td>Holocene</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>----------</td>
<td>---------------------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>------------</td>
<td>-----------</td>
<td>---------</td>
<td>----------</td>
<td>-------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Aspidohymenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bardohymenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caulopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engisopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hanidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moravohymenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protohymenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scytohymenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PALAEODICTYOPTERA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archaemegaptilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breyeridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eubleptidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fouqueidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphiptilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homolopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithomanteidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lycocercidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mecynostomatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Megaptilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychroptilidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syntonopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tchirkovaeida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calvertiellidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dictyoneuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eugereonidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spillapteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diathemidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elmoboriidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permothemistidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PROTODONATA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meganeuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paralogidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EPHEMEROPTERA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triplosobidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jamiliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mithodotidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oboriphielidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palingeniopsidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protereismatidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aenigmephemeridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesepheridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2. (Continued.)

<table>
<thead>
<tr>
<th>Family</th>
<th>Lower Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Palaeocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Pleistocene</th>
<th>Holocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epeoromimidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexagenitidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behningiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ephemerellidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leptophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palingenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siphlonuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ametropodidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ephemeridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heptagenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neoephemeridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polymitarcidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baetidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ODONATA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PROTANISOPTERA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ditaxineuridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permaeschnidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ARCHIZYGOPTERA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permagoniidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permepellagidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permolestidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kennedyidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batkenidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protomyrmeleonidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRIADOPHLEBIOMORPHA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triadophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triadotypidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xamenophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zygophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ANISOZYGOPTERA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triassolestidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archithemistidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asiopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euthemistidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liassophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oreopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progonophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tarsophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turanothemistidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stratigraphic Distribution</td>
<td>Table 2. (Continued.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Devonian</th>
<th>Lower Carboniferous</th>
<th>Permian</th>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
<th>Paleocene</th>
<th>Eocene</th>
<th>Oligocene</th>
<th>Miocene</th>
<th>Pliocene</th>
<th>Pleistocene</th>
<th>Holocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karatawiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANISOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aktassiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liassogomphidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aeschniidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aeshnidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gomphidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petaluridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemeroscopidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corduliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Libellulidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZYGOPTERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steleopteridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amphipterygidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calopterygidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euphaeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Megapodagrionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudolestidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coenagrionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lestidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNCERTAIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stenophlebiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIPLURA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIPLURA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campodeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROTURA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROTURA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© 2009 University of Kansas Paleontological Institute
GLOSSARY OF ENTOMOLOGICAL TERMS

The editors of this volume of the Treatise have suggested that a glossary of entomological terms might be useful to readers who are not entomologists. I have accordingly included here a glossary of somewhat more than a hundred commonly used terms. If a more extensive glossary is needed, I recommend one of the following:


Some of these terms have multiple definitions that are specific to the order in which they are used. For such terms, I indicate the name of the order in parentheses at the end of the definition.

alate: possessing wings.
alula: the basal membraneous portion of the wing.
anal crossing: where the anal veins branch posteriorly from vein CUA to vein A.
anal veins: longitudinal wing veins, posterior to vein CUP.
antenodals: crossoveins on the costal margin of wings between C and SC from the base of the wing to the nodus (Odonata).
archedictyon: a primitive network of small wing veins.
arculus: the short, fused bases of RS+MA (Odonata).
areola postica: an open cell between the branches of CUA (Psocoptera).
arolium: a terminal pad between claws.
calipтерes: pair of basal lobes on wings, proximal to alula (Diptera).
cerci: paired appendages of the 11th abdominal segment.
costal area: the parts of the wing immediately behind the costal margin.
costal brace: a short crossevein extending from the costa at wing base to subcosta.
costal break: an area of the costa that is weak or lacking, the costa appearing to be broken (Diptera).
costal expansion: an area of unusual width in the costal margin, usually in the basal third of the fore wing.
costal fracture: a short transverse line of weakness in a fore wing, often separating the cuneus from the remainder of the corium (Hemiptera).
costa: the basal segment of the insect leg.
costal cavity: the area of space of the costa that articulates to the thorax proper.
terminidia: comblike structures on the body or appendages of insects.
cubitus: one of the main venational systems of the insect wings, herein treated as composed of CUA (convex) and CUP (concave).
cuneus: an area of the corium, separated from the rest of the corium by a small break in the costa (Hemiptera).
cursorial: legs adapted for running.
discoidal cell: any of three cells (1mcu, 3mcu, 2cua) near the middle of the fore wings (Hymenoptera).
discoidal vein: the part of vein CUA beyond its separation from vein M.
claval suture: a suture of the fore wing, between the clavus and the corium (Hemiptera).
clavus: the posterior, triangular area of the fore wing. (Hemiptera).
clypeus: the area of the head between the frons and the labium.
collophore: a ventral tube that projects from the first abdominal segment (Collembola).
corbulica: a concave area on the posterior tibia, used to hold collected pollen (Hymenoptera).
corium: a flexible membrane between segments of appendages and between body segments; or differentiated parts of the fore wing (Hemiptera).
costa: the most anterior of the longitudinal veins of insect wings, typically extending along costal margin.
claval suture: a suture of the fore wing, between the clavus and the corium (Hemiptera).
costal area: the parts of the wing immediately behind the costal margin.
costal brace: a short crossevein extending from the costa at wing base to subcosta.
costal break: an area of the costa that is weak or lacking, the costa appearing to be broken (Diptera).
costal expansion: an area of unusual width in the costal margin, usually in the basal third of the fore wing.
costal fracture: a short transverse line of weakness in a fore wing, often separating the cuneus from the remainder of the corium (Hemiptera).
coa: the basal segment of the insect leg.
costal cavity: the area of space of the costa that articulates to the thorax proper.
terminidia: comblike structures on the body or appendages of insects.
cubitus: one of the main venational systems of the insect wings, herein treated as composed of CUA (convex) and CUP (concave).
cuneus: an area of the corium, separated from the rest of the corium by a small break in the costa (Hemiptera).
cursorial: legs adapted for running.
discoidal cell: any of three cells (1mcu, 3mcu, 2cua) near the middle of the fore wings (Hymenoptera).
discoidal vein: the part of vein CUA beyond its separation from vein M.
ecotognathous mouthparts: exposed mouthparts, characteristic of all members of the class Insecta.
etognathous mouthparts: a facial integument covering all mouthparts, characteristic of the non-insect members of the Hexapoda.
elytron: a leathery fore wing, commonly used as a covering for the hind wing at rest (mostly Coleoptera).
embolium: several differentiated, submarginal parts of the corium in fore wing (Hemiptera).
endopterygotes: insects having complete metamorphosis.
exarate pupa: a pupa with free appendages, not united with the body.
exopterygotes: insects with incomplete metamorphosis, the immature stages resembling the adults.
femoralary organs: sound-producing structures, the hind legs being rubbed against the tegmina.
flagellum: the distal part of the antenna, beyond the pedicel.
forceps: pincers at the end of the abdomen.
frons: an unpaired sclerite of the insect head between the epicranial sutures and bearing the median ocellus.
furcula: a forked process on the fourth abdominal segment, used for jumping (Collembola).
galea: the outer lobe of the maxilla, usually segmented.
gaster: the rounded and posterior part of the abdomen, excluding the propodeum.
genal area: the area of the head on each side, below the eye.
gonopophyses: appendages surrounding the gonopore (external opening of the reproductive duct).
gonostyles: a pair of slender processes arising ventrally from the end of the abdomen, functioning as claspers in males.
gressorial: having legs adapted for walking.
halteres: modified and reduced hind wings, functioning as sense organs (Diptera).
hemelytra: the anterior wing with the basal part thickened and the distal part membranous.
humeral suture: a thoracic suture extending from near the base of the fore wing to the middle coxa.
hypandrium: the ninth abdominal segment of males.
hypognathous: head vertical, the mouth being ventral.
tercalary veins: supplementary veins inserted between the usual wing veins.
labella: a pair of lobes near end of the proboscis.
labial palpi: the segmented appendages of the labium.
labrum: the upper lip of the insect mouth, just below the clypeus.
laciniae: inner lobes of the maxillae.
mandibles: the anterior jaws of insects.
maxillae: the second pair of jaws of insects.
maxillary palpi: the secondary appendages of the maxillae.
media (M): one of the major venational systems of insect wings, herein treated as composed of MA (convex) and MP (concave).
mesoscutellum: the scutellum of the mesothorax.
mesothorax: the second thoracic segment.
metathorax: the third thoracic segment.
microtrichia: cuticular hairs on a hairy membrane.
moniliform: segments that are beaded, like a necklace, as in antennae.
neopterus: pertaining to insects of the infraclass Neoptera, i.e., those that possess wings that can be folded back along the body at rest.
nodal line: a transverse line separating basal half of fore wing from distal half (Hemiptera).
nodus: a stout crossvein near middle of costal margin of wing, joining costa, subcosta, and radius.
nygamata: spots on insect wings presumed to be associated with sense cells.
oblongum: a closed cell in a hind wing, formed by crossveins connecting M and CUA (Coleoptera).
ocelli: the simple eyes of insects, usually occurring singly.
ometadia: the usual elements of the compound eyes.
ootheca: a cluster of insect eggs, enclosed in secretions.
opisthognathus: the mouthparts of insects arranged in a posterior position.
oviduct: the organ in female insects used for depositing eggs.
palaeopterus: pertaining to insects of the infra-class Palaeoptera, i.e., those which are unable to fold their wings back over the body at rest.
pedicel: the second segment of the antenna.
petiole: a stalk or stem, usually connecting the abdomen to the thorax (Hymenoptera).
posterior cubitus: see cubitus.
posterior media: see media.
posterior notal process: a posterior lobe of a wing-bearing plate of the meso- and metathorax.
postnodals: a series of crossveins along the front margin of wings distal to the nodus.
precostal area: area between the costa and the front margin of wing.
pretarsus: the terminal segment of the insect leg, usually consisting of a pair of claws.
prognathous: the head of an insect in horizontal position, the jaws projecting anteriorly.
propleura: the sides of the prothorax of pterygote insects.
propodeum: the apparent posterior part of the thorax although it is usually the first abdominal segment fused with the thorax (Hymenoptera).
prosternum: the sternum of the prothorax.
prothorax: the first segment of the thorax.
proventriculus: the posterior portion of the foregut of insects.
pteralia: small plates or sclerites at wing bases.
pterostigma: a pigmented spot on the anterior margin of fore and hind wings near the apex.
pterothorax: the wing-bearing parts of the thorax, the meso- and metathorax, which are fused in some insects.
puparium: a stiff case derived from the skin of the last nymphal instar in which the pupal stage is formed.
quadrilaterial cell: an unusual form of a discoidal cell, undivided in both fore and hind wings (Odonata).

radius: one of the major venational systems of insect wings, herein treated as composed of radius (convex) and radial sector (concave).

radial sector: see radius.

rostrum: the extended portion of the head, bearing the mouthparts.

saltatorial: insects with legs modified for jumping, usually refers to the hind pair.

scape: the basal segment of the antenna.

sclerite: a hard, bodywall plate, bounded by membranes or sutures.

scopa: a thick hair covering on the hind tibiae of adults, primarily used for carrying pollen.

scutellum: a sclerite of a thoracic notum.

sensilla: sense organs, formed of the cuticular sense cells.

stridulatory organs: structures used to produce sounds, usually by scraping or rasping.

subcosta: a major longitudinal vein (concave) in the wing, next to the costa.

subquadrilateral cell: a conspicuous cell in the cubital area of a wing, just before the quadrilateral cell (or q cell) (Odonata).

suctorial: mouthparts adapted for sucking.

sutural margin: a conspicuous submarginal ridge nearly parallel with the hind margin of an elytron, formed by distal portions of the main veins.

tarsus: the segment of an insect leg beyond the tibia.

tegmen: a leathery fore wing.

tibia: the fourth segment of the insect leg.

trochanter: the second segment of an insect leg, between the coxa and the femur.

tubular probosis: extended beak-like mouthparts.

urugomphi: paired cercus-like processes on last segment of some larvae (Coleoptera).

vena dividens: weakly formed CUP in fore wing, usually visible as a conspicuous depression in the wing.