Class **Trilobita** Walch, 1771[1] [2]

Order **Eodiscida** Kobayashi, 1939[3] (6 families)

Family **Calodiscidae** Kobayashi, 1943 (6 genera, 55 species)
Family **Eodiscidae** Raymond, 1913 (10 genera, 131 species)
Family **Hebediscidae** Kobayashi, 1944 (8 genera, 66 species)
Family **Tsunyidiscidae** Zhang, 1980 (1 genus, 50 species)
Family **Weymouthiidae** Kobayashi, 1943 (20 genera, 69 species)
Family **Yukoniidae** Zhang, 1980 (7 genera, 19 species)

Order **Redlichiida** Richter, 1932 (2 suborders)

Suborder **Olenellina** Walcott, 1890[4] (2 superfamilies)

Superfamily **Olenelloidea** Walcott, 1890 (2 families)
Family **Olenellidae** Walcott, 1890 (22 genera, 87 species)
Family **Holmiidae** Hupé, 1953 (15 genera, 56 species)

Superfamily **Fallotaspidoidea** Hupé, 1953 (5 families)
Family **Archaeaspididae** Repina, 1979 (6 genera, 13 species)
Family **Fallotaspididae** Hupé, 1953 (11 genera, 30 species)
Family **Judomiidae** Repina, 1979 (4 genera, 20 species)
Family **Neltneriidae** Hupé, 1953 (2 genera, 4 species)
Family **Nevadiidae** Hupé, 1953 (9 genera, 23 species)

Suborder **Redlichiina** Richter, 1932[5] (4 superfamilies)

Superfamily **Ellipsocephaloidea** Matthew, 1887 (6 families)
Family **Agraulidae** Raymond, 1913 (35 genera, 123 species)
Family **Bigotinidae** Hupé, 1953 (10 genera, 31 species)
Family **Ellipsocephalidae** Matthew, 1887[6] (72 genera, 313 species)
Family **Estaingiidae** Öpik, 1975 (20 genera, 77 species)
Family **Palaeolenidae** Hupé, 1953 (17 genera, 85 species)
Family **Yunnanocephalidae** Hupé, 1953 (4 genera, 19 species)

Superfamily **Emuelloidea** Pocock, 1970 (1 family)
Family **Emuellidae** Pocock, 1970 (4 genera, 7 species)

Superfamily **Paradoxidoidea** Hawle & Corda, 1847 (3 families)
Family **Centropleuridae** Angelin, 1854 (5 genera, 27 species)
Family **Paradoxididae** Hawle & Corda, 1847 (13 genera, 95 species)
Family **Xystriduridae** Whitehouse, 1939 (2 genera, 29 species)

Superfamily **Redlichioidea** Poulsen, 1927 (12 families)
Family **Abadiellidae** Hupé, 1953 (7 genera, 34 species)
Family **Chengkouaspididae** Zhang & Lin, 1980 (9 genera, 21 species)
Family **Dolerolenidae** Kobayashi, 1951 (4 genera, 12 species)

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1. **BY** Jonathan M. Adrain (for full address, see **Contributor name and address** after **Literature cited**). The title of this contribution should be cited as "Class Trilobita Walch, 1771. *In*: Zhang, Z.-Q. (Ed.) Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness". The class includes 12 orders, 165 families, 3,725 genera and 19,606 species.
2. The currently accepted classification of trilobites is as outlined by Fortey (1997, 2001). Higher trilobite phylogeny remains essentially unresolved, despite some significant analyses of parts of the problem (e.g., Fortey & Chatterton 1988; Fortey 1990). Cambrian trilobites are mostly grouped in orders widely considered polyphyletic and/or paraphyletic. Monophyly of predominantly post-Cambrian orders is more generally agreed upon, but their relationships to each other, and to their Cambrian sister taxa, are all but unknown. The classification used herein is modified from that of Fortey (1997) in several ways. Agnostoid arthropods are excluded from Trilobita. Burlingiidae is excluded from Trilobita. Aulacopleurida and Olenida are listed as new ordinal concepts. Some families are classified differently (in several cases following Jell & Adrain [2003]). Many more families are regarded as Order Uncertain, rather than assigning them to a polyphyletic Order Ptychopariida. Despite these differences, the scheme used here owes much to the work of Fortey. The use of subgenera in trilobite work is often extremely subjective and rarely are they diagnosed or treated differently than genera. All valid genus-group names are dealt with as genera in this tabulation. I am grateful for comments by G.D. Edgecombe and S.R. Westrop.
3. Eodiscides have often been considered a paraphyletic group which includes the agnostoids within its structure, and the classification of Fortey (1997) recognized an Order Agnostida with a paraphyletic Suborder Eodiscina and a monophyletic Suborder Agnostina. Agnostoids are not regarded as ingroup Trilobita herein, and Eodiscida is considered monophyletic.
4. Olenellina is widely considered paraphyletic.
5. Redlichiina is widely considered paraphyletic. Several authors (e.g., Repina 1990; Geyer 1996; Jell 2003) have argued that it is polyphyletic, with multiple separate origins in Olenellina. This view has been countered by, e.g., Paterson & Edgecombe (2006), whose parsimony analysis supports a single origin.
6. Includes Protolenidae.

Family **Gigantopygidae** Harrington, 1959 (6 genera, 23 species)
Family **Kueichowiidae** Lu, 1965 (2 genera, 6 species)
Family **Mayiellidae** Zhang, 1966 (3 genera, 14 species)
Family **Menneraspididae** Pokrovskaâ, 1959 (1 genus, 3 species)
Family **Metadoxididae** Whitehouse, 1939 (9 genera, 19 species)
Family **Redlichiidae** Poulsen, 1927 (40 genera, 309 species)
Family **Redlichinidae** Zhang & Lin, 1980 (7 genera, 30 species)
Family **Saukiandidae** Hupé, 1953 (15 genera, 34 species)
Family **Yinitidae** Hupé, 1953 (12 genera, 47 species)

Order **Corynexochida** Kobayashi, 1935 (3 suborders)

Suborder **Corynexochina** Kobayashi, 1935 (9 families)
Family **Chengkouiidae** Zhu, 1980 (8 genera, 39 species)
Family **Corynexochidae** Angelin, 1854 (17 genera, 82 species)
Family **Dinesidae** Lermontova, 1940 (24 genera, 84 species)
Family **Dolichometopidae** Walcott, 1916 (55 genera, 265 species)
Family **Dorypygidae** Kobayashi, 1935 (39 genera, 408 species)
Family **Edelsteinaspididae** Hupé, 1953 (15 genera, 41 species)
Family **Jakutidae** Suvorova, 1959 (16 genera, 51 species)
Family **Oryctocephalidae** Beecher, 1897[7] (39 genera, 176 species)
Family **Zacanthoididae** Swinnerton, 1915 (26 genera, 114 species)

Suborder **Illaenina** Jaanusson, 1959[8] (4 families)
Family **Illaenidae** Hawle & Corda, 1847 (26 genera, 281 species)
Family **Panderiidae** Bruton, 1968 (4 genera, 26 species)
Family **Styginidae** Vogdes, 1890[9] (106 genera, 606 species)
Family **Tsinaniidae** Kobayashi, 1935 (10 genera, 47 species)

Suborder **Leiostegiina** Bradley, 1925 (4 families)
Family **Illaenuridae** Vogdes, 1890[10] (14 genera, 35 species)
Family **Kaolishaniidae** Kobayashi, 1955 (27 genera, 72 species)
Family **Leiostegiidae** Bradley, 1925 [11] (79 genera, 350 species)
Family **Shirakiellidae** Hupé, 1953 (5 genera, 12 species)

Order **Lichida** Moore, 1959[12] (2 families)
Family **Lichakephalidae** Tripp, 1957 (14 genera, 33 species)
Family **Lichidae** Hawle & Corda, 1847 (49 genera, 398 species)

Order **Odontopleurida** Whittington, 1959[13] (1 family)
Family **Odontopleuridae** Burmeister, 1843 (47 genera, 447 species)

Order **Phacopida** Salter, 1864[14] (3 suborders)

Suborder **Phacopina** Struve, 1959 (3 subfamilies)

Superfamily **Acastoidea** Delo, 1935[15] (2 families)

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7. Includes Cheiruroididae.
8. The monophyly of Illaenina is uncertain, as Styginidae may have a sister taxon among taxa grouped within Leiostegiina. A relationship of Illaenina to Cambrian corynexochines is possible, but to this point weakly supported.
9. Styginidae is here regarded as incorporating the more derived taxa often separated as a Family Scutelluidae. Holloway (2007) has argued for restriction of Styginidae to mostly effaced Ordovician taxa, but his treatment was not phylogenetic and the family as thus restricted is almost certainly paraphyletic. Phillipsinellidae has generally been regarded as a separate family but it seems likely also to be ingroup Styginidae.
10. Fortey (1997, p. 299) listed Lecanopygidae, including Illaenuridae. I agree the families are synonyms, but Illaenuridae is the senior name. Fortey (1997, p. 300) listed Lecanopygidae a second time, assigned to Order Proetida.
11. Includes Pagodiidae**.**
12. Lichids have often (e.g., Thomas & Holloway 1988; Fortey 1997)) been considered closely related to odontopleurids. There is little clear evidence for this, save for broadly similar larval morphologies. I prefer to recognize separate, unambiguously monophyletic orders.
13. Fortey (1997, 2001) has advocated a relationship between the Cambrian dameselloideans and odontopleurids, but as yet little detailed evidence has been marshalled in support of this view.
14. There is general agreement that Phacopina and Cheirurina are phylogenetically related, but more question as to the relationship of Calymenina. The most compelling putative synapomorphies uniting the order involve the larval body plan, in particular the ventrolateral fringe of spines developed around the protocephalon in late protaspid stages (Chatterton *et al*. 1990). On this basis I include Calymenina within Phacopida but regard the question as open.
15. Follows an unpublished draft for revision of the Treatise on Invertebrate Paleontology kindly shared by G.D. Edgecombe.

Family **Acastidae** Delo, 1935[16] (76 genera, 394 species)
Family **Calmoniidae** Delo, 1935 (41 genera, 93 species)
Superfamily **Dalmanitoidea** Vogdes, 1890 (1 family)
Family **Dalmanitidae** Vogdes, 1890 (59 genera, 329 species)
Superfamily **Phacopoidea** Hawle & Corda, 1847 (2 families)
Family **Phacopidae** Hawle & Corda, 1847 (68 genera, 463 species)
Family **Pterygometopidae** Reed, 1905 (36 genera, 202 species)
Superfamily **Uncertain** (2 families)
Family **Diaphanometopidae** Jaanusson, 1959 (3 genera, 3 species)
Family **Prosopiscidae** Fortey & Shergold, 1984 (1 genus, 11 species)
Suborder **Cheirurina** Harrington & Leanza, 1957 (3 families)
Family **Cheiruridae** Hawle & Corda, 1847[17] (104 genera, 654 species)
Family **Encrinuridae** Angelin, 1854[18] (58 genera, 448 species)
Family **Pliomeridae** Raymond, 1913[19] (41 genera, 177 species)
Suborder **Calymenina** Swinnerton, 1915 (5 families)
Family **Bathycheilidae** Přibyl, 1953 (4 genera, 8 species)
Family **Bavarillidae** Sdzuy, 1957 (2 genera, 5 species)
Family **Calymenidae** Burmeister, 1843 (33 genera, 316 species)
Family **Homalonotidae** Chapman, 1890 (22 genera, 171 species)
Family **Pharostomatidae** Hupé, 1953[20] (7 genera, 47 species)
Order **Proetida** Fortey & Owens, 1975[21] (2 families)
Family **Proetidae** Salter, 1864[22] (309 genera, 1,927 species)
Family **Tropidocoryphidae** Přibyl, 1946 (74 genera, 510 species)
Order **Aulacopleurida** nov.[23] (15 families)
Family **Alokistocaridae** Resser, 1939 (41 genera, 183 species)
Family **Aulacopleuridae** Angelin, 1854 (19 genera, 268 species)
Family **Bathyuridae** Walcott, 1886 (49 genera, 229 species)
Family **Brachymetopidae** Prantl and Přibyl, 1951 (17 genera, 126 species)
Family **Crepicephalidae** Kobayashi, 1935[24] (14 genera, 93 species)
Family **Dimeropygidae** Hupé, 1953 (17 genera, 86 species)
Family **Ehmaniellidae** Sundberg, 1994[25] (9 genera, 106 species)
Family **Holotrachelidae** Warburg, 1925[26] (2 genera, 5 species)
Family **Hystricuridae** Hupé, 1953 (29 genera, 48 species)
Family **Marjumiidae** Kobayashi, 1935[27] (20 genera, 137 species)
Family **Rorringtoniidae** Owens, 1990 (7 genera, 32 species)
Family **Scharyiidae** Osmólska, 1957 (4 genera, 41 species)
Family **Solenopleuridae** Angelin, 1854 (82 genera, 326 species)
Family **Telephinidae** Marek, 1952[28] (9 genera, 129 species)

16. Includes the Ordovician "kloucekiines" but these are probably basal sister taxa of the remainder of the superfamily.
17. Includes Pilekiidae.
18. Includes Staurocephalidae.
19. Includes Hammatocnemidae.
20. May be ingroup Calymenidae.
21. Knowledge of the developmental progam of proetids and tropidocoryphids (e.g., Chatterton 1971; Edgecombe *et al*. 1997) has revealed a fundamentally different larval life history than that known for all of the other groups considered Proetida by Fortey & Owens (1975). Proetoideans have two known larval stages, with the first a non-adultlike, tiny, globular form, whereas the other groups (where known) have a series of adultlike larvae typically featuring paired spines or tubercles (absent from proetoideans). I consider that two well supported clades are involved, but that their sister group relationship is not clearly supported. Hence I recognize them as separate orders.
22. Includes Phillipsiidae. Distinction between Proetidae and Tropidocoryphidae dates from ideas developed by Owens (1973).
23. This order includes trilobites with several stages of flattened, adult-like larvae (where known) with a pattern of primary paired tubercles on the dorsal exoskeleton through ontogeny (and sometimes retained in the holaspid).
24. May be be ingroup Marjumiidae.
25. May be ingroup Marjumiidae.
26. May be ingroup Bathyuridae**.**
27. Includes Coosellidae**.**
28. Includes Opipeuteridae.

Family **Tricrepicephalidae** Palmer, 1955[29] (3 genera, 60 species)

Order **Asaphida** Salter, 1864[30] (3 superfamilies)

Superfamily **Asaphoidea** Burmeister, 1843 (2 families)

Family **Asaphidae** Burmeister, 1843 (156 genera, 850 species)

Family **Ceratopygidae** Linnarsson, 1869 (29 genera, 263 species)

Superfamily **Cyclopygoidea** Raymond, 1925 (3 families)

Family **Cyclopygidae** Raymond, 1925[31] (24 genera, 160 species)

Family **Nileidae** Angelin, 1854 (28 genera, 161 species)

Family **Taihungshaniidae** Sun, 1931 (6 genera, 41 species)

Superfamily **Trinucleoidea** Hawle & Corda, 1847 (5 families)

Family **Alsataspididae** Turner, 1940[32] (31 genera, 108 species)

Family **Dionididae** Gürich, 1907 (9 genera, 43 species)

Family **Liostracinidae** Raymond, 1937 (5 genera, 17 species)

Family **Raphiophoridae** Angelin, 1854 (38 genera, 251 species)

Family **Trinucleidae** Hawle & Corda, 1847 (50 genera, 225 species)

Order **Olenida** nov. (11 families)[33]

Family **Andrarinidae** Raymond, 1937 (3 genera, 18 species)

Family **Aphelaspididae** Palmer, 1960 (28 genera, 140 species)

Family **Asaphiscidae** Raymond, 1924[34] (22 genera, 134 species)

Family **Cedariidae** Raymond, 1937 (8 genera, 49 species)

Family **Dokimokephalidae** Kobayashi, 1935 (56 genera, 200 species)

Family **Eulomidae** Kobayashi, 1935 (34 genera, 156 species)

Family **Idahoiidae** Lochman, 1956 (18 genera, 60 species)

Family **Loganellidae** Rasetti, 1959 (4 genera, 18 species)

Family **Olenidae** Burmeister, 1843 (68 genera, 408 species)

Family **Parabolinoididae** Lochman, 1956 (14 genera, 66 species)

Family **Pterocephaliidae** Kobayashi, 1935 (40 genera, 112 species)

Family **Remopleurididae** Hawle and Corda, 1847[35] (68 genera, 398 species)

Order **Harpida** Whittington, 1959 (1 family)

Family **Harpetidae** Hawle & Corda, 1847[36] (19 genera, 168 species)

Order **Uncertain**[37] (58 families)

Family **Acrocephalitidae** Hupé, 1953 (18 genera, 42 species)

Family **Aldonaiidae** Hupé, 1953 (10 genera, 23 species)

Family **Amgaspididae** Černyševa, 1960 (5 genera, 20 species)

Family **Anomocarellidae** Hupé, 1955 (16 genera, 78 species)

Family **Anomocaridae** Poulsen, 1927 (51 genera, 155 species)

Family **Antagmidae** Hupé, 1953 (25 genera, 105 species)

Family **Atopidae** Hupé, 1953 (4 genera, 14 species)

Family **Auritamidae** Öpik, 1967 (1 genus, 5 species)

29. May be ingroup Marjumiidae.
30. Fortey & Chatterton (1988) argued for an expanded Asaphida, supported mainly by the putative synapomorphies of an asaphoid protaspid type and a ventral median cephalic suture. Many of the taxa they grouped appear to form a major, well supported clade. Several families are reassigned to the new Order Olenida herein, and the affinities of several others are regarded as uncertain and they are not assigned to an order.
31. Includes Bohemillidae.
32. Includes Orometopidae, Hapalopleuridae, Jegorovaiidae.
33. This order includes all trilobites with a highly specialized cephalic border structure, often reflected dorsally by the presence of pits in the anterior border furrow. The detailed evidence supporting the taxon will be presented elsewhere. It is likely that several of these traditionally recognized families will prove part of the same clade and they may be subject to synonymy.
34. Includes Emmrichellidae.
35. Includes Richardsonellidae (and Kainellidae).
36. Includes Entomaspididae.
37. Many of these families have previously been grouped in an Order Ptychopariida (sometimes recognized as a suborder). There has been a general narrative that such a group is a plesiomorphic grade from which other groups have been derived (e.g., Fortey 1997, pp. 295–297), but any genuine cohesion, even as a paraphyletic group, has never been demonstrated, and recognizing such a taxon obscures the unsettling reality of just how little we understand about trilobite phylogenetic history. The monophyly of many of these families is either in doubt or has never been addressed. Many of the species they contain are poorly known. The phylogenetic relationships within or between the families have rarely if ever been addressed. Collecting them in an "order" may perhaps be a comfort, but it serves no scientific purpose.

Family **Avoninidae** Lochman, 1936 (2 genera, 2 species)
Family **Bolaspididae** Howell, 1959 (5 genera, 17 species)
Family **Catillicephalidae** Raymond, 1938 (27 genera, 136 species)
Family **Changshaniidae** Kobayashi, 1935 (13 genera, 42 species)
Family **Cheilocephalidae** Shaw, 1956 (9 genera, 52 species)
Family **Conocoryphidae** Angelin, 1854 (9 genera, 113 species)
Family **Damesellidae** Kobayashi, 1935[38] (30 genera, 176 species)
Family **Diceratocephalidae** Lu, 1954 (7 genera, 22 species)
Family **Dikelocephalidae** Miller, 1889[39] (41 genera, 223 species)
Family **Ellipsocephaloididae** Hupé, 1955 (1 genus, 5 species)
Family **Elviniidae** Kobayashi, 1935 (28 genera, 94 species)
Family **Eurekiidae** Hupé, 1953 (11 genera, 32 species)
Family **Harpididae** Whittington, 1950 (13 genera, 45 species)
Family **Holocephalinidae** Hupé, 1953 (5 genera, 24 species)
Family **Hungaiidae** Raymond, 1924[40] (15 genera, 94 species)
Family **Ignotogregatidae** Zhang & Jell, 1987 (1 genus, 1 species)
Family **Inouyiidae** Zhang, 1963 (12 genera, 38 species)
Family **Isocolidae** Angelin, 1854 (10 genera, 20 species)
Family **Ityophoridae** Warburg, 1925 (2 genera, 2 species)
Family **Jamrogiidae** Bentley, Jago & Cooper, 2009 (2 genera, 3 species)
Family **Kingstoniidae** Kobayashi, 1933 (16 genera, 85 species)
Family **Lisaniidae** Zhang, 1963 (14 genera, 97 species)
Family **Llanoaspididae** Lochman, 1944 (13 genera, 42 species)
Family **Lonchocephalidae** Hupé, 1953 (29 genera, 88 species)
Family **Lorenzellidae** Zhang, 1963 (13 genera, 40 species)
Family **Mapaniidae** Zhang, 1963 (8 genera, 16 species)
Family **Menomoniidae** Walcott, 1916 (14 genera, 51 species)
Family **Missisquoiidae** Hupé, 1953 (6 genera, 27 species)
Family **Monkaspididae** Kobayashi, 1935 (8 genera, 26 species)
Family **Namanoiidae** Lermontova, 1951 (8 genera, 26 species)
Family **Nepeidae** Whitehouse, 1939 (6 genera, 25 species)
Family **Norwoodiidae** Walcott, 1916 (9 genera, 45 species)
Family **Onchonotopsidae** Shaw, 1966 (4 genera, 12 species)
Family **Papyriaspididae** Whitehouse, 1939 (11 genera, 26 species)
Family **Phylacteridae** Ludvigsen & Westrop, 1989 (7 genera, 29 species)
Family **Plethopeltidae** Raymond, 1925 (15 genera, 79 species)
Family **Polycyrtaspididae** Öpik, 1967 (2 genera, 6 species)
Family **Proasaphiscidae** Zhang, 1963[41] (74 genera, 312 species)
Family **Ptychaspididae** Raymond, 1924 (17 genera, 105 species)
Family **Ptychopariidae** Matthew, 1887[42] (160 genera, 624 species)
Family **Raymondinidae** Clark, 1924[43] (6 genera, 42 species)
Family **Rhyssometopidae** Öpik, 1967 (4 genera, 13 species)
Family **Sarkiidae** Hupé, 1953 (1 genus, 3 species)
Family **Shirakiellidae** Hupé, 1953 (5 genera, 12 species)
Family **Shumardiidae** Lake, 1907 (22 genera, 122 species)
Family **Sunaspididae** Zhang & Jell, 1987 (2 genera, 15 species)
Family **Utiidae** Kobayashi, 1935 (6 genera, 30 species)
Family **Wuaniidae** Zhang & Yuan, 1981 (15 genera, 69 species)

38. See note under Odontopleurida.
39. Includes Saukiidae.
40. Includes Dikelokephalinidae, following Ludvigsen *et al*. (1989, p. 28), but see Fortey (2010).
41. Includes Tengfengiidae and Holanshaniidae.
42. Ptychopariidae has been treated as a taxon of convenience and is likely polyphyletic.
43. Includes Glaphuridae and Celmidae.

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