Alfred R. Loeblich, Jr.
Helen Tappan
Department of Earth and Space Sciences
University of California
Los Angeles 90024

Suprageneric classification of the Foraminiferida (Protozoa)

ABSTRACT

A revised classification is presented for the Foraminiferida, combining the results of our research with various partial or more inclusive reclassifications that have appeared during the past two decades. The total 591 suprageneric taxa used herein for the Order Foraminiferida include 12 suborders, 63 superfamilies, 253 families and 263 subfamilies. New taxa proposed herein are the suborder Robertinina, the families Abadehellidae, Bolivinoididae, Bronnimanniidae, Coleitidae, Dryorhizopsidae, Dusenburyinidae, Earlandinitidae, Eocristellariidae, Globanomalinidae, Globuligerinidae, Globorotalitidae, Hippocrepinellidae, Hospitellidae, Hyperamminoididae, Linderinidae, Lituotubidae, Oridorsalidae, Pachyphloiidae, Palaeospiroplectamminidae, Pannellainidae, Paratikhinellidae, Partisaniidae, Polysaccamminidae, Praebuliminidae, Thomasinellidae, Valvulinellidae and Virgulinellidae, and the subfamilies Ammoastutinae, Ashbrookiinae, Bykoviellinae, Cuneatinae, Cyclopsinellinae, Endostaffellinae, Eohastigerinellinae, Halyphyseminae, Hergottellinae, Koskinobigenerininae, Lingulinopsinae, Louisettitinae, Novalesiinae, Orthoplectinae, Palmerinellinae, Pernerininae, Planctostomatinae, Shepheardellinae, Siphogenerininae, Siphoninoidinae, Textularioidinae and Torresininae. Family group taxa that are changed in rank (new status) herein are the superfamilies Acervulinacea, Coscinophragmatacea, Cyclolinacea, Geinitzinacea, Glabratellacea, Hyperamminacea, Ptychocladiacea, Robuloidacea, Siphoninacea and Squamulinacea, the families Alfredinidae, Bathysiphonidae, Cyclolinidae, Dictyopsellidae, Discamminidae, Discorbinellidae, Dorothiidae, Elhasaellidae, Globigerinitidae, Orbitopsellidae, Pulleniatinidae, Reussellidae, Robuloididae, and Stainforthiidae and the subfamilies Placentulininae and Semitextulariinae. Brief definitions are given herein for all recognized suprageneric taxa within the Foraminiferida. The synonymy listed for these suprageneric taxa includes only those taxa based on included genera. An index to recognized suprageneric taxa is included.

INTRODUCTION

The importance of the foraminifers as index fossils for biostratigraphy and age-dating of sediments, and for use in paleoecological interpretations has resulted in a continuing wealth of information, amounting to thousands of articles and monographs annually, with a corresponding rapid increase in the number of species, genera and higher taxa. The effective assimilation of this information has become increasingly difficult, as a greater proportion of this information appears in less well-known publications, in editions of limited size or otherwise not generally available. The amount of duplication not only has increased so that determination of priority is difficult for the various taxa but commonly results in the use of junior synonyms or the erroneous citation of authorship for many of the higher taxa. Currently, the most widely used classification is that of the Treatise on Invertebrate Paleontology, which went to press in 1962. During the ensuing 21 years, foraminiferal studies have also come of age; electron microscopy has proved to be an extremely useful tool, and various studies have elaborated on the nature of the wall structure of both calcareous and agglutinated tests, in some instances indicating that genera and higher taxa that had been placed in synonymy in the Treatise were in fact recognizably distinct.

In the Treatise on Invertebrate Paleontology, 1192 foraminiferal genera were recognized as valid and 1267 included as synonyms. A few of that 1192 have since been removed from the foraminifers, and are now recognized as algae, tintinnids, a dinoflagellate, etc. However, well over 1150 additional genera of Foraminiferida have been proposed since the Treatise appeared, as a result of new techniques of study, examination of different facies (carbonate facies of varied ages, deep sea faunas, etc.), different geologic ages (particularly the Late Paleozoic and Triassic), and different geographic regions (particularly eastern Asia).

A summary of the present status of knowledge of foraminiferal systematics and classification appears to be critically needed, both for effective communication between specialists and for ordering this wealth of information, documenting authorship, priority, location of publication, etc. Interim updates on the Treatise classification have been of limited scope (including selected genera and higher taxa: Haynes, 1981; only living taxa: Tappan and Loeblich, 1982; only calcareous suprafamilial taxa: Loeblich and Tappan, 1981; living benthonic taxa of the Pacific Ocean: Saidova, 1975; Cenozoic benthonic taxa: Saidova, 1981; Mesozoic-Cenozoic calcareous taxa: Subbotina et al., 1981), or restricted in space to mere listing of taxa, without synonymy or description: (Loeblich and Tappan, 1982c). A much larger number of revisions concerned particular families or superfamilies (planktonic taxa, fusulinids, etc.), or genera.

Early classifications of the Foraminiferida were strictly morphologic; greater emphasis later was placed on test wall composition and structure, as well as apertural features, chamber subdivision or other modifications. Generally, systematists hope to propose and utilize a classification that reflects relationships, and which is not complicated by convergent morphologic similarities. In the classification here proposed, some taxa have been grouped on the basis of apparent phyletic relationships, or separated from others that may appear superficially alike morphologically but which seemingly have a distinct ancestry. Brief definitions are included for all suprageneric taxa, but characteristics of a taxon at one level generally are not repeated in the definition of the included lower taxa. The synonymy includes only those taxa that are based on the name of an included genus, and only the earliest reference to a particular taxon; if two or three authors independently proposed a particular suprageneric taxon, only that having priority of publication is given herein. In the synonymic list, all references are of the same taxonomic rank as the heading, unless otherwise indicated in parentheses.

Because of the large number of references involved in such a taxonomic summary, only those which have appeared since the Treatise or were not included therein are given in full; for other references, the citation of author, date and page will allow their retrieval from the bibliography in the Treatise (Loeblich and Tappan, 1964a).

The present classification does not list the included genera, other than the type genus, which is indicated by the stem of the family group names. All foraminiferal genera, their description, illustrations, and geologic and geographic distribution, will be included within this framework in a book now in preparation, Foraminiferal Genera and Their Classification, to be published by Hutchinson Ross Publishing Company.

SYSTEMATIC CLASSIFICATION

Order **FORAMINIFERIDA** Eichwald, 1830

Foraminiferida T. L. JAHN and F. L. JAHN, 1949, p. 128, nom. corr. pro order Foraminifera.
Foraminifera CLAPARÈDE and LACHMANN, 1859, p. 432.
Foraminiferiae DELAGE and HÉROUARD, 1896, p. 107 (subclass).
Foraminifera CALKINS, 1909, p. 38 (subclass).
Foraminiferae CHATTON, 1925, p. 76 (order).
Rhizopodophycidae ROTHMALER, 1951, p. 260 (subclass).
Foraminifera MARKS, 1951, p. 377 (suborder).
Arforaminiferia RHUMBLER, 1913, p. 341 (suborder).
Scytinascia DEÁK, 1964, p. 97, 103 (group).
Foraminifereda BOVEE, 1970, p. 179 (superorder).
Forawiniferida ROZOVSKAYA, 1975, p. 18 (order; err. cit.).
Foraminifera MIKHALEVICH, 1980a, p. 53 (subphylum).
Calcifera MIKHALEVICH, 1980a, p. 55 (superclass).
Rotalioida MIKHALEVICH, 1980a, p. 58 (superorder).

Cytoplasmic body enclosed in test or shell of one or more interconnected chambers; wall may be homogeneous, or of similar or differing appearing layers or laminae, may be imperforate or finely to coarsely perforate, basically proteinaceous, but may have agglutinated particles, or may deposit calcite, aragonite, or rarely silica, on the organic base, calcareous wall porcelaneous, microgranular, or hyaline and optically or ultrastructurally radiate or granular; canal or stolon systems of varied complexity may be present; commonly test has one or more main apertures in addition to the wall perforations, through which pseudopodia protrude. Sexual and asexual generations alternate, or one generation may be suppressed; gametes biflagellate, triflagellate, or amoeboid. Free-living, rarely parasitic; benthic or pelagic, in marine to brackish water, rare in fresh water. Cambrian to Holocene.

Suborder **ALLOGROMIINA** Loeblich and Tappan, 1961

Allogromiina LOEBLICH and TAPPAN, 1961, p. 217.
Allogromidiaceae HARTOG in HARMER and SHIPLEY, 1906, p. 58 (order).
Microcometides POCHE, 1913, p. 175 (superfamily).
Allogromiida DE SAEDELEER, 1934, p. 7, 52 (legio).
Allogromioidea CHAPMAN and PARR, 1936, p. 141 (superfamily).
Lagynidea SIGAL in PIVETEAU, 1952, p. 154 (superfamily).
Allogromiidea POKORNÝ, 1958, p. 158 (superfamily).
Allogromiida FURSENKO, 1958, p. 22 (order).
Lagynacea LOEBLICH and TAPPAN, 1961, p. 274 (superfamily).
Lagynea MIKHALEVICH, 1980a, p. 54 (class).
Lagynata MIKHALEVICH, 1980a, p. 54 (subclass).
Lagynida MIKHALEVICH, 1980a, p. 54 (order).

Test unilocular or may tend to become multilocular; wall membranaceous or proteinaceous, may have ferruginous encrustations or small quantity of agglutinated particles. Upper Cambrian to Holocene.

Family **LAGYNIDAE** Schultze, 1854

Lagynidae CARPENTER, 1861, p. 458, nom. corr. pro family Lagynida.
Lagynida SCHULTZE, 1854, p. 52.
Lagyninae GALLOWAY, 1933, p. 41 (subfamily).
Plagiophryiinae VEJDOVSKÝ, 1881, p. 138 (subfamily).
Diplophryidae TARÂNEK, 1882, p. 235.
Myxothecinae RHUMBLER, 1895, p. 79 (subfamily).
Microcometidae POCHE, 1913, p. 175.
Armyxothecnia RHUMBLER, 1913, p. 343 (subfamily; err. emend.).
Belariini DE SAEDELEER, 1934, p. 7, 79 (tribe).
Mikrogromiidae DE SAEDELEER, 1934, p. 7, 68.
Mikrogromiini DE SAEDELEER, 1934, p. 7, 68 (tribe).
Heterogromiini DE SAEDELEER, 1934, p. 7, 82 (tribe).
Microgromiidae DOFLEIN and REICHENOW, 1952, p. 730 (err. cit.).
Microcometesidae GROSPIETSCH, 1958, p. 35, 57 (err. cit.).

Test small, membranous to firm, proteinaceous, and may have ferruginous surface crust, rarely includes agglutinated matter; aperture single or with numerous apertures that are not localized; may form colonies; biflagellate gametes. Holocene.

Family **MAYLISORIIDAE** E. V. Bykova, 1961

Maylisoriidae E. V. BYKOVA, 1961, p. 20.
Alexandrellidae E. V. BYKOVA, 1958, p. 881 (nom. nud.).

Test free or attached, with branching tube terminating in saclike chambers; wall proteinaceous. Cambrian to Silurian.

Family **ALLOGROMIIDAE** Rhumbler, 1904

Allogromiidae SCHOUTEDEN, 1906, p. 374, nom. corr. pro family Allogromida.
Allogromida AVERINTSEV, 1906, p. 324, nom. transl. ex subfamily Allogromiinae.
Allogromidae DOGEL, 1951, p. 464 (err. cit.).
Allogromiida COPELAND, 1956, p. 183 (err. emend.).

Test proteinaceous, or may have agglutinated matter on the proteinaceous base that in *Allogromia* is produced by endoplasm on the plasma membrane, and not by the ectoplasm or pseudopodia; those shown to have alternating generations produce amoeboid gametes. U. Ordovician to Holocene.

Subfamily **ALLOGROMIINAE** Rhumbler, 1904

Allogromiinae RHUMBLER, 1904, p. 202.
Craterininae RHUMBLER, 1904, p. 196.
Arrogromnia RHUMBLER, 1913, p. 343 (err. emend.).
Lieberkuehniinae DE SAEDELEER, 1934, p. 7, 64.
Lieberkuehniini DE SAEDELEER, 1934, p. 7, 64 (tribe).
Pleurophryini DE SAEDELEER, 1934, p. 7, 60 (tribe).
Allelogromiini DE SAEDELEER, 1934, p. 7, 67 (tribe).

Test globular, ovate or elongate, wall proteinaceous; aperture terminal, living taxa commonly with entosolenian tube and pseudopodial trunk. U. Ordovician to Holocene.

Subfamily **SHEPHEARDELLINAE** Loeblich and Tappan, **n. subfam.**

Test free, narrow, tubular and elongate, open at both ends; wall firm, flexible, proteinaceous; apertures at both ends, through which pseudopodia may protrude. Holocene.

Type genus: Shepheardella Siddall, 1880.

Remarks: Differs from the Allogromiinae in having apertures at both ends of the very slender and elongate test.

Subfamily **ARGILLOTUBINAE** Avnimelech, 1952

Argillotubinae AVNIMELECH, 1952, p. 64.
Micatubinae AVNIMELECH, 1952, p. 65.

Test with proteinaceous wall or with wall of argillaceous particles on an organic lining, commonly flexible and wrinkled; aperture at the constricted end or ends of the test. Holocene.

Family **HOSPITELLIDAE** Loeblich and Tappan, **n. fam.**

Test attached, multilocular, with numerous chambers in irregular growth arrangement, attached to inner or outer wall of other foraminiferal tests or may excavate or burrow within the wall; wall proteinaceous, imperforate, commonly brownish in color. Eocene; Holocene.

Type genus: Hospitella Rhumbler, 1911.

Remarks: Differs from the Allogromiidae in being attached and multilocular.

Family **PHTHANOTROCHIDAE** Arnold, 1978

Phthanotrochidae ARNOLD, 1978, p. 161.

Test with single chamber in early stage, later may be biloculine or multilocular, with chamber arrangement irregular, coiled or uncoiling; wall colorless, transparent and proteinaceous, without secreted or agglutinated mineral particles; aperture initially with prominent stomostyle and collar, but in later stages may have more than one aperture, and the aperture may become a simple tubular opening. Holocene.

Suborder **TEXTULARIINA** Delage and Hérouard, 1896

Textulariina LOEBLICH and TAPPAN, 1961, p. 217, nom. corr. pro suborder Textularidae.
Textularidae DELAGE and HÉROUARD, 1896, p. 139.
Astrorhizidea LANKESTER, 1885, p. 846 (order).
Lituolidea LANKESTER, 1885, p. 847 (order).
Textularidea LANKESTER, 1885, p. 847 (order).
Astrorhizidaceae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (order).
Lituolidaceae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (order).
Textulariaceae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (order).
Astrorhizida CALKINS, 1909, p. 38 (order).
Lituolida CALKINS, 1909, p. 39 (order).
Textularida CALKINS, 1909, p. 39 (order).
Textulinida CALKINS, 1926, p. 356 (order).
Textularidia KÜHN, 1926, p. 150 (order).
Textulariacea WEDEKIND, 1937, p. 84.
Haplophragmiacea WEDEKIND, 1937, p. 111.
Astrorhizidea JÍROVEC, 1953, p. 334.
Textulariidea JÍROVEC, 1953, p. 335.
Ammodiscida RAUZER-CHERNOUSOVA and REYTLINGER, 1957, fig. 1 on p. 105 (order; *nom. nud.*).
Textulariida FURSENKO, 1958, p. 23 (order).
Ammodiscida FURSENKO, 1958, p. 23 (order).
Ataxophragmiida FURSENKO, 1958, p. 23 (order).
Calcinifera VYALOV, 1966a, p. 5, 10 (group).
Silicinifera VYALOV, 1966a, p. 5, 10 (group).
Tectinifera VYALOV, 1966a, p. 5, 6, 10 (group).
Astrorhisida SAIDOVA, 1975b, p. 66 (order; err. cit.).
Tectinifera MIKHALEVICH, 1980a, p. 54 (superclass).
Ammodiscata MIKHALEVICH, 1980a, p. 55 (subclass).
Ammodiscoidida MIKHALEVICH, 1980a, p. 56 (order).
Ammoscalariata MIKHALEVICH, 1980a, p. 54 (subclass).
Ammoscalariida MIKHALEVICH, 1980a, p. 54 (order).
Silicinifera MIKHALEVICH, 1980a, p. 54, 55 (superclass).
Silicotubida MIKHALEVICH, 1980a, p. 55 (order).
Miliamminea MIKHALEVICH, 1980a, p. 55 (class).
Miliamminata MIKHALEVICH, 1980a, p. 55 (subclass).
Miliamminida MIKHALEVICH, 1980a, p. 55 (order).
Nouriida MIKHALEVICH, 1980a, p. 56 (order).
Textulariata MIKHALEVICH, 1980a, p. 55 (subclass).
Astrorhizicae SAIDOVA, 1981, p. 10 (subclass).
Textulariicea SAIDOVA, 1981, p. 10 (class).
Hippocrepinida SAIDOVA, 1981, p. 13 (order).
Hormosinida SAIDOVA, 1981, p. 14 (order).
Trochamminida SAIDOVA, 1981, p. 22 (order).
Rzehakinacae SAIDOVA, 1981, p. 27 (subclass).
Rzehakinida SAIDOVA, 1981, p. 27 (order).

Test agglutinated, foreign particles held in organic or mineralized ground mass. Cambrian to Holocene.

Superfamily **ASTRORHIZACEA** Brady, 1881

Astrorhizacea BULATOVA in SUBBOTINA ET AL., 1981, p. 17, nom. corr. pro superfamily Astrorhizidea.
Astrorhizidea GLAESSNER, 1945, p. 88, nom. transl. ex family Astrorhizidae.
Astrorhizina DELAGE and HÉROUARD, 1896, p. 128 (tribe).
Astrorhizidae EIMER and FICKERT, 1899, p. 593 (family group).
Astrorhizicae EASTON, 1960, p. 65.
Astrorhizoidea SOUAYA, 1965, p. 303.
Botellinidea SAIDOVA, 1981, p. 14.
Schizamminidea SAIDOVA, 1981, p. 12.
Diffusilinidea SAIDOVA, 1981, p. 13.

Test irregular, rounded, tubular, or branching, non-septate or with interior only partially subdivided; wall agglutinated. Cambrian to Holocene.

Family **ASTRORHIZIDAE** Brady, 1881

Astrorhizidae BRADY, 1881, p. 41, 43.
Astrorhizina LANKESTER, 1885, p. 846.
Astrorhizida HAECKEL, 1894, p. 185.
Dendrophryida HAECKEL, 1894, p. 185.
Astrorhizinae DELAGE and HÉROUARD, 1896, p. 129.
Dendrophryidae EIMER and FICKERT, 1899, p. 597.
Dendrophyridae LOEBLICH and TAPPAN, 1964a, p. C184 (err. cit.).
Astrorzidae PANDEY, 1981, p. 82 (err. cit.).
Dendrophyida BULATOVA in SUBBOTINA ET AL., 1981, p. 22 (err. cit.).

Test free or attached, generally large, with two or more branches from a central area; wall agglutinated, showing little selectivity and commonly poorly cemented, with a proteinaceous organic lining; apertures at the ends of the arms. M. Ordovician to Holocene.

Subfamily **ASTRORHIZINAE** Brady, 1881

Astrorhizinae BRADY, 1884, p. 61, nom. transl. ex family Astrorhizidae.
Arastrorhiznia RHUMBLER, 1913, p. 344 (err. emend.).
Pelosininae CUSHMAN, 1927, p. 12.
Radiculinae SAIDOVA, 1981, p. 11.

Test free, with central inflated region, from which extend arms or projections in two to many directions; arms generally tapering and bifurcated or multifurcated terminally, although these terminations may be broken from specimens in preservation. M. Ordovician to Holocene.

Subfamily **VANHOEFFENELLINAE** Saidova, 1981

Vanhoeffenellinae LOEBLICH and TAPPAN, 1982c, p. 26, nom. corr. pro subfamily Vanhoeffenella.
Vanhoeffenella SAIDOVA, 1981, p. 10 (nom. imperf.).

Test free, large, discoidal, fusiform, or caplike with agglutinated tubular outer framework surrounding nonagglutinated proteinaceous organic central area on both sides of test. ? Devonian, Holocene.

Family **BATHYSIPHONIDAE** Avnimelech, 1952

Bathysiphonidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Bathysiphoninae.
Bathysiphoninae AVNIMELECH, 1952, p. 66 (subfamily).
Psammosiphonellinae AVNIMELECH, 1952, p. 64 (subfamily).
Flagrinidae VYALOV, 1966b, p. 33.
Astrorhizinullinae SAIDOVA, 1981, p. 10 (subfamily).

Test a straight unbranched or sparsely branched nonseptate tube that may show growth constrictions; wall thick, agglutinated, well cemented, growth occurring at one end of the tube, from which pseudopodia protrude; the opposite end commonly is packed with waste and food debris and periodically discarded, aperture at the open end of the tube. L. Cambrian to Holocene.

Family **RHIZAMMINIDAE** Rhumbler, 1895

Rhizamminidae WIESNER, 1931, p. 79, nom. transl. ex subfamily Rhizammininae.
Rhabdamminina LANKESTER, 1885, p. 846.
Rhabdamminae DELAGE and HÉROUARD, 1896, p. 130.
Arrhabdammidia RHUMBLER, 1913, p. 342 (err. emend.).
Dendrophrynidae VYALOV, 1966b, p. 29.

Test free or attached, simple or branching, tubular to slightly inflated and conical, but interior nonseptate; wall of agglutinated sponge spicules, radiolarians, other foraminiferal tests, and silt particles in a fine grained ground mass, commonly slightly flexible; apertures terminal on ends of branches or chamber. Cretaceous to Holocene.

Subfamily **RHIZAMMININAE** Rhumbler, 1895

Rhizammininae RHUMBLER, 1895, p. 82.
Rhabdammininae BRADY, 1884, p. 64.
Arrhizamnia RHUMBLER, 1913, p. 350 (err. emend.).
Testulosiphoninae AVNIMELECH, 1952, p. 66.
Marsipellinae HOFKER, 1972, p. 80.
Dendrophryninae LOEBLICH and TAPPAN, 1974, p. 43.

Test consisting of an elongate, narrow, simple or branching tube; apertures at open end of tubes. Holocene.

Subfamily **DENDROPHRYINAE** Haeckel, 1894

Dendrophryinae CUSHMAN, 1927, p. 14, nom. transl. ex family Dendrophryida.
Dendrophrynae BERMÚDEZ and RIVERO, 1963, p. 86 (err. cit.).

Test attached, with very elongate, erect nonseptate tubular portion that bifurcates frequently and may be spreading. U. Cretaceous; Pleistocene to Holocene.

Subfamily **HALYPHYSEMINAE** Loeblich and Tappan, **n. subfam.**

Test attached, basal attachment may be expanded and disclike in form, later portion with an erect tubular to conical chamber; wall of agglutinated sponge spicules or other foreign matter; aperture terminal and rounded, commonly surrounded by a tuft of spicules. Holocene.

Type genus: Halyphysema Bowerbank, 1862.

Remarks: The Halyphyseminae differ from the Rhizammininae in being shorter and broader, in commonly having an expanded basal attachment, and in having a tuft of spicules agglutinated to the apertural region.

Family **DRYORHIZOPSIDAE** Loeblich and Tappan, **n. fam.**

Test consisting of a series of irregularly or dichotomously branching tubes attached to the substrate, and that may radiate from a central trunklike region; wall agglutinated. Pennsylvanian to Holocene.

Type genus: Dryorhizopsis Henbest, 1963.

Remarks: The Dendrophryinae differ in growing erect from the substrate, rather than in being attached throughout the length of the tubular portion.

Family **SILICOTUBIDAE** Vyalov, 1968

Silicotubidae VYALOV, 1968, p. 3.

Test elongate, tubular, with regular constrictions giving an appearance of chambers, but without distinct septa. U. Cretaceous (Senonian).

Family **HIPPOCREPINELLIDAE** Loeblich and Tappan, **n. fam.**

Test elongate, tubular to fusiform, open at both ends, nonseptate but commonly with transverse constrictions; wall very finely agglutinated, surface smoothly finished; openings small, rounded, terminal, larger at one extremity. L. Pennsylvanian, Permian, Oligocene, Miocene, Holocene.

Type genus: Hippocrepinella Heron-Allen and Earland, 1932.

Remarks: Differs from the Bathysiphonidae in the thin, more flexible and finer grained wall and the restricted apertural openings, and differs from the Hippocrepininae of the family Hyperamminidae in being open at both ends, and in the less rigid and less firmly cemented wall.

Family **SCHIZAMMINIDAE** Nørvang, 1961

Schizamminidae NØRVANG, 1961, p. 171.

Test free, nonseptate, tubular to flaring, dichotomously branching or spreading fanlike in a single plane; wall thick and agglutinated, labyrinthic, canaliculate, exterior smoothly finished. Holocene.

Family **PSAMMOSPHAERIDAE** Haeckel, 1894

Psammosphaeridae EIMER and FICKERT, 1899, p. 598, nom. corr. pro family Psammosphaerida.
Psammosphaerida HAECKEL, 1894, p. 185.
Stegnamminidae MOREMAN, 1930, p. 48.

Test free, globular to irregular, or with several loosely joined chambers; wall coarsely agglutinated. Ordovician to Holocene.

Subfamily **PSAMMOSPHAERINAE** Haeckel, 1894

Psammosphaerinae CUSHMAN, 1927, p. 11, nom. transl. ex family Psammosphaerida.

Test globular to irregular; wall finely to coarsely agglutinated, with interstitial pores between grains but no recognizable aperture. Ordovician to Holocene.

Subfamily **STEGNAMMININAE** Moreman, 1930

Stegnammininae MOREMAN, 1930, p. 48.
Thekammininae DUNN, 1942, p. 326.

Test free, irregular in form to subcylindrical, straight to curved; no definite aperture. Ordovician to Devonian.

Family **SACCAMMINIDAE** Brady, 1884

Saccamminidae EIMER and FICKERT, 1899, p. 599, nom. corr. pro family Saccamminina.
Saccamminina LANKESTER, 1885, p. 846, nom. transl. ex subfamily Saccammininae.
Pilulinina LANKESTER, 1885, p. 846.
Saccamminae DELAGE and HÉROUARD, 1896, p. 130.
Pilulinida HAECKEL, 1894, p. 190.
Pilulinidae LISTER in LANKESTER, 1903, p. 141.
Saccammanidae DAHLGREN, 1962, p. 200 (err. cit.).
Silicamminidae VYALOV, 1968, p. 4.
Saccaminidae SAIDOVA, 1975a, p. 5 (err. cit.).

Test free or attached, globular to elongate; aperture single to multiple, rounded to slitlike. Ordovician to Holocene.

Subfamily **SACCAMMININAE** Brady, 1884

Saccammininae BRADY, 1884, p. 64.
Arsaccamnia RHUMBLER, 1913, p. 347 (err. emend.).

Test free, globular, flasklike or elongate; wall agglutinated; aperture terminal, rounded, and in living specimens commonly provided with distinctive organic oral apparatus of inward projecting tube enclosing a gel-like capsule. Ordovician to Holocene.

Subfamily **PILULININAE** Brady, 1884

Pilulininae BRADY, 1884, p. 63.
Pilulinae A. D. MIKLUKHO-MAKLAY, 1963, p. 138 (err. cit.).

Test free, globular; wall finely agglutinated, thick, but poorly cemented; aperture an elongate slit, slightly produced. Holocene.

Subfamily **THURAMMININAE** A. D. *Miklukho-Maklay*, 1963

Thuramminninae A. D. MIKLUKHO-MAKLAY, 1963, p. 153.
Thuramminae A. D. MIKLUKHO-MAKLAY, 1963, p. 146 (err. cit.).

Test free or rarely attached, globular, or with a few to many subconical or tubular projections from the surface; wall agglutinated; numerous apertures, flush with the surface or at the ends of the projections. Ordovician to Holocene.

Family **POLYSACCAMMINIDAE** Loeblich and Tappan, **n. fam.**

Test consisting of a linear series of irregular rounded chambers; wall agglutinated, with considerable cement and with organic inner layer, may have a few large sand grains attached to the surface; aperture terminal, and border may be slightly elevated. Holocene; in nearshore or brackish waters.

Type genus: Polysaccammina D. B. Scott, 1976.

Remarks: Differs from the Saccamminidae in the linear

series of irregular chambers, and from the Hormosinidae in the irregular chambers and greater amount of organic matter that results in a more flexible test.

Family **HEMISPHAERAMMINIDAE** Loeblich and Tappan, 1961

Hemisphaeramminidae LOEBLICH and TAPPAN, 1982c, p. 26, nom. transl. ex subfamily Hemisphaeramminae.
Oryctodermidae SAIDOVA, 1981, p. 12.

Test free or attached, consisting of one or more subglobular to discoidal chambers; wall agglutinated; aperture single, or may be unrecognizable. Ordovician to Holocene.

Subfamily **HEMISPHAERAMMININAE** Loeblich and Tappan, 1961

Hemisphaeramminae LOEBLICH and TAPPAN, 1961, p. 277.
Tholosininae BERMÚDEZ and RIVERO, 1963, p. 75.
Saccamminisinae SAIDOVA, 1981, p. 15.

Test attached, wall agglutinated, with considerable cement, interior not subdivided. Ordovician to Holocene.

Subfamily **CRITHIONININAE** Hofker, 1972

Crithionininae HOFKER, 1972, p. 66.
Marsonellinae SAIDOVA, 1981, p. 13 (nom. imperf.; recte Masonellinae).

Test attached, interior subdivided by one or more partial septa. U. Ordovician or L. Silurian, Holocene.

Subfamily **ORYCTODERMINAE** Saidova, 1981

Oryctoderminae SAIDOVA, 1981, p. 13.

Test free or attached, globular to discoidal; wall agglutinated, labyrinthic. Permian to Holocene.

Family **DIFFUSILINIDAE** Loeblich and Tappan, 1961

Diffusilinidae SAIDOVA, 1981, p. 13, nom. transl. ex subfamily Diffusilininae.
Diffusilininae LOEBLICH and TAPPAN, 1961, p. 217 (subfamily).

Test attached, irregular in outline, consisting of a mass of branching tubes with finely agglutinated wall; apertures at top of small pustules on surface. Ordovician, Holocene.

Superfamily **KOMOKIACEA** Tendal and Hessler, 1977

Komokiacea TENDAL and HESSLER, 1977, p. 177.
Komokioidea TAPPAN and LOEBLICH, 1982, p. 531.

Test consists of a complex system of fine branching tubules of even diameter; wall agglutinated, of argillaceous particles in organic cement, covering a thin, laminated inner organic layer; stercomata (fecal pellets) accumulate within the tubules. Abyssal and hadal regions of the oceans. Holocene.

Family **KOMOKIIDAE** Tendal and Hessler, 1977

Komokiidae TENDAL and HESSLER, 1977, p. 178.

Test bushy or arborescent, constructed of widely spaced branching cylindrical tubules that may be of equal diameter throughout or have clublike terminations, commonly nonseptate, although a few may have variably spaced septa. Holocene.

Family **BACULELLIDAE** Tendal and Hessler, 1977

Baculellidae TENDAL and HESSLER, 1977, p. 187.

Rodlike or sparsely branching arborescent test or clump of branching tubules; short lateral branches with frequent constrictions giving a beaded appearance, intertubule interstices may be mud-filled resulting in the appearance of a mud ball. Holocene.

Superfamily **HYPERAMMINACEA** Eimer and Fickert, 1899

Hyperamminacea LOEBLICH and TAPPAN, nom. transl. herein, ex family Hyperamminidae.
Hippocrepinidae SAIDOVA, 1981, p. 13 (nom. imperf.).

Proloculus followed by rectilinear nonseptate tubular or flaring later stage; wall agglutinated; aperture terminal, rounded or ovate. M. Ordovician to Holocene.

Family **HYPERAMMINIDAE** Eimer and Fickert, 1899

Hyperamminidae EIMER and FICKERT, 1899, p. 602.
Saccorhizidae EIMER and FICKERT, 1899, p. 598.
Botellinidae LOEBLICH and TAPPAN, 1961, p. 277.
Hippocrepinidae VYALOV, 1968, p. 4.

Test free, elongate, tubular to slightly flaring, somewhat constricted at the aperture; wall coarsely agglutinated, of irregular quartz grains and sponge spicules, held in little cement. Silurian to Holocene.

Subfamily **HYPERAMMININAE** Eimer and Fickert, 1899

Hyperammininae CUSHMAN, 1910, p. 59, nom. transl. ex family Hyperamminidae.
Botellininae CHAPMAN and PARR, 1936, p. 146.
Botallininae HOFKER, 1972, p. 5 (err. cit.).
Hyperamminae HOFKER, 1972, p. 20 (err. cit.).

Test a large, elongate, tubular chamber extending from the bulbous proloculus. Silurian to Holocene.

Subfamily **HIPPOCREPININAE** Rhumbler, 1895

Hippocrepininae RHUMBLER, 1895, p. 83.
Arhippocrepnia RHUMBLER, 1913, p. 352 (err. emend.).

Test large, elongate, tubular or flaring, closed basally, nonseptate; wall finely to coarsely agglutinated; aperture rounded at the slightly constricted open end. M. Ordovician to Holocene.

Family **HYPERAMMINOIDIDAE** Loeblich and Tappan, **n. fam.**

Hyperamminoididae LOEBLICH and TAPPAN, 1982c, p. 26 (nom. nud.).

Test elongate, flaring, with constrictions at irregular growth intervals but without true septa; wall finely agglutinated. U. Devonian to L. Cretaceous (Neocomian).

Type genus: Hyperamminoides Cushman and Waters, 1928.

Remarks: The late Paleozoic and early Mesozoic species here included superficially resemble the living *Hippocrepina* and *Hyperammina*, but are probably not closely related. They have a very fine grained arenaceous wall with polished surface that probably was somewhat flexible in life, as fossil specimens are almost invariably crushed, whereas other foraminifera in the same material are not compressed.

Family **NOTODENDRODIDAE** Delaca, Lipps and Hessler, 1980

Notodendrodidae DELACA ET AL., 1980, p. 210.

Test large, with bulbous central region from which arises an erect arborescent portion, and a lower, finely branched holdfast portion; wall agglutinated, central bulbous region double-layered, elsewhere single layered; no distinct aperture. Holocene.

Superfamily **AMMODISCACEA** Reuss, 1862

Ammodiscacea LOEBLICH and TAPPAN, 1961, p. 275, nom. corr. pro superfamily Ammodiscoidea.
Ammodiscoidea CHAPMAN, PARR and COLLINS, 1934, p. 556, nom. transl. ex family Ammodiscinea.
Ammodiscidea DAIN in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 180.
Ammodiascacea HAYNES, 1981, p. 81 (err. cit.).

Test consisting of proloculus followed by tubular, enrolled, nonseptate second chamber; aperture at the open end of the tube; wall agglutinated. L. Cambrian to Holocene.

Family **AMMODISCIDAE** Reuss, 1862

Ammodiscidae RHUMBLER, 1895, p. 83, nom. corr. pro family Ammodiscinea.
Ammodiscinea REUSS, 1862, p. 365 (nom. imperf.).
Ammodiscida HAECKEL, 1894, p. 185.
Ammodisculinidae RHUMBLER, 1913, p. 339 (err. emend.).
Arammodisclidia RHUMBLER, 1913, p. 341 (err. emend.).
Tolypamminidae LOEBLICH and TAPPAN, 1954, p. 308.
Mamodiscidae SULEYMANOV, 1963a, p. 43 (err. cit.).
Usbekistaniidae VYALOV, 1968, p. 5.
Ammovolumminidae POYARKOV, 1979, p. 63.
Ammodiscoididae MIKHALEVICH, 1980a, p. 56.
Ammovertellinidae SAIDOVA, 1981, p. 15.
Turritellellidae SAIDOVA, 1981, p. 16.

Globular proloculus followed by coiled or uncoiled nonseptate tubular second chamber that may show irregular growth constrictions; wall agglutinated; aperture at the open end of the tube. L. Cambrian to Holocene.

Subfamily **AMMOVOLUMMININAE** *Chernykh, 1967*

Ammovolumminae CHERNYKH, 1967, p. 38.

Tubular chamber loosely coiled or arcuate. Silurian to Devonian, Holocene.

Subfamily **AMMODISCINAE** Reuss, 1862

Ammodiscinae RHUMBLER, 1904, p. 275, nom. transl. ex family *Ammodiscinea.*

Proloculus followed by tubular chamber, tightly enrolled in a single plane or early stage may be slightly trochospiral. L. Cambrian to Holocene.

Subfamily **TOLYPAMMININAE** Cushman, 1928

Tolypammininae CUSHMAN, 1928, p. 103.
Ammodiscellinae SAIDOVA, 1981, p. 16.

Test attached, proloculus followed by tubular chamber that may be nearly straight, or an early coil followed by uncoiled and straight tubular chamber, or by a zigzag or irregularly growing tubular chamber. U. Devonian to Holocene.

Subfamily **AMMOVERTELLININAE** Saidova, 1981

Ammovertellininae SAIDOVA, 1981, p. 16.

Proloculus followed by streptospirally wound tubular chamber, at least in the early stage of coiling, later may become planispiral. U. Mississippian to Holocene.

Subfamily **USBEKISTANIINAE** Vyalov, 1968

Usbekistaniinae LOEBLICH and TAPPAN, 1982c, p. 26, nom. transl. ex family Usbekistaniidae.
Turritellellinae SAIDOVA, 1981, p. 16.

Proloculus followed by trochospirally enrolled tubular second chamber, with coiling about a vertical axis, at least in the early stage. Silurian to Holocene.

Superfamily **RZEHAKINACEA** Cushman, 1933

Rzehakinacea LOEBLICH and TAPPAN, 1982c, p. 26, nom. corr. pro superfamily Rzehakinidea.
Rzehakinidea SAIDOVA, 1981, p. 27, nom. transl. ex subfamily Rzehakininae.

Test enrolled, with two or less commonly three chambers per whorl; planispiral or with successive chambers added in varied planes, similar to the miliolines; wall finely agglutinated on an organic base, nonperforate. Cretaceous to Holocene.

Family **RZEHAKINIDAE** Cushman, 1933

Rzehakinidae TAPPAN, 1957, p. 210, nom. transl. ex subfamily Rzehakininae.
Rzehakininae CUSHMAN, 1933, p. 144 (subfamily).
Paramiliolidae SIGAL in PIVETEAU, 1952, p. 208 (family; invalid, ICZN Art. 29).
Rzehakinida SAIDOVA, 1981, p. 27 (err. cit.).
Spirolocamminidae SAIDOVA, 1981, p. 27.
Spirolocamminae SAIDOVA, 1981, p. 27 (subfamily).
Miliammininae SAIDOVA, 1981, p. 28 (subfamily).

As in the superfamily. Cretaceous to Holocene.

Superfamily **HORMOSINACEA** Haeckel, 1894

Hormosinacea LOEBLICH and TAPPAN, 1982c, p. 26, nom. corr. pro superfamily Hormosinidea.
Hormosinidea SAIDOVA, 1981, p. 14, nom. transl. ex family Hormosinida.
Cribratinidea SAIDOVA, 1981, p. 15.

Pseudonodosinellidea SAIDOVA, 1981, p. 15.
Preudonodosinellidea SAIDOVA, 1981, p. 15 (err. cit.).

Test multilocular, chambers in uniserial arrangement; wall agglutinated. Mississippian to Holocene.

Family **ASCHEMONELLIDAE** Eimer and Fickert, 1899

Aschemonellidae EIMER and FICKERT, 1899, p. 604.
Aschemocellidae VYALOV, 1966b, p. 31.

Test free, consisting of a series of somewhat inflated chambers; wall thin, agglutinated, firmly cemented; apertures at ends of tubular necks. Cretaceous to Holocene.

Subfamily **ASCHEMOCELLINAE** Vyalov, 1966

Aschemocellinae LOEBLICH and TAPPAN, 1974, p. 43, nom. transl. ex family Aschemocellidae.

Test consists of a series of irregular ovoid chambers; wall agglutinated, particles firmly cemented. Upper Cretaceous.

Subfamily **ASCHEMONELLINAE** Eimer and Fickert, 1899

Aschemonellinae CUSHMAN, 1910, p. 80, nom. transl. ex family Aschemonellidae.
Araschemonellinia RHUMBLER, 1913, p. 439 (err. emend.).

Irregular inflated chambers separated by stolon-like tubular connections; wall agglutinated. Cretaceous to Holocene.

Family **HORMOSINIDAE** Haeckel, 1894

Hormosinidae LOEBLICH and TAPPAN, 1964a, p. C214, nom. corr. pro family Hormosinida.
Hormosinida HAECKEL, 1894, p. 185.
Reophacidae CUSHMAN, 1927, p. 15.
Silicinidae CUSHMAN, 1927, p. 29.
Reophacida COPELAND, 1956, p. 186 (err. emend.).
Reorhacidae SULEYMANOV, 1963b, p. 85 (err. cit.).
Rephacidae KRAEVA, 1971, p. 93 (err. cit.).
Pseudonodosinellidae SAIDOVA, 1981, p. 15.
Psendonodosinellidae SAIDOVA, 1981, p. 15 (err. cit.).

Test free, chambers arranged in rectilinear to arcuate series; wall agglutinated, interior simple; aperture terminal, single or multiple. Mississippian to Holocene.

Subfamily **REOPHACINAE** Cushman, 1910

Reophacinae CUSHMAN, 1910, p. 81.
Arreophaxnia RHUMBLER, 1913, p. 440 (err. emend.).
Proteonininae GALLOWAY, 1933, p. 65.
Silicininae CUSHMAN, 1933, p. 143.
Reophacidinae SILVESTRI, 1950, p.44 (err. emend.).
Pseudoreophacinae SULEYMANOV, 1963b, p. 88 (invalid, ICZN Art. 39; based on *Pseudoreophax* Suleymanov, 1963, non Geroch, 1961).

Test of uniserial chambers that commonly are asymmetrical and in slightly arcuate arrangement; wall agglutinated, of a single layer of quartz grains, spicules or tests of other foraminifers held in small amount of cement; aperture terminal, rounded, on a distinct neck. Mississippian to Holocene.

Subfamily **CUNEATINAE** Loeblich and Tappan, **n. subfam.**

Cuneatinae LOEBLICH and TAPPAN, 1982c, p. 27 (nom. nud.).

Test elongate, uniserial, rarely bifurcating, chambers ovate in section; wall agglutinated, single layered, nonperforate; aperture terminal, rounded, slitlike or with a row of slits, not produced on a neck. L. to U. Cretaceous (U. Albian to L. Senonian), Holocene.

Type genus: Cuneata K. V. Fursenko, 1979.

Remarks: Differs from the Reophacinae and Hormosininae in the slitlike aperture, and from the latter in the single layer of grains in the wall.

Subfamily **HORMOSININAE** Haeckel, 1894

Hormosininae LOEBLICH and TAPPAN, 1964a, p. C215, nom. transl. ex family Hormosinida.
Pseudonodosinellinae SAIDOVA, 1981, p. 15.

Test with symmetrical subglobular rectilinear chambers that may be loosely separated or closely appressed; wall thick, of agglutinated quartz grains, sponge spicules, or other particles; aperture terminal, rounded, at the end of a tubular neck. Holocene.

Subfamily **NODOSININAE** Saidova, 1981

Nodosininae LOEBLICH and TAPPAN, 1982c, p. 27, nom. corr. pro subfamily Nodosinidae.
Nodosinidae SAIDOVA, 1981, p. 15 (subfamily; nom. imperf.).

Test as in the Hormosininae but with slitlike to stellate aperture, the latter resulting from longitudinal ribs projecting inward from the wall in the vicinity of the aperture. Holocene.

Family **THOMASINELLIDAE** Loeblich and Tappan, **n. fam.**

Test uniserial in early stage, later bifurcating to produce two or more linear series of chambers; aperture terminal at the ends of the linear series, commonly a single ovate slit, but just prior to a bifurcation may have two such openings; wall coarsely agglutinated, thick, canaliculate. Cretaceous to Holocene.

Type genus: Thomasinella Schlumberger, 1893.

Remarks: Differs from the Hormosinidae in the canaliculate wall and bifurcating test.

Family **DUSENBURYINIDAE** Loeblich and Tappan, **n. fam.**

Test elongate, straight to arcuate, numerous uniserial chambers; wall thick and agglutinated; aperture terminal, elevated on a short neck, with a distinct tooth projecting from the margin that represents the outside of the curve of the arcuate test. Holocene.

Type genus: Dusenburyina Bermúdez and Key, 1952.

Remarks: Differs from the Hormosinidae in having an apertural tooth. *Dusenburyina* previously was placed in the Valvulininae because of the apertural tooth; however Hofker (1969, p. 18) noted that assignment to the Valvulininae was precluded by the absence of an early triserial or trochoid stage, and because the apertural tooth invariably occurred at the same side of the test, rather than being oriented differently in successive uniserial chambers as a reflection of its multilocular ancestry. Entirely uniserial agglutinated tests are placed in the Hormosinacea, but no other representatives possess a tooth, hence *Dusenburyina* is here placed in a distinct family.

Family **CRIBRATINIDAE** Loeblich and Tappan, 1964

Cribratinidae SAIDOVA, 1981, p. 15, nom. transl. ex subfamily Cribratininae.
Cribratininae LOEBLICH and TAPPAN, 1964a, p. C220 (subfamily).

Test free, chambers arranged in rectilinear series as in the Hormosininae; wall agglutinated, thick, with subepidermal alveolar layer; aperture terminal, single or multiple. L. Cretaceous (Albian) to U. Cretaceous (L. Cenomanian).

Superfamily **LITUOLACEA** de Blainville, 1827

Lituolacea LOEBLICH and TAPPAN, 1961, p. 277, nom. corr. pro superfamily Lituolidea.
Lituolidea GLAESSNER, 1945, p. 93, nom. transl. ex family Lituacea.
Lituolina DELAGE and HÉROUARD, 1896, p. 132 (tribe).
Lituolicae BRÖNNIMANN, 1958, p. 176.
Lituoloidea AYALA-CASTAÑARES, 1963, p. 47.
Lituolaceae HAMAOUI and SAINT-MARC, 1970, p. 336.
Haplophragmiidea PODOBINA, 1975, p. 25.
Lituolicea HAYNES, 1981, p. 85 (err. cit.).

Test free or attached, multilocular, early stage with planispiral to streptospiral coiling, may uncoil in later stages; wall agglutinated, nonperforate, U. Devonian to Holocene.

Family **OXINOXISIDAE** Vyalov, 1968

Oxinoxisidae VYALOV, 1968, p. 5.

Test large, early stage attached, later may grow free of the attachment, ovate proloculus followed by loosely enrolled subglobular chambers, then becoming rectilinear; wall agglutinated; aperture terminal, rounded, on short thick neck. U. Devonian to L. Mississippian (Kinderhookian).

Family **HAPLOPHRAGMOIDIDAE** Maync, 1952

Haplophragmoididae PODOBINA, 1975, p. 25, nom. transl. ex subfamily Haplophragmoidinae.
Haplophragmoidinae MAYNC, 1952, p. 43 (subfamily).
Asanospiridae VYALOV, 1968, p. 5.
Pseudohaplophragmidinae SAIDOVA, 1981, p. 17 (subfamily; nom. imperf.).

Test planispirally enrolled and involute to partially evolute, with septa formed by continuation of outer wall; wall agglutinated, simple, non-alveolar; aperture single or multiple, equatorial in position, basal to areal. Triassic to Holocene.

Family **DISCAMMINIDAE** Mikhalevich, 1980

Discamminidae LOEBLICH and TAPPAN, nom. transl. herein, ex subfamily Discammininae.
Discammininae MIKHALEVICH, 1980b, p. 6 (subfamily).

Test enrolled, early stage planispiral and evolute, may be uncoiled and rectilinear in later stage; wall coarsely agglutinated of quartz grains and sponge spicules on an inner organic layer; septa without agglutinated material but consist of very thin, straight, wholly organic internal partitions; aperture a low interiomarginal equatorial opening in enrolled stage, becoming terminal and central in the rectilinear stage, seen in section as slightly produced foramina in the septa of earlier chambers. U. Cretaceous to Holocene.

Family **SPHAERAMMINIDAE** Cushman, 1933

Sphaeramminidae LOEBLICH and TAPPAN, 1982c, p. 27, nom. transl. ex subfamily Sphaerammininae.
Sphaerammininae CUSHMAN, 1933, p. 87 (subfamily).
Ammosphaerulininae SAIDOVA, 1981, p. 14 (subfamily).

Test planispiral and involute, later chambers almost completely enclosing earlier ones; wall finely agglutinated; aperture areal, rounded to slitlike, with a simple projecting tooth. Holocene.

Family **LITUOTUBIDAE** Loeblich and Tappan, **n. fam.**

Lituiforminoidinae SAIDOVA, 1981, p. 16 [subfamily; invalid, ICZN Art. 13 (*a*) (*i*)].

Test free, proloculus followed by enrolled portion of elongate and irregularly septate chambers, later uncoiling and with an elongate rectilinear adult stage; aperture simple, terminal. Cretaceous; Holocene.

Type genus: Lituotuba Rhumbler, 1895.

Remarks: No definition was given by Saidova for the subfamily Lituiforminoidinae, placed in the family Tolypamminidae, although it was stated to include two genera. Because the type species of *Lituiforminoides* (=*Lituotuba*) is multilocular, rather than consisting solely of proloculus and undivided tubular chamber, it cannot be included in the Tolypamminidae. The Lituotubidae is here described as a distinct family, differing from the Lituolidae in having fewer and more irregular chambers.

Family **LITUOLIDAE** de Blainville, 1827

Lituolidae SCHULZE 1877, p. 28, nom. corr. pro family Lituacea.
Lituacea DE BLAINVILLE, 1827, p. 380.
Lituolata CROUCH, 1827, p. 40.
Lituolitidae BRODERIP, 1839, p. 321.

Lituolacea AGASSIZ, 1844, p. 15.
Lituolida CARPENTER, 1861, p. 470.
Lituolidea REUSS and FRITSCH, 1861, p. 1.
Lituolideae GÜMBEL, 1870, p. 22.
Lituolidee SCHWAGER, 1876, p. 482.
Lituolina LANKESTER, 1885, p. 847.
Lituoletta HAECKEL, 1894, p. 164.
Lituolinae DELAGE and HÉROUARD, 1896, p. 132.
Lutuolidae KOLTYPIN, 1957, p. 132 (err. cit.).
Lituoloidae GUDINA, 1976, p. 37 (err. cit.).

Early stage enrolled, later may be uncoiled and rectilinear; wall agglutinated; aperture terminal. L. Carboniferous (L. Mississippian) to Holocene.

Subfamily **AMMOMARGINULININAE** Podobina, 1978

Ammomarginulininae PODOBINA, 1978, p. 65.
Ammobaculitinae ALEKSEYCHIK-MITSKEVICH in SUBBOTINA ET AL., 1981, p. 28.

Early stage coiled, later uncoiling; wall simple. L. Carboniferous (L. Mississippian) to Holocene.

Subfamily **FLABELLAMMININAE** Podobina, 1978

Flabellammininae PODOBINA, 1978, p. 68.

Early stage coiled, later uncoiling and flabelliform, less commonly triangular or quadrangular in section, with broad and low uniserial chambers that may be arched centrally; aperture terminal, simple. Jurassic to Holocene.

Subfamily **AMMOASTUTINAE** Loeblich and Tappan, **n. subfam.**

Test compressed, ovate to flabelliform in outline, early chambers in slightly arcuate uniserial series, later chambers in more coiled arrangement, increasing rapidly in length as added, and extending back toward the proloculus on the inner margin; aperture an areal opening in the final chamber face, and may be accompanied by multiple openings near the proximal end of the final chamber. U. Cretaceous to Holocene, shallow brackish water.

Type genus: Ammoastuta Cushman and Brönnimann, 1948.

Remarks: Differs from the Ammomarginulininae and Lituolinae in lacking a true initial coil and rectilinear later stage.

Subfamily **LITUOLINAE** de Blainville, 1827

Lituolinae BRADY, 1884, p. 65, nom. transl. ex family Lituacea.

As in the Ammomarginulininae but with multiple aperture. Triassic to Holocene.

Family **AMMOSPHAEROIDINIDAE** Cushman, 1927

Ammosphaeroidinidae LOEBLICH and TAPPAN, 1982c, p. 27, nom. transl. ex subfamily Ammosphaeroidininae.
Ammosphaeroidinini MIKHALEVICH, 1972, p. 29 (tribe).
Recurvoididae SAIDOVA, 1981, p. 18.

Test streptospirally enrolled, wall agglutinated; aperture interiomarginal or areal. Jurassic to Holocene.

Subfamily **AMMOSPHAEROIDININAE** Cushman, 1927

Ammosphaeroidininae CUSHMAN, 1927, p. 40.

Test streptospirally enrolled, chambers few in number, only those of last whorl visible from exterior. Cretaceous to Holocene.

Subfamily **RECURVOIDINAE** Alekseychik-Mitskevich, 1973

Recurvoidinae ALEKSEYCHIK-MITSKEVICH, 1973, p. 15, 18.
Conglobatoidinae SAIDOVA, 1981, p. 18 [invalid; ICZN Art. 13 (a) (i)].

Test streptospirally enrolled, at least in early stage, chambers numerous. Jurassic to Holocene.

Family **HAPLOPHRAGMIIDAE** Eimer and Fickert, 1899

Haplophragmiidae SIGAL in PIVETEAU, 1952, p. 162, nom. corr. pro family Haplophragmidae.
Haplophragmidae EIMER and FICKERT, 1899, p. 621 (nom. imperf.).
Haplophragmiinae CUSHMAN, 1927, p. 19 (subfamily).
Haplophragminae SAIDOVA, 1981, p. 19 (subfamily, err. cit.).
Ammobaculininae SAIDOVA, 1981, p. 18 (subfamily).

Test streptospirally enrolled in early stage, later uncoiling and rectilinear; wall agglutinated, interior simple; aperture single or multiple. Jurassic to Cretaceous.

Family **NEZZAZATIDAE** Hamaoui and Saint-Marc, 1970

Nezzazatidae HAMAOUI and SAINT-MARC, 1970, p. 331.

Test trochospiral or may become planispiral; interior of each chamber with median plate that may be digitate; wall calcareous, probably agglutinated, imperforate; aperture interiomarginal or areal, single or multiple. Cretaceous.

Subfamily **NEZZAZATINAE** Hamaoui and Saint-Marc, 1970

Nezzazatinae HAMAOUI and SAINT-MARC, 1970, p. 331.

Test trochospiral or planispiral, later may be uncoiled; internal plate of varied form and with basal digitation present in the interior of each chamber; aperture an areal median slit, umbilical, or multiple. Cretaceous.

Subfamily **COXITINAE** Hamaoui and Saint-Marc, 1970

Coxitinae HAMAOUI and SAINT-MARC, 1970, p. 332.

Test trochospiral to planispiral, lenticular to globular; internal structure with median plate between consecutive septa, the plates being terminally bifurcate or digitate; aperture interiomarginal, forming a row of small openings in globular tests. Cretaceous.

Family **BARKERINIDAE** Smout, 1956

Barkerinidae SMOUT, 1956, p. 342.
Barkerininae LOEBLICH and TAPPAN, 1961, p. 280 (subfamily).

Test planispirally coiled, involute, may become uncoiled in later stage, chambers numerous, internally subdivided by transverse interseptal partitions; aperture areal or interiomarginal, single or multiple. L. to U. Cretaceous.

Family **PLACOPSILINIDAE** Rhumbler, 1913

Placopsilinidae CUSHMAN, 1927, p. 41, nom. transl. ex subfamily Placopsilininae.
Placopsilininae RHUMBLER, 1913, p. 444 (subfamily).
Arplacopsinia RHUMBLER, 1913, p. 444 (subfamily; err. emend.).
Placopsinidae YUFEREV, 1967, p. 64 (err. cit.).
Ammocibicidinae SAIDOVA, 1981, p. 17 (subfamily).

Test attached, coiled in early stage, later uncoiled; wall agglutinated, not labyrinthic; aperture terminal, single or multiple. Jurassic to Holocene.

Superfamily **COSCINOPHRAGMATACEA** Thalmann, 1951

Coscinophragmatacea LOEBLICH and TAPPAN, nom. transl. herein, ex subfamily Coscinophragminae.

Test attached, may be coiled in early stage, later uncoiled or branching; wall agglutinated, traversed by large pores. Triassic to Holocene.

Family **LITUOLIPORIDAE** Gušić and Velić, 1978

Lituoliporidae GUŠIĆ and VELIĆ, 1978, p. 87.

Test coiled in early stage, later may be uncoiled; wall agglutinated, traversed by pores. Jurassic.

Family **BIOKOVINIDAE** Gušić, 1977

Biokovinidae GUŠIĆ, 1977, p. 8, 22.

Test enrolled, at least in early stage, later may uncoil; wall coarsely perforate, in section appearing almost keriothecal, and in transverse section appearing honeycomblike; aperture simple, single or multiple. Jurassic.

Family **HADDONIIDAE** Saidova, 1981

Haddoniidae LOEBLICH and TAPPAN, 1982c, p. 27, nom. transl. ex subfamily Haddoninae.
Haddoninae SAIDOVA, 1981, p. 18 (subfamily; nom. imperf.; recte Haddoniinae).

Test attached, coiled to uncoiled and may be branched; wall canaliculate, interior of chambers smoothly finished, aperture terminal, simple to complex. Eocene to Holocene.

Family **COSCINOPHRAGMATIDAE** Thalmann, 1951

Coscinophragmatidae LOEBLICH and TAPPAN, 1982c, p. 27, nom. transl. ex subfamily Coscinophragminae.
Polyphragminae RHUMBLER, 1913, p. 446 (invalid, ICZN Art. 39; based on *Polyphragma* Reuss, 1871, non Quatrefages, 1865).
Arpolyphragmina RHUMBLER, 1913, p. 446 (subfamily; err. emend.).
Coscinophragminae THALMANN, 1951, p. 221 (subfamily).
Coscinophragmatinae LOEBLICH and TAPPAN, 1964a, p. C248 (subfamily).

Similar to the Haddoniidae but with labyrinthic wall. Triassic to Holocene.

Superfamily **LOFTUSIACEA** Brady, 1884

Loftusiacea LOEBLICH and TAPPAN, 1982c, p. 27, nom. transl. ex subfamily Loftusinae.
Alveolophragmiidea SAIDOVA, 1981, p. 18.

Test multilocular, coiling planispiral to streptospiral, axis of coiling of varied length, may uncoil in later stage and be flared or peneropliform; wall agglutinated, with differentiated outer imperforate layer and inner alveolar layer. Jurassic to Holocene.

Family **CYCLAMMINIDAE** Marie, 1941

Cyclamminidae LOEBLICH and TAPPAN, 1982c, p. 27, nom. transl. ex subfamily Cyclammininae.
Alveolophragmiidae SAIDOVA, 1981, p. 18.

Test enrolled, involute, or rarely uncoiling; wall agglutinated, with outer imperforate layer and inner alveolar layer. Jurassic to Holocene.

Subfamily **MESOENDOTHYRINAE** Voloshinova, 1958

Mesoendothyrinae BANNER, 1966, p. 207, nom. transl. ex family Mesoendothyridae.
Mesoendothyridae VOLOSHINOVA in N. K. BYKOVA ET AL., 1958, p. 19.

Test streptospirally coiled, involute; wall agglutinated, outer layer imperforate, interior coarsely alveolar, septa single layered, imperforate; aperture an interiomarginal slit. Jurassic.

Subfamily **ALVEOLOPHRAGMIINAE** Saidova, 1981

Alveolophragmiinae SAIDOVA, 1981, p. 18.

Test planispiral, involute; wall agglutinated, with outer imperforate layer and inner alveolar layer; aperture equatorial and areal. Paleocene to Holocene.

Subfamily **HEMICYCLAMMININAE** Banner, 1966

Hemicyclammininae BANNER, 1966, p. 206, 211.

Test planispiral, at least in early stage, later uncoiling; wall agglutinated, uniformly alveolar; aperture single, a large arch or a slit up the apertural face. U. Jurassic to U. Cretaceous (Cenomanian).

Subfamily **CHOFFATELLINAE** Maync, 1958

Choffatellinae MAYNC, 1958, p. 1.

Test planispirally enrolled, with short axis of coiling, later stage may uncoil; wall agglutinated, with solid outer epidermis and continuous inner alveolar hypodermis, septal structure always a continuation of outer wall structure;

aperture multiple, cribrate within septa and apertural face. L. Jurassic to U. Cretaceous.

Subfamily **CYCLAMMININAE** Marie, 1941

Cyclammininae MARIE, 1941, p. 257.

Similar to the Choffatellinae, but does not uncoil, and septal structure is always differentiated from that of the alveolar hypodermis; aperture single or multiple. Paleocene to Holocene.

Family **SPIROCYCLINIDAE** Munier-Chalmas, 1887

Spirocyclinidae MUNIER-CHALMAS, 1887, p. xxxi.
Spirocyclininae MAYNC, 1950, p. 538 (subfamily).

Test trochospiral, or may become nearly planispiral and peneropliform; chamber interior partially subdivided by septulae and pillars perpendicular to septa; aperture cribrate. Jurassic to Cretaceous.

Family **LOFTUSIIDAE** Brady, 1884

Loftusiidae LISTER in LANKESTER, 1903, p. 142, nom. corr. pro family Loftusina.
Loftusina LANKESTER, 1885, p. 847, nom. transl. ex subfamily Loftusinae.
Loftusinae BRADY, 1884, p. 67 (subfamily; nom. imperf.).
Loftusiinae LOEBLICH and TAPPAN, 1961, p. 280.

Test large, planispiral, with much elongated axis of coiling; chamber interior with septulae or pillars that arise perpendicular to axis of coiling and connect the anterior septal face to the hypodermis of the succeeding chamber; wall agglutinated, with solid outer epidermal layer and inner alveolar and labyrinthic layer; aperture multiple. Cretaceous.

Superfamily **SPIROPLECTAMMINACEA** Cushman, 1927

Spiroplectamminacea LOEBLICH and TAPPAN, 1982c, p. 27, nom. corr. pro superfamily Spiroplectamminidea.
Spiroplectamminidea SAIDOVA, 1981, p. 19, nom. transl. ex subfamily Spiroplectammininae.

Test planispirally coiled in early stage, later biserial; wall agglutinated, non-canaliculate. Carboniferous to Holocene.

Family **SPIROPLECTAMMINIDAE** Cushman, 1927

Spiroplectamminidae SAIDOVA, 1981, p. 19, nom. transl. ex subfamily Spiroplectammininae.
Morulaeplectidae SAIDOVA, 1981, p. 21.

Early stage planispiral or streptospiral, later biserial, rarely becoming uniserial in the later stage; wall agglutinated. Carboniferous to Holocene.

Subfamily **SPIROPLECTAMMININAE** Cushman, 1927

Spiroplectammininae CUSHMAN, 1927, p. 21.
Spiroplectammininea SAIDOVA, 1981, p. 19 (supersubfamily).

Test elongate and narrow, early stage planispirally coiled, later biserial, and may be reduced to uniserial, chambers simple, undivided; wall agglutinated. Carboniferous to Holocene.

Subfamily **VULVULININAE** Saidova, 1981

Vulvulininae SAIDOVA, 1981, p. 20.
Vulvulininea SAIDOVA, 1981, p. 19 (supersubfamily).

Test broad and flattened; planispirally enrolled in early stage, later rectilinear; chambers very broad, low and recurved; aperture terminal in the rectilinear part, a single slit or row of slits. U. Cretaceous to Holocene.

Subfamily **SPIROTEXTULARIINAE** Saidova, 1975

Spirotextulariinae LOEBLICH and TAPPAN, 1982c, p. 27, nom. corr. pro subfamily Spirotextularinae.
Spirotextularinae SAIDOVA, 1975a, p. 119 (nom. imperf.).

Test planispiral to biserial, outer part of each chamber partially or completely separated from inner part by a septulum or secondary septum; wall agglutinated, non-canaliculate. M. Eocene to Holocene.

Subfamily **NOVALESIINAE** Loeblich and Tappan, **n. subfam.**

Test planispirally enrolled in the early stage, later biserial; interior of chambers subdivided by radially arranged vertical partitions that extend in from the outside wall, but do not reach the median septum beween the two series of chambers, rarely may have secondary horizontal partitions within a chamber; aperture interiomarginal. L. Cretaceous.

Type genus: Novalesia Magniez, 1974.

Remarks: Differs from the Spiroplectammininae in the presence of internal partitions within the chambers, and from the Spirotextulariinae in the internal partitions being more numerous per chamber and radially arranged rather than merely cutting off a short peripheral part of the biserial chambers, and in rarely having horizontal as well as vertical partitions.

Subfamily **MORULAEPLECTINAE** Saidova, 1981

Morulaeplectinae SAIDOVA, 1981, p. 21.
Morulaeplectinea SAIDOVA, 1981, p. 21 (supersubfamily).

Early stage streptospirally enrolled, later biserial; wall thin, agglutinated, a single layer of grains; aperture interiomarginal. Holocene.

Superfamily **TROCHAMMINACEA** Schwager, 1877

Trochamminacea LOEBLICH and TAPPAN, 1982c, p. 27, nom. corr. pro superfamily Trochamminidea.
Trochamminidea SAIDOVA, 1981, p. 22, nom. transl. ex family Trochamminidea.
Trochamminini MIKHALEVICH, 1972, p. 19 (tribe).
Remaneicinidea SAIDOVA, 1981, p. 23.

Test multilocular, chambers arranged in low trochospiral

coil, at least in early stage; wall agglutinated, noncanaliculate. Carboniferous to Holocene.

Family **TROCHAMMINIDAE** Schwager, 1877

Trochamminidae LISTER in LANKESTER, 1903, p. 142, nom. corr. pro family Trochamminidea.
Trochamminidea SCHWAGER, 1877, p. 21.
Trochammina LANKESTER, 1885, p. 847.
Trochamminida HAECKEL, 1894, p. 185.
Trochamminae DELAGE and HÉROUARD, 1896, p. 133.
Artrochammidia RHUMBLER, 1913, p. 342 (err. emend.).
Trochammnidae BRAZHNIKOVA in BRAZHNIKOVA ET AL., 1956, p. 51 (err. cit.).
Cystamminellidae VYALOV, 1968, p. 5.
Grochamminidae SULEYMANOV, 1969, p. 51 (err. cit.).
Conotrochamminidae SAIDOVA, 1981, p. 23.

Test trochospirally coiled; wall agglutinated; aperture interiomarginal to areal, single or multiple, and may have supplementary umbilical openings. Carboniferous to Holocene.

Subfamily **TROCHAMMININAE** Schwager, 1877

Trochammininae BRADY, 1884, p. 66, nom. transl. ex family Trochamminidea.
Trochoporininae SOLIMAN, 1972, p. 40.
Tritaxinini MIKHALEVICH, 1972, p. 25 (tribe; nom. imperf.; recte tribe Tritaxini).
Tritaxinae LOEBLICH and TAPPAN, 1982c, p. 27.

Test trochospiral, or may tend to uncoil in later stage; wall agglutinated; aperture interiomarginal. Carboniferous to Holocene.

Subfamily **BYKOVIELLINAE** Loeblich and Tappan, **n. subfam.**

Test with low trochospiral coil of subglobular and rapidly enlarging chambers, tending to uncoil in the final stage; wall agglutinated; aperture areal, terminal, rounded, with a narrow lip. U. Cretaceous.

Type genus: Bykoviella Korchagin, 1964.

Remarks: Differs from the Trochammininae in the rounded areal aperture, and from it and the Trochamminellinae in the tendency to uncoil in the later stage.

Subfamily **ROTALIAMMININAE** Saidova, 1981

Rotaliammininae LOEBLICH and TAPPAN, 1982c, p. 27, nom. corr. pro subfamily Rotaliammina.
Rotaliammina SAIDOVA, 1981, p. 22 (subfamily; nom. imperf.).

Test attached, a low trochospiral coil; wall very thin, flexible, finely agglutinated, with particles held in small amount of cement; aperture at end of umbilical lobe. Holocene.

Subfamily **CONOTROCHAMMININAE** Saidova, 1981

Conotrochammininae SAIDOVA, 1981, p. 23.

Test with high trochospiral coil; wall agglutinated; aperture areal. U. Cretaceous to Paleocene.

Subfamily **TROCHAMMINELLINAE** Brönnimann, Zaninetti and Whittaker, 1983

Trochamminellinae BRÖNNIMANN ET AL., 1983, p. 205.

Chambers in a low trochospiral coil, free in early stage, later may be attached and surrounded by a low spreading area of agglutinated material or "puffermasse"; aperture ovate, areal, on the umbilical side. Holocene.

Subfamily **JADAMMININAE** Saidova, 1981

Jadammininae SAIDOVA, 1981, p. 22.

Test low trochospiral; wall thin and agglutinated, single layered; aperture equatorial, an ovate, V-shaped or slitlike areal opening or openings, and may have an interiomarginal opening in addition. M. to U. Eocene; Holocene.

Remarks: Differs from the Trochamminellinae in the equatorially placed and symmetrical aperture or apertures, that of the Trochamminellinae being on the umbilical side.

Subfamily **POLYSTOMAMMININAE** Brönnimann and Beurlen, 1977

Polystomammininae BRÖNNIMANN and BEURLEN, 1977, p. 81.

Test free, low trochospiral; wall agglutinated, imperforate; primary aperture a curved or angled elongate slit extending from the base of the chamber obliquely up the chamber face toward the ventral side, with supplementary umbilical sutural opening in each chamber. Holocene.

Subfamily **ARENOPARRELLINAE** Saidova, 1981

Arenoparrellinae BRÖNNIMANN ET AL., 1983, p. 205, nom. corr. pro subfamily Arenoparrellininae.
Arenoparrellininae SAIDOVA, 1981, p. 22 (nom. imperf.).

As in the Polystomammininae, but lack umbilical supplementary openings, and may have an interiomarginal slit or multiple areal pores in addition to the oblique slitlike aperture. Holocene.

Family **REMANEICIDAE** Loeblich and Tappan, 1964

Remaneicidae BRÖNNIMANN ET AL., 1983, p. 204 (nom. corr. pro Remaneicinidae).
Remaneicinidae SAIDOVA, 1981, p. 23 (nom. transl. ex subfamily).

Test interior partially subdivided by secondary septula or infolding of the umbilical wall. Holocene.

Subfamily **ASTEROTROCHAMMININAE** Brönnimann, Zaninetti and Whittaker, 1983

Asterotrochammininae BRÖNNIMANN ET AL., 1983, p. 205.

Low trochospiral test with interior partially subdivided by infoldings of the umbilical wall transverse to the septa, no secondary septa; wall finely agglutinated; primary aperture interiomarginal, secondary aperture at umbilical end of chamber lobe. Holocene.

Subfamily **REMANEICINAE** Loeblich and Tappan, 1964

Remaneicinae LOEBLICH and TAPPAN, 1964a, p. C266.

Test attached, trochospiral, chamber interior partially subdivided by secondary septula that may represent mere infoldings from the outer wall; wall agglutinated, thin, imperforate, flexible. Holocene.

Superfamily **VERNEUILINACEA** Cushman, 1911

Verneuilinacea LOEBLICH and TAPPAN, 1982c, p. 28, nom. transl. ex subfamily Verneuilininae.

Test multilocular, triserial or biserial, later may be uniserial; wall agglutinated, non-canaliculate. ? Triassic, Jurassic to Holocene.

Family **TEXTULARIOPSIDAE** Loeblich and Tappan, 1982

Textulariopsidae LOEBLICH and TAPPAN, 1982a, p. 61.

Test free, early stage biserial, or may have a single adventitious chamber producing a pseudotriserial base, later may be biserial, loosely biserial or uniserial. L. Jurassic to U. Cretaceous.

Family **VERNEUILINIDAE** Cushman, 1911

Verneuilinidae CUSHMAN, 1927, p. 25, nom. transl. ex subfamily Verneuilininae.
Verneuilininae CUSHMAN, 1911, p. 52 (subfamily).
Spiroplectininae CUSHMAN, 1927, p. 62 (subfamily).
Spiroplectinatinae CUSHMAN, 1928, p. 235 (subfamily).
Verneuilidae DAIN, 1934, p. 16 (err. cit.).
Verneulinidae KOLTYPIN, 1957, p. 100, 109, 120, 121, 131, 139, 149 (err. cit.).
Verneilidae KRAEVA, 1971, p. 93 (err. cit.).
Verneuilinoidesinae SULEYMANOV, 1973, p. 35 (subfamily; nom. imperf.).
Gaudryininae BALAKHMATOVA, 1973, p. 50 (subfamily).
Verneuilinoidinae SULEYMANOV, 1978, p. 40 (subfamily).
Tritaxiidae PLOTNIKOVA, 1979, p. 14.
Verneuilinae PANDEY, 1981, p. 87 (subfamily; err. cit.).
Barbourinellinae SAIDOVA, 1981, p. 25 (subfamily).
Bermudezininae SAIDOVA, 1981, p. 25 (subfamily).
Bermudezininea SAIDOVA, 1981, p. 25 (supersubfamily).
Verneuilininea SAIDOVA, 1981, p. 24 (supersubfamily).
Glaucommininae SAIDOVA, 1981, p. 23 (subfamily; nom. imperf.).

Early stage triserial, later may be biserial, irregularly biserial or uniserial; aperture interiomarginal, may become slitlike, oval or rounded and areal in biserial and uniserial forms. U. Triassic, Jurassic to Holocene.

Family **PLECTORECURVOIDIDAE** Loeblich and Tappan, 1964

Plectorecurvoididae SAIDOVA, 1981, p. 20, nom. transl. ex subfamily Plectorecurvoidinae.
Plectorecurvoidinae LOEBLICH and TAPPAN, 1964a, p. 258 (subfamily).
Plectorecuroidinae SAIDOVA, 1981, p. 20 (subfamily; err. cit.).

Test biserial, with biserial axis planispirally enrolled, as in the calcareous Cassidulinidae. L. Cretaceous.

Family **PSEUDOBOLIVINIDAE** Wiesner, 1931

Pseudobolivinidae LOEBLICH and TAPPAN, 1982c, p. 28, nom. transl. ex subfamily Pseudobolivininae.
Pseudobolivininae WIESNER, 1931, p. 98 (subfamily).
Lacroixininae SAIDOVA, 1981, p. 21 (subfamily).
Lacroixininea SAIDOVA, 1981, p. 21 (supersubfamily).

Test biserial, or loosely biserial with cuneate chambers in later stage; wall thin, agglutinated; aperture oval to rounded, areal to terminal and may be produced on a neck, single or multiple. Holocene.

Family **NOURIIDAE** Chapman and Parr, 1936

Nouriidae LOEBLICH and TAPPAN, 1961, p. 279, nom. transl. ex subfamily Nouriinae.
Nouriinae CHAPMAN and PARR, 1936, p. 149 (subfamily).
Nauriidae K. V. FURSENKO in GUDINA, 1979, p. 23 (err. cit.).

Chambers in loose spiral or biserial, strongly overhanging at sides; aperture terminal and ovate, may be produced on a neck. Cretaceous to Holocene.

Superfamily **TAWITAWIACEA** Loeblich and Tappan, 1961

Tawitawiacea LOEBLICH and TAPPAN, nom. corr. herein, pro superfamily Tawitawiidea.
Tawitawiidea SAIDOVA, 1981, p. 21, nom. transl. ex subfamily Tawitawiinae.
Pavonitinidea SAIDOVA, 1981, p. 25.

Test large, biserial, chambers broad and low; interior partially divided by numerous vertical pillars that project downward from the upper face of the chambers; aperture a high arch at the base of the apertural face or may become terminal and multiple, with a single row of pores. Oligocene to Holocene.

Family **TAWITAWIIDAE** Loeblich and Tappan, 1961

Tawitawiidae SAIDOVA, 1981, p. 21, nom. transl. ex subfamily Tawitawiinae.
Tawitawiinae LOEBLICH and TAPPAN, 1961, p. 282 (subfamily).
Tawitawiinea SAIDOVA, 1981, p. 21 (supersubfamily).
Pavonitininae LOEBLICH and TAPPAN, 1961, p. 283 (subfamily).
Pavonitinidae LOEBLICH and TAPPAN, 1964a, p. C291.
Pavonitininea SAIDOVA, 1981, p. 26 (supersubfamily).
Phyllopsamiinae SAIDOVA, 1981, p. 22 (subfamily).
Phyllopsamiinea SAIDOVA, 1981, p. 22 (supersubfamily).

Test free, biserial, chambers partially subdivided by septulae that are perpendicular to the septal face; wall agglutinated. Oligocene to Holocene.

Superfamily **ATAXOPHRAGMIACEA** Schwager, 1877

Ataxophragmiacea GRIGYALIS, 1978, p. 8, nom. correct. pro superfamily Ataxaphragmiidae.
Ataxaphragmiidae SULEYMANOV, 1969, p. 50 (superfamily; nom. imperf.), nom. transl. ex family Ataxophragmidea.
Ataxophragmiidea SAIDOVA, 1981, p. 26.
Textulariellidea SAIDOVA, 1981, p. 27.
Hagenowinoididea SAIDOVA, 1981, p. 25.
Globotextulariidae SAIDOVA, 1981, p. 23 (superfamily; nom. imperf.).

Test trochospiral, may be reduced to biserial or uniserial in later stages, or may become cyclic; chamber interior may be subdivided by secondary partitions; wall agglutinated, non-canaliculate. ? U. Triassic, Jurassic to Holocene.

Family **ATAXOPHRAGMIIDAE** Schwager, 1877

Ataxophragmiidae GALLOWAY and HEMINWAY, 1941, p. 320, nom. corr. pro family Ataxophragmidea.
Ataxophragmidea SCHWAGER, 1877, p. 22.
Ataxofragmiidae K. V. MIKLUKHO-MAKLAY and UKHARSKAYA, 1975, p. 46 (err. cit.).
Ataxophragmmiidae UKHARSKAYA, 1981, p. 49 (err. cit.).

Test trochospiral, three or more chambers per whorl in early stage, later may have an increased or decreased number; aperture a high narrow arch or straight to curved interiomarginal or areal slit that may be bordered by a lip. Cretaceous to Paleocene.

Subfamily **ATAXOPHRAGMIINAE** Schwager, 1877

Ataxophragmiinae GALLOWAY, 1933, p. 211, nom. transl. ex family Ataxophragmidea.
Ataxophragmiinea SAIDOVA, 1981, p. 26 (supersubfamily).

Test with three or more chambers in early whorl, later may increase in number, but is never reduced to biserial or uniserial in the axis of initial coiling, chamber interior simple. Cretaceous to Paleocene.

Subfamily **PERNERININAE** Loeblich and Tappan, **n. subfam.**

Chamber interior with peripheral internal buttresses, partitions or chamberlets. Cretaceous.

Type genus: Pernerina Cushman, 1933.

Remarks: Differs from other Ataxophragmiidae in the internal divisions of the chambers.

Family **DOROTHIIDAE** Balakhmatova, 1972

Dorothiidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Dorothiinae.

Early stage trochospiral, with four or more chambers per whorl, later may be reduced to biserial or uniserial; wall agglutinated, with organic inner lining; aperture interiomarginal or areal and rounded, without surrounding lip or neck. Jurassic to Holocene.

Subfamily **DOROTHIINAE** Balakhmatova, 1972

Dorothiinae BALAKHMATOVA, 1972, p. 71.

Chamber interior simple. Jurassic to Holocene.

Subfamily **MATANZIINAE** Saidova, 1981

Matanziinae SAIDOVA, 1981, p. 26.

Chamber interior subdivided by internal buttresses, partitions or tiers of chamberlets; aperture interiomarginal. Cretaceous to Miocene.

Family **EGGERELLIDAE** Cushman, 1937

Eggerellidae HOFKER, 1957, p. 35, nom. transl. ex subfamily Eggerellinae.

Test trochospirally enrolled, at least in early stage, later may be reduced to triserial, biserial or uniserial; wall agglutinated, commonly of calcareous particles, on a thick but commonly flexible organic base; aperture an interiomarginal slit to areal. Paleocene to Holocene.

Subfamily **EGGERELLINAE** Cushman, 1937

Eggerellinae CUSHMAN, 1937, p. 30.
Eggerellinea SAIDOVA, 1981, p. 24 (supersubfamily).
Karreriellinae SAIDOVA, 1981, p. 24.
Multifidellinae SAIDOVA, 1981, p. 24.
Verneuillinullinae SAIDOVA, 1981, p. 24 (nom. imperf.; recte subfamily Verneuilinullinae).

Test trochospiral in early stage, later reduced to triserial; aperture a slit just above base of the final chamber, may be completely encircled by a lip. Paleocene to Holocene.

Subfamily **LIEBUSELLINAE** Saidova, 1981

Liebusellinae SAIDOVA, 1981, p. 27.
Jarvisellinae SAIDOVA, 1981, p. 26.
Jarvisellinea SAIDOVA, 1981, p. 26 (supersubfamily).

Test trochospiral, may be reduced to three or less chambers per whorl in the adult, chamber interior subdivided by secondary partitions. Eocene to Holocene.

Family **GLOBOTEXTULARIIDAE** Cushman, 1927

Globotextulariidae SAIDOVA, 1981, p. 23, nom. transl. ex subfamily Globotextulariinae.
Globotextulariinae CUSHMAN, 1927, p. 40 (subfamily).
Globotextulariinea SAIDOVA, 1981, p. 24 (supersubfamily).

Test coiled in high trochospiral, with four chambers per whorl; wall coarsely agglutinated; aperture interiomarginal. Holocene.

Family **TEXTULARIELLIDAE** Grönhagen and Luterbacher, 1966

Textulariellidae GRÖNHAGEN and LUTERBACHER, 1966, p. 244.
Textulariellinae SAIDOVA, 1981, p. 27 (subfamily).
Textulariellinea SAIDOVA, 1981, p. 27 (supersubfamily).
Hagenowinoididae SAIDOVA, 1981, p. 25.
Hagenowinoidinea SAIDOVA, 1981, p. 25 (supersubfamily).
Hagenowinoidinae SAIDOVA, 1981, p. 25 (subfamily).

Test trochospiral in early stage with three or more chambers per whorl, later becoming triserial, biserial or uniserial; wall agglutinated, with alveolar inner structure. Miocene to Holocene.

Family **CUNEOLINIDAE** Saidova, 1981

Cuneolinidae BRÖNNIMANN, DECROUEZ and ZANINETTI, 1983, p. 5, nom. transl. ex subfamily Cuneolininae.

Test conical to subflabelliform, trochospiral in early stage, with as many as five chambers per whorl, rapidly reduced to biserial, test strongly compressed perpendicular to plane of biseriality; chambers subdivided by many septulae extending from the outer wall toward the junction of the two series of chambers; wall agglutinated, with imperforate outer layer and reticulate subepidermal layer;

aperture consists of a series of pores along the base of the final chamber face. ? U. Triassic, Cretaceous.

Subfamily **CUNEOLININAE** Saidova, 1981

Cuneolininae SAIDOVA, 1981, p. 26.

Chambers subdivided by radial partitions and may have horizontal partitions; wall agglutinated, imperforate; aperture simple to multiple, a row of pores at the base of the septal face. ? U. Triassic, Cretaceous.

Subfamily **SABAUDIINAE** Brönnimann, Decrouez and Zaninetti, 1983

Sabaudiinae BRÖNNIMANN ET AL., 1983, p. 5.

Chambers subdivided by vertical partitions, and may have horizontal ones; embryonal stage with double wall, a microgranular inner layer and a hyaline radial outer layer (perforate?), biserial stage with imperforate agglutinated wall; aperture simple in a basal groove. Cretaceous (U. Hauterivian to L. Cenomanian).

Family **DICYCLINIDAE** Loeblich and Tappan, 1964

Dicyclinidae LOEBLICH and TAPPAN, 1964a, p. C301.
Dicyclininae LOEBLICH and TAPPAN, 1964a, p. C302 (subfamily).

Test free, discoidal, chambers cyclical and added biserially, partly subdivided by transverse or radial partitions or both to form numerous small chamberlets; wall of finely agglutinated calcareous particles, with imperforate epidermal layer; aperture multiple, peripheral. Cretaceous.

Family **PFENDERINIDAE** Smout and Sugden, 1962

Pfenderinidae SMOUT and SUGDEN, 1962, p. 582.

Test trochospiral, later stage may have reduced number of chambers per whorl; chamber interior may be subdivided by vertical or horizontal partitions or both; wall agglutinated, with imperforate outer layer covering a reticulate subepidermal layer produced by plates extending inward from the outer wall, leaving alveolar spaces between. Jurassic to Cretaceous.

Subfamily **PFENDERININAE** Smout and Sugden, 1962

Pfenderininae LOEBLICH and TAPPAN, 1964a, p. C291, nom. transl. ex family Pfenderinidae.

Test trochospiral about a central column; outer part of chambers with subepidermal partitions projecting inward from the wall, region between the partitions secondarily infilled by shell material. Jurassic to U. Cretaceous.

Subfamily **KURNUBIINAE** Redmond, 1964

Kurnubiinae REDMOND, 1964, p. 252.

Test trochospiral about a central column in early stage; lacks secondary infilling of the cavities that remain between the subepidermal partitions. Jurassic to U. Cretaceous.

Family **COSKINOLINIDAE** Moullade, 1965

Coskinolinidae MOULLADE, 1965, p. 4033.
Coskinolininae CIMERMAN, 1969, p. 115 (subfamily).
Coskinolilninea SAIDOVA, 1981, p. 26 (supersubfamily; nom. imperf.).

Test conical, early stage trochospiral, then becomes uniserial and rectilinear, with broad, low chambers, interior subdivided by pillars or irregular partitions; wall agglutinated, of granular calcite, single layered; aperture basal, cribrate. Jurassic to Eocene.

Superfamily **TEXTULARIACEA** Ehrenberg, 1839

Textulariacea GRIGYALIS, 1978, p. 8, nom. transl. ex family Textularina.

Test trochospiral, triserial or biserial in early stages; later may be biserial or uniserial; wall agglutinated, canaliculate. Cretaceous to Holocene.

Family **TEXTULARIIDAE** Ehrenberg, 1839

Textulariidae CHAPMAN, 1900, p. 9, nom. corr. pro family Textularina.
Textularina EHRENBERG, 1839, p. 200.
Textularidae D'ORBIGNY in DE LA SAGRA, 1839, p. 140.
Textularina AGASSIZ, 1844, p. 4.
Textilarideae REUSS, 1860, p. 231.
Textilaridea REUSS and FRITSCH, 1861, p. 3.
Textularida SCHMARDA, 1871, p. 164.
Textilarida JONES in GRIFFITH and HENFREY, 1875, p. 320.
Plecanioidea SCHWAGER, 1877, p. 22.
Textilariidae JONES, 1895, p. 140.
Textularinae DELAGE and HÉROUARD, 1896, p. 140.
Textulinidae RHUMBLER, 1913, p. 339.
Artextulidia RHUMBLER, 1913, p. 342 (err. emend.).

Test biserial, at least in early stage, later may be reduced to uniserial; wall agglutinated, canaliculate; aperture interiomarginal to areal, single or multiple. Paleocene to Holocene.

Subfamily **TEXTULARIINAE** Ehrenberg, 1839

Textulariinae CHAPMAN, 1900, p. 9, nom. correct. pro subfamily Textularinae.
Textularinae CARPENTER, PARKER and JONES, 1862, p. 189, nom. transl. ex family Textularina.
Textilarida SCHULTZE, 1854, p. 52.
Textilaridae SCHWAGER, 1877, p. 21.
Textilaria MARRIOTT, 1878, p. 30.
Textularidae BÜTSCHLI in BRONN, 1880, p. 203.
Textilariinae JONES, 1895, p. 141.
Textularinea SAIDOVA, 1981, p. 20 (supersubfamily; nom. imperf.).
Bigenerininae SAIDOVA, 1981, p. 20.
Bigenerininea SAIDOVA, 1981, p. 20 (supersubfamily).

Test free, aperture basal, at least in early stage, may become areal in uniserial stage when present. Paleocene to Holocene.

Subfamily **PLANCTOSTOMATINAE** Loeblich and Tappan, **n. subfam.**

Test free, aperture areal, and may be produced on a neck, single to cribrate. Eocene to Holocene.

Type genus: Planctostoma Loeblich and Tappan, 1955.

Remarks: Differs from the Textulariinae in having a terminal and cribrate aperture.

Subfamily **TEXTULARIOIDINAE** Loeblich and Tappan, **n. subfam.**

Test attached in early stage, later may grow free of attachment; aperture a low arch at base of final chamber. Holocene.

Type genus: Textularioides Cushman, 1911.

Remarks: Differs from the Textulariinae in being attached in the early stage.

Family **VALVULINIDAE** Berthelin, 1880

Valvulinidae BERTHELIN, 1880, p. 16.
Valvulininae SCHUBERT, 1921, p. 179 (subfamily).
Clavulininae BALAKHMATOVA, 1973, p. 53 (subfamily).

Test triserial in early stage, later may have an increased number of chambers per whorl, or may become uniserial; wall agglutinated, canaliculate; aperture with valvular tooth or flap at least in early stage, may become multiple and areal in later stage. Paleocene to Holocene.

Family **CHRYSALIDINIDAE** Neagu, 1968

Chrysalidinidae LOEBLICH and TAPPAN, 1982c, p. 28, nom. transl. ex subfamily Chrysalidininae.
Chrysalidininae NEAGU, 1968, p. 120 (subfamily).

Test triserial, later biserial, chambers globular; wall finely agglutinated, canaliculate; aperture multiple, covering a large area of the apertural face which is supported by pillars. Cretaceous to Eocene.

Superfamily **CYCLOLINACEA** Loeblich and Tappan, 1964

Cyclolinacea LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Cyclolininae.

Test discoidal, early stage may be coiled in microspheric form, later with cyclical or annular chambers in a single layer or with numerous chambers; in advanced forms chambers may be subdivided by parallel or vertical partitions. L. Jurassic to U. Cretaceous.

Family **CYCLOLINIDAE** Loeblich and Tappan, 1964

Cyclolinidae LOEBLICH and TAPPAN, *nom. transl. herein ex subfamily* Cyclolininae.

Test discoid, microspheric stage may have small coil, later with annular or cyclical chambers that may be subdivided by pillars or partitions. Cretaceous.

Subfamily **CYCLOLININAE** Loeblich and Tappan, 1964

Cyclolininae LOEBLICH and TAPPAN, 1964a, p. C301.

Single layer of cyclical chambers not subdivided by radial partitions. Cretaceous (Infravalanginian to Cenomanian).

Subfamily **CYCLOPSINELLINAE** Loeblich and Tappan, **n. subfam.**

Cyclical chambers, medial region of chambers with numerous radial pillars but no subdivisions present in external subepidermal region; *radial stolon system.* U. Cretaceous (Cenomanian to Santonian).

Type genus: Cyclopsinella Galloway, 1933.

Remarks: Differs from the Cyclolininae in having radial pillars in the central part of the chambers, from the Dicyclinidae and Orbitopsellidae in having only a single layer of chambers, and from the Ilerdorbinae in having radial stolons.

Subfamily **ILERDORBINAE** Hottinger and Caus, 1982

Ilerdorbinae HOTTINGER and CAUS, 1982, p. 813.

Test planispiral in early stage, with chambers becoming annular; outer part of chambers subdivided by parallel and perpendicular partitions; oblique stolon system. Cretaceous (Valanginian to Campanian).

Family **ORBITOPSELLIDAE** Hottinger and Caus, 1982

Orbitopsellidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily.
Orbitopsellinae HOTTINGER and CAUS, 1982, p. 813 (subfamily).

Test coiled in early stage, later with cyclic growth and with numerous chambers rather than a single or double layer; exoskeleton simple, without subepidermal partitions, stolon system radial; apertures in alternating arrangement. L. Jurassic (Lias), U. Cretaceous (U. Santonian).

Superfamily **ORBITOLINACEA** Martin, 1890

Orbitolinacea LOEBLICH and TAPPAN, 1982c, p. 28, nom. transl. ex family Orbitolinidae.

Test conical, chambers numerous, partially subdivided by radial or transverse partitions, or with interseptal pillars; wall agglutinated. Jurassic to Eocene.

Family **DICTYOPSELLIDAE** Brönniman, Zaninetti and Whittaker, 1983

Dictyopsellidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily.
Dictyopsellinae BRÖNNIMAN ET AL., 1983, p. 206 (subfamily).
Dictyopsinae BRÖNNIMANN ET AL., 1983, p. 202 (subfamily; err. cit.).

Low conical test, globular proloculus followed by broad low semilunate chambers as seen from spiral side, subtriangular from umbilical side, with prolongation over the umbilical area, sutures nearly radial on umbilical side, chamber interior with numerous radial beams perpendicular to outer wall, apertural face and septa, proloculus and all later chambers with shallow secondary beams perpendicular to the two faces of the test forming a prominent subepidermal network; wall finely agglutinated; primary aperture interiomarginal, with small secondary openings on the opposite side of the final chamber opening beneath the umbilical flap. U. Cretaceous (Cenomanian to Santonian).

Family **ORBITOLINIDAE** Martin, 1890

Orbitolinidae MARTIN, 1890, p. 226.
Arorbitolidia RHUMBLER, 1913, p. 342 (err. emend.).
Orbitolinida COPELAND, 1956, p. 186 (err. emend.).

Test conical; early stage trochospiral to pseudoplanispiral, then rectilinear with broad, low chambers subdivided by marginal subepidermal partitions, central zone containing pillars or vertical partitions; megalospheric embryonal apparatus simple (consisting of protoconch and deuteroconch) to complex (with one or two additional zones); wall trilaminar, with endoskeleton of transparent calcite partly covered by secondary granular calcite containing organic material, and may incorporate some agglutinated particles; aperture consists of numerous pores in the central zone, at the exterior surface of the chamber or in the partitions. Jurassic to Eocene.

Subfamily **DICTYOCONINAE** Moullade, 1965

Dictyoconinae MOULLADE, 1965, p. 4032.

Embryonal apparatus reduced to proloculus, composed of protoconch and deuteroconch. Jurassic to Eocene.

Subfamily **ORBITOLININAE** Martin, 1890

Orbitolininae CUSHMAN in EASTMAN, 1913, p. 27, nom. transl. ex family Orbitolinidae.

Test with complex embryonal apparatus, may have a central reticular zone or one with pillars. Cretaceous.

Suborder **FUSULININA** Wedekind, 1937

Fusulinina LOEBLICH and TAPPAN, 1961, p. 219, nom. corr. pro suborder Fusulinacea.
Cribrostomacea WEDEKIND, 1937, p. 79.
Cribrospiracea WEDEKIND, 1937, p. 79.
Fusulinacea WEDEKIND, 1937, p. 79.
Endothyrida FURSENKO, 1958, p. 23 (order).
Fusulinida FURSENKO, 1958, p. 23 (order).
Palaeotextulariina HOHENEGGER and PILLER, 1975, p. 84.
Tournayellida HOHENEGGER and PILLER, 1975, p. 79 (order).
Rotaliea MIKHALEVICH, 1980a, p. 55 (class; partim).
Rotaliata MIKHALEVICH, 1980a, p. 56 (subclass; partim).
Parathuramminida MIKHALEVICH, 1980a, p. 57 (order).
Fusulinoida MIKHALEVICH, 1980a, p. 56 (superorder).
Ozawainellida SOLOV'EVA, 1980, p. 20 (order).
Biseriamminida MIKHALEVICH, 1981, p. 39 (order).
Tetrataxida MIKHALEVICH, 1981, p. 39 (order).
Archaediscina HAYNES, 1981, p. 137.
Staffellina L. ZHANG, Y. WANG and J. WANG, 1981, p. 35 (suborder).

Test wall of homogeneously microgranular calcite, of tightly packed equidimensional subangular crystals, a few μm in diameter. Advanced forms with wall differentiated into two or more layers. Ordovician to Triassic.

Superfamily **PARATHURAMMINACEA** E. V. Bykova, 1955

Parathuramminacea LOEBLICH and TAPPAN, 1961, p. 283, nom. corr. pro superfamily Parathuramminidea.
Parathuramminidea FURSENKO in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 174, nom. transl. ex family Parathuramminidae.

Test unilocular, globular to elongate, or may consist of a cluster of such chambers. Silurian to Triassic.

Family **PARATHURAMMINIDAE** E. V. Bykova, 1955

Parathuramminidae E. V. BYKOVA in E. V. BYKOVA and POLENOVA, 1955, p. 15.
Archaesphaeridae MALAKHOVA, 1956, p. 87.
Usloniinae A. D. MIKLUKHO-MAKLAY, 1963, p. 144 (subfamily).
Uslonianinae A. D. MIKLUKHO-MAKLAY, 1963, p. 151 (subfamily; err. cit.).
Archaesphaerinae ANTROPOV, 1967 (subfamily; non vidi, cited in KOTLYAR, 1982, p. 10).
Usloniidae CONIL and LONGERSTAEY in CONIL ET AL., 1980, p. 20.
Usloninae CONIL and LONGERSTAEY in CONIL ET AL., 1980, p. 20 (subfamily; err. cit.).

Globular to elongate chamber or cluster of chambers; aperture multiple at ends of tubular projections, or absent. Silurian to Mississippian.

Superfamily **EARLANDIACEA** Cummings, 1955

Earlandiacea LOEBLICH and TAPPAN, 1982c, p. 28, nom. transl. ex family Earlandiidae.

Test with globular proloculus and undivided straight or enrolled tubular second chamber. Silurian to Triassic.

Family **EARLANDIIDAE** Cummings, 1955

Earlandiidae CUMMINGS, 1955, p. 227.
Earlandiinae POKORNÝ, 1958, p. 169 (subfamily).

Test free, tubular, nonseptate. Silurian to Triassic.

Family **PSEUDOAMMODISCIDAE** Conil and Lys, 1970

Pseudoammodiscidae CONIL and LYS in CONIL and PIRLET, 1970, p. 52.
Tournarchaediscinae CONIL and PIRLET in PIRLET and CONIL, 1973, p. 282.

Proloculus followed by planispiral, trochospiral or streptospiral undivided tubular second chamber; aperture simple, at the open end of the tube. Devonian to Mississippian.

Superfamily **ARCHAEDISCACEA** Cushman, 1928

Archaediscacea PILLER, 1978, p. 96, 103, nom. transl. ex subfamily Archaediscinae.

Proloculus followed by planispiral, trochospiral or streptospiral, enrolled tubular second chamber; wall may have more than one layer, and may have secondary axial thickening on one or both sides. Mississippian to Permian.

Family **ARCHAEDISCIDAE** Cushman, 1928

Archaediscidae CHERNYSHEVA, 1948, p. 151, nom. transl. ex subfamily Archaediscinae.
Archaeodiscidae BROWNE and POHL, 1973, p. 171 (err. cit.).
Archaedisidae BROWNE and POHL, 1973, p. 197 (err. cit.).

Test free, discoidal to globular; proloculus followed by enrolled undivided tubular chamber, although the latter may have pseudochambers; wall calcareous, formed of an inner dark microgranular layer that tends to be lost in advanced taxa, and a clear radially built more or less perforate outer layer. Mississippian to Permian.

Subfamily **AMMARCHAEDISCINAE** Conil and Pirlet, 1973

Ammarchaediscinae CONIL and PIRLET in PIRLET and CONIL, 1973, p. 271.
Planoarchaediscinae MAMET, 1975, p. 48.

Proloculus followed by continuous, undivided and spirally wound second chamber, coiling may or may not be symmetrical; microcrystalline wall of two inequally developed layers, with important and continuous dark inner layer and rudimentary hyaline pseudoradial layer, no secondary deposits; aperture simple. Mississippian.

Subfamily **ARCHAEDISCINAE** Cushman, 1928

Archaediscinae CUSHMAN, 1928, p. 209.

Proloculus followed by enrolled undivided tubular chamber that may be planispiral or variable in coiling; two-layered wall of more or less well-developed inner layer, and well-developed hyaline radial layer, laterally thickened, but no stellate formation in interior, and no chamber nodosities. Mississippian to Permian.

Subfamily **ASTEROARCHAEDISCINAE** A. D. Miklukho-Maklay, 1957

Asteroarchaediscinae A. D. MIKLUKHO-MAKLAY, 1957, p. 37.
Astroarchaediscinae BROWNE and POHL, 1973, p. 206 (err. cit.).

Proloculus followed by enrolled undivided tubular chamber, with variable coiling, ranging from planispiral to oscillating or sigmoidal as seen in section; wall with microgranular inner layer reduced or absent but hyaline radial layer present to well developed, central stellate portion well developed, chamber lumen may be partially filled by secondary deposits, and nodosities and surface rugosities may be present. Mississippian to Permian.

Family **LASIODISCIDAE** Reytlinger, 1956

Lasiodiscidae REYTLINGER, 1956, p. 74.
Lasiodiscdae RAUZER-CHERNOUSOVA and REYTLINGER, 1957, p. 112 (err. cit.).

Test discoidal to conical, proloculus followed by undivided enrolled tubular chamber; wall with finely granular dark inner layer, and clear, vitreous and radially fibrous outer layer concentrated particularly in the umbilical region where it may form tubercles or pillars and may be perforated by canal-like fissures; aperture at end of tubular chamber, and additional supplementary openings may occur along the spiral suture between successive whorls. Mississippian to Permian.

Superfamily **MORAVAMMINACEA** Pokorný, 1951

Moravamminacea LOEBLICH and TAPPAN, 1982c, p. 28, nom. transl. ex subfamily Moravammininae.

Proloculus followed by tubular enrolled or rectilinear second chamber; periodic growth results in incipient or partial septa. Devonian to Mississippian.

Family **CALIGELLIDAE** Reytlinger, 1959

Caligellidae REYTLINGER in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 175.
Calligellidae PRONINA, 1978, p. 3 (err. cit.).

Test attached, proloculus followed by straight to curved tubular part with incipient septa projecting inward from the wall. Devonian to Mississippian.

Family **MORAVAMMINIDAE** Pokorný, 1951

Moravamminidae LOEBLICH and TAPPAN, 1961, p. 283, nom. transl. ex subfamily Moravammininae.
Moravammininae POKORNÝ, 1951, p. 7 (subfamily).

Test attached, tubular, and may be enrolled about attachment; irregularly septate; wall microgranular; aperture terminal. M. to U. Devonian.

Family **PARATIKHINELLIDAE** Loeblich and Tappan, **n. fam.**

Paratikhinellidae LOEBLICH and TAPPAN, 1982c, p. 29, nom. nud.

Test free, elongate, interior partially subdivided by incomplete septa; wall of microgranular calcite, single-layered; aperture terminal. U. Devonian (Frasnian) to L. Carboniferous (Avonian).

Type genus: Paratikhinella Reytlinger, 1954.

Remarks: The Earlandiidae differ in being non-septate, and the Nodosinellidae in being distinctly septate.

Superfamily **NODOSINELLACEA** Rhumbler, 1895

Nodosinellacea LOEBLICH and TAPPAN, 1982c, p. 29, nom. transl. ex family Nodosinellidae.

Test of one or more distinct chambers; wall with microgranular outer layer and fibrous inner layer, or may be single-layered. Ordovician to Permian.

Family **EARLANDINITIDAE** Loeblich and Tappan, **n. fam.**

Test free, elongate, uniserial, straight to slightly arcuate; wall of microgranular calcite, single-layered; aperture terminal and central, single or multiple. Ordovician to Pennsylvanian.

Type genus: Earlandinita Cummings, 1955.

Remarks: Differs from other Nodosinellacea in being distinctly chambered and rectilinear, with single-layered wall.

Family **TUBERITINIDAE** A. D. Miklukho-Maklay, 1958

Tuberitinidae A. D. MIKLUKHO-MAKLAY, 1958, p. 134.
Tuberitininae LOEBLICH and TAPPAN, 1961, p. 284 (subfamily).
Neotuberitininae A. D. MIKLUKHO-MAKLAY, 1963, p. 150, 155 (subfamily).

Test attached, consisting of one or more subhemispherical chambers; wall calcareous, microgranular, surface commonly punctate; no distinct aperture. Silurian to Permian.

Family **NODOSINELLIDAE** Rhumbler, 1895

Nodosinellidae RHUMBLER, 1895, p. 85.
Nodosinellida COPELAND, 1956, p. 186 (err. emend.).
Nodosinellinae LOEBLICH and TAPPAN, 1961, p. 285 (subfamily).

Test free, uniserial; wall double, with microgranular outer layer and fibrous or perforate inner layer; aperture terminal. U. Devonian to Permian.

Superfamily **GEINITZINACEA** Bozorgnia, 1973

Geinitzinacea LOEBLICH and TAPPAN, nom. transl. herein ex family Geinitzinidae.

Test uniserial; rounded, ovate or fusiform in section; wall with dark microgranular inner layer and radially fibrous outer layer, advanced forms with secondary lateral thickening. Devonian to Permian.

Family **GEINITZINIDAE** Bozorgnia, 1973

Geinitzinidae BOZORGNIA, 1973, p. 149.
Palaeonodosariidae KRISTAN-TOLLMANN, 1964b, p. 63 (invalid; ICZN Arts. 13 (a) (i) and 29).
Lunucamminidae HAYNES, 1981, p. 137.

Test uniserial, early forms rounded in section, later ones compressed and ovate in section; wall with thicker light-colored hyaline radiate layer and thin, dark, granular inner layer; aperture terminal, rounded to ovate. Devonian to Permian.

Family **PACHYPHLOIIDAE** Loeblich and Tappan, **n. fam.**

Test free, uniserial, compressed, with broad low chambers recurved at the extremities; wall microgranular, calcareous, with secondary lamellar thickening on both sides of test. L. to U. Permian.

Type genus: Pachyphloia Lange, 1925.

Remarks: Differs from the Geinitzinidae in the prominent lamellar thickening on each side of the test.

Superfamily **COLANIELLACEA** Fursenko, 1959

Colaniellacea HAYNES, 1981, p. 137, nom. transl. ex subfamily Colaniellinae.

Test uniserial, chambers strongly overlapping, internally subdivided by vertical radial partitions; wall with outer vitreous layer and finely granular inner layer; aperture rounded to radiate. U. Devonian to Permian.

Family **COLANIELLIDAE** Fursenko, 1959

Colaniellidae LOEBLICH and TAPPAN, 1961, p. 285, nom. transl. ex subfamily Colaniellinae.
Colaniellinae FURSENKO in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 251 (subfamily).

As in the superfamily.

Superfamily **PTYCHOCLADIACEA** Elias, 1950

Ptychocladiacea LOEBLICH and TAPPAN, nom. transl. herein ex family Ptychocladiidae.

Test attached, branching or spreading, uniserial; wall microgranular calcareous, banded, with transverse tubuli; no distinct aperture. U. Pennsylvanian.

Family **PTYCHOCLADIIDAE** Elias, 1950

Ptychocladiidae ELIAS, 1950, p. 288.
Ptychocladiinae LOEBLICH and TAPPAN, 1961, p. 285 (subfamily).

As in the superfamily.

Superfamily **PALAEOTEXTULARIACEA** Galloway, 1933

Palaeotextulariacea HABEEB, 1979, p. 82, nom. transl. ex subfamily Palaeotextulariinae.

Test biserial, enrolled biserial, or may become uniserial; wall microgranular calcareous, may have thin adventitious coating; aperture single or may be multiple in later stages. Devonian to Permian.

Family **SEMITEXTULARIIDAE** Pokorný, 1956

Semitextulariidae POKORNÝ, 1956, p. 284.
Pseudopalmulidae E. V. BYKOVA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 64.

Test biserial or may become uniserial; wall microgranular calcareous, not differentiated into more than one layer but may have considerable agglutinated material; aperture basal to areal, single to multiple. Devonian to Pennsylvanian.

Subfamily **PSEUDOPALMULINAE** E. V. Bykova, 1959

Pseudopalmulinae LOEBLICH and TAPPAN, 1982c, p. 29, nom. transl. ex family Pseudopalmulidae.

Test biserial, flattened, palmate, with broad low chevron-shaped chambers; wall microgranular; aperture terminal, ovate. Devonian.

Subfamily **SEMITEXTULARIINAE** Pokorný, 1956

Semitextulariinae LOEBLICH and TAPPAN, nom. transl. herein ex family Semitextulariidae.

Test laterally compressed and palmate; chambers broad and low, arched centrally, interior with vertical interseptal pillars, those of successive chambers not aligned; aperture a row of ovate openings on the apertural face. M. to U. Devonian.

Subfamily **KOSKINOBIGENERININAE** Loeblich and Tappan, **n. subfam.**

Test biserial in early stage, later may tend to become rectilinear and uniserial, wall calcareous with considerable agglutinated material, single-layered; aperture basal in the early biserial stage, later becoming terminal and cribrate. Mississippian to Pennsylvanian.

Type genus: Koskinobigenerina Eickhoff, 1968.

Remarks: Differs from the Pseudopalmulinae in the agglutinated rather than solely microgranular calcareous wall,

and from the Palaeotextulariidae in lacking a double-layered wall.

Family **PALAEOTEXTULARIIDAE** Galloway, 1933

Palaeotextulariidae WEDEKIND, 1937, p. 79, nom. transl. ex subfamily Palaeotextulariinae.
Palaeotextulariinae GALLOWAY, 1933, p. 221 (subfamily).
Cribrostomatidae WEDEKIND, 1937, p. 79.

Test biserial or may become uniserial; wall calcareous, microgranular, commonly with fibrous radial inner layer and finely granular outer layer that may include small amounts of adventitious material; aperture an interiomarginal arch in biserial taxa, becoming terminal and cribrate in the uniserial stage. Devonian to Permian.

Family **BISERIAMMINIDAE** Chernysheva, 1941

Biseriamminidae CHERNYSHEVA, 1941, p. 70.
Dagmaritidae BOZORGNIA, 1973, p. 144.
Bisseriamminidae MALAKHOVA, 1975b, p. 76 (err. cit.).

Test biserial, with plane of biseriality planispirally enrolled, or may uncoil in later stage; wall calcareous, microgranular, may have more than one layer; aperture at inner border of apertural face. Mississippian to Permian.

Subfamily **BISERIAMMININAE** Chernysheva, 1941

Biseriamminae ZANINETTI and ALTINER, 1981, p. 42, nom. transl. ex family Biseriamminidae.
Globivalvulinae REYTLINGER, 1950, p. 75 (nom. imperf.).
Globivalvulininae POKORNÝ, 1958, p. 200.

Test closely enrolled, with globular chambers, or may have tendency to uncoil. Mississippian to U. Permian.

Subfamily **DAGMARITINAE** Bozorgnia, 1973

Dagmaritinae ZANINETTI and ALTINER, 1981, p. 42, nom. transl. ex family Dagmaritidae.

Test biserial, may be slightly arcuate, chambers angular, or laterally produced and spinose. U. Permian.

Subfamily **LOUISETTITINAE** Loeblich and Tappan, **n. subfam.**

Test biserial, or may be slightly arcuate, chambers with a secondary partition that arises perpendicular to the septum below, and results in the development of a small chamberlet near the test periphery. U. Permian (U. Djulfian).

Type genus: Louisettita Altiner and Brönnimann, 1980.

Remarks: Differs from the Biseriammininae in the uncoiled test and angular chambers, and from it and the Dagmaritinae in the presence of secondary partitions in the outer part of the chambers.

Superfamily **TOURNAYELLACEA** Dain, 1953

Tournayellacea LOEBLICH and TAPPAN, nom. corr. herein pro superfamily Tournayellidea.
Tournayellidea DAIN in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 183, nom. transl. ex family Tournayellidae.

Proloculus followed by planispiral to streptospiral, enrolled tubular second chamber, may be uncoiled in later stage; periodic growth or slight internal protuberances from the wall may result in incipient septa; wall of microgranular calcite, may have agglutinated inclusions; aperture single or cribrate. U. Devonian to Permian.

Family **TOURNAYELLIDAE** Dain, 1953

Tournayellidae DAIN in DAIN and GROZDILOVA, 1953, p. 16.
Forschiidae GROZDILOVA and LEBEDEVA, 1954, p. 36.
Teurnayellidae REYTLINGER, 1958, p. 60 (err. cit.).

As in the superfamily. U. Devonian to Permian.

Subfamily **TOURNAYELLINAE** Dain, 1953

Tournayellinae DAIN in DAIN and GROZDILOVA, 1953, p. 20.
Tournauellinae DAIN in DAIN and GROZDILOVA, 1953, p. 21 (err. cit.).

Test planispirally coiled; wall dark, opaque and microgranular, or may also have an inner translucent layer or translucent secondary deposits at the sutures; aperture simple, single, basal or terminal. U. Devonian to Mississippian.

Subfamily **FORSCHIINAE** Dain, 1953

Forschiinae DAIN in DAIN and GROZDILOVA, 1953, p. 20, 38.
Forshiinae REYTLINGER, 1958, p. 60 (err. cit.).
Forschianinae BRAZHNIKOVA in BRAZHNIKOVA ET AL., 1956, p. 27, 28 (err. cit.).

Test planispirally enrolled; wall clearly differentiated with thick outer coarse layer that may include some agglutinated particles, and a thin, dark, microgranular layer; aperture at the open end of the tube, a rounded areal opening or cribrate. Mississippian.

Subfamily **SEPTABRUNSIININAE** Conil and Lys, 1977

Septabrunsiininae CONIL and LYS, 1977, p. 20.

Test planispiral to streptospiral, later may be uncoiled; wall microgranular to granular, with little if any differentiation, that of advanced and uncoiled taxa may include some agglutinated material, secondary chomata-like deposits may occur; aperture simple and basal to cribrate. Devonian to Mississippian.

Subfamily **LITUOTUBELLINAE** A. D. Miklukho-Maklay, 1963

Lituotubellinae A. D. MIKLUKHO-MAKLAY, 1963, p. 183.
Glomospirellinae REYTLINGER, 1950, p. 26 (invalid, ICZN Art. 39; based on *Glomospirella* Reytlinger, 1950, non Plummer, 1945).

Test streptospirally enrolled, at least in early stage, later may uncoil; wall clearly differentiated with coarse, thick outer layer and thin, microgranular inner layer; aperture single and basal, becoming terminal and cribrate in rectilinear portion. Mississippian.

Subfamily **CHERNYSHINELLINAE** Reytlinger, 1958

Chernyshinellinae REYTLINGER, 1958, p. 60.

Test streptospirally enrolled in early stage, later may become uncoiled and rectilinear, early chambers typically chernyshinelline in form, appearing teardrop-shaped and few per whorl, but geologically later taxa have more endothyroid-like adult chambers; wall undifferentiated to clearly differentiated; aperture interiomarginal in the enrolled stage, becoming terminal in the uncoiled stage and single to cribrate. U. Devonian to Mississippian.

Family **PALAEOSPIROPLECTAMMINIDAE** Loeblich and Tappan, **n. fam.**

Test streptospirally coiled in the initial part, later planispiral and finally becoming biserial; wall microgranular calcareous, undifferentiated, and may have some agglutinated particles; aperture at the base of the final chamber. L. Mississippian to L. Permian.

Type genus: Palaeospiroplectammina Lipina, 1965.

Remarks: This family represents a biserial development from the Chernyshinellinae of the family Tournayellidae, and may be ancestral to the Palaeotextulariidae.

Superfamily **ENDOTHYRACEA** Brady, 1884

Endothyracea LOEBLICH and TAPPAN, 1961, p. 284, nom. corr. pro superfamily Endothyridea.
Endothyridea GLAESSNER, 1945, p. 107, nom. transl. ex subfamily Endothyrinae.
Endothyraceae A. D. MIKLUKHO-MAKLAY, 1963, p. 177, 180 (err. cit.).
Endothyranaceae REYTLINGER, 1966, p. 53 (err. cit.).

Test planispiral to streptospiral in early stage, later may be uncoiled and rectilinear; wall microgranular, calcareous, may have two or three distinct layers, and may have some agglutinated particles; aperture single, basal to areal in position. Devonian to Triassic.

Family **ENDOTHYRIDAE** Brady, 1884

Endothyridae RHUMBLER, 1894, p. 92, nom. corr. pro family Endothyrina.
Endothyrina LANKESTER, 1885, p. 847, nom. transl. ex subfamily Endothyrinae.
Endothyrinae DELAGE and HÉROUARD, 1896, p. 133.
Plectogyridae REYTLINGER in POYARKOV, 1957, p. 29.
Quasiendothyridae ROZOVSKAYA in POYARKOV, 1963, p. 223.
Quasiendothypidae REYTLINGER, 1966, p. 57 (err. cit.).
Endothyranopsidae REYTLINGER, 1966, p. 56.
Endothyridea MALAKHOVA, 1975a, p. 62 (err. cit.).

Test free, coiling planispiral to streptospiral, more or less involute, later may be uncoiled and rectilinear; wall microgranular, may be differentiated into more than one layer, may be alveolar; supplementary deposits present in advanced forms; aperture simple and basal to areal, cribrate in advanced forms, and may have supplementary sutural apertures. Devonian to Triassic.

Subfamily **ENDOSTAFFELLINAE** Loeblich and Tappan, **n. subfam.**

Test streptospirally enrolled, at least in early stage; later may be nearly planispiral; wall microgranular, undifferentiated, may develop secondary chomatal deposits; aperture basal, equatorial. L. to M. Carboniferous (Tournaisian to L. Moscovian).

Type genus: Endostaffella Rozovskaya, 1961.

Remarks: Differs from the Endothyrinae in the wall being undifferentiated, rather than having two or more distinct layers.

Subfamily **ENDOTHYRINAE** Brady, 1884

Endothyrinae BRADY, 1884, p. 66.
Plectogyrinae REYTLINGER, 1958, p. 57.
Quasiendothyrinae REYTLINGER, 1961, p. 53.

Test enrolled, planispiral to streptospiral, involute to evolute, later may be uncoiled; chambers inflated; wall microgranular calcareous, tending to be differentiated into two to three layers, and may develop supplementary deposits; aperture simple, basal to areal. Devonian to Triassic.

Subfamily **HAPLOPHRAGMELLINAE** Reytlinger, 1959

Haplophragmellinae REYTLINGER in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 185.
Endothyrininae A. D. MIKLUKHO-MAKLAY, 1963, p. 183.

Early stage planispiral to streptospiral, with chambers increasing rapidly in size, later may be uncoiled and rectilinear; wall coarsely microgranular and differentiated, no supplementary deposits; aperture single and basal in early stage, cribrate in the adult. Mississippian to Pennsylvanian.

Subfamily **ENDOTHYRANOPSINAE** Reytlinger, 1958

Endothyranopsinae REYTLINGER, 1958, p. 57.

Test large, planispiral and involute, rarely uncoiling in the adult; septa thick and massive; wall coarsely microgranular, with a tendency to recrystallize, in later forms becoming thick and finely perforate, supplementary deposits present as chomata and parachomata; aperture simple, basal, rarely cribrate. Mississippian.

Family **DARIOPSIDAE** Malakhova, 1975

Dariopsidae MALAKHOVA, 1975b, p. 75.

Test enrolled in early stage, later uncoiling, septa extending only partially across central part of chamber, but curve sharply backward to attach to the preceding septum, leaving the axial part of the test undivided; wall microgranular, may be differentiated and may have some agglutinated matter. Mississippian (Tournaisian to Visean).

Family **BRADYINIDAE** Reytlinger, 1950

Bradyinidae REYTLINGER, 1958, p. 57, nom. transl. ex subfamily Bradyininae.
Bradyininae REYTLINGER, 1950, p. 38 (subfamily).
Bradyinae CHANTON, 1964, p. 387 (subfamily; err. cit.).

Test planispiral and involute or rarely biserial and enrolled; few chambers per whorl; microgranular wall with tectum, or alveolar with tectum, or microgranular and finely perforate; septa with septal lamellae, no basal supplementary deposits; aperture simple in early stage, cribrate in last few chambers of adult, sutural supplementary openings also may occur. Mississippian to Permian.

Family **LOEBLICHIIDAE** Cummings, 1955

Loeblichiidae BRÖNNIMANN, 1968, p. 73, nom. corr. pro family Loeblichinidae.
Loeblichinidae ROZOVSKAYA in POYARKOV, 1963, p. 223 (nom. imperf.; nom. transl. ex subfamily Loeblichinae).
Nanicellidae POYARKOV, 1979, p. 28.

Test planispirally coiled throughout, evolute; chambers numerous, increasing slowly in height as added; aperture basal. Devonian to Permian.

Subfamily **NANICELLINAE** Fursenko, 1959

Nanicellinae FURSENKO in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 252.

Test planispiral, evolute; chambers numerous, increasing gradually in height; wall with thin, dark outer layer and thicker, finely granular inner layer; aperture basal, slitlike. Devonian.

Subfamily **LOEBLICHIINAE** Cummings, 1955

Loeblichiinae LOEBLICH and TAPPAN, 1961, p. 286, nom. corr. pro subfamily Loeblichinae.
Loeblichinae CUMMINGS, 1955, p. 3 (nom. imperf.).

Test planispiral, compressed, evolute, chambers numerous, of nearly equal height throughout; aperture basal. Devonian to Permian.

Family **EOCRISTELLARIIDAE** Loeblich and Tappan, **n. fam.**

Eocristellariidae LOEBLICH and TAPPAN, 1982c, p. 31, nom. nud.

Test free, enrolled, chambers increasing rapidly in height and extending back toward the proloculus on the inside of the coil; wall calcareous, outer layer hyaline and inner layer microgranular; aperture a basal slit. Permian.

Type genus: Eocristellaria K. V. Miklukho-Maklay, 1954.

Remarks: Differs from the Loeblichiidae in having fewer chambers per whorl and in these increasing rapidly in height, as in *Astacolus* of the family Vaginulinidae (Nodosariina).

Superfamily **TETRATAXACEA** Galloway, 1933

Tetrataxacea HAYNES, 1981, p. 136, nom. transl. ex subfamily Tetrataxinae.

Test conical, trochospiral, spiral side evolute, umbilical side involute; few to many chambers per whorl, may have secondary partitions that result in many tiny chamberlets; wall microgranular calcareous, may have one or two distinct layers; aperture umbilical. Mississippian to Triassic.

Remarks: Differs from the Endothyracea in the distinctly conical test.

Family **PSEUDOTAXIDAE** Mamet, 1974

Pseudotaxidae MAMET, 1974, p. 201.

Wall single-layered. Mississippian to L. Pennsylvanian.

Family **TETRATAXIDAE** Galloway, 1933

Tetrataxidae POKORNÝ, 1958, p. 199, nom. transl. ex subfamily Tetrataxinae.
Tetrataxinae GALLOWAY, 1933, p. 161 (subfamily).
Tetrataxiinae REYTLINGER, 1950, p. 71 (err. emend.).

Wall two-layered. Mississippian to Triassic.

Family **VALVULINELLIDAE** Loeblich and Tappan, **n. fam.**

Valvulinellidae LOEBLICH and TAPPAN, 1982c, p. 29, nom. nud.

Test free, conical, trochospiral, interior of chambers subdivided by numerous horizontal and vertical partitions; wall calcareous, microcrystalline, apparently single-layered; aperture interiomarginal, on umbilical side of test. L. to U. Carboniferous.

Type genus: Valvulinella Schubert, 1907.

Remarks: Differs from the Pseudotaxidae and Tetrataxidae in the highly subdivided chambers.

Family **ABADEHELLIDAE** Loeblich and Tappan, **n. fam.**

Abadehellidae LOEBLICH and TAPPAN, 1982c, p. 29 (nom. nud.).

Test free, conical, trochospiral, commonly with two chambers per whorl surrounding a broad open umbilical region; chambers subdivided by two to three transverse plates that parallel the base of the test, many radially arranged vertical plates also subdivide the chambers; wall calcareous, the outer wall with two layers, an outer dark microgranular one and an inner light fibrous one, but septa and septula are single-layered and microgranular. U. Permian.

Type genus: Abadehella Okimura and Ishii, 1975.

Remarks: This family differs from the Valvulinellidae in having a double-layered rather than single-layered wall.

Superfamily **FUSULINACEA** von Moeller, 1878

Fusulinacea LOEBLICH and TAPPAN, 1961, p. 287, nom. corr. pro superfamily Fusulinoidea.
Fusulinoidea CIRY in PIVETEAU, 1952, p. 179, nom. transl. ex family *Fusulinidae*.
Fusulinaceae A. D. MIKLUKHO-MAKLAY, 1957, p. 96.
Neoschwagerinaceae A. D. MIKLUKHO-MAKLAY, 1957, p. 109.
Fusulinidea POKORNÝ, 1958, p. 220.
Verbeekinacea A. D. MIKLUKHO-MAKLAY, 1958, p. 7.
Verbeekinidea A. D. MIKLUKHO-MAKLAY, RAUZER-CHERNOUSOVA and ROZOVSKAYA, 1958, p. 17.
Verbeekinaceae A. D. MIKLUKHO-MAKLAY, 1963, p. 132, 177, 203, 259, 274.
Ozawainellacea SOLOV'EVA, 1978, p. 159.
Staffellacea SOLOV'EVA, 1978, p. 159.

Neoschwagerinacea SOLOV'EVA, 1978, p. 159.
Verbeekinida MASLAKOVA, 1981, p. 10 (err. cit.).

Test enrolled, with numerous chambers per whorl, spherical, discoidal or fusiform in shape, less commonly uncoiling in later stage; wall calcareous, microgranular, of one to four distinct layers; partial resorption may result in tunnels or foramina, and secondary deposits may produce chomata, parachomata, tectoria, and axial fillings. U. Mississippian to Permian.

Family **OZAWAINELLIDAE** Thompson and Foster, 1937

Ozawainellidae A. D. MIKLUKHO-MAKLAY, 1958, p. 13, nom. transl. ex subfamily Ozawainellinae.
Ozawanellidae A. D. MIKLUKHO-MAKLAY, 1963, p. 124 (err. cit.).
Ozawalnellidae MALAKHOVA, 1975a, p. 31 (err. cit.).
Eostaffellidae MAMET in MAMET, MIKHAILOFF and MORTELMANS, 1970, p. 33.

Test discoid, spherical or ovoid, early taxa planispiral and evolute, later ones involute to irregularly coiled, axis of coiling short to elongate; wall (spirotheca) of early forms with tectum, upper and lower tectoria, later with diaphanotheca between tectum and lower tectorium, single tunnel, chomata indistinct to massive. Mississippian to Permian.

Subfamily **OZAWAINELLINAE** Thompson and Foster, 1937

Ozawainellinae THOMPSON and FOSTER, 1937, p. 132.
Reichelininae A. D. MIKLUKHO-MAKLAY, 1959, p. 630.

Test small, lenticular, involute to rarely evolute, early coiling may be streptospiral; wall simple, microgranular, single-layered or with weakly developed diaphanotheca, secondary deposits in the form of chomata and pseudochomata. U. Mississippian to Permian.

Subfamily **PSEUDOSTAFFELLINAE** Putrya, 1956

Pseudostaffellinae PUTRYA, 1956, p. 395.
Pseudostaffellininae A. D. MIKLUKHO-MAKLAY, 1963, p. 288 (err. cit.).

Test discoidal to nautiloid, involute, may be streptospiral in early stage; wall weakly differentiated, later ones with tectum, thin diaphanotheca and two tectoria, chomata well developed. Mississippian to M. Pennsylvanian.

Family **SCHUBERTELLIDAE** Skinner, 1931

Schubertellidae A. D. MIKLUKHO-MAKLAY, RAUZER-CHERNOUSOVA and ROZOVSKAYA, 1958, p. 17, nom. transl. ex subfamily Schubertellinae.
Schubertellinidae A. D. MIKLUKHO-MAKLAY, RAUZER-CHERNOUSOVA and ROZOVSKAYA, 1958, fig. 2 on p. 7 (err. cit.).
Boultonidae TORIYAMA, 1960, p. 36 (nom. imperf.).

Test fusiform to subcylindrical, advanced taxa may be uncoiled and rectilinear or flaring in later stage; early coiling streptospiral or with sharp change in direction from early whorls to later ones; early septa flat, fluted in advanced taxa; wall varied, with tectum and upper and lower tectoria, tectum and diaphanotheca, tectum and lower tectorium only, a single thin layer, or with tectum and alveolar keriotheca; tunnel single, chomata low to large and asymmetrical. M. Pennsylvanian to U. Permian.

Subfamily **SCHUBERTELLINAE** Skinner, 1931

Schubertellinae SKINNER, 1931, p. 257.
Schubertellininae ROZOVSKAYA, 1950, p. 376 (err. cit.).
Schubertellinne ROZOVSKAYA, 1975, p. 8 (err. cit.).

Test with plane of coiling changing during early whorls; septa flat to undulate axially; wall structure weakly differentiated, chomata present. M. Carboniferous to Permian.

Subfamily **BOULTONIINAE** Skinner and Wilde, 1954

Boultoniinae SKINNER and WILDE, 1954, p. 437.

Test may uncoil in final volution; septa moderately to intensely fluted; wall with tectum and thin diaphanotheca, septal pores common, chomata present. Permian.

Family **FUSULINIDAE** von Moeller, 1878

Fusulinidae VON MOELLER, 1878, p. 133.
Fusulinina LANKESTER, 1885, p. 848.
Fusulinida HAECKEL, 1894, p. 185.
Fusulininae DELAGE and HÉROUARD, 1896, p. 148.
Fusilinidae CALKINS, 1927, p. 356 (err. cit.).
Fusuliniedae A. D. MIKLUKHO-MAKLAY, 1963, p. 208 (err. cit.).

Fusiform to subcylindrical test, planispirally coiled throughout, or with early whorls at a distinct angle from the later plane of coiling; septa flat to fluted; tunnel single, chomata weak to massive; spirotheca of tectum and upper and lower tectoria, or of tectum and diaphanotheca. L. Pennsylvanian to M. Permian.

Subfamily **FUSULINELLINAE** Staff and Wedekind, 1910

Fusulinellinae STAFF and WEDEKIND, 1910, p. 112.
Fusulinelinae ROZOVSKAYA, 1975, p. 15 (err. cit.).

Septa flat to slightly fluted; wall of three to four layers, with diaphanotheca and generally pronounced outer tectorium, may be perforate, chomata prominent. L. Pennsylvanian to U. Permian.

Subfamily **FUSULININAE** von Moeller, 1878

Fusulininae BRADY, 1884, p. 74, nom. corr. pro subfamily Fusulinidae.
Fusulinidae BÜTSCHLI in BRONN, 1880, p. 213 (nom. imperf.), nom. transl. ex family Fusulinidae.
Pseudotriticitinae PUTRYA, 1948, p. 97.
Quasifusulininae PUTRYA, 1956, p. 467.
Hemifusulininae PUTRYA, 1956, p. 467.

Septa moderately to strongly fluted; wall with two to four layers, with diaphanotheca, outer tectorium weakly developed to absent, pores simple; chomata or pseudochomata may be present. L. Pennsylvanian to L. Permian.

Subfamily **EOFUSULININAE** Rauzer-Chernousova and Rozovskaya, 1959

Eofusulininae RAUZER-CHERNOUSOVA and ROZOVSKAYA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 210.
Eofusulininae RAUZER-CHERNOUSOVA and ROZOVSKAYA in A. D. MIKLUKHO-MAKLAY, RAUZER-CHERNOUSOVA and ROZOVSKAYA, 1958, p. 17 (nom. nud.).

Few whorls, commonly three or four; wall thin and weakly differentiated, with inconstant outer tectorium; axial thickenings present and may have chomata. L. Pennsylvanian.

Subfamily **WEDEKINDELLININAE** F. Kahler and G. Kahler, 1966

Wedekindellininae F. KAHLER and G. KAHLER, 1966b, p. 407.

Test fusiform, septa nearly flat with little or no plication; wall with three or four layers, chomata prominent. Pennsylvanian.

Family **SCHWAGERINIDAE** Dunbar and Henbest, 1930

Schwagerinidae DUNBAR and HENBEST, 1930, p. 363.

Test large, fusiform to irregularly cylindrical, planispiral and involute, but later volutions may be inflated or uncoiled; septa strongly fluted, may have cuniculi or phrenothecae; spirotheca thick, of tectum and alveolar keriotheca; tunnel generally single, chomata faint to massive, axial fillings absent to prominent. M. Pennsylvanian to Permian.

Subfamily **POLYDIEXODININAE** A. D. Miklukho-Maklay, 1953

Polydiexodininae A. D. MIKLUKHO-MAKLAY, 1953, p. 21.

Test very large, closely coiled, septa regularly and intensely fluted, resulting in the formation of cuniculi; axial thickenings present; one to several apertures. M. to U. Permian.

Subfamily **CHUSENELLINAE** F. Kahler and G. Kahler, 1966

Chusenellinae F. KAHLER and G. KAHLER, 1966b, p. 422.

Test with septal plications lacking or very weakly developed in early stage. U. Permian.

Subfamily **SCHWAGERININAE** Dunbar and Henbest, 1930

Schwagerininae YABE and HANZAWA, 1932, p. 42, nom. transl. ex family Schwagerinidae.
Pseudofusulininae DUTKEVICH, 1934, p. 53.
Pseudofusulinae A. D. MIKLUKHO-MAKLAY, 1963, p. 129 (err. cit.).
Pseudofusulinanae A. D. MIKLUKHO-MAKLAY, 1963, p. 119 (err. cit.).
Schwagenininae NEAGU, 1979, p. 171 (err. cit.).

Test of medium to large size, septa range from wavy and weakly or irregularly fluted to intensely and regularly fluted; outer tectorium present only in more primitive forms, chomata present; aperture single. M. Pennsylvanian to U. Permian.

Subfamily **PSEUDOSCHWAGERININAE** L. S. Chang, 1963

Pseudoschwagerininae L. S. CHANG, 1963, p. 224.

Test spherical to fusiform; early stage with tightly coiled whorls, later stage with uneven expansion of the whorl; septa straight to slightly plicated; wall double-layered, consisting of tectum and keriotheca; chomata weakly developed; aperture single. Permian.

Family **STAFFELLIDAE** A. D. Miklukho-Maklay, 1949

Staffellidae A. D. MIKLUKHO-MAKLAY, 1958, p. 11, nom. corr. pro family Staffellinidae.
Staffellinidae A. D. MIKLUKHO-MAKLAY, 1957, p. 96 (nom. imperf.), nom. transl. ex subfamily Staffellininae.
Staffellininae A. D. MIKLUKHO-MAKLAY, 1949, p. 46 (subfamily; nom. imperf.).
Staffellinae ROZOVSKAYA, 1950, p. 378 (subfamily).
Staffelininae POKORNÝ, 1958, p. 233 (subfamily; err. cit.).
Nankinellinae A. D. MIKLUKHO-MAKLAY, 1963, p. 201, 210 (subfamily).
Staffaellinae GROZDILOVA, 1966, p. 257 (subfamily; err. cit.).

Test small, subspherical to discoidal; septa closely spaced, simple and not fluted; tunnel single, chomata distinct, asymmetrical; wall two-layered, of tectum and diaphanotheca, secondary deposits common, wall tends to be secondarily silicified and structure difficult to recognize. U. Mississippian to U. Permian.

Family **PSEUDOENDOTHYRIDAE** Mamet, 1970

Pseudoendothyridae MAMET in MAMET, MIKHAILOFF and MORTELMANS, 1970, p. 36.

Test discoidal, septa formed by the curvature of the spirotheca; wall four-layered, with thin diaphanotheca, secondary deposits variable, generally as small pseudochomata. U. Mississippian (L. Visean) to L. Permian.

Family **VERBEEKINIDAE** Staff and Wedekind, 1910

Verbeekinidae A. D. MIKLUKHO-MAKLAY, 1957, p. 110, nom. transl. ex subfamily Verbeekininae.

Test large, subspherical to cylindrical; planispiral, completely involute; spirotheca of tectum and alveolar keriotheca; multiple tunnels, septa with many foramina that may have parachomata. L. to U. Permian.

Subfamily **VERBEEKININAE** Staff and Wedekind, 1910

Verbeekininae STAFF and WEDEKIND, 1910, p. 114

Test globose, wall with tectum and thicker light colored alveolar layer, and may have thin lower dense layer, chomata may be present in early whorls, and parachomata in outer ones; numerous apertures. M. to U. Permian.

Subfamily **MISELLININAE** A. D. Miklukho-Maklay, 1958

Misellininae A. D. MIKLUKHO-MAKLAY, 1958, p. 9.
Doliolininae GUBLER, 1935, p. 9 (invalid, ICZN Art. 39; based on *Doliolina* Schellwien, 1902, non Borgert, 1894).

Test inflated, fusiform to subcylindrical; early coiling may be endothyroid, later fusulinoid; wall has a thin but distinct keriotheca; parachomata well developed. M. to U. Permian.

Subfamily **PSEUDODOLIOLININAE** Leven, 1963

Pseudodoliolininae LEVEN, 1963, p. 57, 58, 61, 68.
Pseudodolilininae ROZOVSKAYA, 1975, p. 23 (err. cit.).

Test ellipsoid to elongate; septa flat, single-layered; wall thin in early volutions, later with tectum, thin inner layer

and middle layer that may be alveolar; parachomata narrow, high; foramina closely spaced. U. Permian.

Subfamily **KAHLERININAE** Leven, 1963

Kahlerininae LEVEN, 1963, p. 57, 58, 61, 68.

Test globose, axially depressed, streptospirally enrolled in early stage; whorls few, with 8 to 10 rapidly enlarging chambers per whorl; septa flat, thick; wall with two layers, a tectum and probable keriotheca, although keriothecal structure is indistinct; chomata minor, very small parachomata rarely present, tunnel low, discontinuous; foramina and fine septal pores present. U. Permian.

Subfamily **CHENIINAE** F. Kahler and G. Kahler, 1966

Cheniinae F. KAHLER and G. KAHLER, 1966a, p. 99.

Test lenticular, periphery angled, axis of coiling short; septa flat; 9 to 10 volutions; wall commonly recrystallized, appears to have tectum, thicker middle alveolar layer and lower thin dense layer; chomata well developed throughout, parachomata present in outer whorls, tunnel slitlike; foramina present in outer volutions. U. Permian.

Family **NEOSCHWAGERINIDAE** Dunbar and Condra, 1927

Neoschwagerinidae DUNBAR in CUSHMAN, 1948, p. 164, nom. transl. ex subfamily Neoschwagerininae.

Test fusiform to subcylindrical; transverse septula always present, axial septula may occur, as may secondary transverse or axial septula or both; spirotheca consists of tectum and alveolar keriotheca or a single dense layer; foramina throughout length of test, parachomata prominent. L. to U. Permian.

Subfamily **NEOSCHWAGERININAE** Dunbar and Condra, 1927

Neoschwagerininae DUNBAR and CONDRA, 1927, p. 74.

Test large, fusiform to nearly spherical; wall with tectum and keriotheca and may have inner tectorium; development of spiral and axial septulae variable; parachomata well developed, but may be reduced in advanced forms. M. to U. Permian.

Subfamily **SUMATRININAE** Silvestri, 1933

Sumatrininae SILVESTRI, 1933, p. 15, 35.

Test of medium to large size, ellipsoid to fusiform or subcylindrical; pendant secondary spiral and axial septa of uniform length, with up to four secondary septa between two primary ones; wall thin, compact, with poorly differentiated structure; thin long parachomata present, axial fillings in all but last part of final whorl. Permian.

Subfamily **THAILANDININAE** Toriyama and Kanmera, 1968

Thailandininae TORIYAMA and KANMERA, 1968, p. 31, 43.

Test ellipsoidal to fusiform, proloculus large, volutions numerous, with progressively important transverse septula and more numerous parachomata with increased test size; wall subject to recrystallization and replacement, although rarely with a suggestion of an alveolar keriotheca. M. Permian.

Suborder **INVOLUTININA** Hohenegger and Piller, 1977

Involutinina HOHENEGGER and PILLER, 1977, p. 414.
Involutinacea ZANINETTI, 1975, p. 131 (superfamily).
Rotaliea MIKHALEVICH, 1980a, p. 55 (class; partim).
Rotaliata MIKHALEVICH, 1980a, p. 56 (subclass; partim).
Rotaliicea SAIDOVA, 1981, p. 35 (class; partim).
Rotaliicae SAIDOVA, 1981, p. 35 (subclass; partim).

Proloculus followed by enrolled tubular second chamber; wall calcareous, perforate, radiate, probably originally aragonitic, but may be recrystallized to homogeneous microgranular structure, thickened or with pillar-like structures in umbilical region of one or both sides. Triassic to Cretaceous.

Family **INVOLUTINIDAE** Bütschli, 1880

Involutinidae SIGAL in PIVETEAU, 1952, p. 159, nom. transl. ex subfamily Involutinae.
Involutinae BÜTSCHLI in BRONN, 1880, p. 209 (subfamily).
Problematininae RHUMBLER, 1913, p. 389.
Arproblematoia RHUMBLER, 1913, p. 389 (err. emend.).
Involutininae THALMANN, 1935, p. 715 (subfamily).
Ventrolaminidae WEYNSCHENK, 1950, p. 17.
Ventrolamininae LOEBLICH and TAPPAN, 1961, p. 292 (subfamily).
Ventrolamidae LEISCHNER, 1959, p. 867 (err. cit.).

Proloculus followed by planispirally enrolled undivided tubular chamber; may have additional shell material deposited at one or both sides of the test as thickening or nodes. L. Triassic to Cretaceous.

Family **TROCHOLINIDAE** Kristan-Tollmann, 1963

Trocholinidae KRISTAN-TOLLMAN, 1963, p. 150.

Proloculus followed by undivided trochospirally coiled tubular chamber; may have additional material in the form of pillars deposited at the hollow side of the spire. Triassic to Cretaceous.

Suborder **MILIOLINA** Delage and Hérouard, 1896

Miliolina LOEBLICH and TAPPAN, 1961, p. 219, nom. corr. pro suborder Miliolidae.
Miliolidae DELAGE and HÉROUARD, 1896, p. 117 (suborder).
Miliolidea LANKESTER, 1885, p. 846 (order).
Miliolidaceae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (order).
Miliolida CALKINS, 1909, p. 39 (order).
Cornuspiroidea WEDEKIND, 1937, p. 87 (order).
Orbitolitacea WEDEKIND, 1937, p. 120 (suborder).
Cornuspiridea JÍROVEC, 1953, p. 335 (suborder).
Cornusporidea JÍROVEC, 1953, p. 184 (suborder; err. cit.).
Rotaliea MIKHALEVICH, 1980a, p. 55 (class; partim).
Rotaliata MIKHALEVICH, 1980a, p. 56 (subclass; partim).
Cornuspirida MIKHALEVICH, 1980a, p. 57 (order).
Schlumbergerinida MIKHALEVICH, 1980a, p. 56 (order).
Orbitolitida MIKHALEVICH, 1980a, p. 57 (order).
Alveolinida MIKHALEVICH, 1980a, p. 57 (order).
Miliolicea SAIDOVA, 1981, p. 27 (class).

Miliolicae SAIDOVA, 1981, p. 28 (subclass).
Cyclogyrina SAIDOVA, 1981, p. 28 (suborder).
Nubeculariina SAIDOVA, 1981, p. 29 (suborder).
Soritina SAIDOVA, 1981, p. 33 (suborder).
Alveolinellinina SAIDOVA, 1981, p. 35 (suborder).

Test of porcelaneous calcite, commonly with organic lining and may have added adventitious material; generally imperforate in post-embryonic stage; may have flexostyle or spiral passage between proloculus and later chambers. Carboniferous to Holocene.

Superfamily **SQUAMULINACEA** Reuss and Fritsch, 1861

Squamulinacea LOEBLICH and TAPPAN, nom. transl. herein ex family Squamulinidea.

Unilocular test of imperforate porcelaneous calcite; attached. Holocene.

Family **SQUAMULINIDAE** Reuss and Fritsch, 1861

Squamulinidae LOEBLICH and TAPPAN, 1964a, p. C444, nom. corr. pro family Squamulinidea.
Squamulinidea REUSS and FRITSCH, 1861, p. 1.
Squamulinida HAECKEL, 1894, p. 190.

As for the superfamily. Holocene.

Superfamily **CORNUSPIRACEA** Schultze, 1854

Cornuspiracea BOGDANOVICH in SUBBOTINA, VOLOSHINOVA and AZBEL, 1981, p. 47, nom. transl. ex family Cornuspirida.
Cyclogyridea SAIDOVA, 1981, p. 28.
Nubeculariidea SAIDOVA, 1981, p. 29.
Nubeculariacea HAYNES, 1981, p. 166.
Ophthalmidiacea HAYNES, 1981, p. 166.

Test free or attached; may be planispiral or trochospiral, evolute or involute, spreading or *discoidal*; *proloculus* followed by undivided spiral passage or enrolled tubular chamber, later may be irregularly coiled, uncoiled, or show zigzag growth pattern, and may be distinctly chambered. Carboniferous to Holocene.

Family **CORNUSPIRIDAE** Schultze, 1854

Cornuspiridae *REUSS, 1860, p. 177, nom. corr. pro family* Cornuspirida.
Cornuspirida SCHULTZE, 1854, p. 52.
Cornuspiridea REUSS, 1862, p. 364, 394.
Cornuspirideae GÜMBEL, 1870, p. 26.
Hemigordiopsiidae A. NIKITINA, 1969, p. 65 (nom. imperf.).
Hemigordiopsidae BRÖNNIMANN, WHITTAKER and ZANINETTI, 1978, p. 71.
Gordiospiridae SAIDOVA, 1981, p. 28.
Cyclogyridae SAIDOVA, 1981, p. 29.

Test free or attached, proloculus followed by undivided planispiral to streptospiral tubular second chamber that may show later zigzag growth. Carboniferous to Holocene.

Subfamily **CORNUSPIRINAE** Schultze, 1854

Cornuspirinae RHUMBLER, 1904, p. 284, nom. transl. ex family Cornuspirida.
Arcornuspirinia RHUMBLER, 1913, p. 387 (err. emend.).
Cornuspirininae CUSHMAN, 1919, p. 633 (err. cit.).
Cornuspirina COLOM, 1928, p. 8 (err. cit.).
Cyclogyrinae LOEBLICH and TAPPAN, 1961, p. 290.

Test planispirally coiled, involute or evolute, and may uncoil in later stage. Carboniferous to Holocene.

Subfamily **CORNUSPIROIDINAE** Saidova, 1981

Cornuspiroidinae SAIDOVA, 1981, p. 29.

Test planispirally coiled, tubular chamber in later stage flaring and becoming flabelliform, or may be spreading and branching in the plane of coiling. Holocene.

Subfamily **HEMIGORDIOPSINAE** A. Nikitina, 1969

Hemigordiopsinae *LOEBLICH and TAPPAN, 1982c, p. 30, nom. transl.* ex family Hemigordiopsiidae.
Gordiospirinae SAIDOVA, 1981, p. 28.

Test streptospirally coiled at least in early stage, later may be planispiral, involute or evolute. Carboniferous to Holocene.

Subfamily **MEANDROSPIRINAE** *Saidova, 1981*

Meandrospirinae SAIDOVA, 1981, p. 28.
Meandropsininae LOEBLICH and TAPPAN, 1982c, p. 30 (err. cit.).

Test free, proloculus followed by tubular undivided chamber that may be streptospiral or planispiral in coiling, and simultaneously winds back and forth in short zigzag bends. Permian to Holocene.

Subfamily **CALCIVERTELLINAE** Loeblich and Tappan, 1964

Calcivertellinae LOEBLICH and TAPPAN, 1964a, p. C443.

Attached, tubular test may branch over the surface of the attachment. Pennsylvanian to Jurassic.

Family **FISCHERINIDAE** Millett, 1898

Fischerinidae CUSHMAN, 1927, p. 40, nom. transl. ex subfamily Fischerininae.
Fuscherinidae BASOV, 1973, p. 64 (err. cit.).
Wiesnerellidae *SAIDOVA, 1981, p. 30.*

Proloculus and flexostyle followed by an enrolled tubular portion with few chambers per whorl. Jurassic to Holocene.

Subfamily **FISCHERININAE** Millett, 1898

Fischerininae MILLETT, 1898, p. 611.
Trisegmentininae WIESNER, 1920, p. 17, 18.
Planispirinellinae WIESNER, 1931, p. 58, 60, 69, 110.

Coiling planispiral, evolute or involute; aperture at the open *end of the tube*. Jurassic to Holocene.

Subfamily **FISCHERINELLINAE** Saidova, 1981

Fischerinellinae LOEBLICH and TAPPAN, 1982c, p. 30, nom. corr. pro subfamily Fischerinella.
Fischerinella SAIDOVA, 1981, p. 29 (nom. imperf.).

Coiling trochospiral, evolute on spiral side and involute on opposite side. Holocene.

Subfamily **ZOYAELLINAE** Saidova, 1981

Zoyaellinae SAIDOVA, 1981, p. 29.

Early coiling streptospiral, later planispiral, with numerous chambers per whorl. Holocene.

Subfamily **GLOMULININAE** Saidova, 1981

Glomulininae SAIDOVA, 1981, p. 30.

Test with proloculus followed by enrolled tubular chamber that coils streptospirally; later chambers a half-coil in length. Holocene.

Subfamily **NODOBACULARIELLINAE** Bogdanovich, 1981

Nodobacullariellinae BOGDANOVICH in SUBBOTINA, VOLOSHINOVA and AZBEL, 1981, p. 62.
Wiesnerellinae SAIDOVA, 1981, p. 30.

Test planispiral to trochospiral in early stage, with chambers a half-coil in length; aperture a slit at the open end of the chamber, bordered by an everted lip. Pliocene to Holocene.

Family **NUBECULARIIDAE** Jones, 1875

Nubeculariidae AVNIMELECH and REISS in AVNIMELECH, PARNESS and REISS, 1954, p. 838, nom. corr. pro family Nubecularida.
Nubecularida JONES in GRIFFITH and HENFREY, 1875, p. 319.
Nubecularina LANKESTER, 1885, p. 846.
Nubecularinae DELAGE and HÉROUARD, 1896, p. 122.
Nobeculariidae SAIDOVA, 1975a, p. 67 (err. cit.).

Test free or attached, planispiral or irregularly coiled, at least in early stage, later may be spreading or branched; aperture simple, rounded, slitlike or cribrate. Jurassic to Holocene.

Subfamily **NODOBACULARIINAE** Cushman, 1927

Nodobacullariinae CUSHMAN, 1927, p. 36.
Nodophthalmidiinae CUSHMAN, 1940, p. 179.
Nodophthalmidiinae SAIDOVA, 1981, p. 29 (err. cit.).

Early portion planispiral, later uncoiling and rectilinear. Jurassic to Holocene.

Subfamily **MEANDROLOCULININAE** Bogdanovich, 1981

Meandroloculininae BOGDANOVICH in SUBBOTINA, VOLOSHINOVA and AZBEL, 1981, p. 62.

Proloculus followed by cornuspirine second chamber, later chambers elongate and alternating in a zigzag pattern, and tending to become rectilinear in the adult. Miocene.

Subfamily **NUBECULARIINAE** Jones, 1875

Nubeculariinae CHAPMAN, 1901, p. 169, nom. corr. pro subfamily Nubecularinae.
Nubecularinae BRADY, 1884, p. 61 (nom. imperf.); nom. transl. ex family Nubecularida.
Nubeculinellinae AVNIMELECH and REISS in AVNIMELECH, PARNESS and REISS, 1954, p. 838.

Test attached, early stage coiled, later may be irregular. Jurassic to Holocene.

Family **OPHTHALMIDIIDAE** Wiesner, 1920

Ophthalmidiidae CUSHMAN, 1928, p. 159, nom. corr. pro family Opthalmidiidae.
Opthalmidiidae CUSHMAN, 1927, p. 36 (nom. imperf.), nom. transl. ex subfamily Ophthalmidiinae.
Ophthalmidiinae WIESNER, 1920, p. 17 (subfamily).
Opthalmidiinae CUSHMAN, 1927, p. 37 (err. cit.).
Ophtalmiidae LEISCHNER, 1959, p. 858, 859 (err. cit.).
Ophtalmidiinae ANGLADA and RANDRIANASOLO, 1971, p. 172 (err. cit.).

Test free, proloculus and undivided coiled second chamber or flexostyle followed by chambers that commonly are one-half coil in length. U. Triassic to Holocene.

Family **DISCOSPIRINIDAE** Wiesner, 1931

Discospirinidae SAIDOVA, 1981, p. 34, nom. transl. ex subfamily Discospiriniinae.
Krumbachininae WIESNER, 1920, p. 17 (nom. oblit.).
Discospiriniinae WIESNER, 1931, p. 60, 73 (subfamily; nom. imperf.).
Discospirininae LOEBLICH and TAPPAN, 1961, p. 291 (subfamily).
Dcscospirininae SAIDOVA, 1981, p. 34 (err. cit.).

Test discoidal, proloculus followed by cornuspirine coil of several volutions, later chambers one-half coil in length and finally annular, may be incompletely divided into chamberlets by vertical partitions arising from the floor of the chamber but not extending completely across it; aperture a row of pores at the margin of the final chamber. M. Miocene to Holocene.

Superfamily **MILIOLACEA** Ehrenberg, 1839

Miliolacea LOEBLICH and TAPPAN, 1961, p. 289, nom. corr. pro superfamily Miliolidea.
Miliolidea GLAESSNER, 1945, p. 116, nom. transl. ex family Miliolina.
Miliolicae EASTON, 1960, p. 65, 76.
Milioloidea SOUAYA, 1965, p. 307.
Fabulariidea SAIDOVA, 1981, p. 32.

Test coiled, commonly with two chambers, less frequently three or more per whorl arranged in varying planes about the longitudinal axis; may become involute or may uncoil in later stage; advanced forms may have secondary partitions within the chambers. Jurassic to Holocene.

Family **MILIOLIDAE** Ehrenberg, 1839

Miliolidae D'ORBIGNY in DE LA SAGRA, 1839, p. xxxix, 160, nom. corr. pro family Miliolina.
Miliolina EHRENBERG, 1839, table opp. p. 120.
Miliolida SCHULTZE, 1854, p. 52.
Miliolitidae PARKER, 1858, p. 53.
Miliolidea REUSS and FRITSCH, 1861, p. 2.
Miliolidee SCHWAGER, 1876, p. 476, 483.
Hauerinidee SCHWAGER, 1876, p. 483.
Miliolidina BÜTSCHLI in BRONN, 1880, p. 189.
Hauerinidae STEINMANN, 1881, p. 41.
Hauerinina LANKESTER, 1885, p. 846.
Milioletta HAECKEL, 1894, p. 164.
Miliolinidae RHUMBLER, 1895, p. 86.
Miliolinae DELAGE and HÉROUARD, 1896, p. 122.

Hauerinae DELAGE and HÉROUARD, 1896, p. 124.
Armiliolidia RHUMBLER, 1913, p. 341 (err. emend.).
Palaeomiliolinidae HAYNES, 1981, p. 167.
Spiroloculinidae LOEBLICH and TAPPAN, 1982c, p. 30.

Test with proloculus followed by two chambers per whorl, rarely with intervening flexostyle; chambers added in one to five or more planes of coiling; less commonly the adult test may have more than two chambers per whorl or may be uncoiled and rectilinear; aperture at the open end of the final chamber, and may have a simple to complex tooth. Triassic to Holocene.

Subfamily **SPIROLOCULININAE** Wiesner, 1920

Spiroloculininae WIESNER, 1920, p. 17, 18.

Proloculus followed by reduced cornuspirine flexostyle of approximately a whorl or slightly less in length, at least in the microspheric generation, followed by two chambers per whorl; aperture terminal, rounded to elongate, open or with simple to bifid tooth. U. Cretaceous to Holocene.

Subfamily **MILIOLINAE** Ehrenberg, 1839

Miliolinae RHUMBLER, 1895, p. 87, nom. transl. ex family Miliolina.
Miliolininae BRADY, 1881, p. 43.
Quinqueloculininae CUSHMAN, 1917, p. 41.
Massilininae THALMANN, 1941, p. 682.
Siphonapertinae SAIDOVA, 1975a, p. 164.
Quinqueloculininea SAIDOVA, 1981, p. 31 (supersubfamily).
Quinqueloculinae JAIN and BHATIA, 1981, p. 157 (err. cit.).
Cribrolinoidinae HAYNES, 1981, p. 158.

Test with two chambers per whorl, five or more chambers visible externally in the adult; early chamber arrangement quinqueloculine, later chambers may be added in fewer or more than five planes; chamber interior not subdivided; aperture at the end of the final chamber, rounded, or with flap, simple or complex tooth, or cribrate. Jurassic to Holocene.

Subfamily **HAUERININAE** Schwager, 1876

Hauerininae BRADY, 1884, p. 62, nom. transl. ex family Hauerinidee.
Flintininae SAIDOVA, 1981, p. 31.
Flintininea SAIDOVA, 1981, p. 31 (supersubfamily).
Nummoloculininae SAIDOVA, 1981, p. 32.

Test with more than two chambers per whorl, at least in the adult, early chambers may be added in varying planes, later planispiral, rarely uncoiled in final stage. L. Cretaceous to Holocene.

Subfamily **MILIOLINELLINAE** Vella, 1957

Miliolinellinae VELLA, 1957, p. 20.
Triloculininae BOGDANOVICH in SUBBOTINA ET AL., 1981, p. 57.
Planispirinoidinae SAIDOVA, 1981, p. 30.

Test with chambers a half coil in length, two or three chambers visible externally, early stage cryptoquinqueloculine, pseudotriloculine or cornuspirine. Jurassic to Holocene.

Subfamily **SIGMOILOPSINAE** Vella, 1957

Sigmoilopsinae VELLA, 1957, p. 18.
Sigmolinitinae ŁUCZKOWSKA, 1974, p. 148.

Test with two chambers per whorl, early stage with chambers added slightly less than 180° apart, with angle gradually increasing until chambers are added in a single plane. Triassic, Eocene to Holocene.

Subfamily **TUBINELLINAE** Rhumbler, 1906

Tubinellinae RHUMBLER, 1906, p. 25.
Artubinia RHUMBLER, 1913, p. 352 (err. emend.).
Tubiwellinae REDDY and R. J. RAO, 1980, p. 165 (err. cit.).
Tubinellinea SAIDOVA, 1981, p. 32 (supersubfamily).
Pavoninoidinae SAIDOVA, 1981, p. 32.
Poroarticulininae SAIDOVA, 1981, p. 32.

Test milioline or spiroloculine in early stage, with chambers a half coil in length, later becoming rectilinear. M. Eocene to Holocene.

Family **RIVEROINIDAE** Saidova, 1981

Riveroinidae LOEBLICH and TAPPAN, 1982c, p. 31, nom. transl. ex subfamily Riveroininae.
Riveroininae SAIDOVA, 1981, p. 32 (subfamily).
Riveroininea SAIDOVA, 1981, p. 32 (supersubfamily).

Test planispiral, with chambers a half coil in length and partially subdivided by a few oblique secondary septa that project toward the apertural end; aperture terminal, a single curved slit. Holocene.

Family **FABULARIIDAE** Ehrenberg, 1839

Fabulariidae SAIDOVA, 1981, p. 32, nom. corr. pro family Fabularina.
Fabularina EHRENBERG, 1839, table opp. p. 120.
Fabularidea REUSS, 1862, p. 375 (subfamily).
Trematoforininae A. SILVESTRI, 1937, p. 80 [subfamily; invalid, ICZN Arts. 13 (a) (i) and 29].
Fabulariinae LOEBLICH and TAPPAN, 1961, p. 293 (subfamily).
Fabulariinea SAIDOVA, 1981, p. 32 (supersubfamily).
Lacazinellinae SAIDOVA, 1981, p. 33 (subfamily).

Test with milioline early stage; chambers subdivided by secondary partitions into chamberlets; aperture commonly multiple, or may have simple aperture with tooth. U. Cretaceous to Eocene, ? *Oligocene*.

Superfamily **SORITACEA** Ehrenberg, 1839

Soritacea HAYNES, 1981, p. 168, nom. corr. pro superfamily Soritinidea.
Soritinidea SAIDOVA, 1981, p. 34 (*nom. imperf.*), nom. transl. ex family Soritina.
Alveolinidea VOLOSHINOVA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 244.
Solitidae UCHIO, 1967, p. 404 (err. cit.).
Peneroplidea SAIDOVA, 1981, p. 33.
Meandropsinidea SAIDOVA, 1981, p. 33.
Orbitolitacea LOEBLICH and TAPPAN, 1982c, p. 31.

Wall porcelaneous, pitted or perforate in early stage, or less commonly throughout growth; chambers planispiral, uncoiling, flabelliform, or cyclical, may be subdivided by interseptal partitions or pillars. ? Permian, Triassic to Holocene.

Family **MILIOLIPORIDAE** Brönnimann and Zaninetti, 1971

Milioliporidae BRÖNNIMANN and ZANINETTI in BRÖNNIMANN ET AL., 1971, p. 9.

Test free, proloculus followed by tubular chambers arranged about a longitudinal axis in various planes; wall porcelaneous, perforate throughout ontogeny; aperture terminal. ? Permian, Triassic (Carnian to Rhaetian).

Subfamily **MILIOLIPORINAE** Brönnimann and Zaninetti, 1971

Milioliporinae ZANINETTI, ALTINER, DAĞER and DUCRET, 1982, p. 96, nom. transl. ex family Milioliporidae.

Test free, elongate chambers in milioline, quinqueloculine or biloculine arrangement; wall thin, porcelaneous, that of outer chambers traversed by regularly distributed large perforations, oblique to the test surface; aperture terminal, simple. Triassic (Carnian to Rhaetian).

Subfamily **GALEANELLINAE** Zaninetti, Altiner, Dağer and Ducret, 1982

Galeanellinae ZANINETTI ET AL., 1982, p. 97.

Test free, chambers cap-shaped, in biloculine arrangement or irregular, especially in the adult; wall porcelaneous, outer chambers with large perforations oblique to the test surface that ramify and anastomose in the thickened outer wall; aperture terminal, in center of imperforate base. ? Permian, Triassic (Carnian to Rhaetian).

Subfamily **PSEUDOCUCURBITINAE** Zaninetti, Altiner, Dağer and Ducret, 1982

Pseudocucurbitinae ZANINETTI ET AL., 1982, p. 97.

Test free, initial coiled stage followed by amphora-like chambers in more or less rectilinear series; wall porcelaneous, perforated, thick distally, thinning to the imperforate neck of the central terminal aperture, chambers enveloped by thick secondary mass that is perforated like the chamber walls. Triassic (Carnian, ? Norian).

Family **PENEROPLIDAE** Schultze, 1854

Peneroplidae REUSS, 1860, p. 151, nom. transl. ex subfamily Peneroplida.
Peneroplida SCHULTZE, 1854, p. 53 (subfamily).
Cristellarida SCHULTZE, 1854, p. 53 (subfamily).
Peneroplideae REUSS, 1860, p. 217.
Cristellaridae REUSS, 1860, p. 151, 205.
Peneroplidea REUSS and FRITSCH, 1861, p. 2.
Cristellaridea REUSS and FRITSCH, 1861, p. 3.
Cristellarideae GÜMBEL, 1870, p. 54.
Peneroplida SCHMARDA, 1871, p. 165.
Cristellarida SCHMARDA, 1871, p. 165.
Peneroplidee SCHWAGER, 1876, p. 483.
Cristellaroidi SCHWAGER, 1876, p. 477.
Cristellaroidea SCHWAGER, 1877, p. 19.
Peneroplidina BÜTSCHLI in BRONN, 1880, p. 190.
Peneroplidinae BRADY, 1884, p. 62 (subfamily).
Cristellarinae RHUMBLER, 1895, p. 91 (subfamily).
Peneroplinae DELAGE and HÉROUARD, 1896, p. 124.
Peneroplididae LISTER in LANKESTER, 1903, p. 143.
Peneroplinae CUSHMAN in EASTMAN, 1913, p. 39 (subfamily).
Spirolininae CUSHMAN, 1927, p. 54 (subfamily).
Cristellariidae WEDEKIND, 1937, p. 97.
Dendritininae SAIDOVA, 1981, p. 33 (subfamily).

Test close coiled in early stage, later may be uncoiled, or may develop annular chambers; chambers simple, not subdivided into chamberlets; wall porcelaneous, proloculus and a few juvenile chambers may be perforate, adult portion of test imperforate; aperture rounded, slitlike, dendritine, or a series of pores. U. Triassic, U. Cretaceous (Coniacian) to Holocene.

Family **MEANDROPSINIDAE** Henson, 1948

Meandropsinidae HENSON, 1948, p. 77.
Meandropsininae SIGAL in PIVETEAU, 1952, p. 202 (subfamily).

Early stage planispirally enrolled; later may uncoil and flare, or be operculiform, flabelliform, cylindrical, conical or discoidal; marginal zone of chambers with interseptal pillars; aperture multiple, in one or more rows. U. Cretaceous (Cenomanian) to M. Paleocene.

Family **RHAPYDIONINIDAE** Keijzer, 1945

Rhapydioninidae HAYNES, 1981, p. 171, nom. transl. ex subfamily Rhapydionininae.

Test planispirally or streptospirally coiled, may uncoil in later stage; embryonal apparatus simple or quinqueloculine, flexostyle may follow proloculus of megalospheric generation; test with central thickening pierced by canals and bordered by subepidermal lamellae that attach to it; when thickening leaves part of the distal face of the preceding chamber free, the resulting preseptal space is crossed by irregularly spaced pillars extending from the central thickening below to the internal surface of the overlying septum, intercalated between the apertures of the final chamber face and those of the central thickening; aperture multiple, on the final chamber face. ? Jurassic, U. Cretaceous (Cenomanian) to M. Eocene, Holocene.

Subfamily **RHAPYDIONININAE** Keijzer, 1945

Rhapydionininae KEIJZER, 1945, p. 200.
Chubbininae DILLEY, 1973, p. 413.

As in the family; test free. ? Jurassic, U. Cretaceous (Cenomanian) to M. Eocene, ? Holocene.

Subfamily **CRATERITINAE** Saidova, 1981

Crateritinae SAIDOVA, 1981, p. 34.

Test attached by a spreading base. Holocene.

Family **SORITIDAE** Ehrenberg, 1839

Soritidae GALLOWAY, 1933, p. 132, nom. corr. pro family Soritina.
Soritina EHRENBERG, 1838, p. 200 (invalid, ICZN Art. 29).
Soritina EHRENBERG, 1839, table opp. p. 120.
Orbitolitidae GRAY, 1840, p. 76.
Soritida SCHULTZE, 1854, p. 53.
Orbitulitidea REUSS and FRITSCH, 1861, p. 2.
Orbitulitideae GÜMBEL, 1870, p. 27.
Orbiculinida JONES in GRIFFITH and HENFREY, 1875, p. 319.

Orbitulitidee SCHWAGER, 1876, p. 483.
Orbitulita MARRIOTT, 1878, p. 31.
Orbitolitina BÜTSCHLI in BRONN, 1880, p. 192.
Orbitulitida HAECKEL, 1894, p. 185.
Archaiasinidae SAIDOVA, 1981, p. 34 (err. cit.).
Praerhapydioninidae HAYNES, 1981, p. 168.

Test planispiral, at least in early stage, later may be uncoiled, flaring, fusiform, or cylindrical; chambers numerous, commonly subdivided by interseptal pillars or septula; aperture usually multiple, may vary in position in ontogeny. U. Cretaceous to Holocene.

Subfamily **PRAERHAPYDIONININAE** Hamaoui and Fourcade, 1973

Praerhapydioninae HAMAOUI and FOURCADE, 1973, p. 361, 375.

Chambers planispirally coiled, later may be uncoiled and rectilinear to flabelliform; chambers in adult may be cylindrical, annular or flattened; wall calcareous, probably originally porcelaneous, imperforate; aperture generally multiple; may vary in position in ontogeny. U. Cretaceous to Paleocene.

Subfamily **ARCHAIASINAE** Cushman, 1927

Archaiasinae CUSHMAN, 1927, p. 55.
Orbiculininae WIESNER, 1920, p. 17; SCHUBERT, 1921, p. 168 (nom. oblit.).
Archaiadinae WIESNER, 1931, p. 60, 74, 111.
Archaiinae SOUAYA, 1963, p. 240 (err. emend.).
Archaiasininae SAIDOVA, 1981, p. 34 (err. cit.).

Test planispiral in early stage, later chambers may be annular, subdivided into rectangular chamberlets that do not alternate regularly with those of adjacent chambers; aperture commonly a double row of pores on the periphery. U. Cretaceous (Santonian) to Holocene.

Subfamily **SORITINAE** Ehrenberg, 1839

Soritinae WIESNER, 1931, p. 60, 74, 111, nom. transl. ex family Soritina.
Orbitulinidea REUSS, 1862, p. 320.
Orbitolitinae BRADY, 1881, p. 43.
Orbitolitidinae WIESNER, 1920, p. 17.

Proloculus followed by flexostyle; later chambers numerous, in arcuate or annular series, stolons connecting those of successive series, but chambers of a single series not connected. Eocene to Holocene.

Subfamily **FUSARCHAIASINAE** Saidova, 1981

Fusarchaiasinae SAIDOVA, 1981, p. 34.

Test fusiform, numerous chambers planispirally enrolled, axially elongate, with interseptal pillars; aperture consists of openings interspersed between pillars on terminal face. Oligocene to Miocene.

Family **KERAMOSPHAERIDAE** Brady, 1884

Keramosphaeridae LISTER in LANKESTER, 1903, p. 143, nom. corr. pro family Keramosphaerina.
Keramosphaerina LANKESTER, 1885, p. 847, nom. transl. ex subfamily Keramosphaerinae.
Keramosphaerinae BRADY, 1884, p. 63 (subfamily).
Keramosphaerinae DELAGE and HÉROUARD, 1896, p. 127.

Test globular, concentric chambers subdivided into chamberlets, stolons connect chamberlets of same series as well as those of successive series; wall calcareous, porcelaneous, imperforate. U. Cretaceous (Coniacian) to Paleocene, Miocene, Holocene.

Family **ALVEOLINIDAE** Ehrenberg, 1839

Alveolinidae STEINMANN, 1881, p. 41, nom. corr. pro family Alveolinea.
Alveolinea EHRENBERG, 1839, table opp. p. 120.
Alveolinida SCHULTZE, 1854, p. 53.
Borelida SCHMARDA, 1871, p. 165.
Alveolininae BRADY, 1884, p. 62 (subfamily).
Alveolinina LANKESTER, 1885, p. 847.
Alveolininae DELAGE and HÉROUARD, 1896, p. 127.
Alveolinellidae CUSHMAN, 1927, p. 58.
Borelidinae WIESNER, 1931, p. 60, 75 (subfamily).
Borelidae HANZAWA, 1932, p. 36, 102.
Alveolinellinae GALLOWAY, 1933, p. 148 (subfamily).
Alveolonidae NEAGU, 1979, p. 206 (err. cit.).
Alveolinellidae SAIDOVA, 1981, p. 35.
Alveolinellinae SAIDOVA, 1981, p. 35 (subfamily).

Test free, commonly large, globular, fusiform, or subcylindrical, coiled about elongate axis; proloculus followed by flexostyle, later chambers may be quinqueloculine in arrangement in microspheric juvenile stage; chambers numerous, and divided by secondary partitions or septulae into one or more layers of chamberlets, oriented parallel to the direction of coiling; numerous apertures in one or more rows, or rarely fused into a slit. L. Cretaceous to Holocene.

Suborder **SILICOLOCULININA** Resig, Lowenstam, Echols and Weiner, 1980

Silicoloculinina RESIG ET AL., 1980, p. 211.

Wall imperforate, of secreted opaline silica. M. Miocene to Holocene.

Family **SILICOLOCULINIDAE** Resig, Lowenstam, Echols and Weiner, 1980

Silicoloculinidae RESIG ET AL., 1980, p. 211.

Test small, coiled, proloculus followed by chambers of about one-half coil in length, plane of coiling changing as in the miliolines; aperture terminal on the final chamber, appearing as an arched slit because of the broad toothlike flap projecting from one margin. M. Miocene to Holocene.

Suborder **SPIRILLININA** Hohenegger and Piller, 1975

Spirillinina HOHENEGGER and PILLER, 1975, p. 88.
Spirillinoidea CHAPMAN, PARR and COLLINS, 1934, p. 554 (superfamily).
Spirillinidea POKORNÝ, 1958, p. 311 (superfamily).
Spirillinacea LOEBLICH and TAPPAN, 1961, p. 317 (superfamily).
Spirillinidae DAIN and KUZNETSOVA, 1976, p. 120 (superfamily; err. cit.).
Spirillinida GORBACHIK and MANTSUROVA, 1980, p. 36 (order).
Rotaliea MIKHALEVICH, 1980a, p. 55 (class; partim).
Rotaliata MIKHALEVICH, 1980a, p. 56 (subclass; partim).
Rotaliicea SAIDOVA, 1981, p. 35 (class; partim).
Rotaliicae SAIDOVA, 1981, p. 35 (subclass; partim).

Proloculus followed by enrolled tubular undivided chamber, or by a few chambers per whorl, coiling planispiral to high trochospiral; chambers may be secondarily subdivided; wall of calcite, optically a single crystal or few to a mosaic of crystals; *a*-axis preferred orientation along axis of coiling and *c*-axis parallel to umbilical surface (*Patellina*); may have pseudopores or micropores filled with organic matter and closed by sieve plates, wall formed by accretion at edge, not by calcification of an organic template produced by pseudopodia. ? Triassic, Jurassic (Liassic) to Holocene.

Family **SPIRILLINIDAE** Reuss and Fritsch, 1861

Spirillinidae RHUMBLER, 1895, p. 85, nom. corr. pro family Spirillidea.
Spirillidea REUSS and FRITSCH, 1861, p. 2.
Spirillinidea REUSS, 1862, p. 364.
Spirillininae BRADY, 1884, p. 72 (subfamily).
Arspirillinia RHUMBLER, 1913, p. 388 (err. emend.).
Turrispirillininae CUSHMAN, 1927, p. 73 (subfamily).
Terebralininae CUSHMAN, 1927, p. 65 (subfamily).
Sprillinidae BERMÚDEZ and RIVERO, 1963, p. 45 (err. cit.).
Spirilinidae PLOTNIKOVA, 1975a, p. 54 (err. cit.).
Planispirillinidae HOHENEGGER and PILLER, 1977, p. 414 [invalid, ICZN Art. 13 (a) (i)].
Planispirillinidae PILLER, 1978, p. 84.

Spherical proloculus followed by nonseptate enrolled tubular chamber, that may be planispiral or low or high trochospiral, or may enroll back on itself to result in a double-layered cone; conical forms may have an open or filled umbilicus; aperture single at open end of tube, or may be closed at end. ? Triassic, Jurassic to Holocene.

Family **PATELLINIDAE** Rhumbler, 1906

Patellinidae GORBACHIK and MANTSUROVA, 1980, p. 36, nom. transl. ex subfamily Patellininae.

Proloculus followed by spiral undivided tubular chamber, later stage with two chambers per whorl. L. Cretaceous to Holocene.

Subfamily **HERGOTTELLINAE** Loeblich and Tappan, **n. subfam.**

As in the family, but chambers not subdivided by radial partitions. L. Cretaceous to Holocene.

Type genus: Hergottella Ludbrook, 1966.

Remarks: Differs from the Patellininae in lacking secondary partitions in the peripheral area of the chambers.

Subfamily **PATELLININAE** Rhumbler, 1906

Patellininae RHUMBLER, 1906, p. 35.
Arpatellinia RHUMBLER, 1913, p. 390 (err. emend.).

Chambers subdivided by numerous radial partitions extending inward from the peripheral region of the chambers. L. Cretaceous to Holocene.

Family **PLACENTULINIDAE** G. K. Kasimova, Poroshina and Geodakchan, 1980

Placentulinidae KASIMOVA ET AL., 1980, p. 121.

Test a low trochospiral, lacking a tubular undivided second chamber, and with few chambers per whorl. L. Jurassic to L. Cretaceous, Holocene.

Subfamily **PLACENTULININAE** G. K. Kasimova, Poroshina and Geodakchan, 1980

Placentulininae LOEBLICH and TAPPAN, nom. transl. herein ex family Placentulinidae.

Test a low cone, proloculus followed by two to four or more chambers in the first whorl and lacking a tubular undivided second chamber, chambers lack secondary partitions. L. Jurassic to U. Cretaceous, Holocene.

Subfamily **ASHBROOKIINAE** Loeblich and Tappan, **n. subfam.**

Test a low conical spire, proloculus immediately followed by rounded chambers, two to three or four in the first whorl, and lacking a tubular nonseptate second chamber, later whorls may be reduced to fewer chambers per whorl; chambers with secondary partitions as in *Patellina*. M. Jurassic to L. Cretaceous, Holocene.

Type genus: Ashbrookia McCulloch, 1977.

Remarks: Differs from the Placentulininae in having secondary partitions, and from the Patellininae in lacking an undivided tubular second chamber.

Suborder **LAGENINA** Delage and Hérouard, 1896

Lagenina HOHENEGGER and PILLER, 1975, p. 85, nom. corr. pro suborder Lagenidae.
Lagenidae DELAGE and HÉROUARD, 1896, p. 136 (suborder).
Lagenidea LANKESTER, 1885, p. 847 (order).
Lagenaceae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (order).
Lagenida CALKINS, 1909, p. 39 (order).
Nodosalidia CALKINS, 1926, p. 355 (order).
Nodosaridia KÜHN, 1926, p. 135 (order).
Nodosarioidea WEDEKIND, 1937, p. 86 (order).
Lenticulinacea WEDEKIND, 1937, p. 99 (suborder).
Polymorphinacea WEDEKIND, 1937, p. 103 (suborder).
Robulinacea WEDEKIND, 1937, p. 104 (suborder).
Nodosariida GÜVENÇ, 1967, p. 35 (order).
Rotaliea MIKHALEVICH, 1980a, p. 55 (class; partim).
Rotaliata MIKHALEVICH, 1980a, p. 56 (subclass; partim).
Nodosarioida MIKHALEVICH, 1980a, p. 57 (superorder).
Lenticulinida MIKHALEVICH, 1980a, p. 58 (order).
Polymorphinida MIKHALEVICH, 1980a, p. 58 (order).
Rotaliicea SAIDOVA, 1981, p. 35 (class; partim).
Rotaliicae SAIDOVA, 1981, p. 35 (subclass; partim).
Nodosariina SAIDOVA, 1981, p. 35 (suborder).
Plectofrondicularina SAIDOVA, 1981, p. 37 (suborder).
Polymorphinina SAIDOVA, 1981, p. 38 (suborder).

Wall of monolamellar, optically and ultrastructurally radiate calcite, with crystal *c*-axes perpendicular to surface; crystal units enveloped by organic membranes; primitive taxa without secondary lamination, later ones secondarily lamellar. M. Carboniferous to Holocene.

Superfamily **ROBULOIDACEA** Reiss, 1963

Robuloidacea LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Robuloidinae.

Lagenina in which the test wall is not secondarily lamellar, or with a slight tendency in that direction in younger taxa. M. Carboniferous to L. Jurassic.

Family **SYZRANIIDAE** Vachard, 1981

Syzraniidae VACHARD in VACHARD and MONTENAT, 1981, p. 73.

Test uniserial, rectilinear to arcuate; rounded to ovate or compressed in section, or with flattened sides and truncate margin; wall single layered, primitive taxa not secondarily lamellar, but advanced taxa tend to develop secondary lamination. M. Carboniferous (Moscovian) to L. Jurassic.

Remarks: Morphologically similar to the distinctly lamellar Nodosariidae, to which it may be ancestral.

Family **ROBULOIDIDAE** Reiss, 1963

Robuloididae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily *Robuloidinae*.
Robuloidinae REISS, 1963, p. 50 (subfamily).

Test uniserial, coiled, at least in early stage, later may be uncoiling and rectilinear. Permian.

Remarks: Resembles the distinctly lamellar Vaginulinidae, to which it may be ancestral.

Family **PARTISANIIDAE** Loeblich and Tappan, **n. fam.**

Early chambers arranged biserially, but successive chambers added slightly less than 180° apart, resulting in a sigmoid arrangement as seen in section, later may become uniserial; aperture terminal. U. Permian.

Type genus: Partisania Sosnina, 1978.

Remarks: Morphologically similar to the lamellar Polymorphinidae.

Superfamily **NODOSARIACEA** Ehrenberg, 1838

Nodosariacea LOEBLICH and TAPPAN, 1961, p. 295, nom. corr. pro superfamily Nodosariidea.
Nodosariidea NØRVANG, 1957, p. 23, nom. transl. ex family Nodosarina.
Lagenidea GLAESSNER, 1945, p. 126.
Lagenicae EASTON, 1960, p. 65, 78.
Nodosarioidea AYALA-CASTAÑARES, 1963, p. 69.
Nodosaridea GUDINA, 1976, p. 38 (err. cit.).
Polymorphinacea HAYNES, 1981, p. 197.

Wall with both primary lamination and secondary lamination as a result of continued growth. Triassic to Holocene.

Family **NODOSARIIDAE** Ehrenberg, 1838

Nodosariidae LISTER in LANKESTER, 1903, p. 144, nom. corr. pro family Nodosarina.
Nodosarina EHRENBERG, 1838, p. 200.
Nodosarida SCHULTZE, 1854, p. 53.
Frondicularidae REUSS, 1860, p. 151.
Nodosaridae REUSS, 1860, p. 151, 178.
Lagenidea REUSS, 1862, p. 305.
Lagenida CARPENTER, PARKER and JONES, 1862, p. 154.
Frondicularideae GÜMBEL, 1870, p. 53.
Lagenideae GÜMBEL, 1870, p. 28.
Nodosarideae GÜMBEL, 1870, p. 30.
Lagene SCHWAGER, 1876, p. 476.
Nodosarie SCHWAGER, 1876, p. 476.
Dentalinoidea SCHWAGER, 1877, p. 18.
Lagenoidea SCHWAGER, 1877, p. 18.
Lagenidae SCHULZE, 1877, p. 29.
Lagenina LANKESTER, 1885, p. 847.
Lagenetta HAECKEL, 1894, p. 164.
Nodosaretta HAECKEL, 1894, p. 164.
Lageninae DELAGE and HÉROUARD, 1896, p. 137.
Nodosarinae DELAGE and HÉROUARD, 1896, p. 137.
Arnodosaridia RHUMBLER, 1913, p. 342 (err. emend.).
Nodosariellidae WEDEKIND, 1937, p. 93.
Plectofrondicularíidae MONTANARO-GALLITELLI, 1957, p. 143.
Lageridae BAULINA, 1963, table on p. 89 (err. cit.).
Modosariidae AGALAROVA, 1976, p. 66 (err. cit.).
Nodosaridae GUDINA, 1976, p. 38 (err. cit.).
Lingulinidae GRIGYALIS, 1977a, p. 11.
Nodosarridae TRIFONOVA, 1978, p. 52, 53 (err. cit.).
Dentalinidae SAIDOVA, 1981, p. 36.
Nodosaliidae SAKAGAMI and HATTA, 1982, p. 12 (err. cit.).

Test free, multilocular, or rarely single-chambered, chambers uniserial and rectilinear; wall calcareous, hyaline, finely perforate, monolamellar or ortho-monolamellar; aperture terminal, commonly radiate, or may be rounded, slitlike or multiple. *Jurassic to Holocene.*

Subfamily **NODOSARIINAE** Ehrenberg, 1838

Nodosariinae CHAPMAN, 1900, p. 30, nom. corr. pro subfamily Nodosaridea.
Nodosaridea REUSS, 1862, p. 334, nom. transl. ex family Nodosarina.
Frondicularidea REUSS, 1862, p. 307, 335.
Dentalinidae SCHWAGER, 1877, p. 18.
Lageninae BRADY, 1881, p. 44.
Nodosarinae BRADY, 1884, p. 69.
Glandulonodosariinae A. SILVESTRI, 1901, p. 109.
Frondicularíinae GALLOWAY, 1933, p. 235.
Dentalininae GRIGYALIS, 1977a, p. 12.
Dyofrondicularíinae SAIDOVA, 1981, p. 36.
Enodosariinae KALIA, 1981, p. 242 (err. cit.).

Chambers uniserial, rectilinear to slightly arcuate; aperture rounded, radiate, or multiple. L. Jurassic to Holocene.

Subfamily **LINGULININAE** Loeblich and Tappan, 1961

Lingulininae LOEBLICH and TAPPAN, 1961, p. 298.

Test free, compressed, resulting in a flattened or ovate section, rectilinear, or may have early partial coil; aperture an elongate terminal slit. Jurassic to Holocene.

Subfamily **PLECTOFRONDICULARIINAE** Cushman, 1927

Plectofrondicularíinae CHAPMAN and PARR, 1936, p. 143, nom. corr. pro subfamily Plectofrondicularinae.
Plectofrondicularinae CUSHMAN, 1927, p. 62.
Lankasterinae SAIDOVA, 1981, p. 37 (nom. imperf.; recte Lankesterininae).

Test biserial and laterally compressed at least in early part, later may be uniserial and rounded in section. Eocene to Holocene.

Family **VAGINULINIDAE** Reuss, 1860

Vaginulinidae REUSS, 1860, p. 151.
Vaginulinideae GÜMBEL, 1870, p. 53.
Lenticulinidae CHAPMAN, PARR and COLLINS, 1934, p. 554.
Robulinidae WEDEKIND, 1937, p. 104.
Marginulinellidae WEDEKIND, 1937, p. 94.
Marginulinidae WEDEKIND, 1937, p. 99.
Hydromylinidae DE WITT PUYT, 1941, p. 54.
Lenticuliniidae KURBATOV in GRIGYALIS, 1982, p. 118, 120 (err. cit.).

Test enrolled, early stage partially enrolled or arcuate, later may be uncoiled and rectilinear; ovate in section to flattened and palmate; aperture terminal, radiate or cribrate. Jurassic to Holocene.

Subfamily **LENTICULININAE** Chapman, Parr and Collins, 1934

Lenticulininae CHAPMAN ET AL., 1934, p. 554.
Lenticulinae NØRVANG, 1957, p. 93 (err. cit.).
Lenticulinidae GOFMAN [HOFMAN], 1967, p. 56 (subfamily; err. cit.).
Vaginulinopsinae PUTRYA, 1970, p. 41.
Darbyellininae SAIDOVA, 1981, p. 37.
Palmulinae SAIDOVA, 1981, p. 37.

Test lenticular to flattened, ovate to palmate; chambers in a distinct coil, at least in early stage, later may be uncoiled; aperture at the peripheral angle in enrolled forms, terminal in the uncoiled part, radiate, slitlike or multiple. Jurassic to Holocene.

Subfamily **MARGINULININAE** Wedekind, 1937

Marginulininae LOEBLICH and TAPPAN, 1974, p. 27, 46, nom. corr. pro subfamily Marginulinae.
Marginulinae NØRVANG, 1957, p. 83 (nom. imperf.), nom. transl. ex family Marginulinidae.
Menkeninae CHURCH, 1968, p. 560 [invalid, ICZN Art. 13 (a) (i); nom. imperf.].
Astacolinae PUTRYA, 1970, p. 39.
Astacelusinae PUTRYA, 1972, p. 49 (err. cit.).

Test rounded in section to flattened and palmate, early chambers in slightly arcuate arrangement but lacking a distinct coil, later may be rectilinear. Jurassic to Holocene.

Subfamily **VAGINULININAE** Reuss, 1860

Vaginulininae LOEBLICH and TAPPAN, 1974, p. 27, 46, nom. corr. pro subfamily Vaginulinidea.
Vaginulinidea REUSS, 1862, p. 366.
Planulariinae PUTRYA, 1970, p. 41.
Citharininae SAIDOVA, 1981, p. 36.
Citharinellinae SAIDOVA, 1981, p. 36.

Test commonly compressed and bladelike to palmate; chambers in nearly straight series, but with oblique sutures; aperture terminal, at the peripheral angle or central. Jurassic to Holocene.

Subfamily **LINGULINOPSINAE** Loeblich and Tappan, **n. subfam.**

Lingulinopsinae LOEBLICH and TAPPAN, 1982c, p. 31, nom. nud.

Test compressed, early stage planispirally enrolled, later uncoiled and rectilinear; aperture terminal and slitlike. U. Cretaceous (Turonian) to Holocene.

Type genus: Lingulinopsis Reuss, 1860.

Remarks: Differs from the subfamily Lingulininae of the family Nodosariidae in having an early enrolled stage.

Family **POLYMORPHINIDAE** d'Orbigny, 1839

Polymorphinidae D'ORBIGNY in DE LA SAGRA, 1839, p. xxxix, 131.
Polymorphinideae REUSS, 1860, p. 230.
Polymorphinidea REUSS, 1860, p. 151.
Polymorphinida JONES in GRIFFITH and HENFREY, 1875, p. 320.
Polymorphinidee SCHWAGER, 1876, p. 479.
Polymorphinina BÜTSCHLI in BRONN, 1880, p. 200.
Ramulinina LANKESTER, 1885, p. 847.
Polymorphinae DELAGE and HÉROUARD, 1896, p. 138.
Ramulinae DELAGE and HÉROUARD, 1896, p. 138.
Ramulinidae LISTER in LANKESTER, 1903, p. 145.
Enantiomorphinidae MARIE, 1941, p. 142.
Polymorphynidae KUZNETSOVA, 1963, p. 106 (err. cit.).
Polymorpinidae KUZINA, 1976, p. 45 (err. cit.).

Test with chambers arranged in spiral about a vertical axis; chambers strongly overlapping toward the early part of the test; aperture at distal end, radiate. Triassic to Holocene.

Subfamily **POLYMORPHININAE** d'Orbigny, 1839

Polymorphininae BRADY, 1881, p. 44, nom. transl. ex family Polymorphinidae.
Enantiomorphininae LOEBLICH and TAPPAN, 1961, p. 298.
Guttulininae KUZINA, 1973, p. 93.
Cuttulininae KUZINA, 1976, p. 11 (err. cit.).

Test free; interior simple. Triassic to Holocene.

Subfamily **WEBBINELLINAE** Rhumbler, 1904

Webbinellinae RHUMBLER, 1904, p. 224.
Arwebbina RHUMBLER, 1913, p. 346 (err. emend.).
Edithaëllinae FUCHS, 1967, p. 320 (nom. imperf., ICZN Art. 27).

Test polymorphine in early stage, later becoming attached to the substrate, and may have final spreading, branching or irregular chamber against the attachment. Jurassic to Holocene.

Subfamily **RAMULININAE** Brady, 1884

Ramulininae BRADY, 1884, p. 71.

Test free, consisting of a series of very irregular chambers, that may be closely appressed or widely separated by stolon-like connections. Jurassic to Holocene.

Family **GLANDULINIDAE** Reuss, 1860

Glandulinidae REUSS, 1860, p. 151.

Test consisting of a single chamber or with chambers in uniserial, biserial or polymorphine arrangement; aperture terminal, radial or slitlike, provided with entosolenian tube. ?Triassic, Jurassic to Holocene.

Subfamily **GLANDULININAE** Reuss, 1860

Glandulininae LOEBLICH and TAPPAN, 1961, p. 299, nom. corr. pro subfamily Glandulinidea.
Glandulinidea REUSS, 1862, p. 307, nom. transl. ex family Glandulinidae.

Glandulinea HANTKEN, 1876, p. 41.
Laryngosigminae SAIDOVA, 1981, p. 39.

Test multilocular, biserial or polymorphine; aperture terminal, radial or slitlike, with entosolenian tube. ? Triassic, Jurassic to Holocene.

Subfamily **ENTOLINGULININAE** Saidova, 1981

Entolingulininae SAIDOVA, 1981, p. 39.

Test multilocular, uniserial, with chambers in curved to rectilinear series; aperture terminal, radiate to ovoid, with entosolenian tube. Holocene.

Subfamily **SEABROOKIINAE** Cushman, 1927

Seabrookiinae CUSHMAN, 1927, p. 86.

Test compressed, proloculus followed by chambers added 180° from preceding and completely enveloping earlier formed ones; aperture terminal, oval to slitlike, and may have thickened lip. U. Cretaceous to Holocene.

Subfamily **OOLININAE** Loeblich and Tappan, 1961

Oolininae LOEBLICH and TAPPAN, 1961, p. 299.
Ellipsolageninae A. SILVESTRI, 1923, p. 265 (nom. oblit.).

Test a single chamber, with slitlike to radiate aperture that may be central or excentric and is provided with an entosolenian tube. Jurassic to Holocene.

Suborder **ROBERTININA** Loeblich and Tappan, ***n. suborder***

Conorbida HOFKER, 1951, p. 307 (suborder invalid, based on *Conorbis* Hofker, 1951, non Swainson, 1840).
Rotaliea MIKHALEVICH, 1980a, p. 55 (class; partim).
Rotaliata MIKHALEVICH, 1980a, p. 56 (subclass; partim).
Robertinoida MIKHALEVICH, 1980a, p. 59 (superorder).
Robertinida MIKHALEVICH, 1980a, p. 59 (order).
Ceratobuliminida MIKHALEVICH, 1980a, p. 59 (order).
Rotaliicea SAIDOVA, 1981, p. 35 (class; partim).
Robertinicae SAIDOVA, 1981, p. 62 (subclass).
Cassidulinitida SAIDOVA, 1981, p. 62 (order).

Test planispirally to trochospirally enrolled; chambers commonly with internal partition related to apertural foramen; wall of hyaline perforate, ultrastructurally and optically radiate aragonite (orthorhombic crystal form of calcium carbonate), the hexagonal prisms with *c*-axis normal to the wall surface, and basal pinacoid parallel to the surface, prisms in bundles surrounded by organic sheaths; extremely fine wall perforations may be localized in pore fields. M. Triassic to Holocene.

Remarks: The hyaline perforate, optically radiate aragonitic wall characterizes taxa of this suborder.

Superfamily **DUOSTOMINACEA** Brotzen, 1963

Duostominacea LOEBLICH and TAPPAN, 1974, p. 29, 47, nom. transl. ex family Duostominidae.
Oberhauserellacea FUCHS, 1975, p. 221.

Test enrolled, planispiral to high trochospiral, non-lamellar, possibly originally aragonitic, but commonly poorly preserved, wall appearing granular and may incorporate some foreign matter; aperture single or double, interiomarginal. M. Triassic to L. Jurassic.

Family **DUOSTOMINIDAE** Brotzen, 1963

Duostominidae BROTZEN, 1963, p. 76.
Variostomidae KRISTAN-TOLLMANN, 1963, p. 152 (nom. imperf.).
Variostomatidae LOEBLICH and TAPPAN, 1964b, p. 29.

Test low to high spired, with two interiomarginal apertures in the final chamber, separated by a short tenon. M. Triassic.

Family **ASYMMETRINIDAE** Brotzen, 1963

Asymmetrinidae BROTZEN, 1963, p. 76.

Test nearly planispiral, but may be slightly asymmetrical; with a single interiomarginal lobulate aperture. U. Triassic.

Family **OBERHAUSERELLIDAE** Fuchs, 1970

Oberhauserellidae FUCHS, 1970, p. 112.

Low trochospiral test, chambers somewhat inflated dorsally; aperture single, an interiomarginal slit. M. Triassic to L. Jurassic.

Superfamily **ROBERTINACEA** Reuss, 1850

Robertinacea LOEBLICH and TAPPAN, 1961, p. 317, nom. transl. ex family Robertinidae.
Ceratobuliminidea MYATLYUK in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 273.
Robertinidea SAIDOVA, 1981, p. 62.
Cassidulinitidea SAIDOVA, 1981, p. 62.
Ceratobuliminacea DAIN in SUBBOTINA ET AL., 1981, p. 92.
Robertinoidea TAPPAN and LOEBLICH, 1982, p. 539.

Coiling basically trochospiral; chambers subdivided by internal partitions; primary aperture a low interiomarginal slit, areal or at peripheral margin, and may be secondarily closed by clear shell material; intercameral foramen may be remnant of primary opening or secondarily produced by resorption just above internal partition as new chamber is added. Jurassic to Holocene.

Family **CONORBOIDIDAE** Thalmann, 1952

Conorboididae THALMANN, 1952, p. 984.
Conorbidae HOFKER, 1951, p. 414 (invalid, ICZN Art. 39; based on *Conorbis* Hofker, 1951, non Swainson, 1840).
Conorboidinae REISS, 1963, p. 58 (subfamily).

Test a low to high trochospiral, later stage commonly with reduced number of chambers per whorl, and finally may become uniserial; aperture a low interiomarginal umbilical slit in trochospiral taxa, becoming terminal and central in the uniserial stage; a prominent hemicylindrical toothplate projects inward from the aperture as a columella-like structure, that even in uniserial chambers changes in orientation from chamber to chamber, reflecting the ancestral coiled state. Jurassic to M. Eocene.

Family **CERATOBULIMINIDAE** Cushman, 1927

Ceratobuliminidae GLAESSNER, 1937, p. 27, nom. transl. ex subfamily Ceratobulimininae.
Ceratubuliminidae HOFKER, 1956, p. 103 (err. cit.).
Geratobuliminidae BASOV, 1973, p. 65 (err. cit.).

Test trochospiral, primary aperture interiomarginal, commonly closed as chambers are added, with intercameral foramen produced by resorption above the internal partition that subdivides the chambers. L. Jurassic to Holocene.

Subfamily **CERATOBULIMININAE** Cushman, 1927

Ceratobulimininae CUSHMAN, 1927, p. 84.
Lamarckininae DAIN in SUBBOTINA ET AL., 1981, p. 93.

Primary aperture interiomarginal or may diverge, a slit extending up the apertural face, coiling predominantly dextral; later stage may tend to uncoil. M. Jurassic to Holocene.

Subfamily **REINHOLDELLINAE** Seiglie and Bermúdez, 1965

Reinholdellinae SEIGLIE and BERMÚDEZ, 1965, p. 164.

Coiling trochospiral, secondary chamberlets surrounding the umbilicus resulting from an internal partition that subdivides the chambers; aperture interiomarginal, near the periphery on the umbilical side, secondary foramen present in the internal pillar-like partition. L. to M. Jurassic.

Family **ROBERTINIDAE** Reuss, 1850

Robertinidae REUSS, 1850, p. 375.
Alliatinidae HAYNES, 1981, p. 227, 232.
Cassidulinitidae SAIDOVA, 1981, p. 62.

Chambers coiled in low to high predominantly dextral trochospiral, or may be nearly planispiral; interior of chambers divided by double transverse partition resulting from infolding of wall, and forming small supplementary chambers on one or both sides of test, or with primary and secondary chambers in distinct series; aperture interiomarginal, elongate loop-shaped or with two diverging slits, or may have additional areal or sutural supplementary openings. L. Eocene to Holocene.

Subfamily **ROBERTININAE** Reuss, 1850

Robertininae SIGAL in PIVETEAU, 1952, p. 220, nom. transl. ex family Robertinidae.

Coiling in a high trochospiral. L. Eocene to Holocene.

Subfamily **ALLIATININAE** McGowran, 1966

Alliatininae MCGOWRAN, 1966, p. 95.

Coiling nearly planispiral. Miocene to Holocene.

Subfamily **UNGULATELLINAE** Seiglie, 1964

Ungulatellinae SEIGLIE, 1964, p. 509.

Coiling trochospiral, proloculus followed by undivided tubular chamber of one to two whorls, then by two chambers per whorl, or may have two chambers per whorl immediately following the proloculus; aperture a small slit at the end of the final chamber. Holocene.

Subfamily **CASSIDULINITINAE** Saidova, 1981

Cassidulinitinae SAIDOVA, 1981, p. 62.

Biserial series of chambers arranged in a trochospire, alternate chambers extending to the umbilicus on the flattened umbilical side; aperture a high slit near the midregion of the final chamber face on the umbilical side. Pliocene.

Family **EPISTOMINIDAE** Wedekind, 1937

Epistominidae WEDEKIND, 1937, p. 115.

Trochospiral coiling predominantly sinistral, chambers divided by internal partition that attaches to dorsal lip of aperture; aperture a slit on peripheral margin, closed by clear shell material in older chambers. Jurassic to Holocene.

Subfamily **EPISTOMININAE** Wedekind, 1937

Epistomininae LOEBLICH and TAPPAN, 1961, p. 317, nom. transl. ex family Epistominidae.
Garantellinae GRIGYALIS, 1977b, p. 148.
Epistominae S. N. SINGH and KALIA, 1982, p. 31 (err. cit.).

Chambers coiled in low trochospire or may uncoil in later stage. Jurassic to Holocene.

Subfamily **EPISTOMINOIDINAE** Saidova, 1981

Epistominoidinae SAIDOVA, 1981, p. 63.

Test nearly planispiral, internal partition attaching to outer wall only on one side of the test, giving an appearance of biseriality, or may have a stellate arrangement of secondary chamberlets about the umbilicus; broad apertural face with peripheral primary aperture and inner areal foramen, both equatorial in position. Jurassic to L. Eocene.

Family **MISSISSIPPINIDAE** Saidova, 1981

Mississippinidae SAIDOVA, 1981, p. 63.

Chambers in low trochospiral coil, with areas of clear shell material paralleling the periphery on one or both sides; primary aperture low and interiomarginal. Eocene to Holocene.

Subfamily **STOMATORBININAE** Saidova, 1981

Stomatorbininae SAIDOVA, 1981, p. 63.

Test distinctly trochoid; aperture interiomarginal or areal on umbilical side. Eocene.

Subfamily **MISSISSIPPININAE** Saidova, 1981

Mississippininae SAIDOVA, 1981, p. 63.

Chambers in flattened trochospiral to nearly planispiral coil, clear shell areas at both sides of the periphery; pri-

mary aperture interiomarginal, equatorial. L. Oligocene to Holocene.

Suborder **GLOBIGERININA** Delage and Hérouard, 1896

Globigerinina LOEBLICH and TAPPAN, nom. corr. herein pro suborder *Globigerinidae*.
Globigerinidae DELAGE and HÉROUARD, 1896, p. 141 (suborder).
Globigerinidea LANKESTER, 1885, p. 847 (order).
Globigerinidae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (order).
Globigerinida CALKINS, 1909, p. 39 (order).
Heterohelicida FURSENKO, 1958, p. 24 (order).
Globigerinida BLOW, 1979, p. 835 (suborder).
Globigerinea MIKHALEVICH, 1980a, p. 59 (class).
Globorotaliida MIKHALEVICH, 1980a, p. 59 (order).
Hantkeninida MIKHALEVICH, 1980a, p. 59 (order).
Rotaliicea SAIDOVA, 1981, p. 35 (class; partim).
Rotaliicae SAIDOVA, 1981, p. 35 (subclass; partim).

Planktonic habit; test wall of perforate hyaline calcite, optically radiate, preferred crystal orientation with *c*-axis normal to surface; primary lamination bilamellar, with secondary lamination due to addition of material at formation of new chamber; surface crust may develop at time of gametogenesis. L. Jurassic to Holocene.

Superfamily **HETEROHELICACEA** Cushman, 1927

Heterohelicacea GRIGYALIS, 1978, p. 9, nom. corr. pro superfamily Heterohelicidea.
Heterohelicidea ALIYULLA, 1977, p. 197, nom. transl. ex family Heterohelicidae.

Test biserial or triserial, at least in early stage, later may be reduced to uniserial, or more commonly with chamber proliferation in the later stage; aperture at the base of the final chamber, a low to high arch, or terminal in the uniserial stage. L. Jurassic to Holocene.

Family **HETEROHELICIDAE** *Cushman, 1927*

Heterohelicidae CUSHMAN, 1927, p. 59.
Gümbelinidae WEDEKIND, 1937, p. 112.
Heterohelicida COPELAND, 1956, p. 188.
Heterochelicidae DABAGYAN, MYATLYUK and PISHVANOVA, 1956, p. 221 (err. cit.).
Guembelitriidae EL-NAGGAR, 1971, p. 431.
Gumbelitridae SETTY, 1979, p. 395 (err. cit.).

Aperture symmetrical, ranging from a low slit to a high arch at the base of the final chamber, becoming terminal in uniserial taxa. L. Jurassic to Oligocene, ? Holocene.

Subfamily **GUEMBELITRIINAE** Montanaro Gallitelli, 1957

Guembelitriinae MONTANARO GALLITELLI, 1957, p. 136.

Early stage trochospiral, triserial or biserial, later may show serial reductions or proliferations. M. Jurassic to Eocene.

Subfamily **HETEROHELICINAE** Cushman, 1927

Heterohelicinae CUSHMAN, 1927, p. 59.
Spiroplectinae CUSHMAN, 1911, p. 4.
Gümbelininae CUSHMAN, 1927, p. 59.
Ventilabrellinae MAAMOURI and SALAJ, 1974, p. 139 [invalid, ICZN Art. 13 (a) (i)].
Pseudotextulariinae MAAMOURI and SALAJ, 1974, p. 139; SOLIMAN, 1974, p. 205 [both invalid, ICZN Art. 13 (a) (i)].
Tesseraellinae ALIYULLA, 1977, p. 203.
Ventilabrellinae MAAMOURI and SALAJ, 1978, p. 103.
Pseudotextulariinae MAAMOURI and SALAJ, 1978, p. 104.

Early stage biserial or may be planispirally coiled, later stage biserial or with chamber proliferation. L. Cretaceous to Oligocene.

Subfamily **GUBLERININAE** Aliyulla, 1977

Gublerininae ALIYULLA, 1977, p. 202.

Early stage with tiny initial coil or biserial, later biserial series may diverge, or test may become uniserial. L. Cretaceous to Paleocene (Danian).

Subfamily **PSEUDOGUEMBELININAE** Aliyulla, 1977

Pseudoguembelininae ALIYULLA, 1977, p. 200.

Chambers biserially arranged, primary aperture at base of final chamber, supplemental sutural apertures present along the zigzag suture. U. Cretaceous.

Family **CHILOGUEMBELINIDAE** Reiss, 1963

Chiloguembelinidae REISS, 1963, p. 55.
Chilogumbelinidae SETTY, 1979, p. 395 (err. cit.).

Chambers in somewhat twisted biserial arrangement; aperture asymmetrical, extending up the face of the final chamber, bordered at one side by a flaplike extension of the margin, so that aperture faces one of the flat sides of the test. Paleocene to Pleistocene.

Superfamily **PLANOMALINACEA** Bolli, Loeblich and Tappan, 1957

Planomalinacea LOEBLICH and TAPPAN, 1982c, p. 33, nom. transl. ex subfamily Planomalinidae.

Chambers planispirally enrolled, but may tend to become trochospiral; aperture equatorial and interiomarginal with bordering lip, those of earlier chambers may remain as relict apertures as new chambers are added. L. Cretaceous (Barremian) to U. Cretaceous (Maastrichtian).

Family **GLOBIGERINELLOIDIDAE** Longoria, 1974

Globigerinelloididae LONGORIA, 1974, p. 76.
Globigerinelloididae LONGORIA-TREVIÑO, 1974, p. 1741-B [invalid, ICZN Art. 13 (a) (i)].

Chambers planispirally enrolled, globular to radially elongate; aperture at the base of the chamber face and equatorial in position, lateral portions of primary aperture may remain open as new chambers are added, forming relict openings around the umbilical region. L. Cretaceous (Barremian) to U. Cretaceous (Maastrichtian).

Subfamily **GLOBIGERINELLOIDINAE** Longoria, 1974

Globigerinelloidinae LOEBLICH and TAPPAN, 1982c, p. 33, nom. transl. ex family Globigerinelloididae.

Chambers globular throughout growth, not becoming

elongated; planispirally coiled. L. Cretaceous (Barremian) to Paleocene (Danian).

Subfamily **EOHASTIGERINELLINAE** Loeblich and Tappan, **n. subfam.**

Eohastigerinellinae LOEBLICH and TAPPAN, 1982c, p. 33, nom. nud.

Coiling planispiral, chambers globular in early stage, later radially elongate. U. Cretaceous (Turonian).

Type genus: Eohastigerinella Morozova, 1957.

Remarks: Differs from the subfamily Globigerinelloidinae in having radially elongate chambers.

Family **PLANOMALINIDAE** Bolli, Loeblich and Tappan, 1957

Planomalinidae SIGAL, 1958, p. 263, nom. transl. ex subfamily Planomalininae.
Planomalininae BOLLI ET AL., 1957, p. 21 (subfamily).

Test planispiral, biumbilicate, periphery carinate, sutures strongly arched; aperture a low equatorial opening. L. Cretaceous (Albian) to U. Cretaceous (Cenomanian).

Family **SCHACKOINIDAE** Pokorný, 1958

Schackoinidae POKORNÝ, 1958, p. 348.

Coiling trochospiral to nearly planispiral, chambers with one or more hollow tubulospines; aperture equatorial and may have broad lip. L. Cretaceous (Aptian) to U. Cretaceous (Maastrichtian).

Superfamily **ROTALIPORACEA** Sigal, 1958

Rotaliporacea LOEBLICH and TAPPAN, 1982c, p. 33, nom. transl. ex family Rotaliporidae.
Hedbergelloidea LONGORIA and GAMPER, 1975, p. 65.

Trochospirally enrolled test; primary aperture extraumbilical-umbilical, bordered by lip; advanced taxa develop secondary sutural apertures on the umbilical side of the test. M. Jurassic to U. Cretaceous.

Family **HEDBERGELLIDAE** Loeblich and Tappan, 1961

Hedbergellidae FUCHS, 1971, p. 35, nom. transl. ex subfamily Hedbergellinae.

Test trochospirally coiled, primary aperture interiomarginal, extraumbilical-umbilical, may have prominent apertural lip, those of earlier chambers remaining visible around the umbilical region; no sutural secondary apertures. M. Jurassic (Callovian) to U. Cretaceous (Maastrichtian).

Subfamily **HEDBERGELLINAE** Loeblich and Tappan, 1961

Hedbergellinae LOEBLICH and TAPPAN, 1961, p. 309.
? Loeblichellinae PESSAGNO, 1967, p. 287.

Test trochospiral, chambers globular and inflated, no peripheral keel. M. Jurassic (Callovian) to U. Cretaceous (Maastrichtian).

Subfamily **ROTUNDININAE** Bellier and Salaj, 1977

Rotundininae BELLIER and SALAJ, 1977, p. 319.
Rotundininae BELLIER and SALAJ, 1974, p. 23, nom. nud.
Praeglobotruncaninae LOEBLICH and TAPPAN, 1982c, p. 33, nom. nud.

Trochospirally enrolled, periphery subangular and may have keel or imperforate carinal band; wall surface smooth to pustulose or hispid; aperture an interiomarginal extraumbilical-umbilical arch with bordering lip; no secondary sutural apertures. Cretaceous (Albian-Cenomanian).

Remarks: Differs from the subfamily Hedbergellinae in having an imperforate carinal band or keel.

Family **GLOBULIGERINIDAE** Loeblich and Tappan, **n. fam.**

Caucasellidae LONGORIA-TREVIÑO, 1974, p. 1741-B, nom. nud.
Caucasellidae LONGORIA, 1974, p. 48 (invalid, ICZN Art. 39; based on *Caucasella* Longoria, 1974, non Moissiev, 1934).
Caucaselidae NEAGU, 1979, p. 309 (err. cit.).
Caucasellinae LOEBLICH and TAPPAN, 1982c, p. 34 (subfamily; invalid, ICZN Art. 39).

Test trochoid, few chambers per whorl; wall perforate, with strongly perforate areas interspersed with inflational pustules; aperture umbilical, a high arch with bordering lip. Jurassic (Bathonian) to L. Cretaceous (Aptian).

Type genus: Globuligerina Bignot and Guyader, 1971.

Remarks: Caucasella Longoria, 1974 is a homonym of *Caucasella* Moissiev, 1934, hence the family name based on the homonym is also invalid. Although *Globuligerina* has been variously placed in the Globigerinidae and Favusellidae, the wall character is distinct from both. Numerous inflational pustules are present on the surface, but true spines such as those of the Globigerinidae are lacking; pores are localized in areas as in the Favusellidae, but separated only by pustules, rather than with a distinct imperforate reticulum surrounding the pore regions.

Family **FAVUSELLIDAE** Longoria, 1974

Favusellidae LONGORIA, 1974, p. 74.
Favusellinae LOEBLICH and TAPPAN, 1982c, p. 34 (subfamily).

Test trochospirally coiled, chambers inflated, rounded to ovate; wall cancellate, with imperforate ridges bordering fields of numerous perforations; primary aperture umbilical to slightly extraumbilical, bordered by imperforate lip; umbilicus narrow to wide and deep, margin non-carinate. L. Cretaceous (Albian) to U. Cretaceous (Cenomanian).

Remarks: Banner (1982, p. 188) considered the generic name "Reticuloglobigerina" Reiss to have priority over *Favusella* Michael, 1973. However, Reiss (1963, p. 74) stated that "Reticuloglobigerina" (a nomen nudum) had been used for this taxon, but that "a full description must await further study of more and well preserved material." Hence this remained an informally used nomen nudum, and as after 1960 a name proposed conditionally is not available (ICZN Art. 15), Michael's name for the genus is here recognized as valid.

Family **ROTALIPORIDAE** Sigal, 1958

Rotaliporidae SIGAL, 1958, p. 264.
Ticinellidae LONGORIA-TREVIÑO, 1974, p. 1741-B, nom. nud.
Ticinellidae LONGORIA, 1974, p. 93.

Test trochospirally enrolled; primary aperture umbilical-extraumbilical in position, with bordering lip; secondary sutural apertures on umbilical side, opening into posterior edge of chambers. L. Cretaceous (Barremian) to U. Cretaceous (Cenomanian).

Subfamily **TICINELLINAE** Longoria, 1974

Ticinellinae LOEBLICH and TAPPAN, 1982c, p. 34, nom. transl. ex family Ticinellidae.

Periphery rounded, non-carinate. L. Cretaceous (Barremian) to U. Cretaceous (Cenomanian).

Subfamily **ROTALIPORINAE** Sigal, 1958

Rotaliporinae BANNER and BLOW, 1959, p. 8, nom. transl. ex family *Rotaliporidae*.

Periphery angular, due to development of a peripheral keel. L. Cretaceous (Albian) to U. Cretaceous (Cenomanian).

Superfamily **GLOBOTRUNCANACEA** Brotzen, 1942

Globotruncanacea LOEBLICH and TAPPAN, 1982b, p. 381, nom. transl. ex subfamily Globotruncaninae.

Test trochospiral, chambers globular to angular, and may have peripheral imperforate carinal band; primary aperture umbilical, with tegilla of successive chambers covering the umbilical area; accessory intralaminal and infralaminal apertures also may occur. U. Cretaceous (U. Cenomanian to Maastrichtian).

Family **GLOBOTRUNCANIDAE** Brotzen, 1942

Globotruncanidae MOROZOVA, 1957, p. 1111, nom. transl. ex subfamily Globotruncaninae.
Marginotruncanidae PESSAGNO, 1967, p. 298.
Abathomphalidae PESSAGNO, 1967, p. 371.
Abatomphalidae NEAGU, 1979, p. 314 (err. cit.).

Test trochospiral, chambers angular, periphery truncate or carinate; primary aperture umbilical, covered by a spiral system of tegilla, that have accessory intralaminal and infralaminal apertures. U. Cretaceous (U. Cenomanian to Maastrichtian).

Subfamily **GLOBOTRUNCANINAE** Brotzen, 1942

Globotruncaninae BROTZEN, 1942, p. 28.
Helvetoglobotruncaninae LAMOLDA, 1976, p. 396.
Globotrincaninae NEAGU, 1979, p. 312 (err. cit.).
Globotruncanina KORCHAGIN, 1982, p. 117 (err. cit.).

Primary aperture umbilical in position, covered by spiral series of tegilla that have accessory intralaminal and infralaminal openings; also rarely may have sutural openings on spiral side. U. Cretaceous (U. Cenomanian to Maastrichtian).

Subfamily **GLOBOTRUNCANELLINAE** Maslakova, 1964

Globotruncanellinae MASLAKOVA, 1964, p. 113.

Umbilical tegilla present, with infralaminal accessory apertures. U. Cretaceous (Maastrichtian).

Subfamily **ABATHOMPHALINAE** Pessagno, 1967

Abathomphalinae LOEBLICH and TAPPAN, 1982c, p. 34, nom. transl. ex family Abathomphalidae.

Test trochospiral, umbilical side lacks the wide umbilicus of the Globotruncanidae; tegilla-like extension arises only from final chamber to cover the umbilical area; also has infralaminal accessory openings. U. Cretaceous (Maastrichtian).

Family **RUGOGLOBIGERINIDAE** Subbotina, 1959

Rugoglobigerinidae LOEBLICH and TAPPAN, 1982c, p. 34, nom. transl. ex subfamily Rugoglobigerininae.
Rugoglobigerininae SUBBOTINA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 303 (subfamily).

Test trochospiral, chambers inflated, periphery rounded, not carinate; aperture umbilical, with portici or tegilla. U. Cretaceous (Turonian to Maastrichtian).

Superfamily **HANTKENINACEA** Cushman, 1927

Hantkeninacea HAYNES, 1981, p. 343, nom. transl. ex family Hantkeninidae.

Test planispiral or enrolled biserial; chambers globular to elongate; primary aperture equatorial in position, single or multiple; may also have relict or areal secondary apertures. Paleocene to Miocene, ? Pliocene.

Family **GLOBANOMALINIDAE** Loeblich and Tappan, **n. fam.**

Test planispirally enrolled, or may be slightly asymmetrical, biumbilicate, nearly involute; chambers inflated, subglobular to radially elongate and terminally clavate; wall hyaline, perforate, optically radiate, surface smooth, nonspinose; primary aperture symmetrical and equatorial, with bordering lip. Paleocene to Oligocene, ? Pliocene.

Type genus: Globanomalina Haque, 1956.

Remarks: Differs from the Hantkeninidae, to which it is ancestral, in lacking tubulospines, and in having a simple, low aperture.

Family **HANTKENINIDAE** Cushman, 1927

Hantkeninidae CUSHMAN, 1927, p. 64.
Hantkenininae CHAPMAN and PARR, 1936, p. 145 (subfamily).
Hantkennidae TASCH, 1963, p. 441 (err. cit.).

Test planispirally enrolled, chambers rounded, each with a distinct tubulospine arising from its periphery; aperture a high interiomarginal and equatorial arched opening, bordered by a broad lip at each side, or may become cribrate. U. Eocene.

Family **CASSIGERINELLIDAE** Bolli, Loeblich and Tappan, 1957

Cassigerinellidae LOEBLICH and TAPPAN, 1982c, p. 34, nom. transl. ex subfamily Cassigerinellinae.
Cassigerinellinae BOLLI ET AL., 1957, p. 30 (subfamily).

Test planispiral in early stage, later becoming enrolled biserial; primary aperture equatorial in planispiral stage, extraumbilical and alternating from side to side in later biserial stage. Oligocene to Miocene.

Superfamily **GLOBIGERINACEA** Carpenter, Parker and Jones, 1862

Globigerinacea LOEBLICH and TAPPAN, 1961, p. 307, nom. corr. pro superfamily Globigerinidea.
Globigerinidea MOROZOVA, 1957, p. 1110, nom. transl. ex family Globigerinida.
Globigerinaceae BANNER and BLOW, 1959, p. 4.
Glogigerinacea MANOFF, COUSMINER and RASSAM, 1979, p. 52 (err. cit.).
Globigerinoidea TAPPAN and LOEBLICH, 1982, p. 541.

Test trochospiral, but chambers may be enveloping in later stage; wall perforate, with numerous small pores or fewer large pores, surface may be covered with narrow elongate non-lamellar monocrystalline spines with *c*-axis running lengthwise of the spine; aperture interiomarginal, umbilical to umbilical-extraumbilical, to equatorial, relatively large secondary sutural apertures also may occur. Eocene to Holocene.

Family **GLOBIGERINIDAE** Carpenter, Parker and Jones, 1862

Globigerinidae SCHULZE, 1877, p. 29, nom. corr. pro family Globigerinida (nom. conserv., ICZN Opinion 552).
Orbulinida SCHULTZE, 1854, p. 52.
Globigerinida CARPENTER ET AL., 1862, p. 171.
Globigerinidee SCHWAGER, 1876, p. 479.
Globigerinidea SCHWAGER, 1877, p. 20.
Globigerininae BÜTSCHLI in BRONN, 1880, p. 200.
Orbulinetta HAECKEL, 1894, p. 164.
Orbulinidae GALLOWAY, 1933, p. 326.
Orbutilinidae NYHOLM, 1961, p. 184 (err. cit.).
Globigerapsidae BLOW, 1979, p. 1117.

Early stage trochospiral, later may become planispiral, or final chamber may be spherical and completely enclose the early spire; wall strongly perforate, and surface may be covered with thin elongate non-lamellar monocrystalline spines that are not directly connected to the wall, but are set into holes within it and may be readily dislodged; in final stage some may develop a thick outer calcite crust or cortex; aperture interiomarginal, and may be umbilical or become extraumbilical, spiroumbilical, or equatorial, may be accompanied by large sutural supplementary openings on the spiral side, or aperture may consist only of large areal pores. Eocene to Holocene.

Subfamily **GLOBIGERININAE** Carpenter, Parker and Jones, 1862

Globigerininae CUSHMAN, 1927, p. 87, nom. corr. pro subfamily Globigerinae.
Globigerinae CARPENTER ET AL., 1862, p. 181 (nom. imperf.).
Globigerinina JONES in GRIFFITH and HENFREY, 1875, p. 320.
Globigerinidae SCHWAGER, 1877, p. 20.
Sphaeroidinellinae BANNER and BLOW, 1959, p. 5.
Globigarininae SETTY, 1979, p. 395 (nom. imperf.).

Test trochospiral throughout. Eocene to Holocene.

Subfamily **ORBULININAE** Schultze, 1854

Orbulininae CUSHMAN, 1927, p. 89, nom. transl. ex family Orbulinida.
Porticulasphaerinae BANNER, 1982, p. 205.

Final chamber strongly enveloping and may enclose most or all of early part of test. Miocene to Holocene.

Family **CANDEINIDAE** Cushman, 1927

Candeinidae F. L. PARKER, 1967, p. 144, nom. transl. ex subfamily Candeininae.
Candeininae CUSHMAN, 1927, p. 90 (subfamily).

Chambers in low to relatively high trochospiral coil, early stage with umbilical aperture and spinose wall, later chambers tightly coiled with umbilicus closed; aperture consists of a series of rounded openings along the sutures, each with a small bordering lip. Miocene to Holocene.

Family **HASTIGERINIDAE** Bolli, Loeblich and Tappan, 1957

Hastigerinidae SAITO, THOMPSON and BREGER, 1976, p. 282, nom. transl. ex subfamily Hastigerininae.
Hastigerininae BOLLI ET AL., 1957, p. 29 (subfamily).
Hasterigerininae LOEBLICH and TAPPAN, 1961, p. 309 (err. cit.).

Early stage trochospiral, later becoming streptospiral or planispiral, chambers globular to clavate or terminally furcate; wall densely perforate, or with pores localized and separated by nonperforate intervening areas, surface spinose, the elongate spines arising from basal collars at the test surface; aperture interiomarginal and equatorial, to spiroumbilical. Pleistocene to Holocene.

Superfamily **GLOBOROTALIACEA** Cushman, 1927

Globorotaliacea LOEBLICH and TAPPAN, 1982c, p. 34, nom. transl. ex family Globorotaliidae.

Test trochospiral, periphery rounded to carinate; wall finely lamellar, perforate, of optically radiate calcite, with inner organic lining and a primary organic membrane that is calcified on both sides to produce a primary bilamellar structure, but with calcite layers thickest at the exterior; surface smooth, pustulose or pitted, nonspinose, inflational pustules most prominent near the aperture, when present pits are bordered by ridges and have one or more large pores at the center; primary aperture interiomarginal and extraumbilical-umbilical, bordering lip imperforate; supplementary sutural apertures and bullae may be accompanied by infralaminal accessory apertures. U. Cretaceous (Maastrichtian) to Holocene.

Family **EOGLOBIGERINIDAE** Blow, 1979

Eoglobigerinidae BLOW, 1979, p. 1203.

Low to moderately elevated trochospiral coil, small open

umbilicus on umbilical side; wall smooth, nonspinose and non-cancellate, thin, finely perforate; aperture small, nearly circular, extraumbilical, interiomarginal, and lacks a lip or thickened rim. Paleocene to Holocene.

Family **GLOBOROTALIIDAE** Cushman, 1927

Globorotaliidae CUSHMAN, 1927, p. 91.
Globorotalidae KOLTYPIN, 1957, p. 101 (err. cit.).
Cloborotalidae KOLTYPIN, 1957, p. 89 (err. cit.).
Globorataliidae R. A. DAVIS, 1964, p. 419 (err. cit.).
Globorotalliidae LISITSYN, 1974, p. 111 (err. cit.).

Test trochospiral, subglobular to lenticular or compressed; wall surface smooth to pustulose, nonspinose, in later stage may develop a thickened calcite crust; aperture interiomarginal, umbilical-extraumbilical, with thickened rim or flaplike lip. U. Cretaceous (Maastrichtian) to Holocene.

Subfamily **GLOBOROTALIINAE** Cushman, 1927

Globorotaliinae CHAPMAN and PARR, 1936, p. 145, nom. transl. ex family Globorotaliidae.
Acarininae SUBBOTINA, 1971, p. 68 (nom. imperf.).
Truncorotaliinae SUBBOTINA, 1971, p. 69.
Planorotalitinae BANNER, 1982, p. 202.

With primary aperture only, interiomarginal, umbilical-extraumbilical. U. Cretaceous (Maastrichtian) to Holocene.

Subfamily **TRUNCOROTALOIDINAE** Loeblich and Tappan, 1961

Truncorotaloidinae LOEBLICH and TAPPAN, 1961, p. 309.

Test trochospiral; surface of test with inflational pustules, and may have sutural supplementary apertures on spiral side. Eocene.

Family **PULLENIATINIDAE** Cushman, 1927

Pulleniatinidae LOEBLICH and TAPPAN, herein, nom. transl. ex subfamily Pulleniatininae.
Pulleniatininae CUSHMAN, 1927, p. 89 (subfamily).

Test streptospirally enrolled, chambers subglobular; wall perforate, surface smooth to pustulose, nonspinose, may have thickened surface cortex in adult stage; aperture interiomarginal, umbilical-extraumbilical. U. Miocene to Holocene.

Family **GLOBIGERINITIDAE** Bermúdez, 1961

Globigerinitidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Globigerinitinae.
Turborotalitidae HOFKER, 1976, p. 47.

Test trochospiral, surface nonspinose but may be pustulose. M. Eocene to Holocene.

Subfamily **TENUITELLINAE** Banner, 1982

Tenuitellinae BANNER, 1982, p. 202.

Test in low trochospiral coil, with inflated chambers; wall surface pustulose, but not spinose, microperforate; aperture interiomarginal, bordered by small lip. M. Eocene to M. Miocene.

Subfamily **GLOBIGERINITINAE** Bermúdez, 1961

Globigerinitinae BERMÚDEZ, 1961, p. 1.261.

Early stage as in the Tenuitellinae, later with final chamber enlarged and extending over the umbilical region; primary aperture interiomarginal and extraumbilical-umbilical in the early stage, with supplementary apertures at the margin of the umbilical extension of the final chamber that replace the primary aperture of earlier chambers. Miocene to Holocene.

Family **CATAPSYDRACIDAE** Bolli, Loeblich and Tappan, 1957

Catapsydracidae TAPPAN and LIPPS, 1966, p. 637, nom. transl. ex subfamily Catapsydracinae.
Catapsydracinae BOLLI ET AL., 1957, p. 36 (subfamily).
Globorotaloidinae BANNER and BLOW, 1959, p. 7 (subfamily).
Globoquadrinidae BLOW, 1979, p. 1294.

Test trochospiral, wall surface pitted to cancellate, but nonspinose. Paleocene to Holocene.

Suborder **ROTALIINA** Delage and Hérouard, 1896

Rotaliina LOEBLICH and TAPPAN, 1961, p. 219, nom. corr. pro suborder *Rotalidae*.
Rotalidae DELAGE and HÉROUARD, 1896, p. 143 (suborder).
Chilostomellidea LANKESTER, 1885, p. 847 (order).
Rotalidea LANKESTER, 1885, p. 847 (order).
Nummulinidea LANKESTER, 1885, p. 848 (order).
Nummulitidae DELAGE and HÉROUARD, 1896, p. 147 (suborder).
Chilostomellidae DELAGE and HÉROUARD, 1896, p. 138 (suborder).
Tinoporinae CALKINS, 1901, p. 109 (suborder).
Nummulitidea LISTER in LANKESTER, 1903, p. 146 (suborder).
Rotaliaceae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (order).
Cheilostomellaceae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (nom. imperf.; order).
Nummulitaceae HARTOG in HARMER and SHIPLEY, 1906, p. 59 (order).
Chilostomellida CALKINS, 1909, p. 39 (order).
Rotalida CALKINS, 1909, p. 39 (order).
Nummulitida CALKINS, 1909, p. 39 (order).
Rotaliaridia KÜHN, 1926, p. 152 (order).
Rotaliacea WEDEKIND, 1937, p. 85, 115 (suborder).
Nummulitacea WEDEKIND, 1937, p. 119 (suborder).
Conorbida HOFKER, 1951, p. 307 (suborder).
Nummulitinidea COPELAND, 1956, p. 188 (order).
Buliminida FURSENKO, 1958, p. 24 (order).
Rotaliida FURSENKO, 1958, p. 23 (order).
Cassidulinida VOLOSHINOVA in VOLOSHINOVA ET AL., 1970, p. 74 (order).
Rotaliida BURMISTROVA, 1974, p. 134 (order).
Orbitoidida BASHKIROV and ANTONISHIN, 1974, p. 17, 21 (order).
Rotallida PODOBINA, 1975, p. 15 (order; err. cit.).
Rotaliea MIKHALEVICH, 1980a, p. 55 (class; partim).
Rotaliata MIKHALEVICH, 1980a, p. 56 (subclass; partim).
Rosalinida MIKHALEVICH, 1980a, p. 58 (order).
Chilostomellida MIKHALEVICH, 1980a, p. 59 (order).
Orbitoidida PORTNAYA, 1981, p. 39 (suborder).
Rotaliicea SAIDOVA, 1981, p. 35 (class; partim).
Rotaliicae SAIDOVA, 1981, p. 35 (subclass; partim).
Discorbina SAIDOVA, 1981, p. 43 (suborder).
Anomalinina SAIDOVA, 1981, p. 49 (suborder).
Nonionida SAIDOVA, 1981, p. 51 (order).
Nonionina SAIDOVA, 1981, p. 51 (suborder).
Elphidiina SAIDOVA, 1981, p. 53 (suborder).
Turrilinina SAIDOVA, 1981, p. 54 (suborder).

Buliminina SAIDOVA, 1981, p. 56 (suborder).
Eouvigerinina SAIDOVA, 1981, p. 58 (suborder).
Stilostomellina SAIDOVA, 1981, p. 59 (suborder).
Bolivinitida SAIDOVA, 1981, p. 59 (order).

Test multilocular, typically enrolled, but may be reduced to biserial or uniserial, or chambers may proliferate with an encrusting habit; chambers simple or subdivided by secondary partitions; wall calcareous, of perforate hyaline, lamellar calcite (hexagonal crystal form of calcium carbonate), formed by calcification at each side of an organic membrane; wall surface smooth, papillate, costate, striate, or cancellate; aperture may be simple or have an internal toothplate, entosolenian tube or hemicylindrical structure; internal canal systems or stolon systems present in some. Triassic to Holocene.

Superfamily **TURRILINACEA** Cushman, 1927

Turrilinacea LOEBLICH and TAPPAN, nom. corr. herein pro superfamily Turrilinidea.
Turrilinidea SAIDOVA, 1981, p. 54, nom. transl. ex subfamily Turrilininae.

Test trochospiral or triserial, later may become biserial or uniserial; wall calcareous, perforate, optically radiate in structure; aperture simple, no toothplate or other incipient only. U. Cretaceous to Holocene.

Family **TURRILINIDAE** Cushman, 1927

Turrilinidae LOEBLICH and TAPPAN, 1961, p. 300, nom. transl. ex subfamily Turrilininae.
Turrilininae CUSHMAN, 1927, p. 65 (subfamily).
Tosaiinae SAIDOVA, 1981, p. 55 (subfamily).

Test a high trochospiral, with three or more chambers per whorl, but may be reduced to biserial in later stage. Eocene to Holocene.

Family **TRIMOSINIDAE** Saidova, 1981

Trimosinidae SAIDOVA, 1981, p. 56.
Trimosininae SAIDOVA, 1981, p. 56 (subfamily).
Mimosininae SAIDOVA, 1981, p. 56 (subfamily).

Test triserial, at least in early stage, later may be reduced to biserial with sharply angled chambers or each chamber may be laterally produced into a distinct spine; aperture consists of a large interiomarginal opening that may be accompanied by a second areal opening. Holocene.

Family **PAVONINIDAE** Eimer and Fickert, 1899

Pavoninidae EIMER and FICKERT, 1899, p. 606.
Pavonininae CUSHMAN, 1927, p. 59 (subfamily).

Test biserial in early stage, later with broad, low, arched chambers that result in a flabelliform test; aperture terminal, multiple. Eocene to Holocene.

Family **SPHAEROIDINIDAE** Cushman, 1927

Sphaeroidinidae LOEBLICH and TAPPAN, 1961, p. 300, nom. transl. ex subfamily Sphaeroidininae.
Sphaeroidininae CUSHMAN, 1927, p. 86 (subfamily).

Test streptospirally enrolled, with strongly embracing chambers; aperture an arched slit just above the base of the chamber, giving the appearance of a flaplike tooth, or primary aperture may be absent in adult and replaced by a series of sutural supplementary openings. U. Cretaceous to Holocene.

Superfamily **EOUVIGERINACEA** Cushman, 1927

Eouvigerinacea LOEBLICH and TAPPAN, nom. corr. herein pro superfamily Eouvigerinidea.
Eouvigerinidea SAIDOVA, 1981, p. 58, nom. transl. ex subfamily Eouvigerininae.
Stilostomellidea SAIDOVA, 1981, p. 59.
Islandiellidea SAIDOVA, 1981, p. 60.

Test biserial or uniserial, may have initial planispiral coil, biserial stage may be enrolled, or may have no distinct chamber arrangement; wall calcareous, perforate, optically radiate; aperture provided with internal toothplate. Jurassic to Holocene.

Family **BOLIVINIDAE** Glaessner, 1937

Bolivinidae HOFKER, 1951, p. 48, nom. transl. ex subfamily Bolivininae.
Bolivininae GLAESSNER, 1937, p. 420 (subfamily).

Test biserial, at least in the early stage, later may become uniserial; aperture a high loop-shaped opening with an internal toothplate. Jurassic to Holocene.

Family **BOLIVINOIDIDAE** Loeblich and Tappan, **n. fam.**

Bolivinoididae LOEBLICH and TAPPAN, 1982c, p. 32, nom. nud.

Test biserial; wall calcareous, perforate, optically radiate; surface with heavy longitudinal costae that may bifurcate, interior surface tuberculate; aperture a high interiomarginal slit, tending to become areal in position, with an internal toothplate. U. Cretaceous to Paleocene.

Type genus: Bolivinoides Cushman, 1927.

Remarks: Differs from the Bolivinidae in the broadly flared test, lenticular cross section, heavy surface costae, tuberculate inner wall surface, and reduced toothplate.

Family **ISLANDIELLIDAE** Loeblich and Tappan, 1964

Islandiellidae LOEBLICH and TAPPAN, 1964a, p. C556.
Reissiidae SAIDOVA, 1981, p. 61.

Test with biserially arranged chambers or derived from such, axis of biseriality enrolled in a planispiral coil, at least in early stage, later may uncoil; wall of optically and ultrastructurally radiate calcite; aperture a low interiomarginal arch, provided with an internal toothplate that extends inward from the apertural opening to the previous foramen. ? U. Cretaceous, Paleocene to Holocene.

Subfamily **ISLANDIELLINAE** Loeblich and Tappan, 1964

Islandiellinae LOEBLICH and TAPPAN, 1982c, p. 33, nom. corr. pro subfamily Islandiellininae.
Islandiellininae SAIDOVA, 1981, p. 61 (nom. imperf.), nom. transl. ex family Islandiellidae.

Bradynellinae SAIDOVA, 1981, p. 60.
Cassilamellinae SAIDOVA, 1981, p. 61 (nom. imperf.).

Test biserially enrolled throughout, coiling generally involute, but may become evolute. ? U. Cretaceous, Paleocene to Holocene.

Subfamily **REISSIINAE** Saidova, 1981

Reissiinae SAIDOVA, 1981, p. 61.
Cassidulinoidinae SAIDOVA, 1981, p. 61.

Test tending to uncoil in later stage; aperture interiomarginal, or may become areal in position. U. Eocene to Holocene.

Subfamily **ORTHOPLECTINAE** Loeblich and Tappan, **n. subfam.**

Orthoplectinae LOEBLICH and TAPPAN, 1982c, p. 33, nom. nud.

Test elongate, arcuate, with irregularly spiralling internal column (probably a modification of a toothplate) that results in irregular septation; not recognizably enrolled or biserial; aperture subterminal, elongate, just above the base of the final chamber. Holocene.

Type genus: Orthoplecta Brady, 1884.

Remarks: Differs from other subfamilies of the Islandiellidae in the elongate uncoiled test and absence of distinct chambers and septa.

Family **ELHASAELLIDAE** Hamam, 1976

Elhasaellidae LOEBLICH and TAPPAN, nom. transl. herein, ex subfamily Elhasaeliinae.
Elhasaeliinae HAMAM, 1976, p. 454 (subfamily; nom. imperf.; recte Elhasaellinae).

Test enrolled (? planispiral) in early stage, later triserial, biserial and finally becoming uniserial; wall perforate, surface spinose; aperture terminal, bordered by phialine lip. U. Cretaceous (Maastrichtian).

Family **EOUVIGERINIDAE** Cushman, 1927

Eouvigerinidae LOEBLICH and TAPPAN, 1961, p. 300, nom. transl. ex subfamily Eouvigerininae.
Eouvigerininae CUSHMAN, 1927, p. 63 (subfamily).

Test biserial, with tendency to become nearly uniserial in later stage; aperture produced on a neck, with phialine lip and internal siphon-like toothplate. L. Cretaceous to M. Eocene.

Family **STILOSTOMELLIDAE** Finlay, 1947

Stilostomellidae SAIDOVA, 1981, p. 59, nom. transl. ex subfamily Stilostomellinae.
Stilostomellinae FINLAY, 1947, p. 275 (subfamily).

Test uniserial and rectilinear or arcuate, aperture terminal, with phialine lip, and with a toothlike projection from one margin. Eocene to Holocene.

Family **LACOSTEINIDAE** Sigal, 1952

Lacosteinidae LOEBLICH and TAPPAN, 1982c, p. 33, nom. transl. ex subfamily Lacosteininae.
Lacosteininae SIGAL in PIVETEAU, 1952, p. 220 (subfamily).
Spirobolivinidae SAIDOVA, 1981, p. 59.
Spirobolivininae SAIDOVA, 1981, p. 59 (subfamily).

Test planispirally enrolled in early stage, then abruptly changing to an elongate growth axis, chambers biserial, or with as many as four per whorl; aperture a high interiomarginal arch, with an internal toothplate. U. Cretaceous to U. Eocene, ? Pliocene.

Superfamily **BULIMINACEA** Jones, 1875

Buliminacea LOEBLICH and TAPPAN, 1961, p. 299, nom. corr. pro superfamily Buliminidea.
Buliminidea GLAESSNER, 1945, p. 134, nom. transl. ex family Buliminida.
Buliminicae EASTON, 1960, p. 65, 79.
Buliminoidea AYALA-CASTAÑARES, 1963, p. 69.
Bolivinitidea SAIDOVA, 1975a, p. 299.
Bolivinitacea GRIGYALIS, 1978, p. 9.
Millettiidea SAIDOVA, 1981, p. 57.

Test basically a high trochospiral or may be modified to triserial, later stage may be reduced to biserial or uniserial; wall calcareous, perforate, hyaline, optically radial; aperture a high, loop-shaped interiomarginal opening, internal toothplate connected to the apertural margin and may extend within to attach to the margin of the previous chamber foramen. M. Jurassic (Bathonian) to Holocene.

Family **PRAEBULIMINIDAE** Loeblich and Tappan, **n. fam.**

Praebuliminidae LOEBLICH and TAPPAN, 1982c, p. 33, nom. nud.

Test a high trochospiral or triserial, later may be reduced to biserial or uniserial; wall calcareous, perforate, optically radiate; aperture an arch with simple internal toothplate, or may become terminal and may be cribrate. M. Jurassic (Bathonian) to Paleocene (Danian).

Type genus: Praebulimina Hofker, 1953.

Remarks: The Turrilinidae lack a distinct toothplate, and the Buliminidae have a much more complex toothplate than the Praebuliminidae.

Family **BOLIVINITIDAE** Cushman, 1927

Bolivinitidae GLAESSNER, 1936, p. 127, nom. transl. ex subfamily Bolivinitinae.
Bolivinitinae CUSHMAN, 1927, p. 61 (subfamily).

Test biserial, sides flattened and edges truncate, angles of the test carinate; aperture a high opening in the face of the final chamber, one border sharply bent inward to form an internal toothplate. Miocene to Holocene.

Family **STAINFORTHIIDAE** Reiss, 1963

Stainforthiidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Stainforthiinae.
Stainforthiinae REISS, 1963, p. 53 (subfamily).

Test triserial in early stage, later twisted biserial, or may be biserial throughout, chambers relatively high; aperture a high loop in the apertural face, one margin produced, and the other infolded and continuous with the internal toothplate. Eocene to Holocene.

Family **BULIMINIDAE** Jones, 1875

Buliminidae EIMER and FICKERT, 1899, p. 608, nom. corr. pro family Buliminida.
Buliminida JONES in GRIFFITH and HENFREY, 1875, p. 320.
Buliminidee SCHWAGER, 1876, p. 479.
Buliminidea SCHWAGER, 1877, p. 19.
Buliminidae SCHWAGER, 1877, p. 19 (subfamily).
Bulimininae BRADY, 1881, p. 44 (subfamily).
Buliminina LANKESTER, 1885, p. 847.
Buliminae RHUMBLER, 1895, p. 89 (subfamily).
Buliminae DELAGE and HÉROUARD, 1896, p. 140.
Globobulimininae HOFKER, 1951, p. 148 (subfamily).
Globobuliminidae HOFKER, 1956, p. 908.
Hyalovirgulinidae HOFKER, 1956, p. 45 (invalid; ICZN Art. 29).
Buluminidae CITA, 1967, p. 66 (err. cit.).
Biliminidae AGALAROVA, 1976, p. 67 (err. cit.).

Test a high trochospiral, with not more than three chambers per whorl, may be reduced to biserial in later stage; aperture a loop in the apertural face, with distinct plate-like toothplate that extends backward from the aperture to the previous foramen, or primary aperture may be replaced by areal pores in the terminal face. Paleocene to Holocene.

Family **BULIMINELLIDAE** Hofker, 1951

Buliminellidae HOFKER, 1951, p. 121.
Buliminellinae N. K. BYKOVA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 323 (subfamily).

Test a high trochospiral, with numerous chambers per whorl; aperture loop-shaped, with internal toothplate connecting successive apertures. ? U. Cretaceous, Paleocene to Holocene.

Family **REUSSELLIDAE** Cushman, 1933

Reussellidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Reussellinae.
Reussellinae CUSHMAN, 1933, p. 223 (subfamily; nom. subst.).
Reussiinae CUSHMAN, 1927, p. 68 (subfamily; invalid, ICZN Art. 39; based on *Reussia* Schwager, 1877, non McCoy, 1854).
Compressigenerinae SAIDOVA, 1981, p. 57 (subfamily; nom. imperf.).
Tabulogenerininae SAIDOVA, 1981, p. 56 (subfamily; nom. imperf.).
Fijiellinae SAIDOVA, 1981, p. 56 (subfamily).

Test triserial, at least in early stage, later may be reduced to biserial or uniserial; aperture interiomarginal in early triserial stage, becoming terminal in uniserial stage. Eocene to Holocene.

Family **SIPHOGENERINOIDIDAE** Saidova, 1981

Siphogenerinoididae LOEBLICH and TAPPAN, 1982c, p. 33, nom. transl. ex subfamily Siphogenerinoidinae.

Test triserial or biserial to uniserial; aperture with toothplate. U. Cretaceous to Holocene.

Subfamily **SIPHOGENERINOIDINAE** Saidova, 1981

Siphogenerinoidinae SAIDOVA, 1981, p. 60.
Rectobolininae SAIDOVA, 1981, p. 59 (nom. imperf.).

Test biserial in early stage, later may be uniserial; aperture terminal with bordering lip or rim, and internal siphon-like toothplate that changes in orientation in successive chambers. U. Cretaceous to Holocene.

Subfamily **SIPHOGENERININAE** Loeblich and Tappan, **n. subfam.**

Siphogenerininae LOEBLICH and TAPPAN, 1982c, p. 33, nom. nud.

Test triserial or biserial in early stage, later uniserial with triserial ancestry reflected internally by successive hemicylindrical toothplates that are oriented 120° from that preceding; aperture terminal, rounded, with short neck or thickened rim. Eocene to Holocene.

Type genus: Siphogenerina Schlumberger in Milne-Edwards, 1882.

Remarks: Differs from the probably ancestral Siphogenerinoidinae in the less well-developed biserial stage, much larger size, and ovate rather than arcuate or reniform aperture.

Family **UVIGERINIDAE** Haeckel, 1894

Uvigerinidae GALLOWAY and WISSLER, 1927, p. 74, nom. corr. pro family Uvigerinida.
Uvigerinida HAECKEL, 1894, p. 185.
Uvigeinidae UCHIO, 1967, p. 411 (err. cit.).
Uvigeriniae KALIA, 1978, p. 47 (err. cit.).

Test triserial to biserial in early stage, later may be reduced to biserial or uniserial; aperture terminal, with neck and internal toothplate connecting apertures of successive chambers. U. Cretaceous to Holocene.

Subfamily **UVIGERININAE** Haeckel, 1894

Uvigerininae CUSHMAN, 1913, p. 91, nom. transl. ex family Uvigerinida.

Test triserial, at least in early stage, chambers rounded and inflated; aperture terminal, with neck and phialine lip, and provided with internal siphon-like toothplate. U. Cretaceous to Holocene.

Subfamily **ANGULOGERININAE** Galloway, 1933

Angulogerininae GALLOWAY, 1933, p. 377.
Trifarininae SRINIVASAN, 1966, p. 242.

Test triserial and triangular in early stage, later reduced to uniserial; aperture terminal, with neck and internal siphon-like toothplate. Eocene to Holocene.

Family **MILLETTIIDAE** Saidova, 1981

Millettiidae LOEBLICH and TAPPAN, 1982c, p. 33, nom. transl. ex superfamily Millettidea.
Schubertiinae REISS, 1963, p. 53 (subfamily; invalid, ICZN Art. 39, based on *Schubertia* A. Silvestri, 1912, non Gistl, 1848).

Early stage biserial, later with a few subcylindrical uni-

serial chambers, that are subdivided by vertical and horizontal partial partitions into numerous small chamberlets arranged in honeycomb-like style; aperture terminal, with phialine lip and internal siphon-like toothplate. Holocene.

Superfamily **FURSENKOINACEA** Loeblich and Tappan, 1961

Fursenkoinacea LOEBLICH and TAPPAN, *nom. corr. herein pro* superfamily Fursenkoinidea.
Fursenkoinidea SAIDOVA, 1981, p. 58, nom. transl. ex subfamily *Fursenkoininae.*

Test triserial, twisted or flattened biserial; wall calcareous, perforate granular, optically hyaline oblique; aperture loop-shaped, with internal toothplate. U. Cretaceous to Holocene.

Family **FURSENKOINIDAE** Loeblich and Tappan, 1961

Fursenkoinidae SAIDOVA, 1981, p. 58, *nom. transl. ex subfamily* Fursenkoininae.
Virgulinidae HOFKER, 1951, p. 236.

Test a twisted biserial, later may become uniserial; aperture loop-shaped in biserial stage and terminal in uniserial stage. U. Cretaceous to Holocene.

Subfamily **FURSENKOININAE** Loeblich and Tappan, 1961

Fursenkoininae LOEBLICH and TAPPAN, 1961, p. 314.
Virgulininae CUSHMAN, 1927, p. 68 (invalid, ICZN Art. 39, based on *Virgulina d'Orbigny, 1826, non* Bory de St. Vincent, 1823).
Belorussiellinae BALAKHMATOVA, 1973, p. 52.
Forsenkoininae PLOTNIKOVA, 1978, p. 402 (err. cit.).
Furssenkoininae SUBBOTINA, BYKOVA and VOLOSHINA in SUBBOTINA ET AL., 1981, p. 108 (err. cit.).

Test biserial or slightly twisted biserial. U. Cretaceous to Holocene.

Subfamily **SIGMAVIRGULININAE** *Saidova*, 1981

Sigmavirgulininae LOEBLICH and TAPPAN, 1982c, p. 32, nom. corr. pro subfamily Sigmovirgulininae.
Sigmovirgulininae SAIDOVA, 1981, p. 55 (nom. imperf.).

Test biserial, but chambers added less than 180° apart, resulting in a sigmoid arrangement as viewed from the base. Miocene to Holocene.

Family **VIRGULINELLIDAE** Loeblich and Tappan, **n. fam.**

Virgulinellidae LOEBLICH and TAPPAN, 1982c, p. 33, nom. nud.

Test free, triserial to biserial; primary aperture a loop in the terminal face, internal toothplate extending within from the apertural margin to attach near the previous foramen; supplementary sutural apertures partially covered by bridges across the sutures. Miocene to Pliocene.

Type genus: Virgulinella Cushman, 1932.

Remarks: Differs from the Fursenkoinidae in having sutural apertures.

Superfamily **CASSIDULINACEA** d'Orbigny, 1839

Cassidulinacea LOEBLICH and TAPPAN, 1961, p. 313, nom. transl. ex family Cassidulinidae.
Cassidulinoidea AYALA-CASTAÑARES, 1963, p. 101.
Loxostomidea SAIDOVA, 1981, p. 60 (nom. imperf.).
Cassidulinidea SAIDOVA, 1981, p. 61.

Test enrolled biserial or may be secondarily uncoiled, or may be biserial to uniserial; wall calcareous, perforate, optically hyaline oblique; aperture an interiomarginal slit, or may become terminal. U. Cretaceous to Holocene.

Family **CASSIDULINIDAE** d'Orbigny, 1839

Cassidulinidae D'ORBIGNY in DE LA SAGRA, 1839, p. xxxix, 123.
Cassidulinidea REUSS and FRITSCH, 1861, p. 3.
Cassidulina LANKESTER, 1885, p. 847.
Cassiduline DELAGE and HÉROUARD, 1896, p. 140.
Cassidulinida COPELAND, 1956, p. 188 (err. emend.).
Cassiclulinidae SAIDOVA, 1981, p. 60 (err. cit.).
Ehrenberginidae SAIDOVA, 1981, p. 62.

Test biserial, with biserial axis planispirally enrolled, later stage may be uncoiled. Eocene to Holocene.

Subfamily **EHRENBERGININAE** Cushman, 1927

Ehrenbergininae CUSHMAN, 1927, p. 84.

Test with tendency to uncoil in later stage. Eocene to Holocene.

Subfamily **CASSIDULININAE** d'Orbigny, 1839

Cassidulininae BRADY, 1884, p. 69, *nom. corr. pro* subfamily Cassidulinida.
Cassidulinida SCHULTZE, 1854, p. 52, nom. transl. ex family *Cassidulinidae.*
Cassidulinae BRADY, 1881, p. 44.
Cassidulineae CALKINS, 1901, p. 108.
Cassisphaerininae SAIDOVA, 1981, p. 61.
Lernininae SAIDOVA, 1981, p. 61.

Test biserial and enrolled throughout. Eocene to Holocene.

Family **LOXOSTOMATIDAE** Loeblich and Tappan, 1962

Loxostomatidae LOEBLICH and TAPPAN, 1964b, p. 17, 33, nom. corr. pro family Loxostomidae.
Loxostomidae LOEBLICH and TAPPAN, 1962, p. 110, nom. imperf.
Loxostominae SAIDOVA, 1981, p. 60 (subfamily), nom. imperf.
Aragoniinae SAIDOVA, 1981, p. 60 (subfamily).

Test biserial, at least in early stage, later may become nearly uniserial; aperture a low interiomarginal opening in biserial stage, becoming a terminal slit in the uniserial stage. U. Cretaceous to Eocene.

Family **BOLIVINELLIDAE** *Hayward*, 1980

Bolivinellidae HAYWARD in HAYWARD and BRAZIER, 1980, p. 108.

Test biserial, later chambers increasing rapidly in breadth, so that test becomes broad and palmate; aperture cribrate, obscured by pustules on apertural surface, no toothplate. Eocene to Holocene.

Family **ANNULOPATELLINIDAE** Loeblich and Tappan, 1964

Annulopatellinidae LOEBLICH and TAPPAN, 1964a, p. C730.

Test conical, proloculus followed by reniform second chamber, then uniserial, with low chambers appearing annular on the convex side, overlapping on flattened side, chambers subdivided by radial tubules that open as pores at the surface. Miocene to Holocene.

Superfamily **PLEUROSTOMELLACEA** Reuss, 1860

Pleurostomellacea LOEBLICH and TAPPAN, 1982c, p. 32, nom. transl. ex family Pleurostomellidae.

Early stage triserial or biserial, later may be reduced to uniserial with cuneate chambers or with biseriality reflected internally; wall calcareous, perforate, lamellar, optically granular, hyaline oblique in structure; aperture a subterminal straight to curved slit, excentric and partially covered by a projecting hood, or may be terminal and cribrate; internal siphon extends from the aperture to the previous chamber foramen, those of earlier chambers remaining as a columella-like structure that may reflect the ancestral biseriality even within the uniserial chambers. ? Jurassic, L. Cretaceous to Holocene.

Family **PLEUROSTOMELLIDAE** Reuss, 1860

Pleurostomellidae REUSS, 1860, p. 151, 203.
Pleurostomellideae GÜMBEL, 1870, p. 52.
Ellipsoidinidae A. SILVESTRI, 1923, p. 246, 265.
Pleurostomellida COPELAND, 1956, p. 188 (err. emend.).

As in the superfamily. ? Jurassic, L. Cretaceous to Holocene.

Subfamily **PLEUROSTOMELLINAE** Reuss, 1860

Pleurostomellinae LOEBLICH and TAPPAN, 1961, p. 315, nom. corr. pro subfamily Pleurostomellidea.
Pleurostomellidea REUSS, 1862, p. 368, nom. transl. ex family Pleurostomellidae.
Ellipsonodosariinae A. SILVESTRI, 1901, p. 109.
Ellipsoidininae PETTERS, 1954, p. 39.

Early stage biserial, later uniserial, or may be uniserial throughout; aperture simple. ? Jurassic, L. Cretaceous to Holocene.

Subfamily **WHEELERELLINAE** Petters, 1954

Wheelerellinae PETTERS, 1954, p. 39.

Test with early triserial stage, later becoming uniserial; aperture a terminal curved or hooded slit. U. Cretaceous.

Subfamily **CRIBROPLEUROSTOMELLINAE** Owen, 1971

Cribropleurostomellinae OWEN, 1971, p. 120.

Early stage with cuneate chambers or may be uniserial throughout; aperture cribrate. U. Cretaceous.

Superfamily **DELOSINACEA** Parr, 1950

Delosinacea LOEBLICH and TAPPAN, nom. corr. herein pro superfamily Delosinidea.
Delosinidea SAIDOVA, 1981, p. 57, nom. transl. ex family Delosinidae.
Caucasinidea SAIDOVA, 1975a, p. 315.

Test trochospiral or triserial, at least in early stage, later may be biserial or even uniserial; wall of perforate, hyaline oblique lamellar calcite, appearing optically granular, surface smooth or with minor basal spines; aperture a high interiomarginal slit, commonly with internal toothplate, or may be replaced by sutural pores. L. Cretaceous to Holocene.

Family **CAUCASINIDAE** N. K. Bykova, 1959

Caucasinidae LOEBLICH and TAPPAN, 1961, p. 314, nom. transl. ex subfamily Caucasininae.

Test trochospiral, at least in early stage. L. Cretaceous to Holocene.

Subfamily **BAGGATELLINAE** N. K. Bykova, 1959

Baggatellinae N. K. BYKOVA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 325.

Test a low trochospiral throughout; aperture a high curved slit up the final chamber face. M. Eocene to U. Oligocene.

Subfamily **CAUCASININAE** N. K. Bykova, 1959

Caucasininae N. K. BYKOVA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 328.

Test trochospiral in early stage, later triserial and elongate; aperture loop-shaped in the apertural face. L. Cretaceous to Holocene.

Family **TREMACHORIDAE** Lipps and K. L. Lipps, 1967

Tremachoridae LIPPS and K. L. LIPPS, 1967, p. 497.
Tremachorinae SAIDOVA, 1981, p. 55 (subfamily).

Test in a low trochospiral coil; primary aperture a low slit with narrow bordering lip, secondary sutural openings are slightly produced on short tubelike necks. Miocene.

Family **DELOSINIDAE** Parr, 1950

Delosinidae PARR, 1950, p. 345.
Delesinidae MCCULLOCH, 1977, p. 218 (err. cit.).
Delosininae SAIDOVA, 1981, p. 57 (subfamily).

Test triserial, high spired; primary apertural opening may be lacking and secondary sutural pores with bordering lip may be present, the large sutural pores opening into subsutural canals that terminate in a spongy area of the final chamber face. Holocene.

Superfamily **DISCORBACEA** Ehrenberg, 1838

Discorbacea LOEBLICH and TAPPAN, 1964a, p. C572, nom. corr. pro superfamily Discorbidea.
Discorbidea SMOUT, 1954, p. 81, nom. transl. ex family Discorbina.
Discorbinidea SAIDOVA, 1981, p. 43.
Discorbiacea KALIA, 1981, p. 246.
Discorboidea TAPPAN and LOEBLICH, 1982, p. 543.

Test in low trochospiral coil; wall of perforate, hyaline, optically and ultrastructurally radiate calcite; aperture in-

teriomarginal, on umbilical side of test, and may be bordered by a nonperforate area or umbilical flap. Cretaceous to Holocene.

Family **CONORBINIDAE** Hofker, 1954

Conorbinidae HOFKER, 1954, p. 167.
Conorbininae REISS, 1963, p. 58 (subfamily).

Test in low to high trochospiral coil, periphery angled, chambers lunate as seen from spiral side, final chamber occupying up to one-half of umbilical side. L. Cretaceous to U. Cretaceous.

Family **BAGGINIDAE** Cushman, 1927

Bagginidae HAYNES, 1981, p. 237, 260, nom. transl. ex subfamily Bagigininae.
Valvulineriidae BROTZEN, 1942, p. 16.
Valvulineridae HOFKER, 1951, p. 484 (err. cit.).
Cancrisidae HAYNES, 1981, p. 237, 259.

Coiling trochospiral; wall finely perforate, except for imperforate area near aperture and umbilicus on umbilical side. Cretaceous to Holocene.

Subfamily **SEROVAININAE** Sliter, 1968

Serovaininae SLITER, 1968, p. 91.

Test trochospiral, periphery broadly rounded, sutures radial on both sides of test; aperture extending from umbilicus to periphery. U. Cretaceous to Paleocene.

Subfamily **BAGGININAE** Cushman, 1927

Baggininae CUSHMAN, 1927, p. 77.

Test trochospiral, umbilical area closed; portion of final chamber adjacent to umbilicus clear and imperforate; aperture interiomarginal. Cretaceous to Holocene.

Family **EPONIDIDAE** Hofker, 1951

Eponididae THALMANN, 1952, p. 984, nom. corr. pro family Eponidae.
Eponidae HOFKER, 1951, p. 321 (nom. imperf.).
Cyclospiridae EIMER and FICKERT, 1899, p. 630 (invalid; ICZN Art. 39; based on *Cyclospira* Eimer and Fickert, 1899, non Hall and Clarke, 1894).
Pulvinulinidae HOFKER, 1951, p. 448.
Eponidopsidae REISS, 1963, p. 82.

Test trochospiral, at least in early stage; aperture interiomarginal, extending from periphery to umbilicus on umbilical side, or may be cribrate and areal. Paleocene to Holocene.

Subfamily **EPONIDINAE** Hofker, 1951

Eponidinae SUBBOTINA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 269, nom. transl. ex family Eponidae.
Pulvinulininae SCHUBERT, 1921, p. 152.

Coiling trochospiral; relatively large interiomarginal aperture. Paleocene to Holocene.

Subfamily **ALABAMINELLINAE** Saidova, 1981

Alabaminellinae SAIDOVA, 1981, p. 47.

Coiling a medium high trochospiral, umbilicus closed; aperture small but extending a short distance up the apertural face. Pliocene to Holocene.

Subfamily **RECTOEPONIDINAE** Saidova, 1981

Rectoeponidinae SAIDOVA, 1981, p. 47.

Early stage trochospirally enrolled, later uncoiled and uniserial, rectilinear and compressed; aperture a terminal slit in adult, slightly excentric, toward the side of the test that is umbilical in the enrolled portion. Paleocene to U. Eocene.

Subfamily **CRIBROEPONIDINAE** Shchedrina, 1964

Cribroeponidinae SHCHEDRINA, 1964, p. 99.
Sestronophorinae SAIDOVA, 1981, p. 47.
Paumotuinae SAIDOVA, 1981, p. 47.

Test trochospirally enrolled; primary aperture an interiomarginal slit, at least in the early stage, later with additional cribrate openings in the final chamber face, or on the umbilical side of various chambers. Eocene to Holocene.

Family **BUENINGIIDAE** Saidova, 1981

Bueningiidae LOEBLICH and TAPPAN, 1982c, p. 34, nom. transl. ex subfamily Bueningiinae.
Bueningiinae SAIDOVA, 1981, p. 45 (subfamily).

Test enrolled; spiral side inflated, umbilical side flattened, both involute, with keel and deep umbilicus; aperture umbilical with small lip. L. Miocene to Pliocene.

Family **PEGIDIIDAE** Heron-Allen and Earland, 1928

Pegidiidae HERON-ALLEN and EARLAND, 1928, p. 283.
Pegidiinae CHAPMAN and PARR, 1936, p. 144 (subfamily).
Pegidiida COPELAND, 1956, p. 188 (err. emend.).

Test trochospirally derived, chambers few, each successive one opposed to or partially enveloping the preceding, early chambers resorbed with growth; aperture a series of tubes that pierce the umbilical wall. Miocene to Holocene.

Family **DISCORBIDAE** Ehrenberg, 1838

Discorbidae GLAESSNER, 1945, p. 145, nom. corr. pro family Discorbina.
Discorbina EHRENBERG, 1838, p. 200.
Discorbinidae HOFKER, 1954, p. 167.
Discorbididae POKORNÝ, 1954, p. 215 (err. cit.).
Discorbiidae HORNIBROOK, 1961, p. 97 (err. cit.).
Rosalinidae REISS, 1963, p. 65.
Discorbisidae MARGERIE, DEROO and SIGAL, 1966, p. 1550.
Discribidae VEVERS ET AL., 1975, p. 178 (err. cit.).

Test trochospiral, umbilical region open; aperture umbilical, commonly with projecting flap or lip. Eocene to Holocene.

Subfamily **DISCORBINAE** Ehrenberg, 1838

Discorbinae GALLOWAY, 1933, p. 285, nom. corr. pro subfamily Discorbisinae.

Discorbisinae CUSHMAN, 1927, p. 75, nom. transl. ex family Discorbina.
Discorbininae SCHUBERT, 1921, p. 156.
Discorbidinae POKORNÝ, 1954, p. 215 (err. cit.).
Discorbiinae HORNIBROOK, 1961, p. 97.

Test commonly a low trochospiral; aperture with distinct flap extending over the umbilical region, may have additional openings at opposite end of the flaps. Eocene to Holocene.

Subfamily **ROSALININAE** Reiss, 1963

Rosalininae REISS, 1963, p. 65.

Test trochospiral, may have closed umbilicus or umbonal boss; aperture a low arch at base of final chamber on umbilical side. Miocene to Holocene.

Family **PANNELLAINIDAE** Loeblich and Tappan, **n. fam.**

Test low trochospiral, chambers low and numerous on spiral side, those of successive whorls so aligned that septal ridges extend from the apex to the periphery, only last whorl visible from umbilical side where sutures are radially oriented; wall rugose and perforate on umbilical side, nonporous on spiral side; aperture consists of a row of openings running from the periphery to the umbilicus, those of earlier chambers remaining as relict apertural pores in a depression along the sutures, sutures bordered on each side by an imperforate rim. Oligocene.

Type genus: Pannellaina Seiglie and Bermúdez, 1976.

Remarks: Differs from other Discorbacea in the radially aligned chambers with bordering ridges, and nonperforate spiral side.

Family **BRONNIMANNIIDAE** Loeblich and Tappan, **n. fam.**

Bronnimanniidae LOEBLICH and TAPPAN, 1982c, p. 34, nom. nud.

Auriculate test, planispirally coiled, bievolute and biconcave with broad truncate periphery; wall hyaline, finely perforate on apertural side, more coarsely perforate on opposite side, optically radiate; aperture on ventral side associated with umbilical flaps that remain visible for previous chambers of the final whorl. Oligocene, Holocene.

Type genus: Bronnimannia Bermúdez, 1952.

Remarks: Differs from the Planulinoididae in having the aperture at one side under an umbilical flap, rather than being equatorial in position.

Family **ROTALIELLIDAE** Loeblich and Tappan, 1964

Rotaliellidae LOEBLICH and TAPPAN, 1964a, p. C604.
Rotaliellinae SAIDOVA, 1981, p. 54 (subfamily).

Test trochospiral, with few crescentic to subglobular chambers; aperture umbilical, with small bordering toothlike projections. Holocene.

Superfamily **GLABRATELLACEA** Loeblich and Tappan, 1964

Glabratellacea LOEBLICH and TAPPAN, nom. transl. herein ex family Glabratellidae.

Test trochospiral; wall of hyaline, perforate, optically radial calcite; surface of umbilical side commonly with radial striae, costae or nodes; aperture interiomarginal and umbilical; sexual reproduction plastogamic, the two gamont tests becoming firmly attached by their umbilical surfaces which are then resorbed centrally to form a brood chamber for the fusion of gametes and early zygote development. Eocene to Holocene.

Family **GLABRATELLIDAE** Loeblich and Tappan, 1964

Glabratellidae LOEBLICH and TAPPAN, 1964a, p. C587.
Glabratellinae SAIDOVA, 1981, p. 45 (subfamily).

Test a low trochospiral coil, umbilical side commonly with radial ornamentation that aids in attachment during plastogamy. Eocene to Holocene.

Family **BULIMINOIDIDAE** Seiglie, 1970

Buliminoididae SEIGLIE, 1970, p. 113.

Test with extremely high trochospiral coil; aperture umbilical in position. Oligocene to Holocene.

Superfamily **SIPHONINACEA** Cushman, 1927

Siphoninacea LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Siphonininae.

Test trochospiral; aperture slitlike, oval or rounded, in the apertural face or elevated on neck with phialine lip. U. Cretaceous to Holocene.

Family **SIPHONINIDAE** Cushman, 1927

Siphoninidae N. K. BYKOVA, VASILENKO, VOLOSHINOVA, MYATLYUK and SUBBOTINA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 270, nom. transl. ex subfamily Siphonininae.
Syphoninidae BRAGA and GRÜNIG, 1975, p. 107 (err. cit.).

Test trochospiral, at least in early stage, later may be nearly planispiral, streptospiral, uncoiled or biserial; aperture rounded or oval, commonly projecting somewhat and bordered by a distinct lip, equatorial in position, to nearly terminal in biserial or uniserial tests. U. Cretaceous to Holocene.

Subfamily **SIPHONININAE** Cushman, 1927

Siphonininae CUSHMAN, 1927, p. 77.
Siphoninellinae SAIDOVA, 1981, p. 46.
Sphonininae SAIDOVA, 1981, p. 45 (err. cit.).

Test trochospiral, or may tend to uncoil in later stage. U. Cretaceous to Holocene.

Subfamily **SIPHONIDINAE** Saidova, 1981

Siphonidinae SAIDOVA, 1981, p. 46.

Early stage trochospiral, later uncoiled and biserial; terminal aperture bordered by phialine lip. M. Eocene.

Subfamily **SIPHONINOIDINAE** Loeblich and Tappan, **n. subfam.**

Siphoninoidinae LOEBLICH and TAPPAN, 1982c, p. 35, nom. nud.

Coiling irregularly trochospiral or streptospiral, involute; circular aperture with phialine lip. Miocene to Holocene.

Type genus: Siphoninoides Cushman, 1927.

Remarks: Differs from the Siphoninidae in the streptospiral coiling and involute test.

Family **PSEUDOPARRELLIDAE** Voloshinova, 1952

Pseudoparrellidae SUBBOTINA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 272, nom. transl. ex subfamily Pseudoparellinae.

Test trochospiral, at least in early stage; aperture a vertical slit in face of final chamber, paralleling the peripheral margin, or may tend to become areal. Eocene to Holocene.

Subfamily **PSEUDOPARRELLINAE** Voloshinova, 1952

Pseudoparrellinae SUBBOTINA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 272, nom. corr. pro Pseudoparellinae.
Pseudoparellinae VOLOSHINOVA in VOLOSHINOVA and DAIN, 1952, p. 81 (nom. imperf.).
Epistominellinae REISS, 1963, p. 54.

Test lenticular in form. Eocene to Holocene.

Subfamily **CONCAVELLINAE** Saidova, 1981

Concavellinae SAIDOVA, 1981, p. 45.

Test concavo-convex, spiral side flattened to strongly concave, periphery carinate; aperture a high slit, or may later be areal. M. to U. Miocene.

Subfamily **STETSONIINAE** Saidova, 1981

Stetsoniinae SAIDOVA, 1981, p. 45.

Test slightly trochospiral, but final whorl biinvolute. Holocene.

Family **PLANULINOIDIDAE** Saidova, 1981

Planulinoididae SAIDOVA, 1981, p. 44.
Planulinoidinae SAIDOVA, 1981, p. 44 (subfamily).

Test nearly planispiral, periphery truncate, biconcave and partially evolute on both sides; aperture areal, oblique and peripheral, with supplementary apertures on umbilical side at inner margin of chambers. Pliocene to Holocene.

Family **DISCORBINELLIDAE** Sigal, 1952

Discorbinellidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily *Discorbinellinae*.
Laticarinidae HOFKER, 1951, p. 307 (nom. imperf.; nom. nud.).
Laticarininidae REISS, 1963, p. 62.

Test nearly planispiral or in very flat trochospiral; test may be carinate; primary aperture a small interiomarginal equatorial opening, and may have supplementary openings beneath posterior umbilical margin of umbilical flaps. Paleocene to Holocene.

Subfamily **DISCORBINELLINAE** Sigal, 1952

Discorbinellinae SIGAL in PIVETEAU, 1952, p. 228.
Laticarininae SAIDOVA, 1981, p. 45 (err. cit.).
Discorbinellinea SAIDOVA, 1981, p. 44 (supersubfamily).

Chamber interior simple, not subdivided by partitions. Paleocene to Holocene.

Subfamily **TORRESININAE** Loeblich and Tappan, **n. subfam.**

Chambers subdivided by secondary partitions that project inward from the peripheral margin. U. Tertiary to Holocene.

Type genus: Torresina Parr, 1947.

Remarks: Differs from the Discorbinellinae in having secondary partitions that subdivide the chamber interior.

Superfamily **PLANORBULINACEA** Schwager, 1877

Planorbulinacea LOEBLICH and TAPPAN, nom. corr. herein pro superfamily Planorbulinidea.
Planorbulinidea SAIDOVA, 1975a, p. 243, nom. transl. ex subfamily Planorbulinidae.
Planulinacea GONZÀLEZ-DONOSO, 1969, p. 3.

Test free or attached, trochospiral, at least in early stage, later may be uncoiled and rectilinear or biserial, or may have many chambers per whorl, or chambers added irregularly; wall of perforate hyaline calcite, commonly optically radial in structure, with *c*-axes perpendicular to surface, although others have intermediate structure, with crystals of inner and outer wall layers radial and those of median layer somewhat oblique, wall coarsely perforate, apertural face may be imperforate; aperture interiomarginal and extraumbilical-umbilical to nearly equatorial, subterminal in uncoiled forms, additional equatorial or umbilical apertures may be present at the opposite edge of the chamber. U. Cretaceous to Holocene.

Family **PLANULINIDAE** Bermúdez, 1952

Planulinidae GONZÀLEZ-DONOSO, 1969, p. 3, nom. transl. ex subfamily Planulininae.

Test trochospiral to nearly planispiral, partially evolute on both sides; aperture a low interiomarginal equatorial arch. U. Cretaceous to Holocene.

Subfamily **PLANULININAE** Bermúdez, 1952

Planulininae BERMÚDEZ, 1952, p. 91.
Cibicidinellinae SAIDOVA, 1981, p. 48.
Cibicidinellinea SAIDOVA, 1981, p. 48 (supersubfamily).

Test with nearly flat sides and truncate periphery. U. Cretaceous to Holocene.

Subfamily **CARIBEANELLINAE** Saidova, 1981

Caribeanellinae SAIDOVA, 1981, p. 49.
Caribeanellinea SAIDOVA, 1981, p. 49 (supersubfamily).

Test trochospiral, spiral side partially involute, periphery rounded; primary aperture equatorial, supplementary

openings umbilical in position, and at basal margin of final chamber on periphery. Pliocene to Holocene.

Family **CIBICIDIDAE** Cushman, 1927

Cibicididae CHAPMAN, PARR and COLLINS, 1934, p. 556, 570, nom. transl. ex subfamily Cibicidinae.
Cibicidae HOFKER, 1951, p. 332 (err. cit.).
Falsocibicididae SAIDOVA, 1981, p. 49.

Test trochospirally enrolled, at least in early stage, attached by spiral side; primary aperture a low equatorial arch that may extend onto the spiral side, or may become terminal and single or multiple in uncoiled forms. Cretaceous to Holocene.

Subfamily **CIBICIDINAE** Cushman, 1927

Cibicidinae CUSHMAN, 1927, p. 93.
Truncatulininae SCHUBERT, 1921, p. 151.
Orbitorotalininae HOFKER, 1933, p. 125 (nom. nud.; invalid, ICZN Art. 29).
Cibicidinea SAIDOVA, 1981, p. 48 (supersubfamily).
Lobatulinae SAIDOVA, 1981, p. 48.
Lobatulinea SAIDOVA, 1981, p. 48 (supersubfamily).
Falsocibicidinae SAIDOVA, 1981, p. 49.
Falsocibicidinea SAIDOVA, 1981, p. 49 (supersubfamily).

Test enrolled throughout. Cretaceous to Holocene.

Subfamily **STICHOCIBICIDINAE** Saidova, 1981

Stichocibicidinae SAIDOVA, 1981, p. 48.
Dyocibicidinae SAIDOVA, 1981, p. 48.

Test loosely coiled or uncoiled in later stage, and may be uniserial or biserial in uncoiled portion. Eocene to Holocene.

Subfamily **ANNULOCIBICIDINAE** Saidova, 1981

Annulocibicidinae SAIDOVA, 1981, p. 48.
Annulocibidinae SAIDOVA, 1981, p. 48 (err. cit.).

Early stage trochospiral, later with strongly recurved to cyclical chambers. Paleocene to Holocene.

Family **PLANORBULINIDAE** Schwager, 1877

Planorbulinidae CUSHMAN, 1927, p. 95, nom. transl. ex subfamily Planorbulinidae.
Planorbulinidae SCHWAGER, 1877, p. 20 (subfamily).
Planorbulininae GALLOWAY, 1933, p. 297 (subfamily).
Planorbulinellidae FREUDENTHAL, 1969, p. 138 (nom. nud.).
Planolinderinidae FREUDENTHAL, 1969, p. 138 (nom. nud.).

Test attached, early stage trochospiral, later chambers forming discoid, cylindrical or conical test; aperture single or multiple, peripheral. Eocene to Holocene.

Family **CYMBALOPORIDAE** Cushman, 1927

Cymbaloporidae CUSHMAN, 1927, p. 81.
Cymbaloporettidae CUSHMAN, 1928, p. 8.
Halkyardiidae KUDO, 1931, p. 201.
Gymbaloporettidae REISS, 1963, p. 68 (err. cit.).
Cymboloporidae NEAGU, 1979, p. 336 (err. cit.).

Test trochospiral, later chambers in annular series in a single flat to conical layer; numerous apertures present as small circular pores. Cretaceous to Holocene.

Subfamily **CYMBALOPORINAE** Cushman, 1927

Cymbaloporinae CHAPMAN and PARR, 1936, p. 143, nom. transl. ex family Cymbaloporidae.

Chambers in a single layer, interior undivided. Cretaceous to Holocene.

Subfamily **FABIANIINAE** Deloffre and Hamaoui, 1973

Fabianiinae DELOFFRE and HAMAOUI, 1973, p. 302.

Embryonic stage of few large chambers, later with chambers in cycles or tiers, and repeatedly subdivided by horizontal and vertical partitions; aperture consists of pores on terminal face. Eocene.

Subfamily **HALKYARDIINAE** Kudo, 1931

Halkyardiinae SAIDOVA, 1981, p. 49, nom. transl. ex family Halkyardidae.

Early chambers in raspberry arrangement, later with small chambers in annular series; umbilical region filled with horizontal lamellae and connecting pillars; aperture consists of small pores at periphery. Eocene.

Family **VICTORIELLIDAE** Chapman and Crespin, 1930

Victoriellidae CHAPMAN and CRESPIN, 1930, p. 111.
Eorupertiidae COLE, 1957, p. 337.

Test attached, early chambers trochospiral, later may grow upward from the attachment in loose spiral or irregular mass. U. Cretaceous to Holocene.

Subfamily **CARPENTERIINAE** Saidova, 1981

Carpenteriinae SAIDOVA, 1981, p. 47.

Test trochospiral throughout; aperture large, umbilical. Eocene to Holocene.

Subfamily **RUPERTININAE** Loeblich and Tappan, 1961

Rupertininae LOEBLICH and TAPPAN, 1961, p. 312.
Rupertiinae GALLOWAY, 1933, p. 302 (invalid, ICZN Art. 39; based on *Rupertia* Wallich, 1877, non Gray, 1865).
Rupertinae A. SILVESTRI, 1937, p. 143.

Test attached by basal disc, later growing erect from the substrate in a loose spiral; aperture narrow, interiomarginal. U. Cretaceous to Holocene.

Subfamily **VICTORIELLINAE** Chapman and Crespin, 1930

Victoriellinae LOEBLICH and TAPPAN, 1964a, p. C705, nom. transl. ex family Victoriellidae.

Juvenile stage may be free, later attached and high-spired around hollow axis; wall with pillar-like thickenings that replace the pores. Eocene to Miocene.

Superfamily **ACERVULINACEA** Schultze, 1854

Acervulinacea LOEBLICH and TAPPAN, nom. transl. herein ex family Acervulinidea.

Test free or attached, early spiral stage followed by spreading or irregular chambers that form an irregular mass, mound, disc or branching structure; wall of hyaline, optically radial, coarsely perforate calcite; no aperture other than mural pores or openings in cribrate plates covering the areolae. Eocene to Holocene.

Family **ACERVULINIDAE** Schultze, 1854

Acervulinidae EIMER and FICKERT, 1899, p. 630, nom. corr. pro family Acervulinida.
Acervulinida SCHULTZE, 1854, p. 53.
Gypsininae A. SILVESTRI, 1905, p. 142 (subfamily).
Acervulininae GALLOWAY, 1933, p. 308 (subfamily).

Early spiral stage followed by spreading chambers in one or more layers; no aperture other than mural pores. Eocene to Holocene.

Family **HOMOTREMATIDAE** Cushman, 1927

Homotrematidae LOEBLICH and TAPPAN, 1964a, p. C702, nom. corr. pro family Homotremidae.
Homotremidae CUSHMAN, 1927, p. 97 (nom. imperf.).
Polytremidae CHAPMAN, PARR and COLLINS, 1934, p. 556, 573 (invalid; ICZN Art. 39; based on *Polytrema* Risso of authors, non Risso, 1826, nec Rafinesque, 1819).
Homotreminae CHAPMAN and PARR, 1936, p. 144 (subfamily).
Miniacinidae THALMANN, 1938, p. 208.
Homotrematinae POKORNÝ, 1958, p. 333 (subfamily).
Polytrematidae LOEBLICH and TAPPAN, 1964a, p. C702.

Test attached, early chambers irregularly trochospiral, later with numerous chambers forming a massive or branching test growing erect from the attachment; apertures large, covered by a perforated plate. Eocene to Holocene.

Superfamily **ASTERIGERINACEA** d'Orbigny, 1839

Asterigerinacea LOEBLICH and TAPPAN, 1961, p. 302, nom. transl. ex family Asterigerinidae.
Asterigerinoidea AYALA-CASTAÑARES, 1963, p. 78.
Anomalinacea LOEBLICH and TAPPAN, 1964b, p. 34 (based on *Anomalina*; suppressed, ICZN opinion pending).
Anomalinidea SAIDOVA, 1981, p. 40.

Test trochospiral to nearly planispiral; chambers with internal partitions, secondary septa or intersepta that attach to the outer wall, forming supplementary chambers around the umbilicus; no canal system or stolons; wall of hyaline perforate calcite, optically radial; primary aperture interiomarginal, equatorial to extraumbilical-umbilical in position, may extend up the apertural face or be areal; secondary apertures sutural in position or related to the supplementary internal partitions. Cretaceous to Holocene.

Family **EPISTOMARIIDAE** Hofker, 1954

Epistomariidae HOFKER, 1954, p. 166.

Test trochospiral, with supplementary chambers on umbilical side; primary aperture interiomarginal, supplementary sutural and areal apertures also present. Cretaceous to Holocene.

Subfamily **EPISTOMARIINAE** Hofker, 1954

Epistomariinae SAIDOVA, 1981, p. 46, *nom. transl. ex* family Epistomariidae.

Test with numerous supplementary openings on both sides. Eocene to Holocene.

Subfamily **EPONIDELLINAE** Seiglie and Bermúdez, 1965

Eponidellinae SEIGLIE and BERMÚDEZ, 1965, p. 163.

Aperture a high oblique opening in final chamber face, partially closed when new chamber is added, so that intercameral foramen is wholly areal. Eocene to Holocene.

Subfamily **NUTTALLIDINAE** Saidova, 1981

Nuttallidinae SAIDOVA, 1981, p. 46.

Test trochospiral; internal plate extending partially through chambers, but does not attach to opposite wall to form chamberlet. U. Cretaceous (Santonian) to U. Eocene.

Subfamily **PALMERINELLINAE** Loeblich and Tappan, **n. subfam.**

Test nearly planispiral, evolute; secondary chamberlets at umbilical margin of chambers on umbilical side; apertural opening divided by vertical internal partition. Holocene.

Type genus: Palmerinella Bermúdez, 1934.

Remarks: Differs from other Epistomariidae in the presence of the internal partition within the aperture.

Family **ALFREDINIDAE** S. N. Singh and Kalia, 1972

Alfredinidae LOEBLICH and TAPPAN, nom. transl. herein ex subfamily Alfredininae.
Alfredininae S. N. SINGH and KALIA, 1972, p. 157 (subfamily).
Anomalinidae (based on *Anomalina*; ICZN opinion pending, as specimens from the type area indicate it to be *Epistomaroides*).
Anamalinidae PLOTNIKOVA and LIPNIK, 1968, p. 893 (err. cit.).
Anomolinidae NEAGU, 1979, p. 362 (*err. cit.*).
Anomalininea SAIDOVA, 1981, p. 40 (supersubfamily).

Supplementary chambers in umbilical region on umbilical side; areal and interiomarginal openings present. Eocene, Holocene.

Family **ASTERIGERINATIDAE** Reiss, 1963

Asterigerinatidae S. N. SINGH and KALIA, 1972, p. 159, nom. transl. ex subfamily Asterigerinatinae.
Asterigerinatinae REISS, 1963, p. 58 (subfamily).
Heminwayininae REISS, 1963, p. 66 (subfamily).
Eoeponidellidae SEIGLIE and BERMÚDEZ in SEIGLIE, 1965, p. 2 (nom. nud.).

Test trochospiral, umbilical side with secondarily produced chamberlets. U. Cretaceous to Holocene.

Family **ASTERIGERINIDAE** d'Orbigny, 1839

Asterigerinidae D'ORBIGNY in DE LA SAGRA, 1839, p. xxxix, 116.
Asterigerinida COPELAND, 1956, p. 187 (err. emend.).
Asterigerininae SAIDOVA, 1981, p. 46 (subfamily).

Primary chambers alternating with smaller secondary chambers that form a stellate series around umbilical plug. Cretaceous to Holocene.

Family **AMPHISTEGINIDAE** Cushman, 1927

Amphisteginidae CUSHMAN, 1927, p. 79.
Amphistegininae CHAPMAN and PARR, 1936, p. 144 (subfamily).
Boreloididae REISS, 1963, p. 70.

Chambers numerous, with complex chamberlets in center of umbilical side, and may have interseptal pillars; aperture a narrow interiomarginal slit. Paleocene to Holocene.

Superfamily **NONIONACEA** Schultze, 1854

Nonionacea LOEBLICH and TAPPAN, 1964b, p. 34, nom. corr. pro superfamily Nonionidea.
Nonionidea SUBBOTINA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 282, nom. transl. ex subfamily Nonionida.
Nonionellidea SAIDOVA, 1981, p. 41.
Nonionoidea TAPPAN and LOEBLICH, 1982, p. 550.

Test enrolled and planispiral to slightly asymmetrical; wall of perforate hyaline oblique calcite, appearing optically granular; aperture equatorial and interiomarginal, less commonly areal and may be a group of pores; may also have a series of sutural openings, or a peripheral slitlike opening in each chamber that lies slightly to one side of the periphery. U. Cretaceous to Holocene.

Family **NONIONIDAE** Schultze, 1854

Nonionidae CUSHMAN, 1927, p. 49, nom. corr. pro family Nonionida.
Nonionida SCHMARDA, 1871, p. 165, nom. transl. ex subfamily Nonionida.
Nonioninidae REUSS, 1860, p. 151.
Nonioninideae REUSS, 1860, p. 221.
Pullenidae SCHWAGER, 1877, p. 18.
Nonionidea COPELAND, 1956, p. 187.
Pulleniidae PUTRYA, 1963, p. 37.
Nonionellidae SAIDOVA, 1981, p. 41.
Bermudezinellidae SAIDOVA, 1981, p. 52.
Spirotectidae LOEBLICH and TAPPAN, 1982c, p. 36, nom. corr.; nom. transl. ex subfamily Spiroplectinae.

Early stage planispiral or nearly so, involute to evolute; aperture interiomarginal and equatorial, or a series of small openings in that position. U. Cretaceous to Holocene.

Subfamily **SPIROTECTINAE** Saidova, 1981

Spirotectinae LOEBLICH and TAPPAN, nom. corr. herein pro subfamily Spiroplectinae.
Spiroplectinae SAIDOVA, 1981, p. 42 (nom. imperf.).

Test trochospiral, but final whorl completely envelops early ones. U. Cretaceous.

Subfamily **NONIONINAE** Schultze, 1854

Nonioninae CHAPMAN and PARR, 1936, p. 145, nom. corr. pro subfamily Nonionida.
Nonionida SCHULTZE, 1854, p. 53.
Nonioninae A. SILVESTRI, 1950, p. 52.
Nonionellinae VOLOSHINOVA, 1958, p. 141.
Nontoninae SAIDOVA, 1975a, p. 68 (err. cit.).
Nonionellinea SAIDOVA, 1981, p. 41 (supersubfamily).
Nonionellininea SAIDOVA, 1981, p. 41 (supersubfamily).
Nonioninea SAIDOVA, 1981, p. 52 (supersubfamily).

Test moderately compressed, numerous chambers per whorl, increasing rapidly in height; aperture a small interiomarginal equatorial opening. U. Cretaceous to Holocene.

Subfamily **ASTRONONIONINAE** Saidova, 1981

Astrononioninae SAIDOVA, 1981, p. 52.

Test planispiral and involute; chambers numerous, increasing gradually in height; each chamber with a broad to narrow flap that extends from the umbilicus for some distance over each suture; apertural opening near the midpoint of each flap at its proximal edge. Eocene to Holocene.

Subfamily **PULLENIINAE** Schwager, 1877

Pulleniinae SAIDOVA, 1981, p. 52; nom. corr. pro subfamily Pullenidae.
Pullenidae SCHWAGER, 1877, p. 18 (nom. imperf.).
Pulleninae BÜTSCHLI in BRONN, 1880, p. 210.
Pulleniinea SAIDOVA, 1981, p. 52 (supersubfamily).
Poropullenia SAIDOVA, 1981, p. 52 (subfamily; nom. imperf.).

Test with few chambers per whorl, planispiral and involute; slitlike aperture extends from umbilicus of one side to that on the other, or may have a series of pores in that position. U. Cretaceous to Holocene.

Family **MELONIDAE** Chapman, Parr and Collins, 1934

Melonidae CHAPMAN ET AL., 1934, p. 556.
Melonisinae VOLOSHINOVA, 1958, p. 147 (err. emend.).

Test planispiral, or slightly asymmetrical in early stage, biinvolute and biumbilicate; aperture an arch at the base of the final chamber face, extending from one umbilicus to that opposite. ? U. Cretaceous, Paleocene to Holocene.

Family **SPIROTECTINIDAE** Saidova, 1981

Spirotectinidae LOEBLICH and TAPPAN, nom. corr. herein pro family Spiroplectinidae.
Spiroplectinidae SAIDOVA, 1981, p. 42 (nom. imperf.; based on *Spirotectina* Saidova, 1975).
Spiroplectininae SAIDOVA, 1981, p. 42 (subfamily; nom. imperf., based on *Spirotectina* Saidova, 1975).
Spirotectininae LOEBLICH and TAPPAN, 1982c, p. 36, nom. corr. pro subfamily Spiroplectininae.

Test trochospiral, spiral side partially involute; sutures with septal bridges; aperture basal and equatorial, secondary sutural openings present between the septal bridges. Holocene.

Family **ALMAENIDAE** Myatlyuk, 1959

Almaenidae SUBBOTINA in SUBBOTINA ET AL., 1981, p. 89, nom. transl. ex subfamily Almaeninae.

Test nearly planispiral; primary aperture interiomarginal,

equatorial or located slightly to umbilical side, secondary slitlike aperture at outer peripheral margin of chamber in the plane of coiling. Eocene to Holocene.

Subfamily **ALMAENINAE** Myatlyuk, 1959

Almaeninae MYATLYUK in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 272.
Almaeninea SAIDOVA, 1981, p. 41 (supersubfamily).

Test evolute or partially so; primary aperture interiomarginal or areal, secondary apertures peripheral. Eocene to Miocene.

Subfamily **ANOMALINELLINAE** Saidova, 1981

Anomalinellinae SAIDOVA, 1981, p. 41.

Test completely involute; interiomarginal and peripheral apertures present. Miocene to Holocene.

Superfamily **CHILOSTOMELLACEA** Brady, 1881

Chilostomellacea LOEBLICH and TAPPAN, 1982c, p. 36, nom. transl. ex family Chilostomellidae.

Test enrolled, trochospiral, or chambers may be somewhat enveloping, attached forms may be uncoiled in later stage; wall of perforate hyaline oblique calcite, appearing optically granular; aperture interiomarginal, extending from the periphery nearly to the umbilicus on the umbilical side, or may extend up the apertural face as a high slit, becoming terminal and rounded in uncoiled forms. Jurassic to Holocene.

Family **QUADRIMORPHINIDAE** Saidova, 1981

Quadrimorphinidae LOEBLICH and TAPPAN, 1982c, p. 36, nom. transl. ex subfamily Quadrimorphininae.
Quadrimorphininae SAIDOVA, 1981, p. 42 (subfamily).

Test trochospiral, chambers not enveloping. L. Cretaceous to Holocene.

Family **CHILOSTOMELLIDAE** Brady, 1881

Chilostomellidae BRADY, 1881, p. 42, 44.
Chilostomellida HAECKEL, 1894, p. 185.
Chilostomellinae A. SILVESTRI, 1906, p. 23 (subfamily).
Allomorphininae CUSHMAN, 1927, p. 85 (subfamily).
Allomorphinellinae CUSHMAN, 1927, p. 86 (subfamily).
Chistomelidae KOLTYPIN, 1957, p. 132 (err. cit.).
Allomorphinina VETROVA, 1975, p. 26 (err. cit.; subfamily).

Test trochospiral to planispiral, chambers much enveloping, only those of final whorl visible externally. Jurassic to Holocene.

Family **GLOBOROTALITIDAE** Loeblich and Tappan, **n. fam.**

Globorotalitidae LOEBLICH and TAPPAN, 1982c, p. 36, nom. nud.

Test trochospiral, plano-convex, pseudoumbilicus on umbilical side; deep indentation or murus reflectus at base of apertural face attaches to previous septum internally but is not a true aperture and does not communicate with chamber interior; aperture interiomarginal, midway between umbilical region and periphery. Cretaceous.

Type genus: Globorotalites Brotzen, 1942.

Remarks: Differs from the Osangulariidae in having a low basal aperture rather than a vertical slit in the apertural face, and in the distinctive indentation of the apertural face (murus reflectus).

Family **PARRELLOIDIDAE** Hofker, 1956

Parrelloididae HOFKER, 1956, p. 936.
Heterolepidae GONZÀLEZ-DONOSO, 1969, p. 6.
Cibicidoidinae VOLOSHINA, 1975, text-fig. 1 on p. 278 (nom. nud.).
Heterolepinae SAIDOVA, 1981, p. 40 (subfamily).
Heterolepinea SAIDOVA, 1981, p. 40 (supersubfamily).

Test trochospiral, lenticular; umbilical side with closed umbilicus, commonly with boss; aperture a small, interiomarginal equatorial opening bordered by a narrow lip. U. Cretaceous to Holocene.

Family **ALABAMINIDAE** Hofker, 1951

Alabaminidae HOFKER, 1951, p. 389.

Test trochospiral, aperture an interiomarginal slit. Cretaceous to Holocene.

Subfamily **GYROIDININAE** Saidova, 1981

Gyroidininae SAIDOVA, 1981, p. 43.
Gyroidinoidinae SAIDOVA, 1981, p. 41.

Test planoconvex to high trochospiral; aperture extends from periphery to open umbilicus, may be bordered by apertural flap. Cretaceous to Holocene.

Subfamily **ALABAMININAE** Hofker, 1951

Alabamininae SAIDOVA, 1981, p. 43, nom. transl. ex family Alabaminidae.
Alabamininea SAIDOVA, 1981, p. 42 (supersubfamily).

Aperture interiomarginal, partially obscured by infolded area on the apertural face. U. Cretaceous to Holocene.

Family **ORIDORSALIDAE** Loeblich and Tappan, **n. fam.**

Oridorsalidae LOEBLICH and TAPPAN, 1982c, p. 36, nom. nud.

Test lenticular, chambers in low trochospiral coil; wall finely perforate, hyaline oblique, optically granular in structure; aperture at base of apertural face, extending from near the periphery to the umbilical region; small secondary sutural openings on spiral side near junction of spiral and septal sutures, with similar small openings at sharp curve near mid-point of sutures on the umbilical side. Oligocene to Holocene.

Type genus: Oridorsalis Andersen, 1961.

Remarks: Differs from the Alabaminidae in the lenticular form and peripheral keel, nearly equatorial low basal aperture that lacks a deep indentation of the apertural face, and in the sutural secondary openings present on both sides of the test.

Family **OSANGULARIIDAE** Loeblich and Tappan, 1964

Osangulariidae LOEBLICH and TAPPAN, 1964a, p. C752.
Osangulariinae SAIDOVA, 1981, p. 41 (subfamily).

Aperture consisting of two openings that may be distinct or connected, an interiomarginal one and a vertical or oblique areal one that extends up the apertural face or the areal part may become multiple. L. Cretaceous to Holocene.

Family **GAVELINELLIDAE** Hofker, 1956

Gavelinellidae HOFKER, 1956, p. 946.
Anomalinidae CUSHMAN, 1927, p. 92 (suppressed, ICZN opinion pending).
Anomalininae CUSHMAN, 1927, p. 92 (suppressed, ICZN opinion pending).
Gavelinellinae LOEBLICH and TAPPAN, 1961, p. 316 (subfamily).
Lingulogavelinellidae SCHEIBNEROVÁ, 1972, p. 214.
Gavellinellinae SAIDOVA, 1981, p. 40 (subfamily; err. cit.).
Gavellinellidae LOEBLICH and TAPPAN, 1982c, p. 36 (err. cit.).

Test trochospiral; aperture an interiomarginal equatorial arch, that may continue on the umbilical side to the umbilicus, where it is partially covered by a distinctive flap, umbilical flaps of successive chambers commonly remain visible in the umbilical area. L. Cretaceous to Holocene.

Family **KARRERIIDAE** Saidova, 1981

Karreriidae LOEBLICH and TAPPAN, 1982c, p. 36, nom. transl. ex subfamily Karreriinae.
Karreriinae SAIDOVA, 1981, p. 40 (subfamily).

Test attached, early stage trochospiral, later uncoiling and rectilinear; aperture terminal, rounded. L. Cretaceous to Holocene.

Family **COLEITIDAE** Loeblich and Tappan, **n. fam.**

Test trochospiral in early stage, later uncoiled and rectilinear; wall surface coarsely cancellate; aperture elongate and terminal in uncoiled stage, with projecting tooth at one margin; interior with solid column extending from inner margin of aperture to attach near the previous foramen. Paleocene to L. Eocene.

Type genus: Coleites Plummer, 1934.

Remarks: Characterized by coarsely reticulate wall surface, apertural tooth, and the internal column extending from the aperture to the previous foramen.

Family **TRICHOHYALIDAE** Saidova, 1981

Trichohyalidae LOEBLICH and TAPPAN, 1982c, p. 36, nom. transl. ex subfamily Trichohyalinae.
Trichohyalinae SAIDOVA, 1981, p. 43 (subfamily).
Trichohyalinea SAIDOVA, 1981, p. 43 (supersubfamily).

Test trochospiral, umbilical side obscured by secondary growth of shell material forming a vesicular plate that is pierced by perforations opening into an umbilical cavity. Holocene.

Superfamily **ORBITOIDACEA** Schwager, 1876

Orbitoidacea LOEBLICH and TAPPAN, 1961, p. 310, nom. corr. pro superfamily Orbitoidicae.
Orbitoidicae BRÖNNIMANN, 1958, p. 167, nom. transl. ex family Orbitoidee.
Orbitoidoidea AYALA-CASTAÑARES, 1963, p. 97.
Orbitaoidacea SAIDOVA, 1975a, p. 243 (err. cit.).

Test discoidal to lenticular; early stage with coiled or bilocular embryonal chambers, followed by somewhat larger periembryonal ones; equatorial and lateral chambers may be differentiated or indistinguishable, chambers of median layer may be subdivided to form secondary chamberlets; dimorphism prominent, microspheric early stage enrolled or biserial, megalospheric generation with distinctive embryonic stage enclosed in a thicker wall; wall of perforate, hyaline, optically radial calcite; openings present between chambers in early forms, replaced by distinct stolons in advanced forms, no canal system. U. Cretaceous to Miocene.

Family **LINDERINIDAE** Loeblich and Tappan, **n. fam.**

Linderinidae FREUDENTHAL, 1969, p. 138, nom. nud.

Megalospheric embryonal stage biloculine, later chambers in annular series, with those of successive whorls alternating in position; varied amount of umbonal lateral thickening, but no lateral chamberlets present. Eocene to Miocene.

Family **ORBITOIDIDAE** Schwager, 1876

Orbitoididae EIMER and FICKERT, 1899, p. 616, nom. corr. pro family Orbitoidee.
Orbitoidee SCHWAGER, 1876, p. 481 (nom. imperf.).
Orbitoidinae A. SILVESTRI, 1907, p. 12.
Orbitoidae A. SILVESTRI, 1937, p. 155.
Orbitoidida COPELAND, 1956, p. 188.
Hellenocyclinidae FREUDENTHAL, 1969, p. 137 (nom. nud.).

Embryonal chambers enclosed by thick perforated wall, or with thin walled bilocular embryonal chambers followed by relatively large periembryonal ones; stolons present, but no canal system. U. Cretaceous.

Subfamily **ORBITOIDINAE** Schwager, 1876

Orbitoidinae PREVER, 1904, p. 111, nom. transl. ex family Orbitoidee.

Post-embryonal lateral chambers, when present, differentiated from equatorial layer. U. Cretaceous.

Subfamily **OMPHALOCYCLINAE** Vaughan, 1928

Omphalocyclinae VAUGHAN in CUSHMAN, 1928, p. 336, 355.

Lateral chambers not differentiated from equatorial ones in post-embryonal stage. U. Cretaceous.

Family **LEPIDOCYCLINIDAE** Scheffen, 1932

Lepidocyclinidae SCHEFFEN, 1932, p. 251.
Helicolepidinidae POKORNÝ, 1958, p. 395.

Test discoidal to inflated lenticular, with distinct equato-

rial layer and zones of lateral chambers at each side; chamber walls perforated by distinct stolons, no canal system. M. Eocene to M. Miocene.

Subfamily **LEPIDOCYCLININAE** Scheffen, 1932

Lepidocyclininae TAN, 1936, p. 277, nom. transl. ex family Lepidocyclinidae.
Lepidocyclinae VAUGHAN and COLE in CUSHMAN, 1940, p. 357 (err. cit.).

Thin-walled embryonal (and periembryonal when present) chambers, followed by cyclical series of equatorial chambers, lateral chambers numerous, and well differentiated from equatorial layer. M. Eocene to M. Miocene.

Subfamily **HELICOLEPIDININAE** Tan, 1936

Helicolepidininae TAN, 1936, p. 277.
Helicolepidinae VAUGHAN and COLE in CUSHMAN, 1940, p. 325 (err. cit.).

Equatorial layer of chambers in definite and persistent open spiral, with chamberlets intercalated between whorls of spire. M. Eocene to U. Eocene.

Superfamily **ROTALIACEA** Ehrenberg, 1839

Rotaliacea LOEBLICH and TAPPAN, 1961, p. 303, nom. corr. pro superfamily Rotalidea.
Rotalidea GLAESSNER, 1945, p. 143, nom. transl. ex family Rotalina.
Rotaliaridia RHUMBLER in KÜKENTHAL and KRUMBACH, 1923, p. 88 (family group).
Rotaliidea SMOUT, 1954, p. 40.
Rotaliicae BRÖNNIMANN, 1958, p. 175.
Rotalioidea AYALA-CASTAÑARES, 1963, p. 87.
Rotalacea VENKATACHALAPATHY and SHAREEF, 1981, p. 447 (err. cit.).
Elphidiidea SAIDOVA, 1981, p. 53.

Test enrolled, trochospiral to planispiral, involute to evolute, commonly with many small chambers in numerous whorls; as new chambers are added, septal flap attaches to previous apertural face enclosing radial canals, fissures, umbilical cavities, and intraseptal and subsutural canals; wall of perforate, hyaline calcite, generally optically radiate in structure, less commonly hyaline oblique and optically granular; primary aperture single or multiple, interiomarginal to areal, or may be absent on final chamber, only an intercameral foramen being present; small openings into the canal system may occur along the sutures but do not communicate with the chamber interior. U. Cretaceous to Holocene.

Family **ROTALIIDAE** Ehrenberg, 1839

Rotaliidae CHAPMAN, 1900, p. 10, nom. corr. pro family Rotalina.
Rotalina EHRENBERG, 1839, table opp. p. 120.
Rotalideae REUSS, 1860, p. 221.
Rotalidea REUSS and FRITSCH, 1861, p. 4.
Rotalida SCHMARDA, 1871, p. 164.
Rotalidee SCHWAGER, 1876, p. 479.
Rotalidae BRADY, 1881, p. 44.
Rotalinae DELAGE and HÉROUARD, 1896, p. 145.
Rotaliaridae RHUMBLER, 1913, p. 339.
Arrotalaridia RHUMBLER, 1913, p. 342.
Chapmaniidae GALLOWAY, 1933, p. 316.
Chapmaninidae THALMANN, 1938, p. 207.
Miscellaneidae SIGAL in PIVETEAU, 1952, p. 244, 272.
Chapmaniida COPELAND, 1956, p. 187 (err. emend.).
Rotalidae KOLTYPIN, 1957, p. 101, 109, 120, 131, 132 (err. cit.).
Indicolidae S. N. SINGH and KALIA, 1970, p. 77.
Aotaliidae PLOTNIKOVA, 1975b, p. 109 (err. cit.).
Ammoniidae SAIDOVA, 1981, p. 50.

Test trochospiral throughout, with radial canals or fissures and intraseptal and subsutural canals. U. Cretaceous to Holocene.

Subfamily **CUVILLIERININAE** Loeblich and Tappan, 1964

Cuvillierininae LOEBLICH and TAPPAN, 1964a, p. C614.

Test trochospiral to nearly planispiral, spiral and umbilical sides not differentiated in structure; canal system with subsutural and intraseptal canals and vertical fissures. U. Cretaceous (Campanian) to Miocene.

Subfamily **MISCELLANEINAE** Sigal, 1952

Miscellaneinae KACHAREVA in RAUZER-CHERNOUSOVA and FURSENKO, 1959, p. 314, nom. transl. ex family Miscellaneidae.

Planispiral to low trochospiral, no marginal cord or longitudinal canal system, intraseptal radial or vertical canals may be well developed. U. Cretaceous to U. Eocene.

Subfamily **PARAROTALIINAE** Reiss, 1963

Pararotaliinae REISS, 1963, p. 85.

Test trochospiral, no canal system, but may have umbilical cavities; single interiomarginal slitlike aperture, converted into areal intercameral foramen by later attachment of the toothplate. U. Cretaceous to Holocene.

Subfamily **ROTALIINAE** Ehrenberg, 1839

Rotaliinae CHAPMAN, 1900, p. 11, nom. corr. pro subfamily Rotalida.
Rotalida SCHULTZE, 1854, p. 52, nom. transl. ex family Rotalina.
Rotalinae CARPENTER, PARKER and JONES, 1862, p. 198.
Rotalina JONES in GRIFFITH and HENFREY, 1875, p. 320.
Rotalidae SCHWAGER, 1877, p. 20.
Rotalininae HOFKER, 1933, p. 125.

Test trochospiral, external openings on umbilical side consisting of radial canals or fissures or umbilical cavities, commonly also has intraseptal and subsutural canals. U. Cretaceous to Holocene.

Subfamily **CHAPMANININAE** Thalmann, 1938

Chapmanininae FRIZZELL, 1949, p. 482, nom. transl. ex family Chapmaninidae.

Test conical, early portion trochospiral, later uniserial; septa invaginated into tubes or chamberlets; aperture consists of tube openings. M. Eocene to Miocene.

Family **CALCARINIDAE** Schwager, 1876

Calcarinidae EIMER and FICKERT, 1899, p. 631, nom. corr. pro family Calcarine.

Calcarine SCHWAGER, 1876, p. 481 (nom. imperf.).
Tinoporidea SCHWAGER, 1877, p. 21.
Tinoporinae BRADY, 1884, p. 74 (subfamily).
Tinoporina LANKESTER, 1885, p. 847.
Tinoporinae DELAGE and HÉROUARD, 1896, p. 147.
Tinoporidae LISTER in LANKESTER, 1903, p. 146.
Calcarininae HOFKER, 1927, p. 42 (subfamily).
Tinoporininae HOFKER, 1933, p. 125 (subfamily).
Siderolitidae FINLAY, 1939, p. 525.
Siderolitinae SIGAL in PIVETEAU, 1952, p. 250 (subfamily).
Baculogypsinidae SMOUT, 1955, p. 205.
Calearinidae SAIDOVA, 1981, p. 51 (err. cit.).

Test enrolled, little or no differentiation of spiral and umbilical surfaces; commonly with large inflational spines; canal system diffuse and confused with perforations. U. Cretaceous to Holocene.

Family **ELPHIDIIDAE** Galloway, 1933

Elphidiidae SIGAL in PIVETEAU, 1952, p. 240, nom. transl. ex subfamily Elphidiinae.
Polystomellidea REUSS and FRITSCH, 1861, p. 4.
Polystomellida SCHMARDA, 1871, p. 165.
Polystomellina LANKESTER, 1885, p. 848.
Polystomellinae DELAGE and HÉROUARD, 1896, p. 150.
Polystomellidae EIMER and FICKERT, 1899, p. 626.
Canaliferidae KRASHENINNIKOV, 1953, p. 89 (non Canaliferidae Broderip, 1839).
Faujasinidae SAIDOVA, 1981, p. 51.

Test planispiral to trochospiral, or may uncoil in later stage; sutural canal system opening into sutural pores; aperture interiomarginal or areal, single or multiple. Paleocene to Holocene.

Subfamily **ELPHIDIINAE** Galloway, 1933

Elphidiinae GALLOWAY, 1933, p. 265.
Polystomellida SCHULTZE, 1854, p. 53.
Polystomellina JONES in GRIFFITH and HENFREY, 1875, p. 320.
Polystomellinae BRADY, 1881, p. 44.
Cribroelphidiinae VOLOSHINOVA, 1958, p. 167.

Sutural pores and sutural canal system present, with retral processes bridging sutures; aperture interiomarginal or areal and may be multiple. Paleocene to Holocene.

Subfamily **NOTOROTALIINAE** Hornibrook, 1961

Notorotaliinae HORNIBROOK, 1961, p. 129.

Test trochospiral, umbilical side with overlapping septal flaps or chamber extensions; retral processes and vertical umbilical canals present, intraseptal canal system with branches near surface leading into sutural pores; aperture a row of small pores at base of apertural face. Eocene to Pleistocene.

Subfamily **FAUJASININAE** Bermúdez, 1952

Faujasininae BERMÚDEZ, 1952, p. 192.

Test trochospiral, planoconvex; spiral canal system well developed on umbilical side, rudimentary on spiral side, interseptal canals present; aperture an interiomarginal series of pores. Pliocene.

Subfamily **PARRELLININAE** Saidova, 1981

Parrellininae SAIDOVA, 1981, p. 51.

Test bilaterally symmetrical, planispiral and involute; well-developed anastomosing canal system. Oligocene to Holocene.

Family **LEPIDORBITOIDIDAE** Vaughan, 1933

Lepidorbitoididae POKORNÝ, 1958, p. 388, nom. transl. ex subfamily Lepidorbitoidinae.

Bilocular embryonic chambers followed by equatorial chambers that may be spatulate, hexagonal or arcuate, and differentiated lateral chambers; no canal system. U. Cretaceous to L. Eocene.

Subfamily **CLYPEORBINAE** Sigal, 1952

Clypeorbinae SIGAL in PIVETEAU, 1952, p. 259.

Test asymmetrical, with large protoconch and trochoid early spire; thin conical equatorial layer of arcuate chambers that become hexagonal toward the periphery, a thick protruding central pillar originates at the protoconch and widens rapidly within the cone to the exterior, lateral chambers immediately adjacent to the pillar are considerably larger than others and appear to be spirally enrolled. U. Cretaceous (Maastrichtian).

Subfamily **LEPIDORBITOIDINAE** Vaughan, 1933

Lepidorbitoidinae VAUGHAN in CUSHMAN, 1933a, p. 285 (nom. nud.).
Lepidorbitoidinae VAUGHAN in CUSHMAN, 1933b, Family 47 [p. 24] in Key.
Lepiorbitoidinae PORTNAYA, 1981, p. 36 (err. cit.).

Test symmetrical, with biloculine megalospheric embryonic stage, and with equatorial layer of chambers in median position. U. Cretaceous to L. Eocene.

Family **MIOGYPSINIDAE** Vaughan, 1928

Miogypsinidae TAN, 1936, p. 45, nom. transl. ex subfamily Miogypsininae.
Miogypsininae VAUGHAN in CUSHMAN, 1928, p. 354 (subfamily).
Miogypsinoidinae HANZAWA, 1947, p. 262 (subfamily).

Test with appressed laminae or well-developed lateral chambers at each side of equatorial layer of chambers; bilocular megalospheric embryonal stage followed by spire of periembryonal chambers; microspheric generation with early planispiral coil; spiral and intraseptal canals present; equatorial chambers connected by stolons. Oligocene to Miocene.

Superfamily **NUMMULITACEA** de Blainville, 1827

Nummulitacea GRIGYALIS, 1978, p. 9, nom. transl. ex family Nummulacea.
Discocyclinidea PURI, 1957, p. 139.

Test planispiral, evolute to involute, lenticular, discoidal to globular; chambers numerous, may be subdivided into chamberlets, may be differentiated into area of equatorial chambers and that of lateral chamberlets, later chambers

may be added in annular series; septal flap present as in Rotaliacea; subsutural canals, spiral marginal cord and spiral canal system present in early forms, but modified in later ones or replaced by intraseptal canals in advanced forms. U. Cretaceous to Holocene.

Family **NUMMULITIDAE** de Blainville, 1827

Nummulitidae EIMER and FICKERT, 1899, p. 634, nom. corr. pro family Nummulacea.
Nummulacea DE BLAINVILLE, 1827, p. 372 (nom. imperf.).
Nummulitidea REUSS and FRITSCH, 1861, p. 4.
Nummulinida CARPENTER, PARKER and JONES, 1862, p. 238.
Camerinidae MEEK and HAYDEN, 1865, p. 11.
Nummulitideae GÜMBEL, 1870, p. 84.
Nummulinina JONES in GRIFFITH and HENFREY, 1875, p. 320 (subfamily).
Nummuliti SCHWAGER, 1876, p. 477.
Nummulitidae SCHWAGER, 1877, p. 19 (subfamily).
Nummulinidae SCHULZE, 1877, p. 29.
Cycloclypidae BÜTSCHLI in BRONN, 1880, p. 215 (subfamily).
Nummulitinae BRADY, 1881, p. 484 (subfamily).
Cycloclypeinae BRADY, 1884, p. 76 (subfamily).
Nummulitina LANKESTER, 1885, p. 848.
Cycloclypeina LANKESTER, 1885, p. 848.
Nummulinetta HAECKEL, 1894, p. 164.
Nummulitinae DELAGE and HÉROUARD, 1896, p. 152.
Cycloclypeinae DELAGE and HÉROUARD, 1896, p. 152.
Cycloclypeina CALKINS, 1901, p. 109 (subfamily).
Heteroclypeinae SCHUBERT, 1906, p. 640 (subfamily).
Camerininae CUSHMAN, 1928, p. 209 (subfamily).
Cycloclypeidae GALLOWAY, 1933, p. 441.
Heterostegininae GALLOWAY, 1933, p. 421 (subfamily).
Nummulariidae WEDEKIND, 1937, p. 111.
Nummulitida COPELAND, 1956, p. 188.
Assilininae PURI, 1957, p. 97 (subfamily).
Nummulitoidae TRIFONOV and BURAGO, 1960, p. 65 (err. cit.).

Test planispiral, involute or evolute; numerous median chambers, simple or subdivided into chamberlets; with or without lateral chambers; complex canal system of septal, marginal and vertical canals; aperture an arched slit at the base of the apertural face. U. Cretaceous to Holocene.

Family **PSEUDORBITOIDIDAE** M. G. Rutten, 1935

Pseudorbitoididae BRÖNNIMANN, 1958, p. 167, nom. transl. ex subfamily Pseudorbitoidinae.

Test lenticular, bilocular embryonal chambers followed by spire of nepionic chambers, then with equatorial layer of chambers covered on each side by zones of lateral chambers; canal system and stolons present. U. Cretaceous.

Subfamily **PSEUDORBITOIDINAE** M. G. Rutten, 1935

Pseudorbitoidinae M. G. RUTTEN, 1935, p. 544.
Pseudoorbitoidinae COLE in LOEBLICH and TAPPAN, 1964a, p. C725 (err. cit.).

Post-embryonal equatorial layer of chambers subdivided vertically by variously arranged radial plates or rods. U. Cretaceous.

Subfamily **VAUGHANININAE** MacGillavry, 1963

Vaughanininae MACGILLAVRY, 1963, p. 175, 177.

Sulcoperculinoid juvenarium, later with development of lateral chambers, equatorial layer as in pseudorbitoids with roof and floor, equatorial chambers and chamber walls traversed by radial plates, later ones elongated concentrically; chamber walls traversed by radial stolons. U. Cretaceous.

Subfamily **PSEUDORBITELLINAE** Hanzawa, 1962

Pseudorbitellinae HANZAWA, 1962, p. 148.
Orbitocyclininae VAN GORSEL, 1978, p. 104 (nom. nud.).

Radial plates lacking. U. Cretaceous.

Remarks: According to van Gorsel (1978, p. 59–60), *Pseudorbitella* Hanzawa, 1962 is a junior synonym of *Orbitocyclina* Vaughan, 1929, hence he suggested the subfamily Orbitocyclininae for this taxon. However, even if the type genus is a subjective synonym, the oldest family group name, in this case the Pseudorbitellinae, must be conserved (ICZN Art. 40). No definition was given for the Orbitocyclininae.

Family **DISCOCYCLINIDAE** Galloway, 1928

Discocyclinidae VAUGHAN and COLE in CUSHMAN, 1940, p. 327, nom. transl. ex subfamily Discocyclininae.
Discocyclininae GALLOWAY, 1928, p. 55 (subfamily).
Orthophragminidae WEDEKIND, 1937, p. 123, 124.
Orthophragmininae WEDEKIND, 1937, p. 125 (subfamily).
Orthophragminae KAPTARENKO-CHERNOUSOVA, GOLYAK, ZERNETSKIY, KRAEVA and LIPNIK, 1963, p. 162 (subfamily; err. cit.).
Actinocyclininae BASHKIROV and ANTONISHIN, 1974, p. 17, 20 (subfamily; nom. imperf.).

Megalospheric generation with subspherical initial chamber embraced by larger second chamber, microspheric generation with initial coil of small chambers; later with planispiral equatorial layer of chambers that enlarge to become annular, are secondarily subdivided into chamberlets and connected with adjacent chambers and chamberlets by annular and radial stolons; lateral chambers on each side of equatorial layer; intraseptal and intramural canal system present. L. to M. Eocene.

Family **ORBITOCLYPEIDAE** Brönnimann, 1946

Orbitoclypeidae POKORNÝ, 1958, p. 393, nom. transl. ex subfamily Orbitoclypeinae.
Orbitoclypeinae BRÖNNIMANN, 1946, p. 612 (subfamily).
Asterocyclinidae BRÖNNIMANN, 1951, p. 208.

As in the Discocyclinidae, with equatorial layer of chambers, but with several layers of small lateral chambers, annular chambers not secondarily subdivided into chamberlets. Paleocene to U. Eocene.

Suborder **CARTERININA** Loeblich and Tappan, 1981

Carterinina LOEBLICH and TAPPAN, 1981, p. 163.
Carterinacea LOEBLICH and TAPPAN, 1961, p. 317 (superfamily).
Carterinoida MIKHALEVICH, 1980a, p. 59 (superorder).

Trochospiral test of secreted spicules, each of which is a single elongated crystal of calcite, held in a poorly cemented organic matrix and groundmass of smaller spicules that readily disintegrates, hence genus has meager fossil record. Eocene, Holocene.

Family **CARTERINIDAE** Loeblich and Tappan, 1955

Carterinidae LOEBLICH and TAPPAN, 1955, p. 27.
Carterininae BRÖNNIMANN ET AL., 1983, p. 205 (subfamily).

As for the suborder. Eocene, Holocene.

UNRECOGNIZABLE FAMILY GROUP TAXA

Astrorhizinellidae SAIDOVA, 1981, p. 12.
Astrorhizinellidea SAIDOVA, 1981, p. 12.
Astrorhizinellinae SAIDOVA, 1981, p. 12.
Plectotrochamminidae LOEBLICH and TAPPAN, 1982c, p. 28, nom. transl. ex subfamily.
Plectotrochammininae SAIDOVA, 1981, p. 23.
Pseudolituotubidae CONIL and LONGERSTAEY in CONIL, LONGERSTAEY and RAMSBOTTOM, 1980, '1979,' p. 24.
Silicotextulinidae SIGAL in PIVETEAU, 1952, p. 163.
Vulvulinoidinae Saidova, 1981, p. 20.

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