Order Spumellaria

Family Collosphaeridae

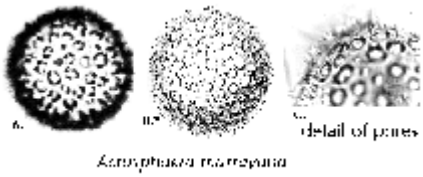


Figure 15.19.

Acrosphaera murrayana (Haeckel) (Figure 15.19) [=*Polysolenia murrayana*]. Large pores, each surrounded by a crown of short spines. Shell diameter: 70-180 µm. Ref: Strelkov and Reshetnjak (1971), Nigrini and Moore (1979).

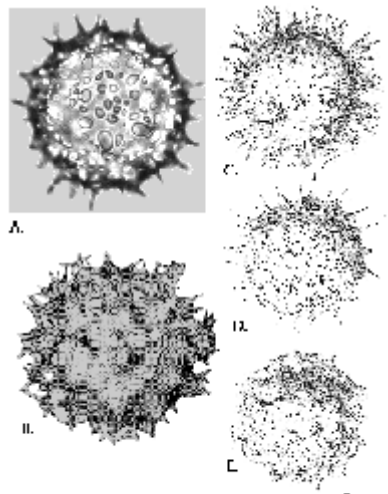
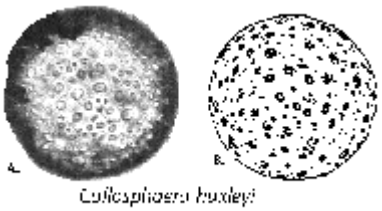


Figure 15.18.

Acrosphaera spinosa (Haeckel) group? (Figure 1D, 15.18) [=*Polysolenia spinosa*, ?*P. lappacea*, ?*P. flammabunda*]. Irregular pores and many irregularly arranged spines scattered about the surface, some of the latter extending from the pore-rims. Spine and pore patterns are variable. Shell diameter: 60-160 µm. *Ref:* Strelkov and Reshetnjak (1971), Boltovskoy and Riedel (1980).

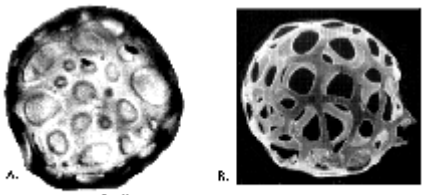

Figure 15.17*.

Buccinosphaera invaginata Haeckel (Figure 15.17) [=*Collosphaera imvaginata*]. The smooth shell produces several pored tubes directed toward the center of the sphere. Rather small, irregular pores. Shell diameter: 100-130 µm. Ref: Strelkov and Reshetnjak (1971), Nigrini (1971).



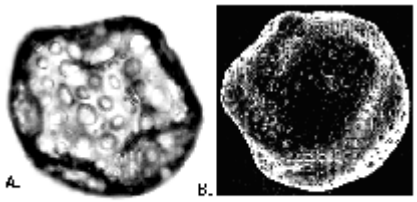
Collosphaera huxleyi
Figure 15.13.

Collosphaera huxleyi Müller (Figure 1E, 15.13). Shells with small to medium-sized pores scattered about the surface only; no spines or tubes. Shell diameter: 80-150 µm. Ref: Strelkov and Reshetnjak (1971), Boltovskoy and Riedel (1980).



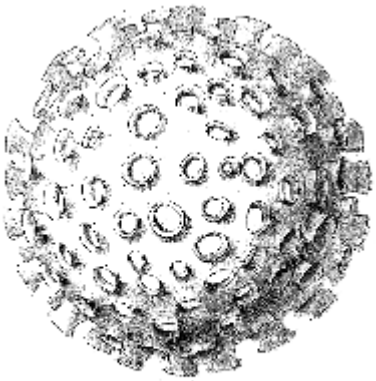
Collosphaera macropora
Figure 15.15.

Collosphaera macropora Popofsky (Figure 15.15). No spines or tubes on shell surface; few very large pores, sometimes angular. Shell diameter: 100-120 µm. Ref: Strelkov and Reshetnjak (1971), Boltovskoy and Riedel (1980).



Collosphaera tuberosa
Figure 15.14.

Collosphaera tuberosa Haeckel (Figure 15.14). No spines or tubes on shell surface, but with conspicuous lumps and depressions; many small, irregularly shaped pores. Shell diameter: 50-300 µm. Ref: Strelkov and Reshetnjak (1971), Boltovskoy and Riedel (1980).



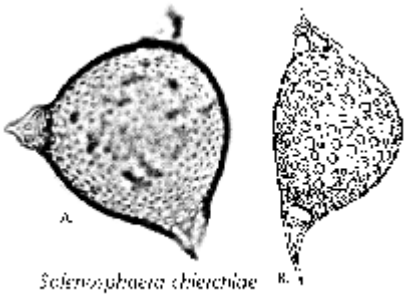
Siphonosphaera martensi
Figure 15.20.

Siphonosphaera martensi Brandt (Figure 15.20). Each pore bears a short centrifugal tube, tube walls are imperforate. Shell diameter: 90-100 µm. Ref: Strelkov and Reshetnjak (1971).

Siphonosphaera polysiphonia

Figure 15.23.

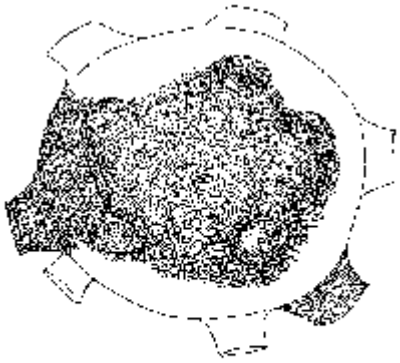
Siphonosphaera polysiphonia Haeckel (Figure 15.23) [=*Siphonosphaera socialis*, ?*Siphonosphaera tenera*]. Tubes of variable length are present on some of the pores, tube walls are imperforate. According to Strelkov and Reshetnjak (1971) *S. socialis* Haeckel has usually smaller shells (50-80 µm). Shell diameter: 80-120 µm. Ref: Nigrini and Moore (1979), Boltovskoy and Riedel (1980).



Solenosphaera chierchiae

Figure 15.22.

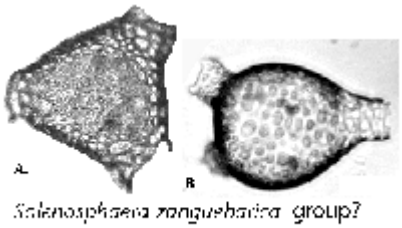
Solenosphaera chierchiae Brandt (Figure 1C, 15.22) [=*Otosphaera polymorpha*]. The shell bears three-four (up to six) short tubes with perforated walls whose distal end is tapered, ending in a slanted pore provided with one-two conspicuous spines. Shell diameter: 65-100 µm. Ref: Strelkov and Reshetnjak (1971), Nigrini and Moore (1979).



Solenosphaera polysolenia

Figure 15.21".

Solenosphaera polysolenia Strelkov and Reshetnjak (Figure 15.21). With many (rather than three-five, as in *Solenosphaera zanguebarica*) short tubes with perforated walls, and smaller, more angular pores. Shell diameter: 90-280 µm. Ref: Strelkov and Reshetnjak (1971).



Solenosphaera zanguebarica group?

Figure 15.24.

Solenosphaera zanguebarica (Ehrenberg) group? (Figure 15.24) [=*Solenosphaera polymorpha*, *Otosphaera polymorpha*, *Disolenia zanguebarica*, ?*Disolenia quadrata*]. General outline of shell often subtrianguar, the vertices extending into three-four short tube-like protrusions with perforated walls and open ends. The rim of these tubes may bear spines. Pores irregular in shape and size, but generally roundish or subangular. A morphotype very similar to *S. zanguebarica* (and most probably conspecific with it), usually cited as *Disolenia quadrata* (Ehrenberg) (Figure 15.24a), differs by having

somewhat larger tubes which are better differentiated from the main body of the shell. Shell diameter: 100-150 µm. Ref: Strelkov and Reshetnjak (1971).

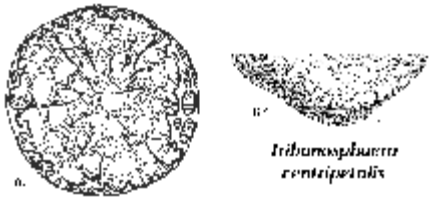
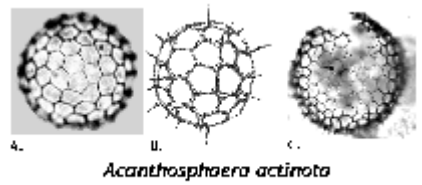


Figure 15.16.

Tribonosphaera centripetalis Haeckel (Figure 15.16). Outer shell surface smooth, but with many slender spines directed toward the center of the sphere; pores irregular in size and shape. Shell diameter: 100-120 µm. Ref: Strelkov and Reshetnjak (1971), Boltovskoy and Riedel (1980).

Order Spumellaria

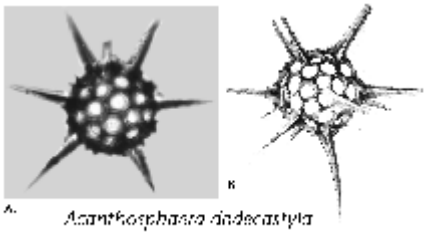
Family Actinommidae



Acanthosphaera actinota

Figure 15.25.

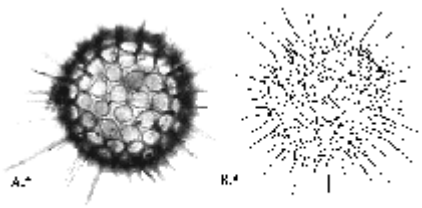
Acanthosphaera actinota (Haeckel) (Figure 15.25) [=*Acanthosphaera tenuissima*]. Single shell with large, regular polygonal meshes separated by very thin bars. Nodal points bear short, bristle-shaped spines; no primary (conspicuously larger) radial spines (broken-off on specimen photographed). Shell diameter: 60-90 µm. Ref: Boltovskoy and Riedel (1980).



Acanthosphaera dodecastyla

Figure 15.26.

Acanthosphaera dodecastyla Mast (Figure 15.26). Single shell with large circular pores with very conspicuous polygonal frames, many (10-20) robust, three-bladed spines. Shell diameter without spines: 50-80 µm. Ref: Popofsky (1913), Boltovskoy and Riedel (1980).



Acanthosphaera pinchuda

Figure 15.28.

Acanthosphaera pinchuda Boltovskoy and Riedel (Figure 15.28). Single shell with regular, subcircular pores surrounded by conspicuous protruding frames which extend into thin, thread-like spines at the nodal points. No primary (conspicuously larger) radial spines. Shell diameter without spines: 90-120 µm. Ref: Boltovskoy and Riedel (1980).

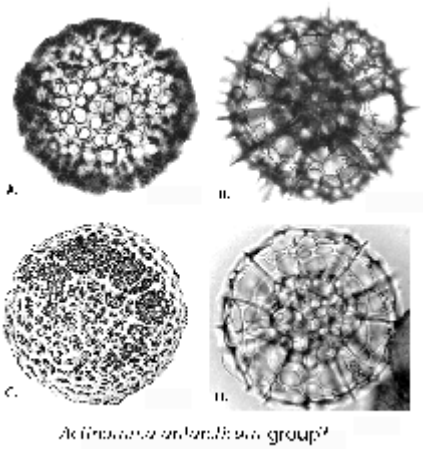


Figure 15.48.

Actinomma antarcticum (Haeckel) group? (Figure 15.48) [=*Diploplegma banzare*, *Diploplegma aquatica*]. Three concentric shells. Cortical shell composed of a very irregular, sometimes sponge-like network of thick anastomosing bars. Second shell large, irregularly shaped, spongy. First shell small, circular, rarely visible. Nigrini (1967) described *Actinomma medianum*, which difffers from *A. antarcticum* in that it has a simply latticed cortical shell and a more delicate medullary meshwork. Cortical shell diameter: 200-400 µm. Ref: Riedel (1958), Nigrini (1967).

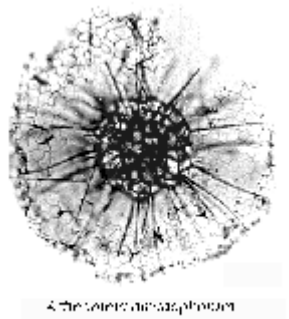


Figure 15.49.

Actinomma arcadophorum Haeckel (Figure 15.49). Medullary shells similar to *Actinomma antarcticum*; cortical shell is composed of an irregular, sponge-like or lace-like network of very thin, delicate anastomosing bars. Cortical shell diameter: 200-250 µm. Ref: Haeckel (1887), Nigrini and Moore (1979).

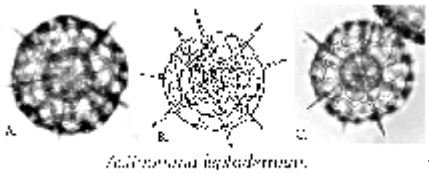


Figure 15.37.

Actinomma leptodermum (Jorgensen) (Figure 15.37) [=*Echinomma leptodermum*]. Three concentric shells, pores on outermost shell relatively large, subcircular, irregularly arranged; surface covered by numerous short three-bladed spines; no primary (conspicuously larger) radial spines. Outermost shell diameter without spines: 60-120 µm. Ref: Nigrini and Moore (1979).

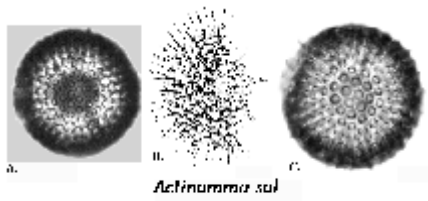


Figure 15.44.

Actinomma sol Cleve (Figure 15.44) [=*Thecosphaera radians*]. Three concentric shells. Outermost with regular, circular pores with well developed polygonal frames, usually bearing short bristle-shaped spines on the nodes (broken off in the specimen photographed); no primary (conspicuously larger) radial spines (see remark for *Thecosphaera inermis*). Outermost shell diameter: 70-100 µm. Ref: Hollande and Enjumet (1960), Boltovskoy and Riedel (1980).

Figure 15.45.

Arachnosphaera myriacantha Haeckel (Figure 15.45). Fully grown specimens with many (up to over seven; four in the specimen illustrated) concentric spheres, the innermost with regular hexagonal meshes and cylindrical spines arising from the nodes. At regular distances these spines produce branches which anastomose laterally forming subsequent spheres with a delicate, irregular, cobweb-like network. Branching spines protrude from the surface of the last shell. Diameter of innermost shell: ca. 100 µm. Ref: Haeckel (1862).

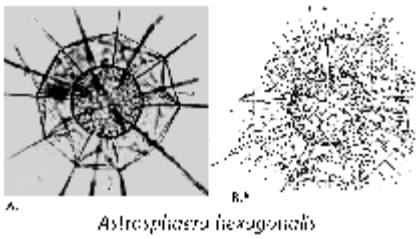


Figure 15.40.

Astrosphaera hexagonalis Haeckel (Figure 15.40). Two shells and many (>6) primary radial spines. Inner shell with regular polygonal meshes and thin bars. Outer shell with very large, triangular meshes formed by anastomosing of lateral branches produced by the long, three-bladed primary spines arising from the first shell. Spines extend beyond the very open outer shell. Diameter of inner shell: 150 µm. Ref: Haeckel (1887).

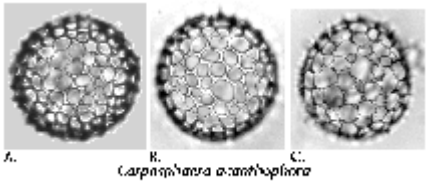


Figure 15.39.

Carposphaera acanthophora (Popofsky) (Figure 15.39). One latticed cortical shell and one medullary shell represented by an irregular formation of anastomosing centripetal bars arising from the cortical shell (may be missing in poorly preserved materials; not focused in specimen illustrated). Pores on outer shell irregular in shape and size, generally subcircular. Surface rough or thorny. Diameter of cortical shell: 150-270 µm. Ref: Benson (1966).

Figure 15.29.

Cenosphaera spp. group (Figure 15.29) [=*Cenosphaera elysia*, *C. compacta*, *C. hirsuta*]. Single sphere, often thick-walled. Pores more or less regular, circular, or irregular, of variable shape and size, with or without polygonal frames, with or without thin, bristle-shaped by-spines or thorns. No primary (conspicuously larger) radial spines. Highly variable group with many different morphotypes present chiefly in middle and high latitudes (e.g., *C. cristata* Haeckel in Antarctic waters, cf. Petrushevskaya 1967; *C. compacta* Haeckel and *C. elysia* Haeckel in subantarctic-transitional areas, cf. Boltovskoy and Riedel 1980). Shell diameter: 50-320 µm. Ref: Petrushevskaya (1967), Boltovskoy and Riedel (1980).

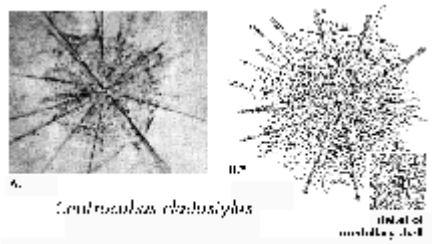
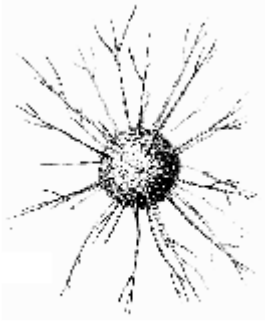


Figure 15.58.

Centrocubus cladostylus Haeckel (Figure 15.58). Medullary shell single, composed of bars that define a small cube (Figure 2C); cortical shell a spongy meshwork arising immediately from the medullary shell, supported by many large, three-bladed spines that protrude outside of the spongy mass. Cortical shell diameter without spines: 150-200 µm. Ref: Haeckel (1887).



Cladococcus cervicornis

Figure 15.41.

Cladococcus cervicornis Haeckel (Figure 15.41). Single shell with very irregular sub-polygonal pores; at many nodal points slightly curved, cylindrical spines project radially dichotomizing repeatedly starting about 2/3 of the way from the cortical shell. Shell diameter without spines: ca. 70 µm. Ref: Boltovskoy and Riedel (1980).

Figure 15.42.

Cladococcus megaceros Hollande and Enjumet (Figure 15.42). Similar to *Cladococcus cervicornis*, differs in that spines can be three-bladed, thickening toward their distal end; branches are short and dull, resembling the horns or a reindeer. Pores are more irregular in size and shape. Shell diameter without spines: ca. 60 µm. Ref: Hollande and Enjumet (1960), Boltovskoy and Riedel (1980).

Cromyechinus antarctica

Figure 30.

Cromyechinus antarctica (Dreyer) (Figure 5A, 5A', 14, 15.30). Fully grown specimens with four concentric, latticed shells. Outermost thin-walled, with very small pores. Third shell thicker, with large, irregularly shaped pores. Surface covered with many short, stout, three-bladed spines, at one of the poles spines may be denser and larger, forming a pylome. Major diameter of outermost shell: 100-160 µm. Ref: Petrushevskaya (1967).

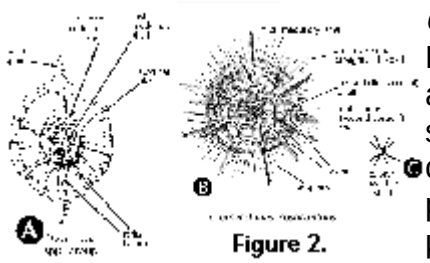


Figure 2.

Cromyechinus icosacanthus Haeckel (Figure 2B). Fully grown specimens with four latticed concentric shells and many (>6) stout, three-bladed spines. Outermost shell thin-walled, delicate, with very small, regular, circular pores. Third shell with large, irregular, polygonal pores. Outermost shell diameter without spines: ca. 160 µm. Ref: Haeckel (1887).

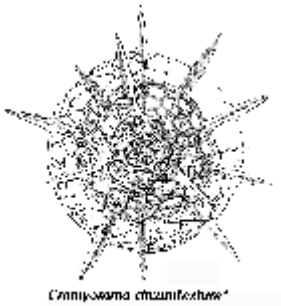
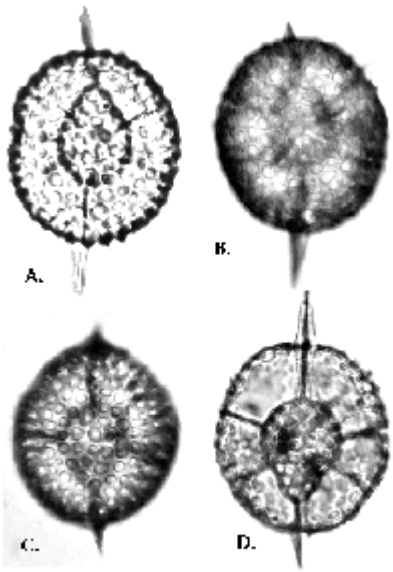


Figure 15.47.*

Cromyomma circumtextum Haeckel (Figure 15.47). Fully grown specimens with four latticed concentric shells and many three-bladed spines of irregular size and distribution. Outermost shell very delicate, thin-walled, with thread-like bars and large, irregular, polygonal meshes; third shell with large, irregular pores and thick bars. Due to its delicacy, the fourth shell is very likely to be absent in sedimentary materials, in which case this species may be identified as *Hexalonche aristarchi* (see below). Outermost shell diameter without spines: ca. 220 µm. Ref: Haeckel (1887).



Druppatractus irregularis

Figure 15.27.

Druppatractus irregularis Popofsky (Figure 15.27). Two latticed shells, outermost thin-walled, smooth, with small regular, circular pores; medullary shell pear-shaped. Two main polar spines of equal or different size (additional, usually smaller spines may be present as well). Cortical shell diameter without spines: ca. 80 µm. Ref: Benson (1966).

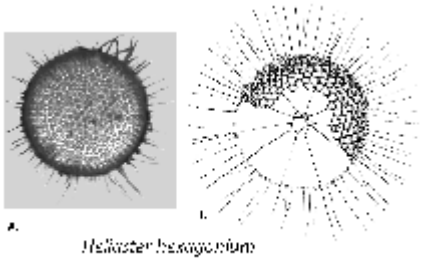


Figure 15.46.

Heliaster hexagonium Hollande and Enjumet (Figure 15.46). Two latticed shells, medullary as in *Carposphaera acanthophora* (may be missing in poorly preserved materials). Pores on cortical shell very regular, polygonal, with thin bars; bristle-shaped spines on nodes. Outer shell diameter without spines: ca. 230 µm. Ref: Hollande and Enjumet (1960).

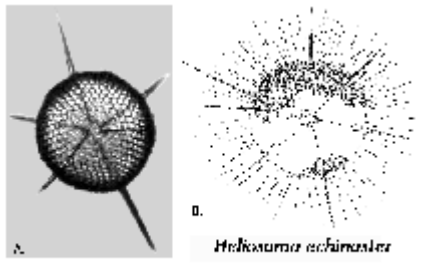


Figure 15.43.

Heliosoma echinaster Haeckel (Figure 15.43) [=*Tetrapetalon elegans*]. Two concentric shells. Medullary shell composed of a loose network of thin anastomosing bars. Outer shell similar to that of *Heliaster hexagonium*, except for the presence of many (>6) long, three-bladed primary spines. Outer shell diameter without spines: ca. 160 µm. Ref: Hollande and Enjumet (1960).

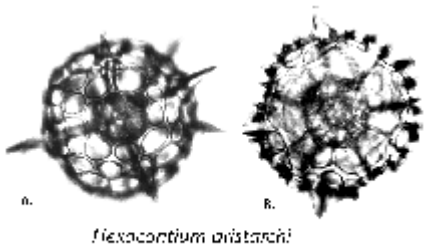


Figure 15.33.

Hexacontium aristarchi (Haeckel) (Figure 15.33) [=*Hexalonche aristarchi*]. Similar to *Hexacontium armatum/hostile*, except that pores on outermost shell are larger and more irregular in size and distribution. May have one medullary shell (?). It is probable that *H. aristarchi* is a developmental form of *Cromyomma circumtextum*, from which it differs by lacking the outermost, very slender and delicate fourth shell. Outermost shell diameter without spines: ca. 130 µm. Ref: Boltovskoy and Riedel (1980).

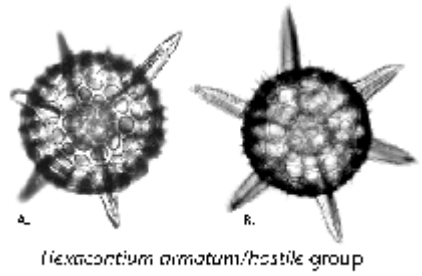


Figure 15.32.

Hexacontium armatum/hostile Cleve group (Figure 15.32). [=*Hexacontium armatum, Hexacontium hostile*, ?*Hexacontium entacanthum*]. Three concentric latticed shells; surface of outermost usually thorny or spiny, pores medium-sized, regular or irregular in size and distribution, with or without polygonal frames. Usually 6 main spines opposite in pairs in three dimensive axes perpendicular to one another. Outermost shell diameter without spines: 70-100 µm. Poorly defined morphotype, probably includes several related species. Ref: Boltovskoy and Riedel (1980).

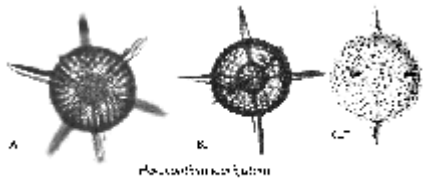


Figure 15.31.

Hexacontium laevigatum Haeckel (Figure 15.31). Similar to *Hexacontium armatum/hostile,* except that the surface of the outermost shell is smooth, and pores are smaller, circular, unframed of regular size and distribution. Outermost shell diameter without spines: 70-120 µm. Ref: Benson (1966), Nigrini and Moore (1979).

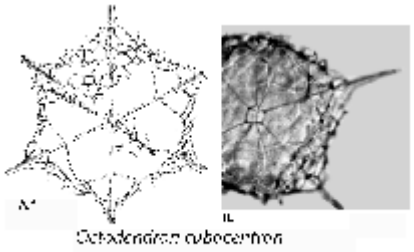


Figure 15.56.

Octodendron cubocentron Haeckel (Figure 15.56). Similar to *Centrocubus cladostylus*, except that spongy meshwork starts at some distance from the cubical medullary shell. Outer shell diameter without spines: ca. 200 µm. Ref: Haeckel (1887).

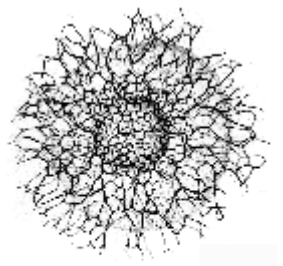


Figure 15.54.

Plegmosphaera entodictyon Haeckel (Figure 15.54). Shell is a spongy mass with a central cavity; the spongy meshwork is denser in the vicinity of the central cavity than at the periphery of the shell. Shell diameter: ca. 200 µm. Ref: Hollande and Enjumet (1960).

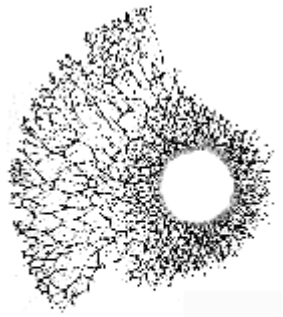


Figure 15.55.*

Plegmosphaera exodictyon Haeckel (Figure 15.55). Similar to *Plegmosphaera entodictyon*, except that the spongy meshwork is denser both in the vicinity of the central cavity and at the periphery of the shell, and looser midway. Shell diameter: ca. 400 µm. Ref: Haeckel (1887).

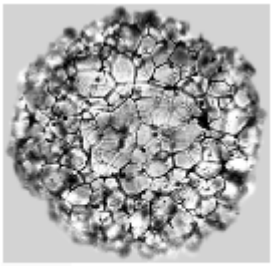


Figure 15.53.

Plegmosphaera pachyplegma Haeckel (Figure 15.53). Similar to *Plegmosphaera entodictyon*, except that the spongy meshwork is denser at the periphery of the shell than in the vicinity of the central cavity. Shell diameter: ca. 200 µm. Ref: Hollande and Enjumet (1960).

Figure 15.36.

Saturnalis circularis Haeckel (Figure 15.36). Two concentric latticed shells, the cortical with circular to subcircular pores and rough surface. Two primary radial polar spines (which extend as internal beams joining the two shells) joined distally by a circular ring. Cortical shell diameter without spines: 70-80 µm. Ref: Nigrini (1967).

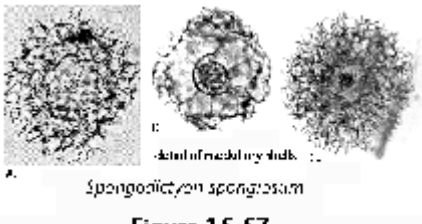


Figure 15.57.

Spongodictyon spongiosum (Müller) (Figure 15.57) [=*Dictyosoma spongiosum*]. Generally similar to *Spongoplegma rugosa*, except that center hosts a double medullary shell; second medullary shell usually incompletely developed. Outermost shell diameter: 200 µm. Ref: Müller (1858).

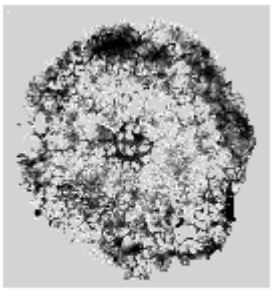


Figure 15.51.

Spongoplegma antarcticum Haeckel (Figure 15.51). Spongy mass with a single irregular, sponge-like medullary shell in the center. Outer shell diameter: ca. 150 µm. Ref: Boltovskoy and Riedel (1980).

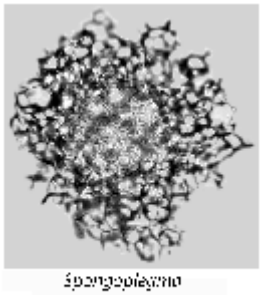


Figure 15.52.

Spongoplegma rugosa Hollande and Enjumet (Figure 15.52). Spongy mass with a single latticed medullary shell in the center (not focused in the illustration); spongy meshwork is looser toward the periphery of the shell. Outer shell diameter: ca. 300 µm. Ref: Hollande and Enjumet (1960).

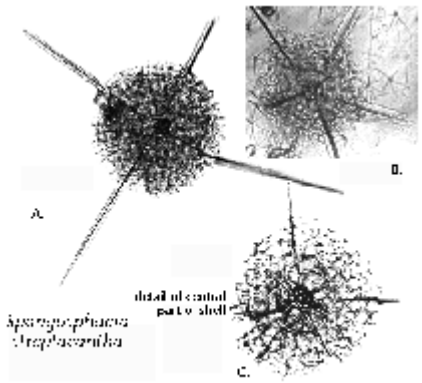


Figure 15.59.

Spongosphaera streptacantha Haeckel (Figure 15.59) [= ?*Rhizoplegma boreale*]. Two concentric, spherical, latticed medullary shells and one spongy cortical shell. With large, three-bladed spines with serrated edges originating in the second medullary shell and protruding conspicuously outside of the spongy outermost shell. Outer shell diameter without spines: ca. 300 µm. Ref: Hollande and Enjumet (1960).

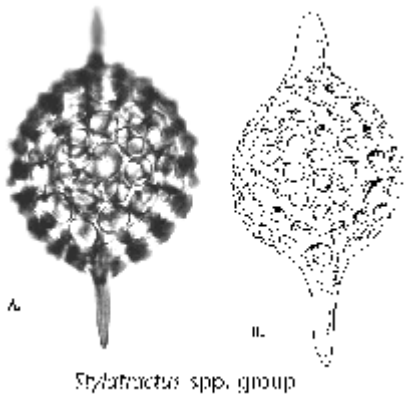
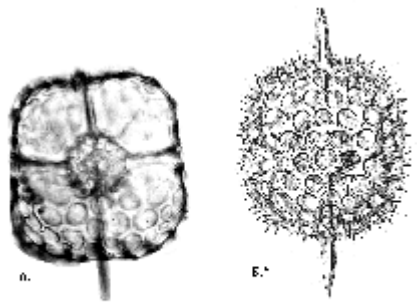


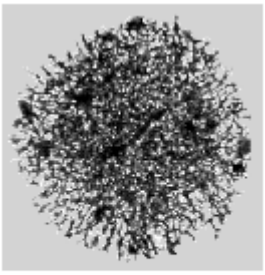
Figure 15.35.

Stylatractus spp. group (Figure 2A; 15.35). [= ?*Stylatractus*, ?*Axoprunum*, ?*Stylosphaera*, ?*Xiphosphaera*, ?*Lithatractus*, ?*Xiphatractus*]. Usually two latticed shells, outermost spherical to oval-shaped, often thick-walled with irregular pores; medullary shell spherical. Two polar spines of equal or different size, with or without secondary spines. Two-spined and usually two-shelled actinommids comprise a large, sometimes abundant, highly variable and very poorly studied group. Outer shell diameter without spines: 100-150 µm. Ref: Nigrini and Moore (1979).



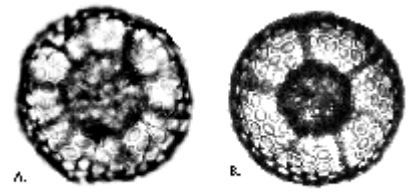
Stylosphaera melpomene
Figure 15.34.

Stylosphaera melpomene Haeckel (Figure 15.34) [=*Stylacontarium bispiculum*]. Two or three (?) latticed shells, outermost with characteristically sub-quadrangular outline, moderately thick-walled, thorny, with irregularly shaped pores; medullary shell spherical. Six stout beams join the two shells; usually two of these beams protrude outside as short, three-bladed polar spines, but the other two pairs may also extend slightly beyond the cortical shell-wall. Polar spines of equal or different size. Outermost shell diameter without spines: 80-130 µm. Ref: Benson (1966).



Styptosphaera spumacea
Figure 15.50.

Styptosphaera spumacea Haeckel (Figure 15.50). Shell is an irregular spongy mass without central cavity. Shell diameter: ca. 450 µm. Ref: Boltovskoy and Jankilevich (1985).



Thecosphaera inermis
Figure 15.38.

Thecosphaera inermis (Haeckel) (Figure 15.38). Three concentric latticed shells; pores on outermost relatively small, circular, regularly arranged, without frames (in some specimens frames around the pores can develop, in which case this species merges with *Actinomma sol*). Cortical shell usually smooth, barren of spines. Cortical shell diameter: ca. 80 µm. Ref: Boltovskoy and Riedel (1980).

Order Spumellaria

Family Coccodiscidae

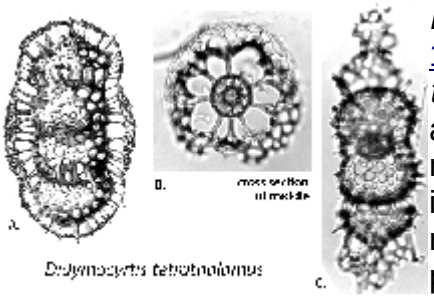


Figure 15.77.

Didymocyrtis tetrathalamus (Haeckel) (Figure 2J, 15.77) [=*Ommatartus tetrathalamus*, *Panartus tetrathalamus*]. Cortical shell cylindrical to ellipsoidal with a very conspicuous equatorial constriction. Two medullary shells (outermost slightly compressed, innermost spherical) joined to the cortical by several radial beams confined to the equatorial plane. May have polar caps (Figure 2J) or spines, and supplemental peripheric growth (mantle; Figure 15.77). Height of cortical shell: 100-150 µm; height of polar cap: 40-65 µm. Ref: Nigrini and Moore (1979).

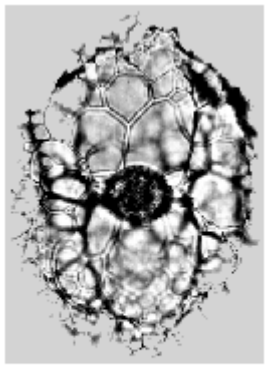
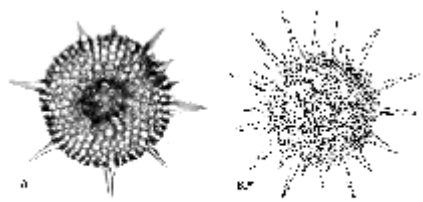


Figure 15.76.

Spongoliva ellipsoides Popofsky (Figure 15.76). Generally similar to *D. tetrathalamus*, except that cortical shell is a much looser and irregular meshwork. Fully grown specimens usually have a well developed mantle. Height of cortical shell: 100-250 µm. Ref: Benson (1966).

Order Spumellaria

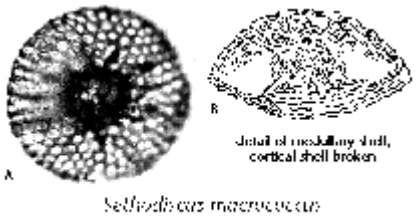
Family Phacodiscidae



Heliodiscus asteriscus

Figure 15.78.

Heliodiscus asteriscus Haeckel (Figure 15.78). Outer shell lenticular, with regularly arranged circular pores and ca. 8-15 radial spines on the equatorial plane; inner shell spherical. Diameter of cortical shell without spines: 120-200 µm. Ref: Nigrini and Moore (1979).



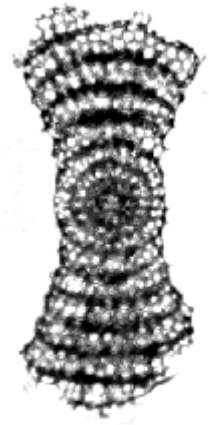
Sethodiscus macrococcus

Figure 15.79.

Sethodiscus macrococcus Haeckel (Figure 15.79). Very similar to *H. asteriscus*, but without radial spines. Diameter of cortical shell: ca. 150 µm. Ref: Haeckel (1887), Boltovskoy and Riedel (1980).

Order Spumellaria

Family Spongodiscidae



Amphirhopalum ypsilon

Figure 15.75.

Amphirhopalum ypsilon Haeckel (Figure 2R, 15.71, 15.75). Shell with two opposite chambered arms, one of them may be bifurcated distally, in which case the shell outline becomes trigonal. Total length: 200-300 µm. Ref: Nigrini and Moore (1979).

Figure 15.71.

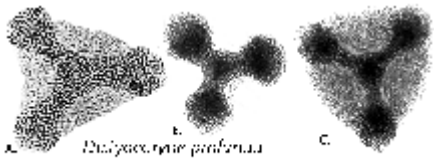
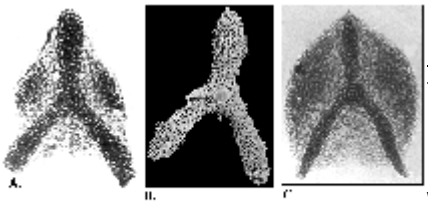


Figure 15.68.

Dictyocoryne profunda Ehrenberg (Figure 2Q, 15.68) [=*Hymeniastrum euclidis*]. Three spongy, unchambered arms radiating at equal or almost equal angles from a central disc. Length of arms (from center of shell): 130-150 µm. Ref: Nigrini and Moore (1979).

Figure 15.69.

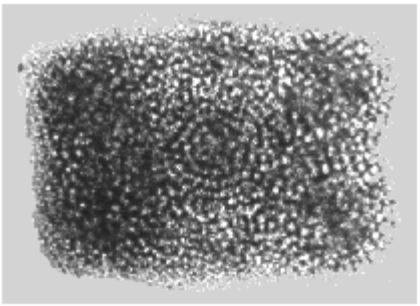
Dictyocoryne truncatum (Ehrenberg) (Figure 15.69). Very similar to *D. profunda* (and probably synonymous with it: intergrading specimens are very common); differs in having much broader arms and usually a well developed patagium (Figure 2Q, 2R). Length of arms (from center of shell): ca. 130 µm. Ref: Nigrini and Moore (1979).



Euchitonia elegans/furcata group?

Figure 15.70.

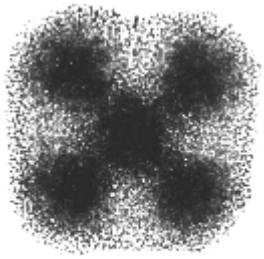
Euchitonia elegans/furcata (Ehrenberg) group? (Figure 15.70) [=?*Euchitonia furcata*, *Euchitonia elegans*]. Differs from *D. profunda* in that the three arms are more slender, longer, and their orientation defines two larger angles and one smaller one. *E. elegans* intergrades smoothly with *Euchitonia furcata*; end members differ in that distal tips of arms taper in *E. elegans* (Figure 15.70c), while in *E. furcata* their terminations are club-shaped and more blunt (Figure 15.70a, b). Length of arms (from center of shell): 150-300 µm. Ref: Nigrini and Moore (1979).



Spongaster tetras irregularis

Figure 15.66.

Spongaster tetras Ehrenberg ***irregularis*** Nigrini (Figure 15.66). Generally similar to *S. tetras tetras*, except that shell is less regular, angles between "arms" are uneven, and outline is an elongated rectange (rather than a square). Length of longer side: 140-260 µm. Ref: Nigrini and Moore (1979).



Spongaster tetras tetras

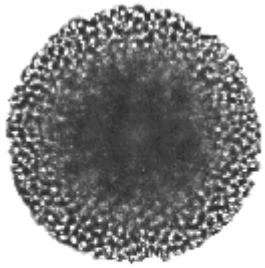
Figure 15.67.

Spongaster tetras tetras Ehrenberg (Figure 15.67). Shell outline rectangular with rounded corners; denser spongy meshwork defines four equidistant pear-shaped "arms" radiating from the center. Side of rectangle: 150-300 µm. Ref: Nigrini and Moore (1979).

Spongocore cylindrica

Figure 15.74.

Spongocore cylindrica Haeckel (Figure 15.74) [=*Spongocore puella*, *Spongocore diplocylindrica*]. Spongy cylinder with or without protruding spines and mantle, often with two slight constrictions. Total length: 200-360 µm. Ref: Benson (1966).



Spongodiscus resurgens

Figure 15.64.

Spongodiscus resurgens Ehrenberg (Figure 15.64). Spongy biconvex disc with no discernible structure, without spines on edges or surfaces of disc. Diameter of disc: 100-400 µm. Ref: Boltovskoy and Riedel (1980).

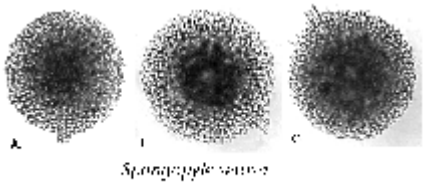
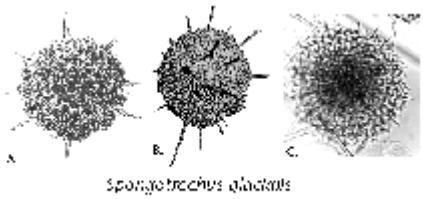


Figure 15.63.

Spongopyle setosa Dreyer (Figure 2N, 15.63) [=*Spongopyle osculosa*]. Similar to *S. resurgens*, except for the presence of a tubular, spiny or notched pylome on the margin. Diameter of disc: 100-300 µm. Ref: Riedel (1958).



Spongotrochus glacialis

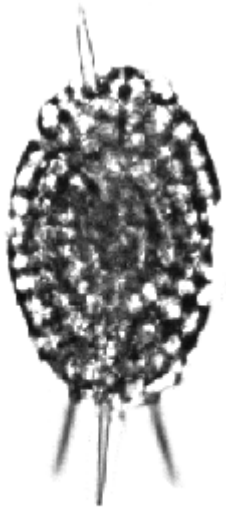
Figure 15.61.

Spongotrochus glacialis Popofsky (Figure 2I, 15.61). Similar to *S. resurgens*, except for the presence of spines on the surfaces and/or on the margins of the disc. Can have an inconspicuous pylome. Diameter of disc (without spines): 100-500 µm. Ref: Riedel (1958), Petrushevskaya (1967).

Spongurus pylomaticus

Figure 15.72.

Spongurus pylomaticus Riedel (Figure 15.72). Shell subcylindrical or elongate ellipsoidal, inner dense spongy meshwork surrounded by looser mantle, surface covered with bristle-like spines, with a pylome at one of the poles. Length: 70-250 µm. Ref: Riedel (1958), Petrushevskaya (1967).



Spongurus
spp. group?

Figure 15.73.

Spongurus spp. group? (Figure 15.73). Irregular, oval-elongate spongy mass, sometimes with concentric or spiral rings, with spines protruding at the poles. Length: ca. 100-150 µm. Ref: Petrushevskaya (1967).

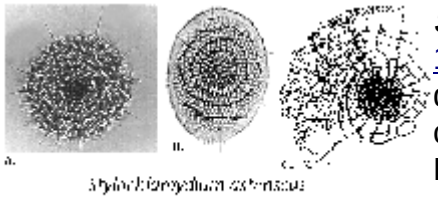


Figure 15.65.

Stylochlamydium asteriscus Haeckel (Figure 2P, 15.65) [=?*Stylochlamydium venustum*]. Biconvex spongy disc more or less clearly partitioned into chambers by circular or spiral, continuous or broken, and radial bands. Both surfaces covered by a thin porous sieve plate which can extend beyond the central spongy mass. With or without protruding spines. Very similar morphotypes with an oval outline and a pylome have been cited under the name *Stylochlamydium venustum* Bailey (Figure 15.65b).

Diameter of disc: 150-350 µm. Ref: Boltovskoy and Vrba (1988).

Figure 15.62.

Stylodictya aculeata Jorgensen (Figure 15.62). Flat disk not thickened in the center, with clearly defined circular concentric rings, the innermost rosette-shaped. Diameter of disc: ca. 150 µm. Ref: Petrushevskaya (1967), Boltovskoy and Vrba (1988).

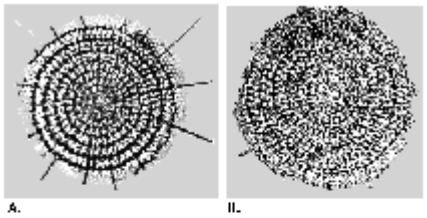


Figure 15.60.

Stylodictya multispina Haeckel (Figure 2O; 15.60) [=*Stylodictya validispina*, *Stylodictya tenuispina*]. Similar to *S. aculeata*, except that all rings are circular to subcircular (rather than rosette-shaped), center may be thickened (darker), and usually with marginal spines. Diameter of disc: 100-200 µm. Ref: Boltovskoy and Vrba (1988).

Order Spumellaria

Family Litheliidae

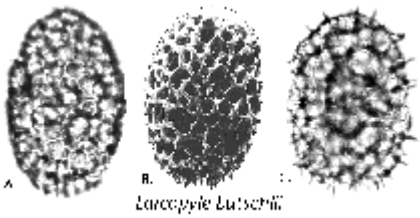


Figure 15.85.

Larcopyle butschlii Dreyer (Figure 5B, 5B', 15.85). Ellipsoidal outer shell with irregular pores, surface often thorny or spiny, inner structure spiral. One of the poles bears a pylome surrounded by larger spines. Major diameter: 80-170 µm. Ref: Nigrini and Moore (1979).

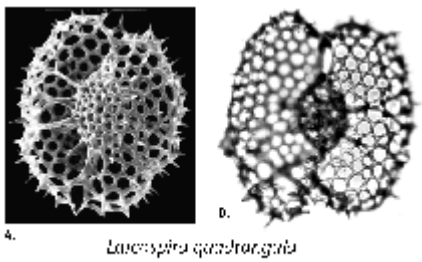


Figure 15.86.

Larcospira quadrangula Haeckel (Figure 15.86). Shell consists of two open spirals arising from a common origin. Breadth of shell: 120-250 µm. Ref: Nigrini and Moore (1979).

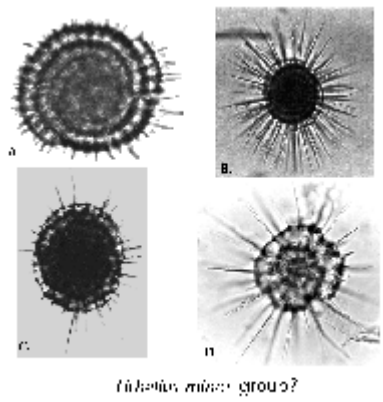


Figure 15.87.

Lithelius minor Jorgensen group? (Figure 15.87). Tightly wound spiral with thorny or spiny surface, outline circular or ovoid. Diameter: 80-150 µm. Ref: Nigrini and Moore (1979).

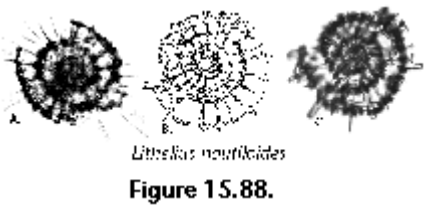


Figure 15.88.

Lithelius nautiloides Popofsky (Figure 5C, 5C', 15.88). Small, spherical medullary shell surrounded by an involute spiral of four-five whorls which increase in width outwards; surface spiny. Diameter: 100-230 µm. Ref: Petrushevskaya (1967).

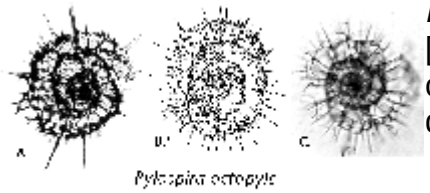


Figure 15.90.

Pylospira octopyle Haeckel (Figure 15.90) [=?*Phorticium pylonium*]. A series of spirally arranged chambers; outline ellipsoidal; surface spiny. Shell diameter: 80-130 µm. Ref: Nigrini and Moore (1979).

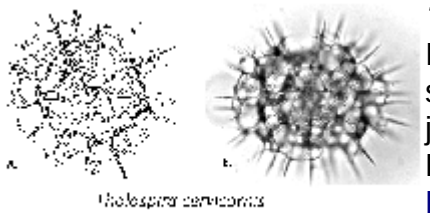


Figure 15.89.

Tholospira cervicornis Haeckel group (Figure 15.89). Irregular meshwork with pores of variable size; surface spiny. Probably an artificial category for lumping various juvenile, broken and poorly known Litheliidae and Pyloniidae. Ref: Petrushevskaya (1967), Takahashi and Honjo (1981).

Order Spumellaria

Family Ploniidae

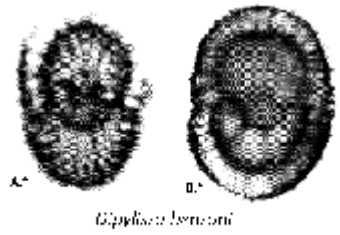


Figure 15.83.

Dipylissa bensoni Dumitrica (Figure 15.83). Shell fomed by three systems of globular caps, in optical section appearing as oval concentric subhemispheres interconnected by numerous thin radial beams. Major diameter: 90-120 µm. Ref: Dumitrica (1988).

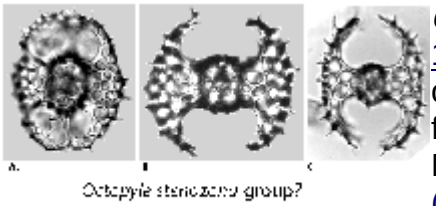


Figure 15.80.

Octopyle stenozona group? Haeckel (Figure 2L, 2M; 15.80) [=*Tetrapyle octacantha*]. Shells with two systems of latticed girdles (as described for the diagnosis of the family, see above) and large gates (Figure 2L, 2M). Major diameter: 100-250 µm. Ref: Nigrini and Moore (1979).

Figure 15.82.

Phorticium clevei (Jorgensen) (Figure 2L, 15.82) [=*Phorticium pylonium*]. Generally resembling *O. stenozona*, except that central part is a large structure formed by a series of spirally arranged chambers. Major axis of shell: 150-200 µm. Ref: Petrushevskaya (1967).

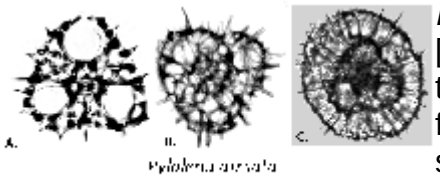
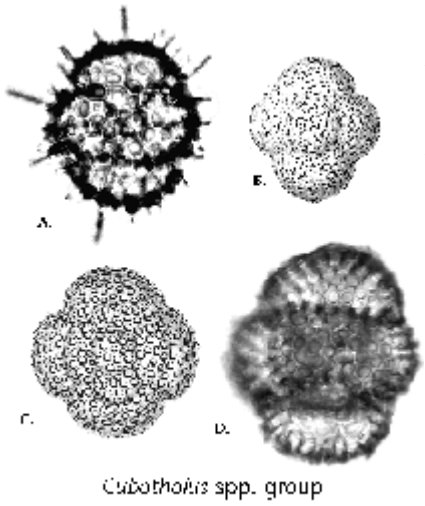


Figure 15.81.

Pylolena armata Haeckel group? (Figure 15.81) [=?*Hexapyle* spp.]. A central pyloniid shell surrounded by three centrifugally radiating girdles whose distal ends join forming a trigonal outline; this structure may be surrounded by supplementary growth in the form of a spherical latticed test. Diameter of fully developed shell: ca. 150 µm. Ref: Nigrini and Moore (1979).

Order Spumellaria

Family Tholoniidae



Cubotholus spp. group

Figure 15.84.

Cubotholus spp. (Figure 2K, 15.84) [=*Tholonium* spp., *Amphitholus* spp., *Cubotholus* cf. *orthoceras*]. Cortical shell composed of 6 hemispherical cupolas, opposite in pairs on the poles of three mutually perpendicular axes. Variously shaped "central chamber" with or without enclosed small medullary shell. Diameter: ca. 150 µm. Ref: Haeckel (1887).