

Foraminifera of the Gulf of Cambay

BY

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[Continued from Vol. 66 (3) : 596]

(With 37 figures in three plates)

Genus *Nodosaria* Lamarck 1812.

Nodosaria calomorpha Reuss (Fig. 32)

Nodosaria calomorpha Brady, 1884, vol. 9, p. 497, pl. 61, figs. 23-27; Brady, Parker & Jones, 1888, vol. 12, p. 223, pl. 44, figs. 1, 4; Cushman, 1913, 71 (3), p. 48, pl. 25, fig. 6.

Description: Test straight with usually three chambers; first chamber subglobular, later chambers slightly oval in outline. Wall smooth and translucent. Aperture entosolenian and situated at the centre of the tip of the ultimate chamber without a neck.

Length: 0.41 mm.

Locality: Station A.

Distribution: North Pacific, Hawaiian Islands, Ki Islands, Philippine Islands, Arabian Sea and Atlantic.

Nodosaria radiclea (Montagu) (Fig. 33)

Nodosaria radiclea Williamson, 1858, p. 15, pl. 2, figs. 36-38; Sethulekshmi Amma, 1958, p. 53, pl. 2, fig. 79.

Description: Test elongate with two to five chambers; initial chamber larger than the succeeding ones and with a blunt spine. Wall calcareous and marked with conspicuous longitudinal costae. The last formed chamber drawn into a neck with a round aperture at the end.

Length: 0.40 mm.

Locality: Station A.

Distribution: British Isles and Arabian Sea.

Nodosaria roemeri (Neugeboren) (Fig. 34)

Nodosaria roemeri Brady, 1884, vol. 9, p. 505, pl. 63, fig. 1; Cushman, 1913, 71(3), p. 55, pl. 24, figs. 4-6.

Description : Test elongate with a few chambers; later chambers slightly inflated. Sutures slightly oblique. Wall calcareous and smooth.

Length : 0.37 mm.

Locality : Station A.

Distribution : Hawaiian Islands, Midway Islands and near Guam, and Arabian Sea.

Nodosaria perversa Schwager (Fig. 35)

Nodosaria perversa Brady, 1884, pl. 64, figs. 25-27, p. 512; Cushman, 1933, 161(2), p. 13, pl. 3, figs. 13-15; Dakin, 1906, vol. 5, p. 235.

Description : Test elongate with the initial chamber provided with a slight blunt spine, ultimate segment drawn into a short and narrow neck, primordial chamber small and later formed chambers increasingly larger. Surface of the test marked with numerous longitudinal parallel costae. Aperture radiate.

Length : 0.38 mm.

Locality : Station A.

Distribution : Indo-Pacific Region, and Ceylon coast.

Nodosaria subperversa Cushman (Fig. 36)

Nodosaria subperversa Cushman, 1917, vol. 51, p. 655; Cushman, 1921, 100, vol. 4, p. 208, pl. 37, fig. 3.

Description : Test long with a few chambers, primordial chamber slightly larger than the subsequently formed ones. Sutures distinct. Wall smooth but marked with fine longitudinal striations. The ultimate chamber without a neck. Aperture terminal.

Length : 0.55 mm.

Locality : Station A.

Distribution : Pacific Ocean, east coast of Mindanao and Arabian Sea.

Genus *Lagena* Walker & Jacob 1798

Lagena globosa (Montagu) (Fig. 37)

Entosolenia globosa Williamson, 1858, p. 8, pl. 1, figs. 15, 16; *Lagena globosa* Brady, 1884, vol. 9, p. 452, pl. 56, figs. 1-3; Dakin, 1906, vol. 5, p. 234; Cushman, 1913, 71(3), p. 3, pl. 4, fig. 2; 1923, 104(4), p. 20, pl. 4, figs. 1, 2; 1933, 161(2) p. 20, pl. 4, figs. 10 a, b; Sethulekshmi Amma, 1958, p. 54, pl. 2, fig. 80.

Description : Test nearly spherical, apertural end slightly produced. Wall smooth and translucent. Aperture slit-like with an entosolenian neck.

Length : 0.27 mm.

Locality : Station A.

Distribution : North Pacific, off Chatham Islands, Honolulu, Tropical Pacific, Philippines, Ceylon coast, off Gulf of Mannar, Arabian Sea, Atlantic and British Isles.

***Lagena marginata* (Walker & Boys) (Fig. 38)**

Lagena marginata Brady, 1884, vol. 9, p. 476, pl. 59, figs. 21-23; H. B. Brady, Parker & Jones, 1888, vol. 12, p. 222, pl. 44, figs. 27, 29, 30, 32; Cushman, 1913, 71(3), p. 37, pl. 22, figs. 1-7; 1921, 100, vol. 4, p. 182; 1933, 161(2), p. 17, pl. 4, figs. 9 a, b, 11, 12, 14-16; pl. 5, figs. 2 a, b, 4 a, b, 6 a, b, 8, 9; Sethulekshmi Amma, 1958, p. 56, pl. 11, fig. 85.

Description : Test more or less globular, compressed, rounded at both ends. Apertural end slightly narrow. Periphery with a marginal keel. Aperture entosolenian.

Length : 0.18 mm.

Locality : Station B.

Distribution : North and Eastern Pacific, Hawaiian Islands, off Japan, Arabian Sea, Atlantic and British Isles.

***Lagena striata* (d'Orbigny) (Fig. 39)**

Lagena striata Brady, 1884, vol. 9, p. 460, pl. 57, figs. 22, 24; Cushman, 1913, 71(3), p. 19, pl. 7, figs. 4, 5; 1921, 100, vol. 4, p. 177; 1933, 161 (2), p. 32, pl. 8, figs. 11, 13; Sethulekshmi Amma, 1958, p. 56, pl. 2, fig. 86.

Description : Test oval with an elongated neck at the apertural end. Wall marked with numerous fine longitudinal costae starting from the aboral end of the test to the base of the neck. Wall calcareous and translucent.

Length : 0.23 mm.

Locality : Station B.

Distribution : North Pacific, off Philippines, Red Sea, Arabian Sea, Atlantic, and British Isles.

***Lagena quadrata* (Williamson) (Fig. 40)**

Lagena quadrata Williamson, p. 11, pl. 1, figs. 27, 28; Brady, 1884, vol. 9, p. 475, pl. 59, figs. 3, 16; Bagg, 1908, vol. 34, p. 142; Cushman, 1913, 71(3), p. 35, pl. 14, fig. 9; Sethulekshmi Amma, 1958, p. 58, pl. 2, fig. 89.

Description: Test ovate, periphery with a marginal keel. Wall smooth and translucent. Aperture entosolenian; apertural orifice slit-like.

Length: 0.12 mm.

Locality: Station B.

Distribution: North Pacific, off Hawaiian Islands and between Guam and Yokohama, Arabian Sea, Atlantic and British Isles.

Lagena orbignyana (Seguenza) (Fig. 41)

Lagena orbignyana Brady, 1884, vol. 9, p. 484, pl. 59, figs. 1, 18, 24, 26; Brady, Parker and Jones, 1888, vol. 12, p. 222, pl. 44, fig. 20; Dakin, 1906, vol. 5, p. 234; Cushman, 1913, 71(3), p. 42, pl. 19, fig. 1.

Description: Test oval in outline with a prominent marginal keel having within a secondary keel. Surface of the test smooth with large pits. Aperture slit-like with an entosolenian neck.

Length: 0.14 mm.

Locality: Station A.

Distribution: Tropical Pacific, off Levuka, Fiji, off Ceylon coast, Arabian Sea and British Isles.

Family NONIONIDAE

Genus *Nonion* Montfort 1808

Nonion boucanum (d'Orbigny) Hada (Fig. 42)

Nonionina boucana Brady, 1884, vol. 9, p. 729, pl. 109, figs. 12, 13; Dakin, 1906, vol. 5, p. 240; *Nonion boucanum* Daniel, 1949, p. 71, fig. 114; Cushman, 1933, 161(2), p. 42, pl. 10, fig. 3; Sethulekshmi Amma, 1958, p. 21, pl. 1, fig. 32.

Description: Test circular in outline, chambers numerous, involute, nine to fifteen chambers in final whorl. Sutures depressed and curved towards the umbilicus; umbilicus slightly depressed and filled with granular material. Wall calcareous, smooth and finely punctate. Aperture a curved slit lying at the base of last chamber.

Diameter: 0.30 mm.

Locality: Station A.

Distribution: Pacific, China Sea off Hong Kong and Tawi Tawi, off Japan, Red Sea, Mauritius, Kerimba Archipelago, Gulf of Mannar off Ceylon coast, and Indian seas.

***Nonion pompilioides* (Fichtel & Moll) (Fig. 43)**

Nonionna pompilioides Brady, 1884, vol. 9, p. 727, pl. 109, figs. 10, 11; Millet, 1904, p. 601; Bagg, 1908, vol. 34, p. 164; Cushman, 1914, 71(4), p. 25, pl. 17, fig. 2. *Nonion pompilioides* Cushman, 1933, 161(2), p. 41, pl. 10, figs. 1, 2; Ganapati & Satyavati, 1958, p. 108, pl. 3, figs. 83, 84.

Description : Test circular with several chambers, the final whorl of ten chambers. Peripheral margin rounded. Sutures limbate and distinct. Wall with coarse perforations. Aperture a curved slit lying at the base of the last chamber.

Diameter : 0.37 mm.

Locality : Station C.

Distribution : North Pacific, Bering Sea, off Japan, Hawaiian Islands, between Hawaiian and Midway Islands, between Guam and Japan, and Indian seas.

***Nonion pacificum* (Cushman) (Fig. 44)**

Nonion pacificum Cushman, 1933, 161(2), p. 44, pl. 10, figs. 9 a, b.

Description : Test circular, compressed with a few chambers, eight chambers in the final whorl; chambers involute. Peripheral margin rounded. Wall calcareous, smooth and finely foraminated. Aperture a long slit at the base of last chamber.

Diameter : 0.14 mm.

Locality : Station D.

Distribution : Pacific Ocean and Arabian Sea.

***Nonion depressula* (Walker and Jacob) (Fig. 45)**

Nonionna depressula Brady, 1884, vol. 9, p. 725, pl. 109, figs. 6, 7; Brady, Parker & Jones, 1888, vol. 12, p. 229, pl. 43, fig. 25; Bagg, 1908, vol. 34, p. 164; Cushman, 1914, 71(4), p. 23, pl. 17, fig. 3.

Description : Test circular with ten to twelve chambers in the final whorl, chambers slightly inflated, sutures depressed. Peripheral margin lobulated. Umbilical region slightly depressed and filled with a clear granular shell material which extends outward along the sutures. Aperture a narrow curved slit lying at the base of last chamber.

Diameter : 0.12 mm.

Locality : Station D.

Distribution : North Pacific, off Hawaiian Islands, off Japan and between Japan and Guam, and Arabian Sea.

Genus *Elphidium* Montfort 1808

***Elphidium crispum* (Linnaeus) (Fig. 46)**

Polystomella crispa Brady, 1884, vol. 9, p. 736, pl. 110, figs. 6, 7; Cushman, 1914, 71(4), p. 32, pl. 18, fig. 1. *Elphidium crispum* Cushman, 1933, 161(2), p. 47, pl. 11, fig. 4 a, b.; *Elphidium macellus* Gnansmuthu, 1943, No. 2, pt. 5, p. 16, *Elphidium crispum* Daniel, 1949, p. 74, figs. 115-116; Sethulekshmi Amma, 1958, p. 22, pl. 1, fig. 33.

Description: Test biconvex, circular in shape with numerous chambers. Sutures slightly raised and distinct with retral processes which extend between the sutures. Peripheral margin acute, umbonal region raised. Aperture consists of numerous pores on the apertural face of last chamber.

Diameter: 0.29 mm.

Locality: Station A.

Distribution: Pacific, Atlantic, British Isles, Mediterranean, Gulf of Mannar, and Indian seas.

***Elphidium jenseni* (Cushman) (Fig. 47)**

Elphidium jenseni Cushman, 1933, 161(2), p. 48, pl. 11, figs. 6, 7.

Description: Test flat, many chambered. Peripheral margin with a slight keel. Sutures slightly raised with retral processes which bridge the gap between sutures, the areas between the sutures somewhat depressed, umbilical region with slight projections.

Diameter: 0.38 mm.

Locality: Station A.

Distribution: In Pacific Ocean from Fiji Islands, Marshall Islands and Landrone Islands, off Australia, and Arabian Sea.

Family CAMERINIDAE

Subfamily Camerininae

Genus *Operculina* d'Orbigny 1826

***Operculina granulosa* (Leymerie) (Fig. 48)**

Operculina granulosa Brady, 1884, vol. 9, p. 744, pl. 112, figs. 6, 7, 9, 10; Cushman, 1933, 161(2), p. 56, pls. 14, 15, 16, figs. 1-3; Sethulekshmi Amma, 1958, p. 19, pl. 1, fig. 29, a, b, c; Ganapati & Satyavati, 1958, p. 108, pl. 4, fig. 92.

Description: Test compressed, bilaterally symmetrical, the final whorl composed of numerous chambers. Sutures evenly curved. Wall

ornamented with beads or bosses along the suture lines and usually concentrated at the centre space and scattered in the interspaces. Aperture at the base of last chamber.

Diameter : 0.40 mm.

Locality : Station C.

Distribution : Pacific Ocean, Honolulu, Red Sea, Ceylon, and Indian seas.

***Operculina gaimairdi* d'Orbigny (Fig. 49)**

Operculina gaimairdi Cushman, 1921, vol. 4, No. 100, p. 375.

Description : Test strongly compressed with an adult coil of about fifteen chambers with a large central area. Sutures marked with beads with interspaces smooth.

Diameter : 0.32 mm.

Locality : Station A.

Distribution : Philippines, in the vicinity of Jolo, Sulu Archipelago, Siasi, Tawi Tawi group; between Burias and Luzon, in the Gulf of Davao and Arabian Sea.

Family PENEROPLIDAE

Subfamily Orbitolitinae

Genus *Sorites* Ehrenberg 1838

***Sorites marginalis* (Lamarck) (Fig. 50)**

Orbitolites marginalis Carpenter, 1883, vol. 7*, p. 20, pl. 3, figs. 1-7, pl. 4, figs. 1-5; Cushman, 1917, 71(6), p. 92, pl. 38, figs. 1-2. *Sorites marginalis* Cushman, 1930, 104(7), p. 40, pl. 18, figs. 1-4; Sethulekshmi Amma, 1958, p. 28, pl. 1, fig. 41.

Description : Test circular in shape with numerous chambers in a single plane, the primordial chamber opens into the second chamber, followed by numerous chambers arranged spirally in one plane. Each chamber divided into numerous small chamberlets having connections with the adjacent ones of previous and following annular chambers. Wall smooth. Apertures numerous along the periphery of the test.

Diameter : 0.31 mm.

Locality : Station C.

Distribution : North Pacific, Hawaiian Islands, Red, and Arabian Seas, coast of Madagascar and Mediterranean Sea.

* Rep. Voy. Challenger, Zoology.

Family BULIMINIDAE

Subfamily Bulimininae

Genus *Bulimina* d'Orbigny 1826

Bulimina marginata d'Orbigny (Fig. 51)

Bulimina marginata Brady, 1884, vol. 9, p. 405, pl. 51, figs. 3-5; Cushman, 1911, 71(2), p. 83, text-fig. 136 a, b; 1922, 104(3), p. 91, pl. 21, figs. 4-5; Sethulekshmi Amma, 1958, p. 44, pl. 2, fig. 66 a, b.

Description: Test oval in outline, many-chambered, tapering, later chambers more inflated than the earlier ones; lower margin of each chamber provided with spines or crenulations. Wall calcareous, smooth, and opaque. Aperture slit-like situated at the inner face of last chamber.

Length: 0.16 mm.

Locality: Station D.

Distribution: Atlantic, Gulf of Mexico, Gulf of Southern Ocean, Mediterranean, Adriatic, British Isles, Arabian Sea and North Pacific.

Subfamily Virgulininae

Genus *Virgulina* d'Orbigny 1826

Virgulina squamosa d'Orbigny (Fig. 52)

Virgulina squamosa Brady, 1884, vol. 9, p. 415; Cushman, 1911, 71(2), p. 91, text-fig. 145; Sethulekshmi Amma, 1958, p. 45, pl. 2, fig. 67.

Description: Test elongate, thin and tapering towards the initial end with few obliquely arranged chambers. Peripheral margin somewhat lobulated. Sutures slightly depressed. Wall calcareous, smooth, punctate and translucent. Aperture loop-shaped.

Length: 0.22 mm.

Locality: Station B.

Distribution: Atlantic, Mediterranean, Red Sea, Antarctic, Arabian Sea and North Pacific.

Genus *Bolivina* d'Orbigny 1839

Bolivina punctata d'Orbigny (Fig. 53)

Bolivina punctata Brady, 1884, vol. 9, p. 417, pl. 52, figs. 18, 19; Cushman, 1911, 71(2), p. 32, text-fig. 53; 1921, vol. 4, No. 100, p. 136, pl. 26, fig. 5.

Description : Test very long, compressed, tapering and many chambered with a blunt apical end. Sutures somewhat depressed. Wall smooth and finely punctate. Aperture an elongate slit situated at the inner margin of last formed chamber.

Length : 0.44 mm.

Locality : Station D.

Distribution : North and Eastern Pacific, Hawaiian Islands, off Japan, Gulf of Mannar off Ceylon coast, and Indian seas.

***Bolivina nobilis* Hantken (Fig. 54)**

Bolivina nobilis Brady, 1884, vol. 9, p. 424, pl. 53, figs. 14, 15; Chapman, 1895, p. 24; Cushman, 1911, 71(2), p. 39, text-fig. 64; Sethulekshmi Amma, 1958, p. 45, pl. 2, fig. 68.

Description : Test elongate, compressed and tapering with a blunt apical end, chambers numerous, slightly inflated. Test wall about half portion from the apical end covered with many fine longitudinal costae, the other half smooth and finely punctate. Sutures depressed. Aperture oval in outline placed at the apertural face of last chamber.

Length : 0.28 mm.

Locality : Station D.

Distribution : North and South Pacific, Hawaiian Islands, Philippines, Arabian Sea, Mediterranean and British Isles.

***Bolivina aenariensis* (Costa) (Fig. 55)**

Bolivina aenariensis Brady, 1884, vol. 9, p. 423, pl. 53, figs. 10, 11; Cushman, 1911, 71(2), p. 44, text-fig. 71.

Description : Test compressed and tapering with many chambers, the apical end with or without a spine and when there is no spine it is usually blunt. Sutures depressed. Wall covered with two or more longitudinal thickenings or costae. Aperture long slit-like with a lip placed on the apertural face.

Length : 0.25 mm.

Locality : Station C and D.

Distribution : North Atlantic, West and North-west of Ireland, North Pacific, off Philippines, off Japan, coast of California, Hawaiian Islands and Arabian Sea.

Bolivina vadescens Cushman (Fig. 56)

Bolivina vadescens Cushman, 1942, 161(3), p. 15, pl. 5, fig. 4; Ganapati & Satyavati, 1958, p. 109, pl. 4, fig. 99.

Description : Test long and many chambered, later formed chambers somewhat inflated. Peripheral margin rounded. Sutures sigmoid and distinct. Wall smooth and finely foraminated. Aperture loop-shaped, situated at the base of ultimate chamber.

Length : 0.22 mm.

Locality : Station C.

Distribution : Tropical Pacific Ocean, Fiji, Levuka, Viva Anchorage, Makemo Lagoon, Paumotu Islands, Rotonga, Guam Anchorage, Landrone Islands and Indian seas.

Bolivina rhomboidalis (Millett) (Fig. 57)

Bolivina rhomboidalis Cushman, 1922, 104(2), p. 44; 1942, 161(3), p. 19, pl. 6, figs. 7, 8.

Description : Test triangular and longer than broad; seven chambers on one side and six on the other side excluding the primary chamber, later chambers increasing in size as added. Periphery obliquely truncate. Sutures oblique and distinct. Wall smooth. Aperture long, situated at the inner wall of last chamber.

Length : 0.41 mm.

Locality : Station C.

Distribution : Pacific Ocean, Hawaiian Islands, Malay Archipelago and Arabian Sea.

Bolivina nitida Brady (Fig. 58)

Bolivina nitida Brady, 1884, vol. 9, p. 420, pl. 52, fig. 30 a, b; Cushman, 1942, 161(3), p. 25, pl. 7, fig. 5.

Description : Test long, compressed, tapering towards commencement with a few broad and flattened chambers. Peripheral margin rounded and subcarinate. Sutures limbate, distinct and obliquely set; a narrow band of clear shell material at the sutures and around the periphery. Aperture long, narrow slit placed obliquely extending almost the whole length of the inner margin of last chamber.

Length : 0.25 mm.

Locality : Station D.

Distribution: Tropical Pacific, Eastern Mancoeur Island, Bass Strait, off Raine Island, Torres Strait, East of Wollongong off Australia and Arabian Sea.

Genus *Loxostoma* Ehrenberg 1854

***Loxostoma limbatum* (Brady) (Fig. 59)**

Bolivina limbata Brady, 1884, vol. 9, p. 419, pl. 52, figs. 26-28; Cushman, 1911 71(2), p. 47, fig. 78 a, b, c. (in text). *Loxostoma limbatum* Cushman, 1942, 161(3), p. 35, pl. 10, fig. 1. *Loxostomum limbatum* Ganapati & Satyavati, 1958, p. 109, pl. 4, fig. 102.

Description: Test somewhat twisted, longer than broad and compressed with biserially set chambers, later formed chambers inflated and broader than long. Sutures distinct and limbate. Wall smooth and coarsely perforated. Aperture an elongate slit at the terminal end of last chamber.

Length: 0.25 mm.

Locality: Station C.

Distribution: Indo-Pacific, West Indies and Indian seas.

Subfamily Uvigerininae

Genus *Uvigerina* d'Orbigny 1826

***Uvigerina tenuistriata* Reuss (Fig. 60)**

Uvigerina tenuistriata Brady, 1884, vol. 9, p. 574, pl. 74, figs. 4-7; Chapman, 1895, p. 35; Cushman, 1913, 71(3), p. 95, pl. 42, fig. 4.

Description: Test cylindrical in shape, longer than broad, with a narrow apical end. Wall ornamented with numerous distinct longitudinal costae, the last formed chamber often without costae. Aperture with a phialine lip at the terminal end of a short neck.

Length: 0.34 mm.

Locality: Station C.

Distribution: North Pacific, off Philippines and Arabian Sea.

Family ROTALIIDAE

Subfamily Spirillinae

Genus *Spirillina* Ehrenberg 1841

***Spirillina vivipara* Ehrenberg (Fig. 61)**

Spirillina perforata Williamson, 1858, p. 92, pl. 7, fig. 202. *Spirillina vivipara* Brady, 1884, vol. 9, p. 630, pl. 85, figs. 1-5; Dakin, 1906, vol. 5, p. 237; Cushman, 1915, 71(5), p. 3, pl. 1, figs. 1, 2; Sethulekshmi Amma, 1958, p. 63 pl. 3, fig. 96.

Description: Test planispiral, flat, the first formed coils narrow compared to the later formed ones. Sutures depressed and distinct. Peripheral margin round. Wall with large perforations. Aperture circular at the end of the tube.

Diameter: 0.13 mm.

Locality: Station B.

Distribution: Arctic, North and South Atlantic, North and South Pacific, Indian and Southern oceans, Mediterranean and Red seas, Ceylon and Arabian Sea.

***Spirillina limbata* Brady (Fig. 62)**

Spirillina limbata Brady, 1884, vol. 9, p. 632, pl. 85, figs. 18-21; Dakin, 1906, vol. 5, p. 237; Cushman, 1915, 71(5), p. 5, pl. 2, figs. 1, 2; 1931, 104(8), p. 8, pl. 2, fig. 2 a, b; Sethulekshmi Amma, 1958, p. 63, pl. 3, fig. 97.

Description: Test planispiral with both faces somewhat flattened or slightly concave. Peripheral margin square. Sutures slightly raised because of the presence of a ridge of shell substance. Test wall finely foraminated. Aperture more or less compressed lying at the end of the tube.

Diameter: 0.27 mm.

Locality: Station A.

Distribution: North and South Pacific, North and South Atlantic, Mediterranean, Ceylon coast and Arabian Sea.

Subfamily Discorbinae

Genus *Discorbis* Lamarck 1804***Discorbis globularis* (d'Orbigny) (Fig. 63)**

Discorbina globularis Brady, 1884, vol. 9, p. 643, pl. 85, figs. 8, 13; Cushman, 1915, 71(5), p. 11, pl. 9, fig. 4; 1931, 104(8), p. 22, pl. 4, fig. 9 a-c; Sethulekshmi Amma, 1958, p. 66, pl. 3, fig. 101 a, b.

Description: Test planoconvex, chambers numerous. All the chambers visible on the dorsal side but only those of the last whorl of about five chambers on the ventral side. Sutures depressed and distinct. Peripheral edge round and carinate. Test wall with coarse perforations. Aperture an elongate slit on the ventral side of inner edge of ultimate chamber.

Diameter: 0.19 mm.

Locality: Station C.

Distribution: Indo-Pacific region, North Pacific, Atlantic, British Isles, Western Europe, Eastern channel of Korean Strait.

***Discorbis rosacea* (d'Orbigny) (Fig. 64)**

Discorbina rosacea Brady, 1884, vol. 9, p. 644, pl. 87, figs. 1, 4; Dakin, 1906, vol. 5, p. 238; Cushman, 1915, 71(5), p. 13, fig. 13; Gnanamuthu, 1943, p. 20, pl. 4, fig. 16; Sethulekshmi Amma, 1958, p. 65, pl. 3, fig. 100 a, b.

Description: Test many chambered, dorsal side conically convex, ventral side flat or slightly concave. Sutures depressed and distinct. Test wall finely foraminated. Umbilical region on the ventral side filled by a thickening of shell substance. Aperture a large elongate opening situated at the inner margin of last chamber.

Diameter: 0.23 mm.

Locality: Stations A & C.

Distribution: North Pacific, Atlantic, Faroe Islands, shores of Shetland, Ceylon coast and Indian seas.

***Discorbis vilardeboana* (d'Orbigny) (Fig. 65)**

Discorbina vilardeboana Brady, 1884, vol. 9, p. 645, pl. 86, figs. 9, 12; pl. 88, fig. 2; Dakin, 1906, vol. 5, p. 238; Bagg, 1908, vol. 34, p. 157; Cushman, 1915, 71(5), p. 14, pl. 9, fig. 2; Sethulekshmi Amma, 1958, p. 67, pl. 3, fig. 103 a, b.

Description: Test planoconvex with numerous chambers, the outer whorl with five to seven chambers. Peripheral edge rounded. Sutures somewhat depressed and distinct. Wall finely foraminated. Aperture

an arched slit situated on the ventral side of test lying close to the umbilical region.

Diameter : 0.27 mm.

Locality : Station A.

Distribution : North Pacific, Hawaiian Islands, Laysan Island, Japan, Atlantic, Ceylon coast and Arabian Sea.

Discorbis bertheloti (d'Orbigny) (Fig. 66 a, b)

Discorbina bertheloti Brady, 1884, vol. 9, p. 650, pl. 89, figs. 10-12; Brady, Parker & Jones, 1888, vol. 12, p. 227, pl. 46, figs. 7, 8; Dakin, 1906, vol. 5, p. 238; Cushman, 1915, 71(5), p. 20, pl. 7, fig. 3.

Description : Test planoconvex, compressed, periphery acute and slightly carinated. Dorsal side of test somewhat flat, ventral side convex. Outer whorl of five to seven chambers. Sutures depressed. Wall punctate. Aperture a narrow slit situated ventrally at the inner edge of ultimate chamber.

Diameter : 0.22 mm.

Locality : Station A.

Distribution : North Pacific, Chatham and Laysan islands, off Guam, Japan, Philippines, Ceylon coast and Indian seas.

Discorbis nitida (Williamson) (Fig. 67)

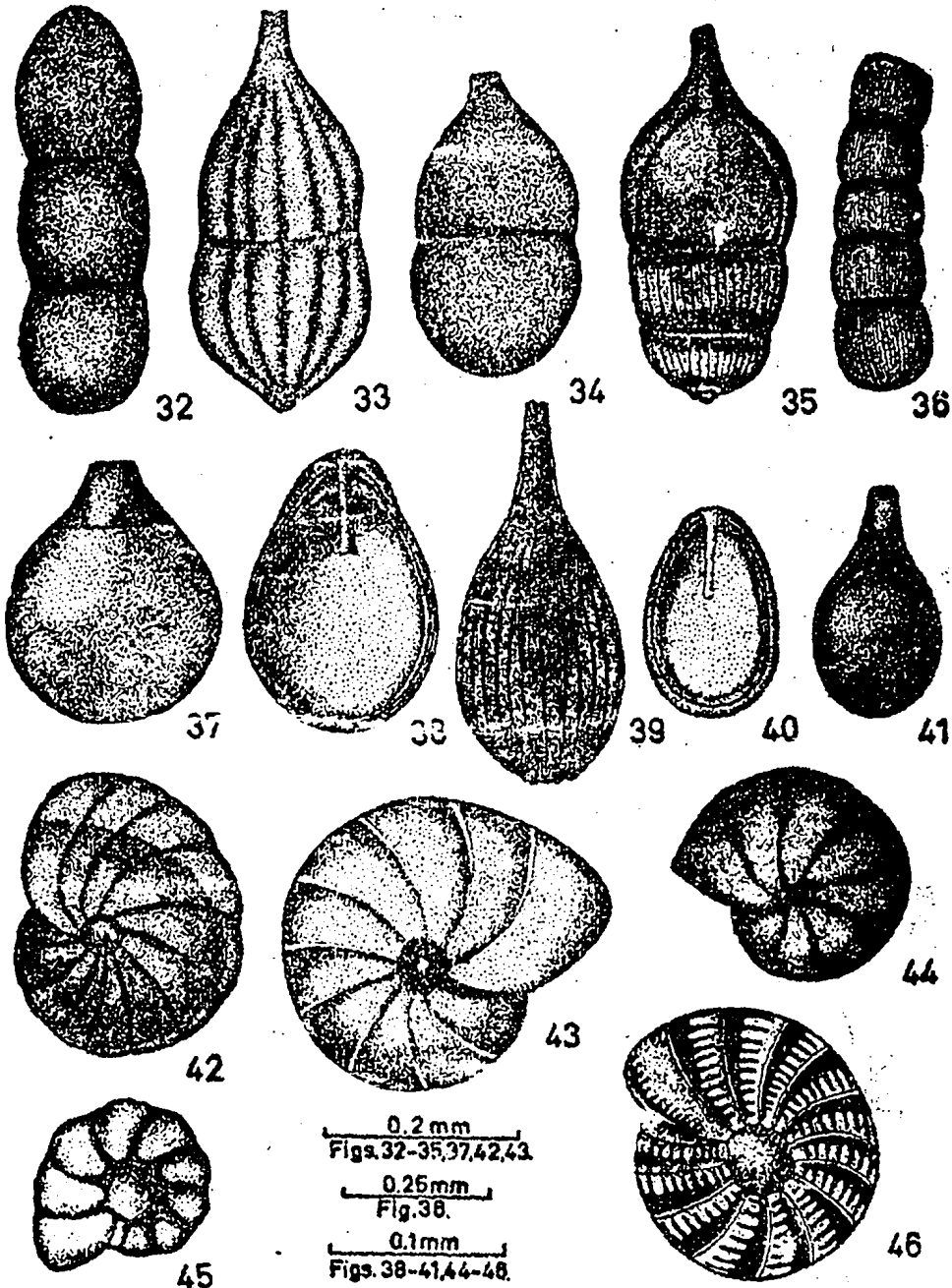
Rotalina nitida Williamson, 1858, p. 54, pl. 4, fig. 106-108. *Discorbis nitida* Cushman, 1931, 104(8), p. 26, pl. 6, fig. 1 a-c; Sethulekshmi Amma, 1958, p. 70, pl. 3, fig. 109.

Description : Test trochoid, many chambered with a little more than two coils, final whorl composed of about six chambers. Peripheral margin with a distinct keel. Sutures slightly depressed below and flush with the surface above. Wall smooth, finely foraminated and transparent. Aperture on the ventral side at the base of the final chamber.

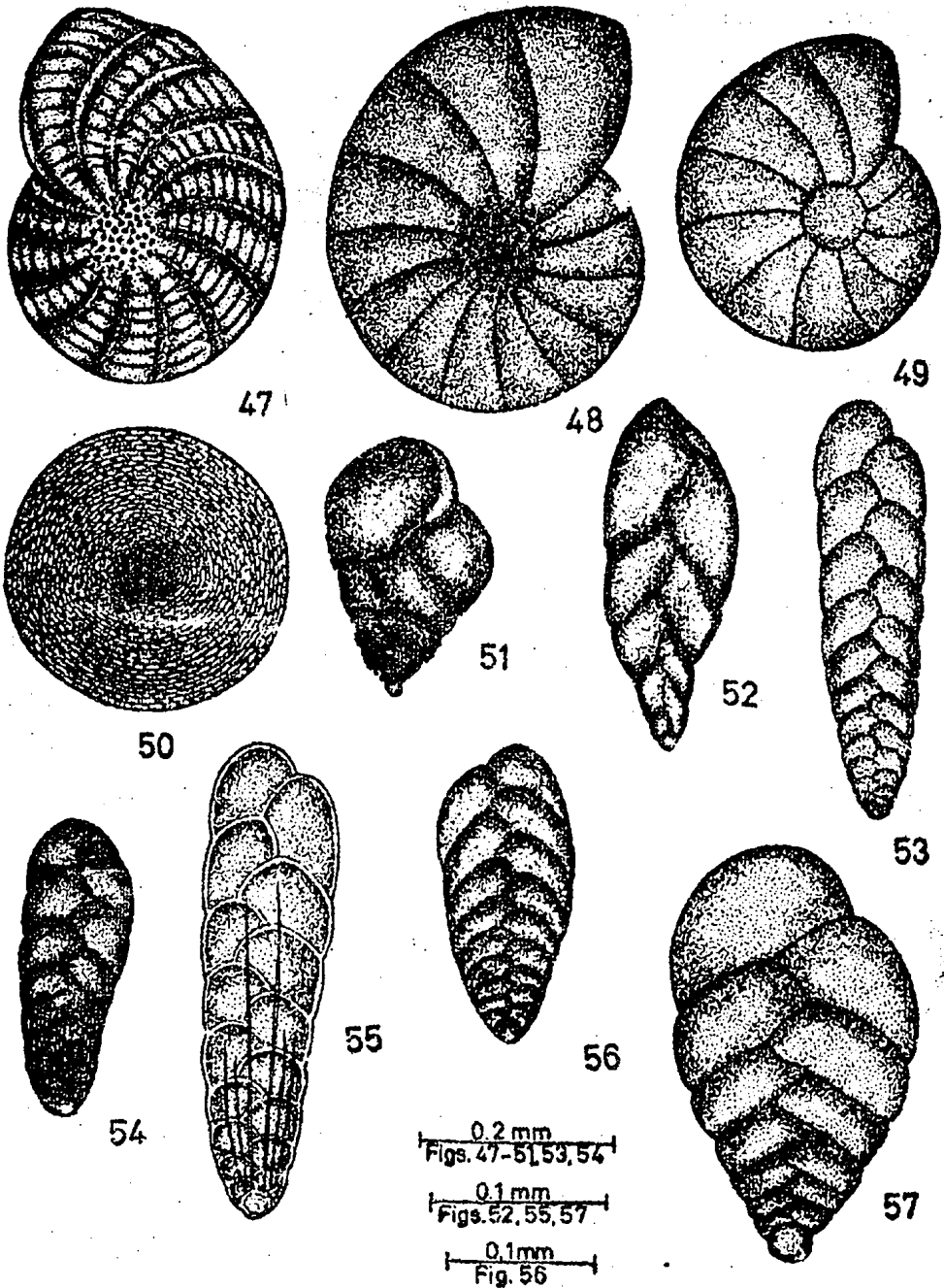
Diameter : 0.14 mm.

Locality : Station D.

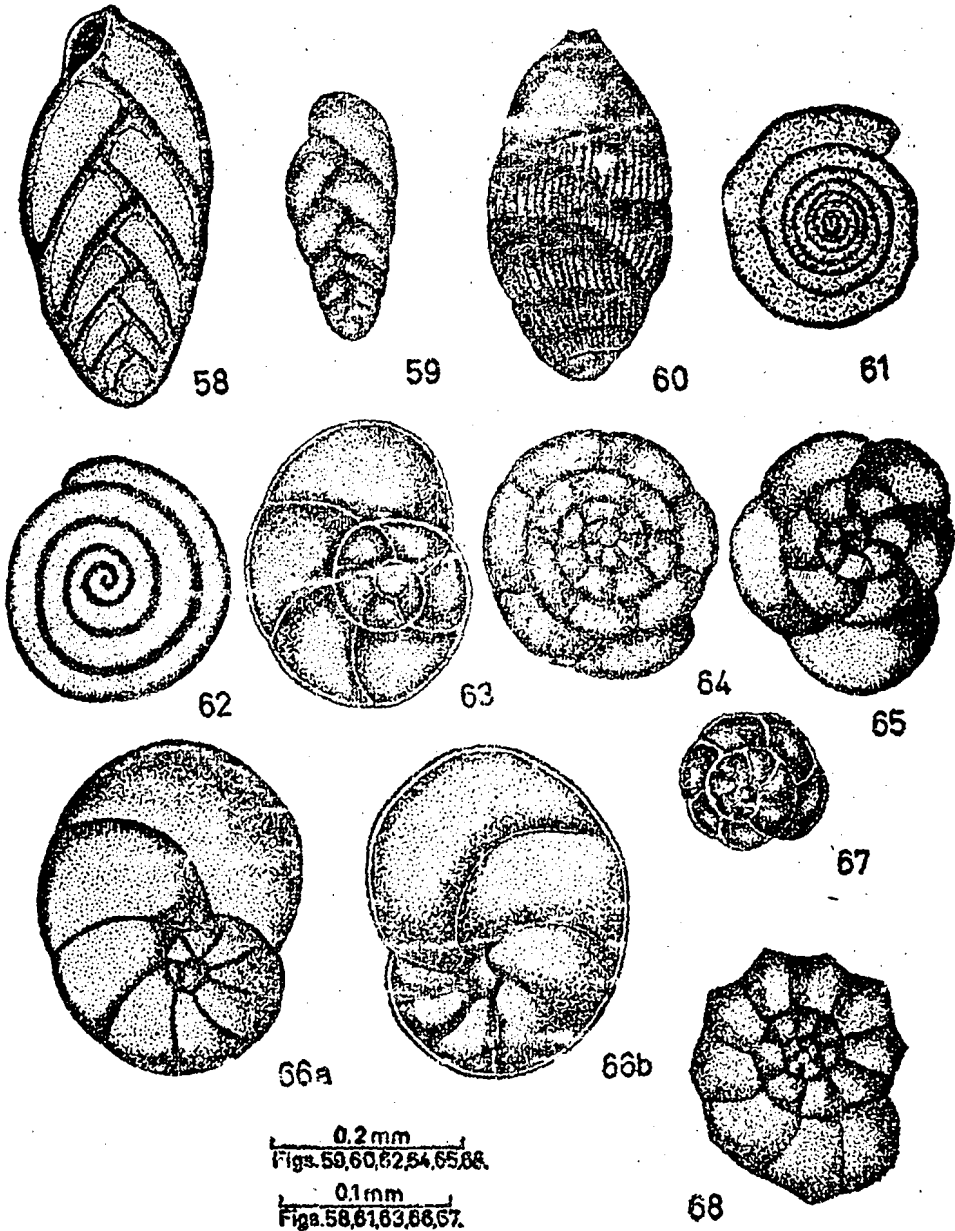
Distribution : Atlantic, European coast, British Isles and Arabian Sea.



FIGS. 32-46. : 32. *Nodosaria calomorpha*; 33. *Nodosaria radiclea*; 34. *Nodosaria roemeri*; 35. *Nodosaria perversa*; 36. *Nodosaria subperversa*; 37. *Lagena globosa*; 38. *Lagena marginata*; 39. *Lagena striata*; 40. *Lagena quadrata*; 41. *Lagena orbignyana*; 42. *Nonion boucaerum*; 43. *Nonion pempilioides*; 44. *Nonion pacificum*; 45. *Nonion depressula*; 46. *Elphidium crispum*.



FIGS. 47-57: 47. *Elphidium jenseni*; 48. *Operculina granulosa*; 49. *Operculina galmairdi*; 50. *Sorites marginalis*; 51. *Bulimina marginata*; 52. *Virgulina squamosa*; 53. *Bolivina punctata*; 54. *Bolivina nobilis*; 55. *Bolivina aenariensis*; 56. *Bolivina vadeszens*; 57. *Bolivina rhomboidalis*.



Figs. 58-68: 58. *Bolivina nitida*; 59. *Laxostoma limbatum*; 60. *Uvigerina tenuistriata*; 61. *Spirillina vivipara*; 62. *Spirillina limbata*; 63. *Discorbis globularis*; 64. *Discorbis rosacea*; 65. *Discorbis vilardeboana*; 66. *Discorbis hirtelliana*, dorsal view; b, ventral view; 67. *Discorbis nitida*; 68. *Rotalla celcar*.

Subfamily Rotaliinae

Genus *Rotalia* Lamarck 1804***Rotalia calcar* (d'Orbigny) (Fig. 68)**

Rotalia calcar Brady, 1884, vol. 9, p. 709, pl. 108, fig. 3, fig. 4?; Dakin, 1906, vol. 5, p. 239; Cushman, 1915, 71(5), p. 69, pl. 28, fig. 2, -' 29, fig. 2. Sethulekshmi Amma, 1958, p. 73, pl. 3, fig. 113 a, b; Ganapati & Satyavati, 1958, p. 110, pl. 5, figs. 118, 119.

Description : Test many chambered with both faces of the test convex, all chambers visible on the dorsal side and on ventral side only those of the last whorl. The outer whorl consists of ten chambers. Sutures limbate. Peripheral margin of each chamber drawn into a pointed end. Test wall finely foraminated. Aperture a narrow slit between periphery and umbilicus on ventral side.

Diameter : 0.28 mm.

Locality : Stations A & C.

Distribution : North Pacific, Hong Kong Harbour, Cebu, Philippines, Ceylon coast and Indian seas.

(to be continued)