94, 95, 97, 98, 99, 100, 101, 103, 104: 23-225 m; living 28-170 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 116, 118, 122, 124, 125, 127, 132, 134, 136, 137, 139, 141, 143: 20-140 m; living 20-100 m); open sea area (Stn. 144, 145, 146: 105-213 m; living 155-213 m); ESK Reg. no. F-9476 - 9525; hypotype in fig. 1a, ESK Reg. no. F-9526 from Stn. 99; hypotype in fig. 1b, ESK Reg. no. F-9527 from Stn. 136; hypotype in fig. 1c-f, ESK Reg. no. F-9528 from Stn.139 ; hypotype in fig. 1d-g, ESK Reg. no. F-9529 from Stn. 136; hypotype in fig. 1e, ESK Reg. no. F-9530 from Stn. 116; hypotype in fig. 1h, ESK Reg. no. F-9531 from Stn. 132.

Geographic Distribution: Tōkyō and Tanabe Bays, and the coastal areas at Hachijo and Yoron Islands; 37) 10-16 m; 40); 56) 9-38 m; 82).

Discorbis nitida (WILLIAMSON)

Rotalina nitida WILLIAMSON, 1858, Ray Soc., London, England, p. 54, pl. 4, figs. 106-108.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64: 66 m); Central Area (Stn. 99: 42 m); ESK Reg. no. F-9532 - 9533.

Discorbis williamsoni CHAPMAN and PARR

Discorbis williamsonii CHAPMAN and PARR, 1932, Roy. Soc. Victoria, Proc., Melbourne, Australia, v. 44, p. 226.

Occurrence and Repository: Central Area (Stn. 91, 93, 94, 98, 102: 105-207 m; living 162 m); Bay Mouth Area (Stn. 108, 137, 139: 105-120 m); ESK Reg. no. F-9534 - 9541.

Genus *Buccella* ANDERSEN, 1952

Buccella cf. *calida* (CUSHMAN and COLE)

Compared with:

Eponides frigida (CUSHMAN) var. *calida* CUSHMAN and COLE, 1930, Contr. Cushman Lab. Foram. Res., v.6, p.98, pl.13, figs.3-4; CUSHMAN, 1931, p.47, pl.10, figs.3-4.

Occurrence and Repository: Bay Head Area (Stn. 44: 144 m): ESK Reg. no. F-9542.

Remarks: Only a single, imperfect specimen is in the collection.

Genus *Discorbinella* CUSHMAN and MARTIN, 1935

Discorbinella bertheloti (D'ORBIGNY)

Pl. 13, figs. 2a-c

Rosalina bertheloti D'ORBIGNY, 1939, *in* BARKER-WEBB and BERTHELOT, Hist. Nat. Iles Canaries, v. 2, pt. 2, "Foraminiferes," p. 135, pl. 1, figs. 28-30.

Discorbis bertheloti (D'ORBIGNY). CUSHMAN, 1915, p. 20, pl. 7, figs. 3a-c; CUSHMAN, 1931, p. 16, pl. 3, figs. 2a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64: 66 m); Bay Mouth Area (Stn. 106, 107, 108, 113, 118, 125, 127, 132, 137, 139, 141, 143: 40-140 m); open sea area (Stn. 145: 155 m); ESK Reg. no. F-9543 - 9556; hypotype in fig. 2a, ESK Reg. no. F-9557 from Stn. 118; hypotype in fig. 2b, ESK Reg. no. F-9558 from Stn. 137; hypotype in fig. 2c, ESK Reg. no. F-9559 from Stn. 145.

Geographic Distribution: Off the northwest coast of North Honshū, the south coast of Central Honshū and the southeast coast of Kyūshū, and Ōmura Bay; 24) 75-78 m; 37) 16-70 m; 47) 91-292 m; 51) 72-232 m, living 72 m; 52) 80 m; 61) 74 m; 73); 77) 122 m.

Remarks: The present species is distributed mainly in the Bay Mouth Area.

Discorbinella convexa (TAKAYANAGI)

Pl. 13, figs. 3a-h

Planulina convexa TAKAYANAGI, 1953, Tohoku Univ., Inst. Geol. Pal., Short Papers, no. 5, p. 34, pl. 4, figs. 14a-c.

Planulina convexa TAKAYAYAGI forma A, B and C. KUWANO, 1962, pl. 20, figs. 6a-c.

Occurrence and Repository: Bay Head Area (Stn. 44, 63, 64: 66-144 m); Central Area (Stn. 67, 71, 73, 74, 75, 76, 78, 79, 81, 84, 86, 87, 88, 92, 93, 94, 98, 99, 100, 101, 105: 28-220 m; living 42-100 m); Bay Mouth Area (Stn. 107, 108, 110, 113, 116, 118, 122, 124, 125, 127, 132, 134, 136, 137, 139, 141, 143: 20- 140 m; living 100-105 m); open sea area (Stn. 144, 145, 146: 105- 213 m; living 105 m); ESK Reg. no. F-9560 - 9603; hypotype in fig. 3a, ESK Reg. no. F-9604 from Stn. 146; hypotype in fig. 3b, ESK Reg. no. F-9605 from Stn. 144; hypotype in fig. 3c, ESK Reg. no. F-9606 from Stn. 146; hypotype in fig. 3d, ESK Reg. no. F-9607 from Stn. 145; hypotype in fig. 3e, ESK Reg. no. F-9608 from Stn. 145; hypotype in fig. 3f, ESK Reg. no. F-9609 from Stn. 146; hypotype in fig. 3g, ESK Reg. no. F-9610 from Stn. 84; hypotype in fig. 3h, ESK Reg. no. F-9611 from Stn. 73.

Geographic Distribution: Off the Pacific coast from Central Honshū to Kyūshū and the Seto Inland Sea; 36) living 80-160 m; 48) 74-235 m, living 74 m; 51) 43-232 m, living 72-232 m; 52) 80- 408 m, living 80 m; 55) 20 m; 70) 70-808 m; 77) 122-745 m.

Remarks: KUWANO (1962) recognized the three types (formas A, B and C) in the present species. Through the examination of many specimens from Kagoshima Bay, I concluded that KUWANO's three formas represent three growth stages of the present species.

Genus *Eoeponidella* WICKENDEN, 1949

Eoeponidella sp. 1

Pl. 13, figs. 4a-e

Occurrence and Repository: Central Area (Stn. 80, 81, 86, 87, 88, 92, 93, 94, 96, 98, 99, 101, 103, 104, 105: 38-225 m; living 78-185 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 116, 118, 122, 127, 132, 136, 137, 139, 141, 143: 40-120 m; living 100-120 m); open sea area (Stn. 144, 145: 105-155 m); ESK Reg. no. F-9612 - 9642; hypotype in fig. 4a, ESK Reg. no. F-9643 from Stn. 139; hypotype in fig. 4b, ESK Reg. no. F-9639 from Stn. 141; hypotype in fig. 4c, ESK Reg. no. F-9644 from Stn. 107; hypotype in fig. 4d, ESK Reg. no. F-9645 from Stn. 139; hypotype in fig. 4e, ESK Reg. no. F-9646 from Stn. 139.

Remarks: Many specimens are in the collection, but the tests are rather small and probably in a juvenile stage.

Eoeponidella sp. 2

Occurrence and Repository: Central Area (Stn. 87: 182 m); Bay Mouth Area (Stn. 113, 139, 143: 96-105 m); ESK Reg. no. F-9647 - 9650.

Remarks: The specimens in the collection are rather few and mostly imperfect.

Eoeponidella sp. 3

Pl. 13, figs. 5a-f

Occurrence and Repository: Central Area (Stn. 76, 82, 86, 87, 88, 89, 92, 94, 96, 97, 98, 102, 103, 104, 105: 38-220 m; living 220 m); Bay Mouth and open sea areas (Stn. 106, 108, 116, 139, 144: 40-120 m); ESK Reg. no. F-9651 - 9670; hypotype in fig. 5a, ESK Reg. no. F-9671 from Stn. 139; hypotype in fig. 5b, ESK Reg. no. F-9668 from Stn. 116; hypotype in fig. 5c, ESK Reg. no. F-9672 from Stn. 139; hypotype in fig. 5d, ESK Reg. no. F-9673 from Stn. 144; hypotype in fig. 5e, ESK Reg. no. F-9674 from Stn. 105; hypotype in fig. 5f, ESK Reg. no. F-9664 from Stn. 104

Remarks: Rather many specimens are in the collection. The umbilicus of every specimen is covered with fine secondary material.

Genus *Epistominella* HUSEZIMA and MARUHASI, 1944

Epistominella kuwanoi ŌKI, n. sp.

Pl. 14, figs. 1a-g

Test small, trochoid throughout, moderately biconvex, periphery acute; chambers about 5 in the last-formed coil; sutures oblique, rather indistinct on the dorsal side, nearly radiate and somewhat depressed on the ventral side; wall smooth, ornamented with many rings in the early stage, perforated coarsely in the adult stage; aperture elongate in parallel with the periphery; color white.

Types and Dimensions: Holotype in fig. 1a, ESK Reg. no. F- 9675 from Stn. 136, maximum diameter 0.18 mm, thickness 0.08 mm; paratype in fig. 1b, ESK Reg. no. F-9676 from Stn. 127, maximum diameter 0.13 mm, thickness 0.06 mm; paratype in fig. 1e, ESK Reg. no. F-9677 from Stn. 127, maximum diameter 0.13 mm, thickness 0.07 mm.

Occurrence and Repository: Central Area (Stn. 73, 99: 42-80 m); Bay Mouth Area (Stn. 107, 118, 127, 136, 139, 141, 143: 60- 101 m); ESK Reg. no. F-9678 - 9686; hypotype in fig. 1c, ESK Reg. no. F-9687 from Stn. 143; hypotype in fig. 1d, ESK Reg. no. F-9688 from Stn. 127; hypotype in fig. 1f, ESK Reg. no. F-9684 from Stn. 139; hypotype in fig. 1g, ESK Reg. no. F-9678 from Stn. 73.

Remarks: The specimens in the collection are identical with *Epistominella hokkaidoensis kagoshimaensis* KUWANO (MS). But no description of this species was given by Kuwano.

Epistominella naraensis (KUWANO)

Pseudoparrella naraensis KUWANO, 1950, Geol. Soc. Japan, Jour, v. 56, no. 657, p. 317, text-figs. 6a-c.
Epistominella naraensis (KUWANO). ASANO, 1951, p. 6, text -figs. 34-36; MATOBA, 1967, p. 254, pl. 26, figs. 11a-c; MATOBA, 1970, p. 53, pl. 4, figs. 5a-c.

Occurrence and Repository: Central Area (Stn. 78, 88, 91, 92, 94, 95: 40-207 m); Bay Mouth Area (Stn. 116: 61 m); ESK Reg. no. F-9689 - 9695.

Geographic Distribution: Off the south coast of Hokkaido and the northwest and east coasts of North Honshū, and Lake Hamanako and the Seto Inland Sea; 9) 82-228 m; 23) 40-875 m, living 56-875 m; 24) 30 m; 25) 38-760 m, living 50-760 m; 27) 8-78 m; 28) 19-39 m; 29) 0.9-8.7 m, Living 8.7 m; 50); 55) 20-40 m; 76) 13-79 m.

Epistominella tubulifera (HERON-ALLEN and EARLAND)

Truncatulina tubulifera HERON-ALLEN and EARLAND, 1915, Trans. Zool. Soc. London, v. 20, no. 12, p. 710, pl.

52, figs. 37-40.

Alabamina tubulifera (HERON-ALLEN and EARLAND). BELFORD, 1966, p. 160-161, pl. 27, figs. 1-6, text-fig. 22-6.

Epistominella tubulifera (HERON-ALLEN and EARLAND). TODD. 1965, p. 31-32, pl. 10, figs. 2a-c.

Occurrence and Repository: open sea area (Stn. 144: 105 m); ESK Reg. no. F-9696.

Genus *Eilohedra* LIPPS, 1965

Eilohedra levicula (RESIG)

Pl. 14, figs. 2a-e

Epistominella levicula RESIG, 1958, Micropaleontology, v. 4, no. 3, p. 304, tf. 16a-c.

Epistominella nipponica KUWANO, 1962, p. 132, pl. 12, figs. 7a-c; MATOBA, 1967, p. 254-255, text-figs. 8a-f; pl. 26, figs. 13a-c.

Eilohedra levicula (RESIG). LIPPS, 1965, p. 124, 138, pl. 3, figs. 5a-c, text-fig. 3.

Occurrence and Repository: Bay Head Area (Stn. 17, 22, 32, 34, 44, 64: 66-156 m; living 149 m); Central Area (Stn. 66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 100, 101, 102, 103, 105: 23-225 m; living 75-225 m); Bay Mouth Area (Stn. 107, 108, 110, 113, 116, 118, 122, 125, 127, 132, 134, 137, 139, 141, 143: 60-140 m; living 74-140 m); open sea area (Stn. 144, 146: 105-213 m; living); ESK Reg. no. F-9697 - 9755; hypotype in fig. 2a, ESK Reg. no. F-9756 from Stn. 103; hypotype in fig. 2b, e, ESK Reg. no. F-9757 from Stn. 139; hypotype in fig. 2c, ESK Reg. no. F-9758 from Stn. 144; hypotype in fig. 2d, ESK Reg. no. F-9759 from Stn. 102.

Geographic Distribution: Off the northwest and southeast coasts of North Honshū and the Pacific coast from Central Honshū to Kyūshū; 23) 570-875 m; 24) 10-30 m; 25) 200-760 m, living 230- 760 m; 29) 0.9-8.7 m, living 8.7 m; 30); 32); 36) living 101-118 m; 48) 74-597 m, living 149-597 m; 51) 72-232 m with living specimens; 52) 31-585 m, living 80-585 m; 70) 70-808 m, living 70 m; 77) 122-745 m, living 122 m.

Remarks: The present specimens are identical to *Epistominella nipponica* KUWANO reported by kUWANO (1962) from Kagoshima Bay. But KUWANO's species has the aperture bordered by a lip extending along the basal suture of the last chamber between the umbilicus and periphery and it should be identified as *Eilohedra levicula* (RESIG).

Genus *Neoconorbina* HOFKER, 1951

Neoconorbina floridensis (CUSHMAN)

Discorbis bertheloti (D'ORBIGNY) var. *floridensis* CUSHMAN, 1931, U.S. Nat. Mus. Bull. 104, pt. 8, p. 17, pl. 3, figs. 3-5.

Neoconorbina floridensis (CUSHMAN). TODD, 1965, p. 15, pl. 2, figs. 4a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64: 66 m); Bay Mouth Area (Stn. 124, 137: 20-106 m; living 20 m); ESK Reg. no. F-9760 - 9762.

Neoconorbina stachi (ASANO)

Pl. 14, figs. 3a-c

Discopulvinulina stachi ASANO, 1951, Illust. Cat. Japan. Tert. Small. Foram., pt. 14, p. 7, text-figs. 46-48; TAKAYANAGI, 1955, p. 44, pl. 2, figs. 9a-b; MATSUNAGA, 1963, pl. 44, figs. 2a-c.

Neoconorbina stachi (ASANO). MATOBA, 1970, p. 57, pl. 4, figs. 6a-c; HASEGAWA, 1979, p. 152, pl. 4, figs. 11a-c.

Occurrence and Repository: Central Area (Stn. 66, 74, 92, 99, 103, 104: 28-185 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 116, 118, 122, 124, 127, 132, 134, 136, 137, 139, 141, 143: 20- 120 m; living 20-101 m); ESK Reg. no. F-9763 - 9784; hypotype in fig.

3a, ESK Reg. no. F-9785 from Stn. 139; hypotype in fig. 3b, ESK Reg. no. F-9786 from Stn. 139; hypotype in fig. 3c, ESK Reg. no. F-9787 from Stn. 136.

Geographic Distribution: Off the northwest and east coasts of North Honshū, the Pacific coast from Central Honshū to Kyūshū; 24) 14-58 m, living 14-49 m; 27) 28-78 m; 28) 27 m; 29) 1.2-12.5 m, living 12.5 m; 32); 45); 50); 51) 23-102 m, living 23-72 m; 52) 31 m; 56) 21 m; 70) 70-123 m with living specimens; 76) 7-40 m; 77) 35 m.

Genus *Patellinella* CUSHMAN, 1928

Patellinella carinata COLLINS

Pl. 14, figs. 4a-b

Patellinella carinata COLLINS, 1958, Brit. Mus. (Nat. Hist.) Great Barrier Reef Exped. 1928-29, Sci. Rep., v. 6, no. 6, Foraminifera, p. 407, pl. 5, fig. 8.

Occurrence and Repository: Bay Mouth Area (St. 136: 60 m); hypotype in fig. 4a, ESK Reg. no. F-9788 from Stn. 136; hypotype in fig. 4b, ESK Reg. no. F-9789 from Stn. 136.

Patellinella inconspicua (BRADY)

Pl. 14, figs. 5a-c

Textularia inconspicua BRADY, 1884, Rept. Challenger Expedition, Zool., pt. 22, v. 9, p. 357, pl. 42, figs. 6a-c.
Patellinella inconspicua (BRADY). BARKER, 1960, p. 86, pl. 42, figs. 6a-c.

Occurrence and Repository: Bay Head Area (Stn. 44, 63, 64: 66-144 m; living 66-138 m); Central Area (Stn. 67, 69, 70, 71, 74, 76, 78, 81, 83, 84, 87, 88, 92, 93, 95, 99, 101, 104: 23-220 m; living 88 m); Bay Mouth and open sea areas (Stn. 113, 116, 122, 127, 132, 134, 136, 139, 141, 143, 144: 60-112 m; living 105-112 m); ESK Reg. no. F-9790 - 9821; hypotype in fig. 5a, ESK Reg. no. F-9822 from Stn. 139; hypotype in fig. 5b, ESK Reg. no. F-9823 from Stn. 134; hypotype in fig. 5c, ESK Reg. no. F-9824 from Stn. 141.

Geographic Distribution: Toyama and Tanabe Bays; 42) 222-248 m; 56) 38 m.

Genus Planulinoides PARR, 1941

Planulinoides biconcava (JONES and PARKER)

Pl. 14, fig. 6

Discorbina biconcava JONES and PARKER *in* CARPENTER, PARKER and JONES, 1862, Ray Soc. Publs., p. 201; PARKER and JONES, 1865, Philos. Trans., v. 155, p.385, p.422, pl. 19, fig. 10b.
Planulinoides biconcava (JONES and PARKER). LOEBLICH and TAPPAN, 1964, p. C584, figs. 458, 4-6.

Occurrence and Repository: Bay Mouth Area (Stn. 127, 134: 74-112 m); ESK Reg. no. F-9825; hypotype in fig. 6, ESK Reg. no. F-9826 from Stn. 134.

Genus *Rosalina* D'ORBIGNY, 1826

Rosalina globularis D'ORBIGNY

Rosalina globularis D'ORBIGNY, 1826, Ann. Sci. Nat., v. 7, p. 271, no. 1, pl. 13, figs. 1-4; TODD, 1965, p. 11-12, pl. 3, figs. 4a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64: 66 m); Central Area (Stn. 70, 71, 72, 73, 74, 75, 76, 79, 80, 81, 84, 85, 87, 88, 89, 90, 91, 92, 93, 100, 102, 103, 104: 23-225 m; living 75-220 m); Bay Mouth Area (Stn. 107, 110, 113, 122, 125, 127, 134, 139, 143: 74-140 m; living 74 m); open sea area (Stn. 144, 146: 105-213 m); ESK Reg. no. F-9827 - 9861.

Geographic Distribution: Off the northwest coast of North Honshū and the south coast of Central Honshū; 24) 5-11 m, living 5 m; 37) 13-70 m; 38); 50); 56) 7-38 m; 57) 1.5-1.8; 60) 50-97.5 m.

Rosalina vilardeboana D'ORBIGNY

Pl. 14, figs. 7a-c

Rosalina vilardeboana D'ORBIGNY, 1839, Voy. Amer. Merid., Foraminiferes, v. 5, pt.5, p. 44, pl. 6, figs. 13-15; MATOBA, 1970, p. 61, pl. 4, figs. 10a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64: 66 m; living); Central Area (Stn. 70, 72, 73, 74, 75, 79, 80, 83, 85, 87, 88, 89, 90, 91, 92, 93, 101, 102, 103, 104: 23-225 m; living 23-225 m); Bay Mouth Area (Stn. 107, 113, 116, 122, 125, 134, 137, 139, 141: 60-140 m; living 61-112 m); open sea area (Stn. 144, 145: 155-213 m); ESK Reg. no. F-9862 - 9870; hypotype in fig. 7a, ESK Reg. no. F-9871 from Stn. 101; hypotype in fig. 7b, ESK Reg. no. F-9872 from Stn. 144; hypotype in fig. 7c, ESK Reg. no. F-9870 from Stn. 145.

Geographic Distribution: Off the west coast of Hokkaido, the northwest and southeast coasts of North Honshū, the north coast of Central Honshū and the Pacific coast from Central Honshū to Kyūshū; 6) 120 m; 11) 56-512 m; 23) 40-50 m, living 40 m; 24) 5-68 m, living 10-30 m; 29) 2.4-12.5 m; 30) 64-155 m; 34) 64-155 m; 37) 18-70 m; 41) 16.8-63 m; 48) 40-235 m, living 74-124 m; 51) 23-155 m with living specimens; 52) 80-408 m; living 80-120 m; 56) 9-38 m; 59) 7-8.6 m; 61) 74 m; 70) 70-202 m; living 70 m; 76) 7-79 m; 77) 35-122 m with living specimens.

Subfamily BAGGININAE CUSHMAN, 1927

Genus *Cancris* DE MONTFORT, 1808

Cancris auricula (FICHTEL and MOLL)

Pl. 14, figs. 8a-c

Nautilus auricula FICHTEL and MOLL, 1798, Testacea micro-scopica, p. 108, pl. 20, figs. a-f.

Cancris auriculus (FICHTEL and MOLL). KUWANO, 1962, pl. 16, figs. 1a-b; MATSUNAGA, 1963, pl. 47, figs. 8a-b; TODD, 1965, p. 22, pl. 5, fig. 5; BELFORD, 1966, p. 96-97, pl. 15, figs. 1-5.

Cancris auricula (FICHTEL and MOLL). HADA, 1931, p. 139, text-figs. 94a-c; MURRAY, 1970, p. 484, pl. 2, fig. 12; MURRAY, 1971, p. 137, pl. 57, figs. 1-7; HAGEMAN, 1979, p. 90, pl. 2, figs. 8a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64: 66 m; living); Central Area (Stn. 71, 73, 75, 79, 88, 100, 104, 105: 38-100 m; living 75-80 m); Bay Mouth Area (Stn. 106, 116, 139: 40-105 m); ESK Reg. no. F-9873 - 9884; hypotype in fig. 8a, ESK Reg. no. F-9873 from Stn. 116; hypotype in fig. 8b, ESK Reg. no. F-9875 from Stn. 73; hypotype in fig. 8c, ESK Reg. no. F-9885 from Stn. 64.

Geographic Distribution: Off the coast of North Honshū, the Pacific coast from Central Honshū to Kyūshū, and the Seto Inland Sea and coastal area at Hachijo Island; 18) 18-25 fms; 23) 40-95 m, living 50-67 m; 24) 27-75 m with living specimens; 27) 28-60 m; 28) 14-33 m; 30) 120-126 m; 32); 36) living 80-276 m; 37) 13-70 m; 40); 45); 48) 40-149 m with living specimens; 51) 23-155 m with living specimens; 52) 31-120 m with living specimens; 53); 54) 23 m; 55) 40-63 m; 60) 50-97.5 m; 62) 96 m with living specimens; 64) 60 m; 65) 6.5-19.9 m; 67) 234-481 m; 70) 70-202 m, living 70-123 m; 72); 77)

35-122 m with living specimens.

Genus *Valvulineria* CUSHMAN, 1926

Valvulineria aff. *hamanakoensis* (ISHIWADA)

Pl. 14, figs. 9a-f

Compared with:

Anomalina hamanakoensis ISHIWADA, 1958, Geol. Surv. Japan, Rep., no. 180, p. 18, text-figs. 3a-c, pl. 1, figs. 24-27.

Occurrence and Repository: Bay Head Area (Stn. 34, 44, 64: 66-149 m); Central Area (Stn. 66, 67, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 89, 90, 92, 93, 94, 97, 98, 100, 101, 102, 103: 28-225 m; living 75-145 m); Bay Mouth Area (Stn. 108, 110, 113, 116, 118, 122, 125, 127, 132, 134, 136, 137, 139, 141, 143: 60-140 m; living 60-112 m); open sea area (Stn. 144, 146: 105-213 m; living 105 m); ESK Reg. no. F-9886 - 9935; hypotype in fig. 9a, ESK Reg. no. F-9936 from Stn. 139; hypotype in fig. 9b, ESK Reg. no. F-9937 from Stn. 137; hypotype in fig. 9c, ESK Reg. no. F-9938 from Stn. 146; hypotype in fig. 9d, ESK Reg. no. F-9939 from Stn. 143; hypotype in fig. 9e, ESK Reg. no. F-9940 from Stn. 144; hypotype in fig. 9f, ESK Reg. no. F-9941 from Stn. 93.

Remarks: The specimens at hand have less inflated chambers than those of the specimens described under the name of *Valvulineria hamanakoensis* by ISHIWADA (1958) and MATOBA (1962).

Valvulineria sp.

Pl. 15, fig. 1

Occurrence and Repository: Central Area (Stn. 91: 207 m; living); Bay Mouth Area (Stn. 110: 110 m); ESK Reg. no. F-9942; hypotype in fig. 1, ESK Reg. no. F-9943 from Stn. 91.

Remarks: Only two specimens are in the collection. The present species are characterized by many foramens of three perforations.

Family GLABRATELLIDAE LOEBLICH and TAPPAN, 1964

Genus *Glabratella* DORREEN, 1948

Glabratella patelliformis (BRADY)

Pl. 15, figs. 2a-d

Discorbina patelliformis BRADY, 1884, Voy. Challenger, Rep., Zool., v. 9, p. 647, pl. 88, figs. 3a-c; pl. 89, figs. 1a-c.

Occurrence and Repository: Bay Head Area (Stn. 44: 144 m); Central Area (Stn. 80, 91, 103, 104: 38-225 m); Bay Mouth Area (Stn. 106, 108, 127, 132, 136, 137, 139: 40-120 m); open sea area (Stn. 144, 145: 105-155 m); ESK Reg. no. F-9944 - 9957; hypotype in fig. 2a, ESK Reg. no. F-9951, from Stn. 127; hypotype in figs. 2b-c, ESK Reg. no. F-9958, from Stn. 145; hypotype in fig. 2d, ESK Reg. no. F-9949, from Stn. 106.

Geographic Distribution: Off the southwest coast of Central Honshū, the south coast of Shikoku and the east coast of Kyūshū; 52) 31 m; 56) 7-38 m; 70) 70 m; 76) 7-40 m.

Glabratella tabernacularis (BRADY)

Discorbina tabernacularis BRADY, 1884, Voy. Challenger, Rep., Zool., v. 9, p. 648, pl. 89, fig. 7a-c.
Pileolina(?) *tabernacularis* (BRADY). BARKER, 1960, p. 184, pl. 89, fig. 7a-c.

Occurrence and Repository: Bay Mouth Area (Stn. 136: 60 m); ESK Reg. no. F-9959.

Geographic Distribution: Kii Strait and Kamaé Bay; 60) 50 m; 76) 10-57 m.

Remarks: Genus *Pileolina* BERMUDEZ, 1952 is regarded as a synonym of *Glabratella* DORREEN, 1948 by LOEBLICH and TAPPAN (1960).

Glabratella sp. 1

Pl. 15, figs. 3a-f

Occurrence and Repository: Bay Head Area (Stn. 12: 122 m); Central Area (Stn. 94, 100, 104: 38-105 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 116, 127, 132, 137, 139, 141, 143: 40-120 m); open sea area (Stn. 144, 146: 105-213 m); ESK Reg. no. F-9960 - 9976; hypotype in fig. 3a-b, ESK Reg. no. F-9977 from Stn. 146; hypotype in fig. 3c, ESK Reg. no. F-9978 from Stn. 127; hypotype in fig. 3d, ESK Reg. no. F-9979 from Stn. 137; hypotype in fig. 3e, ESK Reg. no. F-9980 from Stn. 106; hypotype in fig. 3f, ESK Reg. no. F-9981 from Stn. 110.

Remarks: The present specimens are characterized by high trochospiral tests with bead-like ornamentation.

Glabratella sp. 2

Pl. 15, figs. 4a-c

Occurrence and Repository: Bay Mouth and open sea areas (Stn. 106, 110, 141, 143, 145: 40-155 m); ESK Reg. no. F-9982 - 9986; hypotype in fig. 4a, ESK Reg. no. F-9984 from Stn. 141; hypotype in fig. 4b, ESK Reg. no. F-9987 from Stn. 106; hypotype in fig. 4c, ESK Reg. no. F-9988 from Stn. 110.

Remarks: The present specimens are characterized by planiconvex tests with radial ornamentation on the ventral side.

Genus *Angulodiscorbis* UCHIO, 1953

Angulodiscorbis quadrangularis UCHIO

Angulodiscorbis quadrangularis UCHIO, 1952, Japanese Jour. Geol. Geogr., v. 22, p. 156, pl. 7, figs. 4a-c.

Occurrence and Repository: Bay Mouth and open sea area (Stn. 127, 146: 74-213 m); ESK Reg. no. F-9989 - 9990.

Geographic Distribution: Off the southwest coast of Central Honshū and the southeast coast of Kyūshū, and the coastal areas at the Kii Peninsula and Hachijo Island; 40); 52) 31-80 m; 56) 12-31 m; 58); 60) 50 m; 76) 10-40 m; 77) 122 m.

Genus *Heronallenia* CHAPMAN and PARR, 1931

Heronallenia wilsoni (HERON-ALLEN and EARLAND)

Discorbina wilsoni HERON-ALLEN and EARLAND, 1922, British Antarctic (Terra Nova) Exped., Zool., v. 6, p. 206, pl. 7, figs. 17-19.
Heronallenia wilsoni (HERON-ALLEN and EARLAND). LOEBLICH and TAPPAN, 1964, p. C589, fig. 464, 4a-c; HERNELIN and SCOTT, 1985, p. 210, pl. 6, fig. 8.

Occurrence and Repository: Bay Mouth Area (Stn. 141: 60 m); ESK Reg. no. F-9991.

Superfamily SPIRILLINACEA REUSS, 1862

Family SPIRILLINIDAE REUSS, 1862

Subfamily SPIRILLININAE REUSS, 1862

Genus *Spirillina* EHRENBERG, 1843

Spirillina vivipara EHRENBERG

Spirillina vivipara EHRENBERG, 1843, K. Adad. Wiss. Berlin, Abhandl. (1841), p. 442, pl. 3, fig. 41.

Occurrence and Repository: Bay Mouth Area (Stn. 116, 137, 143: 61-106 m); ESK Reg. no. F-9992 - 9994.

Subfamily PATELLININAE RHUMBLER, 1906

Genus *Patellina* WILLIAMSON, 1858

Patellina corrugata WILLIAMSON

Patellina corrugata WILLIAMSON,1858, Ray Soc., p. 46, pl. 3, figs. 86-89, 89a; MATOBA, 1970, p. 58, pl. 5, figs. 6a-c; MURRAY, 1971, p. 147, pl. 61, figs. 2-5.

Occurrence and Repository: open sea area (Stn. 144: 105 m); ESK Reg. no. F-9995.

Geographic Distribution: Off the south coast of Hokkaido, the east coast of North Honshū and the southeast and southwest coasts of Central Honshū, and the coastal area at Hachijo Island; 13) 640 m with living specimens; 27) 28 m; 29) 2.5-12.5 m; 37) 23-70 m; 40); 45); 56) 21-31 m; 59) 7 m.

Superfamily ROTALIACEA EHRENBERG, 1839

Family ROTALIIDAE EHRENBERG, 1839

Subfamily ROTALIINAE EHRENBERG, 1839

Genus *Rotalia* LAMARCK, 1804

Rotalia sp.

Occurrence and Repository: Bay Mouth Area (Stn. 124: 20 m); ESK Reg. no. F-9996.

Remarks: Only two, imperfect specimens are in the collection.

Genus *Ammonia* BRÜNNICH, 1772

Ammonia beccarii (LINNÉ) forma A

Pl. 15, figs. 5a-b

Nautilus beccarii LINNÉ, 1758, Syst. Nat., ed. 10, p. 710, pl. 19, figs. 1a-c.
Rotalia beccarii (LINNÉ). BANDY, 1953, p. 29, pl. 22, figs. 8a-c.
Rotalia beccarii (LINNÉ) forma B. TAKAYANAGI, 1955, p. 45, text-figs. 32a-c; 33a-c.
Ammonia beccarii (LINNÉ) forma 1. MATOBA, 1970, p. 47-48, pl. 5, figs. 8a-c, 9a-c.

Occurrence and Repository: Bay Head Area (Stn. 17, 22, 32, 34, 44, 45, 63, 65: 39-156 m; living 39 m); Central Area (Stn. 71, 72, 73, 78, 82, 83, 84, 88, 98, 101, 104, 105: 36-216 m); Bay Mouth Area (Stn. 106, 107, 113, 124, 132: 20-100 m); ESK Reg. no. F-9997 - 10021; hypotype in fig. 5a, ESK Reg. no. F-10022 from Stn. 146; hypotype in fig. 5b, ESK Reg. no. F-9997 from Stn. 17.

Geographic Distribution: Off Soma City and Matsushima Bay; 29) 0.4-8.7 m, living 0.4-2.4 m; 32).

Remarks: The size of less inflated tests of the present species is larger (length up to 0.4 mm) than the following form (*A. beccarii* forma B).

Ammonia beccarii (LINNÉ) forma B

Pl. 15, fig. 6

Nautilus beccarii LINNÉ, 1758, Syst. Nat., ed. 10, p. 710.
Rotalia beccarii (LINNÉ) forma A. TAKAYANAGI, 1955, p. 44-45, text-figs. 30a-c; 31a-c.
Ammonia beccarii (LINNÉ) forma 2. MATOBA, 1970, p. 48, pl. 5, figs. 10a-c, 11a-c, 12a-c.
Ammonia beccarii (LINNÉ). HASEGAWA, 1979, p. 142, pl. 6, figs. 3a-d.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64, 65: 39-66 m); Central Area (Stn. 70, 73, 74, 79, 83, 84, 88, 92, 96, 99, 101, 102, 103, 104: 23-188 m; living 28 m); Bay Mouth Area (Stn. 107, 116: 61-96 m); ESK Reg. no. F-10023 - 10040; hypotype in fig. 6, ESK Reg. no. F-10036 from Stn. 102.

Geographic Distribution: Off Sōma City and Matsukawa-ura; 31); 32).

Remarks: Test is smaller than *A. beccarii* forma A (length up to 0.15 mm) and the chambers are inflated.

Ammonia japonica (HADA)

Pl. 15, figs. 7a-c

Rotalia japonica HADA, 1931, Tohoku Imp. Univ., Sci. Repts., 4th ser. (Biol.), v. 6, no. 1, p. 137, p. 138, text-fig. 93; TAKAYANAGI, 1955, pl. 2, figs. 13a-c; MATSUNAGA, 1963, pl. 46, figs. 3a-c.
Ammonia japonica (HADA). MATOBA, 1967, p. 251, pl. 27, figs. 1a-c; MATOBA, 1970, p. 48, pl. 5, figs. 14a-c, pl. 6, figs. 1a-c; HASEGAWA, 1979, p. 142, pl. 6, figs. 4a-c, 5.

Occurrence and Repository: Bay Head Area (Stn. 17, 63, 65: 39-146 m; living 39 m); Central Area (Stn. 69, 74, 78, 83: 28-150 m; living 36 m); ESK Reg. no. F-10041 - 10047; hypotype in fig. 7a, ESK Reg. no. F-10048 from Stn. 65; hypotype in fig. 7b, ESK Reg. no. F-10049 from Stn. 65; hypotype in fig. 7c, ESK Reg. no. F-10050 from Stn. 78.

Geographic Distribution: Off the southeast coast of Hokkaido, the northwest and east coasts of North Honshū, the northwest and southeast coasts of Central Honshū and the northwest coast of Kyūshū, the Seto Inland Sea, Kamaé Bay and the coastal area in the Kanto district; 8); 17) 100 m; 18) 5-33 fms; 23) 40-77 m, living 40-48 m; 24) 5-94 m, living 49 m; 27) 6-78 m; 28) 14-39 m; 29) 0.8-12.5 m with living specimens; 32); 35); 37) 6-52 m; 38); 41) 5.8-65 m; 54) 23 m; 55) 40-64 m; 63) 5 m; 64) 32-60 m; 65) 12.5-33 m; 72); 73); 76) 7-79 m.

Ammonia ketienziensis angulata (KUWANO)

Pl. 15, figs. 8a-c

Rotalia ketienziensis (ISHIZAKI) subsp. *angulata* KUWANO, 1950, Geol. Soc. Japan, Jour., v. 56, no. 657, p. 312; p. 313, tfs. 1, 9.
Streblus ketienziensis angulatus (KUWANO). KUWANO, 1962, pl. 23, figs. 1a-c; ISHIWADA, 1964, p. 17, pl. 6, figs. 92a-c; MATOBA, 1967, p. 251, pl. 27, figs. 2a-c.

Occurrence and Repository: Bay Head Area (Stn. 22, 44, 53, 63, 64, 65: 39-144 m); Central Bay (Stn. 67, 70, 72, 73, 74, 75, 76, 78, 79, 83, 84, 86, 87, 88, 90, 91, 92, 93, 94, 96, 97, 98, 99, 100, 101, 102, 104: 23-220 m; living 40-80 m); Bay Mouth Area (Stn. 106, 108, 110, 113, 127, 134, 139: 40-120 m); ESK Reg. no. F-10051 - 10090 hypotype in fig. 8a, ESK Reg. no. F-10084 from Stn. 106; hypotype in fig. 8b, ESK Reg. no. F-10091 from Stn. 113; hypotype in fig. 8c, ESK Reg. no. F-10092 from Stn. 139.

Geographic Distribution: Off the northwest coast of North Honshū and the Pacific

coast from Sanriku to the Bōsō Peninsula, and the Seto Inland Sea; 23) 40-150 m, living 56-95 m; 24) 8-150 m, living 94-150 m; 26) 81 m; 30); 33) 83-403 m; 36) living 73-118 m; 55) 42 m; 56) 15-38 m.

Genus *Pararotalia* Y. LE CALVEZ, 1949

Pararotalia aff. *globosa* (MILLETT)

Pl. 15, figs. 9a-d

Compared with:

Discorbina imperatoria (D'ORBIGNY) var. *globosa* MILLETT, 1903, Roy. Micr. Soc. London, Jour., p. 694, pl. 7, figs. 6a-c.

Pararotalia? *globosa* (MILLETT), ŌKI, 1975, p. 50-51, pl. 4, figs. 2a-d.

Occurrence and Repository: West-Sakurajima Passage (Stn. 63, 65: 39-138 m); Central Area (Stn. 66, 70, 71, 74, 75, 77, 78, 83, 88, 89, 93, 98, 102, 103, 104, 105: 23-196 m; living 78 m); Bay Mouth Area (Stn. 106, 107, 110, 118, 122, 124, 132, 139: 20-110 m); ESK Reg. no. F-10093 - 10118; hypotype in fig. 9a, ESK Reg. no. F-10118 from Stn. 139; hypotype in fig. 9b, ESK Reg. no. F- 10119 from Stn. 106; hypotype in fig. 9c, ESK Reg. no. F-10120 from Stn. 104; hypotype in fig. 9d, ESK Reg. no. F-10115 from Stn. 122.

Remarks: The specimens at hand are less inflated than the named species.

Genus *Pseudorotalia* REISS and MERLING, 1958

Pseudorotalia gaimardii (D'ORBIGNY)

Pl. 16, figs. 1a-b

Rotalia (Turbinulina) gaimardii D'ORBIGNY, 1826, Ann. Sci. Nat., Paris, v. 7, p. 275, no. 46.

Pseudorotalia gaimardii (D'ORBIGNY). MATOBA, 1967, p. 257, pl. 27, figs. 4a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 63, 64, 65: 39-138 m); Central Area (Stn. 67, 71, 77, 79, 82, 86, 88, 96, 99, 100, 102: 42-196 m; living 150 m); Bay Mouth Area (Stn. 132, 134, 136, 137, 141: 60-112 m); ESK Reg. no. F-10121 - 10139; hypotype in fig. 1, ESK Reg. no. F-10133 from Stn. 100.

Geographic Distribution: Off the northwest of North Honshū, the northwest coast of Central Honshū, the Pacific coast from Central Honshū to Kyūshū, and the Seto Inland Sea and Miyako Bay; 23) 48-95 m; 24) 10-78 m, living 10-49 m; 27) 20-60 m; 41) 28-64 m; 48) 40-149 m with living specimens; 51) 23-232 m, living 23-72m; 52) 31-120 m with living specimens; 54) 23 m; 56) 24-38 m; 58); 60) 50-97.5 m; 62) 96 m; 64) 32-60 m, living 46 m; 70) 70- 123 m, living 70 m; 76) 13-62 m; 77) 35-122 m with living specimens.

Family ELPHIDIIDAE GALLOWAY, 1933

Subfamily ELPHIDIINAE GALLOWAY, 1933

Genus *Elphidium* DE MONTFORT, 1808

Elphidium advenum (CUSHMAN)

Pl. 16, figs. 2a-b

Polystomella advena CUSHMAN, 1922, Publ. 311, Carnegie Instit. Washington, p. 56, pl. 9, figs. 11-12.

Elphidium advenum (CUSHMAN). CUSHMAN, 1933, p. 50, pl. 12, figs. 1-3; TAKAYANAGI, 1955, p. 24, pl. 1, fig. 24; ASANO, 1960, p. 195-196, pl. 22, figs. 3a-b; KUWANO, 1962, p. 129, pl. 17, fig. 6; MATSUNAGA, 1963, pl. 36, figs. 4a-b; ISHIWADA, 1964, p. 14-15, pl. 3, fig. 42; ŌKI, 1975, p. 51-52, pl. 4, figs. 3a-b; HAGEMAN, 1979, p. 93, pl. 5, figs. 2a-b, 3.

Occurrence and Repository: Bay Head Area (Stn. 17, 22, 32, 34, 42, 44, 45, 63, 64, 65: 39-170 m; living 39-149 m); Central Area (Stn. 66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 82, 83, 84, 86, 87, 88, 89, 90, 92, 93, 94, 97, 98, 99, 100, 101, 102, 103, 104: 23-225 m; living 36-150 m); Bay Mouth and open sea areas (Stn. 106, 107, 108, 110, 113, 116, 118, 122, 124, 125, 127, 132, 137, 139, 143, 144: 20-140 m); ESK Reg. no. F-10140 - 10198; hypotype in fig. 2a, ESK Reg. no. F-10199 from Stn. 146; hypotype in fig. 2b, ESK Reg. no. F-10200 from Stn. 34.

Geographic Distribution: The seas adjacent to Japan; 1); 3) 9-17.5 m; 5); 6) 120 m; 8); 11) 100 m; 13) 430 m; 14) 70-598 m; 15) 49-100 m; 19) 214-539 m; 21) 90-344 m; 23) 50-95 m; 24) 5-100 m, living 5-10 m; 26) 44-135 m; 27) 7-78 m; 28) 14-39 m; 29) 0.9- 5.2 m; 32); 33) 83-111 m; 34) 64-1180 m; 37) 6-70 m; 38); 39); 41) 28-65 m; 42) 83-248 m; 43) 45-430 m; 44) 75-421 m; 45); 46) 126-600 m; 47) 24-2226 m; 48) 40-597 m, living 235 m; 49) 2.2 m; 50); 51) 23-422 m, living 23-232 m; 52) 31-201 m; 53); 54) 23 m; 55) 20-63 m; 56) 7-38 m, living 7-25 m; 57) 1.5 m; 58); 59) 2.9-6.4 m; 60) 97.5 m; 61) 21-74 m; 62) 96 m; 63) 5-20 m; 65) 6.5-33 m; 66) 20.5-23 m; 67) 130-481 m; 69) 56-680 m; 70) 70-808 m; 71) 17-27 m; 72); 73); 74) 93-219 m; 75) 300 m; 76) 7-79 m; 77) 35- 122 m.

Elphidium articulatum (D'ORBIGNY)

Pl. 16, figs. 3a-b

Polystomella articulata D'ORBIGNY, 1839, Strasbourg, France, Levrault, tome 5, pt. 5, p. 30, pl. 3, figs. 9, 10.

Occurrence and Repository: Bay Head Area (Stn. 34, 44, 65: 39-149 m); Central Area (Stn. 70, 75, 77, 83: 23-196 m); Bay Mouth Area (Stn. 125, 134: 112-140 m); ESK Reg. no. F-10201 - 10209; hypotype in fig. 3a, ESK Reg. no. F-10210 from Stn. 65; hypotype in fig. 3b, ESK Reg. no. F-10211 from Stn. 65.

Geographic Distribution: The Seto Inland Sea; 66) 21-27 m.

Elphidium crispum (LINNÉ)

Pl. 16, figs. 4a-b

Nautilus crispus LINNÉ, 1758, Ed.10. Holmiae, Suecia (Sweden), impensis L. Salvii, tomus 1, p. 709.

Elphidium crispum (LINNÉ). MATOBA, 1967, p. 254, pl. 27, figs. 7a-b; MATOBA, 1970, p. 51, pl. 7, figs. 1a-b; MURRAY, 1971, p. 155, pl. 64, figs. 1-6; HAGEMAN, 1979, p. 94, pl. 5, figs. 6a-b; HASEGAWA, 1979, p. 147, pl. 8, figs. 2a-b.

Occurrence and Repository: West-Sakurajima Passage (Stn. 65: 39 m); Central Area (Stn. 103, 104: 38-175 m); Bay Mouth Area (Stn. 108, 124: 20-120 m); open sea area (Stn. 144, 145: 105-155 m); ESK Reg. no. F-10212 - 10218; hypotype in fig. 4a, ESK Reg. no. F-10219 from Stn. 124; hypotype in fig. 4b, ESK Reg. no. F-10220 from Stn. 124.

Geographic Distribution: Off the southwest coast of Hokkaido, the northwest coast of North Honshū, the northwest coast of Central Honshū, the Pacific coast from North Honshū to Kyūshū and the northwest coast of Kyūshū, the Seto Inland Sea and coastal areas of the Kii Peninsula, Okino-Erabu Island and Yoron Island; 5); 6) 120 m; 14) 70-505 m, living 70 m; 15) 49-100 m; 18) 10-25 fms; 19) 102-539 m; 21) 68-311 m; 23) 40-50 m; 24) 5-78 m, living 5-34 m; 27) 7-45 m; 28) 14-39 m; 29) 0.9-12.5 m; 35); 37) 10-70 m; 41) 6.1-28 m; 44) 75 m; 45); 46) 216-229 m; 47) 107-780 m; 48) 40 m; 50); 52) 31-120 m

with living specimens; 53); 54) 23 m; 56) 7-38 m; 57) 1.5-1.8 m; 58); 59) 7 m; 60) 50-97.5 m; 63) 8-15 m; 64) 60 m; 74) 93-115 m; 75) 90-152 m; 76) 7-57 m; 81); 82).

Elphidium depressulum CUSHMAN

Pl. 16, fig. 5

Elphidium advenum (CUSHMAN) var. *depressulum* CUSHMAN, 1933, U.S. Nat. Mus., Bull. 161, pt. 2, p. 51, pl. 12, fig. 4.

Occurrence and Repository: Bay Head Area (Stn. 44, 64, 65: 39-144 m); Central Area (Stn. 67, 70, 74, 78, 81, 82, 83, 84, 85, 86, 87, 95, 97, 102, 103, 104: 23-220 m; living 40 m); Bay Mouth Area (Stn. 106, 107, 134, 136, 137, 143: 40-112 m); open sea area (Stn. 146: 213 m); ESK Reg. no. F-10221 - 10246; hypotype in fig. 5, ESK Reg. no. F-10247 from Stn. 65.

Geographic Distribution: Off the east coast of North Honshū; 27) 6-78 m; 28) 19-37 m; 34) 64-155 m.

Elphidium hispidulum CUSHMAN

Elphidium hispidulum CUSHMAN, 1936, Contr. Cushman Lab. Foram. Res., v. 12, pt. 4, p. 83, pl. 14, figs. 13a-b.

Occurrence and Repository: Bay Mouth Area (Stn. 139: 105 m); ESK Reg. no. F-10248.

Geographic Distribution: Off Erimo-misaki and Tanabe Bay; 11) 56-320 m; 56) 7-33 m.

Elphidium jenseni (CUSHMAN)

Pl. 16, figs. 6a-c

Polystomella jenseni CUSHMAN, 1924, Carnegie Inst. Washington, Publ. no. 342 (Dept. Marine Biol., Papers), v. 21, p. 49, pl. 16, figs. 4, 6.

Elphidium jenseni (CUSHMAN). MATSUNAGA, 1963, pl. 36, figs. 11a-b; MATOBA, 1970, p. 52, pl. 7, figs. 3a-b; HASEGAWA, 1979, p. 147, pl. 8, figs. 2a-b.

Occurrence and Repository: Bay Head Area (Stn. 22, 44, 63, 64, 65: 39-144 m; living 39 m); Central Area (Stn. 66, 70, 74, 78, 83, 84, 88, 94, 104: 23-130 m); Bay Mouth Area (Stn. 106, 107, 116, 124: 20-96 m); ESK Reg. no. F-10249 - 10266; hypotype in fig. 6a, ESK Reg. no. F-10265 from Stn. 116; hypotype in fig. 6b, ESK Reg. no. F-10267 from Stn. 106; hypotype in fig. 6c, ESK Reg. no. F-10268 from Stn. 104.

Geographic Distribution: The seas adjacent to Japan; 1) 40 m; 3) 9-17.5 m; 5); 6) 120 m; 8); 14) 505 m; 19) 113-525 m; 21) 130-181 m; 23) 40-56 m; 24) 5-78 m, living 5-50 m; 27) 7-9 m; 28) 25-30 m; 29) 0.8-12.5 m, living 1.5-3.5 m; 32); 35); 37) 10-70 m; 38); 39); 42) 222 m; 44) 150 m; 45); 46) 201-296 m; 48) 40 m; 49) 2.7 m; 50); 51) 23 m with living specimens; 53); 54) 23 m; 55) 13-35 m; 56) 9-31 m; 57) 1.5-1.8 m; 58); 59) 7-8.6 m; 60) 50-97.5 m; 61) 34 m; 63) 5-20 m; 64) 32-60 m; 65) 6.5-33 m; 71) 17-27 m; 72); 73) 6-24 m; 74) 219 m; 75) 148 m; 76) 19-40 m.

Remarks: This species is distributed mainly in the coastal shallow water.

Elphidium oceanicum CUSHMAN

Pl. 16, figs. 7a-b

Elphidium oceanicum CUSHMAN, 1933, U.S. Nat. Mus. Bull. 161, pt. 2, p. 52, pl. 12, figs. 7a-b.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64: 66 m); Central Area (Stn. 67, 71, 74, 83, 101, 102: 28-165 m); Bay Mouth Area (Stn. 108, 139, 143: 96-120 m); ESK Reg. no. F-10269 - 10278; hypotype in fig. 7a, ESK Reg. no. F-10279 from Stn. 108; hypotype in fig. 7b, ESK Reg. no. F-10277 from Stn. 139.

Geographic Distribution: Coastal area at Kujūkuri-hama; 35).

Elphidium poeyanum (D'ORBIGNY)

Pl. 16, fig. 8

Polystomella poeyana D'ORBIGNY, *in* DE LA SAGRA, 1839, Hist. Fis. Pol. Nat. Cuba, "Foraminiferes", p. 55, pl. 6, figs. 25-26.

Occurrence and Repository: Bay Head Area (Stn. 34, 63: 138-149 m); Central Area (Stn. 66, 88, 90, 91, 95, 100: 75-215 m); Bay Mouth Area (Stn. 106: 40 m); ESK Reg. no. F-10280 - 10288; hypotype in fig. 8, ESK Reg. no. F-10289 from Stn. 106.

Elphidium cf. *selseyensis* (HERON-ALLEN and EARLAND)

Pl. 16, figs. 9a-e

Compared with:

Elphidium excavatum (TERQUEM) forma *selseyensis* (HERON-ALLEN and EARLAND). FEYLING-HANSEN, 1972, p. 341-342, pl. 4, figs. 1-7; pl. 5, figs. 1-7.

Occurrence and Repository: Bay Head Area (Stn. 34, 63: 138-149 m); Central Area (Stn. 70, 73, 78, 79, 81, 82, 83, 85, 86, 87, 88, 89, 92, 93, 94, 98, 100, 101, 103, 104, 105: 23-220 m); Bay Mouth Area (Stn. 106, 108, 116, 118, 124, 139, 141, 143: 20-120 m); open sea area (Stn. 145, 146: 155-213 m); ESK Reg. no. F-10290 - 10322; hypotype in fig. 9a, ESK Reg. no. F-10323 from Stn. 116; hypotype in fig. 9b, ESK Reg. no. F-10319 from Stn. 141; hypotype in fig. 9c, ESK Reg. no. F-10324 from Stn. 108; hypotype in fig. 9d, ESK Reg. no. F-10325 from Stn. 139; hypotype in fig. 9e, ESK Reg. no. F-10326 from Stn. 108.

Remarks: The specimens in the collection are quite identical to *Elphidium excavatum* forma *selseyensis* described by FEYLING-HANSSEN (1972), but have rather small tests.

Elphidium subincertum ASANO

Pl. 16, fig. 10

Elphidium subincertum ASANO, 1950, Illust. Cat. Japan. Small. Foram., pt. 1, p. 10, text-figs. 56, 57.
"*Elphidium*" *subincertum* ASANO. MATOBA, 1970, p. 53, pl. 7, figs. 10a-b.

Occurrence and Repository: Central Area (Stn. 70, 83, 87, 100, 102, 104: 23-182 m); Bay Mouth Area (Stn. 106, 107: 40-96 m); ESK Reg. no. F-10327 - 10334; hypotype in fig. 10, ESK Reg. no. F-10331 from Stn. 102.

Geographic Distribution: Around Oki Island, the Seto Inland Sea, Ishikari, Sagami, Tanabe, Ōmura and Kamaé Bays, and the coastal area of the Kii Peninsula; 5); 44) 239-402 m; 45); 50); 58); 59) 2.9-8.6 m; 60) 97.5 m; 63) 8 m; 73) 6-20.5 m; 76) 10-79 m.

Elphidium sp. 1

Pl. 16, figs. 11a-b

Occurrence and Repository: Central Area (Stn. 84, 85, 88, 89, 91, 93, 94, 96, 98, 100, 102, 103, 104: 38-220 m); Bay Mouth Area (Stn. 107, 116, 132, 137, 141: 60-106 m);

open sea area (Stn. 145: 155 m); ESK Reg. no. F-10335 - 10353; hypotype in fig. 11a, ESK Reg. no. F-10354 from Stn. 91; hypotype in fig. 11b, ESK Reg. no. F-10355 from Stn. 89.

Remarks: The present specimens are characterized by a small number of inflated chambers and the sutures filled with coarse material.

Elphidium sp. 2

Pl. 16, figs. 12a-b

Occurrence and Repository: Central Area (Stn. 73: 80 m); hypotype in fig. 12a, ESK Reg. no. F-10356 from Stn. 73; hypotype in fig. 12b, ESK Reg. no. F-10357 from Stn. 73.

Remarks: The present specimens are similar to *Elphidium excavatum* forma *selsey ensis* but differ therefrom in their sinuous sutures.

Genus *Protelphidium* HAYNES, 1956

Protelphidium hadleyana (SMITTER)

Elphidium hadleyana SMITTER, 1955, Palaeontologia Africana, Univ. Witwatersrand, Bernard Prince Inst. Pal. Res., Ann., Johannesburg, v. 3, p. 116; p. 115, fig. 40e-f.

Occurrence and Repository: Bay Head Area (Stn. 45, 65: 39-134 m); Central Area (Stn. 88, 92: 78-185 m); ESK Reg. no. F-10358 - 10361.

Protelphidium schmitti (CUSHMAN and WICKENDEN)

Pl. 17, figs. 1a-b

Elphidium schmitti CUSHMAN and WICKENDEN, 1929, U.S. Nat. Mus., Proc., no. 2780, v. 75, art. 9, p. 7, pl. 3, figs. 9a-c.

Occurrence and Repository: Bay Head Area (Stn. 44, 63, 64, 65: 39-144 m); Central Area (Stn. 66, 67, 70, 73, 74, 78, 83, 88, 89, 90, 92, 93, 94, 95, 96, 99, 100, 101, 102, 104: 23-215 m; living 23-78 m); Bay Mouth Area (Stn. 106, 107, 122, 124, 136, 143: 20-100 m); ESK Reg. no. F-10362 - 10391; hypotype in fig. 1a, ESK Reg. no. F-10392 from Stn. 65; hypotype in fig. 1b, ESK Reg. no. F-10393 from Stn. 65.

Family NUMMULITIDAE DE BLAINVILLE, 1825

Subfamily NUMMULITINAE DE BLAINVILLE, 1825

Genus *Nummulites* LAMARCK, 1801

Nummulites ammonoides (GRONOVIUS)

Pl. 17, figs. 2a-e

Nautilus ammonoides GRONOVIUS, 1781, Zoolphylacium Gronovianum, p. 282, pl. 19, figs. 5-6.
Operculina ammonoides (GRONOVIUS). HUANG, 1961, p. 86, pl. 3, figs. 22-23.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64, 65: 39-66 m); Central Area (Stn. 70, 71, 74, 78, 83, 87, 97, 99: 23-182 m; living 28 m); Bay Mouth Area (Stn. 106, 110, 124, 127, 136, 137: 20-110 m); ESK Reg. no. F-10394 - 10409; hypotype in fig. 2a, ESK Reg. no. F-10410 from Stn. 99; hypotype in fig. 2b, ESK Reg. no. F-10411 from Stn. 74; hypotype in fig. 2c, ESK Reg. no. F-10412 from Stn. 99; hypotype in fig. 2d, ESK Reg. no. F-10413 from Stn. 106; hypotype in fig. 2e, ESK Reg. no. F-10409 from Stn. 137.

Geographic Distribution: Kii Strait and Tanabe Bay; 56) 24-38 m, living 33 m; 57)

1.5 m; 60) 50-97.5 m.

Superfamily ORBITOIDACEA SCHWAGER, 1876

Family EPONIDIDAE HOFKER, 1951

Genus *Eponides* DE MONTFORT, 1808

Eponides procera (BRADY)

Pl. 17, fig. 3

Pulvinulina procera BRADY, 1884, Rep. Voy. Challenger, 1881, Quart. Jour., Micr. Sci., Exp., Repts, Zool., v. 4, p. 698, pl. 105, figs. 7a-c.
"*Eponides*?" *procera* (BRADY). BARKER, 1960, p. 216, pl. 105, figs. 7a-c.
Eponides procera (BRADY). HUANG, 1961, p. 87, pl. 3, figs. 6-8.

Occurrence and Repository: open sea area (Stn. 145: 155 m); hypotype in fig. 3, ESK Reg. no. F-10414 from Stn. 145.

Genus *Poroeponides* CUSHMAN, 1944

Poroeponides lateralis (TERQUEM)

Rosalina lateralis TERQUEM, 1878, Mem. Soc. Geol. France, ser.3, v. 1, no. 3, p. 25, pl. 2, figs. 11a-c.
Poroeponides lateralis (TERQUEM). HUANG, 1961, p. 87, pl. 4, figs. 29-30; LOEBLICH and TAPPAN, 1964, p. C683, figs. 546, 5a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64: 66 m); ESK Reg. no. F-10415.

Family AMPHISTEGINIDAE CUSHMAN, 1927

Genus *Amphistegina* D'ORBIGNY, 1826

Amphistegina cf. *gibbosa* D'ORBIGNY

Pl. 17, figs. 4a-c

Compared with:

Amphistegina gibbosa D'ORBIGNY, 1839, A. Bertrand, Paris, France, p. 120, v. 8, figs. 1-3; BRADY, 1884, pl. 111, figs. 2a-c, 4a-c.

Occurrence and Repository: Bay Head Area (Stn. 32, 44, 45, 63, 64, 65: 39-156 m; living 66 m); Central Area (Stn. 66, 67, 70, 71, 73, 74, 78, 83, 87, 88, 89, 92, 93, 97, 98, 99, 100, 102, 103, 105: 23-185 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 113, 116, 118, 122, 124, 127, 132, 134, 136, 141, 143: 20-120 m; living 60-96 m); open sea area (Stn. 146: 213 m); ESK Reg. no. F-10416 - 10457; hypotype in fig. 4a, ESK Reg. no. F-10458 from Stn. 99; hypotype in fig. 4b, ESK Reg. no. F-10459 from Stn. 48; hypotype in fig. 4c, ESK Reg. no. F-10460 from Stn. 99.

Remarks: The specimens in the collection are identical to the named species except for their rather thin tests.

Family CIBICIDIDAE CUSHMAN, 1927

Subfamily PLANULININAE BERMÚDEZ, 1952

Genus *Planulina* D'ORBIGNY, 1826

Planulina? sp.

Pl. 17, figs. 5a-c

Occurrence and Repository: Bay Mouth Area (Stn. 108, 139, 141, 143: 60-120 m); open sea area (Stn. 144, 146: 105-213 m); ESK Reg. no. F-10461 - 10466; hypotype in fig. 5a, ESK Reg. no. F-10467 from Stn. 144; hypotype in fig. 5b, ESK Reg. no. F-10468

from Stn. 144; hypotype in fig. 5c, ESK Reg. no. F-10469 from Stn. 139.

Remarks: The number of specimens are insufficient for the specific identification.

Genus *Hyalinea* HOFKER, 1951

Hyalinea balthica (SCHRÖTER)

Pl. 17, figs. 6a-d

Nautilus balthicus SCHRÖTER, 1783, Einleitung in die Conchylienkenntniss nach Linné, v. 1, p. 20, pl. 1, fig. 2.
Anomalina balthica (SCHRÖTER). CUSHMAN, 1931, p. 108, pl. 19, figs. 3a-c; ISHIWADA, 1964, p. 18, pl. 8, fig. 111.
Hyalinea balthica (GMELIN). BELFORD, 1966, p. 124-125, pl. 14, figs. 1-8: text-figs. 13, 1-3.
Hyalinea balthica (SCHRÖTER). LOEBLICH and TAPPAN, 1964, p. C686, figs. 552, 2a-c, 3.

Occurrence and Repository: Bay Head Area (Stn. 34: 149 m; living); Central Area (Stn. 66, 69, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 95, 96, 97, 101, 102, 103, 105: 28-225 m; living 95-220 m); Bay Mouth Area (Stn. 107, 108, 110, 113, 116, 122, 124, 125, 127, 132, 134, 136, 137, 139: 20-140 m; living 61-120 m); open sea area (Stn. 144, 146: 105-213 m; living 105 m); ESK Reg. no. F-10470 - 10517; hypotype in fig. 6a, ESK Reg. no. F-10518 from Stn. 110; hypotype in fig. 6b, ESK Reg. no. F-10519 from Stn. 101; hypotype in fig. 6c, ESK Reg. no. F-10520 from Stn. 139; hypotype in fig. 6d, ESK Reg. no. F-10521 from Stn. 139.

Geographic Distribution: Off the southwest coast of Hokkaido, the east coast of North Honshū and the Pacific coast from Central Honshū to Kyūshū; 6) 120 m; 27) 38 m; 32); 47) 107-864 m; 48) 74-597 m with living specimens; 51) 72-422 m, living 72-155 m; 52) 120-585 m; 61) 65 m; 67) 201-481 m; 69) 78-410 m; 70) 70-808 m, living 70 m; 76) 15-79 m; 77) 745 m.

Remarks: In most of the specimens at hand, the last 3 - 5 chambers are inflated. In general, chambers start to inflate at various stages in each individual, and the earlier the inflation, the smaller the diameter of the test.

Hyalinea inflata UJIIÉ and KUSUKAWA

Pl. 18, figs. 1a-d

Hyalinea inflata UJIIÉ and KUSUKAWA, 1969, Bull. Nat. Sci. Mus. Tokyo, v. 12, no. 3, p. 767-768, pl. 2, figs. 1-3.

Occurrence and Repository: Central Area (Stn. 73, 75, 79, 84, 86, 87, 88, 89, 90, 93, 94, 95, 97, 98, 99, 100, 102, 105: 42-215 m; living 93-170 m); Bay Mouth Area (Stn. 118, 122, 132, 134, 137, 139, 143: 96-112 m; living 100 m); ESK Reg. no. F-10522- 10546; hypotype in fig. 1a, ESK Reg. no. F-10547 from Stn. 90; hypotype in fig. 1b, ESK Reg. no. F-10548 from Stn. 139; hypotype in fig. 1c, ESK Reg. no. F-10549 from Stn. 132; hypotype in fig. 1d, ESK Reg. no. F-10550 from Stn. 132.

Geographic Distribution: Miyako and Yamada Bays; 27) 37-60 m; 28) 33 m.

Remarks: This species originally described by UJIIÉ and KUSUKAWA (1969) from Miyako and Yamada Bays in Iwate Prefecture, is characterized by inflation of the chamber. As already mentioned, the chamber of *Hyalinea balthica* starts to inflate at various stages. This species still has a probability to be synonymous with *balthica*.

Subfamily CIBICIDINAE CUSHMAN, 1927

Genus *Cibicides* DE MONTFORT, 1808

Cibicides inagawaensis MATSUNAGA

Pl. 18, figs. 2a-c

Cibicides inagawaensis MATSUNAGA, 1963, Tohoku Univ., Sci. Rep., 2nd ser. (Geol.), v. 35, no. 2, p. 116, pl. 51, figs. 5a-c.

Occurrence and Repository: Bay Head Area (Stn. 22, 32, 45, 64, 65: 39-156 m); Central Area (Stn. 67, 70, 71, 73, 74, 79, 80, 92, 99, 100, 101: 42-185 m; living 75 m); Bay Mouth Area (Stn. 106, 107, 110, 113, 116, 122, 124, 125, 127, 137, 139, 141, 143: 20-140 m; living 20-106 m); open sea area (Stn. 144, 145, 146: 105-213 m; living 105 m); ESK Reg. no. F-10551 - 10582; hypotype in fig. 2a, ESK Reg. no. F-10583 from Stn. 145; hypotype in fig. 2b, ESK Reg. no. F-10584 from Stn. 137; hypotype in fig. 2c, ESK Reg. no. F-10585 from Stn. 144.

Remarks: This species was originally described from the Pliocene Haizume and Shiroiwa Formations, Niigata Prefecture by MATSUNAGA (1963).

Cibicides lobatulus (WALKER and JACOB)

Nautilus lobatulus WALKER and JACOB, 1989, Adams Essays, p. 642, pl. 14, fig. 36.
Cibicides lobatula (WALKER and JACOB). CUSHMAN, 1931, p. 118, pl. 21, figs. 3a-c.
Cibicides lobatulus (WALKER and JACOB). MATOBA, 1970, p. 50, pl. 8, figs. 5a-c, 6a-c.

Occurrence and Repository: Bay Head Area (Stn. 45, 64, 65: 39-134 m); Central Area (Stn. 66, 70, 75, 92, 93, 99, 101: 23-185
m; living 42 m); Bay Mouth Area (Stn. 110, 113, 124, 136, 137, 139, 143: 20-110 m; living 106 m); open sea area (Stn. 144, 146: 105-213 m; living 105 m); ESK Reg. no. F-10586 - 10604.

Geographic Distribution: The seas adjacent to Japan; 5); 6) 220-265 m; 13) 135 m with living specimens; 14) 70-598 m, living 70-115 m; 15) 49-695 m, living 49-100 m; 17) 60-100 m; 18) 4-33 fms; 23) 40-50 m; 24) 5-78 m, living 10-49 m; 27) 9-78 m; 28) 19- 37 m; 29) 0.8-12.5 m; 30); 31); 32); 37) 10-70 m; 38); 39); 40); 42) 468-947 m; 43) 45-570 m; 47) 167-1488 m; 48) 40-74 m; 50); 51) 23-43 m with living specimens; 52) 31-80 m, living 31 m; 53); 54) 23 m; 55) 20-64 m; 56) 7-38 m; 58); 60) 50-97.5 m; 61) 23-74 m; 62) 96 m with living specimens; 63) 5-15 m; 64) 46-60 m; 65) 4.1-33 m; 66) 20.5-27 m; 69) 193-410 m; 70) 234 m; 71) 17-25 m; 72); 73) 6-20.5 m; 76) 10-62 m.

Genus *Caribeanella* BERMÚDEZ, 1952

Caribeanella cf. *polystoma* BERMÚDEZ

Pl. 18, figs. 3a-d

Compared with:

Caribeanella polystoma BERMÚDEZ, 1952, Venezuela, Minase Hidrocarb., Biol., Caracas, v. 2, no. 4, p. 121, pl. 27, figs. 18a-d.

Occurrence and Repository: West-Sakurajima Passage (Stn. 65: 39 m); Central Area (Stn. 66, 70, 71, 72, 73, 74, 75, 77, 81, 82, 83, 87, 88, 89, 92, 94, 98, 99, 102, 103, 104, 105: 23-220 m; living 42-145 m); Bay Mouth Area (Stn. 106, 108, 110, 116, 122, 125, 127, 132, 134, 136, 137, 139, 141, 143: 40-140 m); open sea area (Stn. 144, 145, 146: 105-213 m); ESK Reg. no. F-10605 - 10644; hypotype in fig. 3a, ESK Reg. no. F-10645 from

Stn. 99; hypotype in fig. 3b, ESK Reg. no. F-10646 from Stn. 66; hypotype in fig. 3c, ESK Reg. no. F-10629 from Stn. 108; hypotype in fig. 3d, ESK Reg. no. F-10635 from Stn. 132.

Remarks: Most of the specimens in the collection are of the juvenile stage and a few adult specimens are imperfect. Therefore, the secondary aperture, an important character of the named species, was not recognized.

Genus *Dyocibicides* CUSHMAN and VALENTINE, 1930

Dyocibicides biserialis CUSHMAN and VALENTINE

Dyocibicides biserialis CUSHMAN and VALENTINE, 1930, Contri. Dept. Geol., Stanford Univ., v. 1, no. 1, p. 31, pl. 10, figs. 1-2; MATSUNAGA, 1963, pl. 52, figs. 4a-b; HAYWARD and BUZAS, 1979, p. 52, pl. 12, fig. 155.

Occurrence and Repository: Bay Mouth Area (Stn. 137: 106 m); ESK Reg. no. F-10647.

Geographic Distribution: Off the south coast of Central Honshū; 45); 48) 74 m; 51) 23 m; 52) 31-120 m, living 31 m; 60) 50-97.5 m.

Family PLANORBULINIDAE SCHWAGER, 1877

Genus *Planorbulina* D'ORBIGNY, 1826

Planorbulina acervalis BRADY

Planorbulina acervalis BRADY, 1884, Rep. Voy. Challenger, Zool., v. 4, p. 657, pl. 92, fig. 4.

Occurrence and Repository: Bay Mouth Area (St. 124: 20 m); ESK Reg. no. F-10648.

Geographic Distribution: Kii Strait, Sagami Bay and the coastal area at the Kii Peninsula; 45); 57) 1.5-1.8 m; 58); 60) 50-97.5 m.

Family CYMBALOPORIDAE CUSHMAN, 1927

Genus *Cymbaloporetta* CUSHMAN, 1928

Cymbaloporetta bradyi (CUSHMAN)

Cymbalopora poey (D'ORBIGNY) var. *bradyi* CUSHMAN, 1915, U.S. Nat. Mus., Bull. 71, pt. 5, p. 25, pl. 10, fig. 2, pl. 14, fig. 2.

Cymbaloporetta bradyi (CUSHMAN). MATOBA, 1970, p. 50, pl. 8, figs. 7a-c.

Occurrence and Repository: Bay Mouth Area (Stn. 122: 100 m); ESK Reg. no. F-10649.

Geographic Distribution: Off the northwest coast of North Honshū, the Pacific coast of Central Honshū, Matsushima Bay and the coastal areas at the Kii Peninsula and Takara Island; 24) 8-14 m; 29) 2.2-4.4 m; 45); 50); 52) 31-80 m with living specimens; 55) 33 m; 56) 15-38 m; 57) 1.5-1.8 m; 58); 60) 50-97.5 m; 79).

Cymbaloporetta hemisphaerica ACCORDI and SELMI

Pl. 18, figs. 4a-f

Cymbaloporetta hemisphaerica ACCORDI and SELMI, 1952, Univ., Ann., Ferrara, n.s., sec. 9 (Sci. Geol., Pal.), v. 1, (1951-1953), no. 3, p. 95, pl. 2, figs. 18, 19.

Occurrence and Repository: Bay Head Area (Stn. 34, 45: 134-149 m); Central Area (Stn. 66, 69, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 98, 99, 100, 101 102, 103, 104, 105: 23-225 m; living 28-225 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 113, 116, 118, 122, 124, 125, 127, 132, 134,

136, 137, 139, 143: 20- 140 m; living 40-120 m); open sea area (Stn. 144: 105 m; living); ESK Reg. no. F-10650 - 10705; hyotype in fig. 4a, ESK Reg. no. F-10706 from Stn. 144; hypotype in fig. 4b, ESK Reg. no. F-10707 from Stn. 139; hypotype in fig. 4c, ESK Reg. no. F-10708 from Stn. 139; hypotype in fig. 4d, ESK Reg. no. F-10709 from Stn. 139; hypotype in fig. 4e, ESK Reg. no. F-10710 from Stn. 137; hypotype in fig. 4f, ESK Reg. no. F-10711 from Stn. 132.

Remarks: This species shows the *Discorbis*-form in the young stage and changes into quite a different form in the adult stage. This is the first record of the present species in Japanese waters.

Superfamily CASSIDULINACEA D'ORBIGNY, 1839

Family CAUCASINIDAE N.K. BYKOVA, 1959

Subfamily FURSENKOININAE LOEBLICH and TAPPAN, 1961

Genus *Fursenkoina* LOEBLICH and TAPPAN, 1961

Fursenkoina schreibersiana (CŽJŽEK)

Pl. 18, fig. 5

Virgulina schreibersiana CŽJŽEK, 1848, Haidinger's Nat. Abh., 2, p. 11, pl. 13, figs. 18-21.
Fursenkoina schreibersiana (CŽJŽEK). HAGEMAN, 1979, p. 98-99, pl. 7, fig. 4.

Occurrence and Repository: Central Area (Stn. 73, 74, 75, 86, 104: 28-165 m; living 165 m); Bay Mouth Area (Stn. 122: 100 m); ESK Reg. no. F-10712 - 10717; hypotype in fig. 5, ESK Reg. no. F-10716 from Stn. 104.

Geographic Distribution: Off the Pacific coast from Central Honshū to Kyūshū; 48) 124-235 m with living specimens; 52) 80 m with living specimens; 56) 31-38 m; 61) 34-80 m; 70) 70-202 m with living specimens; 77) 122 m with living specimens.

Remarks: This species has been reported only in the area of the Kuroshio current.

Genus *Sigmavirgulina* LOEBLICH and TAPPAN, 1957

Sigmavirgulina tortuosa (BRADY)

Pl. 18, figs. 6a-c

Bolivina tortuosa BRADY, 1881, Quart. Jour., Micr. Sci., v. 21, p. 51, (1884) Challenger Exp., Repts., Zool., v. 9, p. 420, pl. 52, figs. 31-32; BOLTOVSKOY, GIUSSANI, WATANABE and WRIGHT, 1980, p. 18, pl. 3, figs. 14-17.
Sigmavirgulina tortuosa (BRADY). LOEBLICH and TAPPAN, 1964, p. C733, fig. 601, 1a-c, 2-3; BARKER, 1960, p. 108, pl. 52, figs. 31-32.

Occurrence and Repository: Central Area (Stn. 70, 74, 92: 23-185 m); Bay Mouth Area (Stn. 124, 141: 20-60 m); open sea area (Stn. 146: 213 m); ESK Reg. no. F-10718 - 10723; hypotype in fig. 6a-b, ESK Reg. no. F-10723 from Stn. 141; hypotype in fig. 6c, ESK Reg. no. F-10721 from Stn. 124.

Geographic Distribution: Tanabe and Kamaé Bays and the coastal area at the Kii Peninsula; 56) 9-33 m; 58); 59) 8.6 m; 76) 35 m.

Genus *Virgulinella* CUSHMAN, 1932

Virgulinella sp.

Occurrence and Repository: Central Area (Stn. 81, 83, 85, 86, 87, 92, 94, 102: 36-220 m); ESK Reg. no. F-10724 - 10731.

Remarks: The specimens in the collection are rather few and mostly imperfect.

Family CASSIDULINIDAE D'ORBIGNY, 1839

Genus *Globocassidulina* VOLOSHINOVA, 1960

Globocassidulina oriangulata BELFORD

Pl. 18, figs. 7a-d

Globocassidulina oriangulata BELFORD, 1966, Bur. Min. Resour. Aust. Rep., no. 79, p. 148, pl. 25, figs. 1-5, text-fig. 16, nos. 13, 14; NOMURA, 1983, p. 43-45, text-fig. 36, pl. 3, figs. 16-17; pl. 6, fig. 16; pl. 16, figs. 11-12; pl. 17, figs. 1-2.

Occurrence and Repository: West-Sakurajima Passage (Stn. 65: 39 m; living); Central Area (Stn. 70, 71, 73, 74, 75, 76, 79, 80, 81, 84, 85, 86, 87, 88, 90, 91, 92, 97, 98, 101, 102, 103, 105: 23-225 m; living 88-162 m); Bay Mouth Area (Stn. 107, 108, 110, 113, 118, 122, 125, 127, 132, 134, 136, 137, 139, 141, 143: 60-140 m; living 60-140 m); open sea area (Stn. 144, 145, 146: 105-213 m; living 155-213 m); ESK Reg. no. F-10732 - 10773; hypotype in fig. 7a, ESK Reg. no. F-10774 from Stn. 113; hypotype in fig. 7b, ESK Reg. no. F-10775 from Stn. 137; hypotype in fig. 7c, ESK Reg. no. F-10776 from Stn. 143; hypotype in fig. 7d, ESK Reg. no. F-10777 from Stn. 110.

Globocassidulina subglobosa depressa ASANO and NAKAMURA

Cassidulina subglobosa depressa ASANO and NAKAMURA, 1937, Japanese Jour. Geol. Geogr., v. 14, nos. 2-3, p. 148, pl. 13, figs. 8a-c.

Occurrence and Repository: Central Area (Stn. 67, 71, 83, 92, 93, 94, 98: 36-185 m; living 145-185 m); Bay Mouth Area (Stn. 125, 136: 60-140 m; living 60 m); ESK Reg. no. F-10778 - 10786.

Geographic Distribution: Off the southwest coast of Hokkaido, the northeast coast of North Honshū and the Seto Inland Sea; 6) 220-742 m; 34) 64-155 m; 36) living 80-208 m; 65) 19.5 m.

Globocassidulina venustas NOMURA

Pl. 18, figs. 8a-b

Globocassidulina venustas NOMURA, 1983, Tohoku Univ., Sci. Rep., 2nd ser. (Geol.), v. 53, no, 1, p. 60-61, text-fig. 29, pl. 1, figs. 7a-c, 8; pl. 14, figs. 4-7.

Occurrence and Repository: Bay Mouth Area (Stn. 113, 118, 127, 132, 134, 136, 139, 143: 60-112 m); open sea area (Stn. 144, 145, 146: 105-213 m); ESK Reg. no. F-10787 - 10797; hypotype in fig. 8a, ESK Reg. no. F-10788 from Stn. 118; hypotype in fig. 8b, ESK Reg. no. F-10798 from Stn. 146.

Geographic Distribution: Tanabe Bay; 59) 6.4-8.6 m.

Genus *Cassidulina* D'ORBIGNY, 1826

Cassidulina nørvangi THALMANN

Pl. 19, figs. 1a-f

Cassidulina islandica NØRVANG var. *nørvangi* THALMANN, 1952, *in* PHLEGER, F.B., Cushman Found. Foram. Res., Contr., v. 3, pt. 2, p. 83, footnote 1; PHLEGER, 1952, pl. 14, fig. 30.

Occurrence and Repository: Bay Head Area (Stn. 22, 34, 63: 138-149 m); Central Area (Stn. 66, 67, 69, 70, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 84, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 100, 101, 102, 103, 105: 23 -225 m; living 40-225 m); Bay Mouth Area (Stn. 107, 108, 110, 113, 116, 118, 122, 125, 127, 132, 134, 136, 137,

139, 141, 143: 60-140 m; living 74-120 m); open sea area (Stn. 144, 145: 105-155 m; living 155 m); ESK Reg. no. F-10799 - 10853; hypotype in fig. 1a, ESK Reg. no. F-10854 from Stn. 101; hypotype in fig. 1b, ESK Reg. no. F-10855 from Stn. 145; hypotype in fig. 1c, ESK Reg. no. F-10856 from Stn. 101; hypotype in fig. 1d, ESK Reg. no. F-10857 from Stn. 139; hypotype in fig. 1e, ESK Reg. no. F-10858 from Stn. 101; hypotype in fig. 1f, ESK Reg. no. F-10859 from Stn. 145.

Geographic Distribution: Off the southwest coast of Hokkaido and the northwest coast of North Honshū, and Sendai Bay; 12) 56-80 m; 24) 5-68 m; 30).

Genus *Lernella* SAIDOVA, 1975

Lernella inflata (LEROY)

Pl. 19, figs. 2a-e

Cassidulina inflata LEROY, 1944, Quart. Colo. Sch. Mines, v. 36, no. 1, pt. 1, p. 37, pl. 4, figs. 30-31.
Cassidulinoides inflatus (LEROY). BELFORD, 1966, p. 54, pl. 26, figs. 14-17, nos. 13-14.
Lernella inflata (LEROY). NOMURA, 1983, p. 86-88, pl. 2, figs. 9a-c, pl. 24, figs. 4-5.

Occurrence and Repository: Central Area (Stn. 66, 73, 87, 88, 90, 91, 95, 97): Bay Mouth Area (Stn. 132, 134, 136: 60-112 m); ESK Reg. no. F-10860 - 10870; hypotype in fig. 2a, ESK Reg. no. F-10871 from Stn. 87; hypotype in fig. 2b, ESK Reg. no. F-10872 from Stn. 87; hypotype in fig. 2c, ESK Reg. no. F-10869 from Stn. 134; hypotype in fig. 2d, ESK Reg. no. F-10868 from Stn. 132; hypotype in fig. 2e, ESK Reg. no. F-10873 from Stn. 136.

Lernella ogasawarai NOMURA

Pl. 19, figs. 3a-c

Lernella ogasawarai NOMURA, 1983, Tohoku Univ., Sci. Rep., 2nd ser. (Geol.), v. 53, no. 1, p. 88-89, pl. 2, figs. 8a-b, pl. 24, figs. 8-9.
Cassidulinoides japonicus KUWANO, 1962, pl. 16, fig. 5.

Occurrence and Repository: Central Area (Stn. 72, 81, 91, 93, 94, 96, 98, 100, 102: 75-220 m; living 188 m); Bay Mouth Area (Stn. 113, 122, 125, 136, 139: 60-140 m; living 100 m); open sea area (Stn. 145: 155 m); ESK Reg. no. F-10874 - 10888; hypotype in fig. 3a, ESK Reg. no. F-10889 from Stn. 145; hypotype in fig. 3b, ESK Reg. no. F-10890 from Stn. 136; hypotype in fig. 3c, ESK Reg. no. F-10885 from Stn. 125.

Geographic Distribution: Off the Bōsō Peninsula; 36) living 141-333 m.

Genus *Paracassidulina* NOMURA, 1983

Paracassidulina minuta (CUSHMAN)

Pl. 19, figs. 4a-c

Cassidulina minuta CUSHMAN, 1933, Cushman Lab. Foram. Res., Contr., v. 9, pt. 4, p. 77-95, pls. 8-10.
Paracassidulina minuta (CUSHMAN). NOMURA, 1983, p. 66-67, pl. 5, figs. 16a-c.

Occurrence and Repository: Bay Head Area (Stn. 54: 125 m); Central Area (Stn. 67, 72, 75, 76, 77, 80, 81, 82, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96, 97, 98, 100, 101, 102, 103, 105: 75-225 m; living 93-225 m); Bay Mouth Area (Stn. 107, 108, 110, 137, 139: 96-120 m; 105-120 m); open sea area (Stn. 144, 145, 146: 105-213 m; living 105 m); ESK Reg. no. F-10891 - 10925; hypotype in fig. 4a, ESK Reg. no. F-10926 from Stn. 101; hypotype in fig. 4b, ESK Reg. no. F-10927 from Stn. 82; hypotype in fig. 4c, ESK

Reg. no. F-10928 from Stn. 102.

Paracassidulina quasicarinata NOMURA

Pl. 19, figs. 5a-f

Paracassidulina quasicarinata NOMURA, 1983, Tohoku Univ., Sci. Rep., 2nd ser. (Geol.), v. 53, no. 1, p. 100-101, pl. 2, figs. 19a-c; pl. 25, figs. 9-11.
Cassidulina neocarinata THALMANN. KUWANO, 1962, p. 132, pl. 16, fig. 2.

Occurrence and Repository: Central Area (Stn. 66, 67, 71, 72, 73, 74, 75, 78, 79, 80, 81, 84, 86, 87, 88, 89, 92, 93, 94, 95, 98, 99, 100, 101, 102, 103, 104, 105: 28-225 m; living 93-162 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 113, 116, 122, 125, 127, 132, 134, 136, 137, 139, 141, 143: 40-140 m; living 60-120 m); open sea area (Stn. 144, 145, 146: 105-213 m; living); ESK Reg. no. F-10929 - 10975; hypotype in fig. 5a, ESK Reg. no. F-10976 from Stn. 146; hypotype in fig. 5b, ESK Reg. no. F-10977 from Stn. 146; hypotype in fig. 5c, ESK Reg. no. F-10778 from Stn. 145; hypotype in fig. 5d, ESK Reg. no. F-10979 from Stn. 146; hypotype in fig. 5e, ESK Reg. no. F-10980 from Stn. 146; hypotype in fig. 5f, ESK Reg. no. F-10981 from Stn. 110.

Remarks: In the open sea area and the coastal area off the Ōsumi Peninsula which is under the influence of open-sea water, the frequency of the present species is rather high.

Family NONIONIDAE SCHULTZE, 1854

Subfamily NONIONINAE SCHULTZE, 1854

Genus *Astrononion* CUSHMAN and EDWARDS, 1937

Astrononion hanyudaense MATSUNAGA

Pl. 19, figs. 6a-b

Astrononion hanyudaense MATSUNAGA, 1963, Tohoku Univ., Sci. Rep., 2nd ser. (Geol.), p. 107, pl. 35, figs. 8a-b.
Nonion umbilicatulum UCHIO var. KUWANO, 1962, p. 129, pl. 14, figs. 7a-b.

Occurrence and Repository: Bay Head Area (Stn. 17, 22, 32, 34, 42, 44, 45, 63: 134-170 m; living 144 m); Central Area (Stn. 67, 68, 69, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 95, 96, 97, 98, 99, 100, 101, 102, 103: 40-225 m; living 78-225 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 113, 116, 122, 125, 132, 134, 139: 40-140 m; living 100 m); ESK Reg. no. F-10982 - 11033; hypotype in fig. 6a, ESK Reg. no. F-11034 from Stn. 103; hypotype in fig. 6b, ESK Reg. no. F-11035 from Stn. 91.

Astrononion stelligerum (D'ORBIGNY)

Pl. 19, figs. 7a-d

Nonionina stelligera D'ORBIGNY, 1839, *in* BARKER-WEBB and BERTHELOT, Hist. Nat. Canaries, v. 2, pt. 2, Zool., p. 128, pl. 3, figs. 1-2.
Astrononion sidebottomi CUSHMAN and EDWARDS. KUWANO, 1962, pl. 14, figs. 8a-b.
Astrononion stelligerum (D'ORBIGNY). CHIJI and LOPEZ, 1968, p. 104, pl. 15, fig. 11; HAYWARD and BUZAS, 1979, p. 41, pl. 5, fig. 57.

Occurrence and Repository: Bay Head Area (Stn. 32, 41: 156- 182 m); Central Area (Stn. 67, 70, 76, 78, 79, 80, 83, 84, 85, 87, 88, 89, 93, 94, 104: 23-225 m; living 88-225 m); Bay Mouth Area (Stn. 106, 107, 118, 122, 127, 132, 136, 137, 139, 141, 143: 40-106

m; living 60-100 m); open sea area (Stn. 144: 105 m); ESK Reg. no. F-11036 - 11064; hypotype in fig. 7a, ESK Reg. no. F-11046 from Stn. 84; hypotype in fig. 7b, ESK Reg. no. F-11065 from Stn. 141; hypotype in fig. 7c, ESK Reg. no. F-11066 from Stn. 144; hypotype in fig. 7d, ESK Reg. no. F-11067 from Stn. 144.

Geographic Distribution: The Seto Inland Sea, and Tōkyō and Tanabe Bays; 37) 18-53 m; 56) 21-38 m; 66) 23 m.

Genus *Florilus* DE MONTFORT, 1808

Florilus japonicus (ASANO)

Pl. 20, figs. 1a-c

Nonion japonicum ASANO, 1938, Jour. Geol. Soc. Japan, v. 45, no. 538, p. 593, pl. 15, figs. 1a-b, 2a-b; MATSUNAGA, 1963, pl. 37, figs. 3a-b.

Occurrence and Repository: Bay Head Area (Stn. 17, 22, 32, 34, 44, 63, 64, 65: 39-156 m; living 138-156 m); Central Area (Stn. 66, 67, 68, 69, 70, 72, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 95, 96, 97, 98, 99, 100, 101, 103, 104, 105: 23-225 m; living 28-220 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 116, 125, 134, 139, 143: 40-140 m); ESK Reg. no. F-11068 - 11118; hypotype in fig. 1a, ESK Reg. no. F-11119 from Stn. 82; hypotype in fig. 1b, ESK Reg. no. F-11120 from Stn. 82; hypotype in fig. 1c, ESK Reg. no. F-11121 from Stn. 82.

Geographic Distribution: Off the coast of North Honshū, the north coast from Central to West Honshū, the Pacific coast from Central Honshū to Kyūshū and the northwest coast of Kyūshū, and Lake Saroma; 3) 9-17.5 m; 19) 130-539 m; 21) 130-311 m; 23) 40-80 m, living 48-77 m; 24) 18-100 m with living specimens; 25) 50 m with living specimens; 37) 13-53 m; 38); 39); 44) 75-150 m; 46) 84-481 m; 48) 40-235 m, living 40-149 m; 50); 51) 23-155 m with living specimens; 52) 31-80 m with living specimens; 53); 54) 23 m; 55) 33-40 m; 56) 15-25 m, living 15 m; 61) 21-74 m; 62) 96 m; 64) 46-60 m; 65) 17.3-19.9 m; 66) 21 m; 70) 123-390 m; 71) 25-27 m; 73); 74) 93-406 m; 75) 90-300 m; 76) 13-62 m; 77) 35-122 m, living 35 m.

Florilus manpukuziense (OTUKA)

Pl. 20, figs. 2a-b

Nonion manpukuziense OTUKA, 1932, Geol. Soc. Tokyo, Jour., v. 39, no. 469, p. 655; p. 654, tf. 5; ISHIWADA, 1964, p. 1 , pl. 3, fig. 34.

Nonion manpukujiense OTUKA. MATSUNAGA, 1963, pl. 37, figs. 6a-b; ŌKI, 1975, p. 55, pl. 5, fig. 5.

Occurrence and Repository: Bay Head Area (Stn. 15, 22, 42, 44, 53: 94-170 m); West-Sakurajima Passage (Stn. 63, 64, 65: 39-138 m); Central Area (Stn. 67, 74, 83, 104: 28-165 m; living 38 m); ESK Reg. no. F-11122 - 11133; hypotype in fig. 2a, ESK Reg. no. F-11134 from Stn. 65; hypotype in fig. 2b, ESK Reg. no. F-11135 from Stn. 65.

Geographic Distribution: Off the northeast coast of North Honshū, the north and southeast coasts of Central Honshū, the south coast of Shikoku, the north coast of West Honshū and the northwest coast of Kyūshū, and the Seto Inland Sea; 19) 205 m; 27) 28-78 m; 28) 25-34 m; 36) living 73-127 m; 37) 6-70 m; 41) 7.8-65 m; 42) 83 m; 44) 101-123 m; 46) 128-152 m; 55) 13-64 m; 60) 50-97.5 m; 69) 56-193 m; 74) 93-132 m; 75) 148 m.

Remarks: This species was originally described from the Pliocene Formation at

Manpukuji, Kawasaki City, Kanagawa Prefecture by OTUKA (1932). In Kagoshima Bay, the present species occurs in near shore waters in the Bay Head and the Central Areas. At Station 65 located at the West-Sakurajima Passage where the tidal current is very strong, the frequency of the present species is high (5%).

Florilus? pauperatus (BALKWILL and WRIGHT)

Pl. 20, figs. 3a-d

Nonionina pauperata BALKWILL and WRIGHT, 1885, Roy. Irish Acad., Trans., v. 28, p. 353, pl. 13, figs. 25-26.
Anomalina? pauperata (BALKWILL and WRIGHT). KUWANO, 1962, pl. 14, figs. 6a-b.
Florilus pauperatus (BALKWILL and WRIGHT). BOLTOVSKOY, GIUSSANI, WATANABE and WRIGHT, 1980, p. 33, pl. 16, figs. 15-18.

Occurrence and Repository: West-Sakurajima Passage (Stn. 63, 64, 65: 39-138 m; living 66 m); Central Area (Stn. 75, 80, 87, 88, 92, 99, 100, 101: 42-225 m; living 225 m); Bay Mouth Area (Stn. 107, 110, 113, 125, 127, 132, 134, 136, 139, 141, 143: 60-140 m; living 60-96 m); open sea area (Stn. 145, 146: 155-213 m; living); ESK Reg. no. F-11136 - 11159; hypotype in fig. 3a, ESK Reg. no. F-11160 from Stn. 145; hypotype in fig. 3b, ESK Reg. no. F-11161 from Stn. 143; hypotype in fig. 3c, ESK Reg. no. F-11162 from Stn. 64; hypotype in fig. 3d, ESK Reg. no. F-11163 from Stn. 141.

Geographic Distribution: Off the northwest coast of North Honshū and the Bōsō Peninsula, and Matsushima Bay; 24) 14-75 m; 29) 2.5 m; 36) living 73-378 m.

Remarks: At the shallow water area in the open sea and the West-Sakurajima Passage areas, rather high frequencies (2-5%) were found.

Genus *Pseudononion* ASANO, 1936

Pseudononion grateloupi (D'ORBIGNY)

Pl. 20, figs. 4a-b

Nonionina grateloupi D'ORBIGNY, 1926, Ann. Sci. Nat., Paris, ser. 1, v. 7, p. 294, pl. 6, figs. 6-7.
Nonion grateloupi (D'ORBIGNY). CUSHMAN, 1930, p. 10, pl. 3, figs. 9-11, pl. 4, figs. 1-4; COLE, 1931, p. 32, pl. 7, figs. 7-8; CUSHMAN, 1933, p. 43, pl. 10, figs. 8a-c; ASANO, 1938d, p. 594, pl. 15(4), fig. 14; ASANO, 1950, p. 2, text-figs. 3-4; ASANO, 1960, p. 190, pl. 21, figs. 7a-b; MATSUNAGA, 1963, pl. 37, figs. 5a-b; ISHIWADA, 1964, p. 8, pl. 3, fig. 32; ŌKI, 1975, p. 54-55, pl. 5, fig. 4.
Nonion grateloupi (D'ORBIGNY) forma A. KUWANO, 1962, pl. 19, figs. 10a-c.
Nonion grateloupi (D'ORBIGNY) forma B. KUWANO, 1962, pl. 20, figs. 1a-c.

Occurrence and Repository: Bay Head Area (Stn. 22, 32, 34, 54, 63, 65: 39-156 m); Central Area (Stn. 66, 67, 69, 70, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 86, 87, 88, 89, 92, 93, 94, 96, 97, 100, 102, 103, 104, 105: 23-225 m; living 28-220 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 113, 116, 122, 132, 134, 139, 143: 40-120 m; living 96-105 m); open sea area (Stn. 144, 146: 105-213 m); ESK Reg. no. F-11164 - 11212; hypotype in fig. 4a, ESK Reg. no. F-11213 from Stn. 144; hypotype in fig. 4b, ESK Reg. no. F-11214 from Stn. 78.

Geographic Distribution: Off the coast of Hokkaido, the coast of North Honshū, the north coast of Central Honshū and the northwest coast of Kyūshū, Kii and Tsushima Straits and Kamaé Bay; 1) 40+ m; 9) 276 m; 10) 165-655 m; 11) 660 m with living specimens; 13) 240-430 m, living 430 m; 15) 695 m; 17) 100 m; 19) 102 m; 21) 113 m; 23) 570-875 m, living 650-875 m; 24) 10-78 m, living 49-50 m; 26) 135-283 m; 30); 33) 83-504 m; 34) 64 m; 44) 150-421 m; 45); 46) 130-481 m; 52) 408 m; 56) 9-38 m, living 9-15 m; 59)

7-8.6 m; 61) 54-74 m; 62) 96 m; 64) 32-46 m; 74) 115-406 m; 76) 17.5-79 m.

Remarks: In the coastal water of the Central Area, rather high frequencies of the present species were found.

Pseudononion japonicum ASANO

Pl. 20, fig. 5

Pseudononion japonicum ASANO, 1936, Jour. Geol. Soc. Japan, v. 43(512), p. 347-348, text-figs. a-c; ASANO, 1938b, pl. 7, figs. 1a-c; ASANO, 1938d, p. 597, pl. 15(4), figs. 11a-c; TAKAYANAGI, 1955, pl. 1, figs. 22a-b; ASANO, 1960, p. 193, pl. 21, figs. 2a-c; ISHIWADA, HIGUCHI and KIKUCHI, 1962, fig. 3; KUWANO, 1962, pl. 21, figs. 2a-b; MATSUNAGA, 1963, pl. 38, figs. 7a-c; ISHIWADA, 1964, p. 16, pl. 3, figs. 39a-b; MATOBA, 1967, p. 257, pl. 29, figs. 9a-c; MATOBA, 1970, p. 58, pl. 8, figs. 9a-c; ŌKI, 1975, p. 55-56, pl. 5, figs. 6a-b.

Occurrence and Repository: Bay Head Area (Stn. 34, 63, 64, 65: 39-149 m); Central Area (Stn. 70, 71, 72, 73, 74, 76, 78, 80, 82, 83, 85, 86, 87, 88, 90, 93, 94, 98, 99, 100, 101, 103, 104, 105: 23-225 m; living 38-225 m); Bay Mouth Area (Stn. 106, 107, 108, 116, 118, 122, 124, 132, 134, 137, 139: 20-120 m); open sea area (Stn. 145: 155 m); ESK Reg. no. F-11215 - 11254; hypotype in fig. 5, ESK Reg. no. F-11255 from Stn. 65.

Geographic Distribution: The seas adjacent to Japan; 1) 43-150 m; 3) 9 m; 5); 8); 11) 56 m with living specimens; 12) 19-31 m; 13) 135 m with living specimens; 14) 598 m; 19) 165-325 m; 21) 112-188 m; 24) 30 m; 26) 44-135 m; 27) 9-78 m; 28) 19-39 m; 29) 0.7-5.7 m; 30); 32); 34) 64-155 m; 35); 36) living 59-80 m; 38); 39); 41) 5-47 m; 45); 46) 126-516 m; 47) 764-835 m; 49) 2.2 m; 53); 55) 20-42 m; 60) 50-97.5 m; 61) 34-60 m; 64) 60 m; 67) 201 m; 71) 27 m; 73) 8-20.5 m; 74) 194-219 m; 76) 7-24 m; 78) living 23 m.

Genus *Nonionella* CUSHMAN, 1926

Nonionella stella CUSHMAN and MOYER

Nonionella miocenica CUSHMAN, var. *stella* CUSHMAN and MOYER, 1930, Contr. Cushman Lab. Foram. Res., v. 6, p. 56, pl. 7, figs. 17a-c; BANDY, 1953, p. 29, pl. 22, figs. 2a-c.

Nonionella miocenica stella CUSHMAN and MOYER. ASANO, 1950, pt. 1, p. 5, text-figs. 25-26; MATSUNAGA, 1963, p. 88, pl. 38, figs. 2a-c.

Nonionella stella CUSHMAN and MOYER. ISHIWADA, HIGUCHI and KIKUCHI, 1962, p. 71, pl. 1, figs. 2a-b; PHLEGER, 1964, p. 383, pl. 1, figs. 33-34; ISHIWADA, 1964, p. 37, pl. 3, figs. 41a-b; MATOBA, 1967, p. 256, pl. 29, figs. 10a-b; MATOBA, 1970, p. 57, pl. 8, figs. 8a-c; ŌKI, 1975, p. 56-57, pl. 5, fig. 7.

Occurrence and Repository: Bay Head Area (Stn. 34: 149 m); Central Area (Stn. 72, 102: 162-216 m); ESK Reg. no. F-11256-11258.

Geographic Distribution: Off the southwest and south coasts of Hokkaido, the northwest and east coasts of North Honshū, the northwest and southeast coasts of Central Honshū, the Seto Inland Sea, Kii Strait and Kamaé Bay; 5); 9) 36-120 m; 11) 56-320 m, living 56-100 m; 12) 28-70 m; 13) 84-135 m with living specimens; 23) 40-760 m, living 48-173 m; 24) 20-98 m, living 30-94 m; 25) 38-230 m with living specimens; 26) 44-146 m; 29) 0.8-12.5 m, living 2.4 m; 30); 33) 83-154 m; 34) 64-1180 m; 37) 6-70 m; 38); 41) 16.8-65 m; 50); 54) 23 m with living specimens; 59) 7-8.6 m; 62) 96 m; 64) 39 m; 76) 10-15 m.

Nonionella turgida (WILLIAMSON)

Pl. 20, figs. 6a-c

Rotalina turgida WILLIAMSON, 1858, Ray Soc., Paris, p. 50-51, pl. 4, figs. 95-97.

Nonionella turgida (WILLIAMSON). MURRAY, 1970, p. 484, pl. 2, figs. 3-4, 8; MURRAY, 1971, p. 193, pl. 81, figs. 1-5.

Nonionella subextensa KUWANO, 1962, pl. 20, figs. 2, 3a-c.

Occurrence and Repository: Central Area (Stn. 71, 73, 75, 79, 80, 86, 87, 88, 89, 91, 92, 93, 95, 96, 97, 98, 101: 78-225 m; living 78-170 m); Bay Mouth Area (Stn. 118: 101 m); ESK Reg. no. F-11259 - 11276; hypotype in fig. 6a, ESK Reg. no. F-11277 from Stn. 88; hypotype in fig. 6b, ESK Reg. no. F-11278 from Stn. 92; hypotype in fig. 6c, ESK Reg. no. F-11267 from Stn. 89..

Geographic Distribution: Off the Pacific coasts of Central Honshū and Shikoku; 48) 597 m; 51) 232-665 m with living specimens; 70) 808 m.

Genus *Pullenia* PARKER and JONES, 1862

Pullenia quinqueloba (REUSS)

Pl. 20, figs. 7a-c

Nonionina quinqueloba REUSS, 1851, Geol. Ges., Zeit-schr., Berlin, Bd. 3, p. 71, pl. 5, figs. 31a-b.
Pullenia salisburyi STEWART and STEWART var. KUWANO, 1962, pl. 21, figs. 3a-b.
Pullenia quinqueloba (REUSS). PHLEGER, 1964, p. 383, pl. 3, fig. 23.

Occurrence and Repository: Bay Head Area (Stn. 45: 134 m); Central Area (Stn. 67, 73, 75, 79, 80, 81, 84, 86, 88, 90, 97, 100, 102: 75-225 m; living 75-215 m); Bay Mouth Area (Stn. 108, 110, 113, 118, 122, 132, 134, 139, 143: 96-120 m); open sea area (Stn. 145: 155 m); ESK Reg. no. F-11279 - 11302; hypotype in fig. 7a, c, ESK Reg. no. F-11303 from Stn. 143; hypotype in fig. 7b, ESK Reg. no. F-11304 from Stn. 139.

Geographic Distribution: Tōkyō, Sagami, Toyama and Kamaé Bays; 37) 10-70 m; 42) 248 m; 45); 76) 35 m.

Pullenia subcarinata (D'ORBIGNY)

Nonionina subcarinata D'ORBIGNY, 1839, Voy. Amer. Merid., v. 5, pt. 5, p. 28, pl. 5, figs. 23-24

Occurrence and Repository: open sea area (Stn. 144: 105 m); ESK Reg. no. F-11305.

Geographic Distribution: Off the southwest coast of Central Honshū and Shikoku; 51) 665 m; 70) 123-808 m.

Family ALABAMINIDAE HOFKER, 1951

Genus *Oridorsalis* ANDERSEN, 1961

Oridorsalis tener (BRADY)

Pl. 20, figs. 8a-d

Truncatulina tenera BRADY, 1884, Rept. Challenger Exped., Zool., pt. 22, v. 9, p. 665, pl. 95, fig. 11.
Eponides tener (BRADY). BANDY, 1953, p. 29, pl. 23, figs. 3a-c.
Oridorsalis tener (BRADY). CORLISS, 1979, p. 4, pl. 4, figs. 10-15; INGLE, KELLER and KOLPACK, 1980, p. 142, pl. 5, figs. 5-6.

Occurrence and Repository: Central Area (Stn. 67, 72, 76, 77, 79, 80, 81, 84, 85, 86, 88, 91, 93, 95, 96, 97, 98, 100, 102, 103: 75-225 m); Bay Mouth Area (Stn. 107, 110, 113, 118, 122, 134: 96-112 m); ESK Reg. no. F-11306 - 11331; hypotype in fig. 8a, ESK Reg. no. F-11332 from Stn. 86; hypotype in fig. 8b, d, ESK Reg. no. F-11328 from Stn. 113; hypotype in fig. 8c, ESK Reg. no. F-11333 from Stn. 97.

Family OSANGULARIIDAE LOEBLICH and TAPPAN, 1964

Genus *Gyroidinoides* BROTZEN, 1942

Gyroidinoides acuta BOOMGAART

Pl. 21, figs. 1a-c

Gyroidina neosoldanii BROTZEN, var. *acuta* BOOMGAART, 1949, Min. Geol. Inst. Rijks Univ., Utrecht, p. 125, pl. 14, figs. 1a-c; BELFORD, 1966, p. 165, 167, pl. 28, figs. 1-9, text-fig. 21, nos. 6-7.

Occurrence and Repository: Central Area (Stn. 78, 79, 83, 89, 92, 101: 36-185 m); Bay Mouth Area (Stn. 110, 113, 118, 122, 125, 132, 136, 137, 139, 143: 60-140 m); open sea area (Stn. 144, 145, 146: 105-213 m); ESK Reg. no. F-11334 - 11352; hypotype in fig. 1a, ESK Reg. no. F-11353 from Stn. 146; hypotype in fig. 1b, ESK Reg. no. F-11354 from Stn. 144; hypotype in fig. 1c, ESK Reg. no. F-11355 from Stn. 144.

Remarks: Rather high frequencies of the present species were found in the open sea area and the southern part of the Bay Mouth Area.

Gyroidinoides kuwanoi ŌKI, n. sp.

Pl. 21, figs. 2a-c

Test small, unequally biconvex, dorsal side slightly convex, ventral side strongly convex, umbilicate, periphery broadly rounded; chambers 7 or 8 in the lastformed whorl, distinct; wall smooth throughout, thin, translucent; sutures distinct, not depressed on the dorsal side, slightly depressed on the ventral side; aperture, a narrow opening on the ventral edge of the chamber between the umbilicus and periphery.

Types and Dimensions: Holotype in fig. 2a, ESK Reg. no. F-11356 from Stn. 80, maximum diameter 0.12 mm, thickness 0.06 mm ; paratype in fig. 2b, ESK Reg. no. F-11357 from Stn. 81, maximum diameter 0.11, thickness 0.05 mm; paratype in fig. 2c, ESK Reg. no. F-11358 from Stn. 103, maximum diameter 0.13 mm, thickness 0.06 mm.

Occurrence and Repository: Central Area (Stn. 66, 67, 71, 73, 75, 76, 79, 80, 81, 84, 85, 86, 87, 88, 90, 92, 93, 94, 96, 97, 98, 99, 101, 102, 103, 105: 42-225 m; living 80-185 m); Bay Mouth and open sea areas (Stn. 107, 108, 110, 113, 118, 132, 134, 136, 137, 139, 141, 143, 144: 60-120 m; living 105-120 m); ESK Reg. no. F-11359 - 11397.

Remarks: The specimens in the collection are identical to *Gyroidina kagoshimaensis* KUWANO (MS) reported by KUWANO (1962) from Kagoshima Bay. But no description of this species was given by KUWANO. The generic position of this new species is to be *Gyroidinoides*.

Gyroidinoides nipponicus (ISHIZAKI)

Pl. 21, figs. 3a-e

Gyroidina nipponica ISHIZAKI, 1944, Nat. Hist. Soc. Taiwan, Trans., v. 34, no. 244, p. 102, pl. 3, figs. 3a-c; MATSUNAGA, 1963, pl. 44, figs. 3a-c; ISHIWADA, 1964, p. 29, pl. 5, figs. 87a-b; MATOBA, 1967, p. 255, pl. 29, figs. 13a-c.

Occurrence and Repository: Central Area (Stn. 67, 70, 71, 73, 75, 76, 77, 79, 80, 84, 85, 86, 87, 89, 90, 91, 92, 93, 95, 96, 97, 98, 101, 103, 105: 23-225 m; living 170-225 m); Bay Mouth Area (Stn. 107, 108, 110, 113, 118, 122, 125, 132, 134, 137, 139, 143: 96-140 m; living 100-120 m); open sea area (Stn. 144, 146: 105-213 m; living 105 m); ESK Reg. no. F-11398 - 11436; hypotype in fig. 3a, ESK Reg. no. F-11437 from Stn. 103; hypotype in fig. 3b, ESK Reg. no. F-11438 from Stn. 108; hypotype in fig. 3c, ESK Reg. no. F-11438 from Stn. 113; hypotype in fig. 3d, ESK Reg. no. F-11440 from Stn. 118; hypotype in fig. 3e, ESK Reg. no. F-11441 from Stn. 144.

Geographic Distribution: Off the northwest coast of North Honshū and the Pacific coast from Central Honshū to Kyūshū; 23) 570 m; 36) living 129-333 m; 47) 352-1319 m; 48) 74-597 m with living specimens; 51) 43-665 m, living 43-422 m; 52) 31-585 m with living specimens; 70) 123-808 m with living specimens; 76) 10-79 m; 77) 122-745 m with living specimens.

Family ANOMALINIDAE CUSHMAN, 1927

Subfamily ANOMALININAE CUSHMAN, 1927

Genus *Anomalina* D'ORBIGNY, 1826

Anomalina glabrata CUSHMAN

Pl. 21, figs. 4a-c

Anomalina glabrata CUSHMAN, 1924, Carnegie Inst. Washington, Publ., no. 342, p. 39, pl. 12, figs. 5-7; KUWANO, 1962, p. 138, pl. 14, fig. 4.
Anomalinoide cf. *nobilis* BROTZEN. MATSUNAGA, 1963, pl. 50, figs. 2a-c.

Occurrence and Repository: Central Area (Stn. 71, 74, 76, 110: 28-220 m); Bay Mouth Area (Stn. 113, 118, 122, 127, 132, 134, 139, 143: 74-112 m); ESK Reg. no. F-11442 - 11453; hypotype in fig. 4a, ESK Reg. no. F-11454 from Stn. 139; hypotype in fig. 4b-c, ESK Reg. no. F-11450 from Stn. 132.

Geographic Distribution: Off the southwest coast of Hokkaido, the east coast of North Honshū and the Pacific coast of Central Honshū, Kii Strait and Ōmura, Kamaé and Kagoshima Bays; 6) 190-220 m; 28) 37 m; 31); 32); 45); 51) 232 m; 52) 80 m; 58); 60) 97.5 m; 61) 34 m; 73); 76) 19 m; 78) living 83-150 m.

Genus *Cibicidoides* THALMANN, 1939

Cibicidoides pseudoungerianus (CUSHMAN)

Pl. 21, figs. 5a-f

Truncatulina pseudoungeriana CUSHMAN, 1922, U.S. Geol. Surv. Prof. Paper, 129-E, p. 97, pl. 20, fig. 9.
Cibicides pseudoungerianus (CUSHMAN). ISHIWADA, 1964, p. 8, pl. 8, figs. 115a-b.

Occurrence and Repository: West-Sakurajima Passage (Stn. 63, 64, 65: 39-138 m; living 66 m); Central Area (Stn. 66, 70, 71, 73, 74, 78, 84, 86, 92, 93, 99, 102, 104: 23-185 m); Bay Mouth Area (Stn. 106, 107, 108, 110, 113, 116, 118, 122, 124, 125, 127, 132, 134, 136, 137, 139, 141, 143: 20-140 m; living 106-140 m); open sea area (Stn. 144, 145, 146: 105-213 m; living 105-155 m); ESK Reg. no. F-11455 - 11491; hypotype in fig. 5a, ESK Reg. no. F-11492 from Stn. 144; hypotype in fig. 5b, ESK Reg. no. F-11493 from Stn. 137; hypotype in fig. 5c, ESK Reg. no. F-11494 from Stn. 146; hypotype in fig. 5d, ESK Reg. no. F-11495 from Stn. 137; hypotype in fig. 5e, ESK Reg. no. F-11496 from Stn. 145; hypotype in fig. 5f, ESK Reg. no. F-11497 from Stn. 137.

Geographic Distribution: The seas adjacent to Japan; 1) 41-78 m; 6) 120-1300 m; 9) 276 m; 10) 600-655 m; 13) 135-430 m, living 430 m; 14) 70-505 m, living 115 m; 15) 49-510 m; 17) 496 m; 23) 48-95 m, living 80 m; 24) 10-48 m; 29) 3.5-12.5 m; 32); 37) 10-70 m; 40); 42) 142-468 m; 43) 60-570 m; 45); 47) 54-2226 m; 48) 74-235 m; 51) 43-422 m, living 72-155 m; 52) 80-408 m, living 80 m; 54) 23 m; 56) 9-38 m; 62) 96 m with living specimens; 63) 5-15 m; 64) 32-60 m, living 46 m; 65) 4.1-33 m; 67) 91-349 m; 69) 135-410 m; 70) 70-475 m, living 202 m; 70) 91-349 m; 71) 25 m; 73); 76) 20-35 m; 77) 35-122 m.

Cibicidoides? subhaidingerii (PARR)

Pl. 22, figs. 1a-c

Cibicides subhaidingerii PARR, 1950, B.A.N.Z. Antarctic Research Exped. 1929-1931, Repts., Adelaide, ser. B, v. 5, pt. 6, p. 364, pl. 15, fig. 7a-c.
Cibicides haidingerii (D'ORBIGNY). KUWANO, 1962, pl. 16, figs. 8a-c, 9a-b.
Cibicides? subhaidingeri (BRADY). UJIIÉ and KUSUKAWA, 1969, p. 768, pl. 4, figs. 4a-c, 5a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64, 65: 39-66 m); Central Area (Stn. 71, 79, 84, 86, 89, 98, 103: 88-175 m; living 88 m); Bay Mouth Area (Stn. 113, 118, 122, 125, 136, 137, 139, 143: 60-140 m; living 100 m); open sea area (Stn. 144, 146: 105-213 m; living 105 m); ESK Reg. no. F-11498 - 11516; hypotype in fig. 1a, ESK Reg. no. F-11517 from Stn. 144; hypotype in fig. 1b, ESK Reg. no. F-11518 from Stn. 144; hypotype in fig. 1c, ESK Reg. no. F-11519 from Stn. 137.

Geographic Distribution: Off the southwest coast of Hokkaido and the north coast of Kyūshū, and Kamaé Bay; 6) 120-1250 m; 72); 76) 20-57 m.

Cibicidoides sp.

Pl. 22, figs. 2a-b

Occurrence and Repository: Bay Mouth Area (Stn. 136, 137, 139: 60-106 m); open sea area (Stn. 146: 213 m); ESK Reg. no. F-11520 - 11523; hypotype in fig. 2a, ESK Reg. no. F-11523 from Stn. 146; hypotype in fig. 2b, ESK Reg. no. F-11521 from Stn. 137.

Remarks: This species is characterized by coarse perforations on the spiral side.

Genus *Hanzawaia* ASANO, 1944

Hanzawaia nipponica ASANO

Pl. 22, figs. 3a-d

Hanzawaia nipponica ASANO, 1944, Geol. Soc. Japan, Jour., v. 51, no. 606, p. 98-99, pl. 4, figs. 1a-b, 2a-b; TAKAYANAGI, 1955, p. 45, 49, pl. 2, figs. 21a-b; KUWANO, 1962, pl. 19, figs. 2a-c; MATSUNAGA, 1963, pl. 52, figs. 5a-c; MATOBA, 1967, p. 255, pl. 29, figs. 14a-c; MATOBA, 1970, p. 55, pl. 8, figs. 10a-c.

Occurrence and Repository: West-Sakurajima Passage (Stn. 64, 65: 39-66 m; living); Central Area (Stn. 99, 100, 103, 104: 38-175 m); Bay Mouth Area (Stn. 107, 116, 125, 136, 141: 60-140 m); ESK Reg. no. F-11524 - 11534; hypotype in fig. 3a, ESK Reg. no. F-11535 from Stn. 141; hypotype in fig. 3b, ESK Reg. no. F-11536 from Stn. 136; hypotype in fig. 3c-d, ESK Reg. no. F-11531 from Stn. 116.

Geographic Distribution: Off the southwest coast of Hokkaido, the coast of North Honshū and the Pacific coast from Central Honshū to Kyūshū, and the Seto Inland Sea; 5); 6) 120 m; 14) 70-505 m; 15) 49-100 m with living specimens; 17) 100 m; 23) 40-80 m, living 40 m; 24) 5-78 m, living 14-30 m; 25) 38 m; 27) 34-78 m; 28) 25-33 m; 29) 0.9-4.4 m; 30); 31); 32); 34) 64-155 m; 36) living 59-160 m; 38); 41) 28-47 m; 45); 48) 40-149 m with living specimens; 49); 51) 23-232 m with living specimens; 52) 31-201 m, living 31-80 m; 55) 20-63 m; 56) 7-38 m; 58); 60) 50-97.5 m; 61) 32-74 m; 62) 96 m with living specimens; 64) 60 m; 65) 17.3 m; 69) 56-78 m; 70) 70-202 m, living 70 m; 76) 10-79 m; 77) 35-122 m, living 35 m.

Genus *Heterolepa* FRANZENAU, 1884

Heterolepa margaritifera (BRADY)

Pl. 22, figs. 4a-c

Truncatulina margaritifera BRADY, 1881, Quart. Jour., Micr. Sci., v. 21, p. 66; 1884, Challenger Exp., Repts, Zool., p. 667, pl. 96, fig. 1a-c; CUSHMAN, 1915, p. 40, Pl. 17, figs. 1a-c; text-figs. 43a-c; CUSHMAN, 1921, p. 319, pl. 65, figs. 1a-c, pl. 74, figs. 1a-c.

Cibicides margaritiferus (BRADY). BARKER, 1960, p. 198, pl. 96, figs. 2a-c; KUWANO, 1962, p. 129, pl. 17, fig. 1; ISHIWADA, 1964, p. 18, pl. 8, figs. 117a-b.

'*Eponides*' *margaritiferus* (BRADY). BELFORD, 1966, p. 126-127, pl. 18, figs. 11-16.

Occurrence and Repository: Central Area (Stn. 73, 75, 79, 84, 88, 101: 78-119 m); Bay Mouth Area (Stn. 108, 110, 113, 125: 100-140 m); ESK Reg. no. F-11537 - 11546; hypotype in fig. 4a, ESK Reg. no. F-11542 from Stn. 101; hypotype in fig. 4b, ESK Reg. no. F-11547 from Stn. 75; hypotype in fig. 4c, ESK Reg. no. F-11548 from Stn. 75.

Geographic Distribution: Kii Strait; 60) 97.5 m.

Genus *Melonis* DE MONTFORT, 1808

Melonis sp.

Pl. 22, figs. 5a-b

Occurrence and Repository: Bay Head Area (Stn. 32, 34, 53: 94-156 m); Central Area (Stn. 73, 98, 103: 80-175 m); Bay Mouth Area (Stn. 107, 122, 134, 136, 141: 60-112 m); ESK Reg. no. F-11549 - 11559; hypotype in fig. 5a, ESK Reg. no. F-11559 from Stn. 141; hypotype in fig. 5b, ESK Reg. no. F-11560 from Stn. 34.

Remarks: The specimens at hand are rather few and the chambers of the adult stage of all the specimens are imperfect.

Superfamily ROBERTINACEA REUSS, 1850

Family CERATOBULIMINIDAE CUSHMAN, 1927

Subfamily CERATOBULIMININAE CUSHMAN, 1927

Genus *Lamarckina* BERTHELIN, 1881

Lamarckina sp.

Pl. 22, fig. 6

Occurrence and Repository: Central Area (Stn. 91, 92, 93: 142-207 m); open sea area (Stn. 144, 145: 105-155 m; living 105 m); ESK Reg. no. F-11561 - 11565; hypotype in fig. 6, ESK Reg. no. F-11566 from Stn. 145.

Remarks: Only six specimens are in the collection, and the tests are rather small and probably of juvenile stage.

Subfamily EPISTOMININAE Wedekind, 1937

Genus *Hoeglundina* BROTZEN, 1948

Hoeglundina elegans (D'ORBIGNY)

Pl. 22, figs. 7a-c

Rotalia (Turbinulina) elegans D'ORBIGNY, 1826, Ann. Sci. Nat., v. 7, p. 276, no. 54.

Epistomina elegans (D'ORBIGNY). CUSHMAN, 1931, p. 65-67, pl. 13, figs.6a-c.

Hoeglundina elegans (D'ORBIGNY). BANDY, 1953, p. 29, pl. 23, figs. 9a-c; MATSUNAGA, 1963, pl. 47, figs. 2a-c; LOEBLICH and TAPPAN, 1964, p. C775, figs. 3a-c, 4-5; TODD, 1965, p. 56, pl. 23, figs. 2a-c; BELFORD, 1966, p. 190-191, pl. 36, figs. 8-13; MATOBA, 1967, p. 255, pl. 29, figs. 17a-c; BOCK, 1971, p. 185, pl. 2, figs. 4-5; FLINT, 1975, p. 331, pl. 75, fig. 1; BOLTOVSKOY, GIUSSANI, WATANABE and WRIGHT, 1980, p. 35-36, pl. 18, figs. 14-17; INGLE, KELLER and KOLPACK, 1980, pl. 2, fig. 11; POAG, 1981, p. 69, pl. 19, fig. 3; pl. 20, figs. 3a-c.

Occurrence and Repository: Central Area (Stn. 66, 67, 69, 71, 72, 73, 75, 76, 79, 80, 81, 82, 85, 86, 87, 89, 90, 91, 92, 93, 95, 96, 97, 98, 101, 102, 105: 80-225 m; living 145 m); Bay Mouth Area (Stn. 113, 125, 132, 134, 139: 100-140 m); open sea area (Stn. 144, 146: 105-213 m; living 105 m); ESK Reg. no. F-11567 - 11600; hypotype in fig. 7a, ESK Reg. no. F-11601 from Stn. 93; hypotype in fig. 7b, ESK Reg. no. F-11602 from Stn. 90; hypotype in fig. 7c, ESK Reg. no. F-11603 from Stn. 76.

Geographic Distribution: Off the southwest coast of Hokkaido, the northwest and northeast coasts of North Honshū and the Pacific coast from Central Honshū to Kyūshū, and coastal areas at Okino-erabu and Yoron Islands; 6) 190-200 m; 23) 95 m with living specimens; 24) 19-94 m, living 94 m; 27) 45 m; 45); 48) 74 m; 51) 72-422 m, living 72-232 m; 52) 31-585 m with living specimens; 60) 97.5 m; 70) 202-808 m; 76) 55-79 m; 77) 745 m; 81); 82).

Remarks: This species occurs at the stations deeper than 80 meters in the open sea, the Bay Mouth and the Central Areas. At the basin bottom in the Central Area, frequencies are rather high (1-3%).

Family ROBERTINIDAE REUSS, 1850

Genus *Geminospira* MAKIYAMA and NAKAGAWA, 1941

Geminospira simaensis MAKIYAMA and NAKAGAWA

Geminospira simaensis MAKIYAMA and NAKAGAWA, 1941, Geol. Soc. Japan, Jour., v. 48, no. 572, p. 241, 243, figs. 3-5.

Occurrence and Repository: Central Area (Stn. 81: 220 m); Bay Mouth Area (Stn. 106, 139, 141: 40-105 m; living 40 m); ESK Reg. no. F-11604 - 11607.

Geographic Distribution: Off the northwest and east coasts of North Honshū; 24) 50-75 m, living 50 m; 27) 34-78 m; 28) 25 m; 32).

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Appendixes I - II

Appendix I

The areas and the authors of the studies on Recent foraminifera in Japan

1) Okhotsku Sea: KUWANO (1953-1954)
2) Northern part of the Sea of Japan: KUWANO (1953)
3) Lake Saroma, Hokkaido: YOSHIDA (1954)
4) Mokoto-numa, Hokkaido: YOSHIDA (1953a)
5) Ishikari Bay, Hokkaido: IKEYA (1970)
6) Around Okushiri Island, Hokkaido: CHIJI and KONDA (1970)
7) Akkeshi Bay, Hokkaido: YOSHIDA (1953b)
8) Akkeshi Bay, Hokkaido: MORISHIMA and CHIJI (1952)
9) Off Kushiro, Hokkaido: ISHIWADA (1964)
10) Off Erimo-misaki, Hokkaido: ISHIWADA (1964)
11) Off Erimo-misaki, Hokkaido: IKEYA (1971)
12) Off Noboribetsu, Hokkaido: UCHIO (1959)
13) Off Muroran, Hokkaido: IKEYA (1971)
14) Off Shiriya-zaki, Aomori Pref.: IKEYA (1971)
15) Off Misawa, Aomori Pref.: IKEYA (1971)
16) Off Hachinohe, Aomori Pref. (Stn.36): ISHIWADA (1964)
17) Off Hachinohe, Aomori Pref.: IKEYA (1971)
18) Mutsu Bay, Aomori Pref.: HADA (1931)
19) Off the northeast coast of Honshū: ASANO (1956a, b, 1958, 1960)
20) Tsugaru Strait: ASANO (1956a, b, 1958, 1960)
21) Off the northwest coast of Honshū: ASANO (1956a, b, 1958, 1960)
22) Yamato Bank, the Sea of Japan: ASANO (1956a, b, 1958, 1960)
23) Off Noshiro, Akita Pref.: MATOBA (1976a)
24) Around the Oga Peninsula, Akita Pref.: MATOBA (1975, 1976c)
25) Off Akita, Akita Pref.: MATOBA and NAKAGAWA (1972)
26) Off Sanriku: ISHIWADA (1964)
27) Miyako Bay, Iwate Pref.: UJIIÉ and KUSUKAWA (1969)
28) Yamada Bay, Iwate Pref.: UJIIÉ and KUSUKAWA (1969)
29) Matsushima Bay, Miyagi Pref.: MATOBA (1970)
30) Sendai Bay: MATOBA (1976b)
31) Matsukawa-ura, Fukushima Pref.: TAKAYANAGI (1955)
32) Off Sōma City, Fukushima Pref.: TAKAYANAGI (1955)
33) Off Sioya-saki, Fukushima Pref.: ISHIWADA (1964)
34) Off Inubō-saki, Chiba Pref.: ISHIWADA (1964)
35) Coastal area at Kujūkuri-hama, Chiba Pref.: HARRINGTON (1960)

36) Off Bōsō Peninsula, Chiba Pref.: KUWANO (1963)
37) Tōkyō Bay: MORISHIMA (1955)
38) Coastal area at Zushi, Miura Peninsula, Kanagawa Pref.: HIGUCHI (1954)
39) Coastal area at Koamishiro, Miura Peninsula, Kanagawa Pref.: HIGUCHI (1954)
40) Coastal area at Hachijo Island, Tōkyō: UCHIO (1952)
41) Off Niigata, Niigata Pref.: UCHIO (1962b)
42) Toyama Bay: ISHIWADA (1950)
43) Toyama Bay: HASEGAWA (1979)
44) Around Oki Island and the north coast of West Honshū: ASANO (1956a, b, 1958, 1960)
45) Nabeta cove, Izu Peninsula, Shizuoka Pref.: AOKI (1967)
46) Off the southwest coast of Japan, from Shizuoka Pref. to Kagoshima Pref.: ASANO (1956a, b, 1958, 1960)
47) Suruga Bay, Shizuoka Pref.: NAGAHAMA (1954)
48) Off Ogasa, Shizuoka Pref.: AOSHIMA (1978)
49) Lake Hamanako, Shizuoka Pref.: ISHIWADA (1958)
50) Lake Hamanako, Shizuoka Pref.: IKEYA (1977)
51) Off Atsumi, Aichi Pref.: AOSHIMA (1978)
52) Off Owase, Mie Pref.: AOSHIMA (1978)
53) Ōsaka Bay: NAKASEKO (1953)
54) Ōsaka Bay: KATO (1982)
55) Izumi-nada, Seto Inland Sea: TAKAYANAGI (1953)
56) Tanabe Bay, Wakayama Pref.: CHIJI and LOPEZ (1968)
57) Tanabe Bay, Wakayama Pref.: UCHIO (1968)
58) Coastal areas at Wakaura, Nishihiro, Seto and Kushimoto, Wakayama Pref.: UCHIO (1962a)
59) Mori Harbor, Wakayama Pref.: UCHIO (1962a)
60) Off Shirahama, Wakayama Pref.: UCHIO (1968)
61) Kii Strait: SAWAI (1958)
62) Kii Strait: KATO (1982)
63) Seto Inland Sea (Seto-naikai): KATO (1979)
64) Seto Inland Sea (Seto-naikai): KATO (1982)
65) Western area off Shodo Island, Seto Inland Sea (Seto-naikai): TAI (1971)
66) Hiuchi-nada, Seto Inland Sea (Seto-naikai): SAWAI (1955)
67) Coastal area at Kouno-ura, Kochi Pref.: ASANO (1937)
68) Tosa Bay, Kochi Pref.: ASANO (1937)
69) Tosa Bay, Kochi Pref.: ISHIWADA (1964)
70) Tosa Bay, Kochi Pref.: AOSHIMA (1978)
71) Hibiki-nada, Yamaguchi Pref.: KATO (1979)
72) Off Tsuyazaki, Fukuoka Pref.: SHUTO (1965)
73) Ōmura Bay, Nagasaki Pref.: SHUTO (1953)

74) Tsushima Strait: ASANO (1956a, b, 1958, 1960)
75) Off the west coast of Kyūshū: ASANO (1956a, b, 1958, 1960)
76) Surrounding sea area of Kamaé Bay, Ōita Pref.: KAMEYAMA (1984)
77) Off Miyazaki, Miyazaki Pref.: AOSHIMA (1978)
78) Kagoshima Bay, Kagoshima Pref.: KUWANO (1962)
79) Coastal area in Takara Island, Kagoshima Pref.: KUWANO (1956)
80) Coastal area in Nakano Island, Kagoshima Pref.: KUWANO (1956)
81) Coastal area in Okino-Erabu Island, Kagoshima Pref.: ETO (1970)
82) Coastal area in Yoron Island, Kagoshima Pref.: ETO (1970)

Appendix II

Distribution of the remarkable species (Figs. 35-68)

The term, "remarkable species", was defined to mean the species of benthonic foraminifera representing groups recognized by cluster analysis of foraminifera, and species whose distribution patterns seemed to be closely related to the environmental factors (Table 12).

Lagenammina kagoshimaensis ŌKI, n. sp. (Fig. 35; Pl. 1, fig. 2): The frequencies are relatively high on the basin bottom in the Central and the Bay Head Areas. The five stations off Kokubu City and around the An-éi Rise in the Bay Head Area (Stn. 12, 18, 35, 37 and 51) had the highest frequencies of this species ranging from 11 to 18%.

Similarly, the living specimens in the living assemblage also had high frequencies on the basin bottom. The three stations (Stn. 65, 89 and 99) located in the rather shallow coastal areas of the southern part of the Central Area and West-Sakurajima Passage had exceptionally high ratios of the number of living specimens to the total number of individuals of this species (33.3 to 100%). It is still unknown, however, whether this type of high frequency is an ecological feature of this species restricted to the winter season or the result of destruction of delicate tests of dead specimens during transportation.

Ammodiscus minimus HÖGLUND (Fig. 36; Pl. 1, fig. 5): This species was found in 12 stations in Kagoshima Bay, but the frequencies are rather low. The samples from the three stations (40, 41 and 42: 170-228 m in depth) located at the 200 m deep bottom in the northeastern part of the Bay Head Area had the highest frequencies of this species ranging from 2 to 8%. As already mentioned, the environment of the 200 meter deep bottom is strongly influenced by the acidic water mass caused by the submarine fumarolic activity in this area (*see* p.15).

Glomospira gordialis (JONES and PARKER)(Fig. 37; Pl. 1, fig. 6): At the three stations (40, 41 and 42) in the above-mentioned 200 meter deep bottom where *Ammodiscus*

minimus occupies 2-8% of the total assemblage, the frequencies of this species ranged from 4 to 7%. At the three stations (32, 44 and 45) located at the boundary between the Bay Head Area and the West-Sakurajima Passage, those range from 1 to 2% lacking *A. minimus*.

Cribrostomoides kosterensis (HÖGLUND)(Fig. 38; Pl. 2, fig. 1): At the deep basin bottom (130-185 m deep) in the northernmost part of the Central Area and the Bay Head Area, the frequencies of this species are rather high (1-8%). Especially high frequencies (6 to 8%) were found at the three stations (21, 41 and 42) in the northeastern part of the Bay Head Area and Station 69 in the northeasternmost corner of the Central Area. At Station 69, living specimens occupy 64% of the total number of individuals of this species.

Textularia bigenerinoides LACROIX (Fig. 39; Pl. 2, fig. 9): This species occurred at the 35 stations deeper than 80 m in the Central and the Bay Head Areas, but it was not found in the stations in the Bay Mouth and the open sea areas. High frequencies were seen in the northernmost part of the Central Area (Stn. 66, 67, 68 and 69) and the northern (Stn. 1, 3, 12, 18, 21, 41 and 42) and southeastern (Stn. 32, 44, 45 and 63) parts of the Bay Head Area. The extremely high frequencies of this species are recognized at the five stations (1, 21, 41, 42 and 68: Group Ia, Ib and VI) where the total agglutinated foraminifera also had high frequencies (95.9-100%). Around the fumaroles at the 200 meter deep basin bottom, the frequency of this species decreased from 25 to 2% toward Station 40, nearest to the fumaroles. Most of the stations in the southeastern part of the Bay Head Area are under the influence of acidic water, while some of the other stations including Stations 1 and 68, characterized by extremely high frequencies, are free from the acidic water. These features suggest that T. *bigenerinoides* prefers embayment conditions and sometimes has high frequencies caused by the paucity of the calcareous foraminifera, which cannot survive due to the presence of acidic water or some other reasons.

Textularia kattegatensis kagoshimaensis ŌKI, n. subsp. (Fig. 40; Pl. 3, fig. 2): This species was mainly found at the stations located in the Central and Bay Head Areas, but it was not found in the stations in the Bay Mouth and the open sea areas. Stations 1, 21, 40, 41 and 42 (Group I) in the northeastern and northwestern parts of the Bay Head Area had high frequencies ranging from 7 to 29%. At the 200 meter deep basin bottom of the Bay Head Area, the frequency of this species increased from 7 to 29% toward Station 40 nearest to the fumaroles, in contrast with the case of *T. bigenerinoides*. The features mentioned above suggest that the acidic water mass provides a condition favourable for *T. kattegatensis kagoshimaensis* to live or does not permit the survival of the other species. Based on this phenomenon, it is assumed that some kind of acidic water occurs also at Station 1 (frequency: 14%), rather remote from the known fumaroles.

Textularia wiesneri EARLAND (Fig. 41; Pl. 3, fig. 4): This species commonly occurs in the Bay Head Area and the northern half of the Central Area. In the Bay Head Area, this species occurred in all the stations (frequencies: 12-20%) at the basin bottom deeper than 102 meters except for four stations. The extremely high frequencies were found at Station 77 located at the foot of the bank in the northeastern part of the Central Area, at Stations 21 and 42 in the 200 meter deep basin bottom, and at Station 61 located at the sequestered area in the southeastern part of the Bay Head Area.

Trochammina osumiensis ŌKI, n. sp. (Fig. 42; Pl. 3, fig. 9): The seven stations (90, 91, 92, 95, 96, 97 and 103: 170-215 m in depth) in the southern part of the Central Area show high frequencies ranging from 4 to 11%. At four stations (91, 95, 96 and 97) among the seven mentioned above and at Station 98, the frequencies of living specimens in the living assemblage were also high (4-10%). On the other hand, only one living specimen was collected without a corresponding dead specimen from each of the four stations (73, 74, 83 and 84) in the shallow coastal area of the northern part of the Central Area (28-88 m in depth). This is thought to result from the destruction of the delicate tests of dead specimens during transportation by the current.

Trochammina pacifica simplex CUSHMAN and MCCULLOCH (Fig. 43; Pl. 3, fig. 10): This species was found at the stations near the shoreline. The stations with relatively high frequencies were within the West-Sakurajima Passage and on the deep basin bottom in the northern part of the Bay Head Area. At the eight stations (1, 3, 12, 18, 21, 40, 41 and 42) in the northern part of the Bay Head Area, no living specimens were collected. On the other hand living specimens made up 20 to 34.8% of the total number of individuals at the two stations (64 and 65) in the West-Sakurajima Passage. This is thought to result from the destruction of delicate dead tests during transportation by bottom current*) in the shallow passage. This is also the case at the stations (73, 88, 104 and 124) with shallow bottoms in the Bay Mouth and Central Areas.

Dorothia sp. (Fig. 44): This species occurred at the 13 stations (Stn. 32, 34, 35, 37, 41, 42, 44, 45, 51, 53, 54, 61 and 63) in the southern half of the Bay Head Area and at Station 101 in the southern part of the Central Area with rather low frequencies.

Eggerella scabra (WILLIASON) (Fig. 45; Pl. 4, fig. 7): This species was found at all the stations in the Central and the Bay Head Areas, except for Station 134 located at the

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*) The velocity of the surface water in this area can reach up to 1.7 knots, which is the highest velocity in the bay (Coastal Oceanography Research Commitee, The Oceanographical Society of Japan, 1985). The median diameter values (Mdϕ) at Stations 64 and 65 are -0.1 and 1.9ϕ, reflecting the current velocity in this area.

deepest part of the Bay Mouth Area. At the stations in the northern half of the basin in the Central Area, the frequencies are high (6-23%). In the Bay Head Area, this species occurs at all stations except for the two stations (64 and 65) located at the shallow area of the West-Sakurajima Passage, and is predominant at 15 stations. Therefore, I feel that the foraminiferal fauna in the Bay Head Area is represented by this species. All the stations in the Bay Head Area except for two (Stn. 34 and 63; less than 10%) had frequencies ranging from 15 to 70%. The eight stations (3, 18, 35, 37, 51, 54, 58 and 61) off the Hayato Islands (Oki-kojima, Benten-jima and Heta-kojima), around the An-éi Rise and in the southeastern part of the Bay Head Area, show extremely high frequencies of more than 50%. The same may be said of the living specimens of this species.

Buliminella elegantissima (D'ORBIGNY)(Fig. 46; Pl. 8, fig. 8): This species had with rather low frequencies at most of the stations in the open sea, the Bay Mouth and the Central Areas, and the southwestern part of the Bay Head Area. The distribution of the stations (44, 63, 66, 70, 74, 78, 83, 90, 94 and 100) showing relatively high frequencies (2-6%) are limited to the coastal sea area along the Satsuma Peninsula. This area is under the influence of hyposaline nutritious water.

Bolivina ordinaria PHLEGER and PARKER (Fig. 47; Pl. 9, fig. 5): This species occurs at all the stations except for the ones in the eastern half and the northwestern parts of the Bay Head Area and the two (68 and 85) at the deep basin in the Central Area. The frequencies tend to be low (less than 1%) at the deep basin bottom in the Central Area and at the deepest of the open sea area (Stn. 146) and they are high (2-10%) in the shallow coastal sea area. The two stations (88 and 93) off Furué, Kanoya City in the Ōsumi Peninsula and the ten stations off the coast between Kagoshima and Ibusuki Cities in the Satsuma Peninsula had high frequencies of more than 4%.

Bolivina retia ŌKI, n. sp. (Fig. 48; Pl. 9, fig. 7): In contrast to the fact that many species of *Bolivina* occurred in the shallow coastal area in the bay, *B. retia* was found at the stations deeper than 80 meters in the Bay Mouth and the Central Areas.

Bolivina robusta BRADY (Fig. 49; Pl. 10, fig. 1): This species was found at all the stations in the bay except for the four stations (68, 72, 77 and 96) located at the deep basin in the Central Area and in the eastern half and northwestern part of the Bay Head Area. The frequencies were rather low (less than 1%) at the basin bottom in the Central Area and relatively high (2-11%) at the coastal areas shallower than 100 meters in the Bay Mouth and the Central Areas. At the five stations (99, 104, 127, 136 and 141) off the coast of the Ōsumi Peninsula and the seven stations (63, 65, 74, 78, 83, 116 and 118) off the coast of the Satsuma Peninsula in the Bay Mouth and the Central Areas frequencies of this species are rather high (4 to 11%). The same may be said of the living specimens.

Bolivina striatula CUSHMAN (Fig. 50; Pl. 10, fig. 3): This species was found at most of the stations in the Bay Mouth and the Central Areas, but the frequencies are rather low. The stations having the frequencies of more than 2% were distributed in the shallow coastal area off Kagoshima City and Kiiré-chō (Stn. 70, 74, 78 and 83), and in the southern part of the Central Area (Stn. 94, 95, 97 and 105). These areas are under the influence of hyposaline nutritious water.

Rectobolivina hancocki (CUSHMAN and MCCULLOCH)(Fig. 51; Pl. 10, fig. 7): The occurrence of the species is limited to the stations in the Bay Mouth Area, including the two stations (Stn. 104 and 105) at the southeasternmost part of the Central Area. The specimens collected from Station 81 (220 meter deep) seemed to be from the shallow coastal area.

Bulimina marginata D'ORBIGNY (Fig. 52; Pl. 11, fig. 3): This species representing the benthonic foraminiferal fauna in Kagoshima Bay occurred at all 73 stations except eleven stations influenced by the acidic water mass (Stn. 1, 3, 12, 21, 35, 37, 40, 51, 54, 58 and 61) and two shallow stations in the Central and the Bay Mouth Areas (Stn. 70 and 106). This species predominated at 30 stations among the 73. Frequencies of this species were more than 10% at the 39 stations deeper than 88 meters; 20 to 27% at the four stations (89, 90, 95 and 96) in the southwestern part of the Central Area; 20 to 38% at the nine stations (67, 69, 72, 75, 76, 77, 80, 81 and 82) in the northern part of the Central Area; 20 to 41% at the seven stations (15, 17, 22, 32, 34, 44 and 45) in the southwestern part of the Bay Head Area; and 54% at Station 53 located on the seamount in the eastern part of the same area. The same may be said of the living specimens in the Central and the Bay Head Areas. In the Bay Mouth Area, occurrence of this species was limited to the area east of the line running from NNE to SSW at the central part of the area.

Bulimina spinosa (HERON-ALLEN and EARLAND)(Fig. 53; Pl. 11, fig. 4): This species was found on the slope between the outer edge of the submarine terrace (about 90 meter deep) and the basin bottom in the Central Area, and at the bottom in the southwestern part of the Bay Head Area. Exceptionally, it occurred at the station located in the deepest part of the Bay Mouth Area, but the frequency was less than 1%. At three stations (77, 81 and 94) in the northeastern and southwestern parts of the Central Area and two stations (22 and 34) in the southwestern part of the Bay Head Area, the frequencies were rather high (10 to 30%). The living species occurred mainly at the stations on the marginal slope and its foot in the basin in the Central Area.

Uvigerina vadescens CUSHMAN (Fig. 54; Pl. 12, fig. 5): This species was found at all the stations in the open sea, the Bay Mouth and the Central Areas and the West-Sakurajima

Passage except for the four stations (Stn. 68, 70, 90 and 106). The high frequencies occurred in the deepest parts of the Bay Mouth Area (8-14%) and at five stations (71, 75, 79, 84 and 89) at the edge of the submarine terrace (about 90 m in depth) in the western part of the Central Area (8-21%). These stations were located on either the boundary between the open-sea water flowing into the bay along the Ōsumi Peninsula and the embayment water flowing out along the Satsuma Peninsula or the boundary between the normal saline water flowing into the bay along the Ōsumi Peninsula and the embayment water diluted by fresh water supplied by the rivers.

Discorbis mira CUSHMAN (Fig. 55; Pl. 13, fig. 1): Many stations widely distributed in shallow areas ranging from the open sea area to the West-Sakurajima Passage had frequencies more than 2%. High frequencies (6-12%) were found in four areas; the southeastern part of the Bay Mouth Area where the open-sea water flows northward into the bay (Stn. 127, 136 and 141), the boundary area between the Bay Mouth and the Central Areas (Stn. 99, 103 and 107), off the southern part of Kagoshima City (Stn. 70), and the shallow area in the West-Sakurajima Passage (Stn. 64 and 65).

Eilohedra levicula (RESIG)(Fig. 56; Pl. 14, fig. 2): The species occurred widely in the areas ranging from the open sea to the southwestern part of the Bay Head Area. The stations showing frequencies of more than 4% were concentrated on the slope and the basin bottom deeper than 80 m in the Central Area with an exception of Station 32 at the western part of the Bay Head Area.

Neoconorbina stachi (ASANO)(Fig. 57; Pl. 14, fig. 3): The distribution of the stations yielding this species was restricted to a small area in the Bay Mouth Area and to the southeastern part of the Central Area.

Ammonia beccarii (LINNÉ) forma A (Fig. 58; Pl. 15, fig. 5): This species occurred mainly in the shallow coastal area of the bay, and exceptionally on the basin bottom in the northern part of the Central Area (Stn. 72) and at the southwestern part of the Bay Head Area (Stn. 22, 32, 34, 44 and 63). The dead specimens contained in the bottom sample at Station 72 seem to have been derived from the submarine terrace (less than 100 m in depth) off Tarumizu City, on the Ōsumi Peninsula by the counterclockwise coastal current assumed to exist in the Central Area. The dead specimens at the six stations in the southwestern part of the Bay Head Area are also regarded to have been derived from the shallow coastal area in and near the West-Sakurajima Passage where the bottom current is rather strong. These assumptions are supported by the fact that the specimens are composed exclusively of dead test at the bottom of the Bay Head Area, while living specimens occupy 4% of the total number of individuals of this species at Station 65 located at the shallowest part of the West-Sakurajima Passage.

Elphidium advenum (CUSHMAN)(Fig. 59; Pl. 16, fig. 2): This species occurred in the shallow coastal areas (less than 100 m in depth) of the bay, and the frequencies are relatively high on the Satsuma Peninsula side. Especially Station 64 located at the West-Sakurajima Passage which had a frequency of 18%. The stations which had frequencies of more than 2% were distributed on the bottom of the area extending from the West-Sakurajima Passage to off the Hayato Islands. The living specimens commonly occurred on the shallow bottom of the West-Sakurajima Passage and its northeastern extention (Stn. 34). This suggests that open sea water flowing in through the West-Sakurajima Passage reaches the area around Station 34.

Protelphidium schmitti CUSHMAN and WICKENDEN (Fig. 60; Pl. 17, fig. 1): This species occurred on the shallow coastal sea bottom in the Bay Mouth, the Central and the West-Sakurajima Passage areas. At the five stations (65, 70, 74, 78 and 83) extending from off Kagoshima City to off Kiiré-chō, the frequencies were relatively high ranging from 4 to 9%. This area is strongly influenced by hyposaline and nutritious water from the urban area.

Cymbaloporetta hemisphaerica ACCORDI and SELMI (Fig. 61; Pl. 18, fig. 4): This species occurred at many stations in the Bay Mouth and the Central Areas and at the two stations (34 and 45) in the southwestern part of the Bay Head Area where the influence of the open-sea water coming through the West-Sakurajima Passage is remarkable. High frequencies ranging from 4 to 11% were found in the area off the coast extending from Kagoshima City to Ibusuki City and the boundary area between the Bay Mouth and the Central Areas. These areas correspond quite well with the course of the littoral current flowing southward along the Satsuma Peninsula down to the north of Ibusuki City and reaching the Ōsumi Peninsula across the Bay Head Area.

Globocassidulina oriangulata BELFORD (Fig. 62; Pl. 18, fig. 7): The frequencies seemed to be high in the area influenced by the open-sea water mass; 4 to 11% at the three stations (144, 145 and 46) in the open sea area, and 2 to 7% at the 14 stations in the Bay Mouth Area other than the four off Ibusuki City. This species occurred at more than half of the stations in the Central Area, but the frequencies were relatively low; only 1 to 2% at the six stations (87, 90, 91, 97, 98 and 102) in the southern part and the three stations (71, 75 and 79) at the edge of the submarine terrace (about 90 m in depth) in the western part of this area.

Cassidulina nørvangi THALMANN (Fig. 63; Pl. 19, fig. 1): The stations which had high frequencies, ranging from 4 to 13%, were distributed at depths between 80 and 196 m from the open sea to the Central Area. Extremely high frequencies were found on the marginal slope of the deep basin in the Central Area.

Paracassidulina quasicarinata NOMURA (Fig. 64; Pl. 19, fig. 5): High frequencies of this species were generally found in the open sea area. In the southern and northeastern parts of the Bay Mouth Area, frequencies were also rather high (2-8%). In the Central Area, high frequencies ranging from 1 to 2% were found at the stations on the marginal slope of the deep basin.

Astrononion hanyudaense MATSUNAGA (Fig. 65; Pl. 19, fig. 6): None were found at the open sea stations. At the bottom deeper than 80 m in the Central Area and the southwestern part of the Bay Head Area, the frequencies were rather high (more than 2%). The stations at the basin deeper than 200 m in the Central Area had frequencies ranging from 3 to 9%.

Florilus japonicus (ASANO)(Fig. 66; Pl. 20, fig. 1): This species occurred widely from the Bay Mouth Area to the southwestern part of the Bay Head Area. In the Central Area, the stations showing relatively high frequencies (3-7%) were distributed in the coastal area off Kagoshima City and Kiiré-chō on the Satsuma Peninsula (Stn. 66, 70, 74 and 78: 23-130 m in depth) and in the southern part of the deep basin (Stn. 85, 86, 91, 95 and 96: 165- 220 m in depth). The same was true of the living specimens. It is remarkable that the stations which had frequencies ranging from 3 to 5% were distributed in the narrow strip in the Central Area extending from the shallow area off the southern part of Kagoshima City (Stn. 74: 28 m in depth) to the basin bottom, and that the living specimens occupied 50 to 100% of the total number of individuals at the four stations (Stn. 91, 95, 96 and 103) in the basin area deeper than 150 meters. At the four stations (17, 22, 32 and 34) located in the southwestern part of the Bay Head Area, relatively high frequencies (2-8%) of dead and living specimens were found. This area is influenced by the open-sea water flowing in through the West-Sakurajima Passage.

Pseudononion japonicum ASANO (Fig. 67; Pl. 20, fig. 5): Relatively high frequencies were found in the coastal part of the Central Area. Especially, the four stations (70, 74, 78 and 83) in the coastal shallow area off Kagoshima City and Kiiré-chō influenced by the hyposaline nutritious water mass had high frequencies ranging from 3 to 10%.

Cibicidoides pseudoungeriana (CUSHMAN)(Fig. 68; Pl. 21, fig. 5): This species was found at every station in the open sea and the Bay Mouth Areas. High frequencies (more than 4%) were found in the areas where strong bottom currents were observed, namely, the open sea (Stn. 144, 145 and 146), the Bay Mouth Area (Stn. 106, 107, 122, 125, 134, 136, 137 and 141) and the West-Sakurajima Passage (Stn. 64 and 65). Station 64, characterized by a gravelly sand bottom, had the highest frequency (11%).

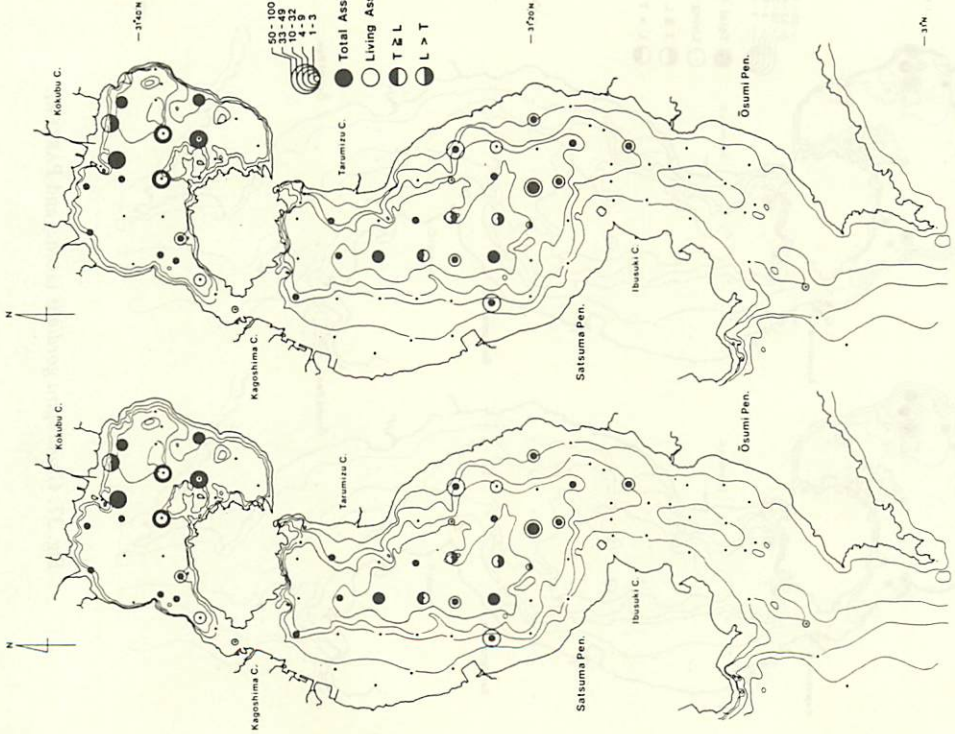

Fig. 35. *Lagenammina kagoshimaensis* ŌKI, n. sp.

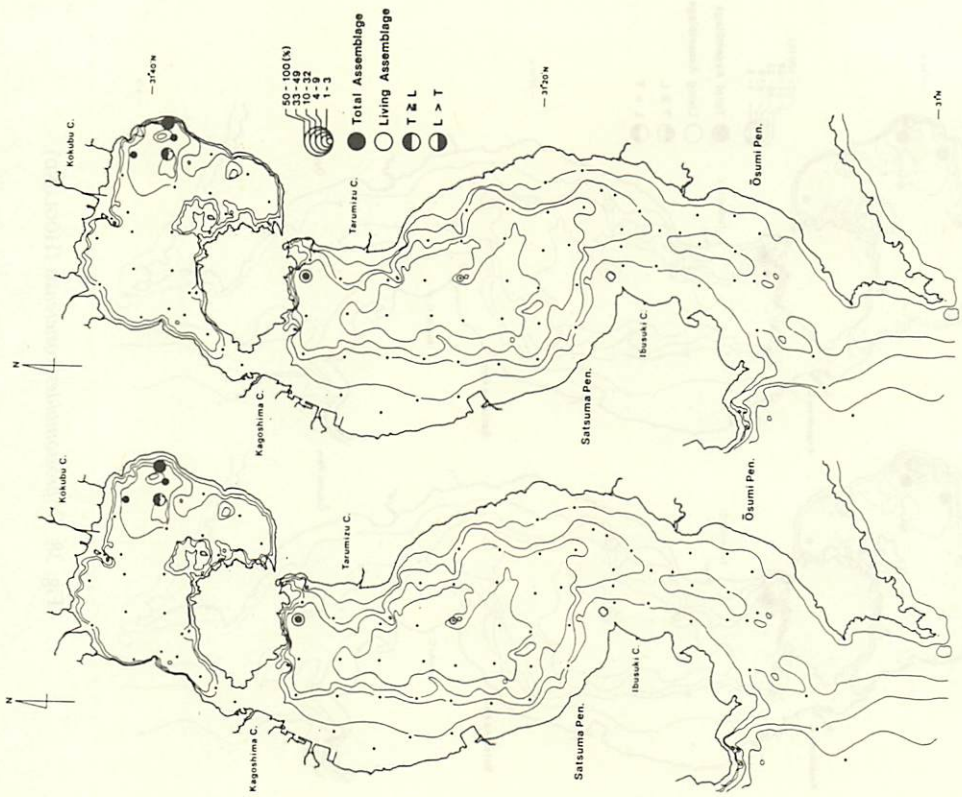

Fig. 36. *Ammodiscus minimus* HŌGLUND.

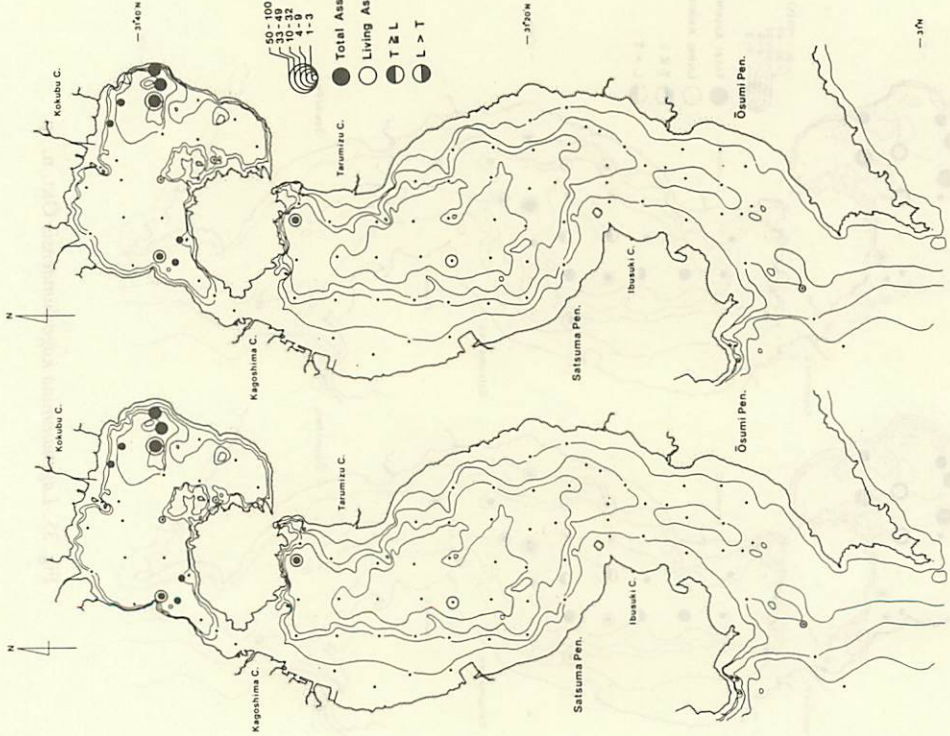

Fig. 37. *Glomospira gordialis* (JONES and PARKER).

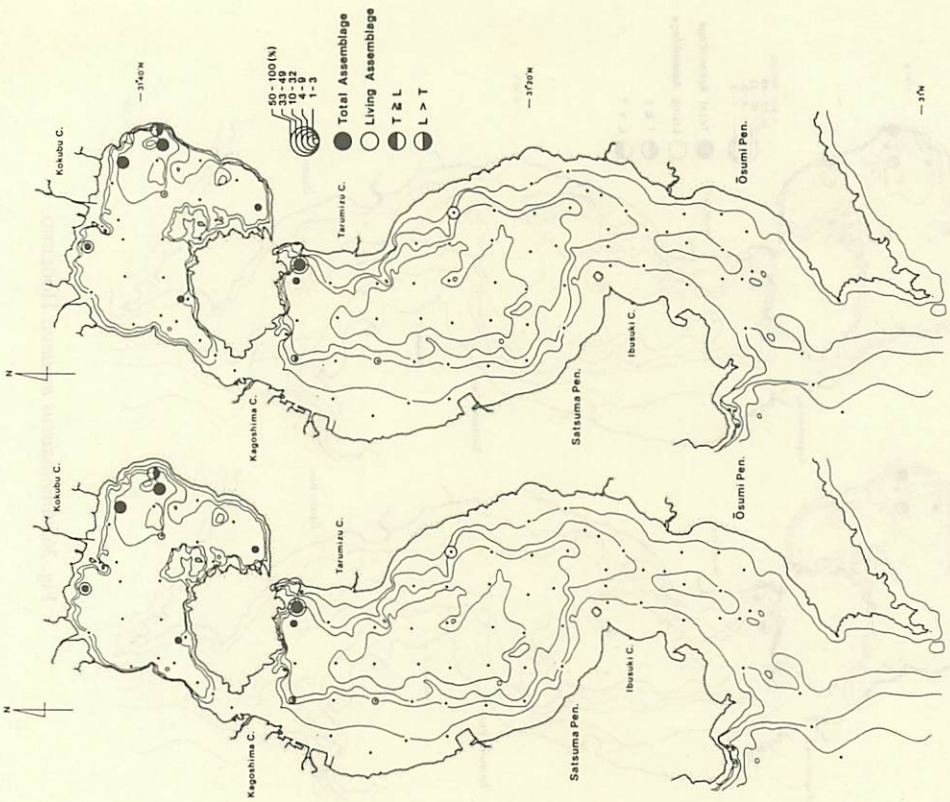

Fig. 38. *Cribrostomoides kosterensis* (HÖGLUND).

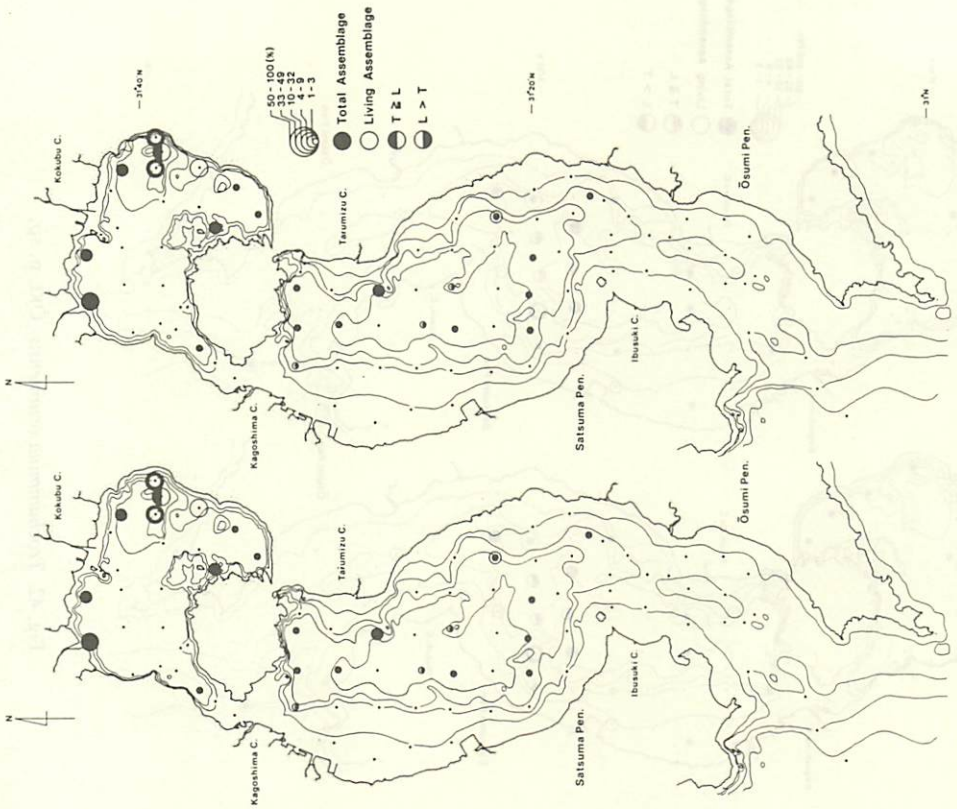

Fig. 39. *Textularia bigenerinoides* LACROIX.

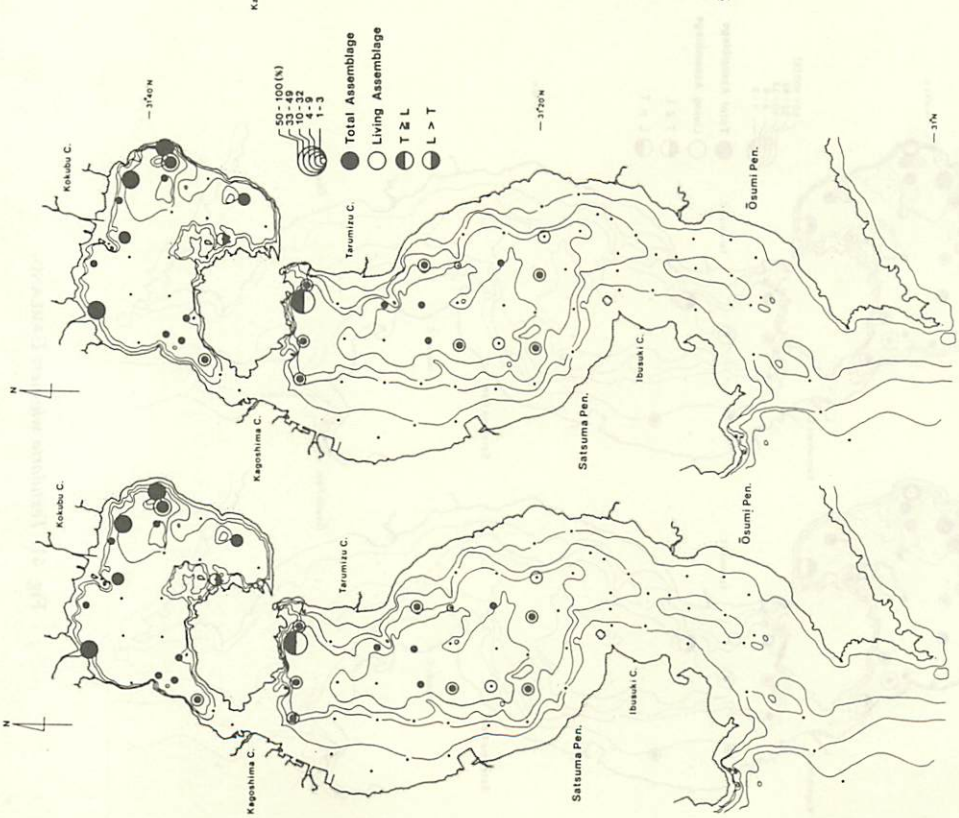

Fig. 40. *Textularia kattegatensis kagoshimaensis* ŌKI, n. subsp.

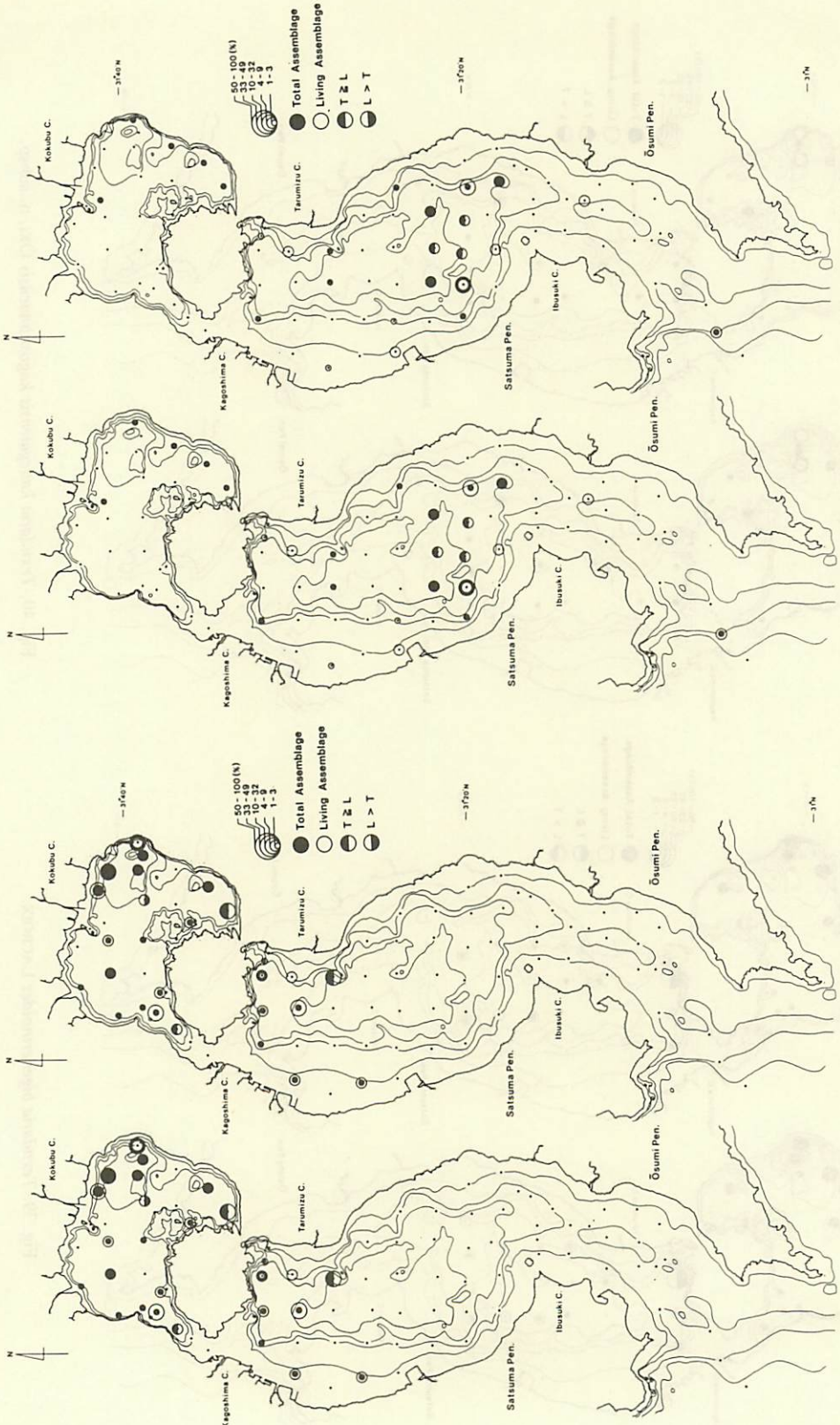

Fig. 41. *Textularia wiesneri* EARLAND.

Fig. 42. *Trochammina osumiensis* ŌKI, n. sp.

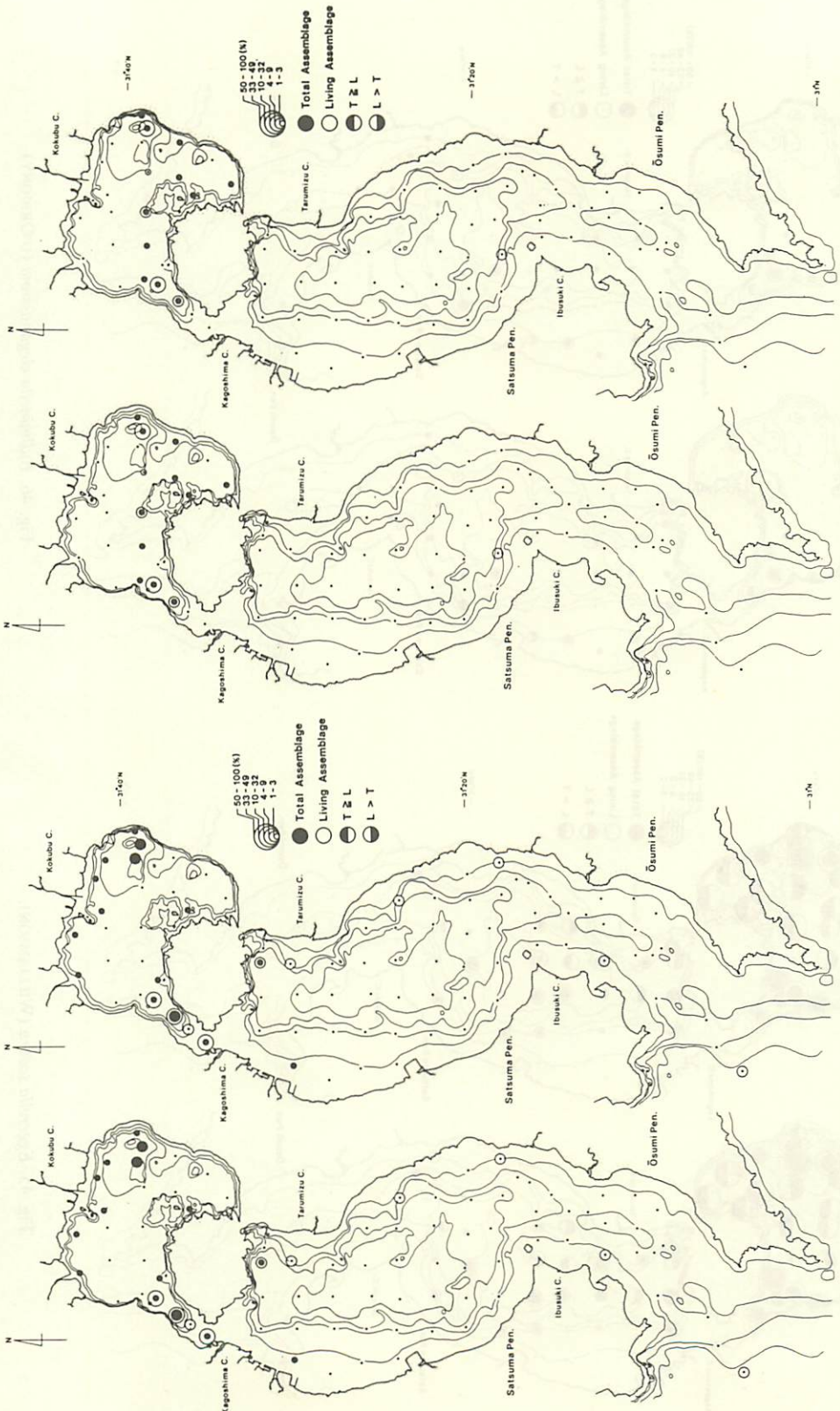

Fig. 43. *Trochammina pacifica simplex* CUSHMAN and MCCULLOCH.

Fig. 44. *Dorothia* sp.

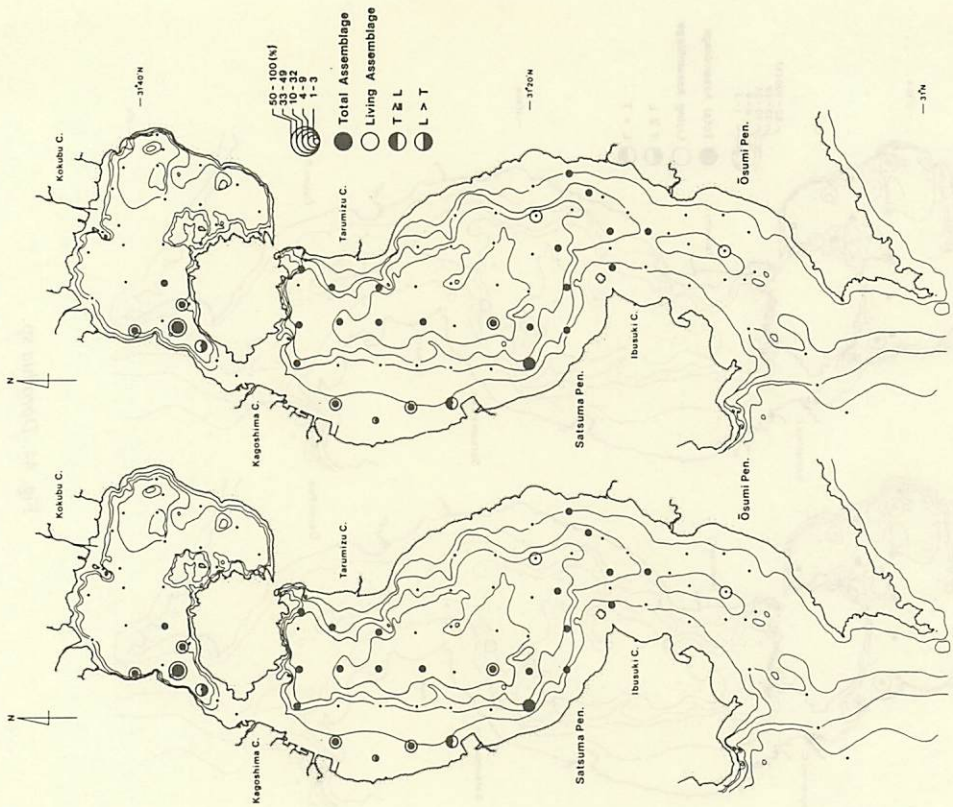

Fig. 46. *Buliminella elegantissima* (D'ORBIGNY).

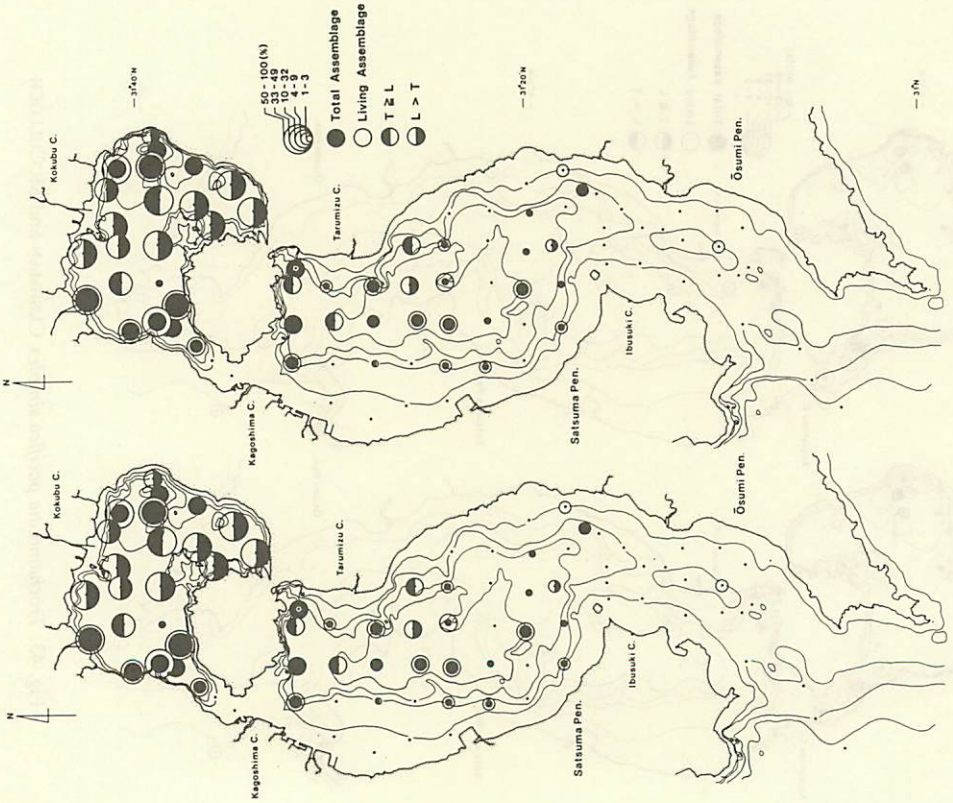

Fig. 45. *Eggerella scabra* (WILLIAMSON).

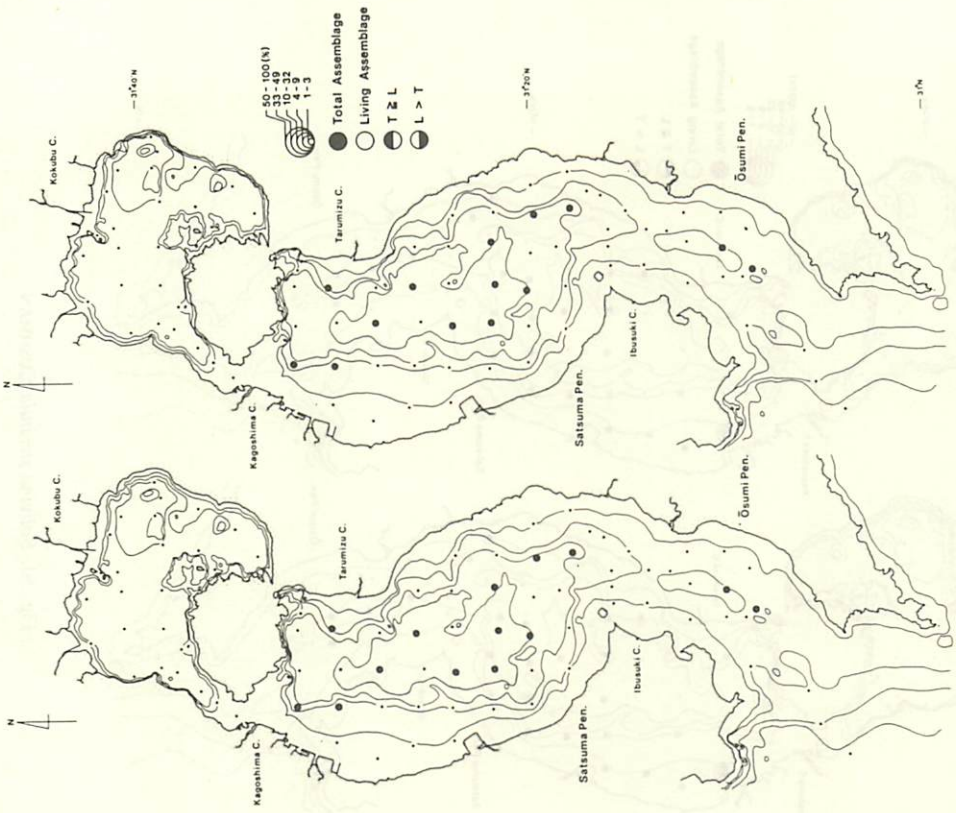

Fig. 48. *Bolivina retia* ŌKI, n. sp.

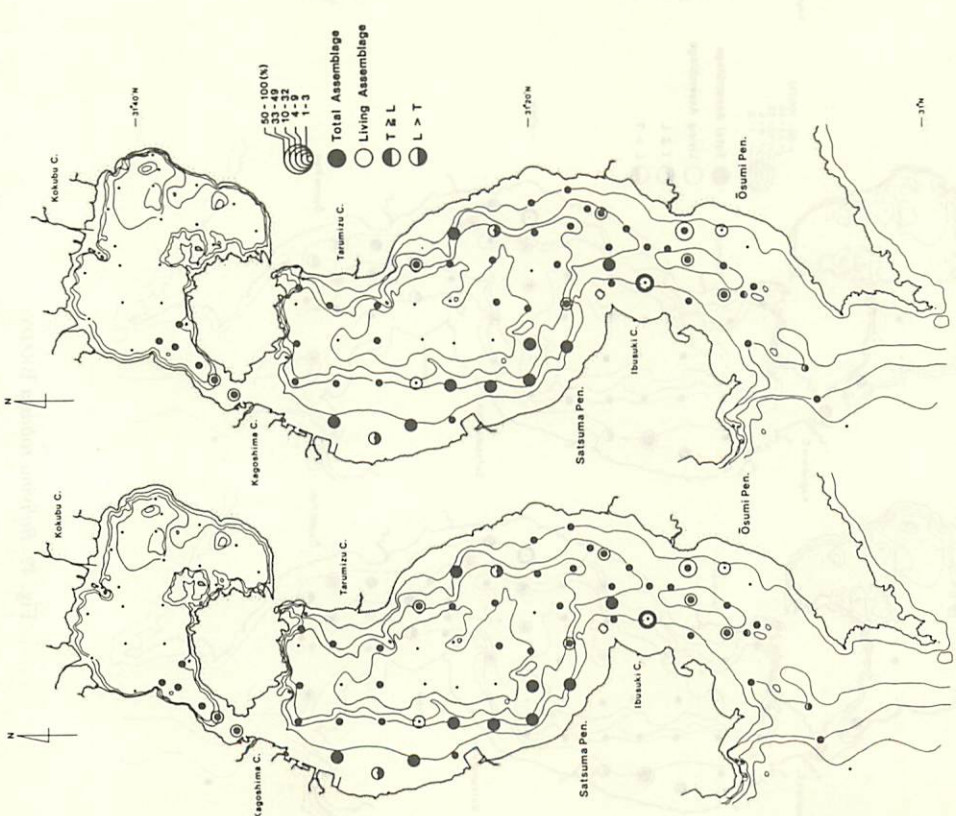

Fig. 47. *Bolivina ordinaria* PHLEGER and PARKER.

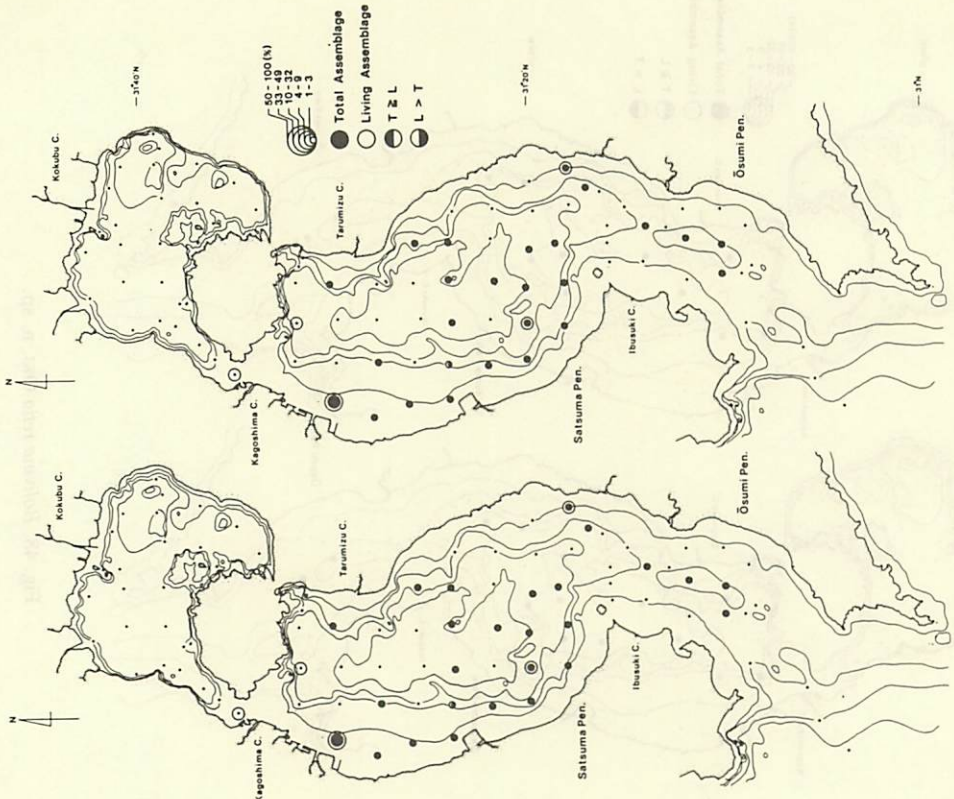

Fig. 50. *Bolivina striatula* CUSHMAN.

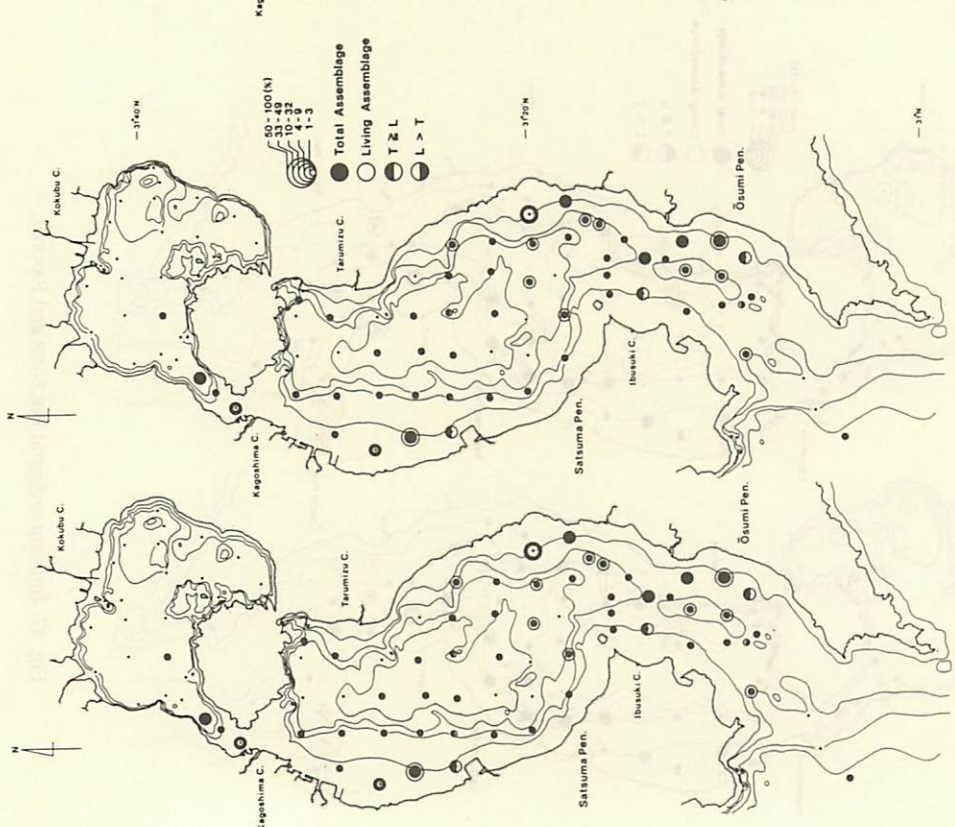

Fig. 49. *Bolivina robusta* BRADY.

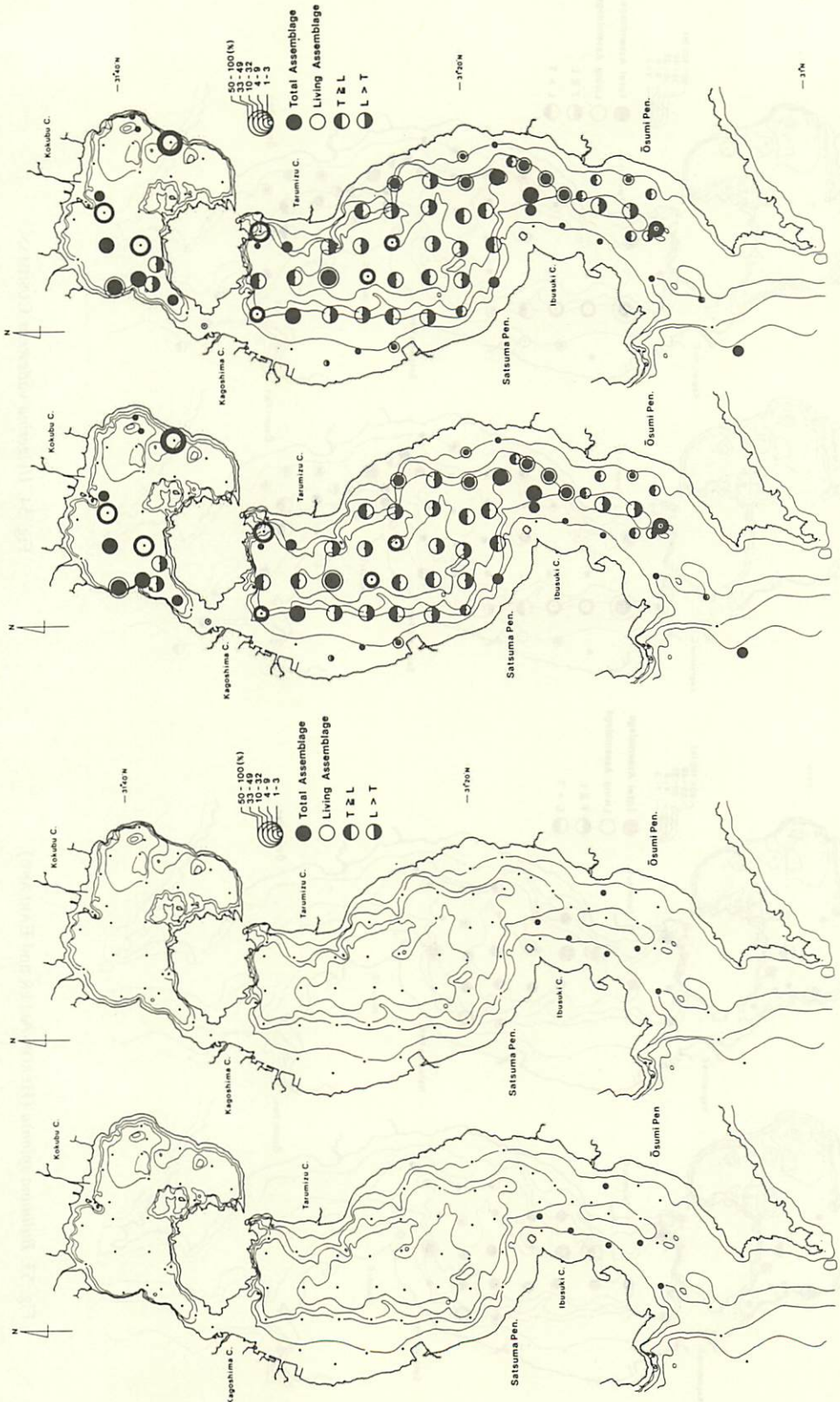

Fig. 51. *Rectobolivina hancocki* (CUSHMAN and MCCULLOCH).

Fig. 52. *Bulimina marginata* D'ORBIGNY.

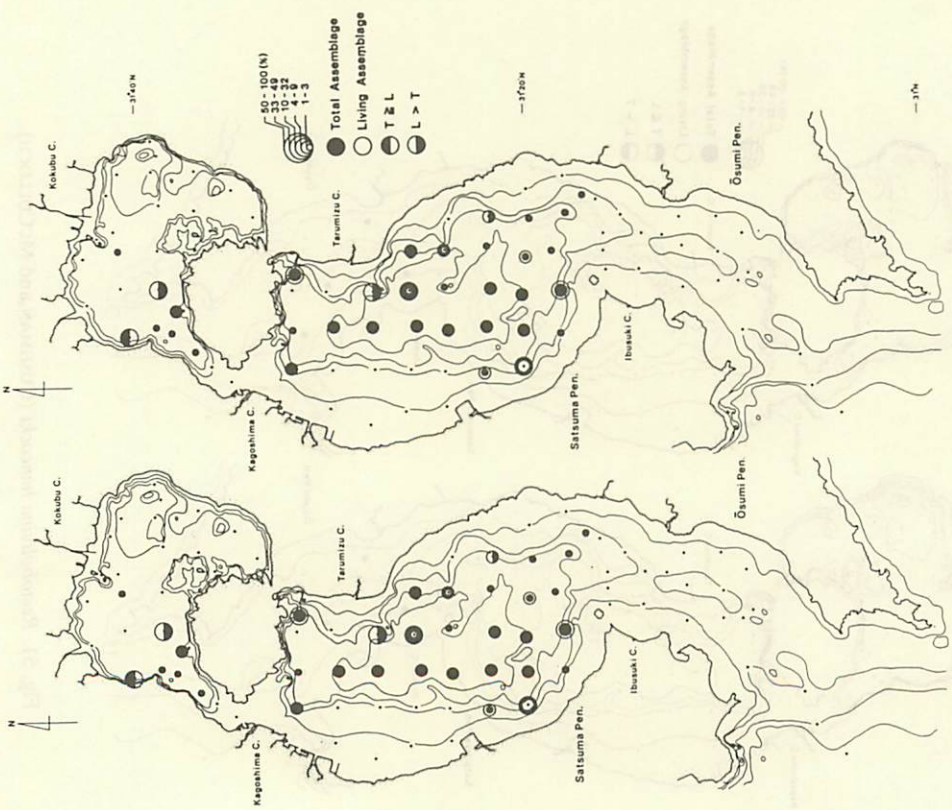

Fig. 53. *Bulimina spinosa* (HERON-ALLEN and EARLAND).

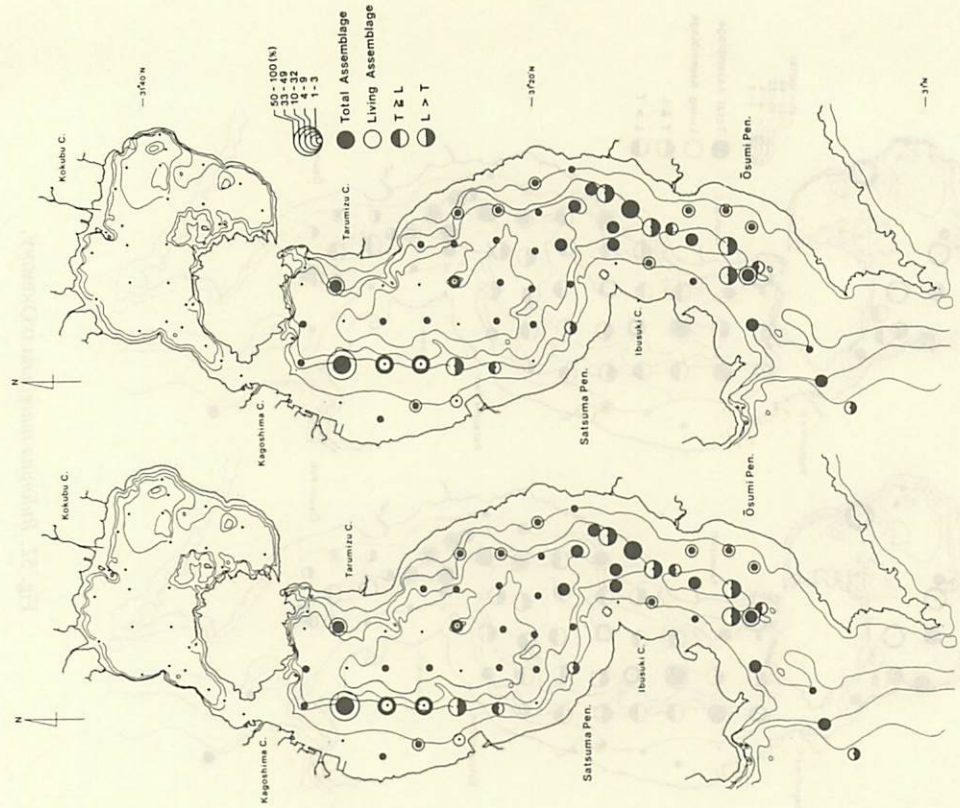

Fig. 54. *Uvigerina vadescens* CUSHMAN.

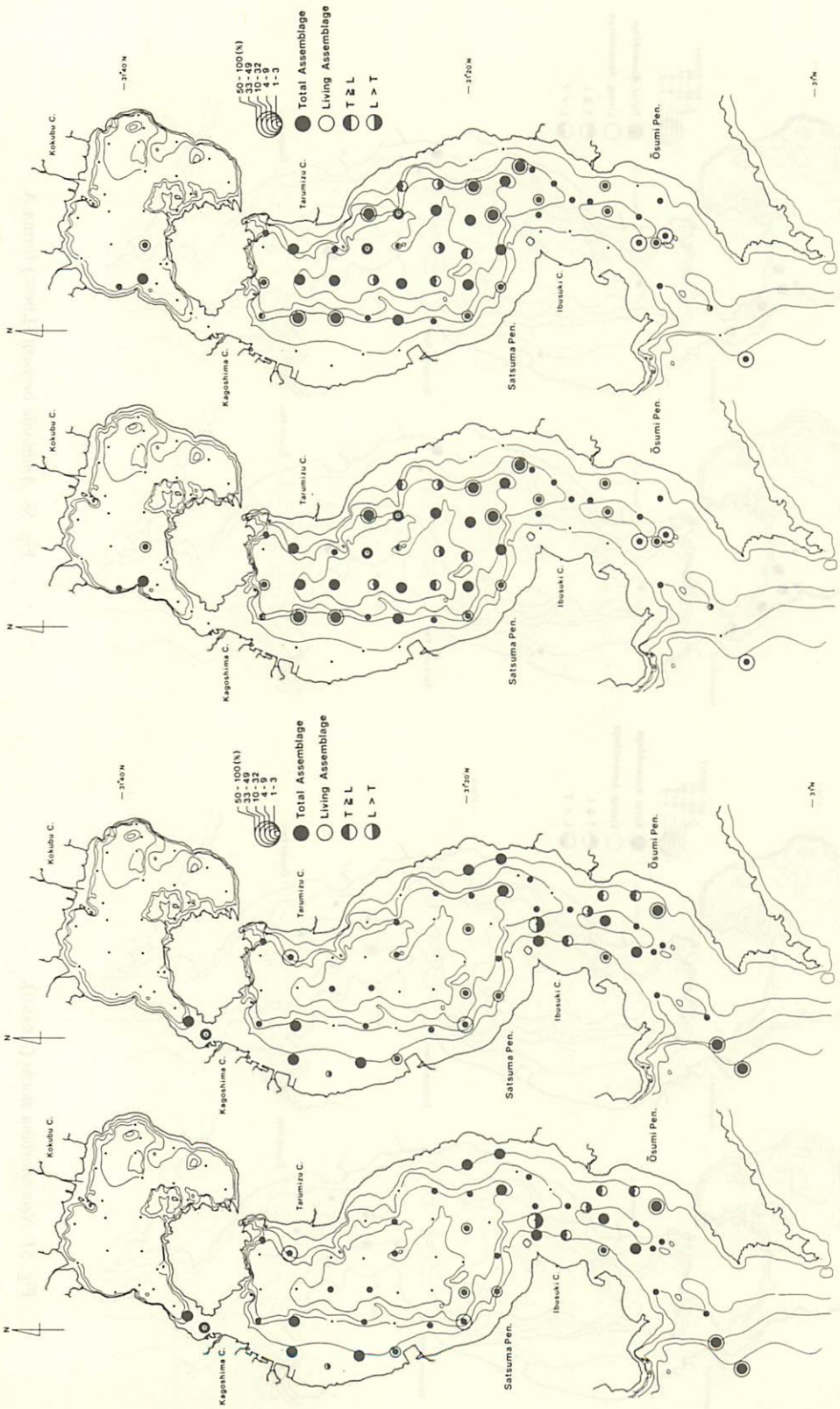

Fig. 55. *Discorbis mira* CUSHMAN.

Fig. 56. *Eilohedra levicula* (RESIG).

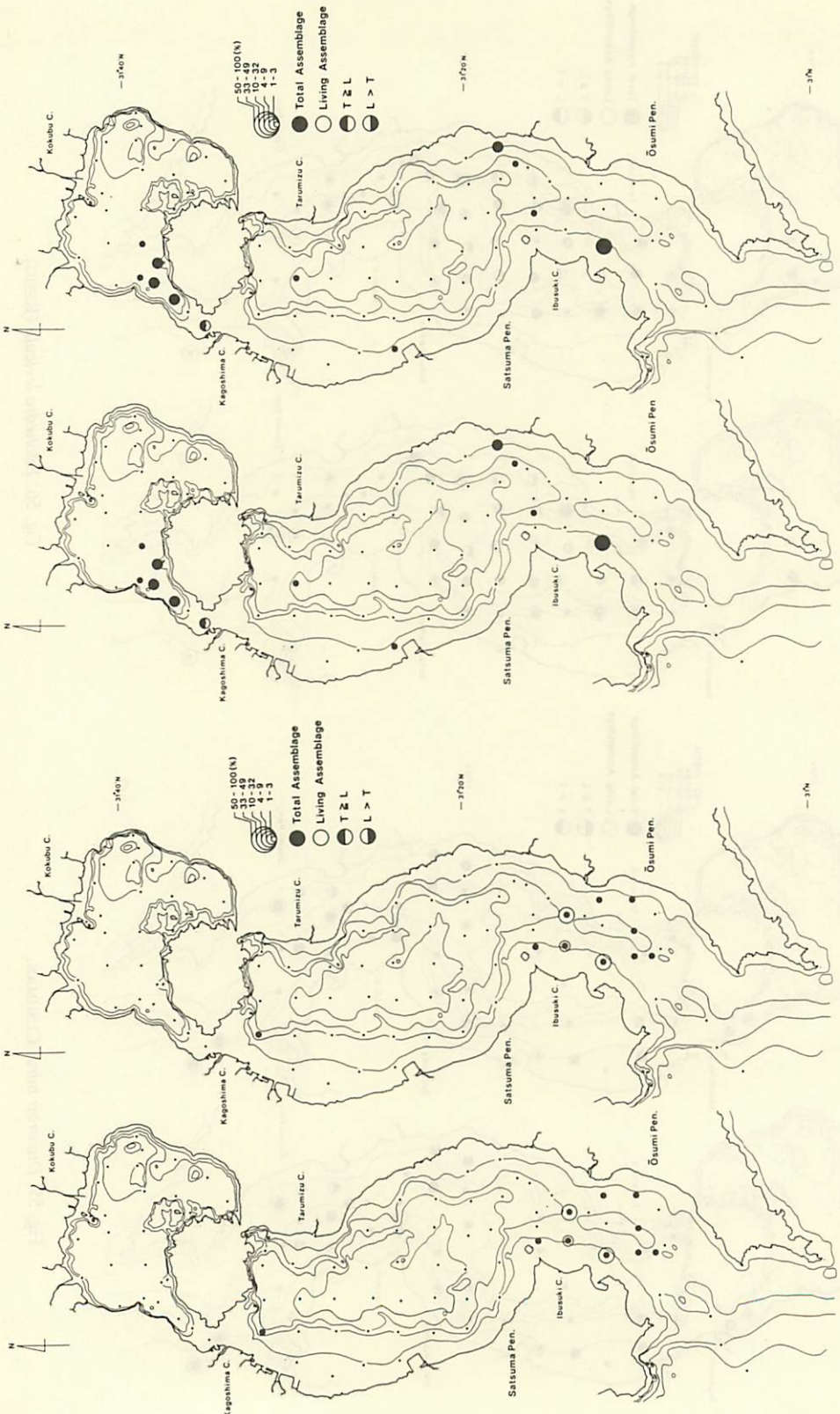

Fig. 57. *Neoconorbina stachi* (ASANO).

Fig. 58. *Ammonia beccarii* (LINNÉ) forma A.

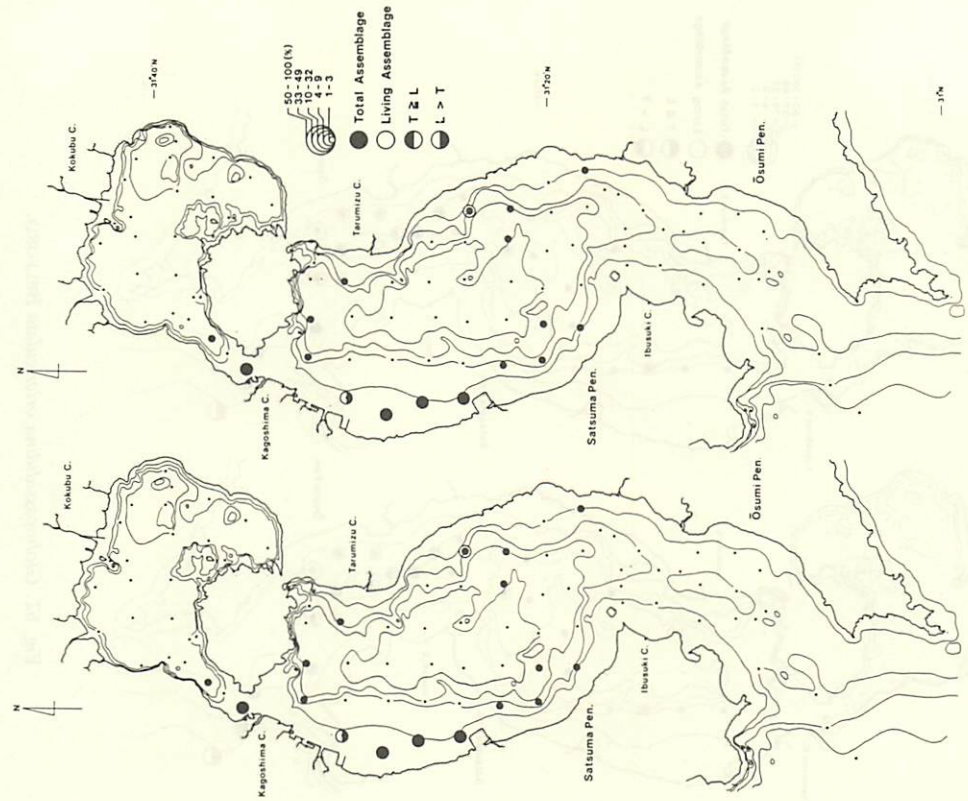

Fig. 60. *Protelphidium schmitti* CUSHMAN and WICKENDEN.

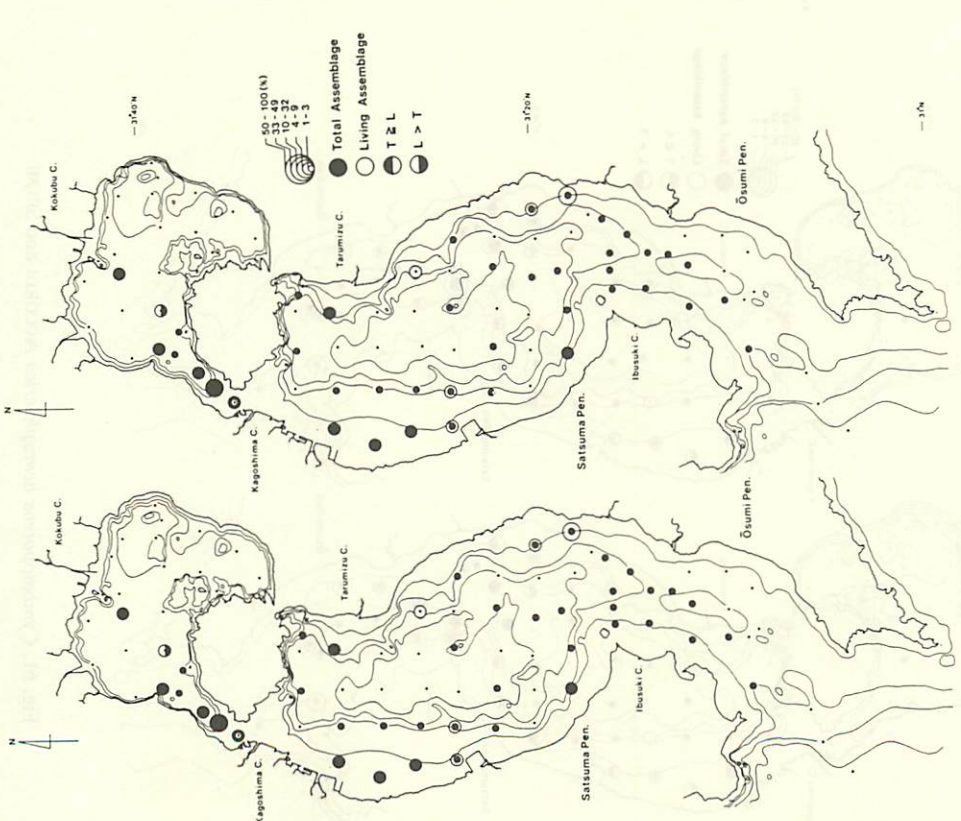

Fig. 59. *Elphidium advenum* (CUSHMAN).

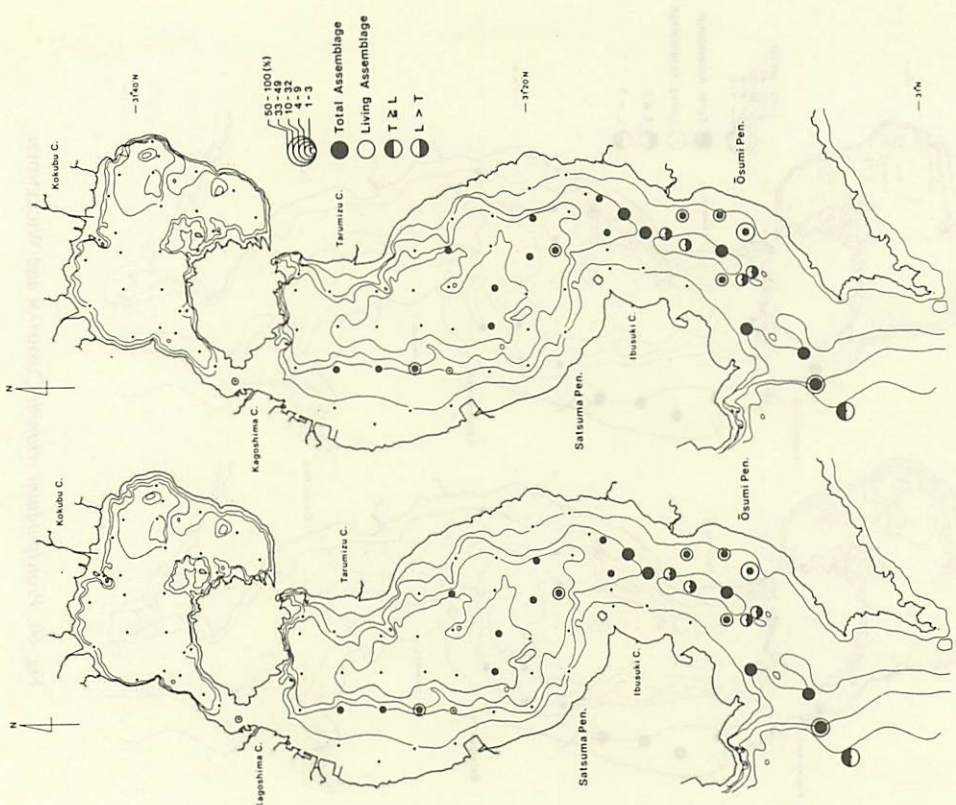

Fig. 61. *Cymbaloporetta hemisphaerica* ACCORDI and SELMI.

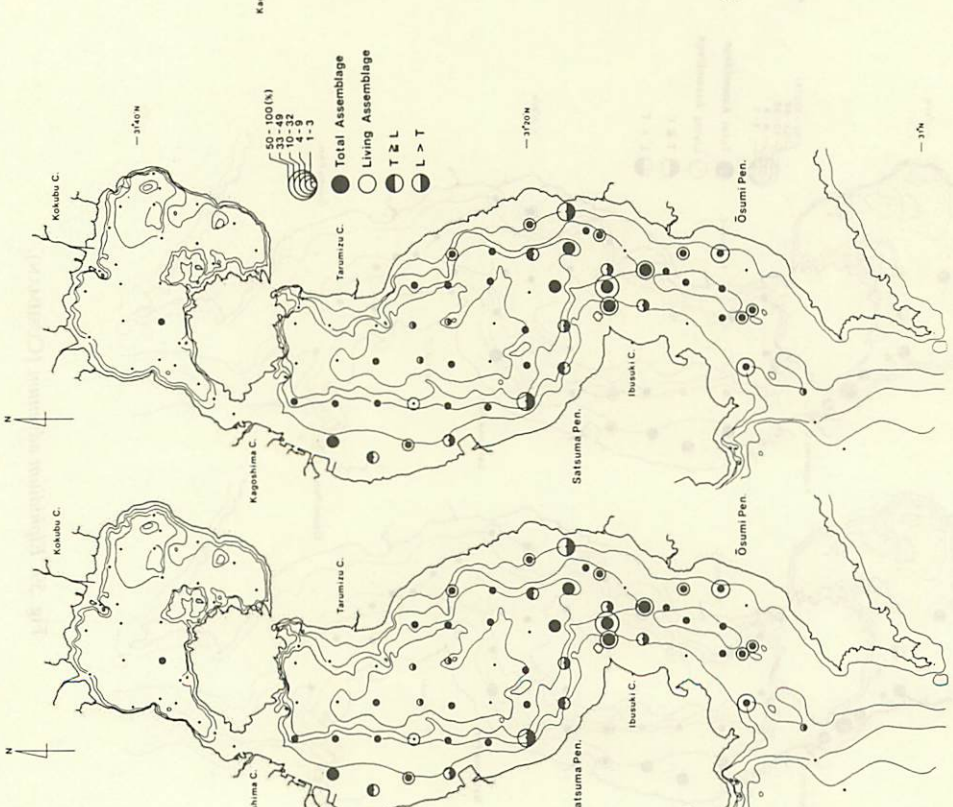

Fig. 62. *Globocassidulina oriangulata* BELFORD.

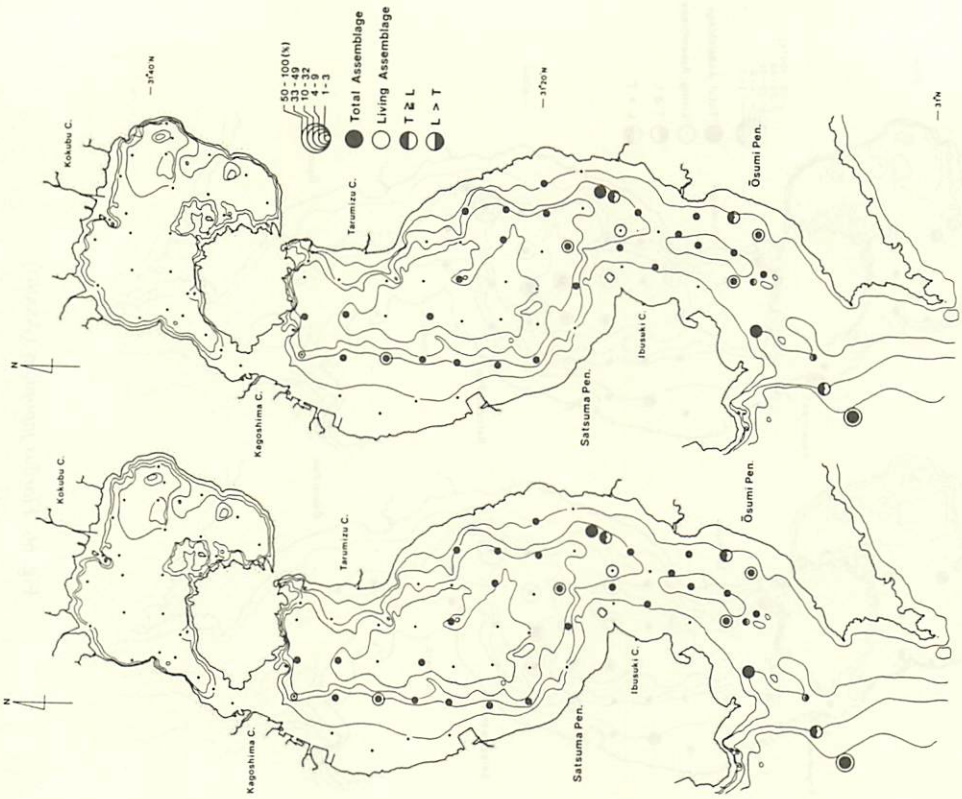

Fig. 64. *Paracassidulina quasicarinata* NOMURA.

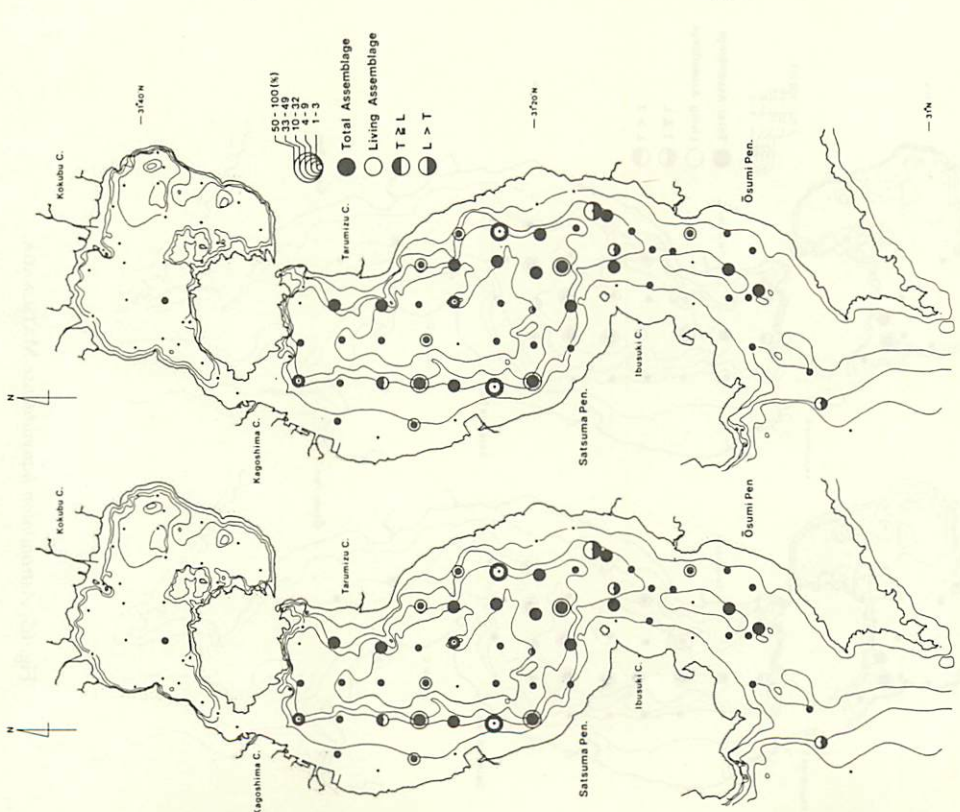

Fig. 63. *Cassidulina nørvangi* THALMANN.

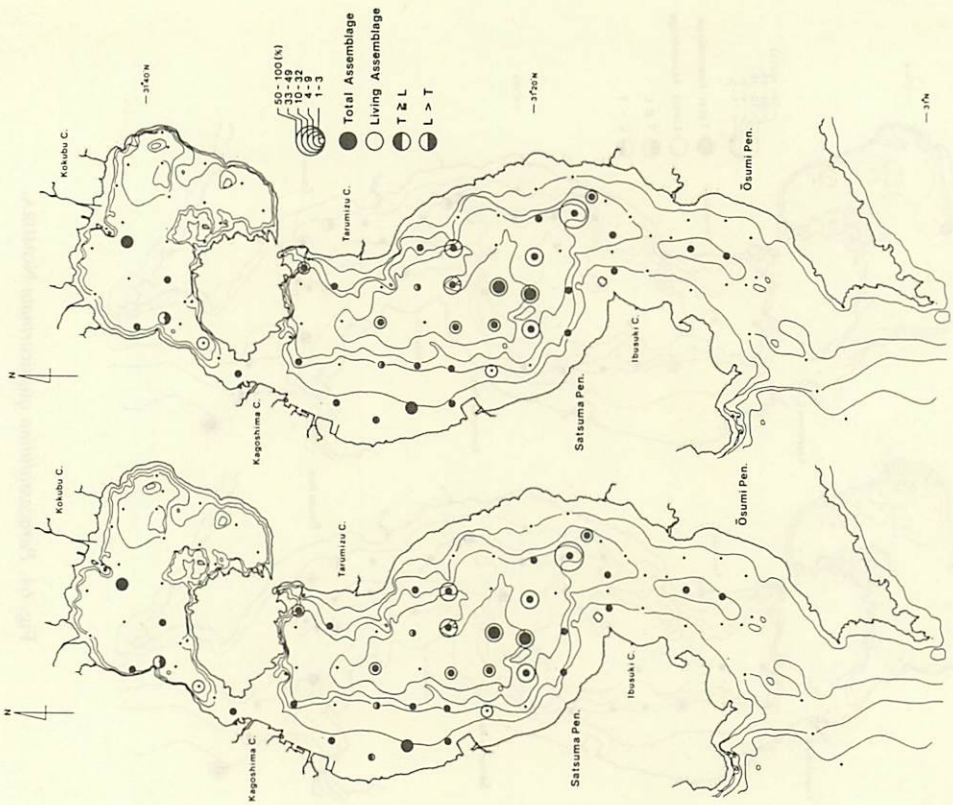

Fig. 66. *Florilus japonicus* (ASANO).

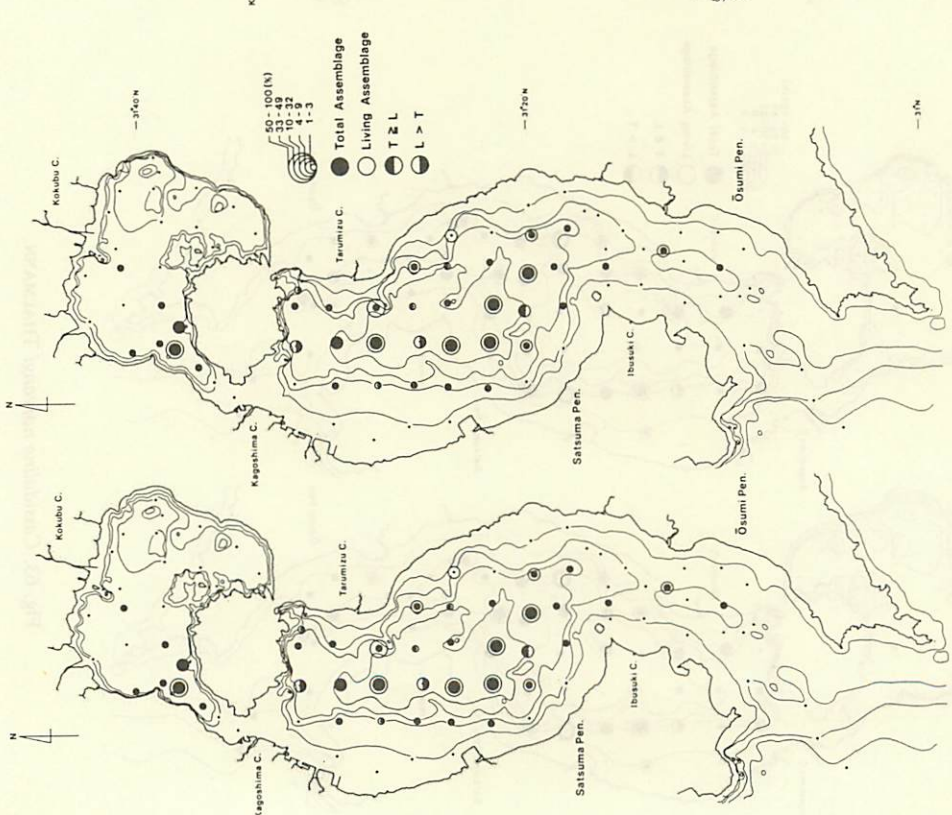

Fig. 65. *Astrononion hanyudaense* MATSUNAGA.

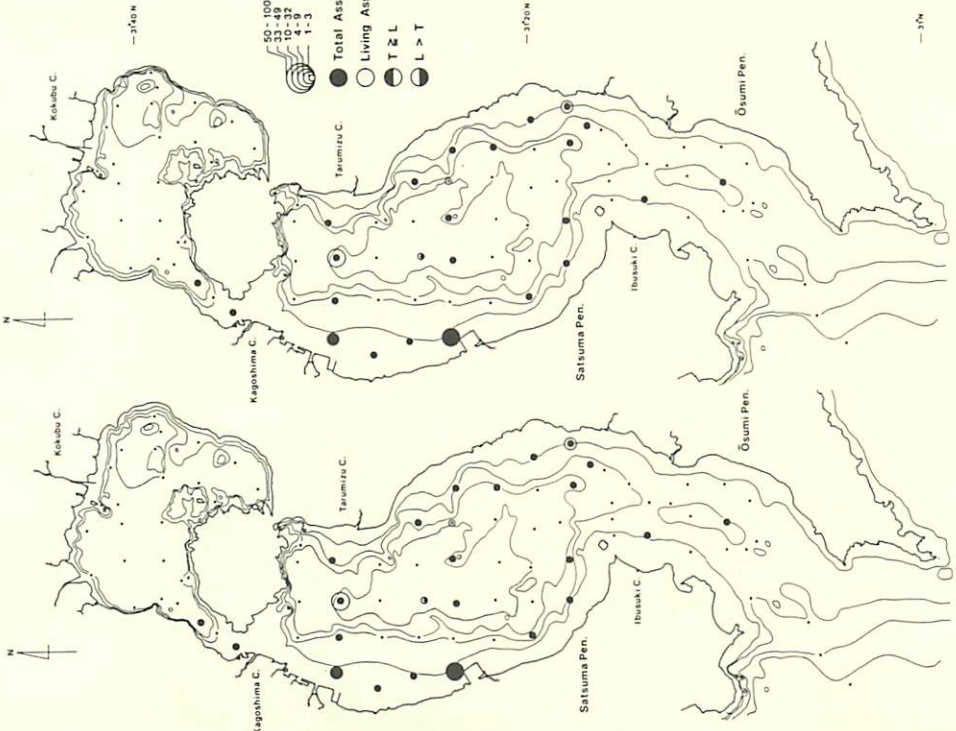

Fig. 67. *Pseudononion japonicum* ASANO.

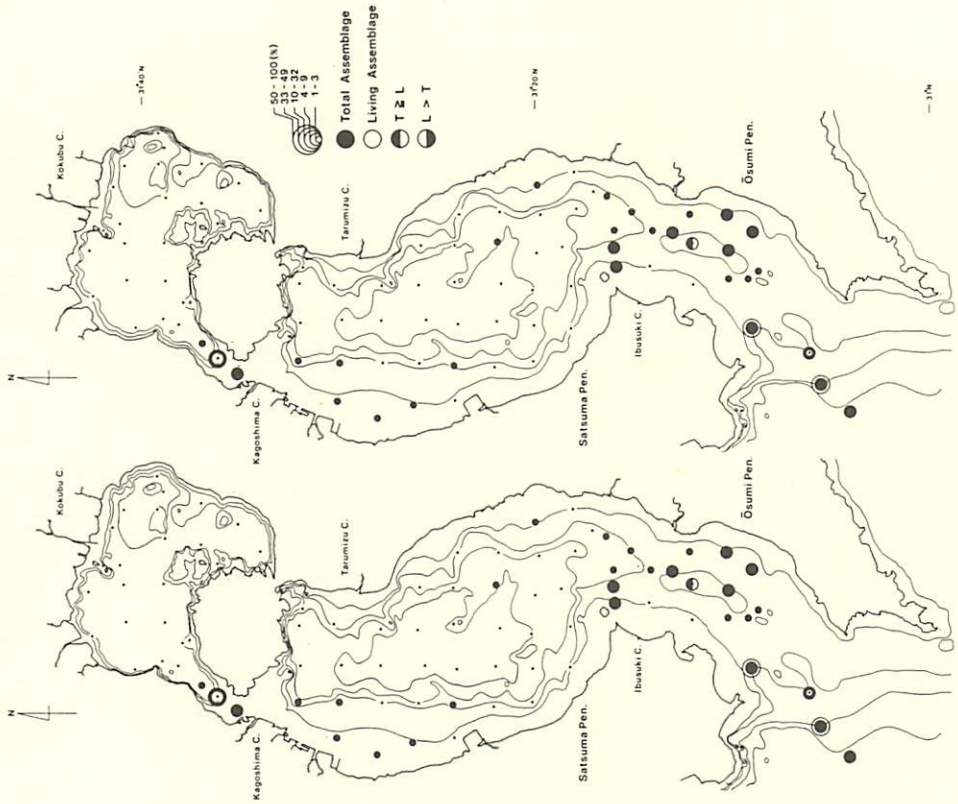

Fig. 68. *Cibicidodes pseudoungeriana* (CUSHMAN).