Three New Species of Holocene Benthic Foraminifera from the Queen Charlotte-Hecate Strait Region of Coastal British Columbia[1]

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Abstract. Three new species of benthic foraminifera are described from Holocene cores in the Queen Charlotte-Hecate Strait region of coastal British Columbia. *Lagena fidicularia* n. sp. is characterized by deep longitudinal costae on the test body becoming spirally arranged on the neck; *Procerolagena simulampulla* n. sp. is distinguished by 10 longitudinal costae and a phialine lip, and *Pleurostomella delicatula* n. sp. has a distinct arcuate, narrow test and elongate chambers.

During a recent distributional and paleoecological assessment of Quaternary benthic foraminiferal faunas found in the Queen Charlotte Sound-Hecate Strait area off the coast of British Columbia, the results of which are reported in detail elsewhere (Patterson, 1991), three species were observed that are not referable to previously described taxa (Fig. 1). The discovery of new taxa in this area is not surprising because few studies have been carried out on the foraminiferal faunas of the region (see Patterson, 1990).

Materials and Methods

Specimens of the new species were obtained from Holocene segments of two Geological Survey of Canada (GSC) piston cores (Fig. 2): END 84B-07 and END 87A-23. Core END 87A-23 (50°59.94'N, 128°56.55'W) was collected in 95 m of water from Cook Bank off the northwestern tip of Vancouver Island, but core END 84B-07 (52°16.70'N, 130°12.27'W) was collected in 474 m of water from the margin of Moresby Trough between the southeastern tip of Queen Charlotte Island and Vancouver Island. Exact sampling intervals are provided in the Types and Occurrences section of each species description. Illustrations were made with a Cambridge Stereoscan 90® scanning electron microscope using Polaroid® NP 55 film. Figured holotypes and unfigured paratypes are deposited in the micropaleontological collections of the Geological Survey of Canada in Ottawa, Ontario.

Taxonomic Account

Suprageneric classification follows that of Patterson & Richardson (1987) and Loeblich & Tappan (1987).

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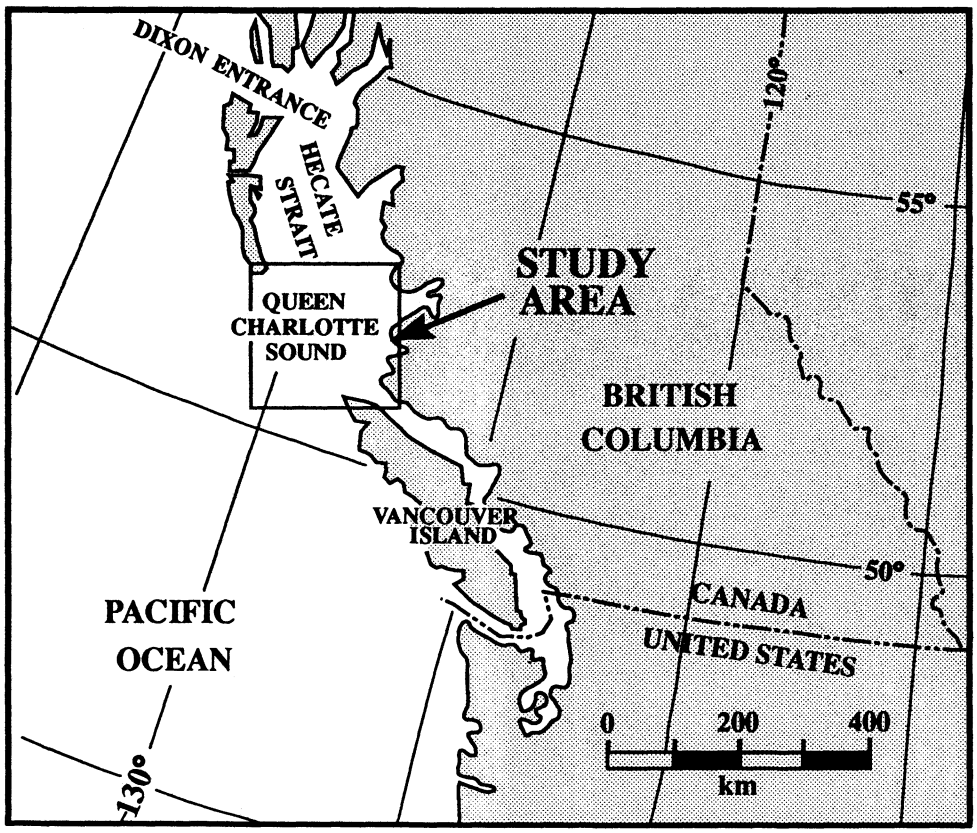

FIG. 1. Continental shelf of western Canada showing location of Queen Charlotte Sound and Hecate Strait.

Suborder Lagenina Delage & Hérouard, 1896
Superfamily Nodosariacea Ehrenberg, 1838
Family Lagenidae Reuss, 1862
Subfamily Lageninae Delage & Hérouard, 1896
Genus *Lagena* Walker & Jacob, 1798
Lagena fidicularia n. sp.
(Figs. 5–7)

Lagena sulcata (Walker & Jacob) var. *interrupta* Williamson Brady, 1884, p. 463, pl. 57, figs. 25, 27 (not *Lagena striata* (Walker & Jacob) var. *interrupta* Williamson, 1848).

Lagena laevis (Montagu) Barker, 1960, p. 118, pl. 57, figs. 25, 27, not 23, 26 (not *Vermiculum laeve*, Montagu, 1803).

Diagnosis. A species of *Lagena* with deep longitudinal costae on the test body becoming spirally arranged on the neck.

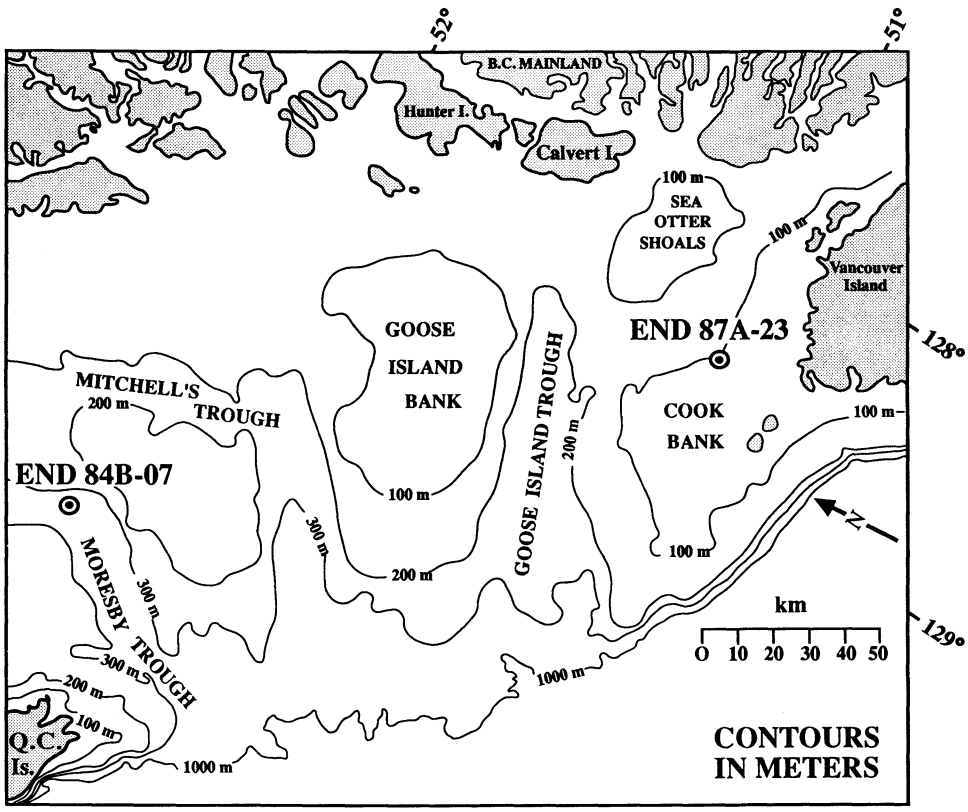

FIG. 2. Bathymetric map of Queen Charlotte Sound-southern Hecate Strait showing location of cores from which Late Quaternary benthic foraminifera were examined.

Description. Test free, unilocular, main part of chamber globular, neck narrow and elongate comprising one-third of test length; wall calcareous, hyaline, smooth, imperforate; 15 deep and narrow costae extending from base, alternate ones terminating near base of neck and near base of test body, others

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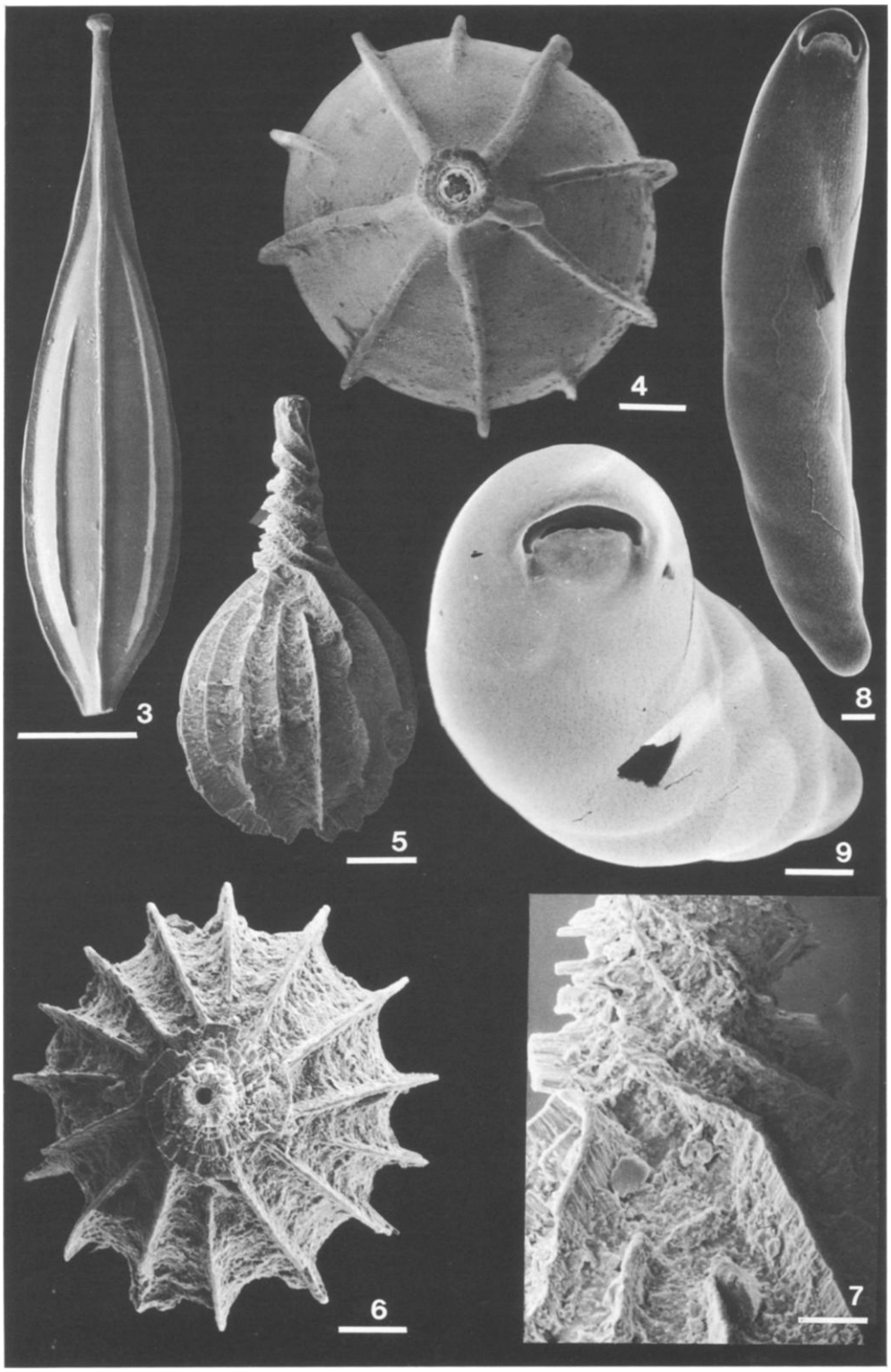
FIGS. 3, 4. *Procerolagena simulampulla* n. sp. Fig. 3. Lateral view of holotype (GSC 99317) showing pronounced longitudinal costae, some of which extend from the damaged apical spine to just short of the aperture. Scale bar represents 100 μm. Fig. 4. Apertural view showing circular aperture within phialine lip. Scale bar represents 25 μm.

FIGS. 5–7. *Lagena fidicularia* n. sp. Fig. 5. Lateral view of holotype (GSC 99311) showing longitudinal surface sculpture on test body becoming spirally arranged on neck. Scale bar represents 85 μm. Fig. 6. Apertural view showing circular apertural opening. Scale bar represents 45 μm. Fig. 7. Magnified view of spiral surface sculpture on neck. Scale bar represents 20 μm. FIGS. 8, 9. *Pleurostomella delicatula* n. sp. Fig. 8. Lateral view of elongate holotype (GSC 99366). Scale bar represents 20 μm. Fig. 9. Oblique apertural view showing flap partially restricting opening. Scale bar represents 20 μm.



extending from base to terminate at aperture, longer costae changing from a longitudinal orientation on test body to a spiral arrangement on neck, spiralling costae complete two and one-half whorls on neck; aperture small and round with a slight lip. Maximum length, 480 μm; maximum width, 260 μm.

Etymology. From the Latin *fidicularis*, like a cord, twisted, with reference to the twisted carina on the neck.

Types and occurrences. Holotype collected from Geological Survey of Canada vibra core END 84B-07 collected from the margin of Moresby Trough off the southeastern tip of Queen Charlotte Island in Queen Charlotte Sound off the coast of British Columbia, 52°16.70′N, 130°12.27′W. Illustrated holotype (GSC 99311) from core interval 56-59 cm (RTP sample 397), Holocene. Material examined consisted of three specimens.

Remarks. Lagena fidicularia is most similar to *Lagena sulcata* (Walker & Jacob) var. *peculiaris* Cushman & McCulloch, 1950. The shape of the test, and the number and arrangement of costae are almost identical. However, the Cushman & McCulloch species is characterized by costae arranged in transverse rings on the neck, not forming a spiral as in *Lagena fidicularia*. *Lagena caepulla* Schwager, 1866, is similar to the new species but has more costae and lacks the spiral costae on the neck. *Lagena striata* (d'Orbigny) var. *intermedia* Rzehak, 1886 also has more costae than *Lagena fidicularia* and has rings but lacks an arrangement of spiral costae on the neck. *Lagena sulcata* (Walker & Jacob) var. *laevicostata* Cushman & Gray, 1946 also is similar in shape and costae arrangement to the new species. However, the costae on the neck of the Cushman & Gray species develop in a much more gentle spire of less than one whorl, as opposed to the two and one-half whorls characteristic of *Lagena fidicularia*.

Genus *Procerolagena* Puri, 1954
Procerolagena simulampulla n. sp.
(Figs. 3, 4)

Diagnosis. A species of *Procerolagena* with 10 longitudinal costae and a phialine lip.

Description. Test free, unilocular, elongate, broadest near midpoint, neck narrow and elongate; wall calcareous, hyaline, smooth, finely perforate between costae; 10 costae extending along test surface, alternate ones terminating at the base of the neck and near base of test, others extending from base increasing in depth on the neck and terminating near the aperture, short segment of neck immediately preceding aperture smooth; aperture small and round surrounded by a phialine lip.

Etymology. From the Latin, *simulis*, like, *simulatrix*, *-icis*, f. imitator: similar, resemble, facsimile; and *ampulla*, flask, bottle, with reference to the species' similarity to a flask, and with reference to the species' superficial resemblance to *Lagena ampulla* Galloway & Heminway, 1941.

Type specimens and occurrence. Figured holotype (GSC 99317) from Geological Survey of Canada vibra Core 87A-023 collected from Cook Bank off

the northwestern tip of Vancouver Island in Queen Charlotte Sound off the coast of British Columbia; 50°59.94′N, 128°26.55′W, 18–20 cm (R.T.P. sample 411), Holocene. Material consisted of two specimens.

Remarks. *Procerolagena simulampulla* is similar to *Lagena ampulla* Galloway & Heminway, 1941 but differs in having an elongate basal spine and a slightly more elongate test. *Lagena multilineata* McCulloch, 1977 is similar in shape and in the number of costae but differs in having all costae extend from the base to the aperture. The costae of this deep-water species also are much thicker than those found in *Procerolagena simulampulla*. *Oolina raricosta* d'Orbigny, 1939 has a similar number of costa—eight—but is much less elongate and more globular than *Procerolagena simulampulla*.

Suborder Rotaliina Delage and Hérouard, 1896
Superfamily Pleurostomellacea Reuss, 1860
Family Pleurostomellidae Reuss, 1860
Subfamily Pleurostomellidae Reuss, 1860
Genus *Pleurostomella* Reuss, 1860
Pleurostomella delicatula n. sp.
(Figs. 8, 9)

Diagnosis. An arcuate species of *Pleurostomella* with a narrow test and elongate chambers.

Description. Test free, elongate, almost circular in transverse section, test gradually increasing in width with addition of later-formed chambers; 5–6 pairs of biserially arranged chambers, becoming increasingly more oblique in later chambers; wall calcareous, finely perforate, surface smooth; aperture terminal with projecting hood on one side and opposite side partially obstructed by a flange-like projection. Maximum length, 400 μm; maximum width 80 μm.

Types and occurrences. All specimens—13 in all—from Geological Survey of Canada vibra core END 84B-07 collected from the margin of Moresby Trough off the southeastern tip of Queen Charlotte Island in Queen Charlotte Sound off the coast of British Columbia, 52°16.70′N, 130°12.27′W. Illustrated holotype (GSC 99366) from core interval 152–156 cm (RTP sample 398), Holocene; unillustrated paratypes (GSC 99753) from core interval 56–59 cm (RTP sample 397), Holocene.

Etymology. From the Latin *delicatus*, soft, delightful, tender, *delicatulus*, (dim.), delicate, with reference to the fragile nature of the test.

Remarks. *Pleurostomella delicatula* is similar to *Pleurostomella schuberti* Cushman & Harris, 1927, with regard to the oblique suture arrangement. However, the latter species is compressed and increases much more rapidly in diameter than *Pleurostomella delicatula*. The elongate and obliquely chambered arrangement of the Cretaceous species *Pleurostomella dacica* Neagu, 1968, also is quite similar to that of *Pleurostomella delicatula*. However, the chambers overlap to a much greater extent in *Pleurostomella dacica*. The test outline of *Pleurostomella delicatula* differs from that of *Pleurostomella dacica* by being arcuate and much narrower.

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Continued from page 336.

diagnosed, but owing to the variable morphology of its members, which are highly modified parasites of other crustaceans, keys and diagnoses to the lower taxonomic categories (families, subfamilies, genera, and species) are not included in the text. However, the four commonly recognized epicaridean families are discussed and the 42 species known from the Caribbean are listed alphabetically with their known crustacean host or hosts.

The section on Zoogeography presents a brief, but interesting, treatment of the faunal provinces, an analysis of the isopod fauna of the Caribbean area, and a comparison of the isopod fauna of the adjacent marine areas of the Americas, Bahamas, and Bermuda. This section is augmented with lists of the known marine isopods from the Gulf of Mexico, Bermuda, and species occurring on both sides of the isthmus of Panama. There is also a brief discussion of the cave-dwelling isopod fauna of the Caribbean area.

The Appendix deals with new isopod taxa from the Caribbean or adjacent areas that were published after the volume was in press. The extensive Literature Cited includes over 275 references and the guide concludes with an Index to all isopod taxa discussed or mentioned in the text.

Without reservations, I highly recommend this guide for use by professional biologists, teachers, students, and naturalists interested in marine zoology. The current hard cover price ($35.00) for this book may be prohibitive for students. It would be useful if a less expensive, soft covered edition could be made available in the future to better accommodate this important user group.—RICHARD W. HEARD, Invertebrate Zoology Section, Gulf Coast Research Laboratory, Ocean Springs, Mississippi.