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299. SOME OBSERVATIONS ON RECENT FORAMINIFERS FROM VENEZUELA: PART I[1]

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ABSTRACT

Two new genera of foraminifers are described, **Orectostomina** gen. nov. and **Sigmoilinita** gen. nov., as well as seven species, two of which are new: **Orectostomina camachoi** sp. nov. and **Nodosaria ericsoni** sp. nov.; and a third one is **Quinqueloculina brodermanni**, nomen novum. The remaining four species have been rarely recorded in foraminiferal literature.

INTRODUCTION

The purpose of this paper is to describe three new species and two new genera of the order *Foraminiferida* found in recent sediments of the submarine shelf off Araya Peninsula, Eastern Venezuela. Some recent miliolids rarely recorded in foraminiferal literature are also described.

This work represents part of a systematic study of recent foraminifers of the Araya shelf. We have dealt as well with their distribution. Many of the foraminifers found in this area have been encountered previously only in the Pacific and Indian Oceans and in the Mediterranean Sea. Some of them were abundant. Similar benthic assemblages of warm water foraminifers will be found in different parts of the world when extensive studies are made. For this reason the geographical subdivision of warm-water benthic foraminifers made by Joseph A. Cushman will lose much of its significance. Of course, the atolls of the Pacific Ocean, non-existent in the Atlantic, have typical ecological conditions and consequently their foraminiferal assemblages are different. These differences are, however, of an ecological and not of a geographical character. In this work we describe some species that are common to these different seas.

Thanks are given to Dr. Pedro J. Bermúdez for giving us worthwhile suggestions as well as for allowing us the use of his personal library.

MATERIALS

The samples used for this paper were taken in several cruises made by the research vessel "Guaiquerí," of the Instituto Oceanográfico, Cumaná, in October 1962 and during the first month of 1963. Most of these samples were taken by means of a jaw dredge; the others with a core sampler.

1 Contribution from the Instituto Oceanográfico, Universidad de Oriente, Cumaná.

SYSTEMATICS

Family TEXTULARIIDAE Ehrenberg, 1839

Subfamily SPIROPLECTAMMININAE Cushman, 1927

Genus **Orectostomina** gen. nov.

Type species.—*Orectostomina camachoi* sp. nov. Recent; near Los Testigos Islands, Venezuela.

Description.—Test small and elongated, slightly compressed. Proloculus with early chambers forming a planispiral followed by a biserial stage. Wall arenaceous, with the internal surface smooth and covered by a thin layer of segregated material. Aperture in the central part of the inner face of the last chamber, and provided with a thick lip.

Remarks.—The closest genus to *Orectostomina* is *Spiroplectammina* Cushman, 1927, but in *Orectostomina* the aperture is not at the base of the inner margin, but in the central area of the inner face of the last formed chamber. This same characteristic of the aperture and the planispiral early chambers differentiate *Orectostomina* from *Morulaeplecta* Hoeglund, 1947. The arrangement of the early chambers around the proloculus in this last genus is irregular, and it must not be confused with the planispiral growth plan that sometimes covers the proloculus of the younger chambers of *Orectostomina*. The peculiar arrangement of the aperture and the development of a test in planispiral biserial stages is sufficient to differentiate *Orectostomina* from all others of the same family.

Orectostomina camachoi sp. nov.

Plate 8, figures 1a, b and 2

Description.—Test small and elongated, slightly compressed. Proloculus followed by several chambers in a planispiral; sometimes the planispiral covers the proloculus; then follows a biserial stage. Wall arenaceous, fine grained and of uniform size that gives more or less a smooth appearance; color brownish red. Aperture is in the central area of the inner face of the last formed chamber and provided with a thick lip that usually projects outside in the form of a beak. Length between 0.26 mm. and 0.54 mm.; average length 0.42 mm.

Holotype.—The holotype is represented by figures 1a, b, plate 8, and may be found in the Department of Geology of the Instituto Oceanográfico, Cumaná. The typical locality is Station 16, Cruise

G-6306, located at 11° 15′ North, and 63° 00′ West, at a depth of 29 meters and in the neighborhood of Los Testigos Islands.

This sample is composed of large fragments of corals, bryozoans shells, and a small amount of sand consisting of shell fragments.

Other specimens were found on Station 23, Cruise G-6308, at 11° 11′ North and 63° 45′ West, 33 meters deep and also near Los Testigos Islands.

This sample consists of a clean cream-colored calcarenitic sand composed of shell fragments.

Remarks.—The outside projection of the apertural lip in the form of a beak is very remarkable in this species and it gives a peculiar appearance to the test. The name is given in honor to Dr. Enrique C. Camacho from Shell Oil Company, Lafayette, Louisiana.

Family MILIOLIDAE Ehrenberg, 1839

Subfamily QUINQUELOCULININAE Cushman, 1917

Genus **Quinqueloculina** Orbigny, 1826

Quinqueloculina brodermanni nom. nov.

Plate 8, figures 3a, b, c and 4a, b; Plate 9, figure 1

Miliolina auberiana var. *arenacea* HERON-ALLEN and EARLAND, 1922 (preoccupied name), Brit. Mus. Zool., vol. no. 2, part 2, p. 232, pl. 1, figs. 1-3.

Quinqueloculina cf. *agglutinata* BOLTOVSKOY (not Cushman), 1959, Foram. Rec. Sur Brasil, p. 47, pl. 3, fig. 12a, b; BOLTOVSKOY (not Cushman), 1960, Ciencias Zool., t. 6, no. 6, p. 301, pl. 4, figs. 33 and 34.

Description.—Test small to medium for the genus, in front view more or less circular. Peripheral border of the two last chambers at least, with tendency to form a more or less square-shaped and truncated keel. Adults have twelve to fourteen chambers; the chambers are arched and almost semi-circular. Wall arenaceous, grain of nearly uniform size and smoothly cemented; on account of this, some sutures are nearly invisible. Aperture provided with a simple tooth of irregular form. Length between 0.56 mm. and 0.69 mm.

Remarks.—The name *Miliolina auberiana* (Orbigny) var. *arenacea* Heron-Allen and Earland = *Quinqueloculina arenacea* (Heron-Allen and Earland), has been previously occupied by *Quinqueloculina arenacea* Rhumbler = *Miliolina* (*Quinqueloculina*) *arenacea* Rhumbler, 1906, Zool. Jahrb., Abt. System. Jena, vol. 24, p. 43, pl. 3, figs. 24, 25 from Hawaii. The specimens of the species described by Heron-Allen and Earland were taken offshore from Rio Janeiro.

The specimens in the description made here are from Station 4, Cruise G-6303 at a depth of 94 meters and 10° 38′ North, 64° 20′ West, near the reefs offshore of Punta Escarceo, Araya Peninsula, Venezuela.

The tendency of this species to have a circular form in front view and a dull and nearly square-shaped keel is enough to differentiate it from the remaining species of the genus. The closest species is *Quinqueloculina agglutinata* Cushman, 1917, from which it is differentiated because the sutures of *Q. brodermanni* nom. are frequently invisible or hardly visible. For this reason, externally it looks like *Sigmoilopsis* Finlay, 1947. The name is given in honor of Jorge Brodermann.

Quinqueloculina sp. cf. **Q. philippinensis** Cushman

Plate 9, figures 2a, b

Quinqueloculina kerimbatica (Heron-Allen and Earland, 1915) var. *philippinensis* CUSHMAN, 1921, U. S. Nat. Mus., Bull., no. 100, vol. 4, p. 438, pl. 89, figs. 2 and 3, text-fig. 34.

Description.—Test more or less elongated. Borders of the chambers rounded in peripheral view. Walls of the chambers reticular with the exception of two smooth bands in each chamber and parallel to the sutures of the chambers; network with net projecting and with deep concavities. Wall calcareous. Aperture preceded by a smooth neck and provided with a bifid tooth. Length between 0.40 mm. and 0.84 mm.

Remarks.—A similar species was originally described by Cushman from water near the Philippine Islands, Pacific Ocean. We have found it in samples from Station 14, Cruise G-6306 (11° 05′ N. and 63° 00′ W.) at a depth of 26 meters, and Station 26, Cruise G-02 (11° 00′ N. and 63° 00′ W.), at a depth of 30 meters. The sediments of the first station are composed mostly of reef fragments (algae, corals, bryozoans, worm tubes, etc.) and shells of all sizes. The sediments of the second station are composed mainly of fragments of calcified algae more or less of uniform size. These samples were taken in or near the reefs southeast of Los Testigos Islands. Nevertheless this species is probably originally from shallower depths.

Quinqueloculina sp. aff. **Q. reticulostriata** Cushman

Plate 9, figures 3a, b

Description.—Test large and elongated. Chambers elongated and rounded in peripheral view. Chamber walls, in the peripheral face, provided with longitudinal, thick and irregular costae. On account of this, many tests show only elongated concavities irregularly disposed as well. Wall calcareous. Aperture preceded by an elongated neck and provided with a bifid tooth. Length, 1.05 mm. to 2.25 mm.

Remarks.—A similar species, *Quinqueloculina reticulostriata* Cushman, 1921, was originally de-

scribed from waters near the Philippine Islands. We have found it in the same stations as *Quinqueloculina* sp. cf. *Q. philippinensis* Cushman.

Genus **Pyrgo** Defrance, 1824

Pyrgo jugosus Cushman

Plate 9, figures 4a, b; 5a, b, c

Pyrgo jugosus CUSHMAN, 1935, Smith. Inst. Misc. Coll., 91 (Pub. 3327), p. 6, pl. 2, figs. 9-11. Recent.

Description.—Test medium, ellipsoidal. Chambers semi-ellipsoidal and provided with a broad and very thin keel. Each chamber is provided with just one central, thick costa with a length equal to three quarters the length of the chamber; in very long specimens the costa is bifurcated. The part of the last chamber opposite to the aperture is denticulated. Aperture wide, provided with a tooth in the form of a Greek T (Tau). Length 0.71 mm. to 1.10 mm.

Remarks.—This species was described by Cushman from recent marine sediments off Puerto Rico. We found it in the same localities as the two preceding species.

Pyrgo oeensis (Martinotti)

Plate 8, figures 5a, b, c; 6a, b

Biloculina oeensis MARTINOTTI, 1920, Soc. Ital. Sci. Nat. Milano, LIX, p. 253, pl. 1, figs. 1-3, text-fig. 1. Recent.

Description.—Test medium. Front view, oval-shaped in outline. Each chamber is provided with a thick keel, and well separated from the keel of the next chamber. The sutures are rather depressed. In about half of the specimens, the part of each chamber close to the aperture shows four or five weakly developed costae; they reach only one fourth the total length of each chamber. Aperture wide and provided with a broad tooth that covers a large portion of it. Length 0.60 mm. to 1.01 mm.

Remarks.—This species was described by Martinotti from samples taken at a beach in Tripolis, Mediterranean Sea. We have found it in the same stations mentioned before.

Genus **Sigmoilinita** gen. nov.

Type species.—*Sigmoilinita tenuis* (Czjzek) = *Quinqueloculina tenuis* CZJZEK, 1848, Haidingers Nat. Abh., vol. 2, p. 149, pl. 13, figs. 31-34.

Description.—Test small to medium. First chambers quinqueloculine-like, later ones biloculine and added in planes of a little more than 180° from one another, so that in transverse section their centers are in a sigmoidal curve; chambers two in a coil and evolute. Sutures visible. Wall calcareous; the wall of each chamber has several layers of calcite and each wall with its respective layers covers only the corresponding chamber and not the former ones. Aperture terminal with or without a tooth.

Remarks.—*Sigmoilina sigmoidea* (Brady) = *Planispira sigmoidea* Brady, type species of the genus *Sigmoilina* Schlumberger, 1887, according to some authors (Barker, 1960) is really *Nummoloculina* Steinmann, 1881. In our opinion, both genera are different. *Nummoloculina* has the apertural tooth in the form of a valve, similar to *Miliolinella* Wiesner, 1931, and in each coil has more than two chambers. The genus *Sigmoilina* has a thin tooth as *Quinqueloculina* and only two chambers per coil. Regardless *Sigmoilina* and *Sigmoilinita* are evidently two different genera. In the first one, the former chambers are covered by the walls of the next ones, in such a way that the sutures are not visible, and the younger chambers are covered by a thick layer. In *Sigmoilinita,* on the other hand, the wall of each chamber does not cover any of the preceding ones, and with the exception of the chambers in the quinqueloculine stage, the remaining ones are visible from the exterior. (See figures 6, 7 and 8, plate 9).

Specimens of *Sigmoilinita tenuis* (Czjzek) gen. nov. were taken at Station 18, Cruise G-6306, 11° 3′ N. Lat. and 63° 00′ W. Long., at a depth of 84 meters, and Station 28, Cruise G-6308, 11° 32′ N. and 63° 45′ W., at a depth of 92 meters.

Family NODOSARIIDAE Ehrenberg, 1839

Genus **Nodosaria** Lamarck, 1812

Nodosaria ericsoni sp. nov.

Plate 9, figures 9, 10, 11

Description.—Test small to medium for the genus, elongated. Two or three chambers rather elongated, the first one provided with a long terminal needle-shaped spine; in few instances, the first chamber is very short and curved, and the terminal needle-shaped spine is short and arched. Aperture terminal, radiate with four slits; preceded by a very thin, long, tubular neck. Length from 0.70 mm. to 1.35 mm.

Holotype.—The holotype is represented by figure 10 of the plate 9, and is deposited in the Department of Geology of the Instituto Oceanográfico, Universidad de Oriente, Cumaná. The typical locality is Station 29, Cruise G-6308, 11° 31′ N. Lat.

EXPLANATION OF PLATE 7

FIGS.		PAGE
1-4.	*Valvulina oviedoiana* d'Orbigny, 1839. 1 and 2, side views of typical specimen of Group 1, × 34, station H-3; 3 and 4, side views of typical specimen of Group 2, × 32, station F-3. ...	67
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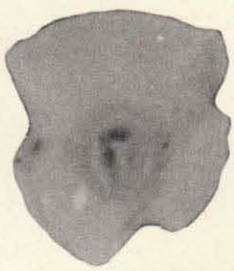

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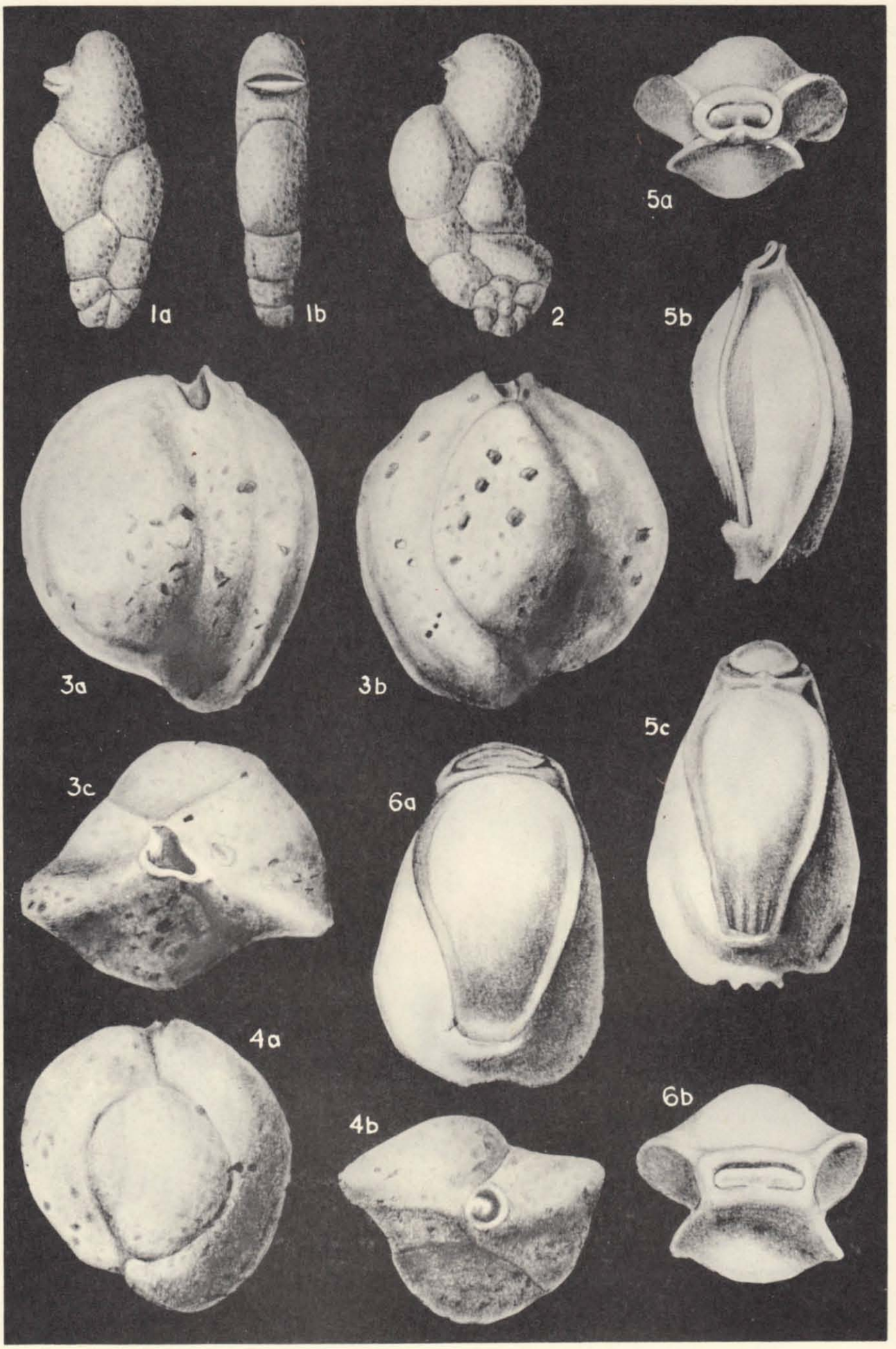

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and 63° 45′ W. Long., at 75 meters and also at Northwest of Los Testigos Islands. The specimens were taken from the upper 8 centimeters of core. The sample is a gray silty, sandy clay.

Specimens were also taken from the lower portion of that core and also in Station 25, Cruise G-6308, 11° 35′ N. Lat., and 63° 45′ W. Long., at 140 meters.

Remarks.—The small number of elongated chambers and the long and thin neck are enough to differentiate the remaining species of the genus. In our opinion, the first chamber of the specimen represented in figure 11, plate 9, is abnormal. If this is not so, it is then a microspheric specimen and the species may be included with the genus *Amphicoryna* Schlumberger, 1881. The name is given in honor to David B. Ericson from Lamont Geological Observatory.

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EXPLANATION OF PLATE 8