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RECENT BENTHONIC FORAMINIFERA FROM BRASIL MORPHOLOGY AND ECOLOGY PART I

BY

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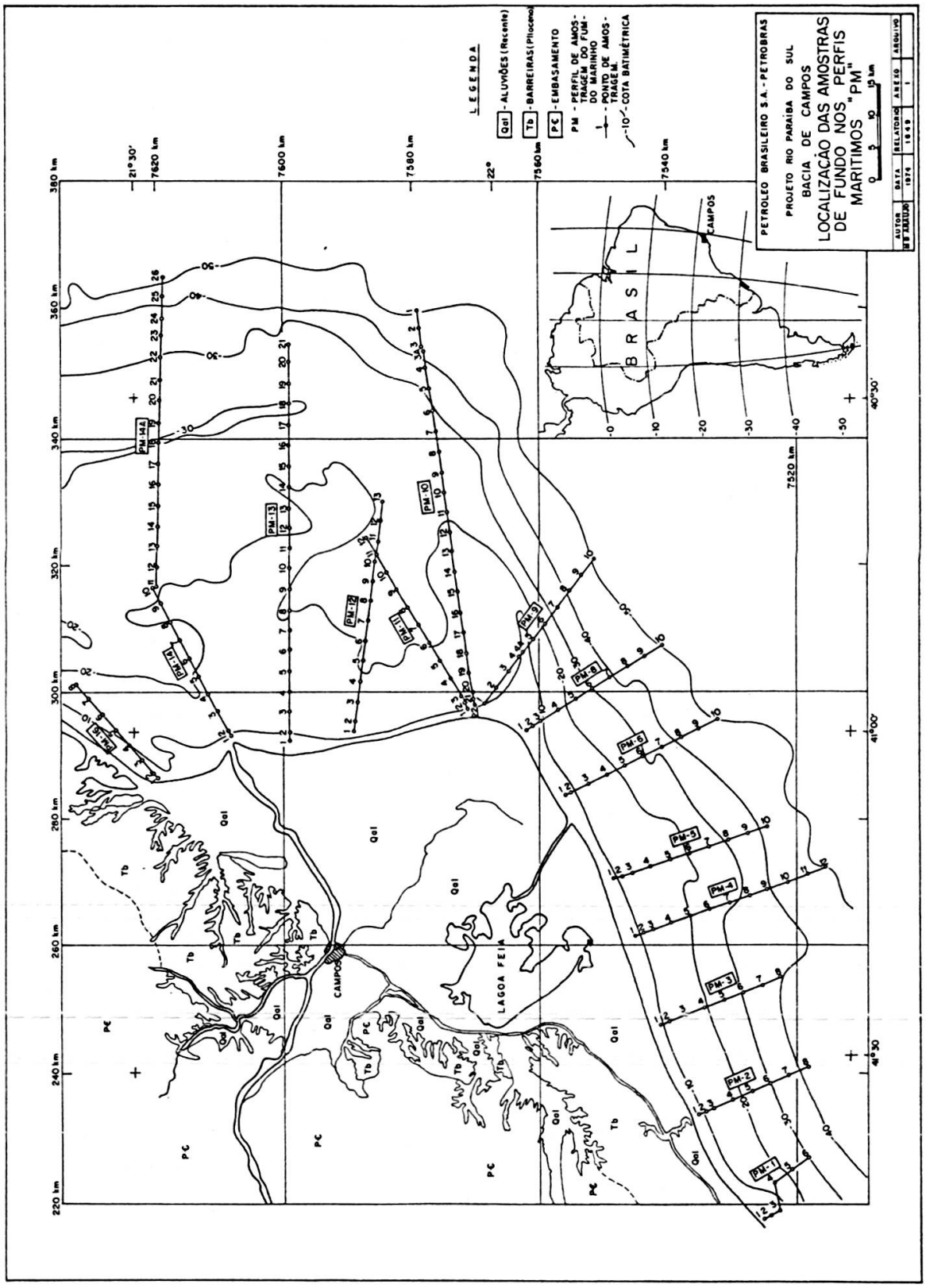
1. POLYSTOMAMMININAE, NEW SUBFAMILY OF THE TROCHAMMINIDAE, AND DESCRIPTION OF POLYSTOMAMMINA PLANULATA (MIKHALEVITCH), 1971, FROM THE CAMPOS SHELF.

ABSTRACT

Polystomammina nitida (BRADY), 1884, is compared with the closely related *Polystomammina planulata* (MIKHALEVITCH), 1971, encountered in the near-shore area of the Campos shelf, Brasil, Lat. S 21° 30′/22° 30′ and Long. W 40° 30′/41° 30′. *Polystomammina planulata*, apparently a cold to temperate water species, is illustrated by scanning photographs. The new trochamminid subfamily Polystomammininae BRÖNNIMANN AND BEURLEN with *Polystomammina* SEIGLIE, 1965, as type genus is proposed.

In samples dredged by Petrobras in 1974 off the town of Campos in an area approximatively defined by Lat. S 21° 30′/22° 30′ and Long. W 40° 30′/41° 30′ rich assemblages of living arenaceous and calcareous benthonic foraminifera have been encountered between the coast and about 50 m water depth (see location map, text-fig. 1).

Trochamminids represent an important fraction of the arenaceous assemblages. Among the different species of trochamminids which will be described in forthcoming notes occurred relatively rarely a low trochospire which in its overall shape and ovoid outline as seen in spiral view much resembled *Trochammina nitida* BRADY (1884, p. 339, pl. 47, fig. 5*a-c*, not fig. 6) from Challenger Station 135, off Nightingale Island, Tristan da Cunha, S Atlantic, depth 100 to 150 fathoms. In both forms the low trochospire is flat to slightly convex spirally, concave umbilically, and peripherally rounded in side view. Further, the umbilicus is narrow and deep and the yellow to red brown surface is covered by an irregular mosaic of mainly flake-like foreign elements, which are essentially quartz platelets in the Campos form. There are, however, also some differences. The radial sutures are distinct and straight in BRADY's



TEXT-FIG. 1. — Location map of the dredge samples taken on the Campos shelf.

species and the peripheral outline is not much lobate whereas in the species from the Campos shelf the equally distinct and depressed radial sutures are normally slightly curved and the peripheral outline may be strongly lobate. Further, to judge from BRADY's illustration, the apertural features differ considerably between *Trochammina nitida* and the species from the Campos shelf. *T. nitida* is known in BRADY's illustration to have a single slit-like interiomarginal, probably umbilical-extra-umbilical aperture. That of our species, however, is distinctly multiple. The primary aperture is a narrow curved slit which extends from the base of the septum far into the septal wall, and the secondary aperture is represented by a number of umbilical-sutural openings. It is here of interest to note that BRADY in his description of *T. nitida* (1884, p. 339) wrote that the aperture is "a curved slit on the final segment, close to the margin of the previous convolution". This would mean that there is in *T. nitida* not necessarely an interio-marginal but some other sort of aperture. In order to elucidate this apparent contradiction between the illustration and BRADY's description of the apertural features of *T. nitida* and to find out whether the Campos species could perhaps represent *T. nitida*, the senior author wrote to Dr. J. E. WHITTAKER, British Museum (Nat. Hist.), London, who in his letter of 24th May 1976 confirmed that the specimen illustrated by BRADY on his pl. 41, fig. 5*a-c*, possesses in fact a multiple aperture consisting of a thin "arcuate interio-areal slit" and "supplementary openings" in the umbilicus. Dr. WHITTAKER also wrote that Mrs. V. I. MIKHALEVITCH, Zoological Institute, Academy of Sciences, Leningrad, USSR, had seen BRADY's *T. nitida* in 1968. Subsequently Mrs. MIKHALEVITCH published a note on this and other trochamminids (MIKHALEVITCH, 1971) introducing the new genus *Arcoparrella*, with *Arcoparrella planulata* MIKHALEVITCH as type species, for trochamminids showing the multiple apertural features as seen in *A. planulata*, in *A. fragilis* MIKHALEVITCH and in BRADY's *T. nitida*. The senior author during a visit to the British Museum also examined the 2 specimens of *T. nitida* from Tristan da Cunha in the BRADY collection. The larger specimen which served as original to BRADY's illustration pl. 41, fig. 5*a-c*, with the B.M. No. ZF 2500, has a narrow hook-like apparently areal (interio-areal) slit on the septal face and numerous minute umbilically directed and most probably spirally arranged openings at the umbilical tips of the chambers. The "areal" slit however starts on the septal face in an interiomarginal position, and goes upward into the septal face, then turns abruptly and runs more or less parallel to the umbilical suture almost to the umbilical cavity however without reaching it. This narrow hook-like slit which starts in an interiomarginal position hence is not areal as it could be thought at first and is a most characteristic feature of *T. nitida*. It has been illustrated by MIKHALEVITCH (1971, p. 66, fig. 2). From BRADY's description it is quite obvious that he observed it, but the artist who drew the specimen did not recognize its position and made a conventional interiomarginal slit as aperture. The smaller specimen from Tristan da Cunha, with the B.M. No. ZF 2506, is not complete.

The septal face is broken at its base and only a part of the hook-like aperture is preserved, but it shows clearly the minute umbilical openings. No other specimen of this trochamminid exists in the Museum's BRADY Collection and a rapid examination of the original Challenger sample did not produce any other specimen. It would be important to find additional specimens in order to show that the hook-like septal slit represents a constant apertural feature of *T. nitida* BRADY. Both specimens described above have very delicate walls and because of their fragility cannot be much moved. In her paper of 1971, Mrs. MIKHALEVITCH made the specimen illustrated by BRADY's pl. 41, fig. *5a-c*, (excepting the apertural features) the lectotype of *Trochammina nitida* BRADY. The smaller specimen, which is not illustrated, is a paratype.

From the foregoing it appears that the apertural features of *Trochammina nitida* BRADY and of the species from the Campos shelf are very close. The examination of the Campos forms shows however that the details of the multiple aperture are quite different from those of *T. nitida*. The main differences lie in the form of the septal slit, which is not hook-like, but gently curved in the Campos forms, and in the umbilical openings which have a distinctly umbilical-sutural backward directed position. These apertural features are those of *Arcoparrella planulata* MIKHALEVITCH, 1971, the type species of *Arcoparrella* MIKHALEVITCH, 1971. The Campos forms therefore would have to be referred to *A. planulata* and not to *T. nitida*.

However, already in 1965, SEIGLIE observed in the Los Testigos Reef area, about 60 km off Venezuela, a trochamminid which he thought to be identical with BRADY's *Trochammina nitida*. He stated (1965, p. 53, 54) that the illustrations of pl. 41, fig. 5 and 6 in BRADY's work do not show clearly the apertures, but on the overall morphological similarity between his form and the illustrations of *T. nitida* he concluded that the apertural features of *T. nitida* in BRADY should be the same as those which he observed in the trochamminid from the Los Testigos area. Following these considerations, but without having examined BRADY's illustrated specimens, he proposed the genus *Polystomammina* SEIGLIE, 1965, with *Trochammina nitida* BRADY as type species. SEIGLIE not only included in his new genus BRADY's specimen pl. 41, fig. 5 but also that illustrated by fig. 6 which later was renamed after examination by Mrs. MIKHALEVITCH *Trochammina subtilis* MIKHALEVITCH, 1971, hence only the specimen pl. 41, fig. 5 is to be considered representative of *Polystomammina nitida* (BRADY). SEIGLIE did not designate a lectotype for *Polystomammina nitida* (BRADY) and erred in assuming that the apertural features of *P. nitida* (BRADY) were the same as those of the trochamminid from the Los Testigos area which in fact correspond with those described by Mrs. MIKHALEVITCH for *Arcoparrella planulata* MIKHALEVITCH.

We therefore have now to consider the validity of 2 genera. One is *Polystomammina* SEIGLIE, 1965, with *Trochammina nitida* BRADY as type species (and not SEIGLIE's form from Los Testigos), represented by BRADY's specimen illustrated by

pl. 41, fig. 5*a-c*, and which possesses as explained above a multiple aperture consisting of a hook-like primary aperture starting in an interiomarginal position and numerous umbilical supplementary openings, and the other is *Arcoparrella* MIKHALEVITCH, 1971, with *Arcoparrella planulata* as type species, which has a multiple aperture consisting of an interiomarginally beginning gently curved, not hook-like, slit, and numerous supplementary umbilical-sutural backward directed openings.

The only important morphological difference between the type species of *Polystomammina* and that of *Arcoparrella* lies in the shape of the primary aperture which is a gently curved slit in *Arcoparrella planulata* and a hook-like slit in *Polystomammina nitida*. The shape of the primary aperture had been regarded by Mrs. MIKHALEVITCH to be of specific significance only because she included both *Trochammina nitida* BRADY and *Arcoparrella planulata* in her genus *Arcoparrella*. The present writers follow Mrs. MIKHALEVITCH in this interpretation and consider the 2 forms to belong to one and the same genus. If this is accepted then *Arcoparrella* MIKHALEVITCH, 1971, becomes a junior subjective synonym of *Polystomammina* SEIGLIE, 1965. *Polystomammina* SEIGLIE is the type genus for the below defined new trochamminid subfamily Polystomammininae BRÖNNIMANN and BEURLEN.

Polystomammina planulata (MIKHALEVITCH) has been encountered near New Zealand, and near Aden, Indian Ocean, at depths from 30 to 60 m (MIKHALEVITCH, 1971). It also occurred in samples described by CUSHMAN and MCCULLOCH (1939, p. 105, 106) from numerous stations of rather shallow depth going on the Pacific Coast from Cordova, Alaska, to Sechura, Peru. It has also been reported and illustrated under the name of *T. nitida* by HERON-ALLEN and EARLAND (1916, pl. 40, fig. 19-21) from the W of Scotland, Loch Dunvegan, Skye, at 50 fathoms depth. SEIGLIE reported *Polystomammina planulata* (MIKHALEVITCH) as *Polystomammina nitida* (BRADY) from the Los Testigos Reef area, off Venezuela, in water depths between 10 and 90 m (SEIGLIE, 1965, 1966) and in 1971 from the Bahía de Mayagüez also as *P. nitida* (BRADY) from station 77, at 183 m depth. The here described specimens of *P. planulata* have been found in water depths from about 5 to 50 m. Their maximum frequency is in the dredge sample PM-8-10B at 50 m depth (see text-fig. 1).

Textulariina DELAGE and HÉROUARD, 1896
Lituolacea DE BLAINVILLE, 1825
Trochamminidae SCHWAGER, 1877
Polystomammininae Brönnimann and Beurlen, n. subfam.

Type genus: Polystomammina SEIGLIE, 1965.

Definition: Test low trochospiral, free. Wall agglutinated, single-layered, imperforate, without inner structures and not forming subdivisions of chamber lumen. Aper-

ture multiple: primary aperture a single curved or hook-like elongate slit-like opening starting in an interiomarginal position and extending toward umbilical side of septal face, supplementary aperture numerous small openings at umbilical tips of chambers or in sutural-umbilical position.

Remarks: The new subfamily Polystomammininae differs from the Trochammininae SCHWAGER, 1877, type genus *Trochammina* PARKER and JONES, 1859, type species *Trochammina inflata* MONTAGU, 1808, by its multiple apertural features and from the Remaneicinae LOEBLICH and TAPPAN, 1964, type genus *Remaneica* RHUMBLER, 1938, type species *Remaneica helgolandica* RHUMBLER, 1938, by the apertural features and by the absence of internal subdivisions of the chamber lumina.

The following species are placed into the Polystomammininae: *P. nitida* (BRADY), 1884, *P. planulata* (MIKHALEVITCH), 1971, and *P. fragilis* (MIKHALEVITCH), 1971. The genus *Arenoparrella* ANDERSEN, 1951, type species *Trochammina inflata* var. *mexicana* KORNFELD, 1931, differs from *Polystomammina* by its apertural features, essentially by the absence of secondary umbilical apertures, and cannot be placed into the Polystomammininae.

Polystomammina SEIGLIE, *1965*
Type species: Trochammina nitida BRADY, 1884
Polystomammina planulata (MIKHALEVITCH), 1971
Pl. 1, Fig. 1-9; Pl. 2, Fig. 1-6

Synonymy:

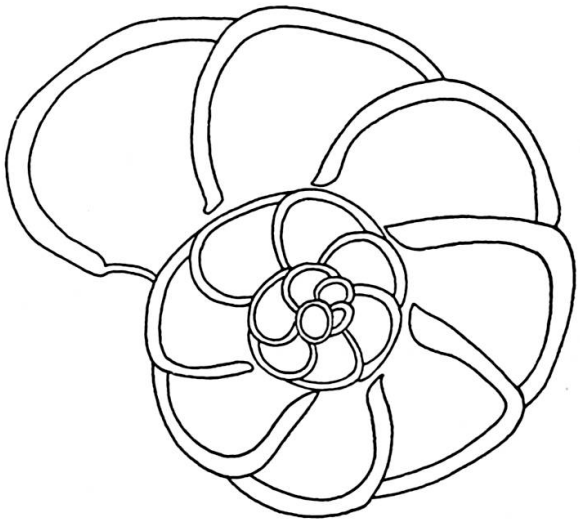
1916. *Trochammina nitida* BRADY. HERON-ALLEN and EARLAND, p. 228, pl. 40, fig. 19-21.
1939. *Trochammina nitida* BRADY. CUSHMAN and MCCULLOCH, p. 105, 106, pl. 11, fig. 7-8.
1965. *Polystomammina nitida* (BRADY). SEIGLIE, p. 53, 54, pl. 1, fig. 7, 8.
1971. *Arcoparrella planulata* MIKHALEVITCH, p. 65, fig. 1.
1971. *Polystomammina nitida* (BRADY). SEIGLIE, p. 271 (not illustrated).

Morphological description

The outline of the low trochospire is ovoid as seen in spiral or umbilical view. The periphery as seen in side view is broadly rounded. The spiral side is flat (pl. 1, fig. 5), occasionally slightly depressed over the center (pl. 1, fig. 7), or gently convex. The umbilical side is broadly concave and has a narrow and deep axial cavity which measures about 40 μ across in a typical specimen (pl. 1, fig. 1, 3, 4, 8). The trochospire consists of 19 to 20 chambers including the proloculus, and the final whorl of 7 to

9, normally 8 chambers. They are arranged in about 2½ to 3 whorls and increase gradually in size as added. The last 2 chambers make up $^1/_2$ to $^1/_3$ of the test. The chambers are normally radially somewhat elongate. The sutures are distinct and very slightly curved on both the spiral and the umbilical sides. The radial elongation of the chambers may produce a slight, occasionally a strong peripheral lobation in the final portion of the last whorl (pl. 1, fig. 1, 4, 9). This lobation may also be completely absent as shown by the specimens pl. 1, fig. 2, 6. In such cases there is not much difference in the peripheral outline between *Polystomammina planulata* (MIKHALEVITCH) and *Polystomammina nitida* (BRADY). On the umbilical side each chamber overlaps somewhat on the preceding one as shown in particular by the scanning photographs of the specimens illustrated by pl. 1, fig. 4 and 8. The maximum diameters of the illustrated specimens range from about 220 to 420 μ.

The aperture is multiple. It consists of a primary opening in the septal face and in numerous secondary openings formed at the umbilical-sutural tips of the chambers. The primary aperture is an elongate and narrow slit, devoid of any lip or lip-like structures, which at the umbilical end is broadly rounded. From the scanning photographs to judge it starts in an interiomarginal position then curves gently up into the septal face and toward the umbilical side. It is illustrated by the scanning photographs of the specimens pl. 1, fig. 5, 7 and 8. The specimen illustrated by pl. 1, fig. 9 and pl. 2, fig. 1 shows that the primary aperture starts in an interiomarginal position. Also the specimen illustrated by the photograph pl. 2, fig. 4 and by text-fig. 2 shows clearly that the apertural septal slit begins in an interiomarginal position.

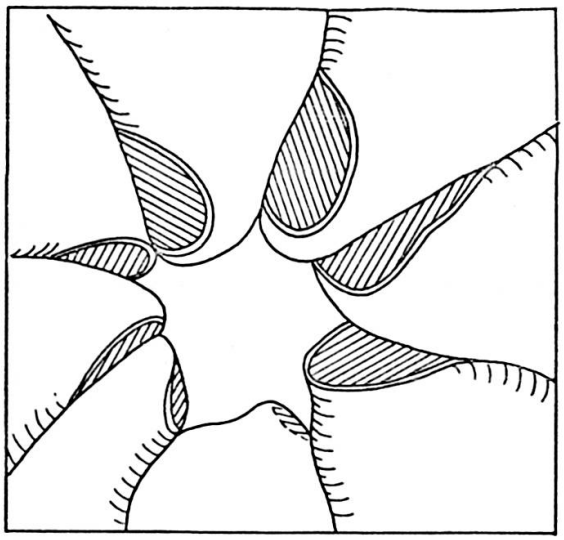


TEXT-FIG. 2.

Polystomammina planulata (MIKHALEVITCH). Same specimen as illustrated on Pl. 2, Fig. 4. It is an optical cut showing the interiomarginal beginnings of the septal slit. 135 ×.

The rounded end of the septal slit on the umbilical side may be somewhat enlarged as shown by pl. 1, fig. 5. This primary aperture may start slightly on the spiral side as shown by the specimen pl. 1, fig. 9 (detail pl. 2, fig. 1) but then always extends toward the umbilical side. Its length is about 50 to 70 μ and its width about 10 μ.

The secondary apertures are openings in the sutures at the umbilical tips of the chambers. They are small crescent-like backward directed openings. They are, as the chambers, spirally arranged. Their number equals the total number of the chambers, excepting the proloculus. The details of the secondary aperture are illustrated by pl. 2, fig. 5 and 6 and by text-fig. 3 and show that not only the sutural openings at the umbilical tips of the chambers of the final coil but also those of at least the preceding coil open into the narrow and deep umbilicus and most probably remained functional. The length of the crescent-like secondary opening of a chamber of the final coil is about 35 μ and its height about 10 μ. The secondary openings of the earlier chambers are naturally smaller. There are no lips or lip-like structures but the borders of the secondary apertures may be somewhat lifted.



TEXT-FIG. 3.

Polystomammina planulata (MIKHALEVITCH).
Same specimen as illustrated by the scanning photograph Pl. 2, Fig. 6 showing the crescent-like small sutural-umbilical backward directed secondary openings of the chambers of the final whorl. The scanning photograph Pl. 2, Fig. 6, shows also the secondary openings of the preceding whorl. 800 ×.

The chamber walls are thin and fragile. They consist of an organic base in which are incorporated minute foreign elements. Minute quartz flakes produce the irregular surface mosaic (pl. 2, fig. 3). Also sponge spicules and diatom frustules may be agglutinated (pl. 2, fig. 5, 6). The wall as shown by the broken specimen pl. 2, fig. 2, is simple and seems to be finely porous. There are however no perforations. It is about 6 to 7 μ thick. The color of the specimens is red brown.

The following dimensions in microns are from the specimen in immersion oil illustrated in part by pl. 2, fig. 4 (total 19 chambers including the proloculus, 8 chambers in the final whorl).

Maximum diameter of test	400 μ
Height of final chamber incl. outer wall	150 μ
Width of final chamber incl. outer wall	150 μ
Diameter of proloculus incl. wall	25 μ

Remarks :

MIKHALEVITCH (1971, p. 64, 65) distinguished *P. planulata* from *P. nitida* on gross morphological features and on differences in the multiple aperture. It is difficult to consider gross morphology as only 2 specimens of *P. nitida* are known which are in fact very close to those of *P. planulata* as described herein. The apertural differences between the 2 species, on the other hand, are more significant. The primary aperture in *P. nitida* is hook-like whereas it is gently curved in *P. planulata*. The supplementary openings in *P. nitida* seem, to judge from the examination of BRADY's specimen, to be simple small radially directed openings at the umbilical tips of the chambers whereas they are sutural-umbilical and backward directed in *P. planulata*.

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2. SPIROPLECTAMMINOIDES CAMPOSI BRÖNNIMANN AND BEURLEN, N. GEN., N. SP., FROM THE CAMPOS SHELF.

ABSTRACT

Spiroplectamminoides BRÖNNIMANN and BEURLEN, n. gen., is defined and compared with *Spiroplectammina* CUSHMAN, 1927. Most of the specimens of *Spiroplectamminoides camposi* BRÖNNIMANN and BEURLEN, n. sp., the type species of *Spiroplectamminoides*, n. gen., occur on the Campos shelf between about 30 to 50 m depth. Its occurrence below the 50 m depth line is unknown. It is usually associated with *Polystomammina planulata* (MIKHALEVITCH) and the cold to temperate water *Cribrostomoides jeffreysi* (WILLIAMSON) and other cold to temperate water arenaceous and calcareous foraminifera.

Both *Spiroplectamminoides camposi* BRÖNNIMANN and BEURLEN, n. sp., and *Spiroplectammina biformis* (PARKER and JONES) are illustrated by scanning photographs and by photographs of specimens in a clearing liquid.

The delicate tests of an arenaceous biserial foraminifer which in its gross morphology and overall dimensions strongly resembles *Spiroplectammina biformis* (PARKER and JONES), 1865, occurs rarely but in many samples throughout the 30 to 50 m depth range of the Campos shelf, Brasil (Lat. S 21° 30′/22° 30′ and Long. W 40° 30′/41° 30′ (see location map, text-fig. 1)). However, closer examination showed that the Campos form differed in its apertural features and also in the appearance of the agglutinated wall surface from *Spiroplectammina biformis*. *S. biformis* possesses an interiomarginal elongate crescent-like opening. The aperture of the Campos form, on the other hand, is a distinctly areal opening which perforates the septal wall well above its suture with the preceding chamber. This areal aperture is quite large, oblong, and completely surrounded by a thin and much protruding funnel-like lip. This new arenaceous biserial foraminifer from the Campos shelf, *Spiroplectamminoides camposi* BRÖNNIMANN and BEURLEN, n. gen., n. sp., is described below and compared with *Spiroplectammina biformis* (PARKER and JONES).

Textulariina DELAGE and HÉROUARD, 1896
Lituolacea DE BLAINVILLE, 1825
Textulariidae EHRENBERG, 1838
Spiroplectammininae CUSHMAN, 1927

Spiroplectamminoides Brönnimann and Beurlen, n. gen.

Type species: *Spiroplectamminoides camposi* BRÖNNIMANN and BEURLEN, n.sp.

Definition of the genus: Test free, elongate, compressed in the plane of enrollment, early portion planispiral, later chambers biserially arranged. Chambers devoid of inner structures. Wall agglutinated, single-layered, imperforate and non-calcareous. Aperture areal opening across septal face.

Remarks: *Spiroplectamminoides*, n. gen., differs from *Spiroplectammina* CUSHMAN, 1927, by its areal aperture. In both genera the walls are agglutinated, single-layered, imperforate and non-calcareous (see also NØRVANG, 1966, p. 13 and his remarks concerning the validity of *Spiroplectammina* and *Bolivinopsis* YAKOLEV, 1891). The chamber lumina of *Spiroplectamminoides* nor of *Spiroplectammina* CUSHMAN are internally subdivided.

Spiroplectamminoides camposi BRÖNNIMANN AND BEURLEN, *n. sp.*
Pl. 3, Fig. 1-3, 6-8, 10

Holotype : The holotype of *Spiroplectamminoides camposi*, n. sp., is the specimen illustrated by the scanning photograph of its side view pl. 3, fig. 3. The maximum length of the holotype is 340 μ and its maximum width as seen in side view is 150 μ. The maximum thickness of the test as seen in edge view is about 100 μ. The specimen is from the dredge sample PM-14A-24B, Campos shelf, Brasil, depth ca. 35 m. The species is named for Dr. C. W. MARINHO CAMPOS, Rio de Janeiro, Brasil.

Morphological description of the holotype.

The relatively small test is elongate and compressed in the plane of enrollment. As seen in side view (compressed side), the outline of the test is wedge-shaped, tapering gradually from the larger apertural end to the smaller and broadly rounded initial portion. The apertural end is characterized by the strongly protruding final chamber. Also in edge view the outline of the test shows a slight wedge-like tapering from the apertural to the initial portion. The chambers are peripherally broadly rounded.

The test consists of a virtually involute planispiral initial coil of very few chambers and a short biserial stage of 2 chamber pairs. The biserial chambers increase rapidly in height thus developing quite a large septal face. The early planispiral chambers are subglobular, those of the biserial stage compressed-subglobular.

The aperture is areal, about in the center of the septal face. It is a fairly large (40 μ long, 10 μ high) oblong crescent-like opening across the septal face and completely surrounded by a thin and strongly protruding funnel-like lip.

The walls are agglutinated and the surface is smoothly finished. As in associated lituolids and trochamminids of the same environment and depth range, the agglutinated material consists essentially of minute quartz platelets which produce an irregular surface mosaic. In between the quartz flakes may occur also other foreign elements such as sponge spicules. The organic material does not form an "inner lining" but appears as a finely granular substance in the interstices of the mosaic. The wall is very thin, fragile and easily damaged or destroyed. It is imperforate and non-calcareous. The color is dark red brown to brown.

The following dimensions in microns refer to the holotype:

Maximum length of test	(side view)	340
Maximum width of test	(side view)	150
Maximum thickness of test	(edge view)	100
Maximum width across the initial portion		100
Maximum height of final chamber		135
Length of aperture about		40
Height of aperture about		10

Morphological remarks on paratypes.

Paratypes of *Spiroplectamminoides camposi*, n. sp., are illustrated by scanning photographs pl. 3, fig. 1, 2, 10 and by photographs of specimens in a clearing liquid (immersion oil), pl. 3, fig. 6-8. The overall morphology, the apertural features and the surface texture are those described from the holotype. The maximum lengths of the paratypes range from about 300 to 450 μ. The biserial stage is invariably short consisting of not more than 2 to 3 pairs of chambers. As noticed in not illustrated paratypes, there is some difference in the diameters of the proloculus and the initial coil. This may suggest the presence of dimorph specimens.

The photograph of the paratype pl. 3, fig. 6 shows clearly that the initial coil is made up of only 7 chambers, including the proloculus. The areal aperture surrounded by a protruding thin lip occurs already in the proloculus. The surface of the same specimen, pl. 3, fig. 7 and of the paratype, pl. 3, fig. 10 exhibits the mosaic surface pattern and the granular probably organic material in which the foreign elements are embedded. The total length of the specimen illustrated by pl. 3, fig. 6-8, is 275 μ and its maximum width as seen in side view 140 μ. The proloculus including its walls measures 40 μ across. The deuterolocular diameter is smaller than that of the proloculus and measures including the walls about 35 μ. The height of the final chamber is 130 μ and its width 100 μ. The single layered wall of the final chamber is 1.5 to 2.5 μ thick. The scanning photograph of the specimen illustrated by pl. 3, fig. 2, 10 shows the position of the aperture and the detail photograph the smoothly finished surface which so strongly contrasts with that of the granular-rough surface of *Spiroplectammina biformis*.

Comparison between Spiroplectamminoides camposi, n. sp., and Spiroplectammina biformis (Parker and Jones).

We have received well preserved specimens of *Spiroplectammina biformis* from Dr. E. BOLTOVSKOY, Museo Argentino de Ciencias Naturales, Buenos Aires. They come from a sample taken in the littoral zone, Muelle principal, Ushuaia, Tierra del Fuego, Argentina, No. FMACN 5179. Some of these specimens are illustrated by pl. 3, fig. 4, 5, 9, 11, 12. In the samples from the Campos shelf, *S. biformis* is absent. The tests of the Ushuaia specimens are usually less tapering than those of *Spiroplectamminoides camposi*, n. sp., and the biserial chambers do not increase much in height so that the final chamber protrudes only weakly. The initial coil is also involute but consists normally of more chambers than in *Spiroplectamminoides camposi*, n. sp. The maximum lengths of the illustrated tests of *Spiroplectammina biformis* from Ushuaia range from about 290 to 500 μ.

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PLATE 1

Polystomammina planulata (MIKHALEVITCH)

FIG. 1. — 145 ×
FIG. 2. — 220 ×
FIG. 3. — 145 × (see also pl. 2, fig. 5)
FIG. 4. — 135 ×
FIG. 5. — 140 ×
FIG. 6. — 195 ×
FIG. 7. — 140 × (see also pl. 2, fig. 2)
FIG. 8. — 135 ×
FIG. 9. — 140 × (see also pl. 2, fig. 1)

All specimens are from dredge sample PM—8—10B, Campos shelf, depth 50 m.

PLATE 2

Polystomammina planulata (MIKHALEVITCH)

FIG. 1. — 650 × (see also pl. 1, fig. 9)
FIG. 2. — 550 × (see also pl. 1, fig. 7)
FIG. 3. — 3750 ×
FIG. 4. — 120 ×
FIG. 5. — 540 × (see also pl. 1, fig. 3)
FIG. 6. — 700 ×

All specimens are from dredge sample PM—8—10B, Campos shelf, depth 50 m.
The specimen Fig. 4 has been photographed in immersion oil. It clearly shows that the septal slit starts in an interiomarginal position.

PLATE 3

FIG. 1-3, 6-8, 10. — *Spiroplectamminoides camposi* BRÖNNIMANN and BEURLEN, n.sp.

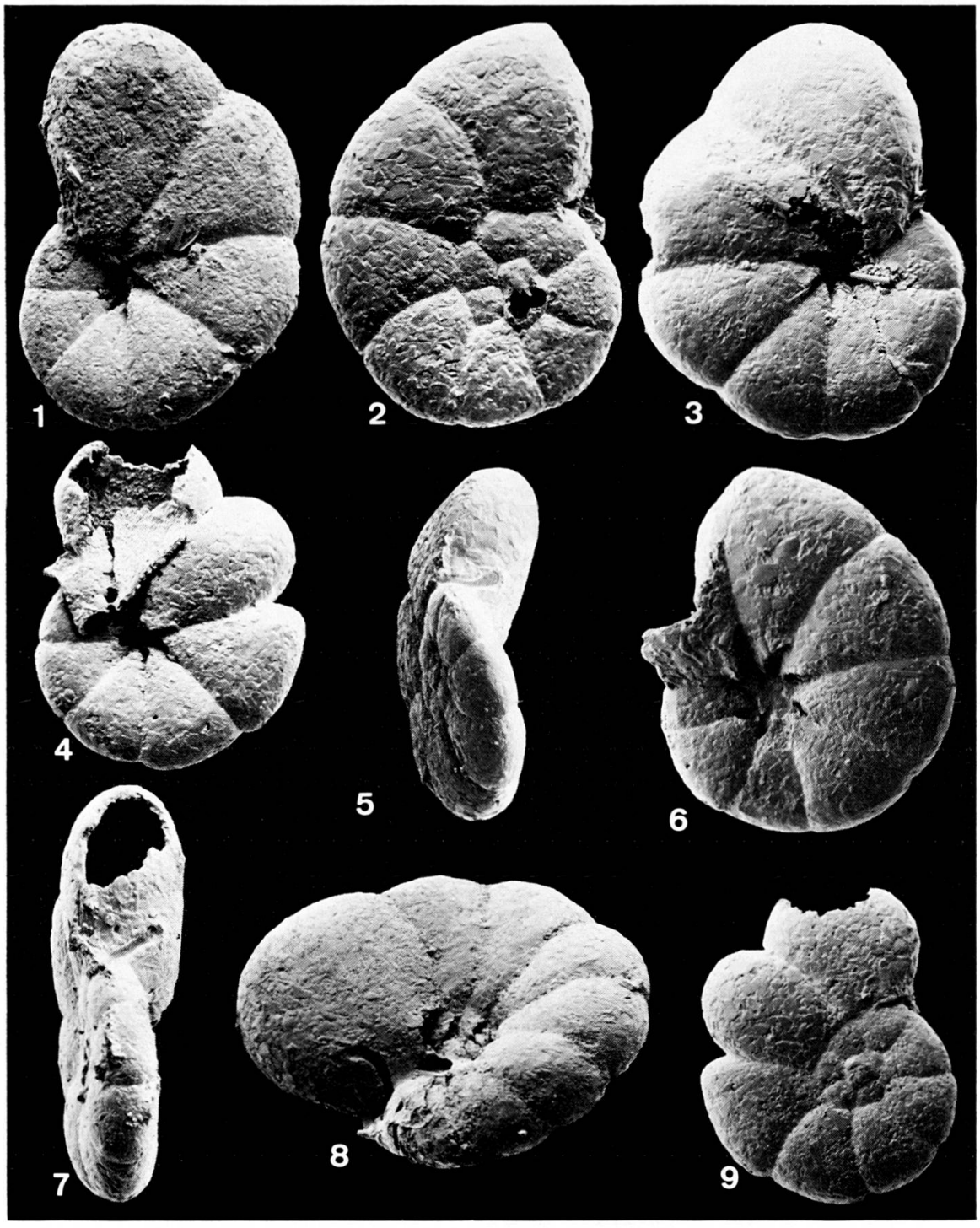
FIG. 1. — 200 ×
FIG. 2. — 105 ×
FIG. 3. — 140 × (Holotype)
FIG. 10. — 350 × (same as fig. 2)
FIG. 6. — 130 ×
FIG. 7. — 250 ×
FIG. 8. — 140 ×
} same specimen

Specimens Fig. 1, 2 lost. — Holotype from dredge sample PM-14A-24B. — Depth 35 m ca. — Specimen Fig. 6, 7, 8 from dredge sample PM-4-11B. Depth 45 m.

FIG. 4, 5, 9, 11, 12. — *Spiroplectammina biformis* (PARKER and JONES)

FIG. 4. — 140 ×
FIG. 5. — 100 ×
FIG. 9. — 140 ×
FIG. 11, 12. 145 ×

All specimens from Ushuaia, Muelle Principal, Tierra del Fuego, Argentina, Museo Argentino de Ciencia Naturales No. FMACN 5179.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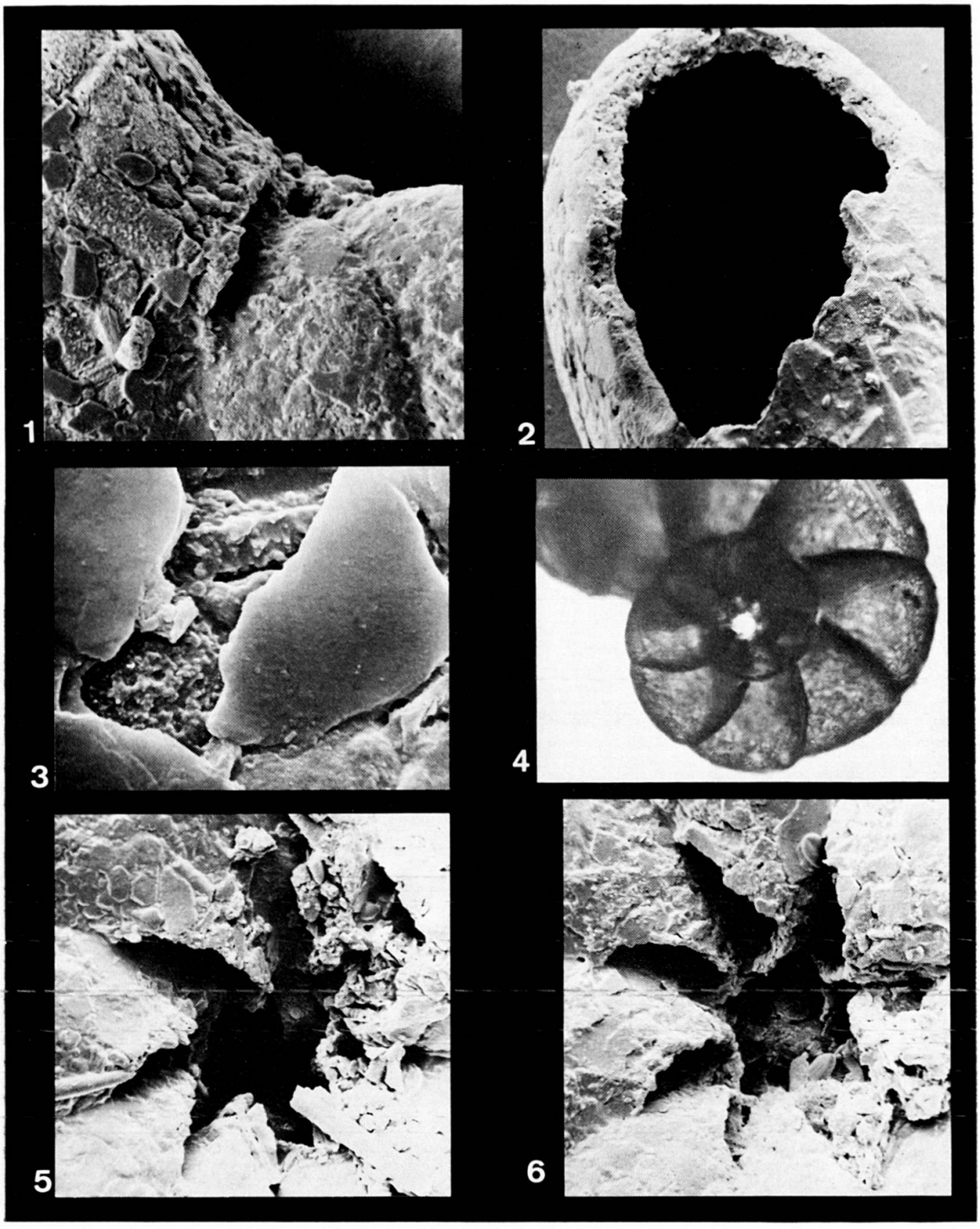
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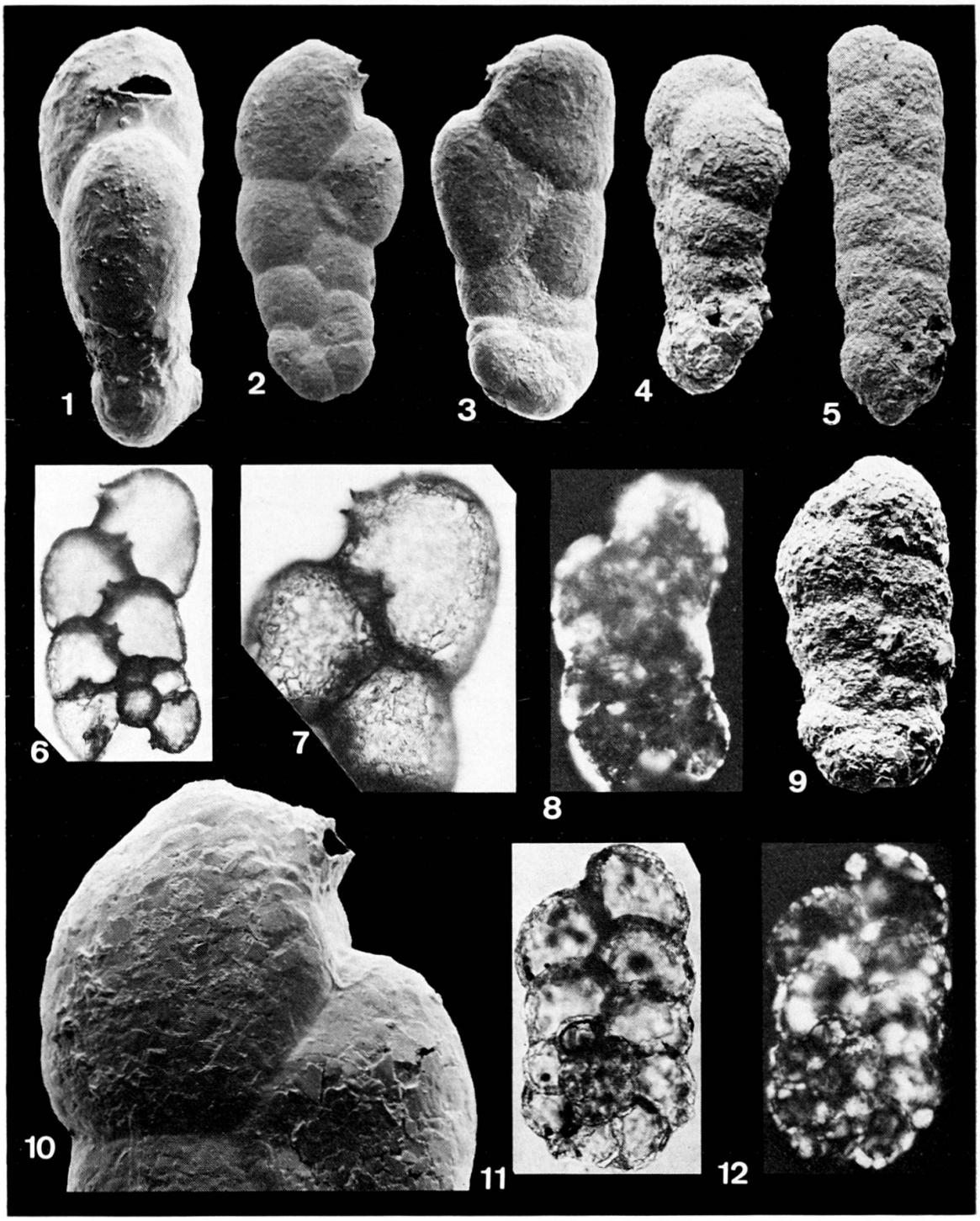
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