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Title	New Forms of the Foraminifera from the Northwest Pacific, I. (With 10 Text-figures)
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Citation	北海道大學理學部紀要, 13(1-4), 24-31
Issue Date	1957-08
Doc URL	https://hdl.handle.net/2115/27195
Type	departmental bulletin paper
File Information	13(1_4)_P24-31.pdf

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New Forms of the Foraminifera from the Northwest Pacific, I.

By
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(With 10 Text-figures)

The present work is related to the studies on the Foraminifera, which have been hitherto made by the author. The materials were collected mainly by himself and partly by some research boats from the coasts of Japan proper, Sakhalin, Korea and Formosa, from the entire areas of the Sea of Japan, the Yellow Sea, the Gulf of Pechili, the southern part of the South Chinna Sea, the Gulf of Siam and the Java Sea, and from coastal waters of the South Sea Islands, such as Palao, Yap, Saipan and Tenian. In this report among numerous forms are described only ten arenaceous ones which are probably new to science.

The author's best thanks are due to Dr. T. Uchida, Professor of the Faculity of Science, Hokkaido University, for the usual encouragement and the sincere aid during his stay in the university.

Family ASTRORHIZIDAE

***Astrorhiza crassatina* Brady var. *asper* n. var.** (Fig. 1)

Test free, elongate with rounded ends, consisting of a tubular chamber; wall thick, composed of very coarse sand grains, surface rough; apertures opening at both ends; colour gray.

Lengh, 2.2–3.2 mm; breadth, 1.0–1.5 mm.

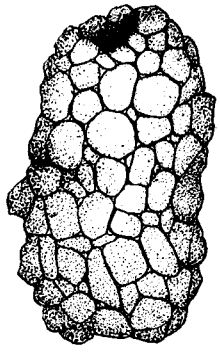

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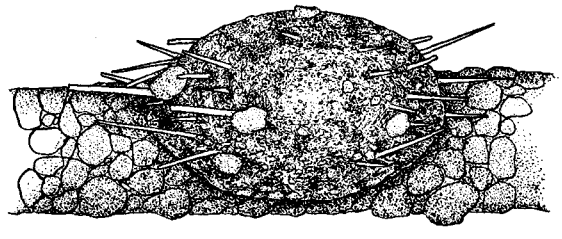
Fig. 1. *Astrorhiza crassatina* Brady var. *asper* n. var. 15×.

Fig. 2. *Psammosphaera alba* n. sp. 50×.



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Jour. Fac. Sci. Hokkaido Univ. Ser. VI, Zool. 13, 1957 (Prof. T. Uchida Jubilee Volume).

A few specimens were examined in the materials taken from the vicinity of Hagi, Yamaguti-Ken where is the type locality of this variety and the Tusima Strait.

The new variety is different only in coarser texture from the typical form of which the wall is composed of rather fine sand grains.

Family SACCAMMINIDAE

***Psammosphaera alba* n. sp.** (Fig. 2)

Psammosphaera rustica : Earland, 1933, p. 60, pl. 2, fig. 77.

Test usually adherent, monothalmous without definite apertures, globular, dorsal face convex, while fixed one typically concave; wall composed of sponge spicules and a white amorphous material, firmly cemented, surface rarely roughened by attaching sand grains or other foreign particles; colour generally white.

Longer diameter, 0.8 mm; shorter one, 0.6 mm; height, 0.3 mm.

A single characteristic specimen attaching to a tube of *Rhabdammina abyssorum* SARS was detected in the collection taken from Owasi Bay, Mie-Ken where is the type locality of the new species.

This form is similar to *P. rustica* Heron-Allen & Earland in utilizing sponge spicules as a material of the wall, but this is different from the latter species in the following respects : in the latter the wall is almost entirely made of sponge spicules which are neatly laid side by side, while in the former that is mainly composed of an amorphous material and fewer spicules project outwards along the longer axis of the test. Therefore, this is probably new to science. The specimen reported by Earland (1933) from the northern coast of South Georgia as *P. rustica*, seems to be included in the new species due to close resemblance in form of the test and construction of the wall.

Family REOPHACIDAE

***Reophax paucus* n. sp.** (Fig. 3)

Test minute in size, consisting of few (3 or 4) globular chamber arranged in a curved series, apertural end produced to form a short cylindrical neck, aboral end rounded; wall more or less coarsely arenaceous with yellowish brown cement; aperture simple, terminal; colour yellowish or brownish gray.

Length, 0.4–0.6 mm.

A few specimens were detected in the material collected from a station southesat of Quelpart Island in 163 m.

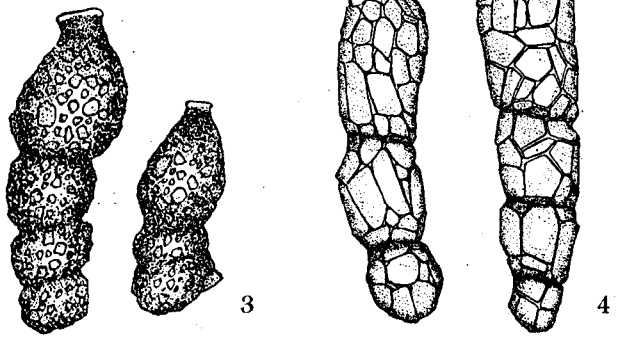
The new species somewhat resembles *R. aduncus* Brady in shape and arrangement of chambers, but it is easily distinguished from the latter by a minute size of the test and a small number of chambers.

Reophax palaoensis **n. sp.** (Fig. 4)

Reophax sp.: Hada, 1943, p. 201, fig. 6.

Test usually cylindrical, slightly arcuate, consisting of a few (3 or 4) chambers of which the initial one globular, while the last one elongate, produced into a short tubular neck at the distal end; sutures scarcely constricted, indistinct; wall composed of coarse sand grains, but surface rather smooth; aperture terminal, circular; colour generally grayish wihte.

Fig. 3. *Reophax paucus* n. sp. 75×.
Fig. 4. *Reophax palaoensis* n. sp. 50×.



Length, 1.0–1.3 mm.

This new species rarely occurs in the lagoons of the Palao Islands. This is more or less close to *R. dentaliniformis* Brady in general conture, but different from the latter in having a more cylindircal test consisting of tubular chambers.

Reophax validus **n. sp.** (Fig. 5)

Reophax sabulosus: Goës, 1894, p. 27, pl. 6, figs. 199-202.

Test elongate, usually straight, gradually tapering towards the initial end, consisting of several globular chambers, apertural end slightly produced, aboral one rounded; wall finely arenaceous with the excess of brown cement; sutures slightly constricted; aperture simple, terminal; colour brownish gray, fading towards the distal end.

Length, 1.8 mm.

Only one specimen was secured in the collections taken from Taraika Bay, Sakhalin. This form has been already recorded by Goës (1984) from a boreal area of the Atlantic in 1750 m.

The Atlantic specimens described by Goës under the name of *R. sabulosus*

Brady of which the test is cylindrical, are very large in size as compared with the present one, but they closely resemble the latter in form, structure and colour of the test. Therefore, the author has identified them as large forms of this new species. This is different from *R. pilulifer* Brady in having more chambers and slight sutures and from *R. bacillaris* Brady and *R. nana* Rhumbler in stouter contour.

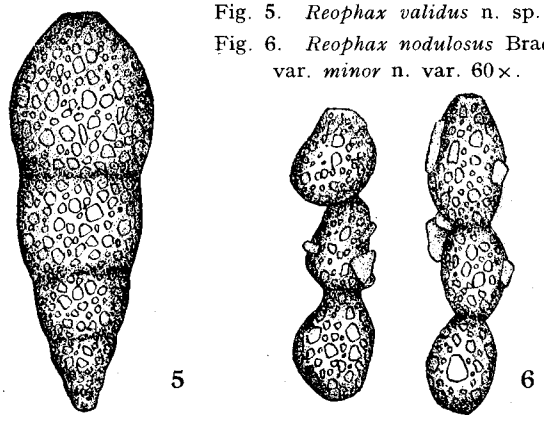


Fig. 5. *Reophax validus* n. sp. 30×.
Fig. 6. *Reophax nodulosus* Brady var. *minor* n. var. 60×.

***Reophax nodulosus* Brady var. *minor* n. var.** (Fig. 6)

Reophax nodulosus: Brady, 1884 (pt.), p. 294, pl. 31, fig. 8.

Test elongate, straight or somewhat arcuate, consisting of a number of oblong or pyriform chambers; sutures deep and distinct; wall thin, finely arenaceous with the excess of cement, surface smooth, but coarse particles rarely attaching to it; aperture circular, terminal at the distal end of the last-formed chamber; colour grayish.

Breadth of the last-formed chamber, 0.2 mm.

The new variety is very rare in Taraika Bay, Sakhalin. The large typical form is widely spread in all of the seas in the world, but this small-sized variety has been certainly recorded only from the South Atlantic.

R. nodulosus is variable in form and size, especially remarkable in the latter. The length of its test varies from 0.5 to 25 mm. This new variety comprises an exceedingly minute form as given by Brady (1884) in Pl. 31, fig. 8 in the *Challenger* Report. In the present study any complete specimen has not been found owing to the delicate connection of chambers. Therefore, the author has been unable to record on a number of chambers and the total length of the test in this paper.

***Reophax pacificus* n. sp.** (Fig. 7)

Reophax bilocularis : Cushamn, 1910, p. 90, figs. 127a, b; HADA, 1931, p. 57, text-fig. 9.

Test stout, straight or curved, consisting of two globular chambers of which the second overlaps the first, aboral end rounded, apertural one somewhat produced; wall usually composed of coarse sand grains cemented firmly, but the surface not so roughened; aperture rather large, terminal, having no definite tubular neck; colour light gray or yellowish brown.

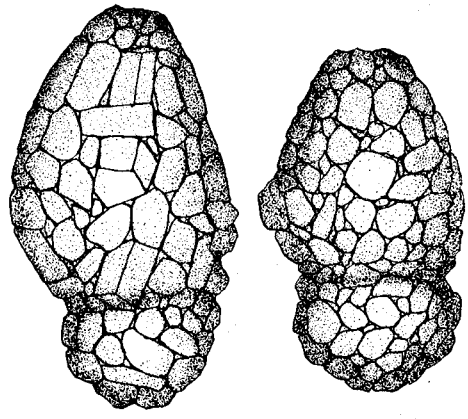


Fig. 7. *Reophax pacificus* n. sp. 30×.

Length, 1.1–1.8 mm.

In the present investigation some specimens were detected in collections taken from Owasi Bay and the vicinities of Katu-ura, Wakayama-Ken and the Seto Marine Biological Station of Kyoto University on the Pacific coasts besides the region of the Misaki Marine Biological Station of Tokyo University where is the type locality of this species, and from the port of Hagi and Turuga Bay, Fukui-Ken on the side of the Sea of Japan. They were also found from a station southeast of Quelpart Island in 163 m and the Gulf of Pechili. Furthermore, being reported from the area of *Globigerina* ooze north of Gum (Cushman, 1910) and Mutu Bay (Hada, 1931), this species seems to be widely distributed in the Northwest Pacific.

Having inflated rotund chambers without an apertural neck, a faint sutural constriction at the conjunction between two chambers and a fairly neat surface, this form is possible to separate from *R. bilocularis* of which the test provided with a difinite neck, consists of two elongate chambers having a deep suture between them and the wall is constructed with very coarse foreign particles to give an irregular appearance. This is apparently different from the other two-chambered species, *R. bicameratus* Earland, in stout conture and coarse

texture. The specimens collected from the Gulf of Pechili are only brownish in colour of the test, though those from the other localities in the study are grayish.

***Reophax obliquus* n. sp.** (Fig. 8)

Reophax scorpiurus : Goës, 1894 (pt.), p. 24, pl. 6, figs. 164, 165.

Test stout, curved fusiform, consisting of few (2–4) chambers increasing rapidly in size as added, last-formed chamber typically elongated ovate, occupying a large proportion of the test and tending to become triangular in cross section; sutures generally oblique; wall composed of rather coarse sand grains agglutinated neatly with rich cement; aperture simple, terminal; colour often graysih or rarely brownish.

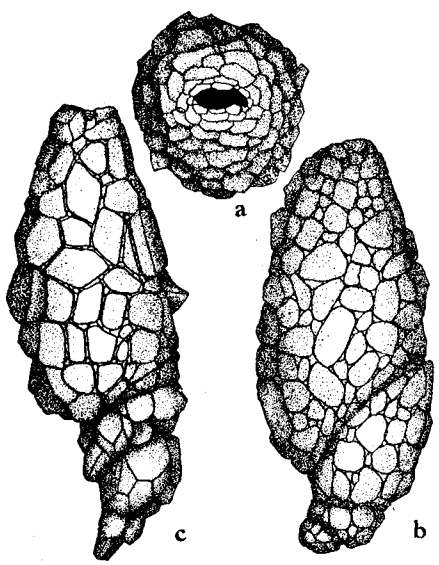


Fig. 8. *Reophax obliquus* n. sp. 35×. a, apertural view, b, c. side view. a, b, the same specimen.

Length, 0.8–1.7 mm.

The new species frequently occurred in the materials obtained from Taraika Bay, Sakhalin, Broughton Bay, Korea and the region off Akkesi Bay, Hokkaido. The last sea is its type locality. It is apparently a cold-water inhabitant, being reported by Goës (1894) from the shallow area of Greenland Sea in 35-215 m besides the above mentioned localities.

It differs from *R. scorpiurus* Montfort in s tout and curved contour and in having a large last-formed chamber and oblique sutures and from *R. curtus*

Cushman in arcuate form and oblique sutures. Most of specimens are curved inward in the early chambers and cross sections of the last-formed chamber are more or less triangular, therefore, it fairly resembles the elongate form of *Ammobaculites cassis* (Parker) in general outline. From this fact it seems to show the transition from a linear series of chambers to a coiled arrangement.

***Reophax delicatus* n. sp.** (Fig. 9)

Reophax sp., Hada, 1943, p. 202, figs. 8, 9.

Test slender, more or less curved, composed of several bottle-shaped chambers provided with remarkably constricted short connections; wall delicate, thin, semitransparent, surface smooth; aperture opening at the distal end of short neck with a slight lip; colour light gray.

Length, 0.33 mm.

A few specimens of this new species carrying a flexible test detected in plankton collections made in the lagoons of the Palao Islands.

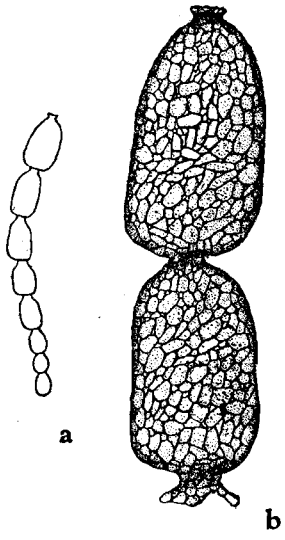


Fig. 9. *Reophax delicatus* n. sp. a, 100×. b, enlarged distal chambers in fig. a, 500×.

This is closely similar to *R. gracilis* (Kiaer) in slender contour, but is different from the latter in shape of chambers of which the aboral end is rounded in this in spite of its acute margin in the other. The specimens recorded by Millet (1899) from the Malay Islands as ones of *Nodellum membranaceum* (Brady), probably belong to this new species which is apparently different from the last species in composition of the wall.

Family LITUOLIDAE

***Ammobaculites amarus* n. sp.** (Fig. 10)

Ammobaculites americanus var.: Hada, 1936, p. 852, fig. 6.

Test flattened, finally widened, consisting of the coiled part in which six or seven chambers of the outer convolution are visible and of the straight portion in which low chambers increases in breadth as added; sutures somewhat distinct; wall composed of fine sand grains agglutinated with less cement; aperture large, elongate along the distal margin of the broadest last-formed chamber; colour light or yellowish gray.

Length, 0.50–1.05 mm.

The new species is common in the two small brackish-water lakes, Hijirippu and

Mochirippu, lying side by side on the southeast Pacific coast of Hokkaido.

This form has been described by the author (1936) from the above brackish-water lakes as a variety of *A. americanus* Cushman, however, this is so obviously distinguishable from that species in form and structure of the test and in texture of the wall, that it seems to be natural that this is identified as a new independent species. In this new form the later straight portion of the test is remarkably variable in contour, being twice or more as long as breadth in elongate specimens, while nearly equal in length and breadth in stout ones.

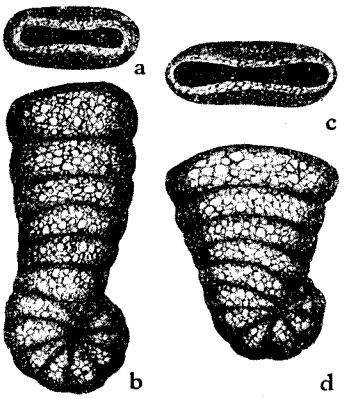


Fig. 10. *Ammobaculites amarus* n. sp. 60×. a, c, apertural view. b, d, side view.

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