

# RECENT FORAMINIFERA FROM BEACH SAND AT PURI, ORISSA

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ABSTRACT—Fourteen species of foraminifera are recorded and illustrated from the beach sand at Puri. These include many characteristic Indo-Pacific species.

## INTRODUCTION

THE paper is based on samples collected by the senior author from the beach sand at Puri (19°84': 85°52'), Orissa, in January 1959. Fourteen species of foraminifera are recorded and illustrated from these samples. Of these fourteen species, the following are the characteristic Indo-Pacific forms:

*Quinqueloculina tropicalis*? Cushman

*Elphidium simplex* Cushman

*Streblus annectens* (Parker & Jones)

*S. dentatus* (Parker & Jones)

*Asterorotalia trispinosa* (Thalman)

*Dentostomina agglutinans* (d'Orbigny)? and *Elphidium advenum* (Cushman) have been recorded both from the Indo-Pacific and the Atlantic regions. The remaining identifiable species have a world-wide distribution.

## PREVIOUS WORK

There are no specific records of foraminifera from the beach sand at Puri, Orissa. Perhaps the only paper dealing with recent foraminifera from the east coast of India is by Gnanamuthu (1943). This paper records the foraminiferal fauna of the Krusadai Island in the Gulf of Manaar. Although a large number of species are recorded from this area, a majority of them are poorly illustrated and lack proper description. As such, the paper can hardly be utilized for comparing the faunas of the two areas. As far as can be made out from Gnanamuthu's paper (op. cit.), the only species which appear to be common in both the areas (Puri and the Gulf of Manaar) are the following (the

figures in parenthesis refer to Gnanamuthu's paper):

*Quinqueloculina seminulum* (Linnaeus)  
(Plate II, figs. 4a-f)

*Triloculina* sp. (Plate III, figs. 2a, b) =  
*T. trigonula* (Lamarck)

*Eponides repandus* (Plate IV, figs. 19a-c) =  
*Poroeponides lateralis* (Terquem)

Some of the *Lenticulina* and *Robulus* appear to be spiny *Streblus*. This can only be verified after careful restudy of the type specimens.

## SYSTEMATIC DESCRIPTION

### Family MILIOLIDAE

Genus QUINQUELOCULINA d'Orbigny, 1826

QUINQUELOCULINA SEMINULUM (Linnaeus)  
(Pl. 1, figs. 1a, b)

*Serpula seminulum* Linnaeus, 1758, *Systema Naturae*, 10th Edn., p. 786.

*Quinqueloculina seminulum* (Linnaeus) d'Orbigny, 1826, *Ann. Sci. Nat.*, Vol. 7, No. 44, p. 303; Cushman, 1917, *U.S. Nat. Mus. Bull.* 71, Pt. 6, Pl. 11, fig. 2, p. 44; Bhatia, 1956, *Contr. Cush. Found. Foram. Res.*, Vol. VII, Pt. I, Pl. 2, fig. 9, p. 17.

This well-known species has a world-wide distribution. The species occurs commonly in our samples.

QUINQUELOCULINA TROPICALIS? Cushman  
(Pl. 1, figs. 2a, b)

*Miliolina gracilis* (d'Orbigny) Brady, 1884, *Challenger Rept.*, Zool., Vol. 9, Pl. 5, fig. 3.

*Quinqueloculina tropicalis* Cushman, 1924, *Carnegie Inst.*, Washington, Publ. 342, p. 63.



This species is rare in our material and seems to come within the range of variation of *Q. tropicalis*.

Genus DENTOSTOMINA Carman, 1933

DENTOSTOMINA AGGLUTINANS (d'Orbigny) ?

(Pl. 1, fig. 3)

*Quinqueloculina agglutinans* d'Orbigny, 1893, *Foram. Cuba*, Pl. xii, figs. 11-13, p. 168.

*Dentostomina agglutinans* (d'Orbigny) Bermudez, 1935, *Mem. Soc. Cub. Hist. Nat.*, Vol. 9, No. 3, p. 161.

We have three specimens of this agglutinate miliolid. The aperture is obscure. Bermudez (loc. cit.) placed the species under *Dentostomina*. According to Barker (1960, p. 16) forms figured by Brady (1884, Pl. 8, figs. 6, 7) probably represent a different species from d'Orbigny's Cuban forms. As our specimens are closer to those figured by Brady (loc. cit.) we have followed Barker in assigning them questionably to *Dentostomina agglutinans* (d'Orbigny).

Genus TRILOCULINA d'Orbigny, 1826

TRILOCULINA TRIGONULA (Lamarck)

(Pl. 1, figs. 5a, b)

*Miliolites trigonula* Lamarck, 1804, *Ann. Mus.*, Vol. 5, No. 3, p. 351.

*Triloculina trigonula* (Lamarck) d'Orbigny, 1826, *Ann. Sci. Nat.*, Vol. 7, Pl. 16, figs. 5-9, p. 229; Marks, 1951, *Contr. Cush. Found. Foram. Res.*, Vol. 2, Pt. 2, p. 41 (*et syn.*).

This species is rare in our material and only one specimen was found.

#### Family NONIONIDAE

Genus NONION Montfort, 1808

NONION SCAPHUM (Fichtel & Moll)

(Pl. 1, figs. 6a, b)

*Nautilus scapha* Fichtel & Moll, 1798, *Test., Micr.*, Pl. 19, figs. d-f, p. 109.

*Nonion scaphum* (F. & M.) Cushman, 1930, *U.S. Nat. Mus. Bull.* 104, Pt. 7, Pl. 2, figs. 3, 4, p. 5; Bhatia, 1956, *Contr. Cush. Found. Foram. Res.*, Vol. 7, Pt. 1, Pl. 5, fig. 15.

This is a well-known species having world-wide distribution. Bhatia (loc. cit.) recorded it from shore sands of western India. The species is common in our material.

Genus ELPHIDIUM Montfort, 1808

ELPHIDIUM ADVENUM Cushman

(Pl. 1, figs. 9a, b)

*Polystomella advena* Cushman, 1922, *Carnegie Inst., Washington*, 311.

*Elphidium advenum* Cushman, 1930, *U.S. Nat. Mus. Bull.* 104, Pt. 7, Pl. 10, figs. 1, 2, p. 25; Bhatia, 1956, *Contr. Cush. Found. Foram. Res.*, Vol. 7, Pt. 1, Pl. 5, fig. 9, p. 20.

There are many records of this species from the Recent and Tertiary of the Atlantic and Pacific regions. Bhatia (loc. cit.) recorded it from shore sands of western India.

ELPHIDIUM SIMPLEX Cushman

(Pl. 1, figs. 7a, b)

*Elphidium simplex* Cushman, 1933, *U.S. Nat. Mus. Bull.* 161, Pt. 2, Pl. 12, figs. 8, 9, p. 52; Bhatia, 1956, *Contr. Cush. Found. Foram. Res.*, Vol. 7, Pt. 1, Pl. 5, fig. 13, p. 20.

The specimens from the Puri beach sand are identical with those described by Bhatia from the western coast. It is a characteristic Indo-Pacific species with a somewhat lobulate periphery, slightly depressed sutures and small spiny projections running from the umbonal region to the apertural face. Common in occurrence.

ELPHIDIUM sp. indet.

(Pl. 1, figs. 8a, b)

This is a diminutive species which cannot be assigned to any known species. Only two specimens were found and more specimens are needed before any definite identification is made.

#### Family ROTALIIDAE

Genus STREBLUS Fischer, 1817

STREBLUS ANNECTENS (Parker & Jones)

(Pl. 2, figs. 1a-c)

*Rotalia beccarii* (Linnaeus) var. *annectens* Parker & Jones, 1865, *Philos. Trans.*, Vol. 155, Pl. 19, figs. 11a-c pp. 387, 422.

*Streblus annectens* (P. & J.) Bhatia, 1956, *Contr. Cush. Found. Foram. Res.*, Vol. 7, Pt. 1, Pl. 3, figs. 1, 2, p. 22.

This is a characteristic Indo-Pacific species. Bhatia (loc. cit.) recorded the species from the west coast of India and discussed the taxonomic aspects of the genus *Streblus*.



STREBLUS DENTATUS. (Parker & Jones)  
(Pl. 2, figs. 2a-c)

*Rotalia beccarii* (Linnaeus) var. *dentata*  
Parker & Jones, 1865, *Philos. Trans.*,  
Vol. 155, Pl. 19, figs. 13a-c pp. 387,  
422.

*Streblus dentatus* (P. & J.) Bhatia, 1956,  
*Contr. Cush. Found. Foram. Res.*, Vol. 7, Pt. 1,  
Pl. 4, fig. 3, pp. 22, 23.

This is again an Indo-Pacific species.  
Rare in our material.

Genus POROEPONIDES Cushman, 1944

POROEPONIDES LATERALIS (Terquem)  
(Pl. 2, figs. 3a, b)

*Rosalina lateralis* Terquem, 1878, *Mem.*  
*Geol. Soc. France*, ser. 3, Vol. 1, Pl. 2,  
fig. 11, p. 25.

*Poroeponides lateralis* (Terquem) Cushman,  
1944, *Cushman Lab. Foram. Res.*, *Spec. Publ.*  
No. 12, Pl. 4, fig. 23, p. 34; Bhatia, 1956,  
*Contr. Cush. Found. Foram. Res.*, Vol. 7,  
Pl. 3, figs. 3-5, p. 23 *et syn.*

Bhatia (loc. cit.) recorded the species from  
the west coast and discussed the taxonomic  
status of *P. lateralis* and *P. cribroropandus*.  
The specimen from the Puri beach sand is  
identical with the west coast forms.

Genus ASTEROROTALIA Hofker, 1951

ASTEROROTALIA TRISPINOSA (Thalman)  
(Pl. 1, figs. 10a, b)

*Rotalia trispinosa* Thalman, 1933, *Eclog.*  
*Geol. Helv.*, Band xxvi, No. 2, p. 248.

*Asterorotalia pulchella* (d'Orbigny) Hofker,  
1951, *Siboga Exped.*, Pt. III, p. 505.

*Asterorotalia trispinosa* (Thalman) Barker,  
1960, *Spec. Publ. 9, Soc. Econ. Paleont.*  
*Mineral.*, p. 238.

This is the first record of this species from  
the Indian region. Our specimens come  
within the range of variation of the species.  
They have a distinctly triangular outline,  
with seven chambers in the last whorl. The  
sutures on the dorsal side are raised and  
limbate, while those on the ventral side have  
a narrow covering of a porous plate, charac-  
teristic of the genus *Asterorotalia*. Rare in  
occurrence.

#### Family ANOMALINIDAE

##### Subfamily CIBICIDINAE

Genus CIBICIDES Montfort, 1808

CIBICIDES sp. indet.  
(Pl. 2, figs. 4a, b)

This is an indeterminate species. The  
number of chambers in the last whorl varies  
from 8 to 9. The ventral sutures are limbate.  
The periphery is keeled. Common in occur-  
rence.

#### ACKNOWLEDGEMENT

The authors wish to take this opportunity  
of expressing their gratitude to Prof. M. R.  
Sahni, Department of Geology, Panjab  
University, Chandigarh, for going through  
the manuscript critically, and communicating  
the paper.

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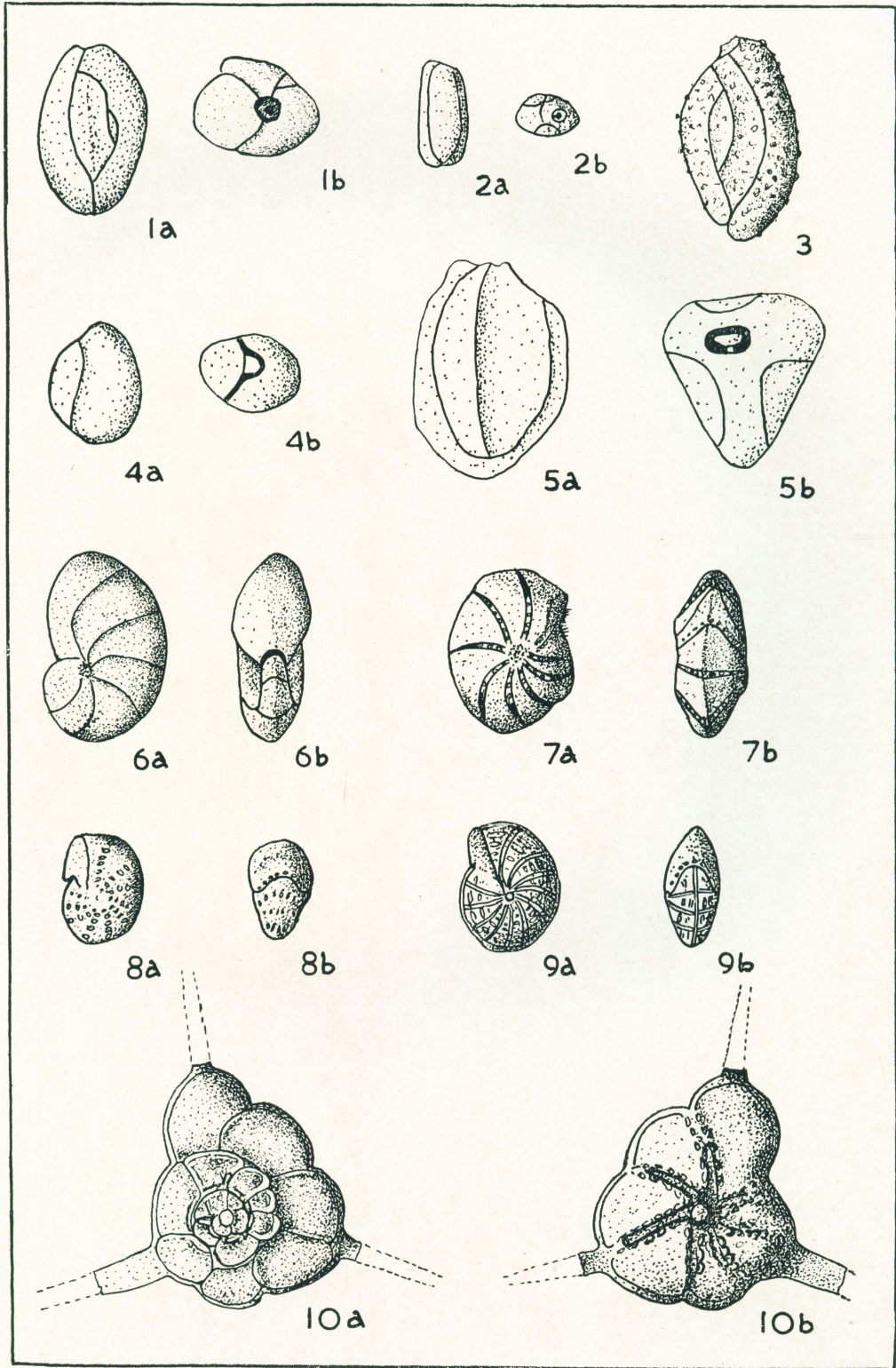
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#### EXPLANATION OF PLATE 1

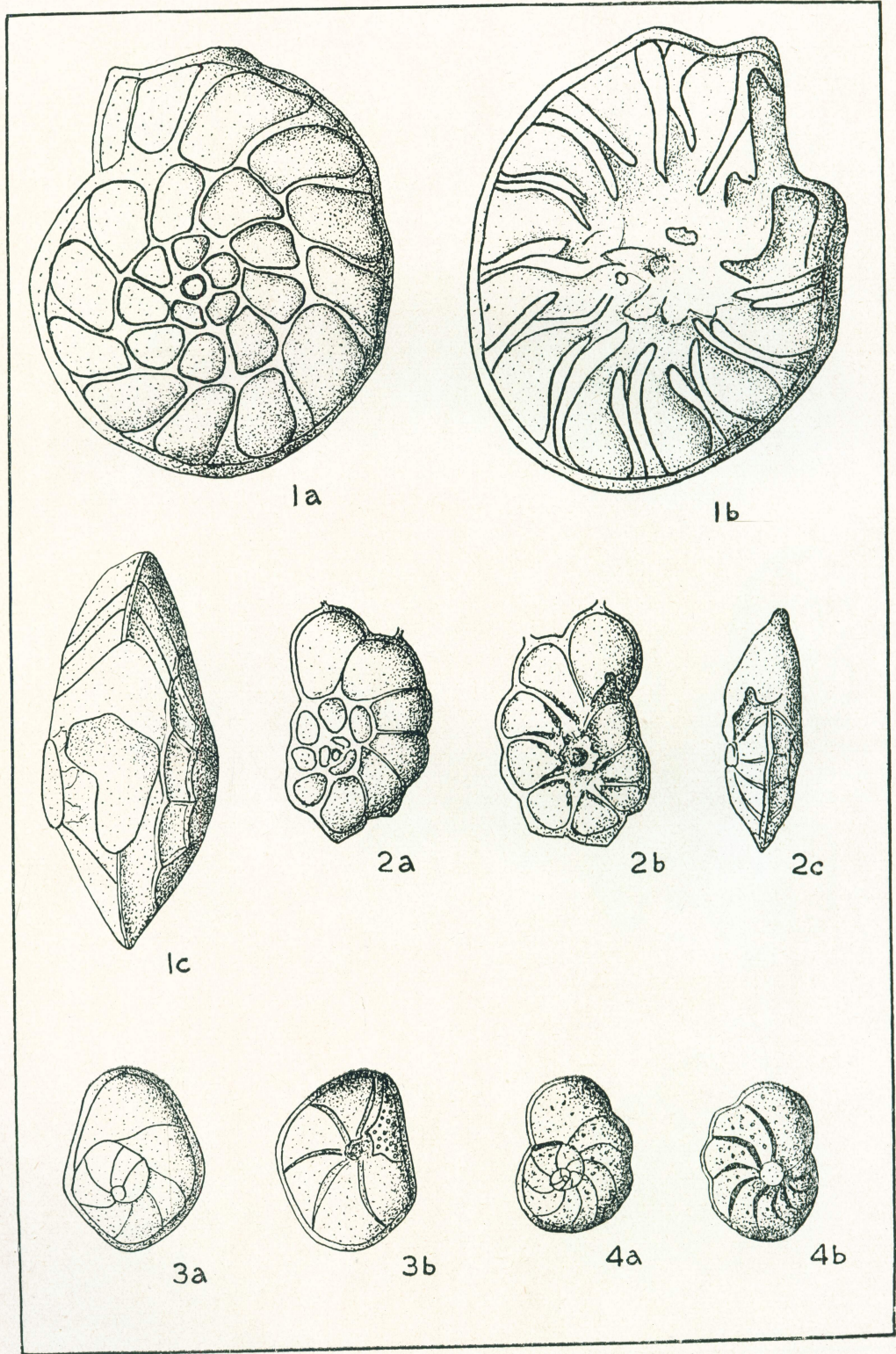
(All figures  $\times 65$  unless stated otherwise)

- 1a, b. *Quinqueloculina seminulum* (Linnaeus): a, side view; b, apertural view.
- 2a, b. *Quinqueloculina tropicalis*? Cushman: a, side view; b, apertural view.
3. *Dentostomina agglutinans* (d'Orbigny)?: side view.
- 4a, b. *Bitoculinella* sp. indet: a, side view; b, apertural view.
- 5a, b. *Triloculina trigonula* (Lamarck): a, side view; b, apertural view.
- 6a, b. *Nonion scaphum* (Fichtel & Moll): a, side view; b, peripheral view.
- 7a, b. *Elphidium simplex* Cushman: a, side view; b, peripheral view.
- 8a, b. *Elphidium* sp. indet: a, side view; b, peripheral view.
- 9a, b. *Elphidium advenum* (Cushman): a, side view; b, peripheral view.
- 10a, b. *Asterorotalia trispinosa* (Thalman).  $\times 125$ : a, dorsal view; b, ventral view.











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## EXPLANATION OF PLATE 2

(All figures  $\times 65$  unless stated otherwise)

- 1a-c. *Streblus annectens* (Parker & Jones): a, dorsal view; b, ventral view; c, peripheral view.
- 2a-c. *Streblus dentatus* (Parker & Jones).  $\times 125$ : a, dorsal view; b, ventral view; c, peripheral view.
- 3a, b. *Pororeponides lateralis* (Terquem): a, dorsal view; b, ventral view.
- 4a, b. *Cibicides* sp. indet: a, dorsal view; b, ventral view.