

RECENT FORAMINIFERA FROM BEACH SANDS OF JAFFNA, CEYLON

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ABSTRACT—Ten foraminiferal species have been noted and described from the recent beach sands of Jaffna, Ceylon.

INTRODUCTION

ORGANIC contents, including foraminifera, have been described from time to time by various workers from the fossiliferous Lower Miocene formations of Jaffna, Ceylon. Wayland and Davies (1923), Eames (1950), and Tewari and Tandon (1960) have dealt with the age of these beds and have remarked upon the fossil foraminifera of these beds. Recent foraminifera from Jaffna-peninsula in northern part of Ceylon, have not drawn the adequate attention. The present paper is based on the study of beach sands from Jaffna Peninsula presented by Shri L. K. Seneviratne in 1960.

The sands are medium grained in size with modest sphericity and roundness. Some of the important detrital minerals present are listed below in order of abundance.

1. Quartz —flood
2. Feldspar —abundant
3. Magnetite—rare
4. Hematite—rare
5. Zircon —rare

Cushman's classification has been followed in this paper.

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SYSTEMATIC DESCRIPTION

Order FORAMINIFERA

Family LITUOLIDAE

Subfamily HAPLOPHRAGMINAE

Genus AMMOBACULITES Cushman, 1910

AMMOBACULITES sp. indet

(Plate 15, fig. 5)

Description—Test free, early part coiled, later becoming straight; wall coarsely arenaceous; chambers indistinct; aperture terminal.

Measurements—Length 1.17 mm.; breadth at the apertural end 0.27 mm.; breadth at the base 0.73 mm.; thickness 0.16 mm.

Remarks—A single specimen has been found making specific identification difficult.

Family MILIOLIDAE

Genus SPIROLOCULINA d'Orbigny, 1826

SPIROLOGULINA AFRICANA Martinotti

(Plate 15 figs. 1a-c)

Spiroloculina africana Martinotti, A. 1921, *Soc. Ital. Sci. Nat. Milano*, Atti, Milano, Ital., vol. 59 (1920), fasc. 3-4. p. 267.

Description—Test free, planispiral, chamber visible from both sides, which are half coiled in length, a somewhat raised carina present on both sides of the chambers; wall porcellanous, smooth; aperture simple with a neck and lip and a simple tooth.

Measurements—Length 0.40-0.95 mm; breadth 0.25-0.60 mm.; thickness 0.12-0.29 mm.

Remarks—It is identical to *Spiroloculina africana* Martinotti described from recent material of Spiaggia di Tripoli, Sotto Gargarese, Libya. The most striking feature of the species is the aperture with a neck and lip. Preservation is good and is abundant in our material.

SPIROLOCULINA aff. BIDENTATA Hadley
(Plate 14 figs. 2a, b)

Hadley, W. H. Jr., 1935, *Bull. Amer. Pal. Itaca*, N. Y., U. S. A., vol. 22, no. 74, p. 5.

Description—Test thick; length is about double the breadth, extremities of the test pointed; chambers 6 or 7 in number with edges rounded, sutures distinct, last chamber projecting at the apertural end; wall thick, smooth porcellanous; aperture terminal with a bifid-tooth.

Measurements—Length 0.42 mm.; breadth 0.25 mm.; thickness 0.12 mm.

Remarks—The present form is similar to the type species described from the Basal Jackson, Moody's Branch Marl, U. S. A. assigned to the Tertiary, but it differs from it in having single bifid tooth instead of two simple teeth in the type species. It is rare in the present material, but the preservation is fairly good.

Genus TRILOCULINA d'Orbigny, 1826
TRILOCULINA TRICARINATA d'Orbigny
(Plate 14 figs. 5a-c)

Triloculina tricarinata d'Orbigny, 1826, *Ann.*

Sci. Nat., vol. 7, p. 229, no. 7; Cushman, 1929 *U. S., Nat. Mus., Bull.* 104, pt. 6, p. 56, pl. 13, figs. 3a-c; Bhatia, S. B., *Contr. Cush. Found. Foram. Res.*, vol. 7, pt. 1, pl. 1, fig. 16, p. 19.

Description—Test elongated, about two times as long as wide; chambers slightly sharp-angled, triangular in end view; wall smooth, calcareous, porcellanous, aperture sub-rectangular with a simple tooth and wider at the distal end.

Measurements—Length 0.47-0.64 mm; breadth 0.34-0.45 mm.; thickness 0.27-0.38 mm.

Remarks—The form is identical to *Triloculina tricarinata* d'Orbigny described from the recent sands of Lamer Rouge. It is abundant in our material and specimens are generally well preserved. It has been recorded in India from the recent beach sands of Bombay and Bhogat in Gujarat.

Genus QUINQUELOCULINA d'Orbigny, 1826
QUINQUELOCULINA sp. indet
(Plate 14 figs 4a-c)

Only a solitary specimen has been met with, making identification difficult.

Measurements—Length 0.42 mm.; breadth 0.27 mm.; thickness 0.20 mm.

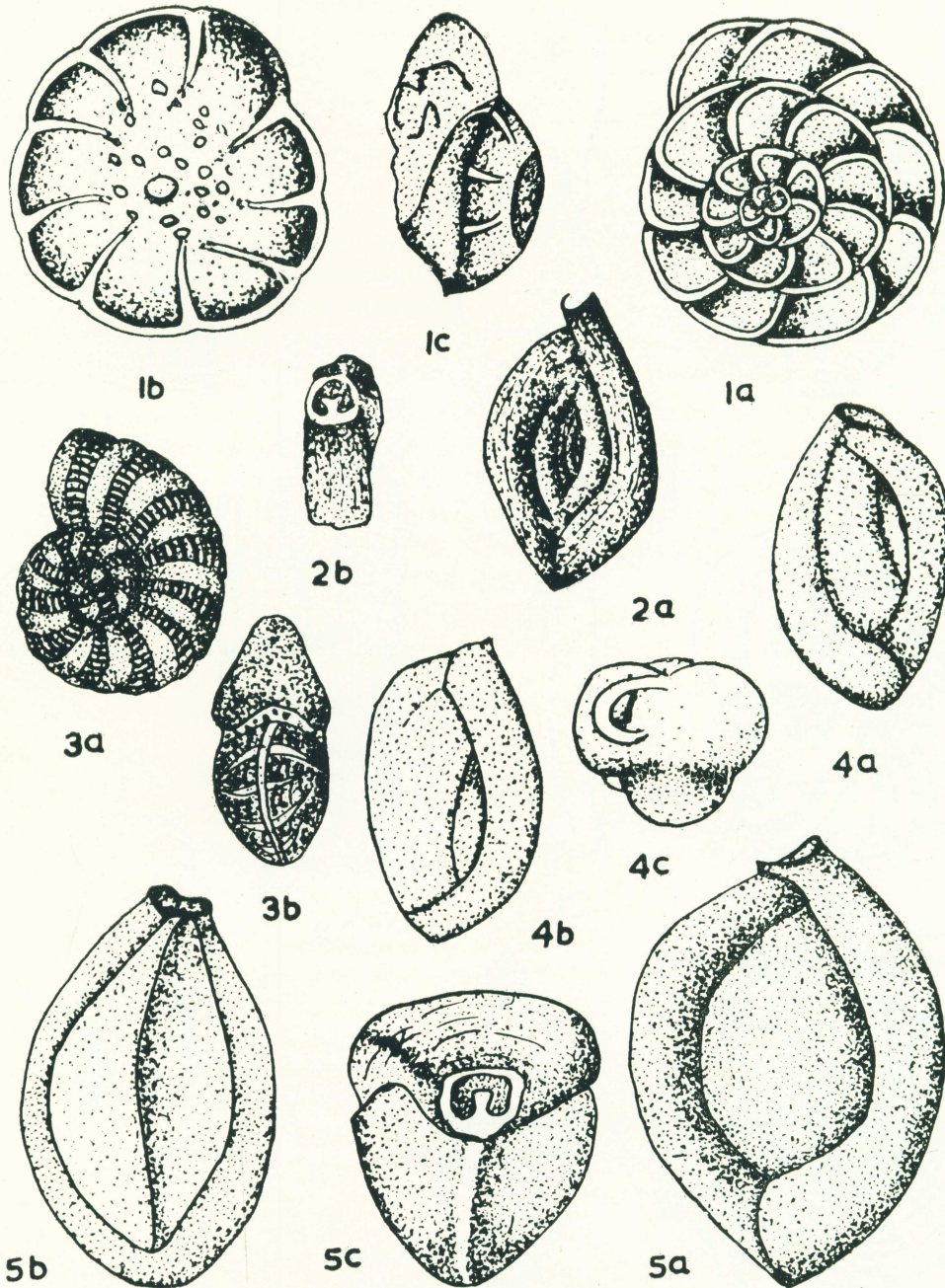
Family NONIONIDAE
Subfamily POLYMORPHININAE
Genus ELPHIDIUM Montfort, 1808
ELPHIDIUM CRISPUM Linnaeus
(Plate 15 figs. 4a, b)

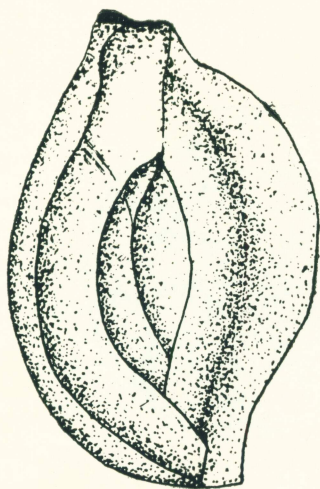
Nautilus crispus Linnaeus, 1758, *Systema naturae*, Edn. 10, 709; Edn. 13 (Gmelin), p. 3370.

Polystomella crispa (Linnaeus) Lamarck, 1822, *Histoire des animaux sans vertebres*, vol. 7, p. 625.

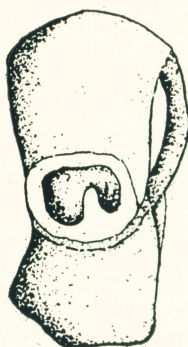
EXPLANATION OF PLATE 14 (All figures X 50)

- 1a-c *Streblus amectens* Parker and Jones. a, dorsal view; b, ventral view; c, apertural view.
2a-b *Spiroloculina* aff. *bidentata* Hadley a, lateral view; b, apertural view.
3a-b *Elphidium subevolutum* Cushman. a, lateral view; b, apertural view.
4a-c *Quinqueloculina* sp. indet d'Orbigny. a, b, lateral views; c, apertural view.
5a-c *Triloculina tricarinata* d'Orbigny. a, b, lateral views; c, apertural view.

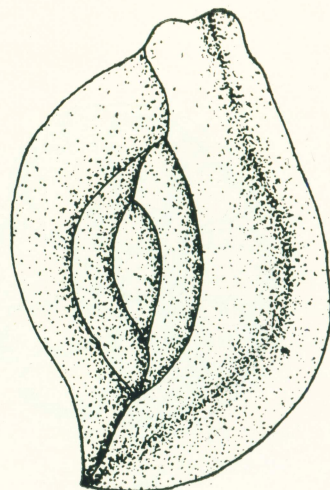




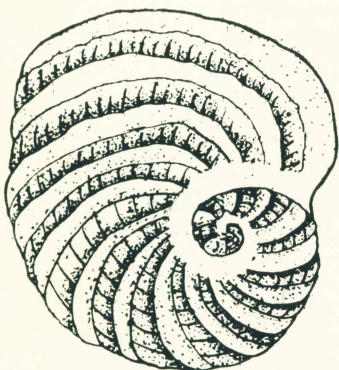
1b



1c



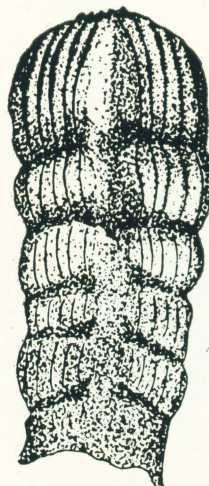
1a



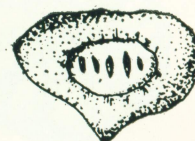
2a



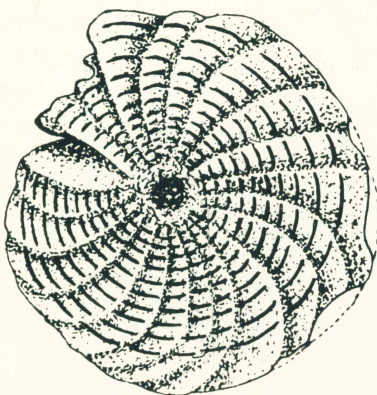
2b



3a



3b



4a



4b



5

Elphidium crispum (Linnaeus) Cushman and Grant, 1927, *San Diego Soc. Nat. Hist. Trans.*, vol. 5, p. 73, pl. 7, figs. 3a,b; Cushman, 1939, *U.S.G.S. Prof. Paper* 191, p. 50, pl. 13, figs. 17-21; Bhatia, S. B., 1956, *Contr. Cush. Found. Foram. Res.*, vol. 7, pt. I, pl. 5, fig. 11, p. 20.

Description—Test compressed, planispiral, bilaterally symmetrical, sides convex but flattened in the centre, periphery acute and keeled; chambers distinct about 19 to 21 in number in the final volution increasing very gradually in size, not inflated; sutures distinct, sharply raised, strongly curved; retral processes distinct, extending nearly across the chambers; aperture consisting of two small rounded openings at the base of the triangular apertural face.

Measurements—Length 0.78-1.04 mm.; breadth 0.69-0.95 mm.; thickness 0.34-0.44 mm.

Remarks—It is identical to the type species. It has also been recorded in India from the recent sands of Bhogat beach, west coast, Gujarat. The form is abundant in our material and preservation is good.

ELPHIDIUM SUBEVOLUTUM Cushman
(Plate 14 figs. 3a, b)

Cushman, J. A., 1933, *U. S. Nat. Mus.*, Washington, D. C., U. S. A., *Bull.*, 161, p. 52.

Description—Test biconvex, slightly compressed, open coiled with three whorls seen externally, periphery acute and only slightly keeled; chambers numerous, inflated and nearly of uniform shape, increasing gradually in size; retral processes narrow, occurring above the sutures, which are strongly depressed; wall smooth, finely perforate; aperture consisting of

few pores at the base of the apertural face.

Measurements—Length 0.38 mm.; breadth 0.33 mm.; thickness 0.16 mm.

Remarks—The specimen is identical to *Elphidium subevolutum* described from south of the Pacific Ocean. It is rare in our material and preservation is good.

Family PENEROPLIDAE

Subfamily SPIROLININAE

Genus PENEROPLIS Montfort, 1808
PENEROPLIS PLANATUS var. Fichtel and Moll
(Plate 15 figs 2a, b)

Nautilus planatus—Fichtel and Moll var. α ; Fichtel and Moll 1798, *Schroter, Neue Litherat. d. Naturgisch.* 1. Bd., p. 314, tab. 1, fig. 1.

Peneroplis planatus Fichtel and Moll 1803, *Test. Micr.*, p. 93, pl. 16, figs. d-f.

Description—Test free, compressed, planispiral, young close coiled, usually involute adult variously shaped, close coiled with radial curved; sutures in primitive forms; chambers numerous about 17 to 19 in number, broad and tending to embrace the earlier chambers; wall porcellanous; aperture simple, consisting of a row of slit like openings at the apertural face.

Measurements—Length 0.49-0.80 mm.; breadth 0.45-0.77 mm.; thickness 0.12-0.18 mm.

Remarks—The form is identical to *Peneroplis planatus* described from recent material of Toscana, Italy. The specimens are abundant in our material and are very well preserved. It is being recorded for the first time from India and adjacent countries.

EXPLANATION OF PLATE 15

(All figures X 50)

- 1a-c *Spiroloculina africana* Martinotti a, b, lateral views; c, apertural view.
2a-b *Peneroplis planatus* var. α Fichtel and Moll. a, lateral view; b, apertural view.
3a-b *Spirolina pusilla* Schwager. a, lateral view; b, apertural view.
4a-b *Elphidium crispum* Linnaeus. a, lateral view; b, apertural view.
5 *Ammobaculites* sp. indet. Lateral view.

Genus SPIROLINA Lamarck, 1804

SPIROLINA PUSILLA Schwager

(Plate 15 figs 3a, b)

Schwager, C. 1883, *Plaeontogr., Beitr. Naturg. Vorzeit, Cassel, Deutschland*, Bd. 30 (Folge 3, Bd. 6) Pal. Theil, Abth. 1, p. 92.

Description—Test free, early portion broken and compressed, later portion ractilinear, lobulate periphery, distinct median ridge; chambers distinct and earlier part compressed, later chambers enlarging gradually; wall porcellanous, imperforate, longitudinally striated; aperture a series of pores on the apertural face.

Measurements—Length 0.87 mm.; breadth towards aperture 0.36 mm.; breadth towards early chamber 0.27 mm.; thickness towards aperture 0.23 mm.; thickness towards early chamber 0.18 mm.

Remarks—The form is identical to *Spirolina pusilla* Schwager described from the Eocene of Egypt. A broken specimen has been found in the material. The preservation is quite good. This is the first record of its occurrence from India and adjacent countries.

Family ROTALIIDAE

Subfamily DISCORBINAE

Genus STREBLUS Fischer, 1817

STREBLUS ANNECTENS Parker & Jones

(Plate 14 figs. 1a-c)

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

Streblus annectens (Parker & Jones) Bhatia, S. B., 1956, *Contr. Cush. Found. Foram. Res.*, vol. 7, pt. 1, p. 22, pl. 3, figs. 1, 2; Bhatia, S. B. and Mandwal, N. K.: 1957, *Pal. Soc. India*, vol. 2, text fig. B, p. 169, Tewari, B. S. and Bhargava, O. N.; 1959, *Pal. Soc. India*, vol. 4, p. 9, pl. 2.

Description—Test trochoid, ventral side somewhat concave, dorsal side convex; periphery rounded with a very narrow keel which is not distinct; whorls are divided into cham-

bers, which are 8 to 100 in the last whorl, tangential diameter of the chambers is larger than the radial diameter; sutures limbate, gently curved on the dorsal side, depressed on the ventral; umbilicus filled with a star-shaped shell material; wall calcareous perforate; aperture between the periphery and umbilical area on the ventral side.

Measurements—Length 0.29-0.49 mm.; breadth 0.25-0.44 mm.; thickness 0.16-0.29 mm.

Remarks—The specimen is identical to the type material, described from the recent mud of China and Fiji Islands. It has been reported from recent material of Surat-Broach area, Western India and is also recorded from the Aquitanian beds of Kutch. Well preserved specimens are abundant in our material.

REFERENCES

- WAYLAND E. J., and DAVIES, A. M., 1923, The Miocene of Ceylon. *Quart. Journ. Geol. Soc., London*, vol. 79, pp. 577-602.
- EAMES, F. E., 1952, A Contribution to the Study of the Eocene of the Western Pakistan and Western India, *Quart. Journ. Geol. Soc., London*, vol. 107, pp. 159-200.
- JACOB, K. and SASTRI, V. V., 1952, Miocene Foraminifera from Chavra, near Quilon, Travancore, *Rec. Geol. Surv. India*, vol. 82, pp. 342-353.
- BHATIA, S. B., 1956, Recent Foraminifera from Shore Sands of Western India, *Contr. Cush. Found. Foram. Res.* vol. 7, pt. 1, pt. 15-24.
- BHATIA, S. B., and MANDWAL, N. K., 1957, Smaller Foraminifera from Agate Conglomerates (Burdigalian) of the Surat-Broach Area, Western India. *Journ. Pal. Soc. India*, vol. 2, pp. 163-173.
- TEWARI, B. S. and BHARGAVA, O. N., 1960, Kutch Microfauna Eocene Foraminifera. *Proc. 47th. Ind. Sci. Congr.*, Part 3, (Abstract), p. 279.
- TEWARI, B. S. and BHARGAVA, O. N., 1959, Kutch Microfauna Aquitanian Foraminifera from Waior, South-Western Kutch, *Journ. Pal. Soc. India*, vol. 4, pls. 1-3, pp. 6-11
- TEWARI, B. S. and TANDON, K. K. 1960, On Microfauna and Age of Jaffna Limestone, Ceylon. *Proc. 47th. Ind. Sci. Congr.*, Part 3, (Abstract) p. 280.
- ELLIS, B. F. and MESSINA, A. R., (upto 1963), Catalogus of Foraminifera. *Spec. Publ. Amer. Mus. Nat. Hist.*, New York.