

SOME ABERRANT FORAMINIFERA FROM THE SHELF SEDIMENTS OF CENTRAL EAST COAST OF INDIA

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Abstract

A rich foraminiferal outer shelf assemblage has yielded some aberrant forms in the case of *Uvigerina* sp., *Siphonoperta* sp., and *Nodosaria* sp. The aberration is (1) in the development of two terminal apertures with parallel necks and phialine lips in *Uvigerina* sp., (2) a twinned case in another *Uvigerina* sp., (3) development of two end chambers as last chamber instead of the usual one only in the case of *Siphonoperta* sp., and (4) *Nodosaria* sp., showing a 'bend' at an angle after being straight for sometime. It is concluded that, after considering several causes for the aberrations, the two apertural *Uvigerina* sp., and the finally terminated two chambered *Siphonoperta* sp., are cases of phylogerontism showing over-specialisation; the twinning in *Uvigerina* sp., as due to an accidental coalescence of two tests in the early stages of growth, and *Nodosaria* sp., showing a 'bend' as a result of damaged last chamber being recalcified with the terminal aperture shifting to an angle and continue to grow further maintaining the same direction. Thus, it appears to be a clear case of regeneration.

Introduction

During a detailed investigation of the foraminiferal assemblages of the shelf sediments of the outer shelf region of the central east coast of India, a few, though rare, aberrant forms of foraminifera were encountered. The samples were collected in 1964 aboard INS KISTNA in her 18th cruise as part of the Indian programme of the International Indian Ocean Expedition. These aberrant forms were noticed in samples collected at Sta. Nos. 453 and 461 at 17° 02.0' N, 83° 00.0' E and 16° 58.5' N 82° 45.0' E at 202 and 129 m respectively. The aberration is (1) in the development of apertures having two necks with phialine lips in the case of *Uvigerina* sp.,; (2) *Siphonoperta* sp. showing two end chambers as last chamber instead of the usual one only; and lastly (3) *Nodosaria* sp. showing a 'bend' at an angle of approx. 45° after being straight and uniserial for sometime.

There are reports in the literature of abnormal specimens of foraminifera encountered from various regions of the world. To quote a few, Brady (1884) reported the occurrence of an abnormal *Quinqueloculina* sp. from the Recent sediments of North Pacific; Hooper (1966) reported an abnormal *Miliolinella* sp. from the New Foundland Grand

Banks ; and Dhillon (1969 ; 1970) referred to an abnormal *Asiacolus reniformis* (d'Orbigny) from the Holocene of Gantheaume Bay, Western Australia, and to a double apertured *Ammotium salsum* (Cushman and Bronniman) = *Anomobaculites salsus* (Cushman and Bronniman) 1948) from the Muar River estuary, West Malaysia.

A brief description of the species (normal type) and the abnormalities notice dare detailed below. The classification followed hereunder is that proposed by Loeblich and Tappan (1961).

Buliminacea Jones 1875

Uvigerinidae Haeckel 1894

Uvigerininae Cushman 1913

Uvigerina d'Orbigny 1826

Uvigerina sp. Plate I. Figs. 1-4.

Brief description of a normal species : Test triserial to biserial, elongate and fusiform ; wall calcareous, perforate ; chambers inflated, rounded ; aperture terminal, rounded, with neck and a lip.

Remarks : A specimen of the above description (*Uvigerina* sp.) possessing two apertures instead of the usual one in the last chamber is noticed at Sta. No. 453 at 202 m depth. These two terminal apertures are made up of two necks that are independent and parallel to each other with rounded phialine lips at their terminal ends. The internal structure is not apparent when examined in transmitted light or under immersion in glycerine, hence the number of apertures in the immediate or earlier last chambers is unknown.

Uvigerina canariensis d'Orbigny *forma distoma* De Amicis (1895) described from Lower Pliocene of Sicily ; *Uvigerina curta* Cushman and Jarvis (1929) from the Eocene of Trinidad ; and *Uvigerina cocoaensis* Cushman from Upper Eocene of Mississippi (Ellison Jr. 1953) are similarly abnormal specimens. However, the present specimen is very much similar to *Uvigerina cocoaensis* Cushman in that the two necks are found in the last chamber, but differs in having these two necks parallel to each other rather than found to be at an angle (45°) diverging from a point inside the penultimate chamber.

Two specimens of *Uvigerina* sp. noticed (at Sta. No. 453) are twinned species, wherein two specimens branch out after being together in the earlier nepionic stages of growth (Fig. 4).

This aberrant form and the twinned variety are found in a foraminiferal assemblage of *Uvigerina peregrina*, *U. multicostrata*, *Cassidulina laevigata*, *Bohrina* sp. and others. The majority of the species of this assemblage are Uvigerinas and Globigerinas.

Miliolidae Ehrenberg 1839

Quinqueloculininae Cushman 1917

Siphonaperta Vella 1957

Siphonaperta sp. Plate 1. Figs. 5-7.

Brief description of a normal species : Test quinqueloculine in chamber arrangement ; agglutinated ; aperture having a ridge-like tooth and a phialine lip.

Remarks : This anomalous specimen found at Sta. No. 461 at 129 m depth is typically characterised by two last chambers instead of a usual one. Both of them have terminal apertures each with a ridge-like tooth and a porcellaneous lip. The abnormality is in the occurrence of two last chambers. This is the first time such an abnormality in *Siphonaperta* sp. being reported. This specimen is very similar to *Siphonaperta macbeathi* Vella but differs in the absence of the angled periphery and a little raised apertural neck.

This species is found associated in an assemblage of *Ammonia beccari*, *A. dentata*, *Robulus cushmani*, *Textularia agglutinans*, *Textularia* sp., *Amphistegina lessonii*, *Ganeriis auriculus*, *Uvigerinas* and a few others represented in small numbers.

Nodosariacea E'hrenberg 1838

Nodosariidae E'hrenberg 1838

Nodosariinae E'hrenberg 1838

Nodosaria Lamarek 1812

) *Nodosaria* sp. Plate No. 1, Fig. 8-9.

Brief description of a normal species : Test multilocular, rectilinear ; sutures perpendicular to axis of test ; costate ; aperture terminal, central with a neck.

Remarks : This anomalous specimen found at Sta. No. 461 is straight and uniserial to some extent but bent later. Here the aberration is in being 'bent' at an angle. This is found along with other normal forms in its taphocoenosis assemblage.

Discussion

The peculiar development of two apertures having almost parallel necks with phialine lips in the last chamber in *Uvigerina* sp. which is very similar to *Uvigerina cocoensis* Cushman ; a twinned *Uvigerina* sp. showing coalescence at the early stages ; a *Siphonaperta* sp. in having two last chambers with terminal apertures consisting of typical phialine lips and teeth within them instead of a usual one ; and an unusually bent *Nodosaria* sp. instead of being straight are the abnormal types noticed in the shelf sediments. The number of these aberrant forms in the foraminiferal assemblage are very few as they are exceptions to the rule. What really caused them to assume such abnormal features is not very clearly known though several explanations are offered by various authors as, (1) caused by some ecological factors (Dhillon 1969) ; or (2) resulted by injury, disease or mutation (Ellison Jr. 1953). These arguments in general are all possibilities but which ecological factors were causatively responsible are not very clear. The present authors believe that the two apertural *Uvigerina* sp. and the finally terminated two chambered *Siphonaperta* sp. are cases of phylogerontism showing over-

specialisation. Further, it may also be surmised that the double apertural *Uvigerina* sp. may be a case of mutation since the assemblage is dominated by *Uvigerinas* and globigerinas, thus representing a provincial habitat and a homeomorphic faunal assemblage. The twinning in *Uvigerina* sp. noticed may be due to an accidental coalescence of two tests in the early stages of growth.

The *Nodosaria* sp. when immersed in glycerine and observed under the microscope, revealed that the last chamber in the uniserial, straight test was damaged partially breaking off the terminal aperture. This damaged portion seemed to have newly formed, and the wall reclassified with the terminal aperture having shifted to an angle approx. 45° in the process. What caused the shifting of the terminal aperture to an angle is unknown. Thus, the terminal aperture being shifted the later chambers that followed developed further in the same direction and axis of the newly formed terminal aperture to give this 'bent' feature to the species. Thus, it appears to be a clear case of regeneration. In view of the rarity of these specimens described and their teratological character the authors have not been tempted to attempt to erect them into new species or subspecies nor even varieties.

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PLATE NO. 1

- Fig. 1-3 *Uvigerina* sp. showing two terminal apertures—parallel to each other (1-2—2 views ; 3-top views) .. X15
- 4 *Uvigerina* sp.—a twinned variety .. X15
- 5-7 *Siphonoperta* sp.—showing two terminal apertures (5-6-two views ; 7 top view) .. X15
- 8-9 *Nodosaria* sp.—showing normal to 'bent' form .. X15



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PLATE I

Setty and Almeida