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ON PEARL FORMATION IN THE VENERID BIVALVE, *GAFRARIUM TUMIDUM* RODING*

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BOLMAN (1941) in his work ' The Mystery of the Pearl ' has elaborately dealt with all aspects of the pearl as the pearl producing molluscs, the structure of the pearl, its classification, chemical composition, culture, pearl fisheries of the world, the fossil pearls and the vegetable pearls. The marine lamellibranchs, gastropods, and freshwater bivalves of the superfamily Unionaceae are known to produce pearls in nature. Among these, the species under the genus *Pinctada* Roding are well known as the gem pearl producing molluscs and well-established and traditional fisheries exist for these species in some parts of the world. Other marine bivalve molluscs from which pearls have been obtained are *Modiolus*, *Mytilus*, *Malleus*, *Pinna nigra*, *P. squamosa*, *P. nobilis*, *Placuna placenta*, *Tridacna gigas*, *Venus margarifica* and *Ostrea edulis* (Bolman, 1941 ; Alexander, 1951 ; Cooke, 1959). Other genera which do not possess any mother-of-pearl layer, but in which sometimes porcellanous pearls are found are *Spondylus*, *Pecten*, *Anomia*, *Cytherea*, *Lutraria*, *Tellina*, *Mya*, *Hippopus*, *Solen*, *Arca* and *Glycymeris* (Bolman, *op.cit.*). The present communication records a case of pearl formation in the bivalve species, *Gafrarium tumidum* Roding.

OBSERVATIONS AND REMARKS

While examining the clams of the species *Gafrarium tumidum* collected on 23rd December, 1965 from the mudflat at Kundugal Point near Pamban (Lat. 9° 16'N. Long. 79° 13'E.) on a biological study, one measuring 48.5 mm. in length was found to have formed a white pearl of considerable size (Pl. I). The shells in this species are thick and globular with a high calcium carbonate content and are utilized for burning into lime. The inside of the shell is white, with deep brownish patches near the posterior quarter, also sometimes near the anterior adductor impression as small blotches. It is porcellanous with a light gloss which is more pronounced, almost iridescent, in the area below the pallial line.

The pearl was found inside the pearl sac formed in the mantle of the left side near the ventral margin at about the middle of the antero-posterior axis. On gently lifting up the mantle the pearl sac came alongwith and it was noticed that at the place of contact of the pearl sac with the left shell, a shallow cup-like depression had formed in which the pearl was lodged. The depression had lost the nacreous component of the shell in a few places and the dark brownish conchiolin layer was

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apparent inside. On closer examination it was found that the pearl sac was not a completely closed one as in case of ' free ' pearls, but it was open at the place of contact with the shell and the pearl was bare in this place. Since the pearl was not free in the true sense but was in contact with the shell directly, it can be classified as ' shell-pearl '. The condition observed here is similar to the diagrammatic representation of shell-pearl formation given in Text fig. IV on page 27 of Bolman (*op. cit.*) with the difference that in the present case the pearl is lodged in a shallow depression formed in the shell. As a result of the pressure applied on the shells by the pearl the shells had slightly become bulged out to accommodate the pearl and the ventral margins of the left and right shells had become indented.

The shell-pearl was porcellanous, whitish, somewhat spherical except for the place that was in contact with the shell which has become a little rough and flattened. The spherical surface was smooth and slightly glossy. Some concentric layers of the nacreous secretion were incomplete at the place where the pearl was in contact with the depression. The pearl had a diameter of 9.5 mm., a weight of 1.217 gms. and a density of 0.3043. Since this pearl is only one of its kind obtained by the author, no attempt was made to section it and examine its nucleus.

From *G. tumidum* a few seed-pearls were also obtained during the course of this study. These were small, about a millimeter in diameter, invariably deep brownish in colour, somewhat glossy, round or elliptical, and found between the mantle and shell, mostly near the posterior adductor muscle. It is also worth mentioning here that from another clam, *Donax faba*, on which the author was working a small brownish seed-pearl of elliptical size and of light gloss, was obtained near the posterior adductor muscle of a specimen measuring 23.0 mm. in length.

The pearl oyster beds and their fishery in the Gulf of Mannar off Tuticorin are well known from ancient times and they are famous for the production of the oriental pearls. Five species of pearl oysters have been recorded from the seas around India viz., *Pinctada vulgaris* (Schumacher), *P. margaritifera* (Linnaeus), *P. chemnitzi* (Philippi), *P. anomioides* (Reeve) and *P. atropurpurea* (Dunker) (Prashad and Bhaduri, 1933). Of these, *P. vulgaris* which occurs in 'pars' of extensive areas off Tuticorin contributes to the pearl fishery of the Madras State. The windowpane oyster *Placuna placenta* (Linnaeus) occurring in the Gulf of Kutch and other places along the Indian coastline is known to produce seed-pearls of commercial value (Hornell, 1909). The brown mussel, *Mytilus* sp., from the Cape region occasionally bears pearls ranging from a tiny pin-head to a pepper corn, in size (Jones, 1950). Pearls of small size have also been recorded from the green mussel, *Mytilus viridis*. The freshwater mussel *Lamellidens marginalis* is known to produce pearls of a fair quality in a considerable quantity (Hornell, 1949). Pearls have also been obtained from the gastropod *Xancus pyrum* (Linnaeus) from the Indian Coast (Hornell, 1916). The present report is considered to be of interest in that a case of pearl formation has been observed in a marine clam from the Indian coast and in that this adds another species to the list of pearl producing molluscs known heretofore. This also records the occurrence of seed pearls in the wedge-clam, *Donax faba* from the Indian Coast.

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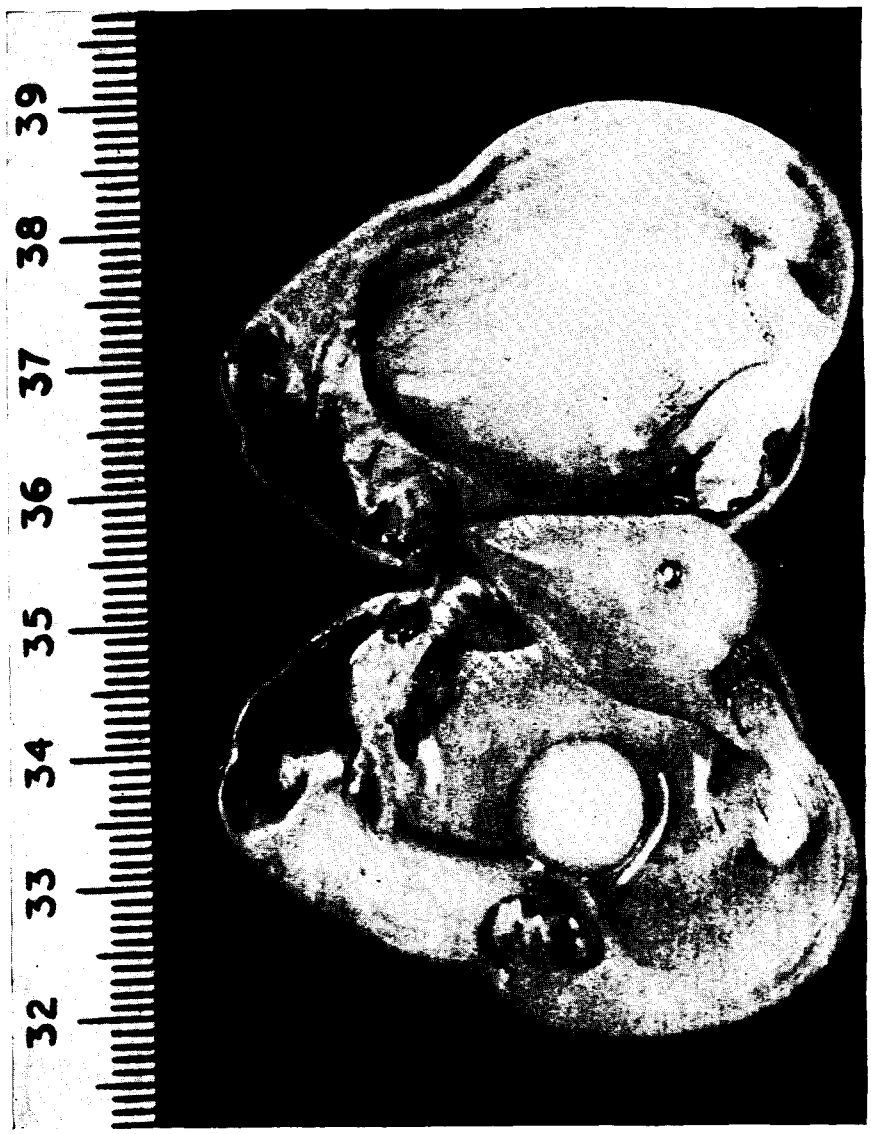

The opened clam *Gafrarium tumidum* (shell length 48.5 mm.) with the visceral mass pinned to a side showing the pearl sac with the pearl inside, the depression on the left valve and indentation on both valves. (Photograph by Sri S. P. Ghanshani).