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# PEARL FORMATION

B.Sc. Part I, paper I, Group A: Animal Diversity

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# INTRODUCTION

- Pearls are organic gemstone formed inside a living pearl producing molluscs. Pearls are formed when a molluscs secrete thousand of very thin concentric layers of nacre, a secretion of calcium carbonate in a matrix that finally coats an irritant either man made or natural. The pearl producing molluscs are the members of class Bivalvia.
- The most historically important source for fine natural pearl is Persian Gulf, where pearl oyster where once found in great abundance off the coast and island of present day Bahrain.
- Japan Has traditional been and continues to be the largest producer of pearls.
- In India the technological breakthrough in pearl culture was achieved in 1973 by the Marine Fisheries Research Institute(CMFRI)at Tuticorin.

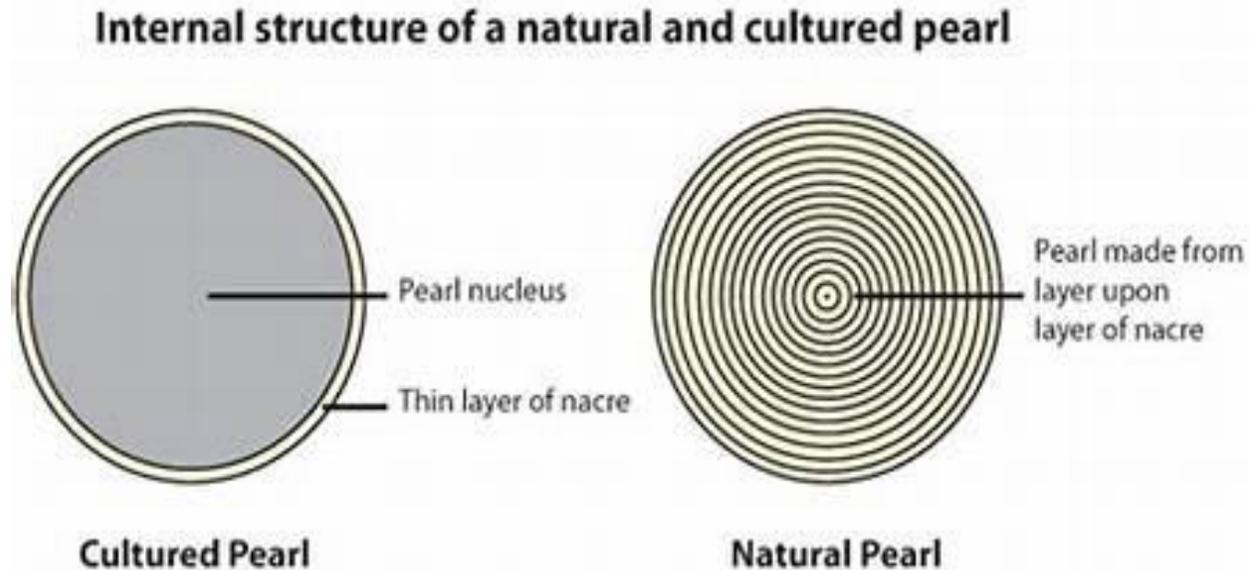
# CULTURED AND NATURAL PEARLS

**Cultured pearls-** These are the real pearls that are formed inside a living oyster with human intervention.

Nucleus is surgically implanted in oyster, and the oyster recognises it as an irritant and starts coating it with smooth layers of nacre. Over time, the growing pearl gets completely covered with the beautiful iridescent substance, nacre or mother of pearl.

**Natural pearl-** Are formed naturally by wild oysters without the human interventions.

When a natural irritant is lodged inside an oyster, it gets coated with concentric layers of nacre.



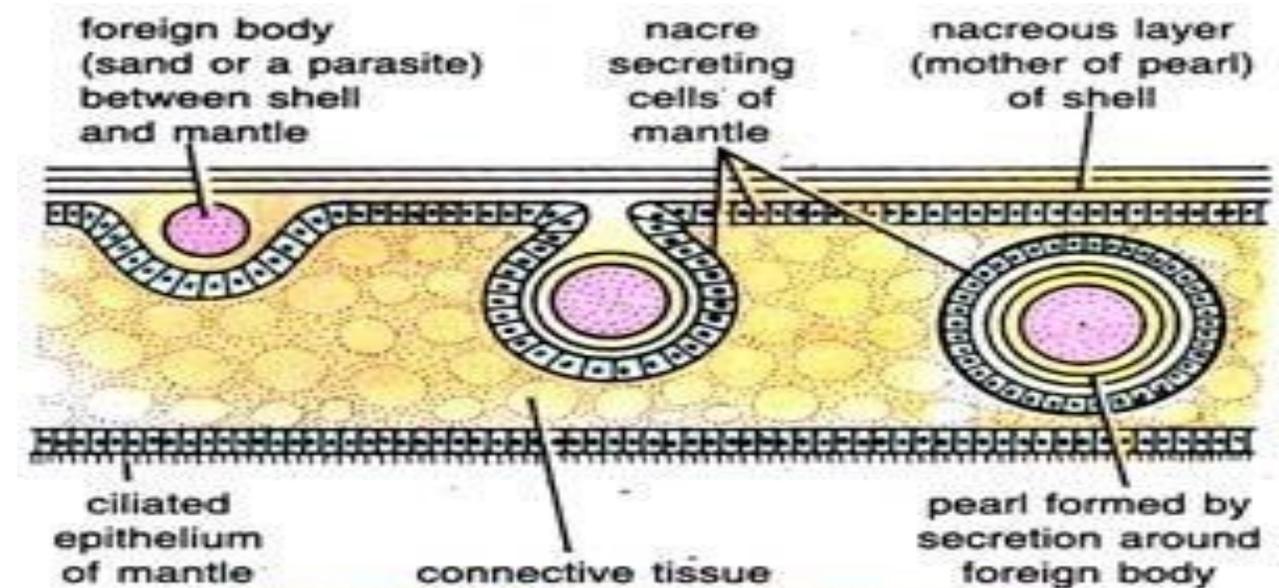


## FORMATION OF PEARL

- The formation of pearl occurs as a result of the defensive response of the oyster.
- Whenever a foreign object enters between the mantle and shell, the mantle epithelium get stimulated and surround foreign particle completely.
- The mantle epithelium starts secreting concentric layers and nacre around the foreign particle.
- In due course of time, several layers of nacre are secreted resulting into the formation of pearl.

## NATURAL PEARL FORMATION

- Natural pearl formation takes place when an irritant, such as fragment of shell becomes lodged inside the molluscs during the feeding process. To protect itself, the molluscs forms a sac around any irritant. This sac secretes nacre to cover the irritant and over time, the growing pearls are completely covered with beautiful iridescent substance nacre, or mother of pearl
- The nacre and the sac materials are made by the molluscs mantle. Mantle is the layer of tissue cells that surround the body of molluscs and lines the shell.



**Fig. 63.3. Stages in pearl formation.**

# CULTURED PEARL FORMATION:

Given the rarity of naturally-formed pearls (only one of approximately every 10,000 mollusks will produce a natural pearl), most pearls today are cultured by “pearl farmers.” Japan has the honour of developing techniques to cultured pearls oyster and obtains pearls out of them by introducing

- artificial devices. The whole process of pearl culture is complicated, technical and time taking. Basic steps involved in the pearl culture operations are as follows:

- 1. Collection of Oysters:

The oysters are collected from the bottom sea by trained divers. The best period for collection of oysters is two months in summer season.

- 2. Rearing of Oysters:

The collected oysters are first cleaned and then placed into the rearing cages. These rearing cages are placed in the sea-water as hanging position from the buoy. These cages well protected from natural enemies of oysters, such as Octopus, Eel etc. Rearing cages remain in the sea-water for a period of about 10-20 days; so that the oysters can recover the strain due to excessive handling and for the adjustment to the shallow water conditions.

- 3. Insertion of nucleus:

The insertion of nucleus as foreign particle is very much technical process and is of great importance for pearl industry. In this method a piece of mantle of living oyster is cut off and inserted together with a suitable nucleus inside the living tissue.

# PEARL OYSTER

- Fresh water molluscs are referred to as mussels while salt water molluscs are referred to as oysters.
- Pearl oysters are distinct species of oysters capable of producing a pearl, have the shells lined with nacre.
- Pearl oysters are member of the phylum Mollusca and class Bivalvia.
- Most pearl producing molluscs are bivalves. Bivalves have shells with two half connected by a hinge. They have a soft body with a small foot, a byssal gland and paired gills. Most Bivalves are passive filter feeder. In order to support their food supply water constantly circulate through their shell. The Molluscs open their shell slightly to allow the water to enter its body this increases of chances of foreign particles to gat inside along with microscopic food particles. This is crucial for pearl production as pearls are formed as a reaction to parasite or foreign body within the shell.
- Some Calms and Mussels can also produce pearls.



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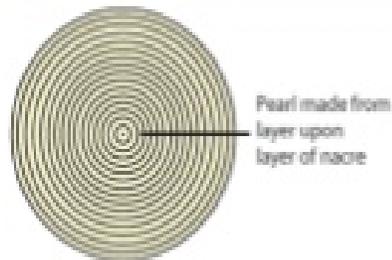
# NACRE

- Nacre is composed of an organic ,horn like compound called conchiolin and calcium carbonate in the form of the mineral aragonite or calcite.
- All species of bivalves are capable of producing pearls ,but only a few can secrete a nacreous coating that has the attractive pearly lustre of gem pearl.
- Nacre is the substance that coats the inner surface of bivalve shell.
- In gem pearl producing bivalves this nacreous shell lining also has pearly lustre and is called mother-of-pearl.
- Nacre is secreted around the irritant in concentric ,thin translucent layer.
- The rate of deposition of nacre to form a pearl depends on the species of bivalve.

# PRODUCTION OF PEARLS

## NATURAL WAY

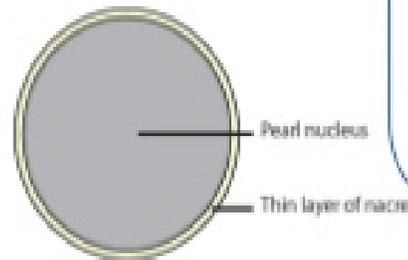
NATURAL PEARLS ARE FORMED DUE TO NATURAL PROCESSES OR DISTURBANCES IN THE ENVIRONMENT WHERE THE OYSTER LIVES.



Natural Pearl

## ARTIFICIAL WAY

ARTIFICIALLY INDUCING THE MOLLUSC TO SECRETE NACREOUS MATTER AROUND AN INSERTED NUCLEUS. IT IS PRODUCED BY HUMAN INTERFERENCE AND IS KNOWN AS CULTURED PEARL. CHIEF IMITATIONS MADE OF PLASTICS THAT HAVE AN ARTIFICIAL LUSTRE ARE KNOWN AS ARTIFICIAL PEARL.



Cultured Pearl