



### Subclass III. Coeloidae (=Dibranchia)

1. Shell internal or absent.
2. Tentacles a few with suckers.
3. One pair of gills, one pair of nephridia.

#### Order 1. Decapoda

1. Ten arms – two elongated and called tentacles, and eight short arms.
- Examples : *Loligo* (squid), *Sepia* (cuttle-fish), *Spirula* (spiral shell).

#### Order 2. Octopoda

1. Body globular and without fins.
  2. Eight equal arms.
- Examples : *Octopus*, *Argonauta*.

## A FEW OTHER MOLLUSCS

1. **Chiton.** *Chiton*, or 'coat of mail shells' is a marine polyplacophoran mollusc, well adapted for life on hard and uneven surface in the littoral zone. The characteristic feature is the presence of eight articulated **shell plates** borne on the mantle dorsally. The mantle cavity consists of two mantle or **pallial grooves**, bearing numerous gill lamellae in lateral series. The small head bears a long **radula** for grazing of attached algae and diatoms from rock surfaces. The ventral muscular locomotory foot is flat and elongated. The nervous system consists of a double ladder of pallial and pedal cords, and the only ganglia are sub-radular. The multiple sense organs are : (i) a pair of **osphradia**, one on either side of anus, (ii) **tactile receptors** in the mantle girdle and on the snout, (iii) **taste receptors** in the buccal region, (iv) **otocysts** near the pedal cords, and (v) **pit organs** in the shell plates. Sexes are separate, fertilization is

external and the zygote develops into a **trochophore larva**.

2. **Dentalium.** *Dentalium* is commonly known as 'elephant's tusk-shell'. It is a marine mollusc, living at moderate depths in sublittoral zone. *D. entalis* is found burrowing in sand or shell gravel. The shell is a slightly curved and tapered tube, opening at both ends and resembling an elephant's tusk. The mantle cavity is long and the gills are entirely wanting. The foot is pointed and the mouth is located at its base in a projection of the pharynx. The radula is simple and its feeding function is assisted by groups of filamentous tentacles, called the **captacula**. The heart is without auricles, the excretory organs are paired nephridia and the nervous system is typically molluscan. The sexes are separate and the sex cells are discharged through right nephridium.

3. **Patella.** *Patella* is a small and sluggish marine gastropod, inhabiting the rocky beaches and feeding on algae. The dorsally placed shell is rounded and conical and the foot is a broad creeping sole, with no operculum. The head bears a pair of eyes and a pair of large sensory tentacles. The respiratory organs are leg-like secondary gills found in a circle between the mantle and foot. There are two unequal kidneys, opening into the

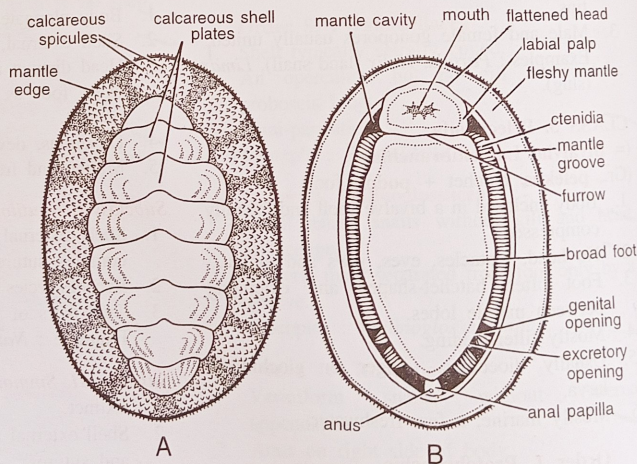


Fig. 1. *Chiton*. A. Dorsal view. B. Ventral view.

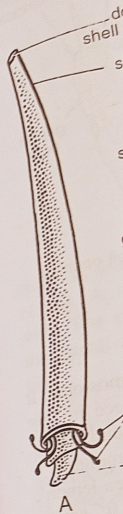


Fig. 2.  
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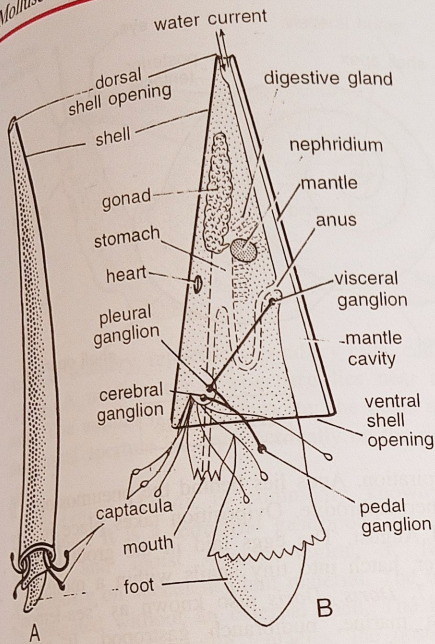


Fig. 2. *Dentalium*. A. External features. B. Internal (anatomical) features (diagrammatic).

anteriorly located mantle cavity by separate openings. A pair of osphradia projects into the mantle cavity, which serve to test the quality of incurrent water. The common species of *Patella* are *P. tarentina* and *P. vulgata*.

**4. *Cypraea*.** *Cypraea* is commonly known as 'cowrie.' It is a marine gastropod, found in Indian and Pacific oceans among coral reefs. The shell is univalve with a large single smooth and polished whorl. The shell aperture is narrow longitudinal and frilled slit on its ventral flat surface. Because of torsion, the body includes a single osphradium and single kidney. Cowrie shells are used in India in an indoor game, called 'Chowpad'.

**5. *Aplysia*.** *Aplysia* is commonly known as 'sea-hare'. It is a tectibranch gastropod, found crawling over the surface of rocks

and boulders. The body is without an external shell and is large-sized. The small internal shell is covered externally by the mantle. The head bears two pairs of tentacles which are grooved on their outer sides; the posterior pair becomes ear-like and is called the **rhinophores**. At the base of each of these tentacles is located a simple eye. The foot is broad and bears a pair of lateral, folds, the **parapodia**, used in swimming, and a posterior small tail. The mantle cavity opens to the right side of body through a longitudinal slit. The anus is posteriorly located. *Aplysia*, when disturbed, secretes a purple fluid which makes the animal invisible to its enemy. The animal is bisexual, with a single gonoduct and a single genital aperture.

**6. *Helix*.** It is the common 'sand-snail' dwelling in moist and shady places like lawns and gardens. During the colder months it retires below the soil to hibernate. It remains more active at night (nocturnal) when it creeps about at its famous 'snail speed'; during creeping it secretes a film of mucus over the substratum to reduce friction. It is herbivorous, feeding mainly on leaves and fruits. *Helix pomatia* is the 'Frenchedible-snail' consumed in western countries.

The body is about 4 cm long, with a thin shell having a low conical spire and distinct lines of growth. The head bears two pairs of tentacles; the posterior pair is large and bears eyes. The

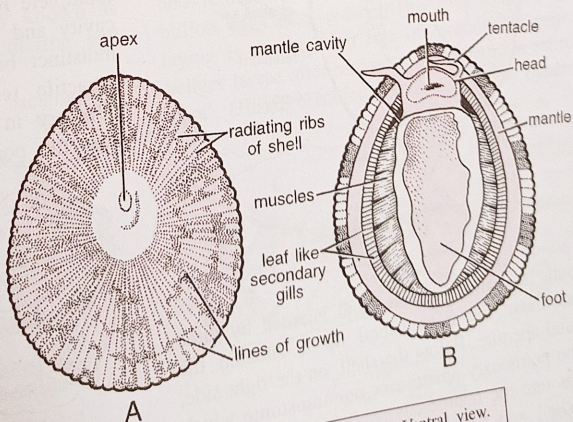


Fig. 3. *Patella*. A. Dorsal view. B. Ventral view.



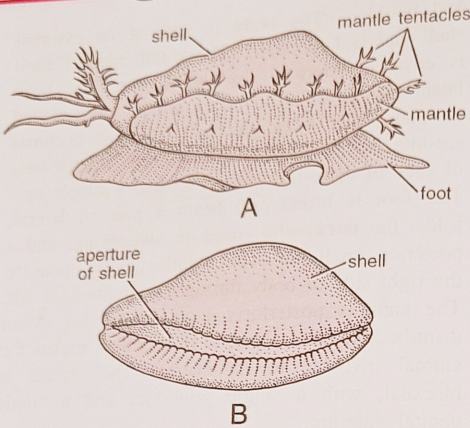


Fig. 4. *Cypraea* (cowrie). A. Living cowrie. B. Shell of cowrie.

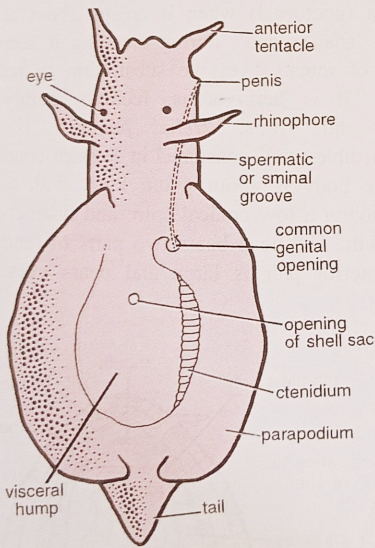


Fig. 5. *Aplysia*. Dorsal view.

mouth is ventrally situated and guarded by three lips; above the right lateral lip is situated the genital aperture. Below the shell, on the right side, is the pulmonary aperture or **pneumostome** which opens into the mantle cavity; the latter lies within the shell and functions like a lung during aerial

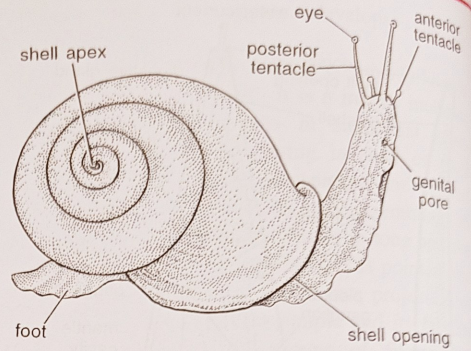


Fig. 6. *Helix*.

respiration. Anus lies behind the pneumostome. It is hermaphrodite. Oviposition takes place in July and August. The eggs laid in the ground, under cover, hatch into tiny snails within a month.

**7. *Doris*.** *Doris* also known as 'sea-lemon', is a marine, nudibranch gastropod. It creeps sluggishly over the substratum and feeds on encrusting organism like sponges. It has a short (5-10 cm long) oval body with a convex dorsal surface and a flat ventral surface; the latter is marked by the presence of a broad foot. The body is covered by a tough, pigmented mantle beset with calcareous spicules and bearing **papillae** or **tubercles** on the dorsal side. Due to **detorsion** (complete reversion of torsion), the shell, mantle cavity and primary gill are absent. The head is indistinct but bears a pair of prominent, short, retractile **tentacles** or **rhinophores** which are olfactory in nature. The **anus** lies mid-dorsally near the posterior end and is surrounded by a

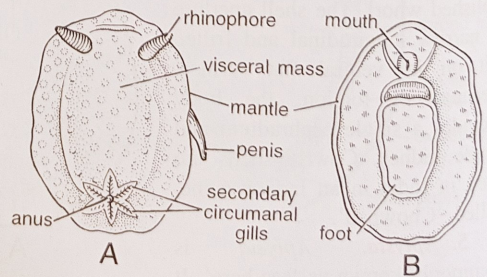
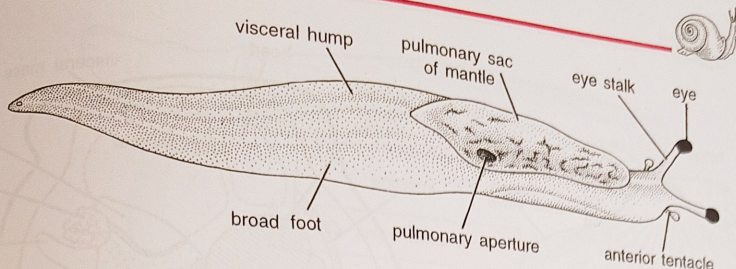


Fig. 7. *Doris*. A. Dorsal view. B. Ventral view.

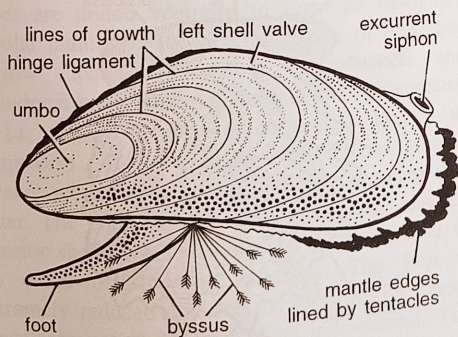



Fig. 8. *Limax*.

circlet of feathery, retractile **secondary gills**, called **cerata**. A median **renal aperture** lies near the anus. The animal is hermaphrodite; the penis and the genital aperture lie asymmetrically on the right side.

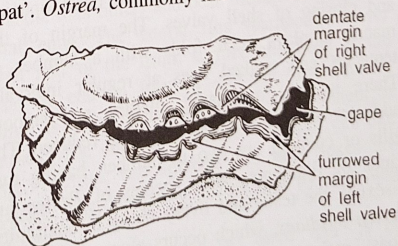
**8. *Limax*.** *Limax* is commonly known as 'grey-slug'. It is a terrestrial gastropod, living in gardens and moist woody region. It feeds voraciously on succulent plant material. The body is elongated without an external shell. The head bears a pair of retractile tentacles, the posterior pair bearing eyes at their tips. The mantle is a small antero-dorsally placed shield with a pulmonary opening, leading into the pulmonary sac, meant for aerial respiration. A small and thin shell lies beneath the mantle. The ventral muscular foot is broad and flat and serves for creeping. The slug is nocturnal in habit and lays eggs in damp sheltered places.

**9. *Mytilus*.** *Mytilus* is commonly known as 'sea-mussel'. It is a cosmopolitan, marine and


Fig. 9. *Mytilus*.

sedentary animal, found attached to rocks between tide-marks. It is a filter feeder, filtering planktons from the incurrent water. The shell is bivalve with the anteriorly placed umbo. The ventral foot is tongue-like with **byssus** threads, serving as organs for attachment. A pair of simple eyes is found anterior to the inner gill lamella. The sexes are separate.

**10. *Ostrea*.** They are bivalve sedentary marine oysters, found attached to rocks and stones. The two valves are unequal. The left valve being large, thick and convex and remains permanently attached to a rock, piling on another shell. The right, smaller, thinner and flattened valve form a sort of lid. The shell surface is coarse, irregular and ruffled. There is a single adductor muscle. The foot is absent. There is no byssus. Heart with two fused auricles lies below the rectum. The same individual can alter the sex as male and female. A single female lays about half a billion eggs in a season. This high rate of egg laying is due to high rate of mortality in eggs. Veliger larvae after setting at the bottom are called 'spat'. *Ostrea*, commonly known as edible oysters


Fig. 10. *Ostrea*



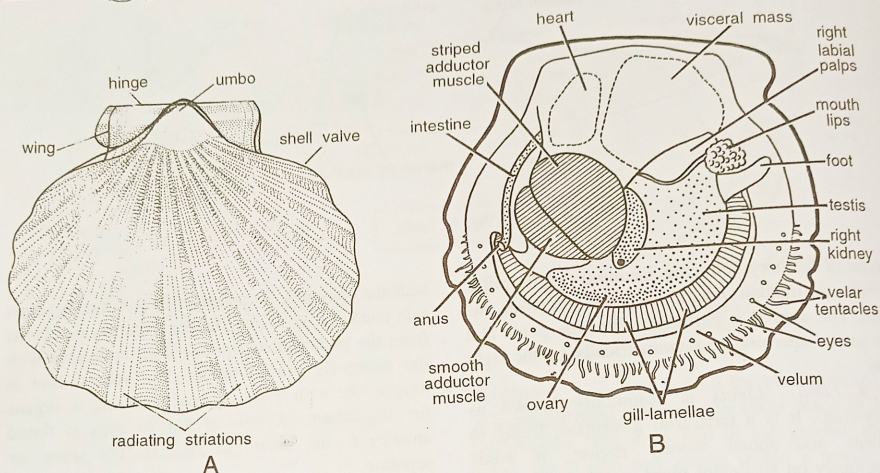


Fig. 11. *Pecten*. A. External features. B. Internal organs after removal of right shell valve.

are nicely flavoured, rich in vitamins and minerals. The Indian edible oyster is *Ostrea virginiana*. The shells of *Ostrea* are grinded up which form a source of calcium for poultry.

**11. *Pecten*.** *Pecten* is commonly known as 'scallop'. It is a worldwide distributed marine bivalve. The unequal shell valves are beautifully sculptured and bear radiating ribose striations. The hinge ligament is straight and toothless. The animal rests on the larger right valve which is having an anterior notch. Locomotion takes place in spurts, the swimming is affected by the rapid opening and closing of shell valves. The margin of the mantle displays velar folds with a number of tentacles and stalked eyes at regular intervals. There is only one large, median and smooth adductor muscle. The foot is greatly reduced. The gills or ctenidia are two in number, having two kinds of filaments. Most species of *Pecten* are bisexual, the testis and ovary being in continuity. *Pecten irridians*, which occurs along the Atlantic Coast, makes a delicious food article.

**12. Pearl oyster.** Oysters are sedentary marine bivalves found in all seas except in colder ones. The Indian pearl oyster is *Pinctada vulgaris* that

is known for yielding precious pearls. The two shells are unequal, with the left one comparatively larger than the right one and remains attached to a rock. The adductor muscle is single and large. The foot is lacking in the adult. Pearl is formed as a result of nacreous secretion from the mantle around a sand particle.

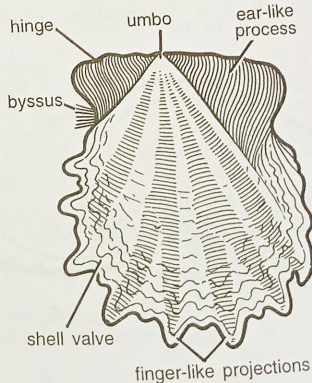


Fig. 12. Pearl oyster (*Pinctada vulgaris*).



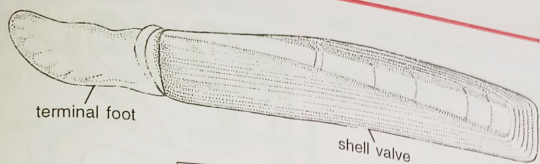


Fig. 13. *Solen*. Razor mollusc.

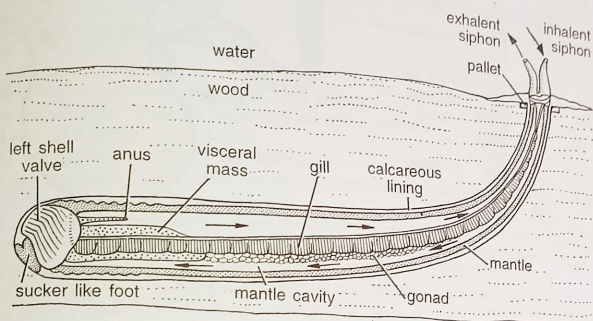


Fig. 14. *Teredo*. Anatomical features (diagrammatic).

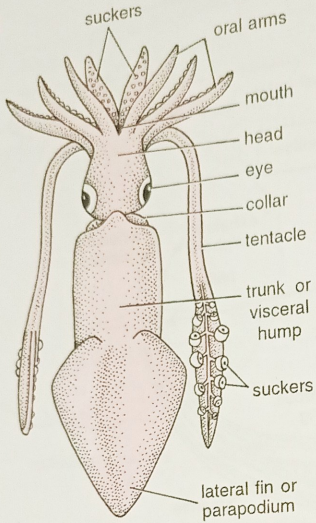
**13. *Solen*.** *Solen ensis* is commonly known as 'razor mollusc' because of its superficial resemblance to a barber's razor. It is a marine mollusc that burrows in sand. The body is elongated and narrow, enclosed in a thin bivalve shell. The umbo is located at its anterior end. Each valve has its own hinge tooth. The mantle lobes are united ventrally to form an elongated tubular mantle cavity, bearing a pair of long and narrow ctenidia. The foot is muscular and cylindrical and constitutes the burrowing apparatus.

**14. *Teredo*.** *Teredo* is commonly known as 'shipworm'. It is a highly specialized marine bivalve which is very destructive to wood in sea water. The body is long and slender with a small anterior shell. The shell is used for burrowing in the wood of ships or wharves. The foot is extremely reduced and acts as an adhesive organ for attachment to the wall of its hole-habitat. The mantle cavity bears paired and elongated gills and gonads. The inhalant (incurrent) and exhalant siphons are also elongated.

**15. *Loligo*.** *Loligo* is commonly known as 'squid' or 'sea-arrow'. It is also a decapod cephalopod, like *Sepia*, and is found in warmer seas. Its body is long, like a *Torpedo*, and resembles very much that of *Sepia* in form except that it is narrower than that of *Sepia*. The head bears a circle of 10 oral arms provided with suckers devoid of horny rims. Two of these arms are long and called the tentacles which are more retractile than others and bear suckers only at their distal ends. The lateral fins (parapodia) cover about half of the trunk surface and meet at the posterior end to form a sort of 'arrow-head'. *Loligo* is a fast swimmer in the open waters of the sea. The shell is a narrow internal pen-like strip. The ink sac secretes the ink. Sexes are separate. The copulation is followed by spawning and death.

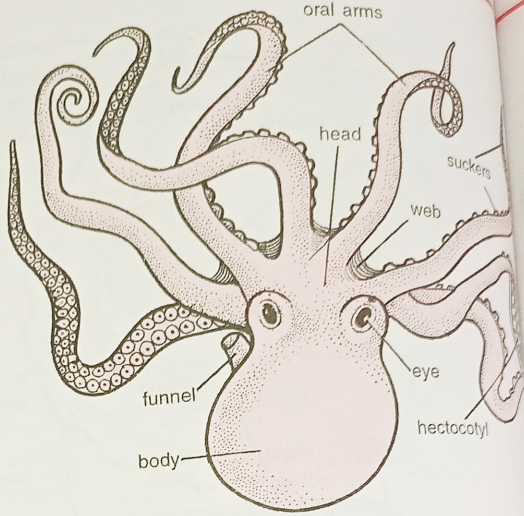
**16. *Octopus*.** *Octopus* or 'devil fish' is an octopod cephalopod, possessing eight oral arms. The body is globular and bag-like and there are no lateral fins and internal shell as are seen in



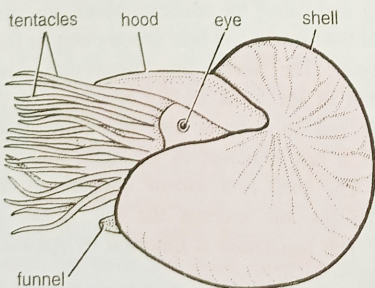
Fig. 15. *Loligo*. Dorsal view.

*Sepia* or *Loligo*. The head bears a mouth and two large prominent eyes. The oral arms are much elongated and bear suckers in two rows on their inner surfaces. These arms are joined together at their bases by a **web**. *Octopus* occurs in dark crevices and among corals in sea water. It is a benthic hunter.

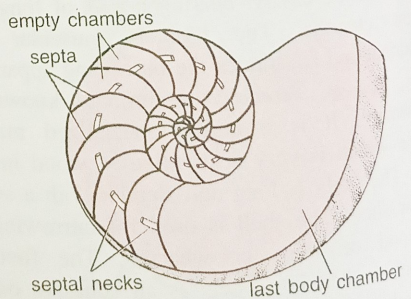
**17. Nautilus.** *Nautilus* is a tetrabranch cephalopod, found in sea waters in Indo-Pacific

Fig. 16. *Octopus*. Dorsal view.

region. The shell is external and is coiled over the head in a bilaterally symmetrical planospiral. It is divided into internal chambers by the presence of transverse septa. The living *Nautilus* lives only in the last chamber. The septa are perforated in the middle and through the perforations emerges a cord mantle, called **siphuncle**, through which the animal secretes gas into the empty chambers. This makes the shell buoyant. The inner layer of the shell is pearly. The body of *Nautilus* is



A



B

Fig. 17. *Nautilus*. A. Animal within shell. B. Shell in section.