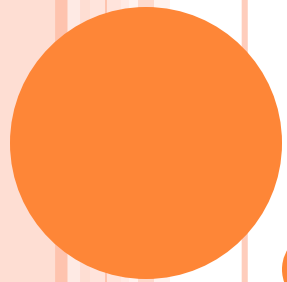




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- TOPIC : RESPIRATION IN PRAWN
- COURSE TITLE : Non-Chordates II – Coelomates
- PAPER : CC3 (ZOOA-CC2-3-TH)
- UNIT : 3
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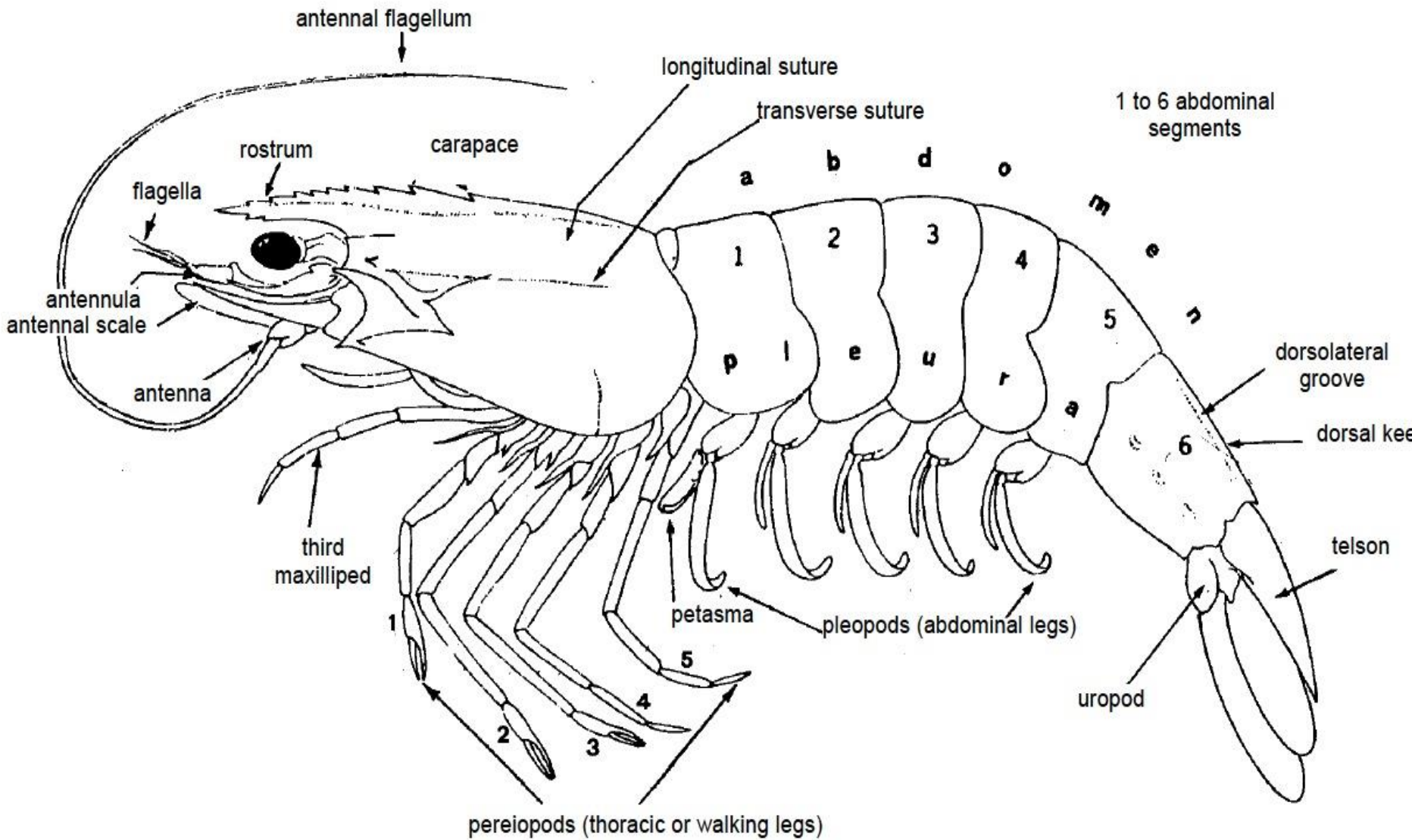


# RESPIRATION IN PRAWN

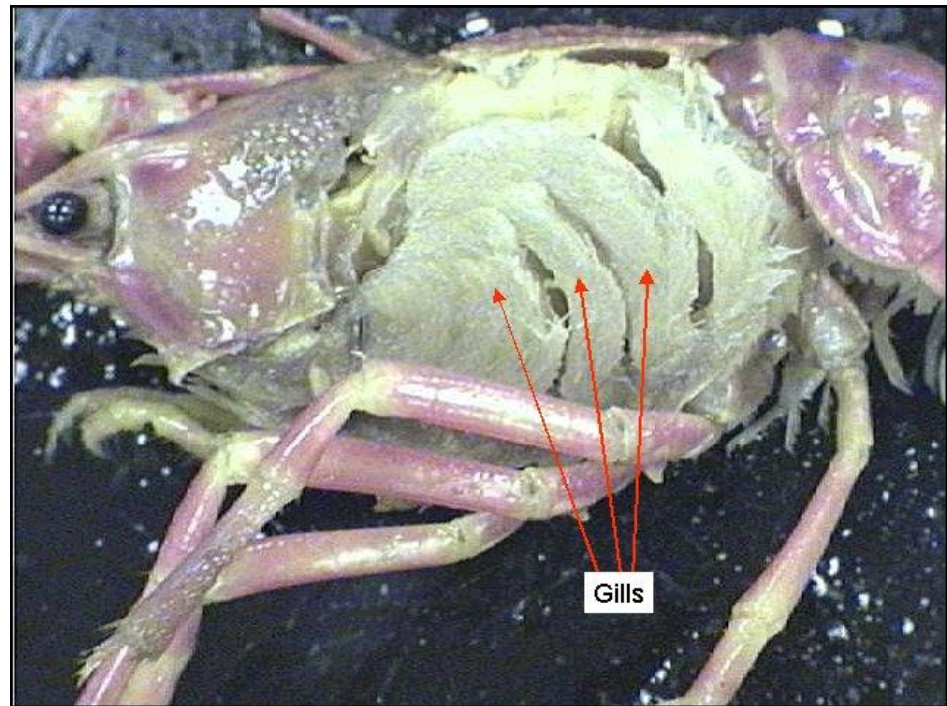
# SHRIMPS AND PRAWNS

## TECHNICAL TERMS AND PRINCIPAL MEASUREMENTS USED

### TECHNICAL TERMS



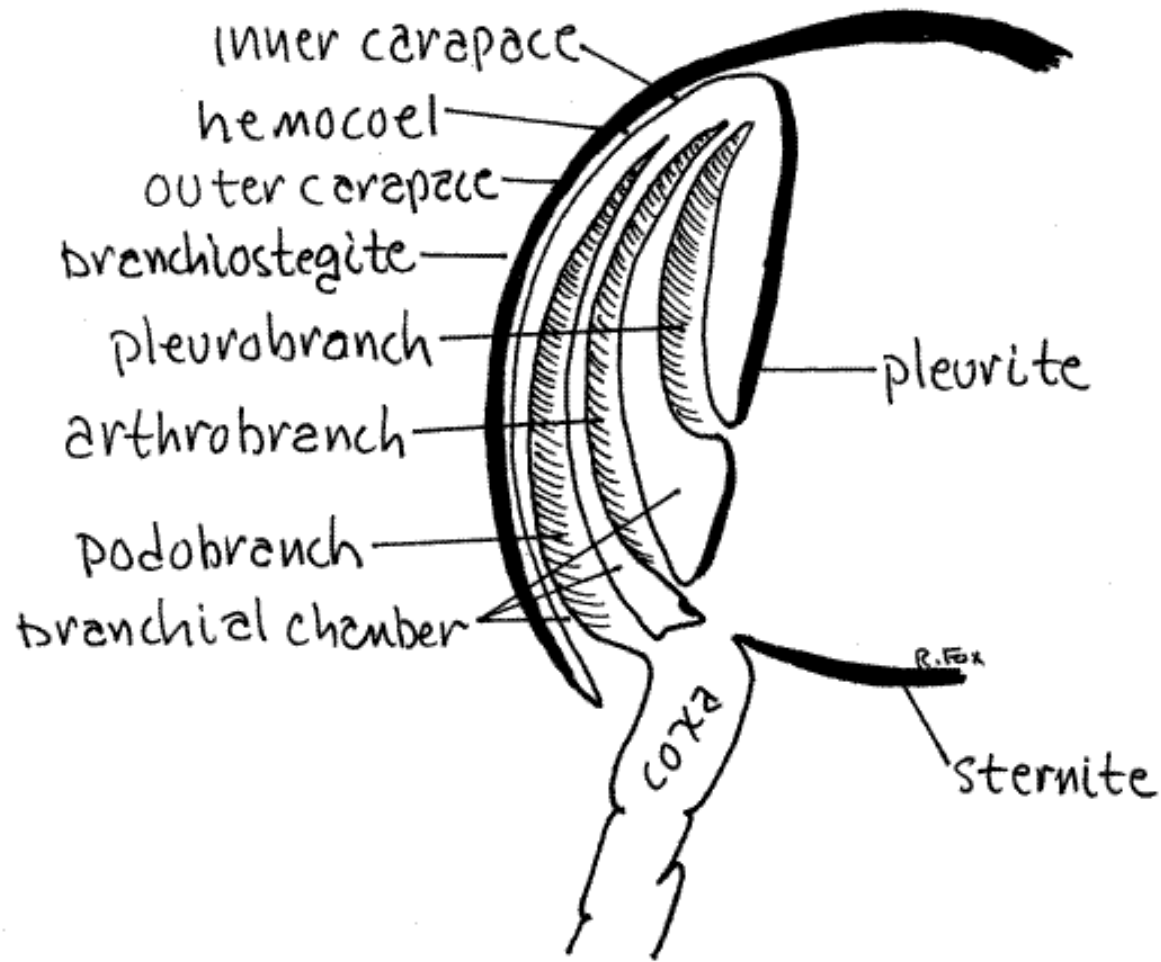
- Well developed respiratory system consists of
  - Lining of **branchiostegites or gill cover**
  - 3 pairs of **Epipodites**
  - 8 pairs of **Gills or branchiae**



## LOCATION

- ✓ Sheltered in two large and compressed chambers one on either side of the thorax.
- ✓ Each gill chamber is bounded **internally by epimeron or the** lateral wall of the thorax and externally by the curving pleural side of the carapace or the **branchiostegite**
- ✓ Gill chamber opens on the anterior, ventral and posterior sides.







**THE SOUTHERN SHRIMP.** (About one-fifth larger than natural size.)

*Penaeus setiferus*, Edwards. (p. 115.)

Drawing by A. H. Sargent, from specimens obtained on the coast of Louisiana.

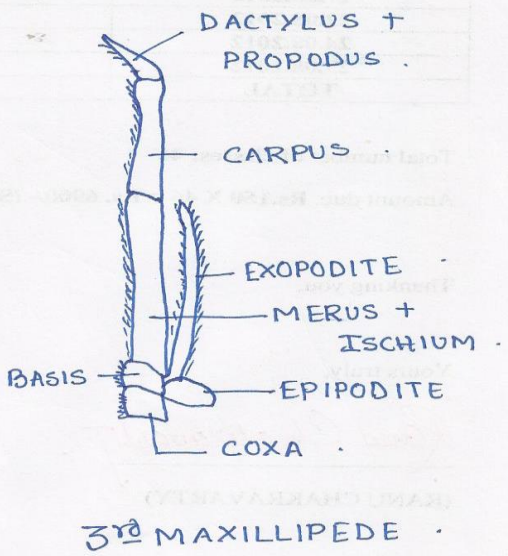
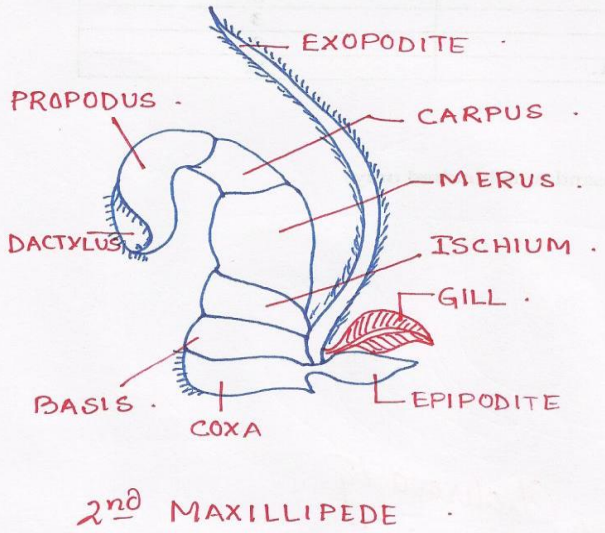
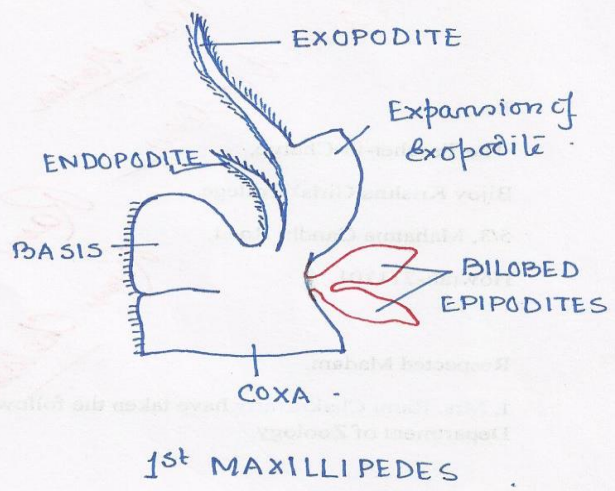
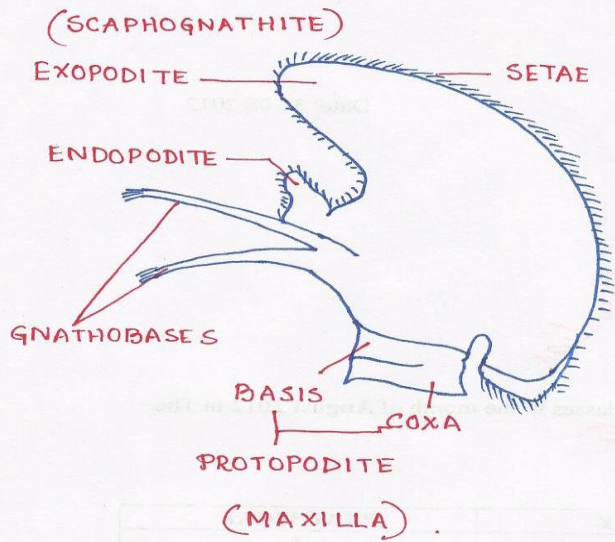
## ○ Lining of branchiostegite:

- Inner lining is thin membranous
- Highly vascular containing minute blood lacunae
- This membranous structure forms the respiratory surface for gas exchange-oxygen and carbon dioxide dissolved in water

## □ Epipodites :

- 3pairs of simple foliaceous, highly vascular outgrowths of integument
- Given out from the coxal segment of 3 pairs of maxillipedes.
- Occupy anterior part of the gill chamber beneath the scaphognathite
- In 1<sup>st</sup> maxillipede- is bilobed and large.
- In 2<sup>nd</sup> maxillipede- one small epipodite and one podobranch
- In 3<sup>rd</sup> maxillipede- epipodite smallest
- Acts as primitive gills and help in respiration





# GILLS

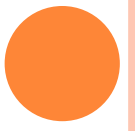
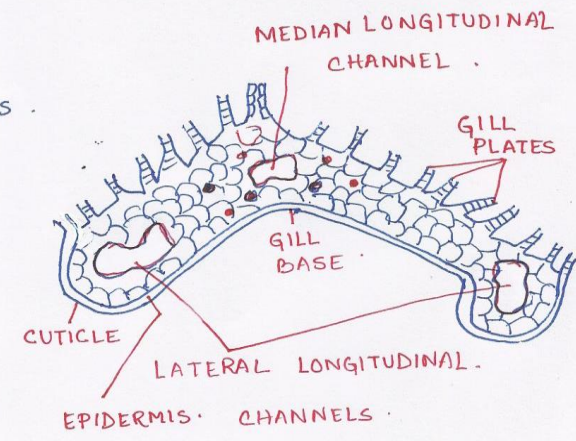
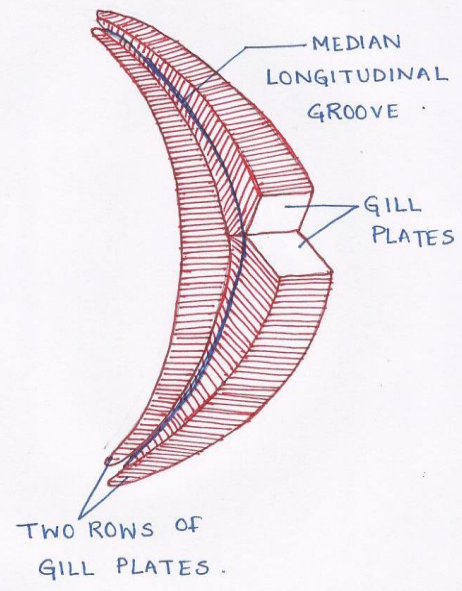
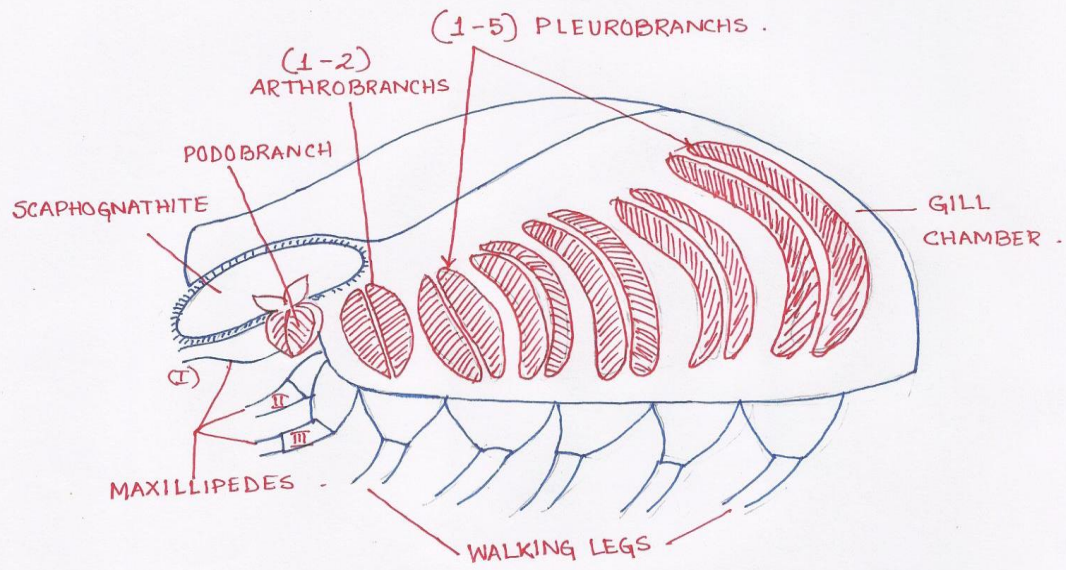
- 8 gills inside the gill chamber
- Only 7 are exposed on removing the gill cover, as the 8<sup>th</sup> gill lies on the dorsal part of the 2<sup>nd</sup> gill.
- Types: based on the place of origin
  - Podobranch or the footgill (1): attached to the coxa of the 2<sup>nd</sup> maxillipede
  - Arthrobranch or joint gill (2): attached to the arthroidal membrane joining a limb to the body. First in 3<sup>rd</sup> maxillipede and the second remains concealed beneath the first.
  - Pleurobranch or side gill (5): attached to the lateral wall (pleura) of the thoracic segment bearing the limb.



# STRUCTURE OF GILLS

- More or less crescentic in shape.
- Gradually increases in size backwards so that the gill is larger in the back than in the front.
- Each gill is attached at its middle to the wall of the thorax by a small connection – gill root (blood channels enter and leave through it).
- Each gill consists of 2 rows of rhomboidal gill plates arranged like the leaves of a book at right angles to the long narrow axis.
- Gill plates are the largest at the middle and smaller towards the end.
- A deep median longitudinal groove runs between two rows of diverging gill plates.
- Histologically:
  - ✓ made up of single layer with cuticle
  - ✓ Pigmented cells and transparent cells alternating each other.
  - ✓ Triangular gill base.

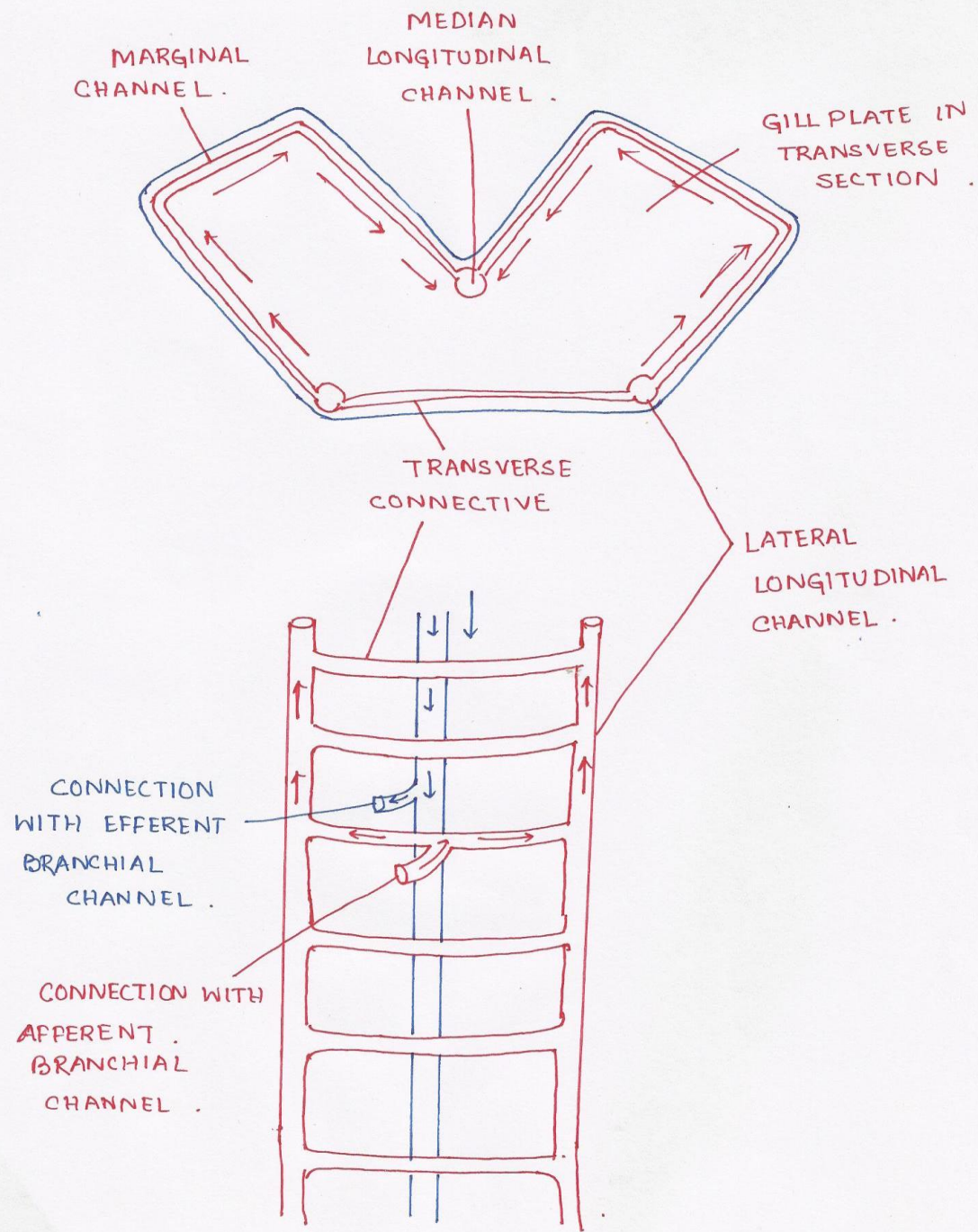




# BLOOD SUPPLY IN GILL

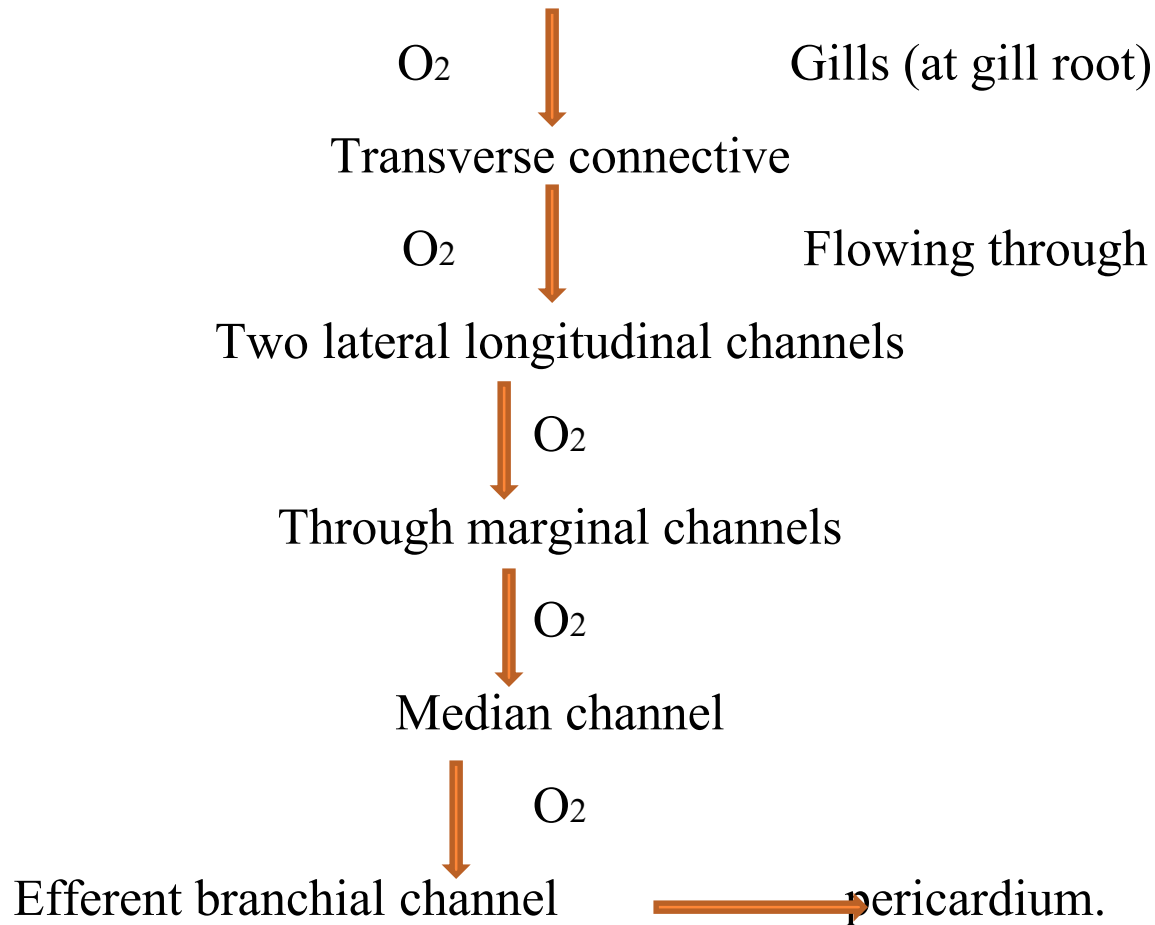
- Consists of 3 longitudinal blood channels.
  - 2 lateral longitudinal channel
  - 1 median longitudinal channel
- Runs through gill base from one end of the gill to the other.
- Lateral channels run along lateral margins one on each side.
- Median channel through apex of the gill base, beneath outer median groove of gill.
- Transverse connectives connects lateral channels.
- Marginal channels arise from each lateral channels on each side and joins the median channel





# BLOOD CIRCULATION IN GILLS

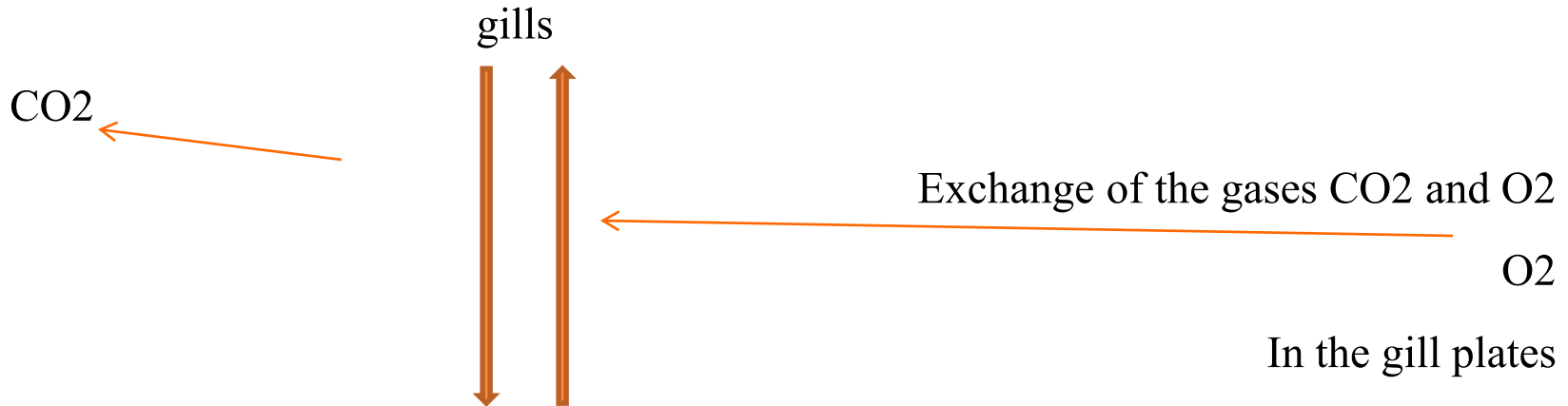
- Deoxygenated blood from body
- Afferent branchial channel



# MECHANISM OF RESPIRATION

Constant vibration of the scaphognathite present anteriorly

Bales out water from anterior open end of the gill chamber



Flows over the lining of the branchiostegite, gills epipodites (highly vascularised)

Fresh water enters inside from behind by beating of the exopodites of the maxillipedes