Navy Anchorage School And College Khulna

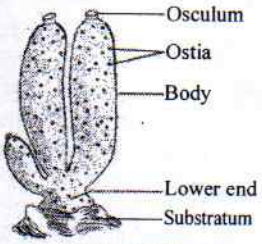
Subject: ZOOLOGY (Practical)

Class XI-XII

Practical part 3 identification (animal specimen, permanent slide, Human bone)

Identification-1 Specimen animal (*Scypha gelatinosum*) observation of porifera phylum of non-chordata

Specimen animal :
Sponge : *Scypha (Sycon) gelatinosum*
Classification
Phylum : Porifera
Class : Calcarea
Order : Heterocoela
Family : Sycettidae
Genus : *Scypha*
Species : *Scypha gelatinosum*

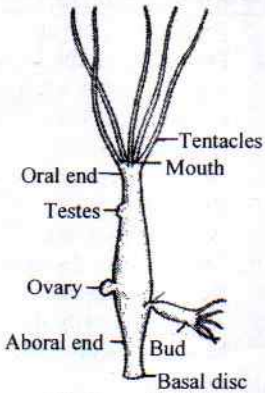


Scypha gelatinosum

Observation : The following characteristics are found after observation–
1. Narrow body like vases.
2. The middle part of the body is inflated.
3. Numerous pores called ostia are present in the body wall.
4. The free end of the body is opened in osculum covered by spicules.
5. The closed end is attached with the dependable substance through stolon.

Identification-2 Specimen animal (*Hydra vulgaris*) observation of cnidaria phylum of non-chordata

Specimen animal :
Hydra : *Hydra vulgaris*
Classification
Phylum : Cnidaria
Class : Hydrozoa
Order : Hydroida
Family : Hydridae
Genus : *Hydra*
Species : *Hydra vulgaris*

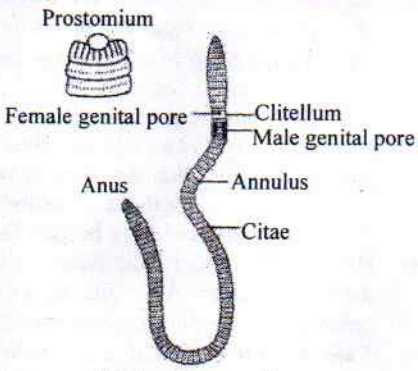


Hydra vulgaris

Observations : The specimen bears the following characteristics–
1. Tubular body and small. One end is opened and other is closed.
2. Mouth and hypostome are present at the anterior end.
3. There are 6 – 8 tentacles surrounding the hypostome.
4. Round-shaped basal disc is seen in the bottom part of the body.
5. One or more buds are present in the body.

Identification-3 Specimen animal (*Metaphire posthuma*) observation of annelida phylum of non-chordata

Specimen animal :
Earth worm : *Metaphire posthuma*
Classification
Phylum : Annelida
Class : Oligochaeta
Order : Neo-Oligochaeta
Family : Megascolecidae
Genus : *Metaphire*
Species : *Metaphire posthuma*



Metaphire posthuma

Observation : Observing the specimen we get these characteristics–
1. Tubular body and consists of same type of ringlike segmentation.
2. At the anterior end, mouth, prostomium and peristomium are present.
3. Dermata like band or clitellum is present on 14 – 16th segment.
4. Citae named seta in every segments which is like microscopic spine.
5. Dorsal blood vessels are seen along dorsal midline because of thin skin.

Identification-4 Specimen animal (*Hirudinaria granulosa*) observation of Annelida phylum of Non-chordata

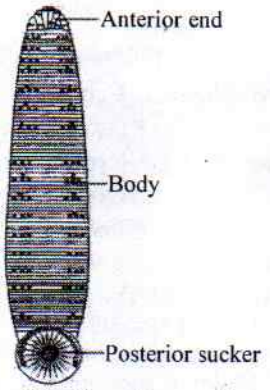
Specimen animal :
Leech : *Hirudinaria granulosa*

Classification

Phylum : Annelida
Class : Hirudinea
Order : Gnathobdellida
Family : Gnathobdellidae
Genus : *Hirudinaria*
Species : *Hirudinaria granulosa*

Observation : Following features are observed in the specimen–

1. Long muscular body and dorso-ventrally flattened.
2. Bilaterally symmetrical.
3. Some annuli are present in every segment.
4. Seta is absent.
5. 5 pairs of ocelli are present in the first 5 segment.
6. Anterior end is narrower and the posterior end is comparatively widen.
7. Sucker is present at the both end.
8. There are 3 teeth in anterior sucker.



Hirudinaria granulosa

Identification-5 Specimen animal (*Periplaneta americana*) observation of Arthropoda phylum of Non-Chordata

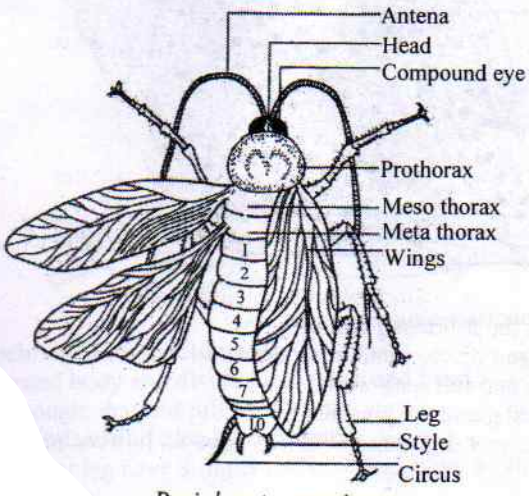
Specimen animal :
Cockroach : *Periplaneta americana*

Classification

Phylum : Arthropoda
Class : Insecta
Order : Dictyoptera
Family : Blattidae
Genus : *Periplaneta*
Species : *Periplaneta americana*

Observation : The following characteristics are found in the specimen–

1. Auburn or reddish brown body.
2. Comparatively long and may be long upto 4 c.m.
3. Triangular pronotum wide and middle part deeply coloured.
4. Wings are longer than the body of both male and female.
5. They are capable of flying.

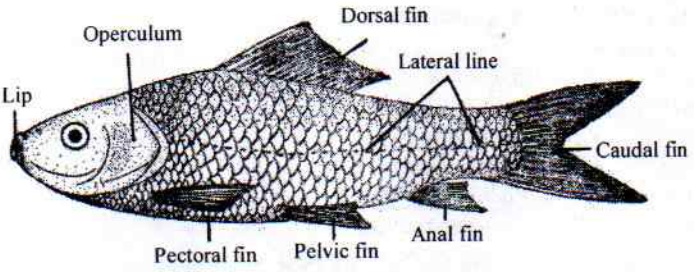


Periplaneta americana

Identification-6 Specimen animal (*Labeo rohita*) observation of vertebrata sub-phylum of phylum-chordata

Specimen animal :
Rui fish : *Labeo rohita*
Classification

Phylum	:	Chordata
Sub-Phylum	:	Vertebrata
Class	:	Osteichthyes
Order	:	Cypriniformes
Family	:	Cyprinidae
Genus	:	*Labeo*
Species	:	*Labeo rohita*



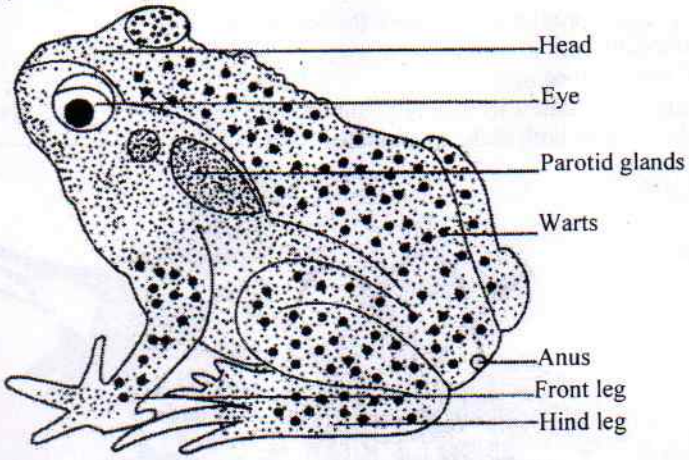
Labeo rohita

Observation : The following characteristics are found in the specimen after observation.
1. Body is spindle shaped or tapering.
2. Dorsal side is blackish or grey colour.
3. Mouth is sub-terminal, mouth is transverse pore surrounded by thick muscular lips.
4. Body is covered by thin cycloid scale.
5. Anal fin bears 4 – 6 fin rays.

Identification-7 Specimen animal (Duttaphrynus melanostictus) observation of vertebrata sub-phylum of phylum-chordata

Specimen animal :
Frog : *Duttaphrynus melanostictus*
Classification

Phylum	:	Chordata
Sub-Phylum	:	Vertebrata
Class	:	Amphibia
Order	:	Anura
Family	:	Bufonidae
Genus	:	*Duttaphrynus*
Species	:	*Duttaphrynus melanostictus*



Duttaphrynus melanostictus

Observation : The specimen bears the following features–
1. Brown or grey coloured body and divided into trunk and head.
2. Body integument is rough; dry and full with warts.
3. One pair eye, nostril and parotid gland are present.
4. Two pairs of limbs, front leg have 4 digits and hind legs have 5–digits of partially connected fingers.
5. No lips, no tooth in the jaw.
6. No tail.

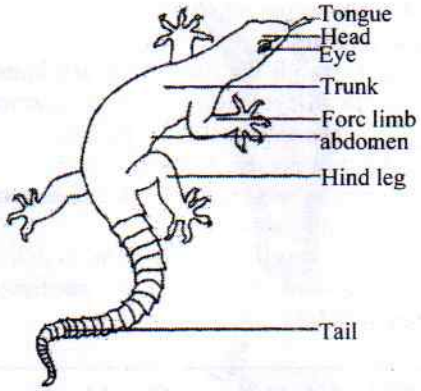
Identification-8 Specimen animal (*Hemidactylus brookii*) observation of vertebrata sub-phylum of phylum-chordata

Specimen animal :

Wall lizard : *Hemidactylus brookii*

Classification

Phylum	:	Chordata
Sub-Phylum	:	Vertebrata
Class	:	Reptilia
Order	:	Squamata
Sub Order	:	Lacertilia
Family	:	Geckonoidae
Genus	:	*Hemidactylus*
Species	:	*Hemidactylus brookii*



Hemidactylus brookii

Observation : Following features are found in the specimen–

1. Their body is divided into– head, trunk and tail.
2. Usually lives in the wall of building.
3. Triangular head.
4. Small in size, long tail but fragile.
5. Body is long, soft and two pairs of leg with 5. fingers with each.
6. Sucker or pad is present in the finger.
7. Eyelid is motionless, tongue is capable to interpolation.

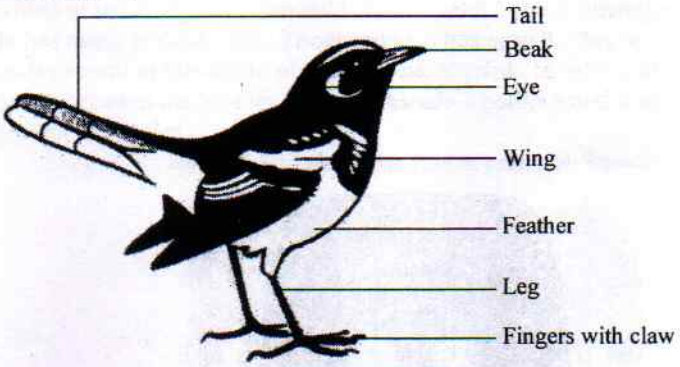
Identification-9 Specimen animal (*Copsychus saularis*) observation of vertebrata sub-phylum of phylum-chordata

Specimen animal :

Magpie Robin : *Copsychus saularis*

Classification

Phylum	:	Chordata
Sub-Phylum	:	Vertebrata
Class	:	Aves
Order	:	Passeriformes
Family	:	Turdidae
Genus	:	*Copsychus*
Species	:	*Copsychus saularis*



Copsychus saularis

Observation : The specimen bears the following characteristics—

1. Small sized bird.
2. Two legs, fore limbs are modified into wings.
3. Dorsal feathers are deep black and the ventral feathers are white.
4. Narrow beak.
5. Four fingers with claw in their legs.

Identification-10 Observation of permanent slide of longitudinal section of *Hydra*

Observation : The supplied specimen is the permanent slide of longitudinal section of *Hydra*.

Characteristics :

1. Body wall is divided into outer ectoderm and inner endoderm. An acellular layer mesogloea is present in between the two layers.
2. Coelenteron is present in the body.
3. Mouth is present on the tip of hypostome.
4. Tentacles are present in the upper part and pedal disc present in the lower part.
5. Cnidoblst cell is present in the ectoderm.

So, the supplied specimen is the permanent slide of the longitudinal section of *Hydra*.

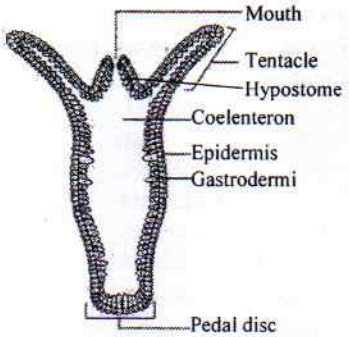


Fig : L.S of *Hydra*

Identification-11 Observation of permanent slide of transverse section of *Hydra*

Observation : The supplied slide is the permanent slide of transverse section of *Hydra*.

Characteristics :

1. The specimen is round.
2. Body wall is present around it and a hollow circular coelenteron is present in the middle.
3. Body wall has two layers. An outer layer called ectoderm and inner layer called endoderm.
4. Acellular mesogloea is present in between ectoderm and endoderm.
5. Various types of cells are seen in both layers. Such as cnidoblast cell, flagellated cell, musculo-epithelial cell etc.

So, the supplied specimen is the permanent slide of the transverse section of *Hydra*.

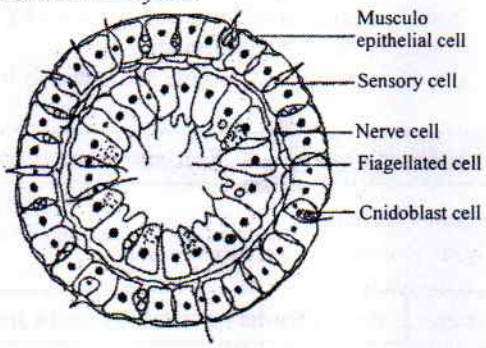


Fig : T.S. of *Hydra*.

Identification-12 Observation and identification of permanent slide of section of liver

Identifying characteristics :

1. Liver is divided in some segments named lobule.
2. Each lobule has many hepatic cells. These cells are hexagonal.
3. Central vein is present in the centre of each lobule.
4. There are space between the lobules called sinusoid.
5. Bile duct present in lobules.

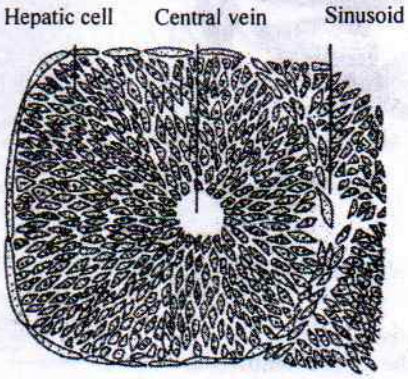


Fig. Section of liver.

Decision : On the basis of above characteristics, the specimen is the part of section of liver of vertebrates.

Identification-13 Observation and identification of permanent slide of section of pancreas

Identifying characteristics :

1. There present excretory multi-cellular acinus with central cavity.
2. There are connective tissues between the acinus.
3. Nucleus present in the lobules and lobular cavity present in the centre.
4. Islets of Langerhans are scattered between the spaces of lobules.
5. Blood vessels and pancreatic duct are present in the cells.

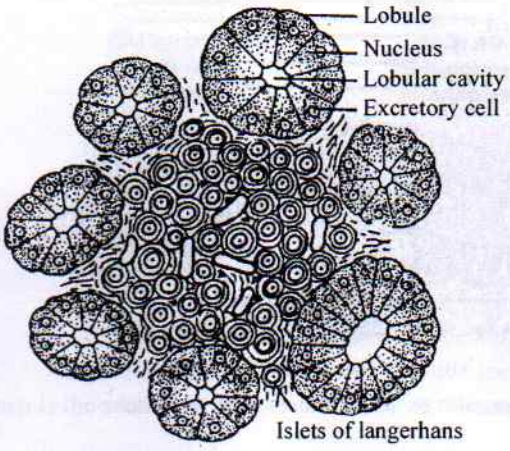


Fig. Section of Pancreas (Partial)

Decision : On the basis of the above characteristics, the specimen is the section of pancreas of vertebrates.

Identification-14 Observation and identification of permanent slide of section of stomach

1. Consists of five-layered epithelial cells. The layers are– serosa, longitudinal muscularis layer, circular muscularis layer, sub-mucosa and mucosa.
2. The layers are serially arranged.
3. Blunt and smaller rugae and gastric glands are present in mucosa layer.
4. The muscular layer consists of outer longitudinal and inner circular muscles.
5. There present wall surrounded lumen of stomach.

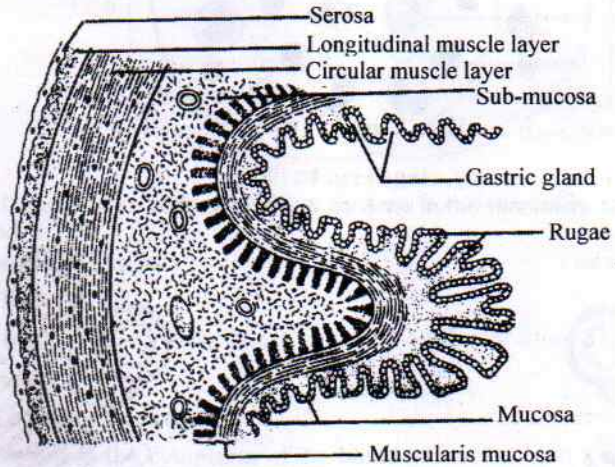


Fig. Section of stomach

Decision : On the basis of the above characteristics it is said that the specimen is the section of stomach.

Identification-15 Observation and identification of permanent slide of section of small intestine

Identifying characteristics :

1. Wall is consisted of serosa, longitudinal muscle layer, circular muscle layer, sub-mucosa, muscular is mucosa and mucosa.
2. Muscle layer consists of outer longitudinal and inner circular muscles.
3. Narrow as finger and smaller villi present in the mucosa layer.
4. Cavity of blood vessels present in the sub-mucosa.
5. Numerous goblet cells and absorbtive cells are present in mucosa layer.

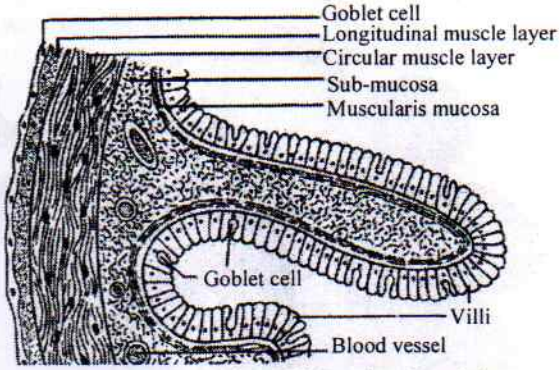


Fig : Section of small intestine (partial).

Decision : So, the specimen is the section of small intestine of vertebrates.

Identification-16 Observation of permanent slide of different blood cells

Identifying characters of human blood : Different components of bloods are seen into the slide in microscope.

1. Some corpuscles are round-shaped, non-nucleated, biconcave red blood cell.
2. Different types of irregular shaped W.B.C are present.
3. The platelets are non-nucleated and small in size.

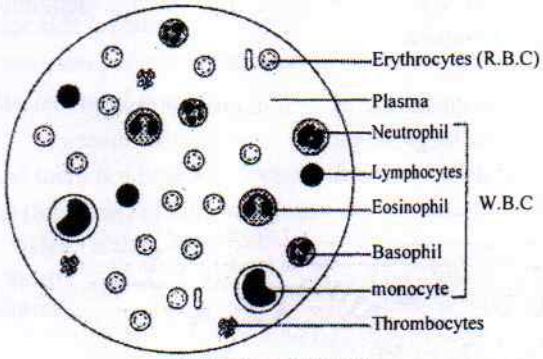


Fig : Human blood.

Decision : All the characteristics of human blood are seen in the specimen. So, it is human blood.

Observations of blood corpuscles :

Red Blood Cell or R.B.C :

1. Round shaped, biconcave and looks like disc.
2. No nucleus present.
3. Presence of red coloured haemoglobin.
4. Haemoglobin present in the cytoplasm of the blood cells.

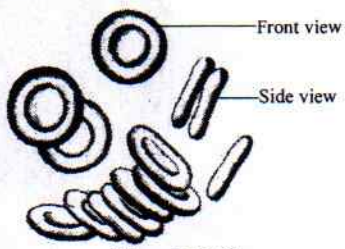


Fig : R.B.C

Identification : On the basis of the above characteristics, the observed specimen is R.B.C.

Identification-20 Observation and identification of appendicular skeleton (model) of human being

1. **Rib :** The following characteristics are found if the rib is observed —
   1. It is a long, narrow, compressed and bend bone.
   2. In the posterior side of the bone, facet bearing head, crest bearing neck and tubercle are present.
   3. Cartilage remains in the anterior part of the bone.
   4. The bone is curved.
   5. Costal groove remains in the down edge of the bone.

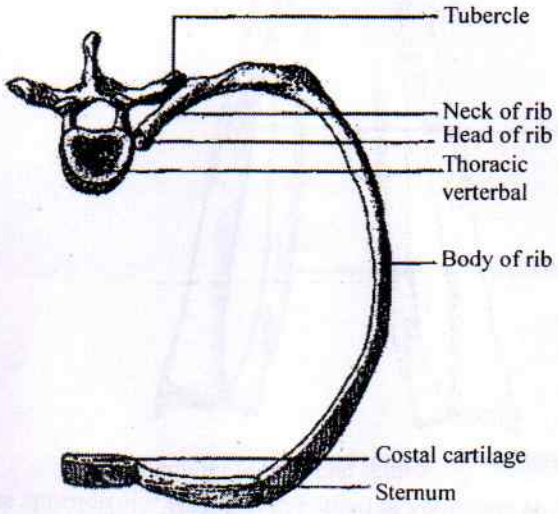


Fig : A typical rib, with thoracic vertebral and sternum

Inference : It is the bone (rib) of thoracic case of human beings.

2. **Humerus :** The following characteristics are found if humerus is observed —
   1. The bone is tubular and the anterior side is roundish.
   2. There are some tubercle of different sizes present in the bone.
   3. Deltoid ridge is present for the attachment of muscle.
   4. It is a single long bone.
   5. There is a trochlear in the bone and there is a hole seen exactly the above of it.

Inference : It is the appendicular bone (humerus) of human being.

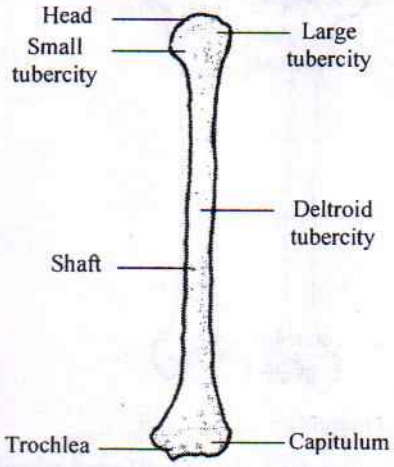


Fig : Humerus of human being.

3. **Radius-ulna :** The following characteristics are found if radius – ulna is observed —

1. It is made of the co-ordination of two bones named radius and ulna.
2. The upper side of ulna is wide and the lower side is narrow.
3. In the upper part of ulna, olecranon process like a hood of serpent remains.
4. The upper side of radius is narrow and the lower side is gradually wide.
5. The head with a groove remains in the upper edge of radius.

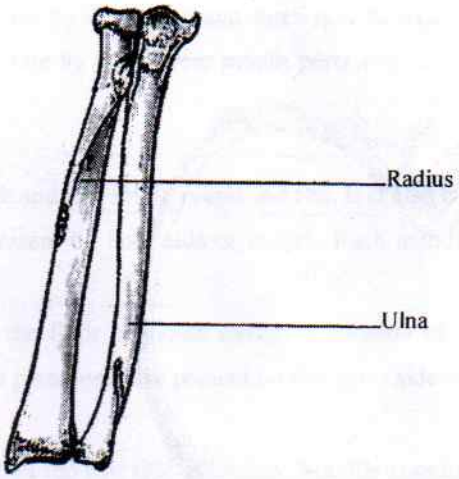


Fig : Radius and ulna of human being

Inference : It is the appendicular bone (Radius-ulna) of vertebrate animal (human being).

4. **Femur :** The following characteristics are visible if femur is observed —

1. The bone is long, single and tubular to see.
2. A spherical smooth head remains in the front edge of the bone.
3. A large bone-piece remains nearby the head in the bone.
4. In the lower part of the bone, a pair of condile and tubercle remain.
5. A hole remains between two condiles.

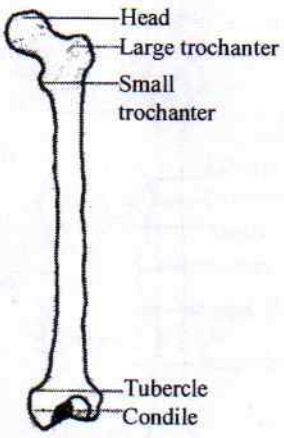


Fig : Femur of human being

Inference : It is the appendicular bone (femur) of vertebrate animal (human being)

Experiment-3 Observation of mouthparts of cockroach

Materials : Lab apron, gloves, eyeglasses, dissecting tray, dissecting kit with forcep and scalpel, T-pins, magnifying glass, preserved cockroach, paper and pencil.

Procedure of dissection : The collected cockroach is taken in a glass container. Then a piece of cotton with chloroform is placed inside it and closed the open end. After a few moment, the cockroach will be inactive. The inert cockroach is then taken in the hand and grip by the thumb and forefinger in such a way so that it remains on the back and the mouth parts can be plucked one by one. These mouth parts will then be placed and arranged on the slide with glycerine.

Observation :

1. **Labrum :** It is situated over the mouth and it is small, round and flat. It is also called the upper lip.
2. **Mandible :** A pair of mandible is present on both side of mouth. Each mandible is stout, triangle and bears sharp teeth in its inner edge.
3. **Labium :** It is large and present on the floor of mouth cavity. It consists of 3 parts such as — prementum, mentum and sub-mentum. Glossa and paraglossa are present on the inner side of prementum. Three segmented labial palp is present around them.
4. **Maxilla :** A pair of maxilla is present on the two side of labium. Maxilla consists of five segments as — cardo, stipes, lacinia, galea and maxillary palp.

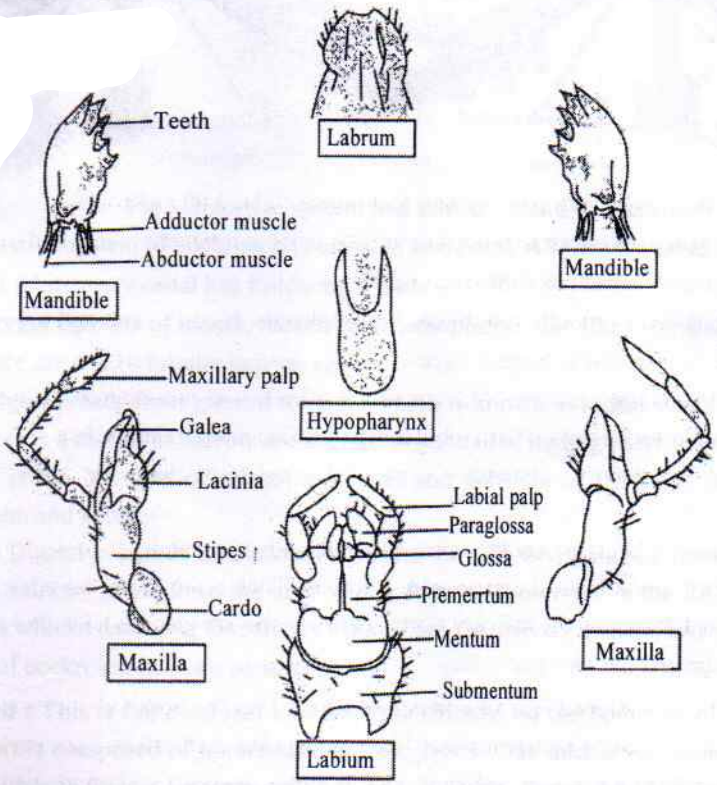


Fig : Mouth parts of cockroach.

5. **Hypopharynx :** It is an elongated, fleshy part situated into the mouth cavity. Ducts of salivary gland opens into it.

Experiment-4 Observation of digestive system of cockroach

Materials : Lab apron, gloves, eyeglasses, dissecting tray, forcep and scalpel, T-pins, magnifying glass, preserved cockroach, paper and pencil.

Procedure of dissection : Take a chloroformed cockroach and cut off the wing and antennae. Then cut off the pleura on both sides with a scissor and fix it with tray in such a way that the dorsal side placed to the outer side and ventral side placed to the inner side. After that, pour water into tray and carefully remove the tergal plates with a forcep. Remove carefully fat bodies by means of a brush and cut away most of the muscles. Thus expose the alimentary canal, salivary glands and other digestive glands. Now, the alimentary canal is taken away to the side and fix with a pin so that the other parts can be exposed. The work should be done very carefully without damaging the internal organs.

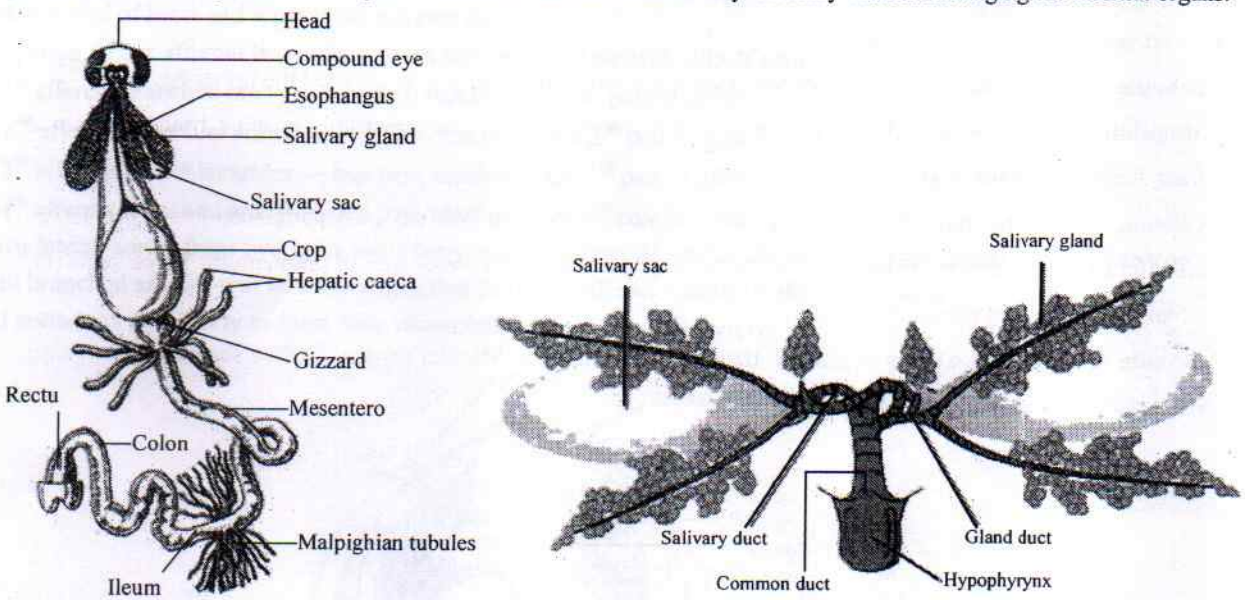


Fig : Digestive system and salivary gland of cockroach

Observation : Digestive system of cockroach consists of two parts. Alimentary canal and digestive glands.

Alimentary canal : Alimentary canal has following 3 parts —

1. **Foregut :** Foregut consists of mouth, mouth cavity, esophagus, sac like crop and a triangle gizzard. At the end of gizzard, there are 6 – 10 tubular hepatic caeca.
2. **Midgut :** Midgut spreads from gizzard to ileum which is known as mesenteron. At the junction of mesenteron and ileum, there is a cluster of narrow and tubular organ called malpighian tubule.
3. **Hindgut :** It is the last part of alimentary canal and consists of ileum or small intestine, colon or large intestine, rectum and anus.

Digestive glands : Digestive glands of cockroach means the salivary glands. It looks like a transparent leaf. For observation, detach salivary gland from the crop with a forcep. Then remove the fat bodies and other organs from behind the esophagus without damaging the salivary gland. Then the salivary gland is taken to a slide drown into water. The salivary gland of cockroach has two parts as —

(i) **Salivary gland :** This is flattened leaf like structure situated on the both side of esophagus. It consists of two parts. Each part is composed of numerous leaf like glands. One duct arises from each part, left duct and right duct unite together to form a common salivary duct. It moves forward and unites with the duct of salivary sac and forms a general gland duct which opens into hypopharynx.

(ii) **Salivary sac :** It is sac like structure which is attached to salivary gland. It contains saliva.

Experiment-5 Dissecting, identifying and drawing the circulatory system of Rohu fish

Materials : Lab apron, dissecting pins, gloves, forceps, scissors, scalpel, water, preserved rohu fish, hand lens, dissection tray.

Purpose : To observe afferent and efferent branchial system of circulatory system of rohu fish.

Procedure of dissection : Take a dead rohu fish with left hand and place the fish on the dissecting tray in such way that the ventral side is placed to above. Insert the tip of the scissors in the anus and cut towards the head, cut only through the skin carefully, not cut any internal organ. Be careful so that the scissor does not insert deeply. Then carefully remove the mesentary and muscle from the both sides of the body. This process should be done carefully, not to cut into the blood vessel. After opening the thorax, heart can be easily seen. Ventral aortal system starts from the anterior end of heart and it proceeds towards the front.

Observation : Four afferent branchial arteries will be found on each side of ventral aorta.

(i) 1st afferent branchial artery— one pair, reaches to the 1st pair of gills.

(ii) 2nd afferent branchial artery — one pair, reaches to the 2nd pair of gills.

(iii) 3rd afferent branchial artery — one pair, reaches to the 3rd pair of gills.

(iv) 4th afferent branchial artery — one pair, reaches to the 4th pair of gills.

The two lateral aortas from two sides have been united to form the dorsal aorta. Behind the dorsal aorta, 4 pairs of efferent branchial arteries will be seen originating from the gill and reached to the lateral aorta.

Dorsal aorta runs posteriorly to form iliac, masenteric, renal and caudal artery.

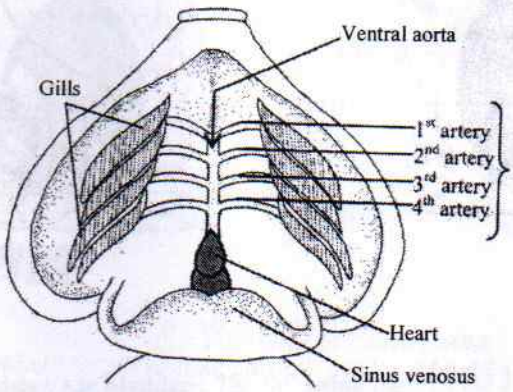


Fig : (i) Afferent branchial arterial system of *Labeo*

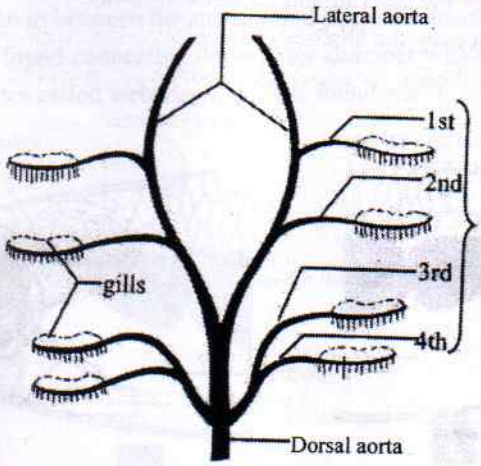


Fig : (ii) Efferent branchial arterial system of *Labeo*

Experiment-6 Dissecting the respiratory system of *Labeo rohita* and identifying the gills and air biadder

Materials : Lab apron, dissecting tray, dissecting pins, forceps, scissors, scalpel, water, preserved fish, hand lens.
Procedure : Place the supplied fish on the dissecting tray. Then with the help of scalpel lift the operculum and look at the gill. After observation of gill, the ventral muscles from anus to pharynx will be taken off. Cut away the flap of skin and locate the swim bladder.

Observation of gill : After removing the operculum of one side, the gills will be visible. There are four gills in the gill chambers on either side of the pharynx. After observation, the following organs will be found associated with respiration :

(i) Gill chamber
(ii) Gills
(iii) Gill rackers
(iv) Gill arch
(v) Gill fillament or lamellae
(vi) Afferent branchial artery
(vii) Efferent branchial artery

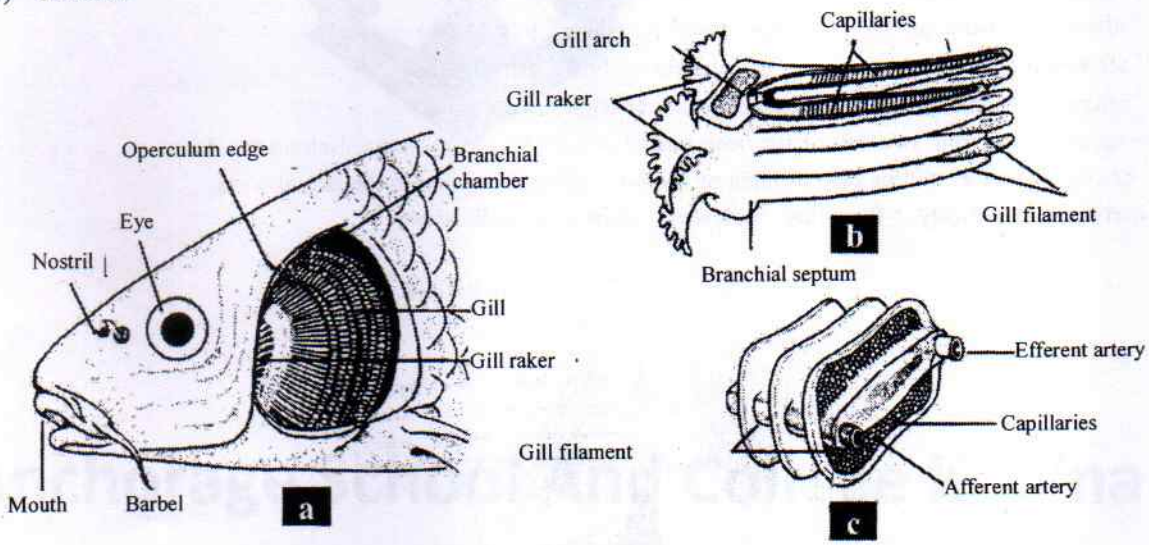


Fig : Gills of *Labeo rohita*

Observation of swim bladder/Air bladder : The following parts of the air bladder will be seen :

(i) It is silvery coloured air filled sac with two chamber.
(ii) There is a constriction in between the anterior and posterior chamber.
(iii) A pneumatic duct is found connecting the anterior chamber with the esophagus.
(iv) A series of small bones called weberian ossicle is found which connects the air bladder with inner ear.

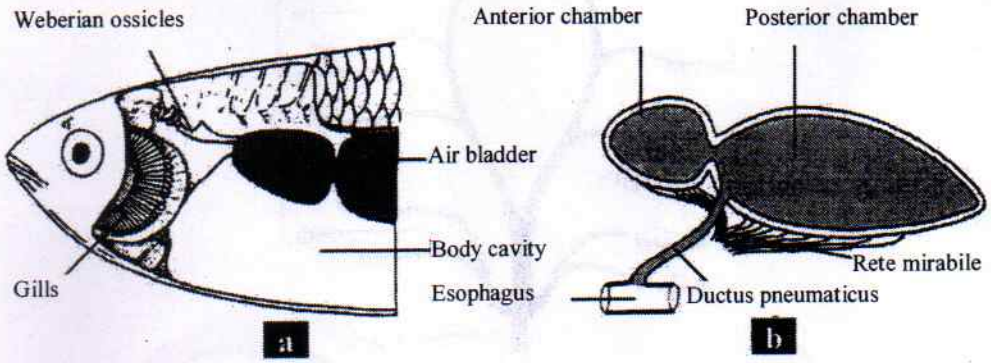


Fig : Air bladder of *Labeo rohita.*