

# EXOSKELETON IN FISH

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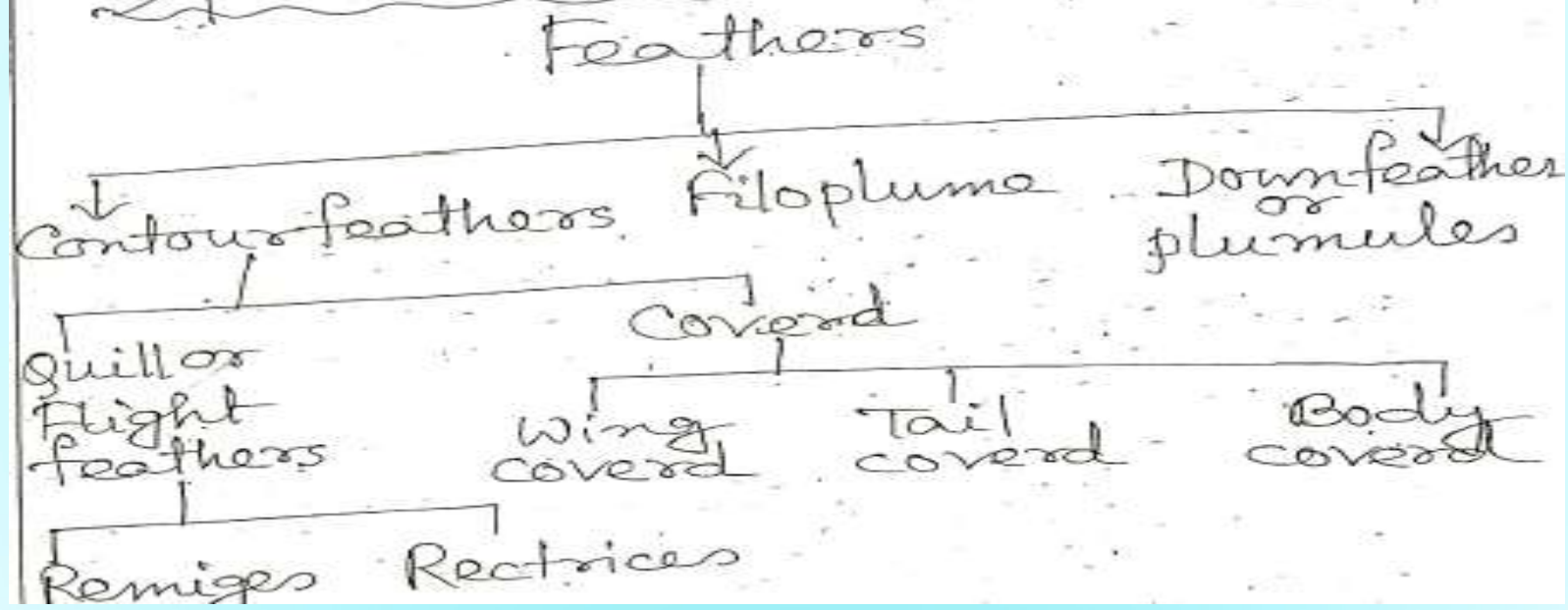


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# Exoskeleton Structure in Bird

Exoskeleton of Birds is purely epidermal and represented by feathers, scales, claws, beaks, spurs and webs etc. But among these structure feathers are most important one. The exoskeleton structure of birds perform various defensive and offensive functions.

## Types of Feathers



## Structure of Contour feathers (Structure of a typical feather)

a) A typical contour feather or flight feather consist of a supporting central axis or main stem and an expanded distal portion, the vane.

b) The axis is divided in a proximal lower portion the Calamus or quill and the distal upper portion, the rachis or the shaft.

## Types of contour feathers

### ① Flight feathers or quills →

The typical flight feathers have a comparatively strong shaft. They are also characterized by the presence of barbs with an interlocking arrangement. These feathers constitute the major locomotor surfaces. These are the large feathers of wing and tail.

#### a) Remiges or wing quill →

The flight feathers of the wing call remiges. Their inner or posterior half of the vane is slightly broader than the outer or anterior half. In pigeons, 23 remiges are attached to the hinder border of each wing.

Remiges are of two wings - the primary quills which are attached to the manus (hand). In pigeon they are 11 in number. The secondary quills are attached to the alar. They are 12 in number.

## 2) Coverlets →

These are medium sized feathers covering the whole body. They close the interstices between quills of flight feathers thus presenting a continuous area to oppose the buoyancy of air.

a) Wing coverlet → These are covering the wings. They are of upper wing coverlets and lower wing coverlets.

b) Tail coverlet → The upper and lower tail coverlet covers the upper and lower part of the tail.

c) Body coverlet → Except wings and tail these feathers covered other part of the body.

## Development of Feather

Feather develops during embryonic period from feather follicle. Feather follicles are invaginations of the epidermis that dip into the underlying dermis. The root of the follicle in association with the dermal pulp cavity begins to form the feather. The feather itself grows outward in a sheathed case. Within the sheath, the central axis is divided into a distal rachis and a proximal calamus.

## Function of Feathers →

a) Protection → They protect the underlying tender skin from wear or any mechanical and physiological injury.

## Claws and Beaks

### A hard keratin layer

Covers the upper and lower jaws of birds. These covered jaws are called beaks. The beak is pointed having no teeth which remain covered with a horny sheath called Rhamphotheca.

Claws are situated at the open end of the digits of the foot.

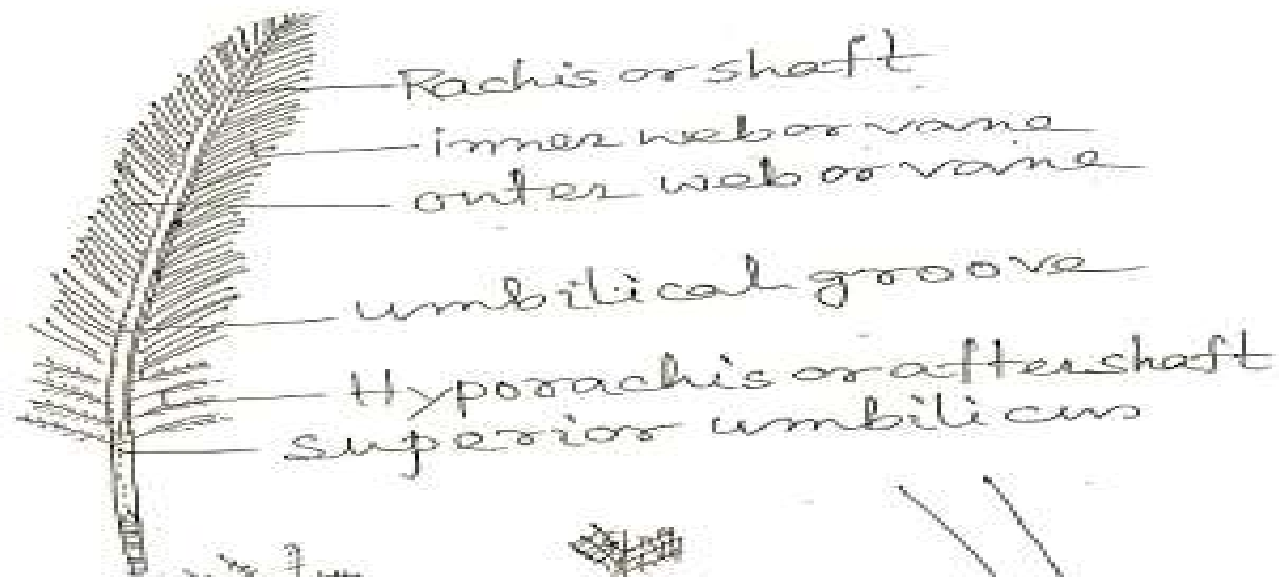
These are composed of hard keratin and are modified scales. A claw has a dorsal plate called unguis and ventral plate called sub-unguis. It is used for grasping food and in perching mechanism.

Spurs → Spurs are not found in pigeons. A spur is a bony projection of tarsometatarsus in the male of certain species of birds. It may be sharp and pointed and remains covered by a horny, scale-like epidermal sheath. The spurs are best developed in the gallinaceous birds and used for fighting. Spurs may also occur on the wings in certain birds.

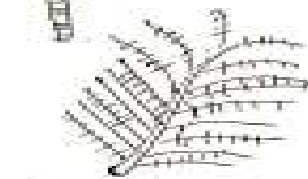
Webs → Webs are modified folds of integument on the feet of aquatic birds, such as geese, swans and ducks. The skin form webs is usually characteristically scaled.



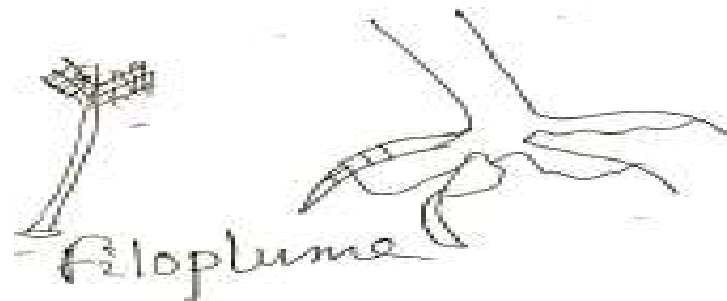
Scales → The scales are confined to the feet or legs. They are not dermal scales, like those of fishes but are epidermal scales of the reptilian type. They are generally and are formed in the same manner as those of snakes and lizards.



Contour feather



Down feather



Filoplume