



Aves

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Characteristics of Class Aves

- aves are commonly known as birds.
- Body – **boat / spindle shaped**, with head, neck, trunk and tail.
 - neck disproportionately long
 - for balancing and food gathering.

They are warmblooded

- Endothermic metabolism







- ❖ **Generate heat to warm body internally**
- ❖ **Need large quantities of food**
- ❖ **Can't go long periods of time w/o eating**
- ❖ **Feathers and a layer of fat help to regulate their body temperature**



➤ Limbs paired

forelimbs- modified for flying.

hindlimbs - with four toes- variously adapted.

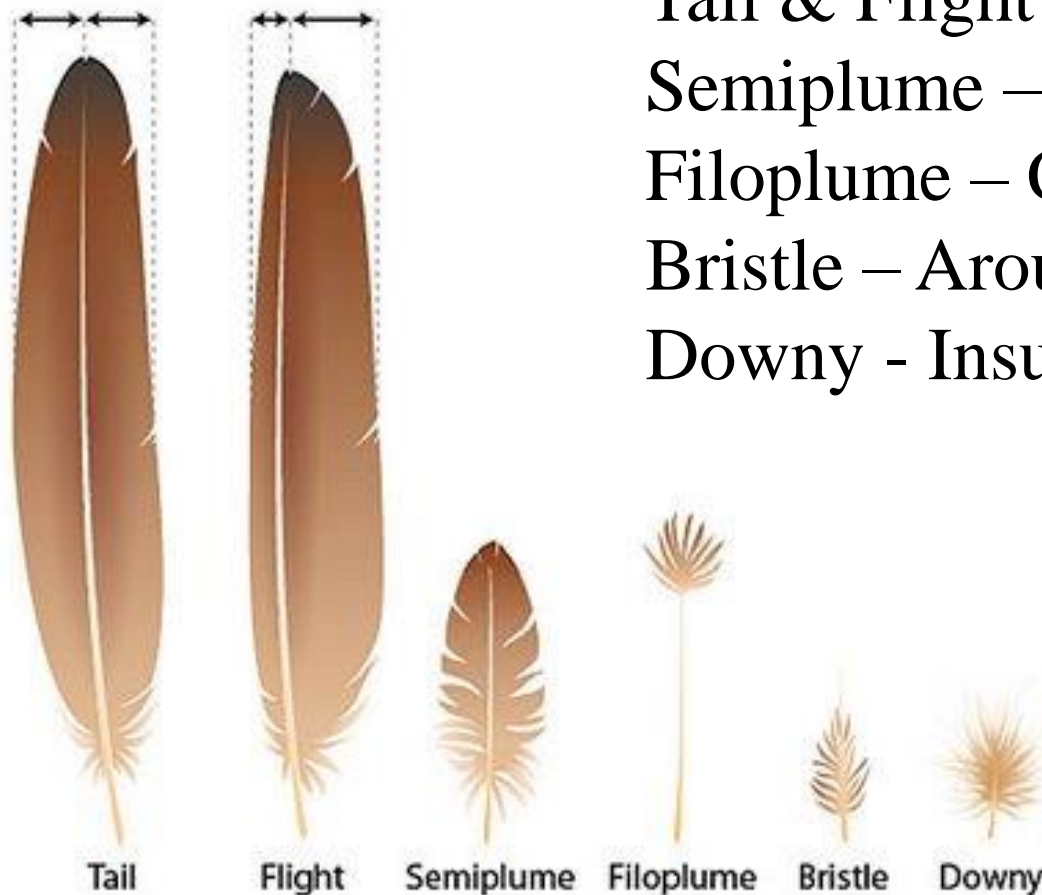
Shape of Bird Foot	Type of Bird Foot	Adaptation and Lifestyle
	Climbing	Feet like these help birds, like woodpeckers, climb trees. Notice the sharp nails for digging into the wood, and the back toes so that the bird doesn't topple backward.
	Swimming	Webbed feet help birds, like ducks, paddle through the water more efficiently.
	Running	For running quickly, birds like emus, often have three toes, all of which face forward.
	Perching	Feet with four toes, one of which is in the back, are useful for perching on tree branches. Birds, like blue jays, wrap their toes around the branch to help balance.
	Grasping	Predatory birds, like hawks, have clawlike feet called <i>talons</i> for grabbing their prey.
	Scratching	Chickens, and other birds that scratch in the dirt for insects, usually have feet with four toes, all of which have strong nails for digging into the ground.

➤ Integument (epidermis and dermis) - Thin

loosely attached to the body

➤ Epidermal covering- exoskeleton of feathers; leg- scales.

Tail & Flight – Support during flight
Semplume – Provides shape & color
Filoplume – Connected to nerve endings
Bristle – Around the eyes & mouth
Downy - Insulation



Molting:

- **Shedding of feathers**

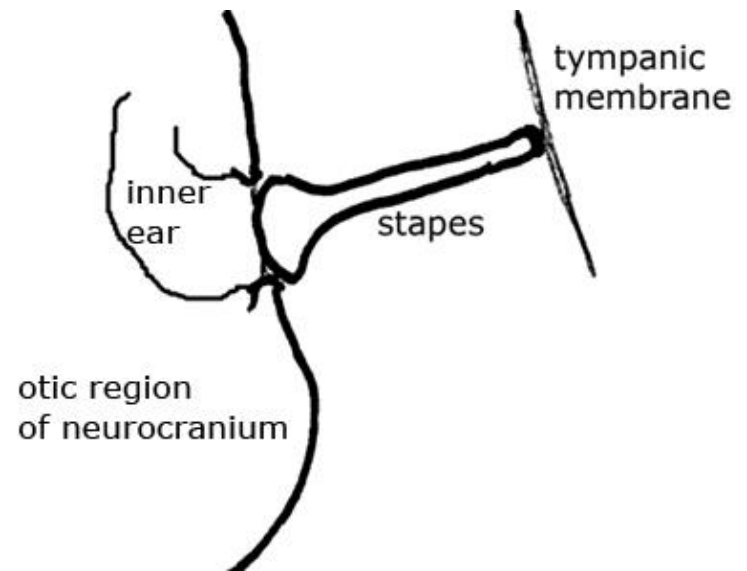


➤ Oil or preen gland (**uropygial gland**) - at base of tail.

➤ No sweat glands.



➤ Pinna or ear - rudimentary.
Single bone in middle ear.



- Skull bones - fused with one occipital condyle.
- Beak - jaw covered with keratin sheath; No teeth

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**Types
of bird
bills**



Fully ossified skeleton with air cavities.

❖ **Bones are thin and lightweight**

❖ **hollow with honeycombed air filled spaces.**



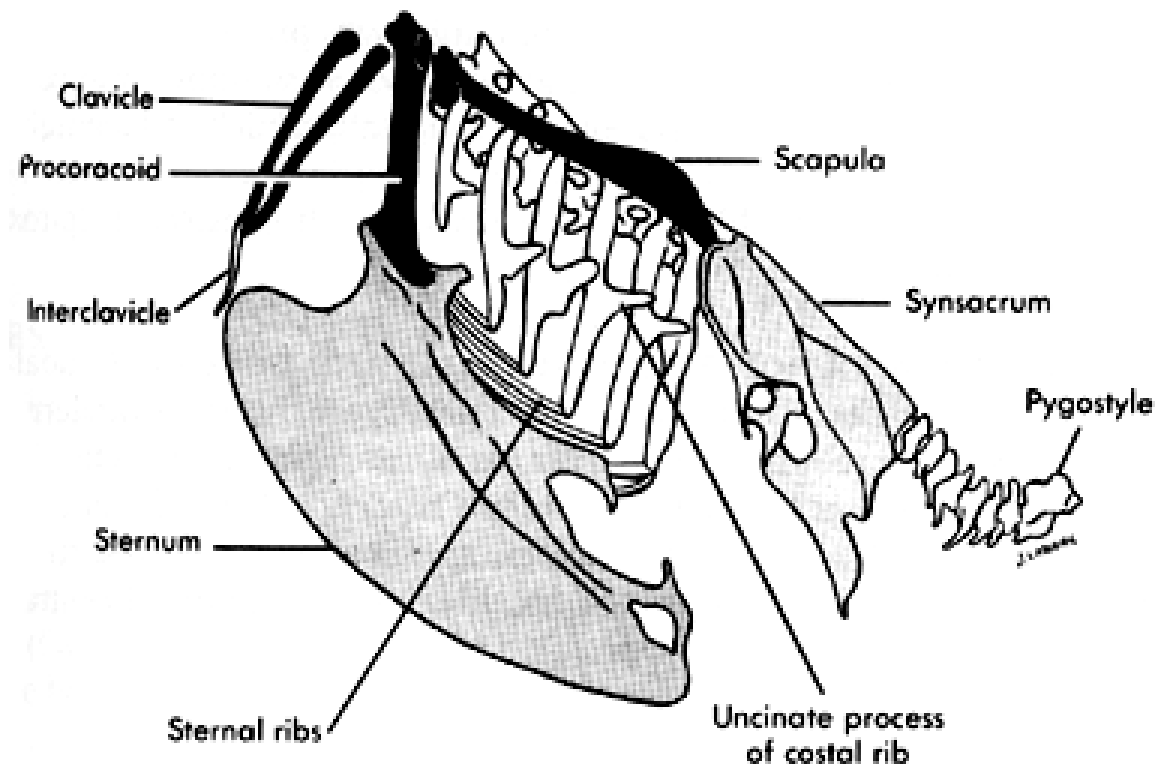
A pelican is approximately 5 feet long and weighs nearly 20 pounds

-However, their bones only weigh 23 ounces

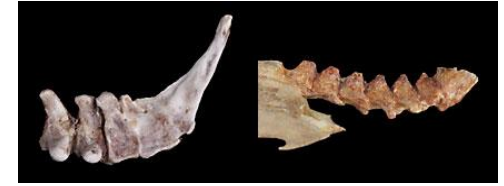


➤ ribs with strengthening- **uncinate** processes.

➤ Pelvic girdle
- **synsacrum**.



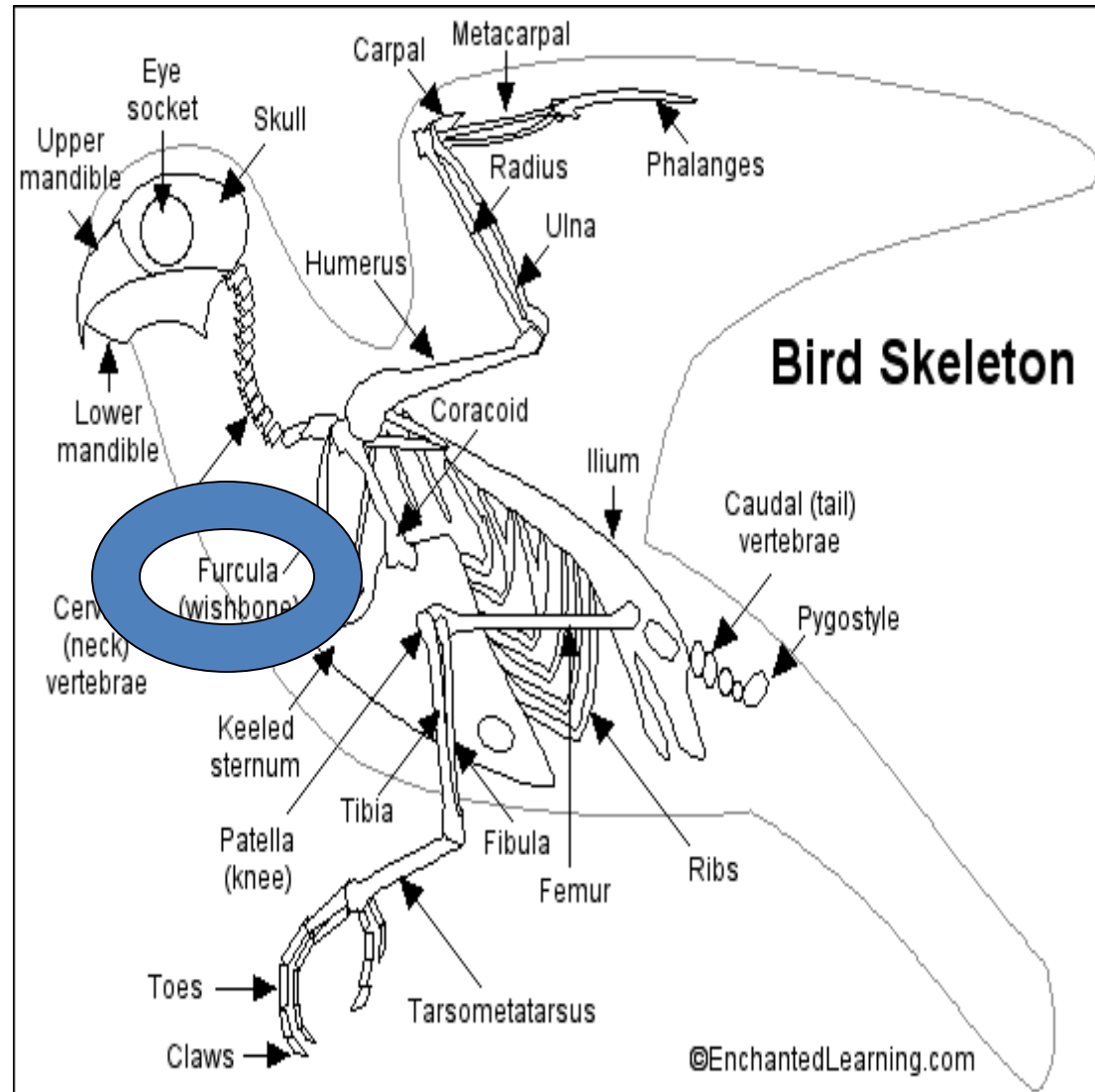
❖ Posterior caudal vertebrae reduced and fused as the pygostyle.



❖ Many bones are fused for greater support

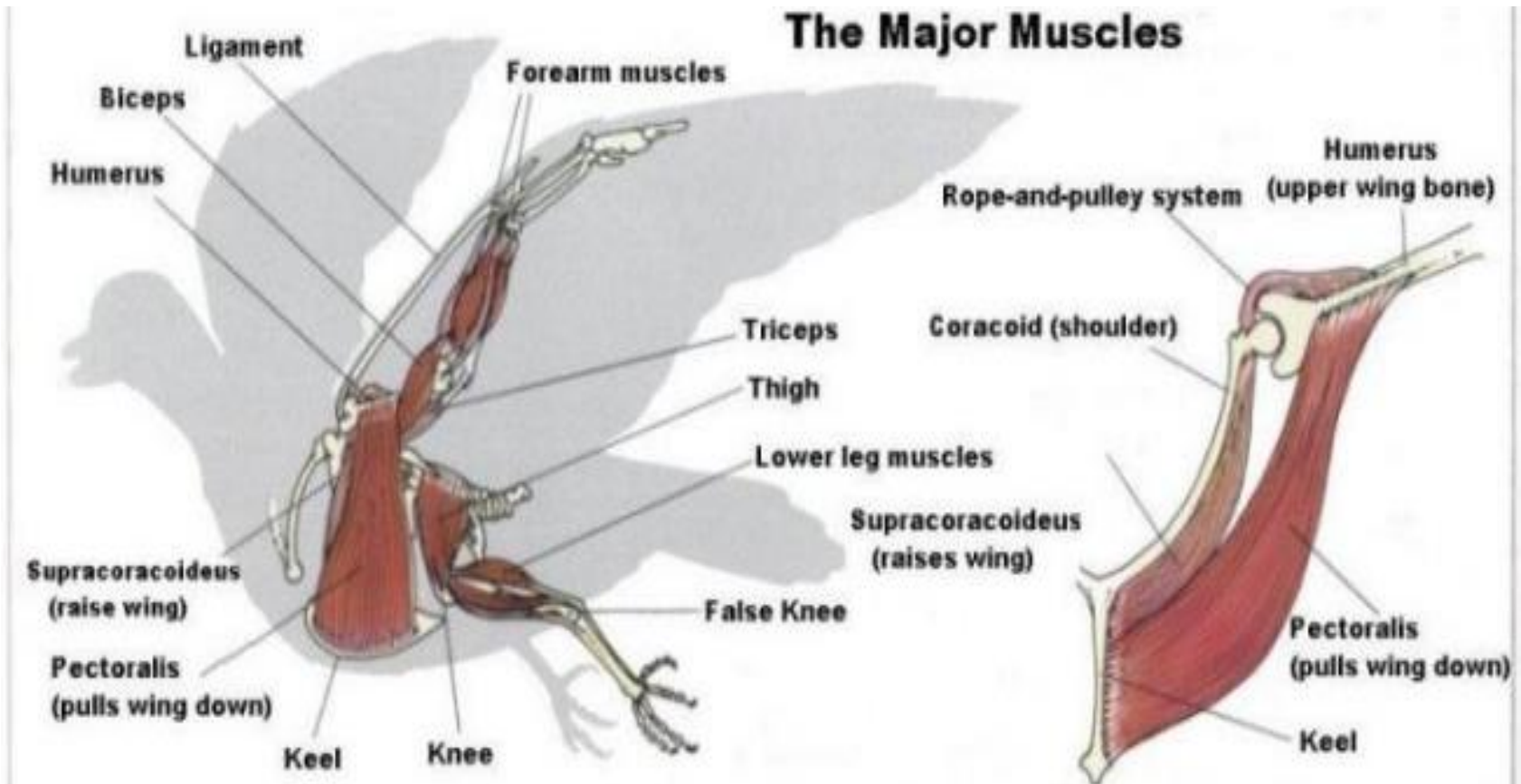
❖ Example:

❖ Breast bones are fused to form the KEEL. The keel is the anchor for the powerful flight muscles.



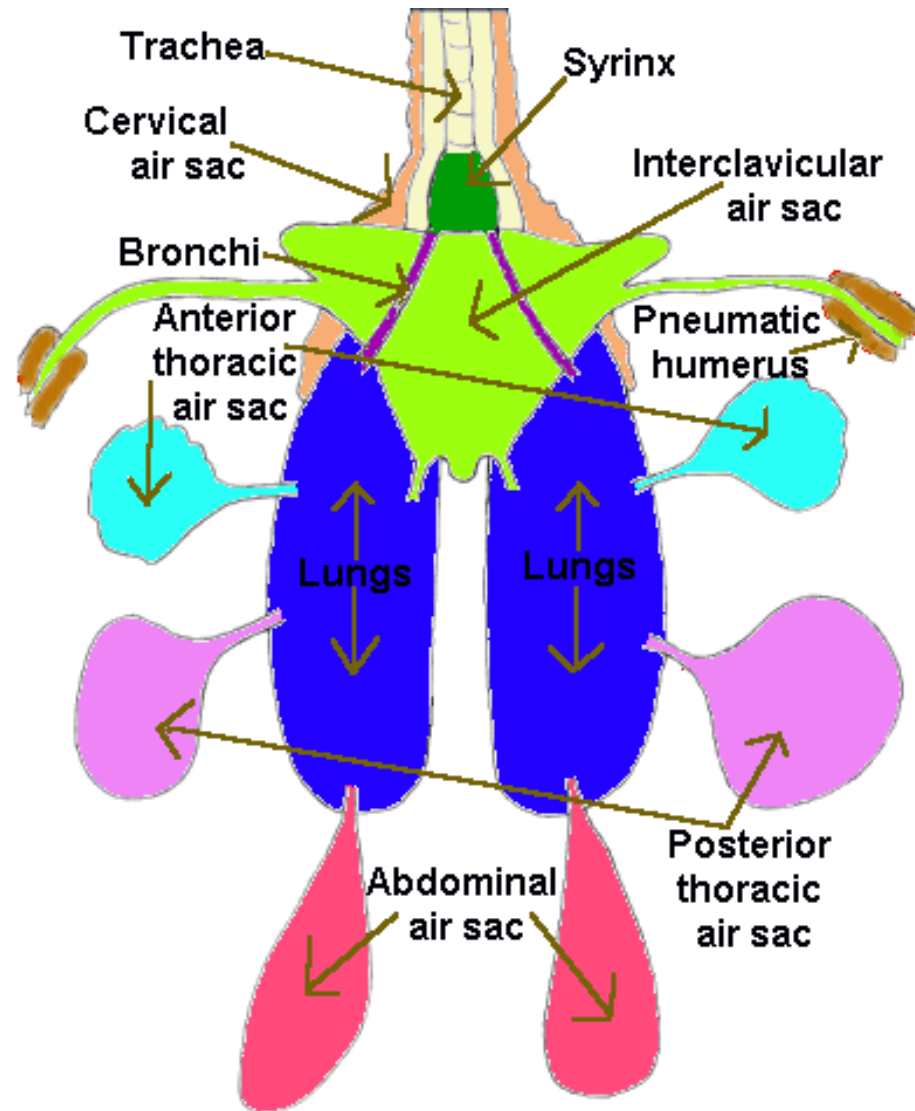
Muscular System:

- ❖ Large muscles for strength
- ❖ Largest muscle - breast or pectoralis muscles.
- ❖ Skin muscles attached to each feather follicle- allowing feathers to alter position during flight.



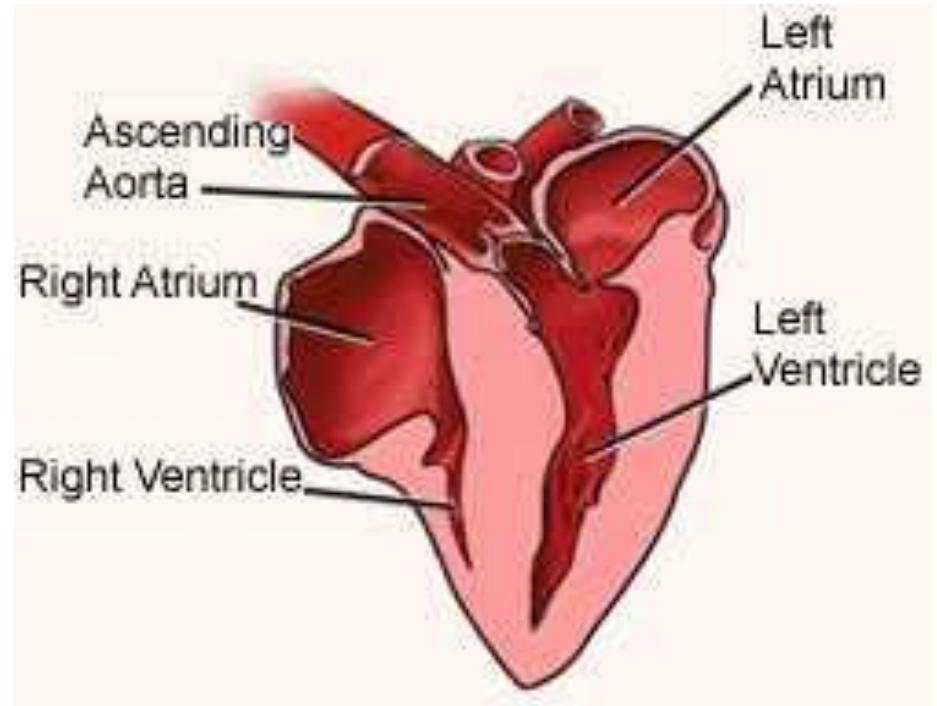
Respiration

Respiration by slightly expansible lungs, with thin air sacs among the visceral organs and skeleton;



Circulation

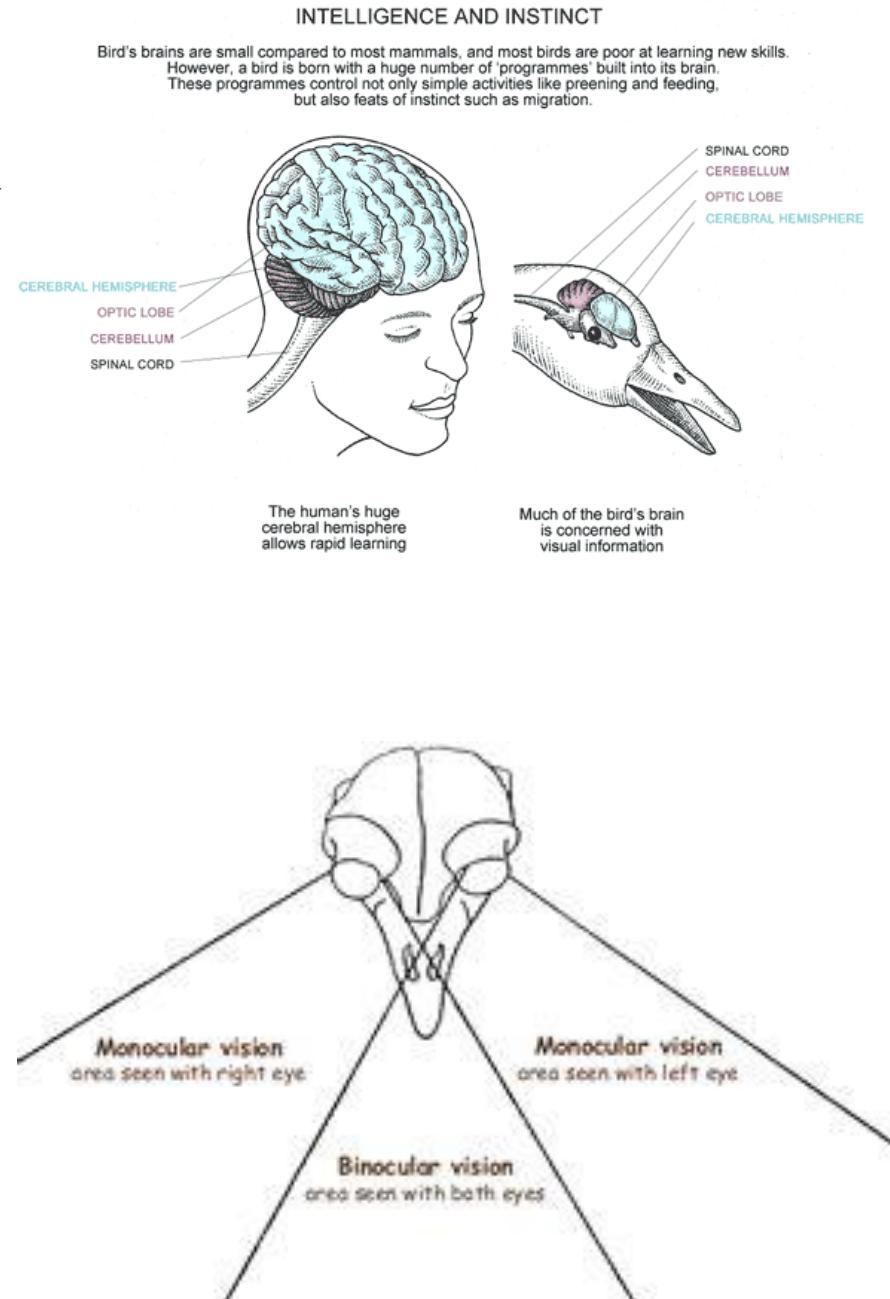
Circulatory system consists of four-chambered heart with two atria and two ventricles.



Nervous System

- 12 pairs of cranial nerves and brain with large cerebellum and optic lobes.
- Large brains : Body size
- Keen vision
 - Most can detect color
 - Eyes located on sides of head
 - Broader field of vision
 - Eyes located on front of head
 - Depth of field

Up to 8 times keener than human vision
Each eye moves independently



Digestive System

- Crop

 - Storage “eat and run”

- Stomach

 - First chamber uses acid to breakdown materials

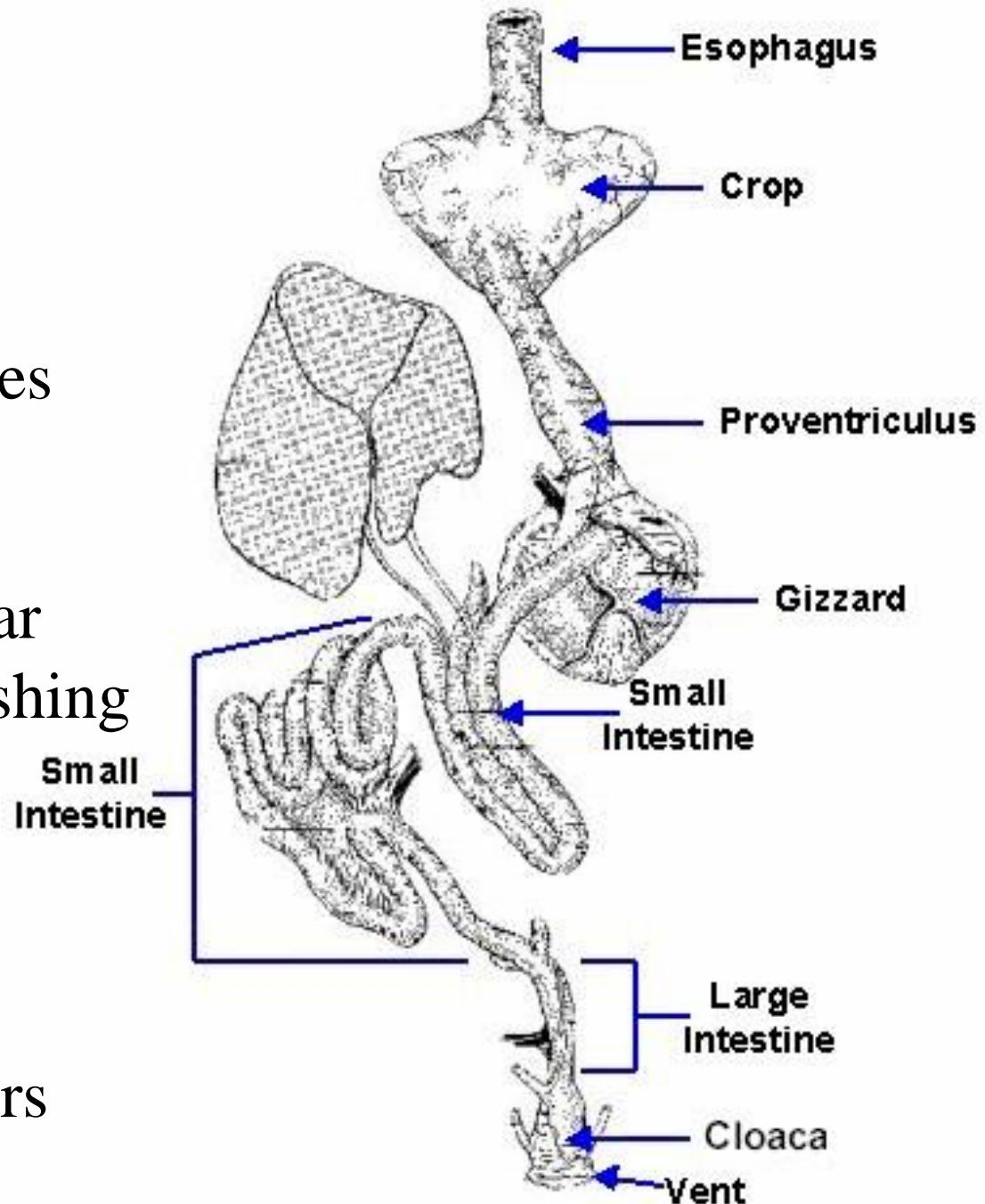
 - Gizzard, muscular tissue used for crushing food

- Small intestine

 - Absorbs nutrients

- Cloaca

 - Collecting chambers



Excretory System

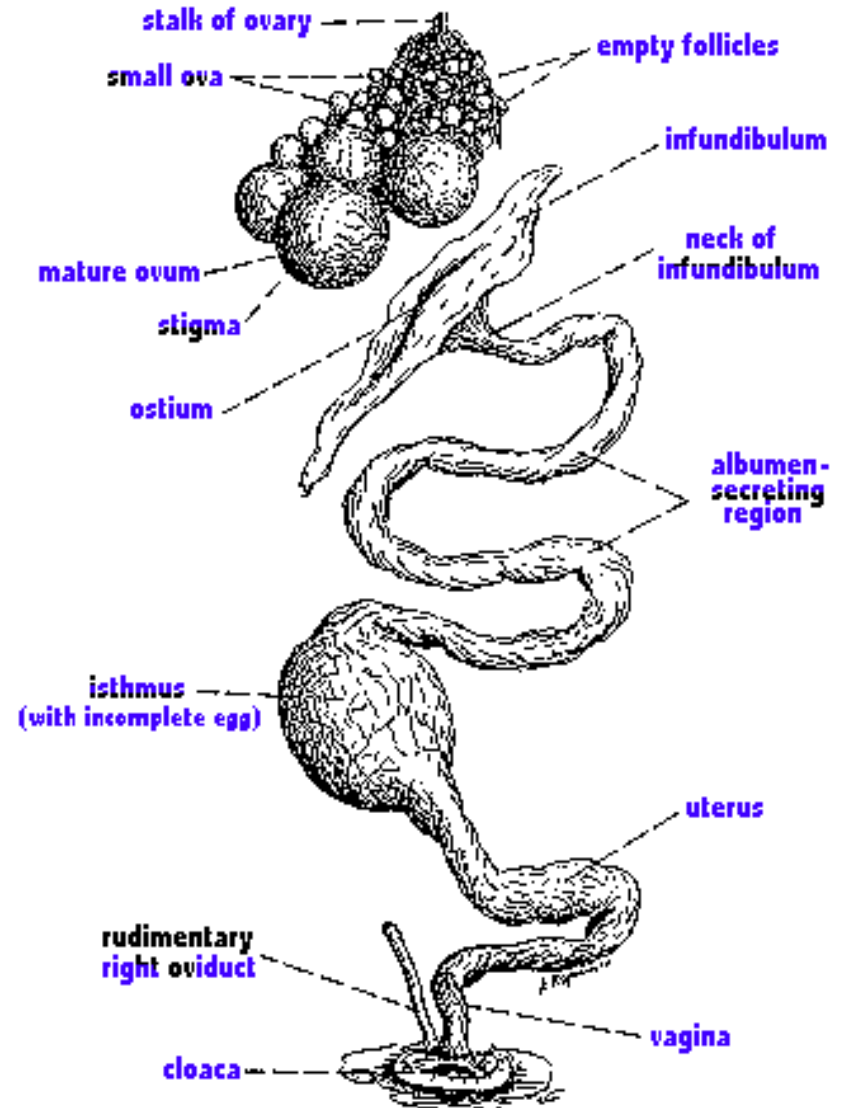
- Kidneys filter blood, remove toxins and waste
- No bladder to store waste instead converted to uric acid (white paste)

Sexes separate;

- testes paired, with the vas deferens opening into the cloaca.

- Copulatory organ (penis) only in ducks, geese, paleognathids and a few others.

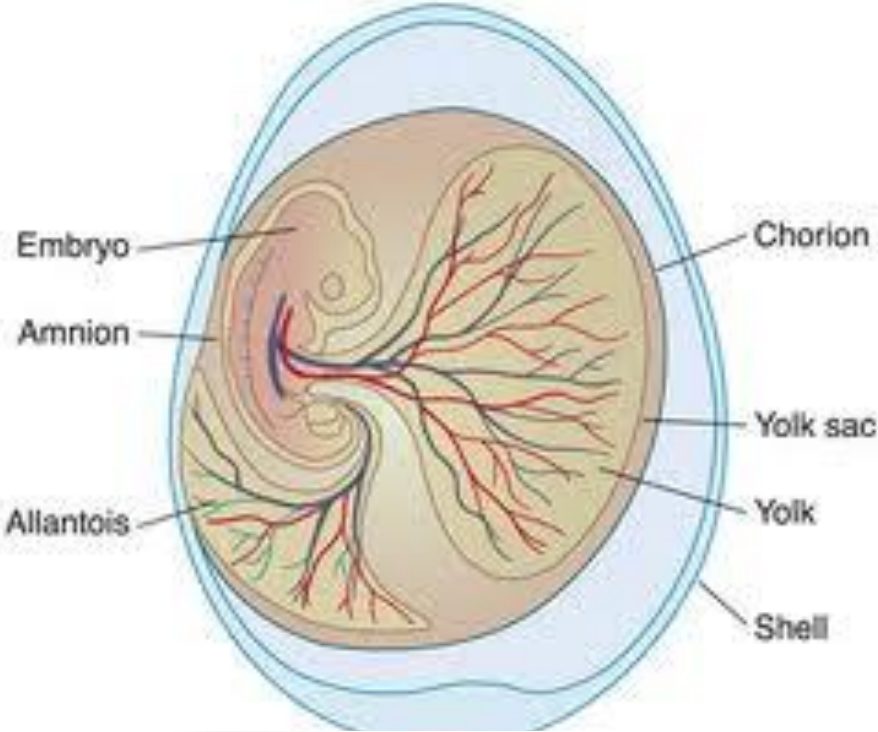
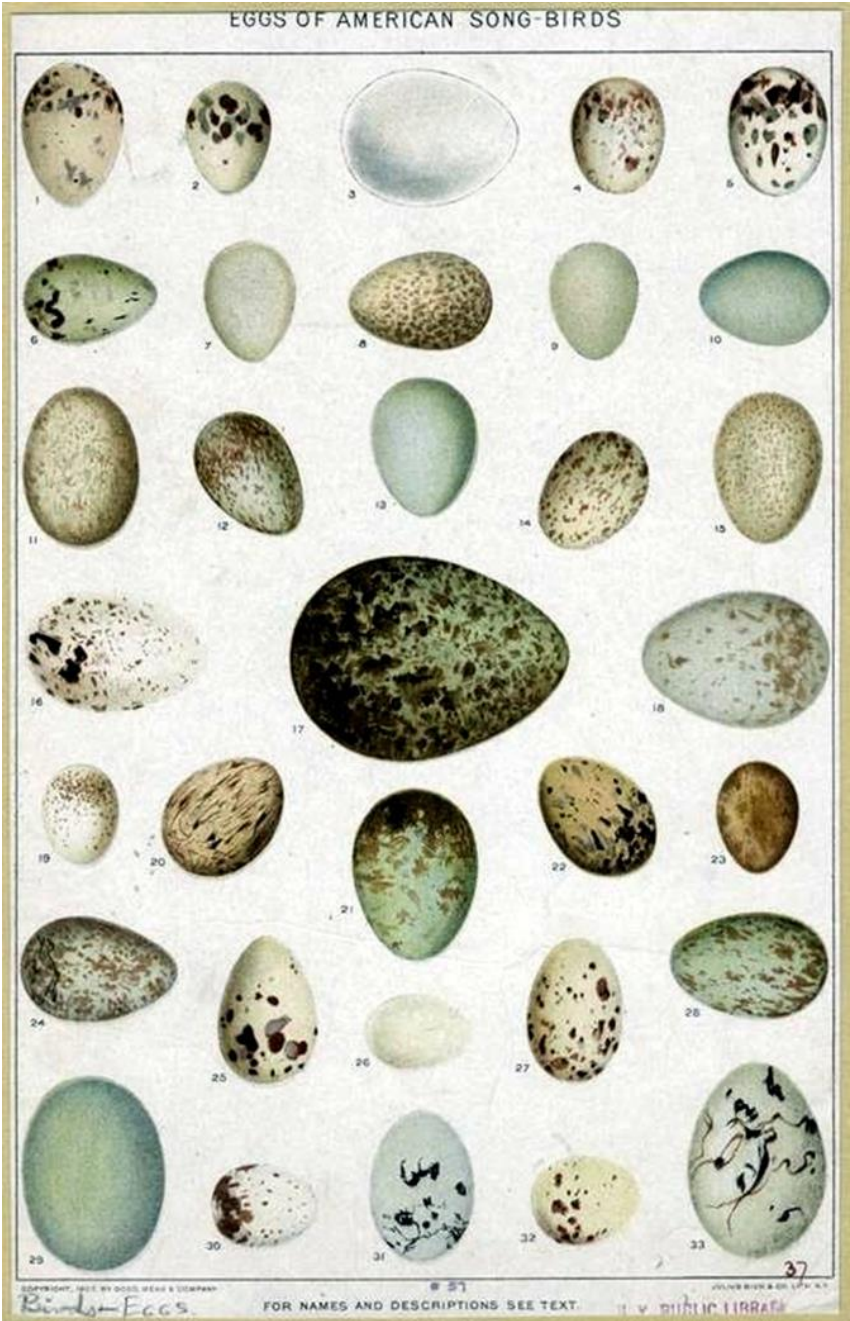
- Females have left ovary and oviduct only.



Fertilization internal;

- amniotic eggs with much yolk and hard, calcareous shells;
- embryonic membranes in egg during development;
- incubation external;
- young active at hatching (precocial) or helpless and naked (altricial);
- sex determined by females (females heterogametic)

amniotic eggs





- Altricial
 - No feathers
 - Cannot walk or see
 - Cannot feed themselves



Precocial

- Down feathers
- Can walk and see
- Can feed themselves

Parental care is well developed.

- Male and female involvement
- Nest
- Precocial, chicks are ready to go
- Atricial, chicks are help - less



Extraordinary communication and song production
Adapt navigational abilities in many species

Navigation:

**Use stars & sun;
earths magnetic field;
changes in air pressure;
low frequency sounds;
topographical landmarks**

