

## Class REPTILIA

The upper part of the skull of reptiles is modified giving the reptiles a far more efficient and powerful jaw action and making the skull light. The reptiles are classified mainly on the structure of their skulls, in which there are temporal vacuities or fossae or empty spaces in the temporal region. The function of these temporal fossae was probably to enable the jaw muscles to protrude out onto the upper surface of the skull. In this way, the jaw muscles could be made much longer, giving a far more powerful jaw action. Three different groups of reptiles developed fossae in different places, **parapsid**, **synapsid** and **diapsid** types, and these remained unchanged throughout the evolutionary history of these groups.

### **Key features of Class REPTILIA**

- Body varied in shape, covered with horny epidermal scales, sometimes with dermal plates; integument with few glands.
- Paired limbs, usually with five toes with claws, adapted for climbing, running or paddling; limbs absent in snakes and some lizards.
- Skeleton well ossified; ribs with sternum except in snakes, forming a complete thoracic basket; skull with single occipital condyle.
- Respiration by lungs.
- Three-chambered heart, except in crocodiles which have four-chambered heart.
- Metanephric kidney; uric acid is the main nitrogenous waste.
- Ectothermic animals.
- Nervous system with primitive brain, spinal cord dominant. There are 12 pairs of cranial nerves.
- Sexes separate; fertilization internal, hemipenis as copulatory organ.
- Eggs covered with calcareous or leathery shells. Extra embryonic membranes, amnion, chorion, yolk sac and allantois are present during embryonic life.

### **Subclass ANAPSIDA**

- Anapsid reptiles are those in which the dermal bones form a complete roof over the skull, with no temporal fossae. Two main groups possess anapsid skull, the extinct **Captorhinida** and the extant **Chelonia**.
- Modern chelonians are classified into two suborders, according to the method of retracting the head into the shell. The most primitive group are the side-necked turtles (Suborder **Pleurodira**), which have very long necks to assist in catching fish. In these chelonians, the neck bends sideways in order to fit the head into the shell. Most modern species that belong to this group include the turtles, tortoises and terrapins.

### **Order CHELONIA**

- Tortoises and turtles do not have teeth but possess horny beaks. Tortoises are usually herbivorous while sea and fresh water turtles are omnivorous. Body is covered with a shell consisting of two parts – the dorsal **carapace** and the ventral **plastron**, which are connected by bridges between front and hind legs. The ribs and backbone are fused with the carapace.

### **Subclass Parapsida**

- These are reptiles with one temporal fossa, placed high up on the skull. A number of different forms of aquatic reptile showed this form of skull, such as the Protosaurs, Nothosaurs and Placodonts but we will deal with the two largest groups – the **ichthyosaurs** and the **plesiosaurs**. These two lines of reptiles became modified for aquatic life in quite different ways but they share the same basic type of skull organisation, with minor differences. Both **Ichthyosaurus** and the **Plesiosaurus** became extinct at the end of the Cretaceous when many other terrestrial reptiles including dinosaurs died out.

### **Subclass Diapsida**

- These reptiles possess two temporal fossae in the skull and they have been the most successful and diverse of all the reptiles. They include the dinosaurs and pterosaurs which dominated the land and air during the Mesozoic era and also include the most successful of modern reptiles, such as the crocodiles, snakes and lizards.
- The diapsid reptiles are divided into two major groups, the Archosauria and the Lepidosauria, which share the same type of temporal vacuities in the skull, but there are a number of differences in their skull construction which makes it possible that they may have evolved independently from separate cotylosaur ancestors.

### **Order Rhyncocephalia**

- The order contains only two species that live on some islands off the coast of New Zealand. They look like lizards but there are differences that set the tuatara apart from lizards. The tuatara spends daytimes in burrows. It comes out in the evening to feed on insects and other invertebrates.

### **Order Squamata**

The order includes Lizards and snakes, which are creepers and inhabit a variety of habitats. Snakes are carnivorous but lizards eat a variety of foods including plants and insects. Snakes have descended from lizards and there are many similarities between them. Some characteristics that distinguish snakes from lizards are:

- Snakes do not have eyelids but lizards have.
- Snakes usually have one row of scales on the belly; lizards have many.
- Snakes do not have legs; most lizards have legs.
- Snakes have jaw bones that disarticulate allowing them to swallow large objects. Lizard jaw bones do not disarticulate.

## **Order Crocodilia**

- This order includes alligators, caimans, crocodiles and gharials that are found in and near water in warmer areas of the world. They eat fish, birds, turtles, and mammals.
- Members of the crocodile group have legs and feet designed for walking on land and a strong flattened tail used for swimming. The three groups are distinguished from one another by the shape of their heads. Alligators have a broad, rounded snout; while the crocodiles have a triangular head with a more pointed snout and gharials have a very long and narrow snout.

## **THE DINOSAURS**

- Dinosaurs belonged to three orders:

### **Order Saurischia**

- They possessed lizard-like pelvic girdle in which ischium and pubis bones diverge from the base. These dinosaurs were both bipedal and quadrupeds, carnivores as well as herbivores. Examples are, *Allosaurus*, *Tyrannosaurus*, *Brontosaurus*, *Diplodocus*, *Brachiosaurus* and *Struthiomimus*.

### **Order Ornithischia**

- They were dinosaurs with bird-like pelvic girdle in which both ischium and pubis are directed backwards. Examples include *Iguanodon*, *Stegosaurus*, *Triceratops*, *Camptosaurus* and *Ankylosaurus*.

### **Order Pterosauria**

- They were flying reptiles in which forelimbs were modified to support a patagium that stretched from forelimbs to hind limbs. Their size varied from that of sparrow to giants that had wing span of 12 metres.

### **Subclass Synapsida**

- These reptiles have one temporal fossa, on the lower side of the temporal region of the skull. They were the most successful and dominant reptiles during the Permian period. In

the Mesozoic era they were largely replaced by other lines of reptiles such as dinosaurs, but the surviving synapsids gave rise to the mammals. There is a range of fossil species of these reptiles throughout the Mesozoic. At the start of the era they show typically reptilian characteristics but by the end of the era they became so mammal-like that it is difficult to know whether they should be classified as mammals or reptiles.

- The **Pelycosauria** seem to have died out towards the end of the Permian period since they had more reptilian characters than mammalian characters. The synapsid line of reptiles continued with the radiation of a new group, the **Therapsida**, which diversified into specialized predators called **Cynodonts** and the giant herbivores called **Dicynodonts**. They all died out in Permian and Triassic extinctions, leaving behind small descendents. Throughout the mesozoic era there was a series of successive radiations of these therapsid reptiles to give rise to mammals.