B.Sc. Part II, Paper III A

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Characters, Distribution & Affinities of subclass Prototheria (Part-I)

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Subclass : Prototheria

Systematic Position & Distribution: Prototheria is the subclass of class Mammalia and includes egg-laying mammals distributed only in Australia and the neighbourhood islands of Tasmania and New Guinea. Prototheria includes a single order, Monotremata. They include the duck-bill platypus and one species of Echidna or Spiny anteater, Tachyglossus from Australia and two species of Zoglossus from New Guinea. Both are basically similar to each other but two different from other mammals. Monotremes desire from an early stock in the principal mammalian line of descent.

Distinctive Characters :-

1. **Habit and Habitat** — The platypus is highly modified for aquatic life and spiny anteater are terrestrial. Both are burrowing in habit.

and make nests for rearing their young. Both are insectivorous, nocturnal, warm-blooded, quadrupedal and oviparous.

2. External Features — Body of Platypus is flattened and covered with a dense soft under-fur protected by harsher outer fur. Body of Spiny-anteater is covered above with strong pointed spines, between which are coarse hairs, while the lower surface of the body has only hairs. In Platypus, jaws are produced into a depressed beak covered with soft but tough skin. In Spiny anteater, jaws are produced into a long sensitive pointed rostrum. External ears or pinnae are absent. Tail flat and elongated in Platypus and vestigial in spiny ant-eater. Mammary glands devoid of nipples. Mammary pouch on the abdomen of female is present, in which milk is secreted through a large number of specialised sweat glands, but the ducts of these glands are not united to open on central nipples. In Platypus, fore-legs are short and powerful. The five digits are webbed and end in strong claws. Hind limbs are

this specialized. In the male, a hollow horny spur is connected with a small crural gland whose secretion is poisonous. This gland is well-developed in duck bill platypus and less developed in Spiny ant-eaters.

Digestive System

In Spiny Ant-eaters, teeth are absent in all stages of Development. In Young Platypus fleshy, rigid teeth are present and these are replaced by horny structures formed by an ingrowth of epidermis beneath them and used for breaking the Cells of molluscs. Spiny Ant-eaters have a tiny round mouth at the end of long beak. In Spiny Ant-eaters, posterior part of tongue is beset with horny serrations which grind the food against corresponding ridges on the palate. Sub-maxillary, parotid and sub lingual glands are present whose secretions helps to neutralise formic acid discharged by their preys. Stomach of Monotremes is almost globular, intestine is differentiated into small and large caecum is also present. Rectum opens into the cloaca posterior to the ureters. and vagina differentiation. Liver is large and

there is a gall bladder with bile duct which traverses the pancreas and joins the pancreatic duct.

Respiratory System

Respiration is Pulmonary (by lungs). Larynx is also present.

Circulatory System

Heart is four-chambered. Right auriculo-ventricular valve is incomplete and partially muscular. ~~They~~ There are no chordae tendinae. Left auriculo-ventricular aperture is guarded by tricuspid valve; not by bicuspid valve as in other mammals. Single left aortic arch resembles those of other mammals. There are no renal portal veins. In Spiny Anteater, an anterior abdominal vein arising on the bladder and distributed to the liver. Erythrocytes are small, circular and non-nucleated. In Monotremes, heat regulation is imperfect thus far advanced over that of living reptiles, in absence of sweat glands, heat reduction by vasodilation occurs. The temp. of spiny anteater rises with thalamic surroundings above 30°C and drops at 37°C. The Platypus has few sweat glands but its fur mostly is water as in a cool burrow.

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