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COMPARATIVE ANATOMICAL STUDIES OF THE RESPIRATORY SYSTEM IN SOME EGYPTIAN REPTILES

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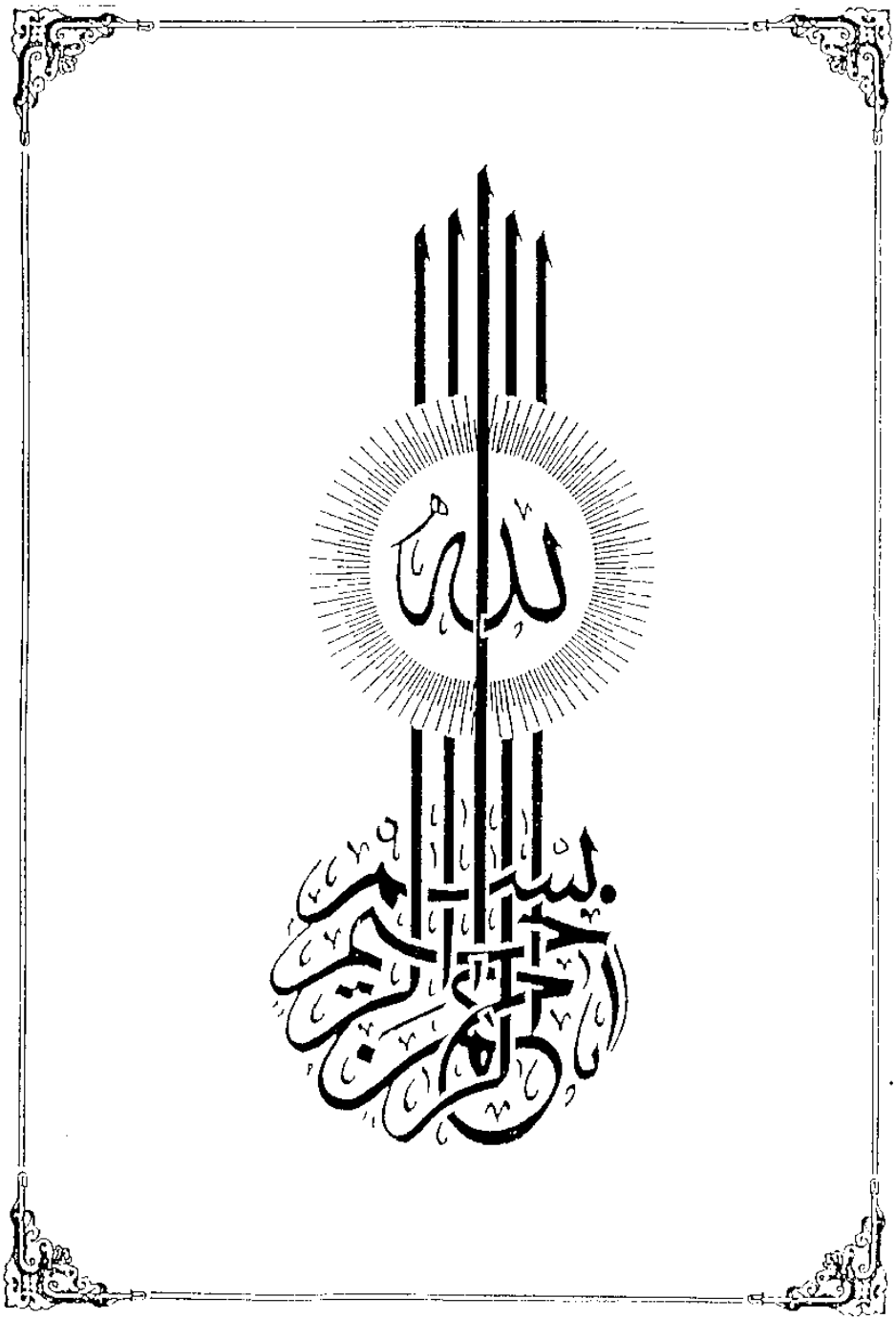

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INTRODUCTION

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INTRODUCTION

Class Reptilia is one of the largest and important groups of vertebrates. Reptiles are descendants of the early amphibians and were the dominant animals of the earth during the Mesozoic era. They gave rise to the two classes of vertebrate animals that have internal temperature control , the endothermal Aves and Mammalia. Although reptiles have lost the dominant position they held during the Mesozoic era, yet they are still much more numerous than amphibians. The reptiles which are still alive belong to only four out of the seventeen orders of all reptiles extinct and alive. Order Squamata is the largest and most successful group of this class, as it comprises about 3,000 species which are widespread in tropical and subtropical regions allover the world. Some of these species are aquatic, others are arboreal or burrowing and most of them are terrestrial.

The work on the reptilian respiratory system is rather incomplete and fragmentary. Besides, it seems that no integrant work has been done on the respiratory system of the Egyptian reptiles. Therefore , the present work is carried out to give a detailed account of

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the gross and microscopic anatomy of the respiratory system of some local lizards (lacertilians) and snakes (ophidians). These species are Chalcides ocellatus, Eumeces schneideri, Psammophis sibilans and Natrix tessellata. Chalcides ocellatus and Psammophis sibilans are easily obtainable and thus they are used as laboratory animals in our universities for studying the reptilian anatomical organization.

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HISTORICAL REVIEW

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HISTORICAL REVIEW

The study of the respiratory system of reptiles has drawn the attention of many investigators since a long time.

Wright (1883) described the nasal cavity, Jacobson 's organ and lachrymal duct in Tropidonotus.

Cope (1894) examined many species of snakes and gave detailed notes on the characters of their lungs. He found that some snakes (e.g., Rhachiodon scaber) possess only a single functional lung, whereas other ones (e.g., Natrix vulgaris and Heterodon) have a rudimentary lung, in addition to the functional one. Moreover, few snakes (e.g., Typhlops) possess a tracheal lung, in addition to the functional and rudimentary ones.

Butler (1895) observed that the functional lung of Tropidonotus natrix and Zamenis gemonensis is the right lung and there is no trace of the left one. He also found that in all Amphisbaenidae (except Trogonophis wiegmanni and Pachycalamus brevis) the right lung is rudimentary or absent altogether, while

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in these two species the right lung is distinctly smaller than the left one. This author also concluded that in all lizards, including the snake-like ones, if one lung is smaller it is the left one.

Beddard (1903) compared between Naja and Ophiophagus as regards their tracheae and lungs. He found that the vascular or pulmonary part of the lung and consequently its respiratory region is proportionately larger in Ophiophagus than in Naja. Moreover, the dorsal tracheal membrane of Ophiophagus is perforated at regular intervals by oval foramina which lead to air sacs. This author could ascertain that there is nothing precisely similar to such a structure in other snakes and stated that it may be similar to the tracheal pouch of the emu.

Beddard (1909) described the bronchi and lungs in Boa occidentalis and B. madagascariensis. In the former snake, the bronchus extends for a long distance into the interior of the lung, while in the latter one the intrapulmonary bronchus is very short.

Thompson (1913) described the trachea and lung in many species of snakes belonging to three

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families (Hydrophidae, Acrochordinae and Viperidae). In Hydrophidae and Acrochordinae, the tracheal lung is developed so as to give buoyancy and to enable these sea-snakes to remain sometime beneath the surface of water. In Viperidae, however, the tracheal lung results from an indirect and different reason. This is explained by the fact that the elaboration of venom in the vipers requires a large liver and as a rule vipers have short thick bodies and consequently the liver invades the region just caudad of the heart. As a result of this condition, the crowded pulmonary tissue looks for the direction of the least resistance namely, along the tracheal membrane to form the tracheal lung.

Ogawa (1920) studied the respiratory epithelium in Tetrapoda. He clarified that the respiratory epithelium of the reptilian lung [e.g., Clemmys japonicus (tortoise), Gecko japonicus (lizard) and Elaphe quadrivirgata (snake)] is made up of two kinds of cells, large flat cells and cuboidal ones.

Gnanamuthu (1935) studied the hyoid apparatus and tongue of fifteen reptilian species. He came to the conclusion that the hyoid apparatus and the muscles

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