THE BURSA EPIPHARYNGEA IN THE SUMATRAN RHINOCEROS (*DIDERMOCERUS SUMATRENSIS*)

by

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L'auteur donne la première description de la bourse pharyngienne chez *Didermocerus sumatrensis*. Cette bourse se présente comme un saccule ovoïde et uniloculaire situé entre la base du crâne et le plafond du pharynx ; elle communique directement avec l'épipharynx. Une structure comparable se retrouve chez les différentes espèces de Rhinocéros étudiées jusqu'à présent ; elle constitue sans doute un caractère constant chez les Rhinocérotidés.

INTRODUCTION

The so-called 'bursa pharyngea' of mammals is commonly an insignificant dimple-like recess in the dorsal parietes of that postnasal segment of the respiratory tract conventionly termed 'naso-pharynx' but shown by Cave (1960) to be, on morphological and descriptive grounds alike, more appropriately designated 'epipharynx'. In some mammalian forms this mucosal recess is remarkably enlarged so as to constitute a macroscopic structure, viz. a pyriform or oviform saccule (sacculus epipharyngeus) proceeding diverticulum-wise caudally from the epipharynx between the basiocciput and anterior cervical vertebrae dorsally and the pharynx roof ventrally.

Among carnivores such epipharyngeal saccules were known for ursids to Rapp (1839) and to later nineteenth century morphologists, whilst more recently they have been recorded for *Ailuropoda melanoleuca* by Davis (1964) and Cave (1965). In ursids the epipharyngeal bursa takes the form of a pair of asymmetrical diverticula, each provided with a discrete crescentic ostium in the epipharyngeal wall. Such an arrangement characterised the immature *Ailuropoda melanoleuca* specimen utilised as the basis of Davis' (1964) monograph on this species and was not unnaturally interpreted as an indication of ursid (rather than procyonid) affinity. However four additional *Ailuropoda* specimens dissected by the writer manifested a single saccule type of epipharyngeal bursa,

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showing no hint of duality and presenting a single, oval ostium. This single-saccule form of epipharyngeal bursa is the form alone encountered in non-carnivores and Cave (1965) has reported its presence in *Giraffa camelopardalis, Okapia johnstoni, Rhinoceros unicornis* and *Ceratotherium simum*. Further (unpublished) investigation has confirmed its occurrence in the African black rhinoceros (*Diceros bicornis*). The present notice records the presence of an epipharyngeal sacculus in a specimen of the rare and fast-vanishing Sumatran rhinoceros (*Didermocerus sumatrensis*).

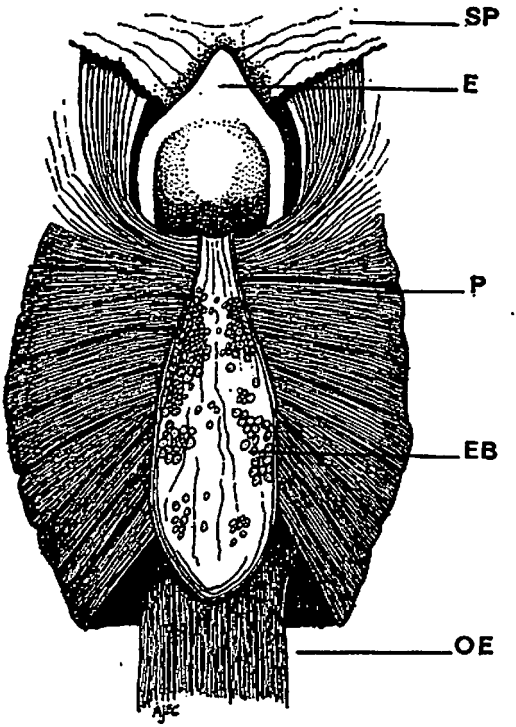

Fig. 1. — Sumatran rhinoceros (*Didermocerus sumatrensis*) ad. ♀. Dorsal aspect of epipharyngeal bursa. E = epiglottis ; EB = epipharyngeal bursa (opened) ; OE = oesophagus ; P = pharynx ; SP = soft palate.

Report on specimen

A female of this species, captured in the Little Siak River district, Riau, Sumatra, lived on exhibition in the Copenhagen Zoo from 1959 to 1972 and at death was an estimated 13 years old. Through the courtesy of Professor K. G. Wingstrand, of the Insti-

tute of Comparative Anatomy, University of Copenhagen, certain of the viscera, including the pharynx and its adnexa, were carefully excised in the fresh state and were formalin preserved for the writer's examination.

Evisceration had secured most of the epipharyngeal mucosa intact and in continuity with an obtrusive epipharyngeal saccule attached inferiorly to the pharynx roof. This saccule, approximately 110 mm long and 40 mm in greatest diameter, was a pyriform, thin-walled fibrous chamber, lined by a characteristic epipharyngeal mucosa. Its rounded ostium communicated directly with the epipharynx dorso-medianly to the isthmus epipharyngo-pharyngeus and its neck expanded rapidly into a fusiform body having a fundus overlying the juxtapharyngeal portion of the oesophagus. It was anchored to the subjacent pharynx roof by lax ligamentous condensations of the retropharyngeal fascia, wherein occurred notably large, tortuous veins, receiving tributaries from the saccule wall and draining into the pharyngeal venous plexus. The saccule mucosa resembled in all particulars that previously noted in *Rhinoceros, Diceros* and *Ceratotherium,* its characteristics being an intensive and generalised infiltration with lymphoid tissue, an abundance of mucous (and muco-serous) glands and a correspondingly elaborate vasculature. Below a pseudo-stratified columnar (respiratory) epithelium, the mucosa was principally disposed in permanent, longitudinal, notably tall plicae, each of which presented a linear series of discrete surface elevations, each effected by an underlying lymphoid follicle of massive proportion, and cratered centrally by a gland-duct ostium. The extremely numerous mucous glands in the mucosa depths showed ducts traversing for the most part the dense lymphoid follicles, though sometimes passing surfacewards between these. Diffuse lymphoid tissue occurred generally throughout both the mucosa and the submucosa.

Commentary

The constitutional correspondence between the epipharyngeal saccule (in *Didermocerus* as in other forms) and the palatine (faucial) tonsil is clearly apparent, either structure comprising essentially an aggregation of highly active lymphoid tissue and mucous glands localised within a circumscribing fibrous chamber. Such common morphological constitution implies a common (tonsillar) physiological function an interpretation according with Killian's (1888) observation that the non-saccular (epi)pharyngeal bursa is

primarily the organisational focus for that particular association of lymphoid follicles and glands known descriptively as the pharyngeal (Luschka's) tonsil.

Why physiological requirements should necessitate the development of a saccular form of epipharyngeal bursa in some mammals but not in others remains so far unexplained and a subject for further enquiry.

Since a sacculus epipharyngeus is now known to obtain in four of the five extant rhinoceros forms it is extremely probable that it occurs also in the almost extinct Javan rhinoceros (*Rhinoceros sondaicus*) and is thus a morphological character throughout the extant Rhinocerotidae.

SUMMARY

A single, unilocular epipharyngeal bursa (sacculus epipharyngeus) is recorded for an adult female specimen of Sumatran rhinoceros (*Didermocerus sumatrensis*). In constitution and topography this bursa agrees with the corresponding bursae previously observed in *Ceratotherium simum*, *Diceros bicornis* and *Rhinoceros unicornis*. Such a structure would appear to be a normal feature of rhinoceros morphology.

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