Some Structural Variations in the Second Upper Premolar of the Lesser One-horned Rhinoceros (*Rhinoceros sondaicus*).

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(With 1 figure in the text.)

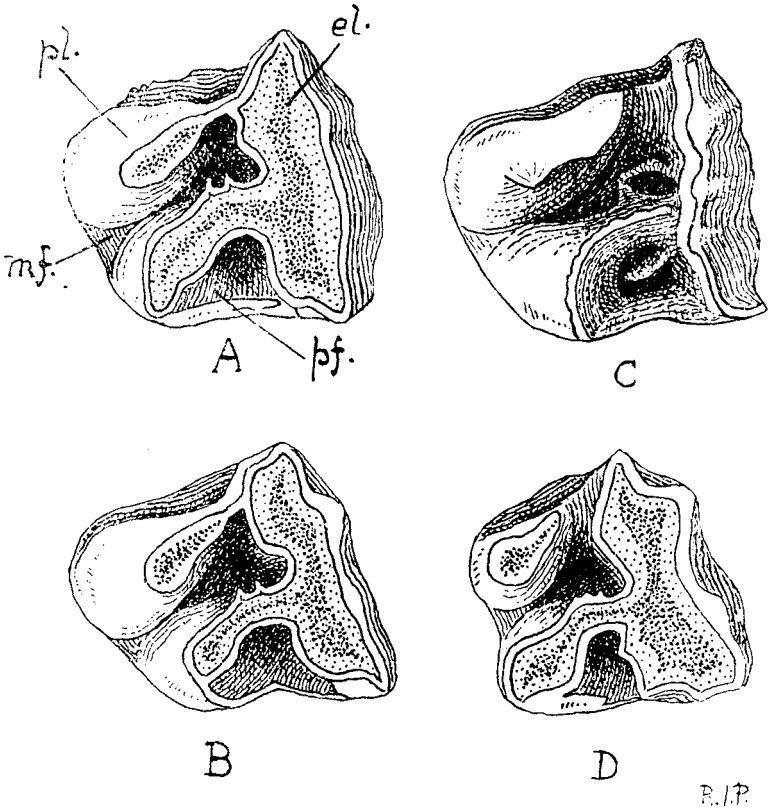
The lesser one-horned Rhinoceros (*Rhinoceros sondaicus*) formerly had a wide geographical range from Sikkim, the Bhutan Duars, the Sanderbans and the neighbourhood of Calcutta to ? Borneo. It was quite probably represented by more than one subspecies, like the Asiatic two-horned Rhinoceros (*Didermocerus sumatrensis*), which had a similar extensive distribution ; and this probability is enhanced by the exposure of the species to diverse physical conditions, including mountain forests in Java and the low-lying swampy districts in the deltas of the Ganges and Brahmaputra. It was said by Cockburn (Proc. As. Soc. Beng. 1884, 140) to be plentiful in the Sanderbans in 1884 ; but it has long been extinct there and elsewhere in northern India, and apart from the size of the adult and perhaps the epidermal sculpture of the calf, no external features of the specimens that lived there appear to have been recorded in sufficient detail for comparison with specimens from Malaya and the Sunda Islands, of which the external features are known. Fortunately the British Museum has the skull of an adult ♂ from the Sanderbans (No. 76.3.30.1) ; and this shows a difference in one of its teeth from skulls collected in Java and Borneo.

In a recent paper (Proc. Zool. Soc. London, vol. 114 (1945), pp. 437–450), I stated that the anterior fossa of the upper cheek-teeth of the permanent set is closed in front in almost all the skulls of *Rh. sondaicus* in the British Museum. The exception is supplied by pm^2 of three skulls in which the fossa opens in front, forming a gap of considerable depth and width between the anterior ends of the ectoloph and the protoloph. Of these skulls the most interesting is the one from the Sanderbans which has its full complement of upper cheek-teeth, with m^3 fully erupted and a little worn. As my figure shows (fig. 1, D) pm^2 is very considerably worn ; but the ectoloph and protoloph are widely separated by a gap which puts the anterior fossa in communication with the exterior in front. The floor of this gap in the inverted left tooth figured is only 3 mm. above the cingulum, 10 mm. below the adjoining summit of the ectoloph and 7 mm. below that of the protoloph. Hence the tooth would have to be ground down for an additional 10 mm. to effect a junction between these two crests and close the anterior fossa in front. In the corresponding tooth of the right side the gap is a little shallower.

In two skulls from Java, which may be taken as representing to all intents and purposes typical *sondaicus*, which was from Sumatra, pm^2 is noticeably different, and neither, it must be emphasized, is so old as the skull from the Sanderbans. This point is important, because in skulls with greatly worn teeth the anterior fossa is always closed in front in all the teeth. One of these skulls (No. 723 d) indeed is decidedly younger than the skull from the Sanderbans, m^3 being only half way up and quite unworn. As the figure shows (fig. 1, A) pm^2 is not worn to the same extent as in the Sanderbans skull, but the ectoloph and protoloph are joined by a bridge which completely closes the anterior fossa in front, the summit of the bridge being 8 mm. above the cingulum, and almost level with the worn summits of the ectoloph and protoloph. The other Javan skull (2.12.18.1) is older than the last but not so old as the skull from the Sanderbans, m^3 being fully erupted and a little worn. It has an unusually shaped pm^2, which has no parastyle-prominence, but the ectoloph and protoloph

are joined by a bridge, the edge of which is 7 mm. above the cingulum. Nevertheless, this tooth is not so worn as it is in the skull from the Sanderbans. Another skull resembling the two from Java in the junction of the ectoloph and protoloph and the closure of the anterior fossa in pm^2, is the type of *nasalis* Gray (723 C) supposed to be from Borneo. It is a youngish skull with m^3 unerupted, but

Figure 1



A. Second upper premolar (pm^2) of left side of adult skull of *Rhinoceros sondaicus* from Java (723 d) showing the ridge joining the protoloph (*pl*) to the ectoloph (*el*) and closing from the exterior in front the anterior fossa, which is a continuation of the median fossa (*mf*), also the posterior fossa (*pf*), which is widely open to the exterior behind. The dotted areas represent the dentine of the worn crests, with their edging of enamel.

B. The same of a slightly younger skull, the type of *nasalis* (59.8.16.1) said to have come from Borneo.

C. The same of an immature skull from Lower Tenasserim (2.12.18.1) showing the anterior fossa opening to the exterior in front, the unworn crests, the formation of an accessory fossa by the junction of the deep-set "crochet" and "crista" and the division of the posterior fossa by a crest from the inner wall of the ectoloph.

D. The same of a skull from the Sanderbans (76.3.30.1), older than A and B, with the crests wider from being more worn, the posterior fossa more nearly closed behind, but the anterior fossa open in front and separating the protoloph and ectoloph.

(All figures natural size.)

just visible in the alveolus. As the figure shows (fig. 1 B) pm^2 is much less worn than in the skull from the Sanderbans and a little less worn than in the Javan skull (723 d). The summit of the ridge closing the anterior fossa is 7 mm. above the cingulum.

The other two skulls above referred to as resembling the one from the

Sanderbans in having the anterior fossa open in front are not so instructive. One (723 b), which has no recorded locality and was assigned by Gray to *nasalis*, is young, with m^3 just appearing in the alveolus, pm^1 retained and pm^2 hardly at all worn. This tooth is too deeply imbedded for ascertaining the height of the floor of the gap above the cingulum; but the floor is 11 mm. below the adjoining summit of the ectoloph, nearly the same as in the skull from the Sanderbans in which the ectoloph is greatly worn and the original depth of the pit, with the ectoloph unworn, must have been considerably greater. The other skull, from Lower Tenasserim, (21.5.15.1) is younger than the last and has m^3 concealed, m^2 and m^1 a little worn and pm^3 and pm^4 unworn. In pm^2 the summit of the metaloph and protoloph are compressed and sharpish and of the ectoloph also compressed but bearing three blunt cusps; the floor of the wide gap between the protoloph and ectoloph is 15 mm. below the summit of the latter, a little more than in the skull from the Sanderbans with its deeply worn ectoloph; but it is 7 mm. above the cingulum, that being approximately the height of the summit of the ridge joining the ectoloph and protoloph in the two Javan skulls and in the type of *nasalis* (**fig. 1, C**).

The tooth in the skull from Lower Tenasserim differs from the others described in this paper in having an accessory pit cut off from the median fossa by the junction of the deep seated "crochet" with a crest from the ectoloph and in the division of the posterior fossa by a supplementary crest. In these respects it is like pm^3 and pm^4 of the same skull as described in my above-quoted paper (Proc. Zool. Soc. Lond. **vol. 114 (1945), pp. 437–8**, fig. 5 c); but in neither of these teeth is the anterior fossa open in front as it is in pm^2.

On account of its unworn condition it is impossible to say whether pm^2 in this skull from Lower Tenasserim would, when equally worn, have resembled in the structure of its anterior fossa the same tooth in the skulls from the Sanderbans or in those from Java and Borneo. Possibly it would have been intermediate between them; but so far as the evidence permits a guess, I incline to the opinion that it would have been like that tooth in the Javan and Bornean skulls.

The above described difference in pm^2 exhibited by the skulls from the Sanderbans and the Sunda Islands was noticed before I consulted the principal literature relating to the Rhinoceros from the Sanderbans described by Lesson as *Rh. inermis* in allusion to the absence of the horn in the type, an adult ♀ (Compl. de. Buffon, ed. 2, 514, 1848). This feature is now known to have no systematic importance. Peters, however, accepted the species on those grounds when he described and figured the skull of Lesson's type, which was collected by Lamare-Picquot on an island at the mouth of the Ganges (Mon. Ak. Wiss., Berlin, 1877 (1878), p. 71, pl. 1*).

This skull has its full complement of upper cheek-teeth, with pm^1 retained and m^3 fully erupted and a little worn. Judging from the figure it is about the same age as my ♂ skull from the Sanderbans and older than the two Javan skulls above described; and, as the figure clearly shows, it agrees with the former and differs from the latter in having the anterior fossa of pm^2 open in front, separating the ectoloph from the protoloph. Peters, moreover, figured (*op. cit.* pl. 3) a skull of *Rh. sondaicus* from Java which also has its full complement of upper cheek-teeth, but they are more worn than in the type of *inermis*; and this skull differs from the latter and resembles my two Javan skulls in having the ectoloph and protoloph united and the anterior fossa closed in front on pm^2.

Clearly, therefore, the skulls from the Sanderbans and Java figured by Peters resemble respectively in the structure of pm^2 those from the same localities in the British Museum.

* Peters erroneously gave 1838 as the date of Lesson's description and acknowledged his indebtedness to Dr. P. L. Sclater for the information; but the copy of ed. 2 of Lesson's Compl. de Buffon in the Zoological Society's Library is dated 1848. Lydekker (Cat. Ung. Mam. 5, p. 49, 1916) cited Lesson's work as Hist. Nat. Anim., 1. p. 514, 1848. Lesson first published the name *inermis* in 1842 in Nov. Tab. Règne Anim. p. 159, but since there was no description, it was a *nom. nud.*, as stated by Sherborn who, however, overlooked the description of 1848 which makes it valid.

Summary.

Two main conclusions may be deduced from the foregoing description :—

(1) In *Rh. sondaicus* pm^2 of the permanent dentition, when *unworn*, may differ from pm^3 and pm^4, as well as from the molars, in having the ectoloph and protoloph superficially separated and the anterior fossa opening in front between them. This at all events is the case in two youngish skulls, one without locality, the other from Lower Tenasserim. These may be set aside for the time being, pending the examination of additional skulls, if any, to prove that the newly erupted pm^2 is always so constructed.

(2) In two fully adult, if not oldish, skulls from the Sanderbans, with pm^2 considerably *worn*, the condition above described persists, whereas in several skulls from the Sunda Islands, younger than the last, or about the same age, with pm^2 less or about equally worn, the ectoloph and protoloph are connected by a vertical crest which completely closes the anterior fossa in front. I provisionally attach racial significance to this difference and restore the name *inermis* for the now extinct Rhinoceros of the Sanderbans, restricting *sondaicus* in a racial sense to the form from the Sunda Islands.