

Prof. Ray Lankester, M.A., F.R.S., read a memoir on the hearts of *Ceratodus*, *Protopterus*, and *Chimæra*. The structure of the conus arteriosus and its valves was more particularly described in this paper. Owen and Hyrtl had shown that the conus of the Dipnoans differed from that of cartilaginous fishes and Amphibians in the fact that its walls were devoid of pocket-valves, and presented instead a long spiral valve and a second short vertical valve. Dr. Günther, the only author who had described the heart of *Ceratodus*, showed that it possessed in the upper part of the arterial cone pocket-valves, whilst the spiral valve was shortened so as to be absent from this upper region. The possession of pocket-valves served as a very important character to connect the Dipnoans and the other fishes.

Prof. Lankester now showed that in the lower part also of the arterial cone of *Ceratodus* there were numerous small pocket-valves, in addition to those in its upper part; and further he showed that these small pocket-valves (so called "ganoid valves") were also present in the lower part of the arterial cone of *Protopterus*, the African Mud-fish, which had been generally supposed to be quite devoid of this kind of valve. The basal fibro-cartilage of the floor of the heart was described and compared in *Ceratodus* and *Protopterus*, and a possible rudiment of this remarkable structure pointed out in *Ceratodus*.

This Paper will be published entire, with illustrations, in the Society's 'Transactions.'

The following papers were read:—

1. On the Skull of a Rhinoceros (*R. lasiotis*, Scl.?) from India. By WILLIAM HENRY FLOWER, F.R.S., V.P.Z.S.

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Mr. Sclater has put into my hands for examination the skull of a Rhinoceros, which he had received from Dr. W. D. Stewart, of Cuttack, Orissa, being the skull of the two-horned Rhinoceros killed near Comillah, in Tipperah, as mentioned in P. Z. S. 1877, p. 269. Mr. Sclater thinks that the skull may not improbably belong to the species (at present only known by the living animal in the Society's menagerie) which he has named *R. lasiotis*.

It is that of a nearly adult animal. All the sutures of the upper surface of the cranium are consolidated; and all the permanent teeth in both jaws are in place except the posterior molars, which are still concealed in their alveoli.

In size and general conformation it resembles the skull of *R. sumatrensis*, and possesses all the essential characters<sup>1</sup> which distinguish that species from *R. indicus* and *R. sondaicus*, viz. the separation of the postglenoid from the posttympanic processes of the squamosal below the auditory meatus, the backward position of the occipital crest (though, perhaps, less marked than usual), and the

<sup>1</sup> See "On some Cranial and Dental Characters of the existing Species of *Rhinoceros*," P. Z. S. 1876, p. 443.

indication of a second or frontal horn. I have compared it with the eight skulls assigned to *R. sumatrensis* at present in London—four in the British Museum, and four in the Museum of the College of Surgeons.

These skulls present considerable individual variation in general conformation, proportional breadth to length, in the development and form of the nasal bones, number and position of the lachrymal foramina, form of the posterior margin of the palate, and other details. The present skull, however, is strikingly different from all in its superior breadth compared with its length, and especially the breadth and flatness of the frontal region. The annexed table of dimensions exhibits the extent of this peculiarity; and, to make it more manifest, I have added the ratio of the breadth, taken between the anterior margins of the orbits (where the difference is most characteristic), compared with the entire length of the skull, the latter being taken as 100. On looking down this column of the Table, it will be seen that, though there is a considerable variation among the

	Length from occipital crest to anterior extremity of nasals.	Greatest breadth across zygomata.	Breadth across anterior edge of orbits, in groove above lacrymal eminence.	Proportion of last to length as 100.	Breadth across maxillæ above middle of last premolar tooth.	Length of upper molar and premolar teeth (excluding first and last).	Proportion of last to length of skull as 100.
1. Adolescent (all permanent teeth except milk-molars), from Tipperah .....	20.0	12.0	6.8	34.0	7.3	8.0	40.0
2. Aged ♀. Malacca. Died in Zool. Gardens, 1872. B. M. ...	20.7	11.8	6.0	29.0	6.4	6.5	31.4
3. Aged ♀. Sumatra. Mus. R. C. S. No. 2933 .....	20.4	11.1	5.2	25.5	6.1	6.6	32.6
4. Adult. Pegu. B. M. ....	21.4	11.1	5.9	27.6	6.6	6.9	32.7
5. Adolescent ♂ (all permanent teeth except last molars). Sumatra. M. R. C. S. No. 2935	23.0	12.0	6.0	26.1	7.0	7.6	33.0
6. Young (last milk-molar remaining). Sumatra. M. R. C. S. No. 2937 .....	19.0	10.6	5.0	26.3	6.5	7.3	38.0
7. Young (dentition as last). B. M. ....	18.9	10.5	5.0	26.4	6.3	6.9	36.5
8. Younger (all milk-molars and first and second permanent molars). Sumatra. M. R. C. S. No. 2936.....	21.0*?	10.7	5.2	24.8?	6.4	7.0	33.3?
9. Still younger (all milk-molars and first permanent molars). Borneo. B. M.....	18.1	9.6	5.0	27.6	6.2	Teeth nearly all lost.	

\* Nasals broken.

other skulls, the difference between the narrowest and widest being almost as great as that between the latter and the present skull, yet there are intermediate gradations in the former case, whereas the Tipperah skull is completely isolated from the others. It is curious that the skull which comes next to it in width is that of the small dark-coloured animal from Malacca, which died in the Society's menagerie in 1872, and of which the external characters were certainly quite unlike those of *R. lasiotis*.

A second peculiarity by which this skull is distinguished from all the others, and one to which I am inclined to attach still more importance, is the greater size of the teeth, especially the premolars, both absolutely and relatively. This is also seen in the Table, in which is given the absolute length of the series of molars and premolars, excluding the first and last, which are either absent or not developed in many of the specimens under consideration, and including, therefore, the three posterior premolars and the two anterior molars. In the case of the younger skulls, milk-molars occupy the place of premolars; but this probably does not materially affect the length of the series. It will be seen that in the present skull this length absolutely exceeds that of any of the others, and, relatively to the length of the skull (taken as 100), it is 40.0, whereas, of the other seven, five range between 31.4 and 33.3, and the other two, which give a higher figure, are both young animals, in which the skull had not attained its full dimensions, and the teeth therefore appear relatively larger than they otherwise would have been. It is probable that sex may affect the size of the teeth, as in the two known females (Nos. 2 and 3 of the list) they are smaller than in any of the others. Not only in antero-posterior diameter are the premolars larger in the present specimen, but still more notably in breadth. Thus the last premolar in the Pegu adult skull (No. 4) is 1".8 in greatest breadth, in the Sumatran female (No. 3) 1".85, in the Malaccan skull (No. 2) 1".9, in the Sumatran male (No. 5) 2".05, in the present skull 2".2. The lower molars exhibit the same superiority of size; but in other respects the dentition does not differ appreciably from that of the various specimens of *R. sumatrensis*.

As an individual peculiarity may be noted the single lachrymal foramen on each side, whereas many of the others have two; but in both the Malacca and one of the other British-Museum skulls, the foramen is also single on both sides, and in the Pegu and one of the Sumatran specimens it is single on one and double on the other side. Again, the great amount of ossification in the base of the pterygoid fossa, at the posterior end of the vomer, forming a sort of "parasphenoid" mass, is worthy of note; but it is repeated in the Pegu skull, and partially in the old Sumatran specimen (No. 2), though not in the equally aged Malacca female.

I have pointed out the peculiarities of this skull, which are interesting in connexion with the fact that it was obtained from a locality quite beyond the hitherto known range of the Sumatran Rhinoceros; but, in the absence of other evidence, will not attempt to decide whether they should be considered of specific value.