

# THE PLEISTOCENE OF CEYLON

with 58 Plates and 40 Text figures

by

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CEYLON NATIONAL MUSEUMS  
NATURAL HISTORY SERIES

July 20th, 1958

Obtainable from the Colombo National Museum

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Printed at the Government Press, Ceylon

X, 164, p. 1-58

Fossil Elephant Molars in Rainpura Museum—(contd.)

Reg. No.	Tooth	Total No. of Folds	No. of Folds in 10 cms. of worn crown	Basal length	Diagonal length	Greatest lateral height of a fold	Width of tooth	No. of folds in width laterally	Ht. $\frac{Ht.}{W}$	Ht. $\frac{Ht.}{100 W}$	No. of unworn folds	Length of worn surface of crown	Lateral thickness of enamel fold	Lateral thickness of cement fold
R.M.F. 60 (3)	O L 3M	91	51	147	154	124	—	—	—	—	—	—	—	—
R.M.F. 41	O R 3M	—	7	87	125	135	61	4	2.2	—	1	72	11	5
R.M.F. 134	O L 2M	—	Unworn molar 31	70	110	97+	83	31	1.1	—	5	111	11	9
R.M.F. 87	O R 2M	—	—	103	212	117	66	—	1.7	—	3	—	—	—
R.M.F. 24	O L 3	61	61	159	180	133	70	—	1.0	—	—	—	—	—

## Order PERISSODACTYLA

Frontal is separated from jugal by the temporal and all three enter the orbit. No horns with bony cores occur upon skull, the median axis of the foot passes down the third digit, all tarsals unfused, a third trochanter exists upon femur, premolars highly modified to resemble molars. This order is only represented in Ceylon by the Rhinocerotidae.

Rhinoceroses first commenced to appear in early Eocene times and in the Oligocene their premolars had commenced assuming molariform shape. During Pleistocene times there appeared the modern of one-horned and two-horned genera. In the lower Miocene are fossils of 5 or 6 genera and of these *Baluchitherium* Forster-Cooper is the largest land mammal yet known. In the lowest beds of the Shivalik fossil deposits occurs the genus of comparatively hornless rhinoceros *Aceratherium* Kaup but the modern single horned rhinoceri appear first in the Upper Shivalik deposits of India and persist up to the present day. The two horned rhinoceroses formed both an Asian as well as an African branch, in Pleistocene times and both have survived into the present time.

## Terminology

Since the terms employed in describing the teeth of rhinoceroses have not been fully stabilized, the present terminology is a combination of those of Hooijer 1946, and Cooke 1950.

*Upper Premolars* and *Molars* are roughly cuboid (Fig. 33). The occlusal surface of a tooth resembles the Roman numerals  $\overline{\text{II}}$  or  $\overline{\text{III}}$  with the lower horizontal bar removed. The upper horizontal bar is formed by a longitudinal ridge, the ectoloph, which bears on its labial surface four vertical ridges here termed the parastyle anteriorly, followed by the parastyle fold, the mesostyle and the metastyle posteriorly. The ectoloph consists of an anterior paracone and a posterior metacone. The paracone is connected to the protocone which is on the lingual side of the tooth, by the interconnecting protoconule, the metacone being connected to the hypocone lying on the lingual side, by the metaconule. The protocone, protoconule and paracone form a transverse ridge or crest the protoloph which is the anterior vertical bar of  $\overline{\text{II}}$  while the hypocone, metaconule and metacone form another the metaloph, which is the posterior vertical bar of  $\overline{\text{II}}$ . Separating these two ridges is a trough or valley the medisinus, behind which is the post sinus separating the metaloph from the posterior or metastyle end of the ectoloph. The anterior valley is usually a vestigial shelf (fig. 33.7).

The median valley or medisinus ends labially in a sac-like termination. From a lump-like mass upon the floor of this sac there arise three vertical ridges or columns which gradually separate out as individual ridges as they near the occlusal surface of the crown. (Fig. 33. II).

Attached to each conule connecting the enlarged cones to the ectoloph is one of these vertical ridges near the blind end of the valley. The one attached to the protoconule is the anterochet, that attached to the metaconule is the crochet, while attached to the paracone is the third ridge, the crista which is often bifurcate. When the tooth is worn down to the level where a pair or more of these opposed vertical ridges unite they partition off the blind end of the valley to form one or two circular or elliptical pits termed fossettes to which are added the prefix pre-, medi-, or post-, according to their positions. When the tooth has been worn to a certain level the hypocone and metacone are found to be united at the margin of the tooth. The remnant of the posterior valley thus occluded is represented by an ovate or circular post-fossette. Sometimes the posterior extension of the metastyle unites with a metastyle fold to produce another fossette posteriorly. (Fig. 33d II).

The singulum extends across the anterior and part of the posterior surfaces of the tooth. Along the anterior face of the base of the protocone it forms a more or less wide shelf and is at

times represented by a tubercle on the posterior face of the protocone at the entrance to the median sinus. Another such tubercle is also formed on the metacone which is the labial side of the entrance to the posterior valley or postsinus.

*Lower teeth* are all 'W' shaped, each consisting of two crescents placed uniserially. The anterior of these is termed the metalophid, the posterior one the hypolophid. (pls. XLVIII and XLIX).

The prominences projecting lingually are termed the paraconid anteriorly, the metaconid mesially, the entaonid posteriorly. The bays formed between them are the metaflexid anteriorly and entoflexid posteriorly. The labial aspect is composed of the protoconid anteriorly, the hypoconid posteriorly. The former is the labial boundary of the metaflexid, the latter of the entoflexid. A tubercle projects into the entoflexid in some species, e.g. *R. sivalensis*. *Fossette formation* in *Rhinoceros sivalensis* from off the median valley is by (1) the crochet fusing with the ante-crochet or protocone, (2) the crista fusing with the crochet, (3) the crista fusing with the ante-crochet. These fossettes will be termed medi-fossettes when the tooth is worn down; the posterior valley only produces a single fossetto, the post fossetto by the external lingual fold of the metacone fusing with the labial fold of the hypocone.

### Family Rhinocerotidae Owen

*Rhinocerotidae* Owen 1845, a History of British Fossil Mammals.

In Asia this family ranges from Miocene to Recent and comprises some nine or ten sub-families, some possessing—

- (a) two horns, upper incisors usually vestigial or absent, e.g. the *Ceratocerotinae* of Asia, Africa and Europe, with living genera and species in the first two continents;
- (b) one horn, upper incisors blade-like, developed, e.g. the *Rhinocerotinae* Dollo, with living and extinct species restricted to Asia; (fig. 33a);
- (c) a vestigial horn and elongate body with short limbs, e.g. the *Teleocerotinae* Hay, of North America and Europe, extinct;
- (d) A vestigial horn and body of normal shape, upper incisors present, e.g. the *Accratheriinae* Dollo of Europe and Asia, extinct;
- (e) No trace of a horn or of upper incisors, build slender, e.g. the *Turkanotheriinae* Deraniyagala, from the Pliocene of East Africa, extinct.

### Subfamily Rhinocerotinae Dollo

*Rhinocerotinae* Dollo 1885, Rev. Question Sci. Brussels, vol. 17, p. 293.

Premaxillaries strong, with well developed blade-like incisors. Two genera restricted to the Pleistocene and Recent of Asia. One of them occurs in Ceylon.

### Genus *Rhinoceros* Linné

*Rhinoceros* Linné 1758, Systema Naturae Ed. X type loc. India, type 'unicornis' Linné.

Rhinoceroses with the nasal bones expanded into a boss for carrying only one horn, upper incisors enlarged and blade-like, lower ones procumbent, skull short and with occipital area

sloping forwards from condyle, auditory meatus closed inferiorly by fusion of post-tympanic and post-glenoid processes, cheek teeth sub-hypsodont. Posterior angle of mandible with a protuberance. Six extinct and two living species. Pleistocene to Recent of Asia.

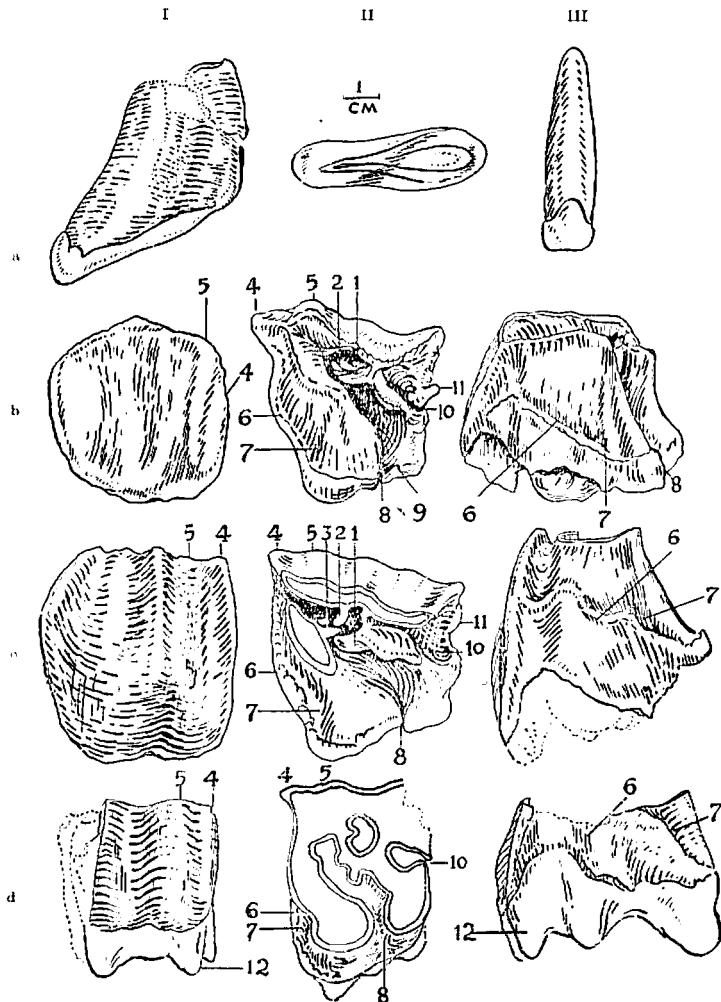


Fig. 33. Upper teeth of the two extinct Rhinoceroses of Ceylon.  $\times \frac{1}{3}$  natural size (a) upper incisor, seen from the side, II is its occlusal surface (1); III is its front view. The enamel covered crown is greatly worn. This tooth is also shown on pl. XIX fig. e it is Reg. No. F. 57. 304.

Sub-Figs. (b), (c), (d) are upper molars with their parts indicated thus:— 1 = crochet, 2 = crista, 3 = antecrochet, 4 = parastyle, 5 = paracone, 6 = cingulum, 7 = anterior shelf or valley, 8 = median valley, 9 = tubercle, 10 = posterior valley, 11 = tubercle of vestigial cingulum, 12 = root.

These aspects of each molar are shown from the reader's left to his right as follows:—

To the left is the labial aspect of the tooth, in the centre is an occlusal view with the ectoloph at the top, the figure to the right is an anterior view of the tooth showing the protoloph.

In II, (b), (c), (d), the protoloph extends downward from 4 to 8. The cone between 7 and 8 is the *protocone* that between the median valley 8 and the posterior valley 10 is the *hypocoene*, the one above the posterior valley and forming the end of the ectoloph is the *metacone*. The area connecting the *protocone* to the *paracone* is the *protocune*, that which connects the *hypocoene* to the *metacone* is the *metacune*.

(b) Holotype second molar of *Rhinoceros sinhaleyus* Deraniyagala. This tooth is also shown on Plate XLVII Figs. 1, 5; Reg. No. F. 12.

(c) Holotype second molar of *Rhinoceros kugavensis* Deraniyagala, sp. nov. also shown on Plate XLVII Fig. 3, 2, 6; Reg. No. F 57.26.3

(d) Paratype of *Rhinoceros kugavensis* Deraniyagala sp. nov. also shown on Plate XLVII Fig. 15; Reg. No. F 57.26.3.

#### Key to Two Ceylon Rhinoceroses

1. Upper molars lack antecrochet and are low crowned.....*R. sinhaleyus*.
2. Upper molars with antecrochet and are high crowned.....*R. kugavensis*.

#### *Rhinoceros sinhaleyus* Deraniyagala Pls. XLVII, XLVIII, XLIX

*Rhinoceros sinhaleyus* Deraniyagala 1939, Journal Royal Asiatic Society (Ceylon vol. XXXIII, No. 88 Fig. 1.

*Rhinoceros sivalensis* Deraniyagala 1937, Spolia Zeylanica, vol. XX, p. 196, Pl. VI.

*Rhinoceros sivalensis sinhaleyus* Deraniyagala, 1939, Journal Royal Asiatic Society (Ceylon Branch,) vol. XXXIV, No. 91, Fig. 2, Science and Culture vol. VII, p. 94, Fig. 2.

*Rhinoceros sondaicus simplivius* Deraniyagala 1946, Spolia Zeylanica, vol. 24 pt. 3, pp. 161-167, pl. 1 text fig. 1.

*Rhinoceros sinhaleyus* is somewhat smaller than the living Indian *R. indicus* and possesses a strong outer gonial prominence to the angle of the mandible (Pl. XLIX, Fig. b). The upper molars are mesodont or almost brachydont, and possess a feebly wavy labial aspect to the ectoloph; the parastyle buttress is moderately developed, and not as pronounced as in *R. sondaicus*. In this character it resembles *R. unicornis*. The crochet is well developed, bifid or trifid and apt to unite with the crista to form a medifossette. The antecrochet is absent, the crista is variable being present in some teeth wanting in others, tubercles are present at the entrance to the median valley in some premolars but are generally wanting in the molars, the cingulum is best defined anteriorly and often wanting lingually. It is sometimes represented by a tubercle at the entrance to each of the two valleys. The lower cheek teeth lack the conical prominence in the entoflexid of *R. sivalensis*. (Pl. XLVII).

Measurements :—

TABLE XIII

Comparison of dental characters of *R. sinholeys* with those given in Colbert 1912 for *unicornis* and *sandicus* are as follows :—

	<i>R. unicornis</i>	<i>R. sandicus</i>	<i>R. sinholeys</i>	<i>R. kagavena</i>
Teeth	Advanced sub-hypsodont or mesodont	sub-hypsodont or mesodont	More brachyodont than either of the other species	Hypsodont
Ectoloph	Nearly straight	Sinuous	Feebly sinuous	Nearly straight
Parastyle buttress	Faint	Strong	Moderate	Feeble
Crochet	Developed	Present	Developed	Strong
Crista	Developed	Usually wanting	Usually present	Strong
Crochet and Crista	Unite to form a medio-fossette		Unite to form a medio-fossette	
Antecrochet			Usually wanting	Present

**Dentition**

Incisors :—

- (a) The upper incisor is as long as a molar, compressed and blade-like, with a shallow lateral groove extending vertically up the middle of the root (Pl. XIX, Fig. e). Known from a single tooth F. 57.30.4 recovered from the gem pit of Mr. B. M. Gunaseela at Naranvatta, Karmaragapitiya, Palamadulla. It lay above the base of the gem sand and almost upon the decomposed bed-rock at a depth of 24 feet beneath the surface. Associated with it was part of an upper molar of *Elephas maximus sinholeys*. (Fig. 33a).

The enamel on the crown had been worn off from the posterior quarter of its length. The diagonal length of the tooth inclusive of the root is 80 mm., the length of the crown 58 mm., the greatest anterior width of crown 17.5 mm., posterior width of crown 13 mm., the thickness of the enamel is 5 mm.

- (b) The lower incisor is rod like, procumbent and with shallow longitudinal grooves. A Rhinoceros right lower incisor F.58.8.23.

From a gem pit in a paddy field at Hurulle Ela at Katurana, near Kurugammodera, Domppe.

Crown badly worn, a shallow groove extends along the upper surface of the root which is feebly curved, and thicker along its outer edge than along its medial or inner. The tooth is procumbent and badly worn, the crown is only one third the length of the conical root which is sub-triangular in section. The occlusal surface has been worn obliquely and comes down on to the dentine of the root.

Total length 122 mm, length of worn crown surface 40 mm, basal width of worn crown surface 33, height of enamel of crown 31 mm, length of root 95 mm, thickness of root on outer edge 27 mm; thickness along its posterior edge 12 mm; antero-posterior diameter across base of crown 37 mm, Earth layers of gem pit were as follows :—

Mud and humus 3'; green clay 2'; red gravel 1'; gem sand 1'; blue micaceous Kaolin. Fossil found in the gem sand.

*Upper Premolars*

The four upper premolars are very molariform, particularly the 2nd, 3rd and 4th.

- (a) The first upper premolar is slightly higher than wide and possesses two roots, the paracone is well differentiated from the metacone by a groove along the labial surface.
- (b) The second upper premolar possesses a protocone which is smaller than the hypocone. The Cingulum is feeble and does not form an anterior shelf, while on the lingual aspect it exists only as a tubercle at the entrance to the median valley (Pl. XLVII fig. 11). The hypocone by overlying the protocone strongly constricts the floor of the median valley, which however expands at its labial end to form a pit into which projects a well-developed bifid crochet and a somewhat poorly developed crista. The posterior valley possesses a wide entrance and terminates in a rather deep pit which forms a posterior fossette when the tooth is worn down.
- (c) The fourth premolar possesses a protocone that is larger than the hypocone. The cingulum forms a rudimentary shelf upon the anterior aspect of the former and is only represented up on the lingual aspect by a tubercle at the entrance to the median valley. The crochet is well defined on the metaloph. In the worn tooth there is generally one pre-fossette and one elliptical post-fossette.

No. F. 90 is the protocone of a broken upper fourth premolar. Antero-posteriorly it is narrow being 23 mm. while the tooth is 40 mm. labio-lingually along its anterior aspect. The cingulum which forms a short and feeble shelf on the anterior aspect of the protocone disappears from the lingual aspect but is represented by a tubercle at the entrance to the median valley, a feeble bulge suggests a rudimentary ante-crochet (Pl. XLVII fig 9).

*Upper molars*

The crowns of the unworn molars are low, being generally about as high as long. In the *first molar*, the labial surface is almost as flat as in the Indian *Rhinoceros unicornis* and flatter than in the African black rhinoceros *Diceros bicornis*. Consequently the degrees of prominence of the parastyle and paracone respectively and the depth of the groove between them are variable while the labial border of the ectoloph is not very sinuous.

In the second molar, however (Pl. XLVII fig. 1), there is a marked vertical groove or depression separating the paracone from the metacone along the labial aspect of the tooth, which is otherwise somewhat flat and resembles the living *R. unicornis*. Generally there is a strong crochet forming an angle of about 45° with the lingual part of the metaloph.

The crista is not infrequently bifid and one portion of it might unite with the crochet to form a pre-fossette. The cingulum commences on the lingual aspect of the base of the protocone and ascends obliquely towards the parastyle or the labial aspect of the tooth. Posteriorly, the cingulum ascends obliquely from the base of the metacone towards the metastyle and there is generally a tubercle on the labial side of the entrance to the posterior valley which is formed by the metacone.

*The third molar.*—The parastyle and paracone are closer together than in the second molars and better defined. It also possesses a crochet and crista, but no antecrochet. The parastyle and the protocone buttress, although well developed, are not as prominent as in the Javanese *Rhinoceros sondaicus*. The cingulum forms a feeble shelf anteriorly upon the base of the protocone. The hypocone gives out a strong crochet.

F. 58. 7. 22. A rhinoceros upper molar L3M taken from a gem pit at Panvula, Edandevala, Kuruvita. Possesses a crochet but no crista or antecrochet. The cingulum is distinct along the base of the tooth but does not form a shelf. The protoloph does not form a rudimentary antecrochet.

Earth layers are as follows:— Mud and humus 4 : fine white sand 3 : white clay 6 : gravel 11 : gem 2½-Micaceous kaolin.



*Lower Premolars.*—The second lower premolar possesses two roots and the paraconid is fairly well marked from the metaconid by a groove along the labial surface of the tooth. Known from a single tooth obtained from a depth of 8 feet at Ihala Minuvandeniya, Gōnapitiya, Kuruvita. The labial aspect of the crown is 27 mm. high, 27 mm. long and 17 mm. thick. The root is 25 mm. long.

*Lower Molars.*—These (Pl. XLVIII, Figs. *b*, *d*) lack the conical prominence that is so conspicuous in the entoflexid of *R. sivalensis* (Pl. XLVIII, Figs. *a*, *c*).

TABLE XIV  
Dimensions of Upper teeth

Reg. No.	Tooth	Length of Ectoloph	Length of Protoloph	Crown height	Length of median valley	Plate XLVII
(1) F. 97 <i>R. sivalensis</i>	<u>2 R.P.M.</u> O	36 mm. +	25 mm. +	21 mm.	26 mm.	fig 11
(2) F. 95 <i>P. sivalensis</i>	<u>4 R.P.M.</u> O	44	53	12	33	13
(3) F. 24a <i>R. sivalensis</i>	<u>3 R.M.</u> O	41 +	43 +	20	29	16
(4)	<u>I.D.L.M.</u> O	39 +	30 +	13	24	
(5) F. 13 <i>R. kagavenu</i>	<u>I.L.M.</u> O	44	50.6	30	29	14
(6) F. 12 <i>R. sivalensis</i>	<u>2 L.M.</u> O	56	48	38	48	1, 5
(7) F. 96			29 +	32 +	40	0
(8) F. 16				37 +	37	
F 57-26-3 (R.M.F. 64) <i>R. kagavenu</i>	<u>1 L.P.M.</u> O	43	62	34	34	15
F 190 <i>R. kagavenu</i>	<u>2 M.</u> O	51	59	47	27	3, 7
F 57-34-3 (R.M.F. 66) <i>R. kagavenu</i>	<u>2 L.M.</u> O	58	62	64	49	2, 6
F 57-28-3 (R.M.F. 69) <i>R. sivalensis</i>	<u>2 R.M.</u> O	58	60	40	34	12
F 57-23-3 (R.M.F. 70) <i>R. kagavenu</i>	<u>2 P.M.</u> O	55	53	47	37	8

TABLE XIV—*contd.*

<i>Reg. No.</i>	<i>Tooth</i>	<i>Length of Ectoloph</i>	<i>Length of Protoloph</i>	<i>Crown height</i>	<i>Length of median valley</i>	<i>Plate XLVII fig.</i>
F 57-27-3 (R.M.F. 47)	3 L.M. O	54	51	36	31	
<i>R. sinhalensis</i>						
F. 186	3 R.M. O	58	58	45	36	4
<i>R. kagavena</i>						
F. 57-174-19 R.M.F. 9 (b)	3 L.M. O	52	49	47	36	
<i>R. sinhalensis</i>						
F 57-25-3 R.M.F. 20 (a)	3 L.M. O	47	52	37	39 Pl. xxi fig. 6	
<i>R. sinhalensis</i>						
F 57-31-4	—	—	—	55	—	
Milk Premolar F. 19	2 D.M. O	—	—	—	27	10
<i>R. sinhalensis</i>						
F 58-7-22	3 R.M. O	51	48	42	44	—
<i>R. kagavena</i>						
F 58-1-21	2 R.M. O	55	59	67	48	—
<i>R. kagavena</i>						

TABLE XV  
Lower teeth

<i>Reg. No.</i>	<i>Tooth</i>	<i>Length</i>	<i>Width</i>	<i>Crown height</i>	<i>Remarks</i>
F. 212	lower molar	47 mm.	28 mm.	41 mm.	worn
F 57-22-3 R.M.F. 71	lower molar	55	28	54	unworn
F. 14	lower molar	42	21	36	worn
F. 17	lower molar	47	25	51	unworn
F. 26 (r)	lower molar	44	20	31	unworn
F. 57-33-4	lower molar	38	22	30	worn
F 57-29-3 R.M.F. 67	lower molar	41	27	33	worn
F 57-57-7 R.M.F. 72	lower molar	—	31	53	broken and worn
F 57-32-4 R.M.F. 34	lower molar	41	21	29	worn
F. 215 R.M.F. 119	lower molar	34	27	12	worn
F 57-34-4 Premolar	—	27	17	26	unworn

## Teeth in Mandible F 18. of Pl. XLVIII Figs. b, d,

Serial No.	Tooth	Crown length	Width	Crown height
(6)	O	42 mm.	42 mm.	38 mm.
	4 P.M.			
(7)	O			
	IM	43	31	36
(8)	O			
	2 M	46	31.5	38

TABLE XVI

Comparison of the length and depth of the ectoloph of *R. sinhaleyus* and of *R. kagavens* with those given for *R. sinensis*, *R. unicornis* and *R. sondaicus* by Colbert & Hooijer (1953) is as follows:—

Species	Tooth	Length of ectoloph	Height of crown
<i>R. sinhaleyus</i>	2 P	36 -	21
	O		
	4 P	44	12
	O		
	1 M	30 +	13
	O		
<i>R. kagavens</i>	1 M	44	30
	O		
	2 M	56	58
	O		
	2 M	58	63
<i>R. sinensis</i>	O		
	3 M	41	20
	O		
	3 P	47	69
	O		
<i>R. sinensis</i>	3 P	47	66
	O		
	4 P	54	74
	O		
	4 P	50	64
	O		

TABLE XVI—contd.

Species	Tooth	Length of ectoloph	Height of crown
	1 M	65	79
	O		
	2 M	63	75
	O		
	2 M	65	77
	O		
<i>R. unicornis</i>	3 P	46-50	58-68
	O		
	2 M	61	72
	O		
<i>R. sondaicus</i>	3 P	42	51
	O		
	1 M	49	53
	O		

*Mandibular body* No. F 18 is shown on Pls. XLVIII and XLIX. It is the right mandibular body with ramus, and containing the fourth premolar, and first and second molars; the third is missing. It is 330 mm long and was obtained by Mr. T. Walloppillai on July 19, 1939, from his gem pit at Kuttapitiya. A molar of *Elphas maximus sikhaleyus* was associated with it, which might indicate that the two animals were contemporaries. The bedding in the pit is as follows:—Recent earth 2 feet, lateritized soil 3 feet, grey clay 2 feet, blue clay 1½ feet, brown sand 1 foot, grey sand 1 foot, leaf bed 6 inches, grit 9 inches, grey gem sand, fossils and boulders 6 inches to 2 feet, decomposing bed rock or marlava.

#### Rhinoceros kagavena

Pl. XLVII figs 2, 3 and text fig. 33

*Identification*: Molars larger and more hypsodont than in *R. sikhaleyus*. The upper cheek teeth with a crochet, and usually an antecrochet and crista, cingulum developed along anterior aspect of protocone. A species somewhat larger than *R. sikhaleyus*. Its fossils occur in the gem of pits in Sabaragamuva Province.

*Type* No. F. 57. 24. 3. An upper left second molar (Pl. XLVII, figs 2, 6 and text fig 33C). It differs from a second molar of *R. sikhaleyus* in that the paracone buttress is not as pronounced along the labial surface of the tooth, which latter is higher than long, whereas in *R. sikhaleyus* the height equals the length. The former also possesses a well developed ante crochet and crista but lacks the pillar-like prominence at the entrance to the posterior valley. Obtained from a Kuruvita gem pit 20 feet deep at Hiriliyadda, Talāvitiya.

*Paratypes*—No. 57.26.3. (pl. XLVII, fig. 15)—Is a first molar in which the crochet is fused with the crista. Obtained from gem sand 15 feet deep at Mātivaḷa Deniya, Pohorabhava.

No. F. 186—Is a right upper 3rd molar (Pl. XLVII, fig 4). Both the crochet and crista are well developed, whereas in *R. sikhaleyus* the 3rd molar lacks the crista. Obtained from Moragalaa Kumbura, Ahaliyagoda.

No. F.58. 1. 21.—Has a well developed crochet, ante crochet and crista. The paracone ridge is not as pronounced upon the labial aspect of the tooth as in our *R. sikhaleyus*, and the tooth itself is higher than wide. Obtained from Pahalamēepitiwēla, Gāthetta at a depth of 20 ft.

No. F. 190—Possesses a crochet, ante crochet and crista, and agrees well with the description of the previous tooth. Obtained from Maddu Kumbura, Kosgoda, Kuruvita.

No. F. 13—Possesses a crochet, ante crochet and crista and is a badly worn specimen. Obtained from Ampalauva, Kuruvita.

*R. kagavena* is somewhat younger than the hippopotamus, the results of a uranium analysis by Dr. K. Oakley being as follows:—

<i>Hippopotamus tooth</i> (F. 58. 2. 21).		c. $U_3O_8$ %
Enamel .....		c. 0.0008
Dentine .....		less than 0.0001

*Rhinoceros tooth* (F. 58. 1. 21).

Enamel .....	c. 0.0002
Dentine .....	less than 0.0001

*Horizon*.—From the gem sands of gem pits in Sabaragamuva Province.

*Dimensions*.—Upper molars of *Rhinoceros unicornis* Linné

	Tooth	Length of ectoloph	Length of protoloph
Skull in Intermediate College, Mysore, India	3 R M O	48 mm.	35 mm.
	2 R M O	58	60
	1 R M O	53	60

TABLE XVII

The length of ectoloph  $\times$  height of crown of unworn teeth of some rhinoceroses

Tooth	<i>R. kagavena</i>		<i>R. sinholeylus</i>	<i>R. unicornis</i>		<i>R. sondaicus</i>		<i>R. sinensis</i>	
	a	b	a	a	b				
2 P O	36+ $\times$ 21								
3 P O				46—50 $\times$ 58—68		12 $\times$ 51		47 $\times$ 69	47 $\times$ 66
4 P O	44 $\times$ 12							54 $\times$ 74	50 $\times$ 64
1 M O	30+ $\times$ 13	44 $\times$ 30			53	49 $\times$ 53		65 $\times$ 79	
2 M O	56 $\times$ 58	58 $\times$ 63	51 $\times$ 47	61 $\times$ 72	58			63 $\times$ 75	65 $\times$ 77
3 M O	41+ $\times$ 20		48 $\times$ —		48				