FOSSIL REMAINS OF RHINOCEROS FROM THE PHILIPPINES

by
Angel P. Bautista[1]

INTRODUCTION

The rhinoceros belongs to a great family of odd-toed ungulate - RHINOCEROTIDAE that once ranged over the northern hemisphere from the Eocene epoch to Pleistocene. Present living species of rhinoceros are found only in Africa and Southern Asia. They are *Rhinoceros unicornis* (great Indian rhinoceros), *Rhinoceros sondaicus* (Javan rhinoceros), *Rhinoceros sumatrensis* (Sumatra two-horned rhinoceros), *Diceros bicornus* (black rhinoceros) and *Certotherium sp.* (white rhinoceros).

In the Philippines, the first fossil remains of rhinoceros were discovered by Alfonso Bagunu and Rodolfo Albano in 1936 in Laya, Cagayan. These finds were identified as *Rhinoceros Philippinensis* sp. nov. Koenigsvald, 1956.

Fossil remains of rhinoceros were also discovered in Cabalwan, Cagayan; Fort Bonifacio, Rizal; and recently in Butuan City, Agusan del Norte. However, a descriptive report on these materials has not been undertaken.

It is the purpose of this report, therefore, to present the description of the fossil remains recovered from the three sites mentioned.

METHODS

Fossil remains were identified and distinctive features were noted. Measurements such as length, length of outer surface, anterior widths and posterior width in millimeters were taken and comparison with the measurements of other species of rhinoceros from published data was also done.

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[1] Supervising Museum Researcher, Archaeology Division, National Museum.

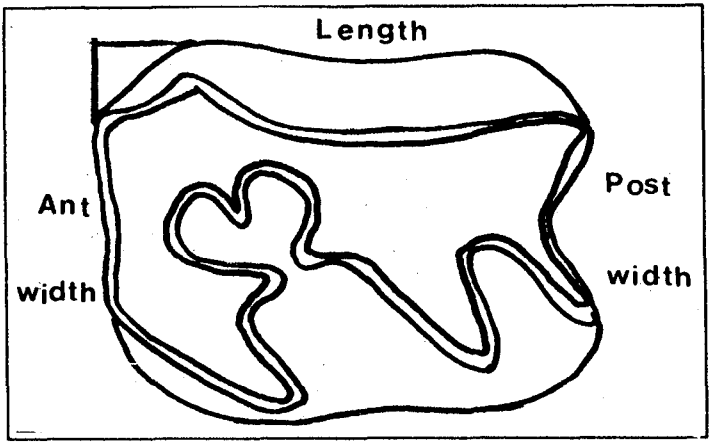

Figure 1. Dimensions used in measurement

RESULTS

A. Accession No. P - 105A, Locality - Fort Bonifacio, Rizal

1. The specimen was recovered in Fort Bonifacio, Rizal. No stratigraphical description of the site was made. The specimen consists of fragmented right maxillary with well preserved M1, M2 and fragmented protoloph of M3. M1 is rather hypsodont with parastyle fold, a well defined crista and crochet, anterior fossette, well developed post fossette and cingulum cuspus on the mesial and lingual surfaces. M2 is rather hypsodont with paracons missing, weak crista and well developed crochet, round anterior fossette, post fossette and cingulum cusps on the mesial surface.

2. The following is the list of metric characters of the three superior right molars:

	M1	M2	M3
Length	41.5 mm.	44.1 mm.	
Anterior width	47.6 mm.	50.2 mm.	44.2 mm.
Posterior width	40.5 mm.	41.8 mm.	

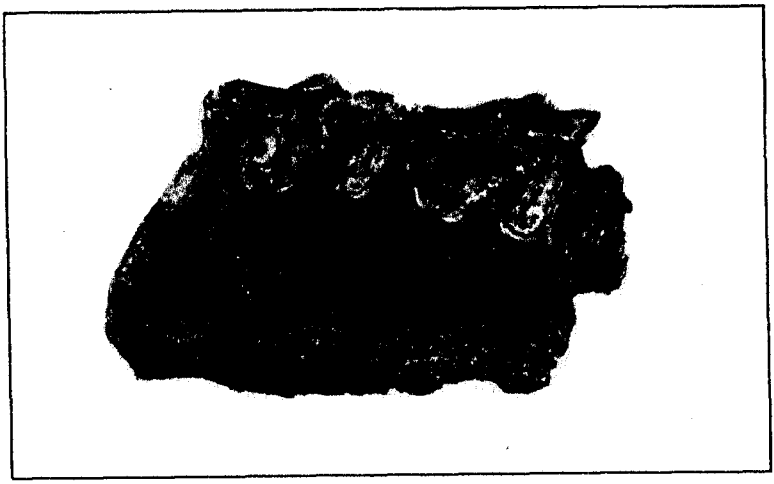

Figure2. Superior right molar (P-105A), occlusal view.

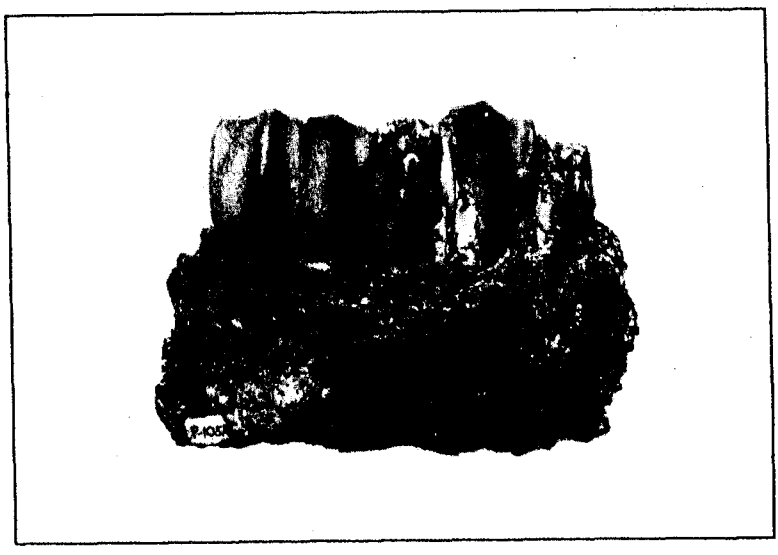

Figure 3. Superior right molar (P-105A), buccal view.

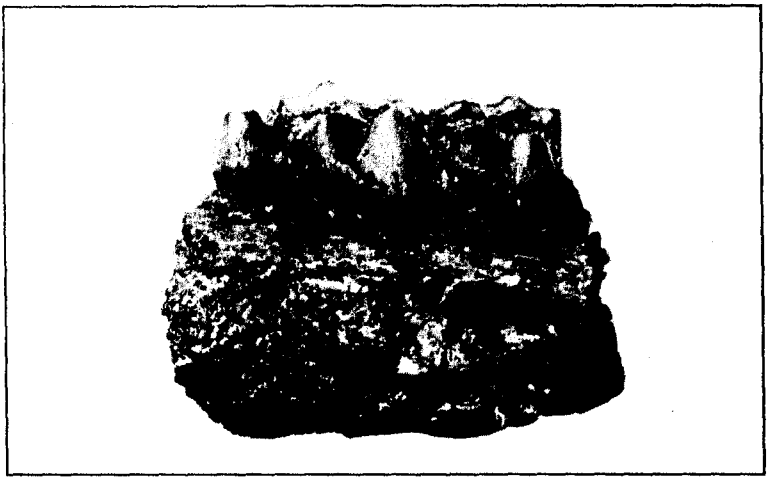

Figure 4. Superior right molars, lingual view.

B. Accession No. X-86-J2-83, Locality - Balanghai Archaeological Site, Butuan City, Agusan del Norte.

1. Two superior teeth (right PM4, left M3) were recovered in a disturbed protohistoric cultural level of Balanghai Archaeological Site, Butuan City. Evidence of drilling was found on the root portion of the teeth. Worn PM4 has a parastyle fold, weak crochet, anterior fossette, small deep post fossette and cingulum cusp on the mesial surface. M3 has a parastyle fold, well developed crochet, anterior fossette and deep post fossette.

2. The following is the list of metric characters of two superior teeth:

	Pm4	M3
Length	44.0 mm.	44.2 (outer surface) mm.
Anterior width	54.9 mm.	42.8 mm.
Posterior width	44.0 mm.	35.5 mm.

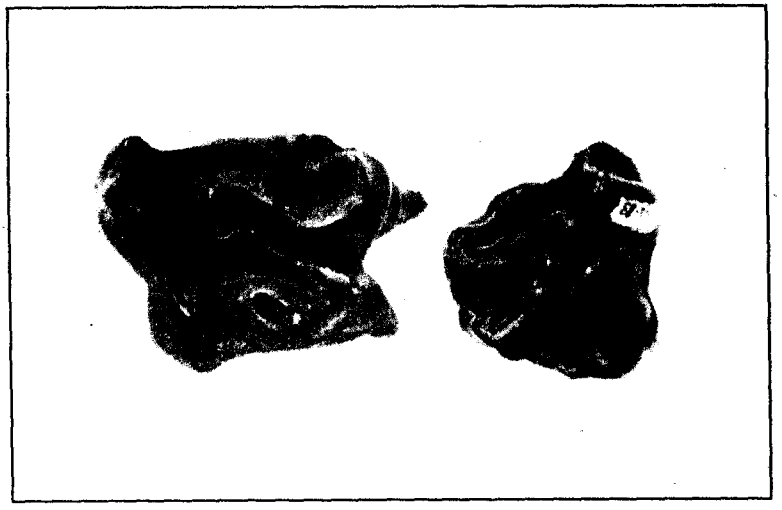

Figure 5. Right PM4 and left M3, (X-86-J2-83), occlusal view.

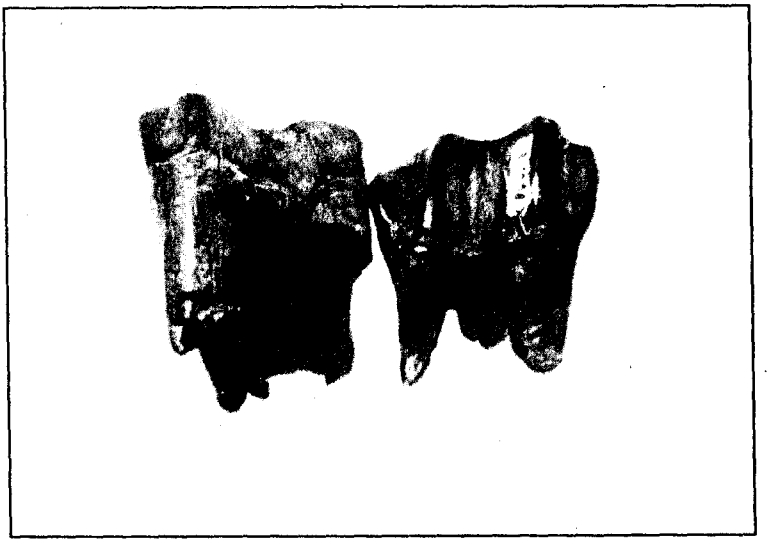

Figure 6. Right PM4 and left M3 (X-86-J2-83), buccal view.

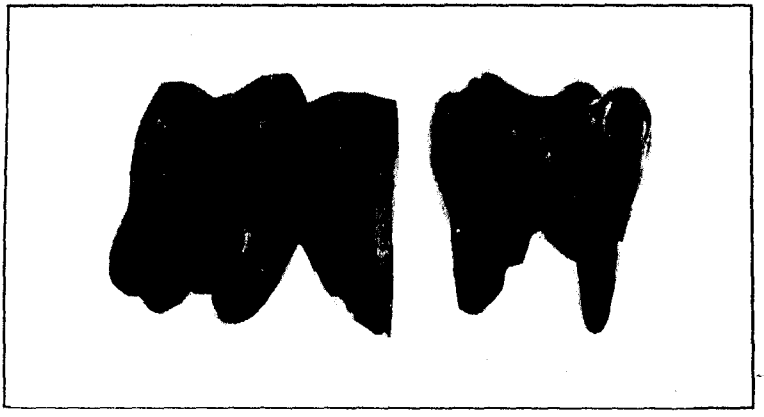

Figure 7. Right PM4 and left M3 (X-86-J2-83), lingual view.

C. Cagayan specimens

Several remains were recovered in Cabalwan, Cagayan Valley but no stratigraphical study of the actual site was undertaken. These remains consist of superior and inferior premolars and molars. However, all the specimens are in fragmentary condition and reconstruction is not possible except for the following specimens.

1. Accession No. P. 478 Locality - Cabalwan, Cagayan Valley
The specimen (superior right? premolar) consists of 2 fragments of outer and mesial surfaces. The metric characters are the following: length of outer surface, 40.5 mm and anterior width, 46.2 mm.

2. Accession No. P. 217 Locality - Cabalwan, Cagayan Valley
The specimens include left superior? molar and right superior? molar. These two specimens consist of outer surfaces. The length of left? molar is 37.4 mm. while the right ? molar is 37.6 mm.

3. Accession No. 73 - N4, Locality - unknown
These specimens include two inferior molars. The measurements are length - 37.3 mm., width - 25 mm. and length - 44.2 mm., width - 26.2 mm.

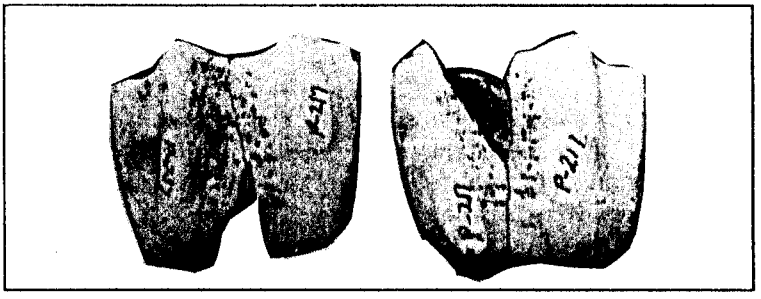

Figure 8. Outer surface of left and right molars.

A comparison of the results of measurements of the specimens from the three sites with other species of Rhinoceros from published data was done (Table 1).

Table 1
Tooth Measurements of Rhinoceros from the Philippines and Neighboring Countries (in millimeter)

	Rizal	Butuan	*Cagayan R. philippinensis* (Koenigsvald) (1956)	*R. Sondaicus* (Hooijer, 1962)			*R. sinensis* (Colbert & Hooijer) (1953)	*R. unicorns* (Colbert & Hooijer) (1953)
				recent	sub-fossil	pleistocene		
PM4								
ant w.	-	54.9	45	51-60	51-52	51-62	57-70	60-69
post w.	-	44.0	43	47-54	Ca-48	48-59	52-64	56-60
M1								
ant w.	47.6	-	-	51-60	-	54-65	-	-
post w.	40.5	-	-	45-52	-	49-56	-	-
M2								
ant w.	50.2	-	-	53-60	57-64	55-62	-	-
post w.	41.8	-	-	45-52	44-51	47-54	-	-
M3								
ant w.	44.2	42.8	-	43-55	57	48-56	-	-
length of outer surface	-	44.8	-	44-58	58	50-62	-	-

DISCUSSION

Fossil remains of rhinoceros from the Philippines are very few and insufficient to know the characteristic feature of Philippine species. Furthermore, stratigraphical investigation of the matrix where some of these specimens were recovered was not undertaken. This gave only one alternative which is to study the morphological and metrical characters of the recovered materials.

Table 1 shows the metric characters of specimens from Rizal and Cagayan are smaller than the other known recent and Pleistocene species of Rhinoceros included in this study. This provided an indication that the form of Rhinoceros in Cagayan and probably the form of Rizal specimens were endemic species. The relationship between the Philippine rhinoceros and other species of rhinoceros from neighboring countries will be cleared only if more and well preserved Philippine specimens are available.

With regard to Butuan specimens, PM4's metric character (anterior width) is within the limits of the size of recent *Rhinoceros sondaicus* (Javan species) but the posterior width is shorter by .2mm only from the lowest value of the size limit of recent Javan species while the length of the outer surface is within the limits of Javan species. Based from this data, there is a possibility that the Butuan specimens belong to recent species of *Rhinoceros sondaicus,* a Javan rhinoceros. Furthermore, the absence of full crista in Butuan premolar and molar resembles closely those of *Rhinoceros sondaicus.*

The specimens from Butuan were recovered in a disturbed protohistoric cultural level along with traded materials from Southeast Asia and China. There is also an evidence of human modification on the specimens such as the presence of holes for stringing purpose on the root portion of PM4 and M3. These known data and the results of descriptive analysis of the specimens provided evidences that Butuan specimens were a part of materials that were brought to the Philippines from Southeast Asia.

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