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ON THE PROBLEMATICAL SPECIES *ACERATHERIUM BOSCHI* VON KOENIGSWALD, 1933

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ABSTRACT

A reexamination of a fossil rhinoceros molar previously identified as *Aceratherium boschi* von Koenigswald has been carried out. It is concluded that the specimen is referable to as *Rhinoceros sondaicus* Desmarest. Examination of the foraminiferal contents of the embedding rock suggests that its relative age is Pliocene or younger. To obtain a more conclusive relative age for this fossil, a detailed restudy is suggested.

INTRODUCTION

A fossilized isolated molar of rhinoceros, reportedly stuck on a sandy limestone, is registered as K 51 at the Museum of the Geological Research and Development Center of Indonesia. It has been considered to be the type specimen of *Aceratherium boschi* von Koenigswald 1933, collected by A.D.H. Bosch from Cisande river, north of Lurahgung, West Java.

Two disputed problems on *Aceratherium boschi* V.K. include the identification and the age of the fossil.

First, von Koenigswald (1933) examined the specimen and assigned it as a new species *Aceratherium boschi* V.K. Later on Hooijer (1946), however, doubted the validity of von Koenigswald's identification, stating that the preservation of the specimen is far from complete to make any concrete identification.

As for the age, von Koenigswald (1933, 1934, 1935a, 1935b, 1949) assigned it to upper Miocene or lower Pliocene. Van Bemmelen (1949) commented on the age which according to Hooijer (1946) that it (*Aceratherium boschi* V.K.) might even be *Rhinoceros sondaicus*. Therefore, this "Tjisande fauna" to which von Koenigswald assigned a lower Pliocene age (Pontian), is rather problematical.

A precise examination of the specimen reveals that the specimen belongs to *Rhinoceros sondaicus* Desmarest and not to *Aceratherium boschi*. The result of the study of this problematic vertebrate remain as well as the lithology and the relative age of the embedding rock are discussed in this report.

We would like to express our cordial thanks to Mr. Darwin Kadar and Mrs. Mimin Karmini, both of the Paleontology Laboratory, Geological Research and Development Center of Indonesia, for their kind advices. Our thanks are also due to the caretaker of the Museum of the Geological Research and Development Center of Indonesia for allowing us to reexamine the specimen.

DESCRIPTION

Rhinocerous sondaicus Desmarest 1822

Aceratherium boschi von Koenigswald, Wet. Med. Dienst. Mijnb. Ned. Ind. no.23, 1933, p.121, pl.XVIII, fig.7–8.
For other synonyms see Hooijer (1946).

Description (Fig. 1)

An unworn left upper third molar. The

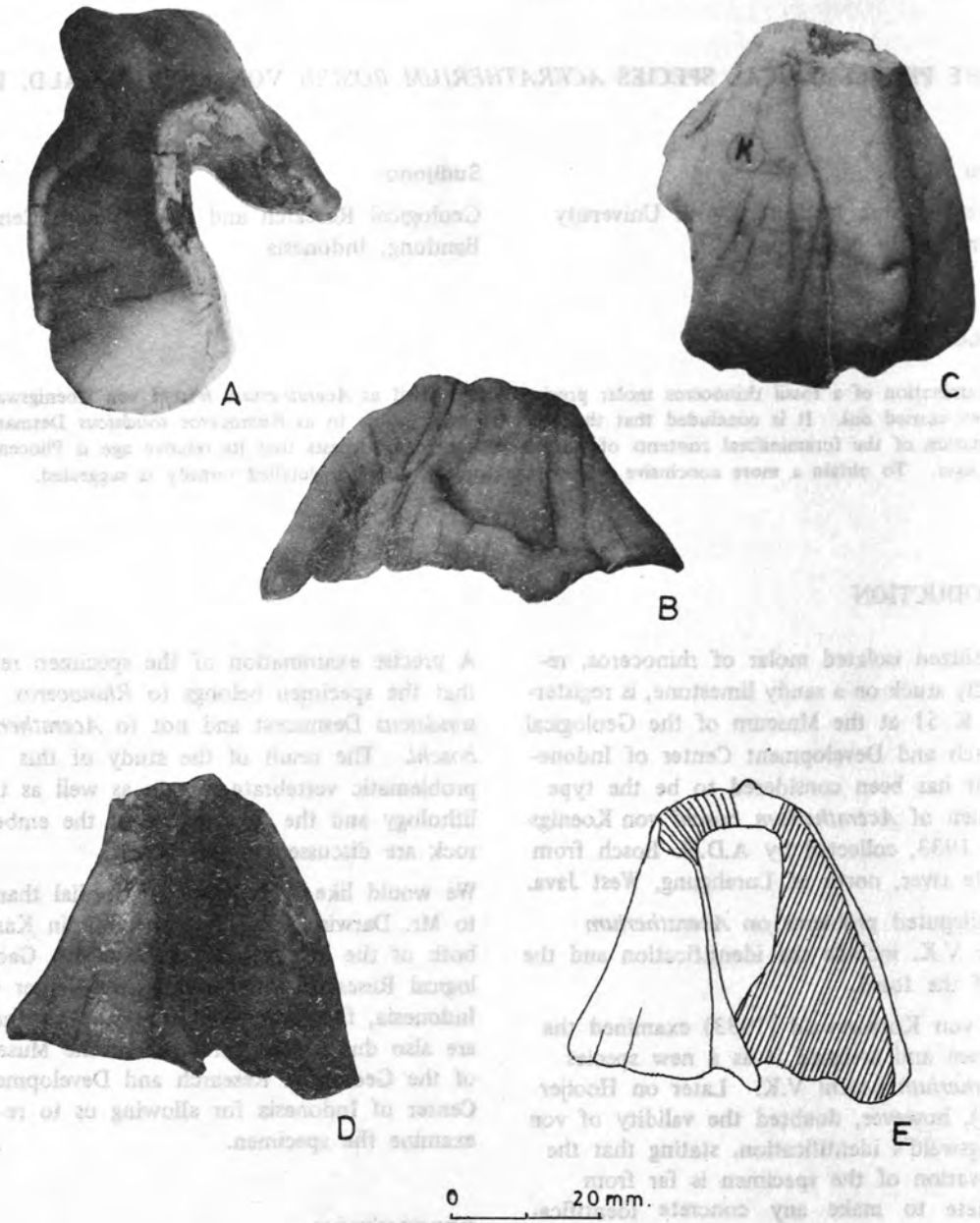

Fig. 1. "*Aceratherium boschi* von Koenigswald"
A – occlusal view; B – mesial view; C – buccal view; D – lingual view; E – buccal view, showing the broken part (striped part).

mataloph and the posterior half of the ectoloph are missing. The occlusal surface in most parts is destroyed, except at the top of the parastyle, where enamel remains are without any sign of attrition. The parastyle does not reach the top of the crown. The angle made by the protoloph and the ectoloph is rather salient. Neither antecrochet nor crista have been observed, whereas the crochet is broken off. The protocone fold is faintly visible. The paracone style is well developed and broad. The protocone is conical and is not swollen at the basal part. The anterior cingulum is distinct but not so well developed as to form the presinus. No internal and external cingula. Only the upper half of the enamel remains as for the lingual wall of the ectoloph. It measures 12.5 mm antero-posteriorly and 22.5 mm in height from the top.

Dimensions

Width (at the base) : protocone – parastyle 52.5 mm, parastyle-posterior edge of the ectoloph 39.5 mm.
Height : protocone 30.4 mm, paracone style 42.2 mm.

Remarks

Von Koenigswald (1933) assigned this specimen to *Aceratherium boschi* n.sp. stating that there is no crochet, in spite of the specimen being broken off the posterior half of the ectoloph. It measures 12.5 mm in width for the remaining antero-internal part of the ectoloph. Table 1 shows the distance from the anterior border of the internal ectoloph wall to the anterior base of the crochet in *Rhinoceros sondaicus* Desmarest. If the tooth is younger at the stage of wear, the distance is greater (Fig. 2 and Tab.1). It ranges between 6.4 mm and 15.5 mm. This range covers the width of the remaining ectoloph.

Supposing that the specimen has no crochet, but actually this part is missing, von Koenigswald insisted about the similarity between the specimen and *Aceratherium bugtiense* Pilgrim.

Pilgrim (1912) described on *A. bugtiense* "with strong internal as well as anterior and posterior cingula; external cingulum probably present on all the molars". The specimen in problem, however, bears only anterior cingulum and no others. This character together with size difference excludes the specimen from *Aceratherium.*

Up to now, there are two species of *Rhinoceros*, i.e. *R. kendengindicus* and *R. sondaicus* Desmarest, recorded from Java. The following characters are incompatible to refer the specimen as *R. kendengindicus* (Dubois). Neither antecrochet nor crista is present. Protocone fold is only faintly visible. Paracone style is well developed. The protocone is conical, not swollen at the basal part (Fig. 3)

As has already been mentioned by Hooijer (1946), the specimen is well in accordance with the tooth at *R. sondaicus,* even though there are some differences in their details, i.e., the former has less developed anterior cingulum and broader paracone style (Figs 1 and 2) with regard to crochet, it is natural to say that the tooth lost it mechanically because the specimen shares so many, mutual characteristics with the tooth of *R. sondaicus* and there is no contradiction between them.

At the present stage of study therefore, it is quite reasonable to refer the specimen to *Rhinoceros sondaicus* Desmarest (1822).

THE EMBEDDING ROCK AND ITS RELATIVE AGE

The rock in which the fossil tooth is embedded is a clastic limestone (calcarenite). It is devoid of any muddy material and the grains are cemented by clear crystalline calcite (Fig. 4). Apart from the tooth, it also contains foraminifera, echinoid spines (fragmented), molluscan shells, a few of bryozoan fragments and algae. The foraminiferal species includes : *Amphistegina* sp., *Operculina* sp., *Cellanthus craticulatus* (Fichtel and Moll), *Anomalinella rostrata* (Brady), *Elphidium crispum* (Linne),

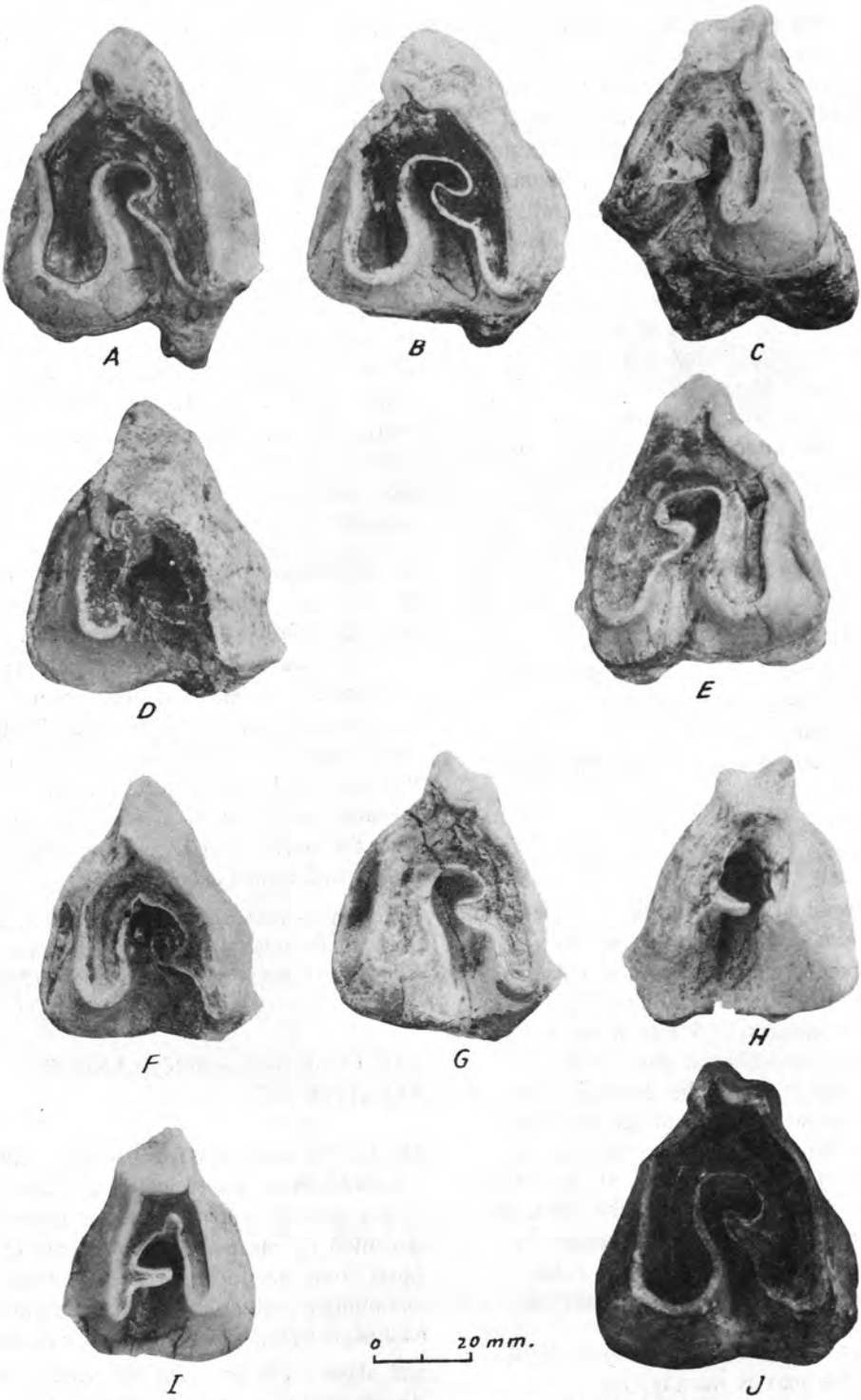

Fig. 2. Occlusal views of *Rhinoceros sundaicus* Desmarest
A. K.461A; B.K.461B; C. K.461C; D. K.461D; E. K.462; F. K.463A; G. K.463B; H. K.463C; I. 463D; J. K.507.

Table 1. Dimensions of the third upper molars of "*Aceratherium boschi*", *Rhinoceros sondaicus**) and *Rhinoceros kendengindicus*.*) (in mm.)

	"Aceratherium boschi"	*Rhinoceros sondaicus*									*Rhinoceros kendengindicus*	
	K 51	K461A	K461B	K461C	K461D	K462	K463A	K463B	K463C	K463D	K507	K473	K508
protocone–parastyle**)	52.5	51.9	50.2	47.1	53.4	52.5	51.3	52.0	48.3	45.6	55.5	54.3	55.9
protocone–paracone style**)	51.7	47.4	48.5	46.2	52.6	51.1	49.4	50.8	47.5	43.3	54.1	52.3	53.9
distance of the crochet***)	>12.5	6.4	9.4	8.3	15.5	11.7	12.1	7.0	13.2	10.2	9.7	10.8	11.0

*) These specimens were collected from Sangiran, Central Java, and kept at the museum of G.R.D.C.I

**) Measurements were taken at the base of crown.

***) Distance from the anterior border of the interval ectoloph wall to the anterior base of the crochet at occlusal level.

Fig. 3. Occlusal views of *Rhinoceros kendengindicus* Dubois
A – K. 473; B – K. 508.

Globigerinoides immaturus Le Roy, *Globigerinoides trilobus* (Reuss), *Pararotalia* sp. and *Ammonia* sp. (Fig. 5). So far, neither *Cycloclypeus* nor *Lepidocyclina* has been observed in the sample. Some of the fossil specimen were worn off. The lithology and paleontology of this limestone suggest a deposition in a high energy shallow marine water (beach deposit ?). There is but little that can be said about the relative age of the limestone due to the insufficiency of the paleontological data. The occurrence of *Cellanthus craticulatus* (Fitchtel and Moll) suggests an age not older than Pliocene (Loeblich and Tappan, 1964).

Bemmelen (1949) correlated the marls of Cisande (to which the present material belongs) with the Kaliwangu Beds. Le Roy (in Bemmelen, 1949, p.650) assigned the Kaliwangu (Pliocene) fauna to the Cheribonian (Early Pliocene). Ludwig (1931) and Bemmelen (1949) were of the opinion that the Kaliwangu Beds might be equivalent to the Cijurey Beds (site of the Cheribonian type molluscan fauna). Silitonga and Masria (1978) included the Cijurey Beds into Kalibiuk Beds and assigned a Pliocene age to these beds. A close examination of some rock samples from the type locality of the Cheribonian molluscan fauna reveals the occurrence of planktonic foraminiferal species such as *Pulleniatina* spp., *Globigerinoides extremus* Bolli and Bermudez, *Globoquadrina altispira* (Cushman and Jarvis), *Globorotalia tumida* (Brady), *Globorotalia margaritae* Bolli and Bermudez and *Sphaeroidinellopsis seminulina* (Schwager). Such an association of species suggests an interval of age between the top of Miocene to Early Pliocene (N.18 – N.19, Blow 1969). Hetzel (1935) and Kastowo (1975) included the carbonate rock exposures in the Cisande River, near Lurahgung, into the Halang Beds (Formation) of Miocene age. From the foregoing discussion it can be concluded that previous studies pointed to an age older than Pleistocene for the marls of Cisande. This supports the Pliocene age for the fossil originally assigned by Koenigswald. Such an assignment is, however, thought to be

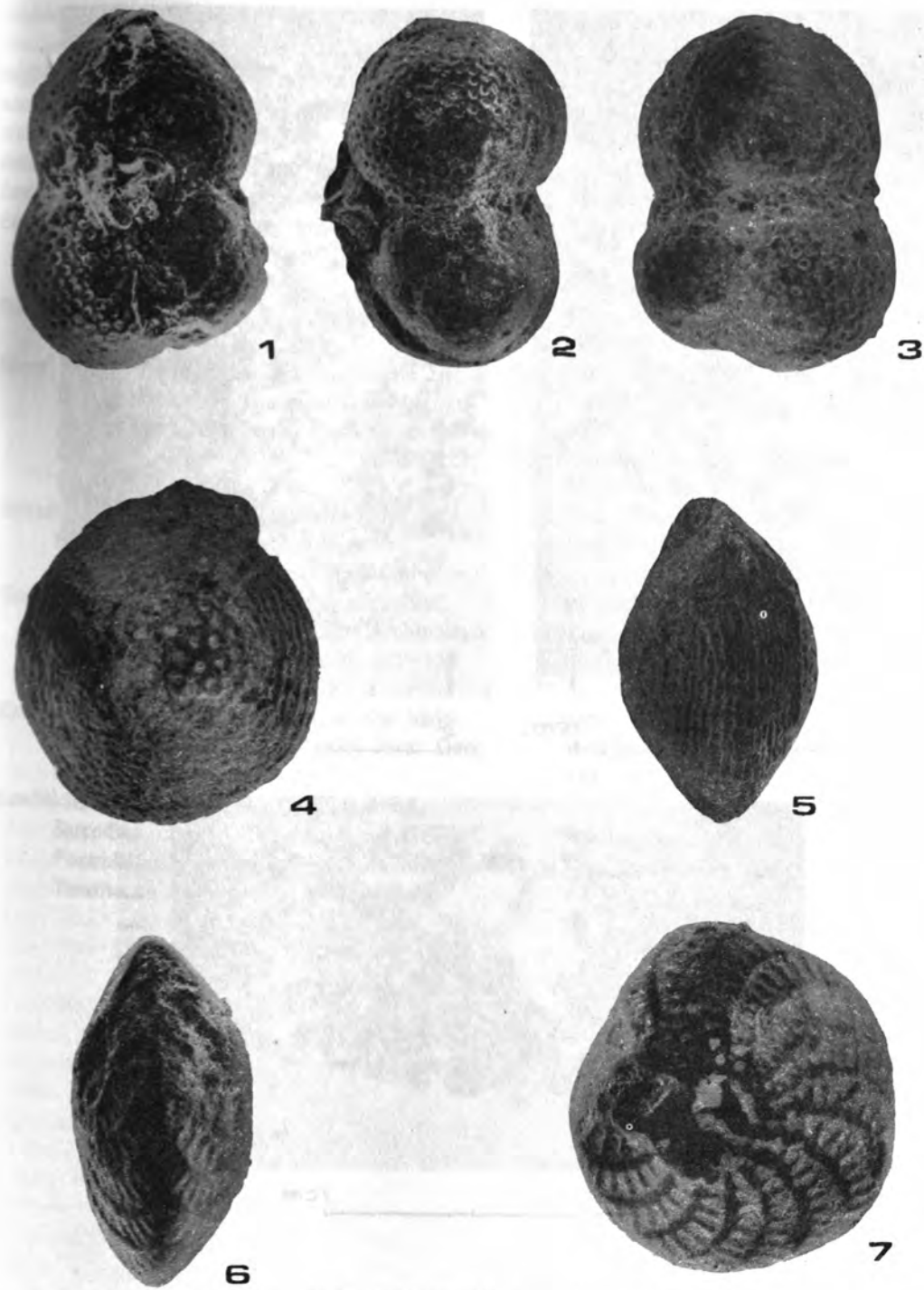

Fig. 4. Some foraminiferal species contained in the sandy calcarenite in which the *"Aceratherium boschi* V.K." molar is embedded.

1–3. *Globigerinoides immaturus* Le Roy, max diameter 0,53 mm
4–5. *Cellanthus craticulatus* (Fitchtel and Moll) max. diameter 1.00 mm
6–7. *Elphidium cf E. crispum* (Linne), max. diameter 0,50 mm.

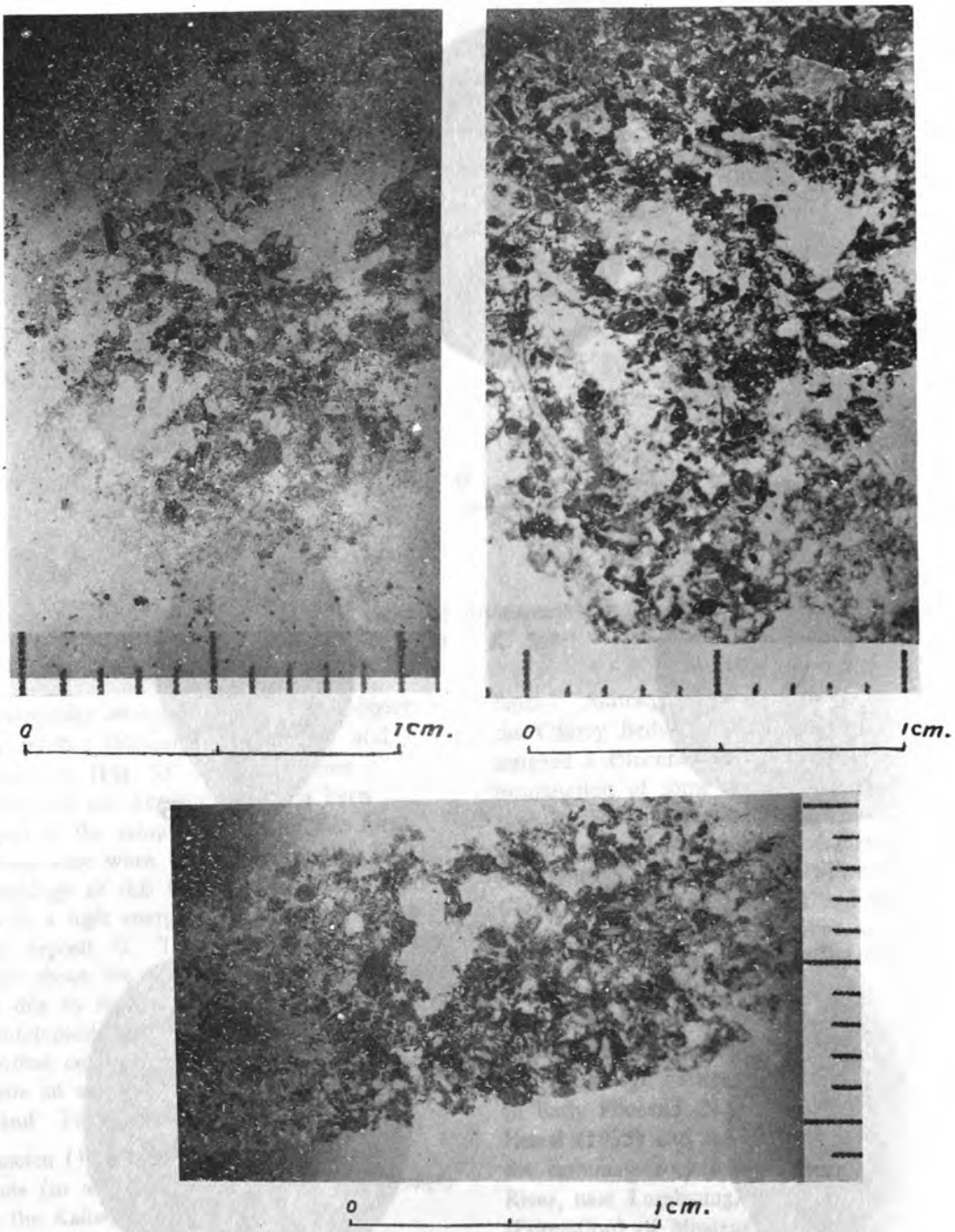

Fig. 5. Photograph of 3 thin sections of the calcarenite in which the tooth of *Rhinoceros sondaicus* is embedded.

problematical by Bemmelen (1949) since Hooijer (1946) supposed that the specimen might be *Rhinoceros sondaicus* which is in accordance with the result of our present study. The occurrence of *Rhinoceros sondaicus* in sediment older than Pleistocene in Java is doubted. To solve this problem, a detailed field and laboratory study is needed.

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