ON THE STRATIGRAPHIC POSITION OF **PITHECANTHROPUS MANDIBLE - C.**

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ICHTISAR.

Hampir semua fosil-fosil hominidae berumur Plestosen Bawah dan Plestosen Tengah dipulau Djawa merupakan penemuan-penemuan dipermukaan tanah. Hal ini menjebabkan penentuan umur relatip fosil-fosil itu suatu hal jang spekulatip.

Pithecanthropus C merupakan pula suatu penemuan diatas permukaan tanah dari lapisan-lapisan Putjangan didaerah Sangiran (Djawa Tengah, Indonesia) jang berumur Plestosen Bawah. Didalam batuan jang melekat pada rahang bawah Pithecanthropus itu terdapat fauna foraminifera ketjil. Berdasarkan perbandingan antara fauna foraminifera ketjil ini dengan fauna foraminifera ketjil jang terdapat didalam lapisan-lapisan Putjangan diatas, maka dapatlah ditentukan posisi stratigrafi rahang bawah itu didalam lapisan-lapisan Putjangan tersebut, sehingga dengan demikian dapat diperkirakan bahwa umur relatip Pithecanthropus C itu adalah Plestosen Bawah Muda.

ABSTRACT.

Up to now almost all of Java's Early as well as Middle Pleistocene hominids are surface finds. As a result, the relative age determinations of these specimens are matters of speculations.

Pithecanthropus C is also a surface find and obtained from the surface of the Lower Pleistocene Putjangan beds from the Sangiran area (Central Java, Indonesia). Within the encrusting matrix of the Pithecanthropus mandible have been colllected a fauna of smaller foraminifera. Based on comparison of this faunal assemblage with the faunal associations of smaller foraminifera from the Putjangan beds, the stratigraphic position of the mandible can be established and in this way its relative age is supposed to be Late Lower Pleistocene.

INTRODUCTION.

In November 1960 one of authors collectors had obtained a mandible from the northeastern part of the Sangiran Dome in Central Java, Indonesia. This specimen has been handed over to author in January 1961 and to her has been proposed by author the specific designation of **Pithecanthropus mandible-C** (Sartono, 1961). This mandible is a surface find and has been obtained from the surface of the Lower Pleistocene Putjangan beds. During the cleaning of the matrix of the mandible foraminiferas has been collected from its adhering matrix.

The purpose of this paper is to make an attempt to establish the stratigraphic position of the mandible based on the foraminiferal assemblage obtained from the matrix of the mandible. To achive this a systematic sampling of the Lower Putjangan beds has been made by a team of the Paleon-

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tological Laboratory of the Geological Survey of Indonesia in the Sangiran Dome. These samples have been taken from the lower boundary of the Putjangan beds up to their upper limit, which in this part of the area attain a thickness of about 85 meters (Darwin, 1966). The sampling has been done between the villages of Ngampon and Pageredjo (see fig. 1). The Putjangan beds in this part of the dome have been chosen for the sampling because they possess the most suitable characteristics necessary for the purpose of the work. Forty rock samples have been collected during this sampling.

The foraminiferal fauna of the rock samples have been worked out by Darwin (1966) under supervision of author, while the foraminiferal assemblage from the matrix of the mandible have been investigated by the author. The attempt to establish the stratigraphic position of the mandible is done by comparing the foraminiferal assemblage from the matrix of the mandible with that obtained from the rock samples.

It may be noted here that Koeningswald (1968) has assigned the specific designation of **Pithecanthropus dubius** to the mandible.

SHORT GEOLOGICAL NOTES.

The mandible has been obtained from the northeastern corner of the Sangiran Dome in Central Java, Indonesia (see fig. 1). The general outline of the stratigraphic succession of this dome is shown in figure 2. According to Koenigswald (1940, p. 31) the basal part of the Putjangan beds consists of a volcanic breccia of about 30 meters thick. Overlying this bed of volcanic facies have been deposited black claystones of a preponderant lacustrine facies of about 200 meters thick, separated into a Lower and an Upper Black Clay series by a marine intercalation consisting of **Diatomea** beds and a yellow sandy claystone. These beds of marine intercalation are found at about 35 - 40 meters above the base of the Lower Black Clay series. The thickness of the **Diatomea** beds — which were very likely deposited in a big and extensive lagoon caused by inundations (Rheinhold, 1937) — varies between 1.5 - 2.5 meters.

According to Es (1931, p. 63) the main bulk of the Putjangan beds consists of a black clay deposited as a fine mud in a lake during that time. In this black clay have been intercalated various other layers, a.o. two horizons of **Diatomea** beds consisting of the Lower and the Upper **Diatomea** bed, tuffaceous layers indicating eruptions of a neighbouring volcano, and a yellow marine clay proving invasions of the Early Pleistocene sea.

For more details of the geology of the Sangiran area, particularly that of the Putjangan beds, author refers to the papers of Es (1931), Rheinhold (1937), Koenigswald (1940) and Suradi (1968).

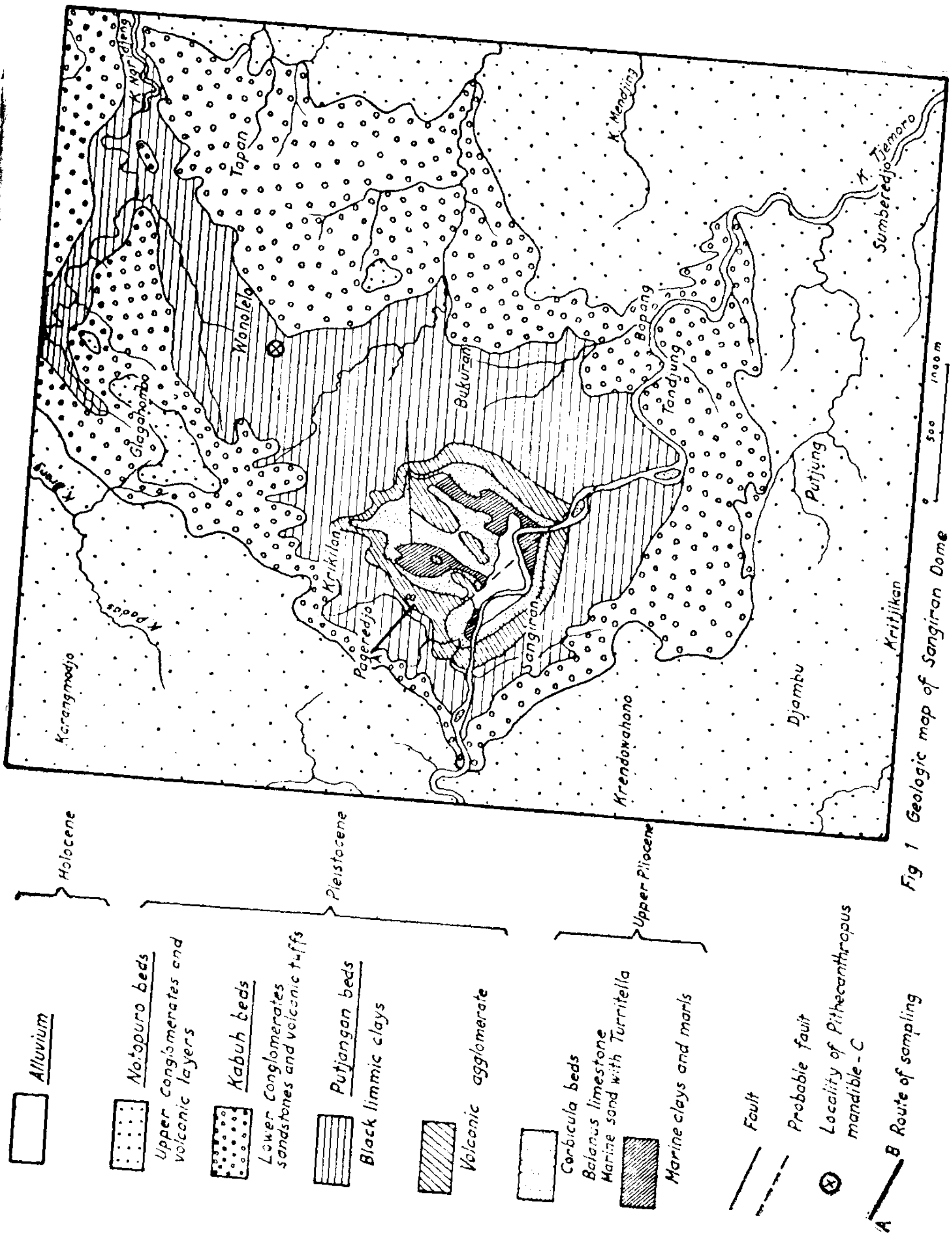

Fig 1 Geologic map of Sangiran Dome

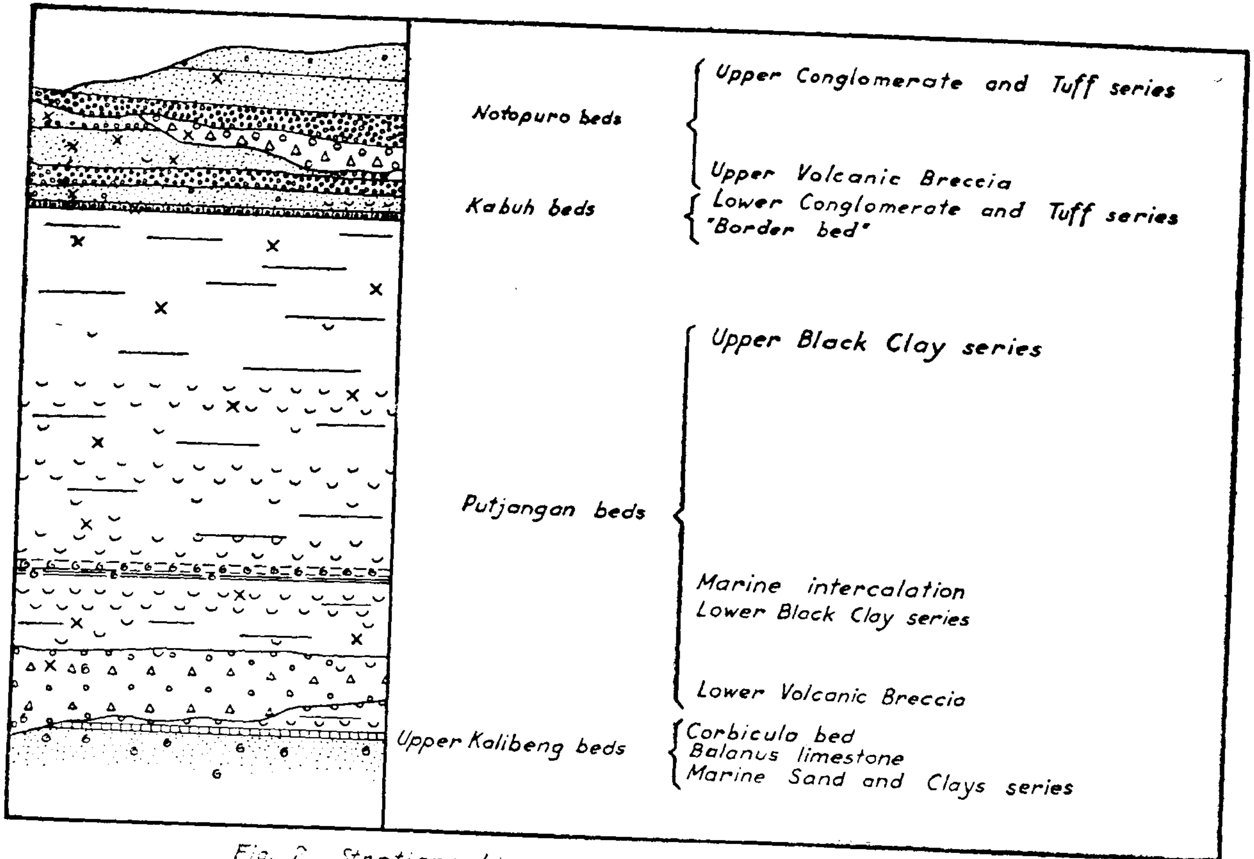

Fig. 2. Stratigraphic succession of Sangiran Dome (modified after Koenigswald 1940. fig. 2, p. 32)

Fossils : X vertebrates
6 marine molluscs
◡ fresh water molluscs
(Thickness of the profile ca 350 meters)

THE FORAMINIFERAL FAUNA OF THE PUTJANGAN BEDS.

Among the 40 rock samples collected from the Putjangan beds many of them, i.e. almost 75%, prove to contain a rich foraminiferal assemblage. They are found in the lower, middle as well as in the upper part of those beds and have been obtained respectively from rock samples nos. 5-10, 12-13, 18-33, and nos. 36-40. The fauna can be subdivided into a planktonic and a bentonic form; of the planktonic from 22 species have been recognized while of the bentonic 62 species have been recovered, both of them have been obtained from an alteration of layers consisting of claystones and tuffaceous claystones (see Darwin 1966, table 1 and 2).

The foraminiferas obtained from the matrix of the mandible also consist of planktonic as well as bentonic form (see fig. 3). The matrix consists of a claystone of lightgrey color.

THE STRATIGRAPHIC POSITION OF THE MANDIBLE.

As shown in figure 2 the Putjangan beds consists of a basal Volcanic Breccia, upwards followed by a Lower and an Upper Black Clay series of lacustrine facies with a marine intercalation in between. It is assumed that the Sangiran area had been occupied by an inland lake during the Lower Pleistocene time and had been ingressed by the sea sometime during its early history. However, as are shown in Darwins paper on table 1 and 2 by the foraminifera bearing layers found on certain horizons in the stratigraphic sequence of the Putjangan beds, the Sangiran area had been ingressed by the sea for several times during its Lower Pleistocene history. The foraminifera bearing layers indicate phases of ingressions while those which do not bear foraminiferas can be considered as being of purely lacustrine facies.

According to the planktonic form foraminiferas can be obtained from 4 horizons while bentonic forms can be found on 5 horizons. (See Darwin 1966, table 1 and 2). If we compile both of these tables then ultimately there will be encountered only 4 foraminifera bearing horizons. Each of this horizon represents a time of ingression. In this way there were 4 phases of ingressions of the sea during the Lower Pleistocene in the Sangiran area (see fig. 4), the second being the shortest one and the third being the longest. All of these 4 ingressions occurred during the Günz-Mindel interglacial period (Sartono, 1968).

If a comparison be made between the foraminiferal assemblage found in the matrix of the mandible with the foraminiferal fauna obtained from the rock samples, then it can be seen that the foraminiferas from the rock samples are identical with those obtained from the matrix of the mandible. If these identical foraminiferas are put in a relationship with the above 4 phases of ingressions, then we see that they do not have the same length of time range (see fig. 5). This figure shows that five species have a time range from the

PLANKTONIC specimen	relative number	BENTONIC specimen	relative number
Globigerina baroemoenensis LEROY	1	*Ammonia beccarii* LINNE	3
„ *bulloides* CUSHMAN	4	*Bulimina buchiana* d'ORBIGNY	1
„ *foliata* BOLLI	2	„ *inflata* SEQUENZA	1
„ *pseudobulloides* PLUMMER	3	„ *striata* d'ORBIGNY	2
Globigerinoides obliqua BOLLI	1	*Cassidulina subglobosa* BRADY	1
„ *rubra* d'ORBIGNY	5	*Egerella bradyi* (CUSHMAN)	2
„ *sacculiferus* (BRADY)	3	*Eponides umbonatus* (REUSS)	9
Globorotalia crassa (d'ORBIGNY)	10	*Gyroidina soldanii* STEWART	1
„ *tumida* (BRADY)	11	*Lagenodosaria scalaris* (BATSCH)	1
Orbulina universa d'ORBIGNY	15	*Nodogenerina lepidula* (SCHWAGER)	1
Pulleniatina obliquiloculata (PARKER)	14	*Nonion pompilioides* (FICHTEL)	2
		Pleurostomella alternans SCHWAGER	1
		Pullenia sphaeroides (d'ORBIGNY)	7
		Triloculina trigonula LAMARCK	8
		Uvigerina hispida SCHWAGER	6

Fig. 3. Foraminiferal assemblage in the matrix.

first up to the fourth ingression, 12 can be obtain from the first as well as from the third to fourth ingressions, one species comes from the third to fourth ingression, one species from the second to third ingression, one species from the first as well as from the third ingression, whereas six species have a limited time range and are only found restricted in the third ingression. All of those species, however, can be obtained from rock samples deposited during the third ingression. In this way, author assumes, that the mandible should be fossilized in a period during which the third ingression took place. In other words this mandible should have been deposited in layers contemporaneous with rock samples nos. 18-33 (see fig. 4).

If we consider only the third ingression, then we observe that of the foraminiferal assemblage obtained from the matrix of the mandible only several species can be found restricted during this ingression; in other words, they have not been encountered in phases of ingressions earlier or later than the third ingression, so that their time ranges are restricted to this third ingression only. These specimens are shown in figure 6.

If we look at the above figure 6 then we observe that several of the foraminiferas obtained from the mandible and which have a time range restricted to the third ingression are also found in rock samples no. 25, no. 27 no. 28 and no. 29. Author assumes from this that within the phase of the third ingression the mandible should have been embedded in layers contemporaneous with rock samples no. 25, no. 27, no. 28, and no. 29. From these 4 rock samples, no. 29 and no. 28 contain more foraminiferas of the same species as those obtained from the matrix of the mandible if compared to those found in rock samples nos. 25 and 27. As a consequence of this fact author assumes that the mandible should have been embedded within layers contemporaneous with rock samples nos. 28 and/or 29. Based on the present knowledge, however, author is not able to decide in which layer, i.e. in a layer contemporaneous with rock sample no. 28 or with no. 29, the mandible had been embedded and fossilized.

As a conclusion of this chapter it may be put forward that the stratigraphic position of **Pithecanthropus mandible-C** lies within layers contemporaneous with rock samples nos. 28 and 29 of the Putjangan beds of Lower Pleistocene age deposited during the third phase of ingression of the Günz-Mindel interglacial period. As there are 40 rock samples collected at regular intervals from these Putjangan beds and also based on identical foraminiferas obtained from the matrix of the mandible as well as from rock samples nos. 28 and 29, author deduces from these that the stratigraphic position of the mandible within the sequence of the Putjangan beds should be placed at a height of about 0.7 of the thickness of these beds measured from their base.

It may be added here that Koenigswald -- who has assigned the specific

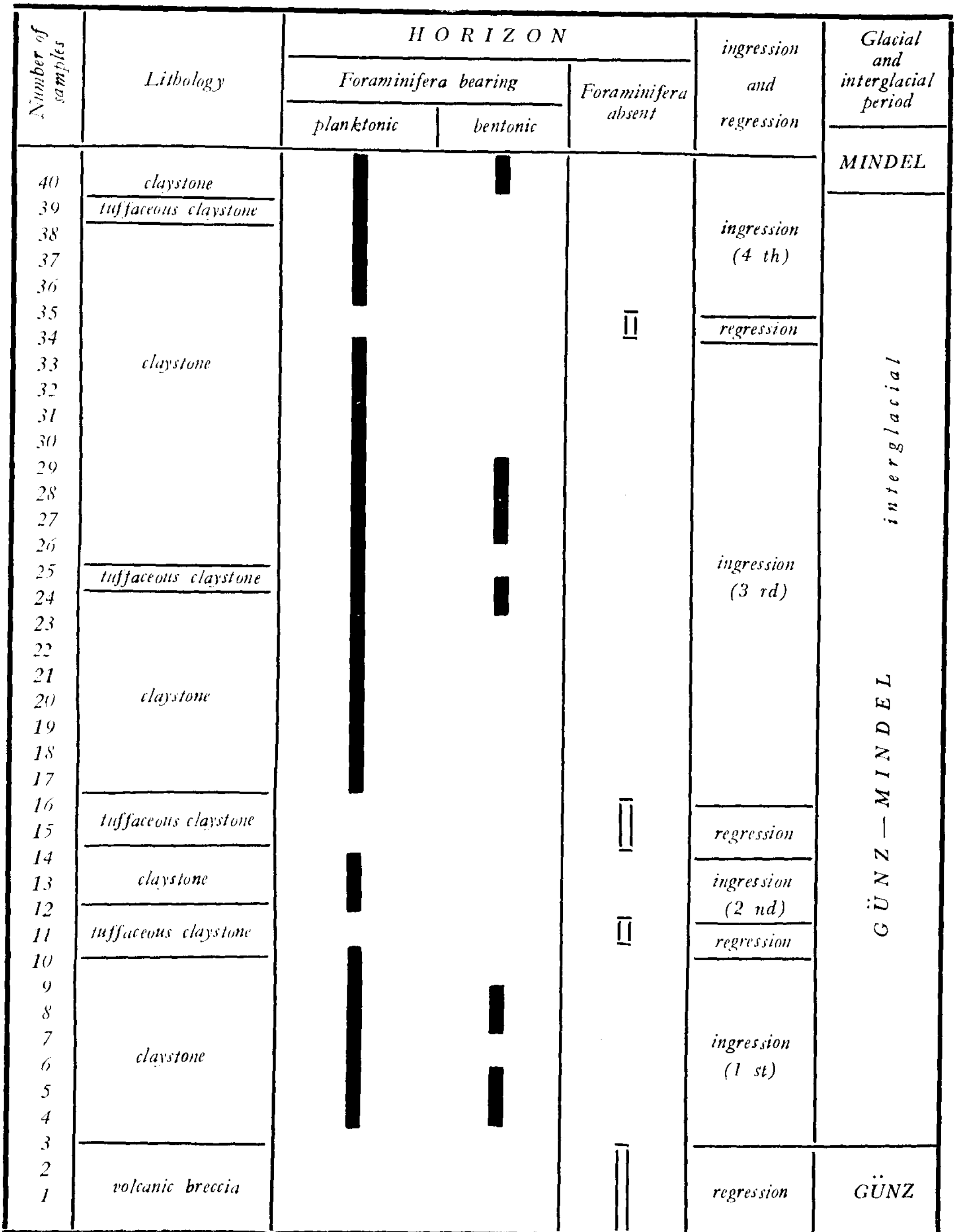

Fig. 4. Phases of ingression and regression.

	SPECIMEN	Ingressions			
		1	2	3	4
Planktonic	*Globigerina bardemoenensis* LEROY			—	
	„ *bulloides* CUSHMAN			—	
	„ *foliata* BOLLI			—	
	„ *pseudobulloides* PLUMMER	—	—	—	—
	Globigerinoides obliqua BOLLI	—	—	—	—
	„ *rubra* d'ORBIGNY	—	—	—	—
	„ *sacculiferus* (BRADY)	—	—	—	—
	Globorotalia crassa (d'ORBIGNY)			—	—
	„ *tumida* (BRADY)	—		—	—
	Orbulina universa d'ORBIGNY	—	—	—	—
	Pulleniatina obliquiloculata (PARKER)	—		—	—
Bentonic	*Ammonia beccarii* LINNE	—		—	
	Bulimina buchiana d'ORBIGNY	—		—	—
	„ *inflata* SEQUENZA	—		—	—
	„ *striata* d'ORBIGNY	—		—	—
	Cassidulina subglobosa BRADY			—	
	Egerella bradyi (CUSHMAN)	—	—	—	—
	Eponides umbonatus (REUSS)			—	
	Gyroidina soldanii STEWART			—	
	Lagenodosaria scalaris (BATSCH)	—		—	—
	Nodogenerina lepidula (SCHWAGER)	—		—	—
	Nonion pompilioides (FICHTEL)	—		—	—
	Pleurostomella alternans SCHWAGER	—		—	—
	Pullenia sphaeroides (d'ORBIGNY)	—		—	—
	Triloculina trigonula LAMARCK			—	
	Uvigerina hispida SCHAGER	—		—	—

Fig. 5. Foraminiferal assemblage in the matrix in relation to phases of ingressions.

Specimen	Number of rock sample			
	25	27	28	29
Globigerina barocmoenensis LEROY	×	×	×	×
" *bulloides* CUSHMAN	—	—	—	×
" *foliata* BOLLY	—	—	—	×
Cassidulina subglobosa BRADY	—	—	×	×
Gyroidina soldanii STEWART	—	—	×	—
Triloculina trigonula LAMARCK	×	—	×	—

Fig. 6. Foraminiferal assemblage restricted to the third ingression
× *present*
— *absent*

name of **Pithecanthropus dubius** to **Pithecanthropus mandible-C** (Koenigswald, 1968, p. 103) — stated in this same paper on page 102 that this mandible is according to his knowledge the oldest one from the Sangiran area.

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