

A NEW *HOMO ERECTUS* SKULL FROM NGAWI, EAST JAVA

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HISTORY OF THE FIND

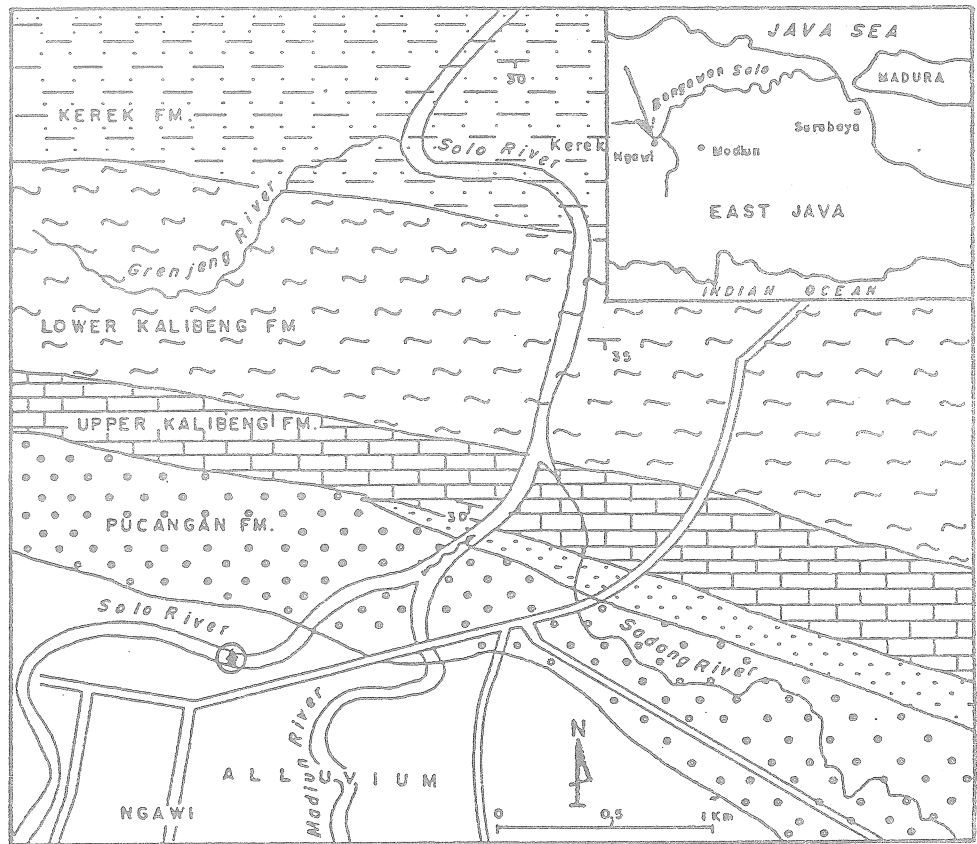
A fossilized skull was found in August 1987 by a student of a secondary Technical School in Ngawi (East Java) in the left bank of the Bengawan Solo in Selopuro village, Ngawi regency. The specimen was handed over to the local government authorities in Ngawi on 20 June 1988. It is now stored there in the Empu Tantular Museum. In December 1988 Mr S. Darsoprajitno, curator of the Geological-Paleontological Museum in Bandung, visited the Empu Tantular Museum and reported his observations to me.

GEOLOGY OF THE SITE

The geology of the site comprises Tertiary and Quaternary formations. The Tertiary formations are the Kerek formation and the Kalibeng formation (*Globigerina* marl) of Miocene and Pliocene ages respectively, whereas the Quaternary sediments comprise the Lower Pleistocene Pucangan formation and the Upper Pleistocene river terraces (Fig. 1).

The fossil skull itself was a surface find in the river bed so its original stratigraphic position was not recorded. There is a possibility that the original site of the specimen was in a terrace deposit equivalent to one of the Pitu terraces in the village of Watualang some 5 kilometres west of Ngawi. These are as old as the Ngandong terrace (Fig. 2, Table 1). This reasoning is based on the morphology of the specimen, which is very close to the Ngandong skulls of Upper Pleistocene age. But on the other hand there may also be a probability that it originated from the Kabuh Formation, such that in this case biostratigraphy may not coincide with lithostratigraphy. In other words, evolutionary processes may cross geologic time boundaries.

As far as exact age is concerned the absence of geological data on the specimen does not permit precision. But the close morphological resemblance of the skull to those of Ngandong - and also to the Sambungmacan 1 cranium - strongly suggest that its age is Upper Pleistocene. It may be added here that the Sambungmacan 1 skull has been regarded as of Middle Pleistocene age by Shibasaki (*et al.* 1985), but I favour an Upper Pleistocene age (Sartono *et al.* 1981).



LEGEND







- | | | | | | |
|---|-----------------------------|------------------------------|--|--|-------------------------|
|  | Alluvium and River terraces | HOLOCENE - UPPER PLEISTOCENE |  | Upper Kalibeng Fm. (Ngepung limestone) | } MIOCENE - PLEISTOCENE |
|  | Pucangan Formation | LOWER PLEISTOCENE |  | Lower Kalibeng Fm. (Globigerina maris) | |
|  | Location of skull | |  | Kerek Formation | |

FIGURE 1: THE GEOLOGY OF THE NGAWI REGION

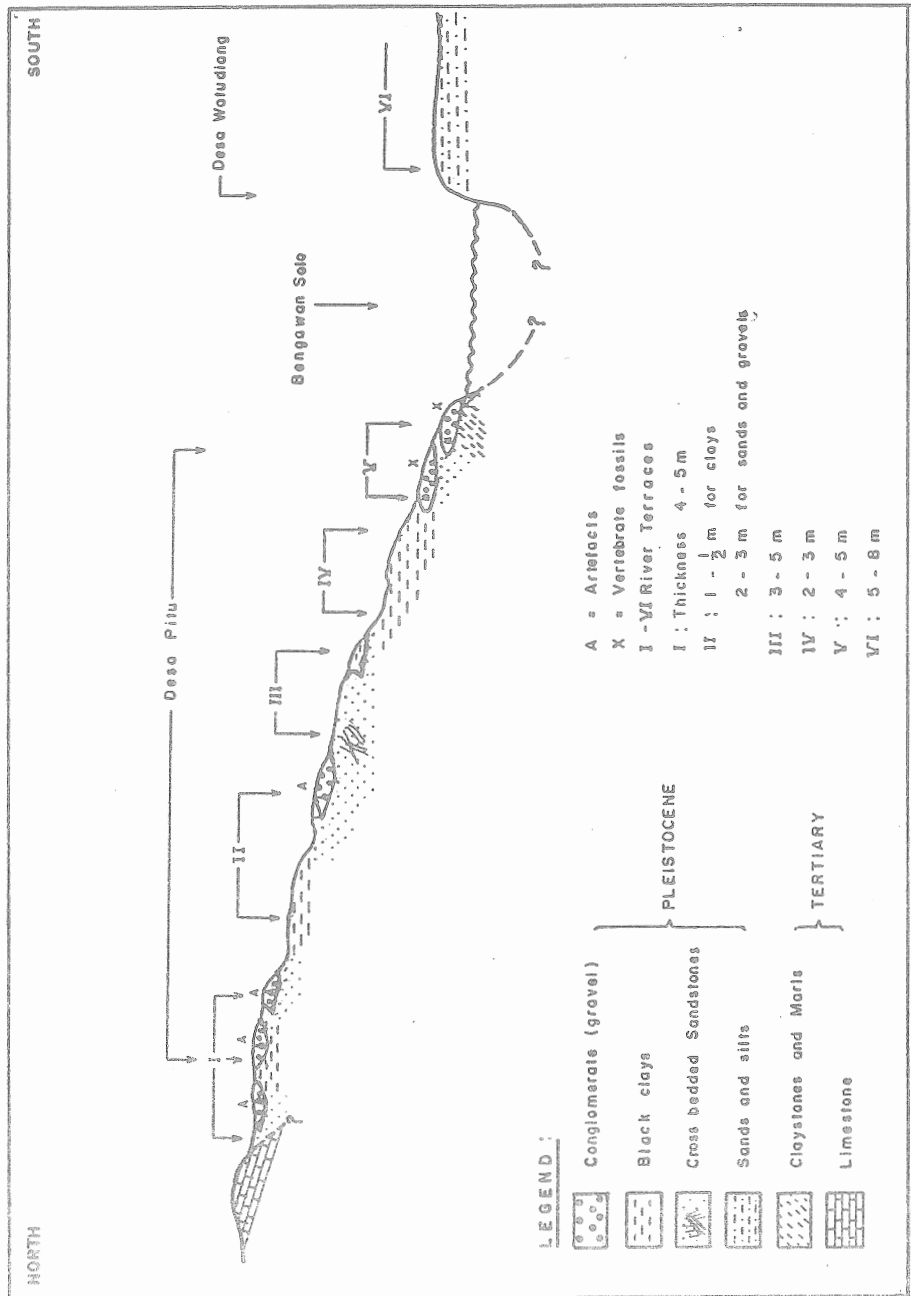


FIGURE 2: LATE PLEISTOCENE TERRACES NEAR THE VILLAGE OF PITU (ZAIM 1984)

AGE		Region	Solo Terraces	Sangiran	Watulang (Ngawi)
			Sariono, 1976	Sariono, 1980	Zaim, 1984
RECENT			Menden	Alluvium	Terrace VI
HOLOCENE			Jipangulu		
P L E I S T O C E N E	Upper	Ngandong	Sandstone IV	Pitu terraces	Y
			-----		IV
	Sandstone III	III			
Middle	Gelas	Breccia II	II		
		Sandstone II (Notopuro)	I		
		Sandstone I (Kobuh)			
Lower	Kedungdowo Rambut(?)	Clay and Breccia I (Pucangan)			

TABLE 1: THE CORRELATION OF TERRACES IN CENTRAL AND EAST JAVA

PRELIMINARY DESCRIPTION OF THE SPECIMEN

The specimen is a well-fossilized cranium consisting of the left and right parietals, the frontal, the occipital, the left and right squamous portion and the basal part (Fig. 3). The various parts of the skull are connected with each other by well-defined sutures: the sagittal suture, the frontal suture, the occipital suture and the squamous suture.

Because of its perfect condition many landmarks on the specimen can be recognized easily. Measurements of the brain size using very fine sand grains give a volume of about 1000 cc. This is far smaller than modern *Homo sapiens* which has an average brain volume of about 1500 cc, but on the other hand it differs little from the *Homo erectus* cranium 8 from Sangiran, which has a volume of 1029 cc (Table 2).

On most parts of the skull the cranial sutures are not wholly closed. Because of this the specimen is regarded as belonging to a female of about 60 years of age (pers. comm. Dr Sukadana, 1989).

<i>Pithecanthropus erectus</i> (Dubois)	600 cc
<i>Pithecanthropus lantianensis</i>	780 cc
<i>Pithecanthropus modjokertensis</i> (cf. <i>Homo robustus</i>)	900 cc
<i>Pithecanthropus</i> VIII	1029 cc
<i>Sinanthropus pekinensis</i>	1100 cc
<i>Pithecanthropus soloensis</i>	1200 cc
<i>Homo erectus</i> Ngawi 1	1000 cc
<i>Homo erectus</i> Narbada (India)	1155-1421 cc
<i>Homo sapiens</i>	1500 cc

TABLE 2: HOMINID BRAIN VOLUMES

The *foramen magnum* is intact, measuring about 2.7 cm postero-anteriorly and 2.0 cm laterally. It is located more to the posterior when compared with modern *Homo sapiens*.

The overall morphology of the specimen also suggests that it most likely belongs to *Homo soloensis* (cf. *Javanthropus soloensis*, *Pithecanthropus soloensis*, *Homo erectus soloensis*, *Homo erectus ngandongensis*). The limits of the craniograms of the specimen fall within the maximum and minimum limits of the Ngandong crania (Figs 4 and 5), but on the other hand are outside those of the Lower and Middle Pleistocene *Homo erectus* (Weidenreich 1951; Sartono 1973). These features indicate that the Ngawi skull belongs to the group of the Ngandong population.

As far as sex is concerned I agree with the opinion of Dr Sukadana that it is a female. The skull of the specimen is distinctly smaller than the male ones of Ngandong. It lacks the robustness and the rugosities which characterize the male Ngandong XI skull. The occipital torus, which is strongly developed in the Ngandong XI skull, is absent in the Ngawi specimen. The supra-orbital tori of Ngawi are strong but far less pronounced than those of Ngandong XI. Compared to Sambungmacan 1, the Ngawi cranium is also smaller. On the other hand, it is almost as large as the female specimens of the Ngandong group. As a consequence of these features I regard the Sambungmacan 1 skull as a male specimen. I also (Sartono *et al.* 1981) regard the age of the juvenile skull of *Homo modjokertensis* as Upper Pleistocene.

Another interesting feature worth mentioning here is that the sagittal craniograms of the Upper Pleistocene skulls from Java shows close resemblances to those of Kow Swamp in Victoria, Australia (Figure 6). This latter group has been dated to about 10,000 BP, which is about the end of the Pleistocene. The age of the Ngandong skulls has not yet been settled, but provisionally it is set between 100,000 and 60,000 BP.

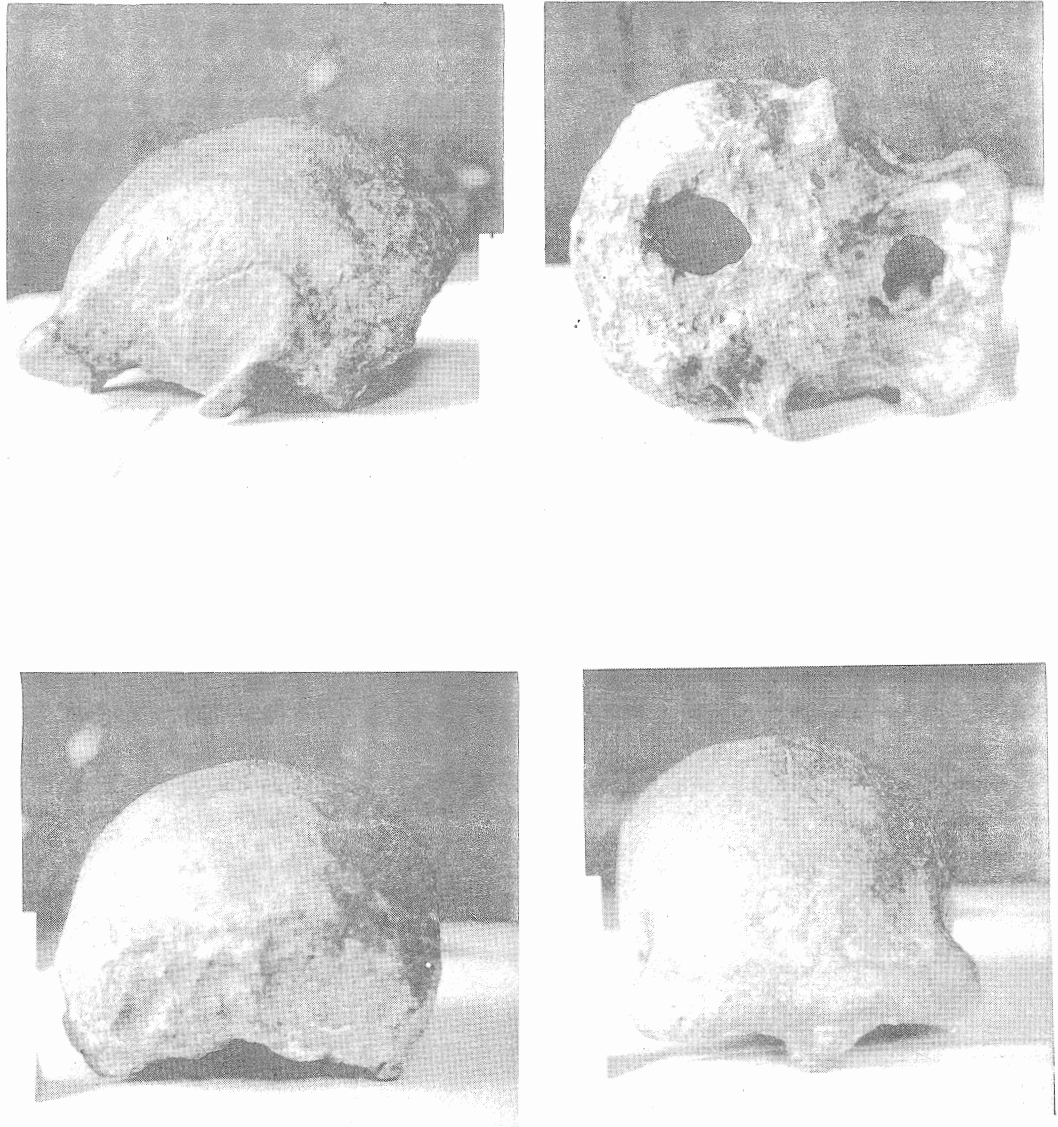


FIGURE 3: THE NEW *HOMO ERECTUS* SKULL FROM NGAWI
Top left: *norma lateralis*. Top right: *norma basilaris*. Bottom left: *norma occipitalis*.
Bottom right: *norma frontalis*.

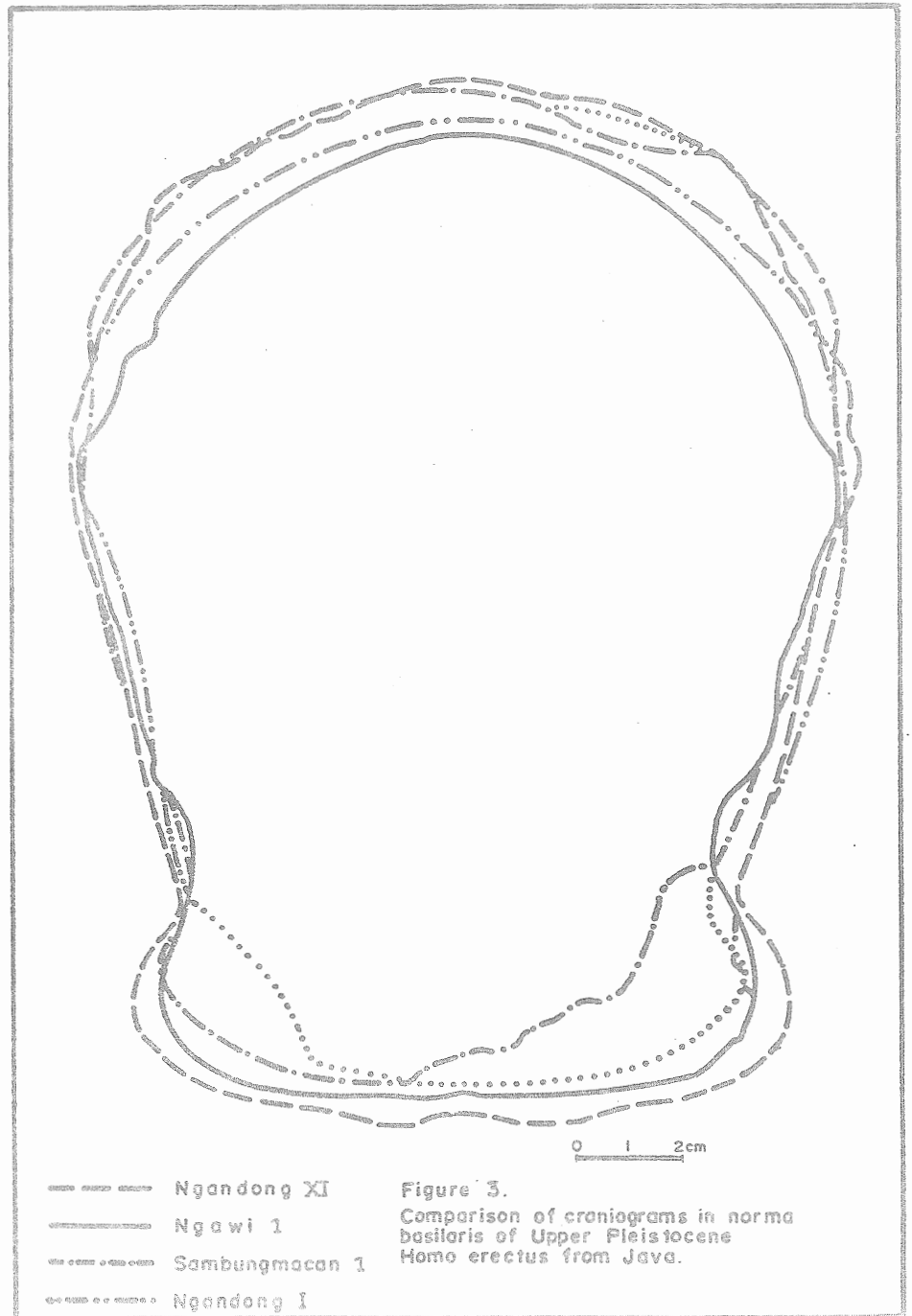


FIGURE 4: COMPARISONS OF CRANIOGRAMS IN NORMA BASILARIS OF UPPER PLEISTOCENE HOMO ERECTUS FROM JAVA

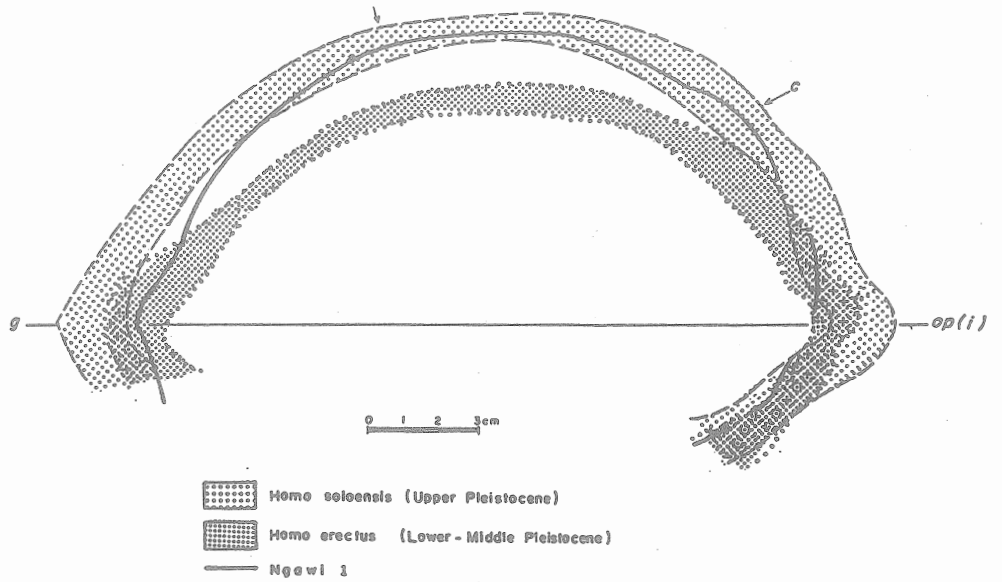


FIGURE 5: COMPARISONS OF CRANIGRAMS IN NORMA LATERALIS OF PLEISTOCENE HOMO ERECTUS FROM JAVA

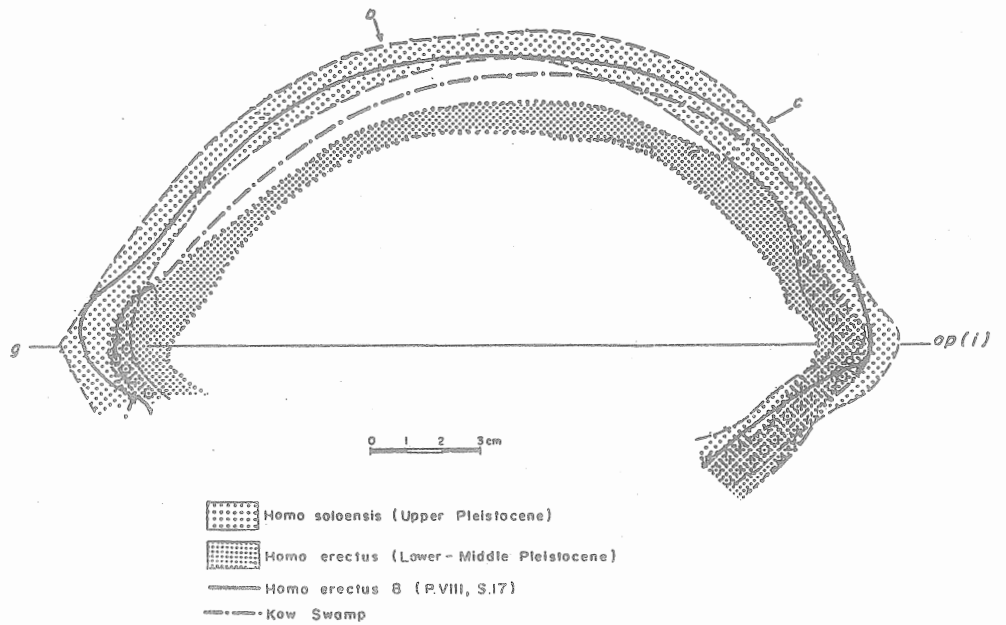


FIGURE 6: COMPARISON IN NORMA LATERALIS OF KOW SWAMP AND JAVANESE PLEISTOCENE HOMINIDS

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