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# 爪哇人类演化的新近图景

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自从杜布哇（E·Dubois）最初发现化石以来，所有重要的人类化石是由中爪哇的当地农民发现的。最古老的化石产自桑吉兰（Sangiran）的上卡利本（Kalibeng）层和普坎甘（Pucangan）层，年代大约为2.0百万年至0.7百万年（Watanabe & Kadar，1985）。这些化石被归为魁人属（*Meganthropus*）。其正型标本为一下颌骨，下颌体部与南方古猿类粗壮型的一样大，但其牙齿是在直立人和南方古猿类纤细型（包括能人）的变异范围之内（图1）。这一正型标本是孔尼华于1947年在一当地农民那里得到的，孔尼华将其定名为魁人属古爪哇种（*Meganthropus paleojavanicus*）。1993年春，萨托诺（S.Sartono）从一当地农民那里得到另一具魁人下颌骨（图2）。大多数专家把魁人归入人属直立种。虽然魁人的下颌超出直立人的已知的变异范围，但这些专家认为这只不过是直立人群体有很大的两性差异而已。

第一具被认为不是属于直立人的人科头骨标本是1959年在桑吉兰由萨托诺获得的（图3）。该标本的确切地层位置不明，可能是出自早更新统普坎甘组与中更新统卡布（Kabuh）组交界处之下几米处。1979年发现了第二具魁人头骨标本（桑吉兰31号）（图4、5）。桑吉兰31号标本由脑颅的后部和底部组成；其样子与已知的直立人的不同，不呈扁头型（Platycephalic），颅盖隆起，很厚，具有双中矢嵴，颅容量约为700毫升。除颅壁厚度和发达的肌嵴之外，其形态与能人的相似。其年代约为2百万年前。

萨托诺获得的魁人头骨化石还包括一枕骨骨块（图6）和一碎裂得很厉害的头骨（桑吉兰27号）。这些标本都在已知的直立人的变异范围之外但在南方古猿类的变异范围之内。桑吉兰27号（图7）标本是萨托诺在1978年从当地农民手中得到的。1980年后该标本由雅各布（T.Jacob）保管，至今未作修复和描述。

根据魁人属的下颌和头骨材料，能有三种解释。第一种解释是，最早来到印度尼西亚的人科成员是非洲的南方古猿类（能人）的一个种。魁人在爪哇出现约在2百万年前而在大约70万年前消失。第二种解释是，直立人在非洲演化，其时间比我们以往所知的要早些，然后很快分布到旧大陆进入印度尼西亚。魁人可能是直立人的一个很粗壮的亚种。第三种解释是，直立人先是在东南亚演化，然后扩散到旧大陆的其它地方。最近公布了莫佐克托（Modjokerto）幼童化石的年代为1.86百万年，除此之外，尚无直立人在亚洲起源的证据。

印度尼西亚最古老的直立人是出自桑吉兰的普坎甘层，其形态非常粗硕，多是下颌断片，年代是自1.8百万年至0.7百万年之间（Watanabe & Kadar，1985）。此层位最有名的标本是直立人4号标本（桑吉兰4号），由颅底和颅后部以及一完整的上颌组成。魏敦瑞将其名为猿人粗壮种。现今，萨托诺仍以此分类名称用在爪哇直立人标本的早期粗壮类

型上.

大多数直立人标本是出自桑吉兰的卡布层，年代是 90 万年至 40 万年前之间 (Wantanabe & Kadar, 1985)．其中最有名的是猿人 8 号（桑吉兰 17 号）标本，由萨托诺于 1969 年获得，具有面部，这在东南亚的直立人化石中尚属首例．由孔尼华获得的爪哇猿人 2 号和 3 号（桑吉兰 2 号和 3 号）标本、雅各布获得的爪哇猿人 6 号（桑吉兰 10 号）标本以及萨托诺获得的爪哇猿人 7 号（桑吉兰 12 号）标本，都在此年代范围内．

1993 年 5 月，一具几乎全整的直立人头骨由萨托诺和 D.E.泰勒从桑吉兰当地农民那里获得（图 8、9）．该头骨的年代是距今 80 万年至 1.6 百万年，头骨形态与桑吉兰 17 号标本相似，与东非最早的直立人化石（ER—3733、ER—3883）最为相似．它可能是桑吉兰 17 号类型中的雌性个体．包括在这一组中的还有特里尼尔的化石和出自帕蒂阿亚姆 (Pati-Ayam) 和凯登布鲁伯斯 (Kedungbrubus) 的化石碎块．莫佐克托幼童的头骨的年代通常也被定为这一时期，但意见不一，有认为是 1.9 百万年前的，也有认为是 70 万年前的 (Wantanabe & Kadar, 1985; Swisher *et al.*, 1994)．如果确实是 1.9 百万年前的话，则它是最古老的直立人了．爪哇 5 万年至 10 万年前的古人类被大多数学者划分为"古智人"或"演化中的猿人"．包括桑邦甘马切 (Sambungmanch) 化石、昂栋 (Ngandong) 头骨和加威 (Ngawi) 头骨．

东南亚当前研究中的一个焦点是关于解剖学上的现代智人的起源问题．昂栋人及其类似的人群是绝灭了呢或是演变成现代人？昂栋人群与现代印度尼西亚人和澳大利亚人的关系如何？对这些早期现代智人的情况尚所知甚少．加里曼丹岛尼阿 (Niah) 洞的化石，年代是 38 000 年前，这是众所周知的了．其它早期解剖学上的现代人是出自巴拉望岛塔邦 (Tabon) 洞 (22 000 年前) 的化石和爪哇的瓦贾克 (Wadjak) 头骨．根据这些头骨的对比研究以及考古学方面的研究，最可靠的解释是，在印度尼西亚解剖学上的现代智人是从昂栋人群发展而成的 (例如，Flood, 1983; Groves, 1989; Habgood, 1989)．

印度尼西亚的现生人群中，农耕人群与华南和东南亚北部的亚洲人群相似．在热带雨林的边远地区仍可看到尼格里托 (Negrito) 人群．澳大利亚的最初居民可能是来自印度尼西亚和马来西亚．这些人是昂栋人群的后裔．农耕人群从东南亚北部迁徙到印度尼西亚约始于 5000 年前，在 3000 年前抵达西印度尼西亚 (Habgood, 1989)．农耕者的这种迁徙引起印度尼西亚热带雨林原初的解剖学上的现代居民——以狩猎和采集为生的尼格里托人群的绝灭．

（张银运 摘译）

# THE CURRENT PICTURE OF HOMINID EVOLUTION IN JAVA

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**Abstract**

Of the four major geographical areas where fossil hominids are found, Southeast Asia is the least understood. Except for some isolated teeth the only fossil hominid remains are from sites near the Ngandong (Solo) River of Java. All of the major discoveries of *Homo erectus* have been made by local farmers except for the original "*Pithecanthropus*" find of 1891. In 1949, based on the large size of a single mandible, G.H.R. von Koenigswald named a new hominid genus "*Meganthropus.*" Today there is no agreement among the authorities concerning the taxonomic status of the mandibular specimens that have been assigned to the genus, "*Meganthropus.*" Despite morphological differences mostly related to extreme size, these mandibles have been assigned by most authorities to a proposed highly sexually dimorphic population of early *H. erectus* in Java. New evidence of cranial material has made this proposal even more problematic. Sangiran 31 consists of nearly complete left and right parietals, part of the left temporal, and an occipital. The overall morphology is different from any known specimen of *H. erectus*. An undescribed specimen, Sangiran 27, consists of a nearly complete but crushed cranium. The palate and dentition are intact and are within the size range found for the "*Meganthropus*" type specimen and outside the range of known *H. erectus* specimens. It also possesses a double sagittal ridge. "*Meganthropus*" may be valid and represent an additional hominid genus in Southeast Asia.

It has now been over one-hundred years since the original excavations led by Eugene Dubois and his discovery at Trinil of the first *Homo* ("*Pithecanthropus*") *erectus*. Since then, only a few archaeological excavations have been performed throughout Southeast Asia, and local farmers from Central Java have discovered all the significant hominid remains since the initial discovery by Dubois.

The most ancient fossils come from the Upper Kalibeng and Pucangan layers at Sangiran. They date from about 2.0 to 0.7 million years ago (m.y.a.) (Watanabe & Kadar, 1985). These fossils have been grouped under the proposed genus "*Meganthropus.*" The type specimen is based on a mandible whose body is as large as the largest of the robust australopithecines, but the dentition is within the range of *Homo* ("*Pithecanthropus*") *erectus* and the gracial

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australopithecines, including *Homo habilis* (Figure 1). G.H.R. von Koenigswald recovered the type specimen in 1947 from a local farmer and attributed it to a new hominid, "*Meganthropus paleojavanicus*" (von Koenigswald, 1954). Since the type specimen was found, additional mandibles have been attributed to "*Meganthropus*." In the Spring of 1993, S.Sartono recovered an additional "*Meganthropus*" mandible from a local farmer (Figure 2). This find is of great importance since it is of similar morphology to the hyper—robust type specimen. Most authorities have placed "*Meganthropus*" within the species *H. erectus* (e.g., Le Gros Clark, 1955; Piveteau, 1957; Lovejoy, 1970; Wolpoff, 1980; Pope & Cronin, 1984; Kramer, 1989, 1994; Rightmire, 1990). Although the "*Meganthropus*" mandibles are outside the known variation of *H. erectus*,

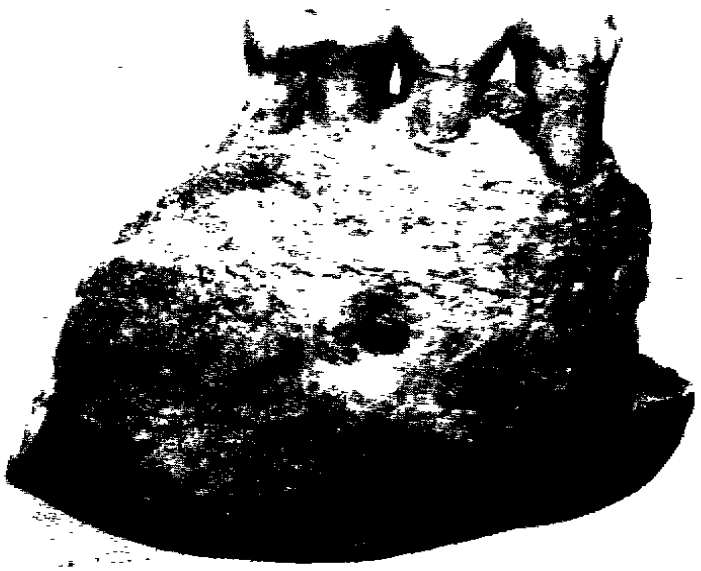

Figure 1 "*Meganthropus*" A (Sangiran 6)

Figure 2 "*Meganthropus*" D

these authorities have stated that they are simply a highly sexually dimorphic population of *H. erectus*.

Recent finds from Sangiran of hominid cranial remains of a hominid outside of the known range of *H. erectus* have shed new light onto the taxonomic puzzle of the "*Meganthropus*" mandibles. There are now four cranial specimens that have been assigned to "*Meganthropus*." These include the complete rear of a brain case, a crushed skull, a parietal, and an occipital fragment.

In 1959 the first fossil hominid skull specimen from Sangiran to be recognized as not belonging to *H. erectus* was recovered by Sartono (Figure 3). Its exact stratigraphic location is not known, but it probably originated several meters below the boundary between the Lower Pleistocene Pucangan and the Middle Pleistocene Kabuh Formations. These layers date from 0.7 to 1.0 m.y.a. (Watanabe & Kadar, 1985). In 1979 the second cranial specimen of "*Meganthropus*" (Sangiran 31) was found. This skull dates from the Upper Kalibeng and Lower Pucangan layers at 1.9 to 2.2 m.y.a., which is before any known *H. erectus* (Watanabe & Kadar, 1985) (Figure 4,5). Sangiran 31 consists of most of the rear and base of a brain case. It is not of the known *H. erectus* design. The brain case is not platycephalic in contrast to other *H. erectus*. It is dome—shaped and is much thicker, especially in the base. It also possesses a double sagittal ridge that is not found on any other *H. erectus*, but is found among the robust australopithecines. The cranial capacity of Sangiran 31 is about 700 cc, which is smaller than any known *H. erectus*. Sangiran 31, except for its cranial thickness and excessive muscularity, is similar in morphology to *H. habilis*, and with a date of about two million years ago is before *H. erectus* is known to have evolved in Africa.

Figure 3 "*Meganthropus*" I skull fragment

Figure 4 Left side view of "*Meganthropus*" II

Figure 5 Rear view of "*Meganthropus*" II

Other cranial fragments of "*Meganthropus*" have been recovered by Sartono, including an occipital fragment (Figure 6) and a complete but badly crushed skull, both of which are outside the range known for *H. erectus*. These do fit within the known range for the australopithecines. A badly distorted but complete skull of "*Meganthropus*" (Sangiran 27) was recovered from local farmers by Sartono in 1978 (Figure 7), but since 1980, it has been in the possession of T.Jacob and has not been restored or described.

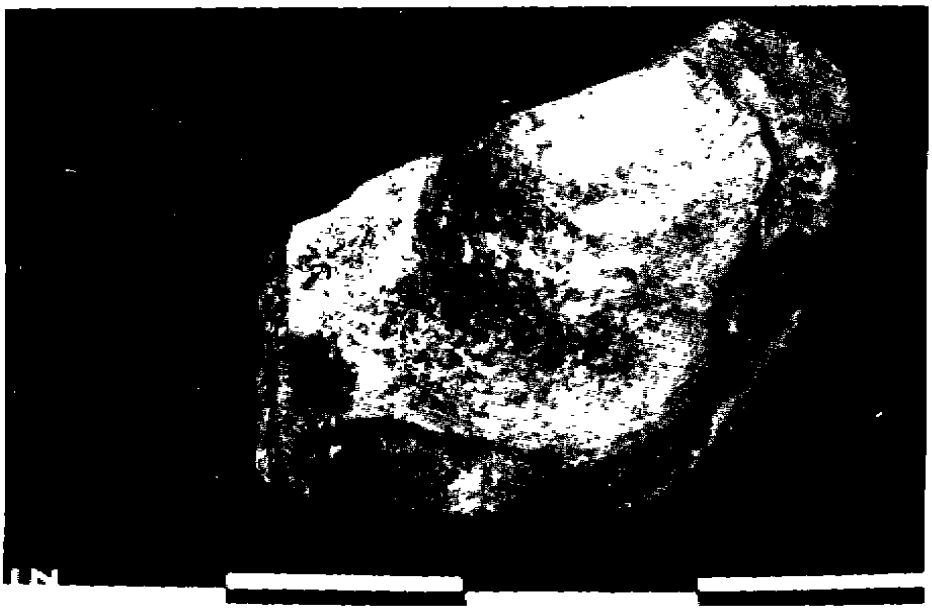

Figure 6 "*Meganthropus*" Ⅲ skull fragment

Figure 7 An Apparent "*Meganthropus*" skull (Sangiran 27)

The authorities do not agree on the taxonomic classification of "*Meganthropus*" and its place in human evolution. Three explanations are possible on the basis of the mandibles and cranial material that have been assigned to this genus. First, it may be that the first hominids to come to Indonesia were a species of australopithecine (*Homo habilis*) from Africa.

"*Meganthropus*" appears in the fossil record of Java about two m.y.a. and disappears about 700,000 years ago. A second explanation would be that *Homo erectus* evolved in Africa earlier than previously known and quickly spread across the Old World and into Indonesia. "*Meganthropus*" could be a very robust sub-species of *Homo erectus* which has not previously been found elsewhere. A third explanation would be that *Homo erectus* first evolved in Southeast Asia and then spread to the rest of the old world. Except for the recently published date of 1.86 m.y.a. for the Modjokerto infant, there is no evidence of an Asian origin of *Homo erectus*.

The most ancient remains of *H. erectus* from Indonesia come from the Pucangan layers at Sangiran and are very robust in their morphology. These are mostly fragmentary remains of mandibles and date between 1.8 and 0.7 m.y.a. (Watanabe & Kadar, 1985). The most impressive find from this layer was discovered by local farmers in the 1940's and recovered by von Koenigswald. This specimen, "Pithecanthropus" IV (Sangiran 4), consists of a complete base and rear of the skull and a complete maxilla. Franz Weidenreich named this specimen "*Pithecanthropus robustus*" based on a large number of primitive and robust features. Today, Sartono continues this taxonomic classification for the early robust forms of *H. erectus* specimens in Java (Sartono, 1991).

Most of the *H. erectus* specimens are from the Kabuh layer at Sangiran and date between 900,000 and 400,000 years ago (Wantanabe & Kadar, 1985). These are similar to the classic

Figure 8 *Homo erectus* (Skull IX) frontal view

Figure 9 *Homo erectus* (Skull Ⅸ) side view

*H. erectus* type found throughout the Old World. The most impressive of these finds is "*Pithecanthropus*" Ⅷ (Sangiran 17) recovered by Sartono in 1969, and was the first face of *H.erectus* to be found in Southeast Asia. Pithecanthropus Ⅱ and Ⅲ (Sangiran 2 and 3) recovered by von Koenigswald, Pithecanthropus Ⅵ (Sangiran 10) recovered by T.Jacob, and Pithecanthropus Ⅶ (Sangiran 12) recovered by Sartono all date during this time.

In May, 1993 one hundred years after Eugene Dubios' initial find of "*Pithecanthropus,*" a nearly complete skull of a *H. erectus* from Sangiran was recovered from local farmers by Sartono and D.E.Tyler at Sangiran from the Kabuh Formation (Figures 8,9). The age of the skull is problematic in that it has been dated from 800,000 to 1.6 m.y.a. depending upon which authority is consulted (Wantanabe & Kadar 1985; Swisher *et al.* 1994). This new specimen is most similar in morphology to the earliest *H. erectus* fossils from East Africa (ER−3733, ER−3883), Which date between 1.8 and 1.7 m.y.a., and is similar to the presumed male hyper- robust Javanese *H. erectus*, Sangiran 17. On the basis of known variation among *H.erectus* of Java, the morphological features of the skull indicate that it is probably a female of the Sangiran 17 type. The other fossils in this group include the Trinil fossils and the fragmentary specimens from Pati−Ayam and Kedungbrubus. The skull of the Modjokerto child is usually placed in this period. It was a child between two and four years of age, and had not developed the characteristics that would identify it as *H. erectus*. There is no agreement on the date; it has been dated from as old as 1.9 million years ago to as recent as 700,000 years ago (Wantanabe & Kadar 1985; Swisher *et al.* 1994). If it is 1.9 m.y.a. it would represent the oldest known specimen of *H. erectus*. The last group of fossil hominids from Java date between 50,000 to 100,000 years ago (Wantanabe & Kadar, 1985). These are classified by most authorities as "Archaic" *H. sapiens* or "Evolved *Pithecanthropus.*" This group consists of the Sambungmancan fossil,

Ngandong skulls, and the Ngawi skull. The brain-case of the Ngandong skulls are more elongated and higher vaulted. Their cranial capacities range from 1100 to 1300 cc.

The focus of current research in Southeast Asia concerns the evolution to anatomically modern *H. sapiens*. What became of the Ngandong and similar populations? Did they become extinct or did they evolve into modern humans? What are the relations of the Ngandong populations and modern Indonesians and Australia? Very little is known of these early modern *H. sapiens*. The Niah cave fossils from the island of Kalimantan, dated about 38,000 years ago, are the best known. Other early anatomically modern populations come from the Tabon caves (22,000 years ago) on the island of Palawan in the Philippines and the skull of Wadjak from Java. On the basis of current studies of metric and non-metric comparisons of these skulls and from the archaeology, the most likely explanation is that anatomically modern *H. sapiens* developed in Indonesia from the Ngandong populations (e.g., Flood, 1983; Groves, 1989; Habgood, 1989).

Although it is believed that Australia has been occupied for at least the last 60,000 years the earliest human remains are those of the anatomically modern skull, Willandra Lakes Hominid 50. The date of this skull is uncertain, but most authorities give it a date of approximately 40,000 years ago (Wolpoff, 1989). Other early anatomically modern populations include the Mungo fossils (30,000 years ago) and Kow Swamp (9,000 to 12,000 years ago) (Flood, 1983).

From looking at the living Indonesian populations a great deal of variation can be observed between the modern farming populations and the indigenous hunting and gathering populations, the Negritos. The farming populations are similar to the Asian populations of South China and Northern Southeast Asia. In the remote areas of the tropical rain forests of Indonesia, Negrito populations can still be observed today. The first inhabitants of Australia probably came from Indonesia and Malaysia more than 60,000 years ago. These peopple would have been the descendants of the Ngandong populations. Then over the Late Pleistocene and Early Holocene the "Australoid" populations of the Indo-Malay archipelago, New Guinea, and Australia evolved independently from each other.

A wave of farmers came to Indonesia from Northern Southeast Aisa beginning about 5,000 years ago and reached into western Indonesia by 3,000 years ago (Habgood, 1989). This migration of farmers initiated the extinction of the original anatomically modern inhabitants of the tropical rain forests of Indonesia, which are the Negrito hunting and gathering populations.

## References

Clark W.E. LeGros, 1955. *The Fossil Evidence for Human Evolution*. University of Chicago Press, Chicago.

Kramer A., 1989. *The Evolutionary and Taxonomic Affinities of the Sangiran Mandibles of Central Java, Indonesia*. Unpublished Ph. D. dissertation, The University of Michigan, Ann Arbor.

Kramer A. & Konigsberg L.W. 1994. The phyletic position of Sangiran 6 as determined by multivariate analyses. In: (J.Franzen, ed.) *100 Years of Pithecanthropus The Homo Erectus Problem*, pp. 105-114.

Lovejoy C.O., 1970. The taxonomic status of the "Meganthropus" mandibular fragments from the Djetis beds of Java. *Man N.S.*, 5: 228–236.

Piveteau J., 1957. *Traite de Paleontologie*. Volume VII. Maisson et Cie, Paris.

Pope G G. & Cronin J E., 1984. The Asian hominidae. *J.Hum.Evol.*, 13; 377–396.

Rightmire G P., 1990. *The Evolution of Homo Erectus: Comparative Anatomical Studies of an Extinct Human Species*. Cambridge University Press, New York.

Sartono, S., 1991. *Homo (Pithecanthropus) Erectus: Le Debat Fin*. L'Anthropologie (Paris), 87: 465–468.

Swisher C C., Curtis G H., Jacob T., Getty A G., Suprijo A., Widrasmoro, 1994. Age of the earliest known hominids in Java, Indonesia. *Science*, 263: 1118–1121.

Watanabe N. & Kadar D., eds. 1985. *Quaternary Geology of the Hominid Fossil Bearing Fromations in Java. Report of the Indonesian–Japan Joint Research Project CTA–41, 1976–1979*. Special Bulletin Number 4. Bandung, Indonesia: Geological Research and Development Centre.

Wolpoff M.H., 1980. *Paleoanthropology*. Knopf, New York.