

THE IMPORTANCE OF JAVA FOR THE EARLY HISTORY OF MAN¹⁾

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At the present moment Java is an island. This has not always been the case: If we could lower the sea level for about only 40 — 50 m, you would see that in the South there would remain a deep trench of several 1000 meters, while the Java Sea in the North would be practically dry. Java with Kalimantan and Sumatra would be linked together and with the mainland of Asia. Geographically Java therefore forms the Southern rim of Asia, and in the past the sea level has been lowered several times to allow mammals and early Man to migrate to Java via landbridges.

During the last 5 — 3 million years Java has grown slowly from West to East. The oldest mammalian fossils from Java are to be found in the Chijulang and Kali Glagah Beds in Western Java; the upper part of the lower Pleistocene Jetis Beds are to be found in Eastern Java, still intercalated in marine beds, indicating an old river mouth. The complete Jetis Layers can be observed at Sangiran, just North of Surakarta. Under these beds marine layers can be observed in just one small locality, where you can find many beautifully preserved sea shells. This can be taken as an indication that this part of Central Java appeared above sea level about 3 — 4 million years ago.

You can find in Java the remains of many fossil mammals which became extinct, some long ago, some more recently. The richness of this fauna is the result of the fact, that mammals from two different regions migrated to Java to live here together. One part, and this is the older part, comes from the Indian region. There, in the foreland of the Himalayas we find famous Sivalik Formation. We have called this migration the *Sivamalayan migration*. Typical for this are the primitive elephants, *Hippopotamus*, *Chalicotherium* and *Merycopotamus*. The two last ones are now entirely extinct. The first had the size of a horse and very sharp and large claws to dig for roots. The second one was like a large pig and only occurred in Western Java.

The second migration comes from the Chinese region: We call it the *Sinomalayan migration*. This event brought to Indonesia the orangutan, the gibbons, the Malayan bear and the tapir. The landbridge to China probably connected Kalimantan with the Philippines and Formosa. Prof. Sardjito from this University was greatly interested in this land connection, as certain diseases transmitted by fresh water shells could only have reached Indonesia via dry land.

This faunal mixture in Java must be the reason for the existence of several types of Human being, in Java. Excellent climatic conditions and fruits in all seasons formed the favourable background for early Human Beings, while at the same time strong volcanism was important for the preservation of the faunal remains. It is the same as in Africa, where the most important sites in Olduvai,

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East Rudolf and Omo are situated in old volcanic regions. Besides that volcanic products form the basis for absolute dating by the potassium/argon method.

By the middle of last century Darwin's theory about the evolution of the animal world, including Man, was much disputed. The two most important fossils of that period were the *Archaeopteryx* from the Jurassic lime stone of Bavaria, a link between reptiles and birds, and the remains of the famous *Pithecanthropus erectus*, the erect walking Ape-Man from Java. This last find had been made by E. Dubois in 1891/92 near Trinil in Central Java, and made him and Java world-famous. What he had found was a thighbone, very much like the one of a modern Man and fully adapted to walk-upright — therefore the name *erectus* — and a skull cap, which from a morphological point was in between man and ape, belonging to a kind of "missing link" between both, as predicted by Darwin. *Pithecos* means ape, *anthropos* man, thus ape-man. The skull cap had a very low forehead, a prominent wall or, as we say, torus, above the eyes, and a typical constriction behind them. Man or ape? A decision could not be made as the diagnostic important ear region was missing. Several interpretations were possible, ape, man, ape-man, man-ape, a microcephalic, a deformed skull, or perhaps a bastard between man and ape. More than 350 scientific papers have been written about the Javanese fossil, but a solution could only come from a new and more complete find.

Another difficulty was that nothing was known of the exact geological age of Trinil. The many extinct animals found in the same layer were proof of a considerable age. It was not before we had discovered more sites with more fossils that we were able to reconstruct the former history of Java. What is called the Pleistocene — in Europe often indicated as the "Ice Age" — in Java can be subdivided in three different units, which, according to the most famous sites and relative to the fauna have been called the Jetis —, the Trinil — and the Ngandong Fauna, the last one being the youngest. So we found out, that the famous *Pithecanthropus* beds were of Middle Pleistocene age. Absolute dates, given by Prof. Jacob, show that these layers have a maximum age of more than 800.000 years; tektites from the same layers were 710.000 years old.

The riddle of *Pithecanthropus* could not be solved in spite of many efforts to make additional finds, till in 1927 the skulls of Peking Man came to light, apparently a family member of the *Pithecanthropus* group. These finds were complete enough to show from an anatomical point of view that our Java Man must have been a true member of the human family. Also from a cultural point he was real human; he had used implements, and had known the use of fire. The roof of the skull was very much like in *Pithecanthropus*, only the torus above the eyes was more pronounced. The brain capacity between 900 and 1100 cc is about 2/3 of that in modern man. But while everybody was now convinced, that Java Man had been a real primitive member of the human family, the discoverer, Dubois, was not impressed. He suddenly changed his mind, and regarded his *Pithecanthropus* as a giant gibbon. Only a new find from Java was needed.

In 1934 we had recognised the great importance of Sangiran, north of Solo. Here in a wonderful natural exposure the Jetis Beds are exposed, and on top the Trinil Beds, containing many fossils. And here from the Trinil

Beds we were able in 1937 to produce a second *Pithecanthropus* skull, this time complete enough to demonstrate without any doubt that *Pithecanthropus*, for so long under dispute, was really human and a relative of Peking Man. Since then several *Pithecanthropus* skulls have been found in Sangiran. They are partly in the collection of your University with Prof. Teuku Jacob in the Department of Anthropology, partly in Bandung.

But *Pithecanthropus* is not confined to Java. There are several finds now from Africa, the best one from Olduvai Gorge, and most probably also from Europe. There is an occipital bone from Bilzingsleben in Eastern Germany which looks like Peking Man, and also the famous Heidelberg mandible might belong to the same group. So *Pithecanthropus*, or, as he is called now, "*Homo erectus*", indicates the final step before the evolution into *Homo sapiens*, the modern type of man. But the Jetis layers in Sangiran produced more human finds belonging to more primitive types than *erectus* from the Trinil. A first indication we had from Mojokerto, where mantri Handojo, working for ir. Duijfsjes, discovered in an shallow excavation a fossil baby skull, we have called *Pithecanthropus modjokertensis*. Because the skull is from a very young child, the find is difficult to judge, and we were glad when additional finds came out in Sangiran. A heavy male skull has a brain capacity of about 900 cc, which is high for such an early hominid (1350 — 1500 ccm in modern Man), combined with a most primitive dentition. There is still a small gap in front of the canines, the so-called "simian gap", typical for the anthropoids, and the dental arch is not parabolic, but the teeth are arranged in straight, converging rows, recalling the conditions in the apes. Only recently comparable dentitions have been found in Africa, in the Omo and the Awash region of Ethiopia. All these finds are very old; for Mojokerto Prof. Jacob has obtained an age of about 2.000.000 years!

But there are still more hominids in the lower layer of Sangiran. One, called *Pithecanthropus dubius* and known only by two mandibles, shows that both premolars behind the canine have two separate roots, a most primitive condition not known from other finds. The most important piece is in the Bandung collection. The second hominid, called *Meganthropus*, probably belongs to the australopithecines. According to modern conceptions they do not form the basis of the hominid line, but more probably a second branch of primitive hominids, which became completely extinct. An interesting mandible, collected in Sangiran by Marks and now in the Bandung collection, has clearly been cracked by a crocodile.

There are at least three different hominids together in the lower layers of Sangiran. They probably belong to the different migrations reaching Java from the Asiatic mainland. But no fossil Man from this period has till now been discovered in India; you might realise how privileged you are here in Java. Trinil, Mojokerto, Sangiran. Our picture of important localities would not be complete without mentioning Ngandong, the youngest of them all, but still at least 100.000 years old. The site is on the left bank of the Bengawan Solo north of Ngawi, on the 20 m terrace of the river. It was discovered by ter Haar in 1931. Among a great concentration of fossil bones and skulls of mostly extinct animals, remains of 11 human skulls and two tibiae have been found. The place apparently had been a camping site; most typical are the skulls of enormous water-buffaloes with a horn spread of more than 2 m. All human remains

found here have been damaged, but otherwise are in good condition. The skulls are very thick and low, but clearly more advanced than the classical *Pithecanthropus* skulls, with a very low frontal part and a strong torus above the eyes. Skull Solo V, length 22 cm, is the longest early human skull ever found. The skulls have been damaged by man, the facial parts are missing, and also the mandibles and some have been transformed in a kind of primitive skull bowls. Perhaps they have been skull trophies — this has been doubted by Prof. Jacob —, but there is a strong resemblance indeed to ancestor skulls which have been used by Australian Aborigines as drinking vessels in historical time. The relationship of "*Homo soloensis*" is not yet clear. Weidenreich tried to relate him to the Australians, a multivariate analysis carried out by Santa Luca (Harvard University) seems to indicate affinities with the older *Pithecanthropus*. From a morphological point of view affinities to Rhodesian Man from South Africa are suggested. The skulls, which good fortune allowed us to save through the difficult time of the Japanese occupation with the help of my wife and some Swiss and Swedish friends, have now returned to Indonesia, and will form part of the collections of your University.

In this short summary I was able to mention not less than five different types of Early Man from Java. No other country in the world has such a record, only Richard Leakey's sites in East Rudolf in Central Africa might be richer, but here the area covered by his research is much greater. The importance of your country for the knowledge of the history of Human Evolution is evident. What for you might look as a part of the history of Java, at the same time in a much wider context is part of the early history of Mankind. This is an obligation to science. The world is waiting for your contribution.



Prof. Dr. G.H.R. von Koenigswald visited the new fossil man site Sambungmacan, Central Java, on June 24, 1976.