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# EVE OUT OF AFRICA, ADAM OUT OF ASIA
## The first human immigration to Southeast Asia and the transition to *Homo sapiens sapiens* in place*

*Hansjürgen Müller-Beck*
Professor Emeritus
Faculty of Geosciences
University of Tübingen

*Although the chronostratigraphy of early human remains in Southeast Asia is still very much open to dispute, archaeological arguments are already available for the presence of human ecosystems east of India at least 1.5 million years ago (My). They are deducted from the traceable differences of technical traditions of stone tool production. There are even chances that the first toolmakers in South and East Asia are still older. It is also still possible that earlier roots of proto-human evolution are present and could be found in Asia itself.*

*After the critical evaluation of the mitochondrial DNA studies by C. Oxnard (1997; from whose article I took the title of this lecture) it seems quite possible that all regional populations of* ***hominids*** *and the early species of the genus* ***Homo*** *made their own ways of genetic evolutions up to the level of early* ***Homo sapiens sapiens*** *(modern humans). They are evidently following a general worldwide genetic trend of (at least later mainly) frontal brain evolution as a result of steadily increasing information processing and connected enlarging technical feedback as exclusive human factors.*

*But depending on the different climatic and topographic conditions controlling the basal productivity available for use by protohumans and humans, and the technologies developed and applied by them, the speed of changes had to be different. Those changes are also evidently related to the range of available choices that add new experiences and more complex interactions to the ecosystem established as cultural tradition.*

* transcribed from the lecture, of the same title, presented at the University of the Philippines, 28 February 2000.

*During the last 10 years more and more data of the Earliest History of humans and apes are available. The new data are mostly coming from Africa with its long and impressive fossil record, especially for the genus* ***Australopithecus****. Traced down to 4.4 My, this genus is definitely not of the apes anymore but an upright walking human— in itself the "missing link" postulated by Darwin and Haeckel. The morphological correlation with the genus* ***Homo*** *is still a matter of very intensive anthropological-philosophical speculation, but the available and sufficiently documented archaeological data make this transition a palaeohistoric reality in sub-Saharan Africa.*

*For the much longer Earliest History of Apes, starting around 27 My, we do not have as much new observations. But we have learned so much about the climatic changes during the later Tertiary in the Miocene from 23.5 to 5.3 My, and the following Pliocene and the Quaternary as well up to the present.*

*[When in the Middle Miocene, around 15 My, the ice shield in the Antarctic started to grow on the continental plate in place there and the world started to become drier once more, the dense tropical forests started slowly to open up. New potentials of land use in the more open forests were made available. This process continued and was intensified, especially after the topography of the still existing "modern" mountains about 10 My have been stabilized after the continental plates finished their long travel from the supercontinent Gondwana into their actual positions. The Monsoons started to blow, and with them the other air and ocean currents as important factors of the daily and seasonal weather and the long scale changes in the regional and global climate. The first parkland savannah ecosystems came into being opening up new perspectives for many animals as well as the early apes and the first known protohumans. The area of grasslands turned slowly into regions of dry forest-steppes and steppes, offering other new chances for many animals and the now existing humans. At the end of the Pliocene the Northern Hemisphere also periodically experienced phases of colder climate and in the end even the steppe-tundra enlarged for some time its area widely, becoming the home for more specialized animals and the stage for application of human technologies invented by* ***Homo sapiens neanderthalensis*** *and other subspecies of early* ***Homo sapiens*** *that developed enough to exploit this ecosystem as early as 60000 years ago.]*

*In this lecture I shall try to describe the actual situation of the available facts as condensed as possible and as base for the following interpretations. The better known sequence in Africa will be put in perspective with the available but still less numerous early observations in Eurasia up to one million years ago. After that the data in both areas are dense enough to compare directly.*

*As introduction there will be a short excursion into the research history of Early Man and the Missing Link. The second part will be a short description of the ecosystems of early apes from the Middle Miocene onwards. The third part will focus on the transition to the genus* ***Homo,*** *and the last part will be the Palaeohistory from the older species of* ***Homo*** *to* ***Homo sapiens sapiens*** *as a continuum documented by archaeological and cultural observations.*

## INTRODUCTION

Under the impression of Haeckel's hypothesis of a "missing link" between apes and men, the young Eugene Dubois (1858-1941), a medical doctor under contract as health officer second class in "Nederlands Indie" published already in 1883 in the "Natuurkundig Tijdschrift voor Nederlandsche Indie" an article, "About the Importance of the Research for Diluvial Fauna, especially in Sumatra", referring to the already known faunal remains of the Siwaliks in India. By 1889 he was ordered by the Ministry of Education to conduct "palaeontological research at the Westcoast of Sumatra."[1] He did so with impressive success, packing fossil bones into 3000 boxes. Among his finds are an already extinct Orang Utan, but no Apeman.

Later, Dubois moved to Java, following the finding of two prehistoric skulls defined as palaeo-Australians and *Homo sapiens* in Wajak. There he found in 1891 near Trinil, "together in the gravel with Pleistocene Java animals with a chimpanzee," a skull, which he initially named *Anthropopithecus.* The following year, a strictly human femur (upper leg bone) was also found in the same gravel with the same Pleistocene fauna. Using the terminology of Haeckel, Dubois then published his finds under the title "*Pithecanthropus erectus*—Eine Menschliche Übergangsform aus Java (A Human Transitional Form from Java)" in Batavia in 1894. However, a long discussion around the material started almost immediately that in the end, even Dubois himself was no longer convinced the skull he found was synchronous with the "modern"-looking femur. For the rest of his life, he believed the skull just belonged to a large fossil gibbon.

[1] The results were published in the *"Quarterly of Mining"*, the proceedings for Mining and Geology.

In the meantime, more than 30 individuals of *Pithecanthropus erectus*, now mostly put under the worldwide uniform species of *Homo erectus*, have been found in Java after 1936. Most of them in the region of Sangiran, in ancient lake and stream deposits, by G.H.R. von Koenigswald. The most archaic was named *Pithecanthropus modjokertensis* (von Koenigswald). Its morphological attributes are relatively close to the genus *Australopithecus.* The dates for all the skulls are given between 0.7 and 1.7 My. Synchronous living floors with artefacts, unfortunately, were so far not known. Meanwhile, in a sandpit in Mauer near Heidelberg, Southwest Germany the lower jawbone of an Early Man was found in 1908 together with remains of a warm forest fauna.[2] Named *Homo heidelbergensis*, it was mostly considered a subspecies of *H. erectus.* More recently however, it is seen as an independent species (e.g. Tattersall 1993) and placed in the sequence leading up to *H. sapiens* in Europe and Africa. *H. erectus*, on the other hand, would stay restricted to Eastern Asia, hitting a dead end there and eventually being replaced by *H. sapiens* as the offspring of *H. heidelbergensis.*

So we have evidently two different models: the old one, with a direct line from the species *H. erectus* leading to modern man, *H. sapiens* ("clever man," as defined by Linaeus); and a new one, where from the numerous early species of the genus *Homo*, only *H. heidelbergensis* continued up into *H. sapiens* and its possible regional subspecies. This does not mean, however, that the question of human evolution can finally be put to rest. Almost each year new hypotheses are created and expressed by the terminology applied to newly found human remains, as in the case of *H. antecessor* from Gran Dolina (Spain), a human fossil with "modern attributes" and dated to 800000 years ago. We can only be content that at least, all those species are not yet defined by palaeoanthropologists as subspecies of *H. sapiens* but still as remains of human beings on the way towards "Modern Man."

[2] These include: *Palaeoloxodon antiquus*, the European and North-African forest-grassland elephant; *Homotherium sp.*, a large saber-tooth cat; *Bos primigenius*, a phylogenetic relatively young Bovide, extinct in Europe since the 17th Century; *Sus scrofa*, the still very active and even townspark-invading European wild pig; *Capreolus capreolus*, the roe deer; *Cervus elaphus*, the large red deer; and *Hippopotamus amphibious*, retreated today to sub-Saharan Africa, as well as many others now mostly extinct animals.

## ECOSYSTEMS OF EARLY APES

Archaic primates are known already in the Palaeocene epoch of the Tertiary between 65 and 56 My. They are characterised by finger- and toetips shielded by flat nails, more sensitive for touch than the claws of small specialised insectivores and rodents. Modern humans still have as primates these sensitive fingertips, together with eyesight the most important and basic means of controlling our working abilities through complex neuronic feedback interactions.

The first "proto-" or "half-monkeys" associated with the genus *Notharcus* made their appearance some 48 My ago in the Eocene. Found in the tropical forests of the uplifted highlands of North America, they were similar to animals found in the island ecosystem of isolated Madagascar. They were later followed by the appearance of the first true monkeys of the genus *Aegypthopithecus* from the rich forested areas of Egypt's Fayum region, about 34 My ago in the Oligocene.

In the same time range, the average world climate also continued to get cooler after the temperature reached its maximum in the beginning of the Eocene some 58 to 56 My. By the early Oligocene the climatic conditions in the Northern Hemisphere deteriorated to the first "non-tropical" albeit still heavily forested ecosystems. This led to the first extinctions of primate species endemic in the area.

Meanwhile in the warmer tropical regions of the world, where the influence of the growing Antarctic Ice shield slowly opened up new forests, the first hominoid and ape appeared. Known as *Proconsul*, with very few fossil finds from Kenya in East Africa, the animal was still close to the genus *Hylobates* (gibbons) in its slender form, but still not as specialised as these agile and fast tree-dwellers. Based on DNA dating estimates, they separated into independent genetic branches some 27 My ago, still late in the Oligocene.

More fossils are known, differing in morphologies and ecosystems, from the genus *Sivapithecus*, which includes two formerly separate genus as *Dryopithecus*[3] and

[3] An ape very well adapted to early oak forests of subtropical ecosystems.

*Ramapithecus*.[4] They are found in forest areas from East Africa to Hungary and as far East as the Siwaliks in Northwestern India between 12 to 7 My ago. They are generally close to *Pongo*—the Orang Utan—but not as specialised in locomotion as these modern tree-climbers. It is estimated that they separated into two phylogenetic branches about 17 My ago. Some grassland species of *Sivapithecus* are also already close to *Gorilla* and *Pan*, the genus of the different species of Chimpanzees in Africa. The separation from the common ancestry for *Gorilla* is given about 11 My ago, and for *Pan*, about 9 to 8 My ago.

There are also two other genus that existed at roughly the same timeframe, which must be mentioned: *Oreopithecus* in Europe, and *Gigantopithecus* in Asia. Known from the remains of more than 200 individuals found in well documented forest biotopes of the Middle Miocene in Northern Italy about 12 My ago, *Oreopithecus* is in some respects also similar to modern apes. Some remains were also found in sub-Saharan Africa. On the other hand, *Gigantopithecus*, known mostly from isolated and very few larger bone fragments from more than 1000 individuals, are found over a larger area in the Siwaliks as well as in the caves of China and Northern Vietnam. With at least 3 different species enlarging in size from the late Miocene (9 My) up to the early Pleistocene (5 My), the possibility for this creature walking upright has led to recent discussions on whether to include it in the list of "Protohumans."

It is important to note, however, that there are still large gaps between the youngest documented fossil apes. In Africa the distance from *Sivapithecus*, declining about 7 My ago, to the earliest species of *Australopithecus*, appearing ca. 4.2 My ago, is still 2.8 M years, and to the oldest representative of *Homo* (the species *H. rudolfensis*, appearing ca. 2.4 M y ago), even 4.6 M years. In Asia, the distance from the youngest *Gigantopithecus*, given about 5 My ago, to the currently accepted oldest date for *H. erectus* in Java of about 1.7 My ago, would be in total a difference of 3.3 M years. This gap is larger than the one from *Sivapithecus* to *Australopithecus* in Africa, which is 2.8 M years, but smaller than the one from *Sivapithecus* to *Homo* in the same region, which is about 4.6 M years. In any case, this stresses the fact that it is still dangerous to make definite conclusions *ex silentio*, given what is known already about sedimentation dynamics and

[4] An ape with dentition well-equipped for grain-feeding in steppe- and grassland areas.

large erosions in fossil sites of *Australopithecus* in Africa. This is, by far, not the case for *Gigantopithecus*, its more robust counterpart in Asia.

## THE TRANSITION FROM *AUSTRALOPITHECUS* TO *HOMO* IN SUB-SAHARAN AFRICA AND SOUTHEAST ASIA

The Palaeohistory of hominids must be started with the first primates that clearly differ from the apes and the main factors in their phylogenetic evolution. This is still, as in the days of Haeckel, the ability for continuous upright walking, as reflected in the concept of the name *H. erectus*.

There are much older primates known from sub-Saharan Africa who are able to walk upright. Most recently, there are 7 species of *Australopithecus* defined in Africa:[5]

- *A. anamensis*, found in Kenya, dated 4.2 to 3.9 My
- *A. afarensis*, found in Tanzania, dated 3.6 to 2.9 My; associated with the Lucy and the Laetoli footprints
- *A. africanus*, found in South Africa, dated 3 to 2.3 My; the specimen from Taung is very young and looks progressive
- *A. (Paranthropus) aethiopicus*, found in Ethiopia, dated 2.8 to 2.3 My; large individuals with big teeth
- *A. garhi*, found in Ethiopia, dated 2.5 My; newest species found and correlated with flakes
- *A. (Paranthropus) boisei*, found in Tanzania, dated 2.3 to 1.4 My
- *A. robustus*, found in South Africa, dated 2.4 to 1.9 My.

Some years ago the genus *Paranthropus* was still kept separate from the genus *Australopithecus* as an independent phylogenetic branch. It hit a dead end after living synchronous with *Australopithecus*, but continued to exist with the genus *Homo* for another one million years.

[5] Given in an article in *Time*, 17 January 2000.

The first two species of the genus *Homo* are now considered to be *H. rudolfensis*[6] and *H. habilis*. Found in Kenya and dating between 2.4 and 1.9 My, *H. rudolfensis* has a brain capacity not very much bigger in average as the later species of *Australopithecus/Paranthropus*. At least in its later range, it is very likely synchronous with tool-making in Koobi Fora, but not with already documented living floors. Also found in Kenya, *H. habilis* is dated between 1.9 to 1.5 My. It has an average brain capacity partially overlapping with the younger species of *Australopithecus*. It is clearly synchronous with the oldest artefact levels and living floors in the sequence of Bed I of Olduvai Gorge.

However, the first widely accepted human species is *H. ergaster*. Found also in Kenya, dated 1.7 to 1.5 My, it has a higher brain capacity as defining attribute, than the average of *Australopithecus*. Yet some authors still consider this a later form of *H. (A.) habilis* in order to construct a continuum separate from the true *H. erectus* with late Oldowan sites.

*H. erectus modjokertensis* as the oldest subspecies of the genus *Homo* in Southeast Asia, with the dates down to 1.7 My, is in the same time range as the African *H. ergaster*. So far however, synchronous stone tools are not reported from the gravels in which human and animal bones in Java have been found. Nevertheless, it fits the chronostratigraphic position that some of the morphological attributes are still similar to the genus *Australopithecus*.

The general conception among anthropologists was and is to correlate members of the genus *Homo* only with the oldest stone tools found, even despite the fact that individuals defined as members of the genus *Paranthropus* did have very advanced hand-bone morphologies. And there was also the old but nearly forgotten hypothesis of J.T. Robinson from the late 1950's, after which the differences between *Australopithecus* and *Paranthropus* could be understood as sexual dimorphism in some populations of that time as we see them among *Gorilla* very often, and also in the larger species of *Pan*. This was for me as palaeohistorian the reason (Müller-Beck 1998) to use the archaeological data of the well observed Oldowan living floors in the lowest levels of Olduvai Gorge sequence and dated down to 1.9 My. There, not only simple flakes and pebble tools are found, but also cores with clearly visible planned production sequences and besides crude

[6] Similarly/formerly *Australopithecus rudolfensis*.

picks, also the first bifacially worked thick "proto-handaxes" with sections identical in their attributes (specially the angle of cutting edges) with those of the bifacially worked chopping tools in the same inventories. So it seems more appropriate to use the term Oldowan "people" or Oldowan "culture" using the stone industry in creating this first documented human ecosystem produced by one or all of the species in transition between the morphologically defined genus *Australopithecus, Paranthropus* or early *Homo.* There is also new argument available that *Australopithecus garhi,* recently found in Ethiopia with synchronous flakes, is also a potential maker of Oldowan tools already 2.5 My ago – even older than *H.(A.) ergaster.*

The Oldowan ends about 1.5 My ago and is replaced in Africa by the Acheulean with typical handaxes and a flake tool industry, which spread from there to the north of the western Old World. However, *H. erectus modjokertensis*, dated about 1.7 My in Java is most likely a producer of later Oldowan tools, if they will be found in the future.

This means clearly that *H. erectus* was present in Southeast Asia before the existence of the Acheulean. If he really came out of Africa as an immigrant to Asia is open to discussion. This could be possible but there are other two different possibilities: that already a late species of *Australopithecus* came out of Africa to Asia before more than 2.5 My ago and made its own way to the genus *Homo*; or there was an independent transition from the early Apes in Asia, of which so far only *Gigantopithecus* is known, directly without any influence with Africa at all. As long as we have the Asian gap between the latest found *Gigantopithecus* between 5 My ago and the first documentation of *H. erectus* not before 1.7 My ago, we have to keep the problem open. It could be that *Homo* really came out of Africa, but so far it must not have been.

## THE TRANSITION TO *HOMO SAPIENS* IN ASIA

According to the model of the Mitochondrial DNA Studies, it was postulated, that not only the earliest species of *Homo* but also the later ones of *Australopithecus* came out of Africa to colonize other parts of the Old World. The same should be the case again with the earliest representatives of *H. sapiens*. If this really would be the case, the species *H. erectus* in Asia would hit a dead end and would have to give way to the newcomers from Africa.

But there are clear archaeological arguments available which speak clearly against such an interpretation of laboratory analytical results, like for example the differences in stone tool traditions. In Africa and Western Eurasia, the Acheulean flourished until about 130000 ago and after that being replaced by the Middle Stone Age traditions in Africa and Southwest Asia, and the Middle Palaeolithic industries in Northern Eurasia. The latter are already connected with the earliest subspecies of *H. sapiens*: *H. sapiens neanderthalensis*. So far the oldest evidence of this subspecies is the female skull of Weimar Ehringsdorf. It is connected with a warm forest fauna and a well made flake tool industry with small handaxes and bifacially retouched projectile points and knives. This site is either to be dated into the last interglacial at the beginning of the Pleistocene about 120000 ago or an even earlier warm stage already 200000 ago. Another site connected with *H. sapiens neanderthalensis* but with plant remains from tundra vegetation and elements of a cold fauna is Salzgitter-Lebenstedt. Here the industry is a late Middle Palaeolithic dated around 60000 ago, with heavy handaxes, bifacial knives and bone points of different sizes and function.

On the other hand, synchronous industries in East Asia are looking very different as for example in Ting Tsun at the Fenho in Central China, the Fenhoian. Here we have an industry without any handaxes, but numerous picks, evidently derived independently from the chopping tools of an older, so far unknown stone technology which could be similar or equal to the Oldowan. In the Fenhoian, a well developed core technology is also present, but with lesser smaller flaking which is replaced by larger very well aimed preparation negatives. The animals connected are also steppe- elephants and other grassland species, human remains are evidently to be considered early *H. sapiens* similar to *neanderthalensis*. The different localities of Ting Tsun are most likely to be dated before and after the last interglacial between 150 and 80 ky ago.

There is no doubt possible that we have two very distinct cultural traditions expressed by the stone industries found in the West and East of Asia, different clearly from synchronous Middle Stone Age traditions in sub-Saharan Africa. They can all be traced over tens of thousands of years. Thus, there is no need to introduce new immigrants from Africa and to make them responsible for this development. It can be much easier understood if the archaeological continuum is connected with an evolution from the

earlier to the later subspecies of the genus *Homo* using the old model of Global Sapientisation with different speed.