

**GIGANTOPITHECUS AND ITS PHYLOGENETIC
SIGNIFICANCE***

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Gigantopithecus was first found in 1935 by von Koenigswald. He obtained among a great number of fossil teeth in Chinese drugstores in Hongkong a right lower third molar of enormous size and believed it to belong to a new giant ape. Thus the name *Gigantopithecus blacki* was given and it was considered as a new genus and a new species. Weidenreich first referred it to a giant orang (1937), but later based on two more molars also purchased by von Koenigswald, he changed his opinion and pointed out the human affinities of this giant and suggested that it should be called "*Gigantanthropus*" (1945). He went on further to assume that *Gigantopithecus* is the direct ancestor of *Pithecanthropus erectus* of Java and of *Sinanthropus pekinensis* of Choukoutien.

In 1952, von Koenigswald, based altogether on eight, including the three just mentioned, teeth of *Gigantopithecus* or referred to it, also modified his opinion and regarded it as a gigantic member of the human group but in an over-specialized side branch of the human line of evolution. Recently (1957), after seeing the mandibles uncovered in the Kwangsi cave, however, he stated that *Gigantopithecus* may be a pongid of "moderate type". So far, very diverse opinions about the systematic position of *Gigantopithecus* are maintained by anthropologists in the world.

As the teeth of *Gigantopithecus* before the Kwangsi discovery were all acquired in the Chinese dispensary in association with numerous teeth of orang, giant panda, tapir, bear, rhinoceros, *Stegodon*, etc., they were suggested by von Koenigswald and Weidenreich to have come from the cave and fissure deposits in South China.

Since 1956, field works have been continuously carried out in Kwangsi by the Institute of Vertebrate Palaeontology and Palaeoanthropology. So far, fossils of *Gigantopithecus* including three fairly complete mandibles and more than 1,000 isolated teeth have been discovered *in situ* in three caves in Tahsin and Liucheng Districts. A monograph of the systematic study of these materials is now in preparation.

* Received November 14, 1961.

As to the geological age of *Gigantopithecus*, formerly it was generally believed from the fossil mammals together found in the drugstores to be Middle Pleistocene. Recently, however, Chow (1957), based on the presence of fossils of *Mastodon* sp. and Chalicotheridae, assigned an early age of the giant creature and considered it probably as belonging to the Early Pleistocene or even Pliocene. Pei (1957) agreed with Chow in believing the age to be Early Pleistocene. But Kahlke (1961) suggested it to be the basal part of Middle Pleistocene instead of Early Pleistocene for the presence of some later mammalian forms such as *Equus yunnanensis* and *Cuon* sp.

The mammalian fossils associated with *Gigantopithecus* are being studied by Prof. Pei Wen-chung and the results will be published separately. No artifacts were found so far in the caves.

The jaws and teeth of *Gigantopithecus* bear the following characteristics.

The mandibles and teeth are large and robust. They are bigger than those of any great apes or men, fossil and modern, except the incisors which are smaller than those of modern great apes.

The contour of the dental arcade and the diastema of *Gigantopithecus* are intermediate between the pongids and the hominids. Judging from the three mandibles, the premolar-molar tooth rows on both sides of the dental arcade of *Gigantopithecus* are neither parallel nor convergent posteriorly. Instead, they are slightly divergent posteriorly, but the degree of divergence is not so great as in the hominid. The anterior tooth row has a fairly marked turning at the point of the canine but not so pronounced as in modern great apes. The canines are in close contact with the incisors leaving no interspace between them. The mandibles have no pre-canine diastemata but only post-canine ones which are smaller than those of the pongids.

Both the upper and lower incisors are very small, especially the lower ones in comparison with the other teeth distal to them. There are contact facets on both sides of the lower incisors, indicating that they are in contact with the lower canines. Thus the incisors of *Gigantopithecus* are evidently more close to those of the hominids than of the pongids.

The characteristics of the canines of *Gigantopithecus* are also intermediate between the pongids and the hominids. They are relatively small, conical but bluntly pointed with fairly marked internal cingulum. In occlusion, the upper and lower canines, though overlapping, are not so marked as in the pongids. The canines project beyond the occlusal level of the post-canine teeth but only to a slight degree. They show fairly marked sexual dimorphism but not so pronounced as in the pongids.

The anterior lower premolar of *Gigantopithecus*, though semisectorial, is distinctly bicuspid with marked anterior and posterior foveae.

The molar teeth of *Gigantopithecus* have more rounded and more closely compacted cusps than those in the Pongidae. The crown of the molar shows.

a marked block pattern. The upper third molar is very short mesio-distally and has undergone a secondary reduction. The cingulum is weak. The occlusal surface has lesser and coarser wrinkles than in the pongids. The first lower molar possesses a sixth cusp. Judging from the characters of the molar teeth, *Gigantopithecus* is definitely far closer to the hominids.

In a moderate degree of attrition the occlusal aspects of both the upper and lower molars become worn down to fairly even flat surface, though somewhat slanter than in the hominids yet more even than in the pongids. There are no prominences and depressions on the occlusal surface as generally seen in the pongids. The manner of attrition of the lower canines of *Gigantopithecus* also ranks between the Pongidae and the Hominidae. As shown in the female specimen of Mandible I, the lower canines wear down in the tips in a greater degree than in the distal sides. But in the male specimen of Mandible III, the degree of attrition of canines is greater in the distal sides than in the tips.

According to the criteria generally used at present in classifying the Pongidae and the Hominidae, *Gigantopithecus* seems to have characters intermediate between both families.

The systematic position of *Gigantopithecus*, thus, may have three possibilities: (i) It belongs to the Pongidae, (ii) it belongs to the Hominidae, and (iii) it is a new third branch between the hominids and the pongids. The present author is inclined to consider it as belonging to the Hominidae.

In the classification of higher primates, Simpson (1945) used the superfamily Hominoidea including three families: Parapithecidae, Pongidae and Hominidae. He regarded *Gigantopithecus* as a genus of the Pongidae. Heberer (1951) and others subdivided the family Hominidae into two subfamilies: Praehomininae and Euhomininae. Robinson (1954) supported the idea to divide the family into two subfamilies, but he suggested to use the term Australopithecinae instead of Praehomininae. The present writer agrees with Heberer and others in subdividing the family Hominidae into two subfamilies—Euhomininae and Praehomininae. The former contains the tool-making man, beginning to have social organization and thus they may be called "social man", while the latter includes creatures which are ground dwellers, semierect or fully bipedal, but have relatively small brains. They can use natural objects such as sticks, stones or bones for gathering food or for defensive or offensive purposes, but they have yet no definite lithic culture and accordingly no social organization. Thus they may be called "biological man".

Judging from the total morphological pattern of *Gigantopithecus*, we consider it to be a prehominid type, but not yet a true man. As the mandibles and teeth had become very much specialized, *Gigantopithecus* was probably a side branch of the prehominids which became extinct at the end of the Early Pleistocene or in the beginning of the Middle Pleistocene.

Besides *Gigantopithecus*, the subfamily Praehomininae also includes the australopithecines. Other forms, such as *Meganthropus palaeojavanicus* (Weidenreich, 1945) from Java and *Meganthropus africanus* (Weinert, 1950) from East Africa may also belong to this subfamily. Even the disputable *Oreopithecus bamboli* (Hürzeler, 1958) from Tuscany, Italy, might be an early form of the prehomínids.

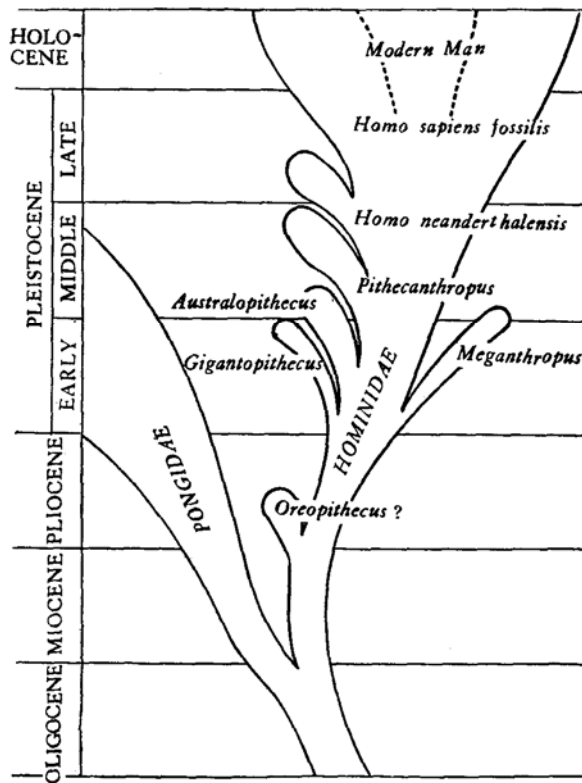


Fig. 1. Family-tree of the Hominidae.

The earliest prehomínids sprang from the pongids probably in the Miocene and continued to survive into the Early Pleistocene or even the early part of the Middle Pleistocene. They probably lasted for more than twenty million years and had a considerable wide range of distribution over a large part of the Old World including the greater parts of Africa and southern Asia and even a part of southern Europe. Many branches of the prehomínids had finally become extinct and a part of them evolved to the grade of the euhomínids. This is probably the process of transition from "ape" to true man or tool-making man. And *Gigantopithecus* is a side branch of the terminal stage of the prehomínids; the tool-making man appeared only within the recent one million years.

The subfamily Euhomininae is divided into two genera, the *Pithecanthropus*, including *Pithecanthropus erectus*, *Sinanthropus pekinensis*, etc. and the *Homo*, including *Homo neanderthalensis* and *Homo sapiens*.

Some forms of the australopithecines such as *Telanthropus* and the newly found *Zinjanthropus* may be finally ascertained to be tool makers; then they may be separated from the Genus *Australopithecus* and form a new genus of Euhomininae preceding the Genus *Pithecanthropus*.

Thus, the following classification of the family Hominidae is suggested and an attempted family-tree is proposed (Fig. 1).

Superfamily: Hominoidea

Family: Pongidae

Family: Hominidae

Subfamily: Prehomininae

Genus: *Australopithecus*

including *Paranthropus*, etc.

Genus: *Gigantopithecus*

Genus: *Meganthropus*

Genus: *Oreopithecus* ?

Subfamily: Euhomininae

Genus: *Pithecanthropus*

including *Pithecanthropus erectus*, *Sinanthropus pekinensis*, etc.

Genus: *Homo*

including *Homo neanderthalensis*, *Homo sapiens*

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