

DISCOVERY OF *GIGANTOPITHECUS* MANDIBLES AND OTHER MATERIAL IN LIU-CHENG DISTRICT OF CENTRAL KWANGSI IN SOUTH CHINA

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I. INTRODUCTORY NOTES

a) Historical Review of *Gigantopithecus*

Fossil bones and teeth are popularly known in China as "dragon bones" and has been used as medicine by Chinese since Han Dynasty or about 2000 years ago.

In 1935, G. C. R. von Koenigswald obtained a single tooth of giant primate from the so-called "dragon bones" and considered it as a new kind of man-like ape and created the name *Gigantopithecus* for it^[1]. In the successive years Koenigswald found two more teeth of the same animal also from Chinese medicine shops. F. Weidenreich in 1945 and 1946 studied the three teeth found by Koenigswald and came to the opinion that the giant primate recovered from the "dragon bones" bears much more Hominid characters than Anthropoid and consequently he proposed the name *Gigantanthropus* in stead of *Gigantopithecus* Koenigswald^{[2][3]}.

In 1952 Koenigswald re-studied all the material, 8 teeth, of *Gigantopithecus* in his possession but all obtained from Chinese medical shop and agreed Weidenreich's conclusion on this giant fossil primate^[4].

However, there are three problems left unsolved at that time, namely: 1) what part of China does the giant fossil primate come from? 2) what is the geological age of it? 3) and whether it is Anthropoid (ape) or Hominid (man)?.

By the help of Kwangsi people and the governmental organizations, workers of the Laboratory of Vertebrate Paleontology of Academia Sinica, in 1955 started to investigate the Mammalian fossils in Kwangsi caves. First we selected out 47 teeth of *Gigantopithecus* from the large quantity of "dragon bones" stored in Kwangtung and Kwangsi Provinces. In the Spring of 1956 our work team discovered three teeth of the same fossil *in situ* in a cave in Ta-Hsin district of southern Kwangsi. The same cave deposits have yielded also other mammalian fossils, commonly known as the Middle Pleistocene age in South China caves.

Therefore, two problems out of three left at the time 1945—46 by Weidenreich

where solved, namely, 1) the native place and 2) the geological age of *Gigantopithecus*. But since all the teeth are isolate, it is, however, difficult to solve the third problem, that is, whether it is an ape or a man.

b) Story of the Discovery and the Excavation

In the winter time of 1956, leading by the author the Kwangsi Working Team of Academia Sinica went again to Kwangsi for continuing exploration and investigation of the fossil mammals in the caves of that province. One farmer of Liu-Cheng district, digging cave deposits for fertilizer in one cave near the village Hsin-Shueh-Chung-Tsun, discovered a great quantity of fossil bones and, being persuaded by one governmental employee, presented all the fossil bones to Academia Sinica for investigation.

Among these fossils, there is one mandible with 12 teeth *in situ* of *Gigantopithecus*. For the importance of this specimen and its bearing locality, continuous excavation in this cave was immediately arranged and as a consequence of the excavation several isolated teeth and another mandible of *Gigantopithecus* and many fossils of other mammals were collected. The present paper is dealing with only some field observation in the cave and a preliminary observation on the collected fossils.

II. DESCRIPTION OF THE CAVE, THE DEPOSITS AND THE FOSSILS

The *Gigantopithecus* bearing cave is located on the vertical cliff, about 90 m above the present ground level, of an isolate hill, Lêng-Chai-Shan, about half km south-east of a village Hsin-Shueh-Chung-Tsun, Liu-Cheng District, in central part of Kwangsi Province of South China.

There are two present entrances of the cave: the upper one is smaller and the lower one larger. Entering by the smaller upper entrance, and stepping down about 1 m there is one horizontal layer of stalagmitic crust, which extends outwardly to the base of the lower entrance and inwardly to the hollow of the cave and forming a horizontal board projecting out from the cave wall (Fig. 1).

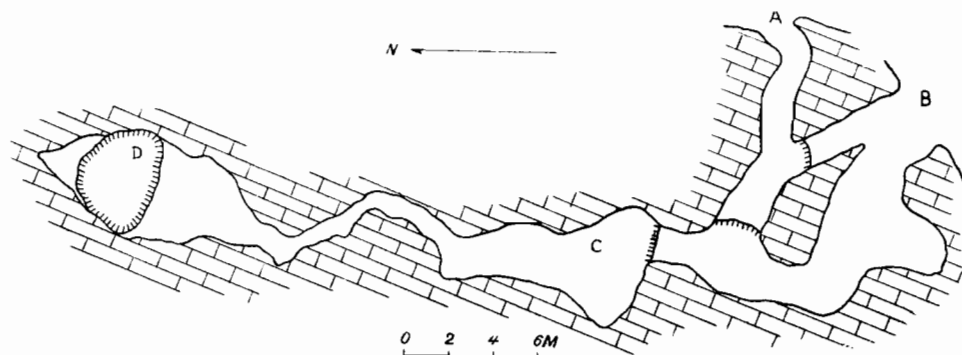


Fig. 1. Horizontal plan of the cave:
 A, small and upper entrance;
 B, large and lower entrance;
 C, the level where 1st. mandible of *Gigantopithecus* was collected;
 D, a depression.

The cave room is about 1 m wide, 4 m high and 10 m deep.

On the bottom of the cave, there is a layer of deposits about 2 m. in thickness. The top of the deposits is covered by another layer of stalagmitic crust (Fig. 2).

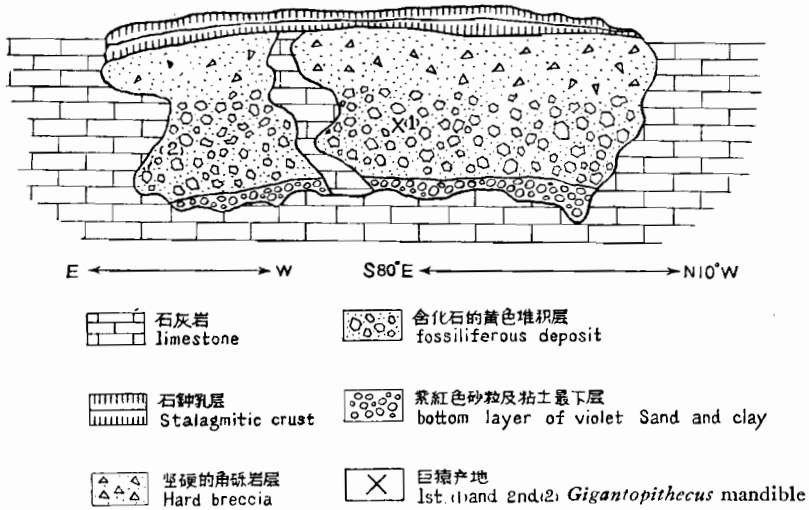


Fig. 2. Section of the cave deposits.

- (1) The 1st mandible of *Gigantopithecus*;
- (2) The 2nd mandible of *Gigantopithecus*.

Under the 2nd stalagmitic crust there is one layer of hard breccia, the upper part of which consists of little of limestone fragments and clay, and the lower part more of limestone fragments and occasionally with isolate animal teeth and bones.

From the layer of hard breccia it passes gradually to another layer, less consolidated and somewhat porous, composing of yellowish red clay and small blocks of clay, with large quantity of fossils. Most of the fossils, including the mandibles of *Gigantopithecus*, are collected from this layer.

At the bottom of the cave there is one thin layer of violet sand and clay, barren in fossil.

Most of the fossils collected from the cave are very fragmentary. But few of them were gnawed by Rodents as those commonly known in the caves in the same province.

The following species of fossils are recongnized:

Artiodactyla.

Sus sp.—probably two forms: one is the ordinary wild boar usually determined as *Sus scrofa* and the other represented by very small M_3 .

Cervidae indet.—represented by isolate teeth and pieces of antler. Also there are two forms: one represented by isolate teeth of ordinary *Rusa* size, and the other represented

by pieces of slender anther.

Perissodactyla.

Tapirus sp.—represented by isolate teeth of small size. It is smaller than *Megatapirus*, very abundant in Yenchingkuo of Wanh sien in Szechwan.

Rhinoceros sp.—represented by a number of isolate teeth, chiefly of milk dentition. According to its general shape and size, it may be referred to *Rh. sinensis* commonly known in south China caves.

Equus sp.—represented by only one isolate tooth.

Proboscidea.

Stegodon sp.—represented by isolate milk teeth, and referable to *S. orientalis* generally occurred in the caves of South China.

Mastodon sp.—represented by one isolate lower molar whose mammallae are somewhat damaged. It might be one element of *Trilophodon* or so.

Except *Mastodon* sp. which is generally known in Pliocene horizon in China, all the other forms are commonly known in South China cave. And by the study of Quaternary Mammals in China, they are popularly known as the *Pongo-Ailuropoda* fauna of South China, contemporary to Middle Pleistocene *Sinanthropus-pachyosteus* fauna of North China^[5]. Without more archaic forms, at the present we are difficult yet to assume the *Gigantopithecus* fauna of the Liu-Cheng cave to be older in geological age.

III. PRELIMINARY OBSERVATION ON THE NEW *Gigantopithecus* MATERIAL

1st mandible (Pl. II)—The first mandible found in the Liu-Cheng cave is rather well preserved, only the part behind M_2 on both sides is missing. At the present state 12 teeth are still in place and two teeth (left medium and right lateral incisor) were broken off during excavation.

All the teeth on this mandible are greatly worn down. In comparison with the *Gigantopithecus* teeth from other places in Kwangsi, the teeth of the 1st mandible are decidedly of smaller type, we, therefore, consider this specimen coming from an old female individual.

The jaw bone is very robust, larger and thicker than any known fossil or modern Anthropoid or Hominid.

The general curvature of symphysis is not so rounded as in Heidelberg jaw and slightly protruded at the place of the canines. The tooth-rows of both side are gently curved and divergent towards the back, unsimilar to those of modern apes, nor Hominids. There is one small diastema between the canine and 3rd premolar.

The incisors and canines are relatively small. Canines somewhat incisor-like, quite different from those of conical-shape in modern apes.

3rd premolar, slightly larger than 4th premolar, distinctly bicuspid and somewhat

sectorial shaped as shown by the sloping surface on its antero-outer side.

4th premolar somewhat molarized, but posterior lobe very small. Both M_1 and M_2 are too worn for proper description.

2nd Mandible (Pl. III) — The second mandible of *Gigantopithecus* was found by our excavation and is buried in very hard breccia. Left 3rd premolar was damaged during the excavation. It is a young individual, as indicated by the freshness of all the premolars and molars. Canines are not yet erupted and two medium incisors were lost.

3rd premolar with a crown exceptionally high, higher than molars, and bicuspid; 4th premolar square-shape and somewhat molarized. M_1 slightly worn, surface corrugated, with 5 distinct tubercles. M_2 slightly larger than M_1 , and with a small tubercle 6.

The fresh teeth on the 2nd mandible shown apparently an omniodont character by their corrugated grinding surface, somewhat like that of *Ailuropoda* or *Ursus*.

Isolate teeth — From the same fossiliferous deposits we also encountered 12 isolate teeth of *Gigantopithecus*. One left M_3 , considerably worn down may come from the 1st mandible (Pl. II, c). 3 Upper premolars: two left P^3 , one left P^4 ; probably representing two individuals. 7 Upper molars, 2 of smaller type, female individuals, 5 of larger type, male individuals. Among these individuals there are one young male and one old female might be the same ones as the two mandibles noted above. Therefore, in this Liu-Cheng cave, there lived about 4—5 individuals of the Giant Ape of different ages in two sexes.

IV. GENERAL CONSIDERATION

As learned from the majority of the mammalian fossils, that the *Gigantopithecus* bearing deposits in the Liu-Cheng cave is of Middle Pleistocene age and contemporary to the *Sinanthropus-pachyosteus* fauna of North China, is but little of doubt. On the other hand, since we have met in this deposits *Mastodon* tooth and some undetermined mammalian teeth, the possibility of being older age, for example, Early Pleistocene should be also looked forward. After the preparation of all the fossils collected from this cave, this question will be solved.

In comparison with the known fossil Apes, such as *Sivapithecus*, *Gigantopithecus* bears similar shaped lower molars (especially M_1 and M_2) but differs from the former by having larger and somewhat molarized P_4 .

With the Hominid group f.i., *Sinanthropus*, *Pithecanthropus*, *Meganthropus*, the Kwangsi giant shows much of Anthropoid characters, such as the high crowned and somewhat sectorial P_3 . Differed from the modern Anthropoid apes, *Gigantopithecus* exhibits much Hominid characters, namely, the smallness of incisors and canines and the incisor-like lower canine, etc.

Certainly by the robustness of the mandibular bones, it seems *Gigantopithecus* is rather close to *Meganthropus* of Java, but the lower teeth are all much bigger than those of the latter.

In South Africa many forms of Australopithecinae were known. If we compare the Kwangsi giant fossil with one of them, for example *Paranthropus*, the South African Ape-man differs from Kwangsi man-ape in having more reduced incisors and canines and more human like premolars.

From the forgoing comparison, it is reasonable to conclude that *Gigantopithecus* is more related to Anthropoid ape than Hominid, so far as the dental and mandibular characters show. Therefore, at the present moment, before a detailed study of the giant ape itself and the accompanied fossils, we favor the nomination of Koenigswald, that is *Gigantopithecus*, and drop *Gigantanthropus* of Weidenreich.

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在廣西省中部柳城縣“巨猿”下顎骨之發現

(摘要)

裴 文 中

廣西省中部柳城縣長曹鄉新社冲村一農民覃秀懷於挖掘山洞裏的“岩泥”作肥料時，發現一個巨猿的下顎骨，後由覃秀懷捐助給中國科學院古脊椎動物研究室，作為科學研究材料。古脊椎動物研究室於本年1月22日到3月11日並在發現“巨猿”下顎的山洞中，進行了正式的發掘工作，又發現了一個巨猿的下顎骨和12個零散的牙齒，以及許多與巨猿同時生活的動物的化石。

與巨猿同時共生的動物，計有：豬 (*Sus*)，有大小兩種；鹿 (*Cervidae*)，約有兩種，大的可能是水鹿 (*Rusa*)；獾 (*Tapirus*)，比四川發現之巨獾 (*Megatapirus*) 較小；劍齒象 (*Stegodon*)，可能是江南山洞常見的東方劍齒象；乳齒象 (*Mastodon*)，一個下臼齒。

除乳齒象外，上述各種化石都是江南山洞裏常見的所謂“猩猩，熊貓動物羣”裏的動物化石，時代是中更新世 (Middle Pleistocene)。但乳齒象一般在中國北部是第三紀 (Tertiary) 的化石，因此這個山洞裏的動物羣，可能在地質年代上，稍古一些。

巨猿下顎現共有兩個，農民覃秀懷發現的，是第一個，上邊有 12 個牙齒，代表一個老年雌性個體。在我們發掘時，曾發現了一個下第三白齒，可能是同一個體上的牙齒。我們發掘的下顎骨，上邊有 10 個牙齒，代表一個青年雄性個體。

第一個下顎骨上的牙齒，排列成稍向外突出的弧形，門齒和犬齒較少，犬齒還有些門齒的式樣，這都說明巨猿與現代的和化石的猿類不同。在另一方面，下顎骨骨骼彎曲的形狀，和下第三前白齒仍有些扇形的樣子，這些性質又說明與一般認為屬於人類 (*Hominid*) 者，有更多的猿類 (*Anthropoid*) 的性質。

第二個下顎骨上的牙齒排列成比較直的兩列，說明幼年的個體，更與猿類接近一些，也就是說“巨猿”是由猿類發展而來的。

由這兩個下顎骨的初步觀察看來，廣西所發現的巨猿基本性質是猿，但比任何已知的猿類 (現代的和化石的) 都具有更多的人類的性質。

Explanation of plate I.

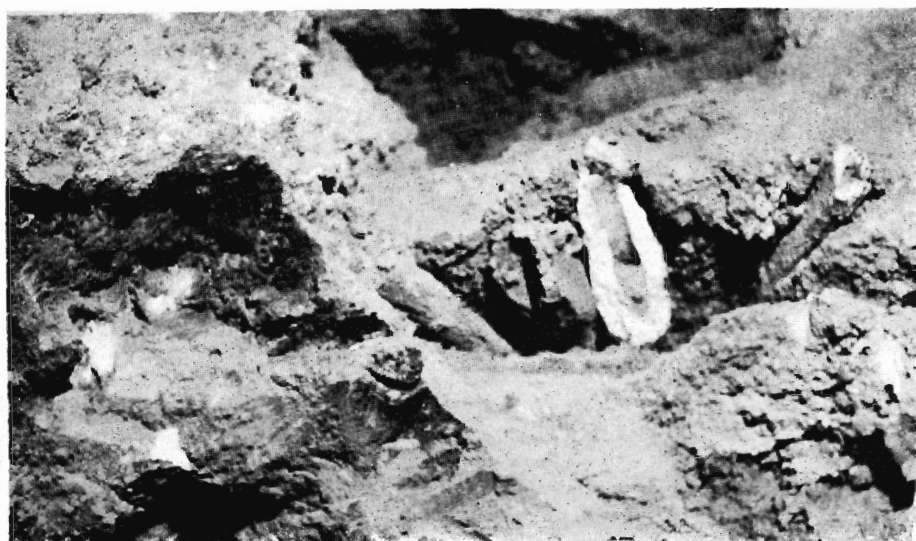
- A, The isolate hill, Leng-chai-shan, on the South-east face of which the *Gigantopithecus* bearing cave is located;
- B, The fossiliferous deposit inside of the cave.

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A



B

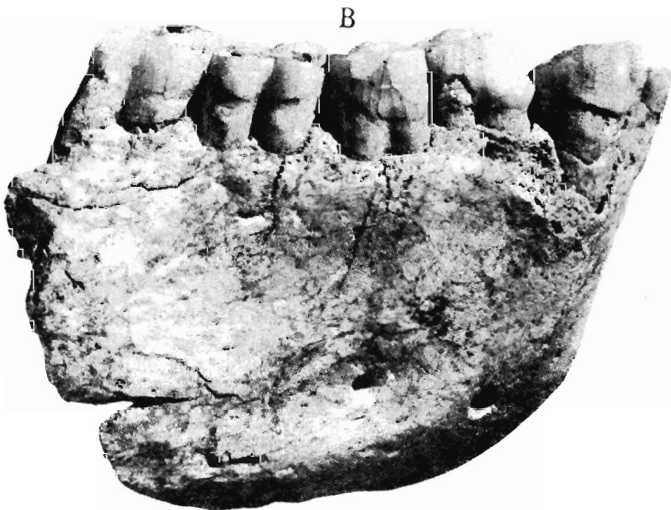
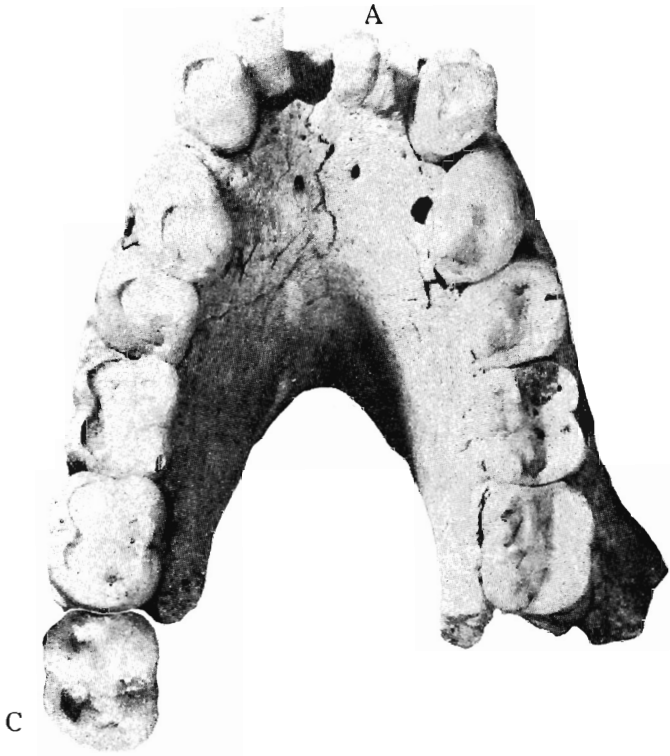


Explanation of plate II.

A & B, Two views of the 1st mandible (old female). $\times 1$;

C, The isolate M_3 found in the same cave and may belong to same individual as the 1st mandible,
 $\times 1$.

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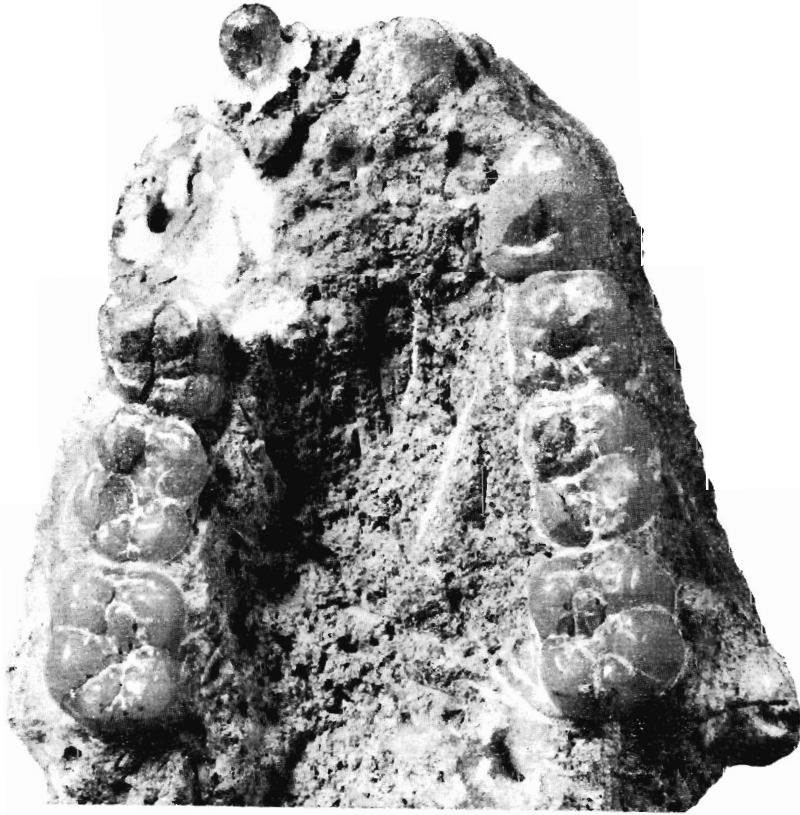
Explanation of plate III.

Two views of the 2nd mandible, halfly prepared (young male), $\times 1$.

A, occlusal view;

B, buccal view.

A



B

