

FOSSIL HUMAN SKULL OF EARLY PALEOANTHROPIC STAGE FOUND AT MAPA, SHAOQUAN, KWANGTUNG PROVINCE

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In June 1958, farmers in digging natural fertilizers in a limestone cave in the "Lion Hill" at Mapa village, Shaoquan Municipality (formerly Chukiang District) of Kwangtung Province, discovered a fossil human skull and many mammalian fossils including *Hyaena*, *Ursus*, *Ailuropoda*, *Felis tigris*, *Tapirus*, *Rhinoceros*, *Sus*, *Cervus*, *Bos*, *Hystrix*, *Lepus*, *Stegodon*, *Palafoxodon namadicus*, etc. as reported by the Provincial Museum of Kwangtung Province. The age of this fauna is reported probably of late Middle Pleistocene.

A more detailed description of the fossil human skull is given here.

1. DESCRIPTION OF THE FOSSIL HUMAN SKULL

The fossil human skull preserved is a calotte or skull cap consisting mainly of the frontal bone and the two parietal bones with fairly complete nasal bones and the right orbit. The calotte is considerably fossilized and of light grayish yellow color intermingled with dark spots and patches.

The main cranial sutures are almost completely fused. A short section of the sagittal suture is still recognizable at the vertex. The coronal suture is still discernible for the greater extent of its length although more obscured. If the state of the closure of the sutures in modern man can be used as a criterion, the skull is that of an individual of advanced age. However, Weidenreich reported that the suture closure occurs much earlier in early hominids than in modern man. The muscular crests are less pronounced, but the skull is fairly rough. This suggests that the skull may be that of a male.

The skull is ovoid in vertical view. The temporal line as seen on the right side is not very distinct. No parietal foramen is recognizable either at the right or left side.

In lateral aspect the skull seems higher than that of *Sinanthropus pekinensis* or of the Solo man found in Java. In *Sinanthropus* the frontal squama has a broad frontal bulge, descending nearly vertically, but it is separated from the supra-glabellar torus by a very distinct sulcus supratoralis. However, in Mapa skull as well as in Solo skull, the bulge descends and merges into the torus.

The glabella is the most projecting landmark in front.

The zygomatic process of the frontal bone is preserved at the right side. It extends downward from the lateral end of the supraorbital torus and terminates with the heavy frontosphenoidal process of the zygomatic bone. At its corner the supraorbital torus continues with the slightly marked temporal line which takes the form of a wide arc almost parallel with the contour of the calotte.

In lateral view, the naso-frontal, the fronto-maxillary and the fronto-lacrimal sutures are recognizable. The coronal suture is neither seen on the right nor on the left side except a small section of its upper end.

Viewed from front, the greatest lateral projection of the skull is about at the level above the supramastoid crest. The form of the calotte as indicated by the outline is like that of the Neanderthal skull and differs from that of *Sinanthropus*. A slight mid-sagittal crest is present though not so marked as in *Sinanthropus*.

The most conspicuous features in front view are the supra-orbital tori which, similar to the condition observed in *Sinanthropus*, almost form a continuous cross bar at the base of the forehead. They are separated only by a slight depression in the glabella region, that is to say, fairly distinct torus glabellaris or supranasalis unites the supra-orbital tori of either side.

The supra-orbital tori are very thick and project markedly both forward and side-wise. Their upper surfaces merge gradually into the frontal squama with a slight sulcus supratoralis, but not so distinct as in *Sinanthropus*. The tori are thickest in their median ends as those of the La Chapelle Neanderthal instead of in their middle parts or lateral ends as those of the Solo man or *Sinanthropus*.

Weidenreich pointed out that viewed from above the anterior contour of the supra-orbitals forms an almost straight line in *Pithecanthropus* and *Sinanthropus*. The Solo man has a similar contour and only towards the lateral end the outline turns slightly backward a little more than in the former two. In the Neanderthals, however, the contour on the whole shows a pronounced forward convexity and a corresponding pronounced retroversion towards the ends. The anterior contour of the supra-orbitals of the Mapa skull is different from that of *Pithecanthropus* or *Sinanthropus* and projects slightly forward than that of Solo man, and their lateral ends also turn more backward. However, its contour as a whole is straighter than that of the Neanderthals. Thus by the anterior contour of supra-orbitals the Mapa skull has an intermediate position between the *Pithecanthropus-Sinanthropus* and Neanderthals and is more close to the Solo skull.

The margin of the right orbit is mostly preserved except its lower margin. The whole contour of the orbit is rounded as the Neanderthals and differs from that of *Sinanthropus* or of Solo Man in which the orbit is almost rectangular in form with straighter upper margin. Near the median end of the upper orbital margin, there is a marked incisura frontalis medialis in *Sinanthropus* and the Solo man. However, the Mapa skull, like the La Chapelle skull, has no such structure.

The right orbital breadth from the maxillo-frontale point is 44.3 mm, the orbital height is approximately 39 mm. Thus the orbital index is 88.0 and it belongs to the hypsiconch type. In *Sinanthropus*, the orbital breadth is 44 mm and the orbital height, 36 mm with the orbital index 81.9 (mesoconch). The range of the orbital index of modern man is 73.9—93.2.

The interorbital breadth (mf-mf) of the Mapa skull is 20.8 mm, which is much larger than that of modern man. The *Sinanthropus* skull also has greater interorbital breadth. The subtense from the nasal bridge to the breadth is 5.8 mm, and thus the index is $\frac{5.8}{20.8} \times 100 = 27.9$, which is smaller than that of modern man.

Like the Solo skull, the Mapa skull has no trace of a circumscribed fossa lacrimalis.

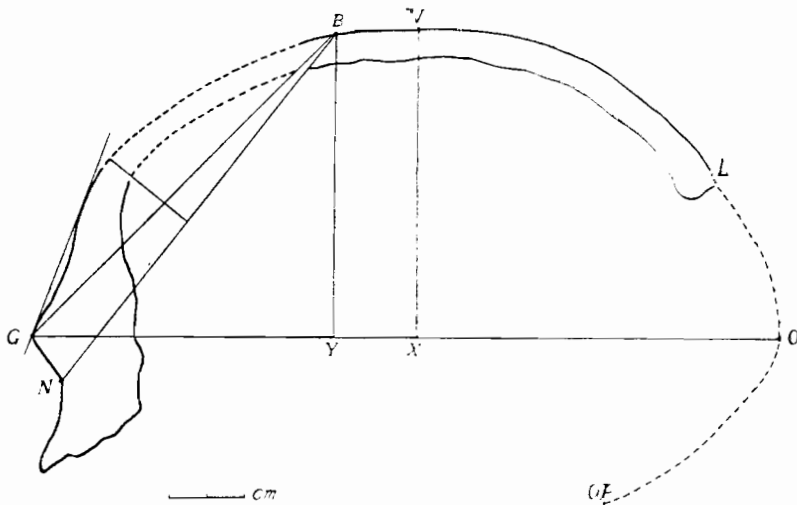


Fig. 1 Mid-sagittal Craniogram of the reconstructed Mapa Skull with outer and inner contours of the braincase.

The nasal bones are fairly well-preserved. There is a distinct notch between the nasal bones and the frontal bone.

All the sutures that separate the nasal part of the frontal bone from the nasal, maxillary and lacrimal bones lie nearly at the same level. These are similar to the structures in *Sinanthropus*, the Solo man and the Rhodesian man. However, in the European Neanderthals the naso-frontal suture bulges upward to form an arch.

The distance (chord) from the glabella to the nasion is 13 mm which is smaller than that (average 17 mm) of the Solo man. In *Sinanthropus*, the corresponding distance is a fourth to a third less than that of the Solo man.

The minimum nasal breadth or simotic chord is 13.3 mm and the simotic subtense 4.3 mm, with the simotic index 32.3. The minimum nasal breadth in *Sinanthropus* is 17.0 mm, and in La Chapelle Neanderthal, 14.0 mm. In modern races, it is generally less than 10 mm. The profile of the nasal bridge in the Mapa skull is slightly concave.

As the supra-orbital tori project laterally, the temporal fossa behind and the post-orbital constriction appear very deep.

As the median ends of the tori supraorbitalis were gnawed off anteriorly by porcupines and the frontal sinuses are thus exposed. They are very large and occupy not only the interior of the glabellar torus proper, but also that of the orbital tori. The right and left sinuses are separated by a relatively thick median septum.

The dimensions of the sinuses can be given as their front walls are laid bare. The width of the right sinus is 26 mm, of the left sinus 21 mm; and the length (antero-posterior diameter) of the right sinus is 16 mm, of the left one 10 mm. The maximum height of the right sinus is 24 mm and of the left sinus 24 mm also.

In Solo man, there is a large frontal sinus on either side, with a median septum between. But the sinuses are restricted to the interorbital region and, as in *Sinanthropus*, do not extend laterally into the roof of the orbit proper.

The thickness of the parietal bone of the Mapa skull at the bregma is 7 mm. The thickness at this point is 9.4 mm in average in the Solo man and 16.4 mm in *Sinanthropus*.

The length of the chord of the sagittal margin of the frontal bone is 115.6 mm, that of the arc 134.0 mm, so the frontal chord-arc index is 86.3. In *Sinanthropus*, the index is 89.9, while that of modern races 85.7. Thus the Mapa skull has flatter frontal bone than that of modern man.

The parietal chord of the Mapa skull is 107 mm and the arc 114 mm, with an index of 93.9. In *Sinanthropus*, the index is 94.3, and that of modern man 89.7. Thus the flatness of parietal bone also has an intermediate position between the *Sinanthropus* and modern races.

Based on the parts of the skull preserved, a mid-sagittal craniogram of the Mapa skull was reconstructed (Fig. 1). The calvarial height index is

$$\frac{VX}{GO} \times 100 = \frac{81.5}{196} \times 100 = 41.6,$$

the bregma position index is

$$\frac{GY}{GO} \times 100 = \frac{79.5}{196} \times 100 = 40.6$$

the bregma angle is 45° and the frontal angle is 81° .

From Table 1, we see clearly that all measures of the Mapa skull lie within the ranges of the Neanderthals.

The position of the bregma of the Mapa skull lies more posterior than that of modern man. In modern man, the bregma lies about at the junction of the anterior and the middle one third of the whole arc. The length of the whole mid-sagittal arc of the Mapa skull is 357 mm, while that of the frontal arc 134 mm. It is larger than one third of the whole arc for 15 mm ($134 - 357/3 = 134 - 119 = 15$ mm). In some Neanderthals, the bregma has a position more posterior than that of modern man, while in *Sinanthropus*, it is even more backward than that of the Neanderthals.

Table 1
Comparison of Skull Measures of Different Human Fossil Types

Groups	Calvarial height index	Bregma position index	Bregma angle	Frontal angle
Living races	51—59	—	—	—
8 Cro-Magnon	46—55	28—37	46—57°	74—90°
Tzeyang	45.3	41.8	47.5°	81°
Liukiang	42.9	44.2	45°	76.5°
9 Neandertal	33—43	33—40	38—49°	50?—74°
Mapa	41.6	40.6	45°	70°
<i>Sinanthropus</i> 2, 3, 10, 11, 12	35—41	37—42	38—45°	56—63°
<i>Pithecanthropus</i> 1, 2	33—37	36—43	38—43°	48—55°

In the restored craniogram of the Mapa skull, the sagittal chord of the occipital bone is 87.2 mm, and the arc 109.0 mm with the chord-arc index of 79.9. In *Sinanthropus*, the occipital index is 72.1, while that of modern man 82.8. Thus in this respect, the Mapa skull has also an intermediate position.

On the cerebral side of the frontal squama there is a broadly based frontal crest. Contrary to the condition in modern man, it is not divided into two lips allowing space for the sagittal sinus.

The imprints of the meningeal vessels are distinct, but only the end branches are preserved. It seems to indicate that the anterior ramus of the middle meningeal vessel is less developed than the posterior one.

2. CONCLUSION

1. The Mapa skull belongs to a male individual of middle age.
2. The supra-orbital tori are heavy and project markedly both forward and side-wise. They almost form a continuous cross bar at the base of the forehead and are separated from the frontal squama only by a slight sulcus. The tori are thickest in their median ends instead of in their middle parts or lateral ends as those of the Solo man or *Sinanthropus*. Viewed from above, the anterior contour of the tori differs from

that of *Pithecanthropus-Sinanthropus* on the one hand and of the Neanderthals on the other. It is more close to the Solo skull. The frontal squama behind the supra-orbitals is markedly constricted as in *Sinanthropus*.

3. The contour of the margin of the orbit is rounded as the Neanderthals and differs from that of *Sinanthropus* in which the orbit is almost rectangular in form with straighter upper margin. There is no incisura frontalis near the median end of the upper orbital margin as in *Sinanthropus*.

4. The nasal bones are very wide as the early hominids. The naso-frontal suture lies nearly in a level.

5. The thickness of the parietal bone at the bregma is 7.0 mm. It is much less than that of *Sinanthropus*, but similar to that of the Neanderthal. The position of the bregma lies more posterior than that of modern man.

6. The frontal sinuses are larger than those of *Sinanthropus* and the Solo man. It occupies only the interior of the glabellar torus proper, but also that of the orbital tori.

7. The indices of flatness of both the frontal and parietal bones have values between those of *Sinanthropus* and modern races.

8. On the mid-sagittal craniogram of the restored skull, the calvarial height index, the bregma position index, the bregma angle and the frontal angle are computed. They all lie within the ranges of the Neanderthals.

9. Judging from the mammalian fauna associated with the Mapa skull, its geological age is probably of late Middle Pleistocene or early Late Pleistocene.

10. Judging from the morphological features of the skull, it probably belongs to the early Paleoanthropic Stage in human evolution.

11. The Mapa fossil human skull is the first discovery of early hominids in South China. Most of the human fossils formerly found in China such as the *Sinanthropus*, the Tingsun fossil human teeth, the Ordos tooth and the parietal and femur fragments, and the Upper Cave skulls are all found in North China. Since the liberation of China in 1949, some important human fossils have been found in South China, such as the Changyang fossil human maxillary fragment of Hupei Province, the Tzeyang skull of Szechuan Province and the fossil human skull base from Chilinshan, Leipin District and the Liukiang skull and a part of the post-cranial skeleton both of Kwangsi Chuang Autonomous Region. But all these human fossils found in South China are not so earlier in geological age as the Mapa skull. It is the earliest human fossil so far found in China with the exception of *Sinanthropus*. This new discovery indicates that in the time of middle Pleistocene, not only North China but also South China are inhabited by early hominids. Thus it greatly extends the distribution of the Paleolithic man in China. And it is even of more important significance that it fills the gap between the *Sinanthropus* and the other paleoanthropic fossils found in China.

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EXPLANATION OF PLATE

Mapa Fossil Human Skull, $\times 1/2$

- 1. Lateral view.
- 2. Anterior view.
- 3. Top view.
- 4. Internal view.



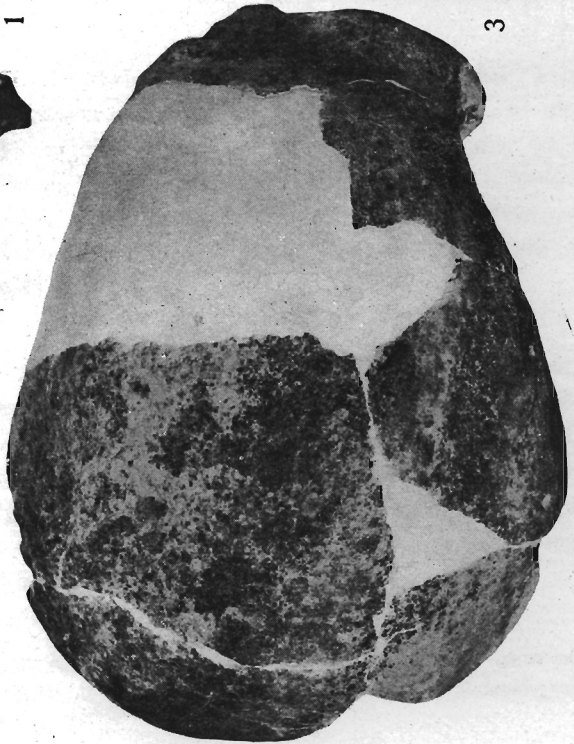
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