HUMAN FOSSILS FROM ANHUI, SOUTHEAST CHINA: COEXISTENCE OF *HOMO ERECTUS* AND *HOMO SAPIENS*

Zhang Yinyun*

In the past 50 years, most important human fossils have been found in northern and southern areas of China. Following the growth of interest in regional variation of fossil man, efforts in searching for fossil materials have focused upon the southeastern area. These explorations resulted in discoveries of *Homo erectus* at Hexian in 1980 and 1981 and of *Homo sapiens* at Chaohu in 1982 and 1983. Both sites are 50 km apart in Anhui Province. Recently, the dating of the fossils of these two sites suggests a coexistence of *Homo erectus* and *Homo sapiens* in China.

FOSSIL REMAINS

The Hexian find includes a skull cap, a fragment of left mandibular corpus and 12 teeth. All were found in the deposits of Longtandong Cave. The well-preserved skull cap is believed to be that of an adult male. Its morphological details resemble *Homo erectus* from Zhoukoudian. The vault is low, the supraorbital torus is heavy and continuous, and the mastoid process is small and is oriented in a medial direction. The occipital torus is well developed, continuous across the entire occipital base to right and left asterion landmarks. The angulation between the superior and inferior nuchal crest of the occipital bone is marked (101°). The cranial capacity is estimated to be c.1025 cc. The temporal squama is relatively high and has an arched parietal margin, as observed in skull No. 5 from the upper deposits at Zhoukoudian.

It is probable that the Hexian skull represents *Homo erectus* rather than *Homo sapiens*. The upper central incisor of Hexian has a shovel-shaped lingual surface, a feature observed in the Zhoukoudian materials and in modern Chinese. The shovel-shaped incisor is one piece of evidence for the theory of continuity of human evolution in East Asia.

In certain details, however, the Hexian skull resembles the Indonesian fossils with respect to the weakly expressed supratoral sulcus of the frontal bone, the parietal angulation, the well-excavated sulcus supratoralis of the occipital bone and greater cranial breadth. These features may indicate evidence of gene flow from Indonesia to China.

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* Institute of Vertebrate Palaeontology and Palaeoanthropology, PO Box 643, Beijing 100044, China

The fossil finds in Chaohu are also from cave deposits. They include an occipital bone and fragment of maxilla with 8 teeth. Only the squama is preserved as the lower half of the lower portion is lost. The lambdoid sutures have not fused, as is indicated by their degree of fusion and pattern of denticulation. However, the biasterionic breadth (122.4 mm) of this bone is quite large and comparable to an adult occipital bone.

The occipital bone presents a weak torus which includes about half the breadth of the bone, then fades laterally. The median portion of the torus has an inferior inclination and is the thickest portion of the bone (7.0 mm). This value may be compared with the 15 mm in the No. 5 skull of Zhoukoudian and 18 mm in the Hexian skull. There is no distinct groove above the torus. The occipital bone forms a curve rather than a marked angle between the occipital and nuchal planes, and exhibits a high curvature angle (>115°). This value may be compared with 98-105° in the Zhoukoudian skulls and 101° in the Hexian skull. The length of the superior nuchal line is 50.2 mm and is somewhat longer than the inferior nuchal crest. However, the latter cannot be measured precisely because of the poor degree of preservation. The distance between inion and the internal occipital proturberance is the same as that in the Hexian skull (22.0 mm). These features indicate that the occipital bone from Chaohu represents an early *Homo sapiens* rather than a *Homo erectus*.

The fragment of maxilla consists mainly of the anterior portion of the alveolar process with a small remnant of the palate. The lateral incisors, right P3 and P4 and the right M1 remain in their alveoli. The left P4, M1 and M2 are loose teeth. The facet on the M2 indicates that the M3 had erupted, hence the individual represented by this maxilla was an adult.

The anterior nasal spine is incomplete, but a part of its basal structure is preserved. Judging from the large size of the vomer, a well developed anterior nasal spine has been present. The nasal floor descends steeply posterior to the inferior nasal margin. The incisive canal is situated immediately posterior to the oral cavity and ascends almost vertically. As compared with specimens from Zhoukoudian, the maxilla from Chaohu differs from those of *Homo erectus* in morphology and resembles an early *Homo sapiens*.

The maxilla has a round anterior alveolar margin, as seen in other fossil specimens discovered in China. On the other hand, this maxilla has an indistinct nasal margin, an unusual feature for Chinese fossil specimens. The indistinct nasal margin is found in some Indonesian specimens, such as the Sangiran-17 and the Wajak skulls. This feature may reflect Australoid affinities (Wolpoff *et al.* 1984).

FOSSIL FAUNA AND DATING

The Hexian skull was accompanied by an abundant fossil vertebrate assemblage. A preliminary analysis has identified 40 different mammalian species. By faunal dating, the Hexian deposit might be correlated with the upper strata at the Zhoukoudian *Homo erectus* site (Han and Xu 1989).

At the Chaohu site, 13 mammalian species were found associated with hominid fossils. Han and Xu (1989) believe that the geological age represented by this fauna is equivalent

to, or somewhat later than, that of the upper strata at the Zhoukoudian *Homo erectus* site. Faunal dating therefore suggests the coexistence of *Homo erectus* and early *Homo sapiens* at this locality. Recently, this possibility has been supported by Uranium Series dating, which resulted in dates of 190-150 ky BP for Hexian and 200-160 ky BP for Chaohu (Chen in press).

In North China, early *Homo sapiens* has been found at Dali and Jingniushan. By the Uranium Series technique, dates of 230-180 ky BP and 300-230 ky BP have been obtained for Dali and Jingniushan respectively. Chronological analysis of the Zhoukoudian deposits, utilizing a wide range of investigative techniques, shows that the *Homo erectus* of this site existed in a period from 460 ky BP to 230 ky BP (Qi 1989). Thus, there is an overlap, more or less, in the ages of *Homo erectus* and early *Homo sapiens* in North China. Based on a chronological correlation of human fossil horizons with the loess-deep sea core records, Liu and Ding (1984) had previously claimed that early *Homo sapiens* from Dali and *Homo erectus* from the upper deposits of Zhoukoudian cave were contemporaries.

CONCLUSIONS

Traditionally, *Homo erectus* has been viewed as a direct ancestor of early *Homo sapiens*. If the coexistence of early *Homo sapiens* and *Homo erectus* in China is established, however, there will be problems for this venerable thesis. *Homo erectus* may have been replaced by early *Homo sapiens* and left no issue of its own. However, the morphological details of human fossils found in China suggest a continuity of human evolution in this part of Asia (Weidenreich 1943, Wu and Zhang 1978, Wolpoff *et al.* 1984, Wolpoff 1985). Considering that *Homo erectus* in China may be traced back to 750 ky BP (the finds at Lantian), early *Homo erectus* there may have been a direct ancestor of some regional populations of *Homo sapiens*, while later *Homo erectus* was eventually replaced.

SUMMARY

Both *Homo erectus* and early *Homo sapiens* had wide spatial distributions in China, and marked geographic variations. In contrast to the situation in northern China, *Homo erectus* and *Homo sapiens* in south-eastern China share certain anatomical features with Indonesian hominids. It is possible that later *Homo erectus* and early *Homo sapiens* coexisted in China, and that only early *Homo erectus* evolved regionally into *Homo sapiens*.

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