

***Homo erectus* from Nanjing**

Wu Rukang and Li Xingxue, Editors-in-Chief; Wu Xinzhi and Mu Xinan, Editors

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The Huludong Cave (Calabash Cave) is a karst cave in the Tangshan hills, just east of Nanjing, China. An investigation in 1992 by members of the Nanjing Institute of Geology and Paleontology (NIGP) recovered numerous mammalian fossils, and a joint work team was assembled from members of the NIGP and the IVPP (Institute for Vertebrate Paleontology and Paleoanthropology) in Beijing. Systematic excavations commenced, and in early 1993 Liu Luhong, a local laborer, discovered the first of two partial crania (an isolated upper molar was also found). A detailed description of the human remains was expeditiously provided in Chinese (with a short English abstract) by Lü Zuné, a professor of archaeology at Beijing University (1996), as part of a monograph on the site and its contents by Lü and an archaeological team from the Nanjing Municipal Museum.

This 317-page monograph was produced by a different group, mostly from the NIGP and IVPP but also from the Department of Geological Sciences of Nanjing Normal University, the Peking Union Medical Hospital, Jinzhou Medical College, and Scripps Institute of Oceanography. It describes the site (and the cave), the human remains, fauna and flora, the age, and the reconstructed ecology, in Chinese and English (70 text pages and table and figure identifications in English). It includes eight color plates preceding the text, 20 plates following the text (most in color and all excellent reproductions), an index of taxa, and figures within the eight chapters. The index is in English and Chinese, but organized in English, while the plate descriptions can be in English, in Chinese, or both. Each of the chapters is divided into separately authored sections, and 29 scientists contributed to various parts of this work. Because the sections are numbered, it is easy to find the abbreviated English text corresponding to the Chinese, and this is important because the internal text figures in the Chinese section are not reproduced in the English section.

The human remains were described in sections by Wu Rukang, Zhang Yinyun, and Wu Xinzhi (Cranium 1), Shang Hong, Wu Xinzhi, Zhang Zhenbiao, and Xi Huanjui (Cranium 1 pathology), Shang Hong and Wu Xinzhi (Cranium 2), and Zhou Wenlian (tooth). The first and more complete cranium is chronologically older, almost certainly overlapping in time with some of the Zhoukoudian crania; the resemblance to these crania is evident in the plates and figures, and is well established in the text. The authors regard it as an adult female, and the small face and reduced supraorbital thickness they demonstrate from comparisons with Zhoukoudian certainly supports this assessment. These comparisons are facilitated by the fact that the tables of metric variation are comprehensive, and all relevant terms are given in both Chinese and English. Using standardized measurements allows for valid comparisons and provides a basis for understanding populational characteristics, as these authors do, in ways that noncomparative descriptions or anatomical observations alone cannot attain.

The authors provide a reconstruction of the cranium (text figures 2-5 – 2-8), though are careful not to let it influence their conclusions. There is not continuous bone surface from the front to back, but their

placement of the rear portion of the vault appears correct. They note the malar notch and malar tubercle, confirming the early appearance of this "modern" morphology in China that was first suggested in the ZKD locality L facial pieces. This anatomy, and other aspects of the midface, provide links with other Chinese fossils and support the contention of regional continuity in China, according to these authors. However, they go on to note that other features such as the "protruding nose and the paranasal bulge" are rarely seen in China and "might suggest [a] small amount of gene exchange between China and Europe in [the] Pleistocene" (p. 273). Perhaps so, but this region is not the European condition, which in the past and present often evinces a high nasal angle that begins at the top of the nose (not midway along its length as in Nanjing 1) and a lofty nasal bridge rising up between the orbits and incorporating the frontal processes of the maxillae as well as the nasal bones themselves (Gill & Gilbert, 1990). Other Chinese specimens such as those from Yunxian (Li & Etler, 1992) have nasal regions similar to Nanjing 1 and I believe that the authors' caveat is more likely: "it is also possible that these features expressed the genes inherited from... the gene pool of the first inhabitants of China" (p. 273), or even more simply that Nanjing 1 reflects one aspect of normal Middle Pleistocene East Asian hominid variation.

Nanjing 2 is a less complete fragment of cranial vault, stratigraphically younger in the cave and possibly a male because of its size and robustness. Although the crania are quite similar in many of the comparisons that are possible, the authors attribute its variation to a population "more progressive than Nanjing 1" (p. 278) because of its greater cranial height, uneven height of the nuchal torus as it extends across the occiput, and significant bregmatic angle. Perhaps so, but the difference in age between the specimens is unclear, and these variations could well appear in a single sample. It is a perennial difficulty to separate differences resulting from evolution over time from differences that normally appear within populations, and indeed the former can depend on the latter.

It is truly laudatory to have a comparative monographic treatment of important material published and available within a decade of discovery. With rare exceptions such as the Nariokotome publication (Walker and Leakey, 1993) and Sambungmachan 3 (*Anatomical Record* 262(4), 2002), for the most part this has not been the case in paleoanthropology, and both the discoverers and their professional colleagues suffer for it. Prompt, thorough, and comparative publication underscores the importance of the discoverers and the scientists who analyze the specimens (these are not always the same; both roles are important), and insures an accurate comprehension and appreciation of the significance of the site and its specimens in the developing understanding of human evolution. This is surely the case for the Nanjing hominids.

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