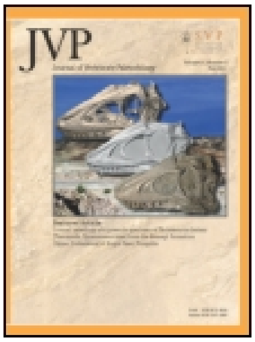

Taylor & Francis
Taylor & Francis Group

Journal of Vertebrate Paleontology

ISSN: 0272-4634 (Print) 1937-2809 (Online) Journal homepage: http://www.tandfonline.com/loi/ujvp20

The type specimen of Ernanodon antelios

Suyin Ting , Banyue Wang & Yongsheng Tong

To cite this article: Suyin Ting , Banyue Wang & Yongsheng Tong (2005) The type specimen of Ernanodon antelios , Journal of Vertebrate Paleontology, 25:3, 729-731, DOI: 10.1671/0272-4634(2005)025[0729:TTSOEA]2.0.CO;2

To link to this article: http://dx.doi.org/10.1671/0272-4634(2005)025[0729:TTSOEA]2.0.CO;2

Journal of Vertebrate Paleontology 25(3):729–731, September 2005

NOTE

THE TYPE SPECIMEN OF *ERNANODON ANTELIOS*

SUYIN TING[1,2], BANYUE WANG[2], and YONGSHENG TONG[2], [1]LSU Museum of Natural Science, 119 Foster Hall, Baton Rouge, LA 70803 U.S.A., glsuyin@lsu.edu; [2]Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, P. O. Box 643, Beijing 100044 Peoples Republic of China

In a recently published note (2003:706), Horovitz claimed that, "Examination of the postcranial skeleton of the holotype of *Ernanodon antelios* (the only known specimen of the taxon), reveals discordances between the morphologies and sizes of left and right femora and humeri, and indicate [sic] that they do not belong to the same taxon." The author further stated, "It is not possible to determine which elements of the skeleton actually belong with the skull of *Ernanodon*. The possibility that some elements might have originated in a different locality, either of the same or a different age, is not ruled out." As collectors of this specimen, we feel obligated to provide the primary information on the excavation and preservation of the specimen, and revisit some of her arguments.

The type specimen of *Ernanodon antelios* (IVPP V5596) was discovered in 1973 by a field team of the Institute of Vertebrate Paleontology and Paleoanthropology, Academia Sinica, Beijing (IVPP), led by the last author of this note. The team members, in addition to the present authors, also included Chun Peng, Dewang Chen, and the late Yuping Zhang. The specimen was collected from the Datang Member of the Nongshan Formation, Nanxiong Basin, Guangdong Province, China. It was first found as bone fragments exposed on the ground surface, and excavated and protected in a plaster jacket, because the bone fragments on the surface were connected to more bones underneath. This specimen was collected in a single block from that single quarry (Field No. 73139), and there were no other vertebrate fossils in the vicinity of this specimen (Fig. 1). The plaster jacket was opened and the specimen (IVPP V5596) was prepared by the late Chunting Chen, a very experienced, skillful preparator at the IVPP. In the process of preparation, we discovered that the specimen included the skull, mandible, and most of the postcranial skeleton, including some vertebrae (fragmentary atlas, axis, and incomplete 3rd to 7th cervicals, parts of dorsals, lumbars, sacrals, and caudals), parts of ribs and ossified sternal ribs, seven sternal elements, fragmentary left and right scapulae, left and right clavicles, left and right humeri, left and right ulnae and radii, left and right manus, incomplete left pelvis and fragmentary right ischium, left and right femora, left and right tibiae and fibulae, and incomplete left and right pedes. Partial vertebrae (Ding, 1987:pl. V, 5; pl. VI, 1a, b, 2, 3, 4), left humerus, ulna, and radius (Ding, 1987:pl. IX, 3a, b), and both the manus and pes (Ding, 1987:pl. XII, 6, 7; pl. XIII, 2, 3; pl. XIV, 1, 2) were in articulation, and most skeletal elements were closely associated in roughly their anatomical position. There was no duplication of any bones from the in situ field jacket, indicating the presence of only one individual. Therefore, specimen IVPP V5596 represents a single individual, an almost complete skeleton, that was professionally collected from the site (Ding, 1979, 1987; Radinsky and Ting, 1984).

Horovitz (2003:706) also stated: "Although the skull shows deformations and it is reasonable to expect deformation in the postcranial skeleton as well, this does not explain differences in the absolute sizes of bones." We would like to point out, however, that the fossil remains may undergo dramatic morphological changes in the process of fossilization (Behrensmeyer, 1991; Martill, 1991). In his study of a marine reptile, Martill (1991:288) mentioned, "However, larger dorsal vertebrae may be compacted in excess of 50 per cent volume reduction, while the neighbouring centrum is uncrushed." As a matter of fact, the entire skeleton of *Ernanodon antelios* has undergone extensive distortion to different degrees, making it asymmetrical. The deformation of the skull may or may not be exactly symmetrical along the midline, so that differences in size and orientation of features such as articular surfaces can be seen in its right and left halves (Fig. 2). The deformed skull and mandible can be articulated well on the right side, but not on the left side. The *Ernanodon antelios* specimen was partially articulated and closely associated, so the forces stretching and narrowing part of the skull and shortening of other part can have been expected to affect the postcranial bones. All right forelimb elements, humerus, ulna, and radius, are longer than the left ones, respectively. The morphological and length differences of the humeri from both sides are the most striking and symptomatic among the postcranial bones, as Horovitz (2003) pointed out. However, the differences between the left and right ulnae and radii are much less than those of the humeri. The ulnae and the radii are basically the same in morphology, despite the difference in length. Unlike in the forelimbs, the right femur is shorter than the left one. Differences also occurred in other postcranial bones, but are far less than in the humeri and femora. Although other factors, such as osteological disease, may also alter the shape of bones, we believe in this particular case that both the skull and postcranial elements were mainly plastically deformed in a way that is qualitatively consistent with the deformation of the humeri and femora.

Horovitz (2003:707) concluded: "Given the observations reported here, however, it seems that that specimen represents at the very least two different taxa." and ". . . I suggest that the holotype specimen for *Ernanodon antelios* be limited to the skull and mandible of IVPP V5596." If Horovitz considered that the skull and mandible represent the holotype of *Ernanodon antelios*, and the postcranial skeleton represents another taxon (or taxa), we would like to point out that the differences of the left and right humeri and femora do not constitute direct evidence against the postcranial skeleton's association with the skull. Actually, the atlas (Ding, 1987:pl. V, 3) was articulated well to the condyle of the skull, strongly suggesting that the postcranial materials belong to the taxon represented by the skull. If the author considered that left and right limbs represent different taxa, the articulation and association of many elements collected in one plaster jacket in one quarry argues against such a division. The left humerus can be well articulated with the left scapula. The right ulna and radius can be articulated with the right humerus, which, in turn, can be articulated with the right scapula. The left and right clavicles are almost identical, and the manus and pes on each side are basically the same. If multiple individuals are represented, their postcranial bones must be mixed in a complex and chaotic fashion. The completeness of the skeleton, the complete absence of duplication of skeletal elements, identity and symmetry of paired elements from both sides, the articulation of many bones, the exhibition of true bone-to-bone relationship in the excavated block, and overall deformation in the skull and the postcranial skeleton clearly rule out random mixing during the preservation of this specimen.

We reassert, based on evidence from the field collection and subsequent study, that the type specimen of *Ernanodon antelios* is a deformed skeleton, representing a single individual. The skeleton of *Ernanodon antelios* offers an excellent example for taphonomic research as exemplified by many rigorous studies (Martill, 1987; Turnbull and Martill, 1988; Li and Etler, 1992; Stevens and Stevens, 1996). In closing, we would like to emphasize a significant point made by White (2003). Are the described morphological differences characteristic of the transformations observed in the lineage? Or are they merely artifacts of postmortem fossilization processes? The skeleton of *Ernanodon antelios* may provide a revealing example of how postmortem fossilization processes can mislead our interpretation of the fossil record.

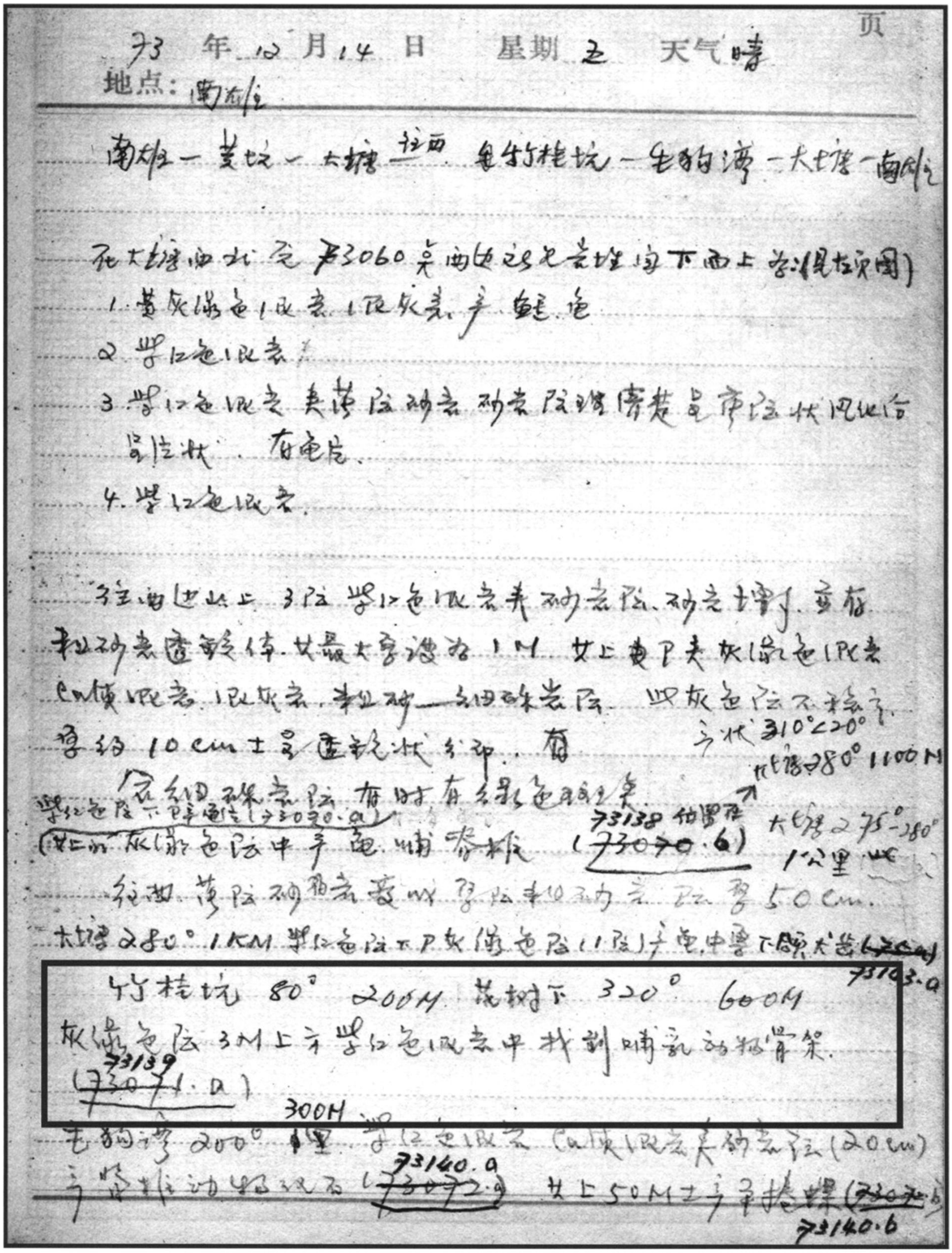

FIGURE 1. Original Chinese field record on the discovery of the skeleton of *Ernanodon antelios*. (The boxed part was translated by Dr. Desui Miao as follows, "In 80-degree direction and 200 meters from Zhugui Keng village, and in 320-degree direction and 600 meters from Huashu Xia village, a mammalian skeleton (73139) was found in the purplish red mudstone 3 meters above the grayish green layer").

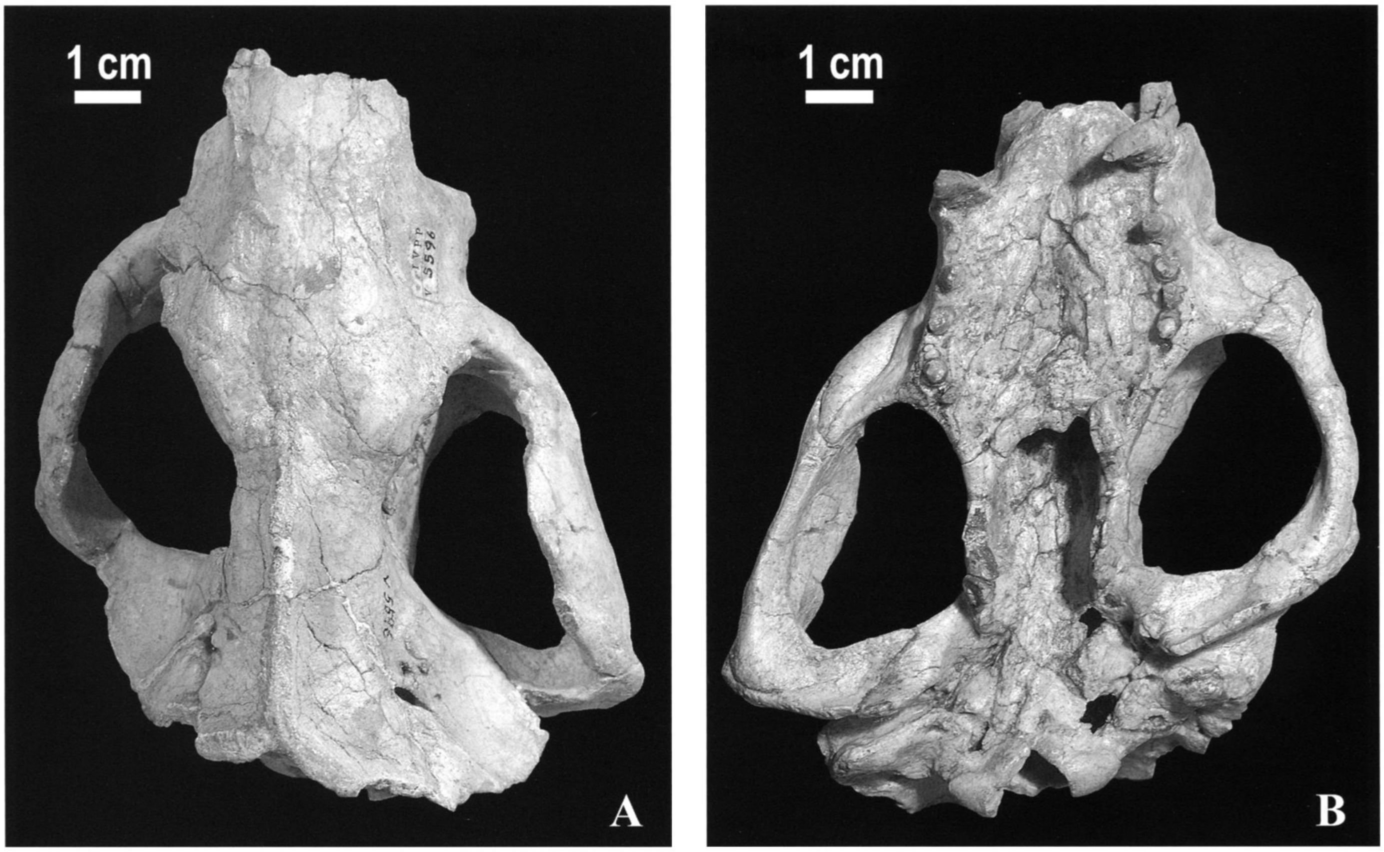

FIGURE 2. Skull of *Ernanodon antelios*. **A**, dorsal view. **B**, ventral view.

Acknowledgments—We greatly appreciate many colleagues for their discussions and suggestions: Meemann Chang, Yuanqing Wang, Desui Miao, Gabriel Bowen, Paul Koch, Judith Schiebout, Steven Hall, Paul White, Malcolm McKenna, and William Clyde. We especially express our thanks to Desui Miao for his translation of the original Chinese field note and his critical reading and stylistic improvement of the note. We thank Ines Horovitz for raising questions on the type specimen of *Ernanodon antelios* and for correcting the translation error on the left and right femur in the English summary in Ding's (1987) paper. We thank two anonymous reviewers for comments that improved the manuscript.

LITERATURE CITED

Behrensmeyer, A. K. 1991. Terrestrial vertebrate accumulations; pp. 291–335 in P. A. Allison and D. E. Briggs (eds.), Taphonomy, Releasing the Data Locked in the Fossil Record. Plenum Press, New York and London.

Ding, S. Y. 1979. A new edentate from the Paleocene of Guangdong. Vertebrata PalAsiatica 17:57–64. [Chinese 57–61; English 62–64]

Ding, S. Y. 1987. A Paleocene edentate from Nanxiong Basin, Guangdong. Palaeontologia Sinica, New series C 17:1–118. [Chinese 1–84 103–118; English 85–102]

Horovitz, I. 2003. The type skeleton of *Ernanodon antelios* is not a single specimen. Journal of Vertebrate Paleontology 23:706–708.

Li, T. Y., and D. A. Etler. 1992. New middle Pleistocene hominid crania from Yunxian in China. Nature 357:404–407.

Martill, D. M. 1987. A taphonomic and diagenetic case study of a partially articulated ichthyosaur. Palaeontology 30:543–555.

Martill, D. M. 1991. Bones as stones: The contribution of vertebrate remains to the lithologic record; pp. 270–292 in S. K. Donovan (ed.), The Processes of Fossilization. Columbia Universtity Press, New York.

Radinsky, L. B., and S. Y. Ting. 1984. The skull of *Ernanodon*, an unusual fossil mammal. Journal of Mammalogy 65:155–158.

Stevens, M. S., and J. B. Stevens. 1996. Merycoidodontinae and Miniochoerinae; pp. 498–573 in D. R. Prothero and S. J. Emry (eds.), The Terrestrial Eocene-Oligocene Transition in North America. Cambridge University Press, Cambridge.

Turnbull, W. D., and D. M. Martill. 1988. Taphonomy and preservation of a monospecific titanothere assemblage from the Washakie Formation (Late Eocene), southern Wyoming: an ecological accident in the fossil record. Palaeogeography, Palaeoclimatology, Palaeoecology 63:91–108.

White, T. 2003. Early hominids—diversity or distortion? Science 299: 1994–1996.