Preface

Why don't you try to be another "Teilhard de Chardin"? This was the question Qiu ardently addressed to Tedford, staring directly into his face, glowing under the golden light of the half-set sun. Both of us were sitting on the slope of a big block of Permo-Triassic violet sandstone after a day of field work in the Yushe Basin in early summer, 1982. Tedford did not answer the question, but immersed himself in deep meditation. All the things that happened thereafter may take their origin from this short unanswered question. Why? And why not?

For Qiu, he felt deeply the need to find a paleontologist rivaling Teilhard de Chardin in scope and depth of knowledge to resume the work in Yushe after almost 40 years of stagnation. The importance of Yushe as a key area for Late Neogene stratigraphy and vertebrate paleontology had been well understood by all the Chinese students studying Neogene problems. In the 1930s, when rich mammalian fossils were first found in the Yushe area, primary importance was attached to the fluviatile-lacustrine character of fossil-bearing deposits radically distinct from the wide-spread "*Hipparion* Red Clay" of North China. It was soon recognized that the main body of the Yushe fossils belonged to an unknown fauna intermediate between the Baode *Hipparion* fauna and the Nihewan *Equus* fauna. Teilhard de Chardin undertook research work on the Yushe mammalian faunas, but he failed to finish this research before he left China in 1945. This left the full nature of one of the most important late Cenozoic faunas from being clearly revealed. This probably was one of the reasons why Prof. C. C. Young, the late founder of the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP), who visited Yushe himself during the 1930s, sent a team to resume the Yushe studies in 1955–1956 soon after he was reappointed as the Director of the Cenozoic Laboratory. When Qiu was transferred from the Paleogene Division of the Laboratory of Paleomammalogy, IVPP, to the Neogene Division, Yushe was naturally chosen as his first target. For Tedford, his fascination with the Chinese Neogene and its mammalian faunas came from his acquaintance with the marvelous specimens collected from China, and then housed in the Frick Collection at the American Museum of Natural History (AMNH), which became fully accessible to him in 1968.

These common interests united them. In 1981, when they first met in the "Horse Heaven" workshop at the AMNH, strong desires from both sides led to a plan to initiate an intimate cooperation on the Chinese Neogene stratigraphy and mammalian faunas. The outcome led to the above scene that occurred in the following year. However, other commitments and the need to raise grant money delayed initiation of this joint project until 1987. In 1982–1984, Qiu went to Germany on a Humboldt scholarship to enhance his knowledge of the European Neogene, while Tedford continued preparation for the Yushe Project. Tedford succeeded in persuading Neil Opdyke, the leading authority on terrestrial paleomagnetics; Larry Flynn, a small mammal expert with focus on the Asian Neogene; and Will Downs, whose rich experience in field work and his ability in reading

and speaking Chinese turned out to be extremely valuable, to join the project from the American side. Meanwhile, Qiu recruited Wu Wenyu, a leading figure in micromammalogy in China, Yu-Qing Li, De-Fa Yan, Guan-Fang Chen, Jie Ye, and Wei Dong, all very active large mammal specialists, and a number of postgraduate students, Xiao-Feng Chen, Yi-Zheng Li, and Gen-Zhu Zhu, to join the project from the Chinese side.

At the very beginning of the joint project, the aims were set forth clearly. (1) To pursue research on the large mammalian fossils of Yushe left unstudied (Canidae, Ursidae, Rhinocerotidae, Suidae, part of Hyaenidae, and part of Equidae); (2) To revise the groups already studied in light of the current knowledge of their systematics; (3) To obtain as many small mammals as possible from stratigraphically defined layers to overcome the strong bias toward large mammals in the early collections; (4) To assign as many mammalian fossils as possible to a solid stratigraphic foundation; (5) To apply modern techniques and methods in field work, especially wet sieving for small mammalian remains; and (6) To combine magnetostratigraphy with biostratigraphy in order to date the faunal succession.

Large-scale fieldwork began in 1987 and concluded in 1991. Subsequently, a number of short trips aimed at solving specific geological problems in Yushe Basin were undertaken by a few team members. Work continued on faunal remains but suffered a few setbacks. De-Fa Yan's key work on ungulates was cut short prematurely, but continued by collaborators. Also unfortunately, Will Downs died toward the end of 2002, but his contribution of translations from the Chinese literature continues to provide insight not only to our project, but also for other non-Chinese writers becoming interested in diverse Chinese earth sciences. Will was a key player in developing the microfaunal record of Yushe, which includes a densely sampled view of the Late Neogene small mammal communities of Shanxi Province. Will's enthusiasm and fascination with China and his contributions to our work provide a lasting gift to us and colleagues of similar interest.

This volume presents the results obtained from both field and laboratory work. As we were preparing the Yushe series of volumes, great progress in the field of Neogene mammalogy and stratigraphy was being made both in other places in China and elsewhere in Eurasia. The Yushe Basin remains the most important and most informative Late Neogene basin in China. It provides the most complete section from latest Miocene through the entire Pliocene and into the Early Pleistocene, with only modest gaps, and it is paleomagnetically calibrated and paleontologically dated based on rich small and large mammalian faunas.

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