

# HISTORY

## Distribution and extinction of the rhinoceros in China: review of recent Chinese publications

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### Introduction

General Western understanding about the distribution of the rhinoceros in China was well stated by Allen (1940: 1279): 'Although rhinoceroses were once widespread over Asia and have left abundant fossil remains in deposits of no great geological age in China, there seems to be no evidence that they have occurred even in southern China within historic times.' The same impression is gained from reading Laufer's (1914) large but rambling survey of ancient works by Chinese authors, who concluded that the rhinoceros was rarely seen in Chinese territories during the Song Dynasty (960–1279) and had completely disappeared in the following Yuan Dynasty (1280–1368). Chang (1926) also looked at ancient Chinese texts and found that in historical times, no elephant or rhinoceros existed in China north of the Yangtze River. However, rhinos were found in numerous places in Hunan Province in the south until the Song Dynasty. It is, of course, well known that the Chinese continued using rhino horn to produce various types of carvings, of which the horn cups are the best known (Jenyns 1954; Chapman 1999).

With this background, it is surprising to read in several recent papers written by Chinese scientists about the existence of the rhinoceros in China as far north as the Yellow (Huang He) River and detailed records of the animal's disappearance in the centuries that followed. Although only a few of these articles are available to me, and most only through an English summary, I present a brief review here. Because it could well be that some of the data refer to fossil rhinoceros material in relatively recent depos-

its, I have also included a few references summarizing the latest findings.

### Fossil remains of rhinoceros in China

As I was primarily interested to learn to what extent the fossil material can help establish which species of rhinoceros lived in China, I looked for findings on specimens from the Late Pleistocene (ca. 120,000 years B.P.) and Holocene (ca. 10,000 years B.P.) periods. The work done in China has been summarized in a number of articles in English or French by Dr Haowen Tong of the Chinese Academy of Sciences in Beijing.

Tong and Moigne (2000) state that for the Late Pleistocene, remains of *Dicerorhinus mercki*, *Coelodonta antiquitatis* and *Rhinoceros sinensis* have been recognized.

*D. mercki* and *C. antiquitatis* were found only in northern China, while *R. sinensis* was restricted to the regions south of the Yellow River. Of the currently living species, *R. unicornis* was recorded only in the Early Pleistocene (2 million years B.P.), while both *R. sondaicus* and *Dicerorhinus sumatrensis* were found in Holocene deposits. The Holocene material dated as 7000 years B.P. was found in the Hemudu neolithic site in Zhejiang Province (ca. 28° N 129° E, just south of Shanghai) and in Hsia-wang-kang (Xiawanggang) in Hsich'uan County, Honan Province (ca. 30° N 115° E, south of the Yellow River). *Dicerorhinus* and *Coelodonta* were confined to the northern parts of China, *Rhinoceros* to the southern parts.



Figure 1. Chinese mainland showing localities mentioned in the text.

Tong (2000) provides a review of rhino material found in sites associated with human remains. Out of 74 palaeolithic sites yielding human remains, 58 (78%) also contained rhinoceros material. For the Holocene, *Dicerorhinus* was found in Hemudu, Xiawanggang and Dongshan (on the eastern shore in Fujian Province), while *Rhinoceros* was found also in Hemudu. It is thought that the rapid decline of rhinoceroses during the later part of the Pleistocene may have been due to human activity.

Tong (2001a) lists 17 names of genera and 62 names of species or subspecies of rhinoceros reported from China. Out of these, 33 taxa were reported only once, in a single locality and a single horizon, indicating that more work is required to understand the relationships of the Chinese rhinoceros remains, especially regarding *D. mercki* and *R. sinensis*.

Tong (2001b) states that fragmented rhino remains were found at the Nanjing *Homo erectus* site (ca. 32° N 119° E), dated to the late Middle Pleistocene. As all

these bones were found in caves, it is concluded that most probably humans hunted the rhinoceros. Tong (2002) further examines the material from Nanjing and refers the material (6 specimens) excavated from the Huludong Cave to *D. mercki*. Although other findings have indicated that this species spread to areas south of the Yangtze River, only the material from Nanjing is reliable; other remains are poorly preserved and are open to question.

## Records of the rhinoceros in southern China

The paper by Wang Zhentang et al. (1993), published in English, contains a number of assertions about the distribution of the rhinoceros that seem to need more explanation than the authors provide. Their aim was to illustrate a logistic equation expressing the relationship between population numbers and

environmental capacity. They state that the rhinoceros was widespread in China about 3000 years ago and that their extinction was due to the human destruction of their environment. They use the rhinoceros as an example, because 'the historical documents on the distribution of *Rhinoceros* in China are unique and detailed'. They in fact provide some detail about the earliest records, about 3400 or 3200 years ago, here summarized. For the Shang Dynasty (2000–1027 B.C.), pictographs on bones show places where King Shang captured rhinos (normally 5–6 per trip, sometimes up to 16), at several places north of Huang River and south of the Tai Hang mountains. An ancient book of geography written by Shang Hai Zhing stated the occurrence of rhinoceros in Mt Nu Chuang (now Mt Mi Gang), Mt Xun Wu (now Mt Quwu) and Mt Zuozi (or Mt Table), all situated roughly at 37–38°N. This, therefore, was the northern border of rhinoceros distribution some 3000 years

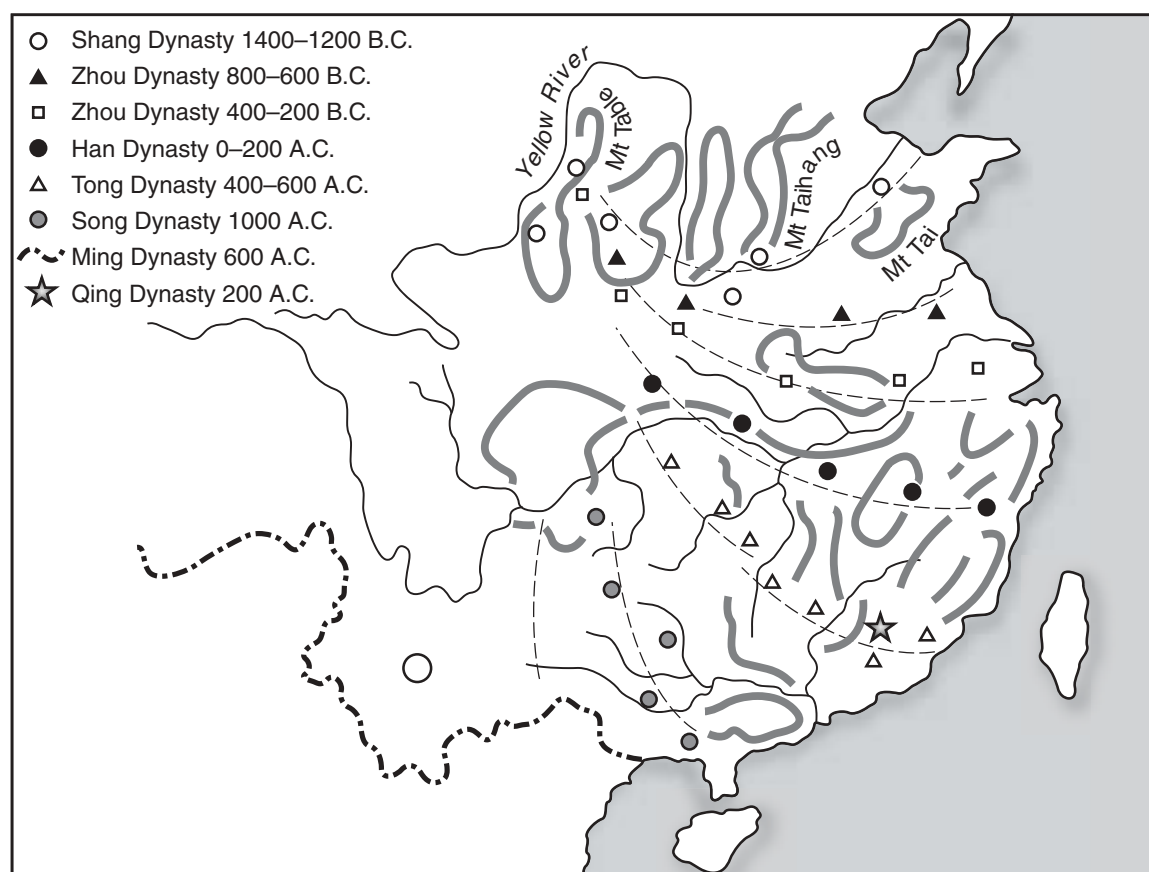


Figure 2. Approximate course of rhinoceros extinction in China (reproduced after Wang Zhentang et al. 1993, fig. 2).

ago. The animals belonged to both *Rhinoceros* (no species given) and *Dicerorhinus sumatrensis*. The subsequent history is said to be divided into eight historical periods, each lasting some 400 years. The rhinoceros retreated southwards in each of these periods, at a higher rate on the eastern coast than in the mainland, coinciding with the spread of the Chinese population. Rhinoceros disappeared from Yunnan in China about 200 years ago.

Although the change of the rhinoceros range from 1400 B.C. to the present is illustrated in two maps, there is no explanation of the historical records underpinning the lines or points shown on them. In a later paper, Wang Zhentang et al. (1997) repeat the same evidence and postulate that the northern distribution boundary of the rhinoceros shrank southwards at a speed of 0.5 km per year, essentially due to human pressure. It is calculated that 4.0 people per square kilometre is the threshold value of human population pressure under which rhinoceros can survive.

Zhou (2003) provides some information on the contents of the Shan Jing part of the ancient book Sang Hai Jing, considering that the ecological material in the book is roughly trustworthy. It describes the environment of the Yangtze River basin, where a rhinoceros identified as *Rhinoceros sondaicus* was found. Lan Yong (1992) discusses the distribution of the rhinoceros in south-west China, but as this paper has only a very short abstract, it can only be said that he refers the animals in this region to *R. unicornis*.

Lefevre (1991) discusses a pictograph found on a Shang oracle bone, which was often translated as 'rhinoceros'. The pictograph was found in an inscription on the head bone of a big animal, excavated on 28 November 1929 in the great connective pit, north-east of Xiaotun village, in the land of Zhang Xuexian. After examining all the evidence about this pictograph, it is concluded that the animal cannot have been a rhinoceros, rather that it referred to a wild buffalo.

Finally, Xu (2000) refers to historical records of the rhinoceros in the southern province of Yunnan. He estimated that between 79 and 123 rhino horns had been paid as tribute to the imperial courts from Yunnan since the 13th century. The rhinoceros became scarce in the area during the 18th century (latter part of the Qing Dynasty) and the last specimen in southern Yunnan was shot as late as 1957. This

payment of tribute has been an important factor in the extinction of the rhinoceros in Yunnan. The present eco-environment is suitable for its reintroduction.

## Discussion

It is not easy to judge the value of the records provided by the Chinese authors. The data relating to the Shang Dynasty oracle bones used by Wang Zhentang and his coauthors seem to be contradicted by the interpretation of the relevant pictograph by Lefevre (1991). The records of the ensuing period of the last 3000 years, when the rhinoceros was retreating southwards, need to be further explained in a paper written in a Western language. There is also uncertainty about which species of rhinoceros lived in China. As the double-horned Sumatran rhinoceros (*Dicerorhinus sumatrensis*) is known from Myanmar and Thailand, and the single-horned Javan rhinoceros (*Rhinoceros sondaicus*) was found in North Vietnam, one may expect that the records pertain to one or both of these species, and it would be interesting to discover if the historical records could be separated between these species, or indeed if the Indian rhinoceros (*Rhinoceros unicornis*) existed in China at all. Hopefully one day the position of the rhinoceros in China will be better known to Western scientists.

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