FIELD NOTES

Asian rhinoceros species in early China: unravelling Si (兕) and Xi (犀) in historical Chinese records

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Introduction

As elsewhere in the world, the history of rhinoceroses in China is one of progressive extinction, and wild rhinos no longer exist in China, having been exterminated due to the cultural value placed on their horns (Martin 2017). However, Si (兕) and Xi (犀) were two animals commonly mentioned in Chinese historical records prior to 221 BCE and appear to have been widely distributed in China from the 17th to the 11th century BCE. Xi refers to rhinoceroses in general. The character of Xi is used as the modern Chinese word for rhinoceros, although it is unclear which species of rhinoceros was being referred to over 2000 years ago. As for Si, it is also uncertain which specific animal it refers to. This field note sheds light on the different meanings of the terms Si and Xi from the Shang dynasty (1600–1046 BCE) to the Tang dynasty (618–907 CE), a period that spans more than three thousand years (Table 1). It suggests that Si refers to the one-horned Javan rhinoceros (*Rhinoceros sondaicus*), and Xi refers to the Asian two-horned rhinoceros *Dicerorhinus sumatrensis*, also known as Sumatran rhinoceros, corresponding to the two species known to be present in China in historical times (Rookmaaker 2006).

Table 1. Timeline of ancient Chinese dynasties referred to in this field note.

Dynasty	Staging of dynasties		Dynastic time period
Shang dynasty			ca. 1600–1046 BCE
Zhou dynasty	Western Zhou dynasty		1046–771 BCE
	Eastern Zhou dynasty	Spring and Autumn period	770–476 BCE
		The Warring States period	476–221 BCE
Han dynasty	Western Han dynasty		202 BCE–8 CE
	Eastern Han dynasty		25–220 CE
Jin dynasty	Western Jin dynasty		266–317 CE
	Eastern Jin dynasty		317–420 CE
Tang dynasty			618–907 CE

Si and Xi in literary sources

The term Si refers to a type of animal widely found in unearthed antiquities and surviving literature from the pre-Qin period (before 221 BCE) in ancient China. During earlier periods, Si had been a commonly seen animal in central and southern China, as evidenced by references in various poems in the collection known as *Shijing* (Book of Songs) from the Western Zhou period (1046–771 BCE), where it is mentioned in poems such as *On an Auspicious Day* and *Why Are the Plants Not Yellow?* (Mao Heng et al. 1999). The poem *On an Auspicious Day* records King Zhou's hunting of Si, aligning with unearthed antiquities such as divination inscriptions from the Zhou dynasty (1046–256 BCE) which mention hunting Si. Records of Si are also abundant in the oracle bones of the Shang dynasty (ca. 1600–1046 BCE), as discussed below. This evidence suggests that Si was widely distributed in China from the Shang dynasty to the Western Zhou dynasty.

Today and in contemporary literature, there is no animal named Si, and there are several theories about what Si refers to historically. While some Chinese authorities consider that Si refers to *R. unicornis* (Wang 2011), other Western sinologists maintain that it refers to a species of water buffalo (Lefeuvre 1991). To complicate matters further, some traditional Chinese texts use Si as the name for *R. sondaicus* (Sun 1982).

The *Shanhaijing* (Classics of Mountains and Seas), an ancient geography book compiled during the late Warring States (5th century to 221 BCE) and western Han dynasty (206 BCE–220 CE) periods, records that "The Si is located to the east of Emperor Shun's tomb, south of the Xiang River. Its appearance is like that of a cow, dark blue, with a single horn". Following this passage, the book also mentions Xi, noting that "in the north-west, there are Xi, resembling cattle but black" (Yuan 1980). These descriptions make it clear that Si and Xi had similar forms, both resembling cattle and being black in colour. Guo's (267–324 CE) commentary on the *Shanhaijing* (Classic of Mountains and Sea) describes the Xi and Si mentioned in the section *Prayers for Crossing Mountains* as follows:

> "The Xi resembles a water buffalo. It has a pig's head, stiff legs resembling those of an elephant, three hooves, a large belly, and is black. It has three horns: one on top, one on the forehead, and one on the nose. The one on the nose is small and does not fall off; it serves to eat. It likes to eat thorns and often spews blood from its mouth. The Si also resembles a water buffalo, is bluish-green, and weighs a thousand jin (千斤), equivalent to 500 kg", (Yuan 1980).

Apart from the number of horns, the pre-Qin literature also records differences in the hardness of the skin between Xi and Si. The Zhou people often used the skins of Xi and Si as armour. The *ZhouLi* (The Rites of Zhou), compiled between 1046–771 BCE, describes "the armour of the Han people" as follows: "Xi armour consists of seven sections, Si armour consists of six sections, and combined armour consists of five sections. Xi armour has a lifespan of a hundred years, Si armour has a lifespan of two hundred years and combined, the armour has a lifespan of three hundred years" (Yang 2004).

The pre-Qin era is seen by the Chinese as "like childhood for humanity". Books of the time are full of legends, and care is required to interpret their contents. In Guo's annotation, the Xi has three hooves, indicating that it belongs to the odd-toed ungulate order, but it is transformed into a three-horned animal. Its body is massive, like that of a cow, while the presence of horns, although a characteristic feature of Rhinocerotidae, could also refer to Bovidae.

Possible confusion with cattle is evidenced in other historical texts. The *Erya*, the first surviving Chinese dictionary, the most of whose glosses must reasonably date from the 3rd century BCE, notes that "the Si resemble cattle" (Guo 1999). However, Guo's subsequent annotations on the *Erya* explicitly state that Si has "one horn, greenish in colour". He adds: "The weight of the horn is about 500 kg" (Guo and Bing 1999), greatly exaggerating the weight of the horn.

The *Shuowen Jiezi*, a dictionary-like collection of various Chinese character glyphs drawn by Xu Shen during the Eastern Han dynasty (ca. 100 CE), describes Xi as "a type of cattle from the southern borders, one horn on the nose, one horn on the top of the head, resembling a pig." (Ding Fubao 2014).

Wang Yun's (1784–1854) interpretation of this passage includes the observation that: "the rhinoceros lives beyond China's south-western border" (Ding 2014). The vagueness and inaccuracies of descriptions of rhinos from northern China imply that—during the

Eastern Han period (25 BCE–220 CE) there was already a noticeable decline in the numbers of rhinoceroses in northern areas and they were no longer commonly seen within the Eastern Han dynasty borders. In addition to this factor, frequent wars during the Eastern Jin period| (317–420 CE) disrupted the dissemination of knowledge and information. Similarly, the very brief references to Si in Guo's (2nd–3rd century CE) annotations on the *Shanhaijing*' suggest that Si was already in decline in the area during the Eastern Jin period. From the pre-Qin period to the Eastern Jin period, due to the increasing scarcity of tangible references, records related to Si gradually became blurred and distorted by history.

Evidence from oracle bone scripts

Oracle bone script is the oldest attested form of written Chinese, dating to the late 2nd millennium BCE. Inscriptions were made by carving characters into oracle bones. The character Si in the oracle bone script is a pictograph representing the form of an animal, and apparently with a single horn (Fig. 1). Lefeuvre (1991) pointed out that the inscription on the base of a bronze vessel from the Shang dynasty, now preserved in the Academia Sinica, representing a side view of a cow, resembles the Si character in oracle bone script (Fig. 2). This viewpoint makes it appear that the cow has a single horn, and Lefeuvre uses this feature to suggest that the character Si refers to a wild *Bubalus mephistopheles*, an extinct Pleistocene-era buffalo species, rather than a rhinoceros. This assertion is incorrect. During the Shang dynasty, the characters representing buffalo in oracle bone script depicted the frontal form of the cow's head, as well as representing the side profile of the animal. This glyph, 牽 (qian), is still preserved in Qin (221–207 BCE) bamboo slips (Fig. 3).

Figure 1. Si in oracle bone script.
© Li Xueqin (Ed). *Origin of Characters* (Li 2013, p 852).

Figure 2. (Above) Inscription on a Shang dynasty bronze square *Ding*.
© Jean A. Lefeuvre (Lefeuvre 1991, p 155);
(Below) https://openmuseum.tw/muse/curation/3e4e9550d8e75d9a37431a52098b724f#curation-viewer-infobox-3870).

Figure 3. The Chinese character "牽" (qian).
© Li Xueqin (Ed).
(Ziyuan, Tianjin Ancient Books Publishing House, 2013 edition, page 72.)

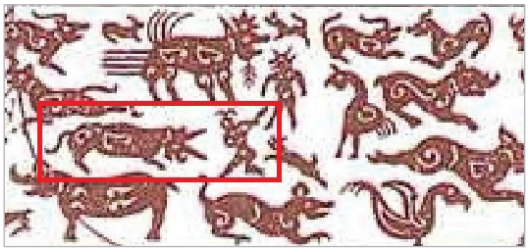

Figure 4. Person hunting a cow with a spear on a spring and autumn period Dou with hunting patterns.
© Palace Museum, Beijing

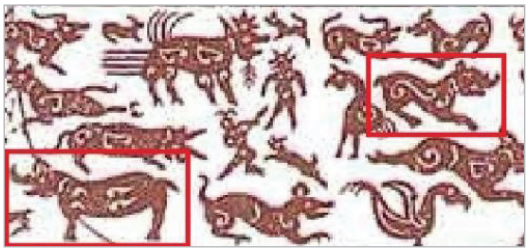

Figure 5. Two-horned rhinoceros on a spring and autumn period Dou with hunting patterns.
© Palace Museum, Beijing

Figure 5 shows a phono-semantic compound character, with 宀 (Mi) as the radical and 牛 (*niu*; this Chinese character means cow) as the phonetic component. The upper component 宀 resembles the rope used to lead cattle, while the lower component resembles the inscription found on the Shang dynasty bronze vessel, depicting the profile view of a cow.

Excavated antiquities differentiate distinctly between images of cows and other bovines and those of rhinoceroses. The hunting pattern engraved on a Spring and Autumn period (770–476 BCE) *Dou* (豆) (an ancient Chinese bronze vessel used to hold offerings) depicts a person hunting a cow with a spear, showing the cow with double horns and a robust body with a long tail (Fig. 4). Beneath this cow, an animal is depicted with a body similar in shape to a cow but with a shorter tail, double horns on its nose; with the front horn longer than the rear horn (Fig. 5) that closely resembles the description of two-horned rhinoceros (Xi) in the *Shuowen Jiezi*.

Si goblets in the Book of Songs

An argument against the identification of Si as cattle is suggested by references to *si gong* (兕觥), wine goblets made from the horns of a rhinoceros, in the Book of Songs, which contains some of the earliest known references to Si. There are four references to *si gong*, as shown in Table 2.

Table 2. Occurrences of the phrase *si gong* (兕觥), translated as 'Si goblet', in the Book of Songs (Source: *Thirteen Classics Annotation and Commentary on the Book of Songs*. (Ed). Li 1993, published by Peking University Press).

Title	Section	Poetic text
Juan Er	*Guofeng: Zhou Nan*	I fill the Si goblet, to prevent eternal sorrow. Climbing that rocky path, my horse tires, my servant falls ill, what can I do?
Seventh Month	*Guofeng: Bin Feng*	In September, the frost is solemn; in October, we cleanse the field. Friends gather for a feast, saying, "slay the lamb" as we ascend to the public hall. We raise the Si goblet, wishing for boundless longevity!
Sang Hu	*Xiaoya*	Filling the Si goblet, the fine wine seems soft. Seeking blessings, without arrogance, they come in multitude.
Silk Garments	*Song*	From the hall to the ancestral shrine, from the sheep to the cattle, with the dainty cups and the Si goblets.

The *Song* (Hymns) are poems for sacrificial rites, while the *Xiaoya* (minor odes) are poems written for and read by aristocrats. *Juan Er* and *Seventh Month* belong to the *Guofeng* (Airs from the States, i.e. folk songs). *Juan Er* depicts a man from an affluent family who travels with horses and servants, while *Seventh Month* depicts a lavish feast for distinguished guests, similar to the ambiance described in the *Silk Garments* of the *Song*. Poetic texts imply that drinking vessels made from Si horns are regarded as luxury utensils, used by nobility and affluent families on formal banqueting occasions. This makes it unlikely that *si gong* refers to humble drinking vessels made of cow horns. Cow horns were very common in those times (as well as now), while rhinoceros horns were incredibly valuable.

Historical references make it clear that rhinoceroses were highly prized animals and that rhino horn was regarded as a precious material. For example,

Figure 6. Si horn wine vessel made of bronze from the late Shang dynasty, ShanXi Province. © Shanxi Museum

Zhanguoce (The Strategies of the Warring States), a book mostly about the mixed wars of the states during ca. 476–221 BCE, notes "They sent envoys with a hundred chariots, presenting the astonishing chicken-horned rhinoceros and the luminous jade *bi* (an ancient Chinese jade ornament which is round in shape with a whole in the centre of the circle) to the King of Qin" (Liu 1983). This reference, where rhino horn is listed alongside the prized treasure of luminous jade, shows that it was valuable and used as a tribute during the Eastern Zhou dynasty. The Eastern Zhou dynasty was the later phase of the Zhou dynasty, which covered the period from 770 BCE to 221 BCE. Moreover, rhino horn was considered to possess mystical and medicinal properties. For example, the *Shennong Bencao Jing* (The Holy Husbandman's Classic on Roots and Herbs), a book on folk medicine prior to 221 BCE, states: "Rhinoceros horn governs against the sting or bite of a hundred venomous insects, evil spirits, [and] obstructed vital energy, and the effects of poison from hooks, bites, stings, and venomous snakes, preventing confusion or sleepiness. Long-term use lightens the body" (Shang 2007).

Although cattle horns were easy to process, they lacked precious and mystical attributes, thus did not highlight the status of the user and were unsuitable for use on formal occasions, in contrast to the dignified nature of Si goblets. People of the pre-Qin period chose luxurious materials for ritual vessels and craftsmen spared no time or effort. Rhinoceros horns were more difficult to craft into wine vessels, than buffalo horns, but their precious attributes and mystical aura made them a far more desirable choice of material for goblets. The symbolic importance of rhino horn in ancient China is also indicated by the choice of precious materials such as bronze to make replica horn goblets for use on ceremonial occasions (Figs. 6 and 7).

These two bronzes (Figs. 6 and 7) are known to Chinese experts in antiquities as *si gong* (drinking vessels made from rhinoceros horn). At first, *si gong* were made directly from rhinoceros' horn. When ancient Chinese craftsmen mastered the art of casting objects in bronze, they enlarged and distorted the si gong to enhance its mystical and solemn character, as it was used in the context of sacred rituals for gods and ancestors.

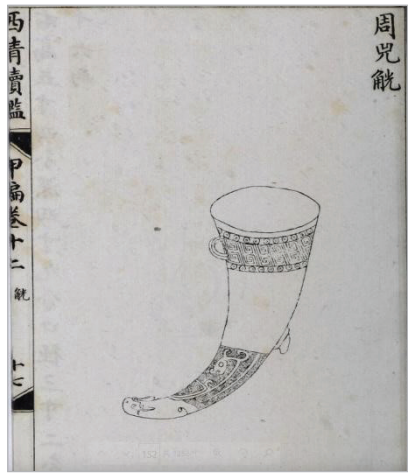

Figure 7. A Si horn drinking goblet made of bronze in the Zhou dynasty (1046–256 BCE). © Wang Jie (Ed). Compilation of antiquities collected by the Qing Royal Family (Wang 1793, chapter 12, p 17).

The stone Si in Xianling

By the time of the Tang dynasty (618–907 CE), the cold climate in the Central Plains made it difficult for rhinoceroses to survive, and from the early to middle Tang period, rhinoceroses entered China through diplomatic channels. The *Old Book of Tang*, a book documenting the history of the Tang dynasty, records: "In the early years of the Zhenguan era (627–649 CE), envoys were sent to present tame [captive] rhinoceroses" (Liu 1975). our references to *si gong*, as shown in Table 2.

Although rhinoceros sightings were rare at that time, rhinoceroses can still be seen in ancient literature and artifacts. In the ninth year of the Zhenguan era (635 CE), Emperor Liyuan of Tang passed away. Outside the divine gate of Xianling (The tomb of Emperor Li Yuan of the Tang Dynasty), leading to the mausoleum where he was buried, pairs of stone tigers and rhinoceroses stood guard, as well as a stone Buddha housed in a niche outside the east divine gate.

The placement of tigers and rhinos together harks back to earlier descriptions from the literature of the Qin and Han dynasties, where Si and tiger are referred to together as 'fierce beasts'. For example, in the *Book of Discussions*, compiled in 50–59 CE, it is stated that: "When one dies, the form decays. Even though tigers and Si are fierce and brave, they cannot return to life" (Huang 1990). Similarly, in the *Salt and Iron Debate*, a book completed in 81 BCE, it is stated: "Tigers and Si can capture bears and tigers, subdue other animals because their claws and teeth are sharp, and they can grasp easily" (Wang 1992). Both passages explicitly describe tigers and Si as fierce and formidable beasts. This suggests that the rhinoceroses outside the divine gate of Xianling were intended to represent Si, and placed together with stone tigers to guard the mausoleum, symbolizing their fierce and resolute nature.

The stone Si from Xianling is on display at the Xi'an Beilin Museum (Fig. 6). The statue is of single-horned rhinoceros, with three toes on its feet, folds on its neck, shoulders, waist, and legs, and skin resembling armour. The stone rhinoceros had lain on its side on the ground, with severe weathering on the right, while its left side protected from the elements remained intact, showing neat scale patterns and irregular rings on its hide (Zhu 2023).

As shown in the illustration, the nasal horn of the stone rhinoceros is shown as a lump-like growth. Female Javan rhinos do not have horns, but some of these individuals grow a lump an inch or two high at the tip of their snouts. This lump on the nose of the stone rhinoceros in Xianling is a typical feature of female Javan rhinoceroses. Therefore, it can be inferred that the stone rhinoceros in Xianling was modelled from a female Javan rhinoceros, *R. sondaicus*. Therefore, the stone rhinoceros in the ancestral tomb of Emperor Liyuan of Tang should be referred to as Si.

Figure 8. Tang dynasty–Xianling Stone Rhinoceros.
© Shaanxi, Xi'an Beilin Museum

Conclusion

In summary, based on pre-Qin literature and unearthed antiquities, the term Si, which commonly appeared, refers to the *R. sondaicus*. It was not until the early 19th century, driven by the continuous development of biological classification, that *R. sondaicus* was identified as a separate species. The historical traces of referring to the single-horned rhinoceros as Si could still be observed in the early years of the Tang dynasty, and the stone rhinoceros dedicated to Emperor Liyuan at Xianling should be called the Xianling Stone Si. Another Asian rhinoceros commonly found in classical Chinese literature at that time—the two-horned *Dicerorhinus sumatrensis*—was referred to as Xi.

R. sondaicus and the *R. unicornis* are both one-horned rhinoceroses and have skin like thick armour. In the early days of China, when observation and species classification were not well developed, they were probably regarded as the same species, called Si. Some Chinese scholars believe that *R. unicornis* was historically present in southwestern China (Lan 1992), but there is no fossil evidence to support this view. Perhaps, with the development of Chinese archaeology and the expansion of the scope of ancient species identification, we will make new discoveries about the relationship between the *R. unicornis* and Si.

It is hoped that this field note will act as a catalyst, especially for Chinese scholars wanting to learn more about the rhino in classical Chinese literature and art, and that it will generate further discussion and research on the presence of rhino species occurring in China historically.

Appendix 1

Ancient Chinese texts quoted in the paper

Ancient Chinese Texts
《爾雅・釋獸》：“兕，似牛。”
《山海經・海內南經》：“兕在舜葬東，湘水南，其裝如牛，蒼黑，一角。”
《山海經》：“犀似水牛。豬頭，痺腳，腳似象，有三蹄，大腹，黑色。三角：一在頂上，一在額上，一在鼻上；在鼻上者，小而不墮，食角也。好噉棘，口中常灑血沫。兕亦似水牛，青色，一角重三千斤。”
《說文解字》：“犀，南徼外牛，一角在鼻，一角在頂，似豕。從牛，屃聲。”
《說文句讀》：“徼猶塞也。東北謂之塞，西南謂之徼。”
《爾雅注疏》：“一角，青色，重千斤。”
《韓詩外傳》：“太公使南宮適至義渠，得駭雞犀，以獻紂”
《戰國策・楚策》：“遣使車百乘，獻雞駭之犀、夜光之璧於秦王。”
《犀鉤序》：“世稱雞駭之犀，聞之父常侍曰：犀之美者有光，雞見影而驚，故曰駭雞。”
《神農本草經》：“主百毒蟲注，邪鬼，障氣殺鉤吻鴆羽蛇毒，除不迷或厭寐。久服輕身。”
《說文解字》：“鰓，角中骨也。”
《周禮注疏・冬官・考工記》：“函人為甲，犀甲七屬，兕甲六屬，合甲五屬。犀甲壽百年，兕甲壽二百年，合甲壽三百年。”
《舊唐書》：“貞觀初，遣使貢馴犀。”
《馴犀》：“馴犀生處南方熱，秋無白露冬無雪。一入上林三四年，又逢今歲苦寒月。飲冰臥霰苦蜷跼，角骨凍傷鱗甲蹜。馴犀死，蠻兒啼，向闕再拜顏色低。”
《論語》：“虎兕出于柙，龟玉毁于椟中，是谁之过与？”
《論衡・論死》：“如死，其形腐朽，雖虎兕勇悍，不能復化。”
《鹽鐵論》：“虎兕所以能執熊羆、服群獸者，爪牙利而攫便也。”

Appendix 2

List of phrases referring Si goblets in the Book of Songs

Title	Section	Poetry Lines
卷耳	國風・周南	我姑酌彼兕觥，維以不永傷 陟彼砠矣，我馬瘏矣，我僕痛矣，云何籲矣。
七月	國風・豳風	九月肅霜，十月滌場。朋酒斯饗，曰殺羔羊，躋彼公堂。稱彼兕觥：萬壽無疆！
桑扈	小雅	兕觥其觩，旨酒思柔。彼交匪敖，萬福來求。
絲衣	周頌	自堂徂基，自羊徂牛，鼐鼎及鼒，兕觥其觩。

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