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RESEARCH ARTICLE

Research on Animal-style Caprine Petroglyphs in the Northern China Steppe

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ABSTRACT

The animal-style caprine petroglyphs in the Northern China Steppe is a typical representative of animal petroglyphs in the Northern China Steppe during the Bronze Age to the early Iron Age. The characteristics and transmission processes of these animal-style caprine petroglyphs are closely related to the animal-style caprine-decorated metal artifacts found in the Northern China Steppe. Specifically, roughly from the late Western Zhou Dynasty to the early-to-middle Spring and Autumn Period (9th–7th centuries BCE), the inhabitants of the eastern Northern China Steppe already created animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs. From the mid-to-late Spring and Autumn Period to the Han and Jin dynasties (7th century BCE–early 5th century CE), archaeological cultures possessing the technology to produce animal-style caprine-decorated metal artifacts spread widely across the Northern China Steppe. Animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs became widespread in the Northern China Steppe. After the Han and Jin dynasties, with the decline of the bronze to early iron age animal-style caprine-decorated metal artifacts traditions in the Northern China Steppe, animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs gradually declined in the Northern China Steppe.

KEYWORDS

Northern China Steppe, Animal-style Caprine-decorated Metal Artifacts, Animal-style Caprine Petroglyph

Northern China Steppe, bordered by the Eurasian Steppe to the north and the Central Plains of China to the south, serves as a crucial hub for cultural exchange between the pastoral inhabitants of the Eurasian Steppe and the agricultural inhabitants of the Central Plains. The Northern China steppe discussed in this article roughly encompasses the southeastern and central-western parts of Inner Mongolia, Ningxia, eastern Gansu, and Northern Hebei, Northern Shanxi, and Northern Shaanxi (Northeast China, the Hexi Corridor in Gansu in Northwest China, and Xinjiang in Northwest China are not included in the scope of this article).

In the 1st millennium BCE, nomadic peoples and other related ethnic groups, who had mastered the techniques of making weapons, horse harnesses, and animal-style artifacts, began to rise in the Eurasian Steppe. During this period, animal-style metal artifacts became widely popular in the Eurasian Steppe region and its adjacent areas (Yang et al., 2020). In academia, some scholars refer to a subset of these animal-style metal artifacts as “Scythian Animal-Style” metal artifacts (Sharkey, 2022). Considering the widespread distribution of this type of animal-style metal artifacts in the Eurasian steppe and its adjacent areas, and to avoid directly associating such artifacts with any specific ethnic group, we will refer to this type of artifact as animal-style metal artifacts, a term that is already widely used in the academic community. The following are some typical examples of animal-style metal artifacts from the Eurasian Steppe.

A bronze rod head ornament depicting a caprine unearthed from the Arzhan I Kurgan in the Tuva region of the central Eurasian Steppe, dating to the 9th–8th centuries BCE (Figure 1 (1)) (Yang et al., 2020).

A bronze mirror decorated with images of deer and sheep was discovered in the Altai region, dating to a period close to that of the Arzhan I Kurgan (Figure 1 (2)) (Yang et al., 2020).

Gold artifacts decorated with horses, deer, and panthers were unearthed from the Arzhan II Kurgan in the Tuva region, dating to the mid-to-late 7th century BCE (Figure 1 (3)–(5)) (Zaitseva et al., 2007; Andreeva, 2018; Armbruster et al., 2024).

A gold foil-covered wooden deer was discovered in the Sauromatian Culture, which dates from the 7th to 4th centuries BCE, in the North Caucasus, and the northern shore of the Caspian Sea (Figure 1 (6)) (Yang et al., 2020; Aruz, 2006).

A golden deer artifact was discovered in the Scythian Culture, which dates from the 7th to the early 3rd century BCE, in the north of Black Sea (Figure 1 (7)) (Yang et al., 2020).

A bronze mirror depicting a caprine and a bronze deer artifact were discovered in the Tagar Culture, which dates from the late 10th century BCE to the 1st century CE and is distributed in the Minusinsk Basin of

Russia (Figure 1 (8), (9)) (Yang et al., 2020).

A bronze ornament depicting a caprine was discovered in the Tasmola Culture of central Kazakhstan dating to the 7th to 3rd centuries BCE (Figure 1 (10)) (Davis-Kimball et al., 1995).

Similar to the Eurasian Steppe, the Northern China Steppe, which is adjacent to the eastern part of the Eurasian Steppe, is an important distribution area for animal-style metal artifacts (Based on factors such as their geographical distribution and specific characteristics, Chinese scholars commonly refer to those animal-style metal artifacts found in the Northern China Steppe as "Ordos Animal-Style" metal artifacts or "Northern China Animal-Style" metal artifacts). Bronze Age to the early Iron Age metal artifacts decorated with full-bodied caprine motifs are a typical example of the local animal-style metal artifacts. (For convenience, this article refers to these animal-style metal artifacts decorated with full-bodied caprine motifs simply as animal-style caprine-decorated metal artifacts; furthermore, due to the similarity between animals of the Caprinae subfamily and animals of the Antilopinae subfamily, to avoid confusion, this article refers to animal-style metal artifacts depicting goats, sheep, and even antelopes

as animal-style caprine-decorated metal artifacts.) (Figure 2 (1), (2))(Ordos Museum, 2006; Editorial Committee of the Complete Collection of Chinese Bronze Artifacts, 1995).

Since there are multiple ways to depict caprines, while creating animal-style caprine-decorated metal artifacts, the inhabitants of the Northern China Steppe also created caprine petroglyphs with similar characteristics to those of animal-style caprine-decorated metal artifacts (hereinafter referred to as animal-style caprine petroglyphs) (Figure 2 (3), (4)) (Zhang, 2009; Zhang et al., 2020).

Considering the current lack of systematic research on animal-style caprine petroglyphs in the Northern China Steppe, and the significant role of exploring these petroglyphs in studying the dating and cultural attribution of petroglyphs in the Northern China Steppe, this paper conducts to conduct a systematic study of typical animal-style caprine petroglyphs in the Northern China Steppe using animal-style caprine-decorated metal artifacts that have relatively clear dates and ethnic affiliations. This aims to provide new data for exploring the age and cultural affiliation of petroglyphs in the Northern China Steppe (see Figure 3).

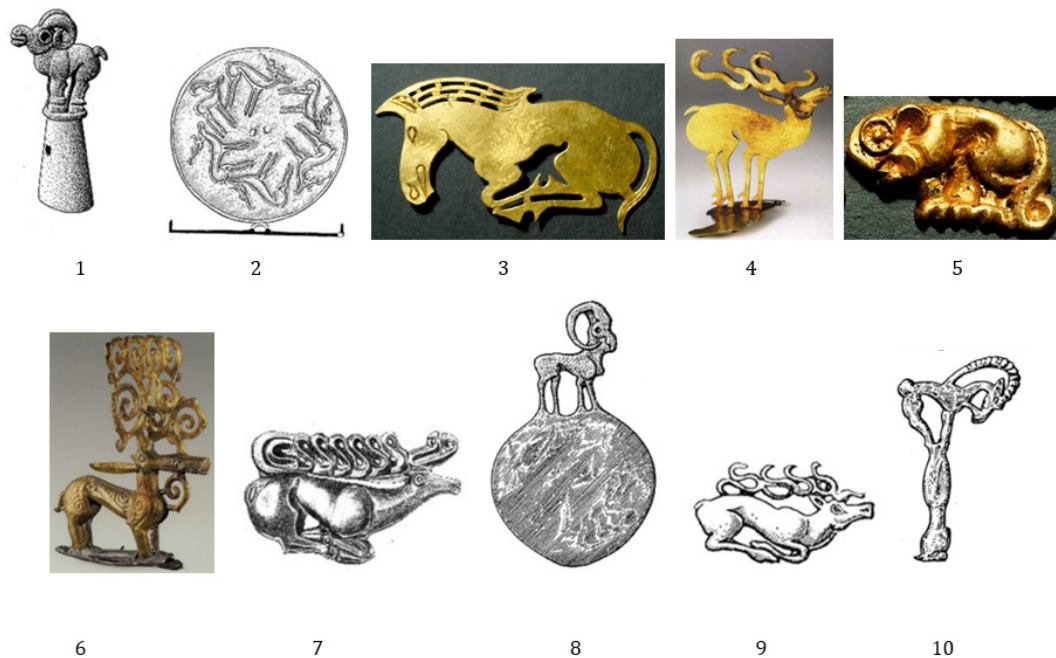


Figure 1 Animal-style Metal Artifacts Discovered in the Eurasian Steppe Region: (1) Bronze rod head ornament depicting a caprine unearthed from the Arzhan I Kurgan; (2) Bronze mirror decorated with images of deer and sheep from the Altai region; (3) Golden horse artifacts unearthed from the Arzhan II Kurgan; (4) Golden deer artifacts unearthed from the Arzhan II Kurgan; (5) Golden panther artifacts unearthed from the Arzhan II Kurgan; (6) Gold foil-covered wooden deer was discovered in the Sauromatian Culture; (7) Golden deer artifacts was discovered in the Scythian Culture; (8) Bronze mirror depicting a caprine was discovered in the Tagar Culture; (9) Bronze deer artifacts was discovered in the Tagar Culture; (10) Bronze ornament depicting a caprine was discovered in the Tasmola Culture.



Figure 2 Images of Animal-style Caprine-decorated Metal Artifacts and Animal-style Caprine Petroglyphs from the Northern China Steppe: (1) A caprine-shaped bronze rod head ornament included in the book "Ordos Bronzes"; (2) Bronze caprine plaque from Mazhuang Cemetery, Guyuan County, Ningxia; (3) Caprine petroglyph at Tuilamamiao in Inner Mongolia; (4) Caprine petroglyph at Chenjiaba, Gansu.

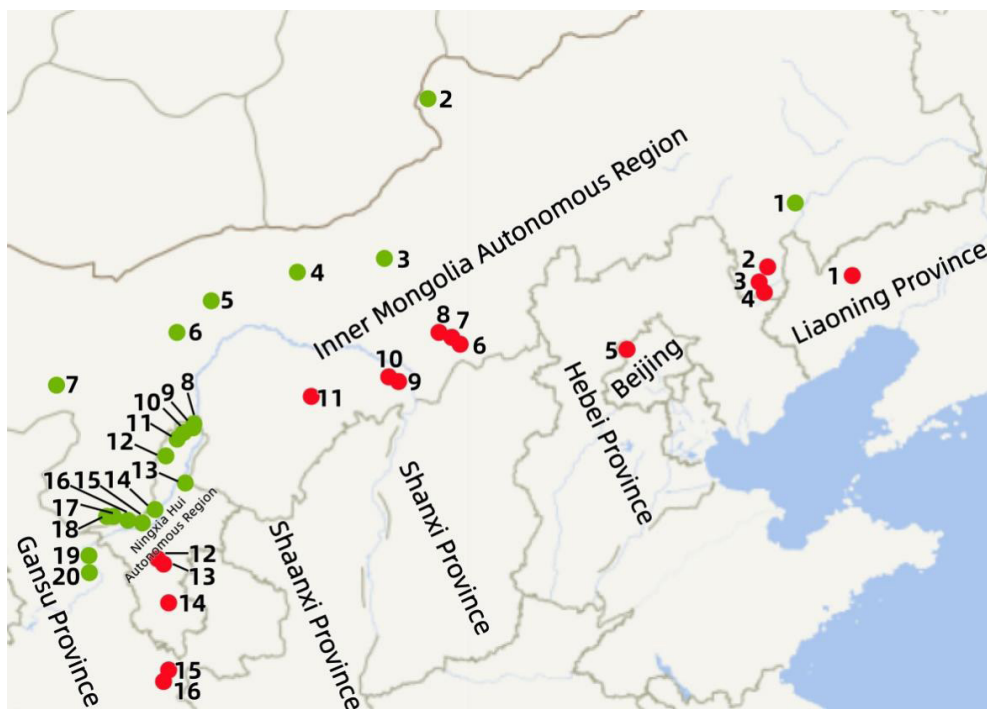


Figure 3 Distribution Points of Animal-style Caprine Petroglyphs and Animal-style Caprine-decorated Metal Artifacts in the Northern China Steppe (limited to those mentioned in this article). ● Distribution points of Animal-style caprine petroglyphs: (1) Daheishan; (2) Barigatu; (3) Tuilamamiao; (4) Moruoqeqige; (5) Burihenhadashan; (6) Melehetugou; (7) Mandelashan; (8) Fanshigou; (9) Shulingou; (10) Heishimao; (11) Guidegou; (12) Helankou; (13) Lingwu; (14) Kouzimegou; (15) Huangyangwan; (16) Zhongwei; (17) Biqigetushan; (18) Aoyoutushan; (19) Shiyangtan; (20) Chenjiaba. ● Distribution points of Animal-style caprine-decorated metal artifacts: (1) Lamadong Cemetery; (2) Nasutai Ruins; (3) Nanshangen Cemetery; (4) Xiaoheishigou Ruins; (5) Yuhuangmiao Cemetery; (6) Manhan mountain; (7) Guoxianyaozi Cemetery; (8) Tianmiliang Cemetery; (9) Yulongtai Cemetery; (10) Xigoupan Cemetery; (11) Aluchaideng Cemetery; (12) Lijiataozi Cemetery; (13) Daodunzi Cemetery; (14) Mazhuang Cemetery; (15) Majiayuan Cemetery; (16) Liuping Ruins.

1. RESEARCH ON ANIMAL-STYLE CAPRINE PETROGLYPHS IN THE INNER MONGOLIA GREAT WALL AREA

According to current research on Chinese rock art, the petroglyphs found in the Northern China Steppe are mainly distributed in southeastern Inner Mongolia, central-western Inner Mongolia, Ningxia, and eastern Gansu. In discussing the animal-style caprine petroglyphs of the Northern China Steppe, this article refers to the Ningxia region and the neighboring eastern Gansu region together as Ningxia and eastern Gansu area; based on the fact that Chinese archaeologists often refer to southeastern Inner Mongolia and central-western Inner Mongolia as the Inner Mongolia Great Wall Area, this article refers to southeastern Inner Mongolia and central-western Inner Mongolia together as the Inner Mongolia Great Wall Area. The following discussion will first focus on the animal-style caprine petroglyphs in the Inner Mongolia Great Wall Area.

1.1 Animal-style Caprine-decorated Metal Artifacts in the Inner Mongolia Great Wall Area

The animal-style caprine petroglyphs are closely related to the caprine-decorated metal artifacts. To study the animal-style caprine petroglyphs in the Inner Mongolia Great Wall Area, it is necessary to first systematically examine the dating and cultural affiliation of the animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area, and to discuss the characteristics of these artifacts and the cultural exchange related to them.

Because the Inner Mongolia Great Wall Area is long and narrow from east to west, this article divides the Inner Mongolia Great Wall Area into two regions, southeastern Inner Mongolia and central-western Inner Mongolia, when sorting out the age and cultural affiliation of the animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area.

Among these, the animal-style caprine-decorated metal artifacts, or metal artifacts similar to animal-style caprine-decorated metal artifacts, that were discovered in southeastern Inner Mongolia and its neighboring areas, mostly existed from the late Western Zhou Dynasty to the Han and Jin dynasties (9th century BCE to early 5th century CE), and were respectively attributed to the prosperous period of Upper Xiajiadian Culture, as well as the Yuhuangmiao Culture and the Xianbei Culture.

The Upper Xiajiadian Culture is an archaeological culture that existed in southeastern Inner Mongolia. This archaeological culture flourished from the late Western Zhou Dynasty to the early Spring and Autumn Period (9th–8th centuries BCE) (Yang et al., 2020). The bronze caprine-shaped ornament unearthed from Tomb No. 101 in Nanshangen, Ningcheng County (Figure 4 (1)), the bronze caprine-shaped ornament unearthed from the Nasutai site in Ningcheng County (Figure 4 (2)), and the bronze tiger-biting-goat plaque unearthed from Tomb No. 8501 in Xiaoheishigou, Ningcheng County (Figure 4 (3)), all belong to the animal-style caprine-decorated metal artifacts that appeared during the flourishing period of the Upper Xiajiadian Culture (The Northeast Asian History Foundation of Korea, & Inner Mongolia Cultural Relics and Archaeology Research Institute of China, 2007).

The Yuhuangmiao Culture is an archaeological culture that exists in northern Hebei and the Beijing area. Archaeologists often divide this culture into the early stage of the early-to-middle Spring and Autumn Period (8th–7th centuries BCE) and the late stage from the late Spring and Autumn Period to the early Warring States Period (6th–5th centuries BCE) (Wu, 2007). The bronze caprine-shaped belt ornament unearthed from Tomb No. 13 at the Yuhuangmiao Cemetery, dating to the early Spring and Autumn Period, is representative of early animal-style caprine-decorated metal artifacts from this culture (Figure 4 (4)) (Beijing Municipal Institute of Cultural Relics, 2007). The bronze caprine-shaped belt ornament unearthed from Tomb No. 212 at the Yuhuangmiao Cemetery, dating to the mid-to-late Spring and Autumn Period, is representative of later animal-style caprine-decorated metal artifacts from this culture (Figure 4 (5)) (Beijing Municipal Institute of

Cultural Relics, 2007).

The Xianbei people were widely active in the Inner Mongolia Great Wall Area and its neighboring regions during the Han and Jin dynasties (late 3rd century BCE-early 5th century CE). The double-caprine gold plaque (Figure 4 (6)) unearthed from the Lamadong Xianbei cemetery in Beipiao, Liaoxi region, near southeastern Inner Mongolia, dating from the late 3rd century CE to mid-4th century CE, is a representative example of animal-style caprine-decorated metal artifacts from the Xianbei Culture in southeastern Inner Mongolia and its surrounding areas during the Han and Jin dynasties (Liaoning Provincial Institute of Cultural Relics and Archaeology, 2002; Wan, 2004).

In central-western Inner Mongolia, most of the animal-style caprine-decorated metal artifacts existed from the mid-to-late Spring and Autumn Period to the Han and Jin dynasties (7th century BCE to early

5th century CE), and were respectively classified as belonging to the Maoqinggou Culture, Taohongbala Culture, and the Xiongnu and Xianbei Cultures of the Han and Jin dynasties.

The Maoqinggou Culture, which is an archaeological culture that existed in the Manhan Mountain and its surrounding areas in Liangcheng County, Inner Mongolia, existed from the mid-to-late Spring and Autumn Period to the late Warring States Period (7th century BCE to 3rd century BCE) (Wu, 2007). The bronze plaque depicting a tiger eating a caprine (Figure 5 (1)) unearthed from Tomb No. 12 at Guoxianyaozi, on the northern slope of Manhan Mountain, dating from the late Spring and Autumn Period to the early Warring States Period (Wei, 1989), and the bronze plaque depicting a mother caprine nursing (Figure 5 (2)) discovered at Manhan Mountain (Tian et al., 1986a), both belong to this culture's animal-style caprine-decorated metal artifacts.

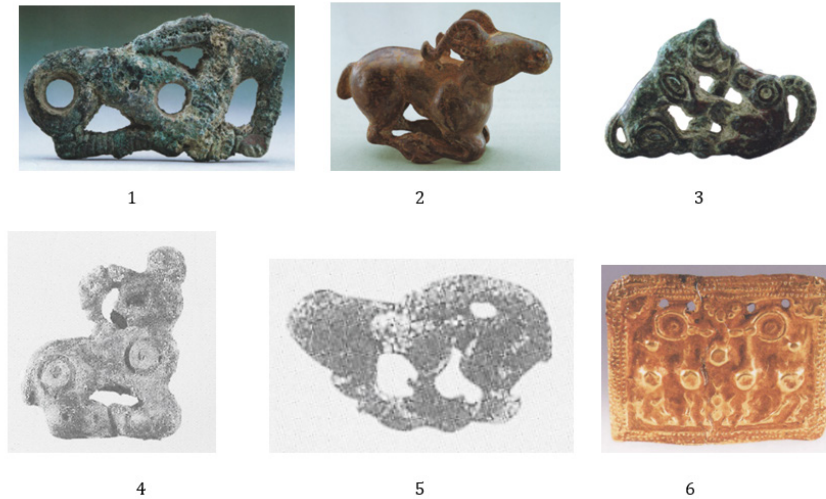


Figure 4 Animal-style Caprine-decorated Metal Artifacts in Southeastern Inner Mongolia and its Neighboring Areas: (1) The bronze caprine-shaped ornament from Tomb No. 101 at Nanshangen; (2) The bronze caprine-shaped ornament from the Nasutai site; (3) The bronze tiger-biting-goat plaque from Tomb No. 8501 at Xiaoheishigou; (4) The bronze caprine-shaped belt ornament from Tomb No. 13 at the Yuhuangmiao cemetery; (5) The bronze caprine-shaped belt ornament from Tomb No. 212 at the Yuhuangmiao cemetery; (6) The double-caprine gold plaque from the Lamadong cemetery.



Figure 5 Animal-style Caprine-decorated Metal Artifacts in Central-western Inner Mongolia: (1) The tiger-eating- caprine bronze plaque from Tomb No. 12 at Guoxianyaozi; (2) The bronze plaque depicting a mother plaque nursing from Manhan Mountain; (3) The caprine-shaped gold plaque from Aluchaideng cemetery; (4) The caprine-shaped bronze rod head ornament from Yulongtai cemetery; (5) The iron-core gold-plated caprine-decorated belt ornament from Xigoupan cemetery; (6) The caprine-decorated gold plaque from Tianmiliang tomb; (7) The caprine-shaped bronze rod head ornament published in the book "Ordos Bronzes"; (8) The caprine-decorated bronze knife published in the book "Ordos Bronzes"; (9) The caprine-decorated bronze plaque published in the book "Ordos Bronzes".

The Taohongbala Culture is an archaeological culture that existed in the Ordos Plateau and adjacent areas from the mid-to-late Spring and Autumn Period to the late Warring States Period (7th–3rd century BCE) (Wu, 2007). The caprine-shaped gold plaque unearthed from the late Warring States Period cemetery of Aluchaideng in Jungar Banner, Ordos City (Figure 5 (3)) (Tian et al., 1986b), and the late Warring States Period caprine-shaped bronze rod head ornament unearthed from the Yulongtai cemetery in Jungar Banner (Figure 5 (4)) (Tian et al., 1986a), both belong to this culture’s animal-style caprine-decorated metal artifacts.

During the Han and Jin dynasties (late 3rd century BCE–early 5th century CE), the Xiongnu and Xianbei cultural inhabitants active in central-western Inner Mongolia also produced animal-style caprine-

decorated metal artifacts. For example, a Western Han Dynasty iron-core gold-plated caprine-decorated belt ornament unearthed from the Xiongnu cemetery at Xigoupan, Ordos City (Figure 5 (5)) (Ordos Bronze Museum, 2021; Tian et al., 1986c), and an Eastern Han Dynasty caprine-decorated gold plaque unearthed from the Xianbei tomb at Tianmiliang, Hohhot, Inner Mongolia (Figure 5 (6)) (Zhang, 2008), are evidence that the Xiongnu and Xianbei Cultures in central-western Inner Mongolia possessed animal-style caprine-decorated metal artifacts.

Besides the animal-style caprine-decorated metal artifacts with relatively clear provenance, related books have also published some animal-style caprine-decorated metal artifacts that are closely related to the central-western Inner Mongolia. For example, the book *Ordos Bronzes* has presents a large number of bronze, gold, and silver animal-

Table 1 Statistical Table of Characteristics of Animal-style Caprine-decorated Metal Artifacts in the Inner Mongolia Great Wall Area and its Neighboring Areas

Numbering of Animal-style Caprine-decorated Metal Artifacts in the Inner Mongolia Great Wall Area and Adjacent Regions	Whether Exhibit the Characteristic of Legs Curled up	Whether Decorated with Vortex / Circular Patterns	Whether Exhibit the Characteristic of Arched back/Abdominal Contraction
Figure 2 (1)	No	Yes	Yes
Figure 4 (1)	Yes	Uncertain (It cannot be confirmed whether the circular perforation on the caprine-decorated metal	Yes
Figure 4 (2)	Yes	No	Yes
Figure 4 (3)	No	No	No
Figure 4 (4)	Yes	Yes	No
Figure 4 (5)	No	No	Yes
Figure 4 (6)	No	No	No
Figure 5 (1)	No	Yes	No
Figure 5 (2)	No	No	Yes
Figure 5 (3)	Yes	No	Yes
Figure 5 (4)	No	No	No
Figure 5 (5)	No	Yes	Yes
Figure 5 (6)	No	No	No
Figure 5 (7)	No	Yes	No
Figure 5 (8)	No	No	Yes
Figure 5 (9)	No	No	Yes

style caprine-decorated metal artifacts discovered in Ordos and its neighboring areas. The caprine-shaped bronze rod head ornament published in *Ordos Bronzes* as shown in Figure 2 (1) is an example. Other examples include another caprine-shaped bronze rod head ornament published in the book *Ordos Bronzes* (Figure 5 (7)), a caprine-decorated bronze knife published in the book *Ordos Bronzes* (Figure 5 (8)), and a caprine-decorated bronze plaque published in the book *Ordos Bronzes* (Figure 5 (9)) (Ordos Museum, 2006), all of which are animal-style caprine-decorated metal artifacts closely related to the Ordos region in central-western Inner Mongolia. Considering that most of the animal-style caprine-decorated metal artifacts in central-western Inner Mongolia belong to the Maoqinggou Culture, Taohongbala Culture, Xiongnu Culture, and Xianbei Culture from the mid-to-late Spring and Autumn Period to the Han and Jin dynasties, we believe that the animal-style caprine-decorated metal artifacts included in the book *Ordos Bronzes* included in this article should also belong to the above-mentioned cultures.

After a systematic study of animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area, this paper will now begin to analyze the specific characteristics of animal-style caprine-decorated metal artifacts in this region, as well as the cultural exchanges involved.

In terms of specific characteristics, based on the animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area listed in this article, we find that animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area often have three relatively obvious characteristics: legs curled up, decorated with vortex/circular patterns, and arched back/abdominal contraction. Among these, *legs curled up* mainly refers to the fact that caprine's legs are often in a curled-up position; *decorated with vortex/circular patterns* mainly refers to the fact that the caprine's body is decorated with vortex or circular patterns; arched back/abdominal contraction mainly refers to the characteristic of caprine's back arching and the characteristic of caprine's abdomen contracting significantly. Since the back arching of caprine usually

causes the end of the caprine's abdomen to be significantly higher than the chest, and the characteristic of caprine's abdomen contracting significantly also causes the caprine's abdomen to be higher than the chest, this article combines arched back/abdominal contraction into the same type of characteristic of caprine. The occurrence of the three types of characteristics in the animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area and its neighboring areas listed in this article is presented in the Table 1.

In terms of cultural exchange, animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area are closely related to the animal-style metal artifacts from the Eurasian Steppe, as they share similar characteristics. For example, among the animal-style metal artifacts from the Eurasian Steppe around the 1st millennium BCE listed at the beginning of this article, there are obvious characteristics similar to those of the animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area. Specifically: animal-style metal artifacts from the Eurasian Steppe depicting legs curled up includes Figure 1 (3), (7), (9); animal-style metal artifacts from the Eurasian Steppe decorated with vortex /circular patterns includes the artifacts shown in Figure 1 (2), (6); and animal-style metal artifacts from the Eurasian Steppe depicting arched back/abdominal contraction includes the metalware shown in Figure 1 (1), (2), (3), (4), (5), (7), (8), (9), (10).

1.2 Animal-style Caprine Petroglyphs in the Inner Mongolia Great Wall Area

After reviewing the relevant information on animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area, the following section explores the animal-style caprine petroglyphs in the Inner Mongolia Great Wall Area that are related to these metal artifacts.

Regarding the identification of animal-style caprine petroglyphs in the Inner Mongolia Great Wall Area, this article explores the animal-style

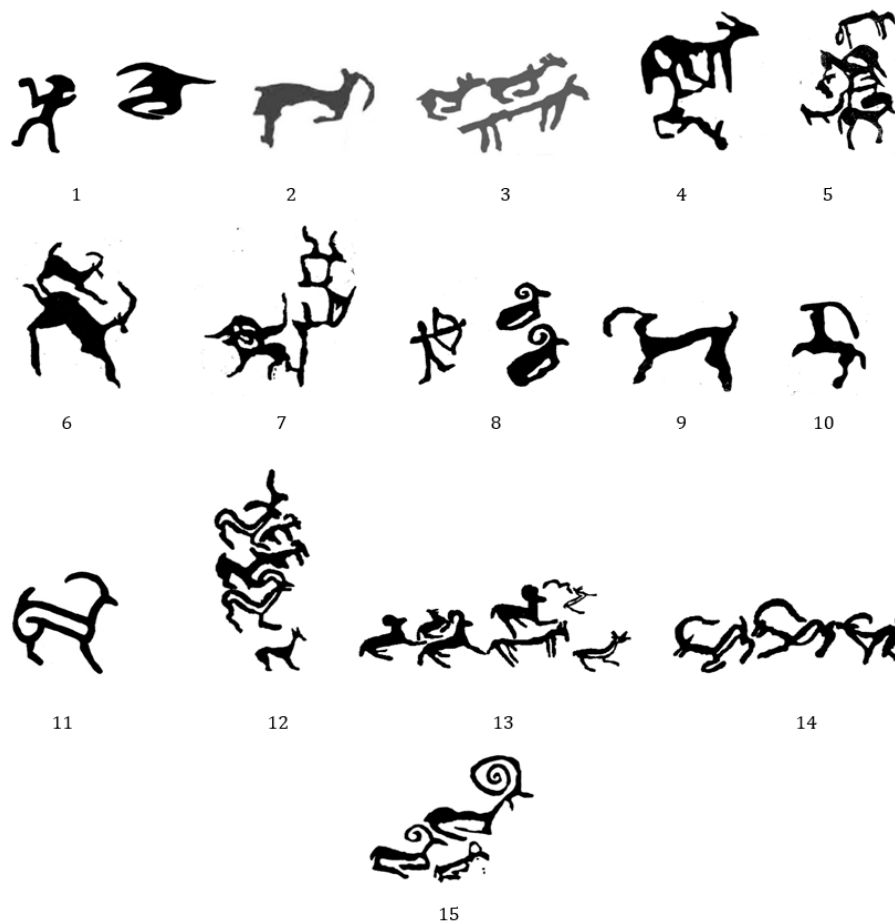


Figure 6 Animal-style Caprine Petroglyphs in the Inner Mongolia Great Wall Area: (1) Daheishan; (2)–(3) Barigatu; (4)–(7) Tuilamamiao; (8)–(9) Moruoqeqige; (10) Buerhenhadashan; (11) Melehetugou; (12)–(13) Biqigetushan; (14) Aoyoutushan; (15) Mandelashan.

caprine petroglyphs in the Inner Mongolia Great Wall Area based on the characteristics of animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area, such as legs curled up, decorated with vortex/circular patterns, and arched back/abdominal contraction. Based on the research in this article, typical animal-style caprine petroglyphs have been found in the following locations within the Inner Mongolia Great Wall Area: Daheishan in Chifeng City (Figure 6 (1)) (Zhou et al., 2022); Barigatu in Xilingol League (Figure 6 (2), (3)) (Wang et al., 2019); Tuilamamiao in Darhan Muminggan United Banner (Figure 1 (3) and Figure 6 (4)–(7)) (Gai, 1989); Moruogeqige in Urad Middle Banner (Figure 6 (8), (9)) (Gai, 1989); Buerhenhadashan in Urad Rear Banner (Figure 6 (10)) (Gai, 1986); Melehetugou at the border of Dengkou County and Urad Rear Banner (Figure 6 (11)) (North Minzu University, & Inner Mongolia Hetao Humanities College, 2010); Biqigetushan in Alxa

Left Banner (Figure 6 (12), (13)) (Gai et al., 2002); Aoyoutushan in Alxa Left Banner (Figure 6 (14)) (Gai et al., 2002); and Mandelashan in Alxa Right Banner (Figure 6 (15)) (Gai, 1998).

In terms of specific characteristics, according to the petroglyph data presented in this paper, the three features in the animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area—the legs curled up, the decorated with vortex/circular patterns, and the arched back/abdominal contraction—have all been found in the animal-style caprine petroglyphs within the same region (see Table 2 for details).

Regarding the dating and cultural attribution, this article based on relevant information about animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area, speculates that around

Table 2 Statistical Table of Characteristics of Animal-style Caprine Petroglyphs in the Inner Mongolia Great Wall Area

Numbering of Animal-style Caprine Petroglyphs in the Inner Mongolia Great Wall Area	Whether Exhibit the Characteristic of Legs Curled up	Whether Decorated with Vortex / Circular Patterns	Whether the Characteristic of Arched back/Abdominal Contraction
Figure 2 (3)	No	No	Yes
Figure 6 (1)	Yes	No	No
Figure 6 (2)	Yes	No	Yes
Figure 6 (3)	Yes	No	Yes
Figure 6 (4)	No	No	Yes
Figure 6 (5)	No	No	Yes
Figure 6 (6)	No	No	Yes
Figure 6 (7)	No	No	Yes
Figure 6 (8)	Yes	No	No
Figure 6 (9)	No	No	Yes
Figure 6 (10)	No	No	Yes
Figure 6 (11)	No	Yes	Yes
Figure 6 (12)	No	No	Yes
Figure 6 (13)	No	No	Yes
Figure 6 (14)	Yes	No	Yes
Figure 6 (15)	Yes	No	Yes

the late Western Zhou to early-mid Spring and Autumn Period (9th–7th centuries BCE), the inhabitants of the flourishing period of the Upper Xiajiadian Culture in southeastern Inner Mongolia, as well as the inhabitants of early Yuhuangmiao Culture in northern Hebei and Beijing, who lived near southeastern Inner Mongolia, had already produced animal-style caprine-decorated metal artifacts. Animal-style caprine-decorated metal artifacts, as well as animal-style caprine petroglyphs with similar characteristics, thus began to appear in the eastern section of the Inner Mongolia Great Wall Area.

During the mid-to-late Spring and Autumn Period to the Warring States Period (7th–3rd century BCE), the late Yuhuangmiao Culture in northern Hebei and the Beijing area, as well as the Maoqinggou Culture and Taohongbala Culture in central-western Inner Mongolia, all mastered the technique of making animal-style caprine-decorated metal artifacts. As a result, animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs spread widely throughout the Inner Mongolia Great Wall Area.

During the Han and Jin dynasties (late 3rd century BCE to early 5th century CE), due to the inheritance of the animal-style caprine-decorated metal artifacts production tradition by the Xiongnu and Xianbei cultural inhabitants, animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs continued to be popular in the Inner Mongolia Great Wall Area. After the Han and Jin dynasties, with the decline of the tradition of making animal-style metal artifacts among the ethnic groups of the Northern China Steppe during the Bronze Age to the early Iron Age (Tian et al., 1986a), the tradition of making animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area and that of making animal-style caprine petroglyphs in the Inner Mongolia Great Wall Area also eventually declined.

In terms of cultural exchange, since the animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area from the late Western Zhou Dynasty to the Han and Jin dynasties are closely related to the animal-style metal artifacts found in the Eurasian Steppe, this paper argues the animal-style caprine petroglyphs in the Inner Mongolia Great Wall Area, which are similar in characteristics to those of the animal-style caprine-decorated metal artifacts in the Inner Mongolia Great Wall Area, are also closely related to the animal-style metal artifacts of the Eurasian Steppe.

2. RESEARCH ON ANIMAL-STYLE CAPRINE PETROGLYPHS IN NINGXIA AND EASTERN GANSU AREA

Ningxia and eastern Gansu are located in the western part of the

Northern China Steppe, and are another important distribution area for petroglyphs in the Northern China Steppe. This study will use archaeological cultures as a guide to sort out the animal-style caprine-decorated metal artifacts discovered in Ningxia and eastern Gansu and further explore and analyze the animal-style caprine petroglyphs in this region based on the specific characteristics of the animal-style caprine-decorated metal artifacts in Ningxia and eastern Gansu.

2.1 Animal-style Caprine-decorated Metal Artifacts in Ningxia and Eastern Gansu Area

Regarding the dating and cultural attribution of the animal-style caprine-decorated metal artifacts in Ningxia and eastern Gansu, this article, based on existing archaeological excavation data, finds that most of the known animal-style caprine-decorated metal artifacts in Ningxia and eastern Gansu date from the late Spring and Autumn Period to the Han and Jin dynasties (6th century BCE–early 5th century CE), and belong to the Yanglang type of Xirong Culture, the Majiayuan type of Xirong Culture, and the Xiongnu Culture.

Among these, the Yanglang type of Xirong Culture is an archaeological culture distributed in central and southern Ningxia and eastern Gansu from the late Spring and Autumn Period to the late Warring States Period (6th–3rd century BCE) (Zhang, 2018). A few tombs of this culture date back to the Qin Dynasty. The bronze caprine plaque and bronze caprine ornament unearthed from the Mazhuang Cemetery in Guyuan County, Ningxia (Figure 2 (2) and Figure 7 (1)) (Xu et al., 1993a), are representative of the animal-style caprine-decorated metal artifacts of this culture.

The Majiayuan type of Xirong Culture is an archaeological culture distributed in southern Ningxia and eastern Gansu from the late Spring and Autumn Period to the late Warring States Period (6th–3rd century BCE) (Zhang, 2019). Caprine-shaped tin ornaments (Figure 7 (2)) and caprine-shaped gold chariot ornaments (Figure 7 (3)) unearthed at the Majiayuan cemetery in Zhangjiachuan Hui Autonomous County, Gansu (Gansu Provincial Institute of Cultural Relics and Archaeology, 2014); and caprine-shaped silver chariot ornaments (Figure 7 (4)) unearthed at the Liuping site in Qingshui County, Gansu (Gansu Provincial Institute of Cultural Relics and Archaeology, & Qingshui County Museum, 2014), were representative of the animal-style caprine-decorated metal artifacts of this culture.

Due to its wide distribution, Xiongnu Culture was also present in Ningxia and eastern Gansu during the Han and Jin dynasties (late 3rd century BCE to early 5th century CE). For example, the double antelope



Figure 7 Animal-style Caprine-decorated Metal Artifacts from Ningxia and Eastern Gansu Area: (1) The bronze caprine ornament from the Mazhuang Cemetery; (2) The caprine-shaped tin ornament from Majiayuan cemetery; (3) The caprine-shaped gold chariot ornament from Majiayuan cemetery; (4) The caprine-shaped silver chariot ornament from Liuping site; (5) The double antelope bronze plaque from Daodunzi cemetery; (6) The double caprine bronze plaque from Lijiataozi cemetery.

Table 3 Statistical Table of Characteristics of Animal-style Caprine-decorated Metal Artifacts in Ningxia and Eastern Gansu Area

Numbering of Animal-style Caprine-decorated Metal Artifacts from Ningxia and Eastern Gansu Area	Whether Exhibit the Characteristic of Legs Curled up	Whether Decorated with Vortex / Circular Patterns	Whether Exhibit the Characteristic of Arched back/Abdominal Contraction
Figure 2 (2)	Yes	No	No
Figure 7 (1)	Yes	No	No
Figure 7 (2)	Yes	No	Yes
Figure 7 (3)	No	Yes	Yes
Figure 7 (4)	Yes	No	Yes
Figure 7 (5)	Uncertain (Legs Unclear)	No	Yes
Figure 7 (6)	No	No	Yes

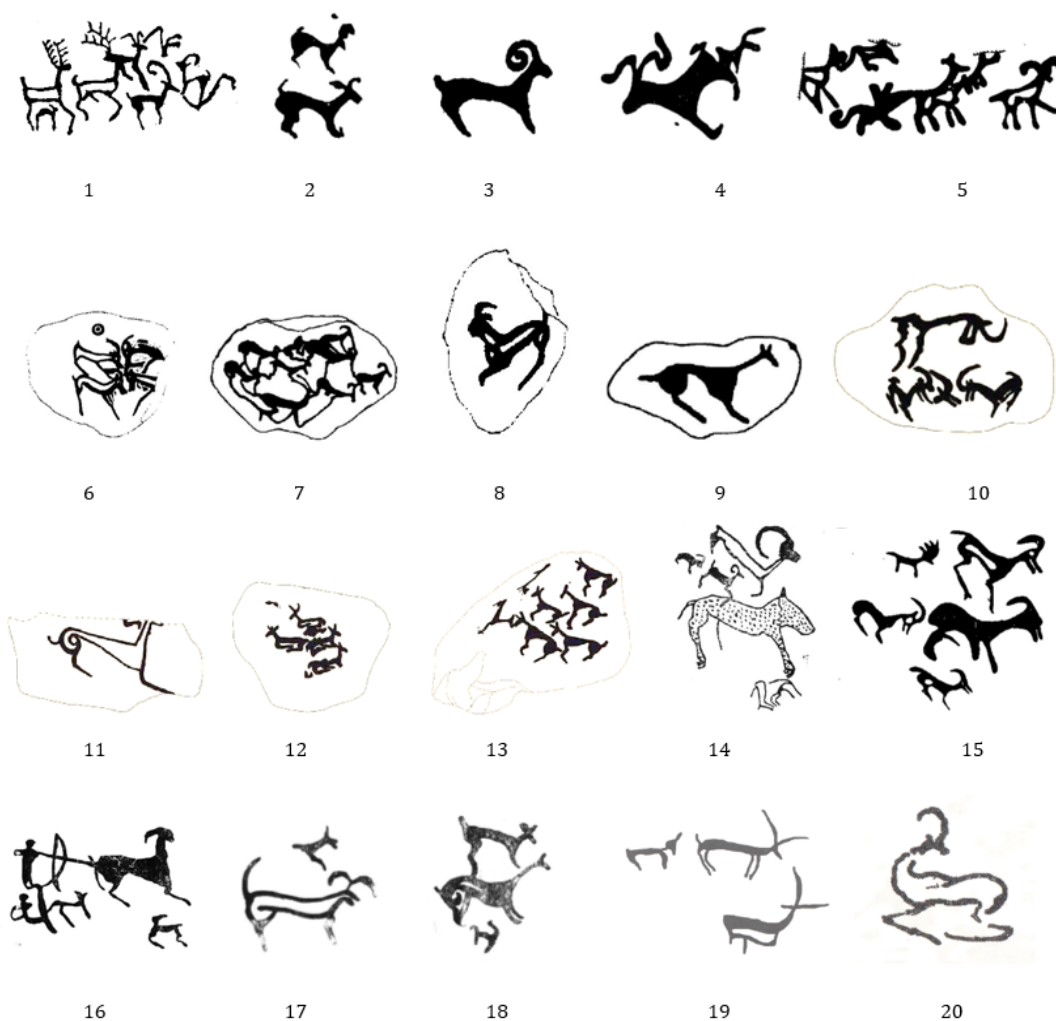


Figure 8 Animal-style Caprine Petroglyphs in Ningxia and Eastern Gansu Area: (1) Heishimao; (2) Fanshigou; (3) Shulingou; (4)–(5) Guidegou; (6)–(9) Helankou; (10)–(13) Lingwu; (14) Kouzimingou; (15) Huangyangwan; (16)–(18) Zhongwei; (19) Shiyangtan; (20) Chenjiaba.

bronze plaque from the Western Han Dynasty Xiongnu cemetery at Daodunzi, Tongxin County, Ningxia (Figure 7 (5)) (Wu et al., 1988), and the double caprine bronze plaque from the early Eastern Han Dynasty Xiongnu cemetery at Lijiataozi, Tongxin County, Ningxia (Figure 7 (6)) (Ningxia Institute of Cultural Relics and Archaeology, & Tongxin County Cultural Relics Management Office, 1988; Editorial Committee of the Complete Collection of Chinese Bronze Artifacts, 1995), are typical animal-style caprine-decorated metal artifacts made by the Xiongnu cultural inhabitants of Ningxia and eastern Gansu during the Han and Jin dynasties.

In terms of specific characteristics, based on the analysis of this paper, it is clear that the animal-style caprine-decorated metal artifacts from Ningxia and eastern Gansu have similar characteristics to those of animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area, with legs curled up, decorated with vortex/circular patterns, and arched back/abdominal contraction (see Table 3 for details).

Regarding cultural exchange, given the high degree of similarity in specific characteristics between the animal-style caprine-decorated metal artifacts from Ningxia and eastern Gansu and those animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area, and considering that this paper has already mentioned the similarities in specific characteristics between these animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area and those animal-style metal artifacts from the Eurasian Steppe, we can roughly confirm that the animal-style caprine-decorated metal artifacts from Ningxia and eastern Gansu are connected to those animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area and these animal-style metal artifacts from the Eurasian Steppe.

2.2 Animal-style Caprine Petroglyphs in Ningxia and Eastern Gansu Area

After exploring the relevant information on animal-style caprine-decorated metal artifacts in Ningxia and eastern Gansu, this article proceeds to examine the animal-style caprine petroglyphs in Ningxia and eastern Gansu.

Regarding the identification of animal-style caprine petroglyphs, based on the three common characteristics of legs curled up, decorated with vortex/circular patterns, and arched back/abdominal contraction, found on animal-style caprine-decorated metal artifacts from Ningxia and eastern Gansu, this paper identifies animal-style caprine petroglyphs in the following locations in Ningxia: Heishimao (Figure 8 (1)) (Xu et al., 1993b); Fanshigou (Figure 8 (2)) (Xu et al., 1993b); Shulingou (Figure 8 (3)) (Xu et al., 1993b); Guidegou (Figure 8 (4), (5)) (Li et al., 1993); Helankou (Figure 8 (6)–(9)) (He, 2012); Lingwu (Figure 8 (10)–(13)) (Wang et al., 2018); Kouzimingou (Figure 8 (14)) (Xu et al., 1993b); Huangyangwan (Figure 8 (15)) (Li et al., 1993); Zhongwei (Figure 8 (16)–(18)) (Xu et al., 1993b). In Shiyangtan (Figure 8 (19)) and Chenjiaba (Figure 1 (4) and Figure 8 (20)) (Zhang et al., 2020), which belong to eastern Gansu, this article also yielded animal-style caprine petroglyphs (see Table 4 for details of feature discovery).

Regarding chronology and cultural affiliation, considering that the Yanglang type and Majiayuan type Xirong Cultures, which produced animal-style caprine-decorated metal artifacts in Ningxia and eastern Gansu, were prevalent from the late Spring and Autumn Period to the Warring States Period, while the Taohongbala Culture, distributed in the Ordos region adjacent to Ningxia and possessing a tradition of animal-style caprine-decorated metal artifacts production, existed from the mid-late Spring and Autumn Period to the late Warring States Period. We believe that during the mid-late Spring and Autumn Period to the Warring States Period (7th–3rd century BCE), the inhabitants in Ningxia and eastern Gansu had already produced animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs.

During the Han and Jin dynasties (late 3rd century BCE–early 5th century CE), the Xiongnu inhabitants of Ningxia inherited the animal-

style caprine-decorated metal artifacts production technique, allowing the tradition of animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs to continue in Ningxia and eastern Gansu. After the Han and Jin dynasties, the tradition of animal-style metal artifacts production by the inhabitants of Northern China Steppe during the Bronze Age to the early Iron Age gradually declined, and the tradition of making animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs in the Ningxia and eastern Gansu area also gradually disappeared.

Regarding cultural exchange, considering the connections between the animal-style caprine-decorated metal artifacts from Ningxia and eastern Gansu, as well as animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area and animal-style metal artifacts from the Eurasian Steppe, we believe that the animal-style caprine petroglyphs from Ningxia and eastern Gansu are also connected to animal-style caprine-decorated metal artifacts from the Inner Mongolia Great Wall Area and animal-style metal artifacts from the Eurasian Steppe.

3. CONCLUSION

The animal-style caprine petroglyphs of the Northern China Steppe are typical representatives of animal petroglyphs from the Bronze Age to the early Iron Age in the Northern China Steppe. The imagery of these animal-style caprine petroglyphs is highly similar to animal-style caprine-decorated metal artifacts throughout the Northern China Steppe; their rise and spread are also closely related to these animal-style caprine-decorated metal artifacts.

Specifically, from the late Western Zhou Dynasty to the early-to-middle Spring and Autumn Period (9th–7th centuries BCE), the inhabitants of the flourishing Upper Xiajiadian Culture in southeastern Inner Mongolia, and the early Yuhuangmiao Culture whose distribution area is located in the Northern Hebei Province and Beijing area, adjacent to southeastern Inner Mongolia, began to produce animal-style caprine-decorated metal artifacts. Animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs thus appeared in the eastern part of the Northern China Steppe. Due to cultural exchange, the stylistic features of these animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs from the eastern Northern China Steppe of this period are similar to those of animal-style metal artifacts found in the Eurasian Steppe.

From the mid-to-late Spring and Autumn Period to the Han and Jin dynasties (7th century BCE–early 5th century CE), with the widespread emergence of late-period Yuhuangmiao Culture, Maoqinggou Culture, Taohongbala Culture, Yanglang-type Xirong Culture, Majiayuan-type Xirong Culture, Xianbei Culture, and Xiongnu Culture in the Northern China Steppe, which mastered the technique of making animal-style caprine-decorated metal artifacts, animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs became widely popular in the Northern China Steppe. During this period, animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs from the Northern China Steppe still maintained connections with the Eurasian Steppe.

After the Han and Jin dynasties, with the decline of the tradition of making animal-style metal artifacts from the Bronze Age to the early Iron Age in the Northern China Steppe, animal-style caprine-decorated metal artifacts and animal-style caprine petroglyphs were no longer popular in the Northern China Steppe.

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AUTHOR CONTRIBUTIONS

This article was written by Yi Ning.

Table 4 Statistical Table of Characteristics of Animal-style Caprine Petroglyphs in Ningxia and Eastern Gansu Area

Numbering of Animal-style Caprine Petroglyphs from Ningxia and Eastern Gansu Area	Whether Exhibit the Characteristic of Legs Curled up	Whether Decorated with Vortex / Circular Patterns	Whether Exhibit the Characteristic of Arched back/Abdominal Contraction
Figure 2 (4)	Yes	Yes	Yes
Figure 8 (1)	No	No	Yes
Figure 8 (2)	No	No	Yes
Figure 8 (3)	No	No	Yes
Figure 8 (4)	Yes	No	No
Figure 8 (5)	No	No	Yes
Figure 8 (6)	No	No	Yes
Figure 8 (7)	No	No	Yes
Figure 8 (8)	No	No	Yes
Figure 8 (9)	No	No	Yes
Figure 8 (10)	No	No	Yes
Figure 8 (11)	No	Yes	Yes
Figure 8 (12)	Yes	No	No
Figure 8 (13)	No	No	Yes
Figure 8 (14)	No	No	Yes
Figure 8 (15)	No	No	Yes
Figure 8 (16)	No	No	Yes
Figure 8 (17)	No	Yes	Yes
Figure 8 (18)	No	Yes	Yes
Figure 8 (19)	Yes	No	No
Figure 8 (20)	Yes	No	No

AVAILABILITY OF DATA AND MATERIALS

All data used in this study are included in this article.

COMPETING INTERESTS

The author declares no conflict of interest.

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