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REVIEW ARTICLE

ANALYSIS OF VEHICLE IMAGE IN YINSHAN MOUNTAIN PETROGLYPHS AND CAR-SHAPE STRUCTURE SEEN IN PETROGLYPHS

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ABSTRACT

Since the late 1970s, Mr. Ge Shanlin has been instrumental in discovering numerous vehicle and wheel-shaped images among the Yinshan Mountain (Moni uul Mountain) petroglyphs. Building upon prior research, the author systematically reviews the data of vehicle petroglyphs discovered in this region, offers insights regarding the distribution areas of these petroglyphs and the identification of vehicle images, and discusses twelve individual vehicle images found on eleven groupings of petroglyphs that have been preliminarily identified. In the analysis of vehicle petroglyphs, the study provides a detailed description of the overall context while also comparing and interpreting the structural characteristics of all vehicle images. Furthermore, initial hypotheses regarding the chronology of the vehicle petroglyphs in the Yinshan area are proposed. Regrettably, due to space limitations, an in-depth discussion on the identification and categorization of related wheel-shaped images cannot be included.

KEYWORDS

Yinshan Mountain Petroglyphs, Vehicle Image, Car-Shaped Structure

The Yinshan Mountain Range is a major east-west trending mountain system located in the central part of the Inner Mongolia Autonomous Region, extending from the Hoyor Bogd uul Mountains (Lang Shan Mountains) north of the Ulaan Bukh Desert in the west to the region around Duo lun (Dolon nuur) at the northern foot of the Yanshan Mountains in the east. It serves as a significant geomorphological boundary between the Mongolian Plateau and the extensive plains of North China¹ and delineates the divide between internal and external watersheds. It is an important geomorphologic dividing line between the Mongolian Plateau and the vast areas of North China, and also a watershed between the inner and outer basins. Yinshan Mountain range, from the west to the east by Hoyor Bogd uul Mountain, Munaa uul Mountain (Wu La Shan Mountain)², Serten uul Mountain, Dalan Khar uul Mountain (Da Qing Shan Mountain), Khuitenshil Mountain³, Liang Cheng Shan Mountain, Hua Mountain, Da Ma Qun Shan Mountain, etc., about 1000 kilometers long from east to west, 50-100 kilometers wide from north to south, the average elevation of 1500-2000 meters⁴. The west end contacts Helan Mountain (Alsha uul Mountain) – Uran Tevshi uul Mountain (Zhuo Zi Shan Mountain). The east side is close to the Yan Shan and the Ikh Khyngan Davaa Mountains. The north slope is gentle and the south slope is steep. The main part of the mountain range is Hoyor Bogd uul Mountains, Munaa uul Mountain and Dalan Khar uul Mountain, during which there are obvious mountain pass plain or

gully, which has been a north-south traffic pass since ancient times.⁵ So far, petroglyphs are mainly found in the western part of the Yin Shan Mountains, namely, Alshaa Left Banner of the Alshaa League, Dengkou County, Urad Rear Banner, Urad Middle Banner, Urad Front Banner of Bayannuur City, Gu Yang County of Baotou City and Union Banner of Darhan Muumyangan⁶, Hoyor Bogd uul Mountain, Munaa uul Mountain and Serten uul Mountain areas in the southwest, while petroglyphs have not been found in Dalan Khar uul Mountain and Khuitenshil Mountain in the central and eastern regions.

1. DISCOVERY AND RESEARCH OF VEHICLE PETROGLYPHS IN YINSHAN AREA

In the summer of 1978, Mr. Ge Shanlin, a famous petrologist, discovered vehicle images in Yinshan petroglyphs for the first time, which are on a rock in the north of Tuo Lin guu Valley, northwest of Dengkou County. He believes that the images of wheels and vehicles engraved on the rock walls are typical works of the Bronze Age.

The research data of vehicle petroglyphs in Yinshan area are mainly concentrated in Ge Shanlin, *Yinshan petroglyphs* (1985 and 1986), *Wulanchabu petroglyphs* (1989), *Cultural Interpretation of petroglyphs in Inner Mongolia* (2002); Munkhdelger, *Historical Footprints of the*

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Aibaga River (1997); Editorial Committee of Cultural and Historical Data of Darhan Muumyanghan Banner Committee of CPPCC and Darhan Muumyanghan Banner Cultural Relics Management Institute *Damao (Darhan Muumyanghan) petroglyphs* (2001); Fire Eagle, *Hoyor Bogd uul Mountain (Lang Shan Mountain) petroglyphs* (2002); Zhang Haibin, Wang Yingze, et al, *Baotou petroglyphs* (2009); Wang Jianping and Zhang Chunyu, *Yinshan petroglyphs* (2011); Wang Xiaokun and Zhang Wenjing, *Research on Yinshan petroglyphs* (2012) and other monographs and Ge Shanlin, *Rare and Precious Ancient national Relics - Yinshan petroglyphs stretching 21,000 square kilometers* (1980), *Petroglyphs in Hoyor Bogd uul Mountain area, Yinshan Mountains, Inner Mongolia* (1980), *Petroglyphs of Vehicles in the Bronze Age of the Mongolian Plateau* (1987); Munkhdelger, *Introduction in Damao (Darhan Muumyanghan)*

Banner petroglyphs (1994); Dai Liangzuo, *A Preliminary Study of Vehicle petroglyphs in Xinjiang, Inner Mongolia and Ningxia* (2003; Wang Zijin, *Images of Ancient Vehicles in Yinshan petroglyphs and Early Grassland Traffic* (2008); Zhang Wenjing, *Vehicle petroglyphs in Yinshan Area of Inner Mongolia* (2013); Gou Aiping, *An Image Survey of Vehicle petroglyphs in Yinshan and Helan Mountains* (2018) and other articles.

According to the author's statistics, a total of 11 groups of vehicle petroglyphs were found in Yinshan area, which were Tuo Lin guu 1 Group; Melkhiit guu 1 Group and Agui guu 1 Group; Dengkou County, Urad Middle Banner of Bayannuur City; Burgastai guu 1 Group; Zuun Khailastai 2 Groups; The front mountain of Bayan uul 1 Group; Khujirt 1 Group; Zuun uud 1 Group; Darhan Muumyanghan Banner of Baotou City,



Figure 1: Vehicle petroglyphs found in Yinshan area

1.Tuo Lin guu 2. Melkhiit guu 3. Agui guu 4. Burgastai guu 5-6. Zuun Khailastai 7. The front mountain of Bayan uul 8.Khujirt 9. Zuun uud 10-11. Delger ukhaa

Delger ukhaa 2 groups. (Figure 1, Table 1) The sources of these vehicle petroglyphs include: 6 groups published in two Yinshan petroglyphs (1985 and 1986) and Wulanchabu petroglyphs (FIG. 1.1, 4-5, 7, 10-11) by Ge Shan Lin, four groups published in four volumes of Yinshan petroglyphs (FIG. 1.2-3, 8-9) edited by Wang Jianping and Zhang Chunyu and 1 group recorded by the author in September 2020 (Figure 1.6). In addition, there are groups of petroglyphs that look like vehicles in places such as Burkhan khad of the Urad Rear Banner (FIG. 2.1) and Zuun Khailastai of the Middle Banner of Urad (Figure 2.2) and other places but the petroglyph image is not entirely certain. Both sets of images were originally published in the 1986 edition of Ge Shanlin's book Yinshan petroglyphs.

It should be noted that although Ge Shanlin had already proposed as early as 1985 that "more than ten vehicle petroglyphs have been found" in Yinshan petroglyphs. However, the "vehicle petroglyphs" discussed in this article need to include the three elements that can reflect the identification of vehicle petroglyphs, which are the wheels, the shaft and the carriage and so on, or according to the overall characteristics of the petroglyphs group in the area where the petroglyphs is located, it can be basically determined to be the image of the vehicle petroglyphs. Therefore, the paper has not included those "images that look like vehicles" and some "wheel shape images" into the research category of vehicle petroglyphs. The above two types of images need further comprehensive analysis and careful screening before final determination. In addition, in the definition of the geographical scope of Yinshan petroglyphs, the author did not include the petroglyphs in the Gobi hills area north of Yinshan, but only the vehicle petroglyphs found in the northern area of Hoyor Bogd uul Mountain and Serten Mountain as the research object.

Image source: 1. Ge Shanlin: Yinshan petroglyphs, Cultural relics publishing House, p. 273. 2. Wang Jianping, Zhang Chunyu: Yinshan petroglyphs, Volume three, Shanghai Ancient Books Publishing House, p. 364. 3. Wang Jianping, Zhang Chunyu: Yinshan petroglyphs, Volume four, Shanghai Ancient Books Publishing House, p. 312-313. 4. Ge Shanlin: Yinshan petroglyphs, Cultural relics publishing House, p. 485. 5. Ge Shanlin: Yinshan petroglyphs, Cultural relics publishing House, p. 15. 6. S.Terguunbayar took the photo and drawing by himself. 7. Ge Shanlin: Yinshan petroglyphs, Cultural relics publishing House, p. 69. 8. Wang Jianping, Zhang Chunyu: Yinshan petroglyphs, Volume two, Shanghai Ancient Books Publishing House, p. 467. 9. Wang Jianping, Zhang Chunyu: Yinshan petroglyphs, Volume four, Shanghai Ancient Books Publishing House, p. 145. 10-11. Ge Shanlin: Wulanchabu petroglyphs, Cultural relics publishing House, 1989, p. 261.

2. VEHICLE PETROGLYPHS FOUND IN YINSHAN AREA

2.1 Tuo Lin Guu Vehicle Petroglyphs (MN001)

Tuo Lin guu is located in Dengkou County, Bayannur City, Shaajin tokhoid Sum, Bayan uul gatsaa territory, where the hollow valley is deep with flowing stream, and the stone walls on both sides are lofty and steep. The length of the ditch is about 15 kilometers, and the petroglyphs are mainly distributed in the range of 4 kilometers north to south and 3 kilometers east to west. The rocks carved with petroglyphs are mostly porphyrite, slightly black. In the eastern part of the Tuo Lin guu, about 1 kilometer north of the gully, there is a north-south mountain called "Changsi Tolgoi". At the top of the mountain, there are black horsehair veins of varying width, with hard and smooth stone surface. Fine petroglyphs are found on almost every rock suitable for carving. The distribution range of petroglyphs is about 1 kilometer long from north to south and less than 100 meters from east to west. On the southern side of a small hill, a large black rock facing upward was mixed in among the rocks, which looked like ancient petroglyphs in the deep sun. The petroglyph is 47 centimeters high and 42 centimeters wide. The carving marks of the petroglyphs are gray and black, the rock surface is eroded, and the picture is not very clear. In the lower right of the petroglyphs is the image of a single shaft two-wheeler. The wheels have spokes, nine on the left wheel and eight on the right. The vehicle is circular, with an axle passing through the middle of the vehicle and connected to the wheels on both sides. The shaft was a long straight line, with a draw-animal on either side of it. From the point of view of expression, the back of the animal is against the beam, the leg is outward, and the left and right are

arranged symmetrically on both sides of the beam, showing a "typical style".⁸ Among them, the left pull animal is obviously a horse, so the car should be a double-set carriage. At the top left of the vehicle image is a human figure with a curved bow in one hand and a full string waiting to be fired. The arrow points to an animal with its ears stuck up and tail turned up. Ge Shanlin believes that the "upright ear and tail" animal is a dog. The animal has a large horn on its lower left and a large horn on its right, which may be a northern goat. The author believes that the whole picture should be the scene of "parking hunting". Two north mountain sheep should be the prey in the mountain, and the animal with the tail up may be a dog, or other animals, which needs to be carefully identified. (Figure 1.1, Table 1.1, Plate 3.2)

2.2 Melkhiit Guu Vehicle Petroglyphs (MN002)

Melkhiit guu is located in the territory of Shaajin tokhoid Sum, Bayan uul gatsaa, Dengkou County, Bayannur City. Among the mountains in the northwest of Dengkou County, there is a big gully leading to the south of the Hoyor Bogd uul Mountain, which is called Ger ovoo guu. From the mouth of the Ger ovoo guu, almost 15 kilometers to the north, you can enter the Melkhiit guu, which contains a large number of petroglyphs. This petroglyph is one of them. The area of this petroglyphs is 11 centimeters high and 25 centimeters wide, and is a two-wheeled cart with single shafts. The rock painting is a thin point chiseled into the map. Only the left wheel can be seen, and there is a line inside the wheel, not connected to the axle. The vehicle is in the shape of "field", and the internal horizontal and vertical two lines are the rear of the shaft and the axle part in the cross. This kind of crossover is probably just a reflection of the visual sense of graphic art, and how the vehicle is at that time needs to be further understood. The shaft of the car is only a short length out of the carriage, and the front of the shaft, the drawbar, and the draft animal cannot be seen (Figure 1.2, Table 1.2)

2.3 Agui Guu Vehicle Petroglyphs (MN003)

Agui guu is located in the territory of Shaajin tokhoid Sum, Bayan uul gatsaa, Dengkou County, Bayannur City. The cliffs in the ditch are steep, with dark rocks and the clear and endless streams. The petroglyphs are mostly carved on the black brown porphyrite on the slopes of the north and south sides of the valley, which stretches for about 5 kilometers. The petroglyphs are 90 centimeters high and 150 centimeters wide. The rock face of the petroglyphs is divided into two parts. The upper part of the rock face on the left side has a single shaft two-wheeled cart, with the front facing right. The draft animal on the right side of the shaft is a horse. However the draft animal on the left is fuzzy, and from its tail characteristics should be a horse. The draft animal of the carriage is composed in a typical style. There is a lever at the front of the shaft, which is on the neck of the horse, and it looks like a yoke. The vehicle was circular, with slight chisel marks on the inside. The center of the wheel is a hub represented by a small circle, and there are several spokes between the hub and the wheel teeth. The wheel and vehicle parts are not easy to identify because of the rock surface cracks and notches. After preliminary observation, the top left wheel has at least 10 spokes and the right bottom wheel has 11 spokes. The axle part of the car is not obvious. Above the image of the vehicle is what appears to be a human figure and a bighorn goat. On the lower side of the car, the legs are spread apart, the hands are held up by the elbows, and the fingers show a clear man figure in the shape of coitus with erect genitals. There are also animal figures around the various human figures. The rock face on the right is carved with riders and various forms of standing human figures and some animal figures. Some of the animals were clearly horses. (Figure 1.3, Table 1.3, Panel 2)

2.4 Burgastai Guu Vehicle Petroglyphs (MN004)

The petroglyphs were found in the south of Urad Middle Banner, Bayannur City, about 3 kilometers northeast of Miaodi Reservoir on the southern side of the Burgastai guu⁹ on the mountain rocks. The painting area is 62 centimeters high and 36 centimeters wide. In the middle of the rock face are images of two single-shaft and two-wheeled vehicles. The wheels of the two cars are circles with spokes inside, with minimum and maximum number of four and seven spokes in a crisscross shape arrangement. Both carriages are square. The axle of the upper vehicle appears to be in front of the vehicle (Table 1.4), while the other axle is in

front of the center of the vehicle (Table 1.5). On the top of the rock face, there is a human figure with a head that seems to have two branches, a long neck, arms spread out, a bow in one hand, a slender body, and short legs standing in an inverted "V" shape. There is a short line in the human file, which is considered to be a "tail decoration", but in general, it does not exclude the embodiment of male characteristics. There is an indistinguishable image on the lower right of the bow holder, which looks like a prey. (Figure 1.4, Table 1.5, Panel 3.3)

2.5 Zuun Khailastai Vehicle Petroglyphs One (MN005)

A large number of ancient petroglyphs¹⁰ have been found in Zuun Khailastai¹¹ in the south of Altan Khoshuu gatsaa town, Khaliut Town, Urad Middle Banner, Bayannuur City, including at least 3 groups of vehicle petroglyphs. The first group is located in a cluster of boulders on the west side of the Zuun Khailastai, and the painting area is 100 centimeters high and 240 centimeters wide. In the middle and lower part of the petroglyphs, there is an image of a two-wheeled vehicle with a side view. Therefore, it is not easy to determine whether the car is a single shaft car or a double shaft car from the single line. One side of the wheel that can be seen in the rock painting has 15 spokes, and above the wheel there is an inverted "L" shape shed represented by the outline method. Above the vehicle petroglyphs is the main part of the petroglyphs. Among them, there are images of groups of animals such as deer, horses, goats, simple human figures with distinguishing ornaments on the head, hunters with bows and arrows hunting northern goat animals, and many other images. Ge Shanlin also saw that the carving technique of the vehicle in the petroglyphs was different from other images, with obvious traces of metal tools, and the performance perspective and painting style were also completely different, so he believed that its age should be later than other images. (Figure 1.5, Table 1.6, Figure 2)

2.6 Zuun Khailastai Vehicle Petroglyphs Two (MN006)

The petroglyphs are located at the top of a hill on the south side of Zuun Khailastai. At the right end of a long rock face there is an image of a single beam two-wheeler. The painting area is 18 centimeters high and 55 centimeters wide, and the vehicle image is 8.5 centimeters high and 13.5 centimeters wide.¹² The vehicle image is made by chiseling and carving techniques, with shallow nicks, and due to years of wind and rain has been very blurred. The two wheels and carriage of the cart are round, the axle and the shaft are slightly behind the position of the cross, and the top of the shaft has a linear shape of the scale. The center of the left wheel has a dense point knocked out of the large dot, which should represent the hub part. The hub and the wheel teeth have a number of thin lines carved out of the spoke, and the right wheel inside has a number of cross and vertical lines of the cutting lines.¹³ In the upper middle and upper left of the petroglyphs, there is an animal that looks like a horse, and the right animal breaks the vehicle image, showing a relationship between front and back. In addition, there are some clear nicks on the rock face of irregular chiseling marks. There are also many exquisite engravings on the rocks on the left and right sides of the petroglyphs. Among them, there are many images on the left rock, including figures riding horses and bending bows to shoot, human figures surrounded by archers with two or one hand raised, and animal figures such as goats. The goat was probably a wild northern goat. (Figure 1.6, Table 1.7)

2.7 The Front Mountain of Bayan Uul Vehicle Petroglyphs (MN007)

The petroglyphs site is located in the territory of Altan Khoshuu gatsaa, a town in the middle banner of Urad, and is located in the southwest of several Zuun Khailastai. The petroglyph is located in the front mountain of Bayan uul, the south side of the Great Wall at the top of the south mountain. It is a single-shaft, double-wheel and double-car rock painting. The draft animal is like a horse. The two wheels of the vehicle are double concentric circles, and the inner circle is smaller, which looks like the hub part on the wheel. The car is slightly square, and there is a small circle inside. The position between the two wheels and the carriage is behind the short line indicating the axle, and the left rear of the car has a herringbone shape of the score that cannot be recognized. The draft animal of the car is represented by the outline method with large body and slightly short legs. The front end of the beam has a "ya" shape score, which may be the head of the horse or the performance of a slightly out-

of-shape truck. As for the draft animal, Ge Shanlin identified it as a horse, and described it as "the horse on the right was followed by a pony on one side." (Figure 1.7, Table 1.8, Panel 1)

2.8 Khujirt Vehicle Petroglyphs (MN008)¹⁴

The petroglyphs are located in Ongon Town, Urad Middle Banner, Bayannuur City, with an altitude of 1,414 meters. On the lower left side of the rock is an image of a double-wheeled and two-horse carriage with single shafts. Both the wheels and the vehicle are represented by circles, and the wheels appear to be slightly larger than the vehicle. The long lines representing the axle pass through the middle of the double wheels and the carriage, and extend to both sides of the wheels, which is the typical style of two-horse carriage. There is a drawbar at the front end of the shaft, and there are "V" shaped lines connected with the drawbar on both sides of the shaft. Above the carriage was a man holding a bow and arrow, facing to the right, bending his bow to shoot. The animal whose arrow is aimed at has multiple horns on its head, resembling a deer. To the lower left of the person is another image that looks like an animal. (Figure 1.8, Table 1.9, Panel 3-1)

2.9 Zuun Uud Vehicle Petroglyphs (MN009)¹⁵

The petroglyphs are located in the territory of Altan Khoshuu gatsaa, Khaliut Town, Urad Middle Banner, Bayannuur City, with an altitude of 1,347 meters. To the south of Zuun Khailastai, there are three valleys called Zuun uud, Dund uud and Baruu uud¹⁶ in the southwest of Alagin oroi Mountain, among which Zuun uud Valley has more petroglyphs. The size of the petroglyphs is 105 centimeters high and 66 centimeters wide. At the bottom left of the picture is a two-wheeled carriage with single shafts. From the point of view of the composition, the vehicle and the two wheels are very large, but the shafts are relatively short. The wheel only shows the wheel teeth part of the big circle, and the vehicle is represented by double concentric circles. The axle section traverses the wheel, connecting the left and right sides to the middle of the vehicle, and the axle stretches out of the two ends. There is a cart scale at the front of the short shaft, and the pull horses on both sides of the shaft are arranged in a typical style. On the top right of the cart is a herbivore like a roe deer or sheep and another indistinguishable animal figure, and on the higher top are some animals of different sizes, such as goats, yellow sheep, and roe deer. (Figure 1.9, Table 1.10)

2.10 Delger Ukhaa Vehicle Petroglyphs One (MN010)

The petroglyphs are located in Myangan town, Darhan Muumyangan Banner, close to Bayannuur City Urad Middle Banner on the Delger ukhaa Mountain. Delger ukhaa Mountain¹⁷ is a horse's mane shaped mountain beam. There are many petroglyphs carved on it. Here, two groups of vehicle rock paintings were found. This is one of them. The petroglyph is 20 centimeters high and 23 centimeters wide, and is an image of a double-wheeled two-horse carriage with single shafts. Two horses are on either side of the shafts, in typical style. The neck of the two horses seems to have a short line, which should be a drawbar. The vehicle is basically square, and the wheel is represented by double concentric circles, like a hub-spoke wheel with a hub inside. The axle is clearly visible and connected at the front of the vehicle. Ge Shanlin thought the two wheels of the carriage are round. The author believes that the shape of the wheel needs to be further explored. (Figure 1.10, Table 1.11, Plate 3.4)

2.11 Delger Ukhaa Vehicle Petroglyphs Two (MN011)

Located near the upper group of petroglyphs, the petroglyph is 19 centimeters high and 27 centimeters wide.¹⁸ On the left side of the picture is the image of a single shaft two-horse carriage, and on the right side is the image of a stag with tall horns. The horse of the carriage also belongs to a typical style of composition. The neck position of the two horses, that is, the top of the shaft has a short line indicating the drawbar. The vehicle is circular, inside which there seems to be image of a royal standing in the carriage with a head facing the shafts, arms spread out and bent by the elbow, and legs in a forked shape. Ge Shanlin thought he was the one sitting in the carriage. Moreover, what is shown in the picture may be an early form of carriage, without axles or wheels, only a circular object equivalent to a carriage, with a succession of shafts

in front, probably made of something like cowhide. Strictly speaking, it is only a vehicle such as a sledge. (Figure 1.11, Table 1.12, Panel 3.5)

Besides the 11 groups of vehicle petroglyphs introduced above, there are two groups of Yinshan petroglyphs that look like vehicles, but still need in-depth research to determine the “petroglyphs images similar to vehicles.”

One group: located in the northwest of Bayan Bulag town¹⁹, the seat of the Urad Rear Banner government, a mountain named “Burkhan khad”²⁰ in the valley on the west side of Dalakai. The petroglyphs are carved on the rock face facing the east at the top of a steep peak, and the painting area is 31 centimeters wide and high. According to Ge Shanlin, “The petroglyph is made by three methods: cutting, drawing and grinding, and there is an unfinished carriage on the picture...You could see the shafts, the wheels, the rear and the hood...There is also a carriage in the lower part of the picture, which is much the same as the above, but more

structured. There are two straight lines on the back of the carriage and the use is not known now.”²¹ (Figure 2.1)

The other group: found on the west bank of Zuun Khailastai in the middle Banner of Urad, the painting area is 18 cm high and 23 cm wide, and it is cut on the rock plate at the top of the mountain. Two circular images that look like wheels are engraved on the screen. Among them, the inside of the left circle has 8 spoke-like lines, and the inside of the right circle has 4 cross-like spokes. Above the two wheel-shaped images are two back-to-back animal figures, with the one on the right looking like a horse. The whole petroglyph looks like the image of a single beam two-wheeled vehicle, and the two animals seem to be the draft animals of a typical style composition. However, no marks on the shafts and wheels can be seen, so it cannot be completely confirmed as vehicle petroglyphs. It can only be speculated that the petroglyphs are likely to be “semi-finished products”—a group of unfinished vehicle petroglyphs. (Figure 2.2)



Figure 2: Petroglyphs that look like vehicles found in the Yinshan Mountain area

1. Burkhan khad 2. Zuun Khailastai (a. Line drawing; b. Rubbing)

Image source: 1. Ge Shanlin: *Yinshan petroglyphs*, Cultural relics publishing House, p. 179. 2a. Ge Shanlin: *Yinshan petroglyphs*, Cultural relics publishing House, p. 30. 2b. Wang Jianping, Zhang Chunyu: *Yinshan petroglyphs*, Volume three, Shanghai Ancient Books Publishing House, p. 151.

3. ANALYSIS OF VEHICLE SHAPE STRUCTURE SEEN IN YINSHAN PETROGLYPHS VEHICLE IMAGE

Among the 11 groups of vehicle petroglyphs found in Yinshan area, there are 12 single vehicle images. Eleven of the cars are from the top view, all of which are single shafts. The other one is from the side view, and the number of shafts is unknown, which is likely to be a double-shaft carriage. (Table 2)


3.1 Wheel and Axle Part

Wheels: Among the vehicle images discussed in this paper, 11 are two-wheeled vehicles, and the condition of 1 wheel is unknown. There is no image of a four-wheeler in Yinshan petroglyphs. There are 6 vehicles with obvious hub-and-spoke wheels in the vehicle image, and 6 vehicles with unknown wheel shape. Two of the six cars whose wheel shape is unknown have small circles in the middle of their wheels. If these small circles represent the hub, then the wheel should be a hub-spoke structure. Of course, the wheel itself does not reflect the characteristics of hub-spoke wheels, and it is not necessarily a “plate wheel” or “cross wheel”. It is probably just a kind of ellipsis mode in the expression technique of petroglyphs. In addition, the car without wheels in the Delger ukhaa petroglyphs (MN011) should not be a means of transportation such as a sledge. From the perspective of its overall shape and the expression of the animal, it is basically consistent with the vehicles found in the petroglyphs of the Toin Lamiin sum Temple - Shaakhan and Olon ovoio in the Yinshan Mountain and the northern Gobi Hills. According to the single-shaft two-wheeler (MN010) that appeared in the Delger ukhaa Mountain, it is inferred that the vehicle should have been a single-shaft two-wheeler. However, at that time, the two-wheel part may not have been engraved completely, or the scoring is shallow,

and it has been blurred. As for some vehicles with spokes, the number of left and right spokes varies. Ge Shanlin had already made clear his view when he interpreted the petroglyphs of the vehicles of Zuun Khailastai and Burgastai guu, that the analysis of the inconsistent situation of the spoke of the wheel might only be a gesture.

Axle: In total, the axles of nine vehicles can be identified in the vehicle image, among which the axles of one vehicle are inscribed in the front of the vehicle (MN004-1), two are in the front position of the vehicle, four are basically in the middle position of the vehicle, and two are in the rear position of the vehicle. From the remains of chariot and horse burial found in the Central Plains, it is also more common for the axle to be located in the middle of the vehicle or slightly forward or behind. From the point of view of chariot and horse burial, because it is not actually used, it is also normal that the axle is not fixed in the position that should be under the vehicle when buried. From the point of view of petroglyphs, people who paint petroglyphs do not operate as strictly as they draw engineering drawings. Therefore, whether the specific position of the axle on the vehicle rock painting can explain the problem needs more comparison and analysis of materials. As for the axle completely in front of the geography is a more special case, such cases have been found in the Eurasian steppe region petroglyphs, but it is still a few. For example, this type of petroglyphs are found in the rock paintings in Inner Mongolia Baotou city Darhan Muumyangan Banner Ulaan elgen (Figure 3.1), Ningxia Zhongwei city Da Maidi (Figure 3.2), Dalan Turgenii khos tolgoi, Bayan-ulgii aimag, Mongolia (Далан түргэний хос толгойн)²² (Figure 3.3), Ваучечекей, Кыргызстан (Байчечекей)²³ (Figure 3.4), Тамгалы, Казахстан (Тамгалы)²⁴ (Figure 3.5). In addition, in Yinshan petroglyphs, the axle part grows out of both sides of the wheel, and there are also two cases of outcropping.

Table 1: A list of structural features of vehicle images on petroglyphs in Yinshan area

Vehicle image number	Name of the site of the petroglyphs	Vehicle shape	Style of drawing and expression	Other car-shaped structural features							Vehicle picture
				Wheel	Shaft	Truck scale	Yoke	Carriage	Hood		
1	MN001	Tuo Lin guu	Single shafts and two wheels horse Typical style	hub-spoke	In the middle of carriage	—	—	circle	—		
2	MN002	Melkhiit guu	Single shafts and two wheels N/A	—	In the middle of carriage	—	—	Square	—		
3	MN003	Agui guu	Single shafts and two wheels horse Typical style	hub-spoke	—	exist	Might have	circle	—		
4	MN004-1	Burgastai guu	Single shafts and two wheels N/A	hub-spoke	In front of the carriage	—	—	Square	—		
5	MN004-2	Burgastai guu	Single shafts and two wheels N/A	hub-spoke	In the mid-front part of the carriage	exist	—	Square	—		
6	MN005	Zuun Khailastai	May be double-shafted and double-wheeled N/A	hub-spoke	—	—	—	—	exist		
7	MN006	Zuun Khailastai	Single shafts and two wheels N/A	hub-spoke	In the mid-rear part of the carriage	exist	—	circle	—		
8	MN007	The front mountain of Bayan uul	Single shafts and two wheels Like horse Typical style	Like hub-spoke	In the mid-rear part of the carriage	—	—	Nearly square	—		
9	MN008	Khujirt	Single shafts and two wheels horse Typical style	—	In the middle of carriage	exist	—	circle	—		
10	MN009	Zuun uud	Single shafts and two wheels horse Typical style	—	In the middle of carriage	exist	—	circle	—		
11	MN010	Delger ukhaa	Single shafts and two wheels horse Typical style	Like hub-spoke	In the mid-front part of the carriage	exist	—	Square	—		
12	MN011	Delger ukhaa	Single shafts horse Typical style	—	—	exist	—	circle	—		

3.2 Shaft and Drawbar Part

Shaft: With the exception of the vehicle (MN005) shown in the side view of Zuun Khailastai petroglyphs, which may be double shafts, the remaining 11 vehicles can be identified as single shafts.

Drawbar: There are seven cars with obvious drawbar at the front end of the shaft.

Yoke: No visible yoke can be seen on all vehicles, except in the Agui guu petroglyphs (MN003), which can be below the drawbar. The neck of the horse appears to be shaped like a yoke, but it needs to be carefully

identified.

“V” shape line: Vehicle petroglyphs with “V” shaped lines on both sides of the shaft are found all over the Eurasian steppe, and Yinshan petroglyphs are also found. In addition to the apparent “V” shape lines on the Hujith petroglyphs (MN008), there also appear to be such lines on the Burgastai guu petroglyphs (MN004-2). In the image of the vehicle, there are two lines between the truck scale and the carriage, one of which is the shaft of the car, the other may be half of the “V” shaped line, and the other half may have been blurred.²⁵ Ge Shanlin also believes that this car should be a single-shaft car, not a double shaft one.

Table 2: Analysis table of vehicle features seen in petroglyphs in Yinshan area

	Wheel and Axle part				Shaft and Drawbar part			Carriage and hood part	
	Number of wheels	Wheel shape	Axle ends	Axle position	Number of shafts	Drawbar	Yoke	Carriage	Hood
Car shape and number	two-wheeler (11)	Hub-and-spoke wheel (6)	The petroglyphs show the sides of the wheels stretching out(2)	In front of the carriage (1)	Single shaft car (11)	Clearly have drawbar (7)	Have yoke (0)	Square carriage (5)	Canopy car (1)
	quadricycle (0)			In the mid-front part of the carriage (2)				Circle carriage (6)	
				In the middle of carriage (4)					
	unknown (1)			unknown (6)				unknown (10)	

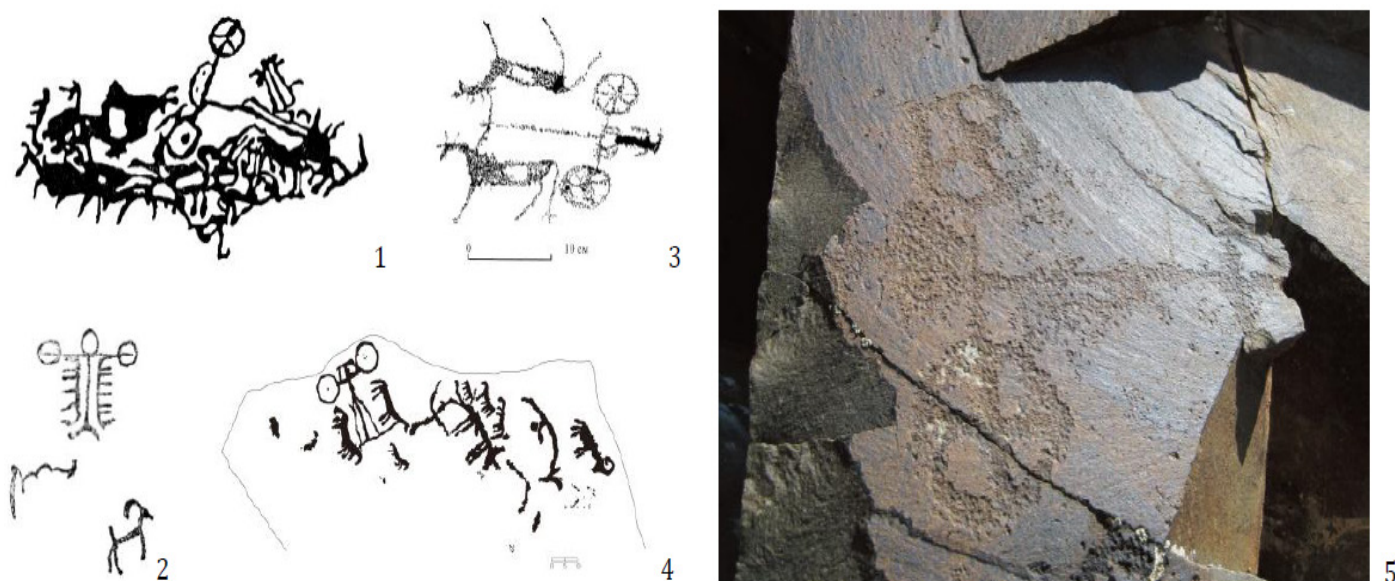


Figure 3: A petroglyphs of a vehicle carved behind an axle

1. Ulaan elgen 2. Da Maidi 3. Dalan Turgenii khos tolgoi 4. Baychechekey 5. Tamgaly

Image source: 1. Ge Shanlin: Wulanchabu petroglyphs, Cultural relics publishing House, p. 62; 2. Xu Cheng, Wei Zhong: Helan Mountain petroglyphs, Cultural relics publishing House, p. 338; 3. Цэрэндагва Я, Цэвээндорж Д. Далан түргэний хос толгойн хадны зураг. УБ., 2016. т.278; 4. Фонд истории Северо-Восточной Азии, Факультет егистории и Регионоведения Музейно-Исследовательский Центр Кыргызского Национального Университета. Петроглифы Южного Кыргызстана. Сеул., 2012. 158. 5. Фондистории Северо – Восточной Азии, Астанинский Филиал Института археологиии. А.Х.Маргулана Комитетанауки МОН РК. Наскальное Искусство Казахстана. Сеул., 2011. 303.

3.3 Carriage and hood part

Carriage: Of the eleven single-shaft cars, five had a square shape and six had a round shape. However, in the MN005 car in Zuun Khailastai petroglyphs, because it is a side view, its vehicle part can not be seen, and it should be rectangular from the appearance characteristics such as the rectangle. The circular chariot was found in M251 of Zhao Qing Tomb of Jin State in Taiyuan and M3 of Majiayuan in Zhang jia chuan, Gansu, dating from the Spring and Autumn Period and the Warring States Period. The two discs found in Houjiazhuang M1003 are nearly elliptical rectangles with rounded corners. A dustpan shape was found in M1, Fushan Qiaobei, Shanxi Province. Houjiazhuang M1003 and Qiaobei M1 are both burial remains of the Shang Dynasty. Of course, whether the vehicle we see on the petroglyphs is round, oval or similar oval dustpan shape can not be matched only from the engraving marks. As for the square vehicle, it can also be divided into square, horizontal rectangular, vertical rectangular and other different shapes. From Qianzhangda in Tengzhou, Shandong, Zhangjiapo in Chang ‘an, Waliu in Zhengzhou, Yuandingshan in Lixian County and other cemeteries unearthed from

the Shang and Zhou Dynasties to the Spring and Autumn period. The square vehicle on the Yinshan petroglyphs should be basically the same with it, but the engraving image is slightly different. (Figure 4)

Hood: The single shafts found are top view, so the questions like whether there is no canopy, and what is the shape are difficult to answer. The cars in Zuun Khailastai petroglyphs using side view are obviously covered cars. The car hood is an inverted “L” shape, similar to the vehicle image on the mural of the Liao tomb of Jiefangyingzi in Chifeng City, Inner Mongolia. (Figure 5)

To sum up, the approximate age of Yinshan petroglyphs area discussed in this paper obviously belongs to two stages: First, the single shaft vehicle petroglyphs from the overlooking perspective basically belong to the Shang and Zhou Dynasties to the Spring and Autumn and Warring States periods, or late to the Western Han Dynasty. Second, the double-shaft carriages from the side view may be of a later age, which may belong to the Eastern Han Dynasty to the Mongolian Yuan Dynasty, or even to the Ming and Qing Dynasties.

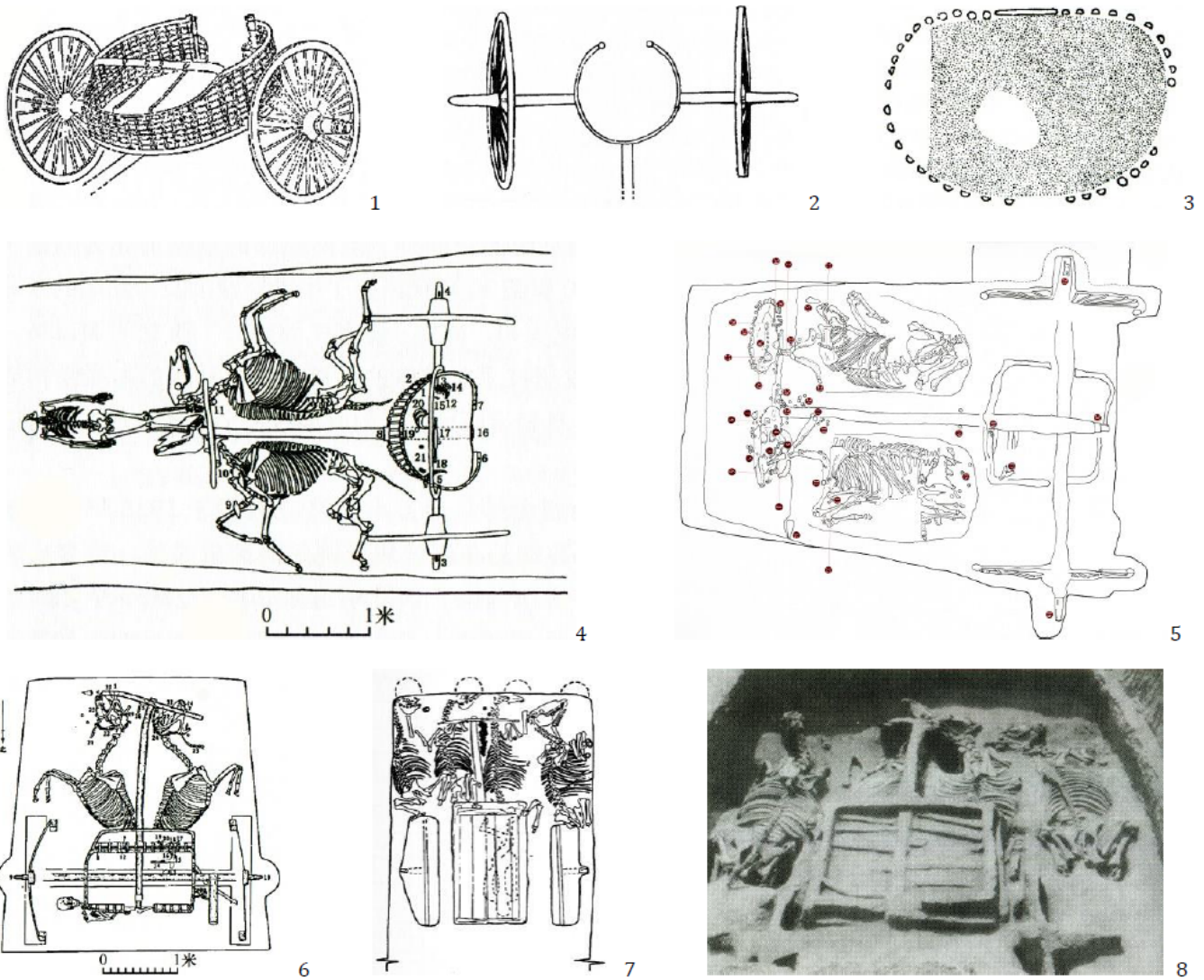


Figure 4: The shape of chariot and horse burial in Shang and Zhou dynasties

Circle carriage: 1.Taiyuan Jin State Zhaoqing Tomb M251 chariot pit I (Spring and Autumn Late Period) 2.Gansu Zhangjiachuan Majiayuan M3 Car 4 (Warring States Late) Ellipsoid carriage: 3.Hou Jiazhuang M1003 Discovery of Yupan (Shang) Dustpan carriage: 4. Shanxi Fushan Qiaobei M1 unearthed carriage (Shang) Square carriage: 5. Chang 'an Zhangjiapo No. 35 Chariot Pit (Western Zhou Dynasty) Horizontal rectangle carriage: 6.No. 131 Chariot pit, Qianzhang Cemetery, Tengzhou, Shandong (Shang) Vertical rectangle carriage: 7.Lixian Yashan Spring and Autumn Cemetery 98LDK1 No.1 car (Spring and Autumn) 8.Waliu 2 Chariot Pit, Zhengzhou, Henan Province (Western Zhou Dynasty) Image source: 1-4、 6-8、 Wu Xiaojun: Research on Chariot and Horse Burial in Shang and Zhou Dynasties, Science Press, pp. 23, 23, 23 ,22, 24, 33, 32; 5、 Liu Yonghua: Chariots, Horses and Horses in Ancient China, Shanghai Dictionary Publishing House, p. 21.

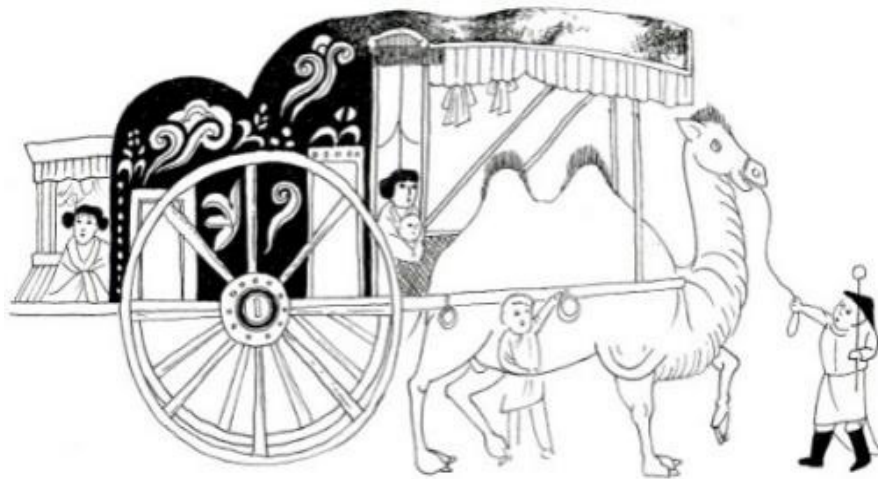


Figure 5: Chifeng City Jiefangying Zi Liao tomb mural camel cart

Image source: Liu Yonghua: *Chariots, Horses and Horses in Ancient China*, Shanghai Dictionary Publishing House, p. 159.

4. PLATE SECTION



Plate 1 (a)

Plate 1 (b)

Plate 1: Zuun Khailastai vehicle petroglyphs

a. Complete map of the dikes of the landform landscape and the vehicle petroglyphs in the three gorges of Zuun Khailastai; b. Three vehicle petroglyphs of Zuun Khailastai. Image source: S. Terguunbayar Photograph (2021)

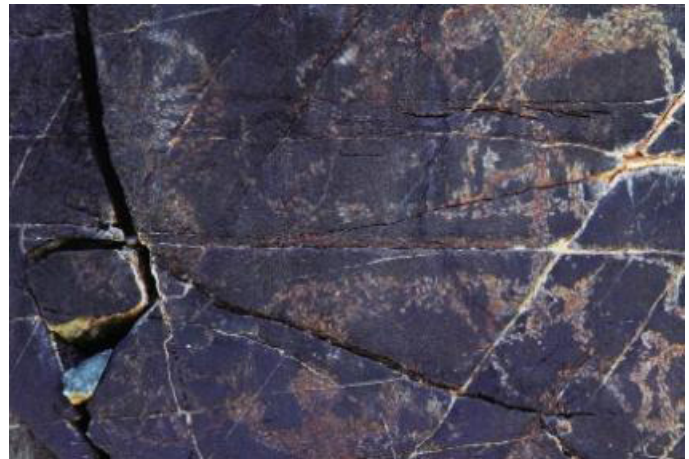


Plate 2 (a)

Plate 2 (b)

Plate 2: Agui guu vehicle petroglyphs

a. Full map of Agui guu vehicle petroglyphs b. Partial map of vehicle image. Image source: Wang Jianping, Zhang Chunyu: *Yinshan petroglyphs*, Volume two, Shanghai Ancient Books Publishing House, pp. 458-459.

ANNOTATION

Note 1. The vast area of North China includes mountains, plateaus and plains of North China, such as Loess Plateau, Ordos Plateau, Shanxi Mountain, Hetao Plain, North China Great Plain, etc. Yinshan Mountain Range, called “Yinshan Mountain” in Chinese physical geography, is the western part of “Yinshan-Yanshan Mountain” in North China. See Editorial Committee of Physical Geography of China, Chinese Academy of Sciences: *Physical Geography of China (Geomorphology)*, Beijing: Science Press, 1980, p. 5.

Note 2. Munaa uul Mountain (Wu La Shan Mountain), also known as “Munaa uul Mountain”.

Note 3. Khuitenshil, also known as gray tengliang, means “cold mountain beam” in Mongolian. Khuiten, meaning “cold,” and shil, meaning “mountain beam.” See Zhang Wenping and Yuan Yongming: *Khuitenshil Grassland visits ancient times*, Beijing: Cultural Relics Publishing House, 2017, pp.2-3.

Note 4. The highest peak, Khuh Bashig, stands at an elevation of 2,364 meters above sea level.

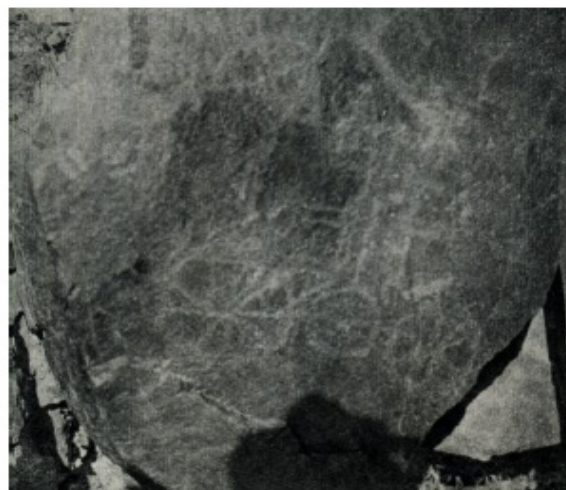
Note 5. Editorial Committee of “Physical Geography of China”, Chinese Academy of Sciences: *Physical Geography of China (Geomorphology)*, Beijing: Science Press, 1980, p. 5; Chinese Academy of Sciences Geographical Research: *Geography of China*, Beijing: The Commercial Press, 1977, p.43; Bao Perlei: *Famous Mountains in Inner Mongolia (Mongolian version)*, Chifeng City: Inner Mongolia Science and Technology Press, 1995, pp. 1-3; Hohhot City Education Bureau teaching and research Office center geography teaching and research group: *Concise Handbook of Geography*, Hohhot: Inner Mongolia People’s Publishing House, 1984, p. 199.

Note 6. ereinafter referred to as “Damao Banner”.

Note 7. S. Terguunbayar: “Study on the evolution of ancient nomads’ car shape from vehicle petroglyphs in central and eastern Eurasian steppe,” *China Rock Art*, 2021(1), p.40. Wang Xiaokun and Zhang Wenjing divided Yinshan petroglyphs into three regions from east to west in their book *Research on Yinshan petroglyphs*, namely, the lower hills of northern Tai Castle Peak (Area I), Serten uul Mountain (Area II) and Hoyor Bogd nuul Mountain (Lang Shan Mountain) (Area III). The author believes that the petroglyphs in Area I mentioned here mainly refer to the petroglyphs in the Toin



1



2



3



4



5

Plate 3: Other vehicle petroglyphs found in the Yinshan mountain area

1. Khujirt petroglyphs 2. Tuo Lin guu petroglyphs 3. Burgastai guu Ditch petroglyphs 4-5. Delger ukhaa petroglyphs

Image source: 1. Wang Jianping, Zhang Chunyu: *Yinshan petroglyphs*, Volume two, Shanghai Ancient Books Publishing House, p. 467. 2. Ge Shanlin: *Yinshan petroglyphs*, Cultural relics publishing House, Plate 42. 3. Ge Shanlin: *Yinshan petroglyphs*, Cultural relics publishing House, Plate 21. 4-5. Zhang Haibin, Wang Yingze et al: *Baotou petroglyphs*, Inner Mongolia University Press, p. 377.

- lamiin sum Temple and Shaakhan area to the northeast of the seat of Darhan Muumyangan Banner government in Baotou City (now located in Batkhaalag (Bailingmiao) Town and Darhan Town), and the petroglyphs in the west of Darhan Muumyangan Banner in the Myangan Town of Delger ukhaa, khardaag and other remains (That is, the petroglyphs at the border of Darhan Muumyangan Union Banner and Ulad Middle Banner referred to in the book *Wulanchabu petroglyphs* by Ge Shanlin). It belongs to the petroglyphs remains in the northeast foot of Serten uul Mountain, which can belong to the category of Yinshan petroglyphs.
- Note 8. In order to facilitate the narrative, the author of the vehicle petroglyphs with the legs of the animal facing outward, the back against the shaft, with the shaft as the center line, the composition of the left and right symmetrical expression is initially named "typical style". See author's work: "*Distribution characteristics and content analysis of vehicle petroglyphs in central and eastern Eurasian steppe*", *Grassland relics*, 2012(2), pp. 40.
- Note 9. "Burgaas" is Mongolian, meaning "willow", "Burgaastai guu Ditch", that is, "a mountain ditch with willow".
- Note 10. Li Qian, Liu Bin: "*Petroglyphs in Zuun Khailastai, the Middle Banner of Urad*", *Bayannuur Cultural Heritage*, Hohhot, Cultural Relics Publishing House, 2014, p. 57. According to the article, more than 3,000 petroglyphs have been found in a range of 5 kilometers from east to west and 4 kilometers from north to south.
- Note 11. "Zuun Khailastai" is Mongolian, also remembered as "Zuun Khailastai", meaning "East elm (mountain or ditch)". Among them, "Zuun" is "East" and "Khailastai" is "where there are elm trees".
- Note 12. The S.Terguunbayar survey was recorded on September 22, 2020.
- Note 13. Because the score is too thin and too dense, it cannot be clearly shown on the line drawing.
- Note 14. In the four-volume *Yinshan petroglyphs* edited by Wang Jianping and Zhang Chunyu, it was recorded as "YitengBaole". It may be another form of marking the place name "Ihk bulag" on page 9 of Ge Shanlin's *Yinshan petroglyphs* (Cultural Relics Publishing House).
- Note 15. The location of the petroglyphs "Zuun uud" means "East gate" in Mongolian, in which "Zuun" means "East" and "Uud" means "door, gate and entrance". In the four-volume *Yinshan petroglyphs* edited by Wang Jianping and Zhang Chunyu, it was recorded as "Jun wuda". Because the Mongolian word for "Ud" (willow) is usually recorded as "Wuda" in Chinese. Therefore, to avoid the ambiguity of the place name record, in this article, "Jun Wuda" is changed to "Jun Wude (Zuun uud)" and explained.
- Note 16. Dund uud, which means "middle gate" in Mongolian; Baruun uud, Mongolian meaning "west gate".
- Note 17. The site of the body is located in Darhan Muumyangan Banner, Bayan Zhureh som, Khangai gacha, Torviin bulag winter camp.
- Note 18. Ge Shanlin: *Wulanchabu petroglyphs*, Beijing: Cultural relics publishing House, 1989, p. 258. As mentioned in the book, the petroglyphs point is located in the east of Hani River at the junction of Darhan Muumyangan Banner and Urad Middle Banner, and the dike where the petroglyphs is located runs east-west. Munkhdelger: *Historical Footprints of the Aibaga River (Mongolian edition)*, Hohhot: Inner Mongolia People's Publishing House, 1997, p. 15. According to Munkhdelger, there are about 10 groups found here, a total of more than 50 petroglyphs. As said in the book, the mountain beam where the petroglyph is located is in a north-south direction.
- Note 19. Also known as "Dongsheng Temple".
- Note 20. It is a Mongolian place name. "Burkhan" means "Buddha", "God" and so on, and "Khad" means "mountain" or "rock".
- Note 21. Ge Shanlin: *Yinshan petroglyphs*, Beijing: Cultural relics publishing House, 1986, pp. 142, 175, 178-179. The author has not been able to investigate and observe the group of vehicle petroglyphs on the spot, nor have their images and photos been seen. Only from the imitation of the observation, it is not quite sure that they are vehicle rock paintings, and it cannot be ruled out that they are not other scene images. Thus, it is temporarily regarded as "like vehicle images", to be determined in the future.
- Note 22. Цэрэндагва Я, Цэвээндорж Д. *Далан түргэний хос толгойн хадны зураг*. УБ., 2016. т.278.
- Note 23. Фонд истории Северо-Восточной Азии, Факультет истории и Регионоведения Музейно-Исследовательский Центр Кыргызского Национального Университета. *Петроглифы Южного Кыргызстана*. Сеул., 2012. 158.
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- Note 25. For such "V" shaped lines or vehicle components, please also refer to the Study on the evolution of ancient nomads' car shape from vehicle petroglyphs in central and eastern Eurasian steppe, pp. 1214, 1216.
- Note 26. The paper was written in Studio on the second floor, Zuguang Community, Hohhot, April 3, 2022
- Note 27. The paper was revised in the third-floor residence of Zuguang Community in Hohhot, November 5, 2023

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