SINO-PLATONIC PAPERS

Number 369 November, 2025

The Pazyryk Vehicles:

New Data and Reconstructions, a Preliminary Report

by
Victor A. Novozhenov, Kyrym Altynbekov, and Elena V. Stepanova

Victor H. Mair, Editor
Sino-Platonic Papers
Department of East Asian Languages and Civilizations
University of Pennsylvania
Philadelphia, PA 19104-6305 USA
vmair@sas.upenn.edu
www.sino-platonic.org

SINO-PLATONIC PAPERS

FOUNDED 1986

ISSN
2157-9679 (print) 2157-9687 (online)

SINO-PLATONIC PAPERS is an occasional series dedicated to making available to specialists and the interested public the results of research that, because of its unconventional or controversial nature, might otherwise go unpublished. The editor-in-chief actively encourages younger, not yet well established scholars and independent authors to submit manuscripts for consideration.

Contributions in any of the major scholarly languages of the world, including romanized modern standard Mandarin and Japanese, are acceptable. In special circumstances, papers written in one of the Sinitic topolects (*fangyan*) may be considered for publication.

Although the chief focus of *Sino-Platonic Papers* is on the intercultural relations of China with other peoples, challenging and creative studies on a wide variety of philological subjects will be entertained. This series is *not* the place for safe, sober, and stodgy presentations. *Sino-Platonic Papers* prefers lively work that, while taking reasonable risks to advance the field, capitalizes on brilliant new insights into the development of civilization.

Submissions are regularly sent out for peer review, and extensive editorial suggestions for revision may be offered.

Sino-Platonic Papers emphasizes substance over form. We do, however, strongly recommend that prospective authors consult our style guidelines at www.sino-platonic.org/stylesheet.doc.

Manuscripts should be submitted as electronic files in Microsoft Word format. You may wish to use our sample document template, available here: www.sino-platonic.org/spp.dot.

All issues of *Sino-Platonic Papers* are free in PDF form. Issues 1–170, however, will continue to be available in paper copies until our stock runs out.

Please note: When the editor goes on an expedition or research trip, all operations may cease for up to three months at a time.

The Pazyryk Vehicles:
New Data and Reconstructions, a Preliminary Report

Victor A. Novozhenov

(Saryarka Archaeological Institute at Karaganda State University in Kazakhstan)

Kyrym Altynbekov

(Al-Farabi Kazakh National University, Almaty, KZ)

Elena V. Stepanova

(The State Hermitage Museum, St. Petersburg, RF)

ABSTRACT

The article proposes new reconstructions of vehicles from the Pazyryk burial mounds, based on the finds of the joint State Hermitage and Altai University archaeological expedition in 2019–2021 at the excavation site and an analysis of all the material stored in the museum's reserves that was not included in the existing reconstructions. Two types of wheeled vehicles are distinguished – two-wheeled A-framed carts and a prestigious four-wheeled carriage with a superstructure in the form of a removable frame covered with felt and decorated with bird figures. It was established that the vehicles were actively used in antiquity, their design was demountable and universal, their parts were interchangeable, and they could be adapted according to the specific needs of the mobile pastoralists. They were made by local craftworkers, based on developed woodworking technologies, as evidenced by the active use of wheeled transport by the local population in previous historical periods. The proposed reconstructions have analogies in archaeological finds and pictorial evidence.

В статье предложены новые реконструкции повозок из Пазырыкских курганов, выполненные на основании находок археологической экспедиции Государственного Эрмитажа и Алтайского университета в 2019–2021 гг на месте раскопок курганов и анализа всех материалов, хранящихся в фондах музея, не задействованных в существующей реконструкции. Выделены два типа колесных средств – грузовые А-образные двуколки и парадная четырехколесная представительская повозка с надстройкой в виде каркасной съемной конструкции, покрытой войлоком и украшенной фигурками птиц. Установлено, что повозки активно эксплуатировались в древности, конструкция их была сборно-разборной, универсальной, детали взаимозаменяемыми, они могли трансформироваться в соответствии с конкретными потребностями кочевников. Предложенные реконструкции имеют аналогии в археологических и изобразительных памятниках, изготовлены местными мастерами, на основе

развитых технологий деревообработки, о чем свидетельствуют факты активного использования местным населением колесного транспорта в разные исторические периоды.

Keywords: Two-wheeled A-framed cart; prestigious four-wheeled carriage; triangular frame design; frame superstructure; chassis; wheel pair; side poles

INTRODUCTION

Of exceptional importance for the study of early wheeled vehicles in Central Asia are the finds of vehicles in the Pazyryk burial mounds, excavated in the 1920s–1940s [Gryaznov 1937, 1950, 1955; Rudenko 1951, 1953, 1960, 1970; Altynbekov 2014; Altynbekov and Novozhenov 2014; Stepanova 2012; Linduff and Rubinson 2022; Crouwel et al. 2024]. They remain unique material evidence of the actual use of wheeled transport among early mobile pastoralist communities, making their detailed study and interpretation an urgent task. In 1955, excavation material was accepted for storage in the Hermitage reserves, and the reconstructed four-wheeled carriage was put on public display in the museum [Rumyantsev 1961; Korolkova 2006].

In 2019–2021, in connection with the organization of an open-air museum at the excavation site of the Pazyryk barrows, the joint Altai University and State Hermitage archaeological expedition carried out clearing and dismantling of the surviving wooden framed burial chambers. As a result of work on Barrow 5, during excavations of the southern pit, in which the parts of the high-status vehicle were placed (Fig. 1), previously unknown significant parts were discovered that cast doubt on the correctness of the reconstruction exhibited in the museum.

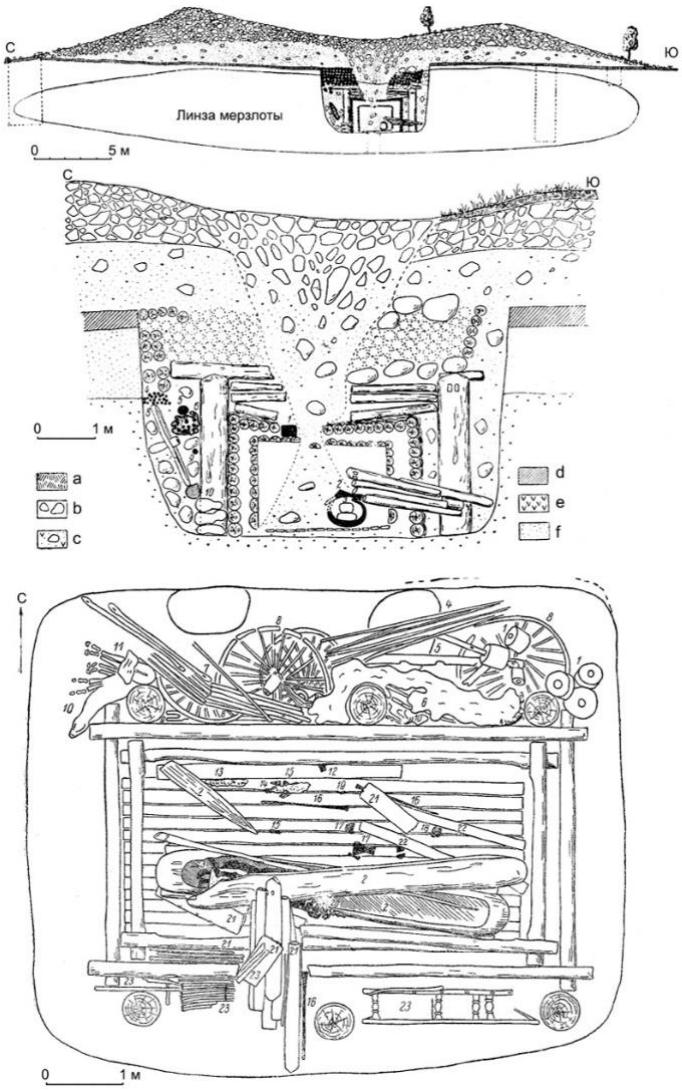

Figure 1. Pazyryk, Barrow 5. Section of the barrow and burial plan [After Rudenko, 1953: figs. 11, 26; 1970: figs. 6, 15]. *Section of the grave and finds*: a – soil; b – cairn; c – disturbed ground; d – buried surfaces; e – natural clay; f – natural sand. 1 – seat cushion; 2 – sarcophagus and lid; 3 – mummified bodies of a woman and a man; 4 – rods from the cart; 5 – ladder; 6 – felt wall hanging; 7 – rods from the carriage; 8 – carriage wheel; 9 – draft pole of the carriage; 10 – bodies of horses. *Grave plan and finds*: 1 – cart wheels; 2 – sarcophagus and lid; 3 – interred corpses; 4 – rods from a cart; 5 – steps; 6 – large felt carpet; 7–9 – parts of the carriage; 10 – bodies of horses; 11 – pile carpet; 12 – fragment of a clay jug; 13 – goat skin; 14 – sheep skin; 15 – table legs; 16 – rods of a hexapod; 17 – horn drum; 18 – felt cushion; 19 – horn vessel with a wooden spoon; 20 – female headdress; 21 – boards with lashings; 22 – logs from the chamber ceiling; 23 – parts of the carriage.

It became clear that it was necessary to review all the relevant Hermitage collections to find new, possibly missed, design details and analyze all artifacts from the Pazyryk burials that could be associated with wheeled transport. Moreover, the directors of the excavations and the existing reconstruction were themselves not sure of its final version and actively debated the accuracy of the reconstruction of the upper part of the carriage [Guk and Nikolaev 2012: 454–455]. In 2023, the authors of this article undertook the large-scale task of reviewing all currently known artifacts stored in the Hermitage collections from the Pazyryk barrows for their possible use as parts of wheeled vehicles. The difficulty was that they were placed in the burial mounds in a disassembled state, the graves were repeatedly robbed, their contents were burned, and during excavations the finds were distributed among different collections, so that it proved problematic to reliably establish the true purpose of many objects.

TRANSPORT VEHICLES

The details of their design can be judged by the remains of a cart[1] in Barrow 3 (frame parts) – a relatively well-preserved pair of wheels with an axle (Fig. 2) – as well as by the design details of another cart in Barrow 5, where it was found together with disassembled parts of the prestigious four-wheeled carriage. The excavator, Sergei I. Rudenko, assumed the presence of four-wheeled trolleys in the barrows but also suggested the presence of single-axled two-wheeled A-shaped structures, resembling a sledge [1953: 234; 1970: 192]. The assumption of the presence of transport vehicles in the burial mounds is confirmed by the finds of two ox yokes lying separately between the logs that filled the upper part of the burial pit of Barrow 1, as well as the curved fragment of a pole in the upper filling of the burial pit of Barrow 5. Made of birch, 3.35 m long, with holes at the end and with a polished lower part, it lay among many other straight poles suitable for use as components of a triangular frame [Rudenko 1953: 234; 1970: 192].

1 A cart is a two-wheeled vehicle; a wagon has four wheels; and a carriage, designed to carry passengers, may have two or four wheels.

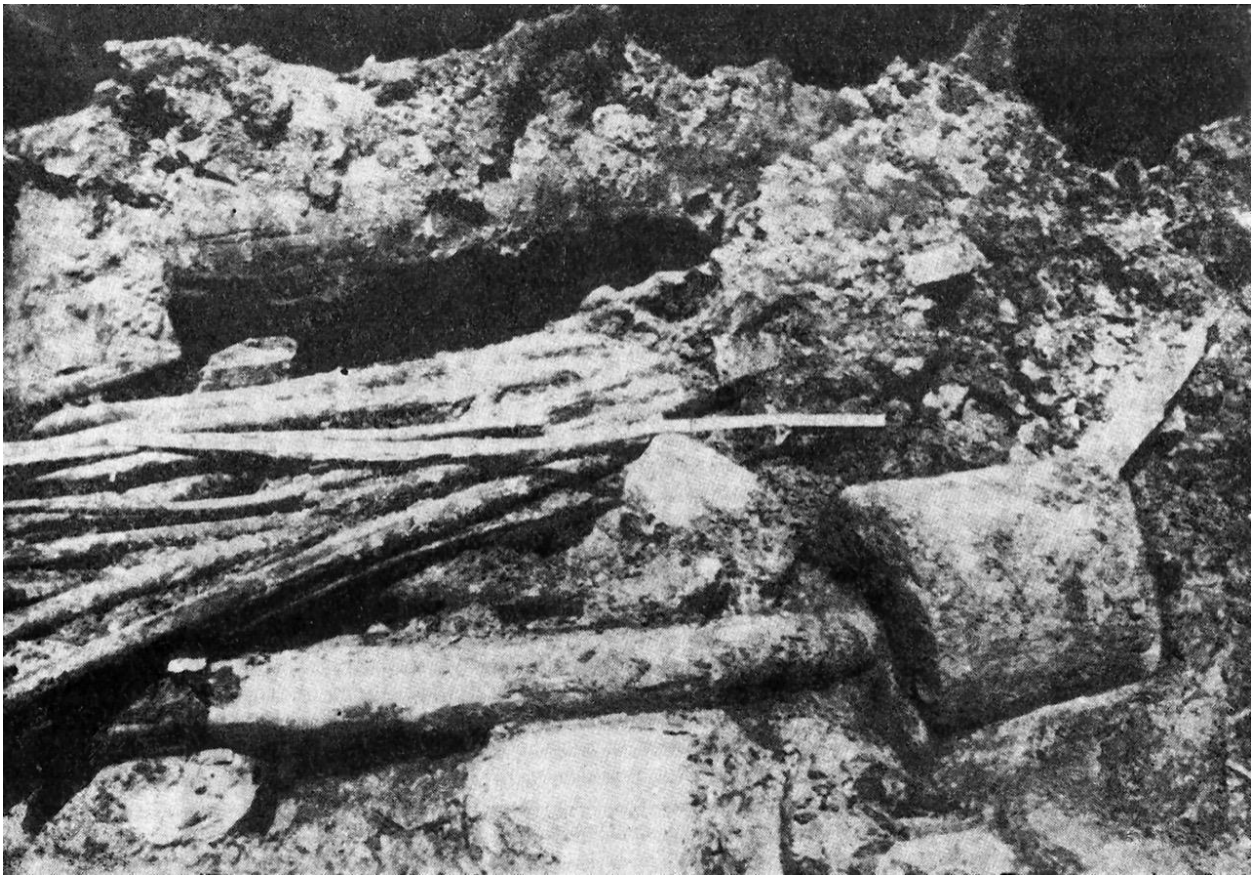

Figure 2. Pazyryk, Barrow 5. Wheel and axle of a cart in the excavation. Archival photo [After Rudenko 1953: pl. 144; 1970: pl. 127].

This is how Sergei I. Rudenko describes the transport vehicles that were found:

> In all the barrows except No. 4, where they had not survived, remains were found of primitive trolleys[2]: in Barrow 1 the body and apparently parts of the yoke, in Barrow 2, wheel and body, and in Barrows 3 and 5, wheels, axles and body of two trolleys. All the wheels are made from a solid piece of larch trunk, 30–47 cm in diameter, 35–40 cm thick, with a central aperture 12–16 cm in diameter.... The body was made from thick larch trunks square in section. In Barrow 3 the body of one trolley was made in such a way that the root that was left on, stuck up at the front like the curves on sleigh-runners.

2 The excavator imagined this vehicle as four-wheeled.

> The larch trunks were held together by a series of cross-struts fixed to them. At the front and back thick axles (ca. 10 cm in diameter) were fixed underneath the frame by large wooden pegs of rectangular section that passed right through axle and frame. The wheels were kept on the axle by wooden linchpins. In the front root part of the example from Barrow 3 a transverse bar had evidently been set in a special slot. Lower down, almost at the hole, there had been haulage ropes or loops for shafts passing through slots, since these showed polishing from wear. The trolleys had sometimes been smeared with pitch, one wheel from Barrow 2 being particularly liberally smeared [Rudenko 1953: 230–231, fig. 143–145; Rudenko 1970: 187–188. pls. 126–128].

The author then notes significant traces of wear on all the axles (more than half their thickness was worn away), on the outer surfaces of the wheels and in places where the wheels rubbed against the frame. Rudenko further suggests that these vehicles were used exclusively for utilitarian purposes in the construction of burial mounds – for the preliminary delivery of a huge number of stones, from which their embankments were then erected [Rudenko 1953: 232; 1979: 187–192].

Our detailed study of the parts of the transport vehicles from Barrows 3 and 5 convincingly proved the presence of two single-axled carts in the form of A-shaped (triangular) structures with a transverse yoke, designed for two draft animals. All the preserved parts of the carts were assembled into a fully functional, archaeologically intact, triangular structure with specially provided fastenings, crossbars, vertical pegs and trapezoid boards for the platform (Fig. 3). The cart is easily assembled and disassembled using these parts. The presence of a triangular structure is evidenced by traces of wear on the outer part of the side poles exclusively in one place – on the outside, where the wheels touched them (behind the axle), in the area of the attachment of the wheel pair and axle to the triangular structure itself. In the area next to the wheels, narrowing towards the yoke, no traces of wear from the wheels were found on the side poles.

Figure 3. Pazyryk, Barrows 3 and 5: 1, 2, 4, 7 – wheels (from various burial mounds); 4 – axle of a cart from Barrow 3; 5 – assembly of the cart structure from surviving artifacts; 6, 8 – side poles of the triangular frames of carts (from Barrows 3 and 5); 6 – graphic reconstruction of an A-framed cart. Photos and drawing by the authors. Visualization: Ilya Gusev.

Thus, the use of two A-framed carts in Barrows 3 and 5 was confirmed. Such carts were made of two thick larch or birch trunks, assembled into a triangular, most durable, structure, with a total length of ca. 3.5 m, on top of which a yoke was attached, and at the base, an axle with a pair of small-diameter wheels. The part of the structure above the axle was covered with trapezoidal boards and attached to the frame of the cart with rawhide thongs using special bevels on the ends of the boards. The platform was fixed with long vertical pegs connecting the parts of the structure to one another (the axle and the frame of the chassis) and serving as a kind of limiter for the cargo on this platform when in use. On the outer edges of the axles, the wheels were held in place with lynch pins (Fig. 3: 6).

Traces of wear on the lower part of the structure and on the axles with wheels (the wear of which is more than 60–70%) convincingly testify to their active use in the construction of these mounds for the transport of stones and other building materials. In total, judging by all the wheel pairs found in the Pazyryk barrows (an axle and a pair of small-diameter wheels), at least seven A-framed carts were used in their construction.

The question of the use of four-wheeled trolleys continues to be debated. That they were employed for use in the region for the transportation of heavy construction loads seems unlikely, due to the impossibility of maneuvering them on mountain roads in comparison with two-wheeled carts, which are more suitable for the terrain. No pieces that could be identified as parts of the designs of four-wheeled trolleys have yet been found in the collections studied.

Four-wheeled carriage from Barrow 5

This was made exclusively of wooden materials, with rawhide leather thongs used to connect units and parts. It had birch bark on the wheels, and there were some remains of thin black and white felt. All moving parts have obvious and significant traces of wear or are polished from prolonged friction.

Sergei I. Rudenko believed that all parts of the vehicle "were made of birch wood" [Rudenko 1951; 1953: 232–234; 1970: 189–193]. According to contemporary analyses (the wood types were identified in the Hermitage by Mariya I. Kolosova), most of the parts were made of birch and pine [Guk and Nikolaev 2012: 456]. Willow rods were used for the flooring under the body, but the wheels and spokes were made from birch, bird cherry, buckthorn, pine, spruce and willow: such a variety of materials may indicate frequent repairs of the wheels and replacement of the spokes, which proves the long-term

practical use of this vehicle. To produce the rounded and curved elements of the wheels and the frame of the superstructure, the traditional steppic method of bending wooden parts under heat before attaching them was used (Fig. 4).

Figure 4. Pazyryk, Barrow 5. 1–6 – Four-wheeled carriage, 1955 reconstruction. General view and details. Authors: S. I. Rudenko, M. P. Gryaznov and E. A. Rumyantsev.

Particularly noteworthy are the significant diameter of the wheels (approx 150 cm), the large number of thin spokes (34), and the length of the hubs (approx. half a meter), which have an exquisite design. These are not symmetrical in their longitudinal section: their outer part is significantly longer than the inner one.[3] This constituted the simplest way to avoid "play" of the wheel rotating on the axle. The longer the hub, the less the wheel wobbles, the better the carriage is controlled and can maintain a given trajectory of movement.

The wheel rims consist of two halves, the ends of which overlap (scarf joints), fastened together with wooden pegs, and in one case, with leather binding. This technology was also widely used for the manufacture of other parts of the carriage such as elements of the superstructure including its rims, the roof, and especially the lattice panel.

The middle part of each hub, where the spokes are inserted, is carefully covered with birch bark, apparently to protect it from drying out and, consequently, the spokes falling out. The diameter of the hub bore is ca. 7.5–8 cm. It is possible that the wheel rims were wrapped with birch bark (and/or leather) in the form of special tires [Chechushkov and Semyan 2022; Hurford 2023; Veldmeijer and Ikram 2023]. We do not exclude the use of felt as tires from the possible options for wheel coverings.

The axles of this vehicle are very long – ca. three meters. Such dimensions were determined by the width of the platform body, the length of the wheel hubs, and the additional rails connecting the front and rear axles of the carriage. The thick axle is rectangular in cross-section. The ends are equipped with round axle arms, more than 60–70 cm long, and ca. 7 cm in diameter, on which the wheels rotated, held in place by lynch pins.

The central draft pole was 3.2 m long. It was attached to the vehicle not only directly with the help of a fork at the rear end, but also with a special bow, its ends fastened to the front axle. Lashed to the slightly widened and rounded front end of the draft pole was a yoke 1.64 m long, with two yoke forks (yoke saddles) attached, one on each side of the draft pole. In addition, special holes were drilled in it between the yoke forks and the ends of the yoke.

3 The hubs on the model carriage in Qinshihuangdi's tomb are asymmetrical (Crouwel et al. 2024: 21), as was the case for all Chinese chariots.

The yoke forks were usually placed on the necks of the draft horses and tied below with a bar and thongs threaded through holes in their lower ends. The holes in the yoke were apparently used to harness the side horses, each pulling by means of a single trace. Thus, four horses were harnessed to this vehicle. The draft pole was articulated vertically, but did not turn horizontally, since it was attached to the fixed front axle.

The body, constructed of poles and rods, formed a two-tiered skeleton – the basis of the chassis of the vehicle with maximum dimensions of 1.28 × 2.36 m, consisting of two frames connected to each other by nineteen carved uprights, each ca. 40 cm high. This two-tier platform is rigidly attached to the front and rear axles of the carriage. In the spaces between the uprights there are tightly twisted lashings connecting the shorter upper, and longer lower, frames. In the upper frame there are three transverse bars on which there is a flooring made of a continuous row of wicker twigs intertwined with thongs, covering almost three quarters of the area. In front, a section of the lower frame is covered with the same flooring. The driver sat on the upper flooring, according to Sergei I. Rudenko, and rested his feet on the lower frame.

In general, the lower part of the body and the chassis of the vehicle are well preserved and do not raise any questions. The parts found in 2019 and 2020 include another carved upright, numerous fragments of rims, and a rod (a locking bar for positioning the axles on the chassis) that do not fundamentally change anything in the already known design and only confirm the correctness of conclusions previously reached about the assembly and the proposed technical solution for the chassis.

The biggest problem was the reconstruction of the upper superstructure of the body. Sergei I. Rudenko noted that the carriage has a "rather complex top" made of thin rods, not all the details of which have been clarified, but he had no doubt that the top of the carriage was partially covered with black felt, on which felt figures of swans were attached. A similar arrangement of bird figures on the roof of the vehicle is noted by Victor I. Sarianidi, recorded during the excavation of one of the Gonur vehicles: there the falcon figurines discovered were located at the corners of a quadrangular superstructure made in the form of a light tent [Sarianidi 2010; Sarianidi and Dubova 2008; 2010].

Mikhail P. Gryaznov suggested that the bent rods of small diameter, connected to each other by long wooden pins and poles with spatulate ends, are parts of a tent-like structure installed on the

platform of the carriage. At the bottom, the poles were attached to a lattice panel made of bent rods, and at the top they were lashed to a quadrangular frame [Guk and Nikolaev 2012: 454–455].

The review of all the collections from the Pazyryk burial mounds stored in the Hermitage, undertaken by the authors of this article, made it possible to identify a significant number of parts that clearly belong to this vehicle according to the available documentation, but that were not used in the known reconstruction. These include, first of all, numerous fragments of the rim with curved rods inserted into them and fragments of preserved thin felt of black and white color, and a significant number of individual fragments of rims, rods, vertical poles and their parts. On one fragment of a curved rod inserted into the rim, covered with thin felt, is fixed the remnant of the foot of a swan (?) tied with a rawhide thong, which clearly indicates the location of the felt bird figures found in the barrow (Figs. 5–6).

Figure 5. Pazyry, Barrow 5. Four-wheeled carriage. 1–7 – preserved fragments of the upper rim of the superstructure; 1, 6, 7 – rods from the dome frame with remains of a leather fastening thong and a foot from a felt bird figure. Wood, felt, leather, stitching. Photos by the authors.

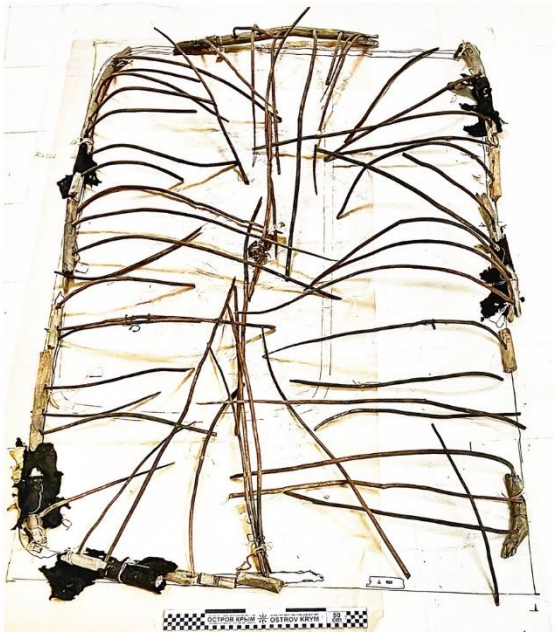

Figure 6. Pazyryk, Barrow 5. Four-wheeled carriage. An archaeologically intact upper rim and the frame of the dome of the superstructure, assembled life-size from fragments from the Pazyryk burial mound stored in different collections. Wood, felt, leather, stitching. Photo by the authors.

Analysis of the surviving fragments allowed us to assume the intentional destruction of this entire rather complex structure of the top of the carriage in antiquity. At the same time, it was possible to experimentally lay out in actual size an archaeologically intact sub-rectangular upper rim of the roof of the superstructure with a dome of thin rods (Fig. 6). The rim was covered with white and black felt, which also covered the dome-shaped frame of rods. Numerous surviving remains of the felt-lined rim and poles of the structure provide convincing evidence of this (Fig. 5:1–7). It is possible that individual felt fragments from this structure were mistakenly used to reconstruct a large carpet from this barrow.

In addition, new parts of the lattice panel in the lower part of the superstructure were found, which made it possible to clarify its shape and design. About 40 cm high, it was erected on the lower rim of the superstructure and attached to the platform of the carriage and the upright posts with rawhide thongs (Fig. 7).

Figure 7. Pazyryk, Barrow 5. Four-wheeled carriage. 1–3 – fragments of the lattice panel fixed on the vertical posts and on the lower rim of the superstructure; 4 – fragment of rim. Wood, leather. Photos by the authors.

New fragments of vertical posts from the 2019 excavations were found in the shape of "oar blades," one of which was fixed in situ, tied with a rawhide thong to a fragment of the lower rim and installed in a special groove for greater strength of connection (Fig. 8) – specifically, with the blade down, and not up, as is currently shown in the existing reconstruction. From an engineering point of view, this position of the blades at the bottom, where they more stably hold the dome of the superstructure, is absolutely justified, and is confirmed by the dimensions of the grooves for fastening the vertical struts

in the upper and lower rims: their mounting holes correspond to the tops of the struts installed in this position.

Figure 8. Pazyryk, Barrow 5. Four-wheeled carriage. 1, 2 – fragment of an "oar" – the vertical post and part of the lower rim in the original position (in situ). The mounting hole, leather thong and the method of fastening these parts together are shown. Wood, leather. Photos by the authors.

Numerous new fragments of rims and lattice found by the joint State Hermitage and Altai University expedition in 2019–2021 made it possible to clarify significantly the general design of the superstructure, already archaeologically restored, and to find previously missing details. Thus, thanks to the perfectly preserved "oar" found in 2019 – a vertical post with grooves and a top designed in the shape of an oar – it was possible to understand the design of the front part of the superstructure (Fig. 9). Previously, a similar left-hand "oar" was found in the barrow in fragmentary form and was not used in the existing reconstruction.

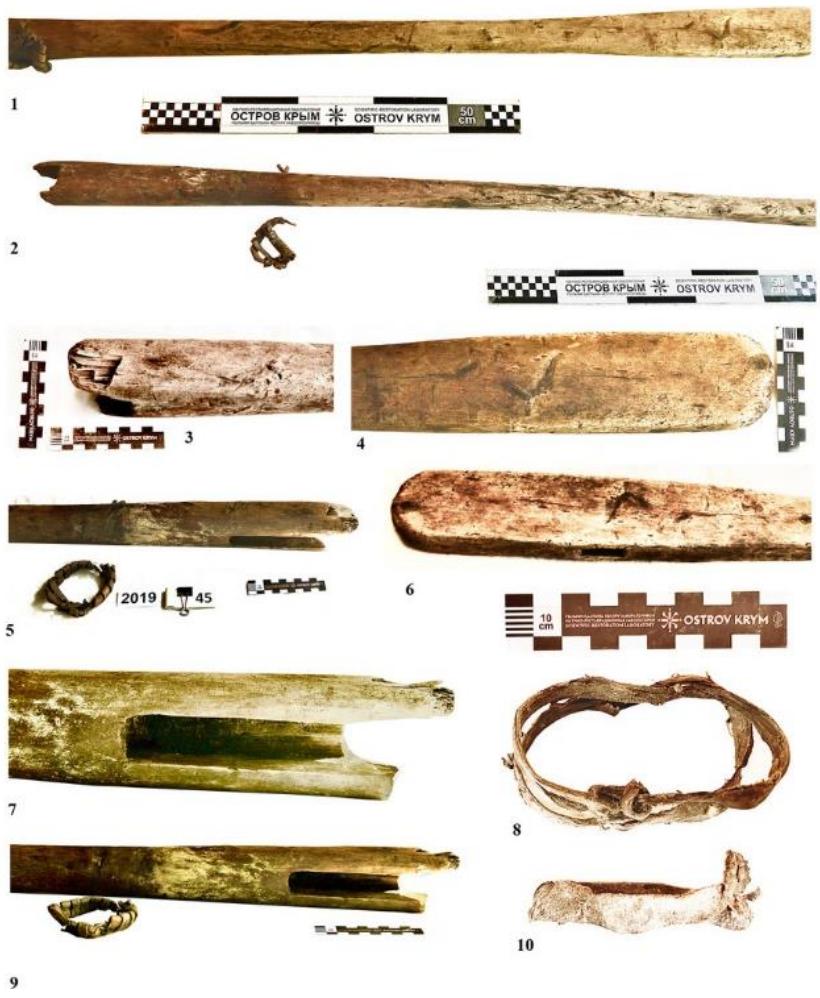

Figure 9. Pazyryk, Barrow 5. Four-wheeled carriage. 1–10 – "oar"– the vertical post of the entrance frame. It was used to decorate and strengthen the structure of the entrance to the superstructure. Found together with leather thongs for fastening to a wooden structure (2, 5, 8, 9 and 10) and with special grooves for fastening to other parts of the superstructure frame: to the upper and lower rims and to the lattice panel. Wood, leather. Photos by the authors.

The pairing of these posts made it possible to assume their use as facings decorating the left and right sides of the entrance to the superstructure, like doorposts, forming a kind of door to the *kibitka* – the sacred space of the leader, his throne space. In the front they vertically connected the upper and lower sub-rectangular rims of the superstructure, which were lashed to the "oar blades" and framed a low lattice panel along the sides, which in turn was also fastened to all the posts and to the lower rim,

encircling the entire perimeter of the superstructure except for the front, where it was inserted at each end into special vertical grooves made in the doorposts.

Thus, the entire superstructure of the ceremonial carriage is reconstructed archaeologically (Fig. 10). It consisted of a collapsible frame made of curved rods, two sub-rectangular rims (upper and lower) fastened to each other with upright posts and a low lattice panel on the sides of the vehicle (except for the front). The roof is dome-shaped, sub-rectangular convex (curved up to 30 cm) assembled from thin rods into an elegant openwork structure, which was covered with felt and decorated with felt figures of birds. The internal height of the superstructure from the floor to the roof (inside) was at least 160 cm. The boards used for the roof in the existing reconstruction most likely covered the floor in the proposed superstructure for more comfort and were undoubtedly embellished with carpets and other symbols of power and prestige. The structure could be used separately outside the carriage in the form of a ceremonial tent or throne, with its own floor made of boards, and is self-sufficient from an engineering point of view.

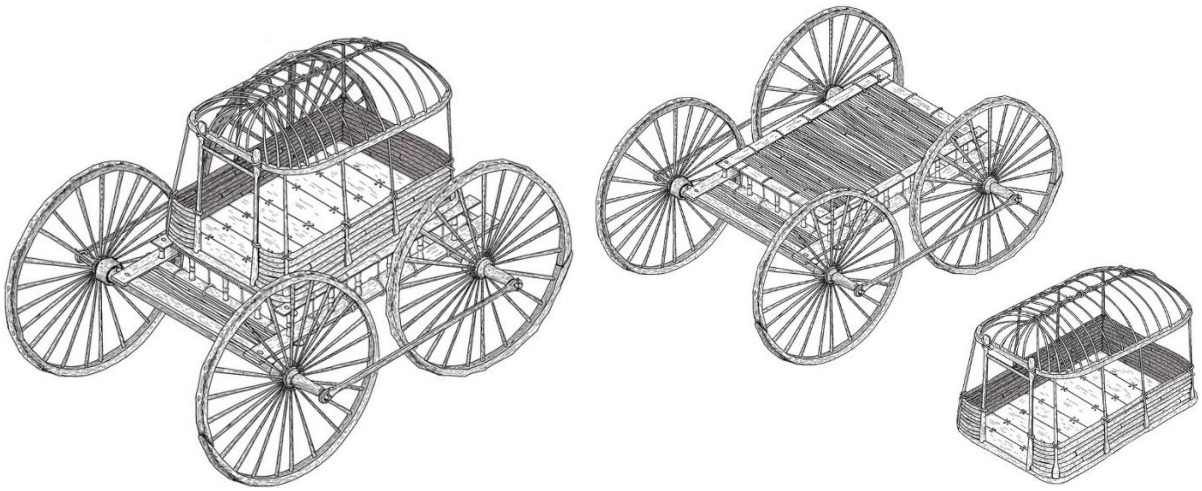

Figure 10. Pazyryk, Barrow 5. Ceremonial carriage. 1 – graphic reconstruction of the general view; 2 – graphic reconstruction of the upper part and chassis of the vehicle. General view of the superstructure frame – a special chamber for the ruler. Prepared by Victor A. Novozhenov, Krym Altynbekov and Elena V. Stepanova. Visualization: Ilya Gusev.

DISCUSSION

In this design a principle was applied that later became widely used in the construction of the portable dwellings of mobile pastoralists – *yurts*, where curved poles (*uyki*) connect together a rather heavy dome (*shynyrak*), in the form of a rounded rim with curved rods inserted into it, at the top, and lattice walls (*kerege*) at the bottom. This design creates a strong and reliable structure that forms the frame of a movable dwelling, with a separately assembled door, which is then decorated inside by carpets and covered outside with felt.

The dating of Barrow 5 in accordance with the chronology developed for all Pazyryk material has been determined to be the middle – beginning of the second half of the third century BCE, given that all the burial mounds were built within fifty years.

> If we accept the latest radiocarbon dating of the First and Second Pazyryk burial mounds at the turn of the 4th–3rd centuries BCE, then the date of the Fifth kurgan is determined to be the middle – beginning of the second half of the 3rd century BCE, then the date of the Third Pazyryk kurgan lies within the first half of the 3rd century BCE. According to the dendrochronological scale, the Third, Fourth and Fifth kurgans were built later than the Second.... Accordingly, the Third Pazyryk kurgan is dated in the interval from +1 to +30 years, the Fourth – from +7 to +35 years, and the Fifth – from +48 to +52 years. [Stepanova, 2012: 451]

At the same time, the proposed reconstructions of the two types of vehicles of the time indicated above are traditional and typical for the population of the Eurasian steppe. Actual two-wheeled A-framed carts are known in Eneolithic–Early Bronze Age sites: in the Bolshoi Ipatovsky Kurgan [Belinskij and Kalmykov 2004], in the Caucasus (Lchashen) and in the foothills, in the southern Russian steppes, as well as in the petroglyphs of Southern Siberia and Kazakhstan [Novozhenov 2014; 2023].

In addition, images of such two-wheeled carts and four-wheeled wagons are also pictured in the petroglyphs of Altai and the above-mentioned regions [Mukhareva 2011: 74, fig. II, 1]. A type of two-

wheeled cart on very small disc wheels was used in the Altai in ethnographic times. Such carts were called here *medvedki* [Savinov 2002].[4]

Theoretically, we can assume that the Pazyryk people used two connected A-framed carts in the form of a special type of transport vehicle articulated by a special device, also well represented in the petroglyphs of Central Asia. Structurally, this type of vehicle combined the advantages of two- and four-wheeled vehicles – increased load capacity and the ability to maneuver in mountainous terrain [Novozhenov 2012: 221–240; 2023].

The design of a covered four-wheeled platform wagon with a dwelling has also been known for a very long time and was developed in the Eurasian steppe based on Novotitorovsk (Pit-Afanasievo and Catacomb) or Gonur platform-type vehicles [Gay 2000; Izbitzer 1993; Dubova and Sarianidi 2008, 2010; Shishlina et al. 2014, Kozhin 2015; Novozhenov 2016]. These wheeled platforms were used to install a collapsible dwelling or were constructed with a cover and were also used to transport heavy loads.

The known written and pictorial sources of the Scythian-Saka period such as clay models testify to the use of collapsible dwellings covered with felt on a frame of poles forming a conical or truncated pyramid shape, mounted on wheels (Fig. 11) [Weinstein 1991: 45–47, figs. 23–25]. A covered four-wheeled vehicle, similar to the one discussed above, with a domed top and with a high-status figure seated in it in the oriental manner, is engraved on a bone plaque as part of a complex and multi-figured composition discovered in the foothills of the Zailiiski (Trans-Ili) Alatau (Kazakhstan), during excavations of a Wusun settlement, dated to the turn of the millennia – the first century AD (Fig. 12) [Goryachev, Yatsenko and Egorova 2016: 632–648].

4 *Medvedki* (медведки) means "mole cricket,"an insect that makes a creaking sound.

Figure 11. Clay model of a Scythian (Sarmatian) wagon [After Korolkova 2006: 72].

It is clear that in the proposed design, the superstructure made of rods is removable and could change the functionality of the vehicle depending on everyday needs. Its design seems to be universal and adaptable; it optimally meets the diverse needs of mobile pastoralists. It has been established that this carriage was intensively used for a long time, as clearly evidenced by significant traces of wear of all parts of the chassis and the obvious replacement of spokes in the wheels that broke during use, when they had to be replaced with wood of different species available to the craftworkers at a specific time and in the places when and where such a breakage occurred.

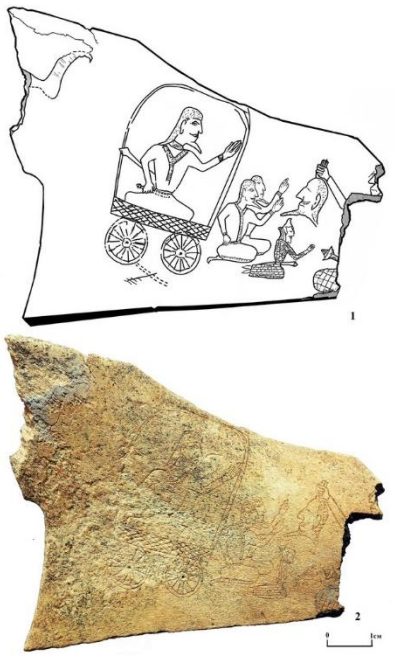

Figure 12. Kazakhstan. Zailiysky Alatau. Bone plaque with the engraved image of a covered vehicle of ceremonial type. Wusun settlement Kyzylbulak IV (Turgen district, outcrops of the Zailiysky Alatau mountain range). Found at the entrance to a dwelling. Photo and drawing after Goryachev, Yatsenko and Egorova 2016.

If necessary, the vehicle could be used without an upper superstructure, without an upper flooring and an upper frame, and even without the carved uprights connecting the two frames (functionally, they are not needed in this design). In the latter case, the driver was positioned on the front edge of the lower platform, which is the supporting base of the entire structure, his legs hanging down or resting on the draft pole, the very large diameter of the wheels making it possible to do this. The woven mat from the upper frame was placed on the lower, principal frame. As a result of this transformation, the original lower platform, measuring 1.28 × 2.36 m, has enough space for the placement of the body of the ruler lying at full length, as well as the driver and even accompanying persons, which makes the previously expressed assumption about the use of this vehicle in a mourning ceremony for driving around the surrounding estates quite probable [Kurochkin 1994]. Such a tradition is described by Herodotus as occurring among the Scythians.

It is possible that the upper superstructure, in the form of a portable yurt, could, if necessary, be installed separately in any chosen place as a headquarters or throne of the ruler, indicating his

presence for subordinates. Installed on a platform with wheels, it could also symbolize the mobile power and sacredness of the leader's authority.

All of these adaptations (and in total we counted at least three options) were originally incorporated into the design of this carriage. This is confirmed by the way vehicle was placed in the grave, in a disassembled state. The method used to assemble and disassemble the main parts of the entire structure allowed any of the various modifications of the design to be made quickly and easily.

Turning such a vehicle required significant space – up to 30 m in one direction, since the pivoting front axle was invented later, only in Roman times [Brownrigg and Crouwel 2017]. But the method of attaching the draft pole gave an important advantage in maneuverability on rough terrain: it was enough to untie the draft pole from the front axle of the vehicle and attach it to the rear, harness the horses again, and continue moving in the desired direction, just like modern electric trains.

In addition, the presence of completely non-functional parts in this design – poles connecting the axles of the carriage to each other on both outer sides, is apparently explained by the need to turn this carriage, when four or even two adults, taking hold of these "handrails," could lift it and turn it in the desired direction, or use it as a stretcher-palanquin or a mobile throne for the leader. But most likely, this ceremonial vehicle was used as a portable throne for the Pazyryk leader and as a prestigious means of transportation – a mobile symbol of power during an inspection of the territories and peoples subject to the ruler.

A similar practice existed among the Chinese emperors, when they regularly inspected the territories subordinate to them in a special cortege of chariots and carriages, accompanied by the nobility and all their dignitaries, assembled to demonstrate the strength of the state and to help effectively manage the empire. This tradition was founded and actively used in his activities to create a unified Chinese state by a contemporary of the Pazyryk leader, the first Chinese emperor, Qinshihuangdi, who, according to chronicles, died in 209 BCE in his two-wheeled covered carriage during the fifth inspection of the territories of his vast empire.

It is noteworthy that the shape of the domed roof of this Chinese two-wheeled traveling vehicle of Emperor Qinshihuangdi in its design resembles the one discussed above (except that, for the construction of the frame of its roof, a technical method well known to the Chinese was used, reminiscent of the openwork design of an umbrella), but the tradition of making four-wheeled wagons

is absent in China.[5] At the same time, it is important to note that this carriage and other vehicles of the imperial cortege were installed in his mausoleum – as an absolutely necessary attribute of the funeral rite – for his last journey to the afterlife [Novozhenov 2012: 220–230; Crouwel, Brownrigg and Linduff 2023: 19–26].

CONCLUSION

It is clear that the prestigious carriage from Barrow 5, as well as other means of transportation found at Pazyryk, are the result of a local tradition of manufacturing various means of wheeled transport and developed woodworking technologies. The discovery of two types of wheeled transport in the Pazyryk burial mounds – A-framed carts and a four-wheeled covered carriage of ceremonial type – testifies to the development of local traditions of their production that embody the deep-rooted ideas of the ancient Altai people in skills and abilities preserved from the time of their charioteer ancestors. These have been recorded for centuries on the Altai rocks in many petroglyphs of various historical periods depicting both war chariots and charioteers and also the use of various other types of wheeled transport. These facts indicate a fairly wide distribution, along with riding horses, in local societies, of wheeled transport, especially in demand in the conditions of the mass development of communications of the population of Central Asia, the development of new routes and territories, and the especially noticeable expansion of trade contacts along the Silk Roads at that time.

ACKNOWLEDGMENTS

The authors are very grateful to our colleagues Konstantin Chugunov, Katheryn Linduff, and Gail Brownrigg, who are more experienced in this topic than we are and who discussed with us various aspects of this text and the meaning of certain English terms. Without this assistance, this text would probably contain many inaccuracies. And our special thanks also to Gail and Katheryn for their corrections on several drafts, as well as for editing it and correcting mistakes in English.

5 There is new, preliminary evidence of a four-wheeled vehicle in Qinshihuangdi's complex. (https://www.cna.com.tw/news/acn/202401260265.aspx).

ABBREVIATIONS

BAR	British Archaeological Reports. Oxford.
IIMK	Институт истории материальной культуры [Institut istorii material'noy kul'tury] (Institute of History of Material Culture). Leningrad/St. Petersburg.
KSIIMK	Краткие Сообщения Института истории материальной культуры [Kratkie Soobtshenia Instituta istorii material'noy kul'tury] (Brief Reports of IHMC). Leningrad/St. Petersburg.
PAV	Петербургский археологический вестник [Peterburgskiy arkheologicheskiy vestnik] (Petersburg Archaeological Bulletin). St. Petersburg.
SGE	Сообщения Государственного Эрмитажа [Soobtshenia Gosudarstvennogo Ermitazha] (Reports of the State Hermitage Museum). St. Petersburg.

REFERENCES

Altynbekov K. (Алтынбеков К.) 2014. Возрожденные Сокровища Казахстана: Реставрация как Возрождение (Revived treasures of Kazakhstan: Restoration as a rebirth). Almaty: Ostrov Krym.

Altynbekov K. (Алтынбеков К.) and V. A. Novozhenov (Новоженов В. А.) 2014. Повозки ранних кочевников в центре Евразии (Vehicles of early nomads in the center of Eurasia). In: Таинство этнической истории древнейших номадов степной Евразии (The mystery of the ethnic history of the early nomads of the Eurasian steppes), A. B. Епимахов (ред.) B. A. Новоженов (сост.) (A. V. Epimakhov [ed.], V. A. Novozhenov [comp.]), 308–341. Almaty: Ostrov Krym, Kazakh Research Institute of Culture.

Belinskij A. and A. Kalmykov 2004. Neue Wagenfunde aus Graben der Katakomben-grabkultur im Steppengebiet des zentralen Vorkaukasus. In: *Rad und Wagen. Der Ursprung einer Innovation Wagen im Vorderen Orient und Europa,* M. Fansa and S. Burmeister (eds.), 201–220. Mainz: Verlag Philipp von Zabern.

Brownrigg G. and J. Crouwel 2017. Developments in harnessing and draught in the Roman world. *Oxford Journal of Archaeology* 36 (2): 197–220. https://doi.org/10.1111/ojoa.12112 https://www.academia.edu/44787669/GAIL_BROWNRIGG_AND_JOOST_CROUWEL_DEVELOPMENTS_IN_HARNESSING_AND_DRAUGHT_IN_THE_ROMAN_WORLD

Chechushkov I. V. (Чечушков И. В.) and I. A. Semyan (Семьян И. А) 2022. Экспериментальное исследование степной колесницы по материалам синташтинско-петровских памятников поздней бронзы (Experimental study of the steppe chariot based on materials from the Sintashta-Petrovka Late Bronze Age sites). Российская Археология (Russian Archaeology) 4: 21–34.

Crouwel J. H., G. Brownrigg and K. Linduff 2024. From Chariot to Carriage: Wheeled Vehicles and Developments in Draft and Harnessing in Ancient China. *Sino-Platonic Papers* no. 344, 1–60.

Gey A. N. (Гей А. Н.) 2000. Новотиторовская Культура (Novotitorovskaya culture). Moscow: Staryi Sad.

Goryachev A. A. (Горячев А. А.), S. A. Yatsenko, (Яценко С. А) and T. A. Egorova (Егорова Т. А.) 2016. Костяная пластина с гравированной композицией из поселения Кызылбулак IV в верховьях ущелья Тургень (Bone plaque with an engraved composition from the Kyzylbulak IV settlement in the upper reaches of the Turgen gorge). In: Актуальные Проблемы Археологии Евразии. Сборник материалов международной научно-практической конференции, посвященная 25-летию независимости Республики Казахстан и 25-летию Института Археологии им. А.Х. Маргулана – 18–19 октября 2016 (Actual problems of Eurasian archaeology: A collection of materials of the international scientific and practical conference dedicated to the 25th anniversary of the independence of the Republic of Kazakhstan and the 25th anniversary of the Alkei Margulan Institute of Archaeology – October 18–19, 2016), 632–648. Almaty: Институт Археологии имени А. Маргулана (Margulan Institute of Archaeology).

Gryaznov M. P. (Грязнов М. П.) 1937. Пазырыкский курган (Pazyryk kurgan). Moscow and Leningrad: Nauka.

Gryaznov M. P. (Грязнов М. П.) 1950. Первый Пазырыкский курган (The First Pazyryk kurgan). Leningrad: Nauka.

Gryaznov M. P. (Грязнов М. П.) 1955. Колесница ранних кочевников Алтая (Vehicles of the early nomads of Altai), vol. VII, 30–32. SGE.

Guk D. Yu. (Гук Д. Ю.) and N. N. Nikolaev (Николаев Н. Н.) 2012. Повозка из Пятого Пазырыкского кургана (Vehicle from the Fifth Pazyryk kurgan). In: Культуры Степной Евразии и их Взаимодействие с Древними Цивилизациями. Материалы международной научной конференции, посвящённой 110-летию со дня рождения выдающегося российского археолога М. П. Грязнова. СПб (Steppe cultures of Eurasia and their interaction with ancient civilizations: Proceedings of the International Scientific Conference dedicated to the 110th anniversary of the outstanding Russian archaeologist Mikhail P. Gryaznov) 2: 454–457. St. Petersburg: IHMC.

Izbitser E. V. (Избицер Е. В.) 1993. Погребения с повозками степной полосы Восточной Европы и Северного Кавказа. 3 – 2 тыс. до н. э. (Burials with wagons in the steppe zone of Eastern Europe and North Caucasus. 3rd–2nd millennia BCE). Author's abstract of a dissertation, cand. hist. sciences. St. Petersburg: IHMC.

Hurford R. 2023. The Ancient V-spoked Chariot Wheel: Why Was It Made That Way? Some thoughts based on some observations and the experience of making chariot reconstructions. In: *Chariots in Antiquity. Essays in Honour of Joost Crouwel*. P. Raulwing, S. Burmeister, G. Brownrigg and K. M. Linduff (eds.), 245–254. BAR International Series 31597. Oxford: BAR Publishing. https://doi.org/10.30861/9781407361178

Kozhin P. M. (Кожин П. М.) 2015. Древний колёсный транспорт: состояние проблем и рабочие гипотезы (Ancient wheeled transport: State of problems and working hypotheses). Научное Обозрение Саяно-Алтая (Scientific Review of Sayano-Altai). 2015. 1 (9). Series: Archaeology. Issue 2, 2–18.

Korolkova E. F. (Королькова Е. Ф.) 2006. Властители Степей (Rulers of the steppes). St. Petersburg: Гос. Эрмитажа; «Арс» (State Hermitage Museum Publishing House; "Ars").

Kurochkin G. N. (Курочкин Г. Н) 1994. Скифские корни сибирского шаманизма: попытка нового «прочтения» пазырыкских курганов (Scythian roots of Siberian shamanism: An attempt at a new "reading" of the Pazyryk burial mounds). PAV 8: 60–70.

Linduff K. M. and K. S. Rubinson 2022. *Pazyryk Culture Up in the Altai*. London and New York: Routledge. https://doi.org/10.4324/9780429456374.

Mukhareva A. N. (Мухарёва А. Н.) 2011. Изображения крытых повозок в наскальном искусстве Центральной Азии (Images of covered vehicles in the rock art of Central Asia). Археология Южной Сибири (Archaeology of Southern Siberia). News of the Laboratory of Archaeological Research (Kemerovo). Issue 25, 72–78.

Novozhenov V. A. (Новоженов В. А.) 2012. Чудо коммуникации и древнейший колёсный транспорт Евразии (The miracle of communication and the ancient wheeled transport of Eurasia). E. E. Kuzmina (ed.). Moscow: "Таус" ("Taus"). https://www.academia.edu/5159110/Communications_and_the_Earliest_Wheeled_Transport_of_Eurasia

Novozhenov V. A. (Новоженов В. А.) 2014. К вопросу о происхождении А – образного типа двуколок Минусинской котловины (On the origin of the A-type carts of the Minusinsk Basin). Археология и Этнография Южной Сибири (Archaeology, ethnography and anthropology of Eurasia) 2 (58): 90–100.

Novozhenov V. A. (Новоженов В. А.) 2016. Коммуникации и транспорт страны Маргуш в пространстве и во времени (Communications and transport of the country of Margush in space and time). In: Труды Маргианской археологической экспедиции (*Transactions of the Margiana Archaeological Expedition*). Vol. 6. In Memory of Viktor Ivanovich Sarianidi, N. A. Dubova (ed.), 361–377. Moscow: Staryi Sad.

Novozhenov V. A. 2023. Chariots on the Central Asian Rocks: The Dating Problem. In: *Chariots in Antiquity: Essays in Honour of Joost Crouwel*, P. Raulwing, S. Burmeister, G. Brownrigg and K. M. Linduff (eds.). BAR International Series 31597. Oxford: BAR Publishing. https://doi.org/10.30861/9781407361178.

Novozhenov, V. A., Altynbekov, K., Stepanova, E. V. [Новоженов, В. А., Алтынбеков, К., Степанова, Е. В.] 2024. Новые реконструкции колесного транспорта из Пазырыкских курганов: (предварительное сообщение) [New reconstructions of wheeled transport from the Pazyryk mounds (preliminary report)], *Археология Казахстана* [Archaeology of Kazakhstan] 4: 26. DOI: 10.52967/akz2024.4.26.101.125

Rudenko S. I. (Руденко С. И.) 1951. Пятый Пазырыкский курган (The Fifth Pazyryk kurgan), KSIIMK. XXXVII, 106–116.

Rudenko S. I. (Руденко С. И.) 1953. Культура Населения Горного Алтая в Скифское Время (The culture of the population of the Altai Mountains in the Scythian Period). Moscow and Leningrad: Academy of Science of the USSR Press.

Rudenko S. I. (Руденко С. И) 1960. Культура Населения Центрального Алтая в Скифское Время (The culture of the population of the Central Altai in the Scythian Period). Moscow and Leningrad: Academy of Science of the USSR Press.

Rudenko S. I. 1970. *Frozen Tombs of Siberia: The Pazyryk Burials of Iron-Age Horsemen*. Translation of Rudenko 1953, by M. W. Thomson (incorporating the author's corrections). London: J. M. Dent and Sons.

Rumyantsev E. A. (Румянцев Е. А.) 1961. Реставрация и консервация древних деревянных повозок из Закавказья и Алтая (Restoration and conservation of ancient wooden vehicles from Transcaucasia and Altai). Советская Археология (Soviet Archaeology) 1: 236–242.

Sarianidi V. I. (Сарианиди В. И.) 2010. Задолго до Заратуштры. Археологические доказательства Протозороастризма в Бактрии и Маргиане (Long before Zarathustra: Archaeological evidence of proto-Zoroastrianism in Bactria and Margiana). Moscow: Staryi Sad.

Sarianidi V. I. (Сарианиди В. И.) and N. A. Dubova (Дубова Н. А) 2008. Археологические работы на юго-западном холме Гонур-тепе (раскоп 16) (Archaeological work on the southwestern mound of Gonur-tepe [excavation 16)]). In: Труды Маргианской Археологической Экспедиции Т. 2 (*Transactions of the Margiana Archaeological Expedition*) 2: 28–49. Moscow: Staryi Sad.

Sarianidi V. I. (Сарианиди В. И.) and N. A. Dubova (Дубова Н. А) 2010. Новые гробницы на территории царского некрополя Гонура (предварительное сообщение) (New tombs on the territory of the royal necropolis of Gonur [preliminary report]). In: На Пути Открытия Цивилизации. Труды Маргианской Археологической Экспедиции Т. 3 (*On the Way to the Discovery of Civilization: Transactions of the Margiana Archaeological Expedition*) 3: 144–171. St. Petersburg: IHMC.

Savinov D. G. (Савинов Д. Г.) 2002. Ранние Кочевники Верхнего Енисея: Археологические Культуры и Культурогенез (Early nomads of the Upper Yenisei: Archaeological cultures and cultural genesis). St. Petersburg: IHMC.

Shishlina N. I. (Шишлина Н. И), D. S. Kovalev (Ковалев Д. С) and E. R. Ibragimova (Ибрагимова Э. Р.) 2013. Повозки катакомбной культуры евразийских степей (Wagons of the Catacomb Culture of the Eurasian steppes. In: Бронзовый Век: Европа без Границ. Четвертое – Первое Тысячелетие до Нашей Эры. (Bronze Age: Europe without Borders: Fourth-first Millennium BCE). Ю. Ю. Пиотровский (ред.) (Yu. Yu. Piotrovsky) (ed.). Exhibition catalogue, 119–126. St. Petersburg: Чистый Лист.

Shishlina N. I., D. S. Kovalev and E. R. Ibragimova 2014. Catacomb Culture Wagons of the Eurasian Steppes, *Antiquity* 88 (340): 378–394. https://doi.org/10.1017/S0003598X00101061.

Stepanova E. V. (Степанова Е. В.) 2012. Седла из Третьего Пазырыкского кургана (Saddles from the Third Pazyryk kurgan). In: Степные Культуры Евразии и их Взаимодействие с Древними цивилизациями. Материалы Международной Научной Конференции, Посвященной 110-Летию со Дня Рождения Выдающегося Российского Археолога Михаила Павловича Грязнова (Steppe cultures of Eurasia and their Interaction with ancient civilizations: Proceedings of the International Scientific Conference dedicated to the 110th anniversary of the outstanding Russian archaeologist Mikhail P. Gryaznov), 446–453. St. Petersburg: IHMC.

Veldmeijer A. J. and Ikram S. 2023. Leather: An Integral Part of Chariots. In: *Chariots in Antiquity. Essays in Honour of Joost Crouwel*. P. Raulwing, P. S. Burmeister, G. Brownrigg and K. M. Linduff (eds.), 61–67. BAR International Series 31597. Oxford: BAR Publishing. https://doi.org/10.30861/9781407361178.

Weinstein S. I. (Вайнштейн С. И.) 1991. *Мир Кочевников центра Азии* (The world of the nomads of the Center of Asia). Moscow: Nauka.

All issues of *Sino-Platonic Papers* are accessible to readers at no charge via our website.

To see the complete catalog of *Sino-Platonic Papers*, visit

www.sino-platonic.org