

The Sintashta cultural particulars and the origin of the war chariot

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One of the most debated subjects in current archaeology is the origin of the light war chariot. If until c. 1970, the war chariot was considered a foreign element of steppe origin in the Middle East, afterwards, the notion that it might instead be a local Middle Eastern development took precedence. However, the publishing of *Sintashta*¹ in 1992 gave new life to the steppe hypothesis. This, however, was met with considerable criticism.

When considering the steppe origin hypothesis for the war chariot, Littauer and Crouwel raise a series of points which question its validity, through the analysis of the economic and technological context in which the steppe chariot would have been developed, deeming it improbable. They instead suggest that the steppe chariot is nothing but a crude imitation of Near Eastern chariots, and whose sole purpose is status display. The reasoning behind this claim lies in the apparent superfluous nature of the chariot on the steppe.

According to the authors, when compared with the Near East, the chariot is fairly useless on the steppe, especially considering the availability of a more effective alternate method of transportation, the mount itself.

It is an undisputed fact that the chariot suffers from severe limitations on the steppe and its immediate surroundings. The terrain is far from optimum: snow, high grass, deep mud and hard ground

¹ Gening, V. F.; Zdanovic, G. B.; Gening V. V., *Sintashta: archeologicheskiye pamyatniki ariyskikh plemen Uralo-Kazahstanskikh stepei*, Chelyabinsk, 1992.

found on the steppe itself had a considerable impact on the speed and manoeuvrability of the chariot. On its fringes, the closed woods, steep terrain, soft sand and swamp terrain would have the same effect.

Furthermore, when considering the socio-economical context of the steppe, there was no use for such a vehicle. Besides its limitations in battle², its inability to match the speed and agility of herded horses and wild animals meant that the mount would be a better alternative for both herders and hunters. The chariot would be of minor importance for migrating nomadic groups due to its inability to carry heavy loads, its lack of comfort over great distances, and its complexity, which would make it impossible to repair *en route*. Heavy carts or pack animals would be a much better alternative.

These limitations, in conjunction with the existence of better alternatives, and the lack of prototypes, made, according to the authors, the steppe chariot a needless and superfluous object.

In contrast, in the Near East, a fast transportation method was needed, and the absence of a suitable mount made the technological development of faster and better vehicles a priority. According to Littauer and Crouwel, this need arose from the social and economic context found in Near East and southern Mesopotamia in the early 2nd millennium BC, which «consisted of a number of city-states, with a common language, religion and shrines. Industry and commerce were highly developed, as were the arts and crafts; architecture was ambitious. Literacy fostered written laws and litigations and facilitated trade. Although transport of all types could come downstream by river, it had to go upstream by land, and land travel was encouraged by the level terrain.»³ The chariot was developed to allow better communication between different communities, who shared similar institutions and a striving industry and commerce, but that were geographically apart.

Therefore, in the Near East, the chariot was a much-needed conveyance, a product of a developed and complex society, in order to

² Littauer, M. A.; Crouwel, J. H., “The Origin of the True Chariot”, *Antiquity* 40 (1996), pp. 934-939.

³ *Idem*, p. 936.

suppress the combined limitations of its social, economic, and political organization and geography. This necessity was what motivated the improvement of already existing methods of transportation that led to the development of the light chariot.

According to the authors, «The scenarios are one of improvement and development out of an established and very useful artefact versus one of the new creation of a superfluous artefact.»⁴ Unlike its near eastern counterparts, for the development of the steppe war chariot, another motivation rather than necessity must be found.⁵

However, this is a very simplistic approach to the problem. It fails to take into account the particular circumstances gathered at the southern Uralian steppes during the Sintashta-Arkaim period that might have contributed to the development of the war chariot.

Despite being named after a single eponymous settlement, the Sintashta culture encompasses a series of settlements, located in the fluvial plains⁶ of the Tobol and Ural rivers' tributaries, in the Trans-Uralian steppe. The settlements are either round- or oval- shaped in layout, with the houses positioned in concentric circles, leaving the centre of the settlement free of any constructions. The houses were usually of rectangular shape, all of similar size, between 100 and 250m². Larger settlements display more houses, rather than larger ones. The houses were built exclusively using frame-pillar technique, with the foundations dug into the bedrock, while soil was the main building material. The houses were built adjacent to each other, with the back against a common defensive wall. Each occupant was responsible for building the parcel of the wall attached to his own house, therefore greatly reducing the costs of construction.

Internally, the houses were divided in three distinct areas: living quarters, an economic area, and a small antechamber at the entrance. One of the most remarkable traits of these settlements is that most,

⁴ *Idem*, p. 938.

⁵ *Idem*, p. 935.

⁶ The exception is the Chekatay site, located in a lake bank.

if not all, of the houses had one or more walls adjacent to a well and to a cupola-shaped furnace. The combination of these two factors creates optimum conditions for metallurgy, and the abundance of remains demonstrates the existence of a high volume of metallurgical production. However, the defining architectonic trait of the Sintashta-type settlements is their heavy fortifications.

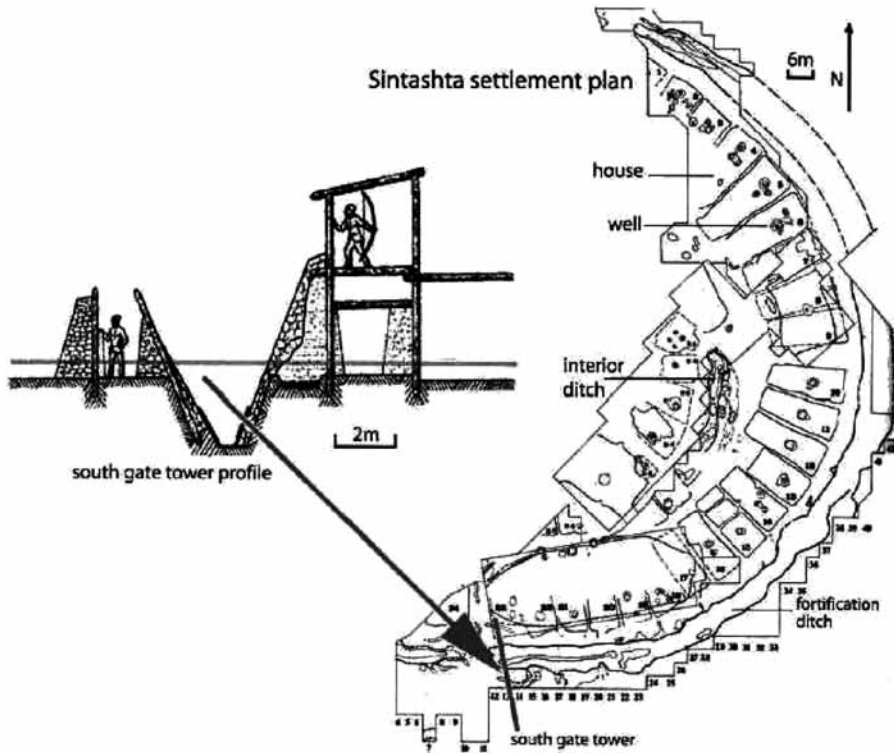


Fig. 1: Sintashta settlement: layout and fortifications.⁷

The Sintashta settlements were, by any standard, heavily fortified. Its main line of defence was the combinations of ramparts and ditches, often followed by an outer wall. Weaker sections of the wall, like entrances, were additionally fortified with towers. The ditches averaged between 2 to 4m wide, depending on the size of the adjacent wall, and

⁷ Gening, V. F.; Zdanovic, G. B.; and Gening V. V., *op. cit.*, figs. 7 and 12.

usually around 1.5m deep. The wall was built using soil and wood⁸. Two parallel walls were built, with the gap between them filled with rock and earth removed from the ditch. The frame structure was reinforced with wood and loam soil. This construction method allowed for surprisingly high walls, up to 6 metres in height⁹.

The presence of fortifications denounces the intention of permanently protecting a specific location, which is a very uncommon practice amongst groups of nomads. Something pushed these groups to settle in a particular location, which was potentially desired by hostile populations, hence the need for defences. It has been shown that groups of nomadic peoples tend to orbit towards critical locations in times of need¹⁰. When faced with low production and/or increased competition, populations tend to settle near critical resources, in order to protect them for themselves. This seemed to be the case with the Sintashta type settlements.

When one considers the northern hemisphere in the last 9000 years, one can notice four phases of rapid climatic change¹¹:

- Phase 1. 560-800 BP – “minor glacial epoch”
- Phase 2. 1300 – 800 BP – Middle Ages optimum
- Phase 3. 2900 – 2300 BP – Iron Age cold
- Phase 4. 7000 – 6000 BP – Climatic Optimum

This data shows that rapid climatic change tends to occur in alternate cycles of increase and decrease in overall temperature. However, these are general observations. Local studies clearly show that while the

⁸ Stone was used in Olginskoye and Alandskoye outer defensive wall.

⁹ Koryakova, L. N. and Epimakhov, A. V., *The Urals and Western Siberia in the Bronze and Iron Ages*, Cambridge U.P., 2006, pp. 68 - 75

¹⁰ Rosenberg, M., “Cheating at Musical Chairs: Territoriality and sedentism in an evolutionary context”, *Current Anthropology* 39/5 (1998), pp. 653-681.

¹¹ Dergachev, V.A.; Zaitseva, G.I; Timofeyev, V. I; Sementsov, A. A. and Lebedeva, L. M., “Izmeneniya prirodnykh protsessov I radiouglerodnaya khronologiya arkheologicheskikh pamyatnikov”, in G.I. Zaitseva, V. V. Dergachev, V. M. Masson (eds.), *Arkheologiya I Radiouglerod*, St. Petersburg, Institute for History of Material Culture, 1996, pp. 7-17; p. 13.

broader changes tend to be global in nature, locally, its consequences can vary considerably, not only between different climatic regions, but between apparently similar cycles¹². Therefore, one has to consider the local effects of climate change in order to correctly assess its potential effect in a human population. This has been done extensively for the Volga-Ural steppe.¹³

The correlation between geological and archaeological periodization was made by Ivanov and Chernyanski:

¹² Koryakova, L. N. and Sergeev, A., “Geographicheskiy aspekt khozyaistvennoi deyatel'nostim plemen sargatskoi kulturi”, in V. Stoyanov (ed.), *Voprosy archeologii Urala* 18, Sverdlosk, Ural State University, 1986, pp. 90-98. Klimenko, V. V., “Klimat i istoriya v epokhu pervykh vysokikh kultur (3500–500 gg. Do n.e.)”, *Vostok [Oriens]* 4 (1998), pp. 5-41; Klimenko, V. V., “Klimat i istoriya ot Konfutsiya do Mukhammeda”, *Vostok [Oriens]* 1 (2000), pp. 5-32; Klimenko, V. V., “Klimat i istoriya v sredniye veka”, *Vostok [Oriens]* 4 (2003), pp. 5-41.

¹³ For details see: Koryakova, L. N. and Epimakhov, A. V., *Op. Cit.*; Alexandrovsky, A. L., *Paleoklimaty golotsena po dannym izucheniya pogrebennykh pochvstepnoi zony* (Paper presented to the Chteniya, posvyashchennye 100-letiyu deyatel'nosti V. A. Gorodtsova v Gosudarstvennom Istoricheskom Muzeye), Moscow, 2003, pp. 192–3; Ivanov, I.V., Chyernyanskiy S.S., “Obshshiy zakonomyernosti razvitiya chyernozyemov Yevrazii i evolyootsiya chyernozyemov Zaooral'ya”, *Pochvovedeniye* 9 (1996) pp. 1045–1055 (Trans-Urals); Ivanov, I. V.; Chernyansky, S. S., “Voprosy arkheologicheskogo pochvovedeniya i nelotorye rezultaty paleopochvennykh isledovaniy v zapovednike ‘Arkaim’ ” in S. Y. Zdanovich (ed.), *Arkheologicheskiy istochnik i modelirovaniye drevnikh tekhnologiy*, Chelyabinsk, Center “Arkaim” Institute of History and Archaeology of RAS, 2000, pp. 3-16 (Trans-Urals); Nemkova, V. K., “Stratigraphiya pozdnei poslednikovykh otlozheniy Preduraly'a”, in V. L. Yakhimovich (ed.), *K istoriy pozdnego pleistotsena i golotsena Yuzhnogo Urala i Preduralyja*, Ufa, BF AN SSSR, 1978, pp. 4-45 (Middle Urals); Duryagin, V. V., *Ozernyye geosistemy vostochnogo sklona Yuzhnogo Urala i ikh izmeneniye v zone tekhnogenogo vozdeistviya* (Ph.D. dissertation), Perm, Perm University, 1999 (Southern Urals).

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Time		Periodization						
Thousands years BP	Centuries	Geological	Thermic epochs	Epochs of humidification of Eurasian steppe	Archaeological			
					Epochs	Cultures		
						Eastern Europe	Urals, Northern Kazakhstan	
1	2	3	4	5	6	7	8	
0	20		Warming		Contemporanarity			
1	15	SA ¹	SA ¹ Cooling, "minor glacial period"	SA ³ Moistening	Middle Ages	Late	Late Nomads	Late Nomads
	10		SA ² Warming, "minor climatic optimum"					
2	5	SA ²	SA ¹ Cooling	Early Sub-athlantic alternation of micro-pluvilas and micro-arids	Iron Age	Sarmatians	Late	Early Nomads
	0						SA ¹ Cooling	
3	5	SA ¹	SA ¹ Cooling	Late sub-boreal moistening	Bronze Age	Sauromatians	Scythians	Sargary
	10	SB ³	SB ³ Cooling					
4	15	SB ²	SB ² Thermic optimum	Early Sub-boreal aridization	Bronze Age	Middle	Srubnaya	Fyodorovo Alakul Petrovka Sintashta
	20						SB ² Thermic optimum	
5	25	SB ¹	SB ¹ Cooling	Late Atlantic Moistening	Bronze Age	Early	Late Yamnaya	Tersek-Botai cultures
	30						SB ¹ Cooling	
6	35	AT ³	AT ³ Thermic maximum	Late Atlantic Moistening	Eneolithic	Eneolithic cultures	Eneolithic cultures	Late Neolithic
	40							

Table 1: Correlation between geological and archaeological periodization in the Eurasian Steppes.¹⁴

The Holocene climatic optimum corresponds to the Atlantic period (AT³), where a thermic maximum met with high percentages of moist. After c. 2500 BC, the climate in the steppes became colder (SB¹ cooling). This decrease in temperature, coupled with an ongoing process of aridization (sub-boreal aridization) led to significant changes to the

¹⁴ Ivanov, I. V., and Chernyansky, S. S., *op. cit.*, 1996.

climatic landscape in the southern Urals. Unlike the Volga steppes, where these changes did not lead to a significant displacement of climatic zones¹⁵, the Trans-Uralian steppes, naturally colder and more arid, saw significant change. The increased aridity meant a significant decrease in marsh-like areas, favoured by pastoralists as winter refuge, due to abundant forage¹⁶. In turn, this led to a significant increase in competition for locations, prompting some groups to settle near them.

Groups of Poltavka and Abashevo pastoralists began to settle in key locations near marshlands. It is relevant that most of the Sintashta settlements, despite their obvious need for protection, were located on the fringes of the floodplains of small and medium rivers, sacrificing the added protection offered by higher ground. This shows that the primary concern of these populations was not the protection of the settlement itself, but rather the protection of the access to marshland.

Even the smallest of these settlements was heavily fortified (Chernorech'ye III, approx. six structures). This suggests a state of endemic warfare. It is not possible to identify one single reason for this conflict. The simplest explanation would be competition between hostile tribal groups for the same resources. However, this might not be the only reason.

Sintashta type settlements specialized in metallurgical production. Almost every structure excavated at major settlements showed remains of smelting furnaces and slag from copper ore (fig.2). The great majority of bronze objects were made with arsenical bronze, avg. 1-1.25% arsenic, with only 2% of objects excavated made of tin bronze. From a mining site of Vorovskaya Yama, east of the Ural River, an estimated six thousand tons of quartzitic rock was extracted for the ground¹⁷. This intense production meant a great demand for metal. These levels

¹⁵ Koryakova, L. N. and A. V. Epimakhov, *op. cit.*, p. 8.

¹⁶ Anthony, D. W., *The Horse, the Wheel and Language*, Princeton, Princeton University Press, 2007, p. 389.

¹⁷ *Idem*, pp. 391-392.

of production suggest foreign trade, rather than an exclusive domestic use. That seemed to be the case.

The shift in production visible in Late Bronze Age steppe settlements can be understood as part of a much broader process, which also includes South Central Asia urban complexes

Of all the bronze objects unearthed at Sintashta sites, only 2% were made of tin bronze. The reason for this is the extreme scarceness of tin throughout the old world. However, tin was one of the most important commodities in Near East and Mesopotamia.

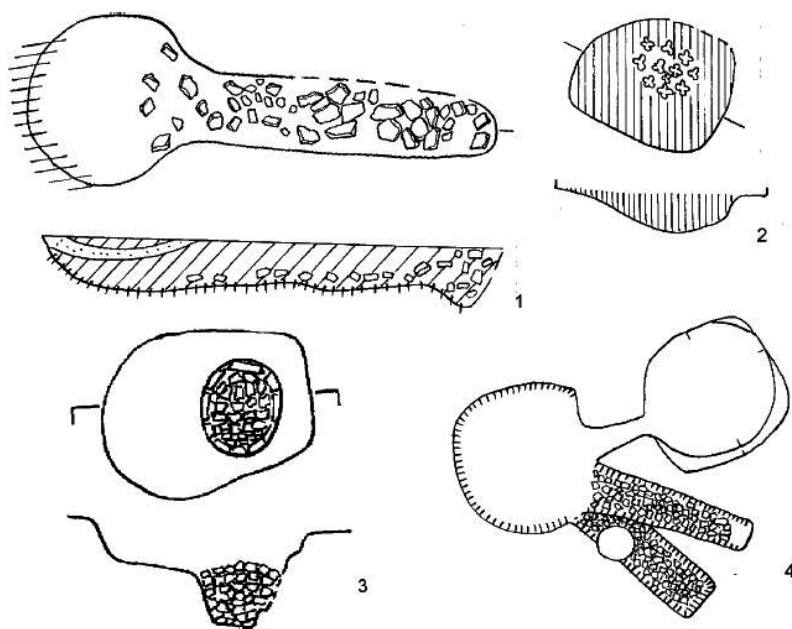


Fig. 2: The furnaces of Sintashta settlements 1, 3, 4 – Arkaim, 2 – Sintashta.¹⁸

The origin of the tin imported to the Near East and Mesopotamia is still under debate. J. E. Dayton¹⁹ lists several possible locations for

¹⁸ Grigoryev, S. A., *The Investigation of Bronze Age Metallurgical Slags of the Sintashta Culture in the Southern Ural*, Chelyabinsk, Russia, Southern Ural Branch of History and Archaeology Institute UB of the Russian Academy of Sciences, 1999.

¹⁹ Dayton, J. E., "The Problem of Tin in the Ancient World", *World Archaeology* 3/1 (1971), pp. 49-70.

the sources of tin traded in the Near East, and concludes that it lies in Europe. That might have been the case, considering Europe had vast deposits of tin or copper ore with high percentages of tin. However, this poses a problem. By the author's own admission, most of the European sites were not explored by the end of the 3rd millennium²⁰. On the other hand, evidence suggests that significant quantities of tin were imported to Anatolia and the Near East from the *east*, not the *west*. This does not mean that there was no tin being imported from Europe, but that there was another source available.

After 2000 B.C., tin was exported to Anatolia from northern Syria, while Mari imported its tin from Anshan and Susa, in Elam²¹. Although the source of the northern Syrian tin is not known, it is possible that it might be the same as in Mari. An alternative source for tin is the Indus valley cities of Mohenjo-Daro and Harappa. About 30% of tested bronze objects found in Mohenjo-Daro and Harappa were made of tin bronze, despite in low percentages (70% had a 1% tin to a 99% copper ratio). Tin bronzes were found in sites in Oman, in the Arabian Peninsula, in conjunction with other imports from the Indus²². This opens the possibility that some of the tin used in Mesopotamia and Near East had its origin in the Indus Valley.

However, this also raises a problem: neither Elam nor the Indus valley cities had significant tin deposits available. Therefore, one must conclude that they also imported tin from elsewhere. The most probable origin for the tin imported by Elam and Mohenjo-Daro and Harappa is the Zeravshan River valley, where the oldest known tin mines were found. Evidence shows the existence of links between this region and Sintashta type steppe cultures, at least since c.2100 B.C. In upper Zeravshan, cheek-pieces, found in a burial site at Zardcha-Khalifa, are direct copies of the ones found in Sintashta. Furthermore, a closer link can be found between the two regions. Ceramic found at the settlement

²⁰ *Idem*, pp. 54-58.

²¹ Anthony, D. W., *op. cit.*, pp. 418-419.

²² *Idem*, p. 419.

of Tugaj is very similar to the one seen in Petrovka culture sites, a variant of Sintashta culture in Northern Kazakhstan²³. However, that which might be the best evidence regarding the exchanges between both cultures are the appearance of horses and horse motifs in the southern urban societies after c. 2000 B.C.

Considering that many settlements seem to have been abandoned around 2000 BC, most notably the sites of Sarazm and Zaman Baba, some authors have suggested an actual migration of steppe peoples to this region at the time²⁴. That might have been the case. Prior to c.2000 B.C., bronze objects found at Bactria-Margiana Archaeological Complex (BMAC) sites tended to be made with arsenical bronze, while other metal objects were made of either unalloyed copper or a 8-10% lead copper alloy. However, after 2000 B.C. tin bronze became much more common in BMAC sites, reaching over 50% of the objects in some cases. However, this is true only in Bactrian sites. In Margiana sites, tin bronze remained a rare commodity²⁵. This might be explained by the proximity between Bactrian sites and the Zeravshan river valley. This allows for two different conclusions. First, considering that no tin was found in Zeravshan sites before the 2nd millennium B.C., it is possible to conclude that the mines began to operate c. 2000 B.C., closely after the establishment of Sintashta steppe cultures in northern Kazakhstan and shortly before the appearance of Petrovka culture pottery in the region. Secondly, there was direct trade between Bactrian BMAC towns and Zeravshan settlements.

Considering that the BMAC towns had extensive contacts with both the Iranian Plateau and with the Indus Valley, a possible tin trade route emerges. Tin gathered at Zeravshan river valley, either by Petrovka miners, or at the very least, by populations with close contact with

²³ Masson, V. M., "Cultures of the Steppe Bronze Age and Urban Civilizations in the South of Central Asia" in *Complex Societies of Central Asia from the 3rd to the 1st Millennium BC*, 2 vols. (JIES Monograph 46), Washington – Chelyabinsk, The Institute for the Study of Man / Institute of History and Archeology: Ural Branch of the Russian Academy of Sciences, Chelyabinsk State University, 2002, pp. 548-549.

²⁴ Anthony, D. W., *op. cit.*, p. 421.

²⁵ *Idem*, p. 425.

Sintashta-type cultures, was transported to the south, through BMAC towns, until it reached either Elam or Mohenjo-Daro and Harappa. This places the steppe cultures of southeast Urals at the beginning of an important trade route. This explains the major shift in production, as well as the extreme specialization, observed in Sintashta-type settlements in the early 2nd millennium B.C. By c. 2100 B.C., Sintashta sites were no longer herding settlements, but heavily fortified, highly specialized, metallurgical military complexes. This does not contradict the current knowledge of the Sintashta culture metallurgy. Being closely linked with Abashevo metallurgy, it represents the last remnants of the Circumpontic metal tradition, while at the same time reflecting the beginning of the Eurasian technocultural network. This stage of affairs, later fuelled by the Seima-Turbino transcultural phenomenon, led to the fully development of bronze metallurgy in Eastern Europe forest zone.

As mentioned earlier, the initial stimulus for permanent settlement came from the need to secure critical resources in a time of scarceness, brought by climatic change. Between 2100 and 1800 B.C. more than 20 fortified settlements were created between the Ural and Topol rivers²⁶. The high proliferation of settlements indicates fierce competition for the available resources, while the presence of fortifications suggests that numbers alone were not enough to protect a certain location. These circumstances indicate a change in warfare. Traditionally, steppe warfare between nomadic groups was limited to cattle raiding and tribal skirmishes. However, if that was the case in the Sintashta period, the concentration of several groups in one settlement would be sufficient to deter any further hostilities, and thus, render the fortifications unnecessary. However, that was not the case. Not only were the settlements heavily fortified, there is evidence that there was fierce competition between hostile groups, not for the control of the settlement itself, but for its location. G. B. Zdanovich and

²⁶ *Idem*, p. 390.

I. M. Batanina²⁷ have demonstrated that newly-arrived populations preferred to raze previous settlements and then proceed to build on the same location, rather than build a new settlement in a new location:

«It is interesting to note that it would have seemed preferable for the newly arrived population to build a new fortified center in a new site, even if it is near the old one. However, this did not happen. The bearers of the new geometrical symbols ruined the old structures with their own buildings and intentionally crossed them to create their own original settlement landscape.»²⁸

This shows that, despite its impressive fortifications, there were warring groups strong enough to take and destroy an entire settlement. This was an age of fully-fledged conflict: «"Squares" demonstrate an especially "hostile" attitude towards "ovals" and "circles". The destroyed circumferences are at the bottom of the cultural layers of the square settlements Rodniki, Stepnoe, Ustye, probably Kamysty, and Chekatai. Aerial photographs show the imposition of different defence systems and help to suggest the succession of changes in the settlements planning schemes.»²⁹

The necessity to control key locations in order to secure access to critical resources, combined with a constant flow of wealth originating from long-distance metal trade, made possible the formation of alliances and the gathering of large groups of warriors, thus creating a vicious circle of escalation in conflict, which in turn led to an exponential increase in the intensity of warfare.

²⁷ Zdanovich, G. B.; Batanina, I. M., "Planography of the Fortified Centers of the Middle Bronze Age in the Southern Trans-Urals According to Aerial Photography Data" in *Complex Societies of Central Asia from the 3rd to the 1st Millennium BC*, 2 vols. (JIES Monograph 46), Washington – Chelyabinsk, The Institute for the Study of Man / Institute of History and Archeology: Ural Branch of the Russian Academy of Sciences, Chelyabinsk State University, 2002, pp. 121 - 138

²⁸ *Idem*, p. 124.

²⁹ *Ibidem*. "Squares", "ovals", and "circles" refer to different groups of people, categorized according to the geometrical shape of their defensive system.

The state of intense warfare, fuelled by a constant flow of wealth, became the breeding grounds for new customs, new tactics, and new weapons. This increase in conflict can be seen in the Sintashta culture graves. For the first time in the region, large deposits of weapons are found buried next to human remains. Earlier burials seldom displayed weapons, and in the rare cases when that happened, mainly in Abashevo graves, it was limited to a single axe or projectile weapon. In contrast, in Sintashta culture graves, a great number of different weapons can be found, as well as numerous projectile points. At the same time, the frequency of weapons burials increased drastically. David Anthony suggests an increase from less than 10% of all graves containing weapons in earlier Bronze Age cultures, to a maximum of 54% of adult graves in Sintashta culture graves.³⁰

Another clear indicator of increased conflict is the emergence of new weapons. This development in armaments can best be seen in projectile points. Older lanceolate arrowheads with flat bases became longer. A new type of projectile-stemmed point appeared, consisting of a long (avg. 4-10 cm long) blade with a thick medial ridge. Being stemmed, it was probably used in javelins rather than in arrows. Besides these projectile points, a new type of socketed spear head, made of bronze or copper and heavier than its predecessors was also found³¹. Because of its mass and weight, this spearhead might have been used in close combat rather than as a throwing weapon. In this period of martial technological development, the war chariot might have arisen.

According to Littauer and Crouwel, the war chariot is a superfluous artefact in the steppe, mainly because of the existence of a more suitable alternative, the horse. That might have been the case in conventional tribal warfare, consisting on occasional skirmishes and cattle raids. This type of conflict is characterized by small and quick engagements. Rather than being used as a weapons platform, the horse was probably used to create a surprise element, and later a swift retreat. In comparison

³⁰ Anthony, D. W., *op. cit.*, p. 395.

³¹ *Ibidem.*

with modern-day horses, Bronze Age horses were little more than sturdy ponies. While some could carry a man, they certainly could not endure the hardships of battle. They could not carry a fully armoured warrior for long periods of time, and being an animal with a fight or flight response heavily geared towards flight, in the case of mares and geldings, or of extreme aggression, in the case of stallions; it would be extremely difficult to manage in any sort of formation or tactical use. While this was no serious drawback in earlier tribal warfare, when the horse served as transportation to light-armoured warriors, during the Sintashta period, where large-scale battles were fought between large groups of organized, and judging by their graves, heavily-armed troops, the horse simply could not be used effectively in the battlefield. It was possible to use it as a mount, but it wasn't possible to use it as *cavalry*.

It is reasonable to expect that Sintashta warriors were aware of the horses' potential as a weapon. However, a way to circumvent its natural limitations had to be found before horses could be used to full effect on the battlefield. The chariot is the solution to this problem.

Therefore, the war chariot, rather than a superfluous object in the steppe, is a much-needed war machine that allowed horses to be deployed on the battlefield, during a time of endemic large-scale conflict. At the time, the necessity was far greater on the steppe than in the Near East, thus providing a stimulus for its local development.

That seems to have been the case. The discrepancy (fig. 3) in size of known steppe war chariots has been interpreted by Littauer and Crouwel as a sign of its inadequacy as a war machine, discarding them as imitations of Near Eastern ones.

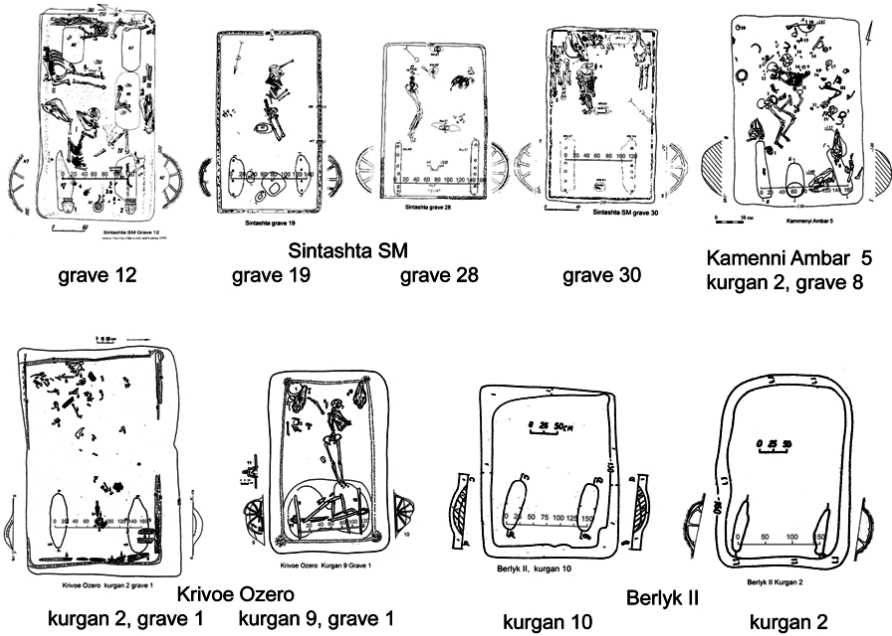


Fig. 3: Gauge discrepancies in different steppe chariots.³²

However, these discrepancies, if anything, suggest experimentation with a new technology, rather than imitation of an already-established one.

Chariots and draught teams are difficult and expensive to maintain. However, considering that Sintashta society relied heavily in the control of critical locations and long distance trade, it is expected that whoever controlled these two factors had the means to maintain chariot troops. It is safe to assume the existence of a military elite in Sintashta settlements, if for no other reason, because of its graves.

At present, all of Sintashta culture funerary sites are marked with kurgans, with the exception of Sintashta's SM and SII funeral complexes. The layout of the graves inside the funerary space, limited by a circular perimeter, reflects the hierarchical nature of its society.

³² Anthony D. W.; Dorcas R. B., "The Secondary Products Revolution, Horse-Riding, and Mounted Warfare" (<http://users.hartwick.edu/anthonyd/harnessing%20horsepower.html> – November 2009).

Despite the fact that all graves share a common design, there are significant discrepancies in both size and content. The largest of all the graves (3-4m length) usually occupy the central area of the complex, with smaller and simpler graves surrounding them, interspersed with areas reserved for sacrificed animals.

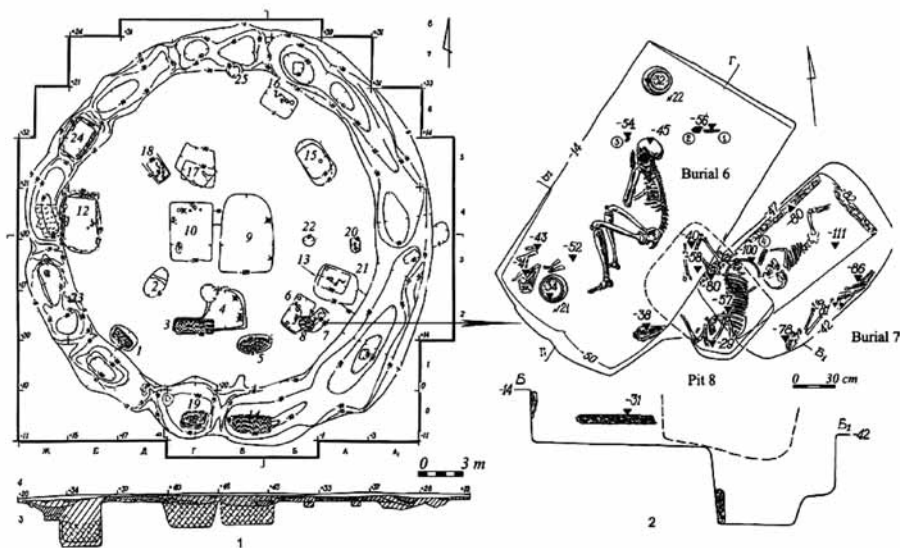


Fig. 4: Bolshekaranganski Kurgan (1) general plan and kurgan profile; (2) burials 6 and 7 and pit 8: general plan and profile (1 – knife and remains of scabbard; 2 – crystal; 3 – *astragali* [talus bone]).³³

All of the graves show remains of animal sacrifice, mostly domestic animals, but also wild canines, like wolves or foxes. The presence of horse remains in conjunction with chariot remains shows that not all of the sacrificed animals were meant as ritual food. The number and species of the sacrificed animals is also a clear indicator of status. Men were usually buried with a horse, while women and children were buried with small horned domestic animals. Furthermore,

³³ Zdanovich, D. G., “Arkheologiya kurgana 25 Bolshekaranganskogo mogilnika” in D. G. Zdanovich (ed.), *Arkaim nekropol*, Chelyabinsk, South Ural Press, 2002, pp. 17-110.

men's graves usually contain weapons, while women's graves tend to contain tools. It is interesting to note that the chariot graves contain an above average amount of weapons, which accounts for its martial importance³⁴. Furthermore, the great number of sacrificed animals found in certain graves³⁵ is proof of the importance of its occupant. A large number of sacrificed animals meant a large number of attendees at the funeral rites. With sacrifices of ten or more animals in certain graves, it is estimated an attendance of hundreds of people.³⁶

However, the lack of a separated necropolis, combined with the inexistence of evidence for a clear social differentiation on the settlements themselves, gives some insight into the nature of this military elite. It was highly symbolic, and operated inside a communal sphere. However, there is clearer evidence of this military elite and its nature. According to V. M. Masson:

«Judging by the presence of monumental cult complexes in Margiana (Gonur, Togolok) and Bactria (Dashly, Djarkutan), this tendency towards a theocratic form of social organization was also preserved in the urbanized societies of south Central Asia in the 2nd millennium BC.[...]Nevertheless, it is characteristic of that in the epoch of the Early Iron Age, when traditional urbanized centers of the Bronze Age become destitute, monumental temple complexes and rich glyptic inscriptions disappeared simultaneously. Citadels on powerful platforms were put in the foreground as organizational centers. This can prove military and aristocratic dominance in the way of politogenesis. Furthermore, due to the armed elite which moved in chariots, the military and aristocratic way of politogenesis [sic] was characteristic of steppe societies of the Sintashta-Arkaim period.»³⁷

³⁴ Koryakova, L. N. and Epimakhov, A. V., *op. cit.*, p. 78.

³⁵ Up to twelve (Stepnoye 7-4, Sintashta and Khripunovo cemeteries).

³⁶ Koryakova, L. N. and Epimakhov, A. V., *op. cit.*, p. 92.

³⁷ Masson, V. M., *op. cit.*, p. 553.

Masson identified a direct correlation between the organizational centres of a society and its political organization. During the Late Bronze Age, urban societies of Central Asia had their organizational centres in temple complexes, similar to early Sumerian city-states. However, during the early Iron Age, this system of organization changed, with the temple complexes being replaced by fortified citadels, of close similarity with the ones found in complex steppe societies of the previous period. Considering that there is a direct link between organizational centres and political organization, and that the late Central Asia Iron Age societies display the same organizational model (the same centres) as the earlier Bronze Age steppe societies, it is safe to assume that these also shared a common political system.

Therefore, one can conclude that the Sintashta societies were organized as military aristocracies, a system that was later implemented in central Asia, as groups of steppe dwellers began to migrate south. These migrations can be seen in the change of architecture and burial rites in the middle and late 2nd millennium BC. Not only did several Sintashta-Arkaim type settlements begin to appear further south, a new type of culture emerged, formed by elements of both cultures in symbiotic union (Vakhsh type cultures). Furthermore, in cemeteries in Bactria and Margiana, new types of graves appeared where stone laying and ceramic facing in the walls were reminiscence of northern burial types.³⁸

Ultimately, the war chariot was a much-needed artefact in the steppe, and the conditions required for its development were all gathered in the Sintashta steppes. The abundance of wealth and intensive warfare created the conditions for experimentation in both weapons and tactics. Despite the horse being used as a mount before, the advent of a new type of large-scale conflict created the need to circumvent the animal's natural limitations. This was accomplished by the development of the war chariot. Its martial potential was further

³⁸ *Idem*, p. 554.

enhanced by parallel developments in ranged weapons, the most significant of which is the introduction of a long-bladed javelin.

The steppe societies at the Sintashta region were of an extremely complex nature. The dissolution of the Circumpontic metallurgical network led to the development of a particular technology, characteristic to the Sintashta region, and shared by several settlements. This is proof of extensive and highly detailed contacts between different populations. Furthermore, there is definitive proof of contact with the urban societies of South Central Asia, which would facilitate long distance trade. Dismissing a possible steppe origin for the war chariot on the ground of its social simplicity alone is an oversimplification, and should be avoided. The organizational changes that occurred in steppe societies after c.2500 BC, in conjunction with contact with new urban cultures that led to interaction in long-distance trade systems, allowed for the development of military elites, which controlled great wealth, and thus could afford to train and maintain the highly-specialized chariot troops. This, however, should not be understood as definitive proof for a steppe origin. That is not the purpose of the present work. It merely states a possibility, often discarded by a simplistic approach to the problem. The extent and importance of the Sintashta findings is yet to be fully assessed by experts, and new evidence surfaces every day. Until such work is done, no definitive answer can be given to where the light war chariot truly originated.