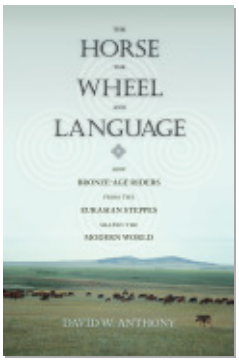
The Horse, the Wheel, and Language

David W. Anthony



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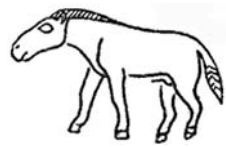
Chapter Fifteen



Chariot Warriors of the Northern Steppes

The publication of the book *Sintashta* in 1992 (in Russian) opened a new era in steppe archaeology.[1] Sintashta was a settlement east of the Ural Mountains in the northern steppes. The settlement and the cemeteries around it had been excavated by various archaeologists between 1972 and 1987. But only after 1992 did the significance of the site begin to become clear. Sintashta was a fortified circular town 140 m in diameter, surrounded by a timber-reinforced earthen wall with timber gate towers (figure 15.1). Outside the wall was a V-shaped ditch as deep as a man's shoulders. The Sintashta River, a western tributary of the upper Tobol, had washed away half of it, but the ruins of thirty-one houses remained. The original town probably contained fifty or sixty. Fortified strongholds like this were unprecedented in the steppes. A few smaller fortified settlements had appeared west of the Don (Mikhailovka, for example) during the Yamnaya period. But the walls, gates, and houses of Sintashta were much more substantial than at any earlier fortified site in the steppes. And inside each and every house were the remains of metallurgical activity: slag, ovens, hearths, and copper. Sintashta was a fortified metallurgical industrial center.

Outside the settlement were five funerary complexes that produced spectacular finds (figure 15.2). The most surprising discoveries were the remains of chariots, which radiocarbon dates showed were the oldest chariots known anywhere. They came from a cemetery of forty rectangular grave pits without an obvious kurgan labeled SM for *Sintashta mogila*, or *Sintashta cemetery*. The other four mortuary complexes were a mid-size kurgan (SI, for *Sintashta I*), 32 m in diameter and only 1 m high, that covered sixteen graves; a second flat or non-kurgan cemetery (SII) with ten graves; a second small kurgan (SIII), 16 m in diameter, that covered a single grave containing the partial remains of five individuals; and finally a huge kurgan, 85 m in diameter and 4.5 m high (SB, for *Sintashta bolshoi kurgan*), built over a central grave (robbed in antiquity) constructed of logs and sod on the

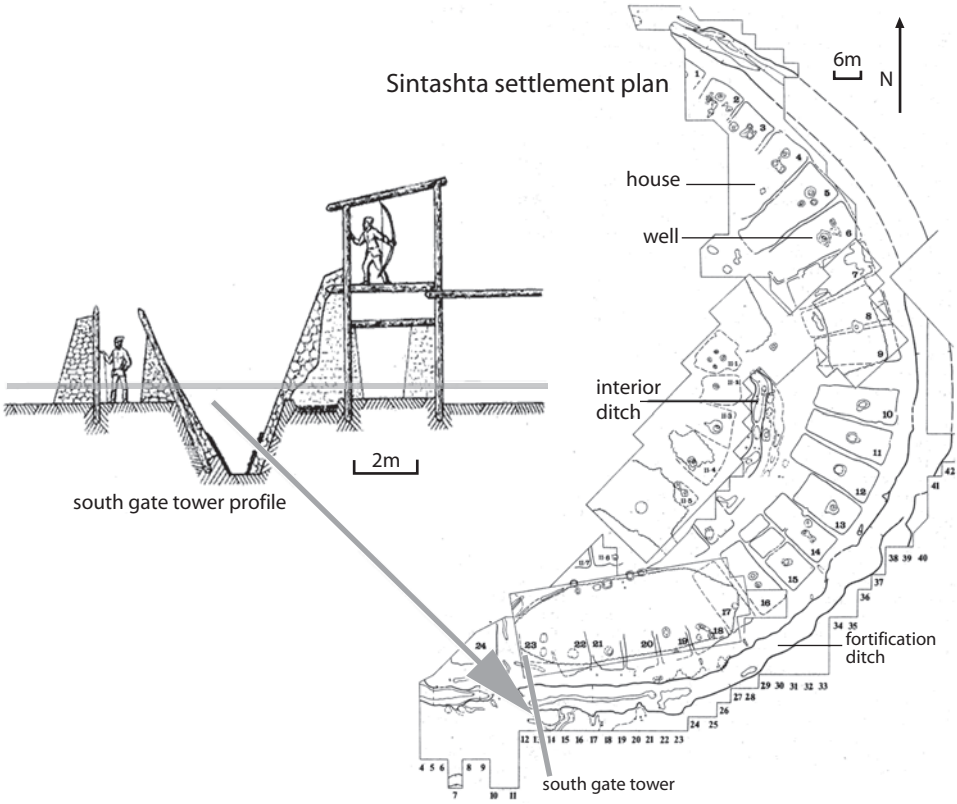


Figure 15.1 The Sintashta settlement: rectangular houses arranged in a circle within a timber-reinforced earthen wall, with excavators' reconstruction of south gate tower and outer defense wall. After Gening, Zdanovich, and Gening 1992, figures 7 and 12.

original ground surface. The southern skirt of the SB kurgan covered, and so was later than, the northern edge of the SM cemetery, although the radiocarbon dates suggest that SM was only slightly older than SB. The forty SM graves contained astounding sacrifices that included whole horses, up to eight in and on a single grave (gr. 5), with bone disc-shaped cheekpieces, chariots with spoked wheels, copper and arsenical bronze axes and daggers, flint and bone projectile points, arsenical bronze socketed spearheads, polished stone mace heads, many ceramic pots, and a few small silver and gold ornaments (figure 15.3). What was impressive in these graves was weaponry, vehicles, and animal sacrifices, not crowns or jewelry.

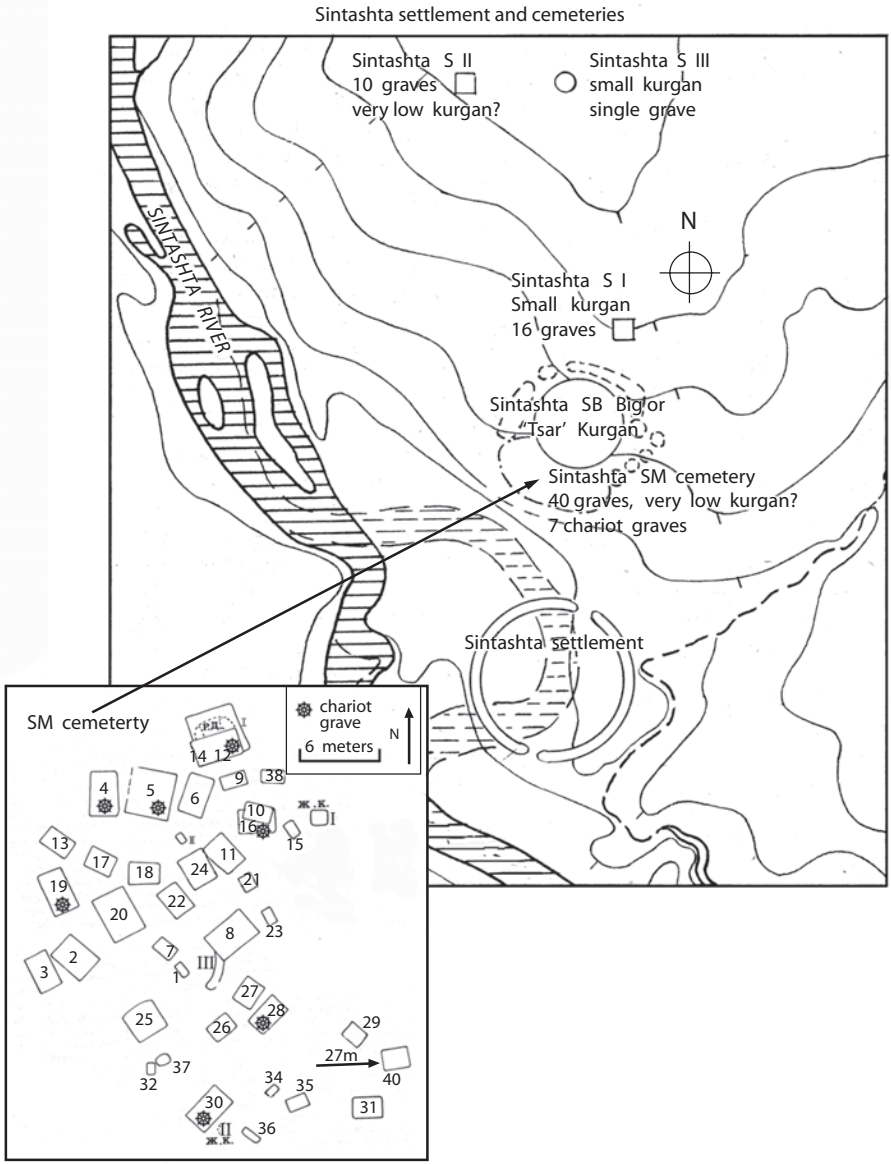


Figure 15.2 The Sintashta settlement landscape, with associated cemeteries, and detail of the SM cemetery. After Gening, Zdanovich, and Gening 1992, figures 2 and 42.

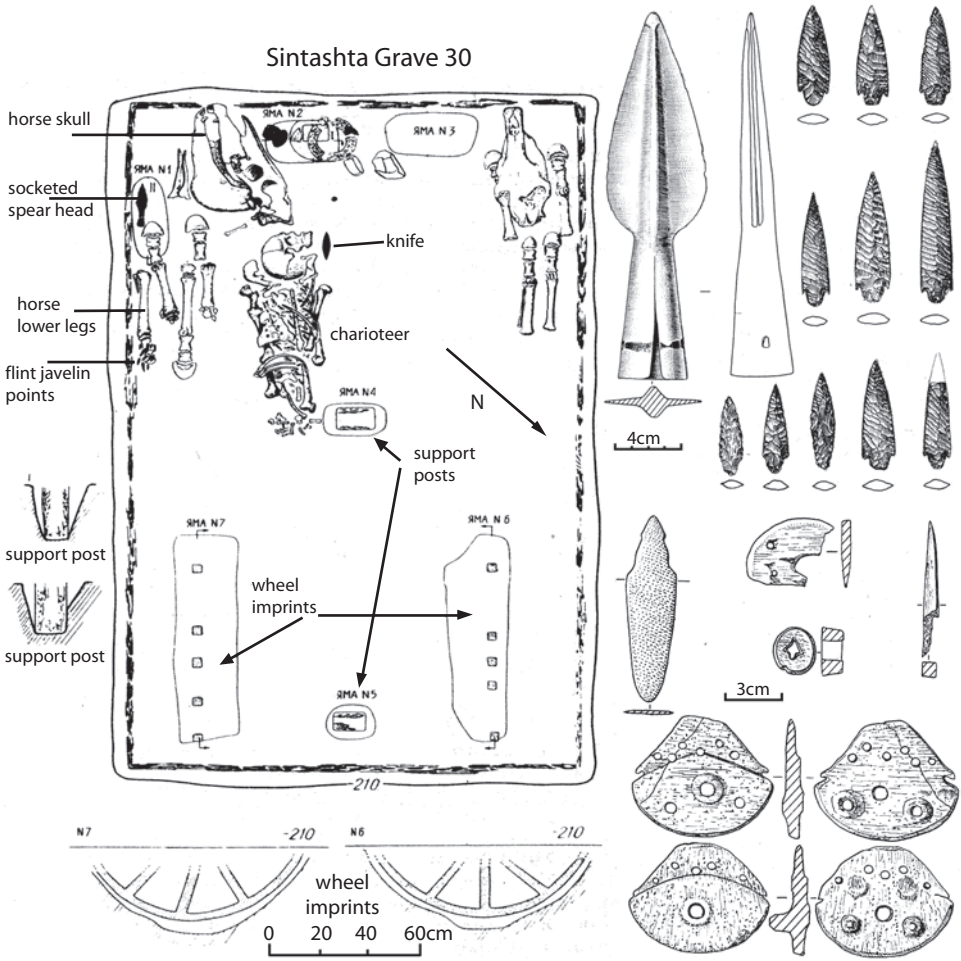


Figure 15.3 Sintashta SM cemetery, grave 30, with chariot wheel impressions, skulls and lower leg bones of horse team, cheekpieces for bits, and weapons. After Gening, Zdanovich, and Gening, figures 111, 113, and 114.

The radiocarbon dates for both the cemeteries and the settlement at Sintashta were worryingly diverse, from about 2800–2700 BCE (4200+100 BP), for wood from grave 11 in the SM cemetery, to about 1800–1600 BCE (3340+60BP), for wood from grave 5 in the SII cemetery. Probably there was an older Poltavka component at Sintashta, as later was found at many other sites of the Sintashta type, accounting for the older dates. Wood from the central grave of the large kurgan (SB) yielded consistent

dates (3520+65, 3570+60, and 3720+120), or about 2100–1800 BCE. The same age range was produced by radiocarbon dates from the similar settlement at Arkaim, from several Sintashta cemeteries (Krivoe Ozero, Kammeny Ambar), and from the closely related graves of the Potapovka type in the middle Volga region (table 15.1).

The details of the funeral sacrifices at Sintashta showed startling parallels with the sacrificial funeral rituals of the *Rig Veda*. The industrial scale of metallurgical production suggested a new organization of steppe mining and metallurgy and a greatly heightened demand for copper and bronze. The substantial fortifications implied surprisingly large and determined attacking forces. And the appearance of Pontic-Caspian kurgan rituals, vehicle burials, and weapon types in the steppes east of the Ural River indicated that the Ural frontier had finally been erased.

After 1992 the flow of information about the Sintashta culture grew to a torrent, almost all of it in Russian and much of it still undigested or actively debated as I write.[2] Sintashta was just one of more than twenty related fortified settlements located in a compact region of rolling steppes between the upper Ural River on the west and the upper Tobol River on the east, southeast of the Ural Mountains. The settlement at Arkaim, excavated by G. B. Zdanovich, was not damaged by erosion, and twenty-seven of its fifty to sixty structures were exposed (figure 15.4). All the houses at Arkaim contained metallurgical production facilities. It has become a conference center and national historic monument. Sintashta and Arkaim raised many intriguing questions. Why did these fortified metal-producing towns appear in that place at that time? Why the heavy fortifications—who were they afraid of? Was there an increased demand for copper or just a new organization of copper working and mining or both? Did the people who built these strongholds invent chariots? And were they the original Aryans, the ancestors of the people who later composed the *Rig Veda* and the *Avesta*?[3]

The End of the Forest Frontier: Corded Ware Herders in the Forest

To understand the origins of the Sintashta culture we have to begin far to the west. In what had been the Tripolye region between the Dniester and Dnieper rivers, the interaction between Corded Ware, Globular Amphorae, and Yamnaya populations between 2800 and 2600 BCE produced a complicated checkerboard of regional cultures covering the rolling hills and valleys of the forest-steppe zone (figure 15.5). To the south, in the

Table 15.1
Selected radiocarbon dates for the Sintashta–Arkaim (S) and Potapovka (P) cultures in the south Ural steppes and middle Volga steppes.

Lab Number	*BP Date*	*Sample Source*	*C, K*	*Calibrated Date*
Sintashta SB Big Kurgan (S)				
GIN-6186	3670±40	birch log		2140–1970 BCE
GIN-6187	3510±40	"		1890–1740 BCE
GIN-6188	3510±40	"		1890–1740 BCE
GIN-6189	3260±40	"		1610–1450 BCE
Sintashta SM cemetery (S)				
Ki-653	4200±100	grave 11, wood	K	2900–2620 BC
Ki-658	4100±170	grave 39, wood	K	2900–2450 BC
Ki-657	3760±120	grave 28, wood	C	2400–1970 BC
Ki-864	3560±180	grave 19, wood	C	2200–1650 BCE
Ki-862	3360±70	grave 5, wood	C, K	1740–1520 BC
Krivoe Ozero cemetery, kurgan 9, grave 1 (S)				
AA-9874b	3740±50	horse 1 bone	C, K	2270–2030 BC
AA-9875a	3700±60	horse 2 bone		2200–1970 BC
AA-9874a	3580±50	horse 1 bone		2030–1780 BC
AA-9875b	3525±50	horse 2 bone		1920–1750 BC
Kammeny Ambar 5 (S)				
OxA-12532	3604±31	k2: grave 12, human bone		2020–1890 BCE
OxA-12530	3572±29	k2: grave 6, "	K	1950–1830 BCE
OxA-12533	3555±31	k2: grave 15, "		1950–1780 BCE
OxA-12531	3549±49	k2: grave 8, "	C, K	1950–1770 BCE
OxA-12534	3529±31	k4: grave 3, "		1920–1770 BCE
OxA-12560	3521±28	k4: grave 1, "		1890–1770 BCE
OxA-12535	3498±35	k4: grave 15, "		1880–1740 BCE
Utyevka cemetery VI (P)				
AA-12568	3760±100	k6: grave 4, human bone	K	2340–1980 BC
OxA-4264	3585±80	k6: grave 6, human bone		2110–1770 BC
OxA-4306	3510±80	k6: grave 4, human bone	K	1940–1690 BC
OxA-4263	3470±80	k6: grave 6, human bone	K	1890–1680 BC
Potapovka cemetery I (P)				
AA-12569	4180±85	k5: grave 6, dog bone*		2890–2620 BC

Table 15.1 (*continued*)

Lab Number	*BP Date*	*Sample Source*	*C, K*	*Calibrated Date*
AA–47803	4153±59	k.3: grave 1, human bone*		2880–2620 BC
OxA–4265	3710±80	k5: grave 13, human bone		2270–1960 BC
OxA–4266	3510±80	k5: grave 3, human bone		1940–1690 BC
AA–47802	3536±57	k.3: grave 1, horse skull*		1950–1770 BC
Other Potapovka cemeteries (P)				
AA–53803	4081±54	Kutuluk I, k1:1, human bone		2860–2490 BC
AA–53806	3752±52	Grachevka II k5:3, human bone		2280–2030 BC

*See note 17

Graves that contained chariots are marked C; graves that contained studded disc cheekpieces are marked K.

steppes, late Yamnaya and a few late Usatovo groups continued to erect kurgan cemeteries. Some late Yamnaya groups penetrated northward into the forest-steppe, up the Dniester, South Bug, and Dnieper valleys. Eastern Carpathian groups making Globular Amphorae pottery moved from the upper Dniester region around Lvov eastward into the forest-steppe around Kiev, and then retreated back to the Dniester. Corded Ware groups from southern Poland replaced them around Kiev. Under the influence of this combined Globular Amphorae and Corded Ware expansion to the east, the already complex mixture of Yamnaya-influenced Late Tripolye people in the Middle Dnieper valley created the Middle Dnieper culture in the forest-steppe region around Kiev. This was the first food-producing, herding culture to push into the Russian forests north of Kiev.[4]

The Middle Dnieper and Fatyanovo Cultures

The people of the Middle Dnieper culture carried stockbreeding economies (cattle, sheep, and pigs, depending on the region) north into the forest zone, up the Dnieper and Desna into what is now Belarus (figure 15.5). They followed marshes, open lakes, and riverine floodplains where there were natural openings in the forest. These open places had grass and reeds for the animals, and the rivers supplied plentiful fish. The earliest Middle Dnieper sites are dated about 2800–2600 BCE; the latest ones continued to about 1900–1800 BCE.[5] Early Middle Dnieper pottery showed clear similarities with Carpathian and eastern Polish Corded

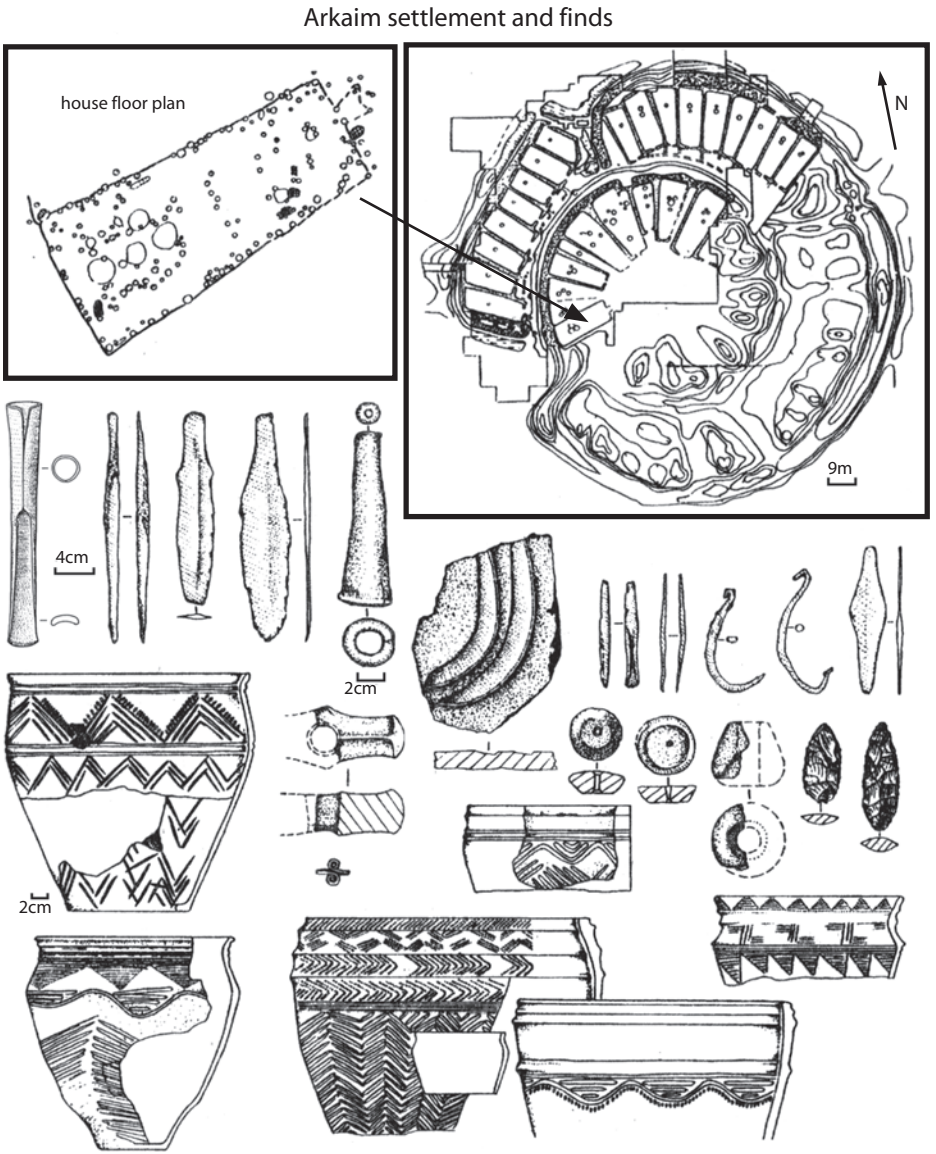


Figure 15.4 Arkaim settlement, house plan, and artifacts, including a mold for casting curved sickle or knife blades. After Zdanovich 1995, figure 6.

Figure 15.5 Culture groups of the Middle Bronze Age, 2800–2200 BCE.

Ware pottery, and Middle Dnieper pots have been found in Corded Ware graves near Grzeda Sokalska between the upper Dniester and the upper Vistula.[6] Some late Sredni Stog or Yamnaya elements also appeared in Middle Dnieper ceramics (figure 15.6). Middle Dnieper cemeteries contained both kurgans and flat-graves, both inhumation burials and cremations, with hollow-based flint arrowheads like those of the Yamnaya and Catacomb cultures, large trapezoidal flint axes like Globular Amphorae, and drilled stone "battle-axes" like those of the Corded Ware cultures. The Middle Dnieper culture clearly emerged from a series of encounters and exchanges between steppe and forest-steppe groups around Kiev, near the strategic fords over the Dnieper.[7]

A second culture, Fatyanovo, emerged at the northeastern edge of the Middle Dnieper culture. After the cattle herders moved out of the south-flowing Dnieper drainage and into the north-flowing rivers such as the Oka that coursed through the pine-oak-birch forests to the Upper Volga, they began to make pottery in distinctive Fatyanovo forms. But Fatyanovo pottery still showed mixed Corded Ware/Globular Amphorae traits, and the Fatyanovo culture probably was derived from an early variant of the Middle Dnieper culture. Ultimately Fatyanovo-type pottery, graves, and the cattle-raising economy spread over almost the entire Upper Volga basin. In the enormous western part of the Fatyanovo territory, from the Dvina to the Oka, very few Fatyanovo settlements are known, but more than three hundred large Fatyanovo flat-grave cemeteries, without kurgans, have been found on hills overlooking rivers or marshes. The Late Eneolithic Volosovo culture of the indigenous forest foragers was quite different in its pottery, economy, and mortuary customs. It disappeared when the Fatyanovo pioneers pushed into the Upper and Middle Volga basin.

The Middle Dnieper and Fatyanovo migrations overlapped the region where river and lake names in Baltic dialects, related to Latvian and Lithuanian, have been mapped by linguists: through the upper and middle Dnieper basin and the upper Volga as far east as the Oka. These names indicate the former extent of Baltic-speaking populations, which once occupied an area much larger than the area they occupy today. The Middle Dnieper and Fatyanovo migrations probably established the populations that spoke pre-Baltic dialects in the Upper Volga basin. Pre-Slavic probably developed between the middle Dnieper and upper Dniester among the populations that stayed behind.[8]

As Fatyanovo groups spread eastward down the Volga they discovered the copper ores of the western Ural foothills, and in this region, around the lower Kama River, they created long-term settlements. The Volga-Kama region,

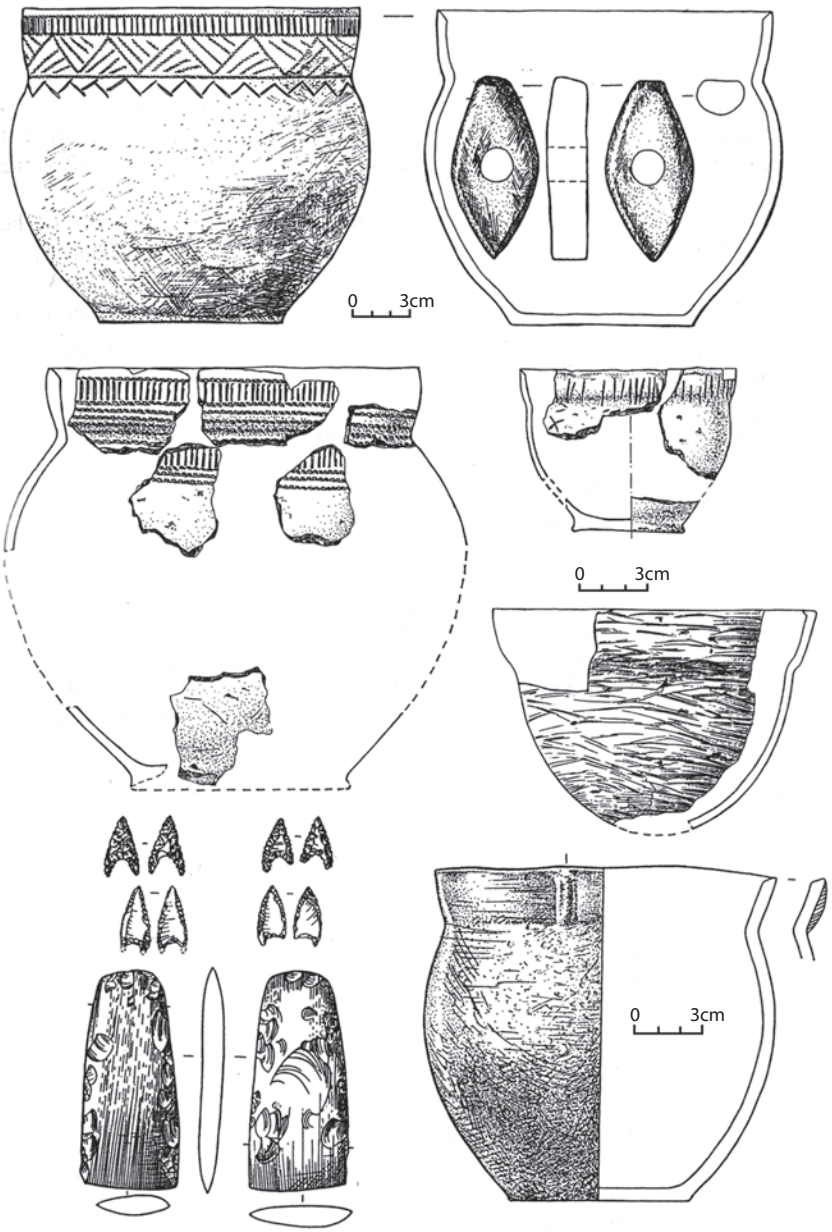


Figure 15.6 Ceramics and stone tools of the Middle Dnieper culture from sites in Belarus. After Kryvaltsevich and Kovalyukh 1999, figures 2 and 3.

which became the metallurgical heartland for almost all Fatyanovo metallurgy, has been separated from the rest of Fatyanovo and designated the Balanovo culture. Balanovo seems to be the settled, metal-working aspect of eastern Fatyanovo. At the southern fringe of Balanovo territory, in the forest-steppe zone of the middle Volga and upper Don where the rivers again flowed south, a fourth group emerged (after Middle Dnieper, Fatyanovo, and Balanovo). This was Abashevo, the easternmost of the Russian forest-zone cultures that were descended from Corded Ware ceramic traditions. The Abashevo culture played an important role in the origin of Sintashta.

The Abashevo Culture

Abashevo probably began about 2500 BCE or a little later. A late Abashevo kurgan at Pepkino on the middle Volga is dated 2400–2200 BCE (3850±95, Ki-7665); I would guess that the grave actually was created closer to 2200 BCE. Late Abashevo traditions persisted west of the Urals probably as late as 1900 BCE, definitely into the Sintashta period, since late Abashevo vessels are found in Sintashta and Potapovka graves. Early Abashevo ceramic styles strongly influenced Sintashta ceramics.

Abashevo sites are found predominantly in the forest-steppe zone, although a few extended into the northern steppes of the middle Volga. Within the forest-steppe, they are distributed between the upper Don on the west, a region with many Abashevo settlements (e.g., Kondrashovka); the middle Volga region in the center, represented largely by kurgan cemeteries (including the type-site, the Abashevo kurgan cemetery); and up the Belaya River into the copper-rich southwestern foothills of the Urals on the east, again with many settlements (like Balanbash, with plentiful evidence of copper smelting). More than two hundred Abashevo settlements are recorded; only two were clearly fortified, and many seem to have been occupied briefly. The easternmost Abashevo sites wrapped around the southern slopes of the Urals and extended into the Upper Ural basin, and it is these sites in particular that played a role in the origins of Sintashta.[9]

Some of the Volosovo foragers who had occupied these regions before 2500 BCE were absorbed into the Abashevo population, and others moved north. At the northern border of Abashevo territory, cord-impressed Abashevo and comb-stamped Volosovo ceramics are occasionally found inside the same structures at sites such as Bolshaya Gora.[10] Contact between late Volosovo and Abashevo populations west of the Urals probably helped to spread cattle-breeding economies and metallurgy into transitional northern forest cultures such as Chirkovska.

Whereas early Abashevo pottery looked somewhat like Fatyanovo/Balanovo Corded Ware, early Abashevo graves were covered by kurgans, unlike Fatyanovo flat cemeteries. Abashevo kurgans were surrounded by a circular ditch, the grave pit had ledges at the edges, and the body position was either contracted on the side or supine with raised knees—funeral customs derived from the Poltavka culture on the Volga. Abashevo ceramics also showed increasing decorative influences from steppe Catacomb-culture ceramic traditions, in both motifs (horizontal line-and-dot, horizontal fluting) and technology (shell tempering). Some Abashevo metal types such as waisted knives copied Catacomb and Poltavka types. A. D. Pryakhin, the preeminent expert on the Abashevo culture, concluded that it originated from contacts between Fatyanovo/Balanovo and Catacomb/Poltavka populations in the southern forest-steppe. In many ways, the Abashevo culture was a conduit through which steppe customs spread northward into the forest-steppe. Most Russian archaeologists interpret the Abashevo culture as a border culture associated with Indo-Iranian speakers, unlike Fatyanovo.[11]

Abashevo settlements in the Belaya River valley such as Balanbash contained crucibles, slag, and casting waste. Cast shaft-hole axes, knives, socketed spears, and socketed chisels were made by Abashevo metalsmiths. About half of all analyzed Abashevo metal objects were made of pure copper from southwestern Ural sandstone ores (particularly ornaments), and about half were arsenical bronze thought to have been made from southeastern Ural quartzitic ores (particularly tools and weapons), the same ores later exploited by Sintashta miners. High-status Abashevo graves contained copper and silver ornaments, semicircular solid copper and silver bracelets, cast shaft-hole axes, and waisted knives (figure 15.7). High-status Abashevo women wore distinctive headbands decorated with rows of flat and tubular beads interspersed with suspended double-spiral and cast rosette pendants, made of copper and silver. These headbands were unique to the Abashevo culture and probably were signals of ethnic as well as political status.[12]

The clear signaling of identity seen in Abashevo womens' headbands occurred in a context of intense warfare—not just raiding but actual warfare. At the cemetery of Pepkino, near the northern limit of Abashevo territory on the lower Sura River, a single grave pit 11 m long contained the bodies of twenty-eight young men, eighteen of them decapitated, others with axe wounds to the head, axe wounds on the arms, and dismembered extremities. This mass grave, probably dated about 2200 BCE, also contained Abashevo pottery, a two-part mold for making a shaft-hole axe

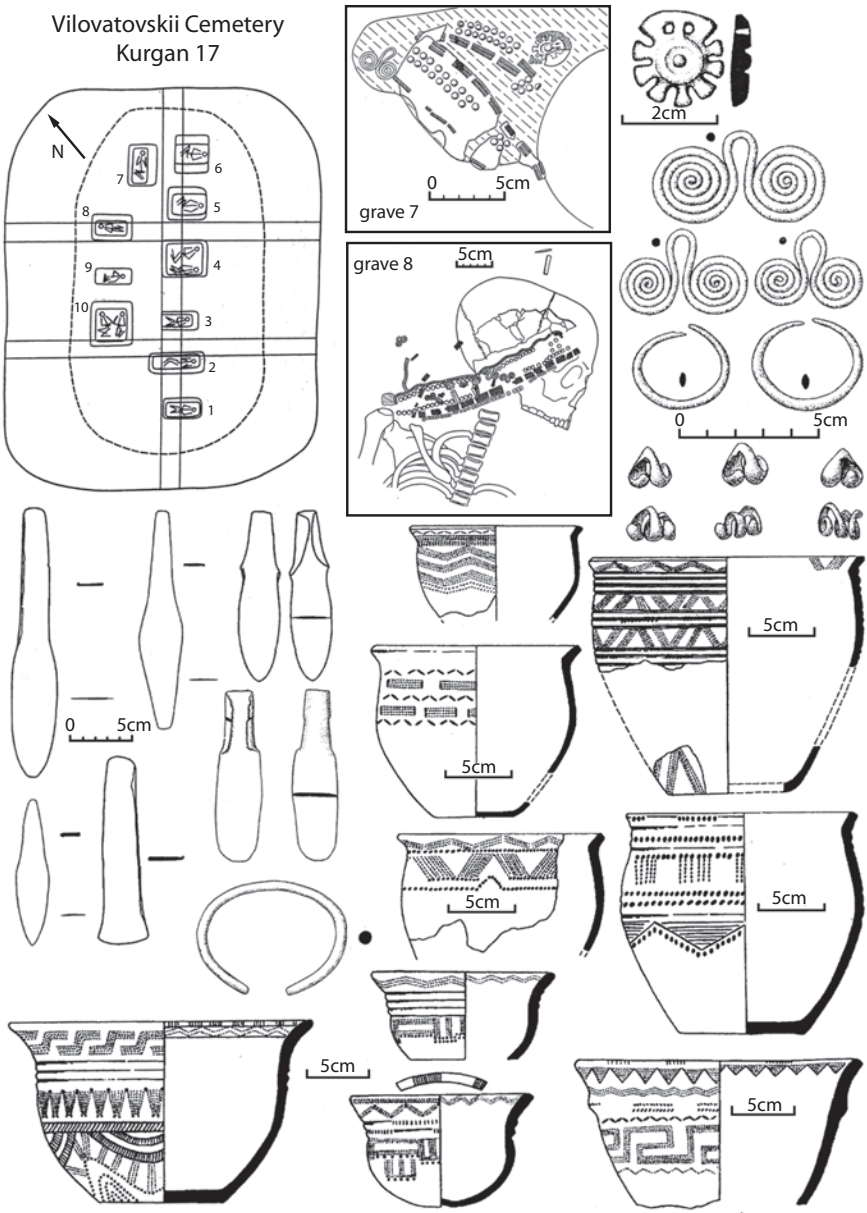


Figure 15.7 Abashevo culture graves and metal objects from the middle Volga forest-steppe (*upper left*), including distinctive cast copper rosettes; and ceramics from the south Ural region (*lower right*). After O. V. Kuzmina 1999, figures 23 and 24 (ceramics); and Bol'shov 1995, figure 13 (grave goods).

of Chernykh's Type V, and a crucible. It was covered by a single kurgan and so probably reflected a single event, clearly a serious battle or massacre. The absence of women or children in the grave indicates that it was not a settlement massacre. If it was the result of a battle, it implies a force of 280 to 560 on the Abashevo side alone, because deaths in tribal battles rarely reached 10% of the fighting force and usually were more like 5%.[13] Forces this size would require a considerable degree of inter-regional political integration. Intense warfare, perhaps on a surprising scale, was part of the political landscape during the late Abashevo era. In this context, the fortifications around Sintashta settlements and the invention of new fighting technologies—including the chariot—begin to make sense.

Linguists have identified loans that were adopted into the early Finno-Ugric (F-U) languages from Pre-Indo-Iranian and Proto-Indo-Iranian (Proto-I-I). Archaeological evidence for Volosovo-Abashevo contacts around the southern Urals probably were the medium through which these loans occurred. Early Proto-Indo-Iranian words that were borrowed into common Finno-Ugric included Proto-I-I **asura-* 'lord, god' > F-U **asera*; Proto-I-I **medʰu-* 'honey' > F-U **mete*; Proto-I-I **čekro-* 'wheel' > F-U **kekrä*; and Proto-I-I **arya-* 'Aryan' > F-U **orya*. Proto-Indo-Iranian **arya-*, the self designation "Aryan," was borrowed into Pre-Saami as **orja-,* the root of **oarji*, meaning "southwest," and of *ārjel*, meaning "southerner," confirming that the Proto-Aryan world lay south of the early Uralic region. The same borrowed **arya-* root developed into words with the meaning "slave" in the Finnish and Permic branches (Finnish, Komi, and Udmurt), a hint of ancient hostility between the speakers of Proto-Indo-Iranian and Finno-Ugric.[14]

Pre-Sintashta Cultures of the Eastern Steppes

Who lived in the Ural-Tobol steppes during the late Abashevo era, before the Sintashta strongholds appeared there? There are two local antecedents and several unrelated neighbors.

Sintashta Antecedents

Just to the north of the steppe zone later occupied by Sintashta settlements, the southern forest-steppe zone contained scattered settlements of the late Abashevo culture. Abashevo miners regularly worked the quartzitic arsenic-rich copper ores of the Ural-Tobol region. Small settlements of the Ural variant of late Abashevo appeared in the upper Ural River valley

and perhaps as far east as the upper Tobol. Geometric meanders first became a significant new decorative motif on Abashevo pottery made in the Ural region [see figure 15.7], and the geometric meander remained popular in Sintashta motifs. Some early Sintashta graves contained late Abashevo pots, and some late Abashevo sites west of the Urals contained Sintashta-type metal weapons and chariot gear such as disc-shaped cheekpieces that might have originated in the Sintashta culture. But Ural Abashevo people did not conduct mortuary animal sacrifices on a large scale, many of their metal types and ornaments were different, and, even though a few of their settlements were surrounded by small ditches, this was unusual. They were not fortified like the Sintashta settlements in the steppes.

Poltavka-culture herders had earlier occupied the northern steppe zone just where Sintashta appeared. The Poltavka culture was essentially a Volga-Ural continuation of the early Yamnaya horizon. Poltavka herding groups moved east into the Ural-Tobol steppes probably between 2800 and 2600 BCE. Poltavka decorative motifs on ceramics (vertical columns of chevrons) were very common on Sintashta pottery. A Poltavka kurgan cemetery (undated) stood on a low ridge 400 m south of the future site of Arkaim before that fortified settlement was built near the marshy bottom of the valley.[15] The cemetery, Aleksandrovska IV, contained twenty-one small (10–20 m in diameter) kurgans, a relatively large Poltavka cemetery (figure 15.8). Six were excavated. All conformed to the typical Poltavka rite: a kurgan surrounded by a circular ditch, with a single grave with ledges, the body tightly contracted on the left or right side, lying on an organic mat, red ochre or white chalk by the head and occasionally around the whole body, with a pot or a flint tool or nothing. A few animal bones occasionally were dropped in the perimeter ditch. A Poltavka settlement was stratified beneath the Sintashta settlement of Kuisak, which is intriguing because Poltavka settlements, like Yamnaya settlements, are generally unknown. Unfortunately this one was badly disturbed by the Sintashta settlement that was built on top of it.[16]

In the middle Volga region, the Potapovka culture was a contemporary sister of Sintashta, with similar graves, metal types, weapons, horse sacrifices, and chariot-driving gear (bone cheekpieces and whip handles), dated by radiocarbon to the same period, 2100–1800 BCE. Potapovka pottery, like Sintashta, retained many Poltavka decorative traits, and Potapovka graves were occasionally situated directly on top of older Poltavka monuments. Some Potapovka graves were dug right through preexisting Poltavka graves, destroying them, as some Sintashta strongholds were built on top of and incorporated older Poltavka settlements.[17] It is difficult to

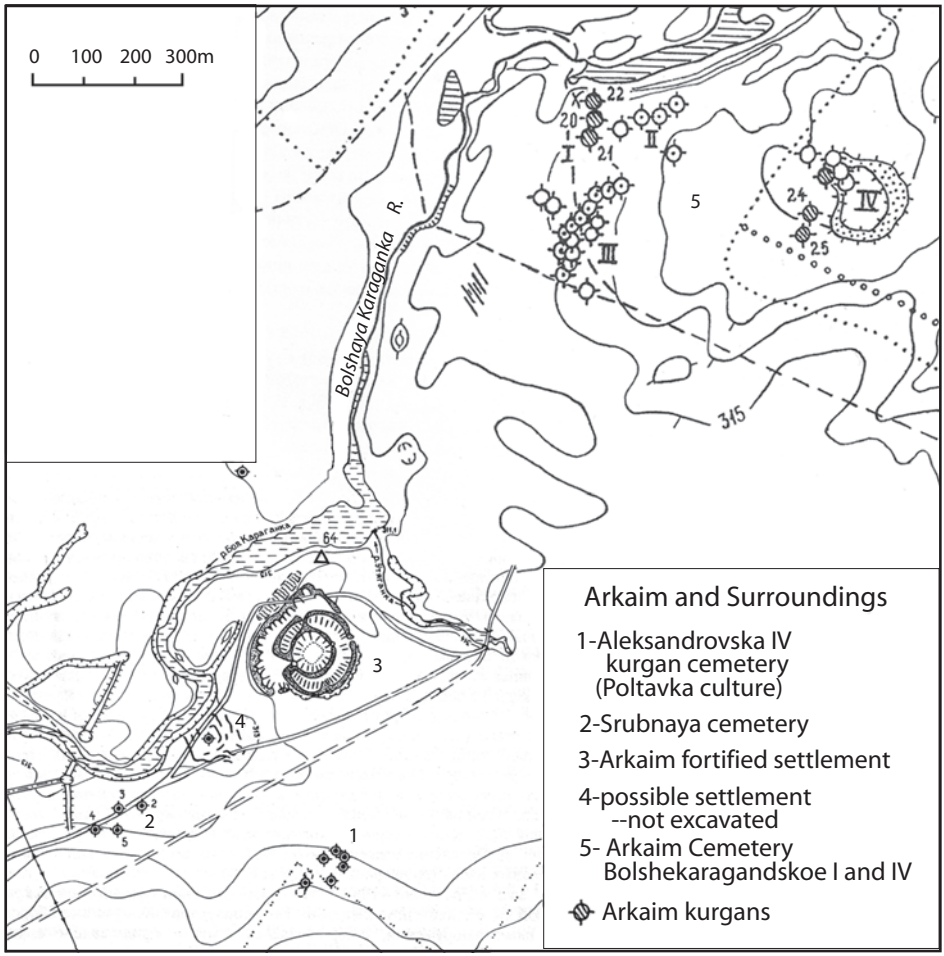


Figure 15.8 Arkaim settlement landscape with the kurgan cemeteries of Aleksandrovka IV (1), an older Poltavka cemetery of six kurgans; and Bolshekaragandskoe I and IV (5), with two excavated Sintashta-culture kurgans (24 and 25). Composite of Zdanovich 2002, Figure 3; and Batanina and Ivanova 1995, figure 2.

imagine that this was accidental. A symbolic connection with old Poltavka clans must have guided these choices.

Poltavka herders might have begun to explore across the vast Kazakh plains toward Sarazm, an outpost of Central Asian urban civilization established before 3000 BCE near modern Samarkand in the Zeravshan valley (see figure 16.1). Its northern location placed it just

beyond the range of steppe herders who pushed east of the Urals around 2500 BCE.[18]

Hunters and Traders in Central Asia and the Forest Zone

Between the Poltavka territory in the upper Tobol steppes and Sarazm in the Zeravshan Valley lived at least two distinct groups of foragers. In the south, around the southern, western, and eastern margins of the Aral Sea, was the Kelteminar culture, a culture of relatively sedentary hunters and gatherers who built large reed-covered houses near the marshes and lakes in the steppes and in the riverbank thickets (called *tugai* forest) of the Amu Darya (Oxus) and lower Zeravshan rivers, where huge Siberian tigers still prowled. Kelteminar hunters pursued bison and wild pigs in the *tugai*, and gazelle, onagers, and Bactrian camels in the steppes and deserts. No wild horses ranged south of the Kyzl Kum desert, so Kelteminar hunters never saw horses, but they caught lots of fish, and collected wild pomegranates and apricots. They made a distinctive incised and stamped pottery. Early Kelteminar sites such as Dingil'dzhe 6 had microlithic flint industries much like those of Dzhebel Cave layer IV, dated about 5000 BCE. Kelteminar foragers probably began making pottery about this time, toward the end of the sixth millennium BCE. Late Kelteminar lasted until around 2000 BCE. Kelteminar pottery was found at Sarazm (level II), but the Kyzl Kum desert, north of the Amu Darya River, seems to have been an effective barrier to north-south communication with the northern steppes. Turquoise, which outcropped on the lower Zeravshan and in the desert southeast of the Aral Sea, was traded southward across Iran but not into the northern steppes. Turquoise ornaments appeared at Sarazm, at many early cities on the Iranian plateau, and even in the Maikop chieftain's grave (chapter 12), but not among the residents of the northern steppes.[19]

A second and quite different network of foragers lived in the northern steppes, north of the Aral Sea and the Syr Darya river (the ancient Jaxartes). Here the desert faded into the steppes of central and northern Kazakhstan, where the biggest predators were wolves and the largest grazing mammals were wild horses and saiga antelope (both absent in the Kelteminar region). In the lusher northern steppes, the descendants of the late Botai-Tersek culture still rode horses, hunted, and fished, but some of them now kept a few domesticated cattle and sheep and also worked metal. The post-Botai settlement of Sergeivka on the middle Ishim River is dated by radiocarbon about 2800–2600 BCE (4160±80

BP, OxA-4439). It contained pottery similar to late Botai-Tersek pottery, stone tools typical for late Botai-Tersek, and about 390 bones of horses (87%) but also 60 bones of cattle and sheep (13%), a new element in the economy of this region. Fireplaces, slag, and copper ore also were found. Very few sites like Sergeivka have been recognized in northern Kazakhstan. But Sergeivka shows that by 2800–2600 BCE an indigenous metallurgy and a little herding had begun in northern Kazakhstan. The impetus for these innovations probably was the arrival of Poltavka herders in the Tobol steppes. Pottery similar to that at Sergeivka was found in the Poltavka graves at Aleksandrovska IV, confirming contact between the two.[20]

North of the Ural-Tobol steppes, the foragers who occupied the forested eastern slopes of the Ural Mountains had little effect on the early Sintashta culture. Their natural environment was rich enough to permit them to live in relatively long-term settlements on river banks while still depending just on hunting and fishing. They had no formal cemeteries. Their pottery had complex comb-stamped geometric motifs all over the exterior surface. Ceramic decorations and shapes were somewhat similar between the forest-zone Ayatskii and Lipchinskii cultures on one side and the steppe zone Botai-Tersek cultures on the other. But in most material ways the forest-zone cultures remained distinct from Poltavka and Abashevo, until the appearance of the Sintashta culture, when this relationship changed. Forest-zone cultures adopted many Sintashta customs after about 2200–2100 BCE. Crucibles, slag, and copper rods interpreted as ingots appeared at Tashkovo II and Iska III, forager settlements located on the Tobol River north of Sintashta. The animal bones from these settlements were still from wild game—elk, bear, and fish. Some Tashkovo II ceramics displayed geometric meander designs borrowed from late Abashevo or Sintashta. And the houses at Tashkovo II and Andreevskoe Ozero XIII were built in a circle around an open central plaza, as at Sintashta or Arkaim, a settlement plan atypical of the forest zone.

The Origin of the Sintashta Culture

A cooler, more arid climate affected the Eurasian steppes after about 2500 BCE, reaching a peak of aridity around 2000 BCE. Ancient pollen grains cored from bogs and lake floors across the Eurasian continent show the effects this event had on wetland plant communities.[21] Forests retreated, open grassland expanded, and marshes dwindled. The steppes southeast of the Ural Mountains, already drier and colder than the Middle Volga grasslands southwest of the Urals, became drier still. Around 2100 BCE a

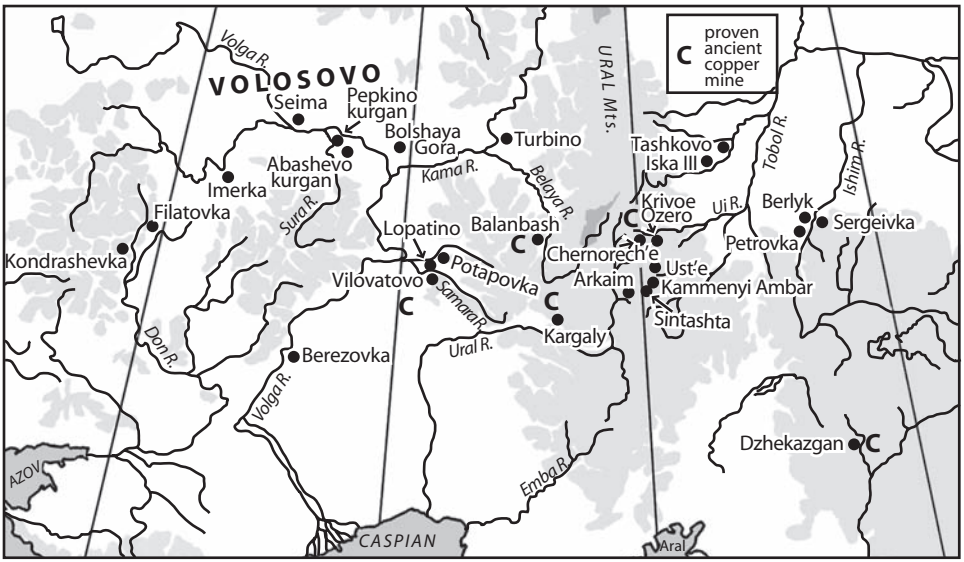


Figure 15.9 Sites of the period 2100–1800 BCE in the northern steppe and southern forest-steppe between the Don and the Ishim, with the locations of proven Bronze Age copper mines. The Sintashta-Potapovka-Filatovka complex probably is the archaeological manifestation of the Indo-Iranian language group.

mixed population of Poltavka and Abashevo herders began to settle in fortified strongholds between the upper Tobol and Ural River valleys, near the shrinking marshes that were vital for wintering their herds (see figure 15.9). Eurasian steppe pastoralists have generally favored marshy regions as winter refuges because of the winter forage and protection offered by stands of *Phragmites* reeds up to three meters tall. In a study of mobility among Late Mesolithic foragers in the Near East, Michael Rosenberg found that mobile populations tended to settle near critical resources when threatened with increased competition and declining productivity. He compared the process to a game of musical chairs,[22] in which the risk of losing a critical resource, in this case, winter marshlands for the cattle, was the impetus for settling down. Most Sintashta settlements were built on the first terrace overlooking the floodplain of a marshy, meandering stream. Although heavily fortified, these settlements were put in marshy, low places rather than on more easily defended hills nearby (see figures 15.2 and 15.8).

More than twenty Sintashta-type walled settlements were erected in the Ural-Tobol steppes between about 2100 and 1800 BCE. Their impressive

fortifications indicate that concentrating people and herds near a critical wintering place was not sufficient in itself to protect it. Walls and towers also were required. Raiding must have been endemic. Intensified fighting encouraged tactical innovations, most important the invention of the light war chariot. This escalation of conflict and competition between rival tribal groups in the northern steppes was accompanied by elaborate ceremonies and feasts at funerals conducted within sight of the walls. Competition between rival hosts led to potlatch-type excesses such as the sacrifice of chariots and whole horses.

The geographic position of Sintashta societies at the eastern border of the Pontic-Caspian steppe world exposed them to many new cultures, from foragers to urban civilizations. Contact with the latter probably was most responsible for the escalation in metal production, funeral sacrifices, and warfare that characterized the Sintashta culture. The brick-walled towns of the Bactria-Margiana Archaeological Complex (BMAC) in Central Asia connected the metal miners of the northern steppes with an almost bottomless market for copper. One text from the city of Ur in present-day Iraq, dated to the reign of Rim-Sin of Larsa (1822–1763 BCE), recorded the receipt of 18,333 kg (40,417 lb, or 20 tons) of copper in a single shipment, most of it earmarked for only one merchant.[23] This old and well-oiled Asian trade network was connected to the northern Eurasian steppes for the first time around 2100–2000 BCE (see chapter 16 for the contact between Sintashta and BMAC sites).

The unprecedented increase in demand for metal is documented most clearly on the floors of Sintashta houses. Sintashta settlements were industrial centers that specialized in metal production. Every excavated structure at Sintashta, Arkaim, and Ust'e contained the remains of smelting ovens and slag from processing copper ore. The metal in the majority of finished objects was arsenical bronze, usually in alloys of 1–2.5% arsenic; tin-bronzes comprised only 2% or less of metal objects. At Sintashta, 36% of tested objects were made of copper with elevated arsenic (from 0.1–1% arsenic), and 48% were classified as arsenical bronze (over 1% arsenic). Unalloyed copper objects were more frequent at Arkaim, where they constituted almost half the tested objects, than at Sintashta, where they made up only 10% of tested objects. Clay tubular pipes probably for the mouths of the bellows, or *tulieres*, occurred in graves and settlements (see figure 15.4). Pieces of crucibles were found in graves at Krivoe Ozero. Closed two-piece molds were required to cast bronze shaft-hole axes and spear blades (see figure 15.10). Open single-piece molds for casting curved sickles and rod-like copper ingots were found in the Arkaim settlement.

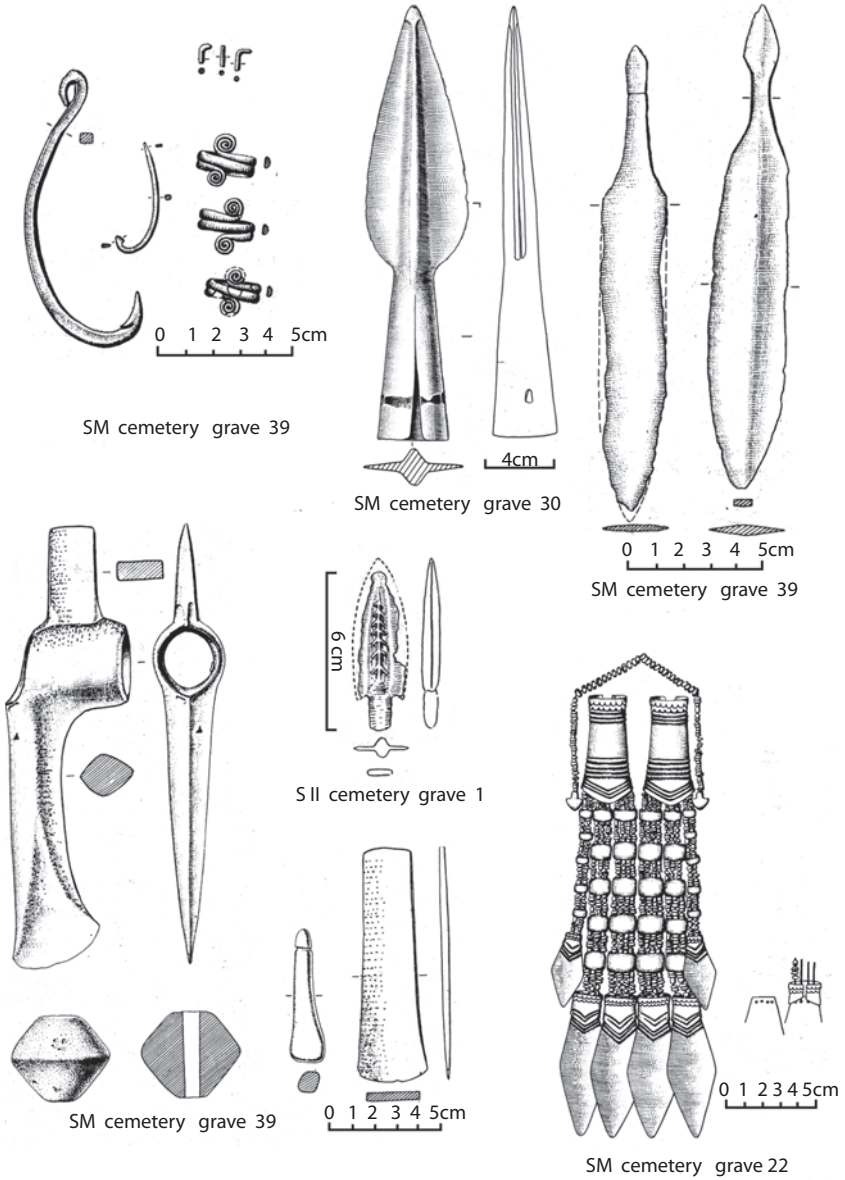


Figure 15.10 Weapons, tools, and ornaments from graves at Sintashta. After Gening, Zdanovich, and Gening 1992, figures 99, 113, 126, and 127.

Ingots or rods of metal weighing 50–130 g might have been produced for export. An estimated six thousand tons of quartzitic rock bearing 2–3% copper was mined from the single excavated mining site of Vorovskaya Yama east of the upper Ural River.[24]

Warfare, a powerful stimulus to social and political change, also shaped the Sintashta culture, for a heightened threat of conflict dissolves the old social order and creates new opportunities for the acquisition of power. Nicola DiCosmo has recently argued that complex political structures arose among steppe nomads in the Iron Age largely because intensified warfare led to the establishment of permanent bodyguards around rival chiefs, and these grew in size until they became armies, which engendered state-like institutions designed to organize, feed, reward, and control them. Susan Vehik studied political change in the deserts and grasslands of the North American Southwest after 1200 CE, during a period of increased aridity and climatic volatility comparable to the early Sintashta era in the steppes. Warfare increased sharply during this climatic downturn in the Southwest. Vehik found that long-distance trade increased greatly at the same time; trade after 1350 CE was more than forty times greater than it had been before then. To succeed in war, chiefs needed wealth to fund alliance-building ceremonies before the conflict and to reward allies afterward. Similarly, during the climatic crisis of the late MBA in the steppes, competing steppe chiefs searching for new sources of prestige valuables probably discovered the merchants of Sarazm in the Zeravshan valley, the northernmost outpost of Central Asian civilization. Although the connection with Central Asia began as an extension of old competitions between tribal chiefs, it created a relationship that fundamentally altered warfare, metal production, and ritual competition among the steppe cultures.[25]

Warfare in the Sintashta Culture: Fortifications and Weapons

A significant increase in the intensity of warfare in the southern Ural steppes is apparent from three factors: the regular appearance of large fortified towns; increased deposits of weapons in graves; and the development of new weapons and tactics. All the Sintashta settlements excavated to date, even relatively small ones like Chernorech'ye III, with perhaps six structures (see figure 15.11), and Ust'e, with fourteen to eighteen structures, were fortified with V-shaped ditches and timber-reinforced earthen walls.[26] Wooden palisade posts were preserved inside the earthen walls at

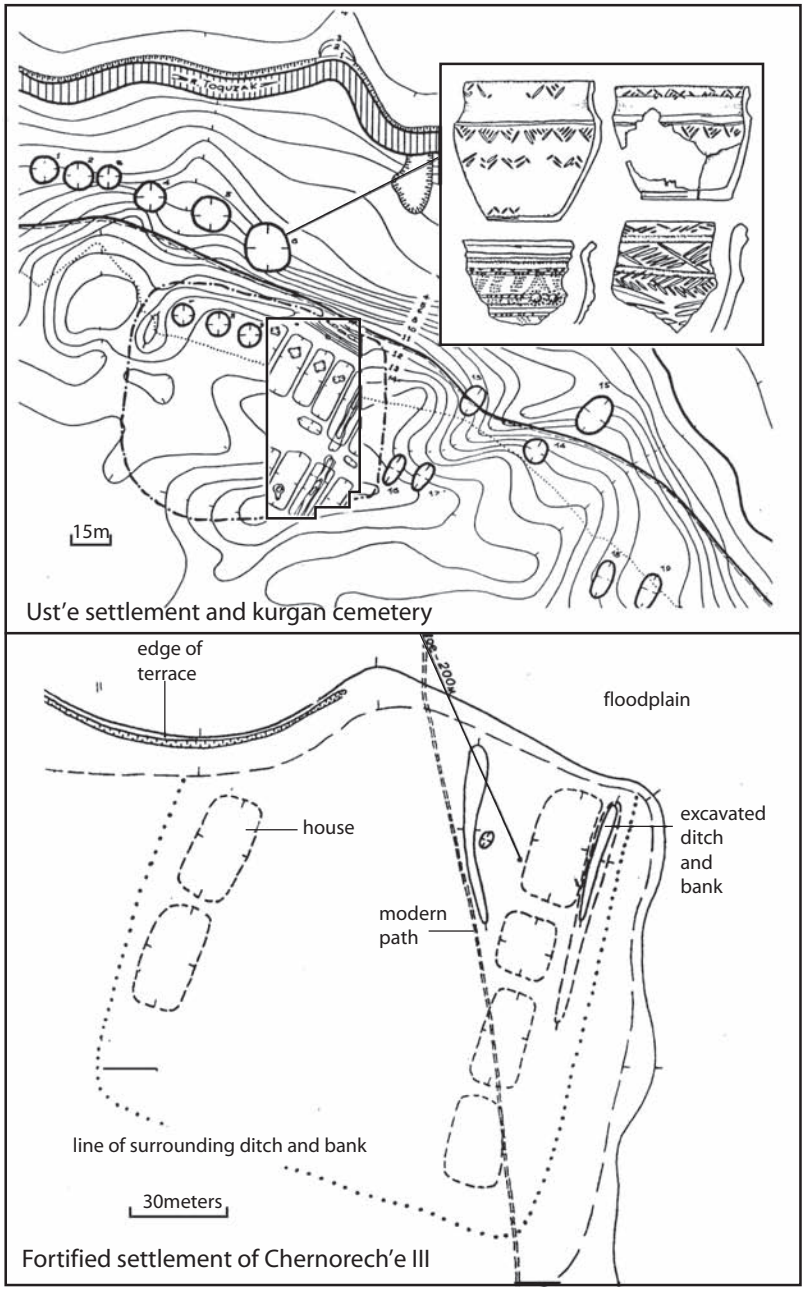


Figure 15.11 Smaller walled settlements of the Sintashta type at Ust'e and Chernorech'e III. After Vinogradov 2003, figure 3.

Ust'ye, Arkaim, and Sintashta. Communities build high walls and gates when they have reason to fear that their homes will come under attack.

The graves outside the walls now also contained many more weapons than in earlier times. The Russian archaeologist A. Epimakhov published a catalogue of excavated graves from five cemeteries of the Sintashta culture: Bol'shekaragandskoe (the cemetery for the Arkaim citadel), Kammeny Ambar 5, Krivoe Ozero, Sintashta, and Solntse II.[27] The catalogue listed 242 individuals in 181 graves. Of these, 65 graves contained weapons. Only 79 of the 242 individuals were adults, but 43 of these, or 54% of all adults, were buried with weapons. Most of the adults in the weapon graves were not assigned a gender, but of the 13 that were, 11 were males. Most adult males of the Sintashta culture probably were buried with weapons. In graves of the Poltavka, Catacomb, or Abashevo cultures, weapons had been unusual. They were more frequent in Abashevo than in the steppe graves, but the great majority of Abashevo graves did not contain weapons of any kind, and, when they did, usually it was a single axe or a projectile point. My reading of reports on kurgan graves of the earlier EBA and MBA suggests to me that less than 10% contained weapons. The frequency of weapons in adult graves of the Sintashta culture (54%) was much higher.

New types of weapons also appeared. Most of the weapon types in Sintashta graves had appeared earlier—bronze or copper daggers, flat axes, shaft-hole axes, socketed spears, polished stone mace heads, and flint or bone projectile points. In Sintashta-culture graves, however, longer, heavier projectile point types appeared, and they were deposited in greater numbers. One new projectile was a spearhead made of heavy bronze or copper with a socketed base for a thick wooden spear handle. Smaller, lighter-socketed spearheads had been used occasionally in the Fatyanovo culture, but the Sintashta spear was larger (see figure 15.3). Sintashta graves also contained two varieties of chipped flint projectile points: lanceolate and stemmed (see figure 15.12). Short lanceolate points with flat or slightly hollow bases became longer in the Sintashta period, and these were deposited in groups for the first time. They might have been for arrows, since prehistoric arrow points were light in weight and usually had flat or hollow bases. Lanceolate flint points with a hollow or flat base occurred in seven graves at Sintashta, with up to ten points in one grave (SM gr. 39). A set of five lanceolate points was deposited in the chariot grave of Berlyk II, kurgan 10.

More interesting were flint points of an entirely new type, with a contracting stem, defined shoulders, and a long, narrow blade with a thick medial ridge, 4–10 cm long. These new stemmed points might have been for javelins. Their narrow, thick blades were ideal for javelin points because the

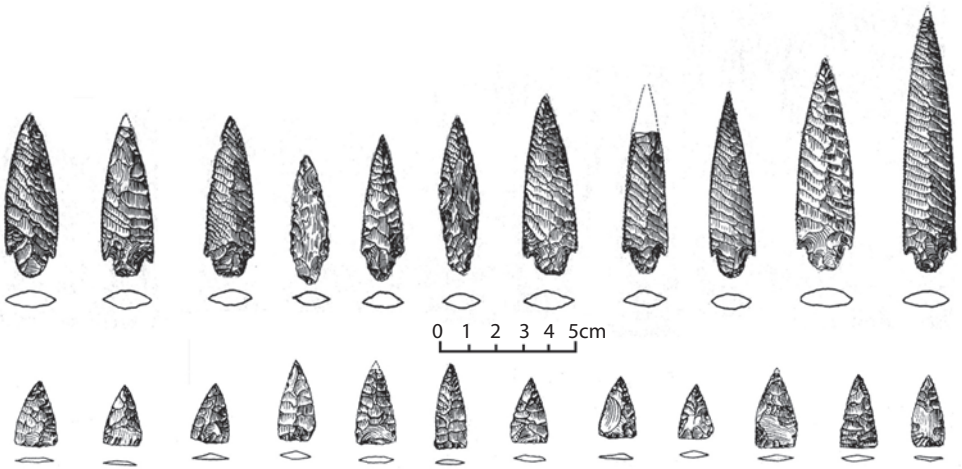


Figure 15.12 Flint projectile point types of the Sintashta culture. The top row was a new type for steppe cultures, possibly related to the introduction of the javelin. The bottom row was an old type in the steppes, possibly used for arrows, although in older EBA and MBA graves it was more triangular. After Gening, Zdanovich, and Gening 1992.

heavier shaft of a javelin (compared to an arrow) causes greater torque stress on the embedded point at the moment of impact; moreover, a narrow, thick point could penetrate deeper before breaking than a thin point could.[28] A stemmed point, by definition, is mounted in a socketed foreshaft, a complex type of attachment usually found on spears or javelins rather than arrows. Smaller stemmed points had existed earlier in Fatyanovo and Balanovo tool kits and were included in occasional graves, as at the Fatyanovo cemetery of Volosovo-Danilovskii, where 1 grave out of 107 contained a stemmed point, but it was shorter than the Sintashta type (only 3–4 cm long). Sintashta stemmed points appeared in sets of up to twenty in a single grave (chariot gr. 20 at the Sintashta SM cemetery), as well as in a few Potapovka graves on the middle Volga. Stemmed points made of cast bronze, perhaps imitations of the flint stemmed ones, occurred in one chariot grave (SM gr. 16) and in two other graves at Sintashta (see figure 15.10).

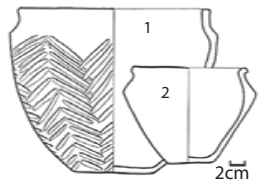
Weapons were deposited more frequently in Sintashta graves. New kinds of weapons appeared, among them long points probably intended for javelins, and they were deposited in sets that appear to represent warriors' equipment for battle. Another signal of increased conflict is the most hotly debated artifact of this period in the steppes—the light, horse-drawn chariot.

Sintashta Chariots: Engines of War

A chariot is a two-wheeled vehicle with spoked wheels and a standing driver, pulled by bitted horses, and usually driven at a gallop. A two-wheeler with solid wheels or a seated driver is a cart, not a chariot. Carts, like wagons, were work vehicles. Chariots were the first wheeled vehicles designed for speed, an innovation that changed land transport forever. The spoked wheel was the central element that made speed possible. The earliest spoked wheels were wonders of bent-wood joinery and fine carpentry. The rim had to be a perfect circle of joined wood, firmly attached to individually carved spokes inserted into mortices in the outer wheel and a multi-socketed central nave, all carved and planed out of wood with hand tools. The cars also were stripped down to just a few wooden struts. Later Egyptian chariots had wicker walls and a floor of leather straps for shock absorption, with only the frame made of wood. Perhaps originally designed for racing at funerals, the chariot quickly became a weapon and, in that capacity, changed history.

Today most authorities credit the invention of the chariot to Near Eastern societies around 1900–1800 BCE. Until recently, scholars believed that the chariots of the steppes post-dated those of the Near East. Carvings or petroglyphs showing chariots on rock outcrops in the mountains of eastern Kazakhstan and the Russian Altai were ascribed to the Late Bronze Age Andronovo horizon, thought to date after 1650 BCE. Disk-shaped cheekpieces made of antler or bone found in steppe graves were considered copies of older Mycenaean Greek cheekpieces designed for the bridles of chariot teams. Because the Mycenaean civilization began about 1650 BCE, the steppe cheekpieces also were assumed to date after 1650 BCE.[29]

The increasing amount of information about chariot graves in the steppes since about 1992 has challenged this orthodox view. The archaeological evidence of steppe chariots survives only in graves where the wheels were placed in slots that had been dug into the grave floors. The lower parts of the wheels left stains in the earth as they rotted (see figure 15.13). These stains show an outer circle of bent wood 1–1.2 m in diameter with ten to twelve square-sectioned spokes. There is disagreement as to the number of clearly identified chariot graves because the spoke imprints are faint, but even the conservative estimate yields sixteen chariot graves in nine cemeteries. All belonged to either the Sintashta culture in the Ural-Tobol steppes or the Petrovka culture east of Sintashta in northern Kazakhstan. Petrovka was contemporary with late Sintashta, perhaps 1900–1750 BC, and developed directly from it.[30]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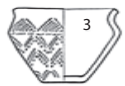
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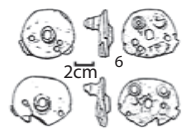
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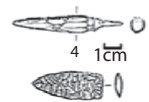
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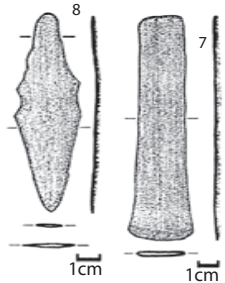
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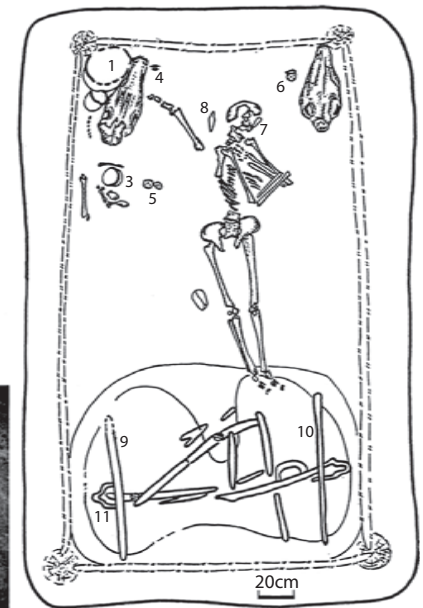
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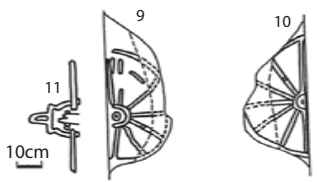
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Scholars disagree as to whether steppe chariots were effective instruments of war or merely symbolic vehicles designed only for parade or ritual use, made in barbaric imitation of superior Near Eastern originals.[31] This debate has focused, surprisingly, on the distance between the chariots' wheels. Near Eastern war chariots had crews of two or even three—a driver and an archer, and occasionally a shield-bearer to protect the other two from incoming missiles. The gauge or track width of Egyptian chariots of ca. 1400–1300 BCE, the oldest Near Eastern chariots preserved well enough to measure, was 1.54–1.80 m. The hub or nave of the wheel, a necessary part that stabilized the chariot, projected at least 20 cm along the axle on each side. A gauge around 1.4–1.5 m would seem the minimum to provide enough room between the wheels for the two inner hubs or naves (20 + 20 cm) and a car at least 1 m wide to carry two men. Sintashta and Petrovka-culture chariots with less than 1.4–1.5 m between their wheels were interpreted as parade or ritual vehicles unfit for war.

This dismissal of the functional utility of steppe chariots is unconvincing for six reasons. First, steppe chariots were made in many sizes, including two at Kammeny Ambar 5, two at Sintashta (SM gr. 4, 28) and two at Berlyk (Petrovka culture) with a gauge between 1.4 and 1.6 m, big enough for a crew of two. The first examples published in English, which were from Sintashta (SM gr. 19) and Krivoe Ozero (k. 9, gr. 1), had gauges of only about 1.2–1.3 m, as did three other Sintashta chariots (SM gr. 5, 12, 30) and one other Krivoe Ozero chariot. The argument against the utility of steppe chariots focused on these six vehicles, most of which, in spite of their narrow gauges, were buried with weapons. However, six other steppe vehicles were as wide as some Egyptian war chariots. One (Sintashta SM gr. 28) with a gauge of about 1.5 m was placed in a grave that also contained the partial remains of two adults, possibly its crew. Even if we accept the doubtful assumption that war chariots needed a crew of two, many steppe chariots were big enough.[32]

Second, steppe chariots were not necessarily used as platforms for archers. The preferred weapon in the steppes might have been the javelin. A single

Figure 15.13 Chariot grave at Krivoe Ozero, kurgan 9, grave 1, dated about 2000 BCE: (1–3) three typical Sintashta pots; (5–6) two pairs of studded disk cheekpieces made of antler; (4) a bone and a flint projectile point; (7–8) a waisted bronze dagger and a flat bronze axe; (9–10) spoked wheel impressions from wheels set into slots in the floor of the grave; (11) detail of artist's reconstruction of the remains of the nave or hub on the left wheel. After Anthony and Vinogradov 1995, photos by Vinogradov.

warrior-driver could hold the reins in one hand and hurl a javelin with the other. From a standing position in a chariot, a driver-warrior could use his entire body to throw, whereas a man on horseback without stirrups (invented after 300 CE) could use only his arm and shoulder. A javelin-hurling charioteer could strike a man on horseback before the rider could strike him. Unlike a charioteer, a man on horseback could not carry a large sheath full of javelins and so would be at a double disadvantage if his first cast missed. A rider armed with a bow would fare only slightly better. Archers of the steppe Bronze Age seem to have used bows 1.2–1.5 m long, judging by bow remains found at Berezovka (k. 3, gr. 2) and Svatove (k. 12, gr. 12).[33] Bows this long could be fired from horseback only to the side (the left side, for a right-handed archer), which made riders with long bows vulnerable. A charioteer armed with javelins could therefore intimidate a Bronze Age rider on horseback. Many long-stemmed points, suitable for javelins, were found in some chariot graves (Sintashta SM gr. 4, 5, 30). If steppe charioteers used javelins, a single man could use narrower cars in warfare.

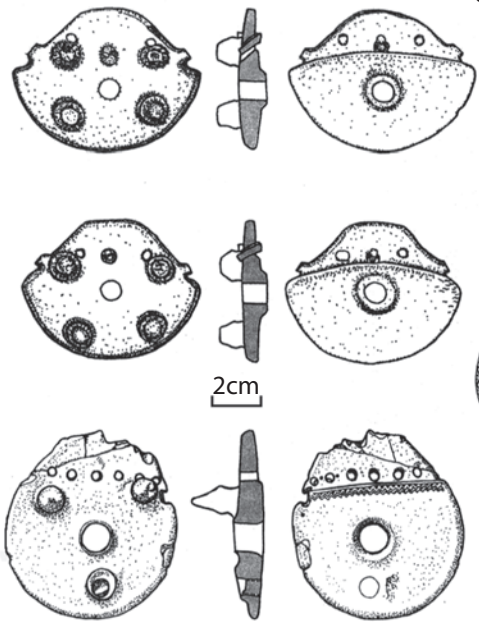
Third, if a single driver-warrior needed to switch to a bow in battle, he could fire arrows while guiding the horses with the reins around his hips. Tomb paintings depicted the Egyptian pharaoh driving and shooting a bow in this way. Although it may have been a convention to include only the pharaoh in these illustrations, Littauer noted that a royal Egyptian scribe was also shown driving and shooting in this way, and in paintings of Ramses III fighting the Libyans the archers in the Egyptian two-man chariots had the reins around their hips. Their car-mates helped to drive with one hand and used a shield with the other. Etruscan and Roman charioteers also frequently drove with the reins wrapped around their hips.[34] A single driver-warrior might have used a bow in this manner, although it would have been safer to shift the reins to one hand and cast a javelin.

The fourth reason not to dismiss the functionality of steppe chariots is that most of these chariots, including the narrow-gauge ones, were buried with weapons. I have seen complete inventories for twelve Sintashta and Petrovka chariot graves, and ten contained weapons. The most frequent weapons were projectile points, but chariot graves also contained metal-waisted daggers, flat metal axes, metal shaft-hole axes, polished stone mace heads, and one metal-socketed spearhead 20 cm long (from Sintashta SM gr. 30; see figure 15.3). According to Epimakhov's catalogue of Sintashta graves, cited earlier, all chariot graves where the skeleton could be assigned a gender contained an adult male. If steppe chariots were not designed for war, why were most of them buried with a male driver and weapons?

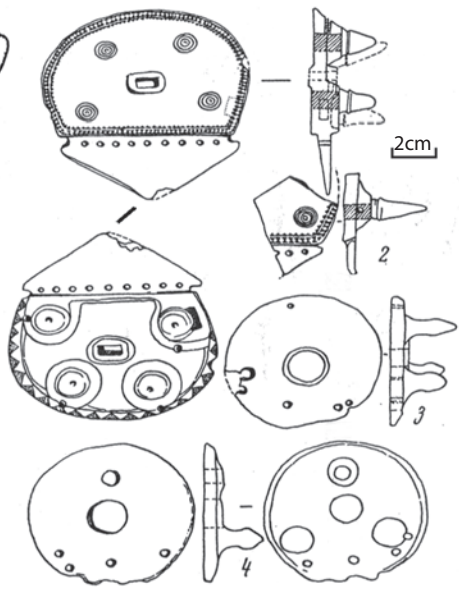
Fifth, a new kind of bridle cheekpiece appeared in the steppes at the very time that chariots did (see figure 15.14). It was made of antler or bone

Potapovka complex, middle Volga
Utyevka VI Kurgan 6 gr. 5

Potapovka complex, middle Volga
Utyevka VI Kurgan 6 gr. 4



Sintashta-Arkaim complex
Kamennyi Ambar 5 Kurgan 2 Grave 8



Filatovskii kurgan, upper Don
Grave 1, 2 pairs of cheekpieces

Figure 15.14 Studded disk cheekpieces from graves of the Sintashta, Potapovka, and Filatovka types. The band of running spirals beneath the checkerboard panel on the upper left specimen from Utyevka VI was once thought to be derived from Mycenae. But the steppe examples like this one were older than Mycenae. Photos by the author; drawings after Epimakhov 2002; and Siniuk and Kosmirchuk 1995.

and shaped like an oblong disk or a shield, perforated in the center so that cords could pass through to connect the bit to the bridle and in various other places to allow for attachments to the noseband and cheek-strap. Pointed studs or prongs on its inner face pressed into the soft flesh at the corners of the horse's mouth when the driver pulled the reins on the opposite side, prompting an immediate response from the horse. The development of a new, more severe form of driving control suggests that rapid, precise maneuvers by the driving team were necessary. When disk cheekpieces are found in pairs, different shapes with different kinds of wear are often found together, as if the right and left sides of the horse, or the right and left horses, needed slightly different kinds of control. For example, at Krivoe Ozero (k. 9, gr. 1), the cheekpieces with the left horse had a slot located above the central hole, angled upward, toward the noseband (see figure 15.13). The cheekpieces with the right horse had no such upward-angled slot. A similar unmatched pair, with and without an upward-angled slot, were buried with a chariot team at Kamennyi Ambar 5 (see figure 15.14). The angled slot may have been for a noseband attached to the reins that would pull down on the inside (left) horse's nose, acting as a brake, when the reins were pulled, while the outside (right) horse was allowed to run free—just what a left-turning racing team would need. The chariot race, as described in the *Rig Veda,* was a frequent metaphor for life's challenges, and Vedic races turned to the left. Chariot cheekpieces of the same general design, a bone disk with sharp prongs on its inner face, appeared later in Shaft Grave IV at Mycenae and in the Levant at Tel Haror, made of metal. The oldest examples appeared in the steppes.[35]

Finally, the sixth flaw in the argument that steppe chariots were poorly designed imitations of superior Near Eastern originals is that the oldest examples of the former predate any of the dated chariot images in the Near East. Eight radiocarbon dates have been obtained from five Sintashta-culture graves containing the impressions of spoked wheels, including three at Sintashta (SM cemetery, gr. 5, 19, 28), one at Krivoe Ozero (k. 9, gr. 1), and one at Kammeny Ambar 5 (k. 2, gr. 8). Three of these (3760±120 BP, 3740±50 BP, and 3700±60 BP), with probability distributions that fall predominantly before 2000 BCE, suggest that the earliest chariots *probably* appeared in the steppes before 2000 BCE (table 15.1). Disk-shaped cheekpieces, usually interpreted as specialized chariot gear, also occur in steppe graves of the Sintashta and Potapovka types dated by radiocarbon before 2000 BCE. In contrast, in the Near East the oldest images of true chariots—vehicles with *two spoked* wheels, pulled by *horses* rather than asses or onagers, controlled with *bits* rather than lip- or nose-

rings, and guided by a *standing warrior*, not a seated driver—first appeared about 1800 BCE, on Old Syrian seals. The oldest images in Near Eastern art of vehicles with two spoked wheels appeared on seals from Karum Kanesh II, dated about 1900 BCE, but the equids were of an uncertain type (possibly native asses or onagers) and they were controlled by nose-rings (see figure 15.15). Excavations at Tell Brak in northern Syria recovered 102 cart models and 191 equid figurines from the parts of this ancient walled caravan city dated to the late Akkadian and Ur III periods, 2350–2000 BCE by the standard or "middle" chronology. None of the equid figurines was clearly a horse. Two-wheeled carts were common among the vehicle models, but they had built-in seats and solid wheels. No chariot models were found. Chariots were unknown here as they were elsewhere in the Near East before about 1800 BCE.[36]

Chariots were invented earliest in the steppes, where they were used in warfare. They were introduced to the Near East through Central Asia, with steppe horses and studded disk cheekpieces (see chapter 16). The horse-drawn chariot was faster and more maneuverable than the old solid-wheeled battle-cart or battle-wagon that had been pulled into inter-urban battles by ass-onager hybrids in the armies of Early Dynastic, Akkadian, and Ur III kings between 2900 and 2000 BCE. These heavy, clumsy vehicles, mistakenly described as chariots in many books and catalogues, were similar to steppe chariots in one way: they were consistently depicted carrying javelin-hurling warriors, not archers. When horse-drawn chariots appeared in the Near East they quickly came to dominate inter-urban battles as swift platforms for archers, perhaps a Near Eastern innovation. Their wheels also were made differently, with just four or six spokes, apparently another improvement on the steppe design.

Among the Mitanni of northern Syria, in 1500–1350 BC, whose chariot tactics might have been imported with their Old Indic chariot terminology from a source somewhere in the steppes, chariots were organized into squadrons of five or six; six such units (thirty to thirty-six chariots) were combined with infantry under a brigade commander. A similar organization appeared in Chou China a millennium later: five chariots in a squadron, five squadrons in a brigade (twenty-five), with ten to twenty-five support infantry for each chariot.[37] Steppe chariots might also have operated in squadrons supported by individuals on foot or even on horseback, who could have run forward to pursue the enemy with hand weapons or to rescue the charioteer if he were thrown.

Chariots were effective in tribal wars in the steppes: they were noisy, fast, and intimidating, and provided an elevated platform from which a skilled

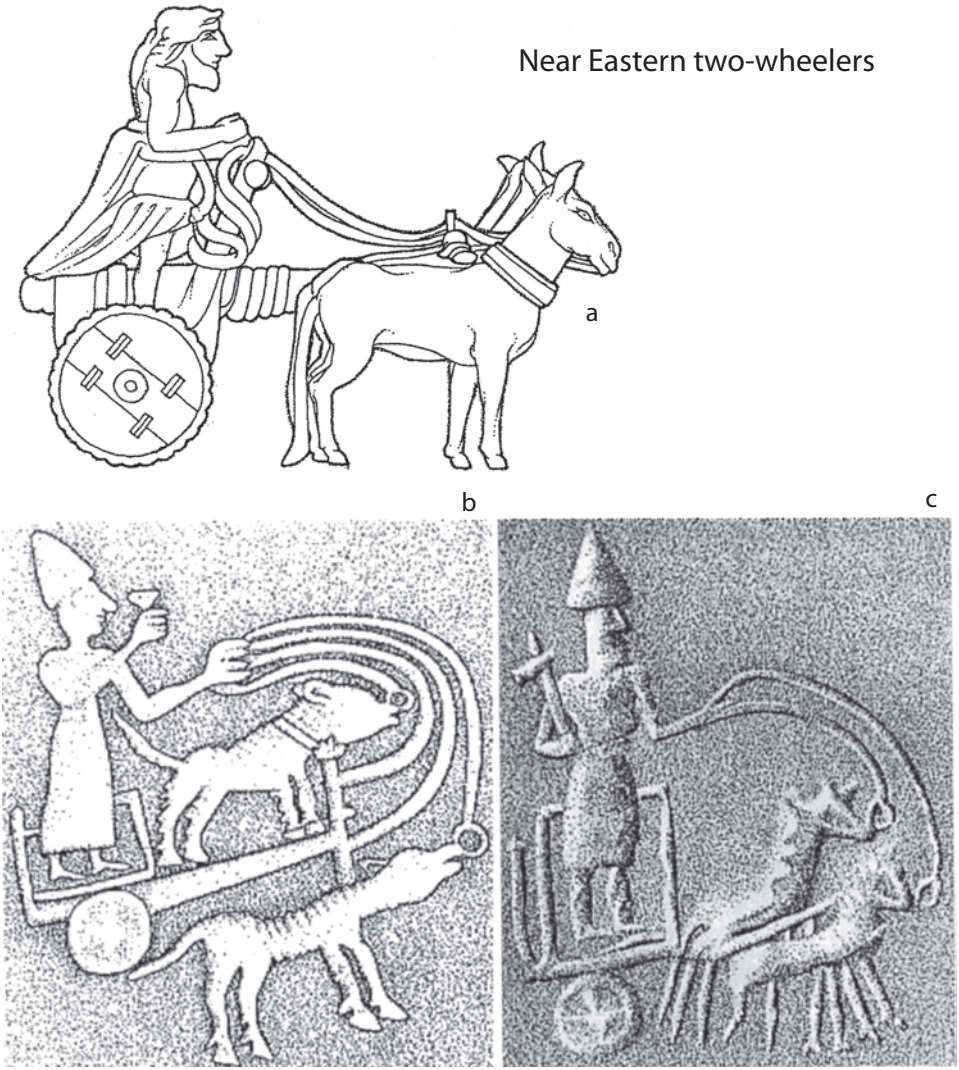


Figure 15.15 Two-wheeled, high-speed vehicles of the ancient Near East prior to the appearance of the chariot: (a) cast copper model of a straddle-car with solid wheels pulled by a team of ass-onager–type equids from Tell Agrab, 2700–2500 BCE; (b and c) engraved seal images of vehicles with four-spoked wheels, pulled by equids (?) controlled with lip- or nose-rings from *karum* Kanesh II, 1900 BCE. After Raulwing 2000, figures 7.2 and 10.1.

driver could hurl a sheath full of javelins. As the car hit uneven ground at high speed, the driver's legs had to absorb each bounce, and the driver's weight had to shift to the bouncing side. To drive through a turn, the inside horse had to be pulled in while the outside horse was given rein. Doing this well and hurling a javelin at the same time required a lot of practice. Chariots were supreme advertisements of wealth; difficult to make and requiring great athletic skill *and* a team of specially trained horses to drive, they were available only to those who could delegate much of their daily labor to hired herders. A chariot was material proof that the driver was able to fund a substantial alliance or was supported by someone who had the means. Taken together, the evidence from fortifications, weapon types, and numbers, and the tactical innovation of chariot warfare, all indicate that conflict increased in both scale and intensity in the northern steppes during the early Sintashta period, after about 2100 BCE. It is also apparent that chariots played an important role in this new kind of conflict.

Tournaments of Value

Parallels between the funerals of the Sintashta chiefs and the funeral hymns of the *Rig Veda* (see below) suggest that poetry surrounded chariot burials. Archaeology reveals that feasts on a surprising scale also accompanied chiefly funerals. Poetry and feasting were central to a mortuary performance that emphasized exclusivity, hierarchy, and power—what the anthropologist A. Appadurai called "tournaments of value," ceremonies meant to define membership in the elite and to channel political competition within clear boundaries that excluded most people. In order to understand the nature of these sacrificial dramas, we first have to understand the everyday secular diet.[38]

Flotation of seeds and charcoal from the soils excavated at Arkaim recovered only a few charred grains of barley, too few, in fact, to be certain that they came from the Sintashta-culture site rather than a later occupation. The people buried at Arkaim had no dental caries, indicating that they ate a very low-starch diet, not starchy cereals.[39] Their teeth were like those of hunter-gatherers. Charred millet was found in test excavations at the walled Alands'koe stronghold, indicating that some millet cultivation probably occurred at some sites, and dental decay *was* found in the Krivoe Ozero cemetery population, so some communities might have consumed cultivated grain. Gathering wild seeds from *Chenopodium* and *Amaranthus*, plants that still played an important role in the LBA steppe diet centuries later (see chapter 16 for LBA wild plants), could have supplemented occasional cereal

cultivation. Cultivated cereals seem to have played a minor role in the Sintashta diet.[40]

The scale of animal sacrifices in Sintashta cemeteries implies very large funerals. One example was Sacrificial Complex 1 at the northern edge of the Sintashta SM cemetery (see figure 15.16). In a pit 50 cm deep, the heads and hooves of six horses, four cattle, and two rams lay in two rows facing one another around an overturned pot. This single sacrifice provided about six thousand pounds (2,700 kg) of meat, enough to supply each of three thousand participants with two pounds (.9 kg). The Bolshoi Kurgan, built just a few meters to the north, required, by one estimate, three thousand man-days.[41] The workforce required to build the kurgan matched the amount of food provided by Sacrificial Complex 1. However, the Bolshoi Kurgan was unique; the other burial mounds at Sintashta were small and low. If the sacrifices that accompanied the other burials at Sintashta were meant to feed work parties, what they built is not obvious. It seems more likely that most sacrifices were intended to provide food for the funeral guests. With up to eight horses sacrificed for a single funeral, Sintashta feasts would have fed hundreds, even thousands of guests. Feast-hosting behavior is the most common and consistently used avenue to prestige and power in tribal societies.[42]

The central role of horses in Sintashta funeral sacrifices was unprecedented in the steppes. Horse bones had appeared in EBA and earlier MBA graves but not in great numbers, and not as frequently as those of sheep or cattle. The animal bones from the Sintashta and Arkaim settlement refuse middens were 60% cattle, 26% sheep-goat, and 13% horse. Although beef supplied the preponderance of the meat diet, the funeral sacrifices in the cemeteries contained just 23% cattle, 37% sheep-goat, and 39% horse. Horses were sacrificed more than any other animal, and horse bones were three times more frequent in funeral sacrifices than in settlement middens. The zoologist L. Gaiduchenko suggested that the Arkaim citadel specialized in horse breeding for export because the high level of ^{15}N isotopes in human bone suggested that horses, very low in ^{15}N, were not eaten frequently. Foods derived from cattle and sheep, significantly higher in ^{15}N than the horses from these sites, probably composed most of the diet.[43] According to Epimakhov's catalogue of five Sintashta cemeteries, the most frequent animal sacrifices were horses but they were sacrificed in no more than 48 of the 181 graves catalogued, or 27%; multiple horses were sacrificed in just 13% of graves. About one-third of the graves contained weapons, but, among these, two-thirds of graves with horse sacrifices contained weapons, and 83% of graves with multiple horse sacrifices contained weapons. Only a minority of Sintashta graves contained

Sintashta cemetery SM sacrificial complex 1

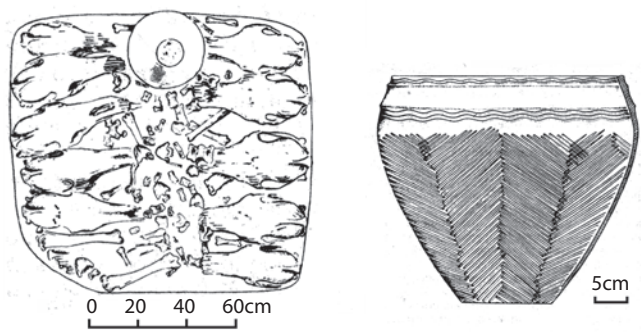


Figure 15.16 Sacrificial complex number 1 at the northern edge of the Sintashta SM cemetery. After Gening, Zdanovich, and Gening 1992, figure 130.

horse sacrifices, but those that did usually also contained weapons, a symbolic association between the ownership of large horse herds, the hosting of feasts, and the warrior's identity.

There is little jewelry or ornaments in Sintashta graves, and no large houses or storage facilities in the settlements. The signs of craft specialization, a

signal of social hierarchy, are weak in all crafts except metallurgy, but even in that craft, every household in every settlement seems to have worked metal. The absence of large houses, storage facilities, or craft specialists has led some experts to doubt whether the Sintashta culture had a strong social hierarchy.[44] Sintashta cemeteries contained the graves of a cross-section of the entire age and sex spectrum, including many children, apparently a more inclusive funeral ritual than had been normal in EBA and earlier MBA mortuary ceremonies in the steppes. On the other hand, most Sintashta cemeteries did not contain enough graves to account for more than a small segment of the population of the associated walled settlements. The Sintashta citadel included about fifty to sixty structures, and its associated cemeteries had just sixty-six graves, most of them the graves of children. If the settlement contained 250 people for six generations (150 years), it should have generated more than fifteen hundred graves. Only a few exceptional families were given funerals in Sintashta cemeteries, but the entire family, including children, was honored in this way. This privilege, like the sacrifice of horses and chariots, was not one that everyone could claim. Horses, chariots, weapons, and multiple animal sacrifices identified the graves of the Sintashta chiefs.

The funeral sacrifices of the Simtashta culture are a critical link between archaeology and history. They closely resembled the rituals described in the *Rig Veda*, the oldest text preserved in an Indo-Iranian language.

Sintashta and the Origins of the Aryans

The oldest texts in Old Indic are the "family books," books 2 through 7, of the *Rig Veda* (RV). These hymns and prayers were compiled into "books" or mandalas about 1500–1300 BCE, but many had been composed earlier. The oldest parts of the *Avesta* (AV), the Gathas, the oldest texts in Iranian, were composed by Zarathustra probably about 1200–1000 BCE. The undocumented language that was the parent of both, common Indo-Iranian, must be dated well before 1500 BCE, because, by this date, Old Indic had already appeared in the documents of the Mitanni in North Syria (see chapter 3). Common Indo-Iranian probably was spoken during the Sintashta period, 2100–1800 BCE. Archaic Old Indic probably emerged as a separate tongue from archaic Iranian about 1800–1600 BCE (see chapter 16). The RV and AV agreed that the essence of their shared parental Indo-Iranian identity was linguistic and ritual, not racial. If a person sacrificed to the right gods in the right way using the correct forms of the traditional hymns and poems, that person was an Aryan.[45] Other-

wise the individual was a *Dasyu*, again not a racial or ethnic label but a ritual and linguistic one—a person who interrupted the cycle of giving between gods and humans, and therefore a person who threatened cosmic order, *r'ta* (RV) or *aša* (AV). Rituals performed *in the right words* were the core of being an Aryan.

Similarities between the rituals excavated at Sintashta and Arkaim and those described later in the RV have solved, for many, the problem of Indo-Iranian origins.[46] The parallels include a reference in RV 10.18 to a kurgan ("let them . . . bury death in this hill"), a roofed burial chamber supported with posts ("let the fathers hold up this pillar for you"), and with shored walls ("I shore up the earth all around you; let me not injure you as I lay down this clod of earth"). This is a precise description of Sintashta and Potapovka-Filatovka grave pits, which had wooden plank roofs supported by timber posts and plank shoring walls. The horse sacrifice at a royal funeral is described in RV 1.162: "Keep the limbs undamaged and place them in the proper pattern. Cut them apart, calling out piece by piece." The horse sacrifices in Sintashta, Potapovka, and Filatovka graves match this description, with the lower legs of horses carefully cut apart at the joints and placed in and over the grave. The preference for horses as sacrificial animals in Sintashta funeral rituals, a species choice setting Sintashta apart from earlier steppe cultures, was again paralleled in the RV. Another verse in the same hymn read: "Those who see that the racehorse is cooked, who say, 'It smells good! Take it away!' and who wait for the doling out of the flesh of the charger—let their approval encourage us." These lines describe the public feasting that surrounded the funeral of an important person, exactly like the feasting implied by head-and-hoof deposits of horses, cattle, goats, and sheep in Sintashta graves that would have yielded hundreds or even thousands of kilos of meat. In RV 5.85, Varuna released the rain by overturning a pot: "Varuna has poured out the cask, turning its mouth downward. With it the king of the whole universe waters the soil." In Sacrificial Deposit 1 at Sintashta an overturned pot was placed between two rows of sacrificed animals—in a ritual possibly associated with the construction of the enormous Bolshoi Kurgan.[47] Finally, the RV eloquently documents the importance of the poetry and speech making that accompanied all these events. "Let us speak great words as men of power in the sacrificial gathering" was the standard closing attached repeatedly to several different hymns (RV 2.12, 2.23, 2.28) in one of the "family books." These public performances played an important role in attracting and converting celebrants to the Indo-Iranian ritual system and language.

The explosion of Sintashta innovations in rituals, politics, and warfare had a long-lasting impact on the later cultures of the Eurasian steppes. This is another reason why the Sintashta culture is the best and clearest candidate for the crucible of Indo-Iranian identity and language. Both the Srubnaya and the Andronovo horizons, the principal cultural groups of the Late Bronze Age in the Eurasian steppes (see chapter 16), grew from origins in the Potapovka-Sintashta complex.

A Srubnaya site excavated by this author contained surprising evidence for one more parallel between Indo-Iranian (and perhaps even Proto-Indo-European) ritual and archaeological evidence in the steppes: the midwinter New Year's sacrifice and initiation ceremony, held on the winter solstice. Many Indo-European myths and rituals contained references to this event. One of its functions was to initiate young men into the warrior category (*Männerbünde*, *korios*), and its principal symbol was the dog or wolf. Dogs represented death; multiple dogs or a multi-headed dog (*Cerberus, Saranyu*) guarded the entrance to the Afterworld. At initiation, death came to both the old year and boyhood identities, and as boys became warriors they would feed the dogs of death. In the RV the oath brotherhood of warriors that performed sacrifices at midwinter were called the Vrâtyas, who also were called dog-priests. The ceremonies associated with them featured many contests, including poetry recitation and chariot races.[48]

At the Srubnaya settlement of Krasnosamarskoe (Krasno-sa-MAR-sko-yeh) in the Samara River valley, we found the remains of an LBA midwinter dog sacrifice, a remarkable parallel to the reconstructed midwinter New Year ritual, dated about 1750 BCE. The dogs were butchered only at midwinter, many of them near the winter solstice, whereas the cattle and sheep at this site were butchered throughout the year. Dogs accounted for 40% of all the animal bones from the site. At least eighteen dogs were butchered, probably more. Nerissa Russell's studies showed that each dog head was burned and then carefully chopped into ten to twelve small, neat, almost identical segments with axe blows. The postcranial remains were not chopped into ritually standardized little pieces, and none of the cattle or sheep was butchered like this. The excavated structure at Krasnosamarskoe probably was the place where the dog remains from a midwinter sacrifice were discarded after the event. They were found in an archaeological context assigned to the early Srubnaya culture, but early Srubnaya was a direct outgrowth from Potapovka and Abashevo, the same circle as Sintashta, and nearly the same date. Krasnosamarskoe shows that midwinter dog sacrifices were practiced in the middle Volga steppes, as in

the dog-priest initiation rituals described in the RV. Although such direct evidence for midwinter dog rituals has not yet been recognized in Sintashta settlements, many individuals buried in Sintashta graves wore necklaces of dog canine teeth. Nineteen dog canine pendants were found in a single collective grave with eight youths—probably of initiation age—under a Sintashta kurgan at Kammenyi Ambar 5, kurgan 4, grave 2.[49]

In many small ways the cultures between the upper Don and Tobol rivers in the northern steppes showed a common kinship with the Aryans of the *Rig Veda* and *Avesta*. Between 2100 and 1800 BCE they invented the chariot, organized themselves into stronghold-based chiefdoms, armed themselves with new kinds of weapons, created a new style of funeral rituals that involved spectacular public displays of wealth and generosity, and began to mine and produce metals on a scale previously unimagined in the steppes. Their actions reverberated across the Eurasian continent. The northern forest frontier began to dissolve east of the Urals as it had earlier west of the Urals; metallurgy and some aspects of Sintashta settlement designs spread north into the Siberian forests. Chariotry spread west through the Ukrainian steppe MVK culture into southeastern Europe's Monteoru (phase Ic1-Ib), Vatin, and Otomani cultures, perhaps with the *satəm* dialects that later popped up in Armenian, Albanian, and Phrygian, all of which are thought to have evolved in southeastern Europe. (Pre-Greek must have departed before this, as it did not share in the *satəm* innovations.) And the Ural frontier was finally broken—herding economies spread eastward across the steppes. With them went the eastern daughters of Sintashta, the offspring who would later emerge into history as the Iranian and Vedic Aryans. These eastern and southern connections finally brought northern steppe cultures into face-to-face contact with the old civilizations of Asia.