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Turning Points in Horse Breeding in the Eurasian Steppes and the Near East

This article discusses the pivotal points in horse domestication on the Eurasian steppes and the Near East in the 5th to 2nd millennia BC, from the initial time and place of the domestication of horses to the emergence of various types of horse harnesses. On the basis of 5th and 4th millennia BC Eurasian horse-headed scepters, the means for handling horses are reconstructed. Six types of head harnesses are described, and their evolution is traced from simple muzzles (type 1) and more complex ones (types 2 and 3) to those supplemented with drop nosebands (type 4) and snaffle (type 5) and non-snaffle bridles (type 6). A unique 3rd millennium BC document—an Elamite clay tablet from Susa, listing horse farms, has made it possible to assess the structure of each farm, and evaluate the size of the domestic horse population in Elam. Training techniques of chariot horses were described by the "master horse trainer Kikkuli of Mitanni". These techniques were further developed by the proto-Indo-Aryans on the Eurasian steppes in the early 2nd millennium BC, and became known to the Hittites and Assyrians via the Mitanni horse breeders. On the basis of the Rigveda, the type and exterior of those swift horses with which the Indo-Aryans spread over Asia are characterized.

Keywords: *Horse breeding, domestication, horse harness, Eurasian steppes, Near East, 5th to 2nd millennia BC.*

Introduction

The problem of the time and place of horse domestication seemed much more resolved fifty years ago than it does today. At that time, the discoveries of "horse-breeding" tribes of the 4th to 3rd millennia BC by archaeologists in the Ukraine and later in the Urals and Kazakhstan, and the study of bone evidence from the early settlements by Russian paleozoologists testified to domestication of horses in the Eurasian steppes in that period. Today, using all the available evidence, scholars are coming to the conclusion that horses were domesticated in the Neolithic-Chalcolithic cultures of the Middle Volga region (Petrenko, 2007: 25–29). A society with a producing economy emerged in that region; this society used horses not only (and not so much) as animals for meat, but also as riding animals for hunting, quick transportation and gradual mastering of the surrounding space, as well as the symbol of an elite status, confirmed by the appearance of horse-headed scepters. According to the genetic data, 77 independent female lines are distinguished in the present-day population of domestic horses. Scholars thus conclude that the genetic material of wild horses was added many times in various territories and among various peoples since the first time the horses were domesticated (Levine, 2006).

Another approach to the study of domestication and dissemination of horse breeding skills in Eurasia is the study of linguistics. A recent study of linguistic evidence by S.V. Kullanda associated with the designation of the horse (*ek'vo-s) in Indo-European languages is significant. The name, horse, belongs to common and the earliest Indo-European lexemes. On the basis of the linguistic formulations by S.A. Starostin, Kullanda emphasized that "the Proto-Indo-European language

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was superimposed on the Northern Caucasian substrate in its ancestral homeland, which means that the proto-Indo-Europeans assimilated a certain group of Northern Caucasians, adopting a number of terms relating to the most diverse areas of life from them" (2008: 672), including terms associated with the horse. Based on the glottochronological evidence in the form amended by Starostin, this borrowing occurred at the turn of the 6th and 5th millennia BC. Thus, we obtain an equation with three unknowns (the areas of the proto-Indo-European and proto-Northern Caucasian languages and the areas of wild and/or domestic horses at that period of time), which can be solved when it becomes possible to establish the above areas within Eurasia. It is important for the emergence of domesticated horses in the Middle East that the designation of horse in the Sumerian language was also borrowed from the proto-Northern Caucasian language (Ibid.), and not from the Indo-European, as had been previously thought. The name itself meaning "donkey from the mountains" or "donkey from the east", speaks of the territory from which domesticated horses came to Mesopotamia. This is the Armenian or Iranian Highlands, and the time was evidently the 4th millennium BC according to the analysis of bone remains and written sources. Yet in general, it should be noted that information on the domestication of horses in different areas of the Old World creates a picture full of blank spots, which can be filled with new facts and interpretations as information accumulates in various fields of knowledge, including archaeology, paleozoology, ancient history of the East, linguistics, and paleogenetics of equids. This will be the key to the refinement and development of our knowledge about domestication and forms of using horses in the Old World.

Earliest devices for harnessing horses

The problem of using horses for carrying packs or riding raises the question on the means of controlling the horse. Archaeological finds contain no other evidence except for the psalia of the Sredny Stog culture, on which specialists do not have a unanimous opinion. However, such an important source of information as representations of horse harnesses on horse-headed scepters has so far remained unused by the scholars. This category of finds is represented by almost 40 artifacts from burials, settlements, and random discoveries. The area of their distribution extends from the Middle Volga region to Ciscaucasia and the Danube region. The time when they were in use (according to the calibrated dates) is the 5th to 4th millennia BC. The number of specialized articles and monographs devoted to horse-headed scepters is very large (for the latest, most complete summary see (Dergachev, 2007)).

The first identification of images on stone scepters with horses belongs to V. Dumitrescu (in the middle of the last century) and D. Birch (in 1954) (Ibid.: 76–77). Different scholars have described the elements of the head harness, which were rendered by relief, polishing, or engraving on horse heads in different ways, but limited themselves to indicating that horses were "bridled" or that muzzles or frenteras of halters were represented. Yet no one attempted to reconstruct the shape, type of head harness, and method of controlling the horse. This article will focus on these aspects, since an analysis of the iconographic features of head harnesses depicted on horse-headed scepters makes it possible to reconstruct the very first steps in controlling horses at the early stage of their domestication in the Neolithic-Chalcolithic period. As we will show below on a series of reconstructions (Fig. 1), the method that was created at that time was sufficient for a person to lead a horse, hold it, tie it up, and use the horse for carrying packs or riding.

Specialized literature pays significant attention to the ability to control the horse when riding through the impact of the rider's weight, whip, the rider's shins, or pressure on the nasal cartilage with a drop noseband (Kovalevskaya, 1977: 11–18; Anderson, 2006: 63). The latter method was also used for controlling chariot horses, as M. Littauer (1969: 291), one of the greatest specialists in the use of horses in ancient times, wrote already in 1969. Judging by the representations of chariot horses in Egypt (2nd millennium BC), they were controlled with the help of a drop noseband without a bridle bit in the mouth. This is confirmed by archaeological finds—bridles without snaffle bits (mouthpieces), indicated by J. Anderson (1961: Pl. 2), and studied in detail by Littauer (1969: 291, 292). Representations of equids with a muzzle and nose ring in the Middle East are separated from the Egyptian images by millennia, but it should be noted that whether they were bridles without snaffle bits or muzzles, in all cases cheekpieces and crownpieces were used, and sometimes additional browbands and nosebands.

Only one terracotta from Syria (Fig. 1, *19*), supposedly dated to the 3rd or 2nd millennium BC (Littauer, Crouwel, 1979: Fig. 22), shows the same type of muzzle combined with a drop noseband, which is connected to the crownpiece with wide upper and lower straps (possibly low-lying cheekpieces), as means for handling horses in the European steppe and forest-steppe during the Chalcolithic. Evidently, they must have been genetically related.

The use of muzzles of types 1–4 (Fig. 1, *1–4*) was a method of harnessing horses. Precisely that method best fits the common Indo-European term that is associated with the first steps to tame a horse and exercise active control over it. This is the Old Indian "tame"/"subdue"/"force", Ossetian "tame"/"wear down",

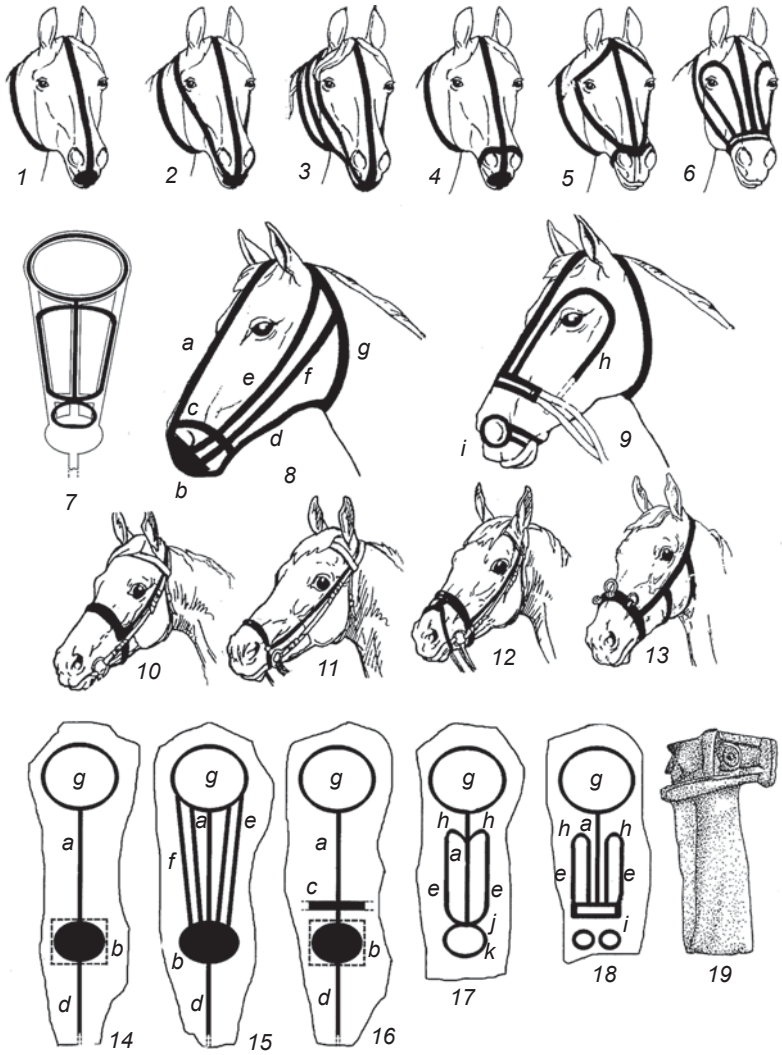

Fig. 1. Reconstruction of muzzles and bridles of the 5th–4th millennia BC based on representations on horse-headed scepters. *1–6* — types 1–6; *7* – cut of the bridle of type 5; *8* – muzzle bands: *a* – long frentera, *b* – muzzle, *c* – drop noseband, *d* – lower connecting strap, *e*, *f* – cheekpieces, *g* – throat latch; *9* – bands of the head harness: *h* – bent cheekpiece, *i* – ring-shaped, spectacle-like drop band above the nostrils; *10–13* – present-day halters: *10* – regular, *11* – Hannover, *12* – Irish, *13* – kaptzug (after (Gurevich, Rogalev, 1991)); *14–18* – cuts of muzzles and bridle (*a–i* – see *8*, *9*; *j* – bent lower part of the frentera-cheekpiece, *k* – oval leather mouthpiece): *14* – type 1, *15* – type 3, *16* – type 4, *17* – type 5, *18* – type 6; *19* – terracotta from Selenkahiye (after: (Littauer, Crouwell, 1979: Fig. 22)).

and only Homer used "break in by riding" (Gamkrelidze, Ivanov, 1984: 483). The muzzle and drop noseband are means of "subduing", "forcing", and "wearing down" the horse, because they make breathing difficult, and do not allow the horse to eat and drink. The horse tamed with the help of such a muzzle can be used by man for work, carrying heavy loads on its back, or riding.

Any horse equipment consists of longitudinal and transverse straps, which are joined with each other. Judging by the available images, we may assume that muzzles were cut out of a single piece of leather measuring approximately 120 to 140 × 30 to 40 cm (Fig. 1, *14–18*). Straps could be 4–5 cm wide or even wider. With this cut, there is a single knot in the muzzle: the connecting (lower) strap is tied to the throat latch under the jowls of the horse. The muzzle could be made in such a way that due to the treatment of the rawhide it might have a rounded convex-concave shape, and lie on the end of the horse's nose.

According to the earlier study by this author (Kovalevskaya, 2014), five types of muzzles (types 1–4, 6) and one type of bridle (type 5) can be distinguished on the basis of representations of halters on scepters. The latter type is a reconstruction made from the pommel of the scepter from Suvodol (Dergachev, 2007: Fig. 6). According to V.A. Dergachev, its small size indicates that it is the earliest among the pommels of stage D. All bands of the head harnesses, including the mouthpiece in the mouth (most likely, an oval band made of rawhide), are carefully represented on the pommel in low relief (Fig. 1, *5*, *7*, *17*). The bridle (in this case, we have reason to use this name for the first time) consists of a frentera (upper band) starting from the very end of the horse's nose and connecting beyond the ears with the crownpiece, making a single whole with it (Fig. 1, *17*). A slanting nosepiece runs obliquely from the central frentera, bends and passes into a long cheekpiece, which, in turn, bends and passes into a semi-oval browband, connected to the frentera. From the middle of the nose parallel to the upper nosepiece, passes a lower strap, extending into the mouth. How can this be understood? If we turn to the muzzles of types 1–4, it can be clearly seen that this snaffle bridle is a reduced version of the muzzle with the noseband. First, it is put on the horse's head with the closed crown-and-throat band, then the small snaffle band is inserted into the mouth, and finally the frentera together with the nosepiece, cheekpieces, and browband are pulled on the head for a snug fit of the head harness. Somewhat analogous to this bridle is the modern Irish noseband (Fig. 1, *12*).

In the settlement of Botai, osteological materials were mainly represented by horse bones. In this settlement, meat, skin, tendons, animal bones, and horse hair were utilized (Olsen, 2003: 83, 100). S. Olsen stressed that the harnesses for Botai riding horses used for hunting

wild horses could have been made of horsehide, which anticipated the conclusions about manufacturing halters considered in this article.

Interestingly, making bridles of type 5 required significantly smaller pieces of leather. Fig. 1, *7* shows how this bridle can be overlaid on a pattern of the type 4 muzzle with two cheekpieces. The central frentera and the crownpiece (in the form of an oval or ring) remain in the same place; the cheekpieces are superimposed on the cheekpieces; the nosepiece is superimposed on the drop noseband of the type 4 halter. The oval of the muzzle turns into a leather band; its upper part lies on the cartilage of horse's nose, while its lower part lies in the mouth on the tongue and in the toothless edge of the jaw. It can be said with certainty that the horse would very quickly chew this leather, so it should be wrapped in a spiral with a rawhide strap or horsehair rope, the ends of which, coming out of the corners of the mouth, would serve as reins.

The designs of the muzzles are standardized: the long central frentera is necessarily present, being the central link of the head harness; all other pieces are attached to it (or rather, run from it): the nosepiece, browband, and crown-and-throat band. It is interesting that the cut of the halter repeats the configuration of the "tree of life", an important symbol in the cults of many ancient peoples (Fig. 1, *15*). Another feature is the occasional use of two additional shortened cheekpieces, which turn into the browband (type 6). The curved line of the browband smoothly passing into the cheekpiece (types 5 and 6) is also a specific feature. These features are determined by the fact that the head harness was not made of separate bands, intersecting at right angles with each other (as was the case in the Middle East in the 3rd to 1st millennia BC or in the present-day horse equipment), but were cut of one piece of leather (Fig. 1, *14–18*). Therefore, it is of great interest to search for such features in iconographic or archaeological materials associated with the equestrian equipment in the areas where domesticated horses from the European steppes were spread: to the west in the Balkans, Central Europe, and Britain, to the east in Asia, and to the south in the Caspian region and the Caucasus. It may also be productive in this respect to work with cultural vocabulary associated with equestrian equipment in Indo-European and other languages.

One such halter appears on the representation of the famous Trundholm horse harnessed to a sun chariot from the 2nd millennium BC—one of the most famous exhibits of the National Museum of Denmark (Copenhagen). Without raising the question of whether it is an example of the earliest image of a metal crownpiece-shaffron (for more details see (Littauer, Crouwel, 1991)), we may note that its ornamental decoration emphasizes a long upper frentera, lower throat latch, and semi-oval browband, that is, specific elements of muzzles and bridles of the Chalcolithic.

The horse leather muzzle from the 1st Pazyryk burial mound—the mask with deer antlers, widely known to archaeologists (Poltsarstva za konya…, 2006: 3, No. 30 according to the catalog)—is an example of morphological similarity. However, since it has not been studied by the present author, it is difficult to say how great this similarity is. In order to consider it possible to link the Pazyryk mask with the Chalcolithic muzzles, it is necessary to have similar finds chronologically linking these artifacts, which unfortunately are not available. Both of the examples, which are from different periods, raise the question of spatial analysis of the distribution of horse-headed pommels and the area of steppe and forest-steppe sites, which testify to the role of horses in the life of the population (Dergachev, 2007: Map 1, 2, 7–10). This topic is closely related to the debated and complex problem of the ancestral homeland of the Indo-Europeans and their further settlement, which this article does not have the place and time to consider. Yet, it is impossible to ignore this problem, since most scholars of European Chalcolithic sites rightly believe that the distribution of domesticated horses from Eastern Europe (as well as the area of horse-headed pommels) reflects the first movements of the Indo-Europeans in the 5th to 4th millennia BC (Ibid.: Map 1, 2; p. 39, tab. 11).

The map presented by Dergachev (Ibid.: Map 2) clearly shows the center of concentration of the pommels in the Middle Volga region and the southern and southeast vectors of their distribution (the pommel from Arkaim indicates the eastward direction). The main conclusion that follows from this map is the advancement of the Volga and Dnieper-Don population with their mobile cattle breeding, riding and pack carrying horses, cult of the horse, and funeral ritual of kurgan burying to the Northern Caucasus already in the 5th millennium BC (Korenevskiy, 2006).

Horse breeding in Elam in the 3rd millennium BC

According to specialists, domestication can be proven by the purposeful breeding of horses, the data of which usually do not reach us. Therefore, of great interest is the Elamite clay tablet from Susa of the early 3rd millennium BC (for more details see (Kovalevskaya, 2008)), which since the beginning of the last century has been viewed by specialists as a list of horse breeding farms or a pedigree table. In as early as 1982, the well-known orientalist I.M. Dyakonov wrote that the ideograms on this tablet undoubtedly depicted the horse (1997: 461, nt. 29).

Thanks to the help of a leading specialist in proto-Sumerian and proto-Elamite writing A.A. Vaiman, it became possible to decipher all numerical indicators, fill

the lacunae, and obtain data for all individual farms. Six lines (the first line was defaced) read from top to bottom and from right to left, and contain pictographic signs, images of horse heads turned to the left, and numbers in the decimal numerary system on the face of the tablet (Fig. 2, *1*). Imprinted double lines with a crossbar correspond to the ones; circles to the tens; and figures shaped like an hourglass correspond to the hundreds. Earlier, scholars determined that the representation of the mane with a downward slope indicates a mare, the mane with an upward slope a stallion, and the absence of a mane indicates colts. Sums of the numbers and seals in the form of gazelles and goats, which according to scholars testifies to the official nature of the document, appear on the back of the tablet.

The text is continuous. Work on its reconstruction consisted in presenting information in a table of conventional form, so it would be possible to check the shares of mares and stallions, which are important from a zootechnical point of view, as well as the output of colts and the possible general amount of horses in Elam in the early 3rd millennium BC (see *Table*). Each sequence (mares, suckling colts, stallions, and colts) begins with a tamga-like symbol, which divides them up. This makes it possible to restructure the text by selecting the lines in accordance with individual farms (Fig. 2, *2*). In our table, the sequences are represented by columns (3–6); in column 2 the sum for each of the sequences is added, and the tamgas of various farms in column 1 are replaced by conventional sequence numbers.

The quantitative indicators of the first and largest farm, which can be hypothetically regarded as a double farm, are obtained in the following way. For the third to the eighth farm, the number of horses was calculated for each position and subtracted from

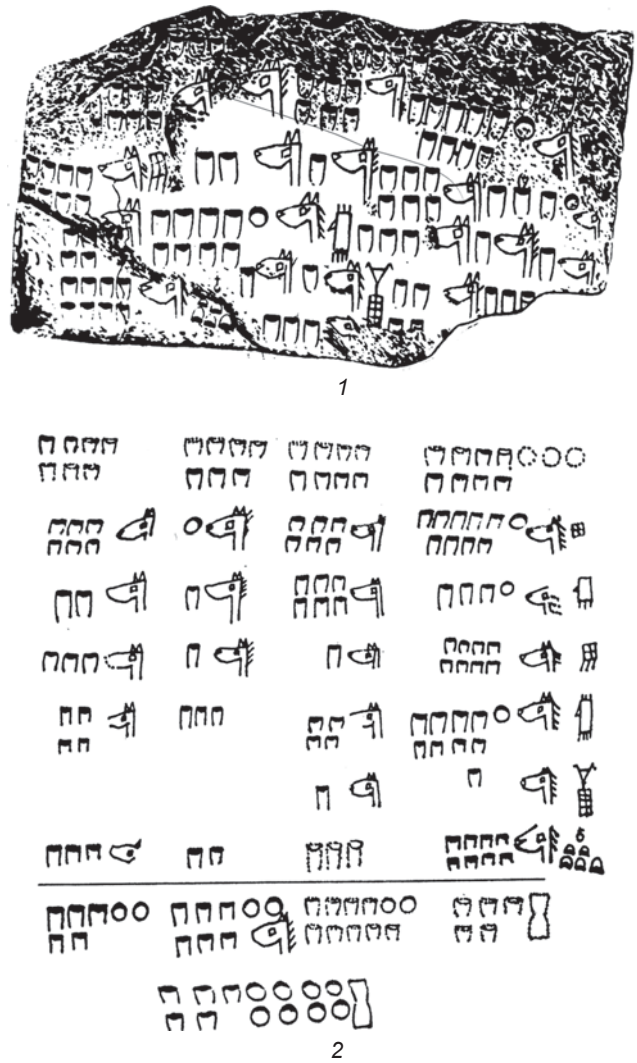

Fig. 2. The Elamite clay tablet of the 3rd millennium BC from the Louvre collection listing horse breeding farms (*1*), and a reconstruction of text lines for individual farms of Elam (*2*).

Reconstructed list of horse breeding farms in Elam in the 3rd millennium BC

6	5	4	3	2	1
Colts	Stallions	Suckling colts	Mares	In total	Farm
7	9	8	38	62	1, 2
6	10	6	19	41	3
2	1	6	13	22	4
3	1	1	8	13	5
4	3	4	18	29	6
–	–	1	1	2	7
3	2	3	8	16	8
25	26	29	105	185	

the total sum that appeared on the back of the tablet. Therefore, the drawing with the restructured tablet (Fig. 2, *2*) indicates seven surviving marks for the stallions from the first farm, and our Table contains nine as the result of the calculation.

Each reconstructed line is the composition of one horse breeding farm (from right to left): the number of mares, suckling colts (by analogy with the present-day form of accounting), stallions, and colts—as we believe, weaned animals of the previous year, which are kept separately in any horse breeding farm. Some information about maintenance of horses can be derived from this form of record. Mares with suckling colts were kept in separate pens and could have been grazed separately. Stallions, most likely, were kept in stables, while weaned colts could have been kept in separate pens or grazed separately in herds.

We are offering an analysis of the tablet data from a zootechnical point of view, in order to determine the structure of each farm, and evaluate the producing composition in comparison to materials of a similar nature, especially since the tablet has not been previously considered from this point of view. Comparative data were taken from the Akhal-Teke horse breeding farms of the Caucasus and Central Asia (data by T.N. Ryabova from 1981–1982), which correspond to traditional equestrian farms (Akhaltekinskaya poroda…, 1981: 3–45; Akhaltekinskaya poroda…, 1982: 1–44).

The ratio of mares and suckling colts was different in the farms appearing in the tablet. Only in one of them (No. 7) was it 1:1. In other farms, one suckling colt corresponded to three mares (No. 3), or two suckling colts to five mares (No. 8), or the same as the rate of the previous year (No. 5). These figures indicate the existence of expanded reproduction in Elamite horse breeding, since it can be assumed (according to the present data) that during the reproductive period each female horse could produce on average from three to five colts. The share of stallions (14.1 %) is very close to the share typical of the Akhal-Teke breed (12.8 % for 1982) (Akhaltekinskaya poroda…, 1982: 3–17). The ratio of stallions and mares varied greatly: from one to two (farm No. 3), to one to 4, 6, 8, 9, and even 13, with one stallion for 8 or 13 mares in two farms (No. 4 and 5). The analysis of the data examined indicates sufficiently developed breeding work, when the horse-breeding farm had a correct ratio between the number of mares and stallions, which contributed to a good yield of colts. Data on the livestock producing composition (131 horses) make it possible to estimate the total number of horses in Elam, which is usually 3–4 times higher than the producing composition, thus amounting to about 400–500 heads (and in fact, we have no reason to believe that this number characterized all of Elam; possibly only some region).

The official nature of the document indicates the interest on the part of the central authorities of Susa in controlling the livestock of horses, since long afterwards, the possession of horses and horse breeding farms, as well as supplying soldiers with horses, were the prerogative of royal power. This Elamite tablet is a most unique source, making it possible to get an idea of the level of horse breeding in ancient times, and compare it with data from the recent past.

Horse training by Kikkuli of Mitanni

The 3rd to 2nd millennia BC were the prime of warfare and cult chariots in the Eurasian steppes and Western Asia. We do not intend to engage in a long-going discussion of whether the chariots appeared in these territories independently or in one of them earlier than in the other. The treatise of Kikkuli of Mitanni (a unique text about a seven-month long, well-elaborated training of chariot horses for their use in combat) is of great interest regarding that problem. The presence of "fossilized glosses" of Indo-Aryan origin in this text and the opportunity for understanding many features of this training by comparing it to the Turkmen horse training make it possible to see the connections between the Middle East and Eurasian steppes in the 2nd millennium BC in their specific manifestations (Kovalevskaya, 2005; 2010: 51–58). Undoubtedly, the horse training system among the proto-Mitannians emerged at the time of their stay on the Eurasian steppes; according to Asko Parpola, it was in the area of the Poltavka, Abashevo, and Sintashta-Arkaim archaeological cultures, from where the Mitannians advanced along the eastern coast of the Caspian Sea through the territory of the Bactria-Margiana Archaeological Complex to Syria, where they were known in the 16th–13th centuries BC (Parpola, 2014: 58). This proposition, however, does not seem to be valid. Based on the studies of S.V. Kullanda, according to which the name of Mitanni was convincingly correlated with the name of the Meotians (2016: 154), and taking into account the territory of the Meotian settlement in the 1st millennium BC in the Northwestern Caucasus, we believe that the Mitannians could have moved through the Greater Caucasus, eastern coast of the Black Sea, and reached as far as Upper Mesopotamia.

Discussion has been held for a long time regarding the seven-month training of Kikkuli: whether it should be considered as preparation for competitions (there is no information on competitions among the Hittites, but if one takes into account the Indo-Iranian tradition, they could have well taken place) or training for use in warfare. Most likely, it was the latter. The manual was not compiled for a horse-breeding farm, since it began not with a gradual

beginning of the work, but with a "trial run", where all the capacities of the horse became apparent.

In the known studies, including A. Kammenhuber's comprehensive monograph "Hittite Hippology" (1961), the authors, while trying to systematize the horse training, followed the path of assigning days with the same training into a single type. Instead, one should consider the changes over time and the system behind various loads, which is distinguished by harmony and forethought. In horse training, several periods can be identified, which in their nature and sequence coincide with the present-day training of Akhal-Teke horses by the Turkmen *seyis* horse breeders (see the distribution of loads for chariot horses when trotting and galloping over six stages for each day in (Kovalevskaya, 1977: 52)).

The first stage was the so-called test run—checking all horses that ended up in the hands of the trainer for the training period primarily for endurance. The culmination point was reached on the morning of the fourth day, when horses in the chariot were supposed to trot 12 km and gallop the same distance without food. Interestingly, in the future, with a gradual increase in load, such work (24 km of running) would be offered to the horses only after five months of daily training.

The second stage (a ten-day cycle of physical training of the horse, its enhanced "sweating") began after the "trial run". The purpose of this stage, just as in the 19th century, was to lose weight, "to dry" the horse, and align its breathing. After such a heavy load on the body, rest was provided in all training sessions. It was the same in the Hittite training: the third stage was rest. Starting from the fourth stage, a daily, ever-increasing trotting training session was carried out up to the sixth stage, when the horse trotted 84 km a day. During the whole training time, not counting the rest period, there was not a single day when the horse was completely freed from work.

The third to fifth months of training, which apparently took place at the hottest time of the year, included the main work with long repeated trotting at night. However, in the days of testing galloping, training was conducted in the mornings and evenings. By the second half of the fourth month, the work on trotting reached its maximum. After a test galloping of 2800 m (upon 16.2 km of trotting), the horses trotted for 42 km upon galloping for 420 m for six nights, then 84 km in one night, and eight nights again trotting for 42 km upon galloping for already 480 m. In our times, such a load is given only to horses that are aiming to break records.

The result of the Hittite training was an amazing endurance of horses adapted for fast movements with daily use. It can be assumed that not only domesticated horses were spread from the Eurasian steppe belt, but also the means of handling them, which were created there (muzzles of various types, bridles with and without the snaffle), and effective training of chariot horses.

Horses of the 2nd millennium BC and ancient texts

There is a large amount of archaeological data on the use of horses in the 2nd millennium BC as a chariot and cultic animal. In steppe burial mounds of that time, numerous remains of horse sacrifices were found, including skulls or lower jaws, skulls and leg bones, or complete skeletons, found in the burial structure or above the burial. There are many hundreds of such kurgans in the Eurasian steppes, and the number of horse remains in each of them ranges from 1–2 to 40 and more. We can reconstruct the rite based on the hymns "The Horse" in the Rigveda, since "the strong Steed, God-descended", "covered with trappings and with wealth…" (I, 162.1, 2) was offered as a sacrifice.

Based on the Rigveda, we can reconstruct the type, exterior appearance, height, nature of movements, and temperament of the horses that the proto-Indo-Iranians saw in front of themselves and that we know today as Akhal-Teke horses. The hymns of the Rigveda emphasize their capacity for fast trotting ("high-spirited", like a "swirling river", a "true runner, running fast like a bird"), harmonious build ("with beautiful members", "with a straight back", "broad-chested", "with filled girth"), and great strength ("mighty", "courageous"), temperament ("roaring, neighing, snorting"), and height ("huge"); the attitude towards the owner ("devoted") was also emphasized (III, 49.1). These descriptions make it possible to envision the exterior appearance of those horses with which the proto-Indo-Iranians, on a "swift mover like a warhorse" (III, 49.3), running in swift career "on your lightning laden cars, sounding sweet songs, armed with lances and winged with steeds!" (I, 88.1), captured the vast Asian expanses.

Conclusions

Considering the problems associated with the domestication and use of horses in the 5th to 3rd millennia BC in Eurasia, scholars have come to the conclusion that horses were domesticated for the first time in the Neolithic-Chalcolithic cultures of the Middle Volga region. During the 5th to 3rd millennia BC, domestic horses gradually spread to the west (the Lower Danube region, Central Europe up to Scandinavia, Britain and Ireland), according to N. Benecke (2006), to the south through the Greater Caucasus, and to the east to Siberia.

During this period, means for restraining horses (muzzles, bridles with and without snaffle rings) were created for the first time. Their features point to a gradual development of horse harnesses. According to the representations on horse-headed scepters, six types can be identified. Notably, a certain line of development

of muzzles from simple (type 1) to more sophisticated (types 2 and 3) can be traced in the Chalcolithic in the Eurasian steppe, ending with muzzles with the drop noseband (type 4). They appear both among stylized and realistic representations on the pommels, while the bridle with a leather snaffle bit (type 5) appears only on realistic images. This means of bridling a horse, reconstructed according to horse-headed scepters of the 5th–4th millennia BC, was the earliest and Indo-European in its origin. Together with domesticated horses, it spread throughout the entire Old World.

There are almost no available data on purposeful breeding of horses in ancient times. The earliest evidence on horse-breeding farms is known only from the Assyrian documents about the wars in Urartu. Therefore, the Elamite clay tablet from Susa belonging to the very beginning of the 3rd millennium BC with a list of horse breeding farms is of great interest. This document makes it possible to establish the structure of each farm, assess the their composition on the basis of comparison to evidence of similar nature, and make an assumption about the total number of horses in Elam (or possibly only in one of its regions) as approximately 400–500 heads. Each year, 15–20 young colts from these eight farms could enter training and become available for military needs, so the mares would remain for breeding.

The 2nd millennium BC was the time when chariots emerged and began to be widely used in the Eurasian steppes, the Middle East, and Egypt. Vast spaces became available to people thanks to the swiftness of chariots, since it became possible to move five times faster than riding on bulls and equids (150 instead of 30 km per day). Horses were well trained, fast, and resilient; they were trained according to a well-designed and highly professional system; they participated in competitions and military operations. Strict bits with leather or bronze mouthpieces and sometimes with psalia with internal studs were used as means of control. Light maneuverable battle chariots and gold multicolored ceremonial chariots decorated with pearls, with high wheels, were created with the latest technological advances. Innovations which were introduced in one land immediately became known throughout the entire civilized world. This was the case with the training system known from the treatise of Kikkuli of Mitanni: designed by the proto-Indo-Aryans in the Eurasian steppes in the first half of the 2nd millennium BC, by the 14th–13th centuries BC it reached Western Asia.

On the basis of written sources and ancient representations, we can imagine the external appearance of horses in the 5th to 2nd millennia BC. At that time, the light "noble eastern horse", close to the present-day Akhal-Teke breed, emerged and spread. The problem of the origin of this breed was posed by V.O. Vitt over 80 years ago, but has not yet been considered in detail. Meanwhile, today it is already possible to closely approach its solution thanks to the body of paleozoological evidence, collected in the repositories of museums and scientific institutions, and the presence of a huge systematized database on the genetics of modern horse breeds, including the Akhal-Teke breed (2041 genetic analyses in the All-Russian Research Institute for Horse Breeding of the Russian Academy of Agricultural Sciences). Analysis of the available data on the role of eastern horses in ancient horse breeding of the world will make it possible to solve the problem using an interdisciplinary approach and comparison with historical evidence. The only prerequisite is for numerous scholars of various fields to unite their efforts in solving this problem.

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