

# THE METAL AGES AND MEDIEVAL PERIOD

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## **An Unusual Fabric from Jety-Asar-2, Eastern Aral Sea Region, in the Context of the Central Asian Textile Tradition**

*We present the results of an interdisciplinary study of an unusual sample of wool fabric, found at the Jety-Asar-2 fortified site, representing the Jety-Asar culture of the late 4th century BC to early 1st century AD, in the central Turan Plain. We outline the results of the analysis of the dyes and technological characteristics of the fabric. The woven pattern is described in detail. The specimen is compared with the tapestry from Shanpula (Sampul) cemetery in the Hotan oasis, Xinjiang, China. We examine the idea that the Jety-Asar fabric had been manufactured in Shanpula and transported to the Aral basin along the Great Silk Road. Previously, this type of tapestry was believed to have been used only in the Hotan oasis, because no direct parallels with other areas were known. A direct parallel with such a remote westerly region is all the more intriguing. Apparently, colorful strips of woolen tapestry depicting animals, birds, humans, fantastic beings, mountains, and flowers were in big demand. The tradition, then, may have been distributed much more widely than previously thought. Many anthropomorphic, zoomorphic, plant, and purely decorative motifs have numerous parallels in the Early Iron Age art of the Eurasian steppes, highlands, and piedmont areas. The Shanpula people used such fabric for decorating skirts. In other cultures, it was destined for various purposes.*

**Keywords:** *Textile, Shanpula, Xinjiang, Jety-Asar culture, Eastern Aral Sea region, interdisciplinary research.*

### **Introduction**

Textiles are a unique archaeological source. They are very rarely discovered at archaeological sites. Only localities like Xinjiang or Egypt possess an abundance of ancient fabrics and items made of them. Ancient textiles, which as a rule have been preserved fragmentarily, are of great value as important sources of scholarly information. Such finds include textiles discovered at the sites of the Jety-Asar culture in the Eastern Aral Sea region.

In 1973, a rectangular white felt rug was found on the steps of the stairs inside the vaulted shooting gallery (cultural layer 9) during the excavations at the settlement of Jety-Asar-2 (7th–6th centuries BC to 3rd–4th centuries AD) conducted by the Khorezm Archaeological and Ethnographic Expedition of the Institute of Ethnography of the USSR Academy of Sciences (today, the Institute of Ethnology and Anthropology RAS), headed by L.M. Levina. As Levina wrote, “This was a case of the secondary use of the



Fig. 1. Felt rug trimmed with woolen fabric. Jety-Asar-2 fortified settlement.

saddle cloth” (1996: 217). Along the perimeter, the rug was trimmed with “a strip of lint-free woolen carpet woven using two-way carpet technique”.

This rare find became the object of research by A.K. Elkina, an expert on ancient textiles, who established that the woven pattern was “a weaving repeat by every 12–13 cm; the pattern consists of two motifs: an animal (horse) is in one half; the height of the animal was equal to the width of the border band; the second motif consisted of two identical images (possibly also animal) located one above the other. In the next repeat, both of these motifs were woven upside-down” (Ibid.). Substances that were used to dye the threads of woolen fabric were identified, and it was established that “red and pink colors were obtained using common madder; blue was produced from indigo; yellow – possibly from some local plant, and green resulted from dyeing yellow over blue” (Ibid.). Unfortunately, the method used for establishing the content of the dyes was not indicated.

The reason for new research into the fabric was information derived from the discovery of numerous remains of woolen textiles in graves in Xinjiang in recent years. The availability of this evidence opens up the prospects for placing the textiles found at a site of the Jety-Asar culture in a historical context.

In 2002, we had an opportunity to comprehensively re-examine the fabric described and take color photos

of it\* (Fig. 1). Unfortunately, the book on the ethnic and cultural history of the Eastern Aral Sea region, where the fabric was described, contains only a black and white drawing (Levina, 1996: 315, fig. 120), which does not reflect rich and bright colors, while the small image size does not make it possible to see all the pattern details.

This study intends to use advanced methods and devices to establish the substances used to dye woolen threads, as well as to identify the technological features of the object, and to describe and interpret the woven images. The analysis was carried out at the Chemical Research Center for Collective Use of the SB of the RAS.

#### **Description of fabric from the Jety-Asar-2 site**

*Research methods and results.* Tissue fibers were analyzed using scanning electron microscopy with a Hitachi TM-1000 microscope. Dyestuffs were extracted from the threads by boiling the samples in a

\*The item is kept in the State Museum of Oriental Art in Moscow. We thank L.M. Levina for the permission to use the evidence from the excavations done by the expedition she leads. Many thanks to E.I. Zheltov for photographing the fabric.





Fig. 2. Photo of samples of the fabric threads.

37 % HCl/H<sub>2</sub>O/methanol solution (2/1/1, v/v/v) for ten minutes. The resulting solution was cooled, separated from the residue by centrifugation, and evaporated. The residue was dissolved in methanol/formic acid (9/1, v/v) and centrifuged again. The solution was used without dilution, for a high performance liquid chromatography. The analysis was carried out using an Agilent 1200 system from Agilent Technologies with a diode array detector. Separation was performed on a Zorbax

XDB-C8 column (2.1 × 150 mm, 3.5 μm) by Agilent Technologies. Detection was conducted at wavelengths of 255 nm (bandwidth 16 nm), 370 nm (60 nm), 440 nm (80 nm), 540 nm (60 nm), and 600 nm (80 nm) with the reference wavelength of 850 nm (100 nm); separation was carried out by gradient elution with a mixture of 2 % water solution of formic acid and 20–90 % acetonitrile (5–15') at a flow rate of 0.3 ml/min.

The threads of red, blue, yellow, pink, and gray colors were analyzed (Fig. 2, 3). All the threads contained fibers of different thicknesses. For example, the diameter of the fine fibers of red threads was from 11 to 17 μm; the diameter of threads of medium thickness ranged from 26 to 40 μm, and the diameter of the coarse wool was from 50 to 68 μm. All the fibers were thoroughly dyed. In blue threads, the fibers were mainly of medium thickness (from 17 to 23 μm). Rough fibers ~50 μm and wool ~91 μm thick occurred. Coarse fibers were not dyed all the way through. Fibers of yellow threads had small (from 12 to 19 μm) and medium (from 28 to 38 μm) diameters. Coarse fibers ~46 μm sporadically occurred. All the fibers were thoroughly dyed. Fibers of pink threads were mixed and included fine fibers with a diameter from 18 to 23 μm and coarse fibers (from 41 to 44 μm). Occasional wool (62–67 μm) was observed. Coarse fibers were not dyed all the way through. Fibers of gray threads were thin (from 15 to 24 μm). Individual coarse fibers had diameters from 39 to 43 μm. Comparison of macrophotographs of fibers with models makes it possible to conclude that the fabric analyzed was woven of unsorted sheep wool (Fig. 3). This is also indicated by the presence of lanolin on the fibers of the threads, which is a typical feature of sheep's wool.

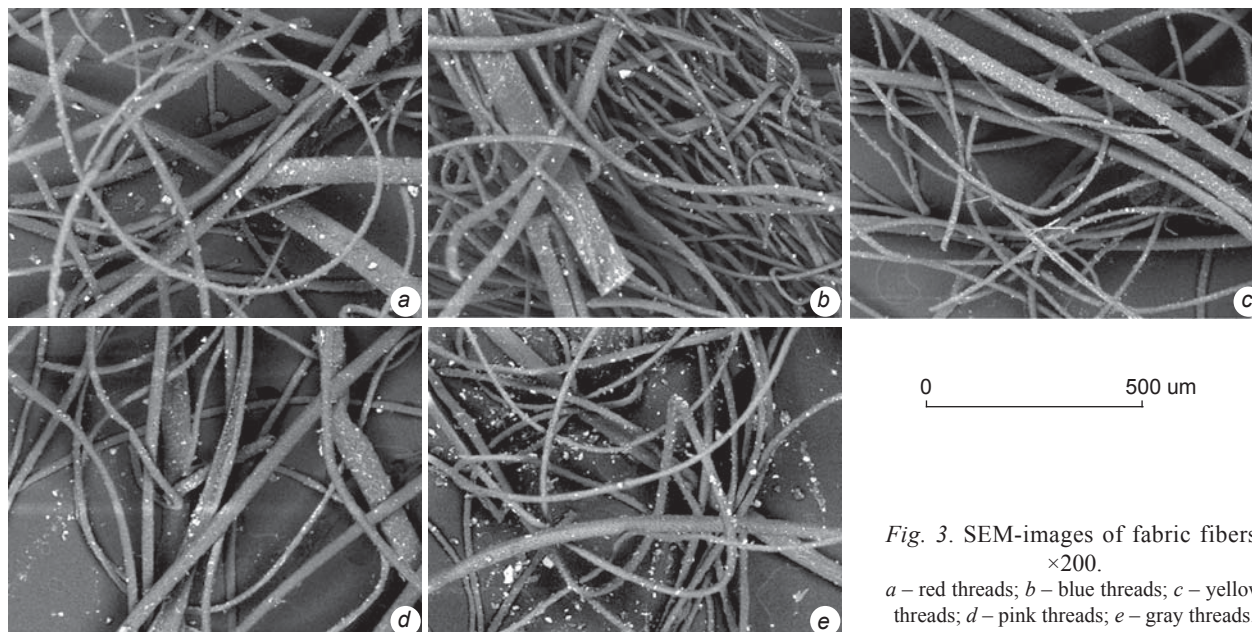


Fig. 3. SEM-images of fabric fibers. ×200.  
a – red threads; b – blue threads; c – yellow threads; d – pink threads; e – gray threads.

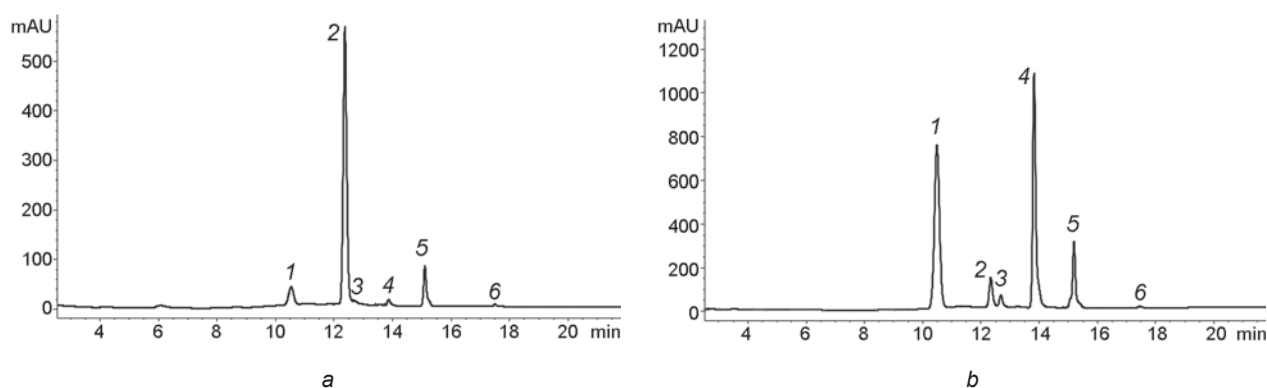


Fig. 4. Chromatographic profile of dyestuff extracts with green buckthorn berries without mordant (a) and with potassium alum (b).

1 – quercetine; 2 – kaempferol; 3 – isorhamnetin; 4 – rhamnetin; 5 – rhamnazin; 6 – emodin.

During the study, the substances used for dyeing woolen threads have been identified. The red threads were dyed with madder (*Rubia sp.*). The main dyestuff is alizarin. A rather high content of purpurin has been detected. Traces of alizarin, purpurin, and xanthopurpurin have been discovered in the threads of other colors. Except for trace amounts of alizarin and purpurin, which probably passed from red threads, dyestuffs have not been detected in gray threads. Most likely, these threads were natural. Indigotine, indirubin, and trace amounts of alizarin and xanthopurpurin have been identified in the blue thread. Purpurin has a retention time close to indigotine; therefore, it was not visible against the background of indigotine peak. Kaempferol, as well as traces of alizarin and purpurin, have been identified in the chromatogram of the yellow thread. Kaempferol was found in the standard dyed with green buckthorn berries (*Rhamnus frangula* L.)\*. It was the main dyestuff for the yellow color in dyes made without mordanting (Karpova et al., 2017: 444). In the chromatograms of wool standard dyed with *Rhamnus sp.* using potassium alum as a mordant, the main component was rhamnetin (Fig. 4, b). Rhamnetin has not been found in the yellow threads of the fabric; it is likely that they were dyed with buckthorn (Persian berries) without mordanting (Balakina et al., 2006).

Thus, it has been established that the threads of woolen tapestry from the Jety-Asar-2 fortified settlement were dyed with madder, Indigofera (or other indigoid plant), and probably buckthorn berries. These data are consistent with the results of analysis of woolen fabrics from the Shanpula site (Xinjiang) obtained at the Netherlands Institute for Cultural Heritage (Graaff de, van Bommel, 2001).

\*Buckthorn grows in North Africa and Europe; in Asia it occurs in Siberia (except for the Far North), Altai, and Northern China.

The item was also studied by an expert in ancient textile technology, Dr. T.N. Glushkova, according to whose conclusion the woven band 80 mm wide, which has come down to us in two fragments, was made using a two-way carpet technique (weft cord weaving), with a weft density of about 18 threads per 1 cm, and with average warp and 6 threads per 1 cm, with loose warp. The weft density was not uniform, because the tapestry weave pattern was created by several wefts. The colored weft moved only within the colored ornamental pattern. The pattern repeats every 12–13 cm; it is composed of two motifs—the image of an animal, and representations of mountains and trees. The edges were made of thick or double threads. Judging by the technological features, the fabric under study was made on a very simple (primitive) loom using the same techniques that were used for creating the Shanpula tapestries (Schorta, 2001: 85).

A complete coincidence of technological features of fabrics and main types of dyestuffs found in textile threads from these sites cannot be a sufficient basis for drawing a conclusion about manufacturing fabrics from the Jety-Asar-2 site in the Hotan oasis. Notably, organic dyestuffs of plant origin (madder and Indigofera, or other indigoid plants), which were used by the craftsmen who created the fabric in question, have been used since ancient times on a vast territory from China to India, and the devices on which such fabric could have been made were very primitive. An important proof that this fabric could have been produced in Xinjiang is the ornamental pattern woven into it.

#### Ornamental composition of the fabric from Jety-Asar-2

The image of an animal, which the authors of the excavations at the Jety-Asar-2 fortified settlement





Fig. 5. Fragment of ornamentation representing an animal on the fabric. Jety-Asar-2.



Fig. 6. Fragment of ornamentation representing an animal on the fabric. Jety-Asar-2.

called a horse, is repeated on the woolen band of the tapestry fabric. Although the image is stylized, which is inevitable with such a weaving technique, it is clearly visible that this is a wild animal, since there are no traces of a harness on it (Fig. 5). The animal is depicted with a short body bent downward, with its head similar

to that of a horse, pointed ears, and an unusual lifted up thin tail, at the end of which there is a brush in the form of a ball with a cross inside (Fig. 6)\*. The stylized and decorative nature of the image makes it possible to suggest that this could have been the tail of a wild ass, kiang, or Przewalski's horse, whose tails have a pronounced brush, since they are covered with hair only in the lower part. All these animals have much in common in appearance; for example, they lack bangs and have a very short mane. We should also pay attention to the colors used for showing the repetitive image of the animal. The muzzle and undertail are white, while the neck and trunk are made up of alternating pale stripes of pink and yellow (see Fig. 5, 6). It is known, for example, that the kiang's upper part of the body is usually light brown with a reddish tint, and the lower part is white. In kulans, the upper part of the body is reddish-brown, and the legs and abdomen are white. Describing wild horses he saw in Dzungaria, N.M. Przewalski observed that their bodies were roan (gray with an admixture of a different color); the lower parts of the body were almost white; in one herd he saw two piebald (with large spots) horses (2008: 240, 241). This means that by the color of their wool, the woven mysterious animals are similar to the wild animals described above. Their habitation area was great in ancient times. For example, Przewalski's horses could be seen in the territory from the Volga in the west to the Daurian steppes in the east. They preferred dry steppes and high foothill valleys up to 2000 m above sea level. Kulan inhabited deserts, semi-deserts, foothills, and plains from Turkmenistan and Kazakhstan to Iran, Mongolia, and China. The habitation area of the kiang includes the territories of Tibet, Chinese Qinghai and Sichuan, India, and Nepal. These animals occur there at a height of 5000 m above sea level. They also live in Xinjiang, where local residents could observe them.

Animals both real (horses, camels, ibex, and rams) and fantastic (winged deer and goats, animals with human faces) were woven on the Shanpula textiles. Even though the image of the animal created on the tapestry that was found in the Eastern Aral Sea region does not find direct parallels in the rich and varied Shanpula bestiary, it fits it well both in the manner and style of its representation. The animal is shown among the mountains overgrown with trees (Fig. 7). Mountains and vegetation are depicted in the same way as on Shanpula textiles and using the

\*The petroglyphs of the Bronze Age in Central Asia show bulls having tails with a brush. This method of representation is an important dating feature, since fantastic animals with thin tails decorated with a mask-like sphere appeared for the first time on the Okunev stelae (see, e.g., (Savinov, 2006: 174, fig. 3)). In the image described here, the spherical shape at the end of the tail is a decorative element.



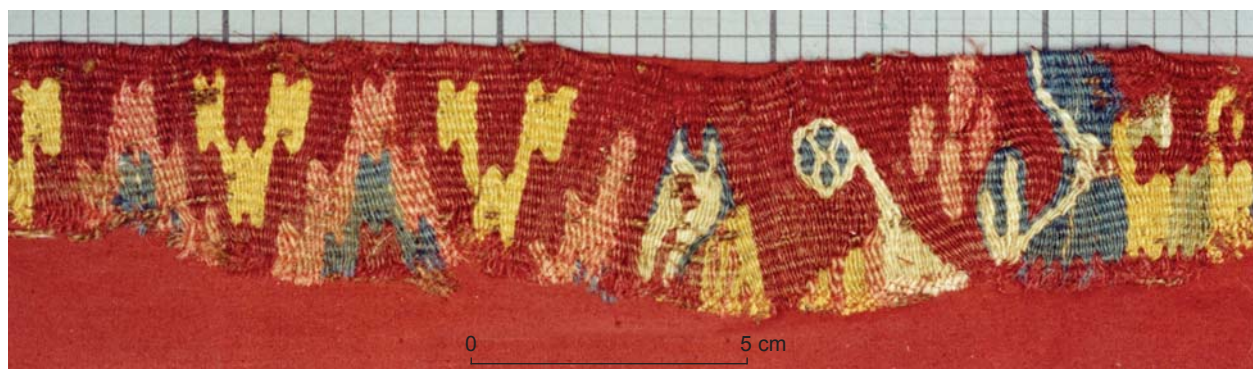


Fig. 7. Fragment of fabric representing an animal among the mountains overgrown with trees. Jety-Asar-2.

same manner (Bunker, 2001: 26–27): mountains are shown in the form of stepped pyramids, and trees and plants in the form of ornamental pattern (Fig. 8, 9).

Comprehensive analysis of the find from the site of the Jety-Asar culture makes it possible to conclude that the tapestry fabric was made by the Xinjiang weavers. The conducted research has revealed many similarities between the textiles from the Eastern Aral Sea region and fabrics found at the Shanpula cemetery. In the local culture in Xinjiang, bands of tapestry fabrics were a part of women's composite skirts and their decoration. As E. Bunker noted, "Tapestries with similar images have not yet been found either in Xinjiang, or further west of it in Central Asia, or anywhere else" (Ibid.: 16). In light of this statement, the tapestry found far to the west of the Hotan oasis constitutes an important piece of evidence that in fact tapestries with original images were much more widespread than it had been previously thought. The discovery of such fabrics in Central Asia is only the matter of time\*.

Studying the modest evidence of the burial inventory from the Shanpula site, Bunker suggested that weaving and trade constituted the basis for the economy of the population inhabiting the oasis (Ibid.: 42). They could have made colorful fabrics not only for their own needs, but also



Fig. 8. Fragment of fabric representing mountains. Jety-Asar-2.



Fig. 9. Drawing of fabric representing mountains. Shanpula, Xinjiang.

for sale (exchange). The find at the site of the Jety-Asar culture supports this assumption.

#### Language of the images on the fabric (In lieu of conclusions)

The results of the interdisciplinary analysis of fabric from the Eastern Aral Sea region make it possible to include this find into the circle of rare sources on ancient textiles of Central Asia. In the course of this study, it has been established that the woolen fabric from the Jety-

\*It is quite possible that in the future we will find skirts with patterned stripes of fabric borrowed from the Shanpula in the burials of the Pazyryk culture. So far, one intact women's skirt and three fragmented skirts have been found in the Pazyryk cemeteries. A band of imported tapestry fabric similar in the structure to kilim weave to the tapestry fabrics from Shanpula was used for sewing one of the skirts of a woman buried in the Second Pazyryk mound (Tsareva, 2006: 244–247).

Asar-2 fortified settlement was similar to the fabrics discovered in the burials at the Shanpula cemetery. The similarity manifested in the use of one type of raw material (unsorted sheep's wool), the set of dyestuffs of plant origin, the method of weaving, the arrangement of the ornamental pattern, and the style of the images all suggest that the bands of ornamented fabric from the two sites were made according to the same weaving tradition.

The Shanpula tapestry fabrics, which were decorations and parts of women's skirts, have always raised many questions regarding the origin of this textile tradition and especially of woven ornamental patterns among the scholars. These fabrics were found only in the Shanpula cemetery. However, the images of animals, people, and fantastic creatures represented on them appear among the evidence found in Kazakhstan, Altai, in the steppes of the Southern Urals, and even in Iran (Bunker, 2001: 39–42). Notably, the similarity is manifested by a single system of imagery—those signs of a culture that replaced writing in the Scythian-Sarmatian period and were a language understandable throughout the Eurasian steppes and vast expanses of Central Asia.

L.M. Levina, the head of the excavations at the Jety-Asar-2 site, believed that “similar multilayer saddlecloths made of white felt trimmed with woolen threads and a woolen patterned band have often occurred in burial mounds of the Altai Mountains”, such as the Fifth Pazyryk mound (1996: 217). The trimmed felt rug is not a complete parallel to the Pazyryk saddlecloths from the “royal” Fifth Pazyryk mound: the latter were much larger in size and only two of the five were covered with cloth (one with

woolen fabric; the other with silk). This is precisely the cover, and not the trimming along the edge, as it is the case with the Jety-Asar find. The fabrics are of the highest quality: the wool fabric was identified as weft rib and the silk fabric as taffeta. It has been established that the woolen fabric was made in the Achaemenid workshops: one part of the sewn cloth, which became the saddle cloth, was produced in the Eastern Mediterranean, the other part in Egypt (Gavrilenko, Grigorieva, 2005), while the silk fabric was produced by South Chinese artisans (Polosmak, Barkova, 2005: 131–137; Lubo-Lesnichenko, 1994: 22). Nevertheless, there is certainly something in common between the Pazyryk finds and the Jety-Asar item: we should only compare not the saddlecloths from the “royal” mound, but the saddle cover from the ordinary Pazyryk burial of a woman with accompanying horses, found in mound 1 at the Ak-Alakha-5 cemetery on the Ukok plateau (Polosmak, 2001: 87–93). A felt saddle cover with the same applied images of fantastic predators and pendants of ram's head were found on one of the buried horses. Along the edge, the item was trimmed with a woolen ribbon with woven stylized bird heads. The fabric has survived in small fragments; its colors have faded and its ornamental decoration is almost invisible to the naked eye (Fig. 10, 11). However, upon careful study it was possible to establish that this band of fabric of tapestry weave was made of threads of green, yellow, and red colors on a primitive loom. In its manufacturing technique, this band is fully consistent with the items discussed above. In addition, many of the characters depicted on the Shanpula tapestries show similarities

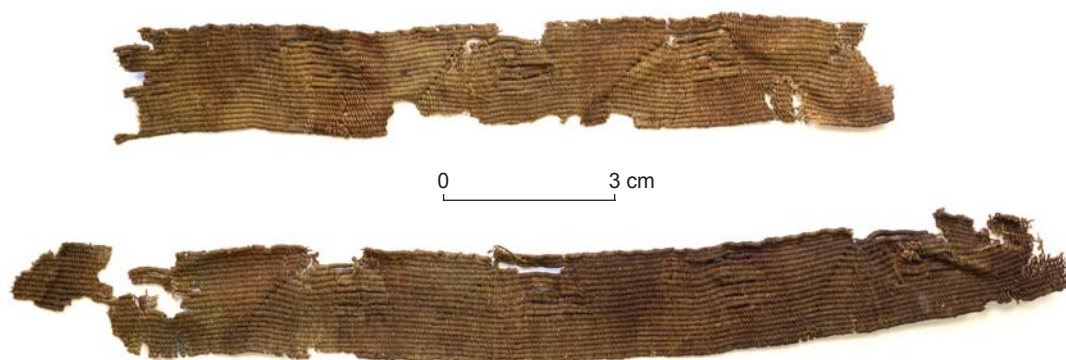


Fig. 10. Fragments of woolen band trimming the saddle cover. Mound 1 at the Ak-Alakha-5 cemetery.



Fig. 11. Drawing of woven ornamentation on the band. Mound 1 at the Ak-Alakha-5 cemetery.



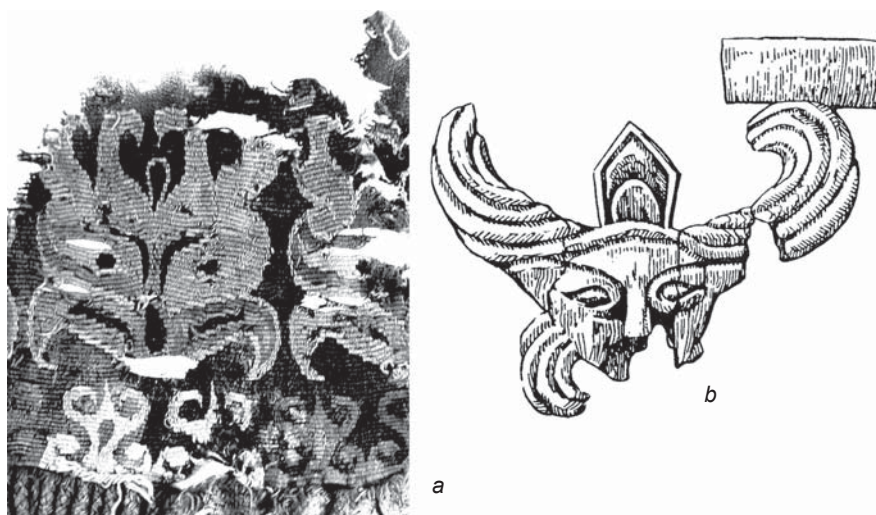


Fig. 12. Head of a fantastic animal, woven on a woolen cloth from Shanpula (a) and wooden pendant representing the head of an anthropomorphic being—decoration of horse harness from the Kuturguntas mound (b).

to the images on the items from the burial mounds of the Pazyryk culture. For instance, the so-called animal muzzles woven on one of the fragments of the Shanpula fabric very much resemble fantastic anthropomorphic heads with horns, which are wooden pendants on a horse harness found in the Kuturguntas mound on the Ukok plateau (Polosmak, 1994: 66–90) (Fig. 12). Bunker also pointed to the similarity between the images of the so-called monsters on the Shanpula textiles and images on a felt carpet from the Fifth Pazyryk mound (2001: 28–29), although she did not find any connections between the carriers of the Pazyryk culture and the inhabitants of the southern oases of Xinjiang (Ibid.: 39).

A band of woolen textiles, similar in all its features to the fabric from Shanpula, was found far from the Hotan oasis. This suggests a wider distribution of fabrics of this type, which simply might not have been preserved in other locations. It is possible that this fabric reached the Eastern Aral Sea region together with other goods; for example, with numerous silk fabrics and other items found in the Jety-Asar burials (Levina, 1996: 218), which were delivered to the region along the northern section of the Silk Road from China.

Such fabrics in the form of rather narrow (5–25 cm) bands could have been used in various ways. The journey of the band of fabric that we studied could have been long, and its use could have been varied. It is quite possible that initially this fabric was a part of a skirt, then a decoration of a saddle-cloth, which after a while became a simple rug on the step of some stairs. In ancient times and in traditional cultures, textiles were treated with great care; they were never thrown away. It is known that in ancient times and in the Middle Ages, the use of beautiful or unusual imported fabrics (their fragments and scraps)

passed from one thing to another. They were stripped from worn-out garments, sewn onto other items, and were used until the fabric became completely unusable.

Without denying the uniqueness of the Shanpula tapestries, we are inclined to assume the tradition of making narrow woolen fabrics with images of animals, birds, people, mountains, and plants on primitive looms in the tapestry technique became spread far beyond the Hotan oasis.

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