Svetlana V. Pankova, Elena A. Mikolaichuk

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Early Chinese silks from the Oglakhty cemetery in southern Siberia (grave 4)

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Abstract

The Oglakhty burial ground in Southern Siberia belongs to the early stage of the Tashtyk culture (1st to 4th centuries AD). Some burials were investigated in 1903 by A. V. Adrianov and in 1969 by L. R. Kyzlasov. The investigated burials are distinguished by good preservation of organic materials, including items made of wood, fur, leather and fabrics. Among the latter are fragments of Chinese silk, both polychrome and plain, which have been studied by E. I. Lubo-Lesnichenko and K. Riboud. These are mostly small fragments, for example used for hair-dress or edging at a bow-case model. The finds from the Oglakhty burials are kept in different museums including the State Historical Museum in Moscow, Krasnoyarsk Regional Museum and the State Hermitage in St. Petersburg. In this article the technical details of textile finds from the Hermitage collection are presented. They include fragments of seven plain and ten polychrome silk fabric fragments. For the *jin* silks (warp-faced compound tabby) comparable finds are identified in the Tarim basin (Loulan-Gutai, Niya, Zaghunluq, Sampula and Yingpan site), Xinjiang Uygur Autonomous Region, China, and discussed with regard to their age.

Keywords: Minusinsk basin, Tashtyk culture, textiles, polychrome silk *jin*, warp-faced compound tabby, China, Xinjiang

Introduction

The large Tashtyk culture cemetery at Oglakhty in the Republic of Khakassia dates between the 1st and 4th centuries AD. It is important because of the exceptional survival of organic remains in some of the graves, as well as the evidence it offers for distinctive burial rites. This cemetery was discovered and first explored in 1902-1903 and in 1969-1973 other graves were excavated by a second expedition. The culture this cemetery belongs to was formed as a result of interaction between local and immigrant populations, and it was the latter who added new features to the material culture and burial rituals, most notably the practice of cremation which appears in this region for the first time.

Exceptionally well-preserved organic remains survived in four graves thanks to their especially dry microclimate created within hermetically sealed wooden log cabins sealed with birch bark. The contents offer a detailed picture of the fur clothing worn by the dead and accompanying objects made of wood, leather and textiles, as well as the distinctive funerary rites. Intriguingly, burials made according to two different funerary rites were placed in one and the same graves: inhumation with trepanned crania and painted plaster masks (so-called 'mummies') and cremations with bone remains placed into leather and grass human-like figures (so-called 'mannequins'). When identified, the former mostly belonged to female burials whereas the latter appeared to be male (Vadetskaya 1999, 48). The tombs usually contained between 2 and 5 individuals who are considered to be family members, and it is significant that mummies and mannequins were placed alongside each other, giving rise to the hypothesis that during this period two initially different groups lived and were interred together.

Pieces of Chinese silk – both plain and figured – were preserved in five graves in this cemetery. Polychrome silks *jin* were made using the traditional sophisticated technique of warp-faced compound tabby ('taffetas à chaîne multiple' or 'Kettsichtiges Kompositgewebe'), where patterns are worked out by warp ends of different colours – from two to five – to create detailed colorful compositions which often included Chinese characters. These complicated and beautiful silks were of great value both in China and beyond. Silks made in this technique and similar to those from Oglakhty were produced in eastern China during the Eastern Han – Jin (25–420 AD) periods but only a very small number have survived there. A larger number of these silks instead survived in the Tarim basin (Uyghur Autonomous Region Xinjiang, China) where

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organic remains are very well preserved owing to the essentially dry continental climate. Most of these silks come from the southern and eastern parts of the Tarim basin, were found in the ruins of towns and graveyards of this period (Loulan, Niya, Yingpan, Zaghunluq, Sampula), and have been studied since the early 20th century by Sven Hedin, Marc Aurel Stein, Folke Bergman and many Chinese archaeologists.

Warp-faced compound tabby silks are known from other regions but they are different to those from Oglakhty. A large amount of Western or earliest Eastern Han *jin* silks were found in early–mid 1st century AD tombs at Noyon-Uul in northern Mongolia constructed for the Xiongnu high rulers (Lubo-Lesnichenko 1961; Lubo-Lesnichenko 1995; Elikhina 2012; Elikhina 2014; Polos'mak et al. 2011, 71, fig. 2, 47; Polos'mak 2012, 82–85) and also in other Xiongnu burials in the Transbaikal area of Russia (Riboud 1968; 1972-73, fig. 3; Moulherat 2008; Miniaev 2011; Pankova 2016). Recent excavations have also revealed Han and Jin period warp-faced compound tabby silks in Gansu province (Zhao 2017, 66–68, 76–77, 85–86). All of these were made from continuous silk threads, not spun like most textile fibres but instead reeled from cocoons. Individual finds of polychrome silks of the type dating to the 1stst–3rd centuries come from the tower tombs of Palmyra (Schmidt-Colinet et al., 2000, cat. 223, 240, 521), although only one (Palmyra fragment S44) appears technologically and decoratively similar to the Chinese warp-faced *jin* of this period (Pfister 1940, 41–42, pl. XVIa; Schmidt-Colinet et al. 2000, cat. 521, 189–190, Taf. 93).

Oglakhty cemetery did not belong to high ranking nobility and only small and tiny pieces of Chinese figured silks were found here. It is therefore hardly possible to explain their presence in the Minusinsk basin as a result of contacts between elites, military trophies, diplomatic gifts or luxury trade which are the accepted mechanisms explaining silks found in the tombs of Pazyryk, Noyon-Uul, Tsaaram etc. to the north of China and Palmyra to the west.

Our first goal here is to present the Oglakhty silks excavated by Leonid Kyzlasov in grave 4 in 1969, complete with all technological properties and functions. We then aim to interpret the Oglakhty finds through comparison with similar silks found in different areas, particularly those from the Tarim basin, and examine their relative chronologies. Of particular significance are the questions of how and when did these silks reach this remote Siberian region, and where did they originate, even if the answers are far from complete.

Oglakhty cemetery and the silks: an overview of the finds and their study

Oglakhty cemetery is located on the left bank of the Yenisei river, 50 km north of the city of Abakan in the Republic of Khakasia. This mountain-steppe area at the north of the Altai-Sayan mountain plateau belongs to the Minusinsk basin (**Fig. 1**). It has favourable natural conditions and climate; hence the population here was traditionally engaged in mixed farming, including animal breeding and floodplain farming, as well as fishing, although settlements of the Tashtyk period have barely been explored (Vadetskaya 1986, 3–7; Savinov 2009, 3).

Almost 300 early Tashtyk burials have now been excavated but none are as well preserved as those at Oglakhty. It is difficult to assess the stratification of society and the personal wealth of those buried in the early Tashtyk period as the dimensions of burials in the cemeteries are quite standardized and the accompanying grave-goods limited. Many unrobbed burials appear virtually empty when excavated, yet their dimensions and comparison with Grave 4 at Oglakhty, where organic remains were exceptionally well preserved, indicate that they might also have originally contained items made of organic materials. At some sites, small fragments of jewelry, gold and silver overlays, glass beads and the remains of lacquered objects and silk fabrics have been found, but many of these burials had been looted in antiquity (Vadetskaya 2009, 32–38, 65–70, 271–276; Gotlib 2007).

Fragments of plain silks were found in early Tashtyk cemeteries of Gorjkoe Ozero excavated in 1924 (Vadetskaya 1999, 227), Salbyk excavated in 1956 (Vadetskaya 1999, 235), Chernoozernoe II excavated in 2001-02 (Gotlib 2007; 2012, 353) but these are still unpublished. However, *jin* silks, which are usually considered to be indicative of prestige culture, are so far only known from the Oglakhty cemetery but whether this is a sign that this cemetery included people of higher status is unclear.

Fig. 1. Map of the Oglakhty burial ground in southern Siberia and the archaeological sites of the Tarim basin with finds of polychrome silks similar to those of Oglakhty.

Oglakhty cemetery is divided into three or more discrete plots and includes, according to a preliminary calculation based on a recent survey, over 200 burials. Investigations at Oglakhty began in 1902-1903, when Alexandr Adrianov excavated 16 graves after the cemetery was occasionally discovered by a local shepherd whose horse fell into a collapsed grave which lacked any visible remains on the surface. Three of the graves yielded examples of well-preserved polychrome and plain silks (Tallgren 1937, fig. 5, 22, 23) (**Table 1**). A. Adrianov published a short description of the graves and finds; selected objects from the cemetery were later published by G. Sosnovski and A.M. Tallgren (Adrianov 1903 a, b; Sosnovskiy 1933; Tallgren 1937). The latter drew attention to the Chinese silks and he concluded that they were 'evidence of wealth, well-being and trade connections' of the local population, and was the first scholar to refer to similar silks found by Aurel Stein in Loulan and Petr Kozlov in Noyon-Uul. The 'Tashtyk civilization', according to Tallgren, 'presents features that unite it to the older local civilization, but at the same time possess many foreign elements, above all, indications of a strong connection with China' (Tallgren 1937, 82, 84, 88).

Some finds from Adrianov's excavations were transferred to the State Historical Museum in Moscow, others remained in Siberia in the Krasnoyarsk regional museum of Local Lore. The excavations at Oglakhty were recommenced in 1969 by an expedition of the Moscow State University led by Leonid Kyzlasov, and 8 graves were studied between then and 1973. In grave 4 (excavated in 1969) different objects from organic materials, including woollen and silk textiles appeared well preserved. In grave 7 (excavated in 1970) pieces of silk were found below the plaster masks of two buried individuals (Kyzlasov 1970 (Otchet), 105).

All finds from grave 4 at Oglakhty were passed to the State Hermitage Museum (collection No 2864). Burials of five people – four adults and a child aged 6-7 – were made in a rectangular pit measuring 3 x 2,4 m and 1,4 m deep with no visible above-ground structure (**Fig. 2, 3**). A log cabin with a ceiling placed in the pit was hermetically wrapped with large thick pieces of birch bark. As a result, a particularly dry and anaerobic microclimate developed in the sealed chamber and ensured the exceptional preservation of the organic remains.

Two adults (a man and woman) were buried as inhumations with trepanned crania and plaster masks, and represent the so-called 'mummies'. Two adults buried according to a

Number of grave	Place of storage	Objects and publications
Grave 1	State Historical Museum, Moscow	1. Fragments of *jin* with chess and lozenge design which covered a birch-bark container thought to have been used as a case for a plait (Tallgren 1937, fig. 22; Riboud/Lubo-Lesnichenko 1973b, pl. 12 A; Miyazaki 1988, 152 left; Vadetskaya 1986, 7–8) 2. Large fragment of a figured silk covering the top of the head of a mannequin (Tallgren 1937, fig. 5) 3. A piece of plain red silk which covered the face of the same mannequin (Tallgren 1937, fig. 7). Remains of embroidery are on the reverse side
	unknown	4. Pieces of plain green silk placed on the eyes, mouth and nose of the dead under the masks (Adrianov 1903a; Tallgren 1937, 78; Vadetskaya 1999, 231)
Grave 2	State Historical Museum	1. Fragments of *jin* with cloud design and Chinese characters which cover a birch bark container thought to have been used as a case for a plait (Tallgren 1937, fig. 23; Riboud/Loubo-Lesnichenko 1973b, pl. 2 A–B; Miyazaki 1988, 152 right)
	Krasnoyarsk regional museum	2. Small piece of *jin* with folded edges 3. Small piece of *jin* with a character
Grave 7	Krasnoyarsk regional museum	Small piece of plain silk with folded edges

Table 1. Silk finds from Oglakhty cemetery graves excavated by A. Adrianov in 1902-1903.

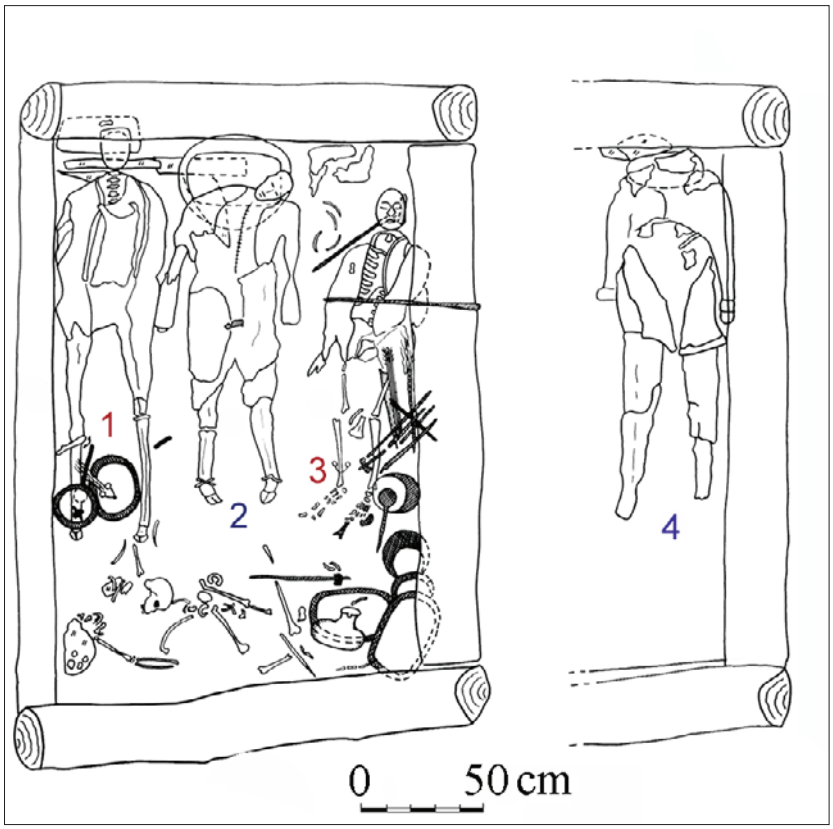

Fig. 2. Plan of Tomb 4 from Oglakhty (Drawing by L. Kyzlasov/after L. Kyzlasov 1969).

different ritual were placed next to them: these had been cremated and the bones carefully placed inside natural-size anthropomorphic forms sewn from leather and filled with tightly twisted grass bundles: the so-called 'mannequins'. All of the deceased were dressed in fur coats (Pankova 2020); the male inhumation and two mannequins also wore fur trousers and the woman wore a woollen skirt. Woodenwares and pottery vessels were placed with all the dead; there were also bridle models next to each and a model of a *gorytos* (quiver/bowcase) placed with mannequin 2 (Kyslassow 1971; Pankova 2020b). Small pieces of silk were also found in the grave (**Table 2**).

Some of the figured silks stored in the State Hermitage and the State Historical Museum were studied by Krishna Riboud and Eugeny Lubo-Lesnichenko and in their joint papers they presented technological data and black and white photographs of the fragments. These researchers identified all the silks they studied as warp-faced compound tabbies and made several important observations.

Firstly, they noted analogies to the Oglakhty fragments among finds from Tarim basin sites excavated by Stein near Loulan and by Yuchen Li in Niya (Riboud 1971; 1972-73; Riboud/Lubo-Lesnichenko 1973a, 274–276; Riboud/Loubo-Lesnichenko 1973b, 143–147). Secondly, they stressed the difference between the Oglakhty silks and those from Noyon-Uul (Riboud/Loubo-Lesnichenko 1973b, 144). In the 1970s the Oglakhty cemetery and Noyon-Uul tombs were considered to be almost contemporary and differences between the silks were explained as the result of different centres of silk production (Riboud/Loubo-Lesnichenko 1973b, 145; Riboud/Lubo-Lesnichenko 1973a, 278). K. Riboud later noted 'a somewhat different palette' of the silks from Mongolia, compared to those from Loulan, and pointed out their archaic decoration: 'some specimen also display a slightly more orthodox tradition of ornamentation pertaining to the Western Han period (206 BC–

Location and affiliation of the silk fragments	Plain silk	Polychrome silk
Female mummy	– (possibly there are silk pieces under the mask)	–
Male mummy	1. Two pieces of green colour below the mask – on the right eye and above the mouth (**Fig. 4**) 2. A piece of a ribbon sewn from strips of dark blue and greyish-green silk, tied to the cap pompon (**Fig. 6**) 3. Ties on the right fur mitten (**Fig. 9**)	–
Mannequin 1 (in the centre of the grave)	–	Pocket for a braid on the top of the head (**Fig. 8**)
Mannequin 2 (at the eastern wall of the grave, head not preserved)	–	Edging of the gorytos model (**Fig. 11**)
Next to mannequin 1 or 2 (location in the grave is unclear)	–	Small rectangular pieces of five textiles (**Fig. 10 a-b**)
Location unknown	A fragment sewn from strips of dark greenish-blue and light greyish-green silk (**Fig. 7 a**)	

Table 2. Silk finds in grave 4 at the Oglakhty cemetery (1969).

AD 9)' (Riboud 1987, 34). In the early 1970s K. Riboud and E. Lubo-Lesnichenko dated the Oglakhty silks to the 1ststcentury BC–2nd century AD, relying on a possible date of the LC cemetery finds supposed by Stein (Stein 1928, vol.I, 226–227) and the first stage of the Tashtyk culture then accepted by Soviet archaeologists (Kyzlasov 1960, 115; Gryaznov 1971, 96–99; Vadetskaya 1986, 144–146). Stein had based his age estimate on a figured silk LC.031.b, found in the surface of the wind-eroded cemetery, which was similar to the silk from Dunhuang watch-station, where Chinese documents dating from 53 BC–137 AD were found (Stein 1928, vol. I, pl. XXXV, 226–227, 241). At the same time, Stein noted the difficulty of estimating the accurate chronology for the objects that had been initially placed, he believed, in the surrounding shallow graves. He accepted the possibility of a wider period for the LC cemetery finds associated with the Chinese garrison presence in Loulan, extending up to the late 3rd or second quarter of the 4th century (Stein 1928, vol. I, 229–230). E. Lubo-Lesnichenko later concluded that the Loulan and Oglakhty silks were younger

Fig. 3. View of the burial after removing the roof (Photograph after L. Kyzlasov 1969).

than those from Noyon-Uul. He placed the Han *jin* silks into three chronological groups: Mawangdui group (early Western Han, mid-2nd century BC), Noyon-Uul group (second half of the 1st century BC–early 1st century AD for Noyon-Uul and broader dating for the other sites like Edsin-Gol, Mojuqi and Ilmovaya padj). The third, Loulan, group included Oglakhty, Niya and possibly Palmyra, and belonged to the late Eastern Han – Western Jin (3rd–4th centuries). He argued that textiles of these three groups differed not only in date but also place of production, and the Loulan silks, in particular, may have been produced in Shu principality (modern Sichuan province). The different social status of Mawangdui and Noyon-Uul tombs, on the one hand, and LC cemetery, on the other, was also noted (Lubo-Lesnichenko 1994, 192–194; Lubo-Lesnichenko 1995, 62–64).

E. Lubo-Lesnichenko followed the opinions of Stein and Bergman that the Loulan grave finds came from mass secondary burials gathered from earlier tombs destroyed by wind erosion (Stein 1928, vol.I, 229; Sylwan 1949), and he was aware of the difficulty of their dating. He cited evidence to date the Loulan settlements to a later period, until at least AD 330 and mass grave 34 (excavated by F. Bergman) and some LC cemetery graves no earlier than the 2nd century AD. These combined data led Lubo-Lesnichenko to conclude that the main part of the Loulan grave finds, including those from LC cemetery, should also be dated to the 3rd–early 4th century, and analogous silks from Oglakhty were therefore attributed to the same period (Lubo-Lesnichenko 1994, 65, 71; Lubo-Lesnichenko 1995, 64).

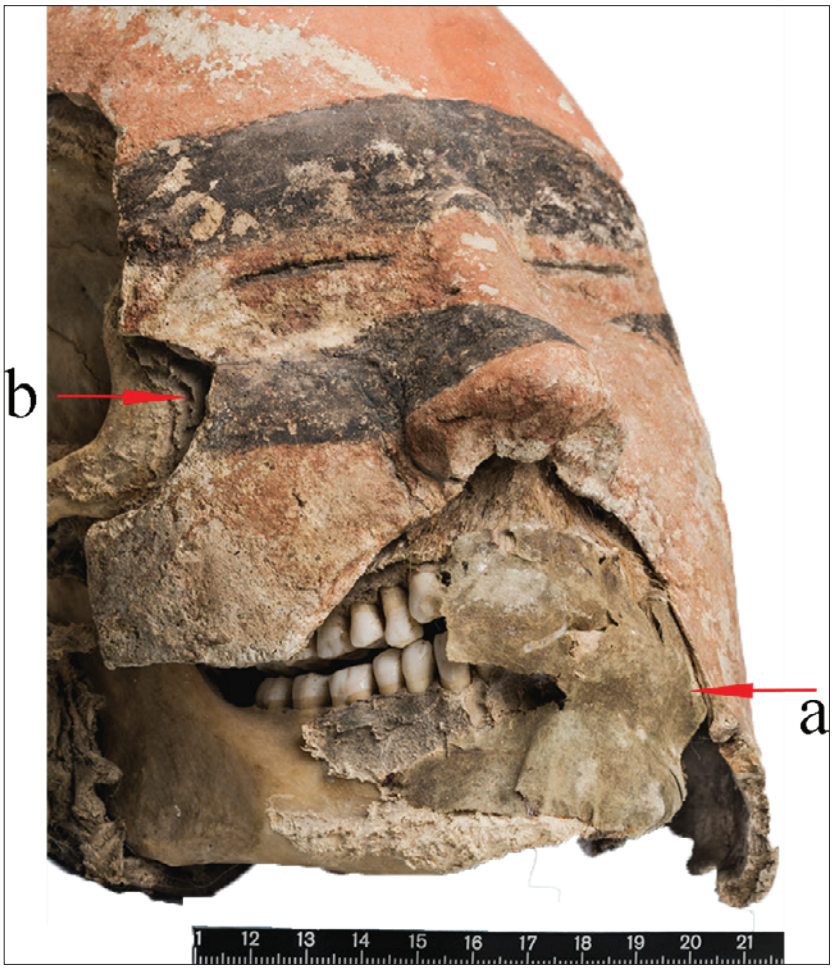

Fig. 4. Arrows a and b point to fragments of plain silk under the funerary mask of a man (© State Hermitage Museum, Inv. No 2864/2. Photograph by D. A. Bobrova).

This was a revolutionary idea for the dating of Oglakhty and the early Tashtyk culture. The same conclusion for the dating of the Oglakhty cemetery was later reached on the basis of certain features of burial structures in early Tashtyk cemeteries and their relative chronology (Vadetskaya 1999, 65–67). Radiocarbon 'wiggle matching' investigation of Oglakhty grave 4 chamber logs led to the same results: for each sample, an early and late probable radiocarbon date was obtained (due to peculiarity of the calibration curve for the period that do not allow for a single estimate). The average dates of both samples fall within intervals AD 260–296 and AD 372–402. Statistical analysis has resulted in a single and more reliable interval within two standard deviations – 387 ± 15 AD (Pankova et al. 2010). But the problem of dating of this and other graves of the cemetery is still vital and needs further study.

Investigations by K. Riboud and E. Lubo-Lesnichenko laid the foundation for this study of the Oglakhty but unfortunately not all silks were published by them and their conclusions only presented in summary form. The main goals of this paper are to present the silks from grave 4 in full and give a revised discussion of their parallels.

Catalogue of the silks from Oglakhty grave 4

Plain silk (hereafter denoted by "P")

Fragments on the face of the male mummy under the mask (P-1, P-2)

Two pieces of silks were placed on the man's face before the mask was made and these are now visible where the mask is broken, on the lips (**Fig. 4 a**) and at the right eye (**Fig. 4 b**).The

two fragments look similar but actually come from different fabrics:
P-1. Rectangular piece of green silk – on the mouth and chin of the man. The left edge is torn. 5 x 7 cm (Measurements are given first in warp, then in weft direction. If warp and weft are unidentifiable, they are called as System A and System B) (**Fig. 4 a**).
Tabby. No selvedges. Warp and weft are not identified.
Thread count in system A – 60 threads/cm, in system B – 52 threads/cm

P-2. Fragment of a dark yellowish-green silk – next to the right eye (only a part is visible from under the broken edge of the mask) (**Fig. 4 b**). Width is 5,5 cm.
Tabby. No selvedges visible. Warp and weft are not identified.
Thread count in system A – 60 threads/cm, in system B – 88 threads/cm

Computer tomography of the mummy's head confirms the presence of a third rectangular textile fragment on the left eye with the imprints of folded thin fabric and its borders on the underside of the mask (**Fig. 5**).

Ribbon on a cap (P-3/1, 2)
Bichrome ribbon, now torn, crumpled and deformed was put under a leather tie attaching a fur pompon to the fur cap (the hair is now missing) (**Fig. 6**). The ribbon is preserved to a length of 4 cm. It consists of narrow strips of dark blue (P-3/1) and greyish-green (P-3/2) silk, sewn along one of the long sides. The preserved width of a blue band is 0,9 cm but its outer side is torn. The green band is destroyed and its width is unclear. The ribbon is folded in two so that the green band is inside the blue one. The seam is mainly torn. It is made with a sinew thread which is S-plied from two z-twisted yarns of 0.2 mm width (further such structure will be marked as zzS).

P-3/1. Tabby, no selvedge. Dark blue colour.
Warp and weft are not identified because of its tiny size.
Width of both warp and weft threads is 0,15-0,20 mm

P-3/2. Tabby, no selvedge. Greyish-green colour.
Warp and weft are not identified because of its tiny size.
Thread width of both warp and weft is 0,15-0,20 mm

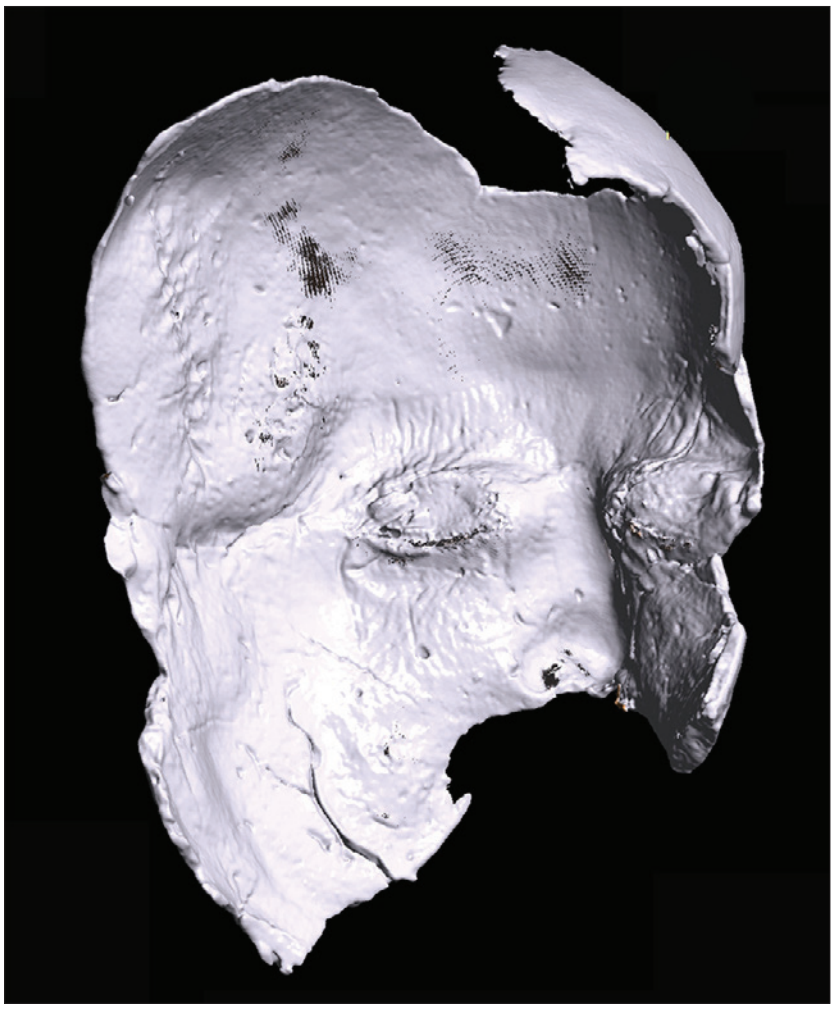

Fig. 5. Fabric impressions on the reverse of the same mask. Photograph based on computed tomography images.

Fragment sewn from two pieces of silk (P-4/1, 2)
Fragment measuring 7,5 x 2,7 cm consists of two pieces of silk sewn along (**Fig. 7**) and with their narrow edges cut or torn. Pieces are stitched with a sinew thread of zzS structure. Location in the grave and function is unknown.

P-4/1. A piece of dark greenish-blue silk measuring 7,5 x 1,9 см. Its long sides are folded inward and both have wavy outlines resulting from the stitching. There are stitching holes at the top of each tiny 'wave' on the long outer side of the fragment but the stitching thread itself is not preserved. Another long side of this silk band is sewn to the second fragment over the edge (**Fig. 7 b**).
Tabby, no selvedges.
Warp threads are parallel to the narrow side of the fragment.
Nearly each 14th warp end consists of paired threads with no twist, forming ribs in every 2,5-3 mm from each other.

Fig. 6. Man's hat with a silk ribbon wrapped around the pompon tie: a) entire object, b) detail (© Hermitage Museum, Inv. No. 2864/64. Photographs by V. S. Terebenin).

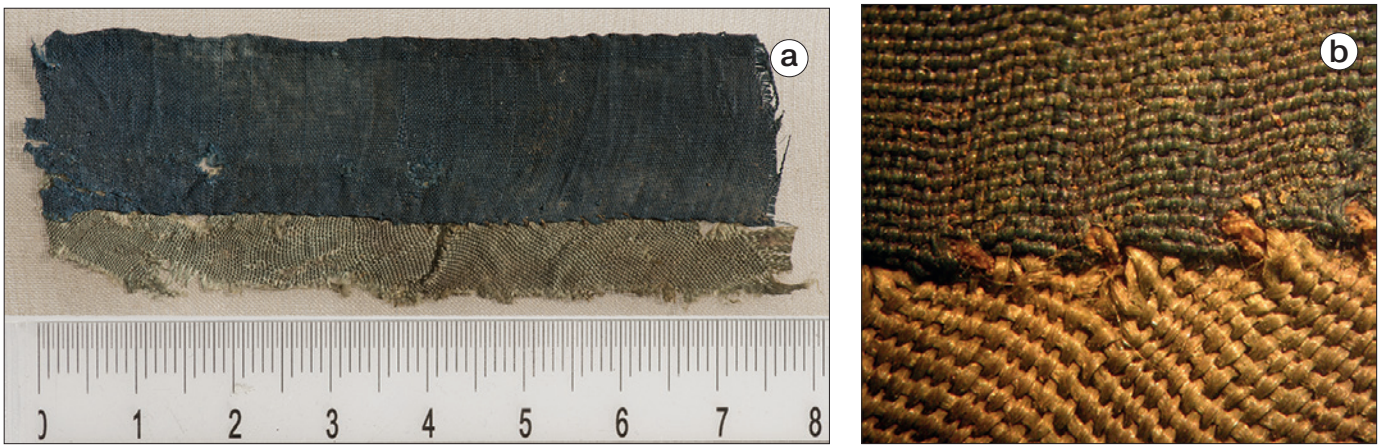

Fig. 7. A piece sewn of two silk strips: a) the entire fragment, b) detail (© State Hermitage Museum, Inv. No. 2864/62. Photograph by P. S. Demidov; photograph by E. A. Mikolaichuk).

Thread count: warp – 56 ends per cm at the left end, 64/70 per cm at the right end; weft – 48 picks per cm
Thread width: warp – 0,15 mm; weft – 0,15-0,20 mm

P-4/2. A piece of light greyish-green silk measuring 7,5 x 1,4 cm. It is stitched to the blue one at an angle of 30-45˚ (**Fig. 7 b**) and this side is not folded. Both long sides are torn. It appears that the green silk was part of a larger fabric, whereas the blue band was stitched to it along the long sides.
Tabby, no selvages.
Thread count: warp – 28/30-40 ends per cm, weft – 64 picks per cm
Thread width: warp – 0,25 mm; weft– 0,15-0,20 mm
It seemed first that this bichrome fragment could be part of the cap ribbon (P-3), but minor differences in textile structure and the ways of stitching exclude this idea.

Ties of a mitten (P-5/1, 2)
Two narrow strips of dark yellow silk served as ties of a fur mitten placed on the right hand of the male mummy (the left mitten has leather ties (Nikolaev/Pankova 2017, 349)). The ties

Fig. 8. a-c) Head of a funeral mannequin 1 with a hair dress made of polychrome silk. Leather, wool, silk, grass; d) silk of the hair dress (© State Hermitage Museum, Inv. No. 2864/78. Photographs by P. S. Demidov).

are stitched into a lengthwise seam of the mitten with sinew threads (**Fig. 9**). Each strip is folded in two lengthways and the edges are unworked. There are single needle holes which may be from prior use.
P-5/1: length 18 cm, width 1,3-1,5 cm
P-5/2: length 19 cm, width 0,9-1,6 cm
Tabby. No selvedges. Warp threads are alongside the pieces.
Thread count: warp – 48 ends per cm; weft 52 picks per cm
Thread width: 0,15-0,25 mm

Polychrome silk fragments

The historical Chinese term *jin* is often used for a particular type of textile defined as a figured cloth (hereafter denoted by „F“) made from silk threads of different colours, and the character *jin* 錦 itself is combined of two parts meaning ‘gold’ and ‘silk’ which literally reflects their beauty and high value, as dyed-silk warp threads were expensive and the weave was complex and labour-intensive (Li 2012a, 120; 2012b, 172). A slightly different explanation of

the character stressing the metal radical *jin* on the left and the word *bo* for the silk in tabby binding on the right is also known (Sheng 2017, 105).

This complicated technique may have been in use in China in the Western Zhou period (1046–771 BC) but is much better known from Warring States period sites (475–221 BC), especially those of elite burials of the Chu kingdom (Peng 2012, 88–93, III.2.28–2.33). Jin reached their zenith in the Han Dynasty, especially the Eastern Han when geometric compositions and rare zoomorphic figures with angular outlines, typical of the previous period, were replaced by a new series of designs which included continuous cloud scrolls, animals and auspicious creatures in lively postures. As 'the weave patterns and their development were dictated by the technical possibilities of the loom' (Kuhn 1995, 80), this change of design could have been directly related to improvement of looms which were 'so equipped to allow them to control far more warps then previously, resulting in silks that repeated intricate designs with finer curves' (Sheng 2017, 110). The period when this advanced loom technology was introduced is believed by D. Kuhn to have been the late

Fig. 9. Mitten from the right hand of the male mummy with silk ties: a) entire piece, b) detail. Leather, silk (© State Hermitage Museum, Inv. No. 2864/76. Photographs by D. A. Bobrova).

Western Han or early Eastern Han (Kuhn 1995, 104–110). Inscriptions of magical or benevolent meaning wishing longevity and fertility were often woven on them (Falkenhausen 2000). Both inscriptions and pictorial patterns were related to the dao idea of immortality. Textiles in warp-faced compound tabby weave were produced in China until the T'ang period when they were replaced by new technologies (Zhao 2004, 67–68; Li 2012a, 115–175). In modern literature the term *jin* is used specifically for these early polychrome silks *(warp-faced compound tabby)*, but sometimes other compound Chinese weaves of later periods are also referred to by it (Zhao 2002, 75; Wu 2006; Kuhn 2012, 27–29; Xinjiang 2016, 103, no.68, 321–322 etc.).

All of the figured silks from grave 4 at Oglakhty are woven from single threads of reeled silk without perceptible twist in a complicated structure of warp-faced compound tabby. The ornamentation was always created by the warp floats and the wefts are almost completely invisible on the face of the fabric. Two or more series of warp, normally of different colours, are employed in these weave, and one weft serves two functions: alternate picks serve to separate the series of warp ends so that only one appears on the face to create a pattern while the other or others are kept to the reverse, and the remaining picks bind the warp ends interlacing with them in tabby. The background and pattern were made at the same time (Lubo-Lesnichenko 1961, 12; Geijer 1979, 57–58; Kuhn 1995, 84–85; Zhao 2004, 69; Wu 2006, 216–217).

In Oglakhty grave 4 two small *jin* fragments were parts of a hair dress on a mannequin head, the others were used along the edging of a *gorytos*; the location and purpose of the other small fragments are unfortunately unknown (**Table 2**). None of the fragments have a selvage and most are too small to reconstruct the pattern unit. Wefts of most of the analysed figured silks are of greyish-yellow or white colour and were most likely undyed.

*Silks of the hair dress on the head of mannequin 1 (F-1, F-2) (**Fig. 8 a-d**)*
The back of the mannequin's leather head and its grass filling are missing but the face, ears and top are well preserved. The face is made by means of a red woollen textile stitched to the leather head at the edge (**Fig. 8 a-b**). A nose (hidden beneath the cloth) is made from a leather roll stitched to the leather of the face with sinew thread. Horizontal cuts in the leather marked the eyes which are visible from the inside (Pankova 2020b, fig. 17, 4). A silk hair dress is stitched to the top of a head (**Fig. 8 c**) but only part survived, a rectangular piece measuring almost 4,0 x 3,6 cm. It is stitched along three sides to form a sort of pocket (F-1). The fourth side is ripped away but the seams with coloured threads on the leather and woollen fabric give an idea of the initial shape of the hair dress. It was rectangular and measured 10,5 x 4,0 cm from back to front. All preserved edges are folded inside and stitched to the head with sinew threads of zzS structure. A tiny piece of another torn silk fragment (F-2), measuring 4,8 x 0,3–1,6 cm, is stitched to the first by similar sinew thread. It is located at the left side of the hair dress but is hidden in a fold of the larger first fragment. A tiny narrow piece measuring 3,8 x 0,3 cm of probably the same fabric survived in the seam at the destroyed front part of the hair dress. Fragments F-1 and F-2 are of similar colours but of different fabrics. They differ from other *jin* from the Oglakhty grave because of the particular colour of the wefts which have a pinkish shade.

*F-1 (**Fig. 8 d**)*
1:1 warp-faced compound tabby
Warp threads are of four colours: sand for pattern, light yellow, light blue and brick red alternately for background. 1:1 means that the textile is woven with two series of warps: one appears on the surface to create the pattern, the other is hidden. If there are several vertical sections, each with warp series of different colours (as on this certain textile), this record refers to a single section structure.
Pattern of sand colour sets off against the vertical stripy background formed by the warp series of other colours: each section is worked out by two warp series with 1:1 structure.
Pattern repeat in warp direction is 2,6 cm. A small pattern repeat is noticed as a distinctive feature of the textile (Riboud/Lubo-Lesnichenko 1973a, 276; Riboud/Loubo-Lesnichenko 1973b, 144).
Thread count: warp – 96 ends (48 ends per warp series) per cm, weft – 24 picks per cm
Thread width: warp – 0,25-0,35 mm; weft – 0,15-0,25 mm

F-2
1:2 warp-faced compound tabby
Warp threads of three colours: dark-red, sand, light blue
Thread count: warp – 108 ends (36 ends per

warp series) per cm, weft – 24 picks per cm
Thread width: warp – 0,15-0,25 mm; weft – 0,15-0,25 mm

*Small fragments of figured silks found next to one of the mannequins (F-3–F-7) (**Fig. 10 a-d**)*
According to K. Riboud, who relied on L. Kyzlasov's description, they were found next to the mannequin with the *gorytos* (and with a missing head, that is mannequin 2) (Riboud 1971, 34). Similar information was supplied by K. Riboud and E. Lubo-Lesnichenko in 1973, where they mentioned these fragments after they were found during conservation of this mannequin in the Hermitage (Riboud/ Loubo-Lesnichenko 1973a, 272; 1973b, 140). They noted the fragments as found next to mannequin from grave 2 but this is certainly a mistake, as both mannequins come from grave 4). Rather different information was provided in L. Kyzlasov's field report: following the description of mannequin 1 [according to our numeration], he said that 'a (big) piece of a figured silk was found as well' (Kyzlasov 1969 (Otchet), 45). However, in the Hermitage collection, there are several small pieces rather than one large fragment. Both mannequins (as well as both mummies) were lifted as blocks from the grave, packed in crates and only opened in the Hermitage. Unfortunately, we failed to find any witness' accounts or detailed memoirs of this initial conservation stage, but later the textiles were cleaned, straightened and mounted, where they lay until we began this research. All of the pieces have numerous regular holes along the perimeter, 0,3–0,5 cm from the edges – remains of a stitching (**Fig. 10 e**). It is likely that the pieces had been stitched onto something or to each other but stitching threads did not survive, except a tiny fragment (**Fig. 10 f**). It cannot be excluded that the pieces were indeed stitched to each other by the time of excavation, and therefore were described as a single large piece by L. Kyzlasov but that later the stitching threads were destroyed and lost.

*F-3 (**Fig. 10 a**)*
Rectangular silk fragment, 5,5 x 4,1 cm. Threads of sand and brownish-golden colour form a design against a dark blue background. Unfortunately, their small size and disturbed structure do not allow identification of the pattern or analogies. In one of the vertical edges of the fragment is a tiny piece of a red thread woven as a warp. Maybe the next lost section had warp threads of red colour.
1:2 warp-faced compound tabby
Warp threads of three colours: dark blue, sand, brownish-golden.
Thread count: warp – 144-156 ends (48-52 ends per warp series) per cm, weft – 26-28 picks per cm
Width of the threads: warp – 0,15-0,20 mm; weft – 0,20-0,25 mm
Warp threads have been a barely noticeable S-twist. Early Chinese silks are often described as not twisted or 'without a perceptible twist' *(sans torsion appreciable)*, but in individual cases slightly more noticeable twist, mainly in S direction, is mentioned, and it is considered as a norm (King 1968, 9; Lubo-Lesnichenko 1994, 171; Li 2006, 261).

*F-4 (**Fig. 10 b**)*
Rectangular silk fragment, 6,5 x 4,8 cm. Pattern made by blue and sand colour threads is woven against the brown-golden background. Small size of the fragment makes it impossible to identify the design.
1:2 warp-faced compound tabby
Warp threads of three colours: blue, sand, brown-golden.
Thread count: warp – 144-156 ends (48-52 ends per warp series) per cm, weft – 26-28 picks per cm
Width of the threads: warp – 0,15-0,20 mm; weft – 0,20-0,25 mm
Warp threads have been given a slightly noticeable S-twist.

The technological characteristic of these two fragments are mainly the same.

*F-5, F-6 (1-2) (**Fig. 10 c**)*
Three silk pieces of nearly rectangular shape, made from two fabrics. Two smaller fragments were stitched together. The larger piece may also have been stitched to them but the stitching holes are not visible as the threads are distorted here. Fragments F-5 and F-6 (1, 2) have one inventory number and by the beginning of our study they were glued on the backing closely to one another. A piece of stitching thread with a knot survived at the edge of the largest fragment (**Fig. 10 c, f**).

F-5. Fragment 9,0 x 3,35 cm with a dark blue pattern against the golden background – or vice versa as the fabric is reversible. The pattern represents cloud scrolls and circles or disks (bi?), both filled with tiny rings.

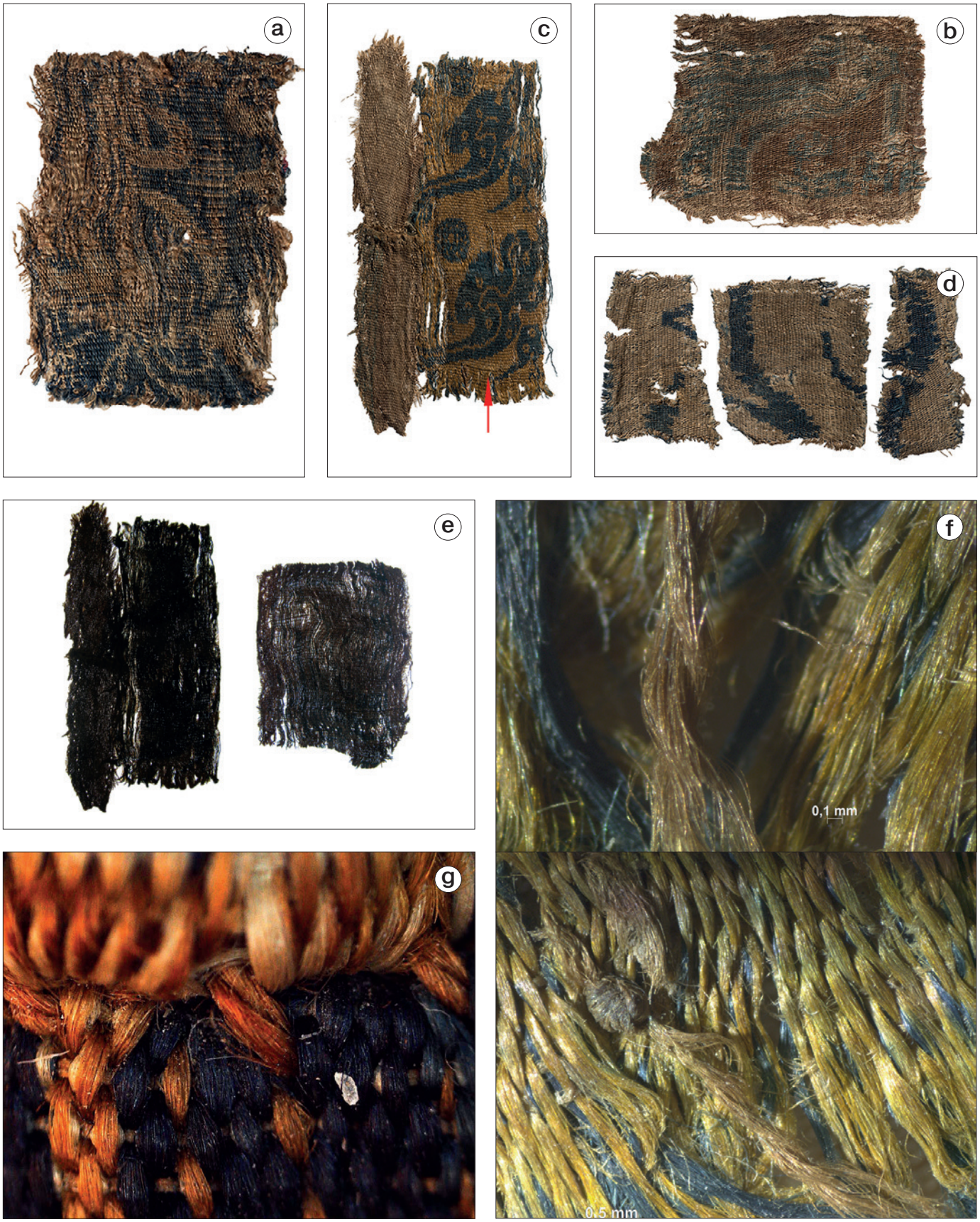

Fig. 10. Fragments of polychrome silk found near one of the mannequins: a) fragment F-3 (© State Hermitage Museum, Inv. No. 2864/58); b) fragment F-4 (© State Hermitage Museum, Inv. No. 2864/59); c) fragments F-5, F-6 (© The State Hermitage Museum, Inv. No. 2864/60). The arrow indicates the location of the knot; d) fragments F-7/1-3 (© State Hermitage Museum, Inv. No. 2864/61; e) photographs of the F-4 (right) and F-5, F-6 (left) fragments held against the light to identify stitching holes; f) silk stitching thread with a knot; g) silk stitching thread to connect fragments 2 and 3 of the gorytos edging. (a–d, g: photographs by P. S. Demidov; e: photograph by E. A. Mikolaichuk; f: photographs by S. Pankova).

1:1 warp-faced compound tabby
Warp thread of two colours: blue and golden-yellow Pattern repeat along the warp: 4,5 cm
Thread count: warp – 128 ends (64 ends per warp series) per cm, weft – 28 picks per cm
Width of threads: warp – 0,15-0,20 mm; weft – 0,20-0,25 mm
Stitching thread: silk, light brown, S-ply from 2 slightly z-twisted yarns, rather loose or unravelled (**Fig. 10 f**). The yarns have been initially identified as z-spun that led us to conclusion of not Chinese but local Tarim basin origin of the thread (Pankova/Mikolaichuk 2019, 129–130). Having looked at the knotted thread again we reconsidered and corrected our identification as the yarns show the absence of any noticeable twist and look similar to reeled silk threads in the main weave.

F-6 (1, 2)
Fragments measuring 5,5 x 1,8 and 5,5 x 1,7 cm are parts of one fabric. The pattern is not clear, stripes of light blue and brick-brown colour are visible of one piece, and brick-brown stripes on another one, both against a sandy background.
1:2 warp-faced compound tabby
Warp threads of three colours: light blue, brick-brown, sand
Count thread: warp – 144-156 ends (48-52 ends per warp series) per cm, weft – 28 picks per cm
Thread width: warp – 0,15-0,20 mm; weft – 0,20-0,25 mm

*F-7 (1–3) (***Fig. 10 d***)*
Three fragments of one fabric measuring 3,9 x 4,0 cm; 2,0 x 4,3 cm; 2,8 x 3,9 cm. Bichrome silk is woven with 3 warp series of two colours, possibly with the intention to create a thicker textile. The design – blue undulating stripes against a goldish background – is known as '*ban wen jin*' in Chinese accounts ('silk with tiger skin pattern') (Zhao/Yu 2000, 87).
1:2 warp-faced compound tabby
Three warp threads of two colours: blue, sand, sand
Count thread: warp – 144-156 ends (48-52 ends per warp series) per cm, weft – 28 picks per cm
Thread width: warp – 0,15-0,20 mm; weft – 0,20-0,25 mm

*Fragments of the gorytos model edging (F-8–F-12) (***Fig. 11***)*
A funerary model of a *gorytos* (combined bowcase/quiver) was placed next to the left foot of mannequin 2. The mouth is edged with silk which consists of *jin* fragments. The model is a triangular flattened leather case, 42 cm long with a diagonally cut upper edge. Width of its flattened mouth is 15 cm (**Fig. 11 a**). There is an M-shaped stem of a meadowsweet *(Spiraea sp.)* which served as an imitation of a bow inside the main compartment of the *gorytos*. Five fletched arrow shafts (birch, *Betula sp.)* without arrowheads and a model whip were placed in a separately stitched leather pocket. The *gorytos* is made from reindeer hide (microscopic identification of the hair structure and its surface pattern by E. Mikolaichuk), and the details sewn with sinew threads (zzS) using a fore stitch. A band of leather nearly 3 cm wide is stitched to the upper edge of the *gorytos* at its inner side, so that the outer surface of the band is coming out of the mouth and is covered with as many as five silk pieces. Along the upper cut of the leather band, the silk is folded inside and stitched to the leather with short fore stitches of sinew thread. The lower edges of the silk pieces are hidden behind the upper edge of the *gorytos* (**Fig. 11 b-c**), so that their width is not clear. Five silk pieces, each of a different shape and size, make up the edging and all are *jin* silks with a blue background. They are carefully stitched to each other and to the leather of the *gorytos* by means of a sinew thread with zzS structure, two fragments being stitched together with silk thread. The edging goes along the mouth of the *gorytos* but is interrupted in the centre of the reverse side so that a section of 7–7,8 cm length remains uncovered (**Fig. 11 c**). Judging by the good preservation of the whole silk edging, this empty section was intentional rather than resulting from the loss of silk. The patterns of the silks were not clear initially as the fragments are very small. However, it was the Chinese characters on four fragments (**Table 3**) that enabled their identification through comparison with more complete silks with the same signs. The fragments have been numbered starting from 1 on the reverse side of the *gorytos* at the left (**Fig. 11 b-c**).

F-8 (*gorytos* model, fragment 1)
Square fragment 2,2 x 2,0 cm is stitched to fragment 2 and to the *gorytos* leather at the top and right. Two partly preserved characters are noticeable (**Fig. 11 c**). They are recognisable by turning the textile to 180º as in the position the fragment is fixed on the *gorytos* the characters are upside down. A half of character *gao* 高 is at the vertical edge of the fragment at the

Fig. 11. Model gorytos, decorated along the opening with fragments of polychrome silk: a) entire object; b) front side, fragments 2–5; c) reverse side, fragments 1–3, 5; d) and e) junction of fragments 2 and 3. (© the State Hermitage Museum, Inv. No. 2864/21. Photographs by P. S. Demidov).

Edging fragment	Character	Affiliation to different textiles from the technological point of view
1	*deng* 登 and *gao* 高 (Silk piece is turned 180º to the other fragments of the edging. The right part of *gao* preserved and the very top of *deng*)	1
2	*gao* 高 and *ming* 明	2
3	-	3
4	*shou* 壽 and *wei* 為	4
5	*deng* 登	4

Table 3. Chinese characters on the silk fragments of the gorytos edging and affiliation of fragments to one or different textiles.

leather open section (**Fig. 12 c**) and a top of character *deng* 登 is in the opposite upper corner. Judging by analogous silks (see below), a character *deng* 登 on these textiles is located at the very selvedge. The selvage therefore can be hidden in a seam between fragments 1 and 2. A pattern made with warp threads of light blue, bright auburn and white colours is woven against the dark blue background with bright auburn veins. The silk is of particularly high density.
1:3 warp-faced compound tabby
Warp thread of 4 colours: dark blue, light blue, bright auburn, white
Thread count: warp – 224-240 ends (56-60 ends per warp series) per cm, weft – 28 picks per cm
Thread width: warp – 0,25-0,35 mm; weft – 0,15 mm

F-9 (gorytos model, fragment 2*)*
Quadrangular fragment of almost 2 cm height, 5,2 cm length. It is located on the bent edge and two opposite sides of the flattened *gorytos* mouth. At the top and base it is stitched to the leather, at the right – to fragment 1, at the left – to fragments 3 and 4 (**Fig. 11 b-c; 12 a-b**). There are two woven characters: *gao ming* 高明. A pattern made with warp threads of light blue, bright auburn and white colours is woven against the dark blue background with bright auburn veins, just as on the previous fragment, but the thread count confirms they are different textiles.
1:3 warp-faced compound tabby
Warp thread of 4 colours: dark blue, light blue, bright auburn, white
Thread count: warp – 176-192 ends (44-48 ends per warp series) per cm, weft –32 picks per cm
Thread width: warp – 0,25-0,4 mm; weft – 0,15 mm

F-10 (gorytos model, fragment 3*)*
Elongated triangular fragment of 1,1 x 4,9 cm. It differs from the previous ones with the shade of the background which is bright blue and has no veins. There are no characters on this piece. The fragment is stitched to the upper edge of the *gorytos* and to fragment 2 by a silk thread (**Fig. 11 c-e**). At the left, there is no stitching between fragments 3 and 4 even though the edge of fragment 3 is folded inward.
1:3 warp-faced compound tabby
Warp threads of 4 colours: bright blue, light blue, light brown, white
Thread count: warp – 192 ends (48 picks per warp series) per cm, weft – 24 picks per cm
Thread width: warp – 0,25-0,4 mm; weft – 0,15-0,25 mm
Stitching thread: silk, light brown or auburn, S-ply from 2 z-twisted yarns (**Fig. 10 g**). The yarns were initially identified as z-spun similar to the thread with a knot (fragment 5) (Pankova/Mikolaichuk 2019). After our first publication we consulted with Hero Granger-Taylor on both samples who confirmed that the yarns under consideration are rather twisted of reeled silk thread while making a sewing thread. She provided the following detailed explanation: 'On your first example, the quiver, the orangey red sewing thread looks as if it is made from one of the warp yarns of the two textiles being sewn together – both the warp-faced compound tabby textiles seem to use a yarn of this colour in the warp. The person doing the sewing would have unraveled the yarn from a cut edge of the textile. In order to make the sewing yarn, he or she has twisted the unraveled reeled silk relatively tightly in

Fig. 12. Fragments of the edging of the Oglakhty gorytos (a-f) with silk analogy Loulan LC.08 (g): a) and b) fragment 2 with character gao (b) and ming (a); c) fragment 1 with parts of characters deng gao; d-f) fragment 5 with the characters deng (f); g) LC.08 (after Stein 1928, vol. III, pl. XXXIV) with Chinese characters deng gao ming wang si hai. Colour-marked areas correspond to the Oglakhty fragments from the gorytos (blue outline – fragment 1, green outline – fragment 2, red outline – fragment 5).

the Z direction and then S-plied more loosely two lengths of the Z-twisted thread together. The Z-twisted thread may have simply been folded on itself and allowed to twist on itself in the S direction to form the ply. This could have been done after the Z-twisted thread had been threaded through the needle. Twisting reeled silk for sewing makes it less liable to wear and easier to handle.

As you will have often found, sewing threads are usually plied, whatever the fiber is. This is to balance out the initial spin/twist so that the thread is a) stronger b) less likely to knot on itself during sewing - in the case of reeled silk, plying is a second procedure making the silk easier to handle, following on from twisting'.

F-11 (gorytos model, fragment 4*)*
Fragment 4 is the largest in the edging, 13,5 cm length. Similar to fragments 1 and 2, it has bright auburn veins within the dark blue background. At the left part of the fragment there are the characters ***wei*** 為 and ***shou*** 壽, partly hidden in seams (**Fig. 11 b; 13 b-c**). Along the long sides, the fragment is stitched to the *gorytos*, at the right to fragment 2, at the left to fragment 5.
1:4 warp-faced compound tabby
Warp threads of five colours: dark blue, light blue, bright auburn, light brown, white
Thread count: warp – 240 ends (48 ends per warp series) per cm, weft – 24 picks per cm
Thread width: warp – 0,25-0,4 mm, weft – 0,15-0,25 mm

F-12 (gorytos model, fragment 5*)*
Fragment 5 measuring 1,4 x 5,5 cm is located on the bent edge and two opposite sides of the flattened *gorytos*. There is a character deng 登, disturbed in its upper part, at the right corner of the fragment (**Fig. 11 b-c; 12 d-f; 13 b-c**). Fragment 5 is technologically the same as fragment 4, most likely they come from one and the same width.
1:4 warp-faced compound tabby
Warp threads of five colours: dark blue, light blue, bright auburn, light brown, white
Thread count: warp – 240 ends (48 ends per warp series) per cm, weft – 24 picks per cm
Thread width: warp – 0,25-0,4 mm, weft – 0,15-0,25 mm

All five fragments of the *gorytos* edging are of similar colour combination with patterns of light blue, bright auburn, light brown and white colours set off against a blue and dark blue background. Fragments 4 and 5 are identical, and belong to one and the most complicated silk width, woven with five warp series. It is considered that silks with five warp series were exceptionally difficult to produce and may only have been produced in Imperial workshops (Riboud 1987, 41; Watt 2004, 118). Judging by the published materials the five-warp series *jin* of different designs were found at Niya (Zhao/Yu 2000, 30–31, no. 1, 62–63, no. 24, 86, no. 41, 88, no. 43) and Grave 2 at Gutai (Watt 2004, cat. 19, 117–118). The fact that two pieces on the Oglakhty edging were parts of the same cloth, yet three others were of three different widths, suggest the care with which the Oglakhty people paid to reusing these colourful scraps of silk and/or that only individual small pieces could be in early Tashtyk people's disposal. However, it should be noted that many fur objects from Oglakhty grave 4 were also assembled from small and tiny pieces (Pankova 2020a).

As mentioned above, most of the Oglakhty fragments were stitched to each other with thin sinew threads. Stitching with sinew threads may be considered a traditional means of stitching items in local society (Pankova 2020a). Nevertheless, two stitching threads appeared to be silk. The first is a thread connecting fragments 2 and 3 of the *gorytos* edging (**Fig. 11 d-e; 10 g**), and the second is a tiny thread with a knot found in a needle hole of an individual fragment with a cloud pattern (**Fig. 10 c, f**).

Preparing our publication in Russian we considered silk threads of zzS structure as made of spun silk, therefore we put a whole paragraph on this in that publication (Pankova/Mikolaichuk 2019) as the presence of spun discontinuous silk in the grave could have been crucial in terms of chronology and the place where the fragments were stitched to each other. There are many facts that prove the appearance of local silk industry in the Tarim basin during the 3rd–4th centuries (Lubo-Lesnichenko 1994, 168–170; Zhao 2004, 72; 2017, 149; Li 2012a; Desrosiers 2019). Desrosiers and Debain-Francfort suggest also the 2nd century AD as a possible period for sericulture's development in the southern oasis of Xinjiang (Desrosiers/Debain-Francfort 2016, 72). Local silk technology there was different from that in eastern China, the main recognizable difference being that local silk textiles were made using discontinuous spun silk yarns rather than the continuous

Fig. 13. Fragment 4 of the gorytos edging: a) full extension of fragment 4 (between the red lines) without the arrow shafts in the process of restoration (after Riboud/ Loubo-Lesnitchenko 1973b, pl. 4 A); b) after restoration with arrow shafts placed on top; c) detail with characters shou and wei.

reeled filaments typical of eastern Chinese technology. However, upon translation and revision of this paper, we realised that new microscopy sheds doubt that our threads were indeed made from discontinuous silk, even though one (on the *gorytos*) has a significant twist (the other was heavily unravelled). We must now admit that our two cases of twisted silk should be reconsidered as reeled continuous silk which has been twisted in order to make a sewing thread.

This apparently small detail has important implications as we cannot now insist that this silk stitching was made in the Tarim basin, and could instead have been practised by local inhabitants. However, we should stress that it was sinew threads which were typically used in this region, either for stitching silk details to each other, or to a leather backing: plain silks P-3/1,2 and P-4/1, 2 (**Fig. 6, 7**), fragments of the hair dress of mannequin 1 F-1, F-2 (**Fig. 8 c-d**); *gorytos* fragments 1, 2, 4, 5 (**Fig. 11 b-c**). Sinew threads were naturally used for all details of fur clothes which were the main and commonest form of clothing in this society. This implies that individual cases of silk thread being used in stitching is still a diagnostic indicator of individuals for whom this stitching was familiar, thus these individual pieces of Oglakhty silks could have been connected together long before they became parts of the funerary objects interred here, and perhaps far from this final destination.

Most of the silk fragments from grave 4 were related to specific funerary objects: plain silk pieces were placed on the eyes of the dead beneath the mask, figured fragments were used in the decoration of a model *gorytos*, figured silk pieces were parts of the hair dress on the mannequin 1 head, whereas other *jin*

pieces, found next to the mannequin and now separate, may formerly have been part of some other object associated with a mannequin. Out of all the silk finds from this grave, only a mitten's ties and cap ribbon found with the male mummy could have functioned as part of an everyday garment. However, it is very difficult to distinguish reliably between everyday and funerary accessories. The silk of a hair dress on the mannequin might reflect reuse of a piece worn as part of a man's hairstyle or it could simply have been selected for use on the mannequin (Pankova 2018, fig. 2, 3–4). A thumb of a mitten with silk ties seems too small to have been used comfortably and this may indicate it was specially made for the grave. None of the silks from grave 4 were associated with the female burial and all of the figured silks were connected with mannequins.

Unfortunately, there are few data to judge the amount or range of functions of silk used by the inhabitants of the Minusinsk basin as organic materials do not generally survive. In order to obtain a clearer idea of the position of the silk pieces from Oglakhty grave 4 amongst known figured silks of this period, we have gathered other published *jin* silks with similar patterns, particularly from sites in the Tarim basin, and examined their geographical and chronological distribution.

Analogies to the silks from Oglakhty grave 4 among finds from the Tarim basin

Most of the silks with identifiable patterns from grave 4 at Oglakhty have counterparts in Xinjiang, China (**Fig. 1, Table 4**). Our review includes both silks previously noted as analogies and others cited below for the first time.

Fragments of the gorytos edging
Analogies were found only for fragments with Chinese characters (1, 2, 4, 5) as they enabled to identify much larger silk fragments bearing the same character combinations and comparative surrounding patterns. For the first time analogies for the silks on the *gorytos* edging were revealed by E. Lubo-Lesnichenko and K. Riboud, an exact counterpart being a fragment LC.08 found by Stein on the elevated 'mesa' LC near Loulan (Riboud 1971, 35; Riboud/Lubo-Lesnichenko 1973a, 274; Riboud/Loubo-Lesnichenko 1973b, 142–143). Silks from Stein's excavations at cemetery LC are often marked using Roman numerals (for instance LC.III.07), meaning that they were found in the graves numbered by corresponding numerals (from I to X). The lack of Roman numerals, like in case of LC.08 implies it was a surface find (Stein 1928, vol. I, 246–259). However, as information on certain characters varies slightly in different papers, as do the numbering of the fragments, and as the counterparts are illustrated in very general manner, we decided to consider the characters and similar silks afresh.

Firstly, we should note that we did not find the letter *hai* 海 *(sea)* noticed by Riboud and Lubo-Lesnichenko, but instead there is another *deng* not mentioned in their publications. All characters available on the edging pieces are represented in **Table 3** and on **Fig. 12** and **13**. Below are all the analogies we have found for fragments 1, 2, 4 and 5 of the edging.

Dark blue silk fragment LC.08 with a pattern of cloud scrolls, ducks and fantastic animals
This represents the key analogy for most of the Oglakhty *gorytos* silk pieces. LC.08 comprises the right part of the width with characters *deng gao ming wang si hai,* woven from the right selvage, that is representing the beginning of the inscription (Chinese inscriptions of the period are usually read from right to left). Character combinations *deng gao, gao ming* and individual character *deng* are present on edging fragments 1, 2 and 5 respectively (**Fig. 12; Table 3**). Comparison of the pattern details around the characters on Loulan and Oglakhty fragments testify that they come from silks with a similar design:

- Oglakhty fragment 2 with characters *gao ming* corresponds to horizontal section of LC.08 with a duck head at the top and two cloud swirls at the bottom (**Fig. 12 a-b, g green outline**);
- Oglakhty fragment 5 with character *deng* corresponds to that plot of the LC.08 where the pattern is represented by cloud ribbon with duck's wings below (**Fig. 12 d-f, g red outline**);
- Oglakhty fragment 1 with partly survived characters *gao* and *deng* correlates, when turned to 180˚, to the section of LC.08 at the very selvage, bounded by these characters and whirls of two cloud scrolls (**Fig. 12 c, g blue outline**).

The illustrations provided show that the colour combinations of Oglakhty and Loulan silks are similar yet not identical. Comparable details sometimes differ in colour and the

Oglakhty: grave 4	Finds in the Tarim basin
Fragments of the *gorytos* edging (**1, 2, 4–5**): F-8 (**Fig. 11 c**; **12 c**) F-9 (**Fig. 11 c**; **12 a-b**) F-11–12 (**Fig. 12 d-f**; **13 b**)	L.C.08 (**Fig. 12 g**) Gutai: grave 2 (**Fig. 14**) Private Collection Shanghai (for details: Zhao 2005, Pankova/Mikolaychuk 2019) Yingpan: grave 20 (**Fig. 15 a**)
Main fragment of mannequin 1 hair dress *F-1* (Monochrome pattern on different sections of background) (**Fig. 8 d**)	Zaghunluq I: grave 51 (**Fig. 15 b**) Zaghunluq I: grave 52 or 137 L.C.01 (**Fig. 15 c**) Niya: unspecified grave
Fragments of silk with 'tiger skin' pattern *F-7* (**Fig. 10 d**)	Niya: grave 8 (**Fig. 15 h**) L.C. IX.02 'Low flow of the Kongque river': grave 1
Golden-blue silk with cloud scroll pattern *F-5* (**Fig. 10 c**)	Sampula I: grave 49 (**Fig. 15 d**) L.C.X.04 (**Fig. 15 e**) Niya:grave 3 (**Fig. 15 f**) Gutai: grave 2 (**Fig. 15 g**)

Table 4. Analogies to jin from grave 4 at Oglakhty in the sites of the Tarim basin.

backgrounds are not completely the same: Oglakhty fragments feature contrasting colour veins – thin lines, often interrupted, formed by the warp ends of bright auburn colour; such veins are absent on LC.08 (Similar veins are available on several *jin* with cloud designs from Gutai and Niya (Watt 2004, 118–119, cat. 19; Zhao 2002, 32–33; 2005, 128, il. 2-4-15, 2-4-17; Zhao/Yu 2000, 58–59, cat. 21, fig. 21 d).

In 1987 K. Riboud provided technological data for LC.08: 'although difficult to ascertain because of pasting and mounting, the five colours of LC.08 probably consist of a four warp series, but the number of warp ends for each warp of the series is the same as in the Chinese [Gutai, MB 2] silk: 43 ends and 24 picks per cm (Riboud 1987, 40).

*A fragment from Gutai burial mound, grave 2 (MB 2) (***Fig. 14***)*
Gutai cemetery studied by Chinese archaeologists in 1979/80 correlates to cemetery LC, partly excavated by Stein in 1914. There were two graves on Gutai section MB, 1 and 2, and the latter corresponded to 'mass grave L.C.iii' excavated by Stein (Lubo-Lesnichenko 1994, 64; Hou 1985, 164). This fragment represents the left part of the width and comprises the continuation of the inscription known on LC.08 *(wang si hai) gui fu shou wei guo qing*. This inscription enabled the identification of the longest fragment 4 of the Oglakhty edging with characters *shou* and *wei*, which are missing on LC.08 (Riboud 1987, 40, pl.6; Lubo-Lesnichenko 1995, 69; Falkenhausen 2000, 72–73, inscriptions of B8 type; Legacies of the Silk Road 2011, 69). The fragment is woven with four colours (blue for the background, yellow, brown and grass green for the pattern) and has a thread count of 43 ends (per warp series) and 24 picks per cm (Huang 1991, 30, 94, no. 82).

*A narrow side stripe of a jin silk with deng gao at the selvedge was used as a front edge of a garment (***Fig. 15 a***).*
This was found in Yingpan cemetery, grave 20 (20BYYM20:4). It has a red background with a pattern made by white, blue and dark reddish-purple warp ends, with two latter alternately woven in different parts. The silk features three warp series at every vertical section (unlike the Loulan and Oglakhty silks which have four or five warp series at full width of the textiles). The warp count is 180 ends (60 ends per warp series) per cm, weft count is 44 picks per cm (Zhao 2002, 42–43, no.10; Li 2012a, 147, 150, ill. 3.35).

According to K. Riboud, figured silk fragments very similar to LC.08 and those from Oglakhty were found at Palmyra during excavations in the 1930s (Riboud 1987, 40), most likely referring some heavily torn pieces marked as S44 by R. Pfister (Pfister 1940, 41–42, pl. XVIa). Belonging to one textile, these came from tower tomb 46 and were woven using dark blue threads for the background, light goldish, brownish-red and light blue-green alternately for pattern, in 1:2 structure for a section. The

thread count is 126-162 ends (42-54 ends per warp series) per cm, 22-24 picks per cm (Schmidt-Colinet et al. 2000, 189–190, cat. 521). However, L. von Falkenhausen did not include these fragments in his group B8 where silks with *deng gao* inscriptions were gathered (Falkenhausen 2000, 71–72). This is because the pieces from tower tomb 46 contained characters *ming* and *tai*, and the latter was absent in *deng gao* inscriptions. On this basis we cannot consider them as analogous to those from Oglakhty.

It is clear that textiles with the same pattern, as well as an inscription as part of it, could vary in colour and structure. Figured silks 'with large and small inscriptions *deng gao*' were mentioned in Chinese accounts of the 4th–6th centuries AD, and many researchers identify these with silks of the LC.08 group. One of these sources is 'Notes on the capital of Ye' *(Ye zhong ji)* which contains enumeration of ornamental motifs and inscriptions of the main types of *jin* produced in the late and post Han periods, during the reign of Shi Hu (334–349) of Late Zhao (Lubo-Lesnichenko 1995, 68; Zhao 2002, 43; Li 2012b, 172). *Deng gao* silks were also mentioned as late as the 6th century, where their production was connected with the city of Ye, modern Linzhang County, Hebei province (Zhao 2017, 134). Unfortunately, it is difficult to know whether these 6th century accounts testify to the production of *deng gao* silks in the 6th century or continuing circulation of older silks. These data are the latest evidence for *deng gao* silk but the 4th century is the latest date for their actual production. References in Chinese sources to 'large *deng gao*' and 'small *deng gao*' inscriptions' suggest that the relevant textiles were different and this is proved by examples of the described group of silks which include those with red and blue background, woven with three, four or five warp series.

Main silk fragment from the hair dress of mannequin 1 (F-1)

No exact analogy was found for this but it features a distinctive design 'scheme' of a monochrome pattern which goes across the vertical stripes of the background created by differently dyed warp series (**Fig. 8 d**). According to W. Li, textiles with monochrome patterns set against a background with differently coloured sections were rather seldom among Han – Jin figured silks: much more popular was the opposite 'scheme' when the background is monochrome and the pattern colour alternates in different sections (Li 2012a, 123–124). Silks of the pattern scheme similar to F-1 were found at the following sites:

- grave 51 at Zaghunluq I cemetery (96QZIM 51) (Wang 2008, 20–21, fig. 2 a);
- grave 52 (96 QZIM52) or 137 (98 QZIM137) of the same site (In two publications that provide identical photos of this fragment, different grave numbers are mentioned (correspondingly Li 2012a, 124, ill. 3.7 and Wang 2008, 20–21, fig. 2 b).) (**Fig. 15 b**);
- 'mesa LC' – fragment LC.01 with a lozenge-chess pattern (Stein 1928, vol. 3, pl. XXXV; Riboud/Loubo-Lesnichenko 1973b, pl. 12 B) (**Fig. 15 c**);
- Oglakhty, grave 1 – similar silk with a lozenge-chess pattern (Tallgren 1937, fig. 22; Riboud/Lubo-Lesnichenko 1973b, pl. 12 A);
- Niya cemetery (no grave number is specified nor is a picture available) (Li 2012a, 124).

In all, six silk pieces of this 'scheme' found in three cemeteries in Xinjiang and at Oglakhty in Khakasia represent a certain group. There are insufficient data to judge whether they are the product of a particular period or workshop.

Silk fragments with blue undulating stripes against a golden background (F-7) or with a tiger skin' pattern

There are at least three counterparts in the Tarim basin burials:

- analogous *jin*, also with 1:2 warp structure, was used for a small pouch found in grave 8 at Niya (95MNI M8) (Zhao/Yu 2000, 87, no. 42) (**Fig. 15 h**). Interestingly this is the very grave where a leather bow case with *jin* edging comparable to that from Oglakhty one, was found (Zhao/Yu 2000, 49, cat. 15).
- similar fragment found by Stein on 'mesa LC' (LC.IX.02) (Stein 1928, vol. III, pl. XLIII);
- another excavated by Chinese archaeologists in 1979 in grave 1 'in the lower flow of the Kongque river' (Huang 1991, 33, 102, fig. 90).

Fragment of a golden-blue silk with cloud scroll pattern (F-5)

This is distinctive because its colours, 1:1 warp series structure, a somewhat 'flaming' shape of the cloud swirls and small circles within these pattern details (**Fig. 10 c**). We did not find exact analogies for the certain part of design, represented on this fragment, but the closest in terms of mentioned features are the following silks:

Fig 14. Silk from Gutai cemetery, grave 2 (after Legacies of the Silk Road 2011, 69).

- one from grave 49 at Sampula I (Shanpula) cemetery in Khotan oasis (84LS I M49) (Xinjiang 2001, 134, no. 227; Zhao 2005, 129, 2.4.22) (**Fig. 15 d**);
- fragment LC.X.04 from Stein's excavations (Stein 1928, vol. III, pl. XXXV, XXXVII) (**Fig. 15 e**).

Additionally, the golden-blue colour combination and 'circles' or rings within animal figures are distinguished for *jin* finds from Niya, grave 3 (95 MN1M3) (Zhao 2005, 129, 2.4.21) and Gutai, grave 2 (Huang 1991, p. 33, 101, no. 91), even though the shape of their cloud scrolls and other details are different (**Fig. 15 f-g**). Circles on the figures of birds are also represented on a bichrome silk from tomb 1 at Mawangdui, dating to 168 BC (Li 2012a, 152, fig. 3.39), suggesting the assumed conservative nature of this design motif.

According to these data, most of the analogies for the Oglakhty silks come from the Loulan area, rather than other sites in the Tarim basin which also have well-preserved textiles. We therefore suggest that it was Loulan which was the starting point for the silks which finally reached the Minusinsk basin. The ancient city of Loulan – a capital of Loulan/Shanshan principality and a seat of prefectural government of the Western regions at the later stage of its existence (Hou 1985) – was an important point on the route from eastern China and also connected with the southern oases of the Tarim basin and to Ku-shi/Chue-shih principality (north of modern Turfan) (Stein 1921, vol. I, 331–337). The latter route may have extended northwards to Dzungaria and thence to southern Siberia (**Fig. 1**).

Our assumption that the Oglakhty silks most likely came from the Tarim basin is supported by other evidence from early Tashtyk graves which testify a possible connection between the inhabitants of the Minusinsk basin and those of the Tarim basin. Certain features of the burial tradition, artistic images and shapes of objects related to early Tashtyk culture find analogies at Loulan, Niya and Sampula (Pankova 2020b). These analogies in Oglakhty and other early Tashtyk graves do not look like imports but rather resemble features of a local, albeit new, regional culture. These parallels are consistent with the fact that the early Tashtyk culture, sometimes referred to as the Oglakhty culture (Azbelev 2007), was formed through the participation of immigrants. One can suppose a group of people entering this attractive part of Siberia from the Tarim basin, or an adjacent region with similar cultural traits, and the corresponding cultural features – and possibly even their personal belongings – entered early Tashtyk cemeteries such as Oglakhty.

L. Kyzlasov dated the Oglakhty cemetery to the 1st century BC, when he believed the


a
b
c
e
d

Fig. 15. Silk analogies to polychrome silk fragments from Oglakhty tomb 4: a) Yingpan, 20BYYM20 (after Zhao 2002, 42); b) Zaghunluq, 96QZIM 51 (after Wang 2008, 20, fig. 2 a); c) Loulan, LC.01 (after Stein 1928, vol. III, pl. XXXV); d) Sampula 84LS I M49 (after Xinjiang 2001, 134, il.227-1); e) Loulan, LC.X.04 (after Stein 1928, vol.III, pl. XXXVII); f) Niya, 95 MN1M3 (after Zhao 2005, 129, 2.4.21); g) Gutai, M2 (after Huang 1991, 33, 103, no. 91); h) Niya, 95MNI M8 (after Legacies of the Silk Road 2011, 85).

Minusinsk basin to have been occupied by the Xiongnu, and therefore concluded that they brought the silks here after acquiring them from the Han as a symbol of appeasement. Other scholars instead suggested that some silks could have been brought here through trade and exchange for furs (Riboud 1971, 33–34). However, we now know that Oglakhty cemetery does not belong to the Xiongnu period and, moreover, the silks found here differ from those unearthed in Noyon-Uul and other Xiongnu sites. Moreover, there are no archaeological sites in the Minusinsk basin directly related to the Xiongnu. Some pre-Tashtyk groups who came here from southern areas adjacent to the Xiongnu formed the so-called graveyard component of the Tes culture on the Yenisei with materials which reflected innovations of the Xiongnu culture, namely an improved type of composite bow and artistic bronzes – mainly belt decoration (Savinov 2009; Kuz'min 2011). But this 'graveyard Tes culture' is different from the early Tashtyk one and there are no silks preserved in these earlier graves. We should now rather exclude any connection of Oglakhty silks with the Xiongnu.

Theoretically there is one more probable source of the Chinese silks in the Yenisei valley and related to the so-called 'Abakan palace' in Khakasia, a building with Chinese-style roof tiles marked with Chinese characters which was discovered in the 1940s. It is dated to the 1st century AD on the basis of the specific spelling of the character *chang* which belongs to the period of Wang Mang (AD 9–23). The latest research on this complex associates it with a Chinese adventurer, Lu Fang, who ran away from the Han to the Xiongnu. The additional occurrence of irrigation canals, mudbrick walls and rare evidences of pig-breeding in the Minusinsk basin are believed to indicate the presence of his immigrant followers (Kovalev 2011; Vadetskaya 1999, 190–195). There was a small number of finds in the building and its surroundings, including some early Tashtyk pottery (Vadetskaya 1999, 71–73, fig. 37; Kyzlasov 2001), but no textiles were preserved, and there is no evidence of any connection between it and the silks from Oglakhty.

Radiocarbon dating of two wood logs from the log chamber in tomb 4 of Oglakhty by dendrochronology and wiggle matching did not result in one clear date for the burial but instead ended with two possible intervals: 260-296 or 372-402 AD (Pankova et al. 2010). The authors consider the latter to be more likely.

In a recent attempt to get a more accurate burial date, short-lived material – grass and a leather fragment from one mannequin – was directly AMS 14C dated. The two previously dated tree-ring sequences were recalibrated, a Bayesian model was established to incorporate the above age-related information and an 'SSimple' outlier command was introduced to model possible offsets resulted from dating anomalies (Pankova et al. 2020 with details and references). Also this dating attempt resulted in two equally possible age-intervals for the short-lived samples: 251-380 AD and 348-410 AD. Further research is in progress.

Can the imported silks from grave 4 provide a narrower chronology and meaningful *terminus ante quem*? As early as 1994, they were considered by E. Lubo-Lesnichenko to be chronological indicators, and the date proposed by him corresponds well to the 14C chronology of grave 4. However, the dating of Tarim silks requires careful evaluation as many new finds have been made and published in more recent decades. Particular attention must be paid to the latest thinking on the dating of warp-faced *jin* silks from the Tarim basin sites, how they were dated and how reliable those dates are. The following section attempts to answer these questions based on the partially published evidence available.

Sites and burials of the Tarim basin with *jin* analogous to those from Oglakhty

Publications devoted to *jin* found in the Tarim basin cemeteries are generally not very specific on their dating, stating simply that they are Han dynasty (206 BC–220 AD), Eastern Han (25–220 AD), Han – Jin (206 BC– 420 AD) or Eastern Han – Jin. This reflects the difficulty in dating both the textiles and the burials they were found with, but it has also been noted that 'of the silks unearthed from the Han through the Jin dynasties, most are from the early Western Han (second century BC) or the late Eastern Han through the Wei and Jin; there are very few extant examples from the late Western Han or Early Eastern Han dynasty' (Li 2012a, 120). No silks comparable to those from Oglakhty have yet been found in graves dated precisely by inscriptions.

Moreover, almost no silks have survived in well-dated burials in eastern China which could have offered independent means of dating.

Primarily warp-faced *jin* found in Xinjiang are dated either according to their archaeological context through associated objects and/or the type of burial construction, or few radiocarbon dates based on associated finds. Unfortunately, these 14C dates are usually single dates, rather than series, and should be treated with caution.

All Tarim basin graveyards with finds of silks analogous to those from Oglakhty contained dozens or even hundreds of graves, and developed over several centuries. Chronologically indicative finds such as glass vessels, patterned lacquer and coins are rare and, in any case, they have received little study. Among other items which could help clarify the dating of some of the Tarim basin burials are those which indicate local silk cultivation as this is believed to have appeared in the Tarim basin in about the 3rd century AD. These are pierced cocoons, so-called silk floss found in Niya and desiccated remains of mulberry trees found in Niya, Loulan and Karadong (Lubo-Lesnichenko 1994, 170; Zhao 1999, 95; Desrosiers/Debain-Francfort 2016, 72); but also textiles made from strongly spun discontinuous silk, e.g. tabbies (Desrosiers/Debain-Francfort 2016, 72, 69, fig. 5 a), narrow bands (Li 2006, 259–261, fig. 207–210; Lubo-Lesnichenko 1994, 170–171; Zhao 1999, 86–87; 2002, 65, 67; 2004, 70; 2008, 79) and *taqueté* (weft-faced compound tabbies) (Desrosiers/Debain-Francfort 2016, 70; Sylwan 1949, pl. 3A; Zhao 2017, 91–92). Woollen textiles made in the same *taqueté* technique as well as blue and white resist-dyed cotton fabrics (Desrosiers et al. 2001, 51; Desrosiers/Debain-Francfort 2016, 73–74), may be included in this list too, although there is even less information about their duration or exact date of origin in the Tarim basin.

Most of the sites, as well as individual graves with *jin* finds, have been published selectively, and some materials published in Chinese are inaccessible to us. Nevertheless, we present the collected information as a first attempt to clarify the dating of these analogous silks. These comparisons (Table 4) differ in terms of their potential for dating as their contexts are so different. The most promising are silks coming from graves with known accompanying materials which support their dating.

These are:
- three graves of Loulan cemetery: graves LC.IX and LC.X (1914) and grave 2 at Gutai (1980)
- two graves at Niya: numbers 3 and 8, excavated in 1995
- grave 49 at Sampula, excavated in 1984.

Less promising are silks which come from graves with no other published materials, but which have already been attributed by their researchers to a particular stage of the cemetery chronology based simply on the type of grave construction. These are graves 51 and 52 or 137 at Zaghunluq I.

Finally, some silks have been found out of context, such as surface finds LC.08 and LC.01. Several silks come from graves with no other published materials or dating offered by the type of grave construction, such as 'low flow of the Kongque river, grave 1' or Yingpan, grave 20. In another case from Niya, the grave number is not given in the publication, so it is impossible to know what it was found with. In such cases we are simply left with the knowledge either of which site they were found or citing them as unprovenanced parallels. Given these considerations, their potential to date the graves containing silks analogous to those from Oglakhty are strictly limited.

Loulan cemetery (LC/Gutai)

The ancient town of Loulan, 28 km north-west of Lopnor lake, was a capital of Loulan principality, also known locally as Kroraina. Ruins of administrative buildings, residential quarters, a Buddhist monastery, watchtowers, defensive walls and an irrigation channel were studied here, as well as two cemeteries located 4,8 and 6,9 km northeast of the town.

Loulan principality was first mentioned in Sima Qian's 'Records of the Historian' (*Shi Ji*), where there is a reference to how the Xiongnu subordinated Loulan and almost 30 small neighbouring states in 176 BC.
During the 2nd–1st centuries BC Loulan was a small state and only later, from the late 1st century AD, did it become a major principality known as Shanshan. During the 2nd century BC more than 20 centres along the southern

and northern edges of the Tarim basin mainly came under the control of the Xiongnu who needed agricultural and craft products they could not produce themselves. Since the late 2nd century BC the Han repeatedly tried to force the Xiongnu out and take direct control of the Tarim basin. They captured Loulan in the late 2nd century BC and after 77 BC the first Chinese agricultural military settlement was founded in Loulan. By 60 BC the Xiongnu were drawn away by the Han and the first Chinese government for the Western regions was established in the northern Tarim basin. The second half of the 1st century BC was the period of most intensive activity by the Chinese military colony in Loulan but, by the end of that century, connections with eastern China had ceased (Krjukov 1988, 241–269). Throughout almost all the 1st century AD, owing to unrest in China, the Chinese administration was absent from the Tarim basin and the Xiongnu returned (Krjukov 1988, 269).

Thanks to the Han general Ban Chao's diplomatic and military efforts in the 70s – 90s, most states – including Loulan – accepted the power of Han and the Xiongnu moved on. 11 agricultural military settlements were founded and lasted until the 90s of the 2nd century AD, including that at Loulan with only 40 soldiers and officers, as these colonies were rather small, but then the Chinese lost power with the end of Eastern Han. The southern areas of the Tarim basin instead became influenced by Kushans and groups of immigrants from Gandhara settled in Heitian and Shanshan towns and villages (Krjukov 1988, 257–260; Hansen 2014, 81–93).

According to M. Krjukov, during this period until about AD 230 there are almost no references to Loulan in Chinese sources, but V. Hansen states there was a Chinese garrison in Loulan in the late 2nd century AD (Hansen 2014, 77).
In the mid-3rd century, a large number of military agricultural settlements were founded or restored by Wei in the Tarim basin, including Shanshan. In the second half of that century a protectoral government of the Western regions was established in Loulan, and letters found there prove contacts with eastern China could be quite intensive (Krjukov 1988, 270; Hou 1985).

The majority of archaeological finds from the residential quarters of Loulan are dated to the early 3rd and first quarter of the 4th centuries AD, as wooden tablets with Kharoṣṭhī inscriptions and Chinese paper documents refer mainly to Wei and Jin dynasties and supply dates from 252 to 330 AD. (Hou 1985; Yang 2004, 294) According to Chinese documents found in Loulan, inhabitants and troops began to depart the town by the 330, if not earlier. The main reason for this was the change of the course of the Kongque river, which led to drying up of water sources along the lower reaches of the river (Hou 1985, 176). This drought could have started already by the mid-3rd century judging by the gradual decline in grain rations awarded to offices and soldiers described in Chinese written sources. The office of prefectural governor moved to Haitou, almost 50 km away and towards Miran, in the period of the Former Liang (AD 314–376) when Loulan was about to be abandoned.

The location of Loulan was very important as it lay on the crossroads of the southern and northern routes around the Tarim basin. It was also one of the closest points in the Western regions to the Chinese border station at Dunhuang. However, this review shows that Loulan was not always connected with China between the 2nd century BC and second half of the 4th century AD: there were periods when contacts were cut before being re-established (Hou 1985), and these interruptions might have affected the supply of silk. Unfortunately, our information is rather fragmented so it is difficult to trace contacts between Loulan and the Chinese administration as the main source for the acquisition of figured silks. Silk used to be acquired by the inhabitants in exchange for horses, grain or local products like cloths and footwear. It was used as currency, and local rulers could obtain silks as diplomatic gifts (Hansen 2014, 79, 90).

Despite the close Loulan analogies for the Oglakhty silks, their dating is difficult. Stein believed that the graves he excavated on the so-called 'mesa LC' were mass secondary burials and he considered them to have been made in a late period of occupation at Loulan but found it difficult to estimate the date of the initial burial which may have been made at the very beginning of contact between Loulan and China (Stein 1928, vol. I, 229). However, Chinese researchers who undertook exploration and excavations at Loulan from March to April 1980 do not consider the two excavated graves at Gutai cemetery to be secondary.

Looking at these graves with silk analogous to those from Oglakhty we can note the following:

Grave LC.IX contained only a figured silk and some plain silk pieces (Stein 1928, vol.I, 258). Grave LC.X contained much more objects but apart from a single warp-faced *jin* silk (**Fig. 15 e**), these were mostly of wood – trays, ladles and combs, arrow shafts and a dagger (model) handle – and the only potentially useful chronological diagnostic is a patterned lacquer box. (Stein 1928, vol. I, 245-246, 258–259, vol. 3, pl. XXI, XXVII-XXIX). An analogy to its pattern is a bowl found in the tomb of Wang Xu in Lelang, Korea. The tomb is not dated exactly, but some inscriptions on lacquer date them to AD 45, AD 52, and AD 69. The question is whether this date can be taken for our LC.X lacquer fragment as we do not know how far the pattern is itself chronologically significant (Yoshito Harada 1930, 28, pl. XXXII, LXXVII). These graves are therefore not very indicative for a precise dating.

Grave 2 at Gutai (MB 2) yielded silks (including 53 polychrome ones, many of full width, and several spun silks), embroideries, woollen tapestries and pile fragments and high-quality cotton textiles; there were also many lacquer objects and wooden tablewares. The spun silk pieces were described as including a children's dress stitched together from fabrics of three colours (Hou 1985, 164; Lubo-Lesnichenko 1994, 64–65), although no pictures or technological descriptions are published. The spun silk is of particular interest as it allows a tentative dating of this LC/Gutai grave and its contents to the 3rd century AD.

In the same grave 2 a red background figured silk with clouds, animals and inscribed *yannian yishou changbao zisun* ('extending years, increasing longevity...') was found, similar to a red- and blue-background cloth from Niya, grave 8 (Zhao/Yu 2000, 32; Tseng 2017, 85–87, fig. 6.5–6.7, 6.9). Both of these graves provided *jin* similar to those from Oglakhty: a silk *deng gao* at Gutai (**Fig. 14**) and a silk with 'tiger skin' design at Niya (**Fig. 15 h**). One can therefore suppose that these two graves were more or less contemporary, and grave 8 at Niya also contained a mirror typical of the late 2–3rd century AD and the reeds used in the grave construction were radiocarbon dated to 205±60 AD (Selbitschka 2010, 632; Tseng 2017, 85).

It is unclear for how long the cemetery on 'mesa LC' existed, and the dating of the surface finds like LC.08 and LC.01 cannot be reliably estimated. Here we note just several 14C dates available for materials from other graves in LC/Gutai cemetery. Firstly, this is a date for pile rug fragment L.C.ii.09.a: 170 BC-60 AD (Persson 2008; Stein 1928, vol. III, pl. XLIV; V&A inventory number LOAN.STEIN.647: http://collections.vam.ac.uk/item/O93006/the-stein-collection-carpet-fragment-unknown), received from the Angström laboratory, University of Uppsala, Sweden). According to a note by H. Persson, 'some of the carpet fragments show signs of wear, so the textiles might already have been old when put in the grave. The carpets found in tombs may have served as coverlets on which the dead were laid or as wrapping the bodies' (Persson 2008).

Secondly, there is wood from the construction of grave 1 at Gutai, excavated in 1980, that was 14C dated to 15 BC–AD 155 (Selbitschka 2010, Teil 2, 630, Tab. 37; Tseng 2017, 86). But there were no figured silks found in this grave (Hou 1985, 164–165; Lubo-Lesnichenko 1994, 64. Selbitschka 2010, Teil 2, 611–614, Tab. 22–23). Wu-shu coins allowed the same early Eastern Han date (Litvinsky/Lubo-Lesnichenko 1995, 279–280). These dates are earlier than that proposed for grave 2 at Gutai which was the late 2nd–3rd centuries AD. They cannot be directly applied to the nearby graves where the silks analogous to those from Oglakhty were found, although it is likely that the cemetery is of the same period. Further research is therefore necessary for clarifying the date of the Loulan grave materials, and particular attention should be paid to the finds made by Stein and more recent archaeologists.

Niya

Niya oasis, the ancient Jingjue kingdom, was conquered by Shanshan in the 2nd century AD, but its ruler retained his title of 'king' (Zhao/Yu 2000, preface). Ruins of numerous small settlements, Buddhist monasteries with stupas, irrigation works, metal foundries, pottery kilns and five cemeteries survived here. They are known to have lasted from the 2nd century BC to early 5th century AD, but the majority of the finds date to the late 2nd–mid 4th centuries AD and during the 3rd–4th centuries AD many inhabitants had already abandoned the town due to desertification (Zhao/Yu 2000, preface, 17; Yang 2004, 296). As in Loulan, wooden

tablets in *Kharoşţhī* script preserved in Niya (Zhao/Yu 2000, 98) indicate the presence of several hundred immigrants from the Kushan empire who settled in the regions of Niya and Loulan and brought their script and Buddhist beliefs (Hansen 2014, 71–97). Wooden reliefs depicted bodhisattvas found in a Buddhist temple in Niya are dated to the Wei–Jin (220–420) period (Xinjiang 2011). These immigrants may also have brought cotton textiles resist dyed with indigo, as well as knowledge of this technique (Desrosiers/Debain-Francfort 2016, 67, 73, 74). There are finds of silk floss and open cocoon which are considered to be products of a local silk industry operating in its last centuries (Zhao/Yu 2000, 44), and several graves yielding woollen textiles in *taqueté* technique (Stein 1921, vol. 1, 262; vol. IV, pl. XLIX; Zhao/Yu 2000, 78–79, no. 37; Zhao 2008, 82–83) confirm this late chronology.

Graves 3 and 8 at Niya contained silks analogous to those from Oglakhty grave 4, are the richest in accompanying objects and represent the local elite. Numerous *jin* silk objects (pieces of cloths, pillows, caches, amulets) were found here as well as bows in cases and daggers in scabbards, pottery, woodenware, individual lacquered objects and beads (Niya site, 1999). Most of these finds are difficult to date, and others still await detailed research, but it should be noted that the bronze mirrors have been described as of rare types and thought to date to the late 2nd–3rd century (Zhao/Yu 2000, 20, 90–91).

Radiocarbon dates are also available for the reeds used in both grave constructions: grave 8 with the 'tiger skin design' silk (**Fig. 15 h**) is dated to AD 205±60 (Selbitschka 2010, 632), grave 3 with the golden-blue textile (**Fig. 15 f**) to AD 215±60 (Selbitschka 2010, 632). These dates therefore place graves 3 and 8 and these silks in the mid-2nd to early 3rd century AD.

We should mention here that a silk sachet from an unnumbered grave in location N14 cannot be taken as a reliable chronological indicator for the burial itself, even less so for the entire cemetery, even though one of its textiles (a repair) bears a woven inscription 'First year of Yuanhe reign', corresponding to AD 84 (Zhao 2017, 124). This is because warp-faced compound tabby silks with inscriptions were definitely woven in eastern China, not locally, so this dates its production, not deposition.

Sampula (Shanpula)

Sampula was a small town located 30 km southeast of Hetian (Khotan) during the Han period and later. There is a large cemetery to the south which seems to have consisted of several small graveyards, three of which were excavated between 1983 and 1995 and yielding a total of 69 tombs and two horse pits (Bunker 2001, 16, 18) (**Fig. 1**). They differ in construction and grave goods and dated approximately from 100 BC to the mid-4th century AD (first phase) and from the mid-4th to late 5th centuries (second phase) (Bunker 2001, 45; Wang/Xiao 2001, 77). The materials from this site are better represented in publications than any other, and give a better idea of the finds and their context.

Grave 49 (84LSIM49), where the silk similar to that from Oglakhty was found (**Fig. 15 d**), belongs to a type of grave described as in 'vertical rectangular pits', and dated to the period 'from around the Wei and Jin Dynasties (that is, mid-4th century to late 5th century)' (Wang/Xiao 2001, 51, 77). The reasons for this dating were the similarities of the coffin shapes to those from Niya, Yingpan and the third stage burials from Zaghunluq, as well as diagnostic types of pottery (Wang/Xiao 2001, 77). The finds from this grave, which contained 11 bodies, included pottery, woodenware, silk and cotton (?) textile objects, and a lacquered comb (Xinjiang 2001). Unfortunately, no object has been directly dated. And there were neither spun silk nor woolen *taqueté* or double cloths to indicate an age. At the same time, woollen *taqueté* and reserved-dyed cotton were found in grave 84LS I M1, a 'knife-shaped' tomb believed to belong to the previous period, and no later than the mid-4th century AD (Xinjiang 2001, 231, fig. 434; Schorta 2001, 106–107; Bunker 2001, 45; Wang/Xiao 2001, 57–59, 77). This fact reminds us of the selective or random character of placing certain types of textiles in graves and the difficulty of dating them in the absence of independent means.
The silk from grave 49 at Sampula is the closest analogy for the Oglakhty golden-blue piece and is dated to the 4th–5th centuries AD. Other comparable pieces come from Gutai and Niya burials which might instead date to the late 2nd–3rd centuries AD. If the dating of grave 49 at Sampula is correct, one might conclude a lengthy production of this sort of *jin* or a long lifespan for this particular silk, which therefore may have been placed in the grave after

decades of use or even storage. The remote position of the Khotan oases from Shanshan may be a factor here too.

Zaghunluq (Zhagunluke)

Zaghunluq is a small village in modern Qiemo (Cherchen) County which gave its name to five nearby cemeteries, two of which – the largest cemetery 1 and small cemetery 2 – were excavated in 1985, 1989, 1996 and 1998, although most of the graves had been damaged by previous looting (Xinjiang 2016, 15, 23). These graves cover a very wide timespan from the early 1st millennium BC up to the mid-1st millennium AD, but patterned silks were found in graves of the late second (c. 3rd century BC – mid 3rd century AD) and third periods (3rd–6rd centuries AD).

Textiles found here which concern us – i.e. silks of the distinctive type where monochrome patterns were set against a vertically striped background – were found in two graves of the Third period: 96QZIM 51 (Wang 2008. 20–21, fig. 2 a) and 96QZIM 52 or 98QZIM 137 (**Fig. 15 b**) (Li 2012a, 124, ill. 3.7; Wang 2008. 20–21, fig. 2). There is no information to say whether the graves where these silks were found belong to the earlier or later stages of the third period as no other textiles, or indeed any other materials, have been published from them.

The only other silks of this type consist of a surface find from LC and a find from an unspecified grave at Niya (**Table 4**), which do not help greatly with their dating but as the terminal dates of these sites are the 4th and 5th centuries AD respectively, it may be concluded that silks of this type circulated in the southern and eastern parts of the Tarim basin during the 3rd–4th or 3rd–5th centuries AD.

Yingpan

Yingpan settlement is located about 200 km west of Loulan, upstream on the north bank of the Kongque river. The remains include walled residential quarters, a Buddhist monastery, watchtowers, irrigation channels and a large cemetery. Yingpan was an important centre on the route northwest of Loulan but, following a change in the political situation and drought, it lost its significance and was abandoned by its inhabitants in the 5th century AD. During excavations in 1989, 1995 and 1999, 122 graves were studied and more than a hundred looted graves also investigated by the Xinjiang Institute of Cultural Relics and Archaeology (Zhou/Li 2004, 41; Zhao 2002, 41; Li 2006, 243), although only some of the excavated materials have yet been published.

According to these data, Yingpan is the site with the largest known number of *taqueté*, both silk and wool (Zhao 2008, 79, 81–83; Li 2006, 247, fig. 192–197). Yingpan's woollen *taqueté* were dated to the Wei–Jin period (220–420 AD) (Xinjiang 2011). According to W. Li, Yingpan should be dated to the Eastern Han – Jin or 1st–5th centuries (Zhou/Li 2004, 43; Li 2006, 243). A *deng gao* silk from grave 20 (**Fig. 15 a**) is dated rather generally to the Han – Jin periods (Zhao 2017, 134).

Conclusions

In search for analogies of the Chinese silk fabrics found in Oglakhty tomb 4 we reviewed the finds of three burials in Tarim basin dated to late 2nd–3rd century (Niya, graves 3 and 8; possibly Gutai grave 2) and three other graves with much later dates of the 3rd–6th centuries (Zaghunluq) and the 4th–5th centuries (Sampula). But most of these were only dated through typological details of tomb construction and this criterion might not be reliable. Besides, all of these silks were imported from eastern China to what the Chinese referred to as the 'Western regions', and some or all may have been heirlooms when they were buried.

The 'cloud scrolls and animals' textiles among silks from Noyon-Uul tombs are dated to the late 1st century BC – early 1st century AD (Miniaev/Elikhina 2009). But for the other types of silks considered here, there is no proof that they already existed in the last centuries BC – first centuries AD. Judging by the blue-golden silk from Sampula, if its dating to the 4th–5th century AD is correct, this sort of *jin* could have been used or stored – if not produced – over a very long period. The same can be true theoretically for all *jin* silks.

The danger of dating burials purely on the basis of figured silks found with them was highlighted long ago by V. Sylwan who pointed out the durability of silks and traditionalism of the patterns which could be produced over two or three centuries (Sylwan 1949, 36). Moreover, we found confirmation in our materials that it is often not possible to date individual textiles

according to the date of the burial they were found in (Wild 2002, 677). At the present stage of knowledge *jin* silks can hardly be used for reliable dating either, and narrow dates should be treated with great caution as the criteria for such precise dating are still unclear, there is little information on the duration of their production, and they could have been used for very long periods. Finally, different sorts of silks could have different curation patterns as they moved further away from their place of production.

Returning to the question of the possible role of figured silks as a *terminus ante quem* for Oglakhty grave 4, we have to admit a dilemma. On the one hand, we can consider Oglakhty silks as a set, and in this 'range' we believe them to date to the 3rd century AD. On the other hand there is too much uncertainty over the dating and durability of these silks and the route by which they came to the Minusinsk basin is also unknown.

It must be acknowledged that all of the silk finds from Oglakhty grave 4 are tiny pieces, and many, including all the figured silks, are present as patchwork samples. This testifies that only small silk pieces were at the disposal of this ancient population and their efficient use even of these scraps. Moreover, these pieces were assigned to those making objects specially for the burial. This raises a question as to how many silks were in everyday use, if only for special occasions, and how or why such scraps reached here if larger textiles were not in use.

All of the figured silks from grave 4 are so-called *jin* silks which were made in eastern China but have not survived in that region. In order to trace their place among other known silks, we collected their counterparts from the Loulan, Niya, Yingpan, Zaghunluq and Sampula cemeteries in the eastern and southern parts of the Tarim basin, where these silks had been brought from China and were used for some time. The chronology of these graveyards, particularly those burials containing silks similar to those from Oglakhty, is not well defined as no systematic absolute age determination has been undertaken yet. The Loulan chronology is even more complicated by peculiarities related to the old methods of excavations and the character of the collective graves, whether secondary or not. It is therefore difficult to accurately estimate the period when these types of silks were used in the area of Shanshan and Khotan principalities. According to the very limited data available, the late 2nd–3rd centuries are the most reliable dating for the Niya graves, the 3rd –6th centuries for graves at Zaghunluq, and mid-4th–5th centuries for Sampula. The Loulan finds need to be more carefully studied if we are to understand their exact date.

Polychrome *jin* silks were valuable, beautiful and durable fabrics and could be kept and used for a very long time. Moreover, according to the written sources and radiocarbon dates, silks of certain patterns, including the characters *deng gao* available on the *gorytos* edging, were produced over several centuries. We therefore can hardly use them as reliable narrow dating sources for the burials they were found in, especially in this region far from China.

If we consider the finds from grave 4 at Oglakhty as a set, the 3rd century AD is the most likely combination of the individual dates, obtained from their analogies in the Tarim basin, and this date is consistent with the radiocarbon dates from grave 4 at Oglakhty which span the 3rd and 4th centuries. The largest number of parallels comes from graveyards at Loulan and, to a lesser extent, Niya. Considering the geographical and political position of Loulan we suppose that it was the point of origin for the Oglakhty pieces. At the same time we should bear in mind that there were other states in the Tarim basin during this period who were also connected with China and they could have been the route through which the Oglakhty silks came, although almost none but Astana cemetery (Litvinsky/Lubo-Lesnichenko 1995, 284–290) have offered any finds earlier than the 4th–5th century AD.

The individuals buried in the Oglakhty cemetery were not of particularly high status. The use of patches of silk differs from the complete silks found in elite tombs at Pazyryk and Noyon-Uul, reinforcing the different status of our silks and possibly the method of transmission and curation. There are no certain data on modes of trade or exchange concerning any of the Minusinsk finds. However, one way for these silks to have entered southern Siberia may be related to the fact that many finds from Oglakhty and other early Tashtyk cemeteries have counterparts in the same cemeteries of the Tarim basin where the silks were found.

There are also close similarities seen in the particular burial rites, as well as types of objects and imagery which are generally new in the region. These features, when viewed together, suggest that there was a foreign element in the population whose culture was represented by the early Tashtyk cemeteries, and it was this group that shaped this new culture. It is quite possible that successors of these immigrants were represented in the graves as the mannequin burials containing cremations. Considering all the analogies, it seems probable that this group came from the Tarim basin, or an adjacent region where similar traditions were common. The silk pieces might then have entered the Minusinsk basin with these people, perhaps even as part of their personal belongings. How long they were worn and used for prior to burial is unclear and for a better understanding of the ways and conditions Chinese silks could find their way to the Minusinsk basin, further study and publication of other silk finds from Oglakhty and other early Tashtyk cemeteries are essential.

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