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## Star-Shaped Pendants from the Perm Region, Western Urals: Hunnic Polychrome Ornaments Reanimated

*The set of personal ornaments of the Lomovatka culture, western Urals (AD 800–1000), includes star-shaped pendants with a copper or silver plate as a base decorated by medallions with inserts, bordered by gold elements with granulation and filigree and by silver details with filigree and embossment. Analysis of the items suggests that the central medallions of such pendants significantly differ from the other constructive elements such as the base, stamped silver wire, and embossed tripartite rosettes, not only in the composition of the metal, but also in terms of technical sophistication of the medallions—the use of fine filigree, calibrated fine granulation, cabochons, etc. Other elements of star-shaped pendants include pegs having no practical function. It was found that the central medallions with inserts were once part of other personal ornaments. For secondary use, they were soldered to the base in their final form. The search for parallels has led to the conclusion that these elements were parts of ornaments of the 5th–6th century polychrome style. Their exact source remains a mystery, but local jewelers made excellent use of them by setting them off with silver. Star-shaped pendants are rather standard, they are few in number, and the time of their manufacture was likely limited. Judging by the burials, they were used as women's pectoral ornaments.*

**Keywords:** Middle Ages, Perm Region, western Urals, Lomovatka culture, star-shaped pendants, jewelry techniques, Hunnic polychrome style.

### Introduction

Most of the researchers of medieval antiquities from the Perm Territory have agreed that all the precious metal jewelry discovered in the region was imported. Yet, a more detailed approach to analyzing such items has led to a conclusion in favor of domestic jewelry production in the Perm Cis-Urals, which was notable in its own set of technological methods and stylistic originality (see, e.g., (Podosenova, 2021b)).

So far, the studies have focused on the most numerous category of jewelry—temporal ornaments (Podosenova, 2021a). Analysis of techniques used in their manufacture

has revealed that local jewelry production emerged already in the 8th century AD. By the end of that century, the Kama artisans mastered the skills of embossing, drawing metal, soldering, and decorating items with stamped wire and granulation. Starting in the 9th century, they commanded the use of gilding backgrounds, making inlays with different materials, and chasing; from the 10th century, they produced filigree by twisting, and from the 11th century they mastered the niello technique. The Kama jewelry production further evolved in the Rodanovo archaeological culture (12th–15th centuries). These techniques were rather labor-consuming, and their widespread use indicates

a relatively high level of skills possessed by the local jewelers (*Ibid.*: 178).

The period from the 9th to the first half of the 10th century was a special time in the development of the Kama jewelry craftsmanship. The borrowing of technical methods and structural elements increased in that period, which resulted in expansion of typological diversity (*Ibid.*: 129, 147) throughout the entire assortment of jewelry.

Distinctive star-shaped pendants of sophisticated structure stand out among the products of local jewelers, combining different jewelry techniques and materials like no other (Fig. 1). For a number of reasons, they were not commonly used. Despite the fact that these ornaments were definitely a typical element of the Lomovatka culture, little is known about them, although individual items (or their elements) have long ago been published (Spitsyn, 1902: Pl. II, 4, 6; XXXI, 10; Talitsky, 1940: Pl. V, 60; Belavin, 2000: Fig. 39). Judging by the evidence from burials, these pendants were women's pectoral ornaments (Fig. 2).

### Description of the finds

Twenty-one star-shaped pendants have been identified in published materials and archaeological collections. Although only two of them were found outside the area of the Lomovatka culture, they appeared at sites with marked influence of this culture—the Kochergino cemetery in the Vyatka River basin, and the Kheibidya-Pedar sacrificial site on the More-Yu River. None of the collected items has survived without losses. Since the soldering of elements made of various metals is very undurable, the vast majority of items were found in a disassembled state and required restoration. This made it possible to focus on the technological features and composition of materials of the available items. The results of analysis turned out to be completely unexpected and gave rise to many questions related to the emergence of this category of jewelry.

Generally, the items under discussion are star-shaped plates (4-, 6-, or 8-pointed) made of copper or a copper-based alloy. Elements soldered to the plate were assembled separately and included a setting with stone insert framed



Fig. 1. Star-shaped pendants and their elements.

1 – Redikar hoard (State Hermitage, No. 535/48); 2–9 – Bayanovo cemetery: 2 – burial 389, 3, 4 – burial 61, 5, 6 – burial 136, 7 – burial 480, 8 – burial 101, 9 – sector A 2017; 10 – burial 51 at the Redikar cemetery.

by filigree work (*drobnitsa*, according to A.A. Spitsyn (1902: 27)) made of precious metals, as well as embossed elements (Fig. 3). Since composite star-shaped pendants included elements differing significantly in manufacturing technique, we should discuss them group-by-group.

**Elements with inserts, made in the filigree technique**, differ in shape, material, and technological features (Fig. 4).

*Type 1, oval* (see Fig. 1, 1, 2, 5–10; 2, 1; 3, 1), 10 items (Redikar hoard, burial 51 at the Redikar cemetery, burials 101, 136 (2 items), 389, 480, and sector A of 2017 at the Bayanovo cemetery, the Verkhne-Berezhovskiy settlement, and Trubensky cemetery). The central medallion measuring from 11 × 14 to 24 × 27 mm was assembled on a separate silver plate (76–90 % Ag\*). Its elements—filigree decor and setting for the insert—were made of an alloy based on gold and silver (53–80 % Au, and 27.5–14.4 % Ag). The oval setting made of a thin metal strip placed on its edge was soldered to the plate at a right angle. The inserts were cabochons of amber (see Fig. 1, 1, 6, 10; 2, 1) and carnelian (see Fig. 1, 5; 3, 1), or a colorless translucent stone (see Fig. 1, 7), rising above the top of the setting. The insert was fastened by the tight rim of the setting holding it, bordered by a thin stamped wire (up to 0.5 mm), on which regular transverse notches were made, imitating granulation. A small “equatorial” incision was made on the “grains”, which gave the wire even greater decorative effect (see Fig. 4, 1, a, c, 2, a, c, e, 4). On some items, such wire was also placed along the outer perimeter of the central medallion (see Fig. 4, 2, a, c) or along the outer perimeter and between “braids” of filigree (see Fig. 4, 4). Rows (2–4) of thin (up to 0.3 mm) filigree wire with multidirectional twists, which created the effect of a “braid” (see Fig. 1, 1, a, 5–9; 4, 1, a, c, 2, a, c, e, 3, 4), ran along the outer edge of the medallions or between the rows of “granulated” wire. An exception



Fig. 2. Star-shaped pendants and their elements.

1 – Verkhne-Berezhovskiy settlement (a – after (Spitsyn, 1902: Pl. II, 6), b – photo from the exposition of the Perm Museum of Local History); 2, 3 – Kheibidya-Pedar sacrificial site (after (Drevneye svyatilishche..., 2016: No. 364, 690)); 4 – burial 51 at the Redikar cemetery; 5 – burial 103 at the Bayanovo cemetery; 6 – Pitersky (Stepanovo Plotbishche) cemetery.

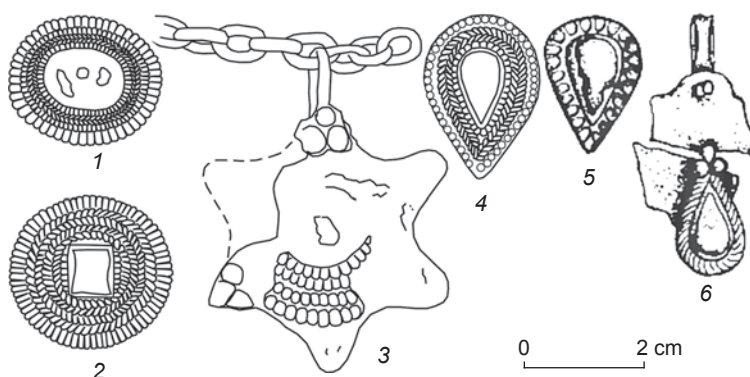


Fig. 3. Star-shaped pendants and their elements.

1 – Trubensky cemetery (after (Spitsyn, 1902: Pl. II, 6)); 2 – village of Kharino (after (Spitsyn, 1902: Pl. XXXI, 10)); 3 – burial 5 at the Kochergino cemetery (after (Talitsky, 1940: Pl. V, 60)); 4 – burial 92 at the Averino cemetery (after (Goldina, Kananin, 1989: Fig. 45, 38)); 5 – Malo-Anikovskoye cemetery; 6 – burial 102 at the Ogurdino cemetery (after (Belavin, 2000: Fig. 39, 8–9)).

\*Chemical composition of metal in all cases was established using X-ray fluorescence analysis. The measured surface was not subjected to mechanical cleaning owing to the fragility of the items.





Fig. 4. Structural elements and technological features of manufacturing star-shaped pendants.

1–3, 5, 8 – Bayanovo cemetery: 1 – burial 480, 2 – sector A 2017, 3 – burial 136, 5 – burial 101, 8 – burial 389; 4, 6 – Redikar hoard; 7 – burial 51 at the Redikar cemetery.

was the medallion on the item from the Verkhne-Berezovsky settlement, where the setting was bordered with fine granulation and two rows of fine filigree wire laid in a “braid” (see Fig. 2, 1, b).

There are indications that these elements were once a part of other ornaments, and were reused. For example, many items show the remains of pegs under the settings, which have no practical purpose in the pendants under discussion. In this regard, a medallion that has a missing insert, found at the Bayanovo cemetery, is noteworthy (see Fig. 1, 9). On its front side, in the center of the setting, there is a square hole; and on the reverse side, a round hole and traces of a cut peg (see Fig. 4, 2, b, c). The head of the peg under the insert was covered with beading of a multicomponent alloy (Ag-Sn-Au-Cu-Pb, where Ag was 40.2 %, Sn was 24.8 %, and Au was 21 %), which served as a substrate for the insert (see Fig. 4, 2, a, d). A hole with remains of a bronze peg in it (see Fig. 4, 1, b) appears on the

reverse side of the central medallion on another item from that site, yet neither the exit of the peg nor the hole are visible through the translucent stone on its front side (Fig. 4, 1, a), which means that there must be a similar substrate under the insert. The pegs were not always cut in the same plane as the plate, and in such cases a hole was made in the plate, where the rest of the peg was inserted, so that the medallion would tightly adjoin to the base of the pendant (see Fig. 1, 1, b; 2, 1, b; 4, 6). The end of the peg was often left without planishing.

The central medallion was framed by one to three rows of thicker (1–2 mm) silver stamped wire (79–92 % Ag) with a “granulation” effect, soldered directly onto the figurate plate base of the pendant. This wire was coarser in execution: the “grains” were irregular, of various sizes; they did not have “equatorial” notches; there were manufacturing defects in the form of non-stamped areas (see, e.g., Fig. 4, 8). Along with “granulated” wire, stamped wire was used, containing straight deep notches, between which were located less deep regular notches. Rows of silver wire usually survive soldered together; in an item from Bayanovo (see Fig. 4, 1, e), remains of the soldering of a tin-based alloy (78.7 % of Sn, 5.95 % of Pb, and 15.3 % of Cu) have remained on its reverse part.

*Type 2, round* (see Fig. 2, 5, 6; 3, 2), 3 items (Pitersky (Stepanovo Plotbishche) cemetery; burial 103 at the Bayanovo cemetery; village of Kharino). The most informative item is the pendant from the Pitersky cemetery (see Fig. 2, 6). The cast central medallion with square setting and insert of dark glass is bordered by rows of pseudo-filigree wire (owing to the large amount of patina, it is visually difficult to establish the material and manufacturing technique, but two rows of “braids” made of pseudo-filigree wire are clearly visible) and silver stamped wire (Fig. 2, 6, a). A peg is visible on the reverse side of the item (see Fig. 2, 6, b).

A medallion similar in appearance was found in the village of Kharino (see Fig. 3, 2). According to Spitsyn, the item consisted “of large *skan* filigree, large incised filigree, and was equipped with an insert” (1902: 44, pl. XXXI, 10). Another similar item comes from the Bayanovo cemetery (see Fig. 2, 5). The decoration was

remodeled due to the loss of the central element. An oval setting with amber insert has survived in fragments. Four embossed elements, similar to those used in decoration of the points on a star-shaped base, but cut off and fitted to the setting, were adjacent to it. The lost central medallion was framed by two rows of stamped silver wire.

*Type 3, teardrop-shaped* (see Fig. 2, 3, 4; 3, 4, 6), 4 items (burial 51 at the Redikar cemetery, Kheibidya-Pedar sacrificial site, burial 92 at the Averino cemetery, burial 102 at the Ogurdino cemetery). On the ornaments from the Redikar cemetery and the Kheibidya-Pedar sacrificial site, the medallions have a base made of a silver plate to which a bezel setting of a thin gold band placed on its edge was soldered. A teardrop-shaped amber insert was fastened by bending forward the rim of the setting. The setting was framed by gold, stamped “granulated” wire; the “grains” had small “equatorial” incisions (see Fig. 4, 7, *b, c*). The teardrop-shaped elements were bordered by stamped silver wire with “granulation” effect (see Fig. 4, 7, *a*), soldered to the base of the pendant. As opposed to the gold wire, the “grains” on the silver wire were large and irregular. A hole was punched on the reverse side of these elements, and remains of a bronze peg, which had no practical purpose in this item, could be seen (see Fig. 4, 7, *d*).

According to the drawing (see Fig. 3, 4), the teardrop-shaped element from Averino was designed like oval pendants: a setting with a teardrop-shaped stone insert was framed by thin and thicker stamped “granulated” wire, with a “braid” of filigree between them. The material was not indicated in the publication. The item was interpreted as an element of a temporal pendant that rotated freely (Goldina, Kananin, 1989: 62, fig. 45, 38).

Judging by the description, the teardrop-shaped item from the Malo-Anikovskoye cemetery (see Fig. 3, 5) had a bronze base, a setting framed by imitation of granulation, and an insert of blue glass (Belavin, 2000: Fig. 39, 8). Another item of similar shape with remains of a plate with a loop (see Fig. 3, 6) comes from the Ogurdino cemetery. The base of that item was cast in bronze. The teardrop-shaped amber insert in the setting is framed by cast imitation of stamped wire. A triangle of pseudo-granulation is located at the sharp end of the “teardrop” (Belavin, Krylasova, 2012: 133, fig. 59, 20). The teardrop-shaped element was detached from the plate base. The drawing shows a variant of its location in comparison with the pendant from Redikar. However, judging by the triangle of pseudo-granulation, it is possible that it was a pendant similar to the one found in the sanctuary on the More-Yu River.

**Embossed elements** made of silver were used in decoration of the points in star-shaped pendants; with one exception (see Fig. 2, 5), when similar cut elements were used in the central part of a decoration in place of a lost filigree medallion.

*Type 1* (see Fig. 1, 2, 7, 8; 3, 3), 4 items (burials 101, 389, and 480 at the Bayanovo cemetery, burial 5 at the Kochergino cemetery). The triangular figure was formed by three dots. The imprinted elements were cut out with a bit of excess metal for their subsequent soldering to the base.

*Type 2* (see Fig. 2, 6, *a*), 1 item (Pitersky (Stepanovo Plotbishche) cemetery). Embossed triangles with nine bulges most likely imitated granulated triangles.

**Star-shaped pendants**, including the elements described above, with one exception, had for their base a figurate plate made of copper or a copper-based alloy. The elements were soldered to the plate blank, which was then carefully trimmed so that the copper base was not visible from under the precious elements. For attaching the pendants, a loop, which was made by bending copper plate, was soldered to the back. Such loops have survived only on the items from the Pitersky (see Fig. 2, 6) and Ogurdino (see Fig. 3, 6) cemeteries, but some items show distinct traces of them with solder residues (see Fig. 1, 1, *b*; 2, 4, *b*; 4, 6). An exception is the pendant from the Kheibidya-Pedar sacrificial site, which was equipped with a cast loop (see Fig. 2, 3). According to the shape of the base, the items can be divided into three types.

*Type 1 with eight points* (see Fig. 1, 1, 2), 2 items (Redikar hoard, burial 389 at the Bayanovo cemetery). One large pendant (5.8 × 5.4 cm) was almost intact (see Fig. 1, 1). The oval medallion in the center was elongated horizontally. Solder residues from the wire frame remained around the medallion. The points showed distinct traces of non-surviving embossed elements\*. Another similar pendant was heavily fragmented (see Fig. 1, 2), but the location of the preserved points shows that it was also eight-pointed, similar in size to the one described above. The central medallion was missing. Three rows of stamped silver wire bordering it, as well as individual embossed elements of type 1, were preserved on the base. Traces of solder from the lost embossed elements were visible on the points of the base.

*Type 2 with six points* (see Fig. 1, 3–8, 10; 2, 3, 5, 6; 3, 3), 11 items (burial 61 (2 items), 101, 103, 136 (2 items), and 480 at the Bayanovo cemetery, burial 51 at the Redikar cemetery, Pitersky cemetery, burial 5 at the Kochergino cemetery, and Kheibidya-Pedar sacrificial site). The size of the figurate plate base ranged from 2.7 × 2.7 to 5.3 × 5.5 cm. Burial 61 at Bayanovo contained two six-pointed plates without decorative elements (see Fig. 1, 3, 4); however, judging by the traces of solder, they were the same as decorative elements on most of the pendants

\*In addition to the eight-pointed star-shaped pendant described above, the Redikar hoard included “a bronze plate in the form of a star with a maximum length of 4 cm, oxidized, dented, with some points broken off, and torn edges” (State Hermitage Museum, No. 535/49, inventory).

of that type. The decor included a horizontally elongated oval medallion (with an insert and filigree decoration) in the center of the base, and embossed elements of type 1 on the points of most items. The pendant from the Pitersky cemetery showed embossed elements of type 2.

The pendant from the Kheibidya-Pedar sacrificial site stands out among other items (see Fig. 2, 3). It has a bronze plate base with cast loop. A round medallion with a diameter of 1 cm and a gold setting, with amber insert, framed with a “granulated” stamped wire, is in the center. The collection from that site contains a similar item with a lost insert, but with a surviving peg and disc (see Fig. 2, 2). This item was interpreted as a belt onlay (*Drevneye svyatilishche...*, 2016: Fig. 2.2.12, 14). Teardrop-shaped elements—gold settings with amber inserts, edged with gold “granulated” stamped wire—were placed on the points of the star-shaped pendant. A frame made of stamped silver “granulated” wire with three granules at the end has survived on one point. Traces of solder indicate that all the teardrop-shaped elements and the round one were framed with similar wires. Judging by the figuratively carved ends, granules were also on all the points.

*Type 3 with four points* (see Fig. 2, 1, 4), 2 items (burial 51 at the Redikar cemetery and Verkhne-Berezovsky settlement). These two pendants are very different. The item from Redikar measures  $2.8 \times 2.8$  cm and is the only one with a hanging loop attached not to one of the points, but between them (Fig. 2, 4, b). Teardrop-shaped elements (two survived, but judging by the traces of solder these were on all the points) were placed with their pointed ends towards the center.

The ornament found in the Verkhne-Berezovsky settlement (see Fig. 2, 1) had a base made of a cross-shaped silver plate ( $6.5 \times 6.5$  cm) with rounded arms. Oval medallions have survived on three arms and in the center; on one arm, the medallion was lost (the item is kept in the main exposition of the Perm Museum of Local History; see Fig. 2, 1, b), although on the drawing in Spitsyn's album, it was still in place (1902: Pl. II, 6). Notably, during restoration, the gold oval medallions with inserts were attached in a different manner than is shown in the drawing, where (judging by the traces of solder) they were located correctly. The drawing contains an important structural element—a frame made of large filigree (probably stamped) wire around the lost medallion (see Fig. 2, 1, a).

## Discussion

At the present time, it is difficult to say anything definitive about the origin of these items. So far, no prototypes have been identified. It is possible that the design of the star-shaped pendants was chosen by local jewelers for using

elements with inserts and gold filigree decor in a most spectacular way. A detailed study of these items shows that individual structural elements differ significantly in terms of workmanship.

The medallions with gold settings and filigree decor were manufactured perfectly, on a high professional level. This is observed in the correct shape of the inserts and accuracy of the fitting of ornamental stones, careful bending of the rim of the cast inward, well-conceived granulation effect of stamped wire, use of very thin filigree wire (up to 0.3 mm) and fine calibrated granulation, absence of streaks and excesses at the joints of parts, as well as in the variation of metals (silver, gold). It is noteworthy that gold was not typically used in the manufacture of filigree by medieval Kama jewelers. They widely used gilding; and when they produced solid gold items, these items were technologically simple (for example, wire temporal rings). In addition, real filigree was not used at the time when the star-shaped pendants were produced in the jewelry industry of the Perm Region of the western Urals. Instead, stamped wire and later twisted wire was used, creating an effect that outwardly resembles filigree (Podosenova, 2021b: 84–89).

The feeling of high professionalism disappears when we turn to the figurate bases of the pendants and to the silver filigree and embossed elements soldered to them, which are of completely different quality. The details are large; the cross-section of the filigree elements is 1–2 mm; they have flaws manifested by irregularity of notches on the wire and different gaps between them; external seams are crudely filled with solder, with streaks and excesses.

In general, the central medallions seem to formerly have been parts of other artifacts, and were soldered to the base in their final form. Remains of pegs testify to their secondary use. These were neatly cut off. If the pegs were on the reverse side of the artifact, they had no practical purpose and were polished, trimmed to the base, but not even planished. Most likely, these were formerly the elements of a belt set.

There is no doubt that the gold elements with inserts were the products of jewelry workshops with deep artisanal traditions and specialized tools. Typologically and technologically similar items could not be identified among the contemporaneous evidence. However, the search for parallels ended with an unexpected result. Specific chemical-technological and formal features, observed in the analysis of the items, were typical of the jewelry in the polychrome style of the Hunnic and post-Hunnic periods (Zasetskaya, 1994: 60). According to differences in inlay technique, such items can be divided into two groups: artifacts with inserts in soldered sockets and those with inserts in cloisonné cells (Zasetskaya, 1982: 14). The elements under consideration belong to the first group, which shows a combination of a gold



background with bright inserts of red semi-precious stones and onlaid wire ornamentation (Ibid.: 16). “Items of this group have a bronze plate base covered with a thin gold or electrum sheet, the edges of which are bent and fit tightly to the bronze base. Sometimes, the upper sheet was attached to the base with pins and rivets located under the inserts” (Zasetskaya, 1994: 69). The design of sockets for inserts was the most common: a folded narrow band was soldered to the surface on its edge, and the base of the socket was decorated with a border of granulation or wire (Ibid.: 70). The similarity of the elements under discussion to artifacts in the polychrome style is suggested by the use of two alloys—silver as a substrate and gold for the manufacture of decorative details (the setting, filigree elements) (Morskoy Chulek..., 2007: Pl. VIII, 1, 2, p. 166, No. 19, p. 167, No. 20, 21), by the presence of copper fastening pegs in silver and gold items (Ibid.: 81, pl. VIII, 3, p. 167, No. 21), substrates under stone inserts in the form of foil or metal (“cement”) poured into the sockets (Ibid.: 60, 155), the use of stamped wire with regular granulation effect, real filigree (Ibid.: 79), etc. The item found at the Kheibidya-Pedar sacrificial site (see Fig. 2, 2), and the insert from a similar item on a star-shaped pendant (see Fig. 2, 3, a) find their direct parallels in horse harness decorative elements from the Morskoy Chulek cemetery (Ibid.: Fig. 28, 3–9).

Scholars express different opinions on the places where the items in the polychrome style were produced. These could have been Bosporan (Zasetskaya, 1982: 24), Byzantine (Morskoy Chulek..., 2007: 62), or Central Asian workshops (Ibid.: 80). After mapping the Ural sites with artifacts in the polychrome style, I.E. Lyubchansky concluded that these were located on the northern branches of the Great Silk Road, and their location may indicate penetration of these items from the production centers of Central and Western Asia (2009: 16).

The use of “antiques” by the people of the Lomovatka culture was by no means a rare occurrence. It is sufficient to recall the unique belt of the “Byzantine type”, dated to the 8th century, from the burial of the 10th century at the Bayanovo cemetery; and chalcedony discs typical of the Azelino and Mazunino burials of the 4th–5th centuries AD, found in the burials of the 9th–10th centuries at the Demenki and Bayanovo cemeteries (Danich, Krylasova, 2014). Incidentally, chalcedony discs were typical of the same period as the items in the polychrome style. For example, the material evidence from the Kudash cemetery in the south of the Perm Territory included both chalcedony disks and items with oval or rounded inserts framed with gold filigree and/or granulation (Bykova, Kazantseva, 2012: Fig. 1, 13–19; Naslediye..., 2007: Fig. 66, 67), similar to those used as central medallions in star-shaped pendants. However, the use of early artifacts or their fragments in new jewelry is an unusual phenomenon.

## Conclusions

The time when the star-shaped pendants of the Lomovatka culture were widespread can be established from the chronological framework of the burials where they were discovered, and corresponds to the 9th–10th centuries. The relatively small number of such items, stylistic and technological unity shown by the majority of the items, and the secondary use of much earlier items as a central element may indicate that they were produced over a limited period of time. Now we can only speculate about the source of the items of the polychrome style (hoards, looting of early burials, etc.), but it is clear that it was not unlimited, which explains the relatively small number of star-shaped pendants at the sites of the Lomovatka culture. The items discussed above also include pendants entirely made by the local jewelers, such as pendants with round central medallions and cast teardrop-shaped elements with inserts. This suggests that after depletion of the source of gold items in the polychrome style, the artisans attempted to continue production of star-shaped pendants, but judging by the small number of finds, this did not become widespread.

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