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I. B. SHRAMKO**BRONZE MIRRORS FROM THE BURIALS
OF THE SKOROBIR NECROPOLIS***

The article introduces into scientific circulation a complete collection of bronze mirrors discovered at the Skorobir necropolis for the first time. The objects originate from the closed complexes of the 6th century BC allowing to trace the archaeological context of the finds and the features of the manufacture of mirrors of different time periods within the same century, as well as making assumptions about their origin and place of manufacture.

Key words: Dnipro forest-steppe Left-bank region, Bilsk settlement, Skorobir necropolis, bronze mirrors, 6th century BC.

In the burials of the Scythian Archaic period in the forest-steppe region, mirrors are found only occasionally and constitute a small percentage among other categories of objects. Unfortunately, a much larger number of them belong to accidental finds, which makes it difficult to solve many issues related to their dating, origin, place of manufacture, etc.

In the 6th century BC, noticeable changes occurred in the early Scythian material complex, which were especially felt starting from the second half of the century, (Алексеев 2003, с. 153; Гречко 2012, с. 76, 79-84). At this century new types of mirrors appeared on the territory of the forest-steppe Scythia — along with archaic forms with a central handle in the form of a loop or two columns covered with a plaque, there were specimens with a simple side iron handle, solid bronze mirrors of the so-called “Olbian” or “Scythian” type were gradually gaining popularity (Скуднева 1962, с. 7, 22-23; Кузнецова 2021, с. 36 et al.). There is no consensus among researchers about the time

and reasons for such changes; different versions are put forward regarding the origin and manufacture of mirrors with side handles found in the Ukrainian forest-steppe (Кузнецова 1972, с. 17-18; 2002, с. 139; 2010, с. 236-241; 2017a, с. 105-107; 2017b, с. 474; Полін 1987, с. 23-24; Ольговський 2011, с. 174-175; Ольговський 2014, с. 223-226; 2017, с. 478-479; Зуев 2021, с. 139 et al.). The questions about the origin, place of production, and manufacturing technique of complex mirrors decorated in the Scythian animal style are answered in different ways (Скуднева 1962, с. 5, 7, 12, 21-25; Барцева 1981, с. 69-72; Скржинская 1984, с. 115-123; Полін 1987, с. 23-24; Гуцал А., Гуцал В. 2009, с. 133; Полидович 2010, с. 92-93; Кузнецова 2010, с. 198, 237-241; Ольговський 2011, с. 167-170; Ольговський 2014, с. 218-235; Кузнецова, Оборин 2022 et al.). Among the main possible centres of their production, researchers usually mention Olbia (Граков 1947, с. 28; Фурманская 1953, с. 52; Островерхов 1978, с. 10; Скржинская 1984, с. 121-122 et al.). Т. В. Barceva drew attention to certain similar features of the recipe and raw materials of some “Olbian” and “Greek” mirrors, emphasising their imported nature for the sites of the forest-steppe, but in her opinion, it is too early to definitively consider Olbia as the place of their production (1981, с. 71-72). Among the forest-steppe centres with developed metalworking, the Bilsk hillfort attracts the attention of the scholars (Шрамко 1987, с. 104-106, 113-121; Трейстер 1998; Кузнецова 2010, с. 186; Ольговський 2011, с. 149-150; Ольговський 2014, с. 178-185, 193 et al.). In addition, it has been suggested that similar mirrors could have been made in different workshops, both barbarian and Olbian (Скуднева 1962, с. 22-23; Онайко 1966, с. 35; Барцева 1981, с. 68, 72; Гуцал А., Гуцал В. 2009, с. 132; Кузнецова 2010, с. 197 et al.). In the latter, according to S. Ya. Olhovskiy, wandering craftsmen of barbarian origin could also work (Ольговський 2014, с. 194-196; 2016, с. 195-197).

Recently, the idea has been proposed in the scientific literature that all variants of mirrors of this type should be considered not “Olbian”, but

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“Borysthenian” (Зуев 2017, с. 144-154). In our opinion, there is no convincing evidence for such a conclusion yet, which has been noted by other researchers (Маньчев et al. 2004, с. 37, 39-40; Ольговский 2014, с. 85-88; Кузнецова 2021, с. 47-48), i.e. the issue of the Berezan production center remains unsolved.

Therefore, the places of manufacture of mirrors of the “Olbian” or “Scythian” types have not yet been established. Mirrors with side iron handles are generally associated with the local forest-steppe workshops (Кузнецова 2002, с. 139; 2010, с. 186; Ольговский 2011, с. 175-177 et al.).

The hypothesis of attribution of some mirrors with a rim (with central and side handles) as vessels, the possibility of their dual use, also remains debatable (Кузнецова 2010, с. 261-262; 2017b, с. 470-472; 2021, с. 37-38; Гуцал А., Гуцал В. 2009, с. 125-134; Бандрівський 2010, с. 160-161; Зуев 2019a, с. 18-20).

The relevance of the problem of the Scythian mirrors is especially important for us, since recently, during the excavation of burial mounds in one of the largest burial grounds of the Bilsk hillfort — the Skorobir necropolis, new samples of different types of mirrors were discovered, which allows us to return to this topic again¹.

Materials and Methods

Over many years of research, more than a hundred barrows in the necropolis of the Bilsk hillfort have revealed a small number of bronze mirrors of different types. Thus, out of nine recorded cases, only four can be said to be whole products or objects with minor damages caused by metal corrosion. Among these we included the mirrors found in the barrows nos. 2/1965 (Шрамко 1994, с. 105, рис. 3, с. 107), 1/2017 (Шрамко, Задников 2018, с. 15, рис. 6: 5), 2/2019 (Шрамко, Задников 2020, с. 9) and 2/2020 (Шрамко, Задников 2021, с. 13) of the Skorobir necropolis, as well as a mirror from the barrow no. 2/2002 of the Pereshchepyne necropolis (Кулатова, Супруненко 2010, с. 113-114, рис. 123). Two of the four complexes (barrows nos. 2/1965 and 2/2019) were not robbed. In some cases, the presence of a mirror in a grave was established only by small fragments of bronze discs (Pereshchepyne, mound 2/2001 and 1/2002; Marchenky, mound 1/1995, burial 1 (Кулатова,

Супруненко 2010, с. 95, рис. 103: 6-7; с. 159, рис. 178: 5, с. 170). The possible usage of a mirror in the funeral rite of the barrow no. 1/2001 of the Pereshchepyne burial ground was indicated by the shape of the decayed leather bag (Кулатова, Супруненко 2010, с. 73).

We should also note an accidental find of a complete bronze mirror with a rim, a central handle in the shape of two columns covered with a plaque (Кулатова, Луговий 2003, с. 83), and a mirror with part of a disc and a handle with zoomorphic design in the shape of a ram's head (Задников, Шрамко 2017, с. 259, рис. 10: 25; 12: 21), originating from the territory of the Bilsk hillfort and its surroundings. We consider these objects, not related to a specific necropolis, as artefacts that do not have a corresponding context, but demonstrate the diversity of this category of products that belonged to the local population.

In the general background of the formed collection of mirrors of the Scythian period, found within the Bilsk archaeological complex, the most informative material source for the Archaic period are four mirrors with side handles, originating from the burials of the Skorobir burial mound necropolis (fig. 1).

All objects were recorded *in situ*, have an appropriate archaeological context, and are in a satisfactory state of preservation. In all cases, it can be assumed that women who had a special status during their lifetime were buried with mirrors (Шрамко 1976, с. 208; 1994, с. 107; Shramko, Zadnikov 2021, p. 143-145; Shramko 2024, p. 24-25).

In order to obtain additional information about the buried individuals and to study the mirrors found with them completely, in addition to archaeological methods, natural science methods were applied. Thus, based on the results of the anthropological study of bones from barrows nos. 1/2019, 2/2017, and 2/2020, the gender and age characteristics of the buried were determined². In two cases (nos. 1/2017 and 2/2020), the preliminary conclusions of anthropologists were confirmed by the results of the DNA analysis³.

The features of the elemental composition of substances in the metal of the bronze parts of the mirrors (a disc, a holder, a handle, a predator figure, a retainer) were established in various research centres: the Institute of Applied Physics of the NAS of

¹ The mirrors from this necropolis discussed in the article are published for the first time.

² Definition of Dr. Hab. of Medicine O. Yu. Vovk and PhD in Medicine A. V. Artemiev.

³ The samples were examined by Dr. Hab. of Biology O. M. Utevska.

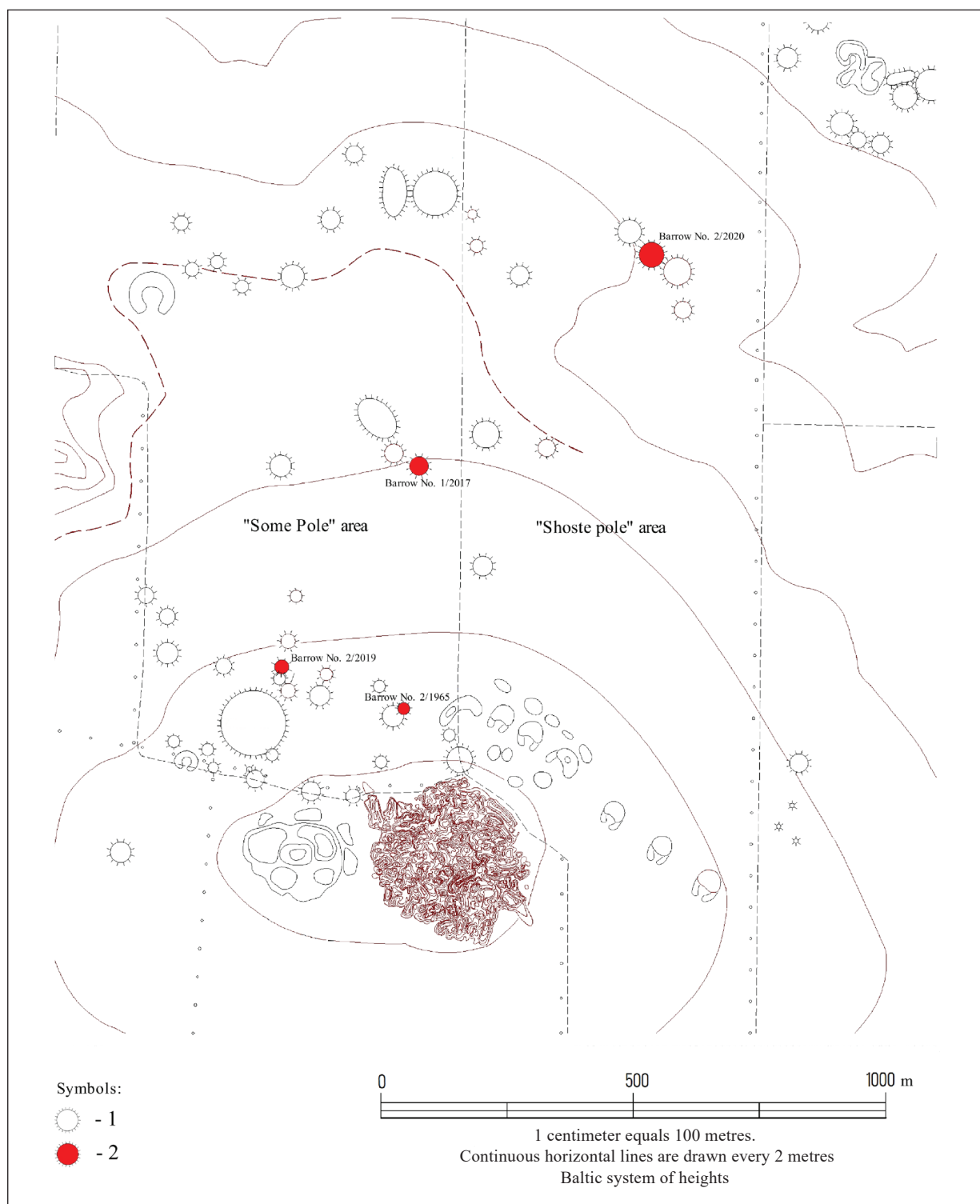


Fig. 1. Scheme of the Skorobir necropolis in part of the “Seventh Field” and “Sixth Field” sections with markings of the barrows containing mirrors: 1 — barrows; 2 — barrows in which mirrors were found

Ukraine (Sumy)⁴, by PhD in History T. Yu. Hoshko⁵

⁴ X-ray fluorescence analysis (XRF) using the X-ray spectrometer “ElvaXProSpector 3” was performed by PhD in Physical and Mechanical Sciences O. M. Buhai. For general characteristics of the device, see: Шпamko 2023, c. 102.

⁵ The metal analysis of the two mirrors was carried out using the “ElvaX Basic” spectrometer.

and in the production engineering laboratory of the ELVATECH Ltd (Kyiv)⁶, which provided a more objective and complete picture of the alloy formulation

⁶ Control measurements of the metal composition of the mirrors using the X-ray diffraction analyser “ProSpector 3 Advanced” were carried out by chemist-technologist D. Ye. Tsvir.

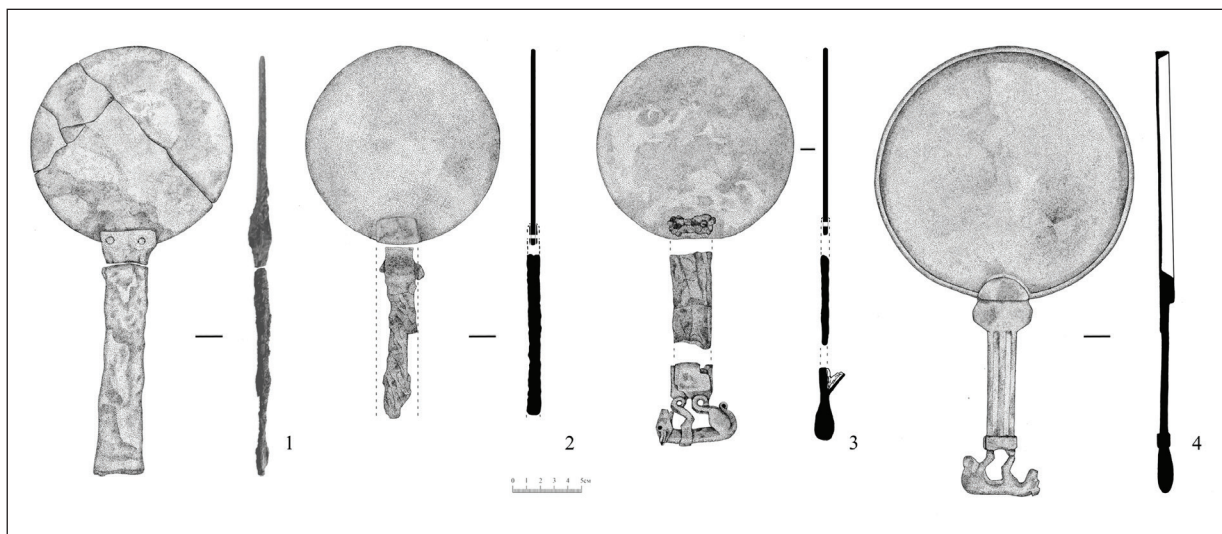


Fig. 2. Bimetallic and solid bronze mirrors from the Skorobir necropolis. 1 — barrow no. 2/2020 (type 1); 2 — barrow no. 2/2019 (type 1); 3 — barrow no. 2/1965 (type 2); 4 — barrow no. 1/2017 (type 3)

and features of the raw materials. The results of the analyses are given in table 1. Quantitative indicators of some detected elements (Mn, Al, Si, S, Ti, Cd, Hg, Cr, Al) are not included in the table, elements such as Bi, Au were not detected. The presence of significant amounts of phosphorus and iron in the metal of some mirrors requires separate additional research.

General characteristics of objects

We have classified the considered mirrors into three types, from different time periods within the same century. The **first** type is characterised by a flat round bronze disc without a rim, a lateral iron handle without decoration (fig. 2: 1–2); the **second** is a flat round bronze disc without a rim; the lateral iron handle is decorated with a bronze figure of a feline predator in the style of the early Scythian art (fig. 2: 3); the **third** is made of solid bronze of a complex design, the so-called “Olbian” or “Scythian” type, the disc has a vertical rim; the lateral fluted handle is decorated with a stylised figure of a feline predator (fig. 2: 4).

Mirrors with a Flat Disc and a Side Iron Handle Without Decoration.

We attributed two objects found in the southern and central parts of the necropolis, in the Skorobir tract, to this type.

A mirror from the **barrow no. 2/2020**⁷, located in the central part of the burial ground (fig. 1) in the “Shoste Pole” (“Sixth Field” — in English) area, was discovered in the part of the grave that was not robbed.

⁷ Repository of the Historical and Cultural Reserve “Bilsk”, inventory no. A488/18, excavations by I. B. Shramko.

Item description. Bimetallic, composite (fig. 3: 1). The flat, rimless, round disc turned out to be broken into five pieces. A thin disc is clamped between the ends of an iron plate and connected using bronze rivets (fig. 3: 1c), 0.4 cm in diameter. The front surface of the disc, in places not covered with patina, has retained its brightness and shine (fig. 3: 2b), on the reverse side, the surface is not polished, scratches and irregularities are visible on the metal (fig. 3: 2a).

Total length of the object — 29.7 cm, diameter of the disc — 14.7 cm, thickness — 0.2–0.3 cm, length of the iron handle — 17.4 cm, width of the middle part of the handle — 3 cm, the extension at the ends of the handle — 3.4–3.8 cm, thickness of the handle — 1 cm⁸, total weight of the mirror — 442 g (the weight of the disc with the remains of the handle is 347 g, the weight of the handle — 95 g.).

Archaeological context. The burial chamber in plan was a quadrangular pit with rounded corners, 4.3–4.6 m long, 2.65–2.75 m wide, oriented with its long axis along the north-south line, and covered with wide wooden planks. A horse grave chamber was attached to one of the corners of the main one. The burial was robbed, only individual bones of the buried remained.

The large size of the burial chamber indicated that it was intended for two deceased people. Based on the results of the study of anthropological material and DNA analysis of dental samples⁹ taken from the northern part of the grave, it was deter-

⁸ By the time it was found, it was broken off from the disc; the metal was corroded.

⁹ Definition by Dr. Hab. of Biology O. M. Utevska.



Fig. 3. Bimetallic mirror from the barrow no. 2/2020: 1 — general view; 2 — fragments of the reverse (a) and front (b) sides of the bronze disc (enlarged), photo by I. B. Shramko

mined that one of the buried was a woman. It can be assumed that the mirror, iron awl, and moulded ware (a storage jar, a scoop and a cup) found in the eastern part of the grave were intended for her. The

mirror is recorded at the point of 1.58–1.62 m from the benchmark (the bottom of the grave).

The objects we attributed to the “male set” (an iron armour, a quiver set, horse bridle parts,

an iron dagger, metal knives, etc.) were found in the western part of the grave. Taking into account the entire set of the items, we previously dated the complex quite broadly, within the first half of the 6th century BC (Шрамко, Задніков 2021, с. 14), but the more probable date for the burial is the first quarter of the century¹⁰.

Mirror from the **barrow no. 2/2019**¹¹, located in the southern part of the Skorobir burial ground (fig. 1), in the “Siome Pole” (“Seventh Field” — in English) area.

Item description. Bimetallic, composite (fig. 4: 1, 2). On the flat bronze disc (without a rim) on both sides there are clear traces of an iron rectangular handle (fig. 4: 1a–b), which has been partially preserved (fig. 4: 2). The handle was connected to the disc using rivets. On the surface of the disc, on one side, there were fabric imprints (fig. 4: 3).

Total length of the object — 29 cm, diameter of the disc — 13.7 cm, thickness — 0.2 cm; the iron handle has been preserved for a length of 14 cm, had a maximum width of — 2.1 cm, thickness — 0.9 cm; weight of the mirror — 281 g.

Archaeological context. The object was found at the bottom of a burial chamber that had a rectangular shape in plan (4.75 × 4.40 m) and was oriented according to the cardinal points with a slight deviation to the north-west. The wooden tomb measured 3.8 × 4.6 m. The burial was not robbed. At the bottom of the grave, at a depth of 1.25 m from the level of the buried ground, on the wooden floorboards, the skeletal remains of a young female¹² were preserved, who was laid on her back, head to the west. On the bones of the skull there were gold plaques from a headdress; in the head area — gold temple earrings, in the sternum and arms area — metal bracelets, a necklace made of semi-precious stones, amber, an Egyptian amulet and a faience bead, iron pins, and the remains of a leather bag (Shramko, Tarasenko 2022, p. 145, fig. 3, Shramko 2024, p. 16–20, fig. 7–8). To the right of the skull there was a mirror with the remains of a wooden case (fig. 4: 3–4), in-

tended for a young woman who belonged to the local elite (Shramko 2024, p. 24–25). The set of items was complemented by a stone dish, moulded ware, and clay spindle whorls. Moreover, parts of a horse bridle and weapons were left in the south-east corner of the grave. According to the accompanying inventory, the complex is dated to the second quarter — mid-6th century BC (Шрамко, Задніков 2020, с. 12–13; Shramko 2024, p. 15). The chronology of the burial is determined by the types of bone bit shanks and a quiver set, in which points with a tower-shaped head predominate quantitatively, as well as an iron akinak, similar to that found in the Shumeiko barrow of the second quarter of the 6th century BC (Гречко 2012, с. 92; Полідович 2019, с. 326–328; Топал 2021, с. 139–143) and barrow no. 377 of the Mamai Hora burial ground (Андрух, Тощев 2022, с. 410, рис. 3: 1–3) of the same time.

Bimetallic Mirrors with a Flat Disc and a Side Handle Decorated in the Scythian Animal Style.

Represented by a single item found in the **barrow no. 2/1965**¹³ (fig. 5: 1), located in the southern part of the burial ground, in the “Siome Pole” area (fig. 1).

Item description. A composite, flat bronze disc without a rim. The iron handle is attached to the disc with two rivets. The end of the handle is decorated with a cast bronze figure of a panther. The panther is connected to the handle by a bronze holder/muff (fig. 5: 2–3), which also served as a stand for the predator.

The panther is made in the Scythian animal style. In general terms, it resembles the famous Kelermes panther, but has certain differences. The animal is shown with bent legs (with the centre of balance of the figure shifted to the rear). The head is lowered, the neck is tilted forward, the ears are oval in shape, narrowed upwards, the auricles are represented by small longitudinal vertical recessions. The eyes and nose are represented by round recesses (the eyes are very deep, the nostrils are approximately the same size, but asymmetrically located) (fig. 5: 3, 4). The half-open maw is represented by an angular recess, which in profile has a triangular shape (fig. 5: 4 a–b, d). In general, the lower part of the muzzle is flat, and the lower jaw almost touches the front, half-bent legs at the elbows, however, still separated, (fig. 5: 3).

The body has an elongated shape, round in cross-section. Its overall elegance and conventionality are notable, with a noticeable widening

¹⁰ Some objects (square-shaped gold plaques) from the burial have analogues in a nearby barrow from the first quarter of the 6th century BC, inv. no. 1/2016 (Шрамко 2017, с. 377–378, рис. 7: 4–5; Shramko 2024, p. 12, fig. 5), while (a bone buckle from a horse bridle) have a direct analogy in one of the early Scythian mounds of Trans-Cuban, (Петренко, Маслов, Канторович 2000, с. 241, рис. 3, 4: 5), dated no earlier than the turn of the 7th–6th centuries BC (Петренко, Маслов, Канторович 2000, с. 246).

¹¹ Repository of the Historical and Cultural Reserve “Bilsk”, inv. no. A 469/59, excavations by I. B. Shramko.

¹² Definition by PhD in Medicine A. V. Artemiev.

¹³ Stored in the Repository of the Museum of Archaeology of the V. N. Karazin Kharkiv National University, inv. no. 6438, excavations by B. A. Shramko.



Fig. 4. Bimetallic mirror from the barrow no. 2/2019: 1 — general view; 2 — a fragment of an iron handle; 3 — fragments of a disc with a fabric imprint (enlarged); 4 — location of the mirror in the burial; 5 — remains of a wooden case, photo by I. B. Shramko



Fig. 5. Bimetallic mirror from the barrow no. 2/1965: 1 — a field photo of the mirror discovered *in situ*, from the archive of B. A. Shramko; 2 — general view; 3–4 — a bronze figurine of a panther on a stand from different angles, photos by S. A. Zadnikov and I. B. Shramko

at the hips and a tapering at the top of the neck, shoulder girdle, and below, on the abdomen (fig. 5: 4a–c). The hips have a smooth outline, the shoulder is highlighted by a rectangular relief elevation (fig. 5: 3a, 4a–b). On the inner side of the thighs and shoulders, four paws are represented by recessions, but in the lower part they are not separated (fig. 5: 3a). The hind legs are parallel to the elongated body with a tucked thin tail, the end of which is curled into a loop (fig. 5: 4a–b). Stylistic features are the semi-circular ends of the legs and tail. According to some researchers, the animal's paws end in stylised bird heads with curled beaks (Шрамко 1976, с. 199, рис. 3: 14; Кузнецова 2010, с. 186; Полідович 2025, с. 326).

Total length of the mirror — 29 cm¹⁴, disc with the preserved part of the handle — 19.7 cm, diameter of the disc — 13.2 cm, thickness — 0.2 cm, length of the fragment of the iron handle — 6.5 cm, width — 2.7 cm, thickness — 0.5 cm. The length of the panther figure — 5.5 cm, height — 3 cm, thickness — 1.4 cm, height of the bronze stand — 5.1 cm, width — 2.5 cm (table 1). The total weight of the object with the remains of the iron handle — 265 g. The weight of the disc — 173 g, the panther figure with the stand — 70 g.

Archaeological context. The mirror has been published first in the context of a funerary complex relatively recently (Шрамко 1994, с. 102–126). The burial turned out to be intact, not robbed, despite the presence of gold objects in it. The grave was a simple rectangular pit (1.5 × 2.0 m) with a wooden top cover, 0.5 m deep from the level of the buried ground. A small bronze pin and a glass necklace with gold beads were found around the neck and chest of the deceased, and a bronze nail-shaped pin was found on the left, above the shoulder. Remains of bones from sacrificial food and a knife were found to the right of the deceased. Against the right humerus was a bimetallic mirror, next to which there was a black-polished cup with a prominent edge decorated with oblique notches, two pieces of realgar, and a piece of sulfur.

The unusualness of this burial lies in the presence of an ash-hill, which was discovered a few metres north-west of the burial pit (Шрамко 1994, с. 103). Based on the remains of burnt straw and grains of various cereals found in the ash-hill, as well as cult clay models of grains, and some other features of the

ritual, the complex was interpreted as the burial of a priestess associated with agricultural cults (Шрамко 1976, с. 207–208; 1987, с. 145–146).

The object complex (paste beads, small beads, beads made of gold hemispheres, a bronze pin with a biconical head, a black-polished cup decorated with notches along the edge, a fragment of an iron knife) does not give a narrow date, but we have reason to believe that the woman was buried around the middle or at the beginning of the third quarter of the 6th century BC. This date is indicated by the shape and the ornamentation of the black-polished cup, which are similar to the samples of wares found in the filling of one of the dug-outs (ash-hill no. 11, Western Bilsk), the pit of which was abandoned in the second quarter of the 6th century BC and in deposits of the third quarter of the 6th century outside the dwelling (Шрамко Б., Шрамко І., Задніков 2018, с. 139), in household pit no. 17 (ash-hill no. 28, Western Bilsk) together with a tower-shaped arrowhead (Шрамко et al. 2021, с. 368, рис. 10: 10), common for the second quarter — the middle of this century, as well as in the barrow no. 57 (1/2020) of the Skorobir necropolis (Гречко et al. 2021, с. 22, рис. 10) dated to 580/570–560–550 BC (Grechko 2024, p. 70).

In the second half of the 6th century BC, mirrors of a different type spread throughout the territory of the forest-steppe Scythia, one of the variants of which was found in the Skorobir necropolis.

Solid Bronze Mirrors with a Rim and Side Handle Decorated with a Stylised Panther Figure.

Represented by one item discovered in the **barrow no. 1/2017**¹⁵ during the study of the barrow group in the central part of the burial ground (fig. 1), in the “Siome Pole” area (Szramko 2018, p. 25–26).

Item description: solid bronze, assembled from several separately manufactured parts (fig. 6: 1). On the inner surface (with a vertical edge), there is a clear relief semi-oval at the place where the handle is attached, and under the disc there is an oval protrusion that served as a retainer, and on the side of the mirror surface, the transition from the disc to the handle is smooth, forming one line with it, without a ledge. The end of the handle opposite the disc is decorated with a cast stylised figure of a panther with an elongated body with thin, half-bent legs, a tilted head, a rounded ear, a straight back and a lowered tail (fig. 6: 2). The rump and tail of the animal are almost not

¹⁴ Unfortunately, the iron part of the handle was preserved only in fragments, so the overall size of the mirror and the length of the handle were determined from a field photograph of the object recorded in situ (fig. 5: 1).

¹⁵ The item is stored in the Repository of the Historical and Cultural Reserve “Bilsk”, inv. no. A453/152, excavations by I. B. Shramko.



Fig. 6. Solid bronze mirror from the barrow no. 1/2017: 1 — general view; 2 — a bronze figurine of a panther on a stand; 3 — fragments of a disc with a rim (enlarged), photo by S. A. Zadnikov and I. B. Shramko

separated, the limbs are transferred conditionally, and do not have ring endings. The ear, forehead, mouth, and tail are accented with small triangular indentations made with a tool from an already cast figure mounted on a smooth, unprofiled base (fig. 6: 2a–c). From the front, the animal's head is turned to the left. In cross-section, the mirror handle is embossed, with three slightly flattened ribs and longitudinal recesses 0.1–0.2 mm deep. At the point of connection of the pommel with the shaft of the handle, there are visible metal inflows, in the upper part of the handle — traces of forging (fig. 6: 1, 2a, c). They are fixed in an area up to 2.0 cm, where the handle is slightly flattened and noticeably deformed. From the inner side of the rim, parallel lines are drawn around the entire perimeter at a certain angle (fig. 6: 3c). Near the handle, on the inner surface of the disc, there are also visible scratches in the form of several crossed lines (fig. 6: 3d), and on the surface of the disc — radial marks from the abrasive (fig. 6: 3a). On the edge of the partially cut side, up to 0.2–0.3 mm, there is also noticeable metal deformation and a crack (fig. 6: 3d). We should also pay attention to the dent (fig. 6: 3b), which was formed as a result of a blow with a sharp object on the front (outer) side of the mirror — probably traces of a kind of ritual of neutralisation. In some places on the front side (without a rim) of the mirror, the polished surface has been preserved (fig. 6: 1b).

Total length — 32.8 cm, disc diameter — 18.7 cm, rim height — 1.1 cm, near the handle — 0.5–0.8 cm. The handle has a total length of 14.2 cm, width — 2 cm, thickness — 0.4–0.6 cm. The bronze panther figure at the end of the handle has a length of 2.3 cm, width — 0.9 cm, height — 1.8 cm. The figure height — 3.5 cm, length — 5.5 cm. The height of the stand — 0.8 cm, width — 2.3 cm. The stand is not profiled. Mirror weight — 688 g.

Archaeological context. The object was discovered in a burial chamber of sub-square shape, measuring 3.5 × 3.9 m, along the walls of which the remains of a wooden structure were preserved. The tomb was robbed in ancient times; however, the funerary items located along the perimeter were covered by shifted soil at the time of the robbery, as a result of which they survived and this allowed them to be recorded *in situ*. Two people were buried in the grave: a middle-aged man and a young woman¹⁶, who were laid on their

backs, heads facing west. The young woman had ritual objects laid out against the eastern wall of the chamber: moulded Greek tableware, a stone slab, a game set, a horn dish, and a mirror (Шрамко, Задников 2018, с. 9–10). A gold plaque from a headdress was found at the place where the robbers entered. The special status of the buried woman was also indicated by a set of leather goods of Central European manufacture, a set of ritual objects and Greek tableware (Shramko, Zadnikov 2021, p. 136, fig. 12).

We previously dated the burial to the last third of the 6th century BC, but later we were able to narrow down the date based on certain similarities in the features of the funeral rite and the types of some categories of objects with the burial complex discovered in the barrow no. 1/2013, dated to the end of the 6th century BC (Шрамко, Задников 2014, с. 36–38; Шрамко 2016, с. 278). Therefore, in our opinion, the burial in the barrow no. 1/2017 was carried out within the last quarter of the 6th century BC.

Results and Discussion

The earliest in the Skorobir collection is a mirror from the **barrow no. 2/2020**, similar to which was found in the barrow no. 3/1983 near Hladkivshchyna village in the left-bank Dnipro forest-steppe region (Григорьев, Скорый 2012, с. 447–448, рис. 7: 3), which may indicate their existence in a close time range¹⁷, within the first quarter of the 6th century BC. It is more difficult to find close analogies for the mirror from the **barrow no. 2/2019** due to the poor state of preservation of the handle, but in terms of its main features it has certain similarities with the mirror from Severynivka (Смирнова 1961, с. 94, 100, рис. 11; Lifantii, Shelekhan 2016, p. 267). Therefore, mirrors with side iron handles, similar to Skorobir type 1, appear in the Forest-Steppe as early as the beginning — first quarter of the 6th century BC. The early specimens known today do not belong to those that imitated the Corinthian ones (in particular, the “Repiahuvata Mohyla”, tomb no. 2) (Ильинская, Мозолевский, Тереножкин, 1980, с. 48, рис. 20: 3) or the Ar-

¹⁶ Definition by Dr. Hab. of Medicine O. Yu. Vovk. DNA analysis of teeth was carried out by Dr. Hab. of Biology O. M. Utevska.

¹⁷ Both items come from burials dated no later than the first quarter of the 6th century BC (Григорьев, Скорый 2012, с. 447–448, рис. 7: 3, с. 457). They have flat, rimless round bronze discs and long iron handles with extensions at the ends, the design of which differs from those Scythian mirrors that imitate Greek (Corinthian or Argivian) types, dated no earlier than the beginning of the second quarter or the second third of the 6th century BC (Кузнецова 2017a, с. 105; 2017b, с. 474).

give (in particular, barrow no. 20 of the Nartan burial ground) (Батчаев, Барцева, Керемов 1985, табл. 48: 53), as T. M. Kuznetsova drew attention to (Кузнецова 2010, с. 30-31; 2017, с. 105-107) and they probably have a different origin. The idea of using mirrors with a flat disc and a long side handle made of another material could have been borrowed by the nomads in one of the regions of Western Asia (Albenda 1985, p. 4-7), but iron handles were not used in this region, that is, in our case we can see the combination of a flat bronze disc with an iron handle connected by rivets in one of the workshops of the Caucasian region, which worked on behalf of the Scythians. S. Ya. Olhovskiy (Ольговский 2011, с. 174-175) also suggests considering the Ancient East as “one of the possible ways of penetration of mirrors with a side handle into the Northern Black Sea Region”¹⁸.

In addition, at the same time, in the territory of the forest-steppe, there are known cases when broken central handles on rather archaic mirrors¹⁹, common for the 7th century BC, were replaced with side ones. This practice is recorded from the materials of the “Zakhareikova Mohyla” burial mounds in the Middle Dnipro (Ильинская, Мозолевский, Тереножкин 1980, с. 59-60, рис. 36: 3), the burial from Postolivka, and the barrow from Lenkivtsi in the Middle Dnister (Мелюкова 1953, с. 62, рис. 28: 3; Бандрівський 2014, с. 349)²⁰. In both cases, local craftsmen acted in the same way: they cut off part of the rim and attached the side forged iron handle to the disc with metal rivets, that is, to fix the new type of handle, a different, fairly simple technique was used, which actually changed the type of the handle. Later, combined (bimetallic) versions of handles appeared, decorated with additional elements using another method of connecting individual parts. An example of such changes, in our opinion, can be the mirror from the **barrow no. 2/1965** of the Skorobir necropolis, which we attributed to the second type.

The scientific literature has put forward several assumptions regarding the features of this mirror, which is to one degree or another associated with the Ancient Greek tradition, mirrors of the “Olbian

type”²¹ (Кузнецова 2002, с. 204-205; 2010, с. 186, 192, табл. 124; 2021, с. 41, рис. 4; Ольговский 2011, с. 150) or, on the contrary, emphasises that it is not even similar to them (Зуев 2020, с. 286), is seen as an object of Greek import (Шрамко 1987, с. 123) or does not exclude the possibility of its manufacture in the workshops of the Bilsk settlement (Кузнецова 2010, с. 186; Ольговский 2011, с. 150).

In our opinion, in terms of type and design, the Skorobir item is closer to a fairly archaic mirror with a flat, rimless disc, a side handle, decorated with a figure of a predator, found near the city of Maikop in the Northern Caucasus (Смирнов 1964, с. 227, 372, рис. 81: 4). The features of its design indicate a general, local Scythian idea and have rather early parallels that are not related to the Ancient Greek world (Полидович 2010, с. 192-193). The figure of a predator on the mirror no. 2/1965 is connected to an iron handle by a bronze holder that served as a stand.

Mirrors with a flat disc, the iron handle of which was decorated with bronze elements, are quite rare; over the long period of research into the antiquities of the Ukrainian forest-steppe, apart from the Skorobir, they have only been found in burial mounds of a similar time range. They are located on the territory of the left-bank Dnipro forest-steppe region: barrows nos. 449/1889 near Hladkivshchyna village (Галанина 1977, с. 38, 43, табл. 21: 4, 4а) and 6/1899 near Basivka village (Ханенко, Ханенко 1900, с. 8, табл. XLIV: 351; Ильинская 1968, табл. XXX: 3), as well as on the right-bank Dnipro region: no. 447/1904 near Zhuravka village (Бобринской 1905, с. 92-94, рис. 27; Ильинская 1975, с. 26, табл. XII: 20). Iron handles may indicate that they were made in local workshops (Кузнецова 2010, с. 186-189).

Clarification of the dates of these burial complexes demonstrates the existence on the territory of the forest-steppe Scythia of a stable tradition of using bimetallic handles with a coupling

¹⁸ Translated into English by I. B. Shramko.

¹⁹ Such mirrors are recognised as imported ones, made in various workshops in the eastern regions of Eurasia (Барцева 1981, с. 65-67).

²⁰ In our opinion, the date of the complexes does not go beyond the first half, or even the first quarter of the 6th century BC.

²¹ T. M. Kuznetsova (Кузнецова 2010, с. 186) included the mirror in the catalogue of Scythian mirrors, among which it took a special place (2nd variant, species II, type I, subgroup II, groups 5, division II, class II), forming a separate variant of the type (the handle barrel without ornament; at the end there is a figure of an animal). Based on the certain compositional coincidence between the figures of panthers on the handles of mirrors found near the village of Oksiutyntsi in the left-bank Dnipro forest-steppe region, Krymgireevske village in the Northern Caucasus and in the barrow no. 2/1965 of the Skorobir, T. M. Kuznetsova (Кузнецова 2021, с. 41, рис. 4) believes that the latter is a direct replica of mirrors of a different type that came to the forest-steppe from the Caucasus (Кузнецова 2021, с. 44).

connection in a rather narrow chronological range of two quarters of the 6th century BC. Thus, the barrow no. 447 near Zhuravka village, in which a mirror with a flat disc and an iron handle with zoomorphic ends were found (Бобринской 1905, рис. 27), is dated to the third quarter of the 6th century BC (Гречко 2012, с. 80). The date of the barrow no. 449/1889 near Hladkivshchyna village within the second quarter — mid-6th century BC is determined by the presence of an Ionic cup (kylix) in the complex (Гречко 2012, с. 82). Presumably, the third quarter of the 6th century BC²² can also be attributed to the bimetallic mirror from the barrow no. 6/1899 near Basivka village. One of the ends of the iron handle of the latter also has a coupling connection with a decorative pommel, decorated in the Scythian animal style. The connection point of the simple bronze disc with an iron handle is covered on both sides by paired figured overlays with a floral motif²³. Their tight fit to the handle was also ensured by a sleeve end and three bronze rivets — techniques that were widely used by local craftsmen in the second and third quarters of the century²⁴. The attention should be paid to the fact that the connection of the iron handle with the bronze disc using a bronze clip is also recorded on one of the mirrors from the tomb no. 2 of the “Репіяхувата Могила” barrow (Ильинская, Мозолевский, Тереножкин 1980, с. 48, рис. 20: 3).

The use of the famous motif of the Kelermes panther in the design of the Skorobir mirror is not a coincidence, as it was found on other finds from the Bilsk settlement (Shramko, Zadnikov, Pankowski 2023, p. 86, fig. 3), which indicates that it was understandable to the local population and could have been well reproduced by Bilsk craftsmen. Moreover, the similarity of some features in the depiction of the panther on the Skorobir mirror and the panther figures carved on another bone object accidentally found on the territory

of the Western Fortification (Шрамко 1987, с. 88, рис. 38: 10)²⁵.

It is important for us that all of these mirrors have a flat, rimless round disc, and the same idea is applied to the fastening of iron handles: the use of bronze clips. This may indicate the appearance on the territory of the forest-steppe Scythia of another, previously unknown method of connecting individual parts already in the second quarter — mid-6th century BC and its use in the third quarter of the century.

All forest-steppe mirrors of the type under consideration were most likely made in various local workshops, which used fairly simple methods of connecting individual parts with a lateral iron handle, artistically decorated with additional elements, including plant and zoomorphic motifs. Mirrors of the first and second types have flat rimless discs and similar metric characteristics (total length — 27.5–29.7 cm, disc diameter — 13.2–14.7 cm, maximum handle width — 3.4 cm). They also differ significantly from the third type of mirror (disc diameter — 18.7 cm, total length — 32.8 cm, handle width — 2.0 cm), the metric characteristics and appearance of which indicate its belonging to the group of the so-called “Olbian” (Кузнецова 2010, с. 239; 2021, с. 36) or “Scythian” (Скуднова 1962; Полидович 2010 et al.), made entirely of bronze, and a lot more complex in structure and manufacturing technique.

The first case of the discovery of such mirrors in the burial grounds of the Bilsk hillfort was the mirror from the **barrow no. 1/2017** from the Skorobir necropolis. Among the others in the collection, it stands out noticeably for its much larger size and massiveness, as well as for the rather complex way of connecting three separate parts (the disc, the handle, and the panther figurine with the stand) without the help of rivets, some of the features of which were established for similar mirrors (Кузнецова 2002, с. 155, рис. 15; Кузнецова, Оборин 2022, с. 178–180 et al.)

Mirrors similar to Skorobir mirrors are usually separated by researchers, paying attention to the strong stylisation (degeneration) of the panther image and significant stylistic differences from earlier figures, which are placed at the beginning of the typological series (Скуднова 1962; Скржинская 1984; Кузнецова 2002; Полидович 2010; Зувев 2019a; 2020). Mirrors with panthers of a simplified, significantly stylised appearance became widespread on the territory of Scythia main-

²² The Greek vessel from this barrow (Ханенко, Ханенко 1900, с. 8, табл. LIV: 840) was identified by S. A. Zadnikov as an amphora produced in Lesbos in the third quarter of the 6th century BC.

²³ A silver mirror with a similar design for the junction of the side handle and the disc was found in the female burial of 550 BC in Gordion (Young 1951 p. 19, pl. IX, fig. 1).

²⁴ In our opinion, iron handles in these cases are not the result of replacing broken Greek-made mirrors that ended up in the forest-steppe (Ольговский 2011, с. 176–177; 2014, с. 225–227), but were part of the local craftsman's single design when making the mirror. Such an idea for the design of the handle could have arisen under the influence of various factors.

²⁵ Materials from excavations at the Bilsk settlement and its necropolis demonstrate the existence of objects of the Kelermes type at least until the middle of the 6th century BC.

ly in the last quarter — end of the 6th century BC (Дворниченко, Плахов, Очир-Горяева 1997, с. 130, рис. 3; Кузнецова 2002; 2010; Зуев 2019а, с. 106), which is not contradicted by the date of our burial complex proposed by us — the last quarter of the 6th century BC. According to V. Yu. Zuev's observations the bronze mirror from the barrow no. 1/2017 is similar in a number of features to three mirrors found in Berezan (grave no. 309 on the necropolis), in Olbia (burial no. 41/1912), and also to one mirror from the barrow in the Dnipro lower region, which may indicate that the details for them were made by one master, in his opinion, a Borysthenean master (Зуев 2019а, с. 80, 81, 88).

The bronze mirror from the barrow no. 1/2017 can indeed be compared with mirrors originating from the Ancient Greek necropoleis of Olbia and Berezan, which, in our opinion, is not surprising, since, firstly, it was with these Greek centres of the Northern Black Sea Region that the population of the Bilsk settlement maintained stable trade relations: from the third quarter of the 7th century BC they were established with Berezan, and starting from the second half of the 6th century BC — with Olbia (Задніков 2014, 2017). Secondly, in the eastern part of the grave, where a mirror (north-east corner), an amphora of the “Proto-Thasian” type (south-east corner), a grey clay bowl of possibly Olbian production and a lekane's lid (near the eastern wall) were left, which may indirectly indicate the source of the artefact, which is rare for the Bilsk settlement. In favour of such version, the overall size of the mirror and its individual parts, which fully fit into the parameters of bronze mirrors of this type²⁶ found in closed complexes of Olbian polis, which cannot be a coincidence, but only evidence that all these mirrors were made by craftsmen who adhered to certain standards, possessed a complex technique for connecting separately cast parts into a single product, and whose products became widely distributed among the barbarian population of different regions of Europe. We do not exclude that specialised bronze-casting workshops existed on the territory of Olbian polis in the last third of the 6th century BC. Since there is still no clear evidence that such mirrors (Копейкина 1980, 1981) were made in the Borysthenean workshop (Манычев et al. 2004, с. 37-40; Назаров, Кузмищев 2005, с. 180; Крутилов 2005, с. 181-182), we can assume that the mirror of Olbian production was left in the barrow no. 1/2017,

²⁶ M. V. Skrzhyńska drew attention to the constancy of the metric characteristics of “Olbian” mirrors (Скржинская 1984, с. 117).

brought to the site with other imported objects, although, according to A. V. Buiskiykh cannot exclude that various artistic products of the Scythian animal style throughout the Late Archaic period could also have been produced in another, Borysthenean centre of Olbia (Буйских 2015, с. 111). S. Yu. Olhovskiy (2016) suggests that such items were produced in Berezan and Olbia by barbarian craftsmen, where they could have stayed temporarily (Ольговский 2016, с. 197). Although the famous image was highly stylised, such mirrors remained popular in Scythia until the end of the century.

Some features of the manufacture and possible origin of the Skorobir mirrors are indicated by the recipe of the bronze alloy and the elemental composition of the metal used for their casting.

Thus, the mirror from the **barrow no. 2/2020** (table 1: 1) is made of high-tin bronze, to the copper base of which a significant amount of tin (23.8 %) ²⁷ was added with much smaller amount of lead (0.97 %). The main micro-impurities in the metal are tenths and hundredths of a percent (table 1: 1). On the polished, shiny surface, where the amount of tin reaches 33 %, a layer of tin coating of 11.6–12.2 microns thick has been preserved, which suggests that the bronze base of the disc was additionally tinned²⁸, i.e. the mirror was made using a rather complex technology for its time, it is certainly an imported item, presumably brought to the settlement by a nomad and left in the first quarter of the 6th century BC in a paired burial of a warrior and a woman — representatives of the local elite.

Mirror disc from the **barrow no. 2/2019** (table 1: 2) cast from tin bronze. The average tin content in the alloy is about 12.5 % with a small amount of lead (0.29 %). All recorded micro-impurities are mainly represented by tenths (Sb), tenths — hundredths (Zn), and hundredths (As, Ag, Ni, Co) fractions of a percent. In our opinion, the mirror can be considered a product of local craftsmen.

The mirror disc from the **barrow no. 2/1965** (table 1: 3) is made of tin-lead bronze with an average tin content of 18.39 % and lead content of

²⁷ Average value based on analysis results in different locations of the product.

²⁸ An example of the use of tin plating is the objects from a burial ground from the late 9th — early 7th centuries BC in Thessaly (Asderaki, Rehren, Malakasioti 2009, p. 383-389). The technology of tin plating was also used quite early in the Middle East. Tin plating allowed to imitate silver and give the surfaces of objects the appropriate reflective brightness (Yalçın, Gönül 2009, p. 129).

2.8 %. The detected micro-impurities are represented by tenths (Zn, As, P), tenths — hundredths (Fe), and hundredths (Ag, Ni, Co) of a percent.

The holder (stand) is made according to a different recipe — from tin bronze (tin content — 15.34 %, lead — 0.28 %). Among the micro-impurities present in the metal, an increased content of Fe is noticeable, possibly due to the fact that part of the iron rod remained in the coupling. The maximum concentration of Zn, Ag, As, Ni and Co are hundredths, and Sb is tenths of a percent.

The panther figure is also cast from tin bronze, with an average content of Sn — 19.52 %, Pb — 0.43 %. The main trace impurities (Zn, Ag, As, Ni and Co) are presented in hundredths of a percent, Sb — in tenths. Therefore, the holder and the panther figure were presumably cast separately from the same metal and connected by local craftsmen into one product around the middle of the 6th cen-

tury BC, when various simple methods of connecting individual elements had already been known. Traces of metal filling are visible at the point of connection of the predator figure with the bronze holder (stand) (fig. 5: 3). The technique of manufacturing the object, the selection of alloy formulations and the features of the transmitted image of the panther indicate the possibility of manufacturing the mirror by local craftsmen.

A mirror from the **barrow no. 1/2017** was made according to a different recipe. The main micro-impurities in the metal of different parts of the object indicate that the craftsmen used the same raw materials and mainly lead-tin bronze, as shown by the results of analyses carried out by different specialists from several research laboratories (table 1: 4).

For casting the mirror disc, a copper-lead-tin alloy was selected, the tin content of which was

Table 1. Results of the elemental composition of the metal of mirrors found in the burial mounds of the Skorobir necropolis

Site	Sample	Cu	Sn	Pb	Zn	Ag	Sb	As	Fe	Ni	Co	P
1. Barrow No. 2/2020	001. Disk ¹	77,3	21,14	0,92		0,05		+	0,04	0,07		0,46
	003. Disk ¹	73,71	24,76	1,28		0,06		+	0,07	0,04	0,01	
	006. Disk ²	73,0	25,7	0,72	0,19	0,08	<0,18	0,23	<0,05	0,08	<0,03	<0,12
	009. Disk ³	63,507	33,34	1,029	0,289	0,107		0,273	<0,149			1,275
2. Barrow No. 2/2019	011. Disk ¹	78,78	13,97	0,36				+	0,64	0,03	0,02	6,15
	013. Disk ²	86,95	11,03	0,22	0,05	<0,04	<0,17	0,048	0,43	<0,024	0,02	0,55
3. Barrow No. 2/1965	014. Disk ¹	71,37	15,33	2,75		0,05		+	0,82	0,02		0,18
	015. Disk ³	71,655	23,347	3,815	0,246	0,136	0,071	0,412	<0,106			0,142
	016. Disk ²	78,9	16,5	2,08	0,26	0,07	<0,016	0,19	0,08	0,09	<0,03	0,49
	017. Hoop ¹	80,32	14,89	0,34		0,03		+	3,81	0,03		0,33
	019. Hoop ²	81,06	15,78	0,22	0,07	<0,04	<0,16		2,68	<0,023	<0,05	0,037
	020. Figurine ¹	73,71	25,13	0,66		0,06		-	0,17	0,04	0,01	
	021. Figurine ²	73,21	13,90	0,20	0,04	0,03	0,13	0,036	0,09	0,020	0,008	5,40
4. Barrow No. 1/2017	023. Disk ¹	64,43	9,66	25,47				-	0,04	0,03		0,35
	024. Disk ¹	71,5	14,1	14,22				-	0,13		0,02	
	026. Disk ²	52,20	9,4	38,09	0,18	0,04	<0,18	<0,15	<0,05	<0,03	0,01	<0,08
	027. Disk ²	80,69	9,68	9,42	0,18	<0,04	<0,16	<0,09	<0,05	<0,023	0,01	0,03
	028. Handle ¹	50,55	9,32	39,83				-	0,12		0,01	0,12
	031. Handle ²	49,27	8,6	41,61	0,34	<0,05	<0,19	<0,15	<0,05	<0,025	<0,03	0,15
	032. Handle ²	82,6	8,44	8,18	0,19	0,07	<0,15	0,48	<0,05	<0,025	0,020	0,02
	033. Panther ¹	69,48	8,07	22,19					0,07	0,04		0,12
	035. Panther ²	78,07	9,13	12,63	0,09	<0,04	<0,17	<0,10	0,02	<0,03	0,02	<0,08

¹ Analysis carried out in the laboratory of the Institute of Applied Physics of the NAS of Ukraine, Sumy (O. M. Bugay).

² Analysis carried out by T. Yu. Hoshko.

³ Analysis performed in the Elvatech laboratory, Kyiv (D. Ye. Tsvir).

on average 10.7 % with significantly higher average lead content, at 21.8 %. At the same time, in certain areas of the disc, different researchers have equally established various in the quantitative indicators of tin and lead in the metal. In some areas, the amount of tin and lead is almost the same — 9.68 % and 9.42 % or 14.1 % and 14.22 %, respectively, in others — the amount of lead is three to four times higher than the tin content (9.66 % and 25.47 %, or 9.4 % and 38.09 %, respectively)²⁹. This difference is especially noticeable in the analyses of the fluted handle, in which the amount of lead reaches 41.61 % (on average 40.72 %) with a much smaller amount of tin (8.52 %). The half-lock at the point of connection of the disc with the handle is cast from a tin-lead alloy with a tin content of 8.44%, lead – 8.18 %. The figure of the panther together with the stand — from a lead-tin alloy with an average tin content of 8.6 %, lead — 17.41 %. Such a composition has not previously been recorded for mirrors of the Scythian period.

The composition of the mirror metal from the barrow no. 1/2017 is significantly different from the recipe used to make a similar panther figurine from the handle of a mirror found in the filling of a dugout in Berezan (Манычев et al. 2004, с. 40), which may indicate different places of their production.

Interestingly, the metal composition of another “Olbian” mirror, decorated with a stylised ram’s head at the end of the handle, accidentally found on the territory of the Bilsk settlement³⁰, also showed a significant excess of lead (9.12 %)³¹ over tin (2.12 %) in its alloy, which cannot be a coincidence. Mirrors with a ram on the end of the handle from the forest-steppe barrow no. 18 near Machukhy village and the barrow no. 38 in Huli-ai-Horod turned out to be cast according to a different recipe, from tin-lead bronze (Барцева 1981, с. 67). That is, mirrors similar in design could have been made in different workshops.

It is not yet possible to establish the place of manufacture of the Skorobir mirror, but the complexity of the technique of joining individual parts

of the object, similar to other mirrors of this variant (Кузнецова, Оборин 2022), does not allow us to link it with the Bilsk craft centre. With a certain degree of probability, it can be assumed that the artefact could have been made in Olbia, where, unlike Berezan, both variants of mirrors (a panther, a ram on a handle) are known and, probably, at the end of the 6th — beginning of the 5th centuries BC, bronze alloys with a significant amount of lead had already been used (Ольговский 1986, с. 96-97, 102-103). Therefore, we consider the mirror from the barrow no. 1/2017 of the Skorobir necropolis to be an imported object, brought in the last quarter of the 6th century BC to the settlement during stable trade relations between Bilsk and Olbia, which at that time remained the main centre of supply of antique products to the settlement. We assume that in the future, the number of mirrors cast according to the recipe we established will increase, which will help to finally determine the place of their possible production.

Conclusions

Thus, all bronze mirrors discovered in the 6th century BC burial mounds of the Skorobir necropolis have side handles, but belong to different types; have differences in the alloy composition, the technique of joining individual parts, and may be associated with different production centres. They were usually left in the burials of women who had a high social status during their lifetime.

The mirror from the barrow no. 2/2020 is an imported item according to the manufacturing technology, associated with the advancement of nomads from the Northern Caucasus to the Dni-pro left-bank forest-steppe region at the beginning of the 6th century BC. The mirror from the barrow no. 2/2019 of the second quarter of the 6th century BC is simpler in manufacturing and could have already been made by Bilsk craftsmen. Presumably around the middle of the 6th century BC, a bimetallic mirror from the barrow no. 2/1965 was made, the design of which implemented the idea of decorating the handle with animal images of the Scythian art, which was formed under the Kelermes horizon of antiquities, presumably in the Northern Caucasus region. Taking into account the significant production potential of the Bilsk hillfort, the composition of the metal, and the technical features of joining individual parts into a single product, the mirror could have been made by a local craftsman. Therefore, the bimetallic handles were

²⁹ In this case, we can certainly observe zonal liquation of the metal, caused by the uneven distribution of its chemical composition during solidification, since when a significant amount of lead is added, copper-based alloys can form zones of uneven composition at the time of solidification (Мошкова, Рындина 1975, с. 128). First of all, this applies to more massive products, which include cast mirrors.

³⁰ The item is stored in the Repository of the Historical and Cultural Reserve “Bilsk”, inv. no. A433/4.

³¹ XRF analysis was performed by D. Ye. Tsvir.

part of the local craftsman's design under the influence of new ideas, and not the result of repair and replacement of lost elements.

The solid bronze mirror from the barrow no. 1/2017 of the last quarter — end of the 6th century BC belongs to the “Olbian” type of mirrors. The complexity of the alloy composition, the manufacturing technique and the connection of its individual parts give grounds to consider the object imported, made in Olbia and brought to the Bilsk hillfort as part of stable trade relations. Perhaps the name “Olbian” is appropriate for mirrors of this simplified version of the last third — end of the 6th century BC.

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БРОНЗОВІ ДЗЕРКАЛА З ПОХОВАНЬ КУРГАННОГО НЕКРОПОЛЯ СКОРОБІР

Бронзові дзеркала залишаються однією з показових категорій знахідок, що свідчать про міжкультурні контакти, впливи та зв'язки. У похованнях одного з найбільших курганних некрополів Більського городища — Скоробору за довгі роки досліджень знайдено чотири дзеркала, що віднесені авторами до трьох різних типів і хронологічних періодів у межах одного століття. Усі дзеркала були виявлені в похованнях жінок VI ст. до н.е., які за життя мали високий соціальний статус та могли виконувати жрецькі функції.

Три біметалевих дзеркала мають плоскі круглі диски, з'єднані із залізною ручкою заклепками. Найбільш раннім є дзеркало типу 1 з поховання кочовика першої чверті VI ст. до н.е., знайдене в кургані № 2/2020. Археологічний контекст знахідки, рецептура сплаву та складна технологія, застосовані при виготовленні дзеркала, вказують на його імпорتنний характер. Ще одне дзеркало того самого типу походить із непограбованого жіночого поховання другої чверті VI ст. до н.е. (курган 2/2019).

Окремий тип 2 утворює дзеркало з кургану № 2/1965 другої чверті — середини VI ст. до н.е. Воно може бути прикладом впровадження традиції оздоблення ручок дзеркал зооморфними образами в стилі ранньоскіфського мистецтва. Диск дзеркала, фігура пантери келермеського типу та обойма виготовлені окремо, з різних бронзових сплавів та з'єднані із залізною ручкою в єдиний виріб за допомогою заклепок і бронзової обойми. З урахуванням розвиненого бронзолivarного та ковальського виробництва на Більському городищі, дзеркала з курганів № 2/2019 та 2/1965 могли бути виготовлені у місцевих майстернях.

Суцільно-бронзове дзеркало (тип 3) з кургану № 1/2017 останньої чверті — кінця VI ст. до н.е. належить до іншого, так званого “ольвійського” типу, бокову ручку якого прикрашає стилізована фігура пантери на гладкій підставці. Складність техніки з'єднання окремих частин предмета, подібної до інших дзеркал такого варіанта, не дозволяють відносити його до продукції місцевих майстрів. Мідно-свинцево-олов'яний сплав із значним вмістом свинцю, з якого відлито дзеркало з кургану, а також інше “ольвійське” дзеркало зі стилізованою головою барана на кінці ручки, знайденої на Більському городищі непрямо вказують на можливість їх виготовлення в майстернях Ольвійського поліса, скоріше за все, в межах Ольвійського городища, оскільки саме тут, імовірно, наприкінці VI — на

початку V ст. до н.е. майстри використовували значні домішки свинцю як лігатуру, а в ольвійському некрополі відомі дзеркала обох варіантів (з пантерою та бараном), подібних до знайдених у Більську. Дзеркало з кургану № 1/2017 могло бути привезене на городище в межах сталих торговельних відносин між Ольвією та Більськом.

Робота виконана в рамках наукового проєкту «Документування, фіксація та збереження української археологічної спадщини»: «Музейні колекції з некрополів Більського городища — одного з найбільших укріплених поселень початку раннього залізного віку в Східній Європі: збереження, дослідження та публікація в умовах війни» за підтримки стипендіальної дослідницької програми Німецького археологічного інституту (DAI): (01.09–01.12.2024).

К л ю ч о в і с л о в а: бронзові дзеркала, VI ст. до н.е., Дніпровське лісостепове Лівобережжя, Більське городище, некрополь Скоробір.

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