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To cite this article: Mariia V. Dobrovol'skaia, Grigorii L. Zemtsov, Anna V. Mastykova & Mariia B. Mednikova (2015) Female Elite Burial from the Upper Don Hunnic Time Settlement of Mukhino 2: A Bioarcheological Reconstruction, *Anthropology & Archeology of Eurasia*, 54:4, 26-48, DOI: [10.1080/10611959.2015.1114874](https://doi.org/10.1080/10611959.2015.1114874)

To link to this article: <http://dx.doi.org/10.1080/10611959.2015.1114874>



Published online: 25 Oct 2015.



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## **Female Elite Burial from the Upper Don Hunnic Time Settlement of Mukhino 2: A Bioarcheological Reconstruction**

*The article examines female burial 1, discovered at the multiple-layered settlement of Mukhino 2 (Zadonskii raion of Lipetsk oblast) on the left bank of the Snova River not far from where it flows into the Don River. Anthropological research of the skeletal remains has shown that they belong to a woman twenty to twenty-nine years of age. Burial 1 from the Mukhino 2 settlement is accompanied by grave goods typical of burials of*

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Translated by Stephan Lang.

*the “barbarian” nobility in the Hunnic period, indicating a high social rank of the buried woman. Her attire is analogous to cultural traditions of the sedentary population of the Late Antique centers of the northern Black Sea region. Based on the grave goods, the Mukhino entombment can be dated to the end of the D2 period through the beginning of the D2/D3 in the “barbarian” European chronology, approximately the years 430–50. Morphological characterization of the postcranial skeleton suggests her refinement. Comparison with previously examined Sarmatian and Alanic female samples from the “elite rafts” of the Klin-Iar complex helps to identify certain similar features. It has been established from isotopic and elemental analysis data that animal proteins did not predominate in the buried woman’s dietary structure, while plants of the C4 photosynthesis type (millet?) comprised a considerable portion, indicating a sedentary lifestyle. This assumption finds additional corroboration in the results of paleobotanical research on regional finds. Skeletal remains reveal a complex of features pointing to a possible southern origin for the buried woman.*

“Princely” finds from the Hunnic time in Eastern Europe in many ways recall complexes from Central and Western Europe of the Untersiebenbrunn horizon. This is the D2 period of the “barbarian” European chronology, using the common European chronology of Barbaricum (see Godlowski 1970; Shchukin et al., 2006; Terjal 1988, 1997, 2007). This corresponds to the years 380–400 through 440–50 [current era]. To these we can add the affluent burial 1, discovered in 2002 at the settlement of Mukhino 2 on the Upper Don in Lipetsk oblast.<sup>1</sup> (Mastykova and Zemtsov 2014; Zemtsov 2003, 2004) (see Figure 1).

Current capabilities of bioarcheology allow for research to be conducted at the individual level (Buzhilova et al., 1998). Methods of bioarcheological reconstruction offer an opportunity to comprehensively describe the morphological characteristics of an individual and to reconstruct peculiarities of health, physical stresses, and more. Work with fragments is a separate methodological task. Parallel use of many methodologies allows for fragmentary data from different programs to be corroborated. In this sense, entombment 1 at the Mukhino 2 settlement is of significant interest.

### **The archeological context of the find**

The most interesting materials from the era of the Great Migration of Peoples in the basin of the Upper Don were discovered on the territory

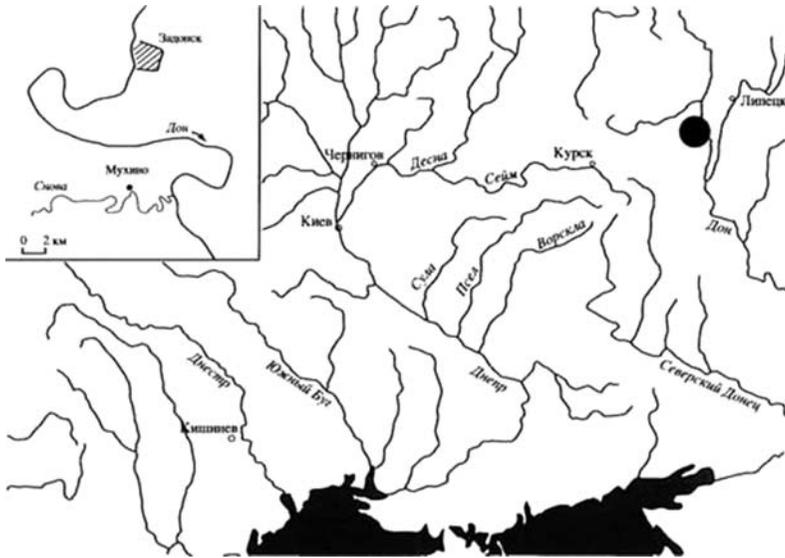


Figure 1. Geographic Location of Mukhino 2 Settlement on the Upper Don (indicated with dot)

of Ostraiia Luka, near the town of Zadonsk, where the river makes a loop (see Figure 1). These are the settlements of Zamiatino, Kapenka, Ksizovo, and Mukhino.

The settlement of Mukhino 2 is dated to the end of the fourth century through the beginning of the sixth; 2,100 square meters in all have been exposed at the site. Archeobotanical research has shown that the cultural layer is very highly saturated with remnants of grain crops. This can have various explanations: the leading role of crop farming in the economy of the settlement residents, their diet regimen, a deliberate concentration in the settlement of large stocks of grain, and more. Comparison of the paleobotanical spectrums of the settlements of Ostraiia Luka—Ksizovo, Zamiatino, and Mukhino 2—has shown that these finds are very similar in the composition of agricultural crop species. However, Mukhino 2 stands out by having a higher content of millet (62 percent), the main agrocrop species here (Antipina and Lebedeva 2007, pp. 314–16, 322, Figure 5).

### Description of the burial

A detailed description of the circumstances of the burial's discovery is appropriate, to ascertain whether it had been disturbed. The

entombment was discovered by chance. In 2001, an area about 2 meters long was noticed on the profile of an excavation wall, standing out because of its lighter color due to an elevated content of particles of native clay in the dark and light humus layers of the settlement. The contours of a pit were not revealed on the basic floor surface of the excavation. During a second clearing, two molded vessels were found in this area (see Figure 2) in the soil, which did not differ from the native clay. The vessels were situated along a north-to-south line at a distance of 1 meter from one another. Registered next to one of them were sparse inclusions of charcoal and a cluster of animal vertebrae (see Figures 2, 1; 3, 4, 5). Paleozoological analysis conducted by E.V. Dobrovolskaia showed that these were the bones of a young lamb.

A core sample of a control layer was implemented after the vessels were removed, but it did not reveal any finds. In 2002, a partial sampling of the 2001 pit was carried out to get a more exact orientation of the new excavation. A second control layer was removed at the place where the vessels had been registered and a clearing conducted at this level. This revealed vague contours of a burial pit oriented along a north-to-south line. Thus both vessels discovered in 2001 belonged to one burial complex: the molded pitcher (vessel 2) lay beyond the confines of the northeastern corner of the grave discovered lower down (see Figure 3, 1), while the molded pot (vessel 1) was situated above the femoral bones of the buried person (see Figure 3, 4).

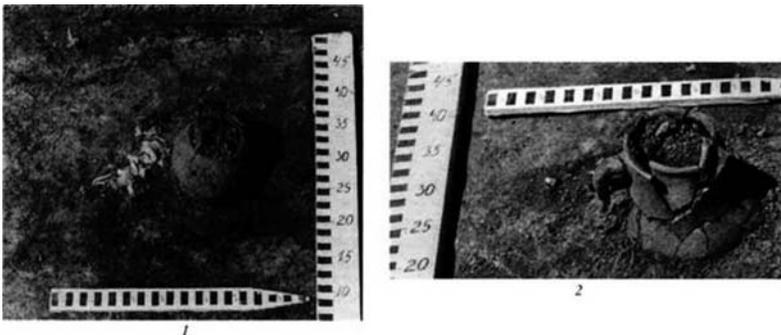


Figure 2. Burial 1 at the Mukhino 2 Settlement. The Moment of Discovery of the Ceramic Vessels. 1—molded pot (vessel 1); 2—molded pitcher (vessel 2). Photo by G.L. Zemtsov

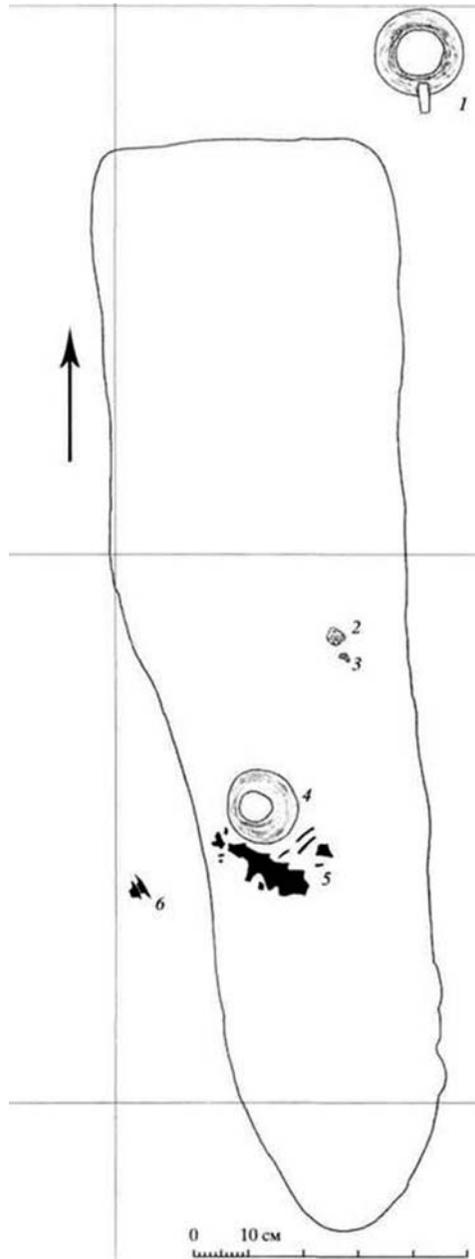


Figure 3. Burial 1 at the Mukhino 2 Settlement. Upper Layer of Burial Pit Infill. 1—molded pitcher; 2—stone with relics of fossilized colonial coral; 3—pieces of chalk; 4—molded pot; 5, 6—animal bones

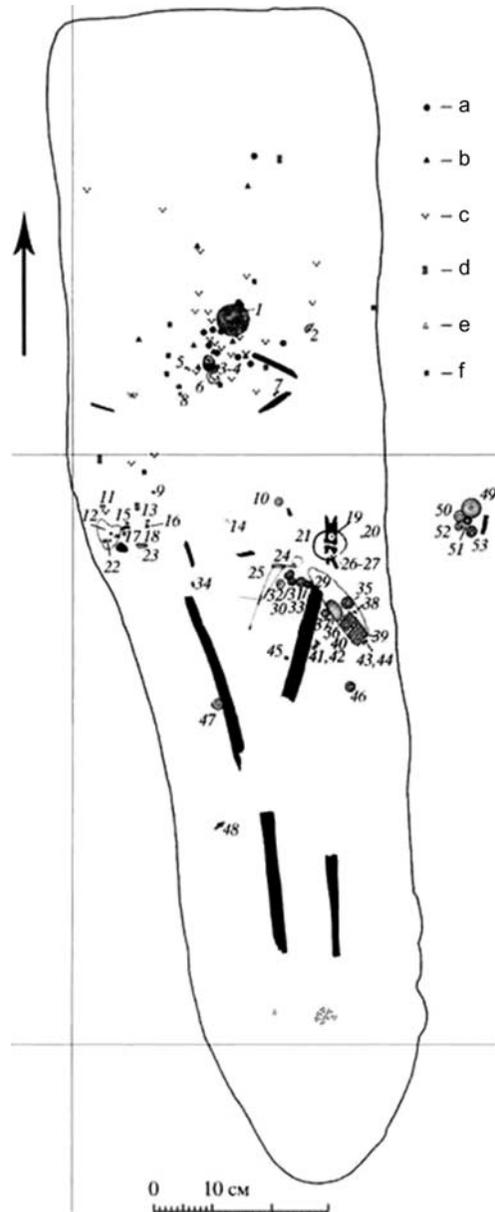


Figure 4. General Plan of Burial 1 at the Mukhino 2 Settlement. 1—mirror; 2—fragmented gold foil object with relief ornamentation; 3, 4, 8, 10, 28, 30–33, 35–37, 46, 47, 49–53—beads [*businy*]; 5 fragment of smooth gold lining with folds traced out with a die; 6—pendant-lunula; 7, 9, 11, 13, 15, 16, 39, 43, 45—gold foil linings with lamellate decoration; 12—wood with fragments of gold foil lining with lamellate

The next level of registration of finds was 10–14 centimeters above the level at which the skeleton was deposited. Discovered at this depth, closer to the eastern wall of the pit, were five small pieces of chalk and a small stone with relics of fossilized colonial coral (determination by Candidate of Geological Mineral Sciences M.E. Generalov, RAS A.E. Fersman Mineralogical Museum) (see Figure 3, 2, 3). Uncovered further to the west of the contours of the burial pit that had been traced lower down, at a distance of 35 centimeters from the molded pot discovered earlier, were two vertebrae of a young lamb (see Figure 3, 6).

Burial by ritual inhumation was in a pit of irregular rectangular form. The pit was infilled with native clay with sparse inclusions of humus and charcoal. The quantity of carbonaceous inclusions increased with depth; a layer of charcoal 1–1.5 centimeters thick was registered at the bottom. More clearly defined stripes of charcoal accumulations were noticed in some places—perhaps the traces of half-beams. A poorly preserved human skeleton and grave goods were discovered on the carbonaceous stratum (see Figures 4 and 5).

The skeleton lay in anatomically correct order (see Figure 5). The skull has not been preserved; however, eight upper and lower teeth have been registered; six of them lay in the area of the chest in a cluster together with beads, a mirror, a lunula, and numerous gold appliqué-plaques [*bliashkami-applikatsiiami*]; two teeth were found a bit to the side: one not far from this cluster under the eastern wall of the grave, the second in the area of the right hand.

Several bones were discovered in the center of the northern part of the grave pit, at chest level—a fragment of a sternum (under a mirror) and a fragment of the diaphysis of a destroyed tubular bone.

The proximal phalanx of the right thumb, a fragment of the upper epiphysis of the thigh bone, and an unidentifiable fragment of a long

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decoration; 14—fragment of metal onlay with two posts; 17, 22, 23—rivets with remnants of wood; 18, 19, 26, 27, 38—fragments of clips and plates; 20—decorative socket-onlay (?); 21—bracelet; 24—tweezers; 25—toiletry kit; 29—remnants of wooden scabbard and iron knife inside it; 44—wood fragment; 34, 41, 42—small fragments of plates; 40—post; 48—smooth gold plate of rectangular form with wood fragment. 1, 6, 14, 17 19, 21–27, 34, 38, 40–42—metal; 20—carnelian, metal; 2, 5, 7, 9, 11, 13, 15, 16. 39, 43, 45, 48—gold; 3, 4, 8, 10, 28, 30–33, 35, 37, 46, 51–53—glass; 36, 47, 49, 50—amber. Legend: a—plaque of rounded form with embossing; b—plaque of triangular form with embossing; c—plaque of zigzag-like form with embossing; d—bead [*proniz'*]; e—plaque of triangular form without embossing; f—tooth, a–e—gold

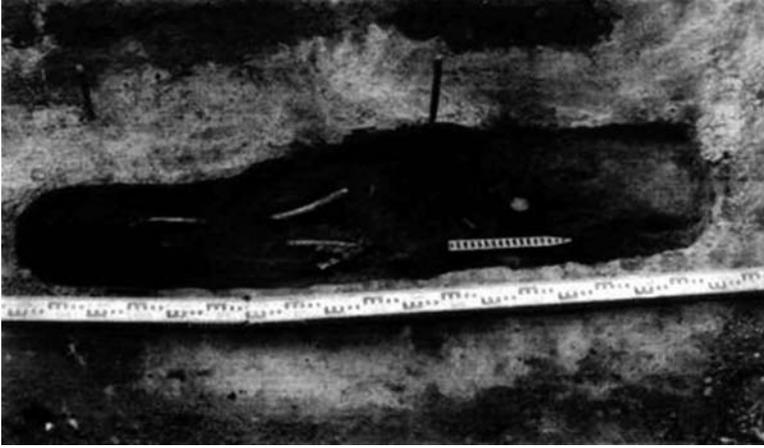


Figure 5. **Photo of Burial 1 at the Mukhino 2 Settlement** (per Zemtsov 2004)

tubular bone were registered by the western wall of the grave, in the area of the right arm.

Discovered in the area of the hips were small unidentifiable fragments of tubular bones and a fragment of a vertebral arch. Here, a bit to the east, in the area of the left arm, lay fragments of three left metacarpal bones, carpal bones, and the distal epiphysis of the left radial bone.

The leg bones were best preserved. The right and left thigh bones came closer together at the level of the knees; the shins lay parallel [to one another] (see [Figure 5](#)).

Judging from the arrangement of the bones, the buried person lay in an outstretched position and was oriented strictly along a north-to-south line, with the head to the north.

Based on the location of the bone remnants at the eastern wall, the left arm was situated lengthwise along the side of the body. Individual bones next to the western wall bear witness to the location here of the other arm, which was probably extended, like the left one (see [Figures 4; 5](#)).

### **Grave goods**

The majority of the finds were registered at the bottom of the grave (for greater detail about the grave goods see [Mastykova and Zemtsov 2014](#)). They were concentrated above all in the area of the chest and hands and consisted of several clusters (see [Figure 4](#)).

Identified in the central part of the northern half of the burial pit, in the area of the buried person's chest, was the *first cluster of finds*. Also discovered here, as already noted, were a fragment of the sternum and six teeth. In this cluster lay a metal mirror, face side up; a tricorn metal pendant-lunula; three glass beads, one with a "gold" metal lining-foil and two blue-violet with overlaid speckled decoration; and a fragment of smooth gold lining with folds traced out with a die (see Figures 4, 1, 3–6, 8; 6, 1, 18; 7, 1–3). Registered in this cluster were the majority of the gold appliqués-plaques of rounded, triangular, and zigzag forms with stamped decoration and little holes for sewing them on (see Figures 4; 6, 8–17). Also found, closer to the northern wall of the grave, were individual gold plaques of rounded, triangular, and zigzag forms, and gold beads in the form of three joined tubules (see Figures 4; 6, 3). Likewise in the area of the chest, between this cluster of finds and the eastern wall of the grave, a fragmented gold foil object with relief ornamentation was uncovered, likely a fragment of a lunula-onlay or the tip of a belt mounting (see Figure 4, 2).

The *second cluster of finds* was registered at the western wall in the central part of the grave (see Figure 4). Judging by the bones discovered

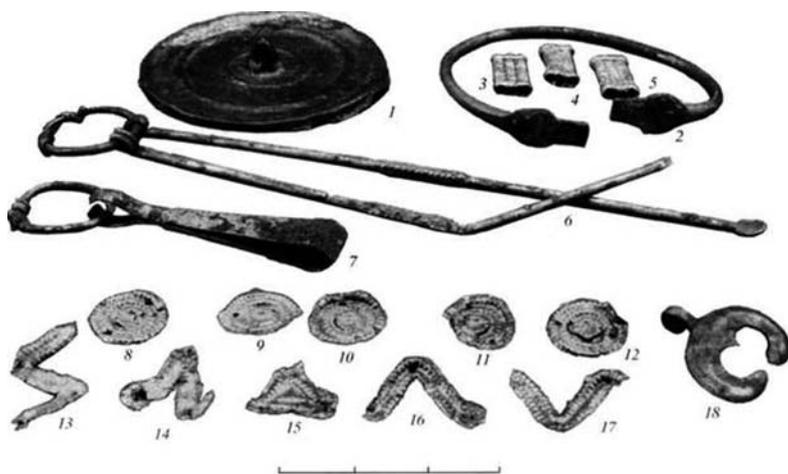


Figure 6. Accompanying Grave Goods from Burial 1 at the Mukhino 2 Settlement (per Zemtsov 2012). 1—mirror with central loop, adorned with relief circles; 2—bracelet with flattened ends; 3–5—beads [*pronizi*] in the form of three joined tubules; 6—toiletry kit consisting of two rods on a wire ring; 7—tweezers with enlarged ends on a wire ring; 8–17—plaques of rounded, triangular, and zigzag-like forms with stamped decoration; 18—tricorn pendant-lunula. 1, 2, 6, 7, 18—metal; 3–5, 8–17—gold

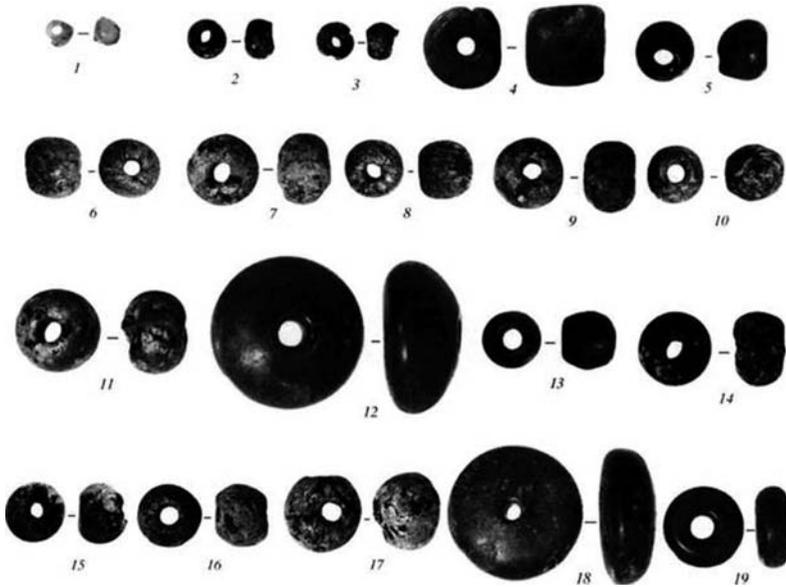


Figure 7. Beads from Burial 1 at the Mukhino 2 Settlement. 1–3, 5–11, 13–17—glass; 4, 12, 18, 19—amber. Photo by S.V. Ol'khovskii

there, this had been the location of the right arm. Discovered among the finds in this cluster were remnants of a wooden article approximately  $4 \times 5$  centimeters (see Figure 4, 12). Here too were registered several fragments of different sizes of gold foil lining with lamellar decoration (see Figure 4, 9, 11, 13, 15, 16). Alongside them were metal rivets preserved on small wooden fragments, an elongated metal plate of rectangular form and fragments of small plates or clips of rectangular forms (see Figure 4, 17, 18, 22, 23, 34). To the side, between the right and left thigh bones, lay a fragment of a metal onlay with two posts (see Figure 4, 14). It is possible that all these fragments were part of a wooden article with metal components, for example a jewelry box faced with a thin gold foil lining with lamellar decoration. Also found in this cluster were another three fragments of zigzag sew-on gold foil plaques, two gold beads [*pronizi*] in the form of three joined tubules, and a tooth from the lower jaw (see Figures 4; 6, 4, 5). An amber bead [*busina*] of cylindrical form was uncovered under the buried person's right thigh bone, below the bottom of the grave pit (see Figures 4, 47; 7, 4). A bit further away, on the right side of the right tibia, on a small fragment of wood lay a small smooth gold plate without decoration ( $24 \times 6$

millimeters), rectangular with little holes at opposite ends (see [Figure 4, 48](#)). It cannot be ruled out that this gold plate and the fragment of unornamented gold lining with folds found in the first cluster on the chest (see [Figure 4, 5](#)) were part of a “jewelry box.” Such a “dispersion” of the objects may reflect the intensity of taphonomic processes.

The *third cluster of finds* was established at the eastern wall in the central part of the grave, alongside the bones of the left carpus and the thigh bone (see [Figure 4](#)). A metal bracelet lay on the bones of the carpus of the buried person (see [Figures 4, 21; 6, 2](#)). Slightly to the side of the bracelet was one monochrome brown glass bead (see [Figures 4, 10; 7, 5](#)). On the right side of the left thigh bone (practically between the left and right thigh bones) lay a metal toiletry kit and metal tweezers on wire rings with twisted ends ([Figures 4, 24, 25; 6, 6, 7; 8](#)). Discovered alongside were five glass beads lying almost in a single line, in which mosaic and speckled beads alternated (see [Figures 4, 28, 30–33; 7, 6–10; 8](#)). On the left side, at an angle to the left thigh bone, were the remnants of a rectangular wooden scabbard of 4 × 15.7 centimeters, inside which lay a 13.8 centimeter long iron knife (see [Figures 4, 29; 8](#)). Registered on the scabbard were fragments of gold foil lining with lamellar decoration (see [Figures 4, 39, 43; 8](#)), similar to the gold linings



**Figure 8. Moment of Clearing of Sector of Entombment Third Cluster of Finds from Burial 1 at the Mukhino 2 Settlement (per Zemtsov 2004)**

from the “jewelry box” found on the right side. Here too, in this cluster, were found a small metal post similar to the posts discovered on the right side, and several small metal fragments—probably small plates and clips of rectangular forms (see [Figure 4, 19, 26, 27, 38, 40–42](#)). On the central part of the scabbard were three beads lying compactly next to each other; two glass (one with speckled decoration and one a brown monochrome) and one very large amber with a disc-like conical form (see [Figures 4, 35–37; 7, 11–13; 8](#)). Closer to the eastern wall lay a decorative socket with a rounded carnelian trimmed with metal (see [Figure 4, 20](#)).

The *fourth cluster of finds* was registered in the southern part of the grave pit, at the feet of the buried person. Here were eight gold foil appliquéés of triangular form without decoration and with little holes for sewing them on; all of them, with the exception of one plaque, lay together (see [Figure 4](#)).

Several beads were uncovered in redeposited condition. A glass bead with speckled decoration was found to the south of the third cluster (see [Figures 4, 46; 7, 14](#)). Five beads—two amber discs and three glass (two with speckled decoration and one millefiori)—were found 0.3 meters to the east of the grave pit in a molehill (see [Figures 4, 49–53; 7, 15–19](#)).

### Origin of the attire

Clearly affluent grave goods are represented in the burial under consideration (see [Figures 6; 7](#)): a large number of gold foil onlays-plaques of rounded, triangular, and zigzag forms; gold beads; an iron knife in a wooden scabbard covered with gold foil lining with lamellar decoration; a metal tricorn lunula, a mirror, a toiletry kit with tweezers, a bracelet with flattened ends in the form of little snake heads; a large number of glass beads—including speckled ones—plus amber beads, and more (see [Mastykova and Zemtsov 2014](#)).

The Mukhino entombment contains practically the same objects as female graves of the mentioned Untersiebenbrunn horizon. Only the paired two-plated fibulas that mark the eastern Germanic tradition and are characteristic of such complexes are not represented here. This circumstance most likely points to a North Pontic origin for the Mukhino garb, where parallels to it are known in the Hunnic time—attire without two-plated fibulas, but with gold onlays-plaques and beads [*pronizkami*]. Examples include: Kerch', tomb 11.1899 g./inhumation 1; crypt 340.1903 g./inhumation 1; crypt 165.1904 g./inhumation 4; crypt

176.1904 g./inhumation 1; and Tanais, burial 10.1981 g., containing a “crossbow” fibula with a foot tied under it (for bibliography see Mastykova 2014).

Female attire with gold appliqués of different forms is typical of Hunnic “barbarian” aristocracy, from the end of the fourth century through the middle of the fifth. Examples extend to the territory of the Western Roman Empire, as well as the European Barbaricum. The prototype for the prestigious attire with gold appliqués of the Hunnic barbarian nobility was the garb of the sedentary Hellenized population of the Late Antique centers of the Northern Black Sea Region (for more detail see Mastykova 2014). Apparently the Mukhino attire with gold plaques has Northern Black Sea Region roots. Such an assumption seems likely since the position of the gold appliqués in the Mukhino entombment is analogous to their placement in the Pontic garb (Arsen'eva et al., 2001, pp. 9, 35) (see Figure 4). It is possible that a buried person in the Mukhino entombment was covered with a coverlet embroidered with gold appliqués, as for example in the well-known burial with the Golden Mask on Glinishche, in Kerch' (Butiagin 2009; Sarov 2003, pp. 39–48). But it cannot be ruled out that only the clothing accessories were adorned with appliqués, as in other burials: Kerch', crypt 165.1904 g., inhumation 4 (Shkorpil 1907, p. 48), Hochfelden in Alsace (Hatt 1965, p. 250), Thuburbo-Majus in Tunisia (Eger 2001, pp. 349–76), and others.

### Dating the burial

Analysis of the grave goods allows the given entombment to be dated to the Hunnic time. Based on the presence in this entombment of glass “speckled” beads, A.M. Oblomskii has specified the second third of the fifth century through the beginning of the sixth (Oblomskii 2007, p. 79). This date corresponds with the time of the greatest proliferation of the given type of beads—the D2/D3, D3, and D3/E periods—that is, approximately from the years 430–40 through 500–10 (Mastykova 2004, p. 85; 2009, pp. 112–15; Mastykova and Plokhov 2010, p. 344). The presence in the Mukhino burial of speckled beads (see Figure 7, 2, 3, 7, 9, 11, 14, 15, 17), unknown earlier for the Untersiebenbrunn horizon (period D2), indicates their appearance by the second quarter of the fifth century, although this type of beads emerges in a mass way in antiquities of the Smolin horizon (period D2/D3).

The gold appliqués (Figure 6, 8–17) discovered in the Mukhino burial are characteristic of the Untersiebenbrunn horizon and are

practically unknown in the post-Hunnic time, after the middle of the fifth century. Among authenticated finds it is possible to name only the Danubian burial in Bakodpuszta, most likely from the concluding phase of the “princely” Smolin horizon—period D2/D3, that is, 430–40 through 470–80 (Kishsh [Kiss], 1995, Table 5).

The combination of speckled beads and gold appliqués in the Mukhino burial allows this burial to be dated to the end of the Untersiebenbrunn horizon (period D2: 380–400 through 440–50) or to the beginning of the Smolin horizon that follows it in time (period D2/D3: 430–40 through 470–80)—that is, approximately to 430–50.

### **The burial rite**

Burial 1 in the Mukhino 2 settlement is difficult to compare with other entombments from this time on the territory of the Upper Don River Region since it stands out in the level of affluence of the grave goods—there is no doubt that the buried individual belonged to a privileged group. Therefore the ritual suggested by the given entombment may not coincide with ordinary burials on the territory under consideration. As noted, the skeleton in the Mukhino entombment was poorly preserved. However, the bones that were present lay in anatomically correct order. The location of the objects discovered in the grave corresponded to what was expected: beads, lunula, and pendant in the area of the chest, bracelet on a wrist, and so on.

A.M. Oblomskii’s conjecture that the Mukhino burial was subjected to ritual destruction with the dismemberment of the skeleton appears improbable. In his opinion, “the overwhelming majority of the items” were moved in the process. Subsequently the grave pit was backfilled anew, while “two molded vessels were placed above the bottom and the level where the bones had been deposited” (Oblomskii 2007, pp. 77, 78).

We would like to propose a more considered interpretation of the burial rite. An examination of the anthropological material does not give grounds for such conclusions. The human remains represent all sections of the postcranial skeleton and skull. The finding of teeth from the upper and lower jaws points to the initial presence of a skull in the burial. The circumstance that the teeth of the upper and lower jaws were discovered together in the area of the chest allows a conclusion to be made about the buried person’s pose. The displacement of the teeth of the upper and lower jaws into the area of the ribcage is often caused by an elevated position of the buried person’s head. Absence of cranial bones and of

the facial skeleton may indicate high activity of bacteria, which had destroyed the bone tissue. As is known, saturation with organic compounds contributes to stimulating microorganisms. It cannot be ruled out that the head reposed on a high headrest (a pillow?) with an organic filler.

The term “dismemberment of the body” does not seem appropriate in the given situation. When skeletal remains are expertly examined, a set of concrete diagnostic features is used for describing posthumous manipulations with the body (Pearson 1999). These are absent in the given situation. The presence of displaced items—the beads in the molehill, the isolated tooth in the area of the right hand, and the gold pierced bead [*pronizi*] to the north of the head—reflects the intensity of taphonomic processes associated with the activity of small burrowing mammals. A thesis about the plundering of the grave likewise cannot be confirmed since undisturbed attire is evident, including gold objects.

### **Determination of gender and age**

Found in burial 1 were the remains of a woman twenty to twenty-nine years of age. This is indicated by very small longitudinal and latitudinal dimensions of the postcranial skeleton, the small thickness of the walls of the tubular bones; the low attrition of the enamel on the crowns of the teeth, and the absence of traces of recent attachment of the epiphyses, as well as postdefinitive age-related changes.

### **Morphological characterization**

Morphological measurements of the postcranial skeleton were taken (see [Table 1](#)).

Unfortunately the posthumous destruction of the epiphyses of the long tubular bones deprives us of the opportunity to determine their longitudinal dimensions, and consequently to reconstruct the length of this woman's body. However, the perimeters and diameters of the thigh bone diaphysis indicates extreme diminutiveness. Noteworthy is the acute flatness of the diaphysis of the thigh on the medial-lateral plane. It cannot be ruled out that this was formed under the effect of specific physical loads, such as horseback riding. However, the impossibility of observing the entire complex of features that leave their mark on the skeletons of riders prompts more cautious assessments. The trait may be

Table 1

**Measurement Characterization of Postcranial Remains of Female Skeleton from Burial 1 at the Mukhino 2 Settlement**

Part of skeleton number	size	Measurement in mm
Proximal phalanx of radius 1 of right hand	Length of proximal phalanx	42
Right thigh bone	6. Sagittal diameter of middle of diaphysis	25
	7a. Latitudinal diameter of middle of diaphysis	20
	9. Upper transverse diameter	32.5
	10. Upper sagittal diameter	26.5
	10:9 Platymetric index	81.54
	6:7a Pilastric index	125
	8. Circumference of middle of diaphysis	77
Left radius bone	5. Width of lower epiphysis of radius bone	21

a congenital abnormality. Exterior bone relief, including the pilaster and *linea aspera* of the thigh, is poorly defined.

The refinement of the skeleton from the Mukhino burial finds analogues among some other female entombments from that era, when similar constitutional variants apparently had wide currency. Comparison with previously examined female samples from the “elite rafts” of the Klin-Iar complex helps to identify differences in form along with similarity of common skeletal dimensions. For example, the circumference in the middle of the thigh bone diaphysis of the Mukhino skeleton is close to the average parameters for Alan women and less close to those for Sarmatian women.

### **Reconstruction of the state of health**

The extremely fragmentary preservation of the remains has not allowed markers of physiological stress to be assessed in full measure. But it can be asserted with confidence that enamel hypoplasia is absent—this feature testifies to stresses endured by an adult in childhood. On this basis it can be assumed that the childhood of this woman was

sufficiently untroubled and was not accompanied by short-term stoppages of growth.

The dental condition can probably be considered satisfactory on the whole. Damage from caries, about 1.5 millimeters in diameter, was noted only on one of the seven described tooth crowns (the first lower molar). A microdent in the enamel on the second lower molar testifies to hard objects being chewed.

As noted above, some dimensions of the woman from this burial are so diminutive that they fall outside the range of morphological variability of the Early Iron Age Eurasian steppe population (Mednikova 1995). However, there are no grounds to attribute this diminutiveness to the sum of childhood stresses. On the whole, an absence of pathological features on this female skeleton from burial 1 of the Mukhino 2 settlement can be asserted.

### **Reconstruction of peculiarities of diet**

A quantitative analysis of some chemical elements—indicators of diet—was done to recreate base characteristics of the daily diet using copper, zinc, and strontium. This selection of elements has been tested on numerous materials (Dobrovol'skaia 2005). Concentrations were determined by the atomic absorption method at the Laboratory of Geology and Geochemistry of the Landscape at the Geography faculty of Moscow Pedagogical State University. Determinations were made by Candidates of Biological Sciences L.V. Aleshchukin and E.E. Kulikova. Two samples were selected as objects: the crown of a premolar and the pisiform [postulnar] bone of the left hand. The bad state of preservation of the skeletal fragments did not permit the use of traditional samples for such an analysis (a compact set of bone tissue from the long tubular bones). The results are presented in [Table 2](#).

A priori it was expected that results indicating significant contamination would be obtained. As follows from the data cited, concentrations of copper and zinc in the two objects differ cardinally. We noted that the woman's wrist was adorned with a metal object. Although copper-containing chemical compounds were not noticeable on the surface of the pisiform bone, the extremely high concentrations of copper and zinc reveal posthumous contamination. The high concentration does not come as a surprise, although the anomalously high content of zinc in the bone requires separate discussion. When archeologists have relevant evidence of a tradition of using bronzes with

Table 2

**Concentrations of Chemical Elements in Samples of Skeletal Tissues of the Individual from Burial 1 from the Mukhino 2 Settlement** (in ppm)

Sample	Cu	Zn	Sr
Tooth	10.8	63.9	119.9
Pisiform bone	14315.8	2153.7	125.0

significant additions of zinc, they can assume that an accumulation of zinc can be explained specifically by this. Another possibility is the use of zinc whitening agents. However, the circumstance that the pisiform bone is a part of the hand significantly reduces the probability of the second assumption. In any case, data on concentrations of zinc and copper in the pisiform bone cannot be used for a reconstruction of *intra vitam* characteristics.

The concentration of zinc—a marker of the use of animal food—in the tooth tissues is moderate; there are therefore no grounds to assume that animal proteins predominated in this woman's everyday diet. In the given case, the moderately high concentration of copper does not contain information about specific dietary structure.

Data on concentrations of strontium are widely used for reconstruction of the type of diet and the climate-and-landscape living conditions. Unconditionally, although the fragmentary nature of the data obtained significantly reduces their reliability, we conjecture that the high concentrations of strontium provide evidence that woman lived the greater part of her life in an arid environment, possibly the southern steppes. There is a large probability that the woman resided in more southerly drought-afflicted areas not long before death.

The isotopic analysis that was conducted of the collagen in the bone tissue of the woman's skeletal fragments and in the bone of the young lamb from the entombment permits hypotheses relative to the buried woman's dietary structure and habitat. To show the reproducibility of the results, each sample of isolated collagen was used for a repeat analysis. The delta values for carbon from the animal bone sample (21.1 per mille) differs greatly from the analogous index determined for the human sample (17.6 per mille). This divergence can have several causes. First, the high delta values in the sample from the woman may be associated with active use of plants of the C4 photosynthesis type

(millet) in the diet. Second, higher carbon delta indices for plant and animal tissues are formed in arid conditions. The relatively low delta values for nitrogen (10.5 per mille) point to a moderate proportion of protein food in this woman's diet. On the whole, the values obtained find direct analogues with the isotopic indices obtained for individuals from the elite Sarmatian and Alan entombments of the North Caucasus (Klin-Iar) (Higham et al., 2010, p. 653). The indices for isotope and element composition thus support the hypothesis of a southern origin for the individual to a significant degree. However, these same results do not rule out the possibility that the composition of the bone tissue was determined by local economic patterns.

E.S. Bogomolov conducted analytical research at the A.P. Karpinskii All-Russian Scientific-Research Geological Institute, St. Petersburg, on the correlation of the strontium isotopes Sr 87/86 in the tooth enamel of the buried woman and in the bone tissue of the animal accompanying this burial (see Table 3).

The correlation of isotopes in the tooth enamel comprises  $0.709642 \pm 12$ , and  $0.709737 \pm 10$  in the animal's bone tissue. The slight differences expressed in the isotopic characteristics of the animal and the human may be the result of modest differences in the territory of their habitation. The main question to resolve using data about isotopic composition is whether this woman was a native of the Upper Don or a recent migrant from other regions. Data obtained earlier about the correlations of strontium isotopes in the bone tissue of humans and animals from the Upper Don region (Dobrovol'skaia and Reshetova 2014) give grounds to assume that the expected value is 0.71000–0.71100. Values of 0.70960–0.70970 have been noted for individuals from more southerly regions (Afanas'ev et al., 2014). Thus there are weighty new grounds to consider that at least the childhood of the young

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Table 3

**Results of Isotopic Analysis of Bone Tissue Collagen from Burial 1 at the Mukhino 2 Settlement**

Sample	$\delta^{13}\text{C}$ , ‰	$\delta^{15}\text{N}$ , ‰
Human	– 17.67/– 17.46	10.51/10.46
Juvenile small ruminant subject	– 21.15/– 21.14	8.05/7.96

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woman buried at the Mukhino 2 settlement was spent outside the Upper Don region and that she was probably a native of the south.

Noted in describing the tooth system was the spatulate shape [*lopatoobraznost'*] of the incisors and a similar form for the upper cuspid. As often noted by odontologists, spatulate incisors are encountered much more frequently in Mongoloid populations. However, caution is needed in using this observation in an individual reconstruction.

It is worth noting that this era is marked by the appearance of people of Mongoloid appearance in the Black Sea region and the Lower Don River region starting in the second century CE (Batieva 2011, p. 93). For example, the appearance of people with Mongoloid features was established in groups of the Black Sea region population in the fifth century (Mednikova and Balueva 2009), which could reflect the direction of migrations of the population in that era. Thus, the woman from the Late Roman time (third through fifth centuries) burial 236 at Shirokaia Balka displays a very high and broad face with a relatively low nose, broad and high orbits, small naso-malar angle, and broad forehead (Mednikova and Balueva 2009, p. 124, Figure 14). A combination of large facial skeleton dimensions with less pronounced horizontal facial cambering make one think of Mongoloid admixture, fully consistent with the given historical segment of time. These particularities contrast sharply with the anthropological appearance of the preceding population.

In sum, burial 1 from the Mukhino 2 settlement was accompanied by affluent grave goods, typical for burials of the “barbarian” nobility in the Hunnic time. It is evidence of the high social rank of the buried woman. Her attire gravitates most of all toward the cultural tradition of the sedentary population of the Late Antique centers of the Northern Black Sea region. Based on the combination of grave goods, the Mukhino entombment can be dated to the last phase of the Hunnic period (the 430s–50s).

The data of an anthropological expert examination showed that this woman’s childhood was relatively untroubled. Thanks to isotope and element analyses, it was established that animal proteins did not predominate in her dietary structure. Plants of the C4 photosynthesis type (millet) comprised a considerable portion of the diet, and this can be interpreted as a marker of a sedentary lifestyle. This conclusion finds additional corroboration in the results of paleobotanical research of the sites of this region (Antipina and Lebedeva 2007, p. 322).

High concentration of strontium in the bone samples indicates that most likely this woman was a migrant from more southerly regions and had lived the greater part of her life in conditions of arid landscapes. To corroborate a probably southern origin,  $^{87}\text{Sr}/^{86}\text{Sr}$  isotope correlation data were enlisted to check our hypothesis. Observation and conjecture about the origin and social class of the buried woman that were based exclusively on archeological material thus have been corroborated through the results of bioarcheological research.

## Note

1. A full publication of the materials of this burial is being prepared by the authors.

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