

**THE FOUNDATIONS OF RADIOCARBON  
CHRONOLOGY OF CULTURES BETWEEN  
THE VISTULA AND DNEIPER:  
4000-1000 BC**

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**BALTIC-PONTIC STUDIES**

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## Editor's Foreword

This volume of the *Baltic-Pontic Studies* is a record of investigations carried out under the research project begun earlier in vol. 7 ("The Foundations of radio-carbon chronology of cultures between the Vistula and Dnieper: 3150-1850 BC", Poznań 1999). Here, the approach is broader in terms of chronology and culture. Our purpose has been to fill taxonomic gaps hitherto present in the discussion (supplementing the dating of cultures, groups or phases) or reanalyze the grounds for findings considered particularly controversial. In the latter case, a very enlightening debate was provoked by the comparative chronology of the Yamnaya and Catacomb cultures presented by A.N. Nikolova. We hope that a large series of  $^{14}\text{C}$  dates and a revision of the foundations of "archaeological knowledge" (stratigraphy, typochronology and groups of co-occurrence of traits), brought together in the paper by D.Y. Telegin, S.Z. Pustovalov, N. Kovalyukh, lay the ground for a stabilization of views on this important dividing line in the chronology of the Bronze Age in the Pontic zone.

A vast majority of the new  $^{14}\text{C}$  dates have been obtained under an international research project financed by the Polish Committee for Scientific Research.

## Editorial comment

1. All dates in the B-PS are calibrated [BC; see: Radiocarbon vol.28, 1986, and the next volumes]. Deviations from this rule will be point out in notes [bc].
2. The names of the archaeological cultures and sites are standarized to the English literature on the subject (e.g. M. Gimbutas, J. P. Mallory). In the case of a new term, the author's original name has been retained.
3. The spelling of names of localities having the rank of administrative centres follows official, state, English language cartographic publications (e.g. *Ukraine, scale 1 : 2 000 000*, Kiev: Mapa LTD, edition of 1996; *Rèspublika BELARUS', REVIEW-TOPOGRAPHIC MAP*, scale 1:1 000 000, Minsk: BYELORUSSIAN CARTOGRAPHIC AN GEODETIC ENTERPISE, edition 1993).

Vitaliy V. Otroshchenko

## RADIOCARBON CHRONOLOGY OF THE BILOZERKA CULTURE — BASED ON BARROWS NEAR THE VILLAGE OF ZAPOVITNE (THE “STEPNOY” CEMETERY)

In 1972, the Zaporizhzhia expedition of the Institute of Archaeology of the Academy of Sciences of Ukraine excavated the largest barrow cemetery of the Bilozerka culture on the land of the former Soviet farm “Stepnoy” near the village of Zapovitne, Kamenka-Dniprovska District of the Zaporizhzhia Region (Fig. 1). The publication itself, of selected materials of the excavation [Otroshchenko 1975], provoked substantial resonance in academic circles and stimulated the process of identification of the Bilozerka culture [Otroshchenko 1986]. At that time the radiocarbon dating of samples from the cemetery was performed (Table 1).

Table 1

Zapovitne, Kamenka-Dniprovska District, Zaporizhzhia Region. Old  $^{14}\text{C}$  datings for graves of the “Stepnoy” cemetery

Lab. No.	Barrow / grave	BP	BC
Ki-575	9/1	3050±70	1293±98
Ki-889	11/3	2850±40	977±60
Ki-885	3/1	2805±55	921±71
Ki-887	2/1	2700±45	839±41
Ki-886	15/2 *	2690±50	837±42

Note: \* – or barrow 14 / grave 2.

A general description of the published barrows was done shortly after the excavation [Otroshchenko 1975:193-206]. Subsequently, the first set of dates for the “Stepnoy” was published [Otroshchenko 1981:17]. Materials of the cemetery were used for the first identification and description of the Bilozerka culture [Otrosh-

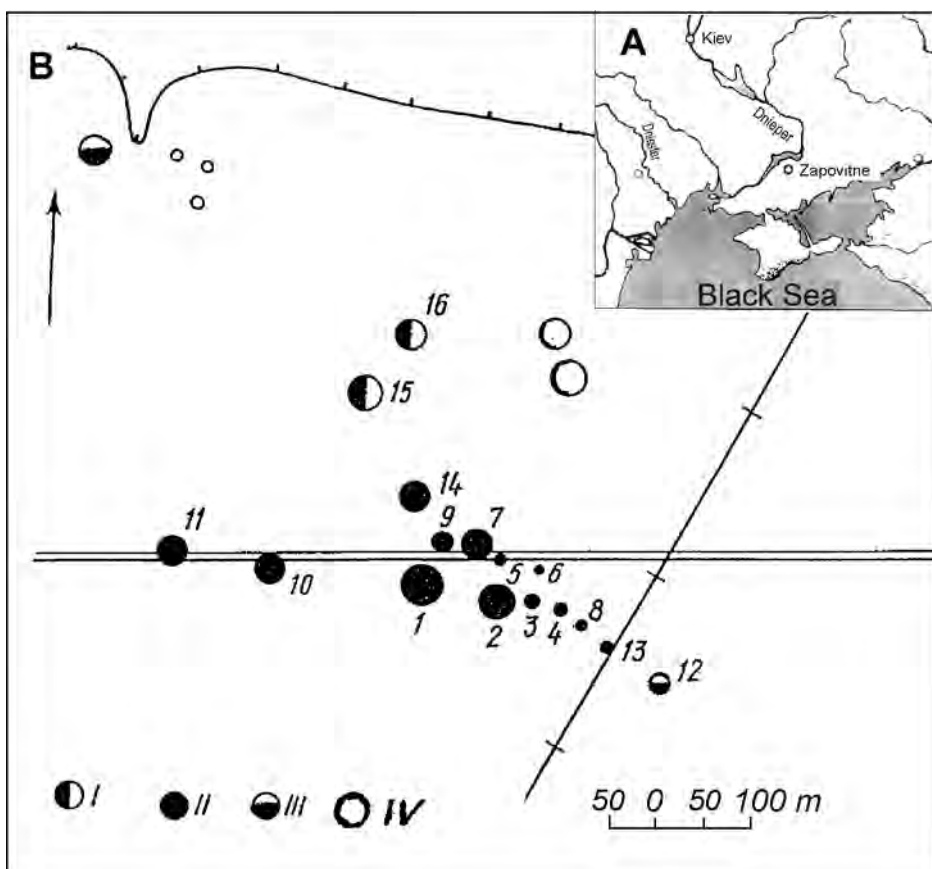


Fig. 1. Location (A) and plan of the barrow group (B) near the village of Zapovitne, Kamenka-Dniprovskaya District, Zaporizhzhia Region. Key: I – barrows of the Mnogovalikovoy Pottery culture; II – barrows of the Bilozerka culture (the “Stepnoy” cemetery); III – Scythian barrows; IV – unresearched barrows

Table 2

Zapovitne, Kamenka-Dniprovskaya District, Zaporizhzhia Region. New  $^{14}\text{C}$  datings for graves of the “Stepnoy” cemetery

Lab. No.	Barrow / grave	BP	BC
Ki-9823	15/2 *	2920±50	1092±83
Ki-9596	3/1	2915±45	1087±78
Ki-9820	9/1	2880±55	1016±89
Ki-9821	11/3	2830±55	962±76
Ki-9822	2/1	2780±55	895±64

Note: \* – or barrow 14 / grave 2.

chenko 1985]. The complex of grave 1 of barrow 3 with a sub-Mycenae fibula was published one year later [Otroshchenko 1986], and barrow 9 was not published until recently [Otroshchenko 2001]. The new dates we have obtained allow us to return to the analysis of materials of the excavation near Zapovitne.

## 1. RECORD OF RADIOCARBON DATED COMPLEXES

Let us consider complexes that have been dated with the use of  $^{14}\text{C}$  methodology and those of non-dated complexes that contain typical archaeological materials.

**Barrow 2** was 2.8 m high and 24 m in diameter (Fig. 1:2)

*Grave 1* was located 1 m to the south of the 0 point. The soil, dug out when the pit had been made, was placed in the shape of a horseshoe along the western, northern and eastern walls (Fig. 2). The entrance to the pit, located at the southern wall (not shielded by the soil) was covered with a fine (up to 0.02 m) layer of reed. The pit was covered with a solid transversal cover made of oak planks of the total size of 5.4 x 4.4 m. The planks were 0.27 m wide and 0.06-0.07 m thick (Fig. 3:1). They rested on the edges of the pit and on two lengthwise beams fastened along the western and eastern walls. Like the planks, the beams were placed crosswise on the pit, but were noticeably shorter than the planks and fully fitted into the opening of the pit. The burial pit — rectangular, with rounded corners — was made 1.9 m deep. The dimensions of the pit were 3.65 m x 3.2 m; it was oriented from north to south. Along the perimeter of the pit, under the wall there was a trench (0.09 — 0.13 m wide, 0.1 m deep). The lower edges of the planks of the wall coating were hammered down 0.15 m to the bottom of the trench. The planks of the wall coating were carefully smoothed and tightly fitted to each other. The location of the planks at the walls was as follows: southern — length 3.15 m, 14 planks; northern — length 3.1 m, 15 planks; western — length 3.35 m, 15 planks; eastern — length 3.65 m, 19 planks (Fig. 3:2-5).

Altogether, 66 planks were used to coat the walls of the burial pit. The side trenches shaped the floor of the pit as a platform (3.45 m x 2.95 m). Its central part was occupied by a rectangle (2.5 m x 2.1 m), limited with four round cylinder holes (Fig. 3:1).

The grave had been robbed. The cleaning of the worn-in cover in the southern part of the pit, at the depth of 1.35 m from the level of buried black soil, displayed a human skull; fragments of a horse skull were found at 1.6 m. Some animal bones were found at the north-western hole. Two bone cylinder-shaped beads (8 mm long, 5 mm in diameter) were found on the wooden planks of the floor that had served as a podium for the dead body (Fig. 2:2).

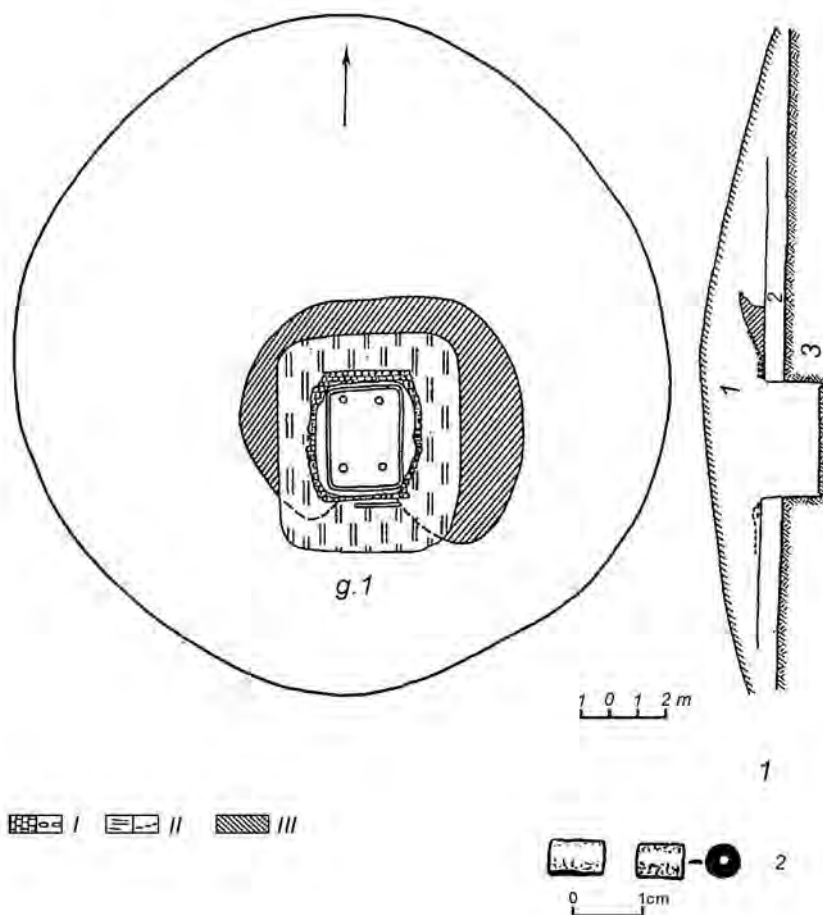


Fig. 2. Barrow 2 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the barrow; 2 – bone beads from grave 1. Key: *I* – wood; *II* – reed; *III* – soil excavated when the grave was dug

$^{14}\text{C}$  dates based on samples of wood were Ki-887:  $839\pm 41$  BC (old), and Ki-9822:  $895\pm 64$  BC (new).

**Barrow 3** was found in 14 m to the east of barrow 2 (Fig. 1). The barrow was 0.4 m high and 22 m in diameter (Fig. 4).

*Grave 1* was found in the centre of the barrow. The square pit with rounded corners was 2.4 m x 2.2 m in size, 1.6 m deep. At the level of 1.5 m there were traces of a worn-in cover that had been made of poplar beams and planks. In the trenches

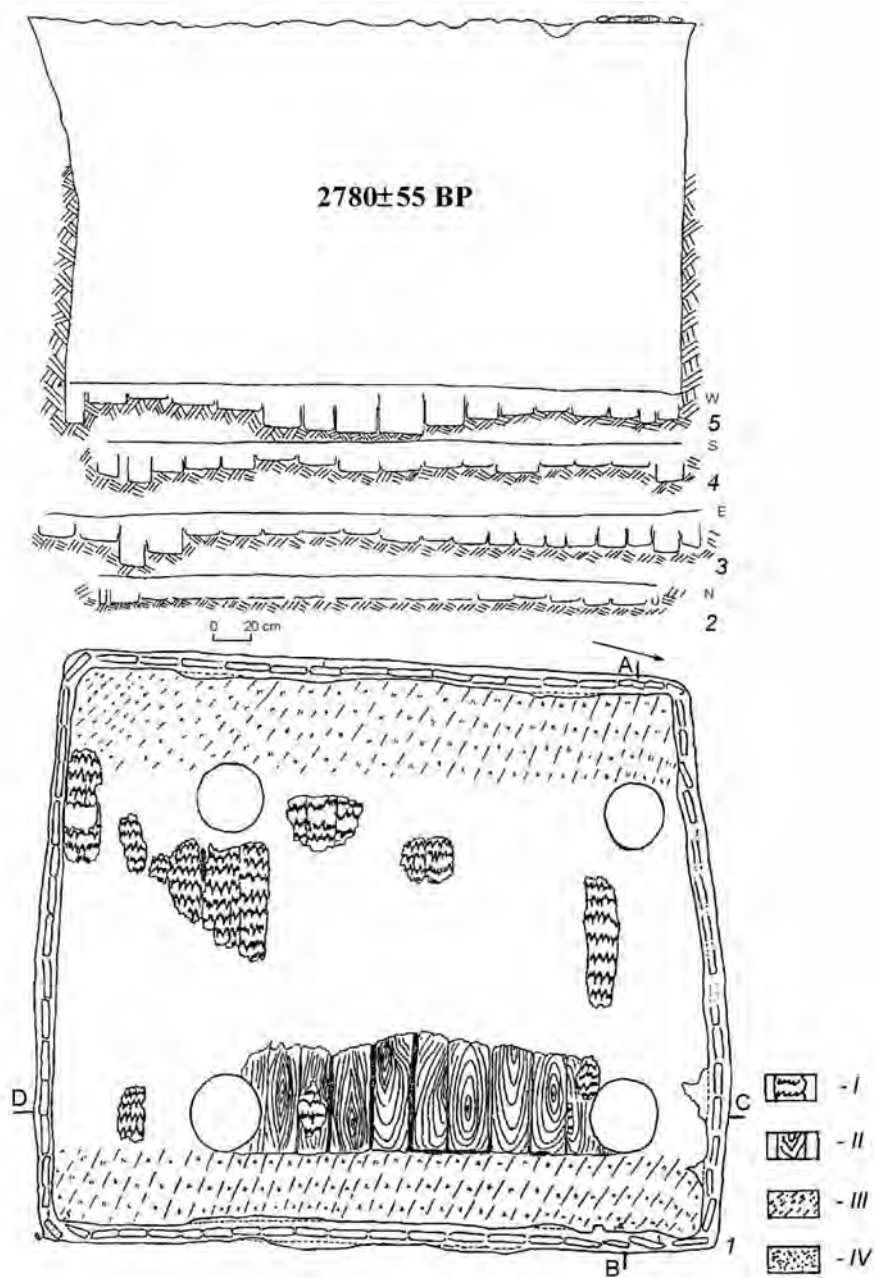


Fig. 3. Barrow 2 near Zapovitne, Zaporizhzhia Region: 1 – plan of grave 1; 2-4 – sections of the northern, eastern and southern trenches; 5 – section along the western wall of the pit. Key: I – planks; II – imprints of the planks on the floor of the pit; III – herbal mat; IV – ochre

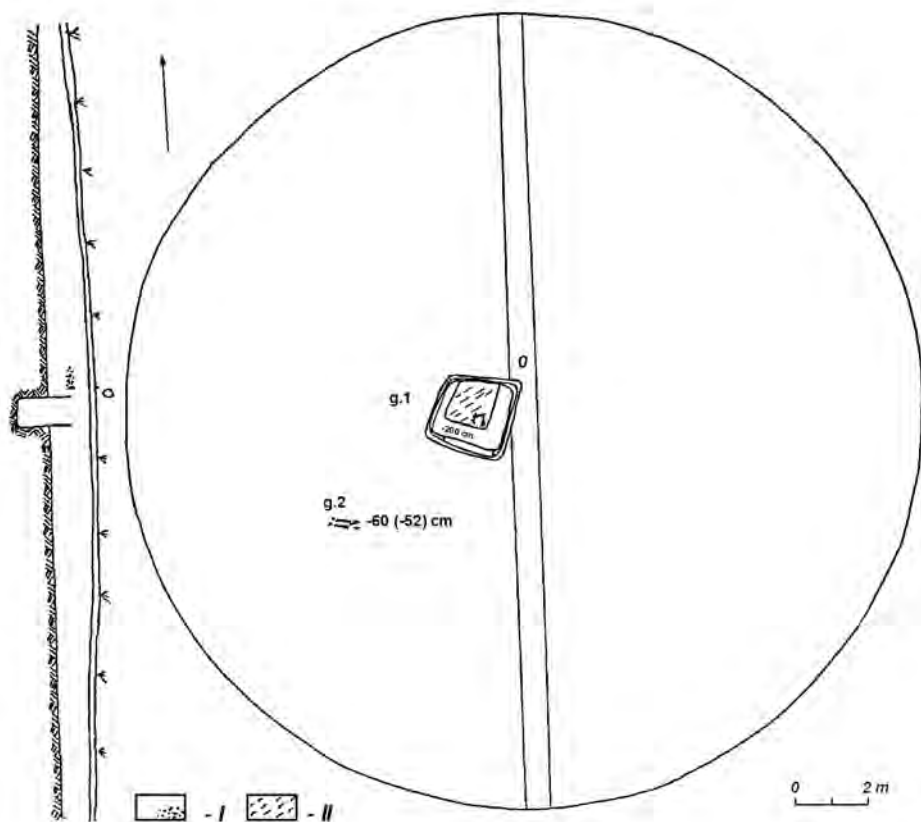


Fig. 4. Plan and section of barrow 3 near Zapovitne, Zaporizhzhia Region. Key: *I* – soil, excavated from the burial pit; *II* – herbal mat

along the perimeter of the pit there were poles that had served as supports for the beams of the cover. The construction of the cover most closely resembles a shed. One of the lengthwise planks was burned from beneath. The presence of the trenches made the bottom of the pit look like a couch or a stepped terrace. A skeleton of a man (aged 20-30 at the time of death; anthropological identification was performed by S.I. Kruts) lay on the eminence in a tightly curved position on the left side, head to the south-west. The skull and leg bones below the knees displayed traces of dark-red paint (Fig. 5:1). In the north-eastern corner of the pit, under a ledge and behind the skull there was a small goblet (1). Under the right knee-cup there was a bronze fibula (2). Behind the pelvic bones there was a round ceramic weaving-stone (3); there were eight glass beads (4) and one amber bead (5) at the

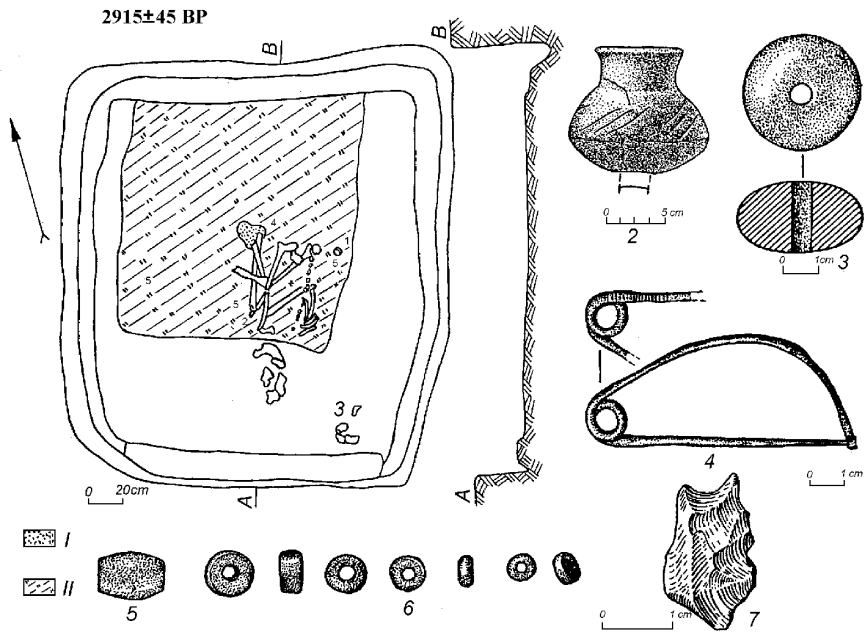


Fig. 5. Barrow 3 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of grave 1; 2-3 – ceramics; 4 – bronze; 5 – amber; 6 – glass; 7 – flint. Key: I – ochre; II – herbal mat

chest and the skull. At the western edge of the mat, opposite the knees, there was a flint splinter (6).

*Description of the finds:*

1. A molded goblet with a cylinder-shaped neck and a concave bottom. The vessel was covered with black polish and decorated with a pair of circular and four groups of inclined cannelures. Each of the groups had three parallel cuts. The vessel was 9 cm high, with the rim of 6.5 cm in diameter; the diameter of the body was 10.5 cm, and the diameter of the bottom was 2.5 cm (Fig. 5:2).

2. A fibula with an arch-shaped back was made out of a piece of bronze wire with a sharpened end of a pin and a narrow stop, hammered flat. The surface of the pin displayed slight faceting; there was also an ornament of crosswise cuts at the place where the back of the fibula transformed into the pin. The length of the pin of the fibula was 7.8 cm, the height of the curve was 3 cm, the diameter of the spring was 1.3 cm, the section of the curve was 0.4 cm, and the section of the needle was 0.2-0.3 cm (Fig. 5:4).

3. A round ceramic weaving-stone with a round hole in the middle. One of the

sides of the hole was framed with two short cuts placed opposite each other. The diameter of the weaving-stone was 3.5 cm, the diameter of the hole was 0.6 cm, and its height was 2.2 cm (Fig. 5:3).

4. Glass beads differed in colour and shape (Fig. 5:6). They included: one dark blue elongated bead (D – 0.6 cm, h – 0.4 cm); seven round beads, including one red (D – 0.6 cm, h – 0.4 cm), two green (D – 0.5 cm, h – 0.35 cm), one yellow (D – 0.4 cm, h – 0.3 cm), three light-brown (D – 0.8 cm, 0.6 cm and 0.45 cm, h – 0.3 cm, 0.2 cm and 0.2 cm).

5. A bi-conical amber bead: h – 1 cm, D at the edges – 0.5 cm, D at the rib – 0.7 cm (Fig. 5:5).

6. A flint splinter in the shape of a short plate with one-sided oblique chops-off, measuring 2.4 cm x 1.3 cm x 0.4 cm (Fig. 5:7).

The <sup>14</sup>C date taken from a wood sample was Ki-885: 921±71 BC (old), and Ki-9823: 1087±78 BC (new).

**Barrow 4** was located 62 m to the east of barrow 2 (Fig. 1). It was 0.35 m high and 18 m in diameter. The mound of the barrow contained fragments of a Polovets statue. The main grave of the barrow was grave 2; there were also ‘dropped-in’ Scythian (3) and Polovets (1) graves (Fig. 6).

*Grave 2* lay 0.8 m to the southeast from the center. The northern part of the burial pit was ruined with the Polovets grave 1. The square burial pit (1.8 m x 1.9 m) had rounded corners. The black soil filling of the pit was filled with fragments of wood from the ruined cover. The bottom of the pit had a complex profile and construction. A “couch” for the dead body (1.0 m wide) was cut 1.2 m deep in the main soil at the centre of the pit along the north-west — south-east axis. To the west and the east from the “couch” there were side trenches (0.5 m and 0.45 m wide and 0.22 m and 0.3 m deep from the level of the grave, respectively). In each of the trenches there were two large round holes that contained thick wooden poles (D – 0.08 m).

Along the perimeter of the pit there were 15 additional small round holes (D – 10–15 cm, up to 10 cm deep), probably for coating the walls of the burial construction. A skeleton of a man aged 25-30 at the time of his death was placed on the “couch” within the square formed by the large holes, in the curved position of the left side, his head to the south. Because the lower part of the skeleton was ruined, it was impossible to identify the positions of the arms and legs. Along the southern edge of the “couch” immediately at the holes of the coating, there was a wooden plank. Another plank was found behind the back of the skeleton along the eastern edge of the “couch”. The bottom of the “couch” was covered with a herbal rug (Fig. 7:1). Under the southern wall of the pit, opposite the back of the skull there was a moulded goblet (1). Next to it there was a lower jaw of an animal. There were two beads behind the back (2).

*Description of the finds:*

1. A goblet — thin-walled, with polished grey-cream surface. The vessel was 12.4

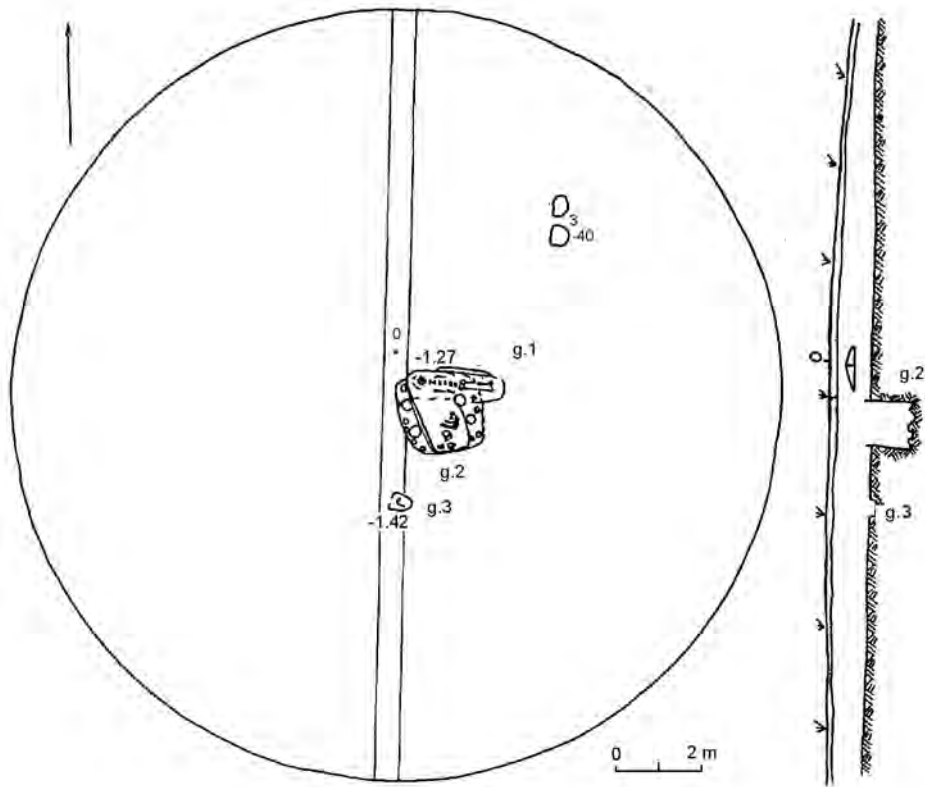


Fig. 6. Plan and section of barrow 4 near Zapovitne, Zaporizhzhia Region

cm high, 7.5 cm in diameter at the rim, 15 cm in diameter at the body and 2.5 cm in diameter at the bottom (Fig. 7:2).

2. Long cylinder-shaped beads (made of bone and amber) — 1 cm long, 0.5 cm in diameter (Fig. 7:3-4).

**Barrow 5** was located in the northern row in 25 km to the northeast of barrow 2 (Fig. 1). The barrow was 0.65 m high and 24 m in diameter. That barrow alone contained two main graves of the Bilozerka culture (Fig. 8).

*Grave 1* was located 1.15 m to the south from the centre. The rectangular pit with rounded corners was 2.1 m x 1.6 m in size, and 0.9 m deep. The black soil filling of the pit contained traces of a vertical coating of the walls, made of thin wooden poles. The polls served as supports for thin wooden crosswise planks. The cover was made inside the pit. The filling of the pit contained occasional pieces of charcoal and fragments of the rim and walls of a polished black goblet with a cylinder-shaped

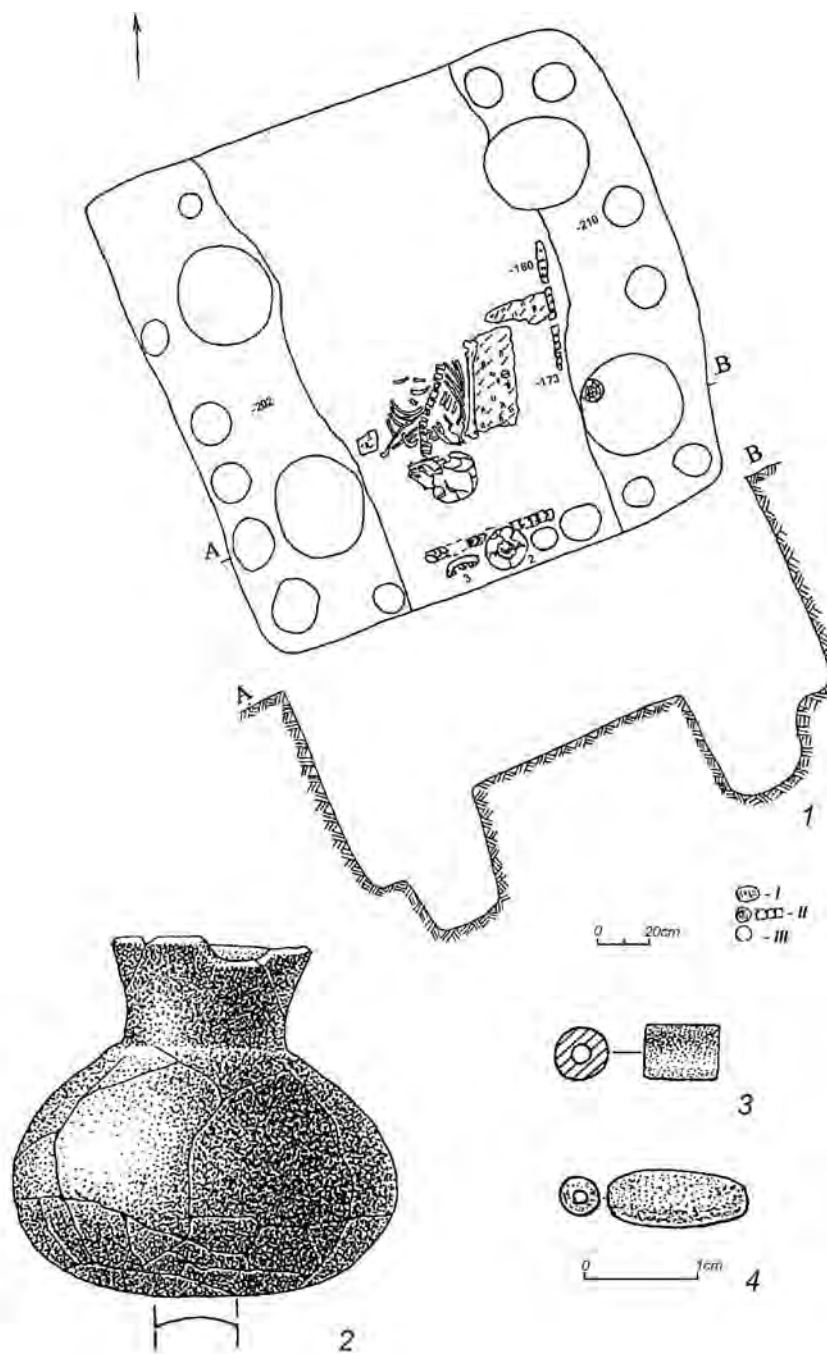


Fig. 7. Barrow 4 near Zapovitne, Zaporizhzhia Region: 1 - plan and section of grave 2; 2 - ceramics; 3 - bone bead; 4 - amber bead. Key: *I* - herbal mat; *II* - wood; *III* - pole hole

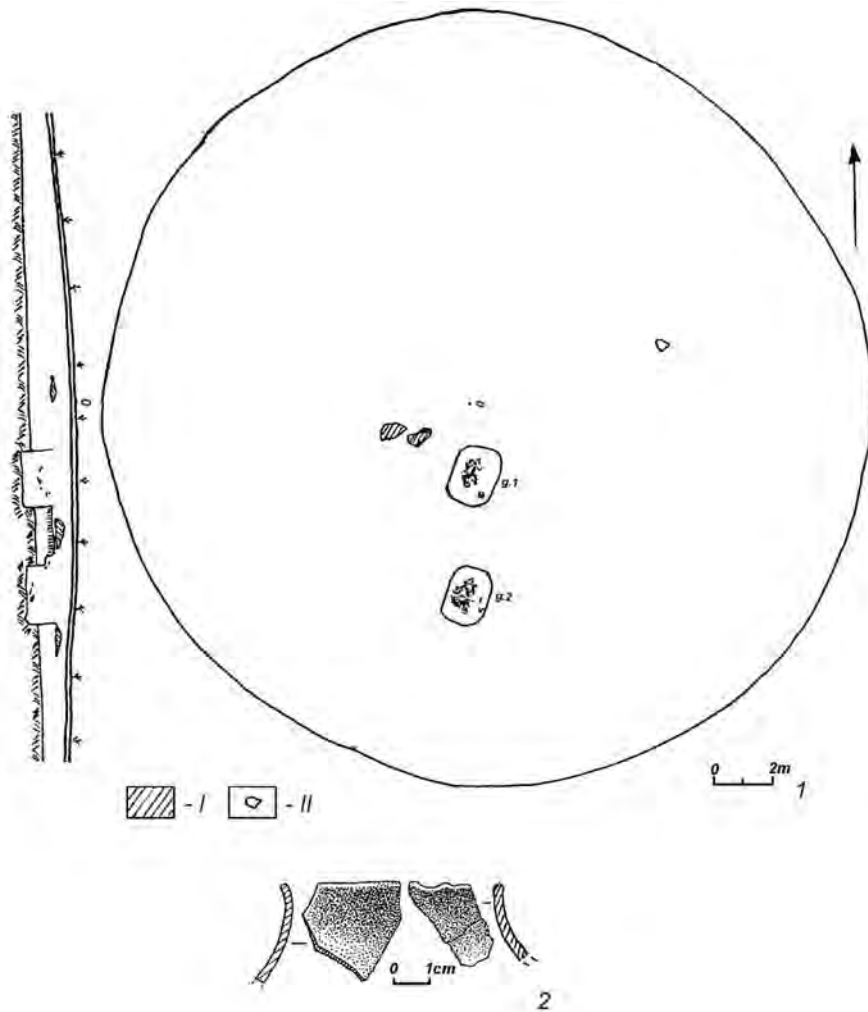


Fig. 8. Barrow 5 near Zapovitne, Zaporizhzhia Region: 1 - plan and section of the barrow; 2 - fragments of ceramics from the filling of the pit of grave 1. Key: I - soil excavated when the grave was dug; II - fragments of stones in the mound

neck (Fig. 8:2). The dead body had been placed on some chalk sprinkled on the floor at the centre of the pit in a tightly curved position on the left side (Fig. 9:1). There were small crumbles of ochre on the herbal rug that served as a cover to the dead body. In the south-eastern corner of the pit there was a moulded vessel (1). In front of the chest of the dead man there was a glass bead (2); behind the back there was a bunch of bronze rattling pendants (3).

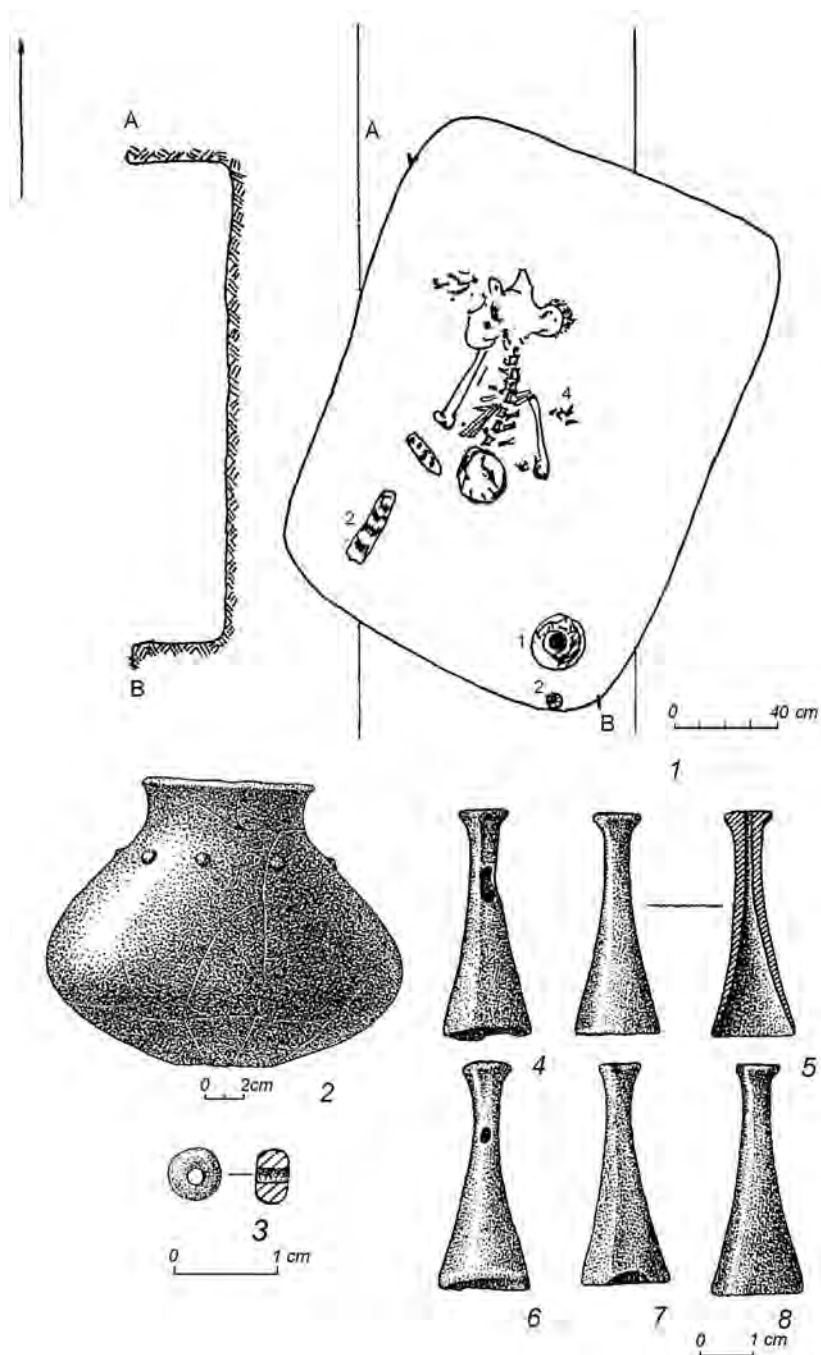


Fig. 9. Complex of grave 1 in barrow 5 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the grave; 2– ceramics; 3 – glass; 4-8 – bronze

*Description of the finds:*

1. The vessel — a polished dark-grey earthenware pot. The shoulders of the pot were decorated with seven nipple-like protuberances positioned in a line. The vessel was 21.5 cm high, 9.5 cm in diameter at the rim, 18.5 cm in diameter at the body, and 5 cm in diameter at the bottom (Fig. 9:2).

2. A round glass bead — D – 0.5 cm, h – 0.3 cm (Fig. 9:3).

3. Bell-shaped pendants (5 items). Inside some of the pendants, at the hole, there were remainders of threads and a leather ribbon tight in a knot. Each of the pendants was 4.4 cm high, 0.8 cm in diameter at the head, 0.5 cm in diameter at the neck; the size of the opening was 1.8 cm x 1.1 cm (Fig. 9:4-8).

*Grave 2* was located in 4.7 m to the south from the centre (Fig. 8:1; 10:1). The rectangular pit with rounded corners was 1.8 m x 1.25 m in size and 0.9 m deep. Pieces of wood occurred frequently in the black soil filling of the pit — positioned vertically under the walls and horizontally across the pit. Therefore, one may assume that there had been a crosswise cover that had rested on the edges of the pit and the lengthwise beams, as well as of vertical coating of the walls with poles. A youth (?) aged under 20 had been put on the floor sprinkled with chalk in a curved position on the right side, his head to the south. In front of his face, at the eastern wall of the pit there was a moulded goblet placed on the side (1); 13 cm to the north of the goblet there was a bi-metallic dagger (2). On the left hand of the skeleton there was a bracelet (3); there was a pin (4) and a eye-like bead (5) beneath. Two more small beads were found at the back of the skull (6).

*Description of the finds:*

1. A goblet with grey polished surface and ornament on the shoulders: three groups of vertical smoothed grooves (four grooves in each of the groups). The vessel was 15.5 cm high, 10 cm in diameter at the rim, 17 cm in diameter at the body, and 6 cm in diameter at the bottom (Fig. 10:2).

2. A dagger with a bronze handle and an iron blade. The dimensions of the artifact were as follows: length — 12 cm, length of the iron part — 5.2 cm, length of the bronze part — 6.8 cm, length of the shaft — 3.6 cm, diameter of the stop — 1.6 cm, diameter of the neck — 0.8 cm, width of the blade — 2.3 cm, thickness of the blade — 0.5 cm (Fig. 10:7).

3. A bronze bracelet with overlapping ends, oval in section. The diameter of the bracelet was 5.2 cm, the section of the rod was 0.3 cm x 0.5 cm (Fig. 10:3).

4. A bronze pin, shaped like a shaft made of wire, round in section, with a head that had been hammered flat and then turned into a pipe. The dimensions of the pin were as follows: length – 11.0 cm, diameter of the head – 0.6 cm, section of the rod – 0.35 cm (Fig. 10:6).

5. A large round bead made of blue glass, with four circular protuberances (“eyes”) and a wide white belt. The dimensions of the bead were as follows: diameter 1.2 cm, height – 0.9 cm (Fig. 10:4).

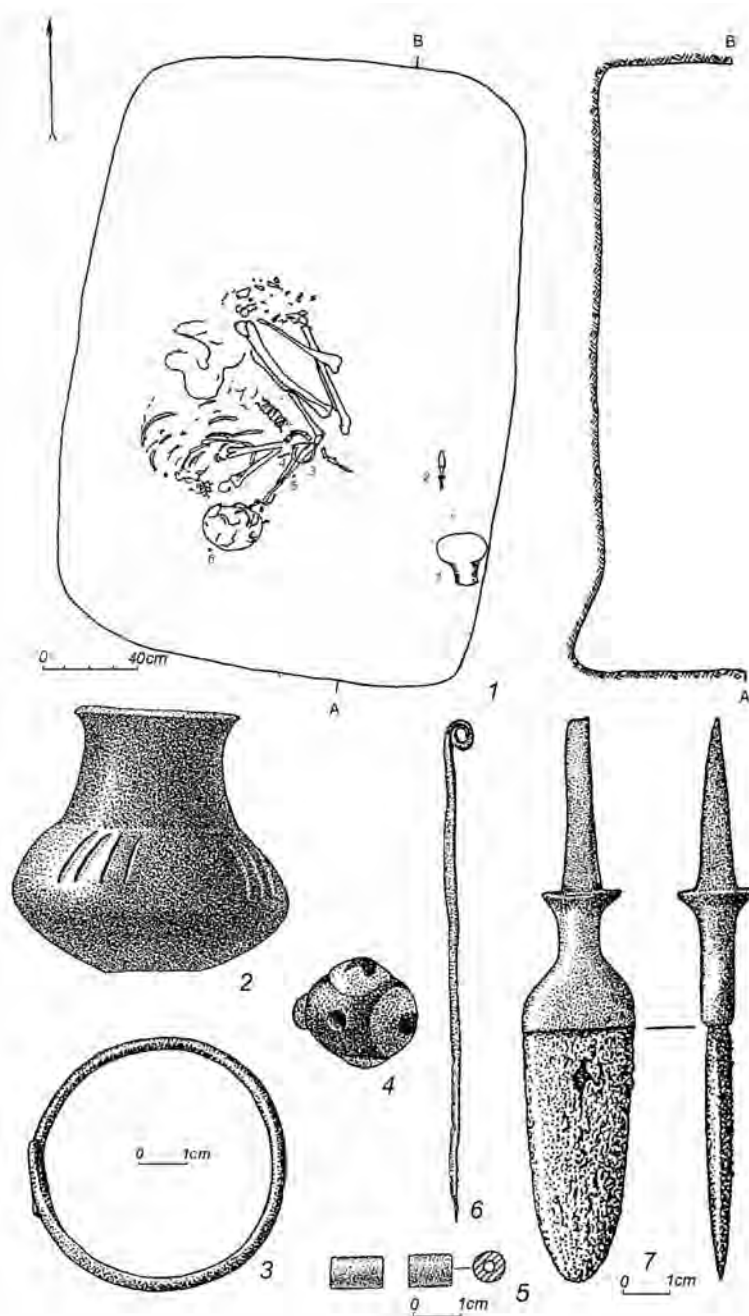


Fig. 10. Complex of grave 2 in barrow 5 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the grave; 2 – ceramics; 3,6 – bronze; 4 – glass; 5 – bone; 7 – bronze and iron

6. Bone beads (2 items) were cylinder in shape, 0.7 cm long and 0.5 cm in diameter (Fig. 10:5).

**Barrow 6** was located in the northern row 50 m to the northeast of the barrow 2 (Fig. 1). The height of the barrow was 0.2 m, its diameter was 13 m. (Fig. 11:1).

*Grave 1* was located in the middle of the barrow. The rectangular burial pit (1.7 m x 1.35 m) was 1.65 m deep. The black soil filling of the pit contained remainders of a reed cover at the level of 1.25 m. A skeleton of a man aged 50-60 at the time of death was placed on a reed rug in a curved position on the right side, head to the south, and covered with another herbal rug. The legs and feet were intensively covered with ochre (Fig. 11:2). At the feet there were animal bones; there was a sharpening stone at the left knee cap (1). The filling of the pit contained a fragment of a moulded vessel (2).

*Description of the finds:*

1. A bar-shaped sharpening stone with a broken lower edge. The length of the preserved part of the sharpening stone was 6.0 cm, the section was 2.5 cm x 1.0 cm, and the diameter of the hole was 0.2 cm (Fig. 11:4).

2. A fragment of the body and a flat bottom of a pot without traces of polish, with admixtures of mica and ground ceramics in the dough. The preserved part of the vessel was 6.0 cm high, the diameter of the bottom was 7 cm (Fig. 11:3).

**Barrow 8** was located 125 m to the southeast — east of barrow 2 (Fig. 1). The mound was completely ploughed-down. The diameter of the remaining smear was 10 m; a grave of the Bilozerka culture was found in the centre of it (Fig. 12:1).

*Grave 1* was made in a rectangular pit (2.5 m x 1.9 m), dug 2.15 m deep. A man (?) aged 40-50 at the time of death had been buried in a curved position on the left side, head to the south-west. Leg bones were preserved *in situ*. When the grave had been buried, the skull had been thrown back to the eastern wall and the chest had been turned across the pit (Fig. 12:2). At the initial position of the head there was a set of beads (1); there was a pendant under the chest (2), and a fragment of a bone plate in the filling of the pit (3).

*Description of the finds:*

1. Round beads (6 items), carved from an *Unio* shell. Their dimensions were as follows: diameter – 0.6 cm, height – 0.2 cm (Fig. 12:5-7).

2. A pendant of irregular oval shape with a small eye, made of a slice of sandstone. The dimensions were as follows: height – 2.1 cm, width – 1.7 cm, thickness – 0.9 cm, diameter of the eye – 0.2 cm (Fig. 12:3).

3. A fragment of a bone moon-shaped plate. The convex surface of the plate was decorated with an ornament of three double concentric circles with a point in the middle. The fragment was 3.8 cm long, 1.0 cm wide and 0.5 cm thick (Fig. 12:4).

**Barrow 9** was located in the northern row in 20 m to the northeast of barrow 1 (Fig. 1). The barrow was 0.9 m high and 20 m in diameter. The barrow was made over

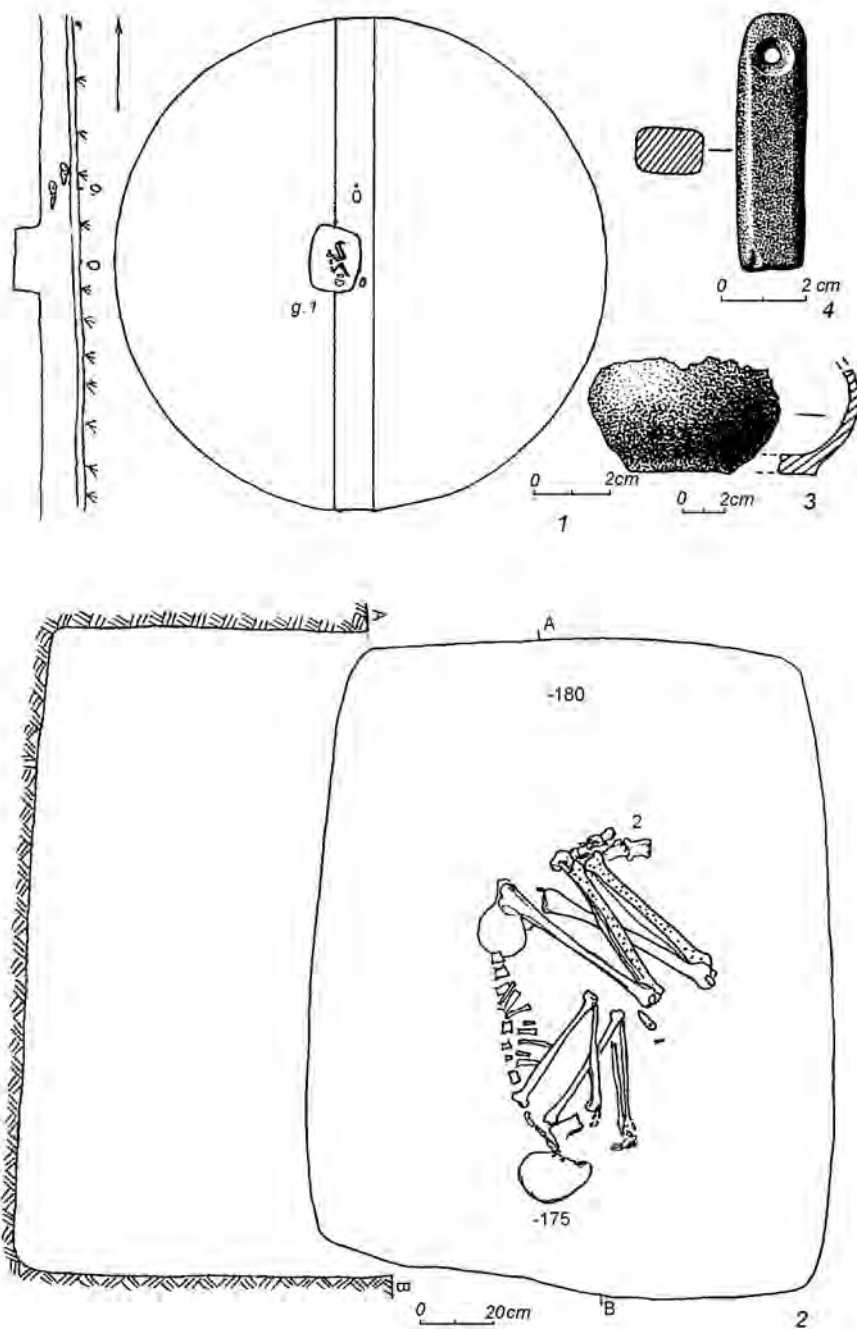


Fig. 11. Barrow 6 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of barrow; 2 – plan and section of the grave; 3 – ceramics; 4 – stone

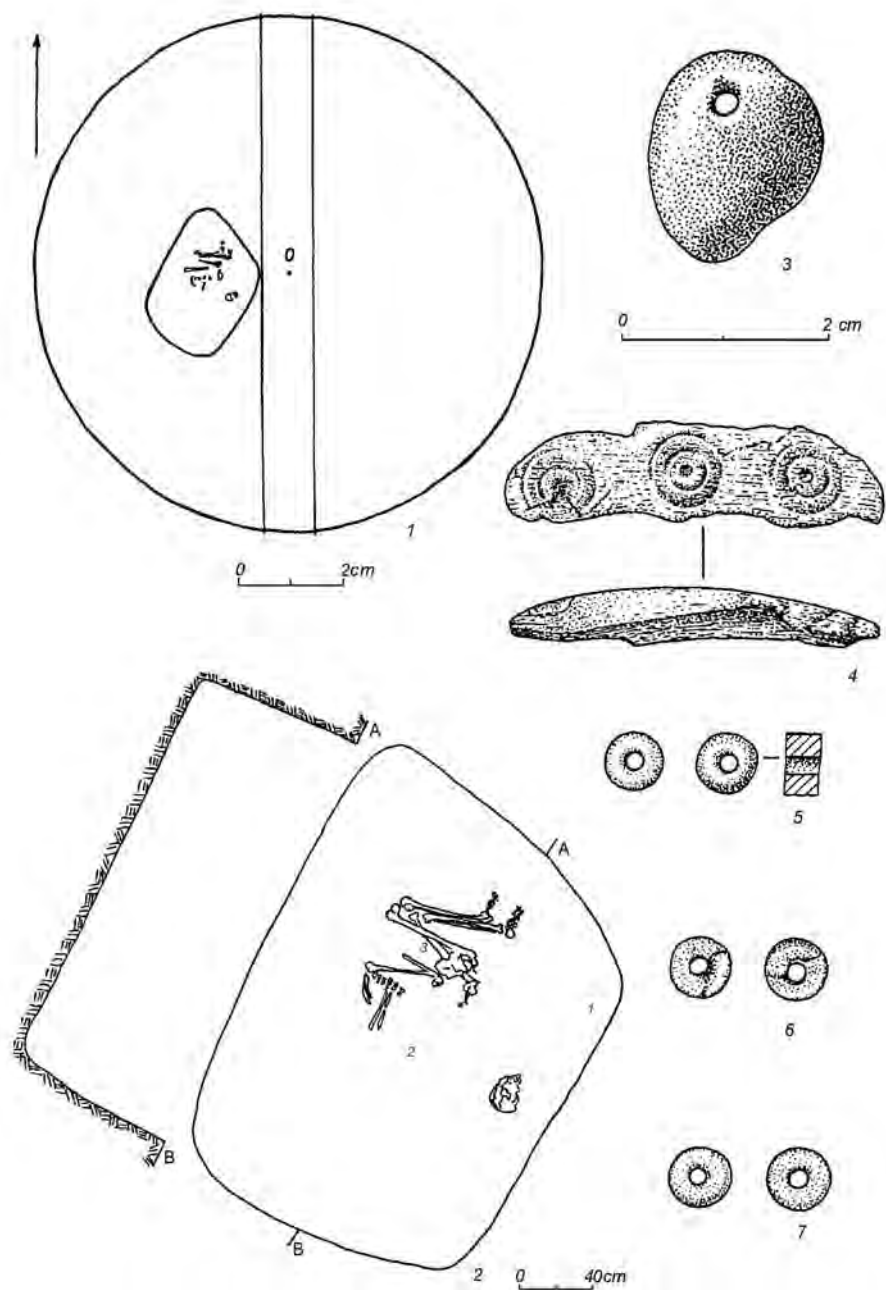


Fig. 12. Barrow 8 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the barrow; 2 – plan and section of the grave; 3 – stone; 4 – bone; 5-7 – beads made of an *Unio* shell

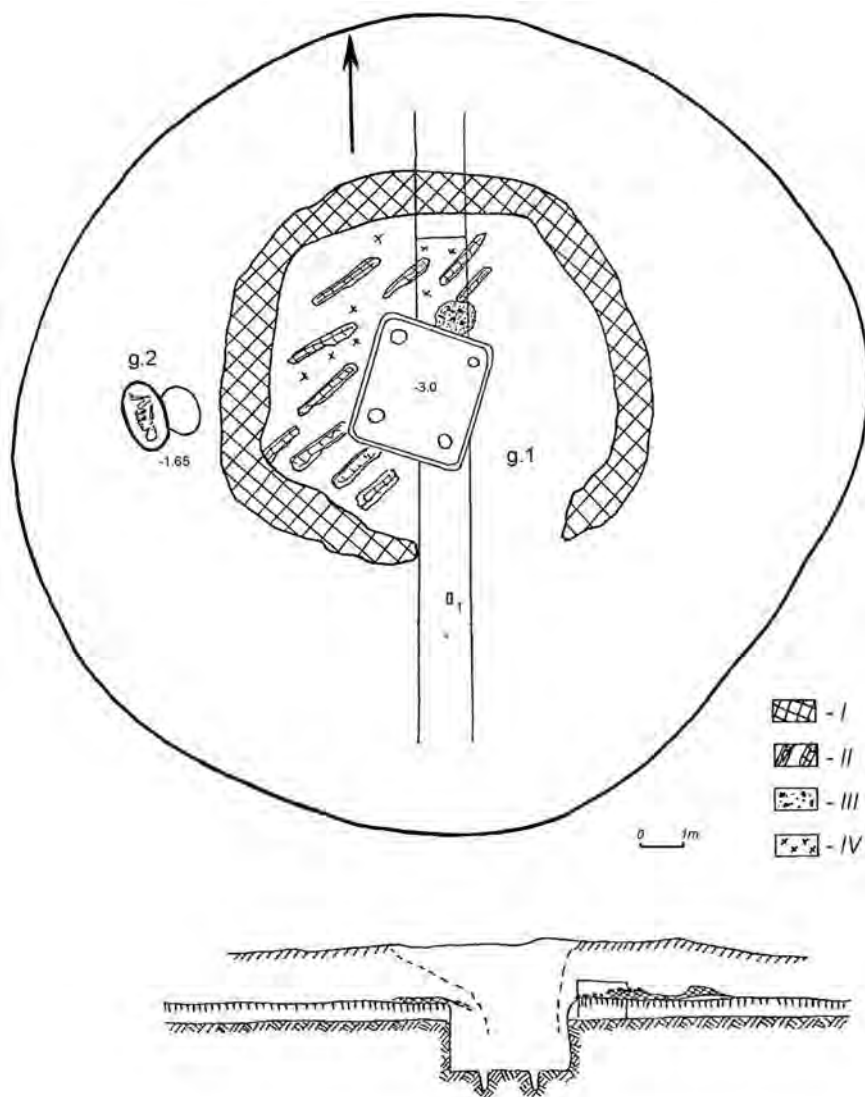


Fig. 13. Plan and section of barrow 9 near Zapovitne, Zaporizhzhia Region. Key: I – soil excavated when the grave was dug; II – wood; III – traces of a fire; IV – mat

grave 1 (the Bilozerka culture); grave 2 (the Chorna Hora type of the Cimmerian culture) was a ‘dropped-in’ grave (Fig. 13).

*Grave 1* was made in the central part of the barrow. Before the construction of the burial pit was started, a fire had been made at the level of buried black soil; the

fire had left a piece of burnt soil and a pile of charcoal and ashes. The diameter of the fire-bed was 1.0 m. A rectangular pit (2.95 m x 2.65 m) was dug 1.7 m deep. The excavated soil was arranged in the shape of a horseshoe with an opening at the southern part. The pit and the surrounding surface in the radius of 2 m from the edges of the pit were covered with a shield of wooden planks, oriented from northeast to south-west. The planks had been placed irregularly, with gaps of about 0.3-0.5 m between them. It could be seen that the planks were worn-in in the central part of the pit. Under the planks there was a thin layer of herbal origin (a rug) that served as the lower component of the cover. The robbery of the grave that had been made from the southern side made it impossible to identify the exact construction of the shield. The construction of the shed inside the pit and the wooden coating of the walls were also ruined. The best preserved was the vertical coating of the eastern wall. The walls of the pit were covered with wooden planks that could be traced at the eastern wall to the height of up to 0.9 m from the level of the bottom of the pit. That wall was coated with 22 planks, each about 10 cm wide. For better fastening of the coating, a trench about 10 cm wide and deep was made along the perimeter of the pit. The bottom of the trench, rising by 0.1 m from north to south, was covered with fine planks and a herbal rug. There were several small lumps of ochre on the rug. Round holes were made opposite each of the corners of the pit (Fig. 14:1). The filling of the holes contained remainders of the poles. At the bottom of the pit there were beads (1); the filling of the south-eastern hole contained a weaving-stone (2).

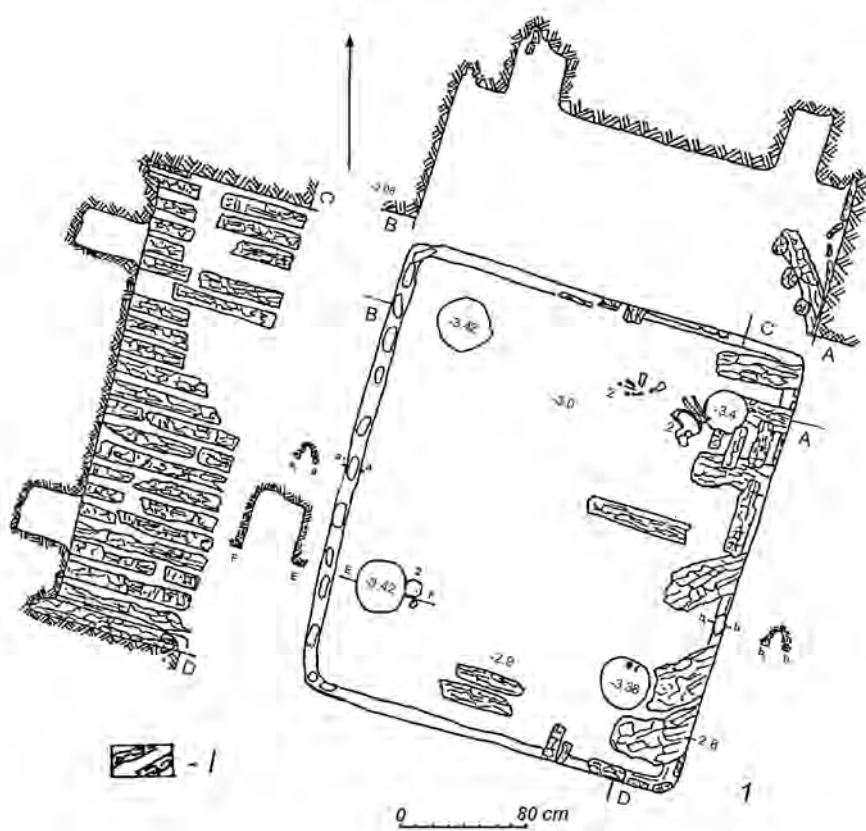
*Description of the finds:*

1. Bone cylinder-shaped beads (3 items) differed in length. Two of them were 0.4 cm long, while the third one was 0.6 cm long; the diameter of all the three beads was the same: 0.5 cm (Fig. 14:2).
2. A round ceramic weaving-stone was 2.9 cm in diameter, the diameter of the hole was 0.5 cm, and its height was 2, 0 cm (Fig. 14:3).

The <sup>14</sup>C dates based on the samples of wood were identified as Ki-575: 1293±98 BC (old), and Ki-9820: 1016±89 BC (new). The geo-magnetic date for the fire-bed at the level of the buried black soil was identified as 1000 BC (responsible for performing the date-setting: H.F. Zahniy).

**Barrow 10** was located 125 m to the north-west-west of barrow 1 (Fig. 1). The barrow was 1.65 m high and 40 m in diameter. The main grave in the barrow was grave 2 (the Bilozerka culture); there were also 'dropped-in' graves 1 and 3 (Fig. 15).

*Grave 2.* The square burial pit (2.3 m x 2.4 m) was 1.95 m deep. The soil, excavated when the pit was made, was moved away from the edges of the pit to the distance of 1.2 m – 1.5 m. (Fig. 15:1; 16:1). The pit, the adjacent surface and the internal sides of the soil wall were covered with a thin layer of reed. Under the reed there was a shield made of firmly fitted wooden planks (Fig. 15:3). The southern edge of the



**2888±55 BP**

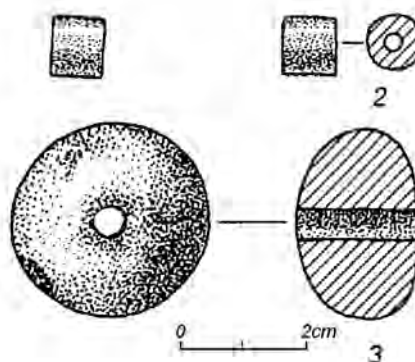


Fig. 14. Grave 1 of barrow 9 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the grave; 2 – bone beads; 3 – ceramic weaving-stone. Key: *I* – wood

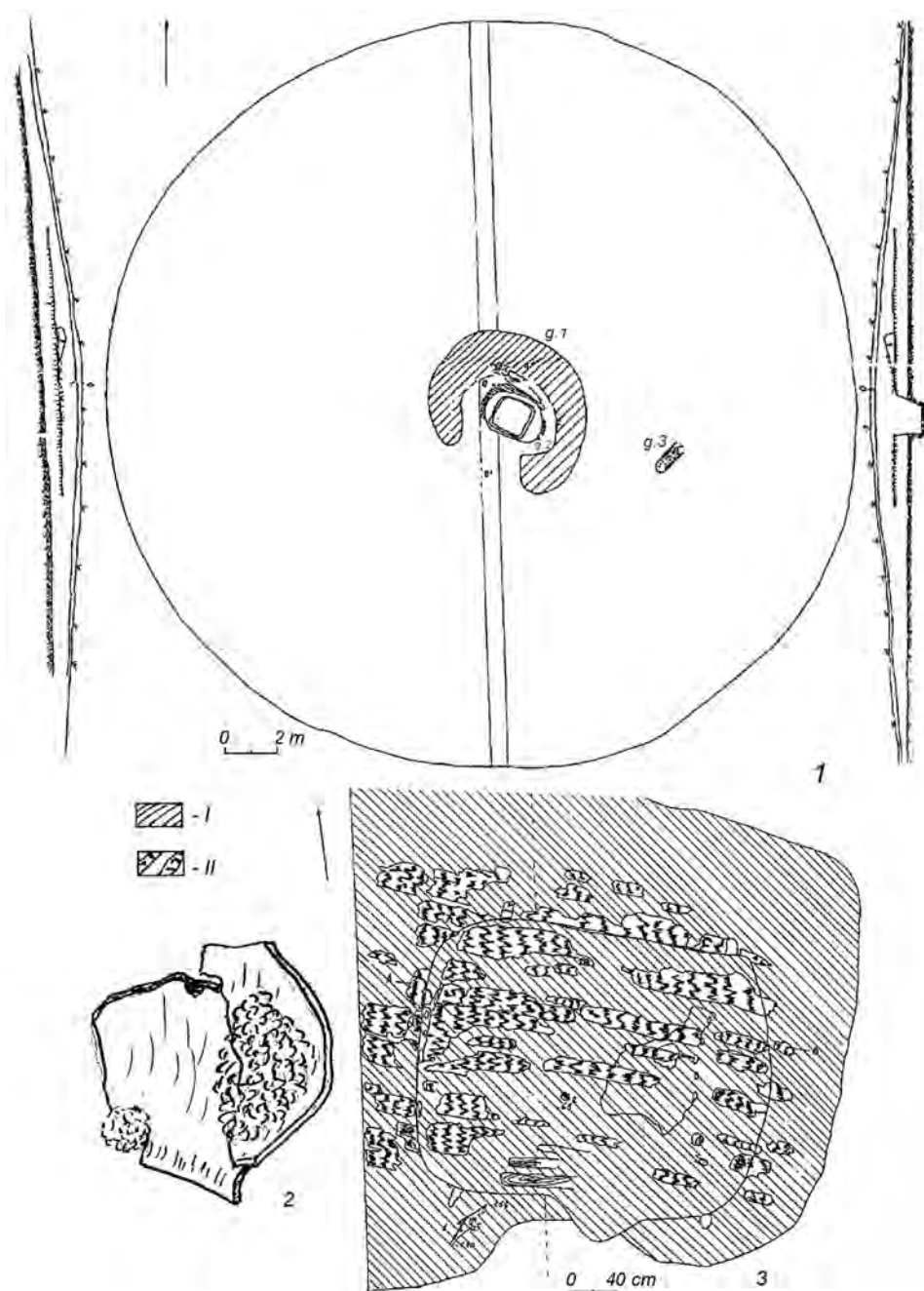


Fig. 15. Barrow 10 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the barrow; 2 – brazier made of a pot wall; 3 – plan of cover over the grave. Key: *I* – soil excavated when the grave was dug; *II* – wood

shield had been ruined by robbers who had penetrated the grave before the planks collapsed. The planks of the shield rested not only on the edges of the pit but also on two crosswise beams (10 cm in diameter). The beams were oriented along the north-south line and fastened in special grooves at the northern and southern edges of the pit by the western and southern walls.

At the centre of the worn-in shield at the depth of 0.65 m there was a brazier that had initially stood on the shield (Fig. 15:2). The northern wall of the pit (1.45 m high from the bottom level) had traces of planks of the vertical coating of the pit walls. The butt-ends of the planks were hammered into the bottom of the groove (8-16 cm wide, 14-19 cm deep), dug along the perimeter of the pit. The floor of the pit, limited by grooves, was covered with thin planks positioned along the north-west-west — south-east-east axis. On lengthwise planks at the western and eastern walls of the pit there were two crosswise planks (Fig. 16:1). At the bottom of the pit there were seven beads: 4 glass beads and three bone beads.

*Description of the finds:*

1. A brazier was made out of a wall of a large moulded pot and filled with pieces of charcoal. The vessel had a slightly flattened and turned-out rim, a well-pronounced neck that smoothly transformed into a rounded body. The part between the neck and the body was emphasized with a thin plastered-on rolled “cord”, triangular in section. The “cord” was decorated with cuts that formed a zigzag. The surface of the pot was finished with scratches made with a fine-teethed cliché. The reconstructable diameter of the rim was 33 cm, the preserved height of the vessel was 23 cm (Fig. 15:2; 16:5).

2. Three beads were made of light blue-green glass (diameter – 0.5 cm, height – 0.3 cm). The fourth one, a large “eyed” bead made of green glass, was crushed (Fig. 16:3, 4).

3. Cylinder bone beads: two of them were 0.7 cm long, while the third one was 0.5 cm long; the diameter of each of the beads was 0.5 cm (Fig. 16:2).

**Barrow 11** was located 65 m to the west of barrow 10 and was the last one in the southern row of mounds from the west (Fig. 1). The barrow was 1.2 m high and 40 m in diameter. The barrow was made over grave 3 (the Bilozerka culture). There were two Polovets graves (1 and 2) dropped into the mound (Fig. 17).

*Grave 3* was located in the centre of the barrow. The rectangular burial pit with rounded corners (2.8 m x 2.55 m) was dug 1.55 m deep. In 0.2 m from the southern edge of the pit at the ancient horizon a fire had been made; the remaining fire-bed (1.0 m in diameter) left burnt soil of terracotta colour, ashes and charcoal. Probably, that fire had been the first to be lit in the rite of burning down the burial construction that had burnt down completely. Reconstruction of the burial rite is prevented by the robbery of the barrow. The robbers entered the barrow having partially ruined the southern wall and the fire-bed. The inner coating of the walls and the floor of the pit with wooden planks was burnt down (Fig. 17:2).

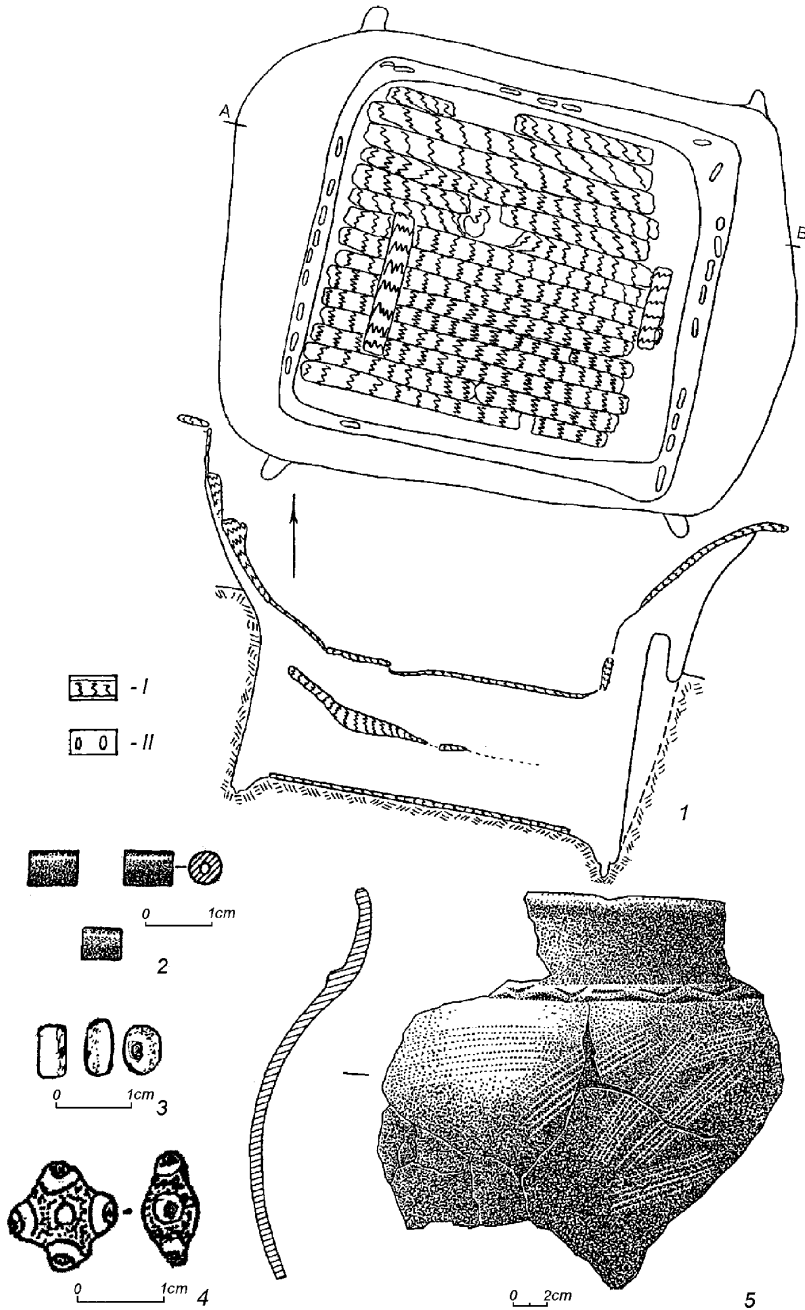


Fig. 16. Grave 2 in barrow 10 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the grave; 2 – bone beads; 3,4 – glass beads; 5 – fragment of a ceramic pot – brazier. Key: I – planks; II – imprints of the planks on the bottom of the trench

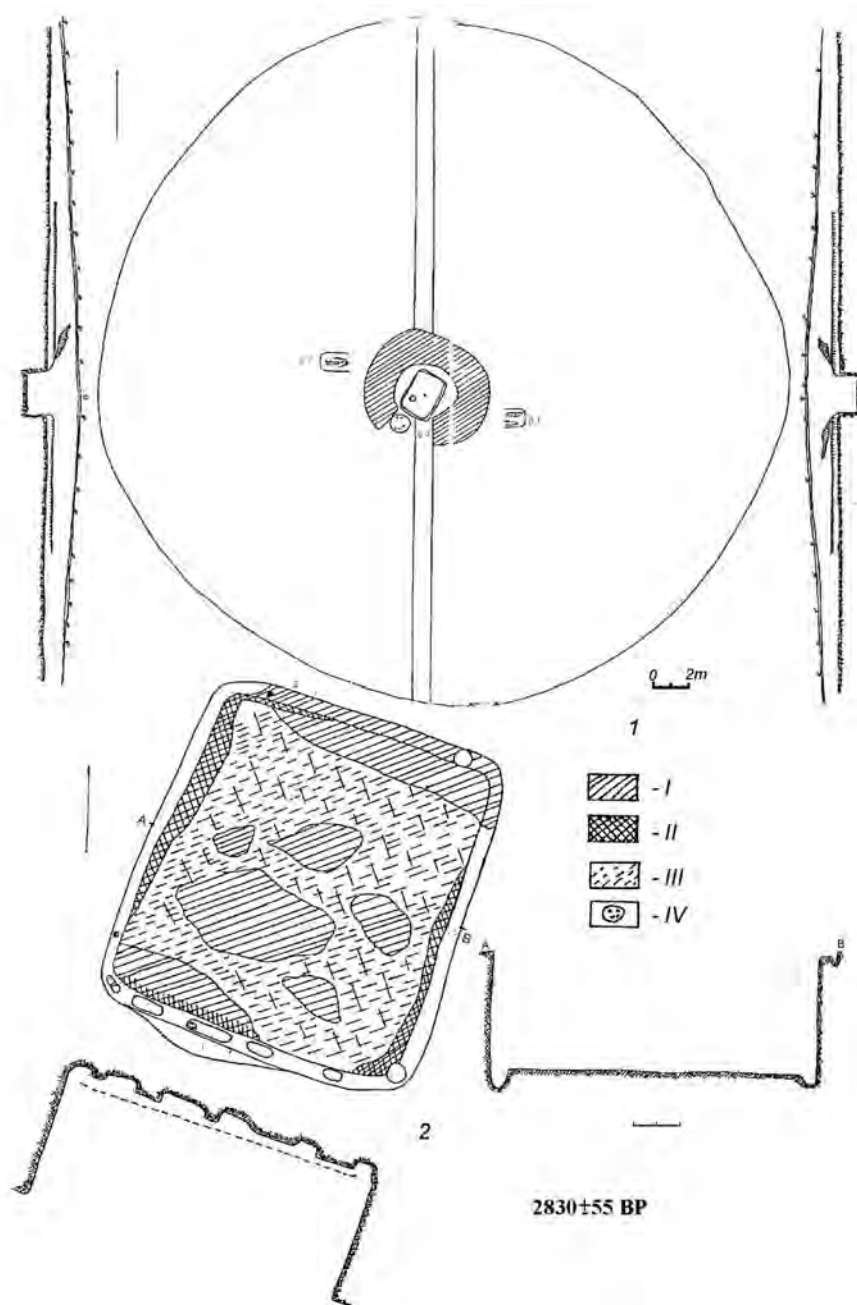


Fig. 17. Barrow 11 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the barrow; 2 – plan and section of grave 3. Key: *I* – burnt soil; *II* – coals; *III* – mixture of coal with burnt soil; *IV* – traces of a fire

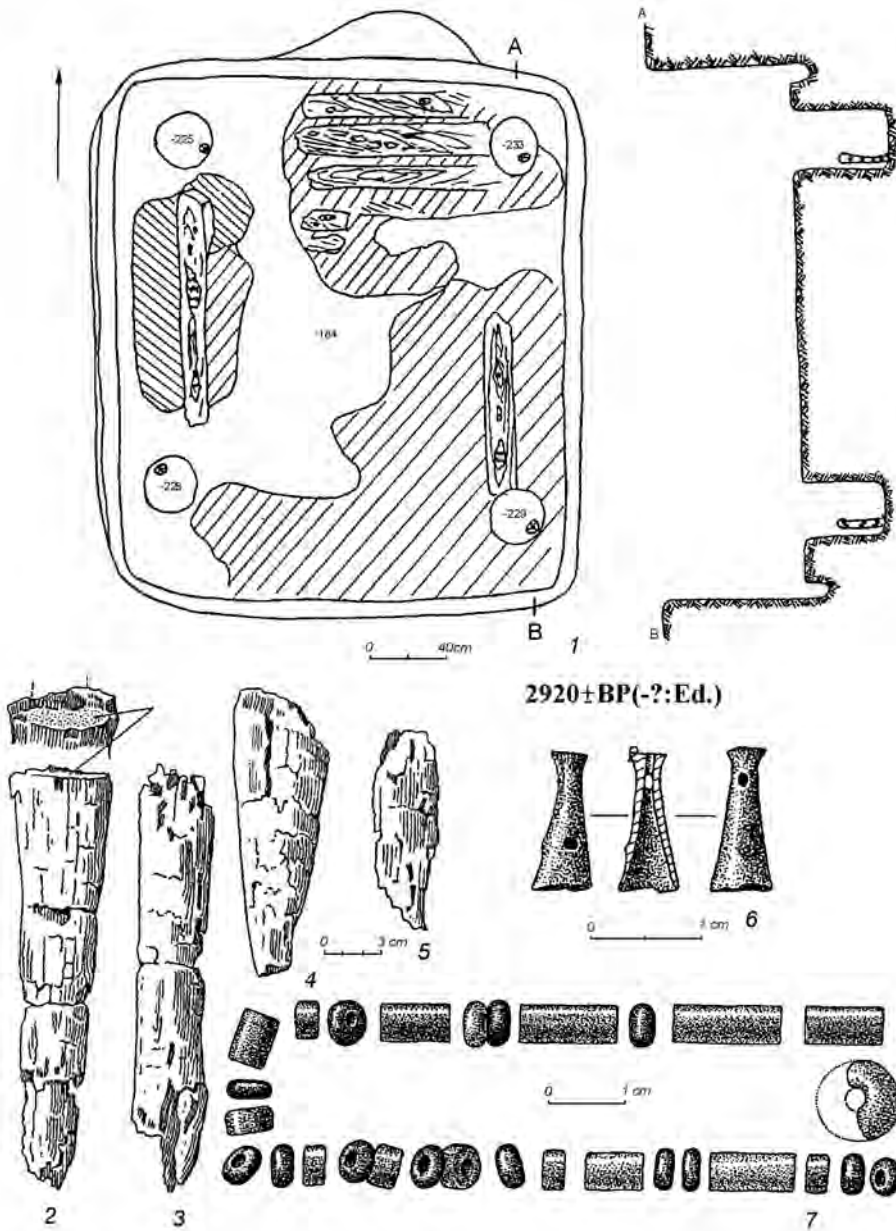


Fig. 18. Grave in barrow 14 near Zapovitne, Zaporizhzhia Region: 1 – plan and section of the grave; 2-5 – remainders of wooden poles; 6 – bronze pendant; 7 – bone and glass beads. Note: Most probably, the sample originated from barrow 14, grave 2 (Ed.)

The  $^{14}\text{C}$  dates, made of the charcoal samples, were as follows: Ki-889:  $977\pm 60$  BC (old); Ki-9821:  $962\pm 76$  BC (new).

**Barrow 14** was located 55 m to the north of barrow 1 (Fig. 1). The height of the barrow was 2.4 m, the mound was 32 m x 26 m.

*Grave 1* was located 8.8 m from the centre. The rectangular burial pit with rounded corners (2.95 m x 2.65 m) was dug 1.85 m deep (Fig. 18:1). Along the perimeter the pit, the floor was limited with a groove (about 10 cm wide, up to 15 cm deep). The part of the floor, limited by the grooves, was covered with a reed rug. There were two pole holes in the bottom of the pit. Each of the pits contained remainders of a sharpened butt-end of a thin pole placed vertically in the hole (Fig. 18:2-5).

The human remains found in the grave had been moved by the robbers to the north-eastern pole hole. While investigating the bones, the researchers found a bell-like pendant (1) and a pile of glass (2) and bone (3) beads. Some of the beads were scattered on the cover.

*Description of the finds:*

1. A bell-like bronze pendant with a nail-shaped head and a hollow body. The height of the item was 2.8 cm, the diameter of the head was 0.8 cm (Fig. 18:6).
2. 18 round glass beads a various colours — dark-blue to light-green (0.5-0.6 cm in diameter, 0.2-0.3 cm high) and one round grey-blue bead of porous glass mass (diameter – 1.1 cm, height – 0.7 cm (Fig. 18:7).
3. Cylindrical bone beads (7 items), 0.4-0.5 cm in diameter and 0.7-1.4 cm high. A round bone bead – 1.1 cm in diameter and 0.7 cm high (Fig. 18:7).

Most probably, related to this grave are the dates marked as barrow 15/2 (see Table 1 and 2), i.e., the  $^{14}\text{C}$  dates taken from charcoal samples Ki-886:  $837\pm 42$  BC (old); Ki-9823:  $1092\pm 83$  BC (new).

## 2. ABSOLUTE CHRONOLOGY OF THE BILOZERKA CULTURE

Materials of the “Stepnoy” cemetery play an important role in identifying more precise chronological limits of the Bilozerka culture along the line of stratigraphical observations, analogies and absolute dating. The pre-Bilozerka period is represented in that field by barrows 15 and 16 with the main graves of the Mnogovalikovoy Pottery culture and additional mounds of the Berezhnovka-Maevka Srubnaya culture [Otroschenko 1976:175-177; Litvinenko 2002:143-144, Fig. 8, 2]. The Chorna Hora grave 2 was dropped into the Bilozerka barrow 9 [Goshko, Otroschenko 1986:168-169, Fig. 1:1-2].

Some time ago a fibula from the “Stepnoy” was the third find of that kind from graves of the Bilozerka culture, but the number of such finds has tripled since. Eight fibulas were made of bronze wire and one of iron wire. Of these, five belonged to the Lukyanovka type (with two springs) and two to the Stepnoy type (with one spring). A fibula of the Stepnoy type was found in grave 2 of the Kazakliya cemetery [Agulnikov 1996:93, Fig. 5, 6]. V.P. Vanchugov proposed a one-spring version for reconstruction of a fragment of a fibula from Kochkovate [Vanchugov 1990:82, Fig. 35:13]. Let us assume that the partially preserved fibula from grave 55 of the Kazakliya cemetery could have had two springs, although it was reconstructed in the publication as having one [Agulnikov 1996:107, Fig. 19:4]. Given the reconstructions mentioned above, we have six two-spring fibulas and three one-spring items. A typical feature of fibulas of the Bilozerka culture is the presence of salient backs. The attempt of G.N. Toshchev [1984] to class a find from the Strumok as a fibula of the bow type was recognized to be incorrect. Its shape was clarified [Vanchugov 1990:82 Fig. 35:11], and it can only be compared with fibulas of the Lukyanovka type [Otroschenko 1998:356, Tab. 3:1, 1a, 2]. After that clarification it should be admitted that bow fibulas are not represented in complexes of the Bilozerka culture, and researchers should refrain from referring the culture to an earlier period (XIII century BC), thus, making it older. Additional analogues to the Bilozerka fibulas confirmed the dates we had proposed before (XI-X century BC) [Smirnova 1985:42-45, Fig. 5].

Bell-like pendants were found in two complexes of the “Stepnoy” (barrow 5, grave 1 and barrow 14). As the fibulas, such pendants were made by Bilozerka craftsmen, as proved by finds of moulds for making those decorations on matrixes of the Lower Dnieper area [Gershkovich, Klochko 1987] and the Donets area [Tatarinov 1979]. To date, 10 cases of finding such pendants in graves of the Bilozerka culture at the left-bank Dnieper area and the area between the Dniester and the Prut rivers. Single analogues to the bell-like pendants originate from treasures of the Cincu-Suseni horizon in Transylvania, dated to the HaA1 period or the XII century BC [Petrescu-Dimbovita 1977: Tab. 165:33, 246:17].

Glass-eyed beads from the “Stepnoy” belong to the oldest in Europe. Finds of analogues items in south-eastern France are referred to the XI century BC [Henderson 1988:441, Tab. 1]. Analogues to other beads from the “Stepnoy” originate from the Dridu treasure that was found in a hut of a settlement that belonged to the second period of the Babadag culture at the Lower Danube (about X century BC). Among 352 objects of the treasure there is a fibula of the Lukyanovka type, knife-shaped plates, a grooved chisel and temple rings of the Bilozerka kind [Enăchiuc 1987: 72-91, Fig. I:7; III:18-21; VII:87-89; XII:145-146]. G.I. Smirnova referred the Babadag II to the second part of the X century or the IX century BC [Smirnova 1986:43, Fig. 4]; this fact should be taken into account when dating the “Stepnoy” complexes.

The “Stepnoy” is the most dated among burial monuments of the Bilozerka culture, as far as the use of the  $^{14}\text{C}$  methodology is concerned. Availability of two generations of radiocarbon dates, obtained from samples of wood and charcoal at the Kiev laboratory in the second half of 1970s and in 2002, allows some observations and certain suggestions. In the first series of dates, the earliest was barrow 9 in the northern row (Ki-575:  $1100\pm 70\text{BC}$ ). Barrows of the southern row were made from west to east: barrow 11 (Ki-889:  $900\pm 40\text{BC}$ ); barrow 1 (Ki-885:  $855\pm 55\text{BC}$ ); barrow 2 (Ki-887:  $750\pm 45\text{BC}$ ) [Otroschenko 1981:17]. The straight sequence of the first series of dates was broken by a wood sample from grave 2 of barrow 15 that belongs to the first period of the Berezhnovka-Maevka Srubnaya culture [Otroschenko 1976: 174-177, Fig. 2g; 2a; 3:1]. Barrow 15 was made over graves of the Mnogovalikovoy Pottery culture; and grave 2 (archeologically dating back to the XV-XIV century BC) was dropped in its southern side and accompanied by an addition to the mound. Therefore the given complex stood away from the Bilozerka cemetery and had no connection to it. A sample of wood from grave 2 was accidentally included among packages with wood samples from graves of the Bilozerka culture. Possibly, that is why it appeared to be about 700 years younger (Ki-886:  $740\pm 50\text{BC}$ ). A subsequent dating of the wood from grave 2 of barrow 15 reduced that difference by half (Ki-9823:  $1092\pm 83\text{BC}$ ). However, the new date was also noticeably younger than the real archaeological age of the complex in question. The regretful mistake was made because analysts did not verify samples against the field report documentation.

The second generation of dates for the Bilozerka complexes of the “Stepnoy” was more compact, but an earlier age of barrows of the northern row no longer looks so evident. The initial date of grave 1 of barrow 9 (Ki-575:  $1100\pm 70\text{BC}$ ) moved towards a more recent period (Ki-9820:  $1016\pm 89\text{BC}$ ) and approximated a geo-magnetic date of the fire-bed at the edge of the burial pit (X century BC). The earliest then was barrow 3 from the southern row (Ki-9823:  $1087\pm 78\text{BC}$ ). It was located next to barrow 2, the last one according to the  $^{14}\text{C}$  dates. The initial age of barrow 2 (Ki-887:  $750\pm 45\text{years BC}$ ) was increased substantially during the second dating (Ki-9822:  $895\pm 64\text{years BC}$ ). The most accurate were definitions of age of wood from grave 3 of barrow 11 (Ki-889:  $900\pm 40\text{BC}$  (old) and Ki-9821:  $962\pm 76\text{BC}$  (new). The clarified and calibrated dates for the “Stepnoy” cemetery define its service time as 1150-850 BC. The same time range includes four  $^{14}\text{C}$  dates for graves of the Hordeevka cemetery at the Southern Bug in the Vinnytsia Region, referred to the Bilogrudovka culture — 1125-920 BC [Klochko 1996:131].

The age of the “Stepnoy” corresponds with the dating of grave 1 of barrow 32 of the Kochkovate cemetery — Ki-1714:  $930\pm 45\text{BC}$  [Vanchugov 1990:119]. Close dates exist for a settlement of the mountain Crimean version of the Bilozerka culture Tau-Kipchak [Kolotukhin 1996:23] and for the lower layer of a settlement of the Koba culture Serzhen-Yurt in Ichkeria [Kozenkova 1977]. It is worth noting that

the old dates for the Tau-Kipchak and the Serzhen-Yurt give a somewhat larger difference in time, and so does the first series of the “Stepnoy”. As a result, for the Bilozerka culture and the final bronze age in general, a rare correspondence of archaeological and radiocarbon dates has been achieved — which can only be seen as a reason for satisfaction.

## CONCLUSION

Due to the obtained results, the issue of reducing the age of the chronological framework of the Bilozerka culture by about 50 years comes on the agenda. The actual age of the culture — instead of 1200 — 1000 BC, as assumed before [Otroshchenko 1981:17; 1986:148-150; Bochkarev 1982:21; Vanchugov 1990:110-123, Fig. 44] — is in the period of the second half of the 12th century BC — first half of the 9th century BC, or 1150-850 BC. While for the lower date that adjustment fully coincides with views of a number of prominent researchers [Terenozhkin 1976:196-197; Smirnova 1985:42-45, Fig. 4-5], the X century BC as the upper edge causes no doubt among researchers of the Bilozerka culture. However, even partial synchronization of complexes of the “Stepnoy” with the Babadag II culture that dates back to the 9th century BC involves raising the upper limit of the Bilozerka culture to the first half of the 9th century BC. Neither old nor new radiocarbon dates contradict such an assumption.

*Translated by Inna Pidluska*

## ABBREVIATIONS

AAC	– Acta Archaeologica Carpathica, Kraków
Annales UMCS	– Annales Universitatis Mariae Skłodowska-Curie, Lublin
AP	– Archeologia Polski, Warszawa
APŚ	– Archeologia Polski Środkowoschodniej, Lublin
BerRGK	– Bericht der Römisch-Germanischen Kommission, Mainz
BPS	– Baltic-Pontic Studies, Poznań
BSA	– Annales of the British School of Archaeology at Athens
JIES	– The Journal of the Indo-European Studies, Washington D.C.
KSIA	– Kratkiye soobshcheniya Instituta Archeologii, Moskva
MANH	– Materiały Archeologiczne Nowej Huty, Kraków
NA IA NAN	– Nauchnyy Arkhiv Instituta Arkheologii Natsionalnoy Akademii Nauk Ukrainy, Kiev
PA	– Przegląd Archeologiczny, Wrocław
PBF	– Prähistorische Bronzefunde, München
PZP	– Prahistoria ziem polskich, Wrocław-Warszawa-Kraków-Gdańsk
RA	– Rossiyskaya Arkheologiya, Moskwa
SA	– Sovetskaya Arkheologiya, Moskwa
SIA	– Slovenska Archeologia, Bratislava
SPA	– Sprawozdania Archeologiczne, Kraków
WA	– Wiadomości Archeologiczne, Warszawa

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