

# SPRAWOZDANIA ARCHEOLOGICZNE

INSTYTUT ARCHEOLOGII I ETNOLOGII POLSKIEJ AKADEMII NAUK



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**SPRAWOZDANIA  
ARCHEOLOGICZNE**



INSTYTUT ARCHEOLOGII I ETNOLOGII  
POLSKIEJ AKADEMII NAUK

# SPRAWOZDANIA ARCHEOLOGICZNE



KRAKÓW 2020

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Dedicated to Professor Jan Machnik for His 90<sup>th</sup> Birthday



Paweł Jarosz<sup>1</sup>, Jerzy Libera<sup>2</sup>

## EARLY BRONZE AGE BARROW IN JAWCZYCE, SITE 1, WIELICZKA FOOTHILLS, LESSER POLAND

### ABSTRACT

Jarosz P., Libera J. 2020. Early Bronze Age barrow in Jawczyce, site 1, Wieliczka Foothills, Lesser Poland. *Sprawozdania Archeologiczne* 72/2, 307-326.

Barrow 11 at site 1 in Jawczyce is the first burial mound in the Wieliczka Foothills, and also in the whole of Lesser Poland, dated to the 19th and 18th centuries BC and associated with the late phase of the Mierzanowice culture. The grave under the mound had a wooden construction, and within it were found faience beads as well as four flint arrowheads. The interment was not preserved. The radiocarbon date acquired from charcoal is 3580±35 BP (Poz-101091), which is 1974-1888 BC after calibration. This dating can be correlated with the beginnings of the late phase of the Mierzanowice culture. The mound in Jawczyce combines older Final Neolithic traditions (the barrow) with Early Bronze ones (the grave goods, arrangement of the deceased). Therefore, it significantly supplements current knowledge of the funeral rite of the Mierzanowice culture.

Keywords: Early Bronze Age, barrow grave, Wieliczka Foothills, faience beads

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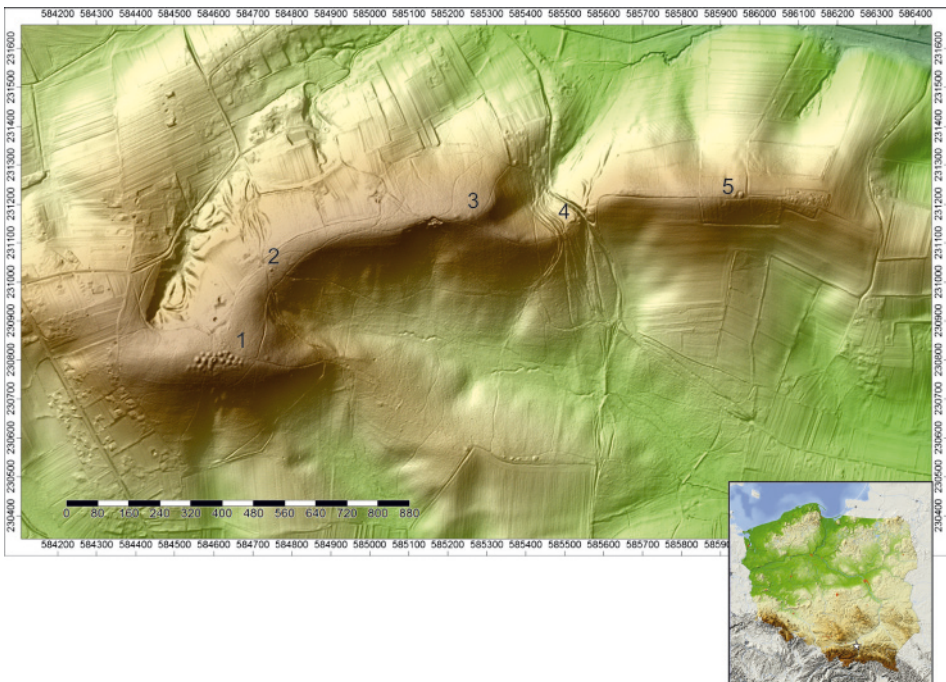
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## 1. INTRODUCTION

Site 1 in Jawczyce, Wieliczka district, is located about 3 km south-east of Wieliczka. It is situated at the culmination of one of the hills in the Wieliczka Foothills, with a height reaching to 304 m a.s.l. (Kondracki 2000, 322, 323). This hill spreads along a W-E axis through Jawczyce and Wiatowice (Wieliczka district), sloping slightly eastwards to the valley of Potok Królewski within the Cracow Submountain Region (Fig. 1; Solon *et al.* 2018). Currently, the majority of the hill is covered with forest.

Mounds in forest complexes in the area of Jawczyce and Wiatowice were discovered by Piotr Galas (1948). Then, during excavations as part of the Carpathian Archaeological Expedition in 1952, headed by Andrzej Żaki, the presence of mounds in this region was confirmed, and new ones were found (Żaki 1952). In the years 1960-1961, during the same expedition, selected burial mounds were explored (Zoll-Adamikowa and Niżnik 1963), revealing burials of the Corded Ware and Mierzanowice cultures (Jawczyce, site 1, barrow 2), as well as mounds of the Early Middle Ages (Jawczyce, site 1, site 8 and site 3; Wiatowice, site 1, site 4). Settlement features of the Funnel Beaker culture (Jawczyce, site 1, barrow 2) and Mierzanowice culture (Jawczyce, site 2) were also discovered under mounds. Further



**Fig. 1.** Location of barrows in Jawczyce and Wiatowice in the Wieliczka Foothills.

1 – Jawczyce, site 1; 2 – Jawczyce, site 2; 3 – Jawczyce, Babia Góra site; 4 – Jawczyce, site 3; 5 – Wiatowice, site 1. Illustrated by P. Jarosz and A. Sznajdrowska-Pondel



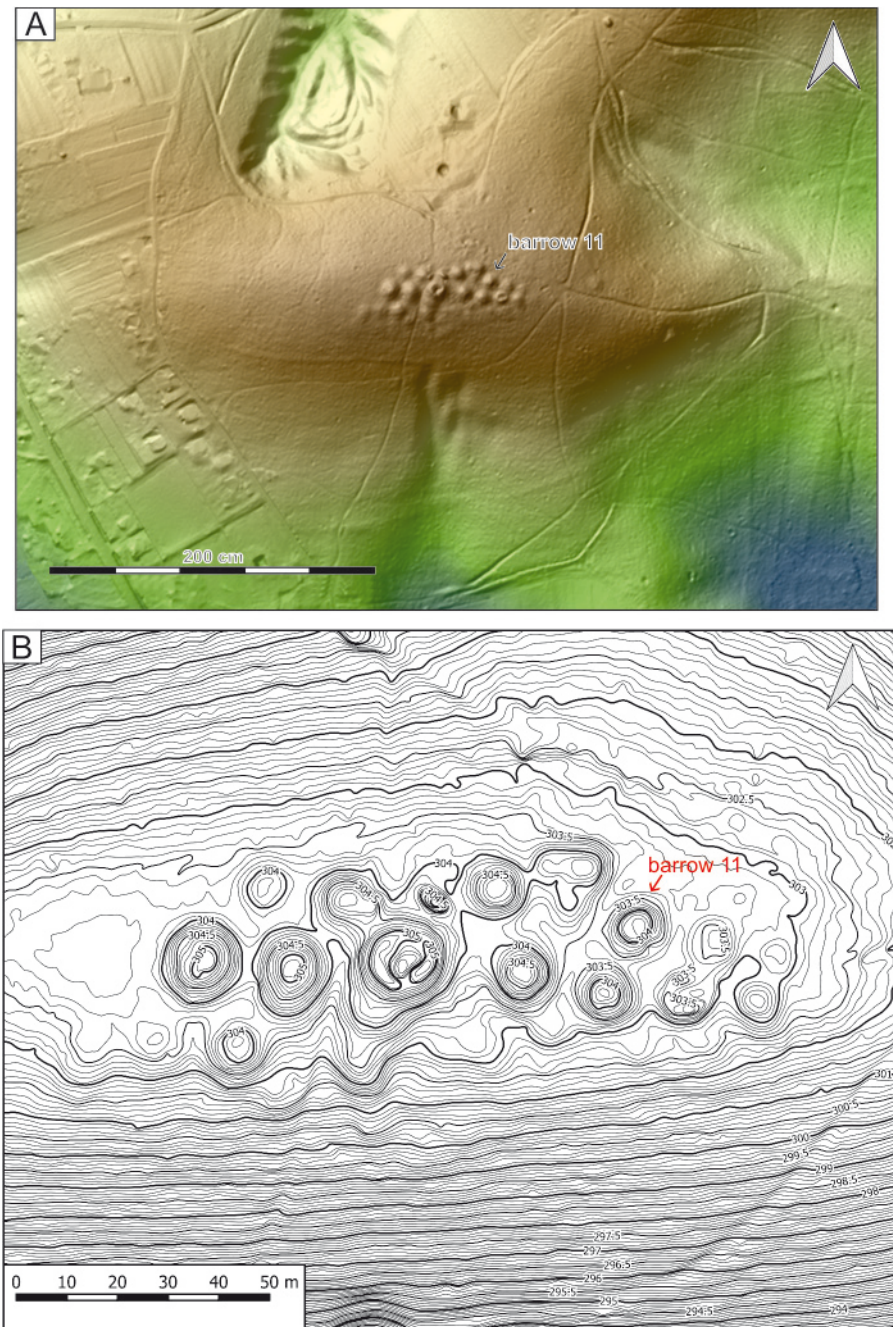


Fig. 2. Jawczyce, site 1. A, B – height plans.  
 Illustrated by P. Jarosz and A. Sznajdrowska-Pondel

investigations of destroyed Early Medieval mounds within this area were conducted in 2005 at site 1 in Wiatowice (Jarosz 2006) and in 2008 at site 2 in in Jawczyce (unpublished excavations of P. Jarosz).

In 2017, excavations of barrow 11 at site 1 in Jawczyce were conducted. A grid of areas was first delineated with primary north-south and east-west lines. Based on the data acquired from airborne laser scanning (LIDAR), an outline of the site was made (Fig. 2). It was therefore possible to verify the arrangement of the mounds that was made in the 1960s (Zoll-Adamikowa and Niznik 1963).

## 2. MATERIALS – DESCRIPTION OF BARROW 11

The mound was slightly oval in shape, stretched along a SW-NE axis with major and minor axes of 12 and 10.5 m, respectively, and a height of about 80 cm (Fig. 3: A, B). The mound was destroyed by the roots of several trees, as well as two windthrows located in its eastern part. Excavations were initially conducted to a depth of 70 cm in the well-preserved, western part of the mound, and after the discovery of the central grave pit, the heavily damaged eastern half of the mound was explored to the same depth. Forty-centimeter-wide profile witnesses were left between the quarters. The examined area was 90 m<sup>2</sup> (Fig. 3: C).

The upper layer of the mound was a dark brown forest humus 10-15 cm thick. Below, there was a light brown layer, with a thickness of about 10 cm in the central part of the mound and about 20-30 cm at its edges. Beneath, in the central part of the mound, there was a yellow layer. Its thickness was about 50 cm, gradually decreasing towards the edge of the embankment (Fig. 4). Some sandstones were found in it. At a depth of about 80 cm from the highest point of the barrow, there was a layer of primeval humus, yellow-brown in colour and with a thickness of about 15 cm. The mound was built on this layer. Deeper down, there was a layer of yellow loess with a thickness of about 80-90 cm, and beneath it layers formed laminates with thicknesses of several cm to about 10 cm. They were formed by sand (eroded sandstones) and yellow-orange clay.

During the exploration of subsequent levels of the embankment, single lumps of fired clay, charcoal and small fragments of clay vessels were discovered. Technologically, they can be linked with the Neolithic (Funnel Beaker culture?) and the Early Bronze Age. Nearly 50 stone artefacts, mainly of silica rocks, were also found. The vast majority of them can be associated with the Upper or Late Palaeolithic, including scrapers, combined tools, a burin, a truncated piece and blade debitage. Only single products should be associated with the Final Neolithic or the Early Bronze Age (these artefacts will be the subject of a separate study). The arrangement of ceramic fragments within the mound was random.

Under the central part of the barrow, a burial pit (grave 1) was discovered. Around it, a layer that was formed during the construction of the pit was visible.



### Grave 1

A grave pit was discovered at a depth of about 90 cm from the highest point of the barrow. It was clearly visible against the background of the primeval level and was orientated along a W-E axis. The western wall of the pit was clearly rounded, and the remaining sides

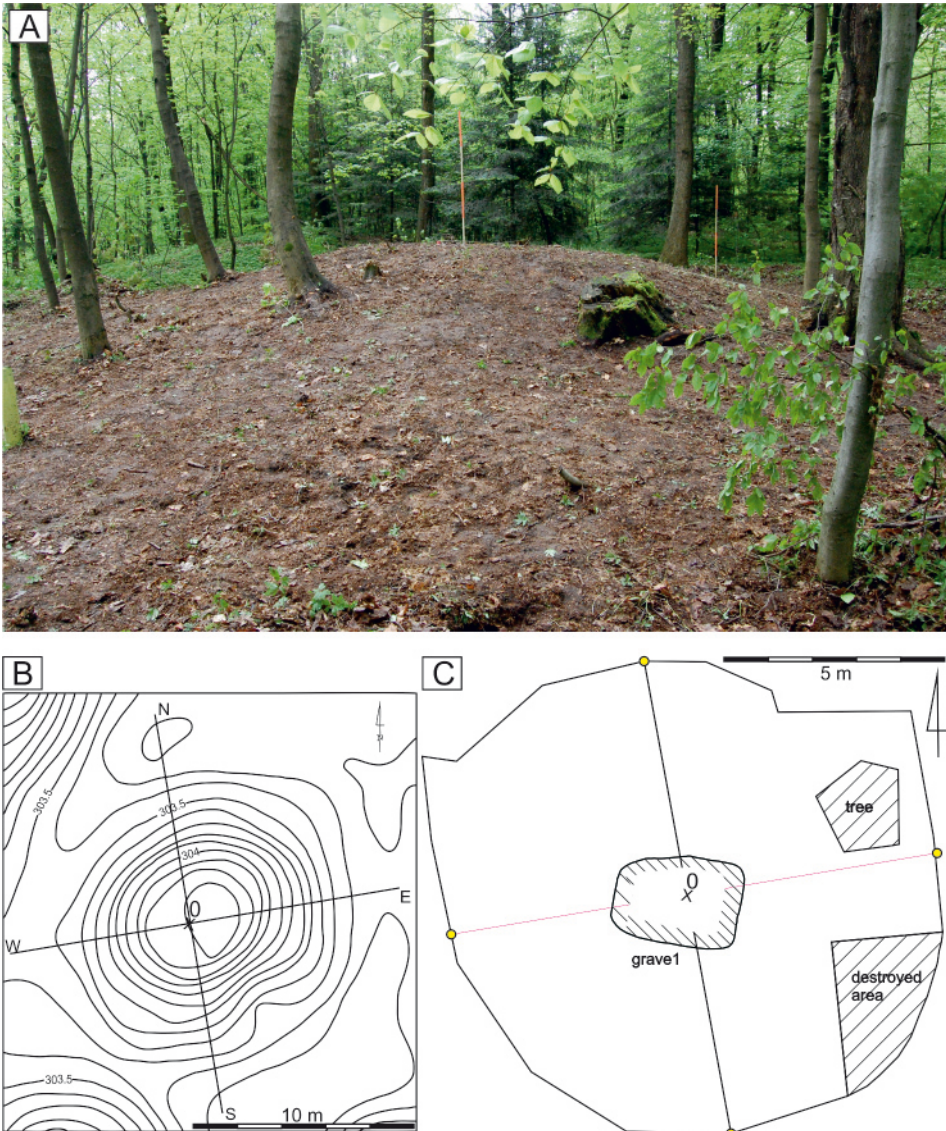


Fig. 3. Jawczyce, site 1, barrow 11. A – barrow before excavations (photo by P. Jarosz); B – height plan (illustrated by J. Ożóg); C – plan under the barrow (illustrated by P. Jarosz and T. Oberc)

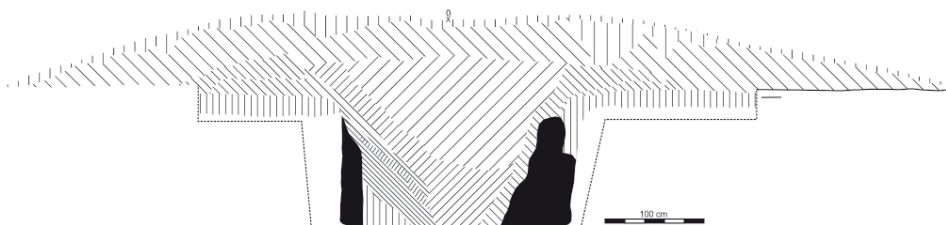


Fig. 4. Jawczyce, site 1, barrow 11. Cross-section of the barrow and the grave along the N-S axis (illustrated by P. Jarosz)

were straight with rounded corners. The dimensions of the pit were  $320 \times 240$  cm (Fig. 5: A). The flat bottom of the grave was at a depth of 220 cm, *i.e.* it was dug into the primeval surface to about 130 cm. In the bottom part, at a depth of about 210 cm, the dimensions of the pit decreased slightly to about  $280 \times 220$  cm (Fig. 5: B). At this level, the fill consisted of two main parts: the outer border and the inner part of the grave. The former was brown and light grey in colour and had a width of up to 40 cm. Possibly, this was a trace of a wooden construction, which was also visible in the arrangement of layers in the profile of the pit (Fig. 4). The inner part of the grave had a rectangular shape with dimensions of  $205 \times 150$  cm, and was formed of a light brown layer. A collection of faience beads was discovered, primarily in the western part of the grave. In the central part, four flint arrowheads were found (Fig. 5: B). Three of them were found in a group, and the fourth one was discovered to the east of them. In the same part of the feature, next to the cluster of beads, an organic residue was found – probably tree bark (?). Inside this material, there was a copper earring. Within the grave, no traces of the skeleton were found, which was undoubtedly placed in sandy and clay layers, where it has completely decayed.

#### Grave inventory:

1. Medium, stubby, symmetrical arrowhead made of chocolate flint with a contour approximate to an isosceles triangle. It had slightly convex lateral edges finished with slightly arcuate wings passing into the sharply concave base (Fig. 6: 1). It was formed by a flat surface pseudogroove retouch on a unilaterally convex flake, which is indicated by both the flat-convex side contour and a similar cross-section. Dimensions: length 20 mm, width 13 mm, thickness 4 mm; weight 0.52 g.

2. A slender symmetrical arrowhead made of erratic flint with a contour similar to an isosceles triangle, with straight lateral edges passing into a sharply indented base (Fig. 6: 2). It was formed by a flat surface pseudogroove retouch on a unilaterally convex flake, which is indicated by both the flat-convex side contour and a similar cross-section. Dimensions: length 23 mm, width 12 mm, thickness 3 mm; weight 0.42 g.

3. A reconstructed medium stubby arrowhead made of Jurassic flint, possessing a contour similar to an isosceles triangle, with slightly convex lateral edges finished with slightly arcuate wings passing into a sharply indented base (Fig. 6: 3). It was formed by a flat surface

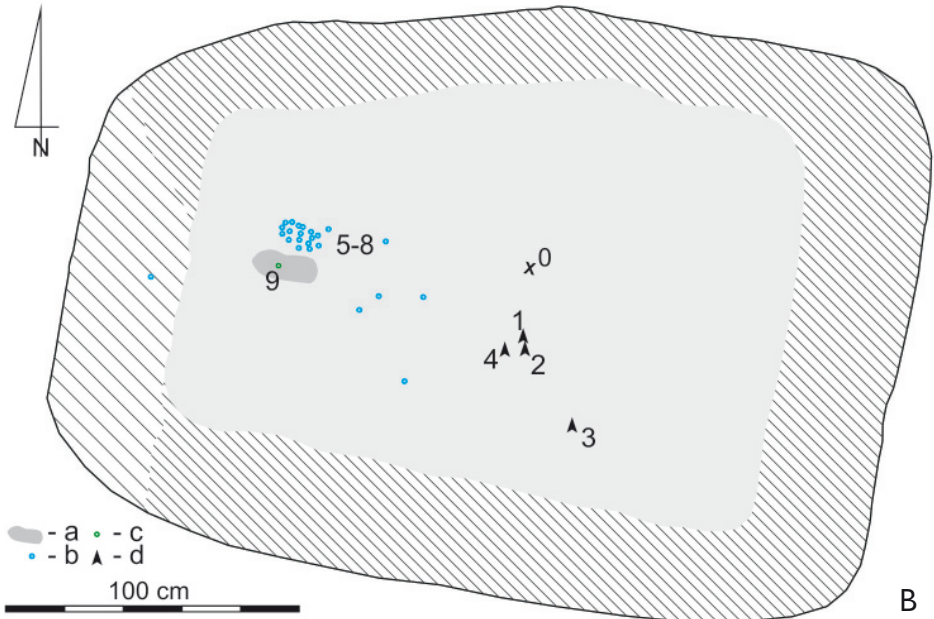
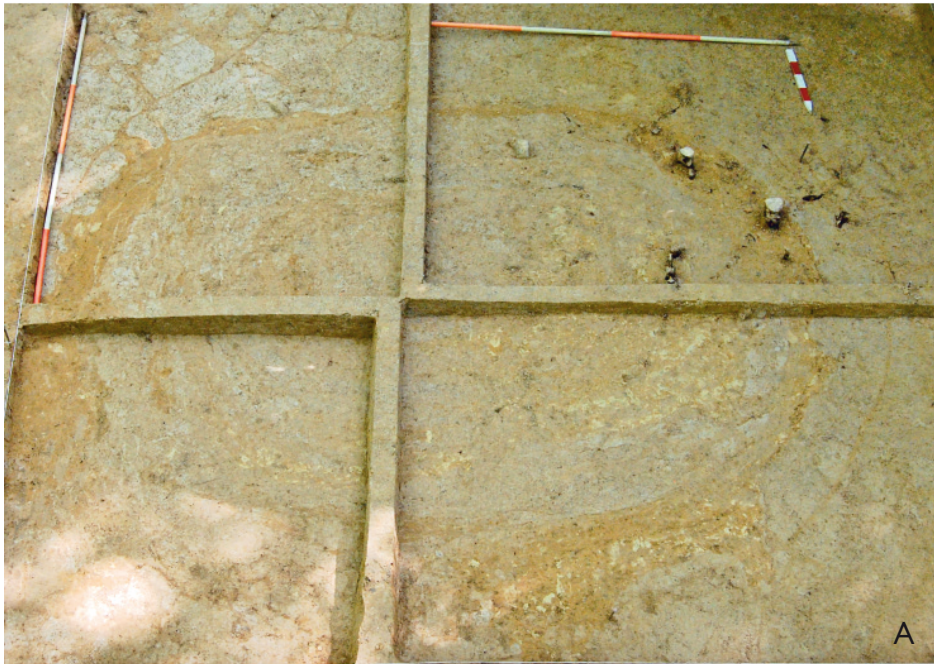


Fig. 5. Jawczyce, site 1, barrow 11. A – Horizontal plan of the grave at a depth of 80 cm (photo by P. Jarosz); B – Horizontal plan of the grave at a depth of 210-220 cm (illustrated by P. Jarosz); a – residues of organic substance; b – faience beads; c – copper earring; d – flint arrowheads



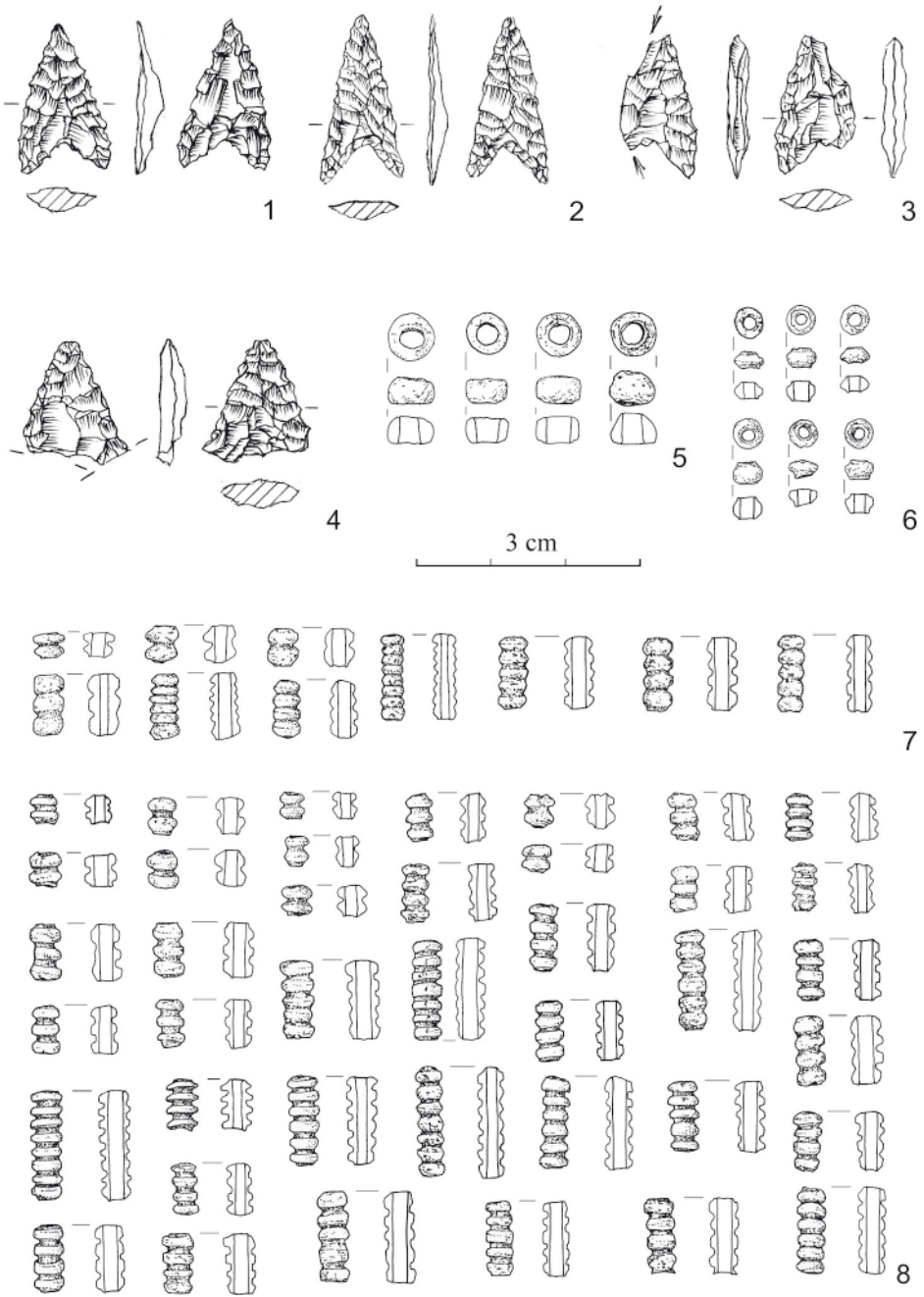


Fig. 6. Jawczyce, site 1, barrow 11. Grave goods (illustrated by J. Ożóg).  
1-4 – flint arrowheads; 5-8 – faience beads

pseudogroove retouch, probably on a scaled flake, which is indicated by both the axial lateral outline and the cross-section. On one lateral edge, there are micro negatives of strikes similar to those from a burin – three on the top, one on the wing. Dimensions: length 19 (reconstructed 21) mm, width 10 (actual 11) mm, thickness 3 mm; weight 0.6 g.

4. A stubby arrowhead made of chocolate flint with a contour approximate to an equilateral triangle, with straight lateral edges passing into the base, probably indented in an arch (uncertain due to broken wings). It was formed by a flat surface pseudogroove retouch on a unilaterally convex flake, which is indicated by both the side contour and the cross-section (Fig. 6: 4). Dimensions preserved: length 17 mm, width 14 mm, thickness 4 mm; weight 0.73 g.

5. One-segmented faience beads with shades of blue and green (Fig. 6: 5). They are ring-shaped and have a conical (with truncated apex) or cylindrical longitudinal cross-section. Dimensions: outer diameter 5-6 mm, inner diameter 2-3 mm, height 4-5 mm.

6. One-segmented faience beads with shades of blue and green (Fig. 6: 6). They are ring-shaped, cylindrical or biconical in longitudinal cross-section. Dimensions: diameter 4 mm, hole diameter 1 mm, height 2-3 mm.

7. Multisegmental faience beads with connectors; 2 to 8 parts; shades of blue and green in colour (Fig. 6: 7). In longitudinal cross-section, segments were ring-shaped, cylindrical or biconical. Dimensions: length from 3 to 15 mm, outer diameter 2-4 mm, inner diameter 1-2 mm, diameter of connectors 2 mm.

8. Multisegmental beads; 2 to 7 parts connected by necks; blue and green in colour (Fig. 6: 8). In longitudinal cross-section, segments were ring-shaped, cylindrical or biconical. Dimensions: length from 3 to 14 mm, diameter 2-4 mm, hole diameter 1-2 mm.

9. Fragment of a circular copper earring with wire of circular cross-section. Wire diameter 2 mm.

### 3. CULTURAL AND CHRONOLOGICAL ANALYSIS

The chronology of the investigated barrow was determined by radiocarbon dating of charcoal and artefacts found at the bottom of the burial pit. The date obtained from the charcoal located in the western part of the pit near the organic substance was  $3580 \pm 35$  BP (Poz-101091), which, after calibration, is 1974-1888 BC (68.2%; Fig. 7). This dating can be correlated with the beginnings of the late phase of the Mierzanowice culture (Kadrow and Machnik 1997). Faience beads are also associated with the late phase of this culture. They occur in the burial complexes of the Samborzec, Szarbia and Giebułtów groups (Kadrow and Machnik 1997, 98, 108, 117), as well as in the Strzyżów culture (Kadrow 1995, 88; Bargiel 2006). They are dated within the first half of the second millennium BC, specifically the years 1950-1600. Some of the oldest dates obtained for graves with this type of equipment were acquired for grave 8 at site 30 in Stryjów, Krasnystaw district (Budziszewski

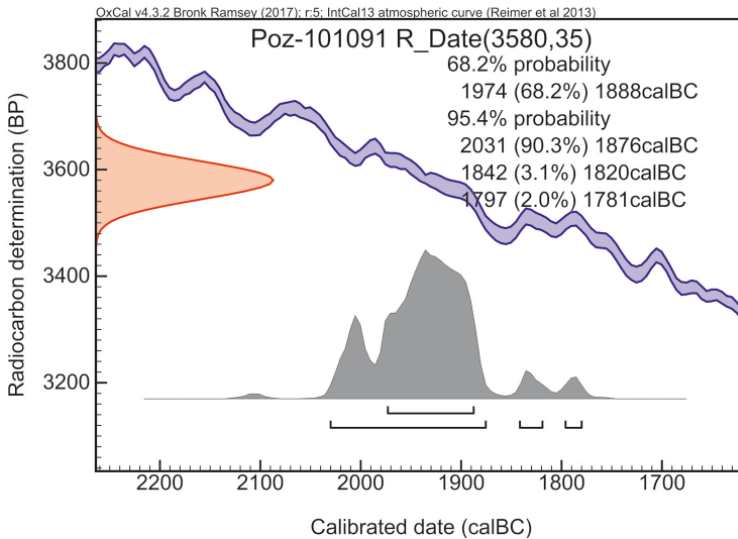


Fig. 7. Jawczyce, site 1, barrow 11. Calibration graph of radiocarbon dating

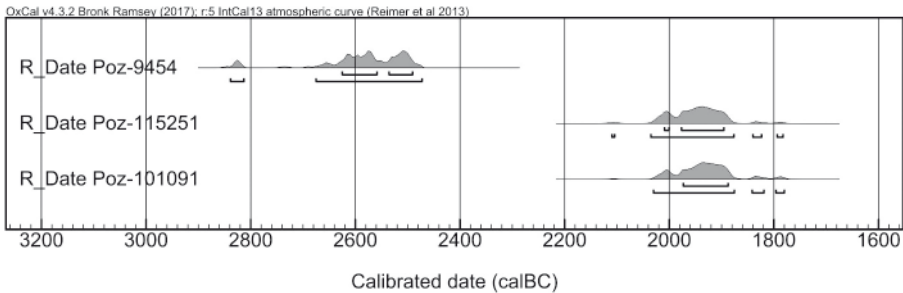


Fig. 8. Jawczyce, site 1. Radiocarbon dates obtained from graves

*et al.* 2016), which is slightly younger than ours –  $3545 \pm 30$  BP (Poz-66520), or 1940-1782 BC after calibration (68.2%) – and from grave 750 in Skołoszów, Jarosław district, site 7 –  $3480 \pm 35$  BP (Poz-82440), which, after calibration, is 1877-1750 BC (68.2%; Rybicka *et al.* 2017, 128, Table 2; 138, 139, Fig. 27, 28).

The investigated barrow is located within a cemetery of 17 mounds (Fig. 2: A, B). In addition to barrow 11, two additional mounds have been excavated so far. Chronologically, the oldest one (No. 2) was erected above the grave of an individual of the Corded Ware culture community. The date  $4050 \pm 35$  BP (Poz-9454), obtained for the skeleton, allows us to situate the time of its creation at the end of the first half of the third millennium before Christ: 2626-2491 BC (68%; Jarosz and Włodarczak 2007, 73). Above the ancient ground

level, a grave (No. 2) dated to the Early Bronze Age was placed. The date obtained for this grave was  $3590 \pm 35$  BP (Poz-115251). Calibration of this dating places it between 1977-1896 BC (62.7%; Fig. 8). This burial was equipped with a copper earring and beads made of fish vertebrae (Zoll-Adamikowa and Niżnik 1963, 32, 33, Fig. 10, 11). The third of the studied mounds (No. 13) was small (diameter about 6 m) and most likely should be connected with the period of the Early Middle Ages.

The dimensions (10-12 m in diameter and 80 cm high) as well as the location in the landscape of burial mound 11 from Jawczyce are similar to those of other mounds of the Corded Ware culture in south-eastern Poland (Włodarczak 2006; Machnik *et al.* 2009; Jarosz 2011, 258, Table 1). The mound of the Early Bronze Age in Stryjów, site 30, was similarly located (Budziszewski *et al.* 2016; Włodarczak 2017, 64-69). The sequence of the layers in the barrow is typical for prehistoric mounds located in the Carpathian foothills, *e.g.* Średnia, Przemyśl district, site 3, barrow 2 (Jarosz 2002), Bierówka, Jasło district, barrows A and B (Gancarski and Machnikowie 1986; 1990). The soil geochemical processes typical for this area, which led to leaching, were also visible. Therefore, fillings of features, as well as the primeval level, acquired a light grey colour (Komornicki *et al.* 1990).

The shape, size and orientation of the burial pit along a W-E axis, as well as constructions that were discovered under the mound, are typical for central barrow graves of communities of the Corded Ware culture in the upper basins of the Vistula, Bug and the Dniester, where such funeral structures dominate (see Sulimirski 1968; Górski and Jarosz 2006, 406, Fig. 5; Włodarczak 2006; Machnik *et al.* 2009; Jarosz 2011). The grave should be classified as large (320 × 240 cm) and of considerable depth (about 130 cm from the primeval soil level). The arrangement of layers by its walls indicates that it had an inner wooden structure, and probably also had a roof (Fig. 4, 9). The pit was surrounded by a typical earthwork, detectable in the form of a layer about 40 cm thick and 120 cm wide, which was formed during the digging of the burial pit (Fig. 4).

Comparable large graves containing extended wooden structures are known from the Early Bronze Age Nitra culture in Slovakia, *e.g.* Jelšovce, Nitra district, grave 444/85 (Bátori 1991, 105, Fig. 11). The preserved elements allow for the reconstruction of these graves in the form of mortuary houses, *e.g.* Branč, grave 31, and Mýtina Nová Ves, grave 262 (Bátori 1991, 102, 104, Fig. 9, 10). Wooden elements in graves of the Mierzanowice culture in the upper Vistula basin are generally in the form of hollow logs (Bąbel 2013b).

The interment, probably placed at the bottom of the pit, was not preserved. A reconstruction of the arrangement of the dead was possible due to the location of the grave goods. In the western part of the pit, within the organic substance (most likely tree bark), there was a fragment of a copper wire earring, along with faience beads nearby (Fig. 5: B; 6). Such items were discovered in graves of the Mierzanowice culture mainly near the head of the deceased, *e.g.* Stryjów, site 30 (Budziszewski *et al.* 2016, 390, Fig. 13), Mierzanowice, Opatów country, site 1, grave 153 (Bąbel 2013b, 171-173, 233-235), Jawczyce, site 1, barrow 2, grave 2 (Zoll-Adamikowa and Niżnik 1963). Therefore, it can be said that the deceased was

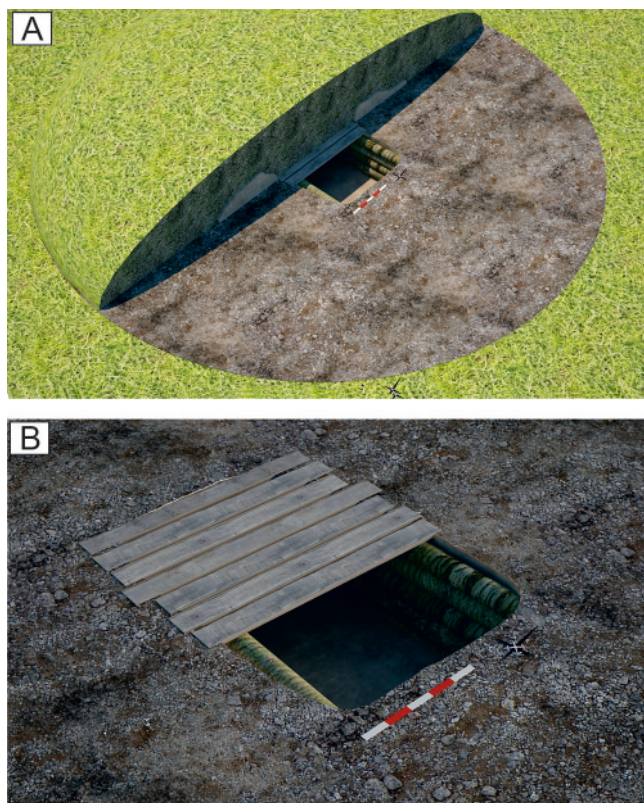


Fig. 9. Jawczyce, site 1, barrow 11.

A – Reconstruction of the barrow with a grave; B – reconstruction of the wooden construction in the grave (created by K. Rosińska-Balik)

buried with the head to the west, which is typical for men's graves at flat cemeteries of the Mierzanowice culture, *e.g.* Iwanowice, Kraków district, Babia Góra site (Kadrow and Machnikowie 1992, 69, Fig. 34), Mierzanowice, site 1 and Wojciechowice, Opatów district, site 1 (Bąbel 2013b, 75, Fig. 32). A similar arrangement of the deceased is noted at the flat cemeteries of the Nitra culture (Bátora 1991, 105, Fig. 11, 39; Šmíd 2006).

The single and multisegmental faience beads that were discovered in the grave differ from one another in shape and inner diameter (Fig 6: 5-8). They were most likely threaded on a strand or sewn to a textile (Fig. 10: A). Their colour during the discovery, regardless of shape, was blue or green. Some of them have weathered, obtaining a yellow or milky white colour. The single beads differ from one another in diameter and height (Fig. 6: 5, 6). In cross-section they are rounded, conical and biconical. Among the multisegmental beads, one can distinguish those whose elements are fused by necks of smaller diameter and those without such parts (Fig 6: 7, 8; 10: a-f). Moreover, within multisegmental beads,



individual elements differ in shape and thickness in longitudinal cross-section. These beads have from two to several elements with a different shape in cross-section: cylindrical (Fig 10: a, f), with a rounded or profiled edge – two-conical (Fig. 10: b-d) or almost conical with a truncated apex (Fig. 10: e). A preliminary analysis of the beads indicates that they were made in at least several casts, or could have been made manually (Purowski 2019, 61, 62). The problem of the possibility of their local production in Central Europe is a contentious issue. The study of their microstructure and chemical composition indicates such a possibility (Robinson *et al.* 2004; Purowski 2020), but their import from Egypt cannot be ruled out (Gregerová *et al.* 2006; Bouzek 2015).

Comparable single and multisegmental beads were discovered mainly in the graves of the Mierzanowice culture in south-eastern Poland, *e.g.* Iwanowice, site Góra Klin, grave 6 (Machnikowie and Kaczanowski 1987, Fig. 32), Szarbia Zwierzyniecka (Baczyńska 1993, 16, Fig. 4: C; tabl. I: 4, 8), Skołoszów, site 7, grave 750 (Rybicka *et al.* 2017, 139, Fig. 28), Mierzanowice, site 1, graves 35, 36, 145, 153, 154 (Bąbel 2013a, 148-150; 2013b, Fig. 72: 2; 73: 3; 231: 5, 6; 237: 11; 242: 16), and Łubcze, Tomaszów Lubelski district, site 38, barrow 1,

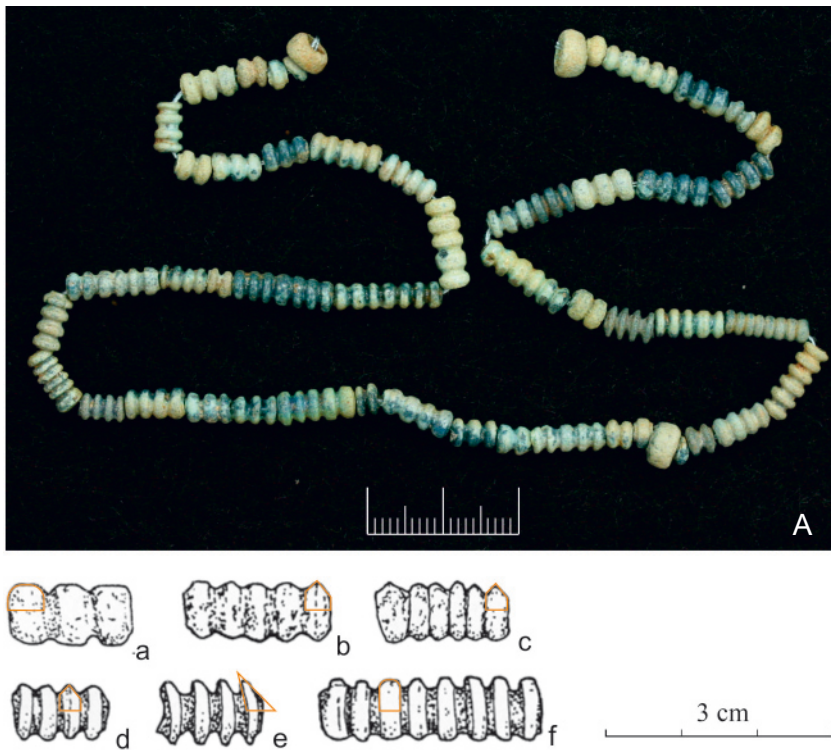


Fig. 10. Jawczyce, site 1, barrow 11. A – faience beads discovered in the grave (photo by P. Jarosz); a-f – examples of different variants of faience beads (illustrated by J. Ożóg)

grave 2 and 4 (Machnik *et al.* 2009, 111, Fig. 82: 3; 114, 85: 2; see also: Purowski 2019, 33, Fig. 3.2). However, they have also been discovered in Slovakia in the Nitra culture milieu (*e.g.* Bátora 1991, 104; Šmíd 2006) and the Košťany culture (*e.g.* Spišské Podhradie, grave 16, 200; Novotná and Soják 2016). Faience beads were also found in a grave dug into burial mound 5 in Kołpiec, Drohobycz district, by the Dniester (Sulimirski 1968, 134, Plate 8: 2) and in the ecumene of the Babino culture (Grigoriev 2019; Fig. 1: 3, 5, 6).

Four arrowheads discovered in the central part of the grave were made of various types of flint: chocolate, Jurassic and erratic. Although only two of them are fully preserved, the morphological and metric features of the entire set is very comparable. Three of these artefacts are similar to an isosceles triangle, and have slightly convex – and in one case straight – arms (sides), but all of them have sharply indented bases. The fourth arrowhead resembles an equilateral triangle and probably had a different, arched, base. The preserved arrowheads are symmetrical in the frontal plane. All are bifacial forms shaped by flat, almost fully surface retouch, partly pseudogroove perpendicular or oblique.

Small double-walled blades are a permanent element of inventories of the Final Neolithic and Early Bronze Age cultures. Their shape, the way of forming the base, and their metric proportions can be found in some coherent sets of both the Corded Ware and Mierzanowice cultures, although they generally differ in numerous varieties / variants (*e.g.* Borkowski 1987; Włodarczak 2006; Bąbel 2013b, Fig. 41: 10-16; 53: 4-7, 10, 11). Examples of forms similar to an equilateral triangle (Fig. 6: 1-3) are discovered in the equipment of some burials dated generally to phase III of the Corded Ware culture in the Małopolska Upland (see: Włodarczak 2014, Fig. 15): grave 3 in Zielona, site 3 (Włodarczak 2006, Table XLVII: 10-12, 14), grave 100 in Mierzanowice, site 1 (Włodarczak 2006, Table LXII: 9) and grave 2 in Mydłów, site 37 (Włodarczak 2006, Table LXV: 18) and in the Rzeszów Submontane region: Mirocin, Przeworsk country, sites 24 and 27 (Machnik *et al.* 2019, Fig. 14: 22; 25: 19, 20) and Szczytna, Jarosław district, sites 5 and 6 (Hozer *et al.* 2017, Fig. 14: 22; 25: 19, 20). Similarly dated stubby forms that resemble isosceles triangles are much more common (Włodarczak 2006, *ibid.*). Analogies to arrowheads (Fig. 6: 2) in inventories of the Mierzanowice culture are: the symmetrical, slim form from grave 122 at Skołoszów, site 7 (Rybicka 2017, Fig. 3: 27), and the more stubby form from grave 27 in Mierzanowice, site 1 (Bąbel 2013b, Fig. 56: 1; 167: 2). In these considerations we did not discuss the stocky blade with broken wings (Fig. 6: 4). In both Corded Ware and Mierzanowice cultures, pseudogroove retouch was used, including in the production of small bifacial blades (*cf.* Libera, Zakościelna 2013, 223 *et seq.*). Parallels to the flint arrowheads from Jawczyce can also be found in the materials of the late phase of the Yamnaya culture (Klochko 2001, Fig. 25: 22-27; 30: 4) as well as late groups of the Catacomb culture in the Northern Pontic Region (Upper Prut; Toshev 2013, Fig. 6: 27, 28).

The occurrence of barrow graves at the turn of the 3rd and 2nd millennium BC is an exceptional phenomenon. Single mounds are also present in phases V and VI of the development of the Únětice culture (Kadrow 2001, 122): *e.g.* Łęki Małe, Grodzisk Wielkopolski

district (Kowiańska-Piaszykowa 2008). Burial mounds are also detected around the middle Danube (Kadrow 2001, 132, Fig. 34; Batora 2011, 166-168; Kern 2011, 174-176). During this period, an expansion of the Babino culture into the Bug River basin may also have occurred, and it is possible that it extended farther to the west, so the barrow patterns associated with the forest-steppe may have had an impact on the previously mentioned burial place in Stryjów and Łubcze, site 25, as well as Nedeżów, site 22, barrow 2 (Włodarczyk 2019, 528).

In the basin of the upper Dniester river, there is a questionably dated mound in Rusiłów where a gold pendant, similar to the one discovered in a grave under the barrow in Stryjów, was found (Sulimirski 1968, Plate 8:1; Budziszewski *et al.* 2016, 394, Fig. 18).

In western and northern Europe in the Early Bronze Age, the frequency of barrows attributable to the Early Bronze Age is notably lower compared to the preceding and following periods (Bourgeois 2013, 168). However, as in the Mierzanowice culture, there are indications of reuse for some older mounds, and possibly of new barrows being constructed as well, but this is a rather rare event, perhaps restricted to only once every generation or even less (Bourgeois 2013, 186).

It is also important to notice the almost simultaneous presence of different burial traditions at the site in Jawczyce: barrow 11 and grave 2, which was dug into a mound of the Corded Ware culture (barrow 2), are nearly contemporary. The differences detected in the locations of burials are examples of the variation in the funeral rite during this period. The digging of burials associated with the Mierzanowice culture into older mounds is particularly evident in areas where the barrow rite of the Corded Ware culture survived until its decline (around 2300-2200 BC), *i.e.* in the Carpathian Foothills, *e.g.* Wola Węgierska (Machnik and Sosnowska 1998), Sokal Ridge – Wierszycza, site 31, barrow 1 (Machnik *et al.* 2009) and in the upper Dniester basin, *e.g.* Łotatniki, barrow II (Sulimirski 1968, 137, Fig. 16: 3, Plate 6: 3: 15, 16, 10: 8). However, such barrow graves already connected with the early stage of the development of the Mierzanowice culture were discovered, for example, in Średnia, site 3, barrow 2, grave 4 (Jarosz 2002; 2018), Kulczyce, barrows 5 and 6 (Sulimirski 1968, 136-137), and Łubcze, site 25, barrow 2, grave 1 (Machnik *et al.* 2009, 64, Fig. 47).

## 4. CONCLUSIONS

The result of the investigation of barrow 11 at site 1 in Jawczyce was the discovery of a sepulchral place dated to the Early Bronze Age (Br A1b according to P. Reinecke; Vandkilde 1996, 140, Fig. 134). The erection of the mound should be synchronized with the early stage of the development of the late phase groups of the Mierzanowice culture – phase IVa, according to the division of Sławomir Kadrow (1995, 22-24). This is the period of large, flat cemeteries with skeletal burials that did not contain clay vessels: Iwanowice, Babia Góra site (Kadrow and Machnikowie 1992, 48, ryc. 7), Szarbia (Baczyńska 1993, 50-51),

Świniary Stare (Juras *et al.* 2020, Table S1). A similar dating of  $3620 \pm 40$  BP (Poz-91860), which, after calibration, is 2031-1927 BC (68.2%), was acquired for a grave in a stone construction under the barrow in Stryjów, site 30, grave 10, in the Lublin Upland (Budziszewski *et al.* 2016, 384, Fig. 4).

Barrow 11, excavated at site 1 in Jawczyce, is a unique find for the Early Bronze Age. Its size and location in the landscape refers to the Final Neolithic mounds of the Corded Ware culture. Both the dimensions and orientation of the burial pit suit these older standards. However, the exclusion of ceramic vessels from the grave inventory is a widespread custom at that time, as was demonstrated during studies of the mound-covered funeral complex at the site in Stryjów in the Lublin Upland (Budziszewski *et al.* 2016). It is difficult to unambiguously determine whether the barrow erected at site 1 in Jawczyce should be associated with the movement of barrow communities from other areas, or whether it is rather a independent invention of the people living in the shadow of the Final Neolithic burial mounds. The barrow cemetery in Jawczyce is an important example of the repeated usage of a place for funeral purposes by communities that do not display any genetic relationships. The achieved results also indicate the importance of investigations of the highlands in south-eastern Poland. Excavations in Jawczyce revealed previously unknown, local cultural phenomena in the Early Bronze Age in the Wieliczka Foothills.

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### References

- Baczyńska B. 1993. *Cmentarzysko kultury mierzanowickiej w Szarbi, woj. kieleckie. Studium obrządku pogrzebowego*. Kraków: Wydawnictwo i Drukarnia Secesja.
- Bargiel B. 2006. Kultura strzyżowska w świetle znalezisk grobowych. *Wiadomości Archeologiczne* 58, 65-99.
- Bátora J. 1991. The reflection of economy and social structure in the cemeteries of the Chlopice-Veselé and Nitra cultures. *Slovenská Archeológia* 39, 91-142.
- Bátora J. 2011. Pochovávanie pod mohylami v oblasti stredného Dunaja v závere eneolitu a na počiatku doby bronzovej. In H. Kowalewska-Marszałek and P. Włodarczak (eds), *Kurhany i obrządek*

*pogrzebowy w IV-II tysiącleciu p.n.e.* Kraków, Warszawa: Instytut Archeologii i Etnologii PAN, Instytut Archeologii UW, 163-170.

- Bąbel J. T. 2013a. *Cmentarzyska społeczności kultury mierzanowickiej na Wyżynie Sandomierskiej. Część 1. Obrządek pogrzebowy* (= *Collectio Archaeologica Ressoviensis* 24/1). Rzeszów: Fundacja Rzeszowskiego Ośrodka Archeologicznego, Instytut Archeologii UR.
- Bąbel J. T. 2013b. *Cmentarzyska społeczności kultury mierzanowickiej na Wyżynie Sandomierskiej. Część 2. Źródła* (= *Collectio Archaeologica Ressoviensis* 24/2). Rzeszów: Fundacja Rzeszowskiego Ośrodka Archeologicznego, Instytut Archeologii UR.
- Borkowski W. 1987. Neolithic and Early Bronze Age heart-shaped arrow-heads from the Little Poland Upland. In J. K. Kozłowski and S. K. Kozłowski (eds), *New in Stone Age archaeology* (= *Archaeologia Interregionalis* 8). Warsaw, Cracow: Instytut Archeologii UW, Instytut Archeologii UJ, 147-181.
- Bourgeois Q. 2013. *Monuments on the horizon. The formation of the barrow landscape throughout the 3rd and 2nd millennium BC*. Leiden: Sidestone Press.
- Bouzek J. 2015. Únětická kultura a civilizace východního Středomoří, Egypta a Mezopotámie. In J. Batora and P. Tóth (eds), *Keď bronz vystriedal meď. Zborník príspevkov z XXIII. medzinárodného sympózia „Staršia doba bronzová v Čechách, na Morave a na Slovensku“*. Levice 8.–11. októbra 2013 (= *Archaeologica Slovaca Monographiae* 18). Nitra, Bratislava: SAV, 39-50.
- Bronk Ramsey C. 2017. Methods for Summarizing Radiocarbon Datasets. *Radiocarbon* 59(2), 1809-1833.
- Budziszewski J., Jarosz P., Libera J., Szczepanek A., Witkowska B. and Włodarczak P. 2016. Kurhany ze stanowiska 30 w Stryjowie, pow. krasnostawski. In P. Jarosz, J. Libera and P. Włodarczak (eds), *Schyłek neolitu na Wyżynie Lubelskiej*. Kraków: Instytut Archeologii i Etnologii PAN, 505-532.
- Galas P. 1948. Jawczyce, pow. Wieliczka. *Z otchłani wieków* 17, 83.
- Gancarski J., Machnikowie A. and J. 1986. Wyniki badań kurhanu A kultury ceramiki sznurowej we wsi Bierówka, gmina Jasło w woj. krośnieńskim. *Acta Archaeologica Carpathica* 25, 55-87.
- Gancarski J., Machnikowie A. and J. 1990. Kurhan B kultury ceramiki sznurowej w Bierówce, gm. Jasło w świetle badań archeologicznych. *Acta Archaeologica Carpathica* 29, 99-124.
- Górski J. and Jarosz P. 2006. Cmentarzysko kultury ceramiki sznurowej i trzcienieckiej w Gabułtowiu. *Sprawozdania Archeologiczne* 58, 401-451.
- Gregerová M., Hložek M. and Sulovský P. 2006. Přírodovědné analýzy fajánsového korálku z hrobu nitranské kultury ze Slatinic, okres Olomouc. *Slovenská Archeológia* 54(1), 33-40.
- Grigoriev S. 2019. Central European Impulses in Eastern Europe in the Early Second Millennium BC. *Slovenská Archeológia* 67(2), 225-239.
- Hozer M., Machnik J. and Bajda-Wesołowska A. 2017. Groby kultury ceramiki sznurowej i domniemane kultury mierzanowickiej w Szczytnej, pow. Jarosław – źródła, analiza, wnioski. In P. Jarosz and J. Machnik (eds), *Nekropolie ludności kultury ceramiki sznurowej z III tysiąclecia przed Chr. w Szczytnej na Wysoczyźnie Kańczuckiej* (= *Via Archaeologica Ressoviensia* 12). Rzeszów: Oficyna Wydawnicza Zimowit, 7-130.

- Jarosz P. 2002. Kurhan kultury ceramiki sznurowej w Średniej st. 3, pow. Przemysł. Wyniki badań wykopaliskowych prowadzonych w 2001 r. *Rocznik Przemyski* 38. *Archeologia* 2, 3-19.
- Jarosz P. 2006. Badania ratownicze na stanowisku 1 w Wiatowicach, gm. Gdów, woj. małopolskie. *Acta Archaeologica Carpathica* 41, 161-170.
- Jarosz P. 2011. Kurhany kultury ceramiki sznurowej na pogórzach i wysoczyznach karpackich. In H. Kowalewska-Marszałek and P. Włodarczak (eds), *Kurhany i obrządek pogrzebowy w IV-II tysiącleciu p.n.e.* Kraków, Warszawa: Instytut Archeologii i Etnologii PAN, Instytut Archeologii UJ, 255-277.
- Jarosz P. 2018. The Settlement of the Corded Ware Culture and Early Phases of the Mierzanowice Culture in Carpathian Mountains. In A. Pelisiak, M. Nowak and C. Astaloş (eds), *People in the Mountains. Current Approaches to the Archaeology of Mountainous Landscapes*. Oxford: Archaeopress Publishing Ltd, 139-152.
- Jarosz P. and Włodarczak P. 2007. Chronologia bezwzględna kultury ceramiki sznurowej w Polsce południowo-wschodniej oraz na Ukrainie. *Przegląd Archeologiczny* 55, 71-108.
- Juras A., Makarowicz P., Chyleński M., Ehler E., Malmström H., Krzewińska M., Pospieszny Ł., Górski J., Taras H., Szczepanek A., Polańska M., Włodarczak P., Szyca A., Lasota-Kuś A., Wójcik I., Jakobsson M. and Dabert M. 2020. Mitochondrial genomes from Bronze Age Poland reveal genetic continuity from the Late Neolithic and additional genetic affinities with the steppe populations. *American Journal of Physical Anthropology* 2020; 1-13. DOI: 10.1002/ajpa.24057.
- Kadrow S. 1995. *Gospodarka i społeczeństwo. Wczesny okres epoki brązu w Małopolsce*. Kraków: Instytut Archeologii i Etnologii PAN.
- Kadrow S. 2001. *U progu nowej epoki. Gospodarka i społeczeństwo wczesnego okresu epoki brązu w Europie Środkowej*. Kraków: Instytut Archeologii i Etnologii PAN, Oddział w Krakowie.
- Kadrow S. and Machnik J. 1997. *Kultura mierzanowicka. Chronologia, taksonomia i rozwój przestrzenny* (= *Prace Komisji Archeologicznej* 29). Kraków: Wydawnictwo Oddziału Polskiej Akademii Nauk w Krakowie.
- Kadrow S. and Machnikowie A. and J. 1992. *Iwanowice. Stanowisko Babia Góra, część II. Cmentarzysko z wczesnego okresu epoki brązu*. Kraków: Secesja.
- Kern D. 2011. Äneolithische und frühbronzezeitliche Hügelgräber in Ostösterreich. In H. Kowalewska-Marszałek and P. Włodarczak (eds), *Kurhany i obrządek pogrzebowy w IV-II tysiącleciu p.n.e.* Kraków, Warszawa: Instytut Archeologii i Etnologii PAN, Instytut Archeologii UJ, 171-178.
- Klochko V. I. 2001. Weaponry of Societies of the Northern Pontic Culture Circle: 5000-700 BC. *Baltic-Pontic Studies* 10.
- Komornicki T., Gerlach T., Zasoński S. and Oleksynowa K. 1990. Gleba w otoczeniu kurhanów neolitycznych w Bierówce koło Jasła oraz gleba w kurhanie B. *Acta Archaeologica Carpathica* 29, 125-142.
- Kondracki J. 2000. *Geografia regionalna Polski*. Warszawa: Wydawnictwo Naukowe PWN.
- Kowiańska-Piaszykowska M. 2008. *Cmentarzysko kurhanowe z wczesnej epoki brązu w Łękach Małych (Wilanowie) w Wielkopolsce* (= *Bibliotheca Fontes Archaeologici Posnanienses* 12). Poznań: Muzeum Archeologiczne w Poznaniu.



- Libera J. and Zakościelna A. 2013. Retusz ryńienkowaty w eneolicie i wczesnej epoce brązu na ziemiach polskich. In M. Nowak, D. Stefański and M. Zajac (eds), *Retusz – jak i dlaczego? Wieloperspektywiczność elementu twarżowego* (= *Prace Archeologiczne* 66). Kraków: Uniwersytet Jagielloński, Instytut Archeologii, 215-239.
- Machnik J., Bągińska J. and Koman W. 2009. *Neolityczne kurhany na Grzędzie Sokalskiej w świetle badań archeologicznych w latach 1988-2006. Z aneksami Jerzego Libery i Lucjana Gazdy*. Kraków: Polska Akademia Umiejętności.
- Machnik J., Jarosz P. and Mazurek M. 2019. Groby ludności kultury ceramiki sznurowej w Miocinie pow. Przeworsk. In P. Jarosz, J. Machnik and A. Szczepanek (eds), *Nekropolie ludności kultury ceramiki sznurowej z III tysiąclecia przed Chr. w Miocinie na Wysoczyźnie Kańczuckiej* (= *Via Archaeologica Ressorviensia* 15). Rzeszów: Wydawnictwo Uniwersytetu Rzeszowskiego, 7-139.
- Machnik J. and Sosnowska E. 1998. Kurhan ludności kultury ceramiki sznurowej z przełomu III i II tysiąclecia przed Chrystusem w Woli Węgierskiej, gm. Roźwienica, woj. przemyskie. *Rocznik Przemyski* 34. *Archeologia* 33, 3-20.
- Machnikowie A. i J. and Kaczanowski K. 1987. *Osada i cmentarzysko z wczesnego okresu epoki brązu na „Górze Klin” w Iwanowicach*. Wrocław, Warszawa, Kraków, Gdańsk, Łódź: Zakład Narodowy im. Ossolińskich. Wydawnictwo Polskiej Akademii Nauk.
- Novotná M. and Soják M. 2016. Gräberfeld der Košťany-Kultur in Spišské Podhradie (Zips). *Acta Archaeologica Carpathica* 51, 67-82.
- Purowski T. 2019. *Od fajansu do szkła. Kontakty ziem polskich z głównymi centrami cywilizacyjnymi w II-I tys. p.n.e. w świetle badań archeometrycznych tworzyw szklistych*. Warszawa: Instytut Archeologii i Etnologii PAN.
- Purowski T. 2020. New data on the technology of faience production in central Europe in the early bronze age. *Archaeometry* 62(3), 563-576.
- Reimer P. J., Bard E., Bayliss A., Beck J. W., Blackwell P. G., Bronk Ramsey C., Grootes P. M., Guilderson T. P., Hafliðason H., Hajdas I., Hatté C., Heaton T. J., Hoffmann D. L., Hogg A. G., Hughen K. A., Kaiser K. F., Kromer B., Manning S. W., Niu M., Reimer R. W., Richards D. A., Scott E. M., Southon J. R., Staff R. A., Turney C. S. M. and van der Plicht J. 2013. IntCal13 and Marine13 Radiocarbon Age Calibration Curves 0 – 50,000 Years cal BP. *Radiocarbon* 55(4).
- Robinson C., Baczyńska B. and Polańska M. 2004. The origins of faience in Poland. *Sprawozdania Archeologiczne* 56, 79-154.
- Rybicka M., Głowacz M. and Król D. 2017. Datowanie radiowęglowe wielokulturowego cmentarzyska ze Skołoszowa, stanowisko 7, pow. jarosławski, woj. podkarpackie. In M. Rybicka (ed.), *Wielokulturowe cmentarzysko w Skołoszowie, stanowisko 7, pow. jarosławski w kontekście osadnictwa z neolitu i wczesnej epoki brązu we wschodniej części Podgórze Rzeszowskiego*. Rzeszów: Oficyna wydawnicza Zimowit, 113-142.
- Solon J., Borzyszkowski J., Bidlasik M., Richling A., Badora K., Balon J., Brzezińska-Wójcik T., Chabudziński Ł., Dobrowolski R., Grzegorezyk I., Jodłowski M., Kistowski M., Kot R., Krąż P., Lechnio J., Macias A., Majchrowska A., Malinowska E., Migoń P., Myga-Piątek U., Nita J.,

- Papińska E., Rodzik J., Strzyż M., Terpiłowski S. and Ziaja W. 2018. Physico-geographical mesoregions of Poland: Verification and adjustment of boundaries on the basis of contemporary spatial data. *Geographia Polonica* 91(2), 143-170.
- Sulimirski T. 1968. *Corded Ware and Globular Amphorae North-East of Carpathians*. London: University of London. The Athlone Press.
- Šmíd M. 2006. Pohřebišťe nitranské kultury ze slatinic, okres Olomouc. *Slovenská Archeológia* 54(1), 1-40.
- Toshev G. N. 2013. In the west of the Catacomb area. *Baltic-Pontic Studies* 18, 72-85.
- Vandkilde H. 1996. *From stone to bronze: the metalwork of the late Neolithic and earliest Bronze Age in Denmark*. Moesgaard: Aarhus Universitetsforlag.
- Włodarczak P. 2006. *Kultura ceramiki sznurowej na Wyżynie Małopolskiej*. Kraków: Instytut Archeologii i Etnologii PAN.
- Włodarczak P. 2014. The Traits of early-bronze Pontic cultures in the development of old upland Corded Ware (Małopolska Groups) and Złota culture communities. *Baltic-Pontic Studies* 19, 7-52.
- Włodarczak P. 2017. Małopolska at the beginning of the Bronze Age (2000-1600 BC). In U. Bugaj (ed.), *The Past Societies. Polish lands from the first evidence of human presence to the Early Middle Ages 3: 2000-500 BC*. Warszawa: Instytut Archeologii i Etnologii PAN, 50-85.
- Włodarczak P. 2019. Małopolskie społeczności kurhanowe u schyłku neolitu i we wczesnej epoce brązu. In M. Szmyt, P. Chachlikowski, J. Czebreszuk, M. Ignaczak and P. Makarowicz (eds), *VIR BIMARIS. Od kujawskiego matecznika do stepów nadczarnomorskich. Studia z dziejów międzymorza bałtycko-pontyjskiego ofiarowane Profesorowi Aleksandrowi Koško (= Archaeologia Bimaris – Dyskusje 7)*. Poznań: Uniwersytet im. Adama Mickiewicza w Poznaniu, Instytut Archeologii, Zakład Prahistorii Europy Środkowo-Wschodniej, 519-532.
- Zoll-Adamikowa H. and Niżnik J. 1963. Z badań kopców-mogił w Jawczycach i Wiatowicach (Podkarpace Polskie) w latach 1960-1961. *Acta Archaeologica Carpathica* 5, 25-39.
- Żaki A. 1952. Początki osadnictwa w Karpatach Polskich. *Wierchy* 24, 99-116.