

Archaeological description, inventory, cultural attribution and interpretation of graves 23 and 25 at Złota, site 6

General description of the feature 23 (see Fig. S1)

Feature 23 was a deep pit excavated into the loess bedrock, circular in horizontal cross-section. Its walls were almost vertical, but the structure widened toward the flat bottom. The diameter measured approximately 160 cm at the top and almost 200 cm at the bottom. Its preserved depth reached about 210–215 cm from the present ground level, though erosion processes suggest that its original depth likely exceeded 250 cm.

The bottom and the lower parts of the loess walls (up to 60–70 cm above the base) were reddened due to exposure to fire. The bottom was irregularly paved with flat sandstone slabs and stones of various sizes, including two grinding stones. This paved surface may be interpreted as an intentional architectural modification, perhaps linked to the previous use of the pit for storage or processing activities. Paving is uncommon in storage pits but not entirely unknown in Złota culture contexts.

Above the pavement lay a c. 10-cm-thick layer of dark green soil interspersed with yellow loess, containing 14 mussel shells, six animal bone fragments, six flint flakes (chocolate and Świeciechów varieties), and 36 small, mostly undiagnostic pottery sherds attributed to the Złota culture (ZC). This layer likely represents a secondary deposition, possibly associated with the use of the pit as a refuse dump after its primary function had ceased. These flints derive from the earlier, non-funerary use of the pit and are not associated with the burial inventory.

In the centre of the feature, above this layer, the skeleton of an adult male was found in a flexed position. This burial marks a significant shift in the function of the feature: from a utility structure to a funerary context. Between the knees and arms of the deceased, two vessels – a bowl and a small beaker – were deposited, both crushed by soil pressure. The presence of these grave goods, along with the burial's positioning, signifies a ritual transformation of the pit into a grave, possibly after a short period of abandonment.

Above the skeleton, up to approximately 50–60 cm above the bottom, the fill consisted of bright yellow loess. This was overlaid by a dome-shaped layer of dark grey soil with inclusions of yellow loess and stones, which in turn was capped by dark grey soil containing bright loess lenses. This upper fill yielded over 100 sherds of Mierzanowice culture (MRC) pottery, alongside a dozen or so sherds from other cultural traditions, including Funnel Beaker

culture (FBC), Globular Amphora culture (GAC), ZC, and Corded Ware culture (CWC). Additional finds included daub fragments, mussel shells, animal bone fragments (notably part of a pig's skull), erratic and local flint flakes, and several large unworked stones.

Grave inventory

The grave goods consisted of two intentionally deposited ceramic vessels:

Bowl:

A tall bowl with a vertical neck and a slightly rounded shoulder situated roughly one-third of the vessel's height; the flat base is only subtly defined. The rim is rounded. The neck is decorated with six double wavy lines impressed with a bipartite cord, bordered above by two double horizontal bands and below by one such band. The shoulder features a horizontal zone of rectangular stamp impressions. The surfaces are roughly smoothed, revealing visible orange-grey temper grains. The vessel was made of clay tempered with crushed pottery. Dimensions: rim diameter 18.7 cm, body diameter 18.6 cm, base diameter 7.2 cm, height 11.5 cm, wall thickness 0.6–0.9 cm.

Beaker:

This small vessel has a slightly S-curved profile with a subtly rounded shoulder and a flat, faintly demarcated base. The high neck is slightly flared with a rounded rim. Below the rim is a band of small vertical and oblique notches, while the junction of the neck and body bears vertical impressions made with a narrow rectangular stamp. The neck is also adorned with four irregular double wavy bands and a double horizontal band (all impressed with a bipartite cord). Both surfaces are roughly smoothed, revealing visible orange-grey temper (with darker inclusions). The vessel was made of clay tempered with crushed pottery. Dimensions: rim diameter 10 cm, body diameter 10.2 cm, base diameter 4.5 cm, height 12.5 cm, wall thickness 0.5–0.7 cm.

The form, decorative style, and manufacturing technique of both vessels correspond closely with the Złota culture repertoire, particularly the use of cord-impressed wavy bands, which – despite being somewhat crudely executed in this instance – remain diagnostic. Analogous examples come from sites such as Złota “Grodzisko I” (*Krzak 1961*) and Złota „Nad Wawrem” (*Krzak 1976*), among others.

Cultural attribution and chronology

The form and construction of the pit, its later transformation into a grave, and the character of the burial support attribution to the Złota culture. Initially, the pit functioned as a storage

structure (cellar-like feature), as suggested by its depth, circular shape, fire-reddened walls, and paving – features observed in other ZC storage pits, e.g. features 54 and 215 at Złota “Nad Wawrem” (*Krzak 1976*). At a later stage, the pit became a refuse dump, as indicated by the thin rubbish layer with mixed cultural material. Eventually, the feature was adapted for use as a grave.

This transformation aligns with burial practices observed in Neolithic and Early Bronze Age contexts, although such reuse within settlements is rarely recorded for the Złota culture. However, closer parallels can be found in the Globular Amphora and Corded Ware cultures, both chronologically and geographically related to the Złota culture. Notably, graves recorded at Mierzanowice, site 1, on the Sandomierz Upland, attributed to the Globular Amphora culture, display similar use of settlement pits for funerary purposes (*Balcer 1963; Włodarczak 2016*). Given the limited number of ZC sites investigated in detail, this evidence provides a valuable new insight into ZC funerary variability.

The body of the male individual, aged c. 50–60 years (Senilis), was placed on his left side along a NW-SE axis, with the head to the SE and limbs flexed. Such burial positioning corresponds to ZC funerary customs. While body placement varied across Late Neolithic and Early Bronze Age cultures, ZC males were typically buried on their left sides with heads oriented towards the SE (*Krzak 1961; Machnik 1979; Bajka et al. 2018*). In contrast, CWC and MRC show different sex-linked burial orientations. In contrast, the CWC and MRC display different sex-linked burial orientations. Therefore, the individual’s burial conforms to expected ZC patterns in both orientation and grave goods.

A bone sample from the burial was dated by AMS 14C at the Poznan Radiocarbon Laboratory (Poz-174480) to 4075 ± 35 BP. Calibrated, this corresponds to 2837–2500 cal BC (68.3% probability), placing the burial in the late 3rd millennium BC. This fits well within the absolute chronology of the Złota culture (*Włodarczak 2008; 2013; 2017; 2019; Wilk 2013*).

General description of the grave 25 (see Fig. S1)

The grave was discovered in 2012 and took the form of a somewhat regular pit resembling a trapezoid, with approximate dimensions of $180 \times 160 \times 140 \times 210$ cm and a depth of approximately 80–95 cm measured from the current ground level (see Fig. S1). Considering erosion processes – which caused surrounding Mierzanowice culture (MRC) graves to be detected already in the plough zone during earlier investigations (*Florek – Zakościelna 2006*) – it is assumed that the original depth of the grave was at least 150–180 cm. The flat bottom of the grave pit in the north-western part was covered with small stone slabs forming an irregular pavement. On this pavement, and partly beyond it, lay a considerably disarticulated human skeleton, preserved only as fragments of lower limbs with the pelvis, fragments of upper limbs, and a few single vertebrae and other small bones.

Next to the left shank bones, three artefacts were deposited together: two small blades – one made of chocolate flint and the other of chalk flint and a copper piercer. The grave pit was filled with pure loess containing a small amount of humus.

The incomplete and non-anatomical arrangement of the skeletal remains, together with the fragmentary nature of the burial, is notable. Only parts of limbs and pelvic bones as well as fragments of scapulae and clavicles were recovered. The absence of the skull, ribs, most vertebrae (save for one), and sternum is striking. Given the depth of 80–90 cm from the modern ground surface, it is unlikely that ploughing alone caused the loss of these bones, as shallower graves from the CWC and MRC with more complete skeletons have been recorded closer to the plough zone.

Grave inventory

The grave (feature 25) contained the following artefacts:

Copper piercer:

Made of copper, square in cross-section, gradually tapering towards both ends; length 7.3 cm, widest cross-section 0.35×0.35 cm, weight 7.25 g. Initially interpreted as a flint retouching tool (*Florek 2012*), this was later dismissed based on microscopic use-wear analysis.

Blade:

Made of chocolate flint, struck from a tetrahedral polished flint axe reshaped into a core. Traces of polishing along one edge and a blurred polished apex (likely due to hafting) are visible, alongside micro-retouch on the edges and indistinct polish from brief use processing soft materials or storage in an organic container; length 6.6 cm, width 1.6 cm, thickness 0.3 cm.

Apical part of a blade:

Made of chalk flint, with micro-retouch on edges and slight surface wear consistent with short-term use or organic storage; length 3.8 cm, width 1.1 cm, thickness 0.4 cm.

The blades and the copper piercer were likely deposited together, possibly in an organic container.

Cultural attribution and chronology

The grave's trapezoidal shape and the irregularly paved slab floor correspond with burial features attributed to the Złota culture (ZC). Comparable graves have been documented at several sites in the Sandomierz region and its environs: Small Market (Mały Rynek) (*Bajka et al. 2018*, pp. 140–141), Kościuszki Street (*Rajpold 2025*), Salve Regina Hill (*Ścibior 1993*), Kleczanów (*Bajka – Florek 2020*, pp. 286–287), Złota „Grodzisko I” (*Krzak 1961*, pp. 16, 90; *1976*, pp. 46–47), and Książnice, Busko District (*Wilk 2013*, pp. 312–320). Due to its form and characteristics, feature 25 is best classified as a niche grave – a type typically associated with the ZC.

The fill of the grave indicates that the ceiling collapsed before the grave was backfilled with soil, which slid down through the entrance shaft. The absence of remains of this shaft may be attributed to disturbance by ploughing, erosion, or the similarity between the fill and surrounding loess bedrock (*Włodarczak 2006*, p. 53). This lack of shaft traces is common among niche graves attributed to the ZC.

Niche graves, generally consisting of a vertical shaft leading to a burial chamber (the niche) often paved with flat slabs, are characteristic of both the ZC and the Corded Ware culture (CWC) (*Krzak 1976*, pp. 171–178; *Włodarczak 2006*, p. 53). ZC tombs typically have paved niches with stones or bodies placed on the slabs (*Krzak 1976*, pp. 160–171; *Ścibior 1993*, pp. 318–319; *Wilk 2013*, pp. 320–322; *Bajka et al. 2018*; *Bajka – Sieradzka 2019*, pp. 245–253, *Bajka – Florek 2020*, pp. 286–289), whereas CWC niche graves usually lack paving (*Włodarczak 2006*, pp. 53–58).

The fragmented, non-anatomical burial style also supports ZC affiliation, reflecting funerary practices inherited from the Globular Amphora Culture (GAC), frequently recorded at ZC cemeteries (*Krzak 1976*, pp. 161–178; *Włodarczak 2017*, p. 300).

Although ZC graves are generally well-equipped with vessels (often multiple) and sometimes include ornaments (bead necklaces, pendants made of shells, bones, antler, animal teeth, amber, and sporadically copper), and artefacts made of stone, flint, bone, antler, or clay (*Krzak 1976*, pp. 177–178), feature 25 notably lacks vessels or pottery fragments. The only grave goods are the copper awl (piercer) and two small flint blades. The chocolate flint blade,

broken post-depositionally, was made from a polished tetrahedral flint axe reshaped into a core. Such axes are rare in ZC contexts, with no known chocolate flint examples. Polished tetrahedral axes made of striped flint are common in the GAC; chocolate flint axes attributed to the GAC and CWC are scarce finds (*Balcer 1983; Włodarczak 2006; Mączyński 2018; Niezabitowska-Wiśniewska – Wiśniewski 2018*).

Copper artefacts in ZC graves are uncommon, generally limited to small, simple adornments or fragments (*Wilk 2013*). Copper awls/piercers or punches occur sporadically in CWC graves (*Włodarczak 2006*).

Radiocarbon dating of a bone sample from the skeleton yielded 4130 ± 35 BP (Poz-174481), calibrated to 2860–2627 cal BC (68.3% probability). This date range aligns with the absolute chronology of the ZC (*Włodarczak 2006; 2008; 2013; 2017; 2019; Wilk 2013; Włodarczak – Przybyła 2013*), the GAC (*Florek – Witkowska 2021*), and phases I–IIIB of the CWC (*Włodarczak 2006*) in the Sandomierz Upland region.

Taking into account the grave's form and chronology, the feature is most probably attributable to the Złota culture.

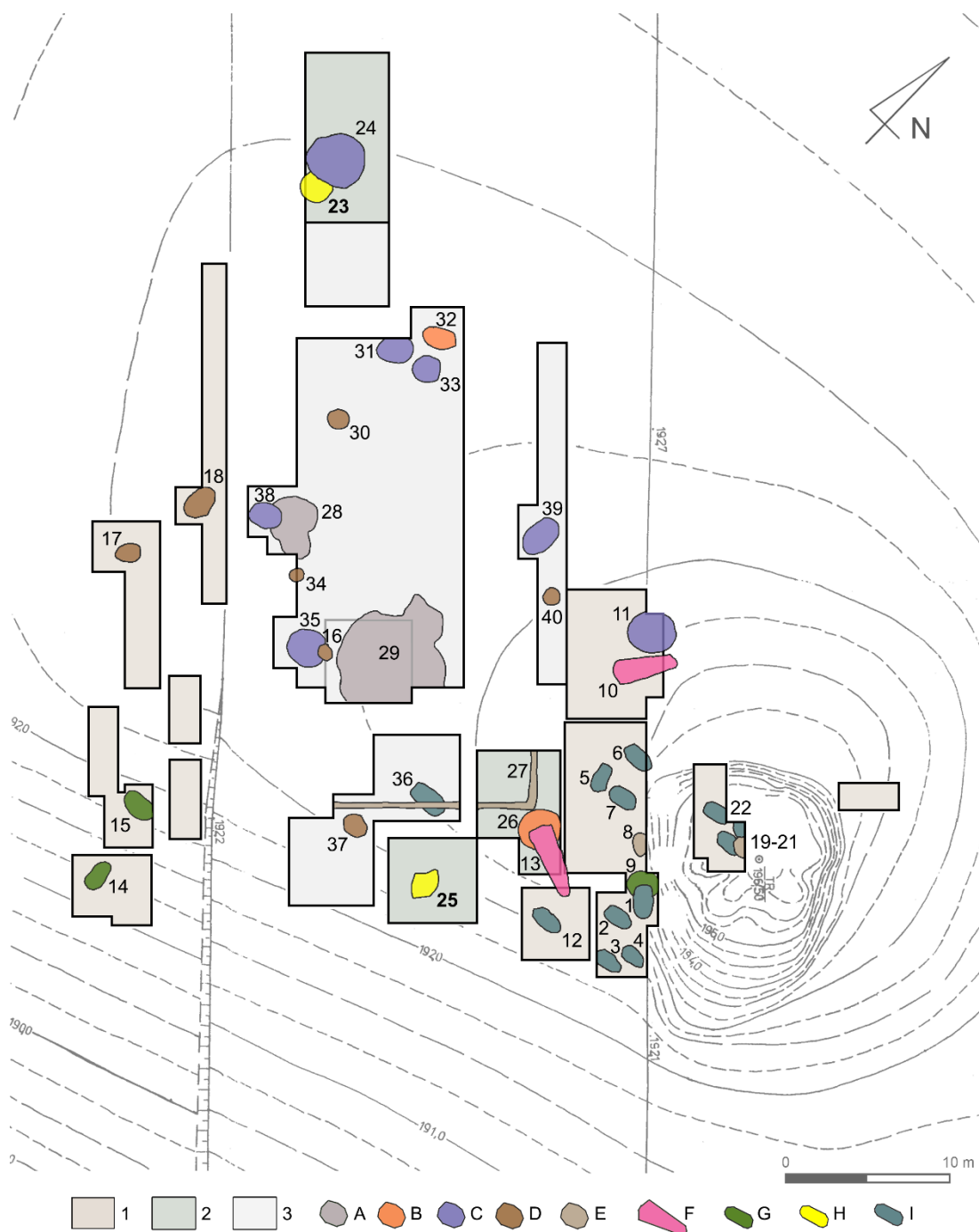


Figure S1. Złota, site 6. Distribution of excavation trenches and features uncovered between 2002 and 2013. Legend: 1 – trenches from 2002–2004; 2 – trenches from 2012; 3 – trenches from 2013. A – settlement features of the Malice culture; B – settlement features of the Złota culture; C – settlement features of the Mierzanowice culture; D – settlement features of undetermined chronology; E – post-medieval features; F – kilns of the Mierzanowice culture; G – graves of the Corded Ware culture; H – graves of the Złota culture; I – graves of the Mierzanowice culture.

References:

- Bajka, M. – Florek, M. 2020: Złota culture grave from Kleczanów, Sandomierz district, Świętokrzyskie Voivodeship. Sprawozdania Archeologiczne 72, 285–306. <https://doi.org/10.23858/SA/72.2020.2.1846>*
- Bajka, M. – Florek, M. – Kozak-Zychman, W. – Makowiecki, D. – Szmyt, M. – Trzaska, A. 2018: Grób ludności kultury złockiej z Sandomierza, stan. 1 (Mały Rynek), woj. świętokrzyskie. Fontes Archaeologici Posnanienses 52, 137–172.*
- Bajka, M. – Sieradzka, E. 2019: The Złota culture grave from Świącica, site 30, Sandomierz district. Sprawozdania Archeologiczne 71, 243–272. <https://doi.org/10.23858/SA71.2019.010>*
- Balcer, B. 1963: Osada kultury amfor kulistych na stanowisku 1 w Mierzanowicach, pow. Opatów. Materiały Starożytne 9, 99–142.*
- Balcer, B. 1983: Wytwórczość narzędzi krzemienych w neolicie ziem Polski. Wrocław: Zakład Narodowy im. Ossolińskich.*
- Florek, M. 2012: Badania archeologiczne w Złotej koło Sandomierza w latach 2002–2004 i 2012. Zeszyty Sandomierskie 33, 66–69.*
- Florek, M. – Witkowska, B. 2021: Absolute chronology of settlement remains of the Globular Amphora culture in the Sandomierz Upland (Site Galkowice-Ocin, Mierzanowice, Złota–Nad Wawrem). Baltic-Pontic Studies 25, 159–188.*
- Florek, M. – Zakościelna, A. 2006: Wyniki badań ratowniczych na stanowisku 6 w Złotej, pow. sandomierski, w latach 2002–2004. Archeologia Polski Środkowowschodniej 8, 41–56.*
- Krzak, Z. 1961: Materiały do znajomości kultury złockiej, Wrocław – Warszawa – Kraków: Zakład Narodowy Imienia Ossolińskich Wydawnictwo Polskiej Akademii Nauk.*
- Krzak, Z. 1976: The Złota culture. Wrocław-Warszawa-Kraków-Gdańsk: Zakład Narodowy im. Ossolińskich Wydawnictwo PAN.*
- Machnik, J. 1979: Krąg kulturowy ceramiki sznurowej. In: Z. Hensel – T. Wiślański (eds.), Prahistoria ziem polskich. Neolit. Wrocław – Warszawa – Kraków: Zakład Narodowy Imienia Ossolińskich Wydawnictwo Polskiej Akademii Nauk, 337–411.*
- Mączyński, P. 2018: Uwagi o sposobach wykorzystania wytworów krzemienych o pradziejowej metryce na przykładzie materiałów ze stanowiska Puławy – Włostowice. In: B. Niezabitowska-Wiśniewska (ed.), Puławy-Włostowice. Wielokulturowe stanowisko z zachodniej Lubelszczyzny. Lublin: Instytut Archeologii UMCS w Lublinie, 343–356.*
- Niezabitowska-Wiśniewska, P. – Wiśniewski, T. 2018: Osadnictwo ludności kultur amfor kulistych i ceramiki sznurowej. In: B. Niezabitowska-Wiśniewska (ed.), Puławy-Włostowice. Wielokulturowe stanowisko z zachodniej Lubelszczyzny. Lublin: Instytut Archeologii UMCS w Lublinie, 264–282.*

- Rajpold, W. 2025: Materiały kultury złockiej ze zbiorów Muzeum Zamkowego w Sandomierzu. Pękowice – Sandomierz: Profil-Archeo.*
- Ścibior, J. 1993: Badania na wzgórzu Salve Regina w 1988 roku. In: S. Tabaczyński (ed.), Sandomierz, badania 1969–1973. Warszawa: Instytut Archeologii i Etnologii PAN, 318–332.*
- Wilk, S. 2013: A Złota culture cemetery at Książnice site 2, Świętokrzyskie Province. Sprawozdania Archeologiczne 65, 311–362.*
- Włodarczak, P. 2006: Kultura ceramiki sznurowej na Wyżynie Małopolskiej. Kraków: Instytut Archeologii i Etnologii Polskiej Akademii Nauk.*
- Włodarczak, P. 2008: Kultura złocka i problem genezy kultury ceramiki sznurowej w Małopolsce. In: J. Bednarczyk – J. Czebreszuk – P. Makarowicz – M. Szmyt (eds.), Na pograniczu światów: Studia z pradziejów międzymorza bałtycko-pontyjskiego. Poznań: Wydawnictwo Poznańskie, 555–576.*
- Włodarczak, P. 2013: Projekt badań chronologii absolutnej eneolitu i początków epoki brązu w Małopolsce. In: I. C. Soják (ed.), Otázky neolitu a eneolitu našich krajín – 2010. Archaeologica Slovaca Monographiae 15. Nitra: Archeologický ústav SAV, 373–387.*
- Włodarczak, P. 2016: Dwa rytuały, dwie społeczności, dwie epoki, dwa światy? Obrządek pogrzebowy w późnym- i schyłkowym neolicie na Wyżynie Lubelskiej. In: P. Jarosz – J. Libera – P. Włodarczak (eds.), Schyłek neolitu na Wyżynie Lubelskiej. Kraków: Instytut Archeologii i Etnologii Polskiej Akademii Nauk, 549–561.*
- Włodarczak, P. 2017: Battle-axes and beakers. The Final Eneolithic societies. In: P. Włodarczak (ed.), The Past Societies. Polish lands from the first evidence of human presence the early Middle Ages: 5000–2000 BC. Warszawa: Instytut Archeologii i Etnologii Polskiej Akademii Nauk, 275–329.*
- Włodarczak, P. 2019: Grób z Wilczyc na tle środkowoeuropejskich odmierności i reguła w obrzędzie pogrzebowym małopolskiej kultury ceramiki sznurowej. In: P. Włodarczak (ed.), Wilczyce, stanowisko 10. Norma i precedens w rytuale pogrzebowym małopolskiej kultury ceramiki sznurowej. Kraków – Niepołomice – Pękowice: ProfilArcheo, 169–209.*
- Włodarczak, P. – Przybyła, M. 2013: Groby z Koszyc na tle innych późno- i schyłkowo-neolitycznych znalezisk środkowoeuropejskich. In: M. M. Przybyła – A. Szczepanek – P. Włodarczak (eds.), Koszyce, stanowisko 3. Przemoc i rytuał u schyłku neolitu. Ocalone Dziedzictwo Archeologiczne 4. Kraków – Pękowice: Profil-Archeo – SAT ‘Stater’, 209–255.*