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Barbara Witkowska[1], Piotr Włodarczak[2]

RELATIONSHIPS BETWEEN GLOBULAR AMPHORA AND CORDED WARE OCCUPATION PHASES IN ZŁOTA-*NAD WAWREM* SITE, SANDOMIERZ UPLAND. CHRONOMETRIC AND STRATIGRAPHIC EVIDENCE

ORCID 0000-0002-1044-2326; Institute of Eastern Studies, Adam Mickiewicz University, Uniwersytetu Poznańskiego 7, 61-614 Poznań, Poland; Institute of Archaeology, Jagiellonian University, Gołębia 11, 31-007 Kraków, Poland; bejotwu@wp.pl

[2] ORCID 0000-0003-0359-7386; Institute of Archaeology and Ethnology, Polish Academy of Sciences, Centre for Mountains and Uplands Archaeology, Sławkowska 17, 31-016 Kraków, Poland; wlodarczak.piotr@gmail.com

ABSTRACT

On the *Nad Wawrem* site in Złota, unique instances of stratigraphic sequences were recorded, involving materials linked to the Globular Amphora culture and Corded Ware culture. This article discusses these sequences and presents hitherto unpublished materials that may contribute to the study of the decline of the Eneolithic in Małopolska. The stratigraphic sequences involve the presence of pottery belonging to the older phase of the Corded Ware culture in pits related to the Globular Amphora culture and the intercutting of Globular Amphora settlement features by Corded Ware graves. In settlement pits, besides dominating materials of the Globular Amphora culture, pottery typical of the older phase of the Corded Ware culture was discovered. Corded Ware niche graves, in turn, were clearly younger than the Globular Amphora settlement pits they cut into. The study of the sequences reveals the complexity of cultural relations on the Sandomierz Upland

in the first half of the 3rd millennium BC. An interesting aspect is the cross-border nature of the pottery often treated as a clear cultural marker. Substantiated by absolute dating, the synchronous development model of the Globular Amphora culture, the older phase of the Corded Ware culture and the Złota culture is reflected in the peculiarity of recorded pottery assemblages.

Keywords: Globular Amphora culture, Corded Ware culture, A-horizon, radiocarbon dating, stratigraphy

INTRODUCTION

From the Sandomierz Upland, at present we know of 42 excavated Globular Amphora culture (GAC) sites and 35 Corded Ware culture (CWC) cemeteries (Fig. 1). The populations of both cultures exhibited similar settlement preferences, leading to the frequent occurrence of their material traces within the same landforms, e.g. in Mierzanowice, Sandomierz-*Kruków*, Wilczyce or Kichary Nowe [Bąbel 1979; Ścibior, Ścibior 1990; Włodarczak 2019: 197 as well as unpublished research by Hanna Kowalewska-Marszałek]. However, stratigraphic sequences involving features linked to the two cultures or the co-occurrence of their materials within the same stratigraphic units are very rare. One of the very few locations where such situations are identified is the *Nad Wawrem* site in Złota village, Sandomierz District. The purpose of this article is to present artefact inventories and radiocarbon dates relating to six features from this site. What attracted our attention was the complexity of materials from two settlement pits in which, next to artefacts displaying classic GAC traits, elements of the so-called A-horizon of the CWC were present. The other four features' high research value, in turn, follows from their stratigraphic interconnections, establishing the sequence of cultural phenomena on the Sandomierz Upland in the 3rd millennium BC. The article therefore makes an important contribution to the study of GAC chronometry.[1]

[1] These investigations were carried out as part of the NSC project *Sandomierz-Opatów Group of the Globular Amphora Culture* (no. 2014/12/S/HS3/00 355). The article is part of the implementation of the project.

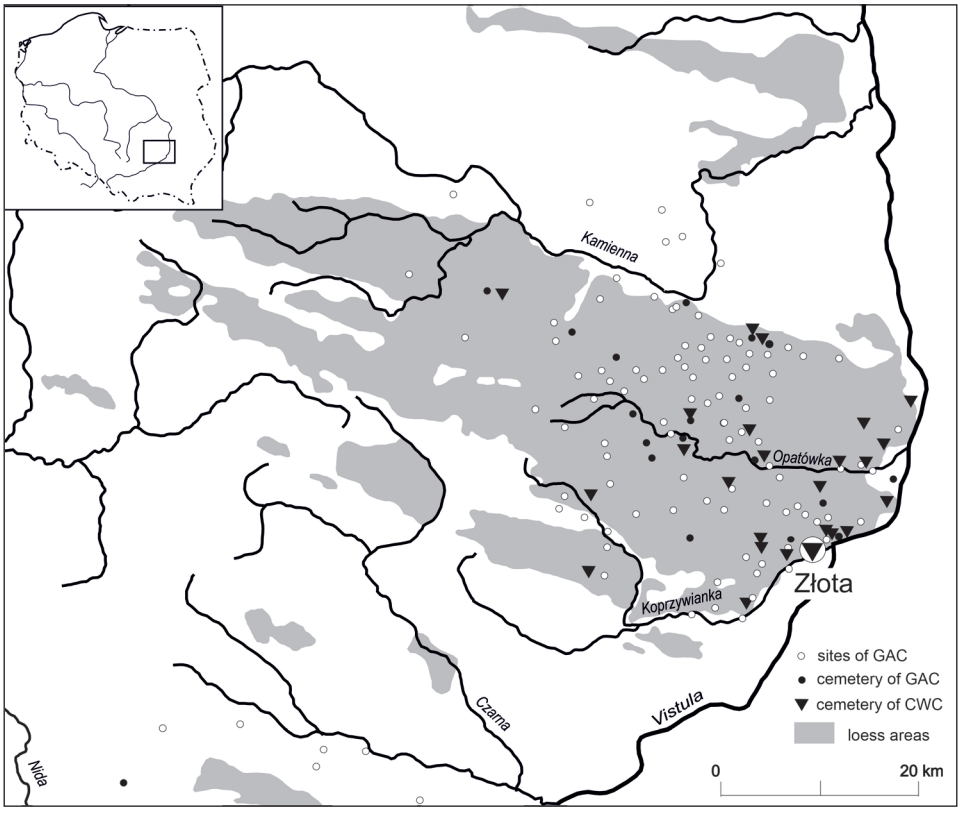


Fig. 1. Complex of sites in Złota on the background of others sites of Globular Amphora and Corded Ware cultures from Sandomierz Upland. Prep. by B. Witkowska

DESCRIPTION OF THE ZŁOTA-*NAD WAWREM* SITE

The *Nad Wawrem* site, being one of the well-known complex of sites in Złota, now labeled as Złota, site 3, is located on a loess bluff at the edge of a high plain about 7 km east of Sandomierz. It was discovered in 1911, when in the course of amateur prospecting, Zdzisław Lenartowicz dug up two Złota culture (ZC) graves there [Antoniewicz 1925]. Successive single features were exposed in 1922 [Antoniewicz 1925] and 1925 [Pietraszewski 1924; Żurowski 1930]. The site was systematically explored by the expedition of the State Archaeological Museum headed by Józef Żurowski in 1926–29. It recorded almost 600 features, dated mostly to the Neolithic and Early Bronze Age (Fig. 2) [Krzak 1970: 11–15; Matraszek 2001]. The abundance of sources that the exploration yielded and the diversity of issues related to them prevented the materials from being ever

published in full. So far, only sepulchral features have been published almost in full: a ZC cemetery of 47 burials [Krzak 1970], five Malice culture graves [Kadrow *et al.* 2009: 231–233, Fig. 61–65], another five graves belonging to the Bell Beaker culture [Budziszewski, Włodarczak 2010: 32–35, 204–210] and 11 Early Bronze graves [Bąbel 2013: 275–299]. Moreover, ten settlement pits have been published as well [Matraszek 2001]. Single artefacts from this site were also mentioned in some articles [e.g. Bąbel 1992; Matraszek *et al.* 2002]. The other materials still await to be processed and published.

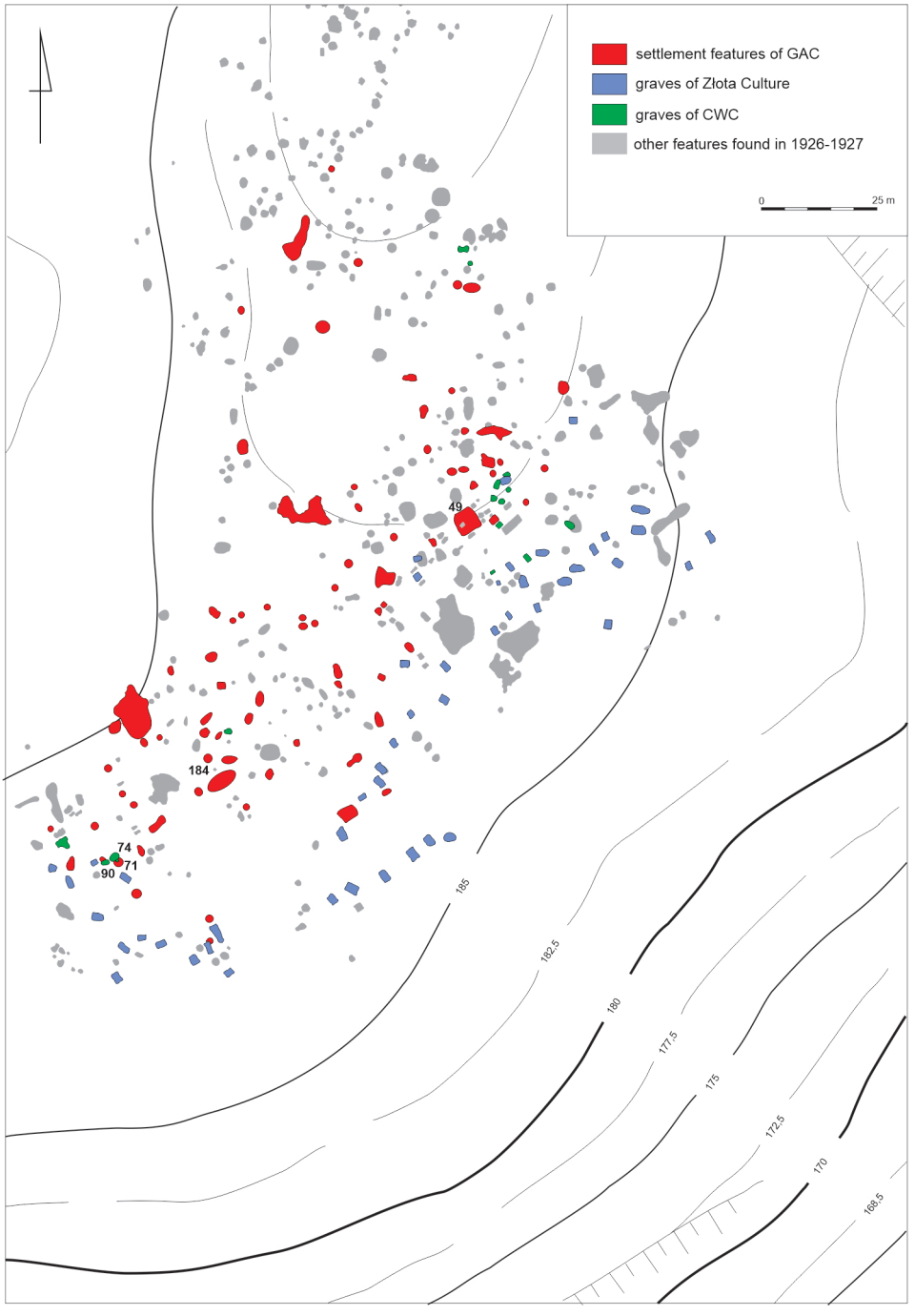
This is also true for GAC and CWC sources, which have not been presented in full yet. Some selected artefacts from 18 GAC settlement pits have been published as belonging to the ZC, despite the fact that among them there were items that did not have any analogy in the grave assemblages of the latter [Krzak 1976: 62–78]. A survey of the collections of the State Archaeological Museum held as part of the project (*see* footnote 1) helped verify relevant source attribution and organize the data on several dozen features associated with the GAC. To put an estimate on their number, it would be necessary to process the *Nad Wawrem* site in full. A similar situation prevails with respect to the other culture under discussion. From CWC graves exposed on the site, only single artefacts from Features 42, 90, 246, 298 and 326 have been published [Machnik 1966: 236, Figs. XV: 3, XVI: 2, XXVII: 6, XXVIII: 4, 7] together with incomplete information on the burials themselves [Krzak 1980: 136, 137]. This by no means exhausts the list of CWC assemblages from the site.

DESCRIPTION OF DATED FEATURES

Chronometric data, most of which have not been published before, helpful in studying the GAC–CWC relationship, were obtained for six features. They include pits in which Final Eneolithic materials were found such as, primarily, pottery characteristic of the older phase of the CWC (Features 49 and 184). The other kind of diagnostic features includes GAC settlement pits cut into by Final Eneolithic graves, attesting to the chronological sequence (Features 71 and 90). As mentioned above, some of these features were wrongly presented in the literature as ZC settlement pits, despite the fact that the ceramic materials retrieved from them exhibited a style typical of either the GAC (a majority) or the CWC. The situations mentioned here involve two types of a stratigraphic relationship:

- co-occurrence of materials of both cultures within settlement pits
- intercutting of older GAC features by CWC graves.

Two pits, 75 m apart, holding CWC materials in the context of materials attributable to the GAC were exposed in the southern part of the site (Fig. 2).



F i g . 2. Złota-*Nad Wawrem* site, Sandomierz district. Plan of the site based on archives of State Archeological Museum in Warsaw. Prep. by B. Witkowska

Feature 49

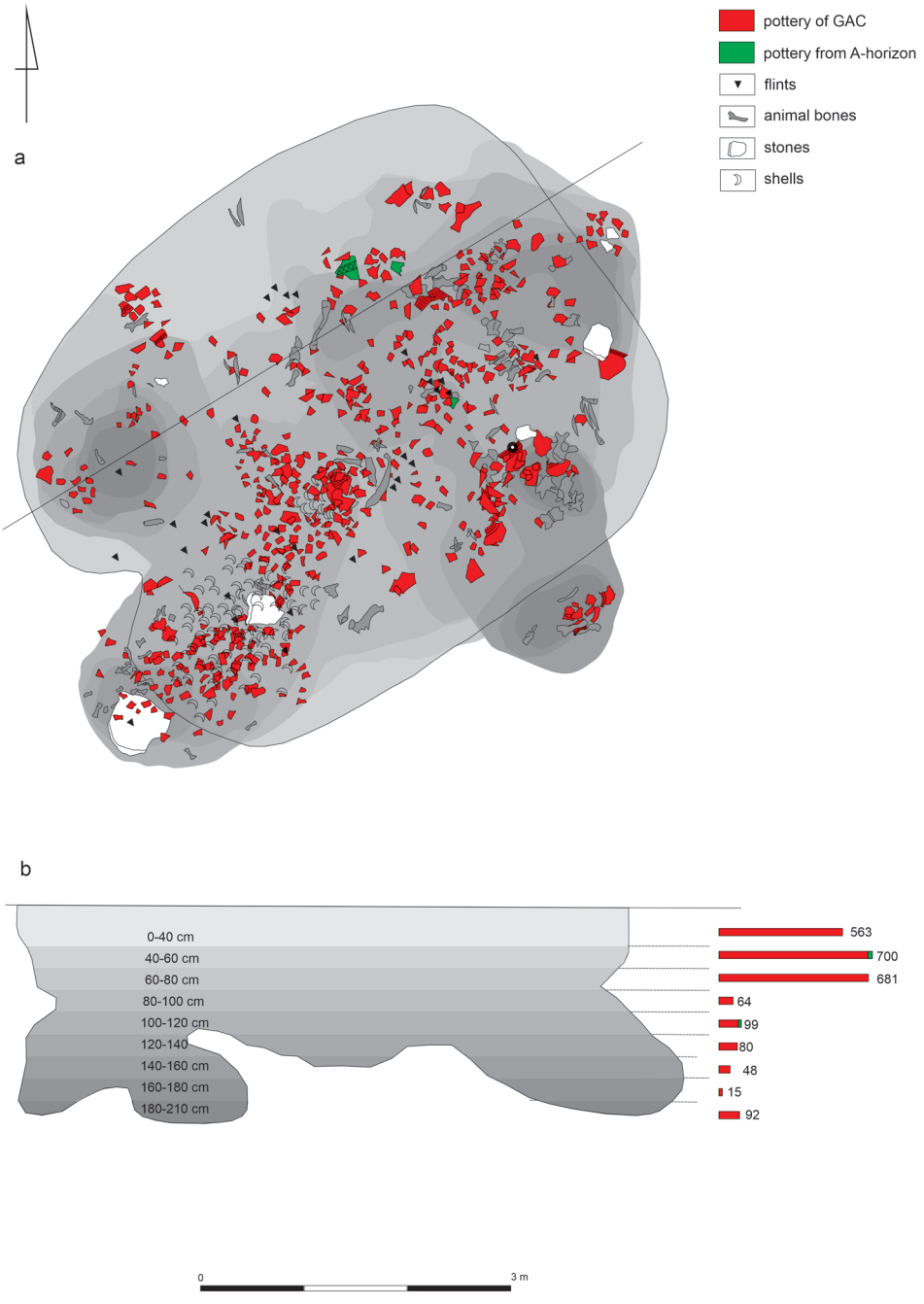
It was a large oval-rectangular pit, most likely of a dwelling nature (Fig. 3: a). At the level of discovery, it was 520 cm wide and 600 cm long. Down to a depth of 100 cm, it was regularly slightly basin-like shaped; below, it separated into several depressions, captured by a few profile cuttings. The drawings of vertical sections show an irregular bottom with numerous over-deepened spots (Fig. 3: b). It cannot be ruled out that this picture resulted from a very schematic documentation system and a wrong interpretation of strata, leading to an incorrect delimitation of the feature boundaries. In addition, little is known about the nature of the fill. In the deepest place, it reached 210 cm. The function of the pit is hard to determine, but by reason of its considerable size (over 30 sq. m), shape resembling a rectangle and hypothetical simultaneity of foundation, seen in the homogeneity of artefacts, it can be assumed that it was a kind of pit house with accompanying storage pits.

Artefacts were discovered at various depths, with the their greatest number concentrating in the ceiling portion down to a depth of 80 cm and in a depression in the bottom in the southeastern part of the feature (Fig. 3: b).

Pottery

In total, the feature yielded 2,342 pottery shards of which 1,682 represented unornamented mass material. Among the rest, the remains of about 170 vessels were identified. These are mostly fine fragments of rims, ornamented bellies, handles and bases. Only four forms could be fully reconstructed (Fig. 4: 1–4). Of the remainder of vessels, mostly upper portions have survived. They are usually ornamented with horizontal cord impressions wrapped closely around them (Fig. 4: 5–7; 5: 1–4) and occurring sometimes in patterns with knobs (Fig. 5: 5, 8) as well as vertical and horizontal plastic strips (Fig. 5: 6, 9) or a row of finger imprints (Fig. 5: 7, 8). In a single instance, such mat-like cord impressions are cut across by a triple vertical impression (Fig. 5: 10). The motif of grouped horizontal cord impressions was identified only in six instances (Fig. 4: 2, 4; 5: 11–13). Most vessel shards of a specific morphology and bearing a simple corded ornament were assigned to the base group of beakers (Fig. 4: 5–7; 5: 1–13). Most of the non-decorated vessels belong to the same group (Fig. 6: 1–4, 6). Among them, a vessels stands out which is ornamented with alternating cord impression motifs and rows of oblique stamp impressions, forming a zigzag line (Fig. 6: 7, 8).

Amphora shards, in turn, bear complex ornamental motifs made above all with various stamps (Fig. 4: 1; 6: 9–19, 21, 22). In the hollows of some impressions, the traces of white incrustation are visible. There are also amphorae decorated little (Fig. 6: 23, 24) or no ornament at all (Fig. 6: 20; 7: 19). Recorded in almost 30 instances, the motif of a multiple wavy cord lined with horizontal impressions is characteristic of both bowls (Fig. 4: 3; 7: 1–7) and amphorae (Fig. 7: 8–13). What merits special attention is a shard ornamented with the impressions of a fine round



F i g . 3. Złota-*Nad Wawrem* site, Sandomierz district, Feature 49. Plan and cross-section based on field documentary from archives of State Archeological Museum in Warsaw. Prep. by B. Witkowska

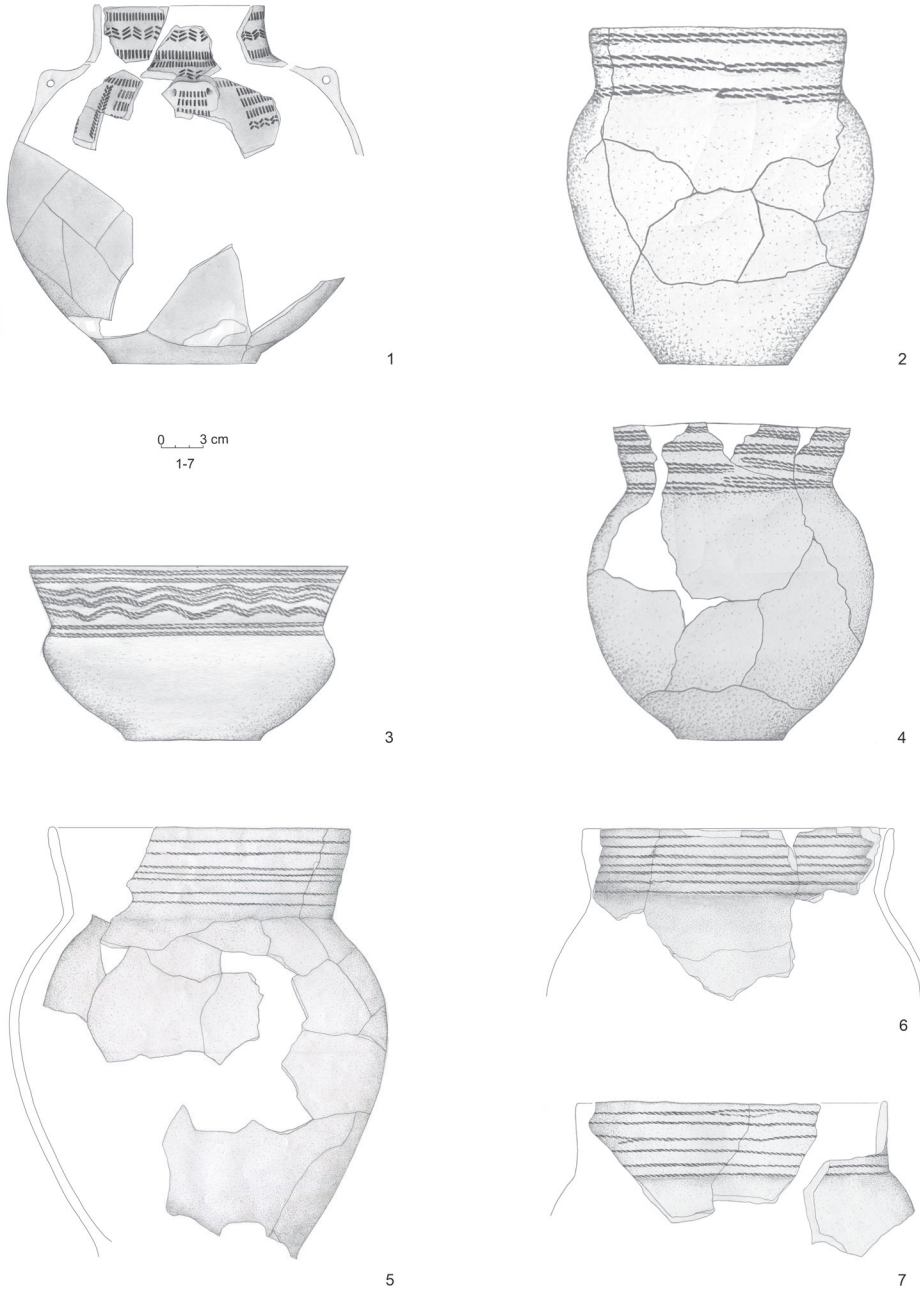
stamp, imitating a wavy cord impression (Fig. 7: 14). Among the reconstructed vessels, there is a vase ornamented with grouped triple knobs (Fig. 7: 15).

The GAC materials are technologically highly homogeneous which is attested to by the number of distinguished technological groups being considerably lower than the number of reconstructed vessels. The dominating group is made up of shards containing a mixture of fine- and medium-grained crushed stone and sand. A much smaller group consists of shards in which sand or mineral temper occurs independently. The firing of most vessels must be considered very good or good, which is reflected in the relatively low comminution of the material. The maximum chord of over 6 cm was recorded in the case of almost 200 shards. In addition, the vessels are thin-walled; wall thickness rarely exceeds 7 mm. Vessel surfaces are carefully finished, sometimes burnished, giving them a shine. In most cases, they were fired to a colour oscillating between orange and beige or less often dark grey or black. However, it must be stressed that the surfaces of large reconstructed forms greatly vary in colour even on a single vessel. This observation should make one cautious when using this characteristic as one of the criteria for distinguishing technological groups.

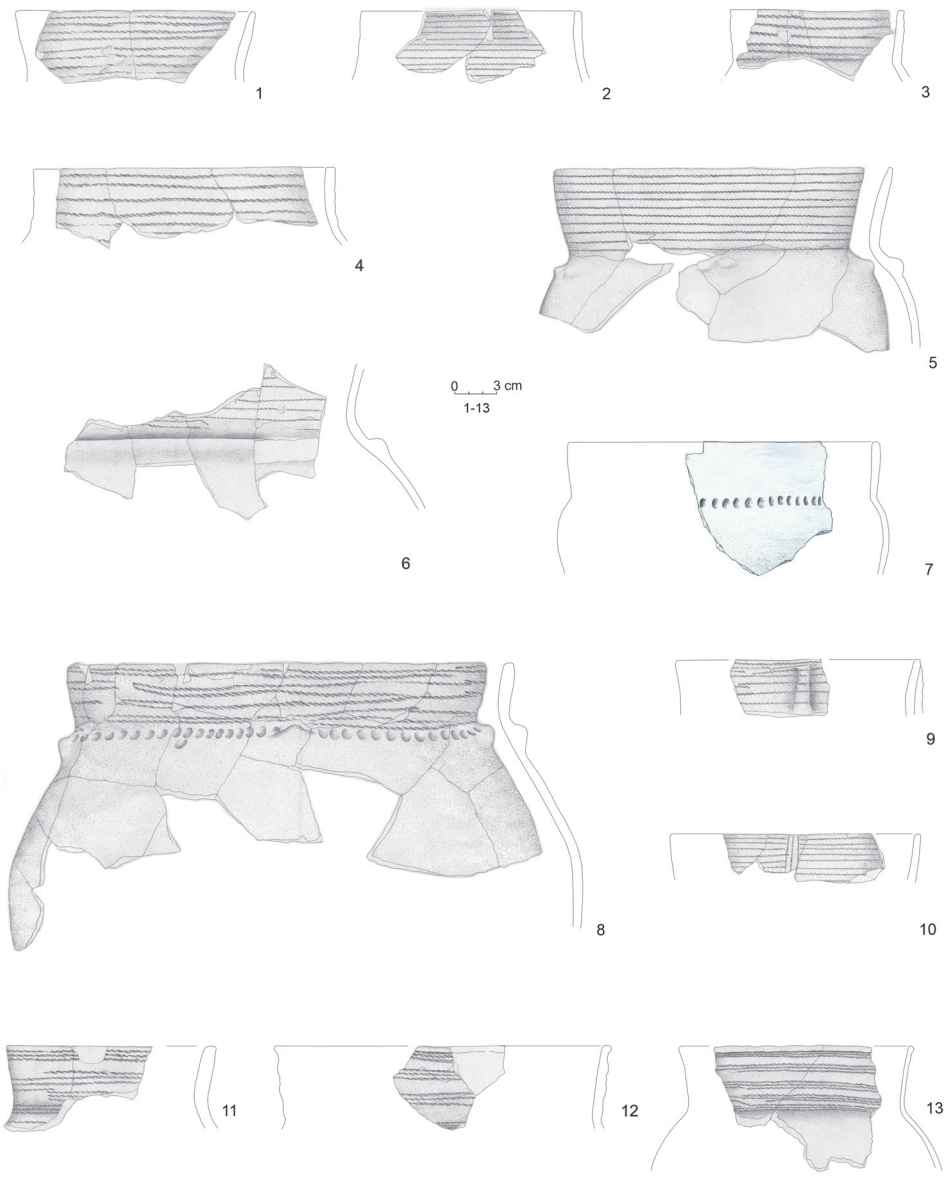
From the above-described materials, fragments of a thick-walled amphora clearly differ. Found at a depth of 60 cm, a body shard, rim shard and a handle bear an incised and fluted ornament (Fig. 7: 16, 20). They were made from clay tempered with sand and a small amount of fine-grained grog, and fired to an orange colour. A similar technology was used to make a thin-walled vessel, found at a level of 120 cm, of which a body shard has survived, ornamented with vertical incised lines (Fig. 7: 17). These finds do not have any analogies among GAC artefacts, being, no doubt, fragments of Type A amphorae, linked to the earliest CWC horizon.

Flint inventory

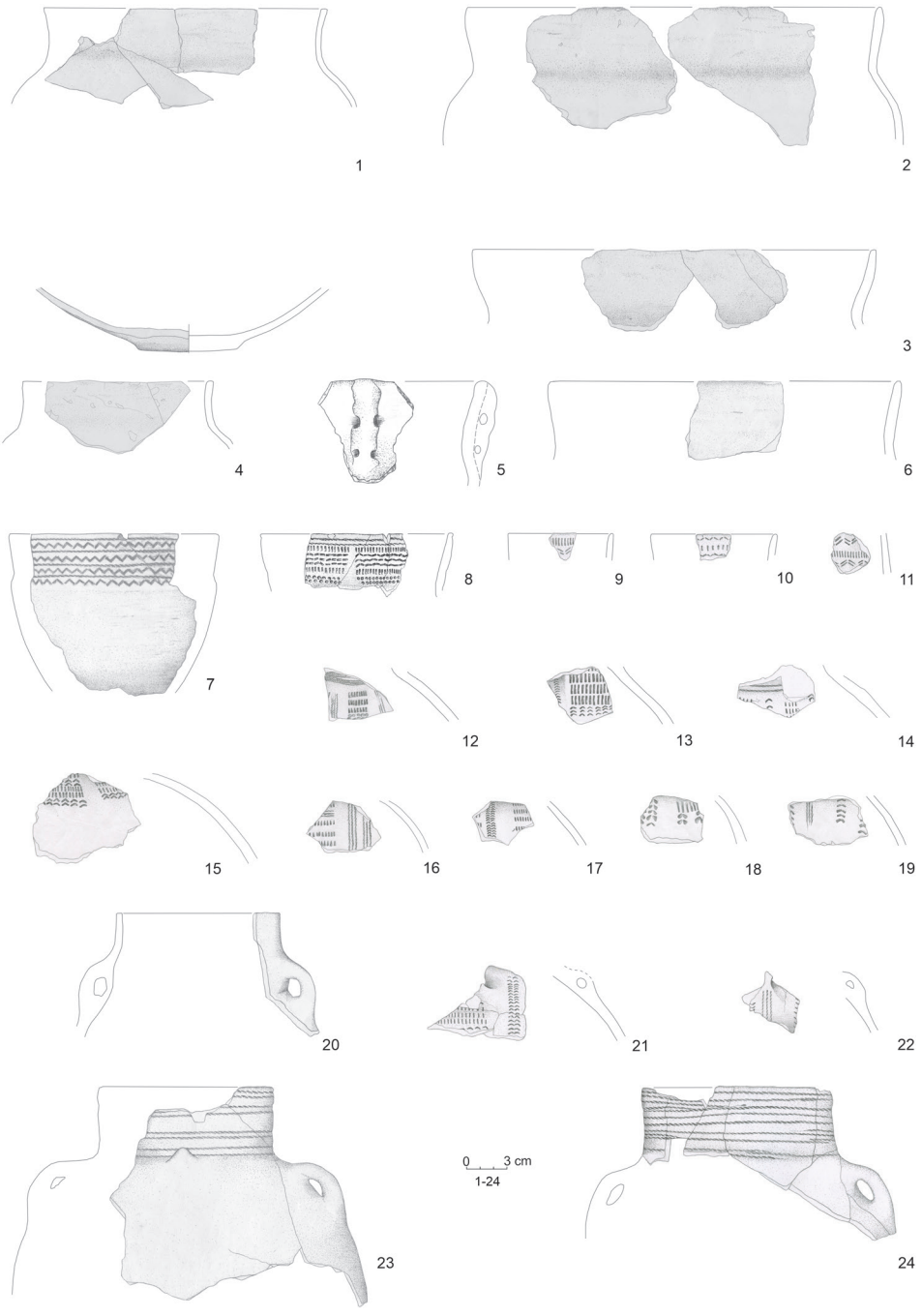
The inventory of flints originating with feature 49 comprises 55 artefacts of which 37 are blanks in the form of four scaled pieces, 24 flakes and 9 unretouched blades. Two blades must be counted among functional tools, owing to a clear gloss on their edges (Fig. 8: 1, 2). Among the retouched tools, the following were identified: double endscraper on regular blade (Fig. 8: 3), fragment of alternately retouched blade (Fig. 8: 4), irregular borer on thermal flake (Fig. 8: 5), and side-scraper made from a thick flake originating with a tetrahedral axe (Fig. 8: 6). A polished core tool was used as a shapeless pounder. Of a similar type of a tool, too, three unintentional flakes were left with crushed surfaces. Apart from the four blade tools, the flints are highly irregular and carelessly made. The settlement character of the inventory is additionally underscored by four splintered pieces made from thick flakes (Fig. 8: 7), retouched thermal flakes and the secondary use of forms attesting to the economic management of raw materials. The raw material dominating in the inventory was Świeciechów flint of which 27 artefacts were made – including almost all the tools – except for the fragments of a Jurassic



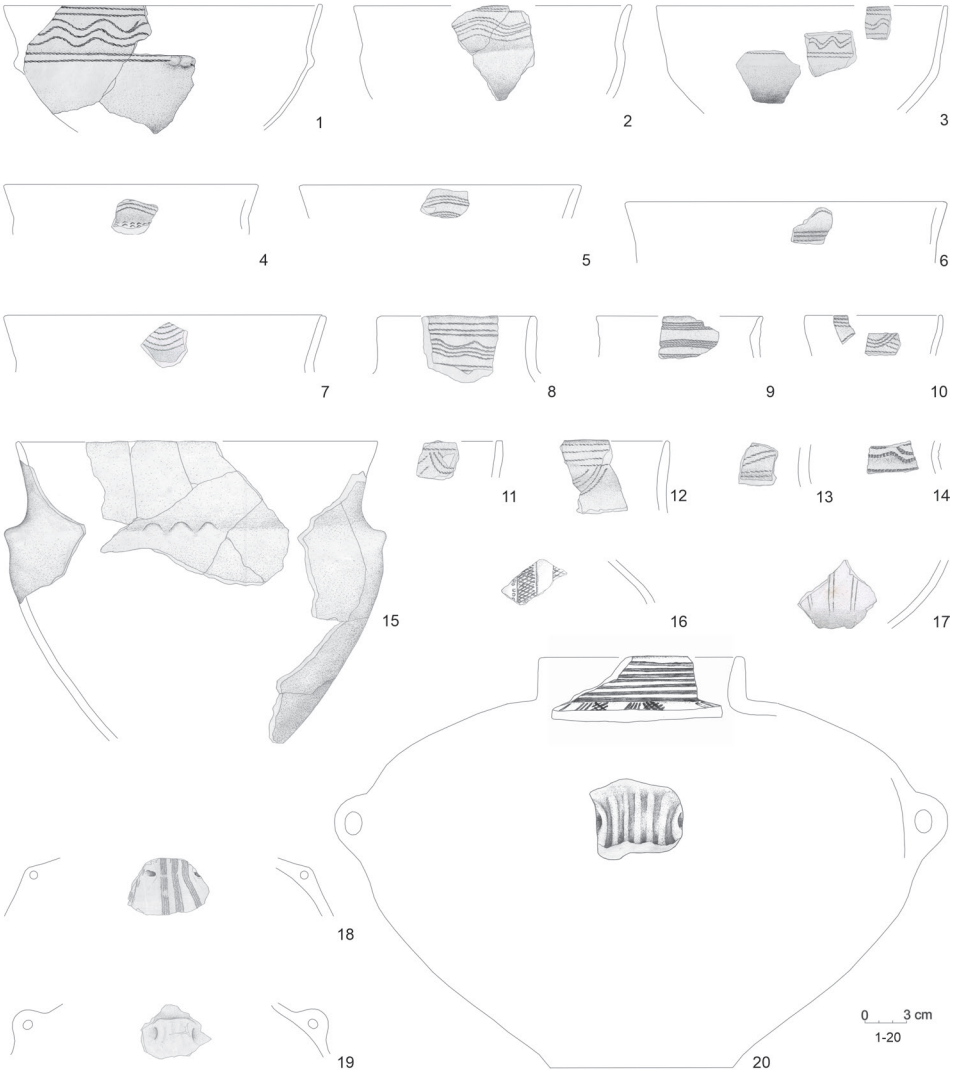
F i g . 4. Złota-*Nad Wawrem* site, Sandomierz district, Feature 49. Pottery: 1, 5-7 – drawn by B. Witkowska; 2-4 – after Krzak 1976 with changes



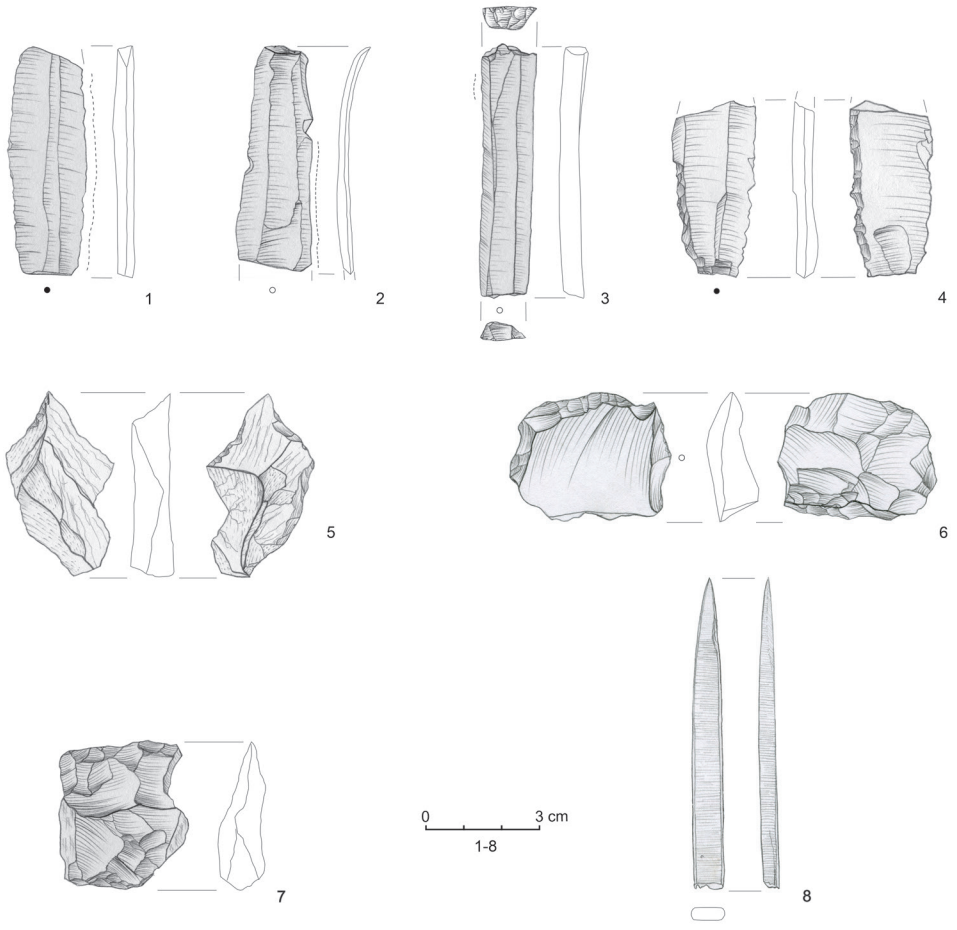
F i g . 5. Złota-*Nad Wawrem* site, Sandomierz district, Feature 49. Pottery: 1-6, 8-13 – drawn by B. Witkowska; 7 – after Krzak 1976 with changes



F i g . 6. Złota-*Nad Wawrem* site, Sandomierz district, Feature 49. Pottery: 1-4, 6, 8-24 – drawn by B. Witkowska; 5,7 – after Krzak 1976 with changes



F i g . 7. Złota-*Nad Wawrem* site, Sandomierz district, Feature 49. Pottery: 1, 16 – after archives of State Archeological Museum in Warsaw; 2-15, 17-20 – drawn by B. Witkowska



F i g . 8. Złota-*Nad Wawrem* site, Sandomierz district, Feature 49. Flint and bone artefacts: 1-4, 6 – Świeciechów flint; 5 – chocolate flint; 7 – striped flint; 8 – animal bone. Drawn by B. Witkowska

flint pounder and a chocolate flint borer on thermal flake. Chocolate flint was represented by 15 artefacts, another six were made of striped flint and four of Jurassic flint. In addition, two small lumps of erratic flint and one of striped flint were extracted from the feature.

Other materials

The collection of tools found in the feature is enlarged by a carefully smoothed bone blade in the type of a perforator with a flat cross-section and preserved length of 81 mm (Fig. 8: 8).

Moreover, the feature fill yielded a damaged amber ornament, 40 swan mussel (*Anadonta cygnea*) shells, fine charcoals and large structural daub lumps with impressions. Apart from these, many animal bones were found in the pit, sheep/goat

remains among them. Although they do not bear any clear signs of damage or burning, their comminution and incompleteness suggest their post-consumption character.

A ^{14}C AMS determination (Poz-90789 4155±35 BP) was made on a sample from a long-bone fragment of a small ruminant.

Feature 184

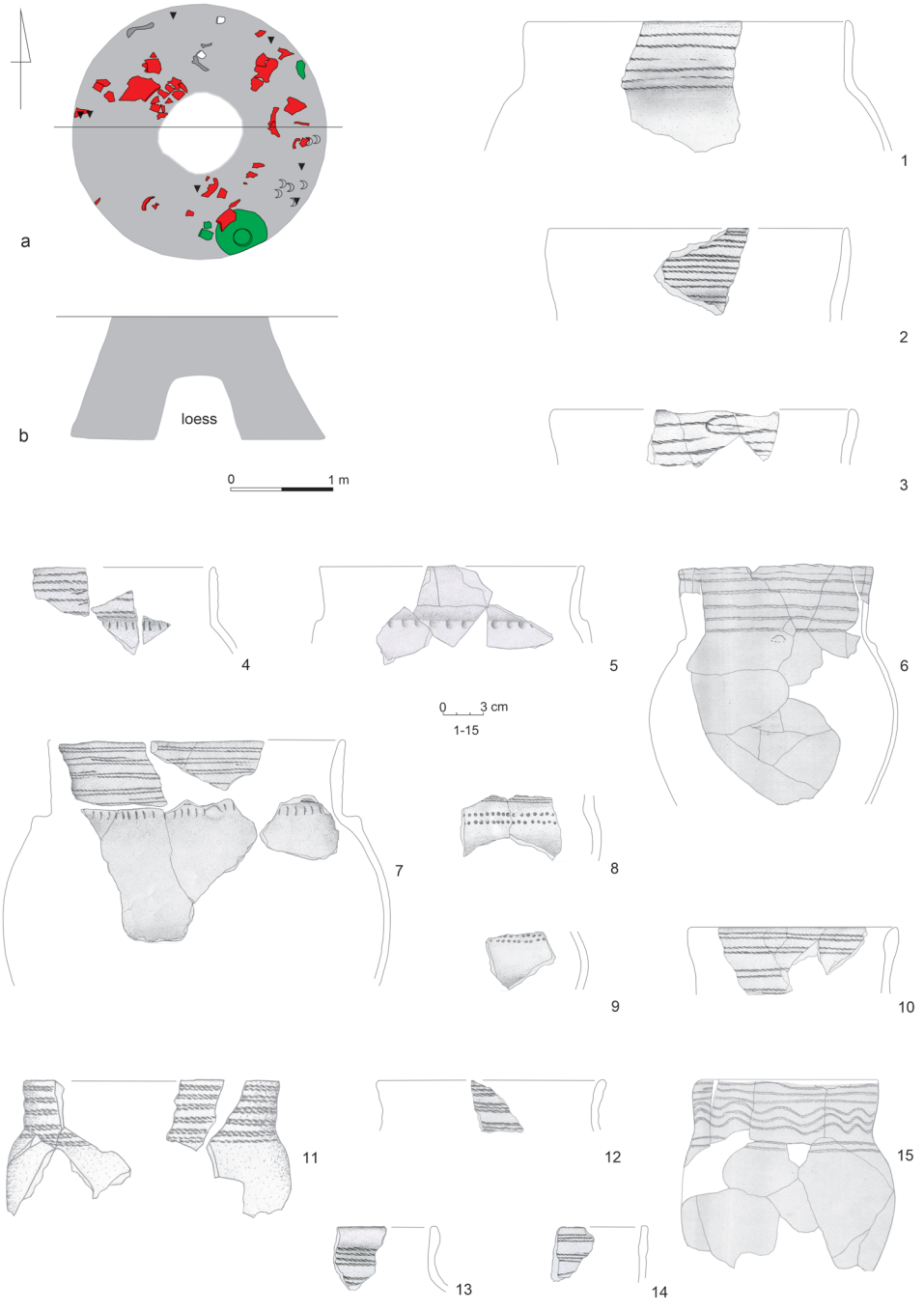
A GAC settlement pit, circular in horizontal projection (Fig. 9: a) and trapezium-shaped in vertical projection, had a diameter of 160 cm (Fig. 9: b) at the level of discovery, while close to its bottom the diameter was much larger, measuring 250 cm. Its depth reached 120 cm. The documentation lacks a profile drawing, but it specifies that in the lower part of the fill, in the centre, there was a conical block of loess, which was described as a 'seat'. Krzak's publication, which wrongly – in our opinion – attributes the feature to the ZC, says that its shape resembled a 'round niche' [Krzak 1976: 63]. This interpretation, however, is not substantiated by the field records. One can hardly agree with the suggestion either that it was a dwelling pit [Krzak 1976: 65] although its settlement character is unquestionable.

Pottery

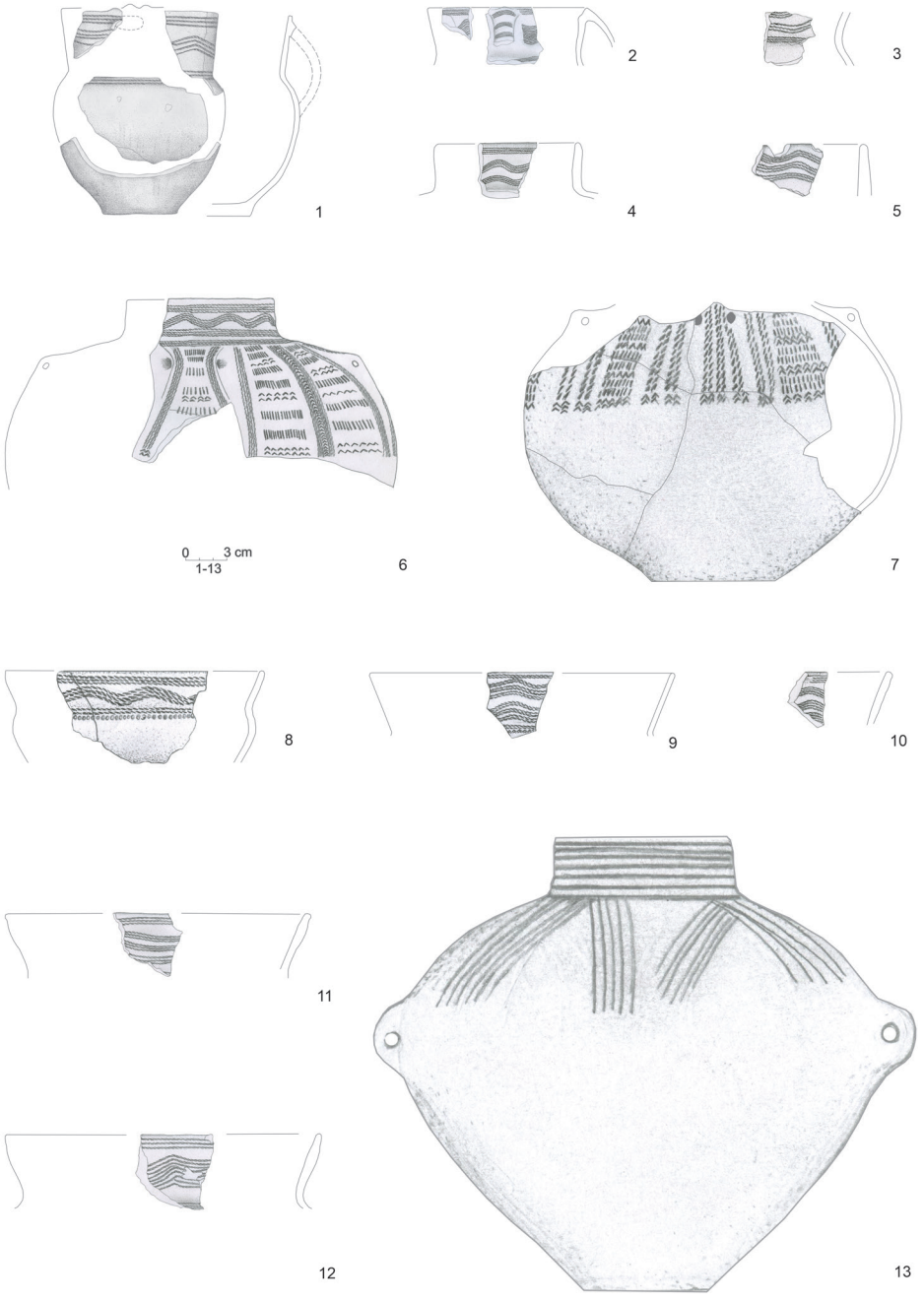
The feature fill was saturated with artefacts, although they occurred only from a depth of 70 cm. It yielded 921 pottery shards, originating with at least 55 vessels of which most were ornamented with horizontal cord impressions (Fig. 9: 1–3). They co-occurred with other ornamental elements such as: finger imprints (Fig. 9: 4, 5, 7), single appliqué knobs (Fig. 9: 6, 7), or round stamp impressions typical of the GAC (Fig. 9: 8, 9). It is worth noting that cord impressions rarely formed mat-like surfaces; instead, they were more often arranged in bands of double or triple lines on the rims of vessels in the type of beakers (Fig. 9: 10–14). The same ornamental motif is seen on the necks of beaker (Fig. 9: 15) where it co-occurs with wavy bands. An analogous ornament is found on the fragments of two cups (Fig. 10: 1–2) and preserved fragments of amphorae (Fig. 10: 3–6) and bowls (Fig. 10: 8–12). The most complicated ornamentation is obviously visible on the Kujawy type amphoras (Fig. 10: 6–7).

Vessel surfaces are carefully finished, sometimes burnished, giving them a shine. The mass of clay is dominated by medium- and fine-grained crushed stone, sometimes co-occurring with sand. The pottery is relatively well-fired, but it is highly comminuted. The shards are usually no more than 4 cm long while vessel forms are partially reconstructed only thanks to few larger fragments.

Against this background, a Thuringian amphora stands out. Preserved almost whole, it has a cylindrical neck ornamented with furrows from which groups of vertical grooved lines radiate to decorate its belly (Fig. 10: 13). It differs from the other ceramic artefacts in having very thick walls (over 1 cm), being very well fired and tempered with grog. It lay at a depth of 85 cm, among GAC-attributable materials.



F i g . 9. Złota-*Nad Wawrem* site, Sandomierz district, Feature 184: a – plan drawn by B. Witkowska based on field drawing; b – reconstructed cross-section based on field notes; 1-5, 7-10, 12-14 – pottery drawn by B. Witkowska; 6 – after Krzak 1976 with changes; 11, 15 – after archives of State Archeological Museum in Warsaw



F i g . 10. Złota-*Nad Wawrem* site, Sandomierz district, Feature 184. Pottery: 1-6, 13 – drawn by B. Witkowska; 7 – after Krzak 1976 with changes; 8-12 – after archives of State Archeological Museum in Warsaw

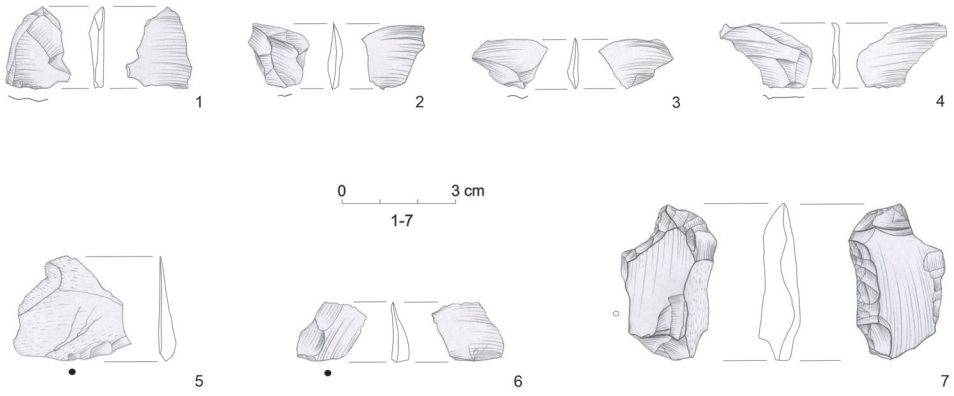


Fig. 11. Złota-*Nad Wawrem* site, Sandomierz district, Feature 184. Flint artefacts: 1, 2, 5-7 – Świeciechów flint; 3, 4 – striped flint. Drawn by B. Witkowska

Flint inventory

In Feature 184, 11 flint artefacts were found, mostly unretouched scaled pieces and small flakes (Fig. 11: 1–6) and a single amorphous Świeciechów flint sidescraper (Fig. 11: 7). It was this kind of flint that dominated in the assemblage as only two artefacts were made of striped flint. The kind of flint of which another two artefacts were made could not be identified because of their overheating (calcination).

In addition, the fill of Feature 184 yielded four rough stones, many shells, daub lumps with structural impressions and animal bones.

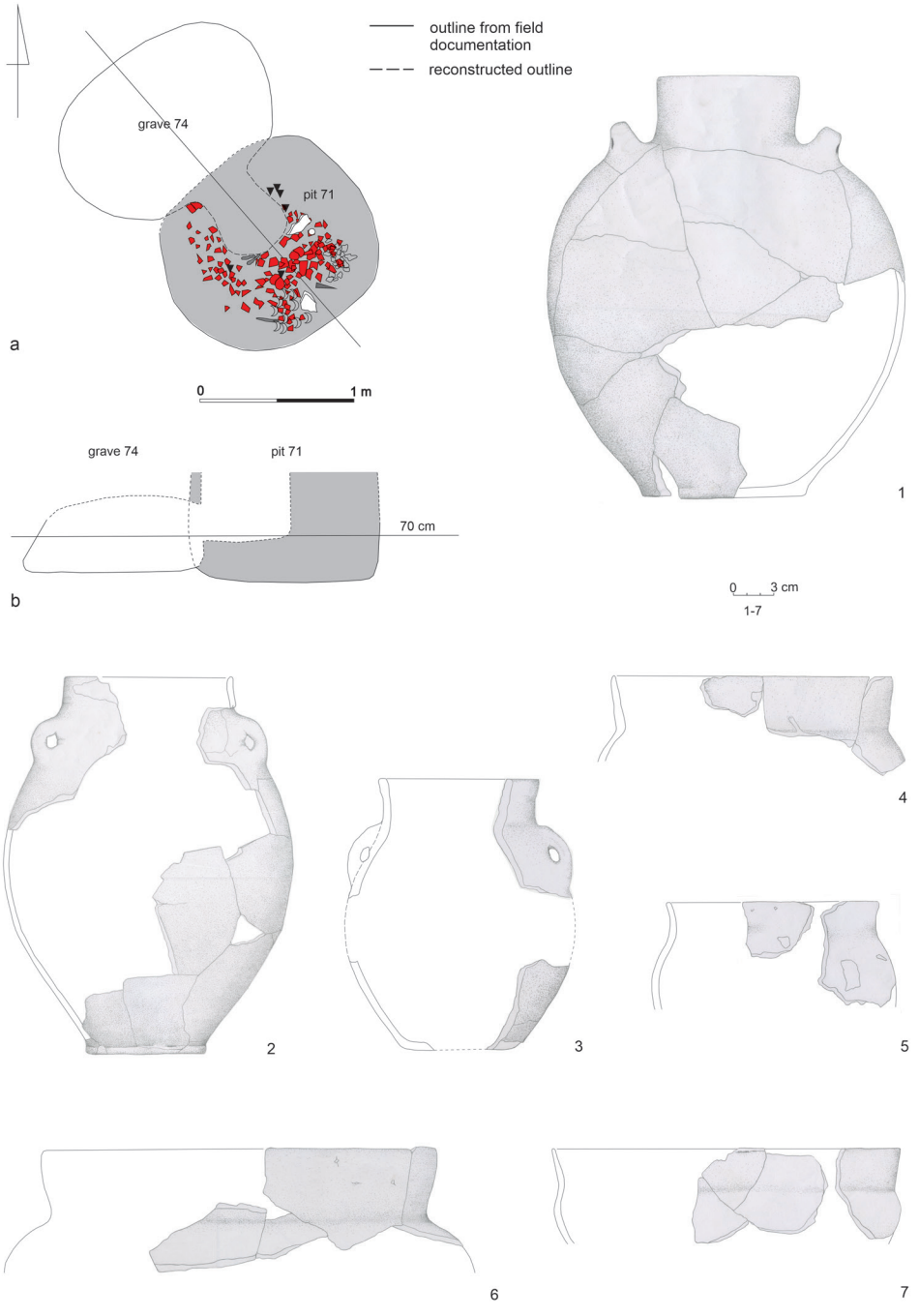
A ^{14}C AMS determination (Poz-90892 3545±35 BP) was made on a sample from a fragment of a cattle rib.

STRATIGRAPHIC SEQUENCE I: FEATURES 71 AND 74

It was found in the southeastern part of the site, in the close vicinity of Stratigraphic Sequence II described below (Fig. 2).

Feature 71

GAC settlement pit cut into by Feature 74 (CWC grave). It was round with a maximum diameter of about 140 cm (Fig. 12: a) and had straight vertical walls (Fig. 12: b). Its convex bottom extended at a depth of about 100 cm, slightly below the bottom of the niche grave cutting into it. The preserved documentation shows two levels of the pit and a compact semicircular concentration of prehistoric material surrounding a space without any artefacts at a depth of 70 cm. The artefact-free space is perhaps all that is left of the niche entrance that cut into artefact-suffused



F i g . 12. Złota-*Nad Wawrem* site, Sandomierz district, Feature 71: a – plan based on field documentary; b – cross-section partially reconstructed from the notes; 1-7 – pottery. Drawn by B. Witkowska

strata (Fig. 12: a). At a depth of 90 cm, there was no sign of the intercutting and artefacts occupied the entire pit bottom, giving almost the impression of going beyond the boundary of the CWC feature (Fig. 16: a). This is probably a result of leaving the skeleton on a raised island during the exploration and over-deepening the surrounding strata. This method of exploration was sometimes employed during investigations by Żurowski, which is seen in the existing photographic records of other sepulchral features on the *Nad Wawrem* site [Krzak 1970, Fig. 96, 103].

Pottery

The pit yielded 1,334 highly comminuted pottery shards among which the remains of at least 33 vessels could be identified. A large portion was unornamented. Unornamented vessels included two-handled amphorae of which one had vertically perforated handles (Fig. 12: 1–3), beaker-type vessels (Fig. 12: 4–6) and bowls (Fig. 12: 7). Single knobs decorated beaker (Fig. 13: 1) and small goblets (Fig. 13: 2, 3). Mat-like cord impressions were recorded only four times (Fig. 13: 4); on two occasions, they were part of more complex patterns made up of plastic motifs as well (Fig. 13: 5, 6). Group cord impressions, in turn, were found on small rim fragments together with wavy bands (Fig. 13: 7, 8), festoon motifs (Fig. 13: 9, 10) or a combination of stamp impressions (Fig. 13: 11, 12). The last-mentioned ornamentation technique was also used on its own to form more complex compositions (Fig. 13: 14-15). The list of ornamental motifs recorded in the feature is closed by a row of finger imprints found on a large, wide-orifice vessel (Fig. 13: 16).

Flint inventory

The flint inventory of the feature comprises 36 artefacts, including 16 flakes and unretouched scaled pieces (Fig. 14: 1–15) of which two originated with polished axes (Fig. 14: 4–5). Most of the 10 blades are regular blanks with parallel edges, originating with single-platform cores (Fig. 14: 16–18; 15: 1–6). One specimen was retouched in its proximal part (Fig. 14: 16) while the other tools were functional specimens, which is seen in their sickle gloss (Fig. 15: 1–3). Retouched tools are represented by one endscraper (Fig. 15: 7) and two scrapers on a flake (Fig. 15: 8, 9). In addition, discoveries were made of three splintered pieces (Fig. 15: 10–12), a flint hammer (Fig. 15: 13) and a round, flat stone which could have served as a pestle (Fig. 15: 14). All the blades and tools are made of Świeciechów flint, which is represented by 14 specimens in total. One flake is made of striped flint and another – of indeterminate flint (due to overheating/calcination). What makes one wonder is the domination of chocolate flint artefacts (20 items) in the inventory. Perhaps some of the indistinctive materials, such as flakes and scaled pieces, were discovered in a secondary context and in reality, are connected to the CWC feature.

According to the field records, Pit 71 yielded two bone awls. Archival collections, however, hold only a partially preserved blade (Fig. 15: 15). Moreover, in the pit fill, there were large structural daub lumps, animal bones and many mollusc shells.

A ^{14}C AMS determination (Poz-90790 4120±30 BP) was made on a sample from an animal long-bone fragment.

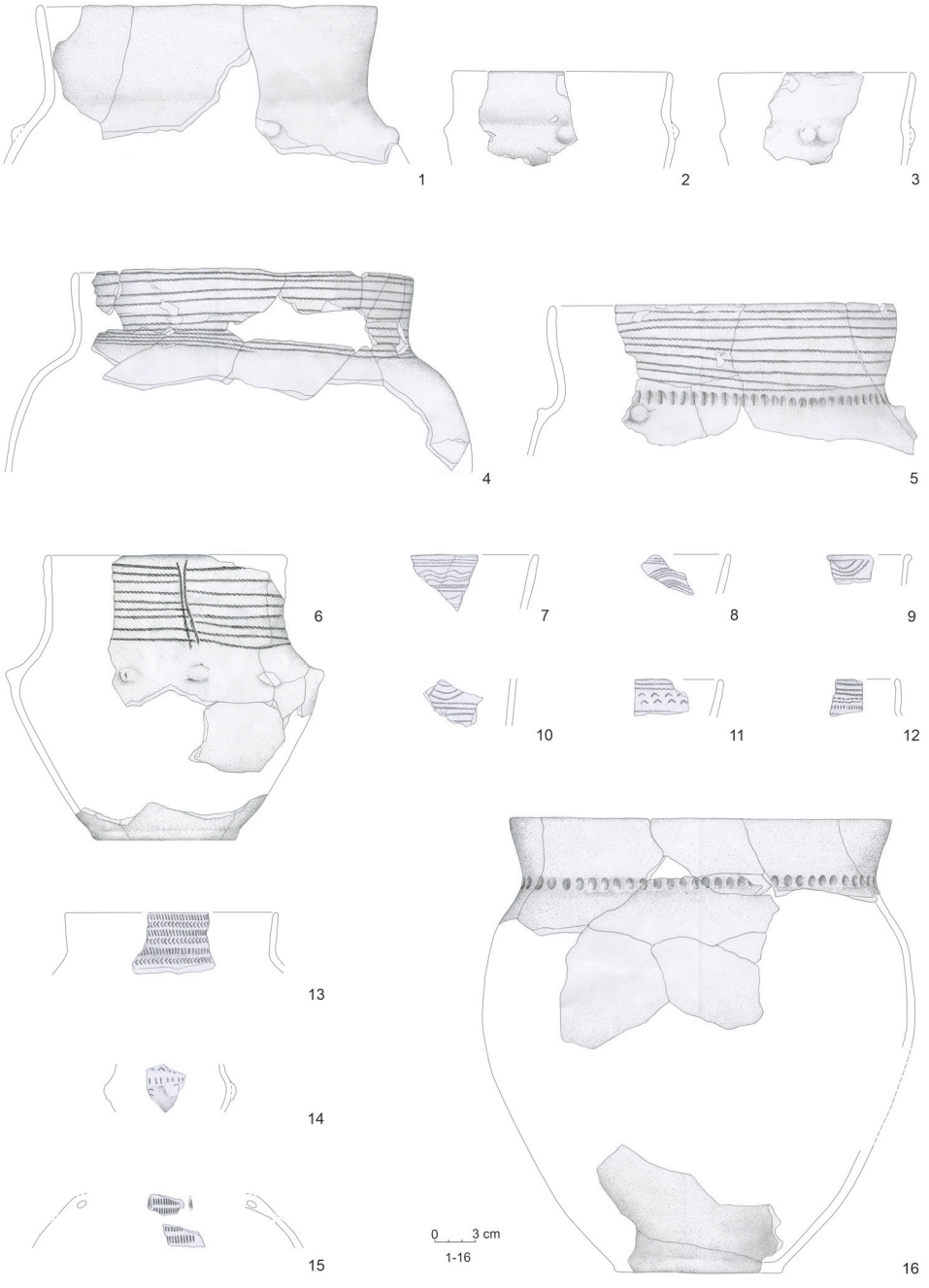
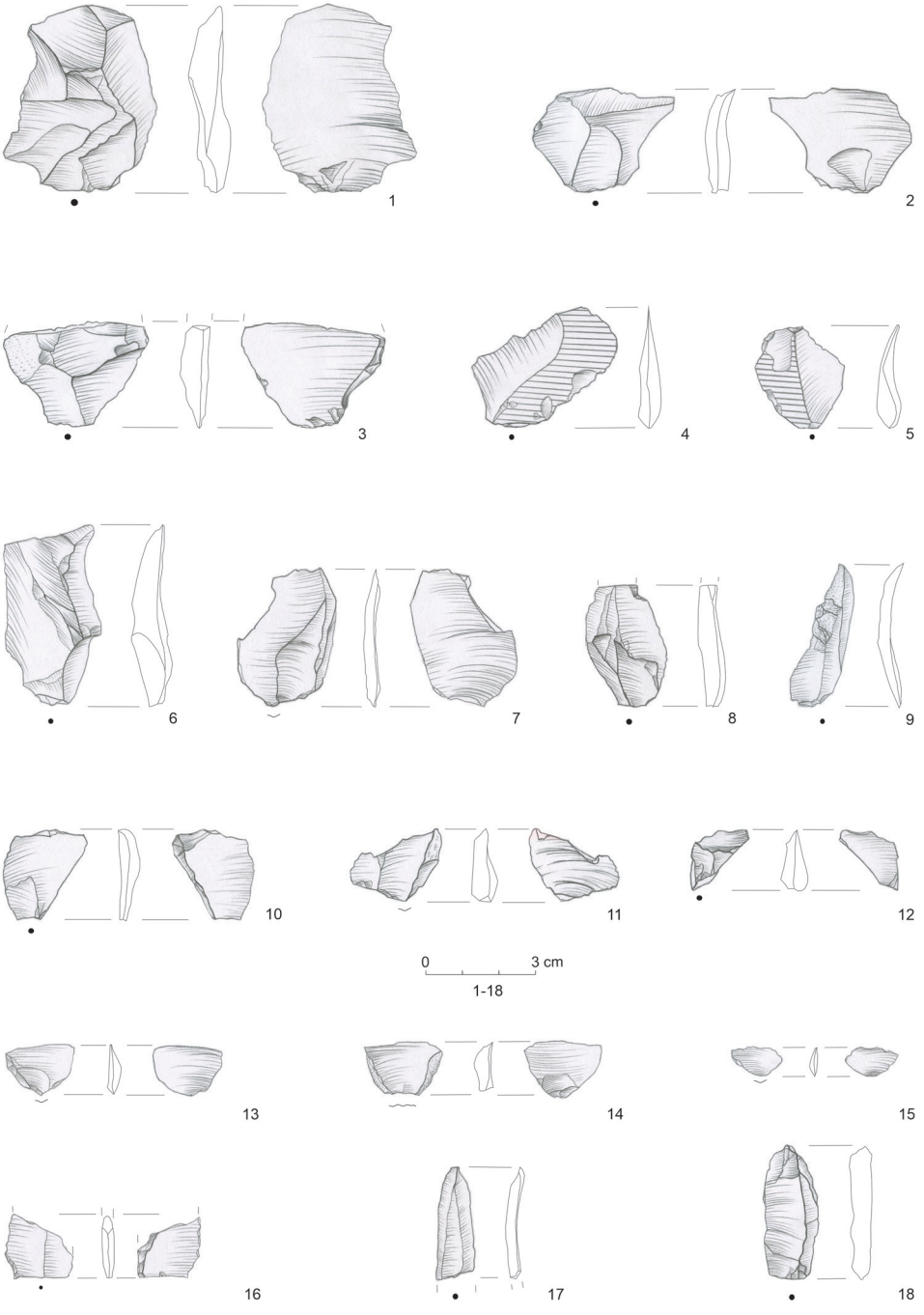
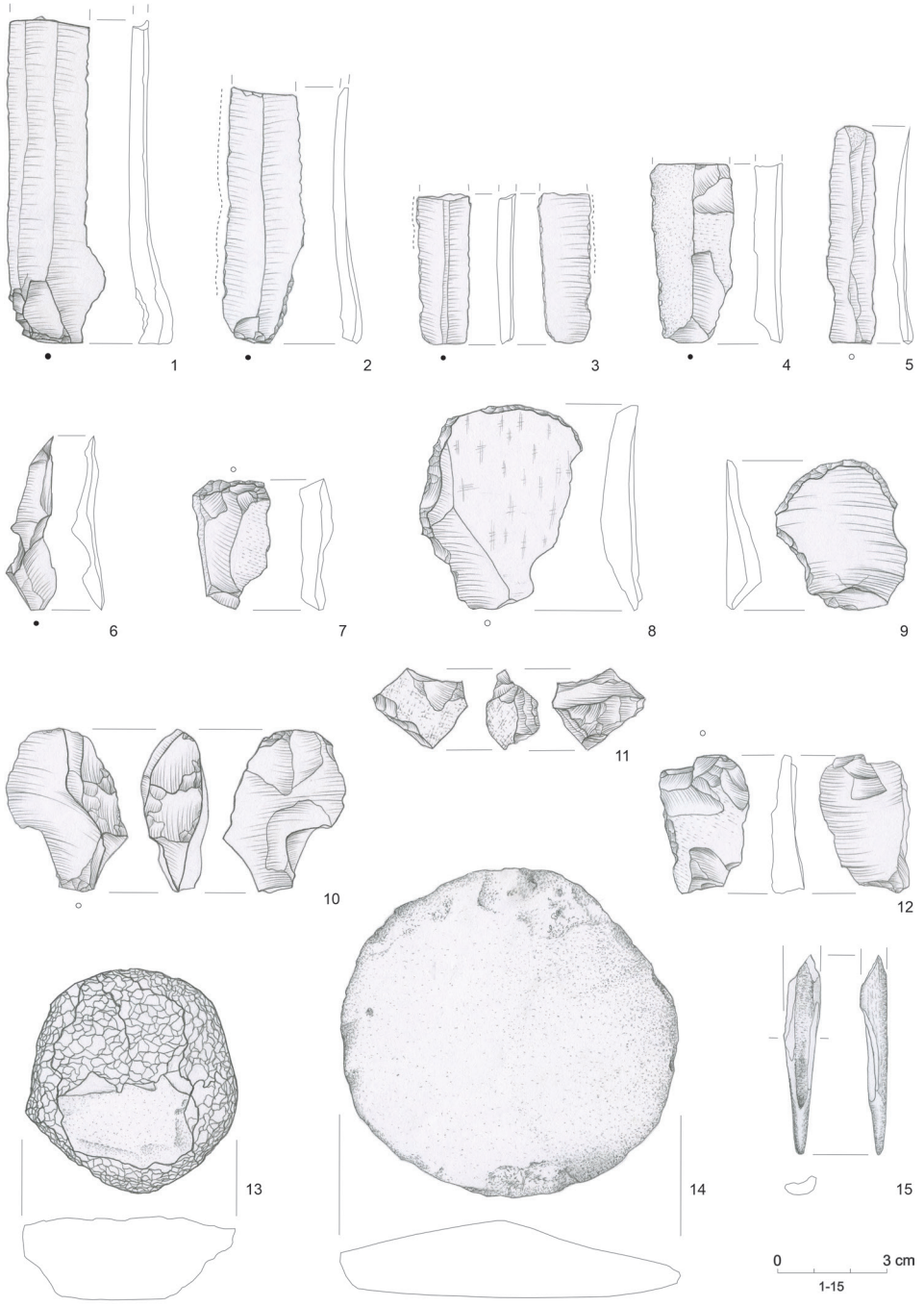


Fig. 13. Złota-*Nad Wawrem* site, Sandomierz district, Feature 71. Pottery. Drawn by B. Witkowska



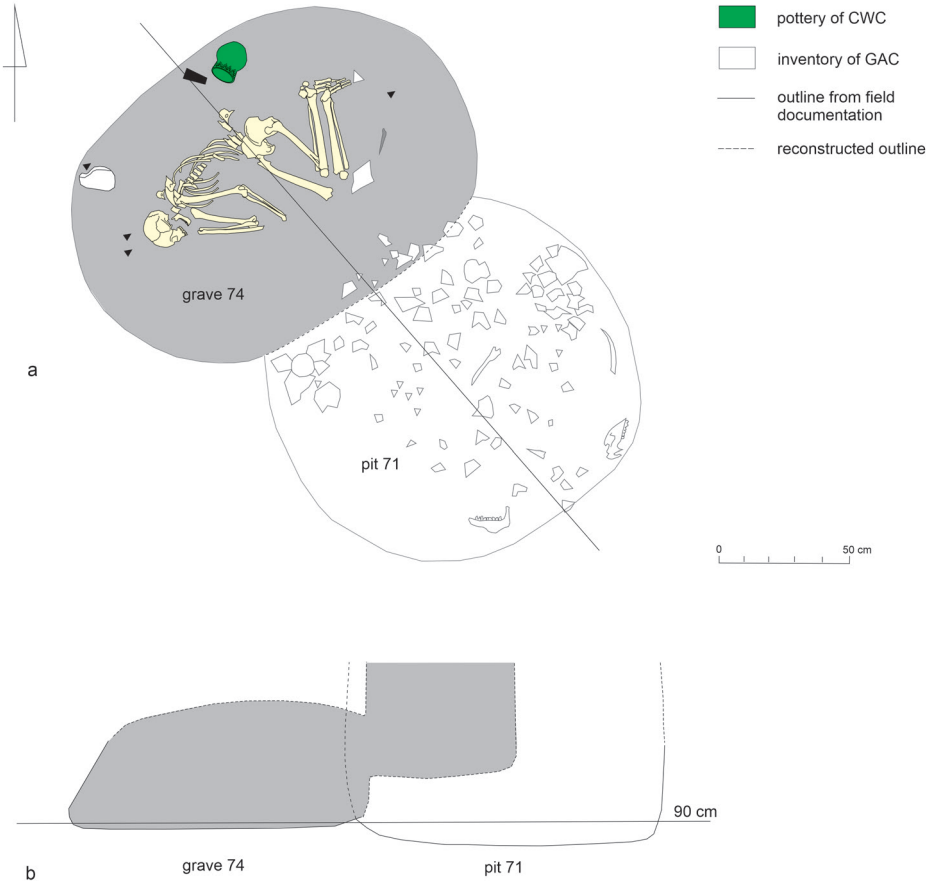
F i g . 14. Złota-*Nad Wawrem* site, Sandomierz district, Feature 71. Flint artefacts: 1-2, 4-6, 15 – Świeciechów flint; 3 – striped flint; 7-14, 16-18 – chocolate flint. Drawn by B. Witkowska



F i g . 15. Złota-*Nad Wawrem* site, Sandomierz district, Feature 71. Flint, stone and bone artefacts: 1-6, 8-10 – Świeciechów flint; 7, 11, 13 – chocolate flint; 14 – stone; 15 – animal bone. Drawn by B. Witkowska

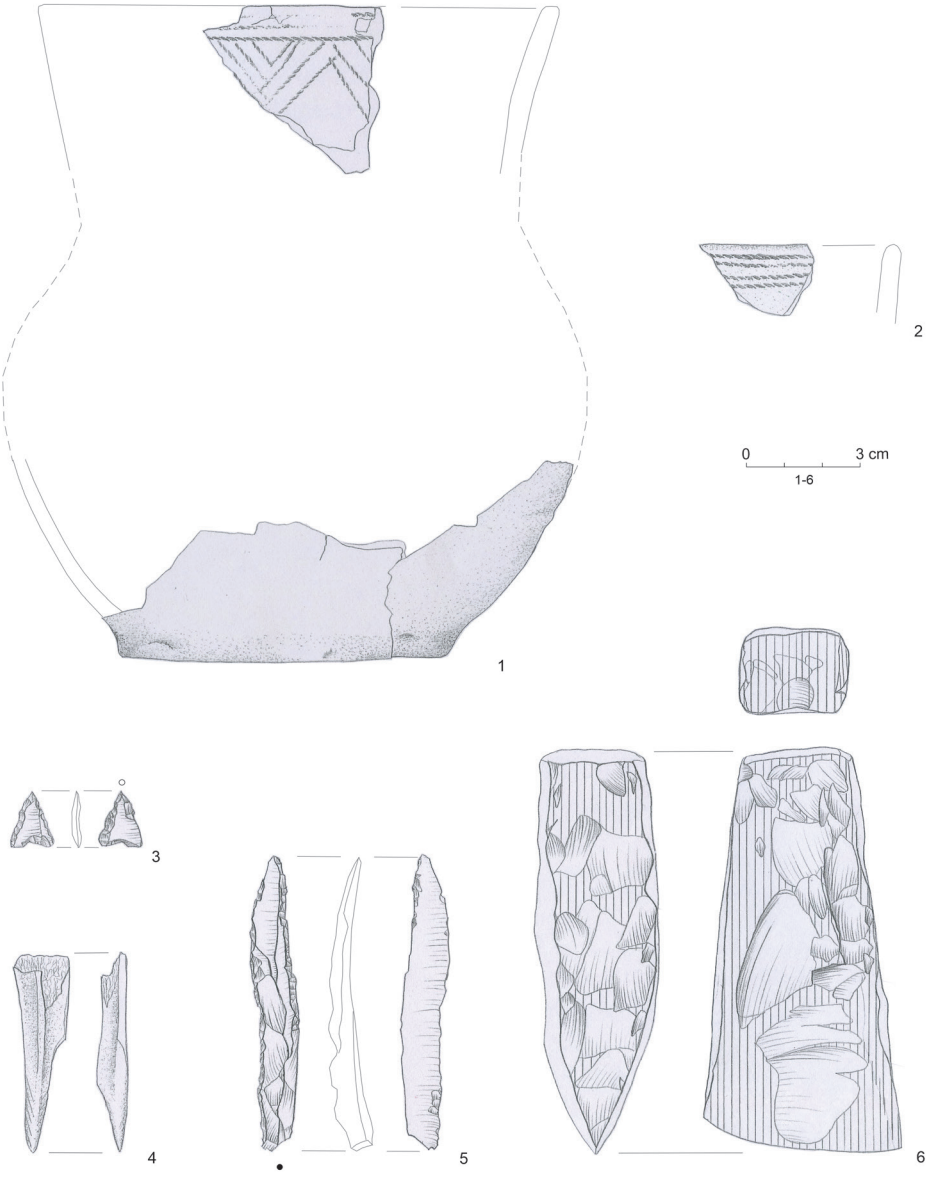
Feature 74

CWC burial. Relying on its recorded trapezium-shaped profile and the knowledge of CWC funerary rites, it can be presumed that it was a niche grave with an entrance pit on the southeastern side, cutting into Feature 71 (Fig. 16). For this reason, it was not identified during the excavations. Probably, the niche ceiling was exposed at a depth of approx. 70 cm from the ground surface and only then was a decision made to set up a profile, revealing the relationship between Features 71 and 74. In a schematic vertical cross-section, only 40 cm of the thickness of features was captured, without giving any details of their strata. The niche was oval and measured approx. 160 × 110 cm. On its bottom (depth: 90 cm), a flexed skeleton was discovered, lying supine with its head and lower limbs turned to the right side (Fig. 16: a). Its right upper limb was bent at the elbow and extended towards the knees. The left arm was bent at the elbow, with the palm reaching towards the face. The burial was oriented SW-NE, with the head pointing SW and the face turned



F i g . 16. Złota-*Nad Wawrem* site, Sandomierz district, Grave 74. Plan and cross-section based on field documentary from archives of State Archeological Museum in Warsaw. Prep. by B. Witkowska)

SE. Its furnishings included a beaker with a corded ornament (Fig. 17: 1), rim of other vessel (Fig. 17: 2), Świeciechów flint axe (Fig. 17: 6), chocolate flint blade tool (Fig. 17: 5), chocolate flint arrowhead (Fig. 17: 3) and a bone awl (Fig. 17: 4). Furthermore, the feature yielded an unornamented pottery shard and a shard bearing a wavy corded ornament, coming from a vessel found in Feature 71 (Fig. 13: 7).



F i g . 17. Złota-*Nad Wawrem* site, Sandomierz district, Grave 74. Grave goods: 1, 2 pottery; 3, 5 – chocolate flint; 4 – animal bone; 6 – Świeciechów flint. Drawn by B. Witkowska

A ^{14}C AMS dating (Poz-90791 3155±30 BP) was made on a sample from the human forearm bone of the burial. Apparently, for unknown reasons, the obtained result obviously does not correspond to the actual age of the CWC burial. The simplest explanation of the situation is that the museum holding was mislabelled.

STRATIGRAPHIC SEQUENCE II: TWO FEATURES JOINTLY DESIGNATED AS FEATURE 90

Feature 90 was unearthed immediately west of Pit 71 and Grave 74 (Fig. 2).

Feature 90

GAC settlement pit cut into by a CWC grave designated by the same number. It is hard to definitely determine its shape and dimensions since all that is available on the feature is a drawing showing the pit level at a depth of 75 cm (Fig. 18: a). At this level, a compact concentration of GAC artefacts stretched NW-SE, immediately adjacent to the CWC grave. Boundaries between the fills of the older pit and the younger grave were not captured in the drawing. GAC artefacts, identified by their field numbers, in spite of the fact that they occupied a space about 160 cm long and less than 100 cm wide, were encircled with a line marking a greater range. Perhaps, the line marked the boundary of the exploration dig.

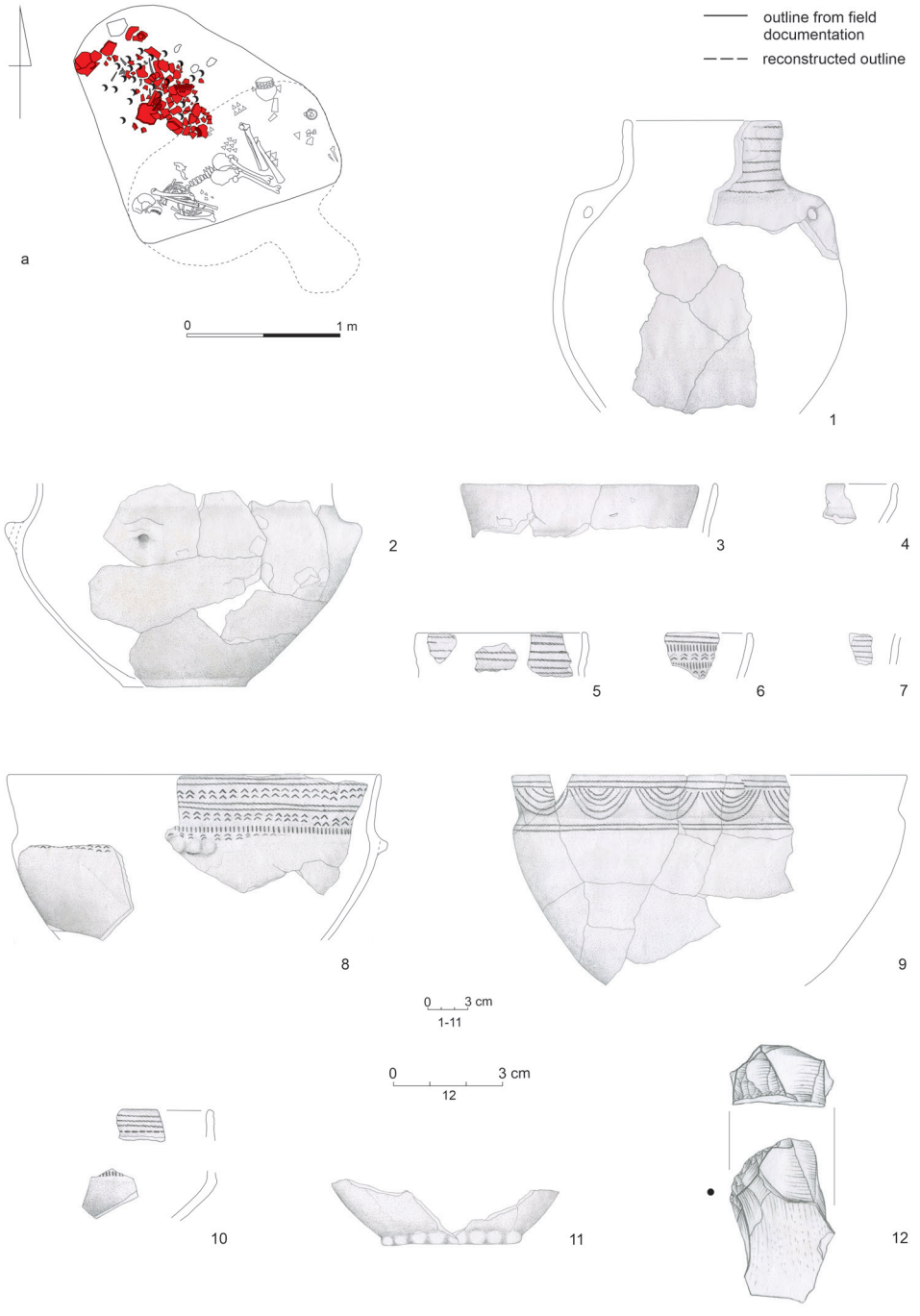
Pottery

The concentration was found to contain 612 pottery shards, originating with about 16 GAC vessels, including a two-handled amphora decorated with cord impressions (Fig. 18: 1), unornamented vase with vertically perforated handles (Fig. 18: 2), beaker (Fig. 18: 3), and at least three richly ornamented bowls (Fig. 18: 8–10). The pottery was highly comminuted: almost 400 shards were below 2 cm in size. They did not permit vessel form identification because they were mostly unornamented body shards. Among its, three rim fragments with a corded ornament (Fig. 18: 5–7) and a single vessel base was recorded with appliqué knobs on its circumference (Fig. 18: 11).

Flint inventory

Among the artefacts making up the GAC material concentration, only one flint tool was found. It was a massive endscraper with a high front made on a striped--flint flake (Fig. 17: 12). Additionally, a record was made of a single pebble with traces of use, shells and fine animal bones.

A ^{14}C AMS determination (Poz-90793 4135±35 BP) was made on a sample from a long-bone fragment of a small ruminant.

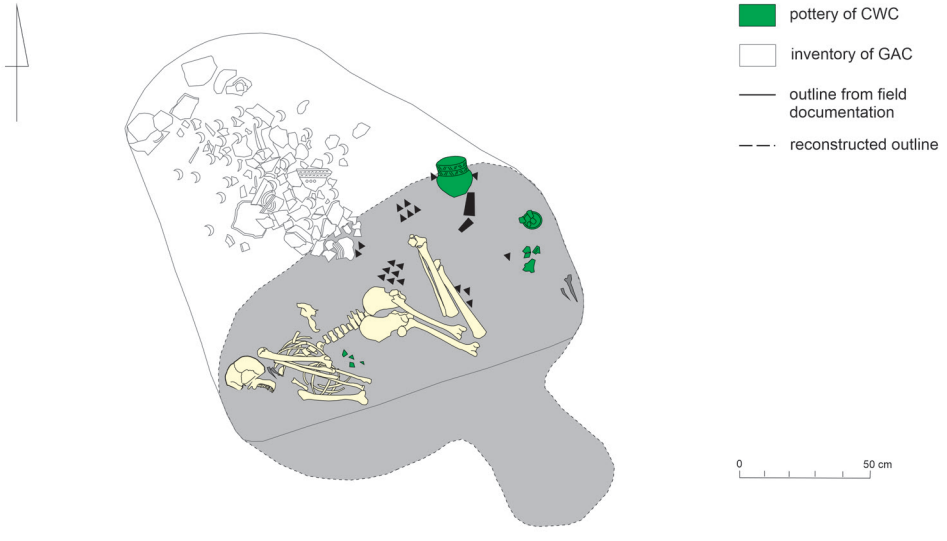


F i g . 18. Złota-*Nad Wawrem* site, Sandomierz district, Pit 90: a – plan based on field documentary, partially reconstructed; 1-11 – pottery; 12 – striped flint. Drawn by B. Witkowska

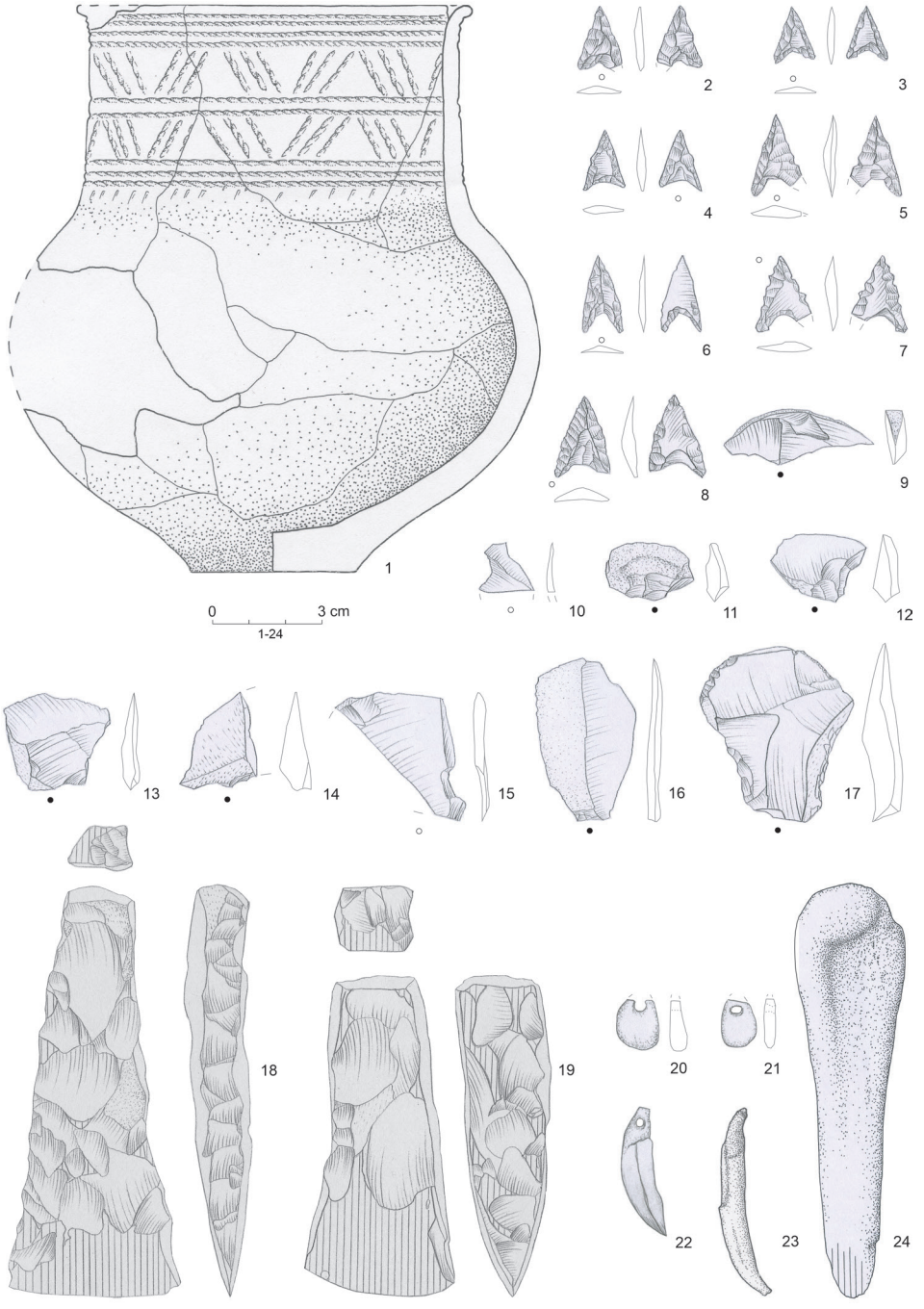
Grave 90

The niche of this human grave cut into the southern portion of the GAC pit (Fig. 19). Its outline was not properly recorded. Nor was an entrance pit marked. Judging by the arrangement of the skeleton, it was located on the S or SE side of the niche. On the grave bottom (75 cm), a burial of an adult lay crouched on its right side, oriented W-E, with the head pointing W and facing S. The right upper limb was bent at the elbow, with the hand reaching towards the face. The arrangement of the left upper limb could not be determined due to a slight shifting of the humerus and a lack of forearm bones. It may have been bent at the elbow – as in the case of the corpse in Grave 74. Most grave goods were placed at the lower limb bones: two vessels (only one beaker has been preserved, Fig. 20: 1), 16 arroheads (only five chocolate flint points and two Świeciechów flint ones have been preserved, Fig. 20: 2–8), eight flint flakes (Fig. 20: 10–14) including two made of Świeciechów flint, three – of chocolate flint, one – of Cretaceous flint, and one – of Turonian flint, a chocolate flint flake fragment (Fig. 20: 15), cortical blade (Fig. 20: 16), flake tool (Fig. 20: 17), two rectangular axes made of Świeciechów flint (Fig. 20: 19) and another variety of Lower Turonian flint (Fig. 20: 18), two bone beads (Fig. 20: 20, 21) and one made of an animal tooth (Fig. 20: 22), and an animal tooth (Fig. 20: 23) and a chisel made from a cattle radius (Fig. 20: 24). The abundance and kind of grave goods suggest that it was a burial of an adult man.

A ^{14}C AMS dating (Poz-90758 3890±35 BP) was made on a sample from a human skull fragment. The skull was the only part of the burial that could be recovered from archival collections.



F i g . 19. Złota-*Nad Wawrem* site, Sandomierz district, Grave 90. Plan based on field documentary from archives of State Archeological Museum in Warsaw - partially reconstructed. Drawn by B. Witkowska



F i g . 20. Złota-*Nad Wawrem* site, Sandomierz district, Grave 90. Grave goods: 1 – vessel; 2–19 – flint artefacts (2, 4, 6–11, 15 – chocolate flint; 3, 5, 13, 16, 17, 19 – Świeciechów flint; 12 – Cretaceous flint; 14, 18 – Turonian flint); 20, 21, 24 – animal bone; 22-23 – animal teeth. 1, 23, 24 – after archives of State Archeological Museum in Warsaw; 2–21 – drawn by B. Witkowska

Altogether, for the features discussed above, six radiocarbon dates have been obtained (Table 1). However, in two cases, for unknown reasons, the results do not correspond to the typological classification of the dated materials. For the bones of the burial from CWC Grave 74, a ^{14}C date has been obtained that relates to the Bronze Age, Period II (corresponding to determinations for Trzciniec culture finds). In turn, for GAC Pit 184, the result of absolute dating points to the late phase of the Early Bronze Age (or the early stage of the Mierzanowice culture). Both results have been considered false and excluded from further analysis. The other determinations concern three GAC settlement features and niche Grave 90 linked to the CWC Kraków-Sandomierz group (Fig. 21).

Table 1.

Radiocarbon datings of features presenting Globular Amphora – Corded Ware relationship from site 3 – "Nad Wawrem" at Złota, Sandomierz district. Calibration in OxCal v4.4.4 [Bronk Ramsey 2021]

Feature no.	Culture	Dated material	Laboratory no.	Age 14C BP	Calendar age BC (68,2%)*
49	GAC	animal bone	Poz-90789	4155±35	2871-2671
71	GAC	animal bone	Poz-90790	4120±30	2854-2623
74	CWC	human bone	Poz-90791	3155±30	1494-1406
90	GAC	animal bone	Poz-90793	4135±35	2862-2630
90	CWC	human bone	Poz-90758	3890±35	2458-2310
184	GAC	animal bone	Poz-90892	3545±35	1941-1779

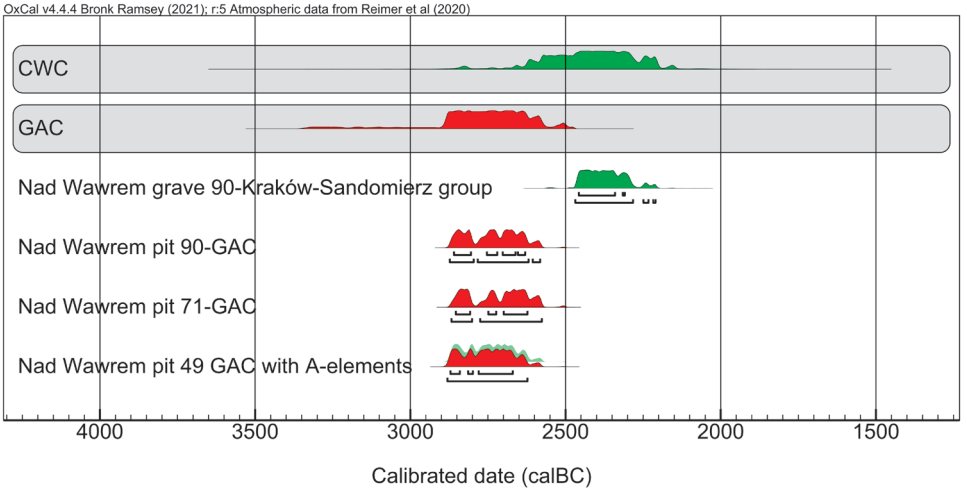


Fig. 21. Złota-*Nad Wawrem* site, Sandomierz district. Calibration of radiocarbon dates of features presenting relationships of the Globular Amphora and Corded Ware cultures. Summary dates calculated including all Corded Ware dates from Sandomierz Upland [after Włodarczak 2019] and all Globular Amphora dates obtained in project the reported project. Calibration in OxCal v4.4.4 [Bronk Ramsey 2021]

For all three credibly dated GAC features,[2] very similar results were obtained, indicating the chronological bracket of *c.* 2870–2620 BC. These results are compatible with other radiocarbon determinations for GAC sites on the Sandomierz Upland, including the cemeteries in Złota-*Gajowizna* site [Witkowska *et al*. 2020], Malice [Witkowska *et al.* 2021, Table 2], Sadowie [Pasterkiewicz 2020] and settlements in Mierzanowice and Gałkowice-Ocinek [Florek, Witkowska 2021]. Moreover, a similar age is suggested by determinations obtained for the other GAC settlement pits on the *Nad Wawrem* site in Złota [Florek, Witkowska 2021].

In turn, the dating of niche Grave 90 to 2458–2310 BC (probability of 68.2%) corresponds to the age of the Kraków-Sandomierz group. This determination is well in line with an already long list of ^{14}C AMS dates for features from the CWC younger phase in southeastern Poland [recently: Włodarczak 2018].

THE QUESTION OF THE RELATIONSHIP BETWEEN THE GAC AND CWC A-HORIZON

The complex of Late and Final Eneolithic sites in Złota supplies rich and crucial data for the study of genetic and chronological relationships between the GAC, CWC and ZC. The occurrence of GAC and A-Horizon artefacts in the same inventories entails a number of research questions concerning relationships between the two cultural phenomena and the place of the GAC in the development scheme of the Małopolska Late and Final Eneolithic. Until recently, the relevant literature has highlighted above all the relationship between the oldest phase of the CWC and the ZC. This preoccupation is quite obvious, considering the facts that Type A artefacts are common in ZC graves and both cultural phenomena are similarly dated, which is borne out by radiocarbon determinations [for the latest list *see* Włodarczak 2019, Fig. 7]. The GAC was referred to in the literature chiefly in the context of ZC origins.

In the course of many years of study of the ZC, Zygmunt Krzak drew attention above all to its syncretism, emphasising the synchronism of the traits of the Funnel Beaker culture, Baden culture, GAC, CWC and even the Bell Beaker culture [summary: Krzak 1976: 195–223], without making chronological divisions for corded elements, occurring in ZC assemblages. What he did stress, however, was the simultaneous appearance of CWC and GAC influence in such assemblages [Krzak 1976, Fig. 6].

Józef Ścibior in his brief reconstruction underscored the importance of the badenization of the GAC, proposing to distinguish a pre-Corded stage in the rise

[2] The Table gives only the results for GAC features particularly significant for studying the chronological relationship to the CWC. A complete list of radiocarbon dates for GAC features from the *Nad Wawrem* site is to be found in another article in this volume [Florek, Witkowska 2021].

of the ZC from the substratum of 'amphora' populations [Ścibior 1991]. Janusz Kruk and Sarunas Milisauskas slightly modified these proposals by pointing to the crucial role of contact between Małopolska GAC communities and Beaker-Baden groups [Kruk, Milisauskas 1999: 208–213]. Both conceptions assumed that the GAC appeared on the Sandomierz Upland slightly earlier, before the rise of the ZC. A similar view was held by Piotr Włodarczak when studying the CWC [Włodarczak 2006, Fig. 55]. As a decisive factor in the origins of the ZC, however, he considered the Northern Pontic contacts between Małopolska GAC communities and those of the older phase of the CWC [Włodarczak 2008].

The conceptions cited above could be verified thanks to the procurement of a series of high-precision (AMS) radiocarbon age determinations for GAC, CWC and ZC material from Małopolska. The most valuable among them were those made on samples of bones from burials. Furthermore, in recent years, a possibility has appeared to verify genetic conceptions, owing to the study of fossil DNA. Its potential is shown by the first results obtained for materials from Małopolska, including above all ones from a collective grave in Koszyce [Schroeder *et al*. 2019] and the burials of the CWC Kraków-Sandomierz group. Unfortunately, the research potential offered by the DNA studies of ZC cemeteries still has not been used. It would settle controversial issues, regarding the nature of cultural changes in Małopolska in the 3rd millennium BC. This is why, yet another attempt made below to fine-tune chronometric data concerns a question that should be further studied, employing specialist methods in the nearest future.

Interestingly enough, in ZC graves, identifications were made of a whole gamut of traits marking the oldest CWC horizon, including all index forms: Type A (or Thuringian) amphorae [Buchvaldek 1986], Type A beakers, early types of battle-axes (including Type A) and pots with a short-wavy moulding strip (Ger. *Wellenleistentöpfe*). Therefore, a simple and obvious conclusion is that ZC graves (or at least some of them) should be dated similarly to CWC Phase I. This conclusion is borne out by radiocarbon dating results. However, the dating of the Małopolska GAC complicates the matter: most absolute age determinations obtained so far give the same age as in the case of the ZC and CWC older phase [for a list *see* Witkowska 2021, Table 2; Florek, Witkowska 2021, Table 2]. In this context, it was important to identify a group of GAC pottery inventories, comprising artefacts with CWC traits, too.

The absolute age determinations of the CWC oldest phase in Małopolska are few [latest updating: Włodarczak 2018]. To make matters worse, none are available for the Sandomierz Upland. This deficiency follows from a failure to explore a Final Eneolithic barrow there. From the vicinity of Sandomierz, not a single grave is known either that would be linked with certainty to CWC Phase I. All we have is two old-CWC beakers, coming from a destroyed grave, discovered close to Site 1 in Samborzec [Machnik 1966: 234]. It could have been a CWC feature, but it cannot be ruled out that it was a ZC feature that was destroyed. In the ZC, similar artefacts are recorded as well. Furthermore, CWC older phase pottery as well as

stone battle-axes were recorded in cemeteries on Sites 1–3 (*Grodzisko I*, *Grodzisko II* and *Nad Wawrem*, respectively) in Złota [Machnik 1966; Krzak 1976]. On these grounds, the horizon of CWC barrows (Phase I, possibly Phase II as well) was synchronised with the age of ZC cemeteries [Włodarczak 2006; 2008].

The oldest radiocarbon determinations for a CWC grave were procured for two barrows located in the Carpathian region: in Średnia [Machnik, Sosnowska 1996] and Bierówka [Gancarski, Machnikowie 1986; 1990]. Two datings from the barrow in Średnia (Gd-10402 4390±100 BP and Gd-10397 4290±90 BP) point to *c.* 2900–2800 BC. A relatively early datings are also shared by Barrows A and B from Bierówka (Gd-1877 4240±40 BP; Gd-2759 4120±80 BP) [for interpretation *see* Włodarczak 2018: 191, Fig. 7]. However, all these oldest determinations come from uncertain contexts and are characterised by large standard errors. Most other determinations for Final Eneolithic barrow graves set their absolute age at *c.* 2850–2600 BC. From the entire Małopolska, only few determinations have been obtained so far for burials exhibiting traits of the oldest CWC horizon, with only one – for Grave 1, Gabułtów (Poz-9451 4115±30 BP) [Jarosz, Włodarczak 2007: 72, 73] – having good quality and an appropriate sample collection context.

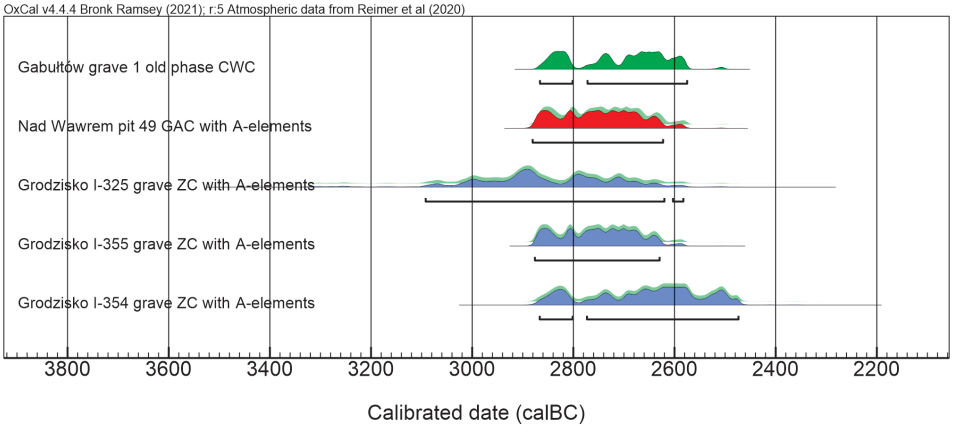
Difficulties in fine-tuning data and marking more precise sequences follow from the nature of the calibration curve – it forms a plateau for a considerable portion of the 3000–2500 BC section [Włodarczak 2007; 2009; 2018]. Hence, a good quality result for the Gabułtów grave (4115±30 BP) indicates a relatively long age bracket of 2850–2585 BC (68.2%). Importantly, this bracket covers also most dates obtained for ZC graves [recently: Włodarczak 2019, Table 4] and GAC graves on the Sandomierz Upland [Witkowska 2021, Table 2]. An analogous ^{14}C date has been obtained for GAC Feature 49, *Nad Wawrem* in Złota, in which artefacts exhibiting traits of the CWC older phase have been discovered (2871–2671 BC).

Bearing in mind that the beginning of CWC Phase I in the overall – central European perspective – may be set at *c.* 2800 BC at the latest, we must presuppose the contemporaneity of Final Eneolithic barrows and most GAC features for which absolute age determinations are available. Harder to interpret, however, the chronological sequence on the *Nad Wawrem* site in Złota is marked by CWC elements, supporting a late dating of GAC pits there (after *c.* 2850/2800 BC). In turn, beyond the bounds of possibility however, the fine-tuning of the relationship between GAC settlement pits and nearby ZC graves also containing CWC older phase elements, may be expected to render an age that would be the same or only slightly younger. For ZC burials from the *Nad Wawrem* site, two determinations were obtained earlier – for Graves 4 and 10 (GrN-9144 4180±35 BP; GrN-9145 4195±35 BP) [Krzak 1989]. Not allowing for any stylistic retardations, it would have to be assumed therefore that Złota graves holding Type A artefacts are dated not later than from *c.* 2850–2700 BC.

A similar dating is correct in the case of the relics of the GAC settlement on the Złota-*Nad Wawrem* site as well as probably the other GAC sites on the Sandomierz

Upland. GAC materials found in the pits under discussion are quite stylistically cohesive albeit certain differences between them are noticeable, e.g. a high share of unornamented vessels in Feature 71 or a low frequency of mat-like cord impressions in Feature 184. It does not seem, however, that these differences are chronologically significant. The study of pottery as the most sensitive marker of typological changes in the GAC makes one conclude that the pits are of a similar age. The fact that they hold the same vessel forms or pottery with identical ornamental motifs such as vertical plastic strips or cord impressions cutting across a mat-like corded ornament, corded festoons, inlays, fine round stamp impressions and cord impression imitations, convincingly argues for their synchronism. At the same time, all these traits classify them as GAC sources, owing to a lack of any analogies in ZC graves.[3] These materials may be viewed in a broader context and – similarly to other GAC sites on the Sandomierz Upland – dated with the greatest certainty to Subphase IIIa [Witkowska *et al*. 2020; Florek, Witkowska 2021; Witkowska 2021].

It must be stressed in this context that making a sharp distinction between ZC artefacts and GAC materials is not always possible or even justified. This is so largely because of ZC peculiarity. However, equally important are newly obtained chronometric data. In their light, it seems impossible to build the sequential models of cultural changes taking place on the Sandomierz Upland in the first half of the 3rd millennium BC and distinguish a pre-CWC phase in the GAC settlement episode in Małopolska. A series of radiocarbon dates argues therefore clearly in favour of the synchronism of the GAC, ZC and the oldest CWC elements (Fig. 22).



F i g . 22. Calibration of radiocarbon dates of related to the Globular Amphora culture (Pit 49 from Złota-*Nad Wawrem* site), Złota culture with Corded Ware A-elements (three graves from Złota-*Grodzisko I* site) and the old Corded Ware phase (grave 1 from Gabułtów). Calibration in OxCal v4.4.4 [Bronk Ramsey 2021]

[3] The same conclusions were favoured in his later publications by Krzak, too, who in 1980 corrected the cultural classification of the features under discussion [Krzak 1980: 136].

THE QUESTION OF THE RELATIONSHIP BETWEEN THE GAC AND THE KRAKÓW-SANDOMIERZ GROUP

Matters look different in the case of the relationship between the GAC and the younger development stage of the CWC or the Kraków-Sandomierz group. At present there are no GAC assemblages that could be referred to the second half of the 3rd millennium BC on the Sandomierz Upland. This is true of both radiocarbon dating results and the overall picture produced by the typological study of materials. The stylistic variety of GAC artefacts on the Sandomierz Upland is relatively small, being probably a reflection of the short lifetime of the culture there. What is more, there are no markers of relatively early (4th millennium BC) and late age of such materials (about the middle of the 3rd millennium BC).

The two examples of stratigraphic sequences discussed above show a sequence characteristic of the *Nad Wawrem* site in Złota: older GAC settlement pits with respect to a CWC cemetery made up above all of burials in niche graves characteristic of the Kraków-Sandomierz group for which a number of absolute age determinations are available [Włodarczak 2006; 2013; Jarosz, Włodarczak 2007]. Few of these ^{14}C determinations, however, relate to cemeteries on the Sandomierz Upland [Włodarczak 2019: 191, Table 3]. The most significant in this context, age determinations for cemeteries located on the so-called 'Vistula scarp' – in Żuków and on the neighbouring *Grodzisko II* site in Złota (*see* below) – suggest a late chronology for niche graves on these sites, falling on the very end of the Final Eneolithic.

The recorded shape of features, corpse arrangement and the scatter pattern of gave goods show that Grave 90 had a niche structure. It was found to hold a burial of an adult (probably a male) arranged characteristically of the CWC Kraków-Sandomierz group. The body orientation was less typical though because the arrangement along the W-E axis with the head pointing W, while encountered in many CWC regions, is rare on Małopolska sites [Włodarczak 2006: 63, Fig. 35]. The grave goods included several elements, chronometrically significant and distinctive for the local CWC group: a large beaker (the second vessel had not been preserved; in all likelihood it was a smaller beaker) and a rich set of points (16 items) and two flint axes. In addition, the male sex of the burial was confirmed by the presence of a bone chisel and a cache of flint flakes. To sum up, the grave goods of Grave 90 consisted of two vessels, a large set of flint points, two axes, tool equipment items (retouched flake, chisel and possibly an animal-tooth fabricator) and a set of flakes (to make points?). What strikes the eye is the absence of a stone battle-axe – frequently encountered in Małopolska CWC male graves. In terms of quality, the inventory has good counterparts in other CWC inventories on the Sandomierz Upland, above all from Graves 76 and 93 on *Grodzisko II* in Złota [Krzak 1958], Grave 1(2) in Żuków [Marciniak 1961],

Grave 29 in Kichary Nowe [Kowalewska-Marszałek 2000]. Outside the Sandomierz vicinity, only one similar inventory is known: from Grave 128, Żerniki Górne, which yielded, however, only three flint points [Kempisty, Włodarczak 2000: 76–81]. Meanwhile, a clear exception is the absence of a regular knife-blade from Grave 90, Złota, which is a standard furnishing of male graves on the Małopolska Upland. The inventory of this last-mentioned grave can hardly be considered complete.

The beaker from Grave 90 is a large two-segment form (Variety PVBb-7) ornamented on the entire neck height. Its ornamentation pattern of successively repeated elaborate motifs was given as an example of the reminiscence of GAC patterns on CWC pottery [Włodarczak 2006: 99], while its component elements (motifs of horizontal and chevron cord impressions, a row of incisions) are characteristic of Kraków-Sandomierz group vessels. The chevron impressions can be found also on other beakers from CWC cemeteries in Złota: from Features 246, 326 and 396 on the *Nad Wawrem* site and Feature 93 on the *Grodzisko II* site [Machnik 1966, Pl. XV: 3a, XVI: 1b, 2b].[4] While relatively rare in other Sandomierz Upland microregions, this ornamental motif was often recorded on beakers and slender amphorae from western Małopolska.

The set of two axes is made up of GS (thick-medium) and PS (flat-medium) types [Budziszewski, Włodarczak 2011]. Hence, this is a classic core tool pair from the Małopolska Upland [Włodarczak 2006: 27], associated above all with burials dated to Subphase IIIB of the CWC. Analogous sets come, for instance, from Grave 1(2), Żuków [Marciniak 1961, Pl. IV: 5, 6] and Grave 93, *Grodzisko II* site, Złota [Krzak 1958: 379, Fig. 32: b, e].

Of the set of 16 points, only seven have been preserved. They differ in terms of typology and dimensions but have a trait in common: a deep notch. Points made of chocolate flint dominate – which is a rule in inventories linked to CWC Subphase IIIB. Only in the inventory from Grave 15, Wilczyce, is raw material noticeably more varied [Boroń 2019: 67–78]. The inventory from Grave 90, Złota, includes a point of slim proportions – as in the assemblage from Grave 76, *Grodzisko II*, Złota [Krzak 1958: 370, Fig. 28: c]. Such forms are characteristic of Early Bronze inventories. In terms of number, the point set from Grave 90 is a rich one, although more numerous inventories are occasionally seen on the Sandomierz Upland, for instance from Grave 1(2), Żuków (21 items) [Marciniak 1961] or Grave 2, Mydłów (27 items) [Bargieł 2009]. The special character of Grave 90 furnishings in Złota is

[4] CWC materials from cemeteries in Złota have not been fully processed yet. Two features (76 and 93) from Site 2 (= *Grodzisko II*) have been published [Krzak 1958] while from Site 3 (= *Nad Wawrem*) only those CWC features have been presented that remained in stratigraphic relationships with ZC graves [Krzak 1970]. Some additional information on other unpublished features and drawings of selected ceramic artefacts have been presented by Jan Machnik [1966]. Materials from unprocessed Features 90 and 246 from Site 3 (*Nad Wawrem*) have been used in a study by Piotr Włodarczak [2006].

consistent with the tendency, observed throughout the region, of stressing archer's tackle in the funerary rite of the CWC younger phase.

It is quite clear, therefore, that Grave 90 goods, *Nad Wawrem* site, fit in well with the local peculiarities of Subphase IIIB of the CWC on the Sandomierz Upland and have many good analogies in the immediate vicinity, that is, on the so-called 'Vistula scarp' close to Sandomierz. The obtained dating corresponds closely to determinations for graves from this microregion, that is, for features 1(2) and 3(4), Żuków (Poz-9583 3885±35 BP; Poz-9579 3835±35 BP) [Jarosz, Włodarczak 2007: 77, 78] and Grave 76, Site 2 (*Grodzisko II*), Złota (GrN-9146 3825±35 BP) [Machnik, Ścibior 1991: 50]. All these determinations, however, are slightly younger than a ^{14}C date for Grave 15, Site 10, Wilczyce (Poz-59139: 4030±35 BP; Poz-4055±30 BP) [Włodarczak 2019]. Importantly, the date refers to a rich inventory linked to CWC Phase II/IIIA, i.e. in terms of typology also older than Kraków-Sandomierz grave assemblages from the *Nad Wawrem* and *Grodzisko II* sites in Złota. The ^{14}C dating of Grave 90, Złota, points to – as do the determinations for the Żuków burials – the middle or late stage of Subphase IIIB, i.e. the late stage of the Kraków-Sandomierz group, chronologically close to the horizon of the Małopolska Bell Beaker culture and the oldest assemblages of the Mierzanowice culture. In general terms, this is the period of 2450–2300 BC.

Grave 74, for which a false result of absolute dating was obtained, was located close to Grave 90. Usually, niche graves, forming small compact concentrations, are of a similar age. Presumably, this was the case here. If so, Grave 74 was connected to the late phase of the Kraków-Sandomierz group, which is also supported by the traits of grave goods found in it.

Judging by the artefact style and funerary rite, it can be claimed that also the other CWC grave features on the Złota-*Nad Wawrem* site date to Subphase IIIB of the CWC, most likely to its younger stage [above all: Krzak 1970; Machnik 1966; Włodarczak 2006].

So late a chronology of the CWC assemblages obviously rules out their synchronism with the GAC settlement on the *Nad Wawrem* site, which is borne out by stratigraphic observations. This conclusion, however, does not apply to the entire lifetime of the Kraków-Sandomierz group that could partially overlap with the decline phase of the GAC on the Sandomierz Upland. This is particularly true for early-dated Kraków-Sandomierz assemblages as per Grave 15 type, Wilczyce [Włodarczak 2019]. Furthermore, the role of the GAC and ZC must be stressed in the origins of the local CWC group (Phase II) on the Małopolska Upland. The role was already noticed in the relevant literature [Włodarczak 2006: 91–99]. Jan Machnik, too, stressed the chronological sequence of the ZC → CWC Kraków-Sandomierz group [Machnik 1966: 119–121], assuming that the two groups were partially synchronous [Machnik 1966: 178; 1979: 392].

CONCLUSIONS

The cultural landscape on the Małopolska Upland in the Late and Final Eneolithic, in the light of the latest radiocarbon age determinations, appears rather complex owing to the co-occurrence of material phenomena that are usually assigned to separate cultural units. On the *Nad Wawrem* site in Złota taxon boundaries have become obliterated, complicating the construction of traditional taxonomic-chronological models. The appearance of old-CWC artefacts in GAC and ZC assemblages means that A-horizon traits cannot be assigned to a specific taxonomic unit on the Sandomierz Upland. They represent a set of exogenous traits that, being a harbinger of changes leading to the rise of corded groups, may also occur in various contexts.

It cannot be ruled out that in the initial phase of the Final Eneolithic on the Sandomierz Upland, A-Horizon traits were found primarily not in the context of the CWC, but the GAC and ZC. This claim seems to be borne out by radiocarbon dating results for GAC and ZC assemblages from the sites in Złota and throughout the region. Their vast majority point to a chronology of *c.* 2800–2600 BC.

Most Kraków-Sandomierz group assemblages, including those from the Złota-*Nad Wawrem* cemetery, are clearly younger, dating to 2500–2300 BC, than GAC and ZC finds. Hence, it continues to be difficult to document the impact of the Złota-GAC factor when studying the origins of the groups of the Final Eneolithic younger phase, including Subphase IIIB of the CWC Kraków-Sandomierz group.

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