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Voiced or Silent? The Sound of the Sistrum in Ancient Egypt

Abstract

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The sistrum was one of the most popular idiophones of Antiquity and, of all the musical instruments, it was most closely associated with the culture of Ancient Egypt, being present there for most of the time of this civilization's existence. To this day, numerous examples in a diversity of shapes have remained and their representations also appear on the walls of temples and tombs. They also can be found in statuary sculptures as well as small plastic art. The sound of sistrum was an important element of the cult of varies deities, but primarily that of Hathor. The symbolic function was so strong that the instrument itself became a votive object. Some researchers believe that only the arched sistrum performed a sound purpose, while the faience naos-sistrum supposedly lacked this function. To obtain a more comprehensive picture of the sounds produced by the sistrum, and to evaluate the acoustic capabilities of the naos-sistrum, the experimental approach was employed.

Keywords: Ancient Egyptian rattles, archaeological rattles, music in Ancient Egypt, Ancient Egyptian instruments, archaeoacoustics, archaeomusicology

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Introduction

Rattles are one of the simplest and oldest musical instruments, with artists from almost all the entire ancient world having created various forms of rattles, adapted to the function they performed. The sistrum is not the only rattle found in Ancient Egypt (Tatoń and Czajka 2021, 8) but no other Egyptian rattle had such a characteristic form or fulfilled such an important function. Certainly, no other rattle made a similar sound. The sistrum's sound and, more broadly, its acoustic properties based on spectral analysis is the author's primary focus in this study.

Sistrum – an overview of the rattle

The term "sistrum" is derived from Greek and has been commonly adopted to describe a kind of rattle. It is one of the most popular idiophones of Antiquity, occurring, among others, in Ethiopia, Mesopotamia, Crete, Palestine, Greece, and Rome as well as on the islands of Melanesia and in North and South America (Pawlicki 1974, 11). Although there are places where the sistrum has been used up until modern times, we associate it primarily with the culture of Ancient Egypt. It has long aroused the curiosity of researchers and much has been written about the sistrum. However, among the numerous analyzes so far, none have been devoted to the acoustic characteristics of these objects.

In general, it is said that sistrum is a rattle consisting of a U-form frame to which metal rods and small discs (sounding plates) are loosely attached so that they jingle when the rattle is shaken (Sachs 1940, 70). According to the Hornbostel-Sachs Classification of Musical Instruments, the sistrum is an indirectly struck idiophone, a stick rattle, where the player himself does not go through the movement of strik-

ing; percussion results indirectly through some other movement by the player. The intention of the instrument is to yield clusters of sounds or noises, and not to allow individual strokes to be perceived. Rattling objects are strung on a bar (*MIMO Consortium*, 5).

The sistrum was present in Ancient Egyptian culture for most of its existence. The art of the land of the pharaohs is recognizable at first glance and may seem uniform, but it changed markedly with the development of the Kingdom. Of course, every musical instrument or sounding tool is not an independent phenomenon and its evolution is related to the evolution of the entire culture. As a result, the sistrum underwent changes over time, taking on various forms. Perhaps this is why the first classification of sistra discovered in Egypt, made by F. Petrie, consisted of as many as five types: with the face of Hathor and large, protruding ears; with a depiction of a lotus instead of Hathor's face; with a lotus flower and Hathor's head above it; with the representation of Hathor's head in the middle part of the instrument and with rods formed in the shape of snakes. Scholars have agreed that this division has many inaccuracies regarding the construction of the instrument itself, the function performed by the instrument, and the material from which it was made (Pawlicki 1974, 7).

Nowadays, two basic types of Egyptian sistrum are distinguished. The first is the arched sistrum, sometimes also termed the loop one (Suddreth 2019). It consists of a loop that is pierced by horizontal metal rods and sometimes the rods can be additionally equipped with plates to enhance the sound. An arched sistrum is usually made of metal but can be made of various materials from wood to faience. The rods and plates were generally metal, although other views can also be found in the literature. As A. Tsakalidou states: *The disks inside the sistrum could be made of various materials, such as ceramics or metal* (Tsakalidou 2021, 28).

The second type is the so-called naos-sistrum, made mostly from glazed faience (Reynders 1998, 1013). It derives its name from the element above the handle, taking its inspiration from the shape of a temple portal (Manniche 2010, 13). The representations of the arched sistrum may be shown as white or yellow, suggesting silver and gold, while the naos-sistrum is depicted in yellow – gold (Manniche 2010, 13–14).

All of the preserved examples of both types differ in appearance. Some of them are very simple in decoration, but the others have ornamentation in various forms. The centerpiece of most of surviving sistra both types is a head of Hathor, the handle often takes the form of a papyrus stem. From the Late Period sistra appear with new elements such as cats and kittens, figures of Bes and uraeus serpents (Manniche 1991, 63). There are many complete examples or their fragments in museums. However, there are equally, if not more numerous, iconographic representations of sistrum. We can find them on the walls of tombs, temples and buildings. They are depicted on stelae, statues, figurines and small works of art as well as on ostraca and papyri.

The first representations of the naos-sistrum come from as early as Old Kingdom – the 4th dynasty, to which the relief from the tomb of Nunetjer in Giza is dated (Köpp-Junk 2020, 16). The oldest preserved instrument of this type also comes from the same period. It is an unusual sistrum made of travertine or Egyptian alabaster, inscribed with the names of King Teti, dating ca. 2323–2291 BC, the 6th dynasty (Pawlicki 1974, 11). The arched form is slightly younger, appearing in the Middle Kingdom, but its depictions are known mostly from the New Kingdom onward (Manniche 1991, 63). They are mentioned earlier in inscriptions, however, the problem here is a bit more complicated.

Generally Ancient Egyptians used two terms for sistrum: *sḫm* and *sššt*. In the older literature we can find a simple designation for both terms. The authors used *sššt* to denote naos-sistrum, while *sḫm* referred only to arched sistrum (Fig. 1; Sachs 1940, 89; Hickmann 1962, 46–51; Pawlicki 1974, 8–9; Manniche 1991, 62–63 and others). This simple interpretation of the reading of both types of sistrum is followed by most older authors. However, over time some of them point out a confusion in the assignment of these terms to a specific type and which term is used to which sistrum in which period of Ancient Egyptian history: e.g. on the scene from Medinet Habu there is a depiction where the term *sššt* appears next to the arched sistrum (Fig. 1). Also, both terms are found for each type in Ptolemaic texts (Reynders 1998, 1014). Furthermore, it was noted that the term *sḫm* does not necessarily refer to a musical instrument and should not always be interpreted as such. As the embodiment of the goddess Bat (Fig. 2; Baines and Málek 1995, 163), the sistrum was the symbol of the 7th nome of Upper Egypt (Fischer 1962, 7). As H. Fischer notes: *By the New Kingdom Bat was completely eclipsed by her powerful neighbor, and Hathor ruled in her place as mistress of Hu, or IJw.t-sḫm 'Mansion of the Sistrum' capital of the 7th nome was then called* (Fischer 1962, 7). This is how M. Reynders explains the matter: *the two words known for Egyptian sistrum have to be interpreted with distinct*

Fig. 1. From left: Naos-sistrum and the term *sššt*, Temple of Seti I in Abydos; arched sistrum and the term *sḫm*, Temple of Hathor in Dendera; arched sistrum and the term *sššt*, Temple of Ramesses III in Medinet Habu (photo and elaboration by the author).

levels of meaning. Sššt is always used for the sistrum when the actual function of the instrument is meant, that is, to make noise. It is not the name of any particular type. Sḫm, however, refers to the symbolic representations of the sistrum as 'a' sekhem of Hathor, and not to the sistrum as a musical instrument. A relief on the southern outer wall of the temple of Opet at Karnak shows a procession of Egyptians provinces: the 7th nome of Upper-Egypt, the nome of the goddess Bat, is depicted as an arched sistrum on a standard. The name hw.y sḫm designating this nome, is however, not to be read as 'The Mansion of the Sistrum', but as 'The Mansion of the sekhem'. The sekhem that is meant here is, of course, the goddess Bat, whose features appear from the Middle Kingdom onward on various Hathoric emblems such as the sistrum (Reynders 1998, 1023–1024). A similar phenomenon occurred in the names of kings. The phonetically read hieroglyph representing the sistrum, Gardiner's symbol "Y8" (Allen 2001, 447), was part of royal names, e.g. Sekhemkhet, a king of the 3rd Dynasty, Sekhemrekhuitaui, aking of the 13th Dynasty (Schneider 2006, 286–288), Neferhotep I Khasekhemra (Fig. 3; Baines and Málek 1995, 37). The names of the latter can be translated: Neferhotep – the perfect one is satisfied, Khasekhemra – the power of Ra appears (Schneider 2006, 194).

Of course, there is a connection between the word *sḫm* and the sistrum, but there are quite a few examples where the word *sḫm* is written with determinative of the sistrum or *sekhem*-sceptre but the word itself does not mean sistrum (Reynders 1998, 1020). Whereas *sššt* refers to the noise made by this instrument, and that because of this *sšš.t* can be used to designate the sistrum itself, whatever the type. *Sššt* mostly appears in the fixed construction *ir(.t) sššt* "doing the

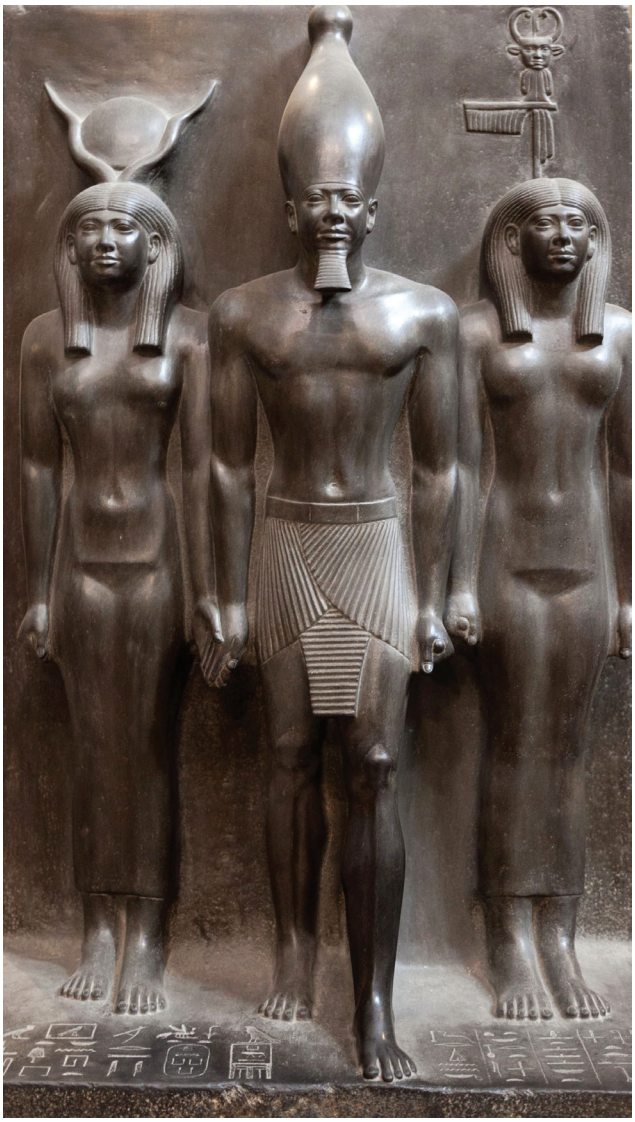

Fig. 2. Triad: King Menkaure positioned between two goddesses; to his right is the goddess Hathor, and to his left is the personification of the seventh nome of Upper Egypt, the goddess Bat, with the sistrum emblem (after: Baines and Málek 1995, 163).

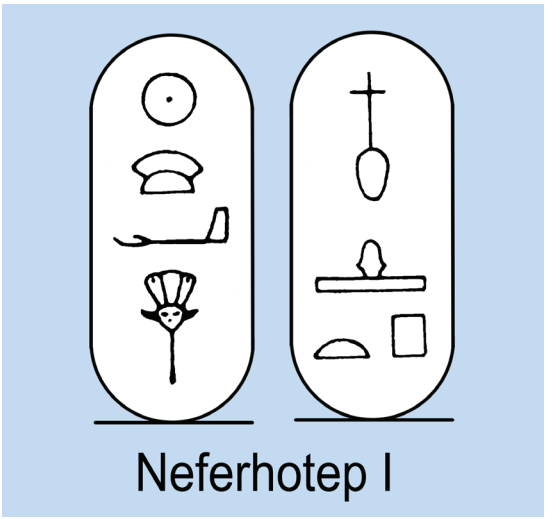

Fig. 3. Cartouches with the names of Neferhotep I Khasekhemra, containing Gardiner's symbol "Y8", the phonetically read hieroglyph representing sistrum (after: Baines and Málek 1995, 37).

shaking". The word *sššt* can be regarded as a participle form "that which is shaken", thus "the sistrum" (Reynders 1998, 1020).

The Ancient Egyptians sometimes used the term *iba* interchangeably for the arched sistrum. Evidence of this can be found in a fragment of text placed in the temple of Hathor in Dendera. The scene shows Hathor holding the naos-sistrum in her right hand and the arched sistrum in her left. Below the image there is an inscription: "*sššt* is in my right hand, *iba* is in my left hand" (Sachs 1921, 31). Scenes where the arched and naos-sistrum are in the hands of one person can also be found in other temples, e.g. in Edfu, at Philae or Luxor. They suggest of using both types at the same time.

Sistrum as a rhythm maker

Sistra were commonly depicted in a few ways: in identical pairs – either the arched or naos-type (Ziegler 1984, 960) in pairs of a naos- and an arched sistrum, or an arched sistrum accompanied by a *menat*. The latter was very popular: the temple songstresses would often perform in groups of three or more, singing a hymn in praise of the god; they probably shook the sistra to divide the phrases of recitation. The sistrum's sound might be enhanced by the *menat*'s rattling, which the women carried in their hands rather than wearing (Manniche 1991, 63). These scenes were quite common during the New Kingdom and onward, with the rhythmic nature of the performance vividly conveyed here. One of such scenes was depicted on the wall of Hatshepsut's sanctuary in the temple of Amun at Karnak (Fig. 4), similar in Theban Tomb no. 82 of Amenemhat (Manniche 1991, 63), and another in the temple of Horus in Edfu (Fig. 4). Lise Manniche points out Apuleius' description of such procession in honour of Isis, where the carrying a sistrum shook it three times in succession. The authoress transcribed this into the rhythm (Fig. 5; Manniche 1991, 65).

As said above, the sistrum was a significant element of the Bat and Hathor cult. But its role did not end here, it was also related to the cult of other deities. The name of Hathor's son – Ihy was interpreted, among others, as a sistrum-player and also *who personified the jubilation associated with the use of the sacred instrument* (Wilkinson 2005, 132). Bastet, as a lioness goddess, since the Middle Kingdom was depicted as a cat or a woman with the head of a cat, often with a sistrum in her hand. The connection between the goddess and the sistrum was so strong that the instrument itself was often decorated with the image of a cat (Wilkinson 2005, 178). The cult of Bes had an equally strong sistrum association – the representation of the god was often placed on the handle of the instrument, e.g. richly decorated arched sistrum from the Roman Period, with the handle formed by a figure of the god Bes, who stands on an elaborate pedestal and whose headdress makes a sort of capital beneath the Hathor head (British Museum, EA6365). The sistrum was also an important element of the rituals of Isis and in the course of the spread of Isis worship in the late period, it reached Greece and Rome (Tsakalidou 2021, 28). It can generally be said that rhythm was essential to religious rituals and the sound of sistrum could calm the gods and increase their willingness to protect and help mankind (Teeter 2009, 25).

Music also appears to be accompanying everyday activities, giving rhythm to people's work, granting the requisite merriness to festivities or ensuring an appropriate tone at funerals or weddings. The iconography of the sistrum in tombs or temples shows it in the hands of not only the priestesses but also people of high status, including kings and queens who are seen playing the ritual sistrum in various religious contexts, regardless of whether it is arched or naos-shaped. Both men and women were performers and musicians, but their roles seemed to be distinct. The women would shake the symbols of Hathor, the beaded *menat* necklaces and the sistra while the men most likely sang and clapped the rhythm with them (Tsakalidou 2021, 36). On the wall of a Middle Kingdom tomb in Kom el-Hisn, the owner – Khesuwer is depicted giving girls lessons in playing the sistrum and hand clapping (Manniche 1991, 123; Yehia and Abdelhakim 2021,

Fig. 4. The arched sistrum accompanied by meant; above: the "red chapel" placed in the sanctuary of the Amun-Ra temple in Karnak, below: Horus temple in Edfu (photo and elaboration by the author).

Fig. 5. The rhythm of the sistrum transcribed by Lise Manniche (after: Manniche 1991, 65).

43). Unfortunately, the scenes depicted by painters or sculptors do not reflect any articulation details of the use of the sistrum, they do not allow us to fully reconstruct the gesture of shaking the instrument (Saura-Ziegelmeyer 2015, 224). According to some researchers, it is possible that the most skilled performers were able to achieve various tones through different articulation (Quiñoes de Leon 2015–2016, 202). Regardless of articulation, the scene depicting a lesson in playing the sistrum proves that singing accompanied by a sistrum was specialized knowledge in ritual music.

Symbolism of the sistrum in Ancient Egypt

Musical instruments in Ancient Egypt can be found in contexts of a secular or religious nature. Among them, the sistrum has the biggest, specific sacred associations (Manniche 1991, 62). The main sacred sistrum connection, of course, was with Hathor. This association was so large that, as M. Reynders notes: *she was believed to be actually immanent in them so that those who touched or handled them would*

be in direct contact with the deity itself (Reynders 1998, 1020). This means that not only the sound of the sistrum had religious significance, but also the object itself. In fact, since the times of the Old Kingdom it was both an instrument and a votive object (Suddreth 2019, 8). Its symbolism may concern many aspects, starting with the name itself. Papyrus stems were traditionally hauled up and shaken in front of Hathor as part of a ritual. *Sššt*, the Egyptian word for sistrum, was the onomatopoeic term for the sound of a bundle of papyrus being shaken (Manniche 1991, 63).

Undoubtedly, the shape of the rattle and its decoration also had a votive significance. In most cases it was depiction of Hathor and other deities. Yet another symbolic feature may also have been the color of the instrument. Preserved examples of naos-sistrum are most often made of faience covered with blue or green glaze, which is reminiscent of turquoise, a material associated with Hathor (Manniche 2010, 13). It could be said that the sistra were manifestations of Hathor. In the Amarna period, it was used to establish the role of Nefertiti in the universe of Akhenaten as the unbroken fundamental concept of the origin of the world (Manniche 2010, 13).

Since it gained importance as a votive object, we can observe naos-sistrum occurring in various sizes, suggesting a non-musical use. Nehi, the viceroy of Kush during Thutmose III's reign, as depicted in a statue in the Nubian Museum in Aswan (Fig. 6: 1), is seen kneeling and holding a large naos-sistrum before him. The sistrum is definitely too big to be a real musical instrument. A similar depiction, identified as Kaemwaset Kneeling with an Emblem of Hathor, also dating to the New Kingdom, is in the Brooklyn Museum (Fig. 6: 2). A representation of the sistrum as a purely symbolic object can be also found in the mortuary temple of Ramesses III in Medinet Habu. In a procession of priests carrying various symbols, one priest holds a large naos-sistrum. Again – its size makes it too large to be a real rattle (Fig. 6: 3). The symbolic importance of these sistra is emphasized by the fact that they are shown without the bars or plates that acoustically make them musical instruments. All the more so because both are unusually large and the representation of holes or bars would not pose any technical difficulty. At the same time, representations of the arched sistrum have rods and often plates, even in the case of representations of relatively small size. In turn, two holes are located in the side walls of naos-sistrum tiny dimensions (Fig. 6: 4), made of grey-green, shiny faience, dated to the Late Period, currently in the collection of the National Museum in Krakow. The object is so small that it would be difficult to fit rods into its holes. It certainly couldn't have performed a sound function but is rather identified as an amulet figurine. The goddess Hathor was distinctly represented by the sistrum and this influenced the temple builders of the 18th dynasty. The columns of Hathor's temple at Dendera have the shape of the sistrum (Fig. 6: 5; Baines and Málek 1995, 113). Temples of other deities also used Hathoric column capitals, which seem to provide sound for the goddess in the afterlife.

The question remains unexplained: when the sistrum had a sound function, when it was only a votive object, and when it fulfilled both functions. Scientists differ in their opinions. A. Saura-Ziegelmeyer believes that it does not seem that the person holding the sistrum was a musician in the eyes of the Ancients (Saura-Ziegelmeyer 2015, 229). Some authors consider only the naos-sistrum to not have been a musical instrument. M. Reynders points out that although the lack of metal rods in the preserved specimens of naos-sistrum and their representations does not determine the purely symbolic function of these objects, but it may testify to it (Reynders 1998, 1013). R. Suddreth explains that the earliest sistra, which were the naos type, were exclusively votive and symbolic in nature, whereas arched sistra were meant almost exclusively as musical instruments. The author explains the reason for this division by the fact that metal is less fragile and more acoustically pleasing than the faience (Suddreth 2019, 9–10). L. Manniche likewise represents a similar viewpoint: acoustically the sistrum, especially when made of faience, would have been less impressive than other musical instruments (Manniche 1991, 63), as she notes: neither on the Karnak blocks, nor in the two representations in the ka-room of Amenophis III in Luxor Temple, nor in the contemporary tomb of Kheruef do we see metal rods and disks which would produce the tinkling sound. This encouraged her to advance some further conclusions, namely that *the symbolic significance of the objects surpasses its musical properties* (Manniche 2010, 19).

On the other hand, from the Old Kingdom onward, the sistrum is known from the depictions where sistrum players along with dancers and singers are shown performing during funeral processions at the entrance to the tomb. Such a well-preserved scene decorates Niunetjer's tomb at Giza (Spencer 2003, 115). The figures carrying the sistra are moving and shaking them, but the representations of the instruments are again devoid of metal rods. Whereas the traces of verdigris indicating the presence of rods, are found on the holes in the

Fig. 6. 1 – Nehi, the viceroy of Kush during Thutmose III's reign, kneeling and holding the large naos-sistrum before him, the Nubian Museum in Aswan (photo by the author); 2 – Kaemwaset Kneeling with an Emblem of Hathor, dating to the New Kingdom, the Brooklyn Museum (after: https://www.brooklynmuseum.org/opencollection/objects/100541, access: 29.07.2024); 3 – Procession of priests carrying various symbols, including a large naos-sistrum, mortuary temple of Ramesses III in Medinet Habu (photo by the author); 4 – Amulet naos-sistrum, made of grey-green, shiny faience, dated to the Late Period, currently in the collection of the National Museum in Krakow (MNK XI-A-370, after: Tatoń 2013, fot. 27); 5 – Hathoric column capitals, Hathor temple at Dendera (photo by the author).

walls of the alabaster sistrum described above, with the Names of King Teti. This rattle may actually have been used for sound purposes (https://www.metmuseum.org/art/collection/search/543897).

The most questionable is the sound function of the naos-sistrum. Researchers most often point to the low acoustic attractiveness of instruments made of fired clay. Is this really the case? Could a faience rattle make a sound comparable to that of its metal counterpart? The answer lies in an in-depth acoustic analysis.

The acoustic characteristic of the sistrum

The sound of a sistrum is not completely unknown to us since we can hear it thanks to modern instruments as well as replicas – today's researchers often turn to experimental methods. Building replicas and recreating the sound of the Egyptian instruments from the Roman period such as sistra was implemented, e.g. by the research project: The European Music Archaeology Project (Both 2019, 428). Increasingly,

scientists are also paying attention to acoustic properties, e.g. Heidi Köpp-Junk examined the acoustic conditions at various music venues. During the research she took acoustic measurements of the replicas of Egyptian instruments and modern equivalents, including the sistrum (Köpp-Junk 2020, 23).

Generally, idiophones, such as sistrum, are featured by an impulsive character of excitation. When shaken, the frame itself, the rods, and the sounding plates vibrate. The nature of the sound we hear when shaking an instrument depends on its material coefficients, such as density, elasticity and damping (Czajka 2021, 129). The impacts of moving elements – rods against frame walls as well as plates against rods or frame walls, and each other, are stochastic in nature. Two similarly performed shakes of the rattle can produce different sounds (Gruszczyńska-Ziółkowska and Tatoń 2021, 104). The amplitude-frequency spectrum of an impulse is very wide, and the shorter the duration of such an impulse, the wider it is. Thanks to this, objects stimulated by impulses can vibrate at very high frequencies (Czajka 2021, 135).

The spectral analysis of the sounds of small idiophones, carried out so far, has shown the individual character of the sound of each object. Their spectra most often have features typical of multifarious sound: the narrower enhanced areas, like lines or bundles, are clearly visible against the background of the wide noise (Drobner 1973, 54). They differ in the range of excited frequencies, formant areas, number of important components – partials, and their distribution in the spectrum. Of course, some of these differences can be explained by the different conditions for sound recording. Therefore, when examining different rattles, it is important to use the same devices – recorder and microphones, organize similar recording conditions, and use exactly the same articulation when producing sound (Tatoń 2021, 73–74). During this research, the sound was recorded using a set consisting of the sensitive, broadband microphone Peluso CEMC-6, and a Zoom H4N pro recorder. The recordings were made at a sampling frequency of 96 kHz, each sample saved as a binary number with a length of 24 bits. The recorded signals were edited using the Audacity audio editor. Two sistra were constructed for the acoustic tests: a brass arched sistrum with a hollow handle and a naos-sistrum made of fired clay, covered with glaze. Their sound was recorded in several stages:

– frames without transverse rods,
– sistra with brass rods in place,
– sistra with brass rods and stainless steel tambourine sounding plates,
– sistra with brass rods and brass tambourine sounding plates.

The brass sistrum frame, without metal rods (Fig. 7), produces the not-very-loud sound when struck with the brass bar. Its timbre can be described as bright, bland, and tinkling. The range of excited frequencies covers the wide band from 100 to 25,000 Hz. The partials at 1300, 2500, 3900, 5000, 5800, 8200, and 9200 Hz are clearly distinguished from the background noise. Additionally, the enhanced area is demonstrated in the zone of higher frequencies, close to the limit of human hearing, at the level of 17,600 and 18,400 Hz. The amplified bands are characterized by the significantly longer decay phase than the noise. The average duration of the noise of a single shake is 0.3 s, the decay of partials is 0.5 s. The lowest amplified band, 1300 Hz, has the longest decay time, approx. 3 s. It determines the pitch of the sound we can hear – E6.

Observation of commonly used idiophones shows that not only metal has the parameters that enable it to produce what we could call a "metallic" sound. Other materials, sometimes not very obvious, have similar properties, e.g. stone, wood or ceramics. This is proven by idiophones with a specific pitch, which are made of them. Lithophones are known, among others, in the form of xylophone bars, but not only. Their sonority is as good as others. Xylophone, marimba bars and other percussion sticks or acoustic boxes are made of appropriate types of wood. Fired clay can be used as a material for constructing, e.g. bells. All of them are characterized by a clear sound and although their spectra do not have a steady phase of the sound, the phases of build-up and decay are easy to spot. The frame of the naos-sistrum constructed for present tests was made of chamotte clay, subjected to the so-called biscuit firing at the temperature of 800 degrees Celsius. Then the frame was glazed and fired again at a temperature of 1,200 degrees Celsius. The sound spectrum of the frame made in this way is quite similar to the sound spectrum of the brass frame (Fig. 7) but the sound seems less resonant. Bands of amplified unharmonic components stand out in a wide noise background: 1400, 2800, 3800, 5600, 6850, 7400, 11850 Hz. The overall range of excited frequencies is slightly narrower, limited to 25,000 Hz. Unlike the sound of a brass frame, in the sound spectrum of a ceramic frame, no significant component is distinguished by its decay length. All of them take about 0.5 s, while the decay time of the noise is 0.3 s. The lowest partial gives the impression of the F6 sound. So, we can say that the ceramic frame is tuned half a tone higher than the brass frame. However, the human ear cannot distin-

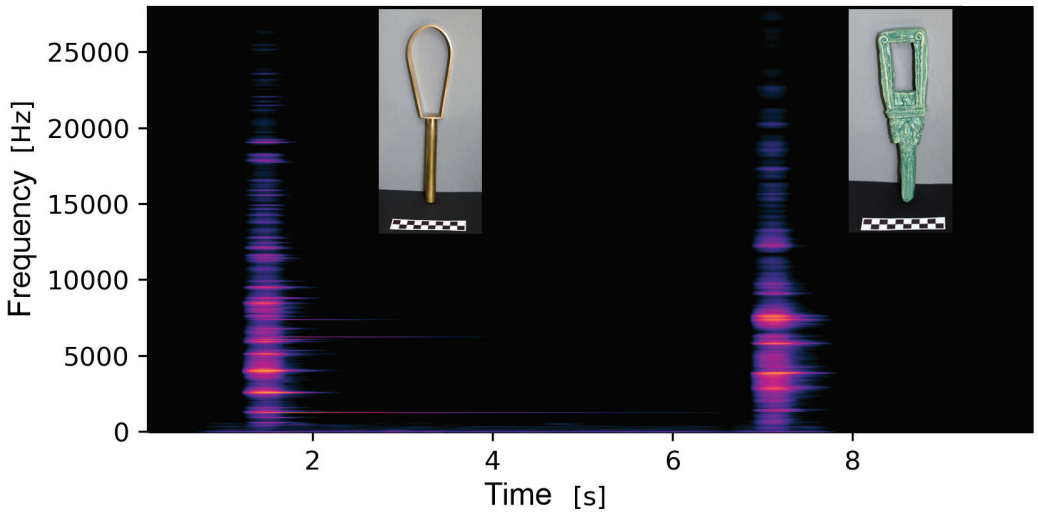

Fig. 7. Comparison of the spectrograms of the sounds of sistrum frames excited by a brass rod; left: brass frame, right: ceramic frame (recording, photo and elaboration by the author).

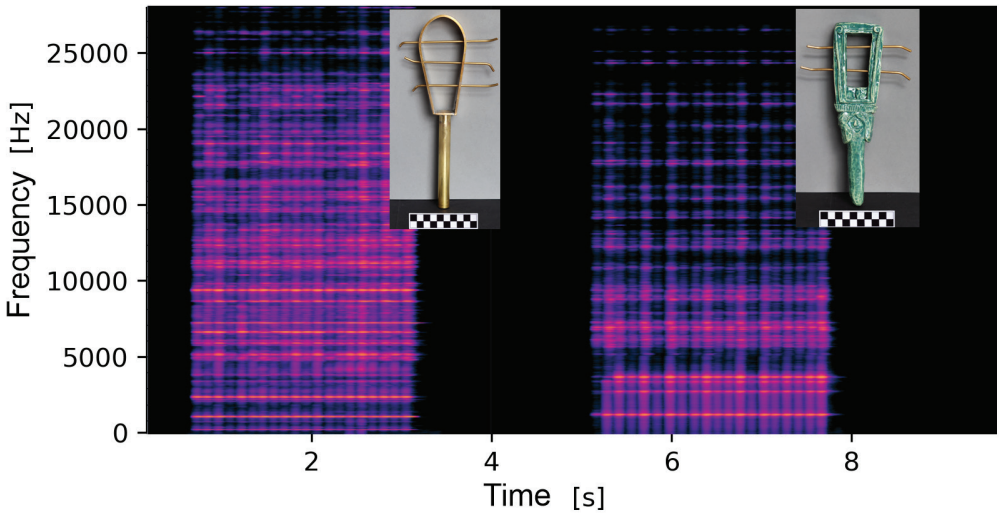

Fig. 8. Comparison of the spectrograms of sounds of sistra equipped with brass rods; left: brass sistrum, right: ceramic sistrum (recording, photo and elaboration by the author).

guish such differences precisely in the idiophone with a range of such high frequencies.

The differences between the sounds of analysed instruments deepened in the audible assessment when they were equipped with brass rods. Both spectra were highly noisy (Fig. 8). Again, the range of frequencies excited is wider in the case of the brass sistrum, but the difference includes ultrasonic frequencies that are actually beyond the limit of human hearing. Both spectrograms show an increased number of partials. The sound spectrum of metal sistrum has many more, densely distributed, narrow, amplified frequency bands. Its sound became clearly lower than the sound of the ceramic instrument – the partial at the level of 500 Hz appeared (note B4). The sound spectrum of the ceramic sistrum is poorer. Regardless of the pitch and number of frequency bands amplified, both rattles produced a pretty loud, bright, metallic sound.

Placing stainless steel sounding plates on the rods caused radical changes in the sound spectra of both sistra (Fig. 9). While the sound of the frames equipped with rods can rather be called noise, the presence of plates causes the appearance of the few very clearly cut-off partials. In the case of the metal sistrum sound spectrum, three significant component areas can generally be distinguished: 4000–9700, 10900–12600 and 16500–19200 Hz. In addition, the partials with the greatest amplitude value, creating the formant: 6500 and 9200 Hz, and the bands at 1200, 2500 Hz, respon-

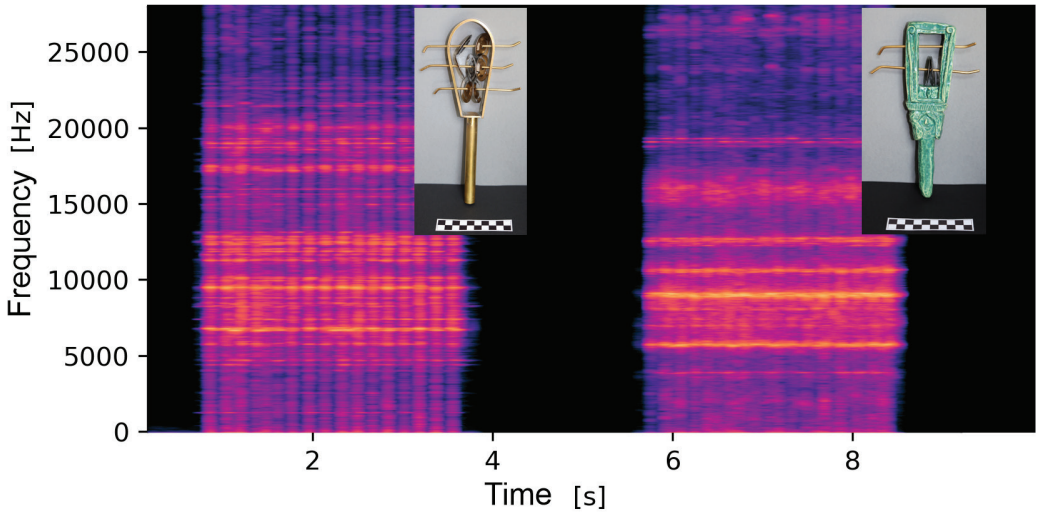

Fig. 9. Comparison of sound spectrograms of sistra equipped with brass rods and stainless steel sounding plates; left: brass sistrum, right: ceramic sistrum (recording, photo and elaboration by the author).

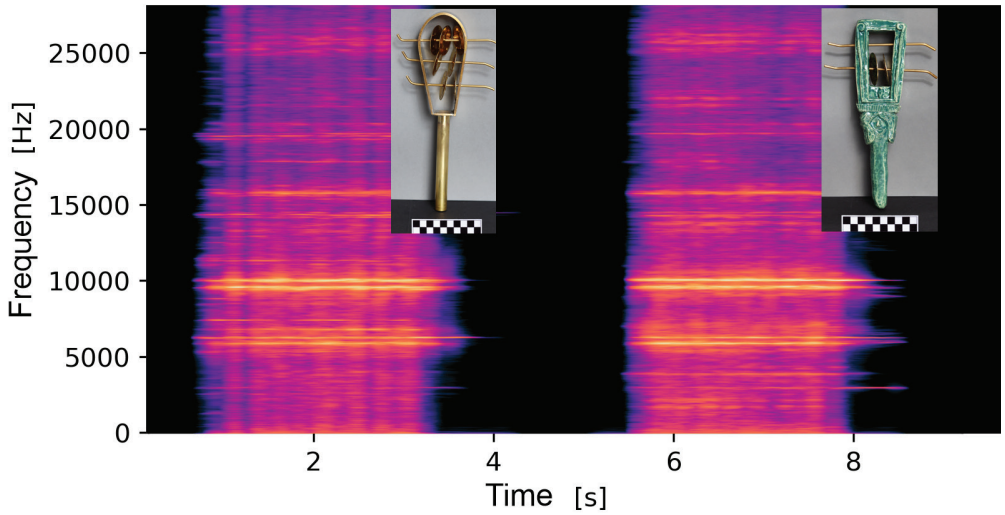

Fig. 10. Comparison of sound spectrograms of sistra equipped with brass rods and brass sounding plates; left: brass sistrum, right: ceramic sistrum (recording, photo and elaboration by the author).

sible for low tuning can be seen. The sound spectrum of the ceramic sistrum contains three distinct bands of frequencies at 5500, 8700 and 10300 Hz, with the middle one having the highest amplitude and constituting the formant. In addition, the spectrum contains two similar bundles of partials in the areas of 11900–12400 and 18000–18500 Hz, and the wide band of amplified noise in the range of 14000–16000 Hz. The band at 3700 Hz is probably responsible for the impression of pitch. Generally, both spectra became very similar, and the sound of both instruments became loud, expressive tinkling, and sharp. Although the ceramic sistrum again seems to be tuned higher, their sound is very similar in perception.

Even more amazing results were obtained by swapping out the stainless steel sounding plates for brass ones, which have better acoustic characteristics (Fig. 10). Now both sistra produced a very loud, bright, and sharp sound, with a very sonorous timbre. Despite the difference in the number of sounding plates – it was only possible to hang two in the ceramic sistrum – no noticeable discrepancies are found in the auditive evaluation. Their spectrograms also look almost identical. Narrow bands with the greatest amplification are initially apparent. In both spectrograms there are two areas with two bands, including formant: 5700 + 6050 Hz and 9200 + 9700 Hz. Background noise is more amplified than previously. The partials' decay time is

also significantly longer than before, up to 3 s. This type of construction gives both brass and ceramic sistrum a very resonant sound that is likely to be discernible even at long distances.

In order to measure the objective loudness, the sounds of both instruments were recorded in a small anechoic chamber at the Department of Mechanics and Vibroacoustics of the AGH University of Kraków. The chamber is a cube with the outer edge of 10 m, which gives the internal volume of about 1000 m3. The temperature was 26 degrees Celsius. During the recordings, measurements were also taken using a sound level meter. The amplitude spectrum shows the intensity of individual partials, not the entire signal. It is not possible to draw conclusions on the loudness of the sound tool on this basis. Without calibration of the measurement path, it is impossible to determine the relationship between the unit of the signal value and the sound pressure, but only to determine the share of individual frequencies amplified in a given signal. Therefore, the sound pressure level was measured by a Svantek Svan 948 device. Instruments were measured at a distance of 1 m. As a result, the volume of the metal sistrum was achieved at a level of 96–99 dB and that of the ceramic sistrum at a level of 92–96 dB, using different methods of excitation of the instruments. This result is higher than that obtained by H. Köpp-Junk in her research (Köpp-Junk 2020, 23), but the conditions of measurements were different and the results are difficult to compare. However, the aim of this study was to assess the acoustic parameters of a fired clay sistrum. Therefore, the sound of the instrument with a ceramic frame was compared to its metal frame counterpart. The recording was based on tests conducted under exactly the same conditions – force and manner of shaking, distance from the microphone, etc.

Conclusions

The sistrum is an instrument from the percussion family, a type of tinkle. It is an object with a wide range of possible uses. Its simple construction means that the sound could be produced by anyone just by shaking it, with no special training required. Perhaps for this reason, the sistrum enjoyed tremendous popularity in Ancient Egypt. The metal form of the rattle, also known from other areas, was adopted here with great success. However, a form not known elsewhere was developed in Egypt – the faience naos-sistrum, characteristic of Egyptian art. There is evidence of the use of the sistrum there at least since the Old Kingdom. It was most often used in cult rites associated with deities, mainly Hathor, and Isis in the late period. The popularity of the rattle moved along with the cult of the latter to the world of ancient Greece and Rome.

As can be seen from superficial observations, the sistrum may produce both a bland, dull sound, which is in fact a kind of noise or a clear and deep timbre similar to the sound of a bell, with a multitone spectrum, extended decay phase, and a small share of noise. Depending on social demand, the tool could be constructed so that its sound had the desired voice. As preliminary research has shown, the frame of an instrument and its handle, including a material from which they are made, significantly affect its acoustic properties but they are not decisive. It seems that the character of the sound of the sistrum depends directly on its movable elements – rods and sounding plates and their acoustic features. Transverse bars and sounding plates determine the sonority of the entire instrument. This hypothesis was only constructed on the basis of initial research, and of course, requires confirmation in the course of in-depth, more detailed analyses. Many of the questions remain unanswered, and others are only beginning to surface. The first concerns the proportion of the acoustic features of all structural elements in the sound spectrum. What effect does the material used have on the spectrum, and what effect does the shape of individual parts of the instrument have? Further research should be extended to include the construction of faithful replicas of specific instruments. Another direction of research should be the numerical reconstruction of both individual examples of the sistrum and its sound, which has proven fruitful in the case of research on other small idiophones of Antiquity.

Undoubtedly, due to its simple construction and considerable acoustic potential, the sistrum could perform a multitude of functions, being well suited for both musical and non-musical purposes. Even its musical use could vary, since the sistrum could serve as a rhythmic accompaniment for dancing or marching or as a means of attracting the attention of the goddess and the procession participants. Depending on the movable elements used, it could produce a quieter or more resonant sound. It was suitable for use both indoors and during outdoor ceremonies. It could be shaken by non-musicians, and at the same time, professional rhythmic effects could be obtained with its use. It is worth mentioning that only advanced player could achieve a very sophisticated and spectacular sound. In addition to their inherent acoustic characteristics, materials could also be thought of as parts

and symbols of functional and votive roles. Certainly, the function of the sistrum in Ancient Egypt was variable, and not only over time.

Finally, perhaps we still do not know whether the naos-sistrum was voiced or silent. However, we can say with certainty that, in terms of its acoustic possibilities, the faience sistrum was no less attractive than its metal counterparts. If the naos-sistrum was used for non-musical purposes, it was due to factors other than the sound properties of the fired clay.

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On the Edge. Relics of LBK Settlement at the Site of Kruszyn 3, Commune Włocławek (Household A)

Abstract

Rzepecki S., Domańska L. 2024. On the Edge. Relics of LBK Settlement at the Site of Kruszyn 3, Commune Włocławek (Household A). *Analecta Archaeologica Ressoviensia* 19, 21–39

The aim of the article is to present the LBK sources recorded in the northern part of the site of Kruszyn 3, commune Włocławek. A special feature of the site is its location on the edge of the Kuyavia Lake District and the Płock Basin. The former was intensively settled in the Early Neolithic, while the latter was anecumene. The complex of finds described in the article consists of the remains of a house, outbuildings, a relatively numerous pottery assemblage and less numerous flints, stone tools, and animal bone remains. The entire site dates to phase II (Music-Note Phase) of the LBK in Kuyavia.

Keywords: Linear Pottery culture, LBK, Kuyavia, settlement, longhouses, Neolithic

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Introduction

The significance of the border between the Kuyavia Lake District and the Płock Basin can probably be expressed in dozens of ways. In an environmental sense, both of these lands form ecumenes with such clearly contrasting features that they have been reflected in folk toponomastics (the so-called Black and White Kuyavia; Szmyt 2013, further literature there). The Kuyavia Lake District is characterised by a flat, sometimes wavy moraine plateau, sometimes wavy and interspersed with drainless depressions, made of heavy boulder clay. In the vicinity of Kruszyn, lessive soils have developed on this substrate, potentially providing a habitat for mixed and deciduous forests (primarily oak-hornbeam). In contrast, the bottom of the Płock Basin in the vicinity of the site discussed in this text is covered by sandy and biogenic sediments. Soils from the group of podzolic soils predominate here (including rusty, podsolic ones), which are a potential habitat for poor, continental forests. The boundary between these two "worlds" is clearly separated by a high (c. 20 m) slope descending from the moraine plateau towards the bottom of the Płock Basin (Twardy and Forysiak 2010). Within its area there is, inter alia, the site of Kruszyn 3, commune Włocławek (Fig. 1–2). Other nearby settlements of Linear Pottery Culture (LBK) are located in a similar manner, located at the sites of Nowa Wieś 8, Kruszyn 10 (Siciński *et al.* 2016; Płaza 2021), Kruszyn 11 and Kruszyn 13. They were all located at the edge of the area occupied by stable LBK settlement forms – both on a regional scale and in the perspective of this culture as a whole (Pyzel 2010; 2017; 2021a; 2021b; cf. Brigand *et al.* 2022; Marciniak *et al.* 2022).

In the case of Kruszyn 3, two features (wells) from the site have been presented so far (Rzepecki 2014). The aim of the following text is in turn to characterise the relics of LBK activity (household A) recorded on the northern edge of the site (Fig. 3). They represent a clearly demarcated, isolated concentration of finds from the Early Neolithic.

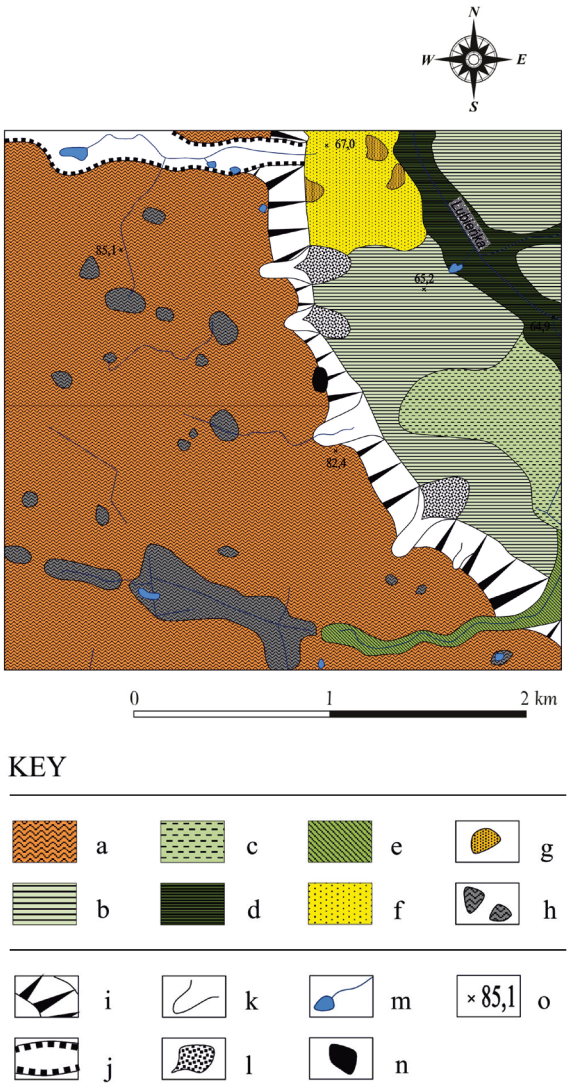

Fig. 1. Kruszyn 3, commune Włocławek. Geomorphological sketch of the site vicinity.

Key: a – undulating and in places flat morainic plateau, b – bottom of the Płock Valley, c – fluvial terrace of the Lubieńka River, d – bottom of the Lubieńka river valley, e – bottom of the subsidiary valley, f – aeolian sand covers, g – aeolian hillocks, h – depression without outflow, i – more important slopes, j – subglacial channel, k – synclines and denudation valleys, l – accumulative cones at the mouth of the valleys, m – lakes, ponds, rivers, n – Kruszyn 3 site, o – elevation points (m above sea level) (after: Twardy and Forysiak 2010).

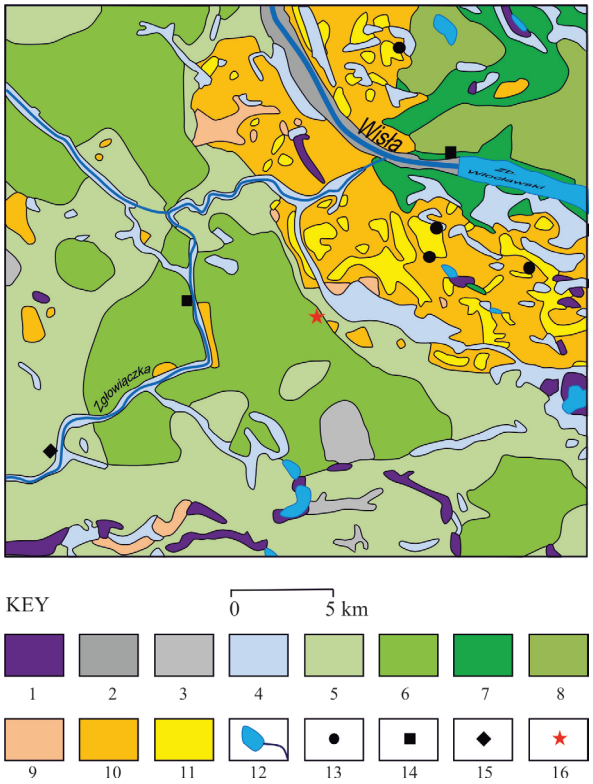

Fig. 2. Potential natural vegetation of the eastern part of the Kujawy Lake District and the Płock Basin.

Key: 1 – Central European alder forest (*Carici elongatae*), 2 – lowland, riverside willow-poplar forests in the zone of periodic floods (*Salici-Populetum*), 3 – lowland, riparian elm-oak forest of water-ground habitats outside the river flood zone (*Ficario Ulmetum*), 4 – lowland alder and ash-alder forests of water-ground habitats, periodically slightly marshy (*Circaeo Alnetum*), 5 – Central European oak-hornbeam forests, Kujawy variety, poor series (*Galio silvatici-Carpinetum*), 6 – as above, fertile series, 7 – subcontinental lime-oak-hornbeam forests, Central Polish variety, poor series (*Tillo Carpinetum*), 8 – as above, fertile series, 9 – oak forests (*Potentillo albae-Quercetum typicum*), 10 – continental mixed forests (*Pino-Quercetum*), 11 – continental, inland pine forests in a complex of fresh forest (*Peucedano-Pinetum*), dry forest (*Cladonio-Pinetum*) and moist forest (*Molinio-Pinetum*), the "Sarmatian" variety, 12 – standing and flowing waters, 13 – continental marsh forest (*Vaccinio uliginosi-Pinetum*), 14 – natural and semi-natural calciphilous and xerothermic grasslands, the so-called steppe grasslands (*Festucetalia vallesiacae*), 15 – coastal and inland salt pan communities (*Thero Salicornietea*), 16 – Kruszyn 3 site (after: Twardy and Forysiak 2010).

1. Building and pits

Before proceeding to the main part of the analysis, it is worth noting that the immediate hinterland of the site has been anthropogenically transformed quite significantly, which was particularly intensively influenced by modern processes of agrotechnical denudation resulting in the "blurring" of small elements of the terrain relief (Twardy and Forysiak 2010). The remains of LBK activity from Kruszyn 3 were also adversely affected by the settlement of the area by people of the Lusatian culture. Overall, however, against the site as a whole, the relics of household A discussed here are relatively well preserved.

A total of 10 postholes and 11 pits were documented within household A (Tab. 1).

Table 1. Kruszyn 3, commune Włocławek. Household A – characteristics of non-portable features. Function: A – posthole, B – pit. Shape: C – oval, D – circular, E – irregular. Cross-section: F – trough-shaped, G – irregular trough-shaped. Fill: H – homogeneous grey and/or light grey humus, I – two-layered in a horizontal pattern (1 – layer of grey humus, 2 – layer of dark grey humus with scattered charcoals)

Feature no.	Function	Shape	Length (cm)	Width (cm)	Depth (cm)	Cross-section	Fill
A18	B	C	560	464	92	F	I
A19	B	D	410	320	90	G	I
A20	B	C	590	262	90	G	I
A21	B	C	540	230	128	G	H
A22	B	C	370	130	52	G	H
A23	B	C	240	120	38	G	H
A24	B	C	376	160	30	F	H
A25	B	C	524	390	120	G	I
A36	A	C	40	46	26	F	H
A37	A	C	46	40	14	F	H
A38	A	C	56	56	12	F	H
A39	A	C	46	44	8	F	H
A40	A	C	44	34	24	G	H
A61	B	C	128	88	21	F	H
A62	B	E	126	112	16	F	H
A63	B	E	179	132	28	F	H
A64	A	D	32	26	5	F	H
A65	A	E	52	38	14	F	H
A66	A	D	30	26	4	F	H
A67	A	D	60	56	11	F	H
A68	A	E	156	64	16	F	H

The postholes (A36–A40, A64–A68) were preserved in the buttress parts, their average depth being only 13 cm. Almost all of them had a circular or oval floor plan (30–50 cm diameter) and a trough-like profile and homogeneous fill. The posthole marked A68 stands out against this background – it has a clearly elongated shape and is 156 cm long. It is likely that this is a remnant of a more complex (albeit undocumented in cross-section) arrangement associated with the repair (replacement) of the pole. The discovered postholes are probably related to the functioning of a longhouse oriented N-S. Its approximate dimensions should be estimated at approximately 8 × 25 m. This assessment is based on the features of the distribution of pits flanking the hypothetical walls of the building. In general, however, the poor state of preservation of the feature does not allow it to be included in discussions of the characteristics of LBK longhouses (cf. Czerniak 2019).

The identified pits (A18–A25, A61–A63) form a fairly diverse group. Although they have an average depth of approximately 64 cm, the median depth is only 52 cm. The shallower features (16–52 cm) are characterised by oval shapes and single-layered fills (Fig. 3). As a rule, small amounts of finely fragmented ceramic cullet were recorded (a dozen or so pieces), here feature

Fig. 3. Kruszyn 3, commune Włocławek. Localization of LBK features and households.
Key: a – postholes, b – pits, c – well (drawn by S. Rzepecki).

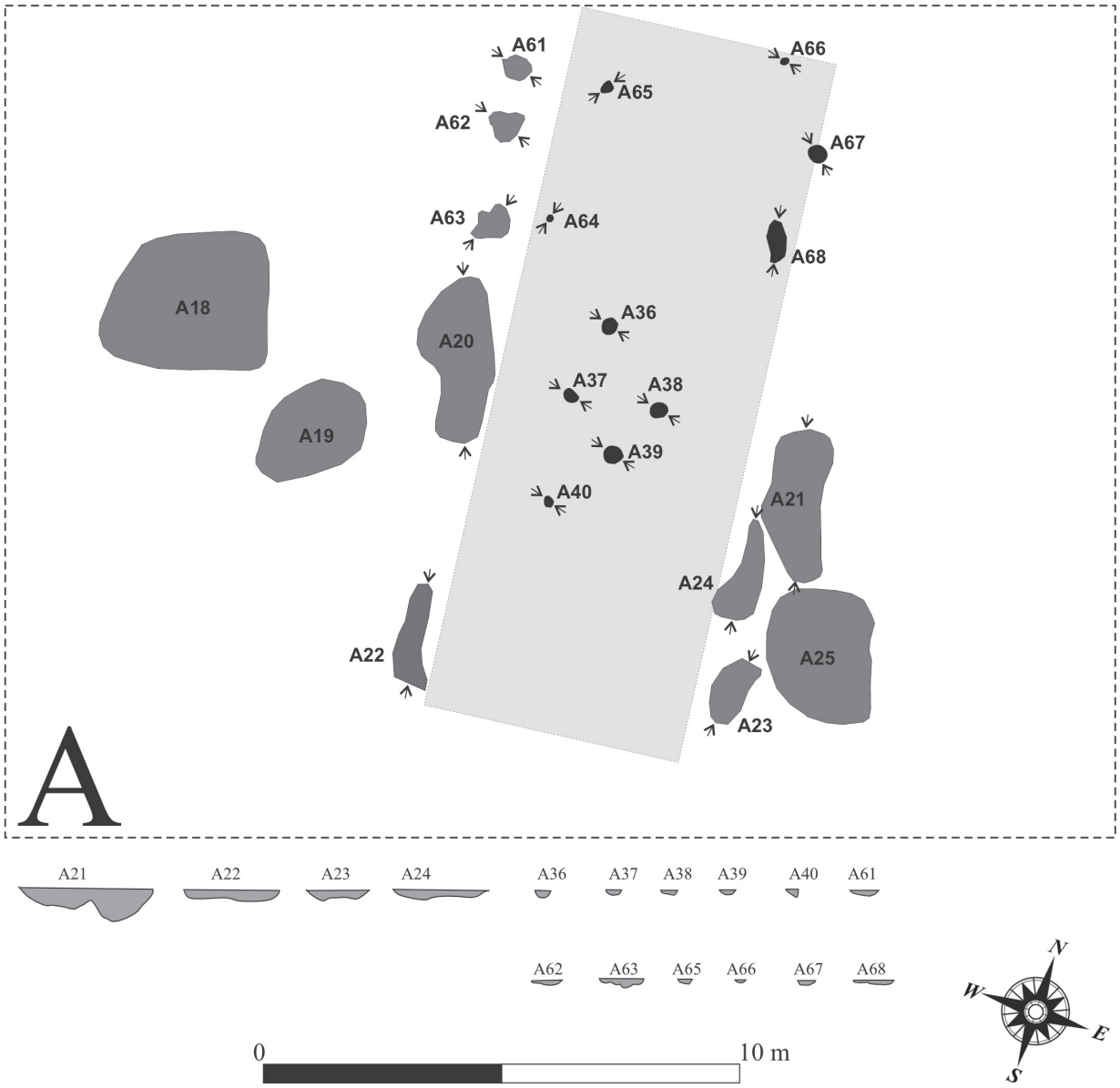

Fig. 4. Kruszyn 3, commune Włocławek. Household A (drawn by S. Rzepecki).

A22 stands out in this respect, with 45 sherds (cf. Tab. 2). On the other hand, deeper features (above 90 cm) were recognised as more or less regular circles or ovals with single or double-layered fills (Fig. 3–4). It is worth paying attention to features A18–A20 and A25 (Fig. 4). They are distinguished by horizontally two-layered fills. A total of approximately 85% of the LBK shreds discovered within pit A were recorded in their bottom parts. Furthermore, the excavated pottery is relatively well-preserved (on average, one sherd weighed approximately 10 g; cf. Tab. 2), suggesting that in this case these are primary waste deposition sites, which is unlikely in the case of pits A21, A23, A24, A61–A63.

All of the features described above had irregular bottoms, which corresponds well to the characteristics of clay pits. After clay extraction, some of these were used as waste pits (ash, pottery, flints, post-consumption residues). This diagnosis is particularly relevant for features: A18–A22 and A25.

2. Pottery

Seven hundred and nine fragments of LBK pottery, weighing a total of 6,794 g were discovered within household A (Tab. 2). The features of the harvesting

Table 2. Kruszyn 3, commune Włocławek. Household A – LBK artefacts source register

Feature no.	Pottery (quantity)	Pottery (weight in g)	Average weight of 1 pottery fragment (g)	Flint artefacts	Stone artefacts	Daub	Bones	Comments
A18	305	3,286	10.77	3	1		24	Poz-40681: 6180 ± 40 BP Poz-40682: 6180 ± 40 BP
A19	171	1,820	10.64	4		6	8	
A20	113	995	8.8	2				
A21	35	130	3.71	3			20	
A22	45	320	7.11	47		4	39	
A23	11	43	3.9			7		
A24	2	6	3	2				
A25	16	176	11	2				
A61	3	4	1.33					
A62	6	9	1.5					
A63	2	5	2.5					
TOTAL	709	6,794			1	17		

Table 3. Kruszyn 3, commune Włocławek. Percentage of technological groups of the LBK pottery

Feature	IA	IB	IC	ID	IIA	IIB	IIIA	IIIB	coars	fine
A18	26.89%	0.00%	1.64%	0.00%	6.89%	1.31%	61.64%	1.64%	36.72%	63.28%
A19	42.69%	0.00%	0.66%	0.00%	1.97%	0.66%	27.87%	0.98%	45.97%	28.85%
A20	48.67%	0.00%	0.33%	0.00%	0.98%	0.00%	17.38%	0.33%	49.98%	17.70%
A21	42.86%	0.00%	0.66%	0.00%	0.33%	0.00%	5.57%	0.00%	43.84%	5.57%
A22	46.67%	0.33%	0.98%	0.00%	0.33%	0.33%	5.90%	0.00%	48.63%	5.90%
household A	36.77%	0.15%	1.94%	0.00%	4.78%	1.05%	53.96%	1.35%	44.69%	55.31%

technology were developed following the proposals of Joanna Pyzel (2010; 2019a). Briefly speaking, it assumes the separation of several basic recipes for losing weight of pottery mass. For coarse pottery ("kitchen" and "storage"), these are technology groups IA (plant admixture), IB (grog+plant admixture), IC (sand admixture, sometimes with grog), ID (grog admixture), IIA (sand+plant admixture), IIB (sand admixture). Fine pottery ("table"), on the other hand, is characterised by the absence of pronounced admixtures (IIIA) or admixture of sand (IIIB). Details of the proportion of each type of recipe are provided in Table 3.

Although the collection in question is quite heavily damaged, several types of vessels can nevertheless be recognised in it. These include: pots in the shape of a section of a sphere (globular pots; e.g. Fig. 7: 1–2; 8: 1), necked vessels (flasks; e.g. Fig. 8: 1; 8: 9; 11: 1), bowls (e.g. Fig. 8: 7) and sieves. Fragments of probably two such vessels were recognised in feature A22 (Fig. 10: 2–3).

While the features related to the technology and morphology of vessels are not very diagnostic in terms of chronology, the situation is different in terms of decoration. A total of 119 decorated fragments were

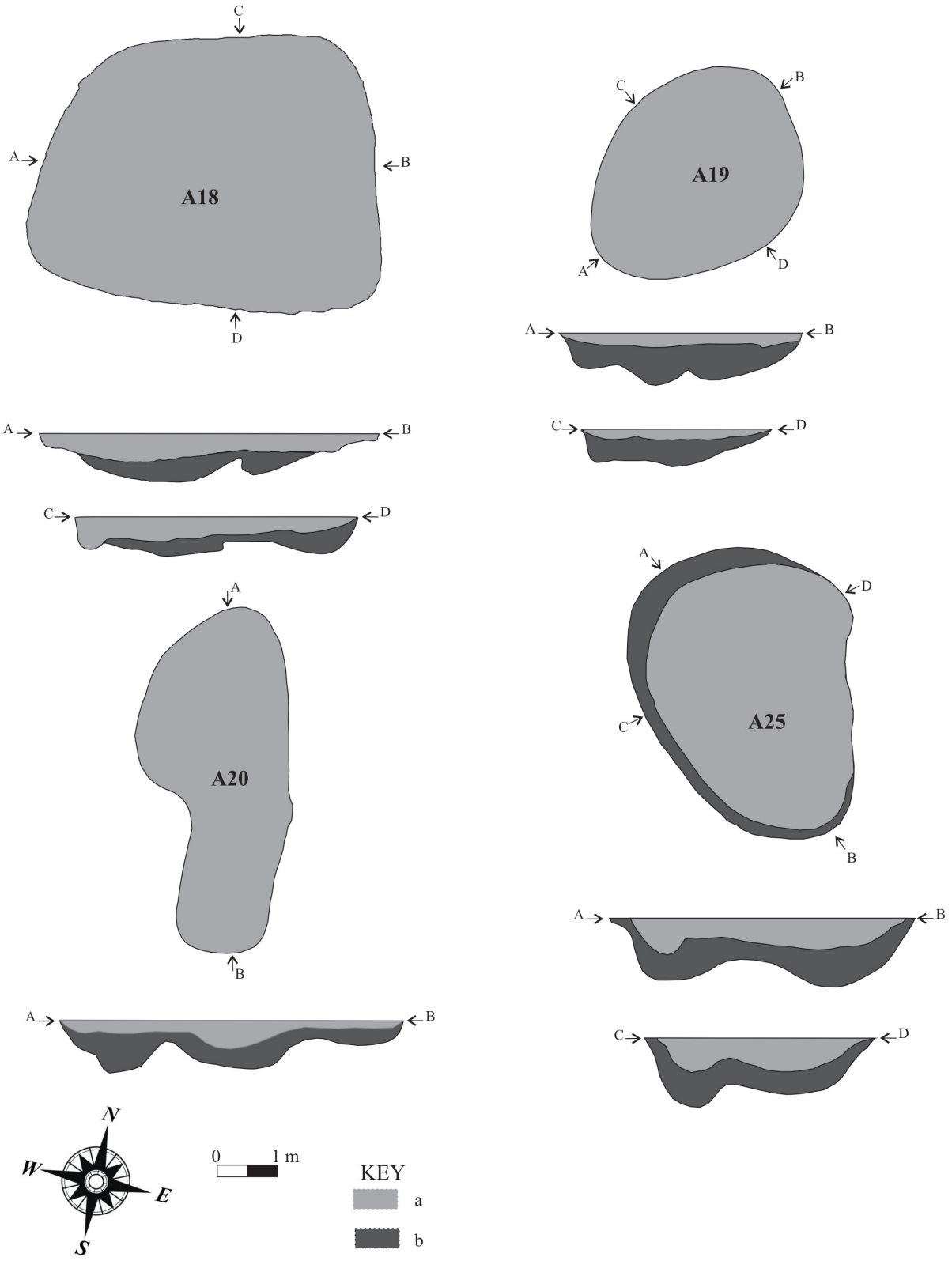

Fig. 5. Kruszyn 3, commune Włocławek. Cross-sections of the pits.
Key: a – layer of grey humus, 2 – layer of dark grey humus with scattered charcoals (drawn by M. Pochylski and S. Rzepecki).

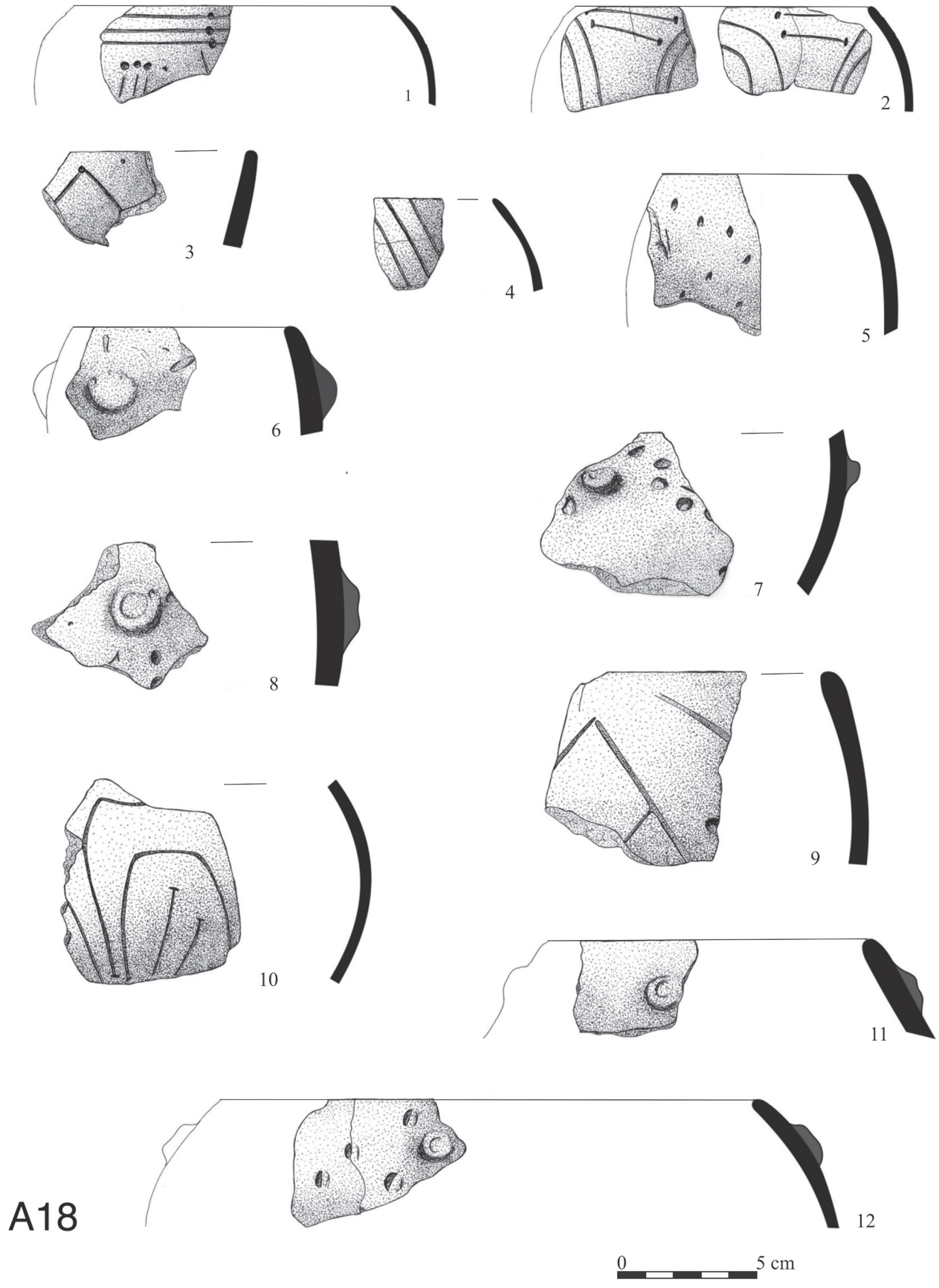

Fig. 6. Kruszyn 3, commune Włocławek. Selection of typical artefacts (drawn by M. Pochylski and S. Rzepecki).

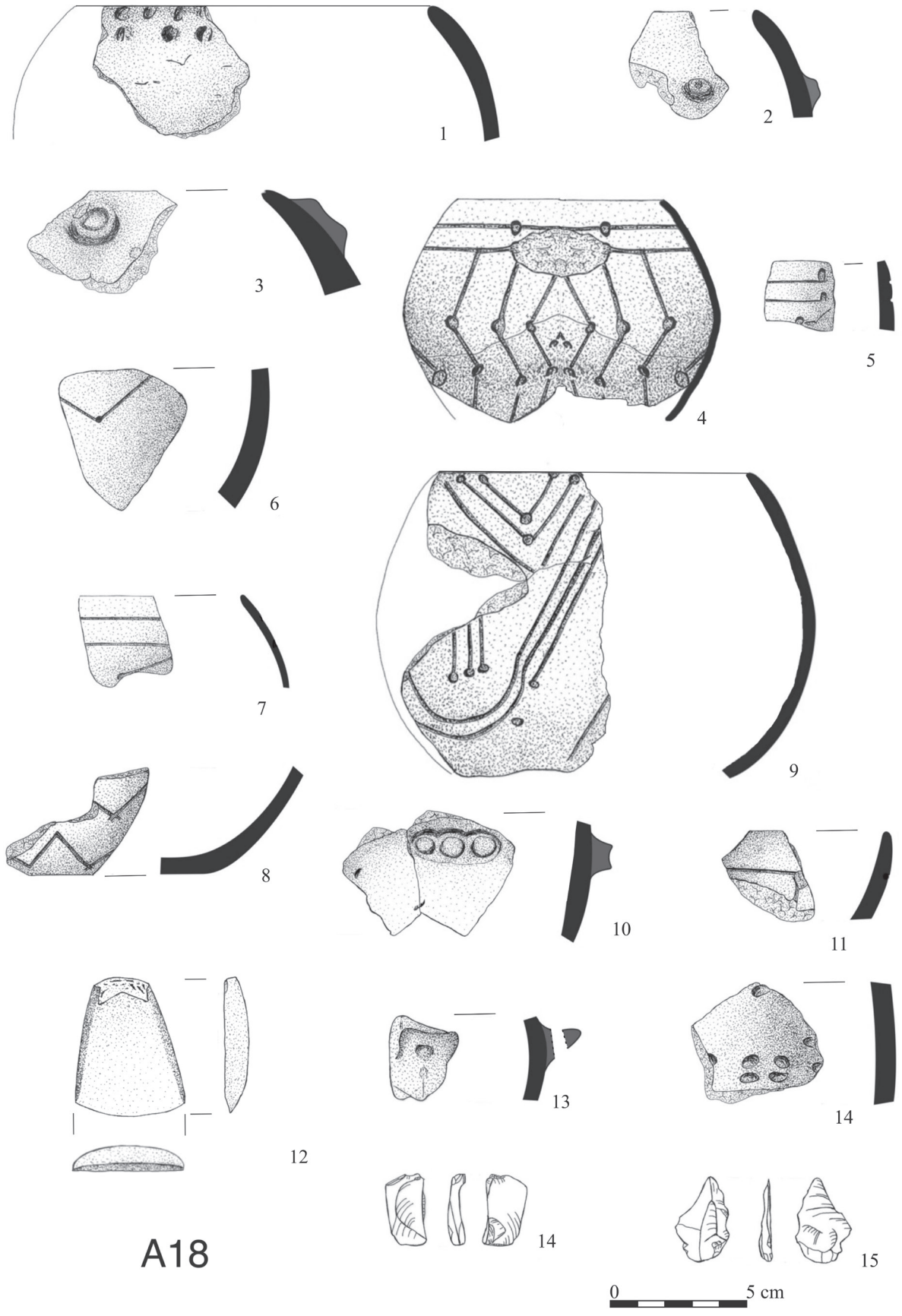

Fig. 7. Kruszyn 3, commune Włocławek. Selection of typical artefacts (drawn by M. Pochylski and S. Rzepecki).

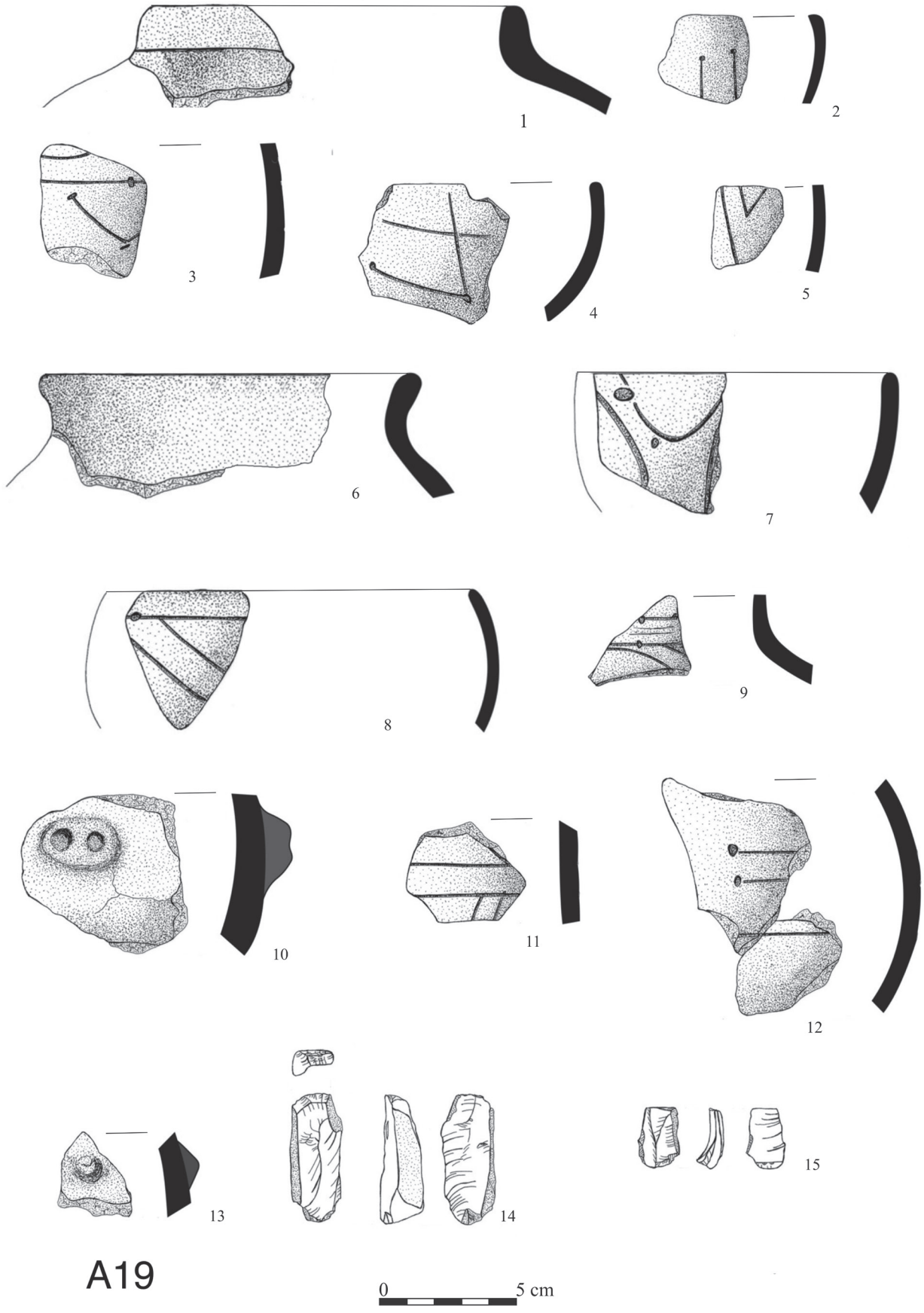

Fig. 8. Kruszyn 3, commune Włocławek. Selection of typical artefacts (drawn by M. Pochylski and S. Rzepecki).

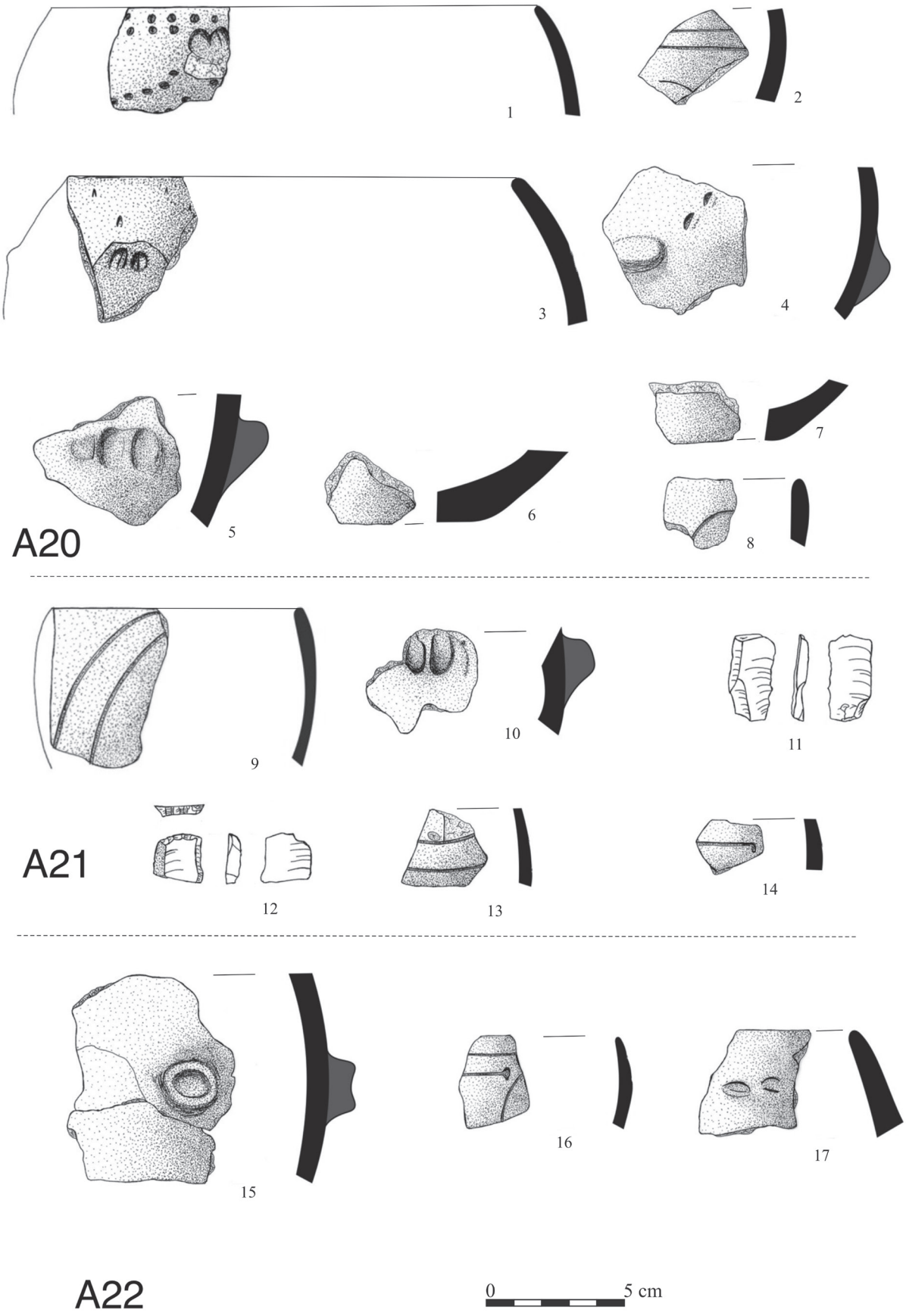

Fig. 9. Kruszyn 3, commune Włocławek. Selection of typical artefacts (drawn by M. Pochylski and S. Rzepecki).

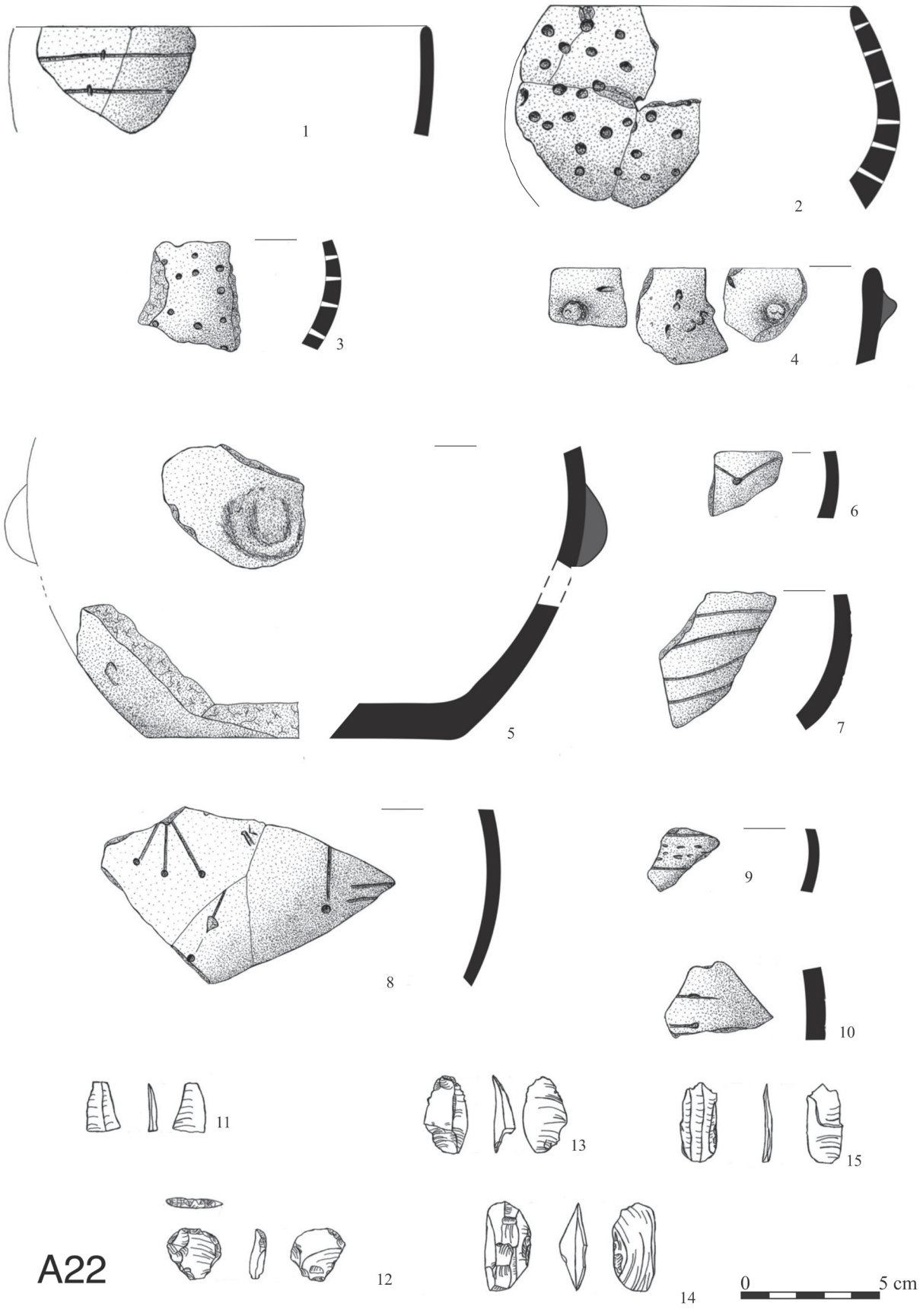

Fig. 10. Kruszyn 3, commune Włocławek. Selection of typical artefacts (drawn by M. Pochylski and S. Rzepecki).

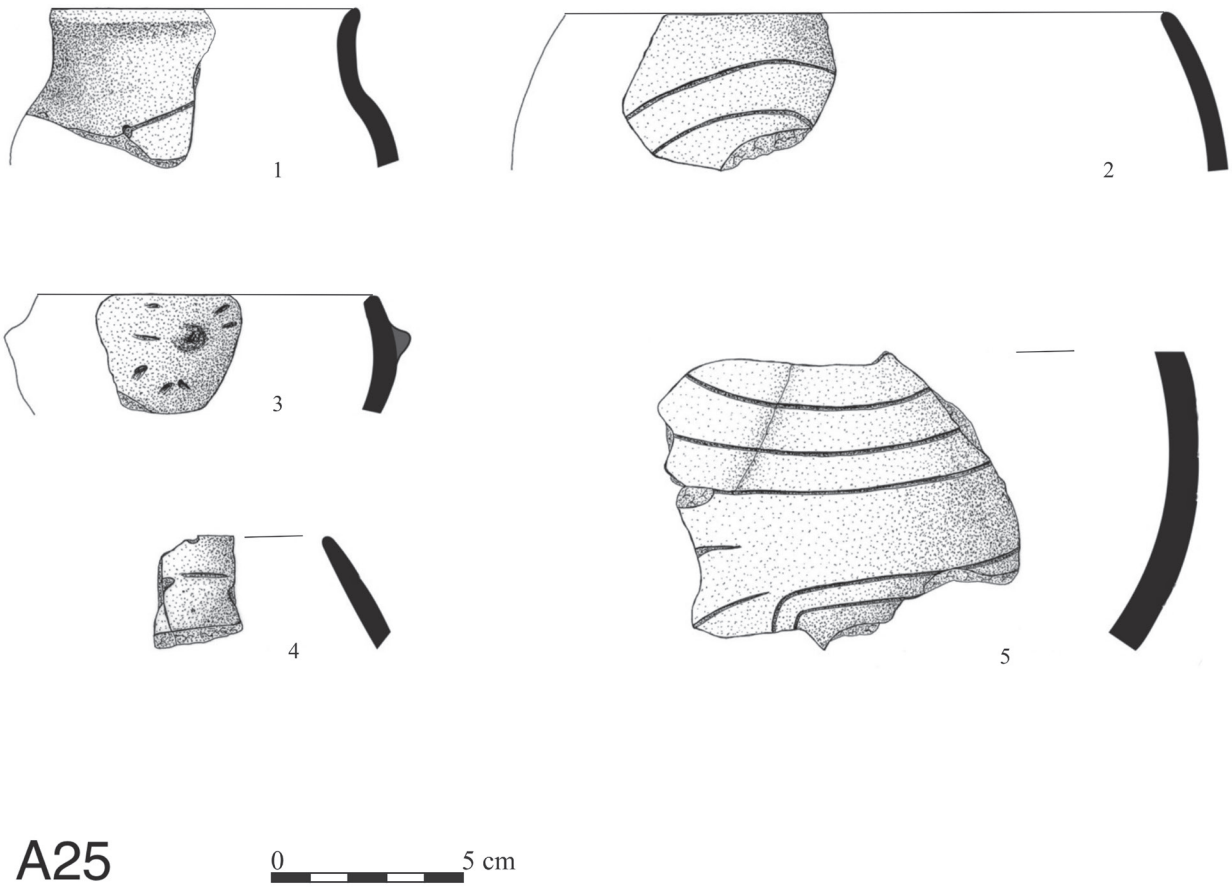

Fig. 11. Kruszyn 3, commune Włocławek. Selection of typical artefacts (drawn by M. Pochylski and S. Rzepecki).

recorded. Mainly decorations in the form of knobs were recognized on the coarse vessels. They were recorded on a total of 26 sherds (e.g. Fig. 6: 6; 7: 2; 9: 4; 10: 4–5). Sometimes they had finials folded inward (e.g. Fig. 6: 8; 6: 12; 7: 3; 9: 5; 9: 10; 9: 15). Less frequently, i.e. in 19 cases, ornaments made with a finger and/or fingernail were recognised (e.g. Fig. 6: 12; 7: 1; 7: 4). In individual specimens, there were fragments of vessels decorated with rows of oval impressions (Fig. 9: 1) or short and wide cuts (Fig. 11: 3).

However, in the analysed collection, the most frequently recorded ornaments were those based on incised lines (70 sherds). Bands composed of two incised lines were most frequently recognised here (e.g. Fig. 6: 2; 9: 9); single incised lines were less frequent (e.g. Fig. 6: 3) or in triple arrangements (e.g. Fig. 6: 1; 7: 9). Incised lines co-occurred with music notes – both small ones and often placed at the bends of the lines (e.g. Fig. 6: 1; 7: 6; 8: 2–4), as well as larger ones (e.g. Fig. 7: 4; 7: 9; 8: 7). In one case, a ribbon ornament filled with punctures was recorded (Fig. 10: 9). The engraved lines usually formed straight and broken ornaments (e.g. Fig. 7: 4; 7: 9; 8: 8), less frequently – wavy ones (e.g. Fig. 6: 2; 6: 10).

The relative chronology of the Kuyavian enclave of the LBK is well recognised thanks to, inter alia, the studies of Lech Czerniak (1994; 2004; 2016), Ryszard Grygiel (2004) and J. Pyzel (2006; 2009; 2010; cf. Marciniak *et al.* 2022). One has to agree with J. Pyzel (2010) that the caesuras between individual phases are fluid and determined intuitively. However, the small proportion of large music notes combined with the high frequency of straight or broken incised lines makes it possible to relate the examined collection to phase IIB of the LBK in the Kuyavia region.

3. Flint artefacts

The exploration of the features attributed to household A yielded a total of 61 flint artefacts (cf. Tab. 2). Unfortunately, this is a small collection and quite trivial in the analytical and interpretative sense. It is dominated by specimens made from chocolate flint (51 pieces), which clearly outweigh Baltic flint (7 pieces). Another

three specimens were burnt to an extent that made it impossible to recognize the raw material.

The general structure of the inventory in question consists of products classified into five categories of flint artefacts. Quantitatively, negative fragments (24 specimens) and burnt fragments (2 specimens) predominate. Among the fragments, the most numerous are chocolate flint specimens (21 pieces), all of them occurred in feature 22.

Seventeen flakes were included in the flakes production group. The majority of them are specimens made of chocolate flint (12 pieces), 4 flakes were made of Baltic flint and 1 specimen was intensively burned. The group of chocolate flint flakes is dominated by cortex specimens. The production of blades group consists of 5 specimens reflected from single-platform cores of chocolate flint. Blades with a width of 14–23 mm predominate (Fig. 9: 11). On the other hand, there were 8 specimens in the exploitation of scaled pieces group, without exception, these are flakes made of chocolate flint.

In the tool group, only an endscraper on a blade (Fig. 9: 12), 2 endscrapers on flakes (Fig. 8: 14; 10: 12) and 2 blades with utility retouch (Fig. 8: 15; 10: 15). All these specimens were made from chocolate flint.

Despite the small size of the examined inventory, a number of features characteristic of the lowland LBK communities can be distinguished (Domańska 2016). These include: (a) the predominance of chocolate flint, (b) the predominance of classical core exploitation techniques, and (c) the predominance of endscrapers and atypical tools in the group of tools.

4. Stones

A low trapezoidal adze made of amphibolite was discovered in feature A18 (Fig. 7: 12). The tool is symmetrical in cross-section, carefully smoothed along its entire length, and bears traces of use.

5. Bones

A total of 91 bones occurred in features associated with household A (cf. Tab. 1; Waszczuk 2010). The vast majority of these (74 pieces) were identified as belonging to domesticated animals. The species affiliation of 17 pieces was not recognised. Fourteen fragments of crushed teeth, 3 fragments of metacarpal bones and 7 fragments of cattle tibia were identified in feature A18. On the other hand, 8 cattle tooth fragments come from feature A19. A special feature of pit A21 was the complete dominance of pig remains (16 rib fragments), accompanied by 4 small bones coming from unknown species. Pit A22 yielded 1 tooth, 21 tooth fragments, 1 fragment of a pelvis and 3 fragments of cattle jaw, as well as 13 small fragments of bones of unrecognized species.

6. Daub

There were isolated lumps of daub in the three features, i.e. A19, A22 and A23.

7. Chronology

Recent work related to Bayesian modelling of radiocarbon dates known for LBK sites from the Kuyavia area has yielded a number of interesting hypotheses (Marciniak *et al*. 2022; Oberc *at al.* 2022). These concern, inter alia: the need to correct the dating of the beginnings and end of the LBK and the hypothetical contemporary nature of materials traditionally classified as phases I–IIB. In the case of phases IIA and IIB, we can probably venture the thesis that these are stylistic rather than chronological differences. The data obtained for household A from the site of Kruszyn 3 supplement the text quoted above in an interesting way.

Two samples from the feature A18 were submitted to the Poznan Radiocarbon Laboratory. Their de-

Table 4. Kruszyn 3, commune Włocławek. Radiocarbon dates

Feature	Material	Lab.	BP	C and N	BC 1 sigma	BC 2 sigma
A18	tibia, cattle	Poz-40681	6180 ± 40	0.1%N 0.9%C	5214–5045 (95.4%)	5177–5141 (23.3%) 5133–5067 (45.0%)
A18	tibia, cattle	Poz-40682	6180 ± 40	0.4%N 1.7%C	5214–5045 (95.4%)	5177–5141 (23.3%) 5133–5067 (45.0%)

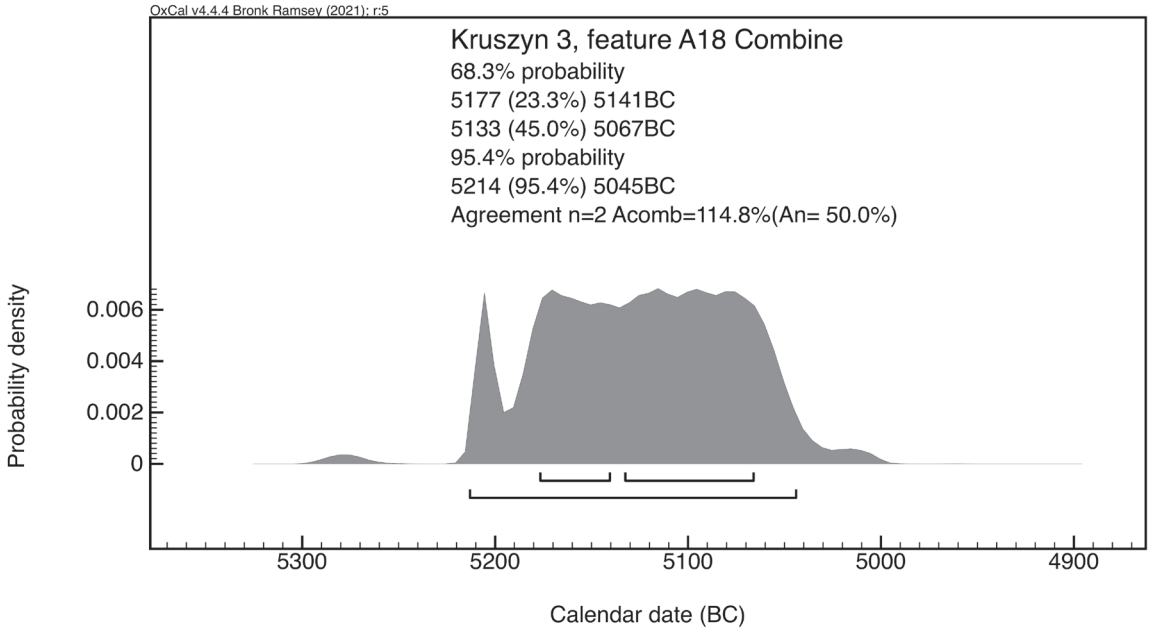

Fig. 12. Kruszyn 3, commune Włocławek. Calibration of radiocarbon dates from feature A18 by the OxCal 4.4.4. package (Bronk Ramsey 2024).

tailed parameters are contained in Table 4. As a commentary, it should be emphasised that the value of both markings should be assessed highly. They were made from animal bones obtained from a context where the likelihood of contamination of the fill was low. It should be added that the combination (Fig. 12) of both dates allows us to conclude that the functioning of household A at the site of Kruszyn 3 should be placed in the period 5214–5045 BC (probability 95.4%), probably in the period 5177–5141 BC (probability 23.3%) or 5133–5067 BC (probability 45%). This corresponds well with the current state of the discussion on the chronology of phase IIB of the LBK in the Kuyavia region (Marciniak *et al.* 2022). In the cited work, the start of phase IIB is modelled at 5295–5155 BC (with 94% probability) and the end at 5145–5155 BC (with 95% probability).

On the Edge. Summary

The above observations require a brief synthesis. However, in order to carry it out, a certain prior declaration is necessary. It addresses the issue of the distinctiveness of the Kuyavian LBK. The issue here is not its source and taxonomic dimension, but one related to identity and a sense of distinctiveness in relation to both hunter-gatherer and Neolithic populations from the South (e.g. Silesia and Lesser Poland). In the case of Mesolithic communities, this is not in doubt, while the problem of the functioning of the local (in the sense: Kuyavian or Lowland) identity of early agricultural communities is debated (Czerniak 1996; Pyzel 2010). It should be added that I understand regionalism here as a correlation between a given society and the territory it inhabits, which triggers ideological attitudes (e.g. political, moral, religious) and shapes the behaviour of territorial communities. What is fundamental here is the recognition of a given area as one's own, the feeling of "being oneself and at home" (Bieniada 2013; Leśniak-Moczuk 2018).

Returning to the LBK community from the Kuyavia area, the colonisation of this region from baseline areas required the identification of ecological "loess analogues" across vast areas of the Lowlands. Moreover, the Kuyavian enclave ("island") was clearly isolated (in a geographical sense) from the hypothetical starting areas for colonisation movements (cf. Czerniak 1996). Covering this space required exceptional and sustained efforts. This alone may have underpinned the emergence of a local identity. Let us not forget, however, that boundaries and identities are not linear in nature, but are (in the phenomenological perspective preferred here) experienced and constituted by the experiences and perceptions of the subject. As Maurice Merlau-Ponty (1962) wrote, boundaries constitute a dynamic space of interaction between the subject and environment, they represent a certain way of experiencing the world (cf. Tilley 1994; 2010). In this approach, the boundaries between radically different environments

define a certain "perceptual threshold" that changes the way we experience the world. The subject confronting a liminal experience is, in a sense, forced to recognize the limits of their own experience, to come into contact with "otherness", their own identity and way of existence. Boundaries force us to structure the image of the world, and crossing them requires reinterpreting it, adapting it to a new horizon of meaning and experiencing a transformation of perception.

The contextuality (here: regionality) of the understanding of the border provides a good justification for limiting further considerations to the area of Kuyavia, i.e. the horizon of "being-in-the-world" analysed here.

The materials discussed in this text from the site of Kruszyn 3 (household A) provide an opportunity to trace some aspects of praxis (in the sense of: Baumann 1973) of everyday life reconstructed for the LBK population (cf. Pyzel 2021b). These relate to the selection of the household location (**a**), the details of buildings and spatial planning (**b**), pottery manufacture (**c**), the use of flint and stone tools (**d**) and the structure of animal husbandry and consumption (**e**).

a. Both the geological structure and the features in terms of lithology, geomorphology and pedology of the site of Kruszyn 3 were typical of the LBK settlers from the Kuyavia region, who erected their houses in the best agricultural areas (Pyzel 2010). It is also worth noting the social context of the location of household A from Kruszyn 3. It is associated with the functioning of a micro-region with a long history of settlement (Kruszyn 10; Siciński *et al.* 2016) and numerous traces of it (Pyzel 2021a). Against this background (the micro-region of Kruszyn), household A is characterised by its unique location – on the edge of the area subject to regular exploitation.

b. When discussing the features of LBK settlements from the area of eastern Kuyavia, J. Pyzel (2021a) suggested the existence of three basic types of spatial organisation of settlements. The first type is made up of houses arranged in a row, in the second case the houses are concentrated around small depressions in the land, and the third type is represented by single houses, whose creation was the result of the spatial expansion of the original highly concentrated villages. Against this background, household A from Kruszyn 3 obviously represents type three. The data for this settlement strongly suggests that this type of spatial organisation was present throughout LBK's local history.

In addition, attention should be paid to the features of the internal organisation of the household. Its axis is formed by a long pillar house situated on a N-S line. Its construction and orientation do not deviate from the norms known from other settlements of the Kuyavian LBK. However, what is noteworthy is the estimated size (approx. 200 m^2) of the establishment. This figure should be treated very cautiously though due to the building's not very good state of preservation. Nevertheless, against the background of the micro-region of Kruszyn, it is exceptionally large (cf. Siciński *et al.* 2016). Of course, even larger features are known from Kuyavia (e.g. Bożejewice 22/23, Łojewo 35; cf. Czerniak 1994; Pyzel 2010). Features from Ludwinów 7 (houses 1–2) and Janowice 2 (Czerniak 2016; Pyzel 2019b) had a similar surface area to the longhouse from Kruszyn 3 (household A) which is discussed here.

Although the state of preservation of the longhouse from Kruszyn does not allow for participation in the discussion on the structural features of the LBK buildings (cf. Czerniak 2019), certain observations can be made. It seems likely that the entrance to the building was located in the south or west wall of the house. Such an assessment is based on the features of the pits flanking the hypothetical walls of the building. All features deeper than the median occurred south of pit A63. In this zone, clusters of four pits were recorded on either side of the building. On the western side these are pits A18–A20, A22, and on the eastern side – A21, A23–A25. Interestingly, the deepest features are distributed almost symmetrically, on an east-west line (A18–A21, A25). However, there is no similar symmetry when it comes to waste deposition patterns. The vast majority (ca. 92%) of pottery was found in features located along the western wall of the longhouse. Similar correlations were noted for flint and stone finds and bone remains. In the latter case, it should also be noted, that in the pits along the western wall of the house only the remains of cattle were found, while on the eastern side – only those of a pig. However, due to the fact that the number of species-identified remains was actually small, it is difficult to draw unambiguous conclusions regarding this regularity.

The concentration of the broadly understood rubbish (e.g. pottery) in the western LBK households known from the Kuyavia region is fairly well recognised (Grygiel 2004; Pyzel 2010; 2019a), although it is difficult to assume that in this case we are dealing with a restrictively observed norm. Rather, it was one of the alternative and acceptable ways of proceeding.

c–d. The pottery (technology, morphology, ornamentation) recovered from the features attributed to the household which is discussed here corresponds well with the characteristics of phase II of the LBK from the Kuyavia region (Grygiel 2004; Pyzel 2010;

Czerniak 2016). The same is true of the few flint and stone artefacts (cf. Kabaciński 2010; Domańska 2016; Szydłowski 2019).

e. The small collection of bones discovered in household A from the site of the Kruszyn 3 is too sparse to reliably present the percentages of individual animal species. However, attention should be paid to the well-confirmed breeding and consumption of cattle and pigs, which does not differ from the current knowledge about the importance of these animals for the local LBK (cf. Marciniak 2005). What is notable, however, is the fact the collection in question does not contain any remains of a goat or sheep. A similar situation was reported in Janowice 2 (Makowiecki 2016).

In conclusion, the above observations can be summed up with a fundamental interpretation: the set of sources discussed in this text constitutes a "miniature" of the early agricultural world reduced to a single household; a canon of "typical" behaviours replicated in a single copy. Both the features of the organisation of the space, the size and shape of the buildings and the daily activities related to food and diet, the use of stone and flint tools and pottery do not differ from the well-documented praxis of the LBK in Kuyavia. I refer here to Bauman's terminology (1973) for a reason. His work presents an inspiring approach to social praxis as a mechanism that organises reality and creates identity and opposition: here/inside *versus* there/outside. The antonyms cited are, of course, only a fragment of a more elaborate sequence of associations "tearing" reality into what is known, safe and the space of everyday activity and interaction, and what is unknown, dangerous and occasionally visited. It is from this perspective that it is fascinating that the "stage" for the manifest declaration of group affiliation (LBK) observed in household A from the site of Kruszyn 3 became the eponymous edge of a well-known ecumene. From the perspective of landscape phenomenology, this is not surprising, but it should significantly influence further considerations regarding the reasons for the breakdown of many aspects of the "practice of being a LBK settler" after crossing the border which is discussed here (cf. Rzepecki 2013). However, this is a topic for another text.

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The Socio-Cultural Background of the Genesis of the Lublin-Volhynia Culture

Abstract

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The direct sources for the study of the origin of many constitutive elements of the Lublin-Volhynian culture (hereafter: L-VC) from various and sometimes distant areas of a culturally diverse nature prompt us to outline the cultural situation in the second half of the 5th millennium BC, and especially in the final phase, in the vast areas of Southeastern Europe and adjacent parts of Eastern Europe. The rationale behind such a move is to help understand this culture and its multifaceted origins. Like a "posthumous child", it appeared at the last moment of the existence of some cultures belonging to the same cultural complex, i.e., the Early Eneolithic Cultural Complex (hereafter: EECC), at the latest around 4100 BC. Paradoxically, the Cucuteni-Trypillia Cultural Complex (hereafter: CTCC) in its younger part of the BI phase (4230–4100 BC; cf. Diachenko *et al.* 2024), with a socio-cultural profile distant from the EECC, seems to be the leading "source" of the constitutive elements of the new culture, i.e. the L-VC. The CTCC was the only cultural entity that did not disappear during this period but rather expanded rapidly.

Keywords: Lublin-Volhynian culture, genesis, socio-cultural background, Early Eneolithic Cultural Complex, Cucuteni-Trypillia Cultural Complex, Polgar culture

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Introduction

This paper aims to draw attention to the question of the genesis of the L-VC in the light of the analysis of CTCC materials. In order to explain the processes of cultural change taking place at the end of the 5th millennium BC by the upper Dniester and upper Bug rivers, it proved appropriate to use sociological concepts new to archaeology, including cultural analysis by Robert Wuthnow (1987), relational sociology according to Matthew Peeples (2018), and Max Weber's theory of traditional power (2002).

Social issues

It has been established that the richest male graves in the Varna cemetery (for example no 4 – Fig. 1; Ivanov 1988a, fig. 24; 1988b, 189–191) have a repetitive assemblage of artefacts as their furnishing consisting of gold ornaments, copper (sometimes stone) shaft-hole axes and other types of axes, and long flint blades (Klimscha 2016, 239–240). The presence of all of the elements mentioned above characterises the wealthiest graves within the richest cemeteries. In addition to the Varna graves, two graves of the Tiszapolgár culture (hereafter: TC) have similar equipment. We are referring here to the graves from Tibava (grave no. 10/56: one long blade, a copper shaft-hole axe, a stone axe and a gold disc – Fig. 2) and from Vel'ké Raškovce (grave no. 1 – a shaft-hole axe, a copper cutting chisel/chisel and a gold disc – Fig. 3; cf. Klimscha 2016, 239–240)

The artefacts mentioned above and their various configurations symbolise the attainment, or the aspiration to do so, of a warrior social status in the local communities. In a few cases of the wealthiest graves,

Fig. 1. Varna, grave 4. A "male" cenotaph of the VC at the time of exploration (after: Ivanov 1988a, fig. 24; graphic editing by M. Juran).

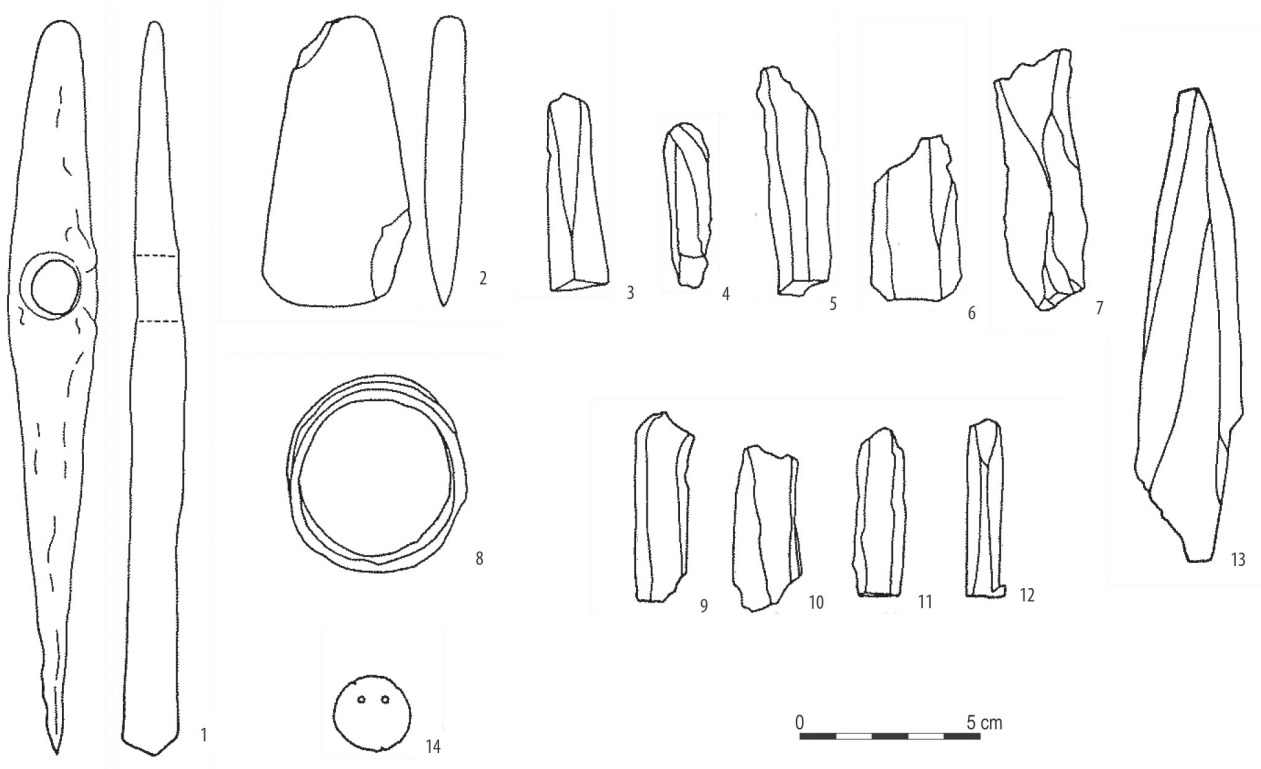

Fig. 2. Tibava, grave 10/56. Selection of grave goods from the TC burial of an adult male: 1, 8 – copper, 2 – stone, 3–13 – flint, 14 – gold (after: Šiška 1964, fig. 15; Lichter 2001, fig. 127; graphic editing by M. Juran).

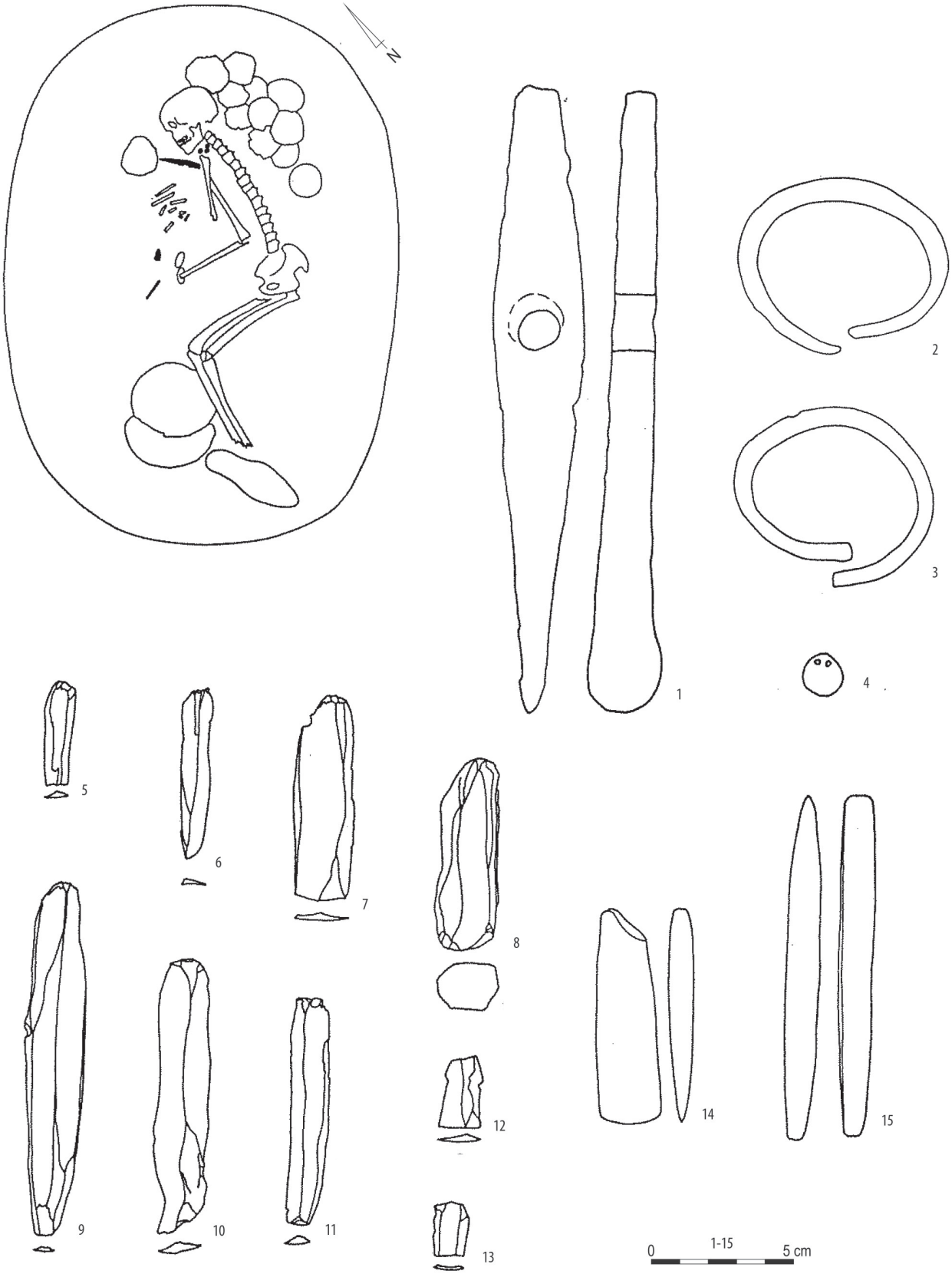

Fig. 3. Velke Raskovce, grave 1. Burial of an adult male of the TC and a selection of the grave furnishing: 1–3, 15 – copper, 4 – gold, 5–13 – flint, 14 – stone (after: Vizdal 1977, fig. 3; Lichter 2001, fig. 128; graphic editing by M. Juran).

all four categories of these symbols are represented. However, the vast majority of warrior graves lack gold ornaments. Also, the further north one goes from the western Black Sea coast, the fewer copper shaft-hole axes and axes and the more numerous stone specimens are found. At the same time, long flint blades and their derivatives, i.e. retouched blades, daggers, etc., are commonly present as warrior status symbols.

Repetitive assemblages of the artefacts described above, insignia of warrior status, have the character of a canon, a socially accepted pattern. However, these sets did not have to be complete in order to fulfil their role effectively. Not all of their elements had to be present and most warrior graves were only equipped with long flint blades. Despite this, they made it possible to effectively distinguish between ordinary men and warriors according to the stylistic figure of *pars pro toto*, in which a part of something represents the whole.

This was possible in a situation where a shared consensus on basic cultural principles and norms, similar world images and value systems (Fig. 4, 5; Klimscha 2016, 264–266), a kind of Greek *koiné*, functioned within the vast areas of the Balkans as well as Eastern and Central Europe.

Male graves equipped with long flint blades define the extent of this area (Fig. 4, 5; cf. Kadrow and Zakościelna 2024, fig. 1). They occur on the western Black Sea coast (Varna culture – hereafter: VC), by the lower Danube (Gumelniţa culture – hereafter: GC), at the mouth of the Danube and in the western part of the Pontic steppes (Suvorovo group – hereafter: SG), on the Pontic and Azov steppes between the Dnieper and Don (Skelya culture – hereafter: SC), by the lower Volga (Khvalinsk culture – hereafter: KC), in the Tisza basin (TC and Bodrogkeresztúr culture – hereafter: BGC), and on the Malopolska, Lublin and Volhynian Uplands (L–VC).

The aforementioned civilisational collectivity was functioning to its fullest within the period 4500–4200 BC (Fig. 4). However, it did not extend to the loess uplands area north of the Carpathians, the most important from our point of view, where the L-VC developed. The oldest assemblages of this culture appeared there no earlier than 4100 BC (Fig. 5). Considering the current radiocarbon chronology, the only element of the cultural community in question that could be contemporary to the L-VC is the BGC in its late phase. However, the presence of flint daggers shaped with the trough-like retouch in the L-VC assemblages, originating from the steppe SC, forces us to revise the dating of the onset of this culture, i.e. to earlier than 4100 BC, or revise the chronology of the end of the culture from the steppe, viz. later than 4100 BC.

An important cultural unit, i.e. the CTCC, is missing from the picture outlined above. It was certainly not part of the EECC described above but was nevertheless an important partner in the cultural contacts of its constituents, especially the Polgar cultures – TC and BGC – (Tkačuk 2023) as well as SC (Rassamakin 1999). The Cucuteni-Trypillia Cultural Complex at the time considered here, i.e. in the 2nd half of the 5th millennium BC, differed in many important ways from the Early Eneolithic Cultural Complex. The dense network of large settlements, indicative of a considerable demographic potential (Diachenko and Harper 2016) and the absence of cemeteries in the CTCC, contrasts with the situation in the EECC, as exemplified by the disappearance of the GC population (Harper 2019). In the Cucuteni-Trypillia Cultural Complex, significant copper production was deposited in hoards (Dergachev and Parnov 2022) rather than in individual graves. This indicates fundamental differences in the social structures of the two cultural blocks: hierarchy (Lichardus 1991) – individualism – smaller populations in Early Eneolithic Cultural Complex vs. heterarchy – collectivism – large populations in Cucuteni-Trypillia Cultural Complex (Müller *et al*. (eds.) 2016; 2024; Shatilo 2021, 231–243).

According to some scholars, the CTCC, in its BI phase, acted as an important intermediary in the exchange of prestige goods between the production centre of the Kodjadermen-Gumelniţa-Karanovo VI-Varna complex (hereafter: KGK-VI-VC) and the steppes, with the main centre of the latter within the SC (Rassamakin 1999, 111). Others attribute a similar role to the GS (Govedarica and Manzura 2019).

On the other hand, at the same time, contacts of the Cucuteni-Trypillia Cultural Complex from the upper Prut and Seret rivers, as well as the upper and middle Dniester, with the TC and BGC intensified as evidenced by the "imports" and imitations of the pottery of those cultures (Tkačuk 2023; cf. also Kruc and Rižov 1997).

The worldview (religion, burial rites) and socio-organisational differences between the Early Eneolithic Cultural Complex and the Cucuteni-Trypillia Cultural Complex in the period 4500–4100 BC did not prevent lively contact between them. On the contrary, there was a hive of activity on the CTCC – SC and CTCC – Tisza basin axes. The Cucuteni-Trypillia Cultural Complex was a vital intermediary and agent of goods, technology and ideas within the Early Eneolithic Cultural Complex area.

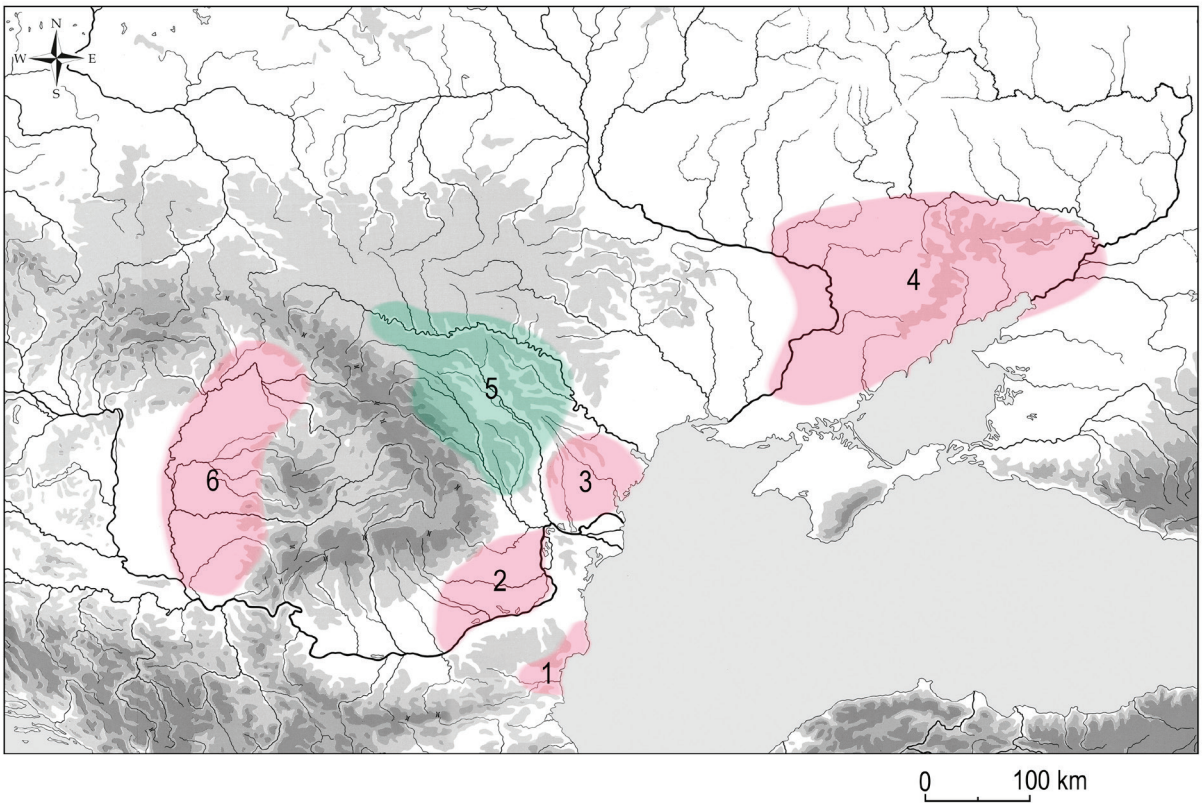

Fig. 4. Cultural situation around 4300–4100 BC: 1 – VC, 2 – GC, 3 – SG, 4 – SC, 5 – CTCC in its BI phase, 6 – Polgar cultures: TC and BGC (graphic editing by E. Starkova).

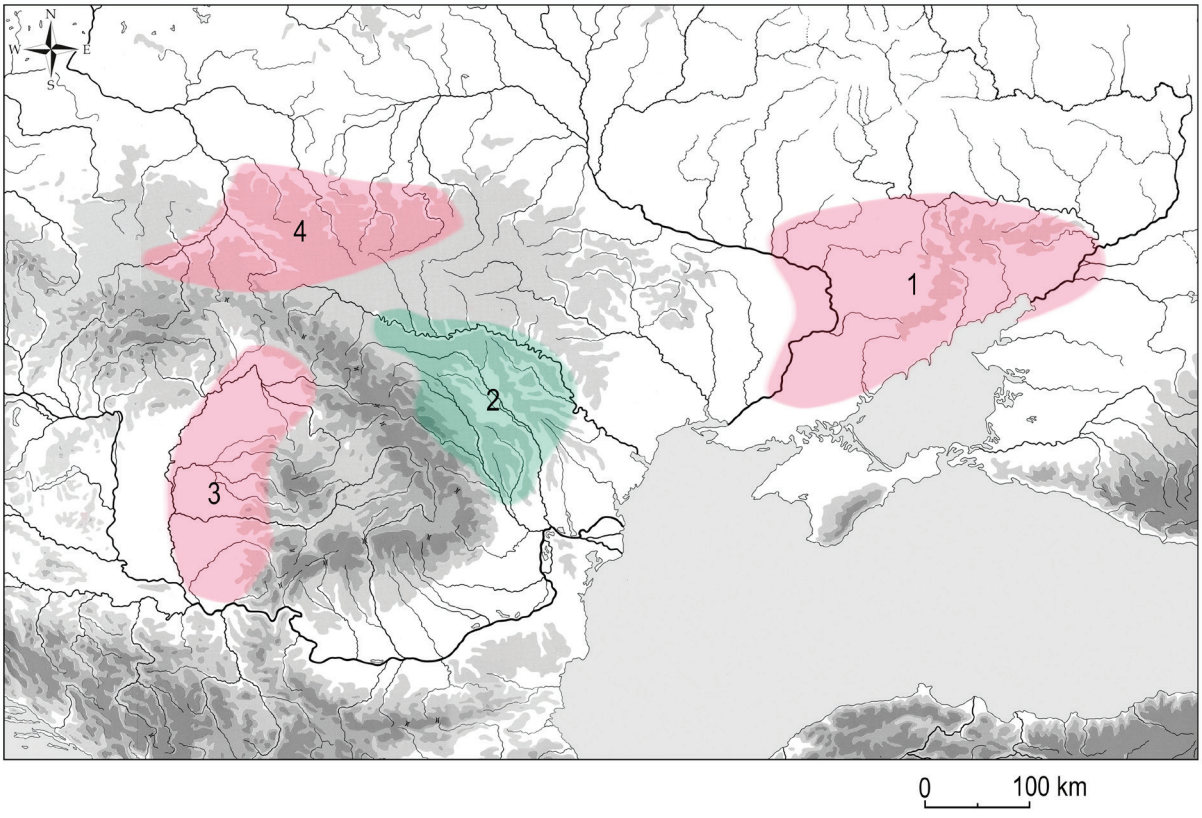

Fig. 5. Cultural situation around 4100–3900 BC: 1 – SC, 2 – CTCC in its BI–BI/BII phase, 3 – Polgar cultures: TC and BGC, 4 – L-VC (graphic editing by E. Starkova).

The CTCC activity increased over time and was inversely proportional to the weakening and disappearance of old centres of civilisation, i.e. the VC and GC (Diachenko *et al*. 2024). Contemporary to the settlement hiatus on the steppe (at the latest c. 4100 BC), the great expansion of the Cucuteni-Trypillia Cultural Complex communities eastwards to the Southern Bug and Dnieper interfluve begins (Shatilo 2021, fig. 110). During the period of the younger part of the BI phase (4230–4100 BC; cf. Diachenko *et al*. 2024, fig. 5), CTCC influences are evident in the upper Bug, Styr and Horyn river basins in the form of the trough-like retouch (Kadrow and Zakościelna 2022a), painting of pottery with white oil paint (Kadrow and Zakościelna 2022b), and the borrowing of some vessel forms (Kadrow and Zakościelna 2025).

Funeral rites

By analysing the furnishings of male graves in terms of social issues, it was possible to define the Early Eneolithic EECC in Southeast, East, and Central Europe. The analysis, which includes certain peculiarities of the funerary rites of the mentioned Early Eneolithic Cultural Complex, reveals its regional and cultural diversity. Despite these peculiarities, symbolic differences between male and female graves are recorded throughout the entire complex in question. In all EECC units, the graves of both sexes were equipped with different sets of artefacts (material symbols). A cultural practice of this type is in line with Evžen Neustupný's (2008; Kadrow 2015) understanding of the idea of the Eneolithic, in which the spread of patriarchal rules is an essential feature.

In general, weapons were deposited in male graves and ornaments in female graves. This rule is evident in all Early Eneolithic Cultural Complex units. Also, throughout the range of the complex, cemeteries are spatially separated from settlements (Häusler 1994; Lichter 2001).

In the VC, TC (Fig. 2, 3), BGC (Fig. 6, 7) and L-VC (Fig. 7, 8), the differences between the sexes

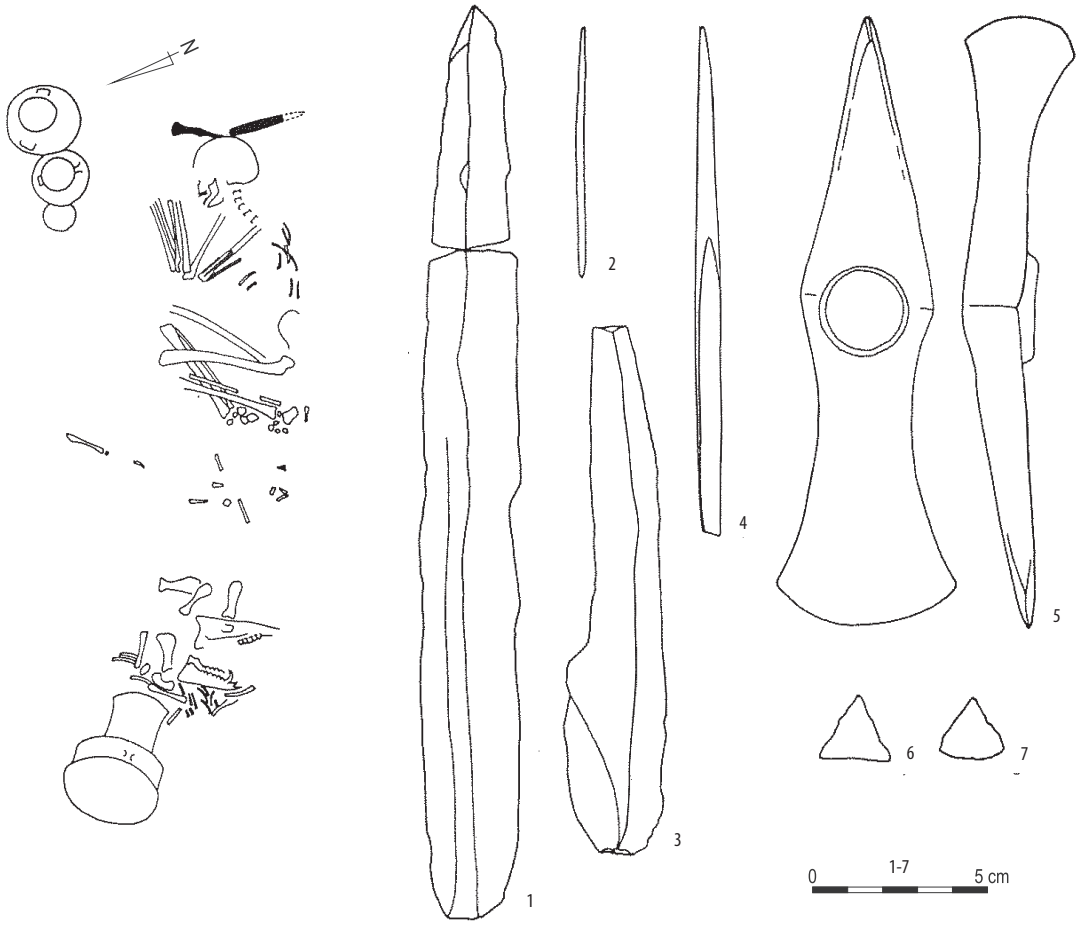

Fig. 6. Magyarhomorog-Kónyadomb, grave 46. Burial of an adult male of the BC and a selection of the grave goods: 2, 4, 7, 8 – flint, 3, 6 – copper, 5 – bone (after: Patay 1976, fig. 27; Lichter 2001, fig. 148; graphic editing by M. Juran).

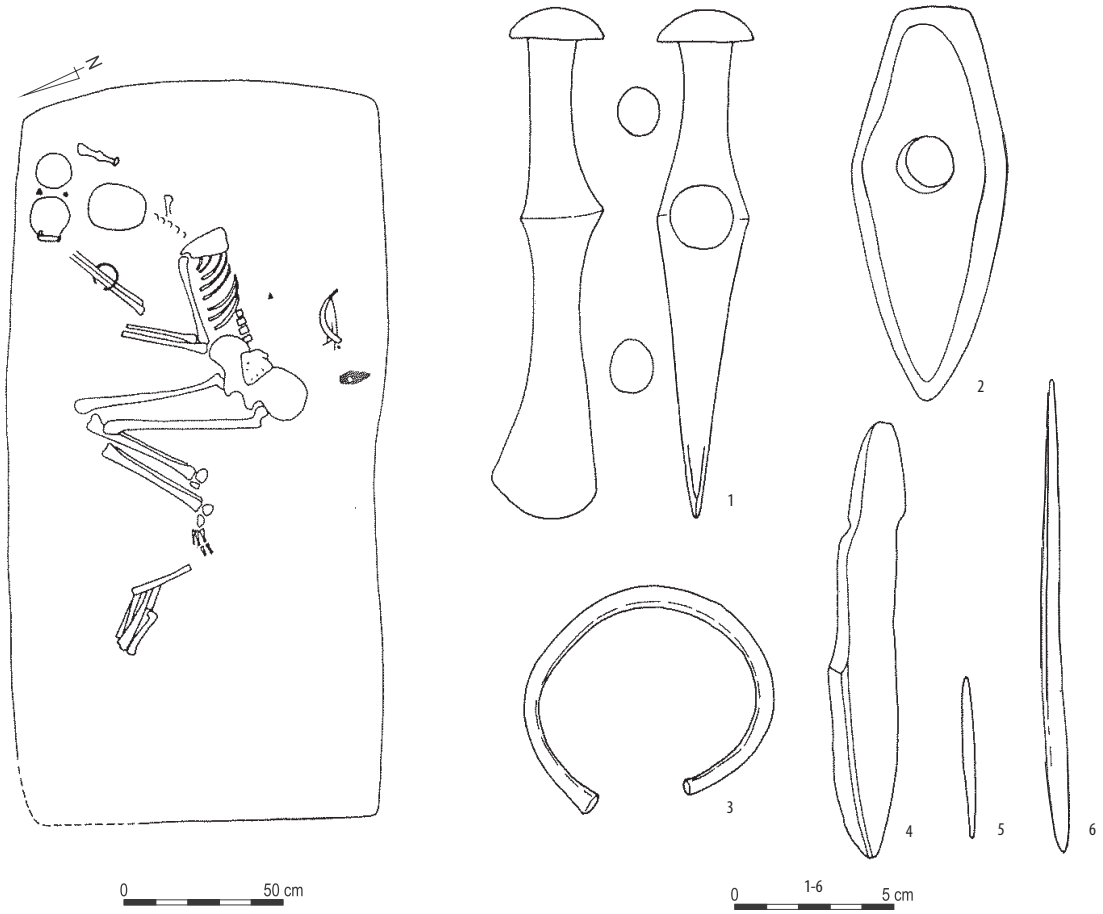

Fig. 7. Tiszavalk-Kenderföld, grave 29. Burial of an adult male of the BC and a selection of the grave goods: 1, 3, 5, 6 – copper, 2 – stone, 4 – flint (according to Patay 1978, fig. 26, tab. IX; Lichter 2002, fig. 141; graphic design by M. Juran).

of those buried are further emphasised by the different rules for arranging the corpse in the burial pit. In phase A/BI of the CTCC, burial rites are archaeologically intangible.

In the late Hamangia culture and the VC, men were laid on their backs in an extended position while women were buried in a flexed position on their right side (Todorova 2002). However, while a small percentage of men were buried like women, weaponry and tools were only deposited in men's graves (Borić 2015, 939–941).

In the TC and BGC, the dead were buried in cemeteries separated from the settlements. Women were laid in graves in a flexed position on the left side while men – on the right. Weapons and tools, as well as gold discs and ornaments made from boar tusks, were deposited in male graves, while copper and gold ornaments were deposited in female graves (e.g. Pusztaistvanháza – Hillebrandt 1929; Nevizánsky 1984; Lichter 2001). Similar elements of funeral rites are recorded in the L-VC cemeteries (Zakościelna 2010; Wilk 2018). In the Hunyadi-halom group (hereafter: H-hG), a shift from the rules described above began with the introduction of cremation (Borić 2015, 942–944).

In the steppe SC and KC, the dead of both sexes were laid on their backs with their legs contracted. Weapons, tools, and copper bracelets were deposited in male graves, while ornaments of small size in female burials (Fig. 10; Agapov *et al.* 1990; Rassamakin 1999; Agapov (ed.) 2010; Anthony *et al.* 2022).

The situation within the Early Eneolithic Cultural Complex at the end of the 5th millennium BC (4200–4000 BC), the collapse of its centres and expansion of the Cucuteni-Trypillia Cultural Complex to the east and possibly to the north

The EECC fully flourished during the period 4500–4200 BC (Fig. 4) and, thus, before the emergence of the L-VC. The populations of the former entity reached their highest level during 4450–4350 BC. A deep though slow crisis, especially by the lower

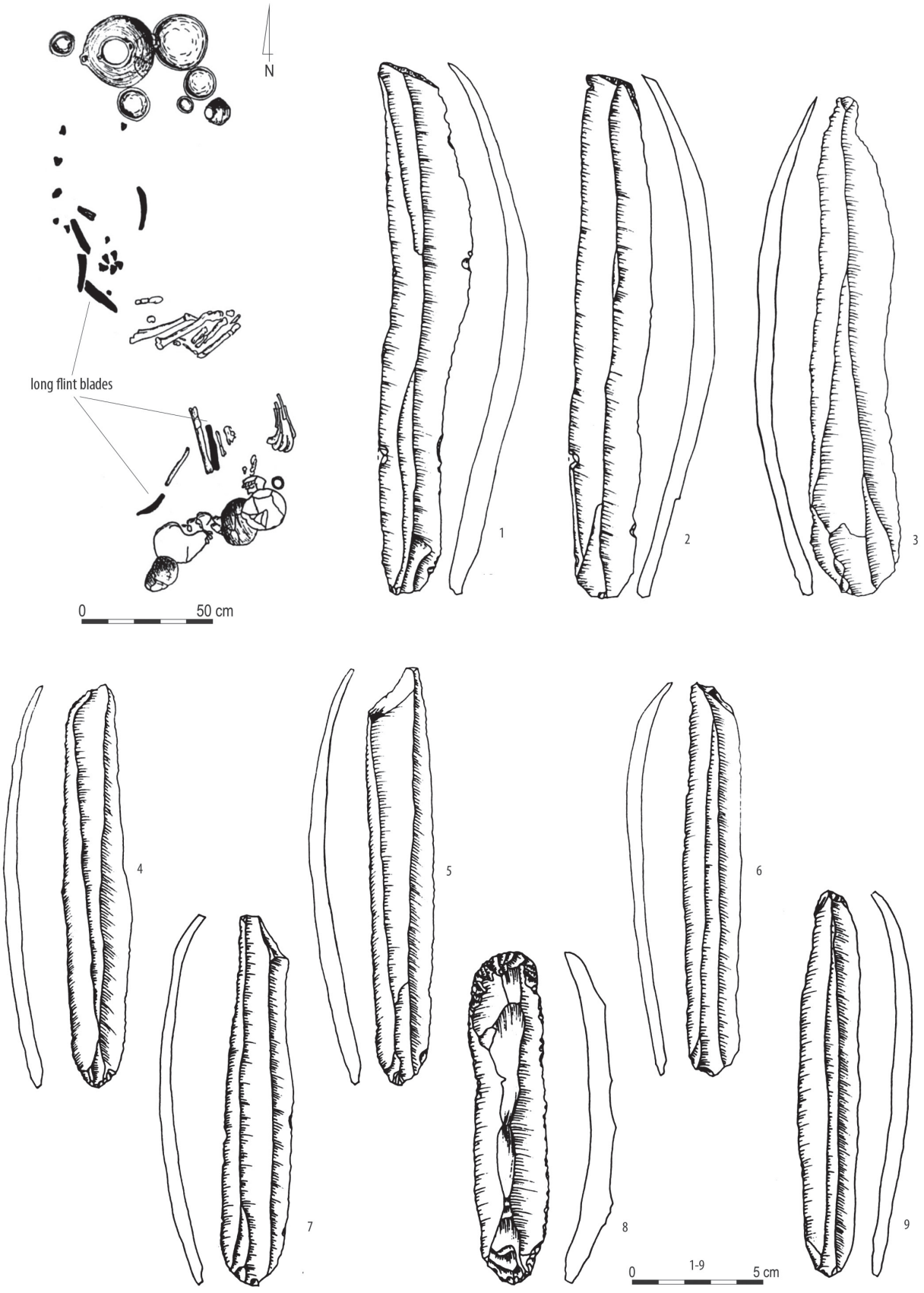

Fig. 8. Strzyżów IA, grave 1/1960. Burial of an adult male and adult female of the L-VC: 1–9 – flint, selection of male grave goods (after: Głosik and Gurba 1963; Zakościelna 2010, tab. LII: B, LIIa, LIIb); graphic editing by M. Juran).

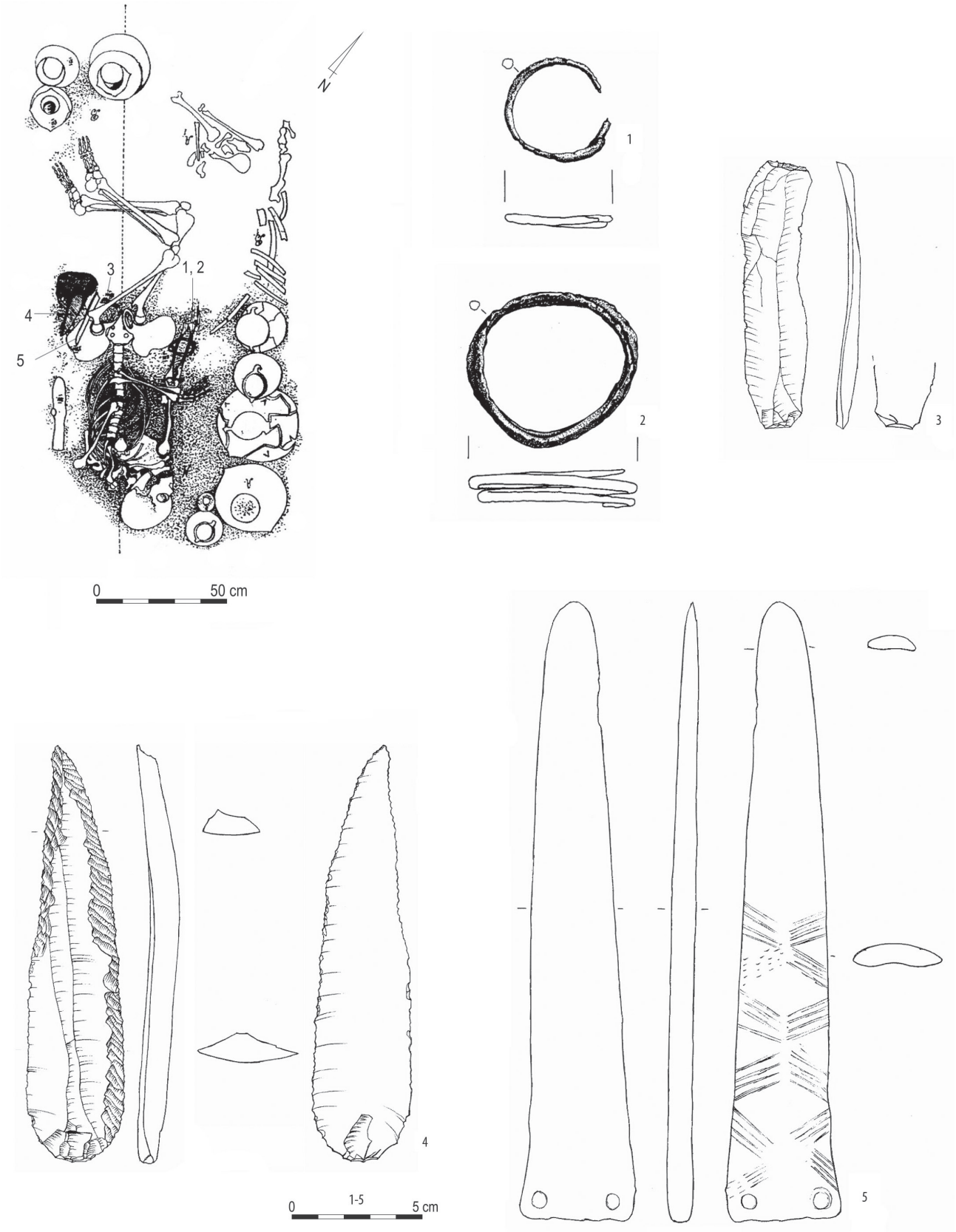

Fig. 9. Złota, „Grodzisko II", grave 101/1930. Burial of an adult male of the L-VC and a selection of grave furnishing: 1, 2 – copper, 3, 4 – flint, 5 – animal bone (after: Sałacińska and Zakościelna 2007; Zakościelna 2010, tab. LXXV, LXXVa; graphic editing by M. Juran).

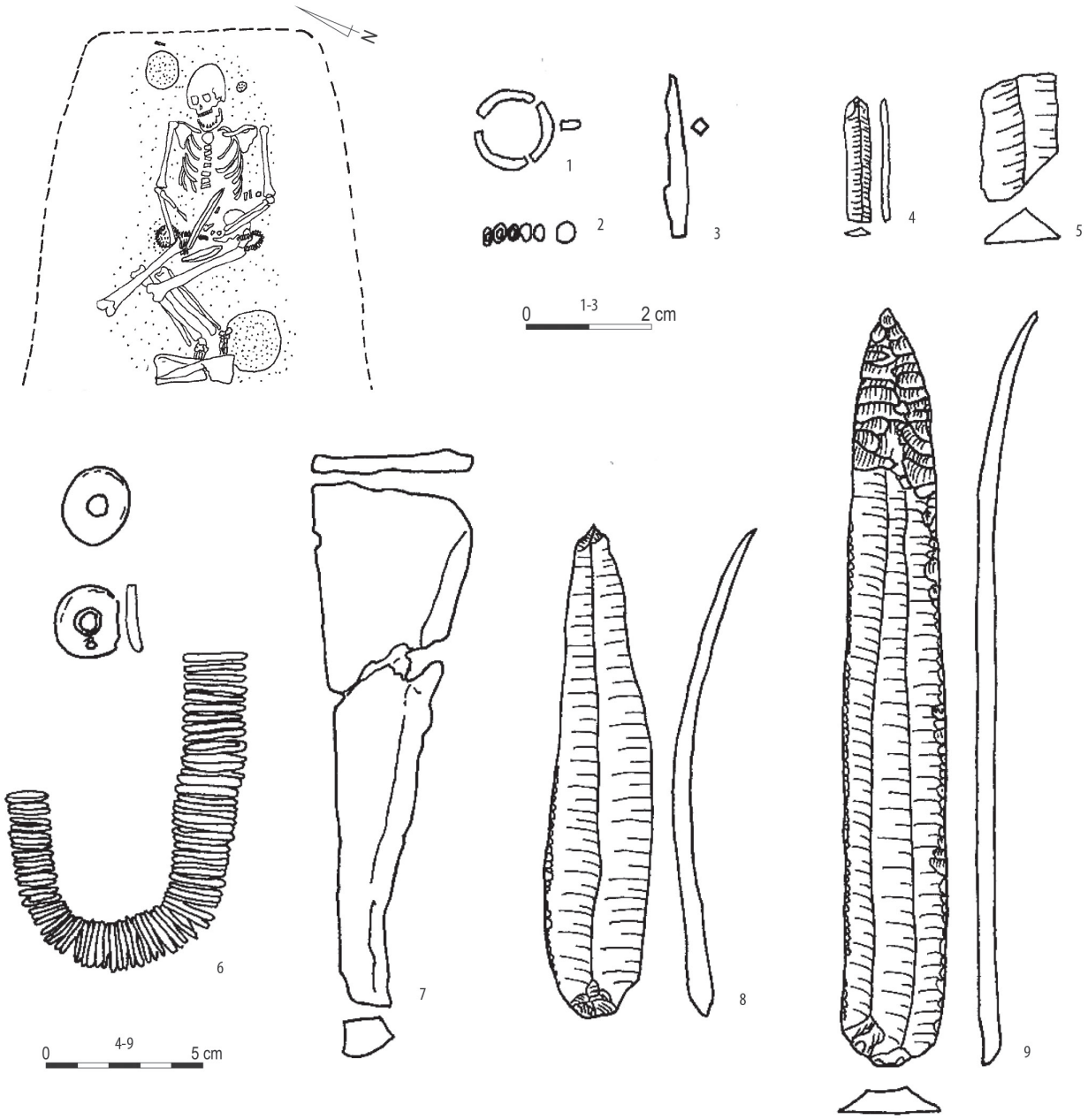

Fig. 10. Aksay "Muhin II", barrow 5, grave 9. Burial and grave goods of an adult male of the SC: 1–3 – copper, 4, 5, 8, 9 – flint, 6 – shell, 7 – animal shoulder blade (after: Rassamakin 2004, plate 291; graphic editing by M. Juran).

Danube, caused by the drying of the climate, started around 4200/4150 BC and, in places, lasted until 3800 BC (Popescu *et al*. 2023).

The aforementioned population decline was concurrent with a sharp increase in the CTCC populations at the end of the BI phase in Moldova and by the middle and upper Dniester, which started at least around 4100 BC (Diachenko and Harper 2016, 91; Harper 2019). This was also when the first BII phase Cucuteni-Trypillia Cultural Complex assemblages appeared (Harper 2021, fig. 1, 2). At the same time, some of the population moved slowly eastwards to the area between the Southern Bug and the Dnieper, giving rise to the giant settlements of the 1st half of the 4th millennium BC.

Probably a smaller part of the discussed CTCC population started to penetrate the areas by the upper Bug, Styr and Horyn (Fig. 5), inhabited by the people of the Malice Culture (hereinafter: MC) of the Rzeszów phase. As a result, the area of the Volhynian Uplands was saturated by the end of the 5th millennium BC with Cucuteni-Trypillia Cultural Complex elements, which became constitutive components of the L-VC. These include some forms of pottery, pottery ornamentation

technique using white oil paint, trough-like retouch, burins, Trypillian arrowheads, etc.

The two expansions of the CTCC population dated to the end of the BI phase, the first one confirmed in the eastward direction and the second postulated northward one, although driven by the exact causes (climate and demography), must have taken different courses and were subject to diverse mechanisms, as evidenced by their various outcomes.

An instructive example in this regard comes from a study of the socio-cultural transformation of the Zuni and Mesa Verde culture populations from the SW part of the USA (Spielmann *et al.* 2016). The exact same reasons, i.e. climate and demography, led to an increase in the diversity of settlements and the stabilisation of politico-religious institutions in the case of the Zuni while, in the case of Mesa Verde culture, there was an increase in the diversity of these institutions. As a result, the Zuni communities overcame the threshold of climatic and demographic change by preserving their former structure, while Mesa Verde was affected by the abrupt change of the former structure, which led to reaching its new state.

Thus, two similar cultural communities (Zuni and Mesa Verde), connected by a network of information exchange, as they belonged to the same cultural circle, responded to climate stress in very different ways (Spielmann *et al*. 2016, fig. 4).

A model of how society acts in the face of change (symbols, rituals, ideologies and institutions)

In most studies conducted in the field of cultural-historical archaeology, stylistic-typological analyses, mainly of pottery and metal artefacts, form the basis for drawing conclusions about the genesis and direction of the cultural development of prehistoric communities. The dynamics of stylistic-typological change are dictated by the movement, including migrations of various scales, and contacts of human groups (e.g. Czarniak 2012).

We believe that changes in all elements of material culture, some to a lesser and others to a greater extent, result from transformations of interrelated parts of the cultural structure (Wuthnow 1987). These changes are a response to internal (moral uncertainty, crisis, demography) and external (climate, environmental change) factors.

Cultural structure consists of material symbols and rituals involving these symbols in their performative function. The action of rituals and symbols, as opposed to their meaning, is directly accessible to archaeological observation. Therefore, ideology and social institutions, i.e. further parts of the cultural structure, are indirectly accessible to archaeological observation because they are connected with the action of symbols and rituals.

The increasing diversity and intensification of ritual practices are indicators of growing uncertainty within a community. Rituals aim to restore social stability and are apparent symptoms of a social crisis resulting in socio-cultural change and the transformation of one culture into another (Wuthnow 1987).

The type of power and authority characteristic of the given era is relevant to our considerations. In our case, it is traditionalist authority, in which people believe in the sanctity of the traditions that have been in force "forever". In patriarchalism, i.e. one of the varieties of traditionalism, one person designated by the rules of heredity reigns. In traditionalism, it is impossible to "create" a new law through its establishment. New rules could only be treated as legitimate if they were considered to have been in force "forever" (Weber 2002, 194). Hence, there is room for manipulation of material culture (symbols) in the process of exercising power (Kadrow 2008) and for a relatively arbitrary selection of various symbols, even of a foreign origin, in order to emphasise legitimate aspirations to seize or maintain that power (Kadrow 2017).

Elements of relational sociology are also of great interpretative importance to us. These have been successfully applied in studies on cultural transformation processes (e.g. Drummer 2022). Relational sociology is based on the assumption that it is possible in archaeology to identify a group identity that consists mainly of categorical identification (e.g. ceramic style, funerary ritual, personal ornaments, etc.) but also to some extent of relational elements (e.g. ceramic technology; cf. Peeples 2018).

Symbols and rituals define group identity, with broadly defined funeral rites of primary importance in this regard. A change in funeral rites is a manifestation of social change and a change of group identity (Drummer 2022, 17–18). The interrelation between relational and categorical identification is important for a comprehensive assessment of social identity and its change.

Relational identification is the result of direct or indirect contacts, interactions and relationships between people. On the other hand, categorical identification results from a person's sense of belonging to a group. It stems from sharing the same values (Drummer 2022, 18).

In this paper, we do not develop further the concept of heterogeneous culture (Barker 2005; Kadrow and Zakościelna 2024) and its heterogeneous grave assemblages. Unfortunately, the source base of this category of tangible culture by the upper Styr and Horyn rivers has not expanded. The current ^{14}C dating of the local CTCC in its phase BII is too late to be included in the consideration regarding the genesis of the L-VC. The chronology of the grave assemblages from Holishiv (Wilk 2018), hitherto considered crucial to the origins of the L-VC culture (Kadrow and Zakościelna 2000, 208–213), is also questionable.

Reconstruction of the cultural transformation processes within the Early Eneolithic Cultural Complex and Cucuteni-Trypillia Cultural Complex at the end of the 5th millennium BC and the genesis of the Lublin-Volhynia Culture

The L-VC consists of an eastern and a western component, with the boundary between the two running along the middle course of the Wieprz River. The main, but not the only, criterion for distinguishing the zones is the exclusive reliance of flintmaking of the eastern part on the Volhynian raw material, while in the western part on other raw materials, i.e. Świeciechów, chocolate, Jurassic, as well as Volhynian flint (Kadrow and Zakościelna 2025). Other elements defining this culture in the eastern and western zones also differ.

Thanks to the analyses and studies of the L-VC grave assemblages at Książnice 2, we have a precise and reliable absolute chronology of this culture with its origins in the western part (Wilk 2016; 2018). The genesis of L-VC in the west is clearly marked by the influences of the Bodrogkeresztur culture (funerary rites, copper artefacts and some pottery forms) with the participation of the Ludanice culture elements, such as pottery. Western communities also adapted arrowheads in the form of microlithic inserts of Mesolithic origin and pottery characterised by the technology and style of "forest Neolithic" decoration into their inventories (Kruk and Milisauskas 1985).

However, in the oldest L-VC graves at Książnice 2, eastern elements are present, i.e. a dagger made of Volhynian flint formed with a trough-like retouch (grave 5) and traces of white paint on pottery (graves 3 and 4). All of the above are male burials.

The grave assemblage from a female grave of early chronology from Podlodów 2 supplies a powerful argument that the oldest L-VC pottery in the eastern zone does not show any Bodrogkeresztur culture or Ludanice culture features but displays obvious Trypillian connections. Painting pottery with white oil paint also originates from the CTCC. Most of the flint knapping techniques and flint products used in the L-VC come directly from the Cucuteni-Trypillia Cultural Complex or were adopted through this cultural unit. For example, we can mention here triangular arrowheads, trough-like retouch, long blades, burins, etc. Daggers formed with trough-like retouch come directly from the steppe SC. In contrast, most copper products in the L-VC have ties with the Polgar culture milieu (Wilk 2016; 2018).

Traditionally, stylistic and typological analyses of pottery (e.g. Czarniak 2012), sometimes also of metalwork, are used to determine the genesis of a given culture. This is done while disregarding the environmental and socio-political conditions of the broader background.

Considering the views of researchers who implement the conceptual apparatus of relational sociology, the funeral rites with associated sets of symbols are of the most significant importance for reconstructing group identity (Peeples 2018; Drummer 2022). For this reason, the BGC, with its almost identical funeral rites, should be considered the most significant factor in the genesis of the L-VC. This is also supported by the tendency to express aspirations to achieve warrior status among men which is distinctive for communities of both cultures.

The above trend is also shared with the L-VC by the steppe SC. Without intermediaries, the latter passed on the idea of a flint dagger formed with trough-like retouch to the former. What is essential is that the idea had been passed while the daggers themselves were not exported. In the L-VC, the raw material used for their production always consisted of Volhynian flint, while local flint was used by the Donec River. This transmission has multiple meanings, as only in the cultures mentioned above was such a product found, always deposited in the graves of men of higher social status. Moreover, this transmission must have occurred before 4100 BC, i.e. before the disappearance of the SC. It also proves the need to look for the origins of L-VC prior to this date.

Paradoxically, the most constitutive elements of the L-VC came from the BI phase of the CTCC, that is, from an environment with which it did not share a common group identity, viz. categorical identifiers. Instead, the shared elements include various technologies, viz. relational identifiers, such as the technique

of painting pottery with white paint, some pottery forms, long blades, and trough-like retouch. Shared relational traits result from close interpersonal contacts, relationships and interactions. They do not, however, result in shared values.

A pre-4100 BC CTCC community, or communities, living in the area by the upper Prut and Dniester rivers with a dissident (deviant) nature from the heterarchy and collective action prevailing in this cultural circle (Müller *et al*. (eds.) 2016; 2024; Shatilo 2021, 231–243), must have been the origin of the L-VC. At that time, that area was penetrated quite intensively by the BGC population (Tkačuk 2023), and it was still within the network of interactions with the SC. The reason for the emergence of this community is unknown. However, it is acknowledged that the emergence of such groups, i.e. offering new ideologies, results from internal conflicts and political struggles (Wuthnow 1987).

Not accepting the identity of the CTCC populations among whom they lived, the communities in question sought a "promised land" to realise their vision of the world. They found it by the upper Bug River and its tributary – the Huczwa River. There, they came across culturally passive communities of the late phase of the MC. They brought various Trypillian technologies and other features without symbolic meaning to this geographical area. Using the technique of manipulating material culture, typical for traditional power, and rejecting the entire Trypillian sphere of symbols and rituals, they instead adopted the universe of religious and socio-political values borrowed from the EECC, together with its symbolism, i.e. the categorical identifiers. In this way, they created and established their own identity. From the BGC milieu, they adopted the funerary rite, while from the steppe world, they took over the social structure in which men aspired to achieve the status of warrior, symbolised, above all, by the long blades and their particular example, i.e. the daggers shaped with trough-like retouch.

The following question then arises: where did the Trypillian dissident communities adopt the Polgar funeral rites from? This could have occurred while they were still by the upper Prut and Dniester rivers before moving out to areas by the upper Bug. However, there is no confirmation of this in the available sources. The presence of categorical identifiers, i.e. daggers formed with trough-like retouch, and relational identifiers, i.e. decorating the pottery with white paint in the oldest L-VC graves in Książnice 2 cemetery, argues in favour of the high mobility of Trypillian dissidents (men) and their conscious, active role in the process of synthesising Bodrogkeresztur, Trypillian and steppe elements, resulting in the establishment of a community with an original group identity in the form of the L-VC.

Conclusion

Climate change, namely drought, by the Lower Danube and in the Dobrudja, led to the decline of the VC and GC civilisation centres and the weakening of the other cultural entities constituting the EECC. On the other hand, the CTCC populations began to expand rapidly. As a result, regional micro-processes were set in motion. One of these led to the emergence of the eastern L-VC by the upper Bug River in the late MC environment. It was possible thanks to the activity of Trypillian dissidents, although with the involvement of crucial Bodrogkeresztur culture impulses.

After the disappearance of BGC just before the end of the 5th millennium BC, the L-VC was the only continuation of the EECC. The development of H-hG, which included the appearance of cremation and lack of long blades in graves, contradicted the ideals of the EECC and thus fit in with the tendencies of the Middle Eneolithic.

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"A House for the Dead" or a Cremation Pyre? The Interpretation of Grave No. 10 Discovered in the Globular Amphora Culture Cemetery in Sadowie in the Sandomierz Upland

Abstract

Pasterkiewicz W. 2024. "A House for the Dead" or a Cremation Pyre? The Interpretation of Grave No. 10 Discovered in the Globular Amphora Culture Cemetery in Sadowie in the Sandomierz Upland. *Analecta Archaeologica Ressoviensia* 19, 57–92

The subject of this study is grave no. 10 of the Globular Amphora Culture discovered in cemetery no. 23 in Sadowie near Opatów, in the Sandomierz Upland. Based on observations made during fieldwork as well as analyses of documentation, it was determined that the feature had two stages of use. The first was as an above-ground structure like a house for the dead, in which human corpses were placed for skeletonization. The second one concerned rites during which a cremation pyre was erected and human remains and grave goods were cremated. So far, there are only a few analogies for the aforementioned feature from close-range cultural circles which developed in a similar time horizon (including the Havelian culture, the circle of the Corded Ware Culture).

Keywords: Globular Amphora Culture, Sandomierz Upland, funeral practices, "a house for the dead", cremation pyre

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Introduction

Several years of excavations carried out at archaeological site no. 23 in Sadowie, Opatów district, have led to the identification of a funeral and ceremonial site coming from the late Neolithic Period, related to the Złota culture and the Globular Amphora Culture (GAC; Mackiewicz *et al.* 2016; Pasterkiewicz 2017). During the research, important data were obtained for studies on the development of Neolithic communities and for the interpretation of sepulchral behaviour in the Sandomierz Upland. The results of research on the GAC features, which have revealed one of the largest known cemeteries of this culture so far, turned out to be crucial. The distinguishing characteristic of the uncovered graves was their great variability of funeral practices and which included: individual burials, partial and multiple burials often involving various stone structures, and multi-stage tombs (mainly cist burials; Pasterkiewicz 2020; 2021; Juras *et al.* 2021). GAC funeral rites also included the custom of depositing animals in human graves, both collective and individual.

Regarding the discovered funeral feature (grave no. 10), it has a unique character and does not draw an analogy with the other GAC sepulchral sites. The research of this feature provided a lot of valuable data about the burial itself and ritual practices. Observations made during fieldwork as well as analyses of documentation also allowed for the reconstruction of the details of the structure and subsequent stages of use of the discussed feature.

Description of the structure of grave no. 10

Grave no. 10 was discovered in the eastern part of the cemetery in Sadowie, on the south-eastern slope of the culmination of a hill (280 m above sea level; Fig. 1). It was part of one of the burial complexes,

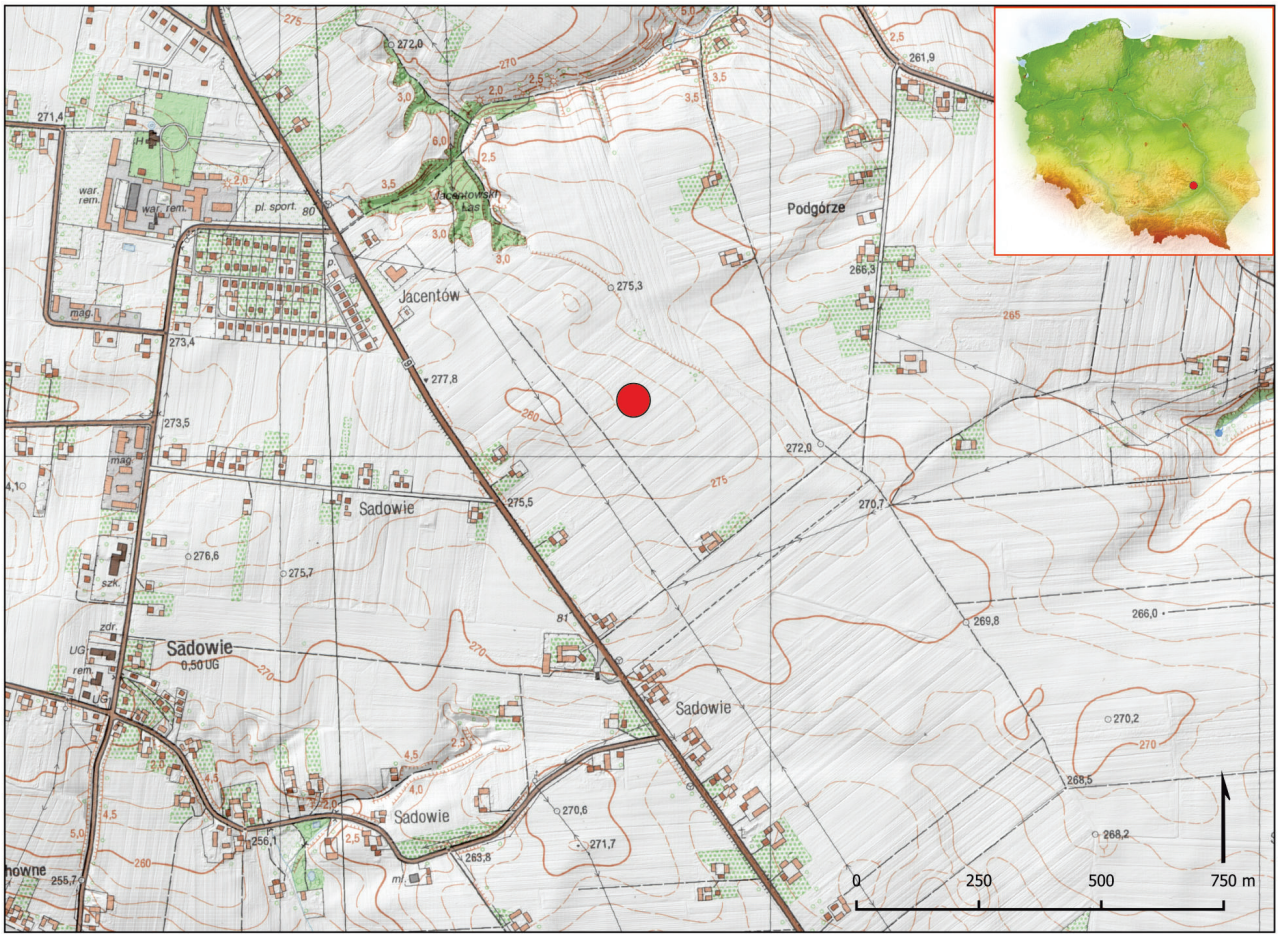

Fig. 1. Location of archaeological site no. 23 in Sadowie, Opatów district, marked on a topographic map and a digital terrain model (landform data was downloaded from the National Geodetic and Cartographic Resource).

which included human and animal burials located close to each other (also called sacrificial pits; Fig. 2). On the northern side of grave no. 10 there was a collective animal burial – grave no. 9 with deposited parts of carcasses belonging to several cattle with inventories typical of GAC. The outline of the discussed grave was found after removing the modern topsoil, coloured (grey-brown) at a depth of 30 cm from the modern ground level, in the roof of the yellow loess subsoil visible here. It appeared as an approximately rectangular patch of darkness, oriented along the NW-SE axis (the deviation from the N-S axis was exactly 45° in the NW-SE direction; Fig. 3, 4). The grave fill consisted of two parts – external and internal, differing in consistency, colour and thickness. The outer part was a kind of rectangle, a "frame" with dimensions of 2.35 × 2.71 m (measured at a depth of 30 cm). Its width in the roof part ranged from about 50 cm (E corner) to 0.65–0.75 cm (S corner). The internal part was 1.6 m long and 1.2 m wide (dimensions measured at 30 cm). At the lower levels, i.e. 10 cm and 20 cm, which is 40 and 50 cm from the current ground surface, the external dimensions of the frame were 2.1 × 2.37 m, internal 1.2 × 1.65 m and 2.1 × 2.37 and 1.22 × 1.67 m, respectively (Fig. 5, 6). The roof part of the outer part was marked by stones measuring 5–8 × 10–17 × 5–10 cm, often surrounded by smaller ones (maximum 4–5 × 8 × 5 cm), and layers of charcoal and burnt wood. The filling was grey in colour while on the outer edge on the NE and NW sides it was a dark grey colour. In the profile, the "frame" took the form of a groove dug into the subsoil (30 cm deep), in the N, NE and NW parts to about 34 cm (Fig. 7: A, B). The bottom was flat, rectangular in profile, widened in the ceiling part as a result of the collapse of the upper parts of the side walls. Above the floor, in several places, there was a layer of loose sediment which was rich in humus and charcoal.

The inner part of the feature was filled with the earth similar to subsoil, mixed in places with dark, light brown spots. On the E side, at the level of 6–10 cm, there was a slightly darker, 1–5-cm-thick layer (red-brown in colour) saturated with a smear of char-

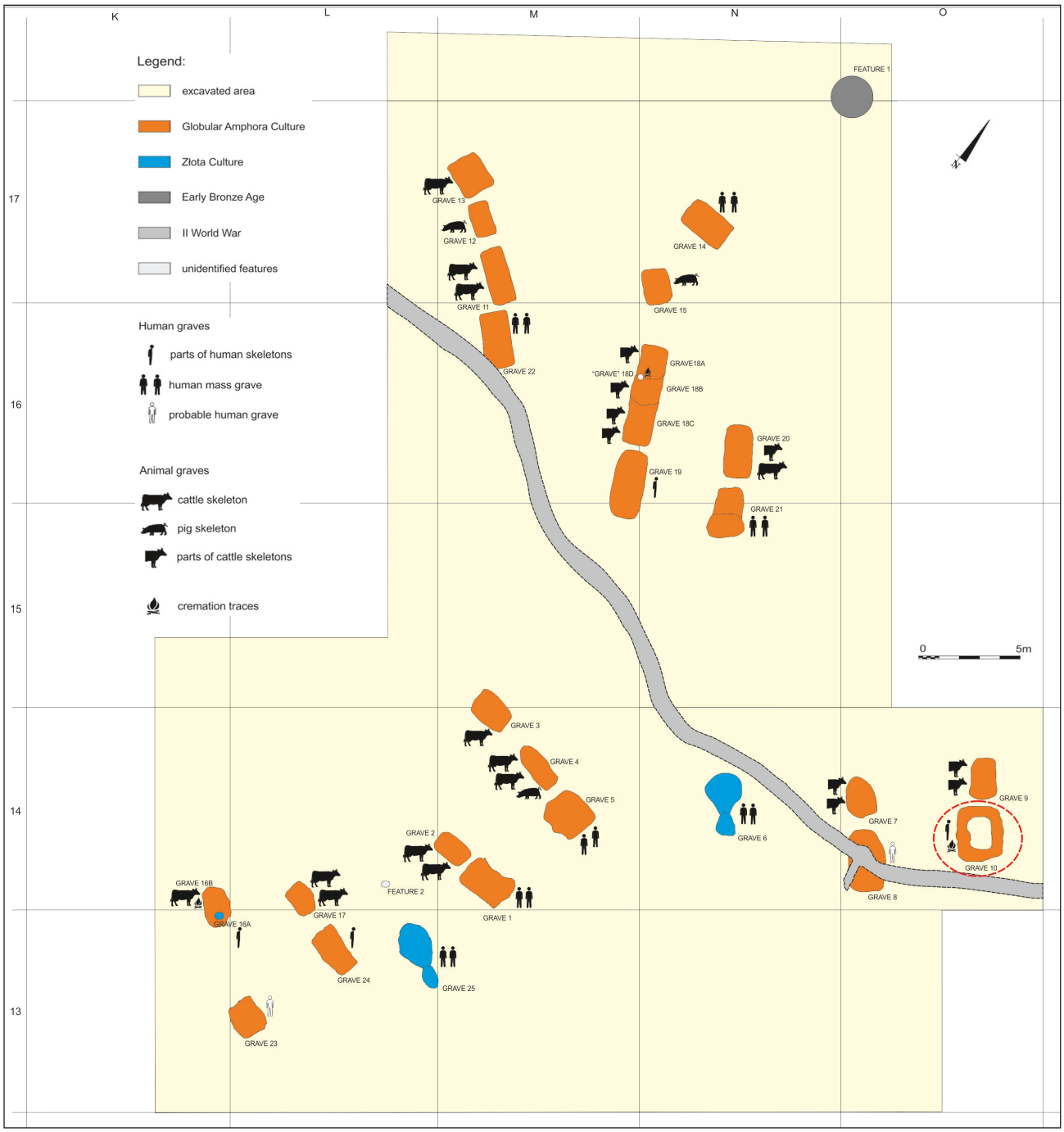

Fig. 2. The range of archaeological excavations covering the northern part of the Late Neolithic cemetery in Sadowie, carried out in 2015–2021, where grave no. 10 was uncovered (marked with a red circle; drawn by the author).

coal (Fig. 7: B). Below, there was a visible surface of the subsoil, which showed traces of burning *in situ*, reaching approximately 13–15 cm in the E part and becoming shallower towards the sides of the frame.

Within the groove (on the inner side), there were fragments of burnt riven planks, forming the actual burial chamber (Fig. 8). They took the form of compact layers of charcoal, sometimes mixed with lumps of burnt earth in the form of black layers. The riven planks were arranged parallel to the sides and vertically, i.e. with narrower edges towards the ground. They were located on four sides, with the best-preserved ones in the NW part. They had a total length of approximately 73 cm and a width of 3–4 cm and they consisted of at least 4–5 separate planks. The remaining riven planks were shorter, segmented and had a total length of 52, 56 and 73 cm. The depth of the preserved planks was at a more or less similar level

Fig. 3. The upper outline of grave no. 10 at a depth of 30 cm from the current ground level, under humus, view from the NE side (photo by the author).

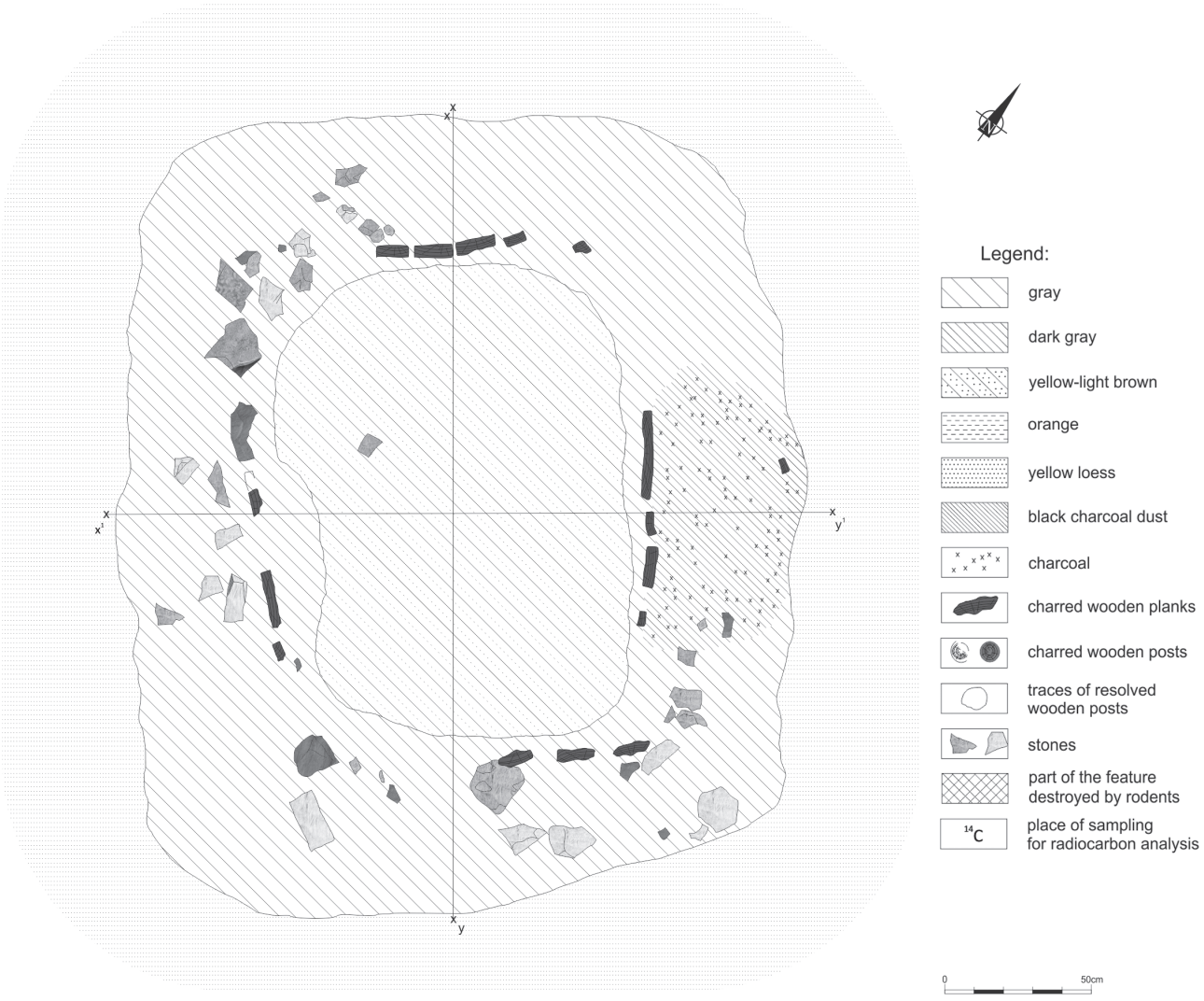

Fig. 4. Sadowie, Opatów district, site 23. A plan view of grave no. 10 on the discovery level (30 cm deep from the current ground level; drawn by the author).

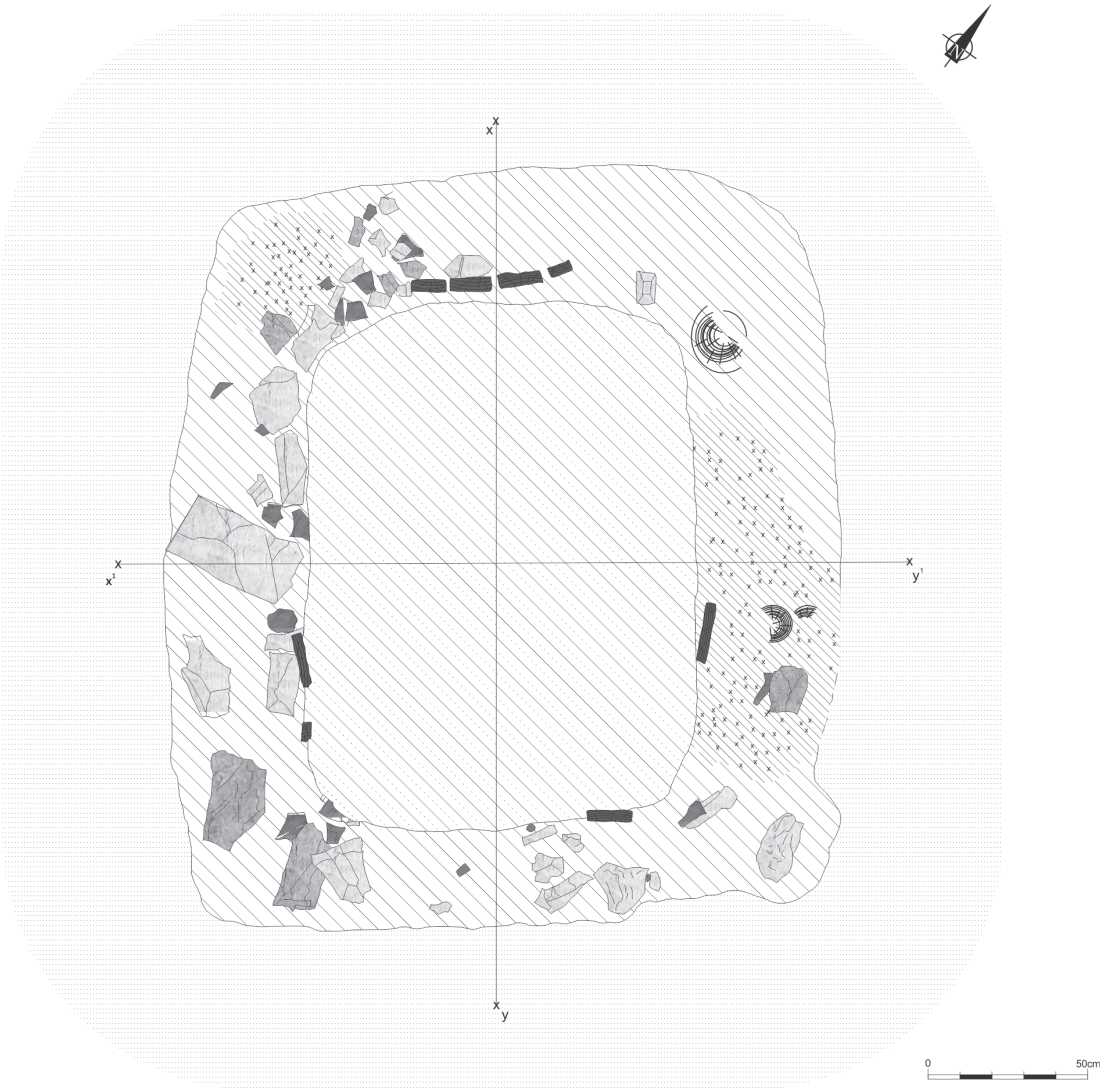

Fig. 5. Sadowie, Opatów district, site 23. A plan view of grave no. 10 at the level of 10 cm (depth 40 cm from the current ground level; drawn by the author).

– 18–20 cm, i.e. they were approximately 12–15 cm higher than the bottom of the groove and from a few to a maximum of 20 cm above the internal part of the structure (Fig. 7: A, B, G).

As for the outer side of the described structure, there was an accumulation of stone slabs forming a kind of a kerb (Fig. 9). They were adjacent directly to the centre of the feature in the NE, NW and SW sides. The dimensions of most slabs were from 30 cm to 20 cm and 7–10 cm thick, while the largest items were 41 × 33 × 7 cm. Some of them showed traces of processing and shaping in order to standardize their size and to ensure that their upper parts were at a similar height, i.e. the level of grave identification (30 cm from the current ground level), possibly selected in terms of size and location to reach the very bottom of the surrounding groove.

On the ceiling of the grave frame there were rubble and angular stone lumps scattered in small clusters. At lower depths of 10 and 15 cm and especially 20 cm, they were concentrated mainly on the inner side of the groove, along the NW, W, SE and partially E sides (Fig. 10, 11). The NE part of the outer frame was devoid of them. Single stones were also scattered within the groove, at depths of 3–18 cm, and they were more common on the edge of its fill, in the middle on the inner side. In most cases, the stones were lying horizontally or slightly tilted towards the interior of the chamber (Fig. 12). Their original task was to stabilize the riven planks forming the burial chamber. The position indicated that it had fallen over when the structure collapsed due to fire. The average dimensions of the stones ranged from 14–20 × 10–15 × 7–10 cm in thickness, whereas

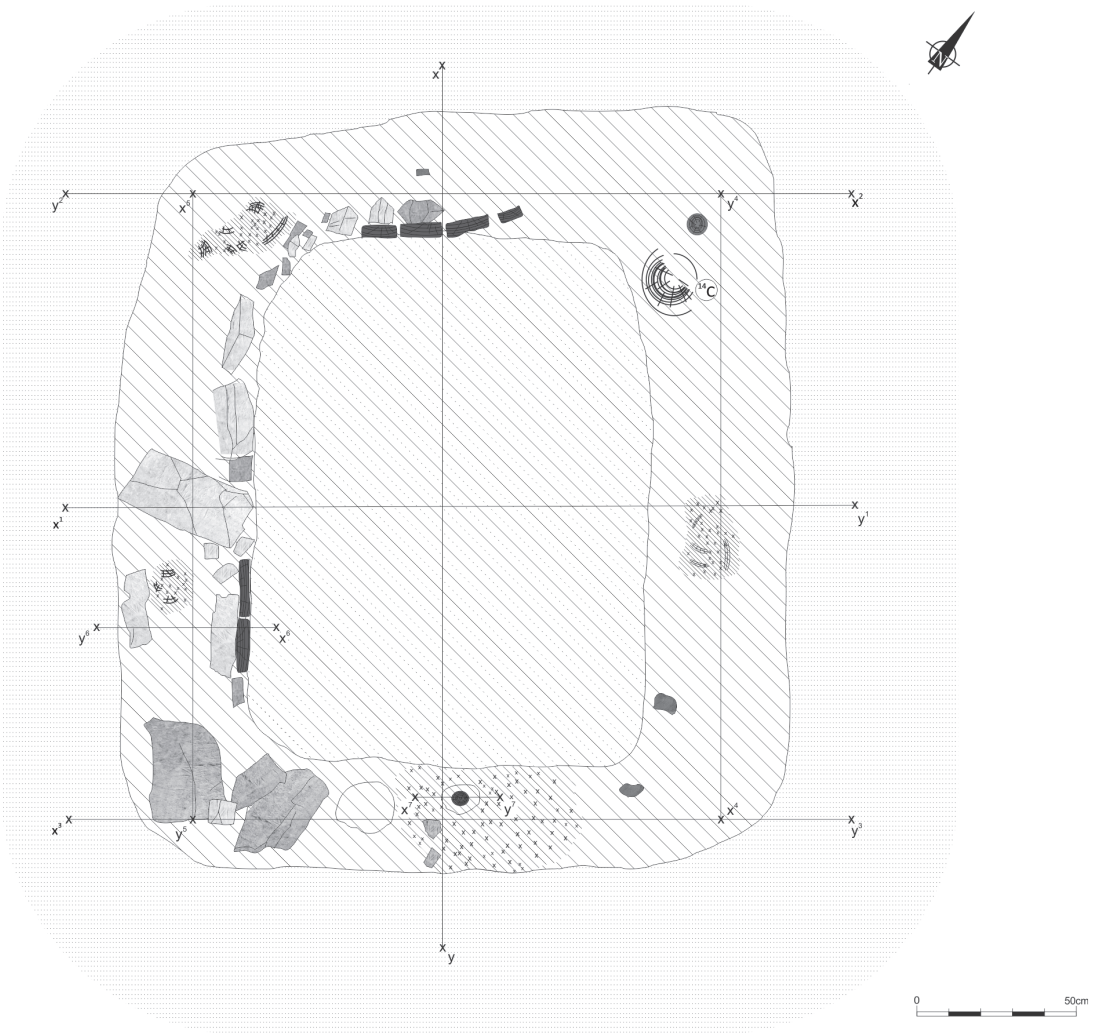

Fig. 6. Sadowie, Opatów district, site 23. A plan view of grave no. 10 at the level of 20 cm (depth 50 cm from the current ground level; drawn by the author).

the largest amounted 32 × 21 × 13 cm. Almost all of them bore traces of burning in the form of thermal cracks and the outside was covered with a black layer of earth mixed with charcoal dust. In the NW corner, the stones reached the interior of the structure and formed a smaller cluster there. It consisted of small lumps measuring 4 × 5 to a maximum of 5 × 10 cm, which revealed traces of intentional cutting or were waste from the processing of larger stone slabs. The preserved traces suggest that the knapping technique was used here.

Most of the stones used to build the grave kerb are made of fine-grained light grey sandstone, the nearest deposits of which occur in the Jurassic formations, approximately 5 km to the SE, in the village Podole (Dowgiałło 1974). In two places of the groove, other small stones were found – fragments of red-coloured Triassic sandstone from Czerwona Góra (Romanek 1991), approximately 4.5 km west of the cemetery.

Within the grave's frame (groove), there were also traces of posts placed vertically in the ground in several places, which were the constructions for supporting the wooden above-ground structure. They were found in the corners (N, NW; Fig. 13) and in the middle of the sides (NE, SW and SE; Fig. 14, 15). In three cases, these were the remains of burnt or charred logs, with a diameter of 12–14 cm and in one case 18 cm, reaching to a depth of 20–23 cm, i.e. 5–10 cm above the bottom of the feature. The posts, as can be revealed from the preserved traces, had flat ends. Some of them were covered with bark on the outside and showed traces of charring. It is worth adding that traces of repairs or support were discovered in the vicinity of some of the posts. In one case (in the N corner) there was a small

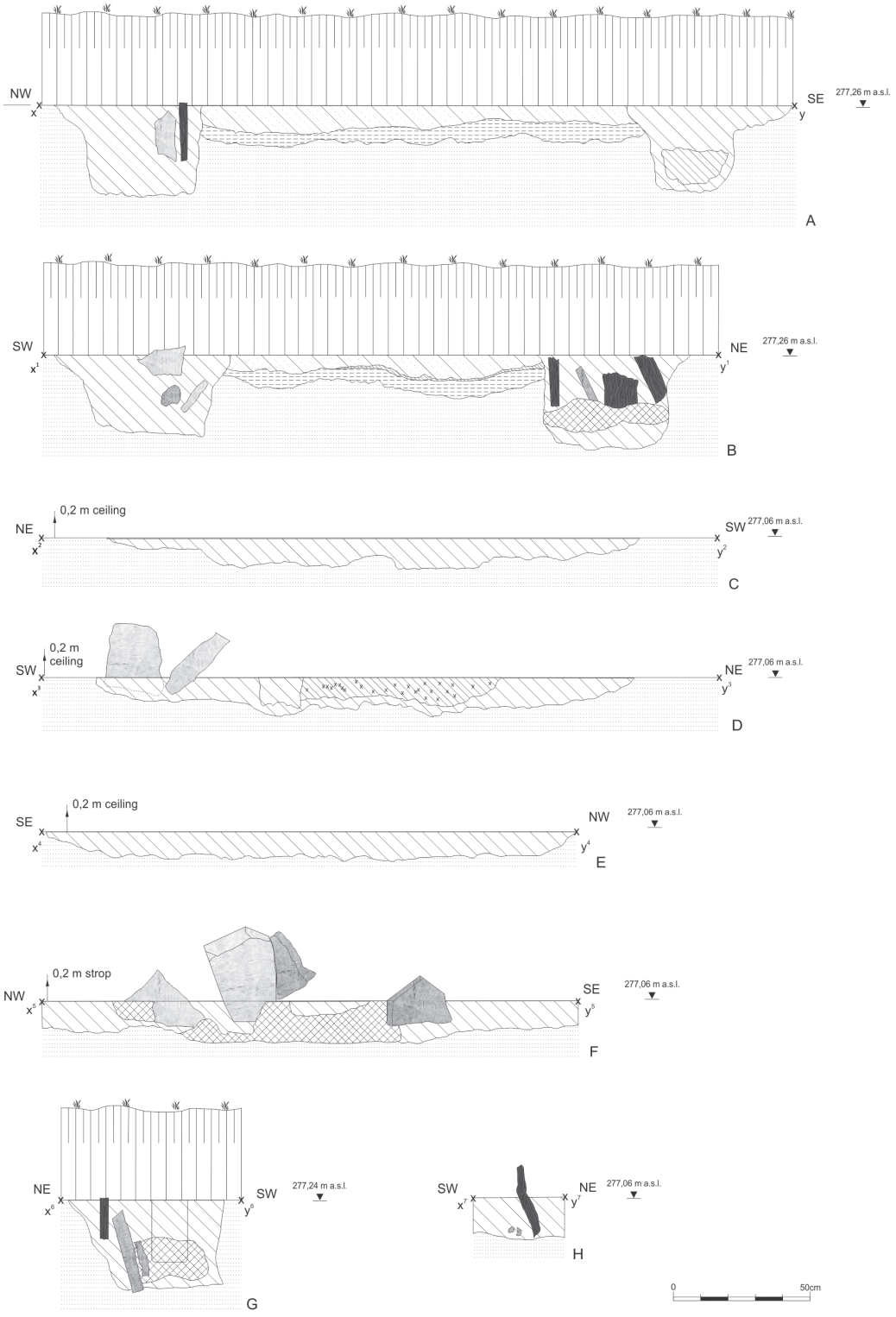

Fig. 7. Sadowie, Opatów district, site 23. Vertical cross-sections of grave no. 10 (drawn by the author).

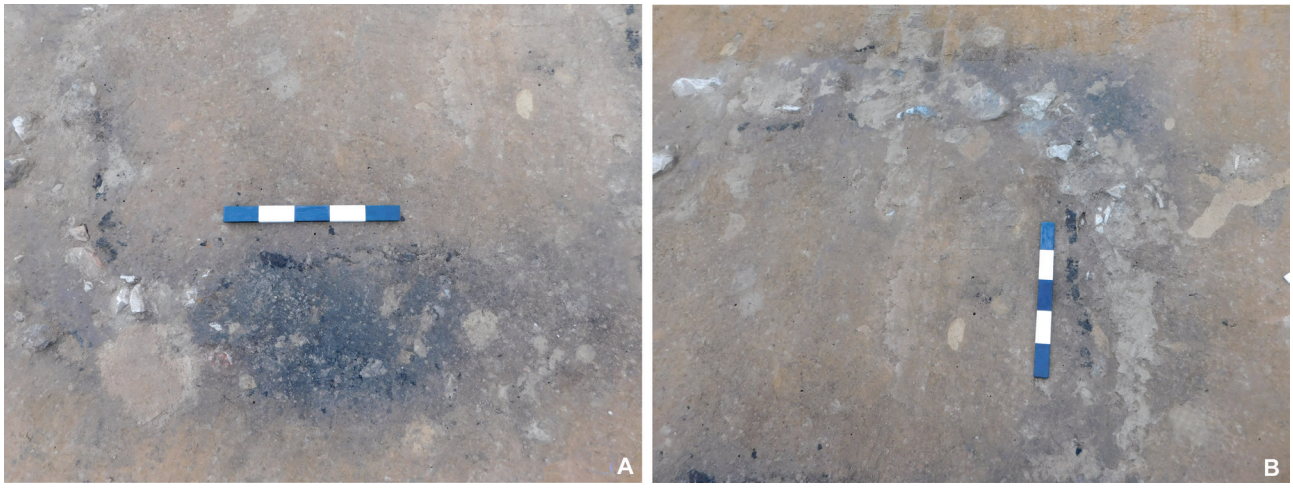

Fig. 8. Fragment of the inner part of the fill of grave no. 10, at a depth of 30 cm, visible remains of wooden riven planks deformed (bent) as a result of high temperature.
A – eastern corner, view from the NE side; B – side NW, view from the NE side (photo by the author).

Fig. 9. Plan view of grave no. 10 at a depth of 20 cm with preserved profile baulks. A visible foundation groove near the wall in an intensely black colour, with slabs and stone lumps supporting the wooden walls of the burial chamber (photo by the author).

Fig. 10. Partially excavated burial feature with visible traces of a stone base strengthening the foundation of the side walls of the burial chamber, W corner, view from the NW side (photo by the author).

Fig. 11. Clusters of stones in the ceiling of the foundation groove, creating a covering of the outer wall of the burial chamber; a preserved fragment of a charred plank is visible under the ruler; NW side, view from the SW side (photo by the author).

Fig.12. One of the stone lumps leaning towards the interior of the burial chamber due to the collapse of the structure, under the influence of fire, view from the NW side (photo by the author).

Fig. 13. A charred wooden post at the bottom of the foundation groove, originally supporting the roof over the burial chamber. In the background, at the SE baulk, along the axis, there is a vertical cross-section of the inner part of the grave with a visible dark layer, saturated with a smear of charcoal, and a layer of overheated loess subsoil underneath it (traces of overheating of the bottom of the pit – marked with a red arrow) (photo by the author).

Fig. 14. Fragments of a vertical cross-section of the groove of grave no. 10 in the NE side, with a charred post and a riven plank (i.e. part of the wall of the burial chamber) adjacent to the inner part, view from the NW side (photo by the author).

Fig. 15. Fragments of a vertical cross-section of the wall groove of grave no. 10 in the SW side, with part of the stone structure supporting a wooden, burnt post and a charred plank from the inside of the burial chamber, view from the NW side (photo by the author).

circle with a diameter of 7 cm, placed on the outside, which lay a few cm below the bottom of the groove. Similar strengthening was noted in the NE part, near the central post in the form of a picket with a diameter of 12–13 cm. In the S side, more or less in the middle of its length, there was a burnt, small wooden post, 26 cm high and about 5–7 cm thick (Fig. 16). It was tilted towards the southern corner, departing from the bottom by about 10–15° (i.e. from the vertical line). It is likely that it responded to pressure when the wooden structure collapsed under the pressure of falling ashes. The end of this post had a sharp point, as can be revealed from the preserved traces.

In two places within the outline of the wall groove, additional structures were uncovered aimed at the stabilization of the vertical wooden elements. On the longer N side, clusters of stones were found in the form of "nests" surrounding empty spaces where the posts were originally located (Fig. 17). Another one was observed in the SE corner. In the S and SW

Fig. 16. Fragment of a vertical cross-section of grave no. 10 along the SE part, with a preserved burnt post bent to the side; view from the SE side (photo by the author).

Fig. 17. A view of the bottom part of the groove fill with stones surrounding the post negative; view from the SE side (photo by the author).

Fig. 18. Fragment of a groove with a double row of stone kerbs in the form of a "corridor", originally surrounding wooden posts supporting the roof over the grave pit, SE side; view from the SE side (photo by the author).

parts of the groove, a stone "corridor" 13–15 cm wide (directed towards the SW) was found, which ran for about 70 cm (Fig. 18). The interior contained relatively loose fire remains, "packets" of burnt earth, and scattered layers of charcoal. It is believed that posts were originally built here and fell over during the fire.

It is worth adding that in some places at the bottom of the groove there were traces of decomposed (rotten?) posts. They were located approximately in the middle of the SE and SW sides. They had a different consistency and lighter colour than the rest of the fill. Most likely, these posts are traces of *ad hoc* repairs or preservation of the construction – "house for the dead".

Speaking of the inside the groove, small pieces of charcoal were recorded and larger concentrations of such coals were found in two places, i.e. on the SW and NE sides (Fig. 19). These were most often traces of subsequent posts or logs with a diameter of about 20–25 cm that had fallen during the fire. Another such accumulation was located in the W corner of the feature, occupying a space of approximately 18 × 35 cm.

Regarding the groove fill, there were also numerous lumps of black daub, strongly hardened during the fire. Some of them had angular shapes, which indicates that they were used to fill the spaces between the stones. The burnt daub usually showed no traces of wood impressions or organic components.

Fig. 19. Traces of burning discovered within the fill of the foundation groove – fragments of charred posts, burnt tree bark (consisted of layers of fibres pressed together, bearing a flexible structure) (photo by the author).

Characteristics of movable artefacts from the grave fill

Within the grave (starting from a depth of 5 cm) there was a collection of 39 movable artefacts, consisting of 19 items of pottery sherds and 6 flint artefacts. In several places, clusters of burnt, very small human bones were also noted (14 fragments in total). Anthropological analysis indicated human origins of the remains.

Ceramic artefacts:

1. A fragment of the rim of a thin-walled pottery vessel (mass find no. 533/16; Fig. 20: 1). The clay paste contains an admixture of medium-grained crushed rock and quartz grains. Coarse, rough surface (roughness is the result of using sharp-edged crushed rock for the clay paste). The fragment is burnt and is dark grey in colour. Weight 2 g. Preserved wall thickness: 2.5 mm.

2. Six fragments of the rim and upper part of an undecorated pottery vessel, most likely a vase with a short cylindrical neck (mass find nos. 524/16, 527/16, 528/16; Fig. 20: 2). The clay paste contains an admixture of large- and fine-grained crushed rock and fine quartz. The surfaces of the external and internal walls and fractures are uniform and orange in colour. Some of the external surfaces are slightly damaged, covered in some places with dark brown deposits of burnt loess and charcoal dust. There are visible traces of smearing on the outer sides of the sherds. The sherds are quite fragile and breakable. Weight 36 g. Thickness of the vessel walls: 4.5–6.5 mm.

3. A fragment of the edge of a pottery vessel, undecorated (mass find no. 535/16; Fig. 20: 3). The clay paste contains a small amount of large-grained crushed rock, burnt and grey in colour. The surface is uneven, dark grey on the outside and fracture, with traces of burning, and light brown on the inside. Weight 2 g. Preserved wall thickness: 5 mm.

4. A fragment of the edge of a pottery vessel, decorated under the outer edge with a double row of horizontal impressions of an irregular, quadrsharp-edged stamp (mass find no. 523/16; Fig. 20: 4). The clay paste contains an admixture of sharp-edged, large- and fine-grained white or light grey crushed rock. The outer surface is partially damaged, it is dark brown on the outside, light brown on the inside and a dark brown fracture. On the inside, there are visible burnt marks extending slightly into the ceramic wall. Weight 5 g. Preserved wall thickness: 5.5 mm.

5. A small fragment of the body of a probably small pottery vessel (amphora) with a horizontally pierced

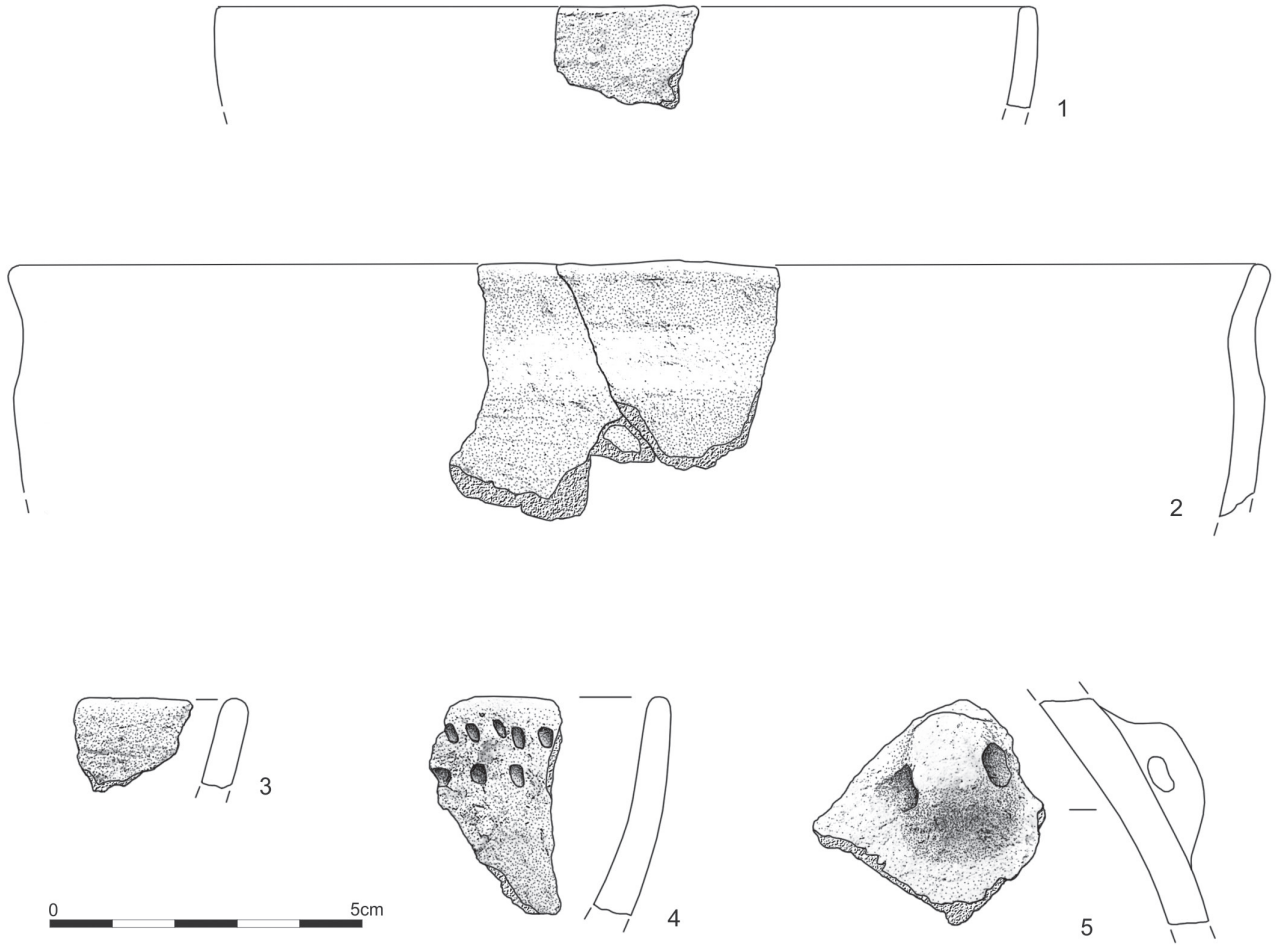

Fig. 20. Sherds of pottery vessels of the Globular Amphora Culture uncovered in the fill of grave no. 10.
1 – mass find no. 533/16; 2–mass find nos. 524/16, 527/16, 528/16; 3 – mass find no. 535/16; 4 – mass find no. 523/16; 5 – mass find no. 526/16 (drawn by A. Bardec´kij).

handle (mass find no. 526/16; Fig. 20: 5). The clay paste contains an admixture of fine-grained quartz and small amounts of sharp-edged, large-grained crushed rock of light grey and whitish colour. The surface is smoothed, dark brown on the outside and inside, and has a black fracture. From the outside, the item is covered in some places with light brown deposit – a burnt layer of loess. A hard item. Weight 16 g. Preserved wall thickness: 6.5–7 mm. A handle dimensions: height 2.8 cm, width in the middle part 1.1 cm, width at the base 1.8 and 2.2 cm, hole diameter 0.5–0.6 × 1.7 cm.

6. A small fragment of a pottery vessel, decorated with faded impressions of a stamp and a cord (mass find no. 531/16). The clay paste contains an admixture of fine-grained quartz grains. The surface is damaged and abraded, in orange colour on the outside and inside and brick-red colour in the fracture. A fragile item. Weight 1 g. Preserved wall thickness: 5 mm.

7. Four undecorated fragments of the body of a pottery vessel (mass find nos. 527/16, 539/16). The clay paste contains an admixture of medium-grained white crushed rock and occasionally fine-grained quartz. The surfaces of the items are smooth, uniform, black in colour on the outside, light brown on the inside, and with black fractures. The external surfaces are covered in some places with a light brown layer of burnt loess. Weight 5 g. Preserved wall thickness: 4.5–5.5 mm.

8. Two undecorated fragments of a pottery vessel (mass find nos. 529/16 and 532/16). The clay paste contains an admixture of large- and medium-grained crushed rock of white and grey colour and fine-grained sand. Fragments are slightly burnt, with grey external and internal surfaces and fractures. The pottery sherds are fragile and separating. Weight 10 g. Preserved wall thickness: 6.5 and 8 mm.

9. A small fragment of a pottery vessel (mass find no. 530/16). The clay paste contains sharp-edged, large- and medium-grained crushed rock of white and transparent colour. The surfaces of the walls are

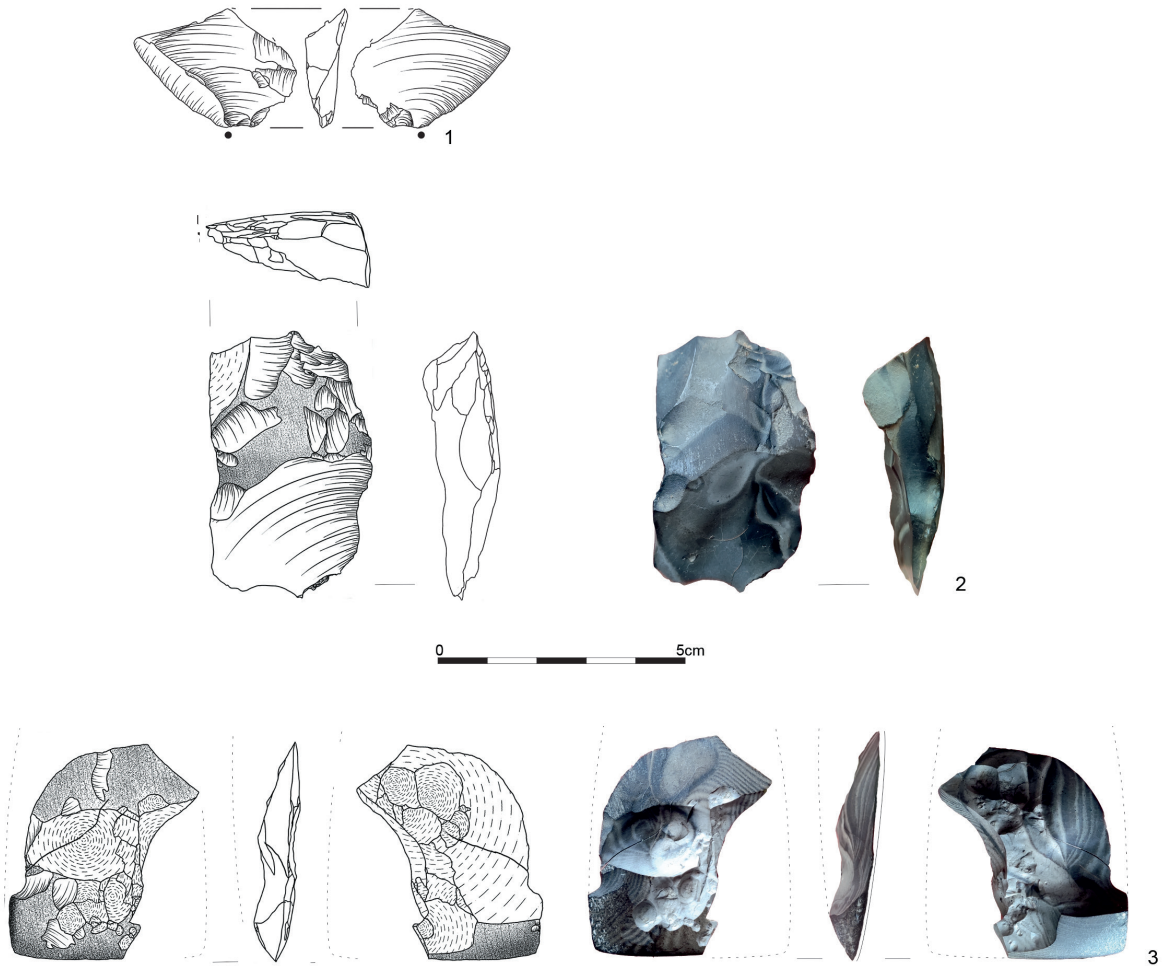

Fig. 21. Flint artefacts discovered in the grave, including fragments of damaged and burnt flint axes (2, 3).
1 – registered find no. 40/2016; 2 – registered find no. 42/2016; 3 – registered find no. 41/2016 (drawn by A. Nowak).

smooth, grey on the outside and black on the inside and in the fracture. The firing is good and the sherd is quite hard. Weight 2 g. Preserved wall thickness: 4 mm.

10. A small fragment of a pottery vessel (mass find no. 534/16). The clay paste consists of large- and medium-grained crushed rock, grey and white in colour. The surface is uneven, orange on the outside and in the fracture, and black on the inside. There are visible traces of smearing with straw or grass on the outside and inside. The firing is good and the sherd is quite hard. Weight 9 g. Preserved wall thickness: 6 mm.

Flint artefacts:

1. One flint flake (registered find no. 43/16). Striped flint. Dimensions: length – 12 mm, width – 12 mm, thickness – 2 mm.

2. One flint flake (registered find no. 40/16; Fig. 21: 1). Chocolate flint. Dimensions: length – 25 mm, width – 35 mm, thickness – 6 mm.

3. One flake with one of its sides partially broken off (registered find no. 44/16). The item is heavily burnt (most likely striped flint). Dimensions: length – 6 mm, width – 16 mm, thickness – 1.5 mm.

4. One small flake, struck from a flint axe or a chisel, with traces of polishing preserved on the upper side (registered find no. 45/16). Striped flint, showing signs of cracking and colour changes due to heating. The edges of the artefacts are fragile and breakable. Dimensions: length – 5 mm, width – 11 mm, thickness – 1 mm.

5. Fragment of a flint axe blade with one of the side edges partially preserved (registered find no. 41/16; Fig. 21: 3). It comes from an axe with a trapezoidal shape and a tetrahedral cross-section. Striped flint, showing signs of cracking and colour changes due to heating. Dimensions: length – 46 mm, width – 37 mm, thickness – 9 mm.

6. Fragment of the central part of the axe with a preserved frontal and side surfaces, showing traces of polishing (registered find no. 42/16; Fig. 21: 2). Striped flint, showing signs of thermal changes (cracks

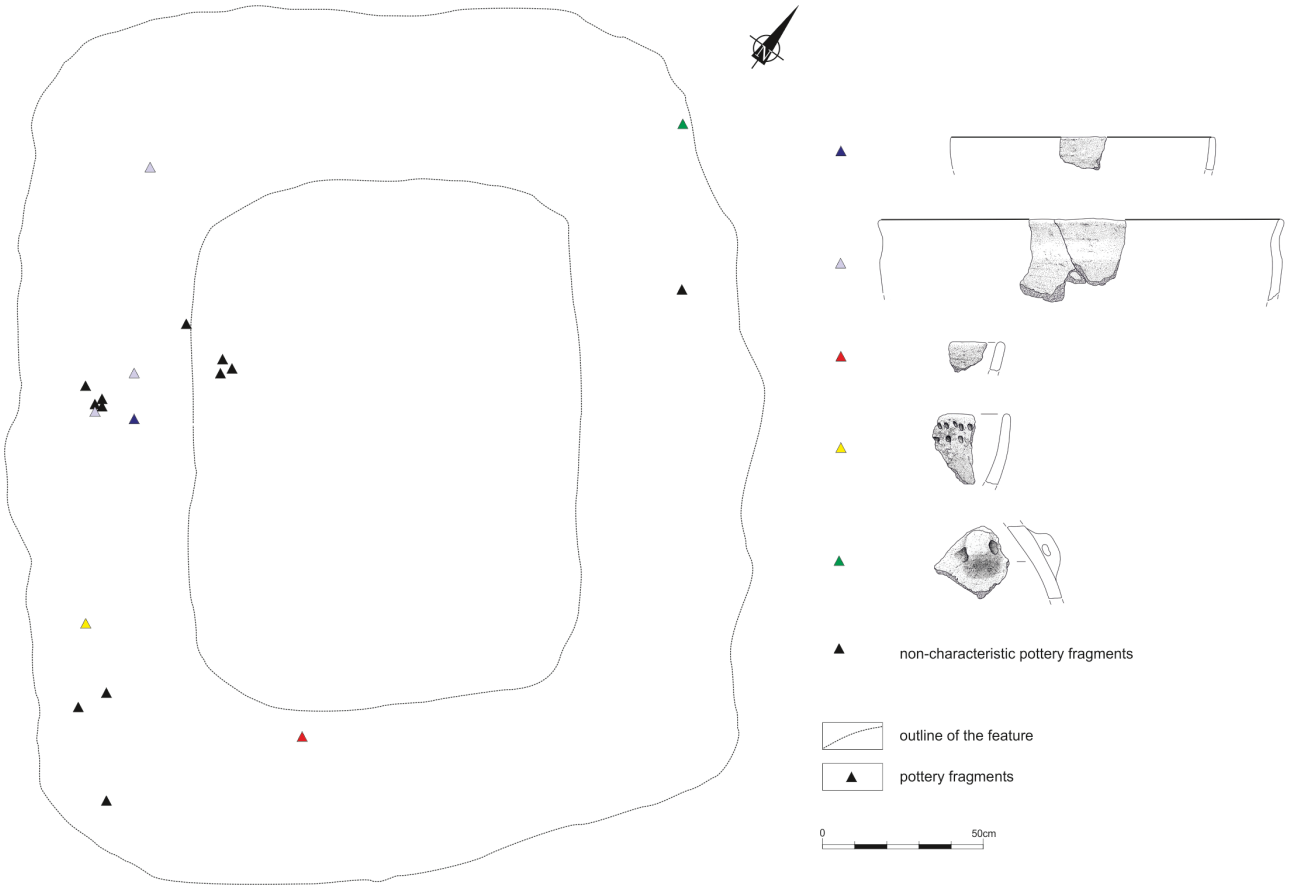

Fig. 22. Sadowie, Opatów district, site 23. Grave no. 10. Planigraphy of pottery with the location of characteristic GAC pottery sherds (drawn by the author and A. Bardec´kij).

and colour changes). The side edges of the item are easily chipped. Dimensions: length – 55 mm, width – 33 mm, thickness – 12 mm.

The pottery sherds found within the grave fill can be classified into at least ten forms. Among them we are able to distinguish a fragment of a small amphora (Fig. 20: 5) and a vase with a bend under the rim without any ornament (Fig. 20: 2). One of the edge fragments of a rather large vessel has a decoration in the form of multiple stamp impressions (Fig. 20: 4). In the case of other uncovered sherds, the technological criteria of the ceramics determine their inclusion in the GAC category, i.e. the type of admixture (mainly crushed rock), fracture (usually single-colour), surface treatment and firing, which have good analogies among other ceramic assemblages from this site. The majority of the discovered pottery sherds are highly fragmented and have traces of burning and being covered with a layer of burnt loess mixed with charcoal dust. As for the distribution of the sherds, they were unevenly scattered within the grave, concentrating mainly in the western part of the grave, directly at the W corner and SW side of the ditch, at a depth of 0 to 10 cm (Fig. 22:). Some of them were located in the SW part of the ditch where bones and flints were grouped. Three pottery sherds were also found outside the ditch, on its E side, in the ceiling of the burnt subsoil at the depth of 20 cm. Near the burnt wooden pole, in the N corner, two more fragments of vessels were found, including a part of the vessel body with a preserved handle.

Six flint artefacts were also discovered within the grave. Among them, there were 2 fragments of a broken, polished axe (or axes; Fig. 21: 2, 3) made of striped flint and 3 flint flakes. Additionally, there was one small flake with traces of polishing, which could also be a fragment of a flint chisel or another small axe. Unlike pottery, flint artefacts were concentrated in the NW side of the ditch, inside the stone slabs (Fig. 23). A single artefact – a flake with traces of polishing – was located in the SW side of the ditch. Near the N corner of the grave, the two fragments of a burnt axe were also found.

Moreover, in the grave fill, 14 very small bone fragments were also discovered, only a few cm in size, showing signs of severe burning (colour ranging from

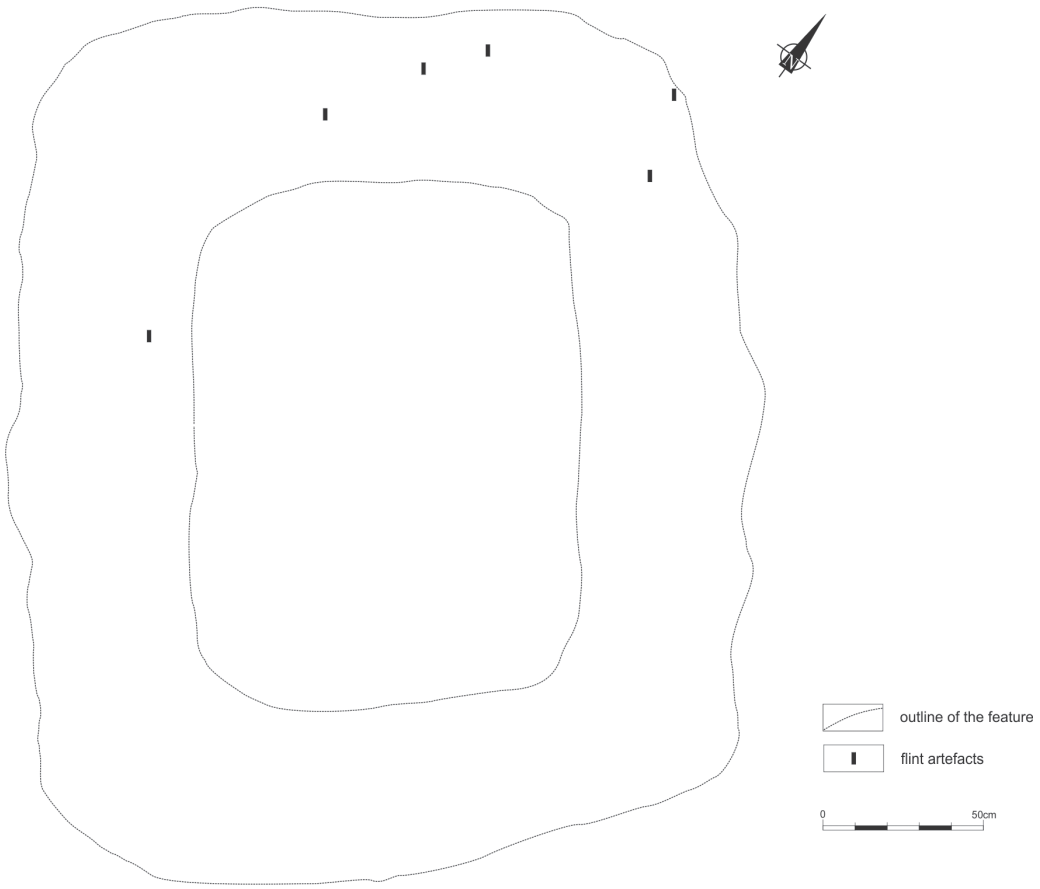

Fig. 23. Sadowie, Opatów district, site 23. Grave no. 10. Planigraphy of GAC flint artefacts (drawn by the author).

white to cream). The vast majority of them were located in the north-western part of the ditch, where pottery sherds and flints were clustered (Fig. 24). Some of them were also found near the south-eastern side and the western corner of the grave at the depth of 5–15 cm. At the bottom, more or less in the middle of the side, there was also a burnt phalanx, which undoubtedly came from a human hand. The anthropological expertise was performed by Dr Joanna Rogóż from the Institute of Archaeology of the University of Rzeszów.

Interpretation of the discovered "grave" no. 10 and an attempt to reconstruct the burial rites

Based on observations made during fieldwork as well as subsequent analyses of documentation and movable artefacts, an attempt can be made to reconstruct the original function of the grave and the subsequent burial rites. It should be assumed that the discussed feature had two stages of use related to its construction.

The first stage included the construction of a rectangular ground structure, marked by a 2.1 × 2.37 m groove sunk into the original level by at least 30–40 cm. On the inside, wooden riven planks were placed vertically (Fig. 8, 14, 15). They had similar features in sizes, i.e. up to 4 cm thick and approximately 20 cm long each. Thus, they created in this way the proper burial chamber with a rectangular outline, a size of 1.2–1.3 × 1.7 m and an area of approximately 2.21 m^2. It is very likely that the strengthening in the form of planks were placed at the bottom, preventing the walls from coming apart. They could have played the role of a wooden "floor" on which the body of the deceased individual(s) along with the grave goods were placed (Fig. 25: A). The wooden walls on the outer sides (the chamber) were enclosed and wedged with vertically placed slabs and sandstone lumps (Fig. 10, 11). The stones were laid loosely, only in one place there was a clear trace of using clay for strengthening. As mentioned, the material used to build the stone kerb was characterized by a high degree of standardization, i.e. in most cases it consisted of blocks knapped to provide a similar size and placed in a groove so that their

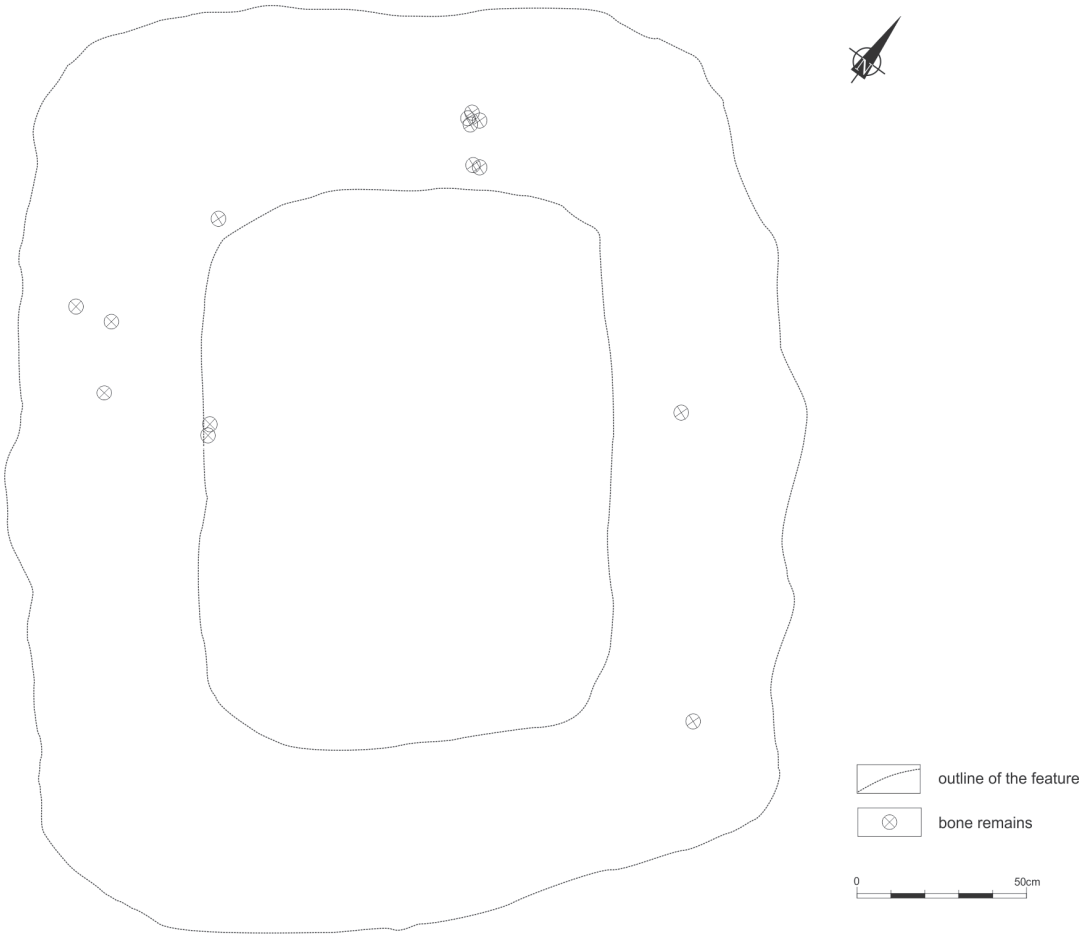

Fig. 24. Sadowie, Opatów district, site 23. Grave no. 10. Planigraphy of fragments of burnt human bones (drawn by the author).

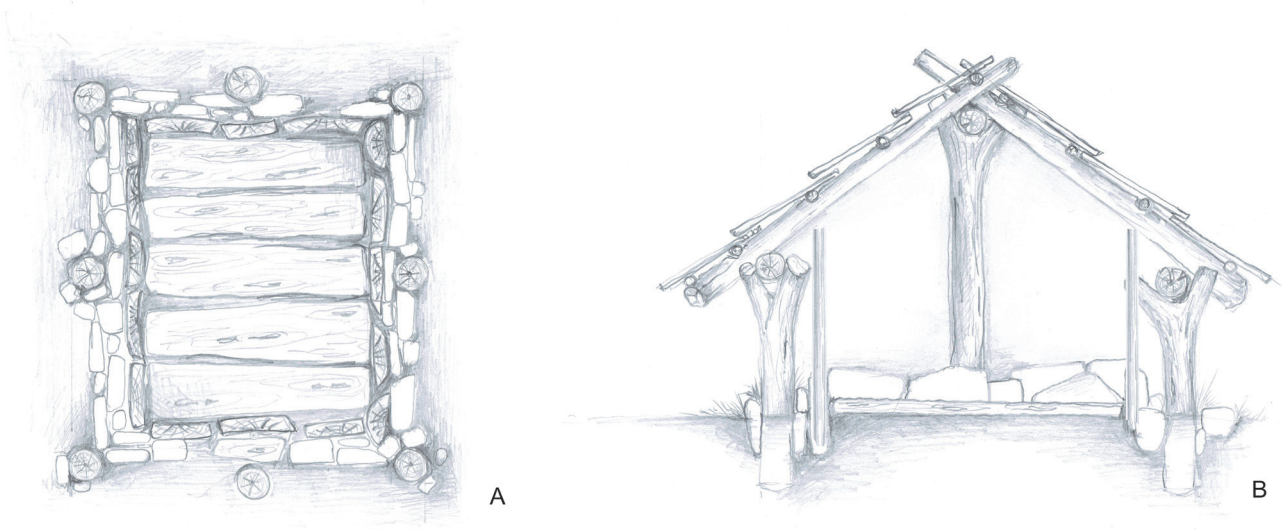

Fig. 25. A reconstructed plan view (A) and cross-section (B) of the "house for the dead", according to Dr M. Gransicki.

upper surface was even and had the same height. On the outside of the groove there were traces of strengthening the structure in the form of wooden posts. They were uncovered directly next to the walls, in all four corners (Fig. 13). The other ones were located on both sides of the structure, approximately halfway along each side. The sizes of the preserved traces indicate that the posts could have had diameters of up to 20 cm. Their arrangement was consistent with the outline of the grave chamber and indicated that they were functionally related to the central chamber. In several places (on the SE and SW sides), within the surrounding groove, there were traces of posts which did not show any signs of burning. Their diameters ranged from 15 to 20 cm, and their depth was about 20 cm. One may presume that they were the remains of ad hoc repairs or the preservation of the construction.

During the period of use, the wooden structure must have been relatively airtight (e.g. to prevent wild animals from getting inside). Unfortunately, now we are unable to determine the location of the entrance to the burial chamber. However, it is worth emphasizing that the bottom layer of the preserved planks was almost continuous on all four sides of the structure. Therefore, this suggests that perhaps one of the planks was removed for opening. Based on the discovered gap in the stone kerb, it can be assumed that the entrance was on the narrower SE side. In this area, a charred post set vertically with a sharp end at the bottom was found, which could have been used to cover the entrance to the chamber (Fig. 16). We cannot determine the actual height of the structure. Taking into account that the dead had to be carried inside easily, its height must have reached at least 1.5–1.7 m. It is worth considering the average height of people from the Late Neolithic, which amounted from 1.63 m to 1.71 m in men and from 1.46 m to 1.62 m in case of women (e.g. Miszkiewicz 1977; Szczepanek 2013, 84–87, tab. 8). Analysing the available data, we cannot say anything certain about the roofing of the structure. The presence of charred posts in the corners of the structure and traces of poles placed halfway along the shorter sides may indicate the use of a gable roof based on a Y-shaped posts and a ridge pole construction (Fig. 25: B). The evidence that seems to confirm this is the need to protect the building against rainfall by quickly draining rainwater. At the same time, we cannot exclude the possibility of a flat covering of the structure, where the roof was an extension of the walls and closed from above. It is probable that the posts could also have formed the base of the scaffold-frame, which was used as a support for the planks forming the sides of the chamber. This suggestion is confirmed by the fact that the building stood freely and may have required bolting of the walls, especially at the corners, where the planks met.

To sum up, it should be assumed that we are dealing with an above-ground construction in which wooden and stone elements created a closed space in the form of a "house for the dead" (other terms found in the literature: pre-funeral house, charnel house, decarnation house; Kjærum 1967; Larsson 2003; Hecht 2007, 126–129; Sjögren 2014, 1015–1016). This structure would only provide temporary protection of the body against further activities related to cremation and various ceremonies preceding it, most likely extended in time. It was probably about protecting the bodies during the decomposition of soft tissues (so-called decarnation; more broadly about taphonomic processes – e.g. Haglund and Sorg 1997). Then, the construction was burned down. Probably it took place during the culmination of the burial ceremony, which was the finale of multiple sacrificial acts. Were the dead cremated then?

The answer to this question seems clear based on the data obtained. It should be noted that the material used to build the house consisted of several planks and at least 8 posts-logs and were structurally incapable of effective cremation. In total, its area amounted approximately 0.75 m^3. In order to cremate the bones, it was necessary to use proper secondary cremation and build a proper funeral pyre.

Regarding the correct interpretation of the further function of grave no. 10, the results of experimental cremations of human remains on pyres may be important (Strzałko and Piontek 1974; McKinley 1993; 1997; Marshall 1998; Fülöp 2018). Moreover, valuable data for reconstruction also result from anthropological, historical, and ethnographic sources (Hiatt 1969; Becker *et al.* 2005; Oestigaard 2005; Davies and Mates (eds.) 2006; Strong 2007; Ulguim 2015). Based on the available scientific advice, funeral pyres have common features, regardless of the chronological period in which they were created (McKinley 1997, 132). They require a sufficient amount of fuel (appropriately chipped and good quality wood), proper arrangement to allow free circulation of oxygen for burning and to ensure the appropriate temperature to complete the cremation. As a rule, pyres have a cuboid or trapezoid form made of wooden logs arranged alternately in layers (Fig. 26; e.g. Piontek 2002, 97, fig. 1; Oestigaard 2005, 14, fig. 1.5, 1.6; Fülöp 2018, 288, fig. 1). Empty spaces are usually filled with smaller branches or brushwood. What is more, reed or straw is

Fig. 26. Examples of cremation pyres.
A – a Hindu funeral pyre used currently in India (Oestigaard 2004, 28, fig. 1);
B – a pyre taken from experimental research (Piontek 2002, 97, fig. 1).

used as an additional burning material, which speeds up the burning process and increases heat emission. Most of the pyres were built on the ground with small additional elements such as supports and posts in the corners (Marshall 2011, 10, fig. 5). Their goal was also to provide stable support for the bodies placed on the pyre and the collected grave goods. In some cases, there are wooden logs placed at the bottom, creating a kind of horizontal wooden structure that strengthens the walls of the pyre (Ulguim 2015, 200, fig. 8.15). This allows the cremation to be completed effectively, as the pyre often collapses after some time due to uneven burning (McKinley 1997, 135, fig. 4).

Speaking of the course of cremation, it is worth mentioning that temperature fluctuations may occur between individual cremations, depending on the type of wood used, its quantity and the intensity of adding wood to the fire. Moreover, the time and effectiveness of cremation are also influenced by several environmental variables, such as the availability of oxygen, wind strength and appropriate weather (heavy rain, for example, may extinguish such a pyre or cause it to burn unevenly and collapse). In addition, the nature of the burning process is also determined by the arrangement of corpses at the top of the pyre, i.e. in places where the highest temperature is reached and oxygen is supplied. It is assumed that the burning time of the pyre, depending on the size and wood used, could last from 3 to 10 hours (McKinley 1997, 134; Piontek 2002, 97). Data collected from various experiments indicate that the minimum temperature needed to burn soft tissues and human or animal bones is at least 700°C. In the case of some metal objects uncovered in urn graves, it was calculated that the temperature of the pyre reached up to 800°C–1000°C (Piontek 2002, 100; Oestigaard 2013, 504). In modern crematoriums fired with natural gas, the temperature during cremation reaches a value between 1000°C and 1300°C (Oestigaard 2013, 502).

Most researchers report that even after intense cremation, there are few traces left on the ground that are legible in the archaeological record. The pyres collapse downwards, with a small extension beyond the original boundaries, and the cohesive layer of daub usually remains relatively weak on the ground surface (easily destroyed by weathering or trampling; Fig. 27, 28; Fülöp 2018, 289, fig. 2, 3). Wood ash, which is the evidence of an intense activity in cremation, is not preserved because it is easily washed away by water and easily blown away by the wind. Experimental studies carried out by Piontek and McKinely show that after the pyre cooled, collecting small fragments of bones, such as the phalanges and teeth, did not pose any difficulties (Piontek 2002, 97; McKinley 1997, 134). They were clearly visible among the remains of the pyre and easy to collect by hand. This activity took up to several working hours.

As noted earlier, it is unlikely that human remains and furnishings would have been cremated in the course of fire of the house for the dead. The next stage of the use of grave no. 10 concerned funeral rites, during which a cremation pyre was built. It is assumed that the time interval in which this happened was probably not very long.

The cremation pyre was built on a levelled and previously cleaned surface. From the outside, its range was limited by clusters of stone blocks placed in a surrounding frame-groove. It is very likely that wooden posts were added at the corners, creating a platform on which the deceased(s) and grave goods were placed. The preserved traces indicate that the entire structure

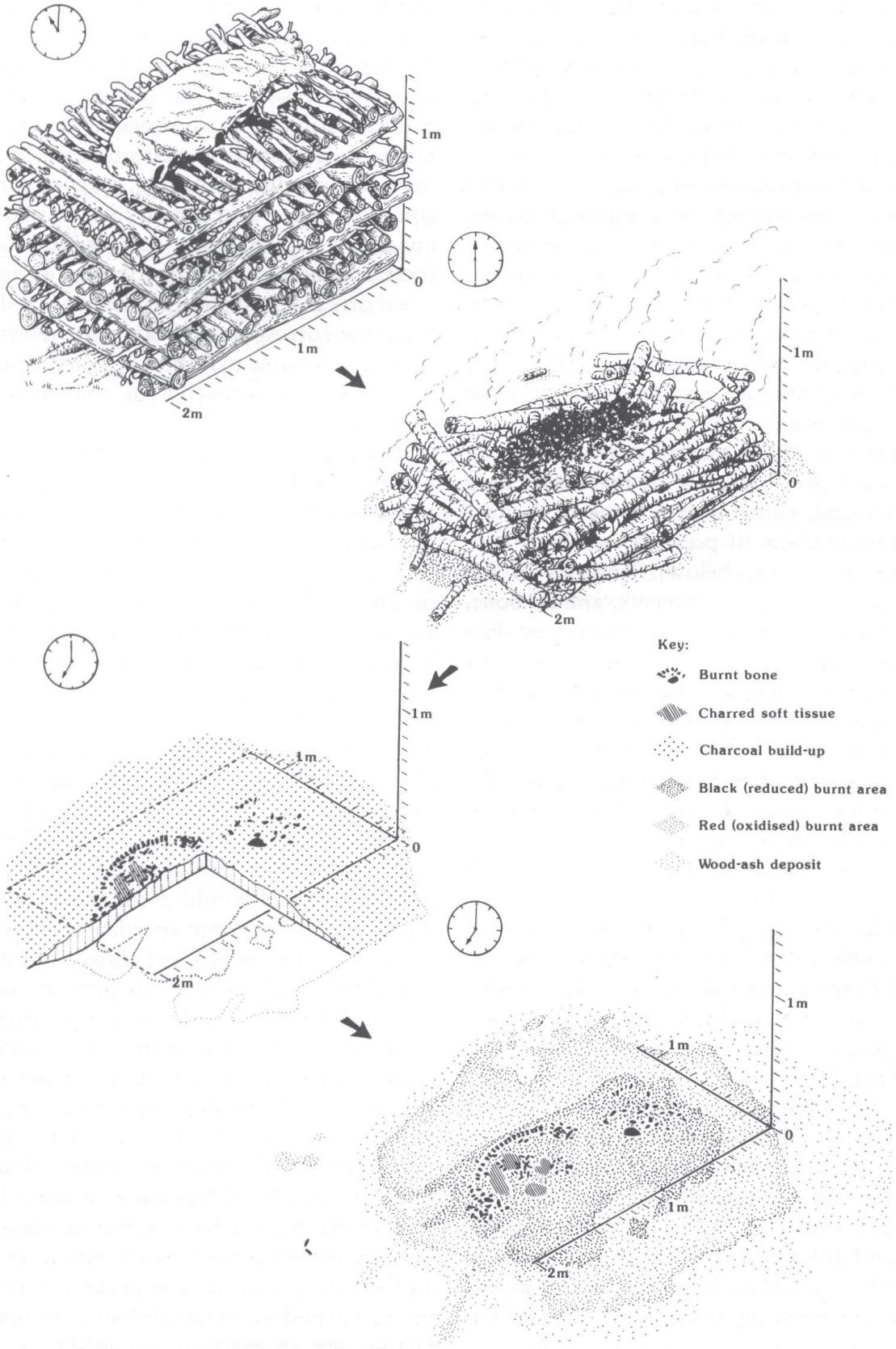

Fig. 27. Schematic illustration showing cremation pyre and different stages of collapse (according to McKinley 1997, 135, fig. 4).

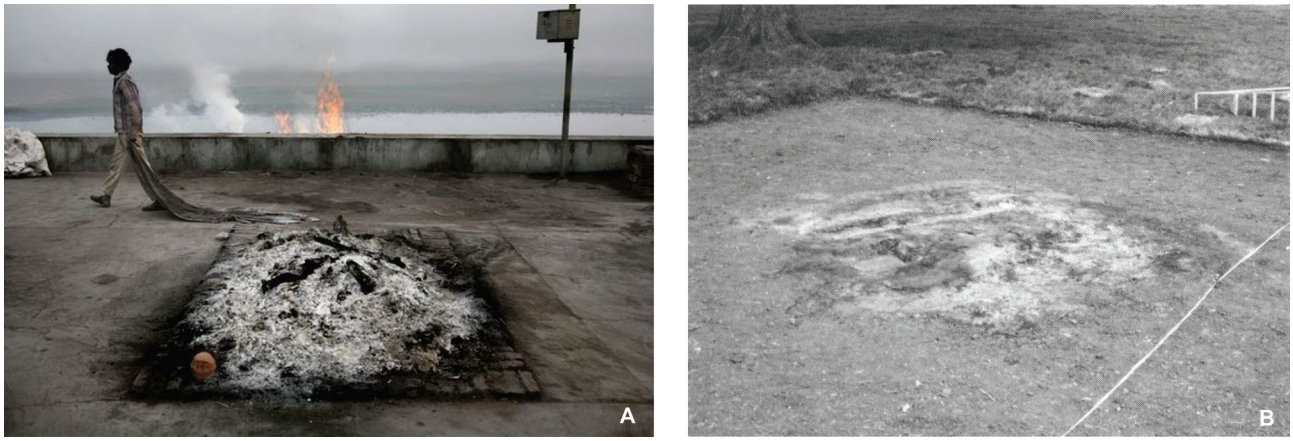

Fig. 28. Cremation sites with preserved remains of the funeral pyre. There are: ashes of burnt wood and bones from the immediate surroundings of the cremation visible after burning.

A – India; B – McKinley experimental research, visible traces of burning in the immediate vicinity after the body was burnt and the remains of the cremation pyre, clay base (McKinley 1997, 134, fig. 3).

burnt down at a very high temperature, which resulted in charring of the preserved and existing, perhaps previously unburnt, posts from the "house for the dead". A significant amount of thermal energy generated in the fire was transferred from areas of higher temperature to areas of lower temperature, and therefore in this case the direction of burning was from the top of the pyre downwards (compare Kokot 2021, 41, fig. 2). The fire resulted in charring of some wooden posts buried in the ground (i.e. coming from the structure of the house for the dead from the first stage of use of the object). Their structure and weak cohesion indicate overheating and burning without access to air (a process similar to that occurring in charcoal piles used in forests in the 20th century; e.g. Marszałek and Kusiak 2013). It is worth noting that most of the posts preserved the bark almost intact, only slightly charred. In this case, the bark was responsible for receiving heat during the fire through a strand of fibres and, after extinction, for its transfer to the surrounding stones and soil. As a result of the burning temperature of the wooden structure, the stones from the surrounding base also overheated. They became looser and their colour changed from red to yellowish. The presence of stones around the pyre resulted in a more effective retention of thermal energy generated during burning, and after the pyre had cooled down, it was released and transferred towards the interior of the original burial chamber. This resulted in the faster cremation by increasing the temperature. Similar solutions in the process of burning human corpses were used, among others, in the so-called *ustrina* (the pyre sites – repeatedly used cremation places), known from the Roman Period (e.g. Witteyer 1993; Józefów 2008).

During the burning of the wood, the immediate surroundings of the wooden structure were burnt, i.e. the upper layer of the subsoil and the covering levels within the surrounding groove. The presence of daub near the posts and stone blocks also confirms the effect of high temperature.

In the literature on the subject, it is possible to find information about cremation as well as experiments with heat transfer through various types of sediments (including sandy, gravel, clay layers; Canti and Linford 2000; Aldeias *et al.* 2016). It is established that during a fire lasting 6 hours in silty (i.e. loess) soil, the temperature reaches 950°C and decreases with its depth. At 6 cm it will be 350°C, while at 10 cm it will reach 288°C (Aldeias *et al.* 2016, 75, tab. 2). Due to the action of fire, much of the heat can be transferred to subsurface areas and to buried items, including bone, wood and stone (Aldeias *et al.* 2016, 76–77, fig. 9)

The results of field experiments clearly show that temperature also influences the colour change of sediments lying near the heat source. In the case of the subsurface layers, there is a gradual change in colour from red to yellow (Aldeias *et al.* 2016, 73, fig. 7).

At the same time, it was noticed that sediments located outside the direct heat source (i.e. sideways or at the edge of the fire) did not show thermal changes (so-called lateral diffusion). The effects of high temperatures in the experimentally burnt pyres can be compared with those visible in grave no. 10. The bottom of the grave pit (under the backfill layer) was heavily burnt, as indicated by its red-brown colour and compact consistency (Fig. 13). The burnt layer was not uniform, reaching approximately 5–8 cm. It is worth noting that burning marks were not notice-

able under the surrounding outline of the groove or outside the construction.

There is no doubt that the body of the deceased (or, more likely bodies) and the grave goods were cremated during the rituals. Ash and fine charcoal have not been preserved to modern times because they are "volatile" particles. After the pyre burnt out and the hot lumps of charcoal and wood cooled, the fire was cleaned up and the bone fragments were selected. Due to the secondary displacement of the interior contents, unfortunately, nothing certain can be said about the position of the deceased's body, its orientation and the arrangement of grave goods during cremation. We are unable to determine whether the human remains were originally placed there (bones arranged anatomically) or whether the remains were cremated after being stored for skeletonization in the house for the dead and were subjected to partial cremation there (the so-called principle of secondary burial rituals; Larsson 2003, 161–164). The poor state of preservation of the bones made it impossible to determine the number of buried individuals. We do not know what happened to the burnt bones collected after the pyre cooled down and where the cremated remains were buried. During the research, single bones were observed scattered on the top part, which were overlooked while cleaning up the burning site. Research on cremation rites in prehistory shows that cremation ashes are most often placed in an urn and transferred to another place or can be used in various funeral practices. It is worth noting here that as for one of the graves (no. 18 D) in the cemetery, a small, shallow pit was found in which there were small burnt bones. Due to defragmentation, it is impossible to say clearly whether they belonged to people or animals in this case? The pottery fragments discovered during fieldwork were mostly concentrated in the western part of the feature, which may indicate that pottery vessels were probably originally located there. It is worth noting here that a similar location, i.e. the "western" location of grave goods, can be observed in most other burials containing human remains discovered in the cemetery in Sadowie. The number of pottery vessels can be estimated as at least 8–10 pieces, mostly of medium size. Some of the pottery sherds showed traces of secondary burning, while others were covered with a layer of burnt loess mixed with charcoal dust, which indicates exposure to high temperatures *in situ* (i.e. in the fire of the cremation pyre). Unfortunately, we cannot determine whether the entire vessels were assembled or only their fragments. Certainly some of the vessels were taken from the cremation site during the cleaning of the remains of the burning site. However, some of the pottery sherds and flints do not show any traces of secondary burning (i.e. mass find nos. 529/16 i 532/16). This also applies to, among others: two flakes made of both striped flint (registered find no. 43/16; Fig. 21: 1) and chocolate flint. It can be assumed that they did not constitute the last act of sacrifice, but they came from the immediate vicinity of the grave when it was being filled. After the ritual ceremonies were carried out, the primary burial pit and the groove were covered with soil from the surroundings, approximately to the level of the stone slabs. It is very likely that a small earth mound was built over the burning site. Perhaps it could have had an additional surrounding stone structure or was topped with, for example, a stela. In the course of excavations, no traces of embankment layers were visible on the surface of the site. As a result of progressive levelling of the land and long-term agricultural cultivation, they could have been completely destroyed.

It is worth adding that an element of the rituals was the burial (sacrificial?) of cattle placed in the neighbouring grave no. 9, located approximately 0.4 m to the NW. At the bottom of the pit there were several incomplete animal skeletons, mainly limb bones and carcasses in the form of spines and ribs, lying in a layer almost 20 cm thick. Their arrangement suggests that they were placed one on top of the other. Nearby, three pottery vessels of the GAC were found – two vases and a two-handled amphora. The interior of the grave was exposed to intense fire. In the southern part of the grave there was a layer of coarse rubble and numerous charcoal, tree bark and fragments of charred logs. They could probably be related to the activities of cleaning up the burning site from the aforementioned neighbouring "grave" no. 10. The wood must have been poured into the pit, partially burning, and it probably burned for a long time, because a change in the colour of the surrounding soil to red was observed, reaching approximately 10 cm.

In the roof of the fill of grave no. 9, a trace of a secondary cut was found, which disturbed the structure of the grave. During these activities, "deposits" were made in the form of the skulls of subsequent cattle, located at various depths in the grave pit.

Cultural and chronological affiliation of grave no. 10

Grave no. 10 was constructed by the GAC people who used the necropolis at site no. 23 in Sadowie. This is evidenced by the artefacts, i.e. the characteris-

tics of pottery vessels, their decorations and the place where they were uncovered inside the construction. Moreover, the localization of it within the cemetery, i.e. within the eastern zone, near grave no. 9, determines its affiliation to the discussed taxonomic unit. The pottery vessels found in the inventory are analogous to other assemblages in the aforementioned necropolis. As for the vase (Fig. 20: 2), it is possible to find similarities in grave no. 1 and no. 20 (Pasterkiewicz 2021, 130, fig. 4: 1; unpublished research results). Slightly similar to the form found among the pottery vessels in the mass grave no. 523 in Koszyce, Proszowice district, site 3 (Przybyła *et al.* 2013, 35, pl. 4: 7). Considering the grave no. 10, it is worth mentioning the original number of vessels deposited in the grave – i.e. at least 8–10 items or their fragments, which have no analogy with other graves in this necropolis. The remaining artefacts from grave 10, such as flint artefacts are also typical for GAC items. It regards the core products in the form of polished axes (Nosek 1967, 323–325; Wiślański 1966, 37–39; Szmyt 1996, 49–51). What is more, flint chisels also often appear in graves.

Speaking of grave no. 10, one radiocarbon date was obtained from a charcoal sample taken from the post discovered in the N corner: 4130±50 BP (MKL-4329). After the calibration at the level of (1σ) –68.3% BC, it amounts to 2866–2624 BC (Bronk Ramsey 2021) and with the probability of (2σ) –95.4% we receive the range: 2879–2574 BC (Fig. 29). The results are similar to the data for other graves from the cemetery in Sadowie and indicate the first half of the third millennium BC (Pasterkiewicz 2020, 68, tab. 1). In that way they connect the discussed object to the late stage of GAC development in the Sandomierz–Opatów region (Witkowska 2021, 34–36, fig. 18; Florek and Witkowska 2021, 181–183, tab. 1, fig. 15). Similar series of ^{14}C results were identified in graves no. 3, 6, 27 and 31 from Złota, site "Gajowizna" (Witkowska *et al*. 2020, 275, fig. 10, tab. 2) and no. 31 and 32 from Malice, Sandomierz district, site 1 (Witkowska *et al.* 2021, tab. 2). Analogous dating comes from the features at the settlements in Mierzanowice, Opatów district, sites 1 and 4 (Florek and Witkowska 2021, tab. 1) and in Złota, at the "Nad Wawrem" site (Florek and Witkowska 2021, tab. 1).

Examples of the use of fire in connection with burial practices (including variously interpreted traces of bone burns and incomplete cremation) are known from the area covered by the GAC settlement (Tab. 1; Fig. 30). In the case of the central group, they are particularly numerous in the cemetery in Złota, "Gajowizna" site, Sandomierz district (Krzak 1977, 62–64). According to anthropological analysis, the skeleton from grave 1 (no. XVIII) identified as a male aged *maturus*, had burnt leg bones (the talus, calcaneal and metatarsal), whereas the skeleton X (female) had the right side of the postcranial skeleton (Miszkiewicz 1977, 135–137). Moreover, the skeleton of a child (no. IX) from grave no. 28 showed traces of high temperature. In features no. 1, 13, 28 and 30 at the same site, there were elements of the wooden structures of the burial chamber burned as part of pre-funeral ceremonies (Krzak 1977, 12–16, 31, 46–49). These included: layers of ash, charcoal, pieces of charred wood and thick layers of loess clay lying on the bottom. Treating the bodies of the dead by fire was recorded in Koszyce, site 3, Proszowice district in grave no. 523. Among the 15 individuals buried there, two of them (no. 12 and 14) were bearing traces of burns, mainly in the area of the skulls and fragments of the upper limbs (Szczepanek 2013, 72, 73). They were also found on one of the clavicles of the individual no. 12. Similar treatments are provided by funeral features from the Lublin Upland. These include, among others: grave II in Las Stocki, site 16, where the skeleton of a female with a burnt skull and the right side of the postcranial skeleton were found (Dzierżykray-Rogalski 1947, 246, 247, 249–251; Nosek 1967, 225). What is more, the damaged skull of another individual with traces of burning on the inside, used for cannibalistic practices, was also found in the grave.

However, more complete cremation of human remains is recorded at other sites of the central group, including the Kujawy region. Krusza Zamkowa, Inowrocław district, site 13, should be included here, where a grave with a cist structure and a corridor (feature 1) was found, inside which burnt and severely damaged, crushed human bones were deposited (Kośko 1989, 33–46). An earth mound was most likely built over the described construction. Cremation, probably of human remains, was also recorded inside a stone cist in Zbyszewo (Zagórki), Słupsk district, site 12, in Western Pomerania (Siuchniński 1969, 23).

Particularly many traces of fire and cremation come from the sepulchral sites of the western group of GAC, where a large range of variability can be observed. They include both single graves and larger necropolises with up to several graves (known from Pevestorf site 19 and from more recent studies in Potsdam, site Alter Markt – Meyer 1993; Beran *et al.* 2016). Mostly, these were cremation burials in urns (Havelberg, site 52 – Beier 1988, 92; Ködderitzsch, site An Walthers Weg – Müller 1976) or pits located in small, in-ground pits with a diameter of several dozen

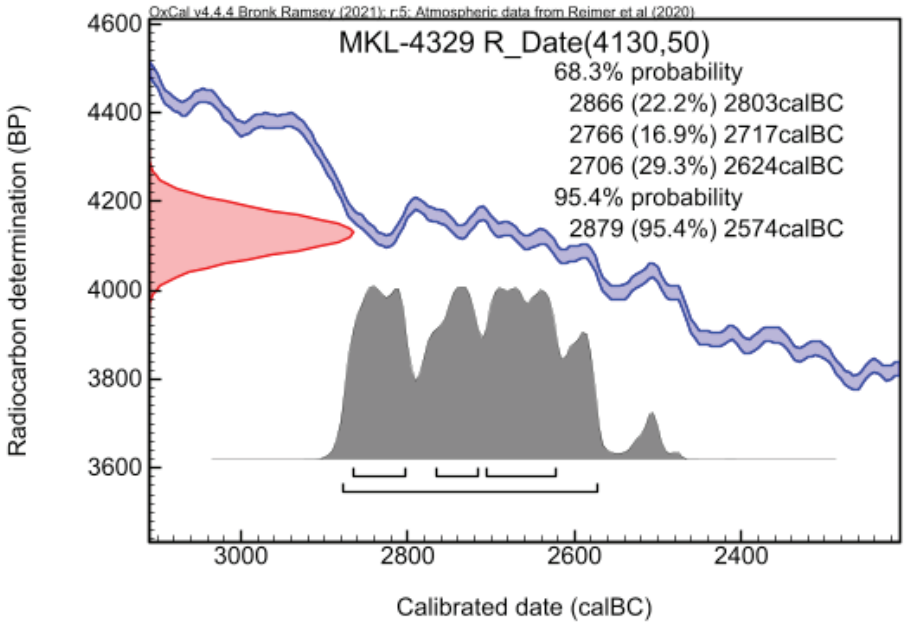

Fig. 29. Sadowie, site 23, Opatów district. A chart of calibration of radiocarbon date from grave no. 10. In calibration the software OxCal v 4.4.4. Bronk Ramsey (2021) was used.

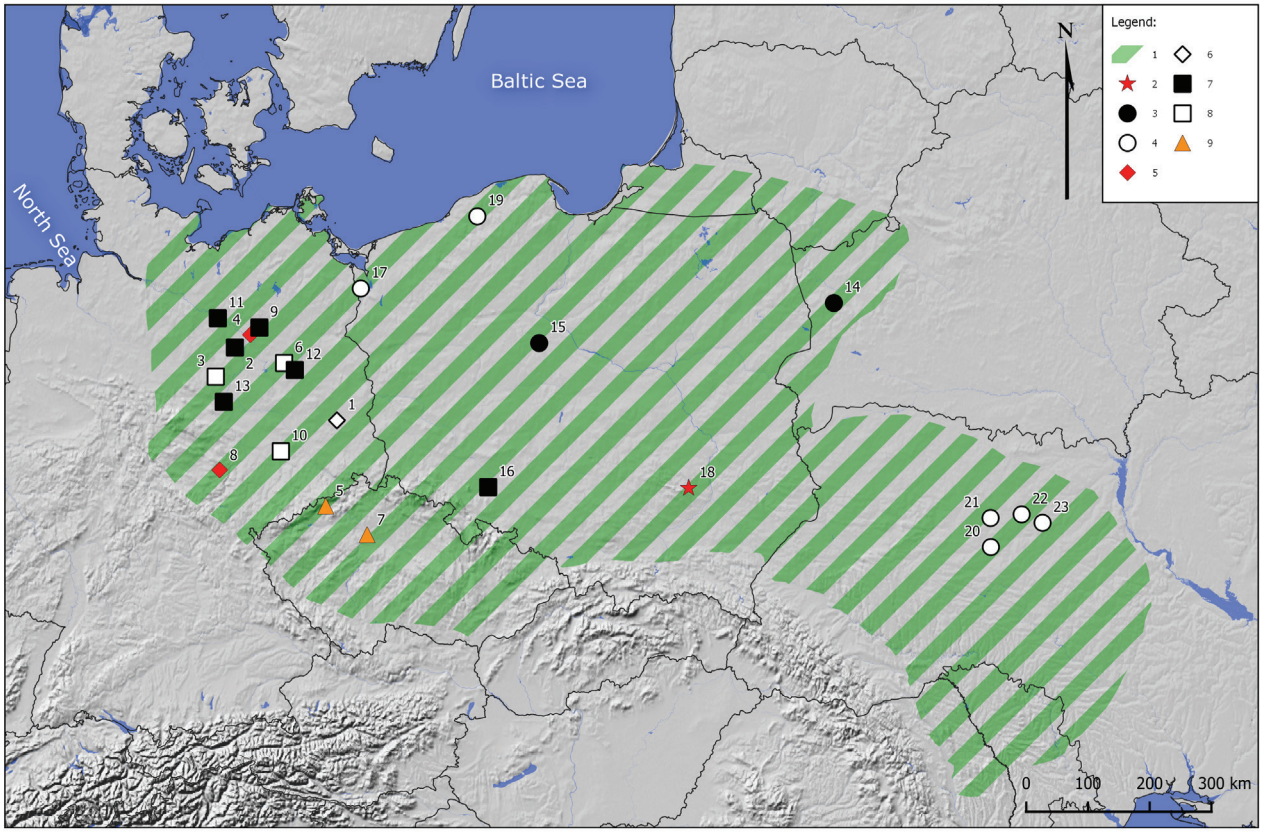

Fig. 30. Map of the GAC settlements in Europe along with the location of sites where traces of cremation were found. 1 – area of the GAC settlement; 2 – place of human cremation; 3 – cist grave with cremation burial; 4 – cist grave with cremation burial – presumed; 5 – cremation urn grave; 6 – cremation urn grave – presumed; 7 – cremation pit grave; 8 – cremation pit grave presumed; 9 – pit with burnt animal bones.

Table 1. List of GAC graves with traces of cremation

No. on the map	Town, number (local name of the site)	Type of grave	Characteristics	Comments	Literature
1	2	3	4	5	6
GAC western group					
1.	**Calau, site 2, Landkreis Oberspreewald–Lausitz**	cremation urn grave – presumed	During the research in 1928 of the Lusatian culture cemetery, a pottery vessel – a richly decorated amphora – was found. There were supposed to be "cremation remains" inside.	-	Kirsch 1975, 136–137
2.	**Groß Schwechten-Peulingen, site 1, Landkreis Stendal**	cremation pit grave	In the pit, next to the burnt bones, three pottery vessels were deposited.	-	Beier 1988, 94–95, pl. 5: 4; Woidich 2014, 134
3.	**Haldensleben I, site 21, Landkreises Börde**	cremation pit grave – presumed	There was "burnt earth" in a funnel-shaped pit with a bottom 1.0 m deep. In the fill of the feature, two pottery vessels were found, including a decorated amphora.	-	Beier 1988, 99, pl. 13: 5, 6
4.	**Havelberg, site 52, Landkreis Stendal**	cremation urn grave	In the pit (0.4 m deep), there was a pottery vessel – a four-handled amphora containing burnt bones of an adult, 20–50 years old.	-	Beier 1988, 92, pl. 7: 1
5.	**Hrdlovka, site open pit mine "Bílina", Okres Teplice**	pit with burnt animal bones	In the pit with dimensions of 2.68 × 1.1–1.6 m and a depth of 0.1–0.35 m, traces of a fire burning *in situ* – a cremation site – were most likely found. Stone paving was found at the bottom of the structure. The fill contained burnt and unburnt animal bones belonging to three pigs, including one piglet. Additionally, the equipment included 4 pottery vessels, 2 flint axes and a flint flake.	-	Dobeš 1997/1998, 138, 157, 158, fig. 8; 9: 2–3
6.	**Ketzin, Landkreis Havelland**	cremation pit grave – presumed	In 1883, a flat grave with "stone wedges" and a cremation was accidentally discovered. Inside there were three pottery vessels and their fragments, including: an undecorated amphora and an ornamented pot.	-	Grebe 1962, 16
7.	**Kostelec nad Labem, site Hof einer Zuckerfabrik, Okres Mělník**	pit with burnt animal bones – presumed	In 1908, a 1.5 m wide pit filled with "dark slag earth" was accidentally discovered. It included inside animal bones, 7 pottery vessels (3 amphorae, 3 bowls, 1 small vessel) and a bone chisel.	A feature explored by accidental explorers.	Dobeš 1997/1998, 142

1	2	3	4	5	6
8.	**Ködderitzsch, site An Walthers Weg, Landkreises Weimarer Land**	cremation urn grave	At a depth of 0.8 m from the ground surface there was a large amphora placed on a layer of cremation remains (remains of the pyre) – ashes and charcoal. Inside the vessel, cremated bones of an adult woman (aged 30–40), the remains of a child and single animal bones were found.	-	Müller 1976
9.	**Kyritz-Rehfeld, site 16, Landkreis Ostprignitz–Ruppin**	cremation pit grave	Grave no. 1 – a pit with a diameter of about 0.7 m and a depth of 0.5 m. At the bottom, there was a pottery vessel – an amphora, 2 flint axes and a flake located on fieldstones. The grave inclusions were strewn with remains of the cremation pyre and burnt bones.	-	Geisler and Teske 1971; Kirsch 1993, 230, 231, fig. 164: 972.1, 972.2
10.	**Nemt-Wurzen or Wurzen-Nemt, site "westlich des Läuseberges", Landkreises Leipzig**	cremation pit grave – presumed	In 1934/1935, probably a destroyed cremation grave was discovered, containing burnt bones, fragments of at least two pottery vessels and a flint axe.	-	Weber 1964, 120–122, fig. 30; Beier 1988, 144
11.	**Pevestorf site 19, Landkreis Lüchow–Dannenberg**	biritual cemetery, cremation pit graves	6 to 7 graves with traces of human cremation were researched. Additionally, three double biritual graves were recorded (marked as K 1, K 3, K 15).	-	Meyer 1993
12.	**Potsdam, site Alter Markt**	biritual cemetery, cremation pit graves	12 GAC graves were researched, of which at least 4 were cremation pit graves. The dimensions of individual graves were as follows: no. 4 – 1.0 × 0.77 m, depth 0.17 m; no. 5 – 1.08 × 1.08 m, depth 1.18cm; grave no. 7 – 1.92 × 1.92 m, depth 0.35 m; no. 9 – destroyed grave, depth 0.4 m. The inclusions of individual graves vary from single pottery vessels to several dozen fragments of pottery sherds and a few flint items.	-	Beran *et al.* 2016
13.	**Stemmern (Sülzetal), site 2, Landkreises Börde**	cremation pit grave	A pit grave with dimensions of 2.2 × 0.93 m and a depth of 0.8 m, with single stones in the fill. At the bottom, there was a layer of burnt material from the cremation of an adult. The grave inclusions included a pottery vessel, ornaments made of amber, animal teeth and shells, as well as flint blades and a flake.	-	Nowak 1963; Beier 1988, 102, pl. 16: 7–22

1	2	3	4	5	6
GAC central group					
14.	**Krasnasel`skì, Vaŭkavyskì raën** [Краснасельскі, Ваўкавыскі раён]	cremation pit grave	A pit grave (no. 2) measuring 4.3 × 2.0 m with a bottom originally covered with stone paving. The fill contained remains of burnt human bones and far from numerous grave inclusions – about 10 items of pottery sherds, a flint fragment and a stone plug from a drilled hole in an axe.	-	Černâŭski 1972; Černâvskij 1972; Charniauski 1996
15.	**Krusza Zamkowa, site 13, Inowrocław district**	cist grave with cremation burial	A cist grave with a rectangular shape, dimensions 3.0 × 1.5 m, with an entrance corridor on the shorter side. Inside, the construction is divided into two, almost square chambers. In the SW part, a cluster of small, burnt human bones was found. Outside the structure, there was a pottery cluster, with fragments belonging to at least 11 pottery vessels and 6 flint artefacts.	-	Kośko 1989, 33–46
16.	**Kurzątkowice, Oława district**	cremation pit graves – presumed (?)	Seven destroyed pits containing burnt human and animal bones were discovered. Dimensions of individual graves: no. 1 – 1.3 × 0.8 m and 0.4 m deep; no. 2 – 2.7 × 0.8 m and 0.2–0.3 m deep; no. 3 – 2.3 × 0.8 m and 0.2–0.3 m deep; no. 4 – 0.7 × 0.4 m; no. 5 – 1.1 × 0.8 m and 0.3 m; no. 6 – 1.5 × 0.8 m and 0.15–0.3 m, grave; no. 8 – severely damaged. The pits contained, mainly single, small sherds of GAC vessels. Near grave no. 6, a cattle burial with a single fragment of a GAC vessel was found. A vase and a fragment of a bowl were discovered in grave 8.	The graves are heavily damaged and GAC materials may be found on secondary deposits of cremation graves from younger prehistoric periods.	Czerska 1963; Wojciechowski 1967, 12–17
17.	**Mierzyn, site 2c, Police district**	cist grave with cremation burial –presumed	A cist grave (no. III) made of stone slabs measuring 0.5 × 0.5 m covered with a stone cover. Inside, there was a cluster of burnt bones (undetermined) and sherds of at least 4 GAC pottery vessels.	The grave was excavated in 1936. There is no drawing records or detailed data on the structure of the object (e.g. the dimensions of the grave are underestimated).	Siuchniński 1969, 151
18.	**Sadowie, site 23, Opatów district**	place of human cremation	The remains of a cremation pyre built on the site of a "house for the dead" were discovered. The burn layer contained some burnt human bones and sherds coming from 8–10 items of pottery vessels and 6 flint artefacts, including 2–3 damaged axes (inventory).	–	in this paper

1	2	3	4	5	6
19.	**Zbyszewo (Zagórki), site 12, Słupsk district**	cist grave with cremation burial –presumed	A cist grave with a rectangular shape and dimensions 4.4 × 2.1 m. The S part was supposed to contain a cremation burial. The inclusions included sherds of at least 7 pottery vessels, including a beaker and a pot.	–	Wiślański 1966, 190; Nosek 1967, 49; Siuchciński 1969, 23
			GAC eastern group		
20.	**Kolodâžne, Romanìvs`kij rajon** [Колодяжне, Романівський район]	cist grave with cremation burial –presumed	A cremation burial was to be held in a cist grave (no. I) covered with a stone slab.	There is no information about the dimensions and construction of the grave and the artefacts inventory.	Levic'kij 1929, 203; 1930, 162
21.	**Kikova, Novograd-Volins`kij rajon** [Кикова, Новоград-Волинський район]	cist grave with cremation burial –presumed	A cist grave (no. 1), measuring 1.85 × 1.8 m, made of stone slabs, with a corridor on the long side, containing a significant amount of "human ashes" and ochre. Additionally, 9 pottery vessels and 3 flint axes or chisels were found inside.	A grave explored by accidental explorers.	Levic'kij 1929, 201-202
22.	**Skolobìv, Horošìvs`kij rajon** [Сколобів, Хорошівський район]	cist grave with cremation burial –presumed	An oval-shaped cist grave (dimensions 2.15 × 1.18 m) with a stone cover and a small corridor next to the narrower wall. There were supposed to be "human ashes" and ochre at the bottom. The grave inventory included 19 pottery vessels, flint artefacts (including 12 axes and chisels) and amber ornaments.	A grave explored by accidental explorers.	Levic'kij 1929, 199–200; Svešnikov 1983, 34, 35
23.	**Visoke, Žitomirs`kij rajon** [Високе, Житомирський район]	cist grave with cremation urn grave –presumed	A rectangular cist grave (dimensions 1.5 × 0.7 m) with an entrance corridor and a cover. The inventory included an amphora with a lid, 5 other pottery vessels, 3 axes and 2 flint chisels. Inside the amphora there were supposed to be "ashes from cremation".	A grave explored by accidental explorers.	Levic'kij 1929, 199; Svešnikov 1983, 35

centimetres (np. Kyritz-Rehfeld, site 16 – Kirsch 1993, 230–231; Stemmern (Sülzetal), site 2 – Nowak 1963; Beier 1988, 102).

With reference to remains of burnt animal remains in pits (burial?), they were discovered in the Czech Republic. In Hrdlovka (site open pit mine "Bílina" – Dobeš 1997/1998, 138) and Kostelec nad Labem (site Hof einer Zuckerfabrik – Dobeš 1997/1998, 142), large pits filled with ash, charcoal, pieces of pottery sherds and burnt bones, mostly belonging to pigs, were discovered. These features are manifestations of undetermined worship practices.

Evidence of traces of fire, including cremation, is also known from the areas east of the Vistula. A good example is grave no. 2 (partially destroyed) in the GAC cemetery in Krasnasel`skì, Vaŭkavyskì raën in Belarusian Polesie (Charniauski 1996). Fragments of burnt human remains were found at the bottom of a flat pit grave covered with stone pavement. Moreover, in the 1920s, several presumed traces of cremation were also recorded in cemeteries located in the Volhynia area. According to Levicki's description, there were "human ashes" or "ashes from cremation" inside stone cist structures discovered in Kolodâžne, Romanìvs`kij rajon; Kikova, Novograd-Volins`kij rajon; Skolobìv, Horošìvs`kij rajon; Visoke, Žitomirs`kij rajon (Levic′kij 1929; 1930). In two cases (Kikova and Skolobìv) they were accompanied by traces of "ochre" which were part of the funeral rites.

Finally, it should be emphasized that there were no cases of the remains of a structure that could be described as a "house for the dead" or a cremation pyre in the GAC milieu. Houses for the dead are known from various prehistoric contexts in Europe. Numerous examples of the use of such structures are known from the Middle Neolithic Period, especially from TRB from Jutland and Scandinavia (Sjögren 2014, 1016). In Fågelbacken, Västmanland and Mogetorp, Södermanland in Sweden (Hallgren 2008, 107–111), complex wooden and stone structures (with walls made of palisades) located near megalithic tombs were discovered. It is believed that these facilities were used to store corpses before being buried together in one grave as part of complex rituals. Some researchers assume that megalithic structures could have been used as a kind of charnel house (Kjærum 1967; Shanks and Tillley 1992; Graslund 1994). Examples of such places include e.g. the graves of the SOM culture from La Chaussee–Tirancourt (the areas of northern France), dating back to the 4th/3rd millennium BC (Masset 1972). Structures that allowed for repeated opening and protecting at the same time were discovered there, i.e. the structures created for long-term use and storage of bodies before common burial in a single grave.

During the Late Neolithic period, houses of worship and charnel houses (ossuaries) were developed within the cultures of Western Europe. Numerous examples come from sepulchral sites of the Walternienburg (Nordhausen, Landkreis Nordhausen – Feustel and Ullrich 1965) and Bernburg cultures (Schönstedt, Landkreis Unstrut-Hainich-Kreis – Feustel 1972; Apfelstädt Landkreis Gotha – Küßner 2016; Großeibstadt, Landkreis Rhön-Grab – Koch 2014). An analogous structure to the burial structure from Sadowie is known from the Havelian culture, more or less contemporary with GAC, from Buchow-Karpzow, site 8, Landkreis Wustermark, in Brandenburg area (Kirsch and Plate 1984). The construction had the form of a U-shaped ("horseshoe") foundation groove with an open side on the SE side, dug into a depth of 0.6 m and oriented along the WNW-ESE axis (Fig. 31). Its dimensions were larger than the object uncovered in Sadowie: 4.8 × 2.6 m (outer frame) and 1.2 × 3.6 m (inner part). As for the upper part, there were stone blocks forming a kind of pavement, concentrated in smaller or larger clusters. At the bottom of the groove, in several places, traces of charred posts and riven planks reinforced with stones were found. The structure inside included burnt bones, pottery sherds, flint and amber artefacts covered with a thick layer of charcoal, mud-daub and burnt earth. They revealed traces of secondary burning. Anthropological analysis indicated the presence of human remains of at least 25 individuals of different ages and sexes (the total weight of the discovered bones amounted approximately 40 kg; Wetzel 1984). Field observations indicate that the burial chamber, built at the highest point of the site, was covered with an earth mound after burning. Researchers of this grave believe that the structure described was a wooden burial house (*totenhütte*) where human corpses and grave inventories were placed. After a long period of use, it was burnt as part of a larger ritual ceremony. Furthermore, the researchers recorded a cult square next to the aforementioned structure, interpreted as a place where offerings were made to the dead. In the course of funeral rites associated with subsequent funerals, pottery vessels were broken, such as pottery drums that were scattered in the immediate area. Moreover, a child sacrifice was also part of the funeral acts, along with animal burials (mainly cattle), including double burials, representing approximately 11 graves. In the light of descriptions, attached figures and photographs, it does not seem that the discussed "death house" with human corpses inside burnt down during a single cremation

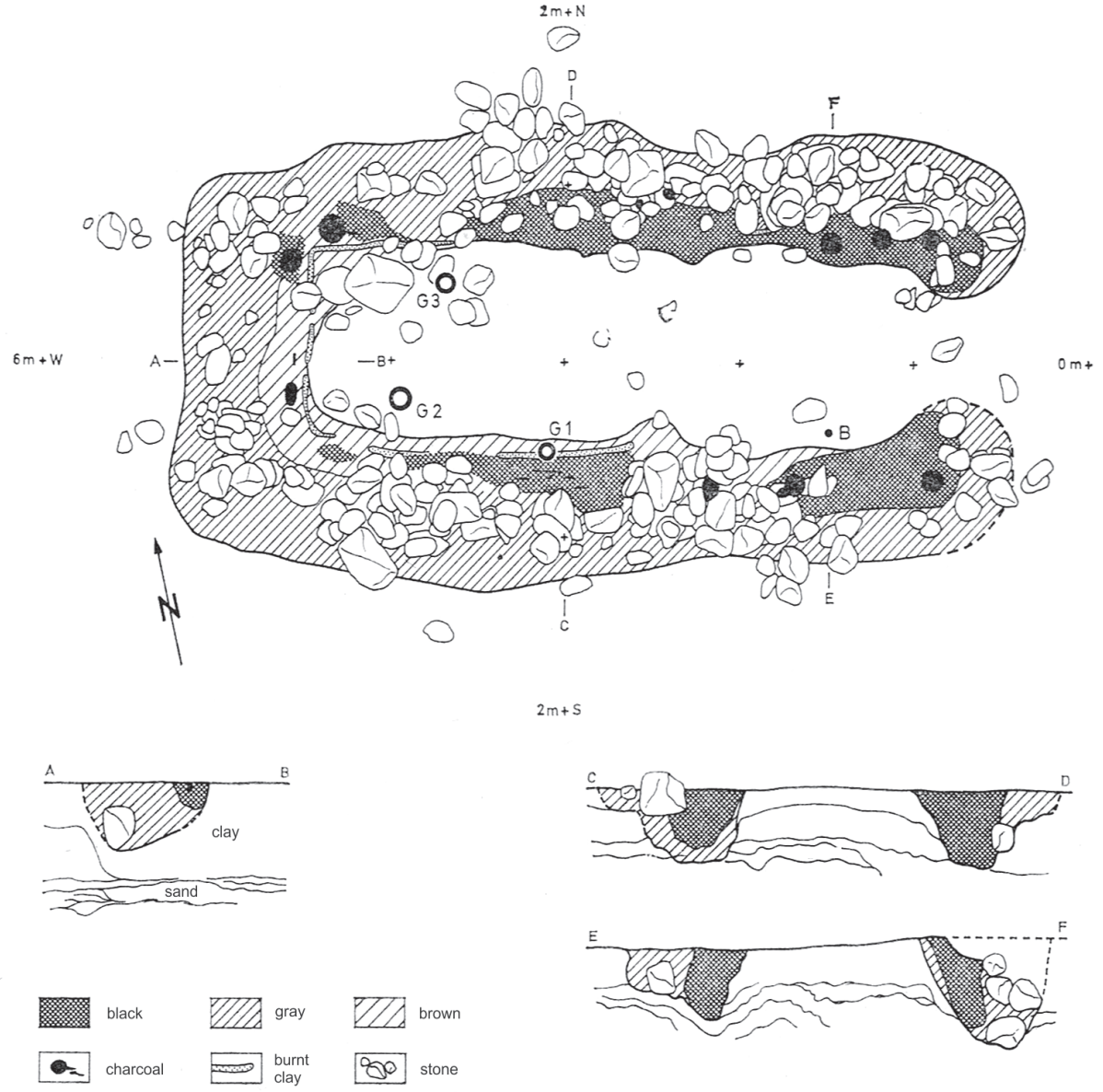

Fig. 31. A stone and wooden structure with a cremation site and a collective cremation burial of the Schönfeld culture, coming from Buchow-Karpzow, site 8, Landkreis Wustermark, in Brandenburg area (according to Kirsch and Plate 1984, 9, fig. 3).

act. Traces of burning (layers of ash, charcoal, pieces of charred wood, thick layers of burnt daub lying on the bottom) and their quantity indicated that the fire lasted for a long time and the fire was perhaps renewed many times. Additionally, it is impossible to ignore the fact that burning 20 to 30 corpses requires a lot of fuel, more than the structural volume of a wooden "burial house". Therefore, it should be assumed that in this particular case the structure was originally built as a house for the dead, burnt during the rituals, and the place was repeatedly used for the cremation of the dead for a longer period of time.

Traces of burial chambers made of wood and burnt are also known from several necropolises of the Walternienburg-Bernburger culture. The community of the described culture in the Harz region built rectangular walls and wooden chambers in the vicinity of various types of in-ground graves (Fischer 1956, 90). A stone mound comes from Kreienkopp near Ditfurt (Schirwitz 1935), under which there was a burnt burial chamber made of oak wood (preserved until excavations carried out by Karl Schirwitz in 1933) with dimensions of 2.0 × 2.4 m and a height of 1.2 m. It was built of vertical oak boards (riven planks) 15 cm thick and supports, and it had a horizontal ceiling. A corridor with a paved bottom and wooden walls led to its interior. The chamber was originally covered with stones, over which an earth mound was built in the

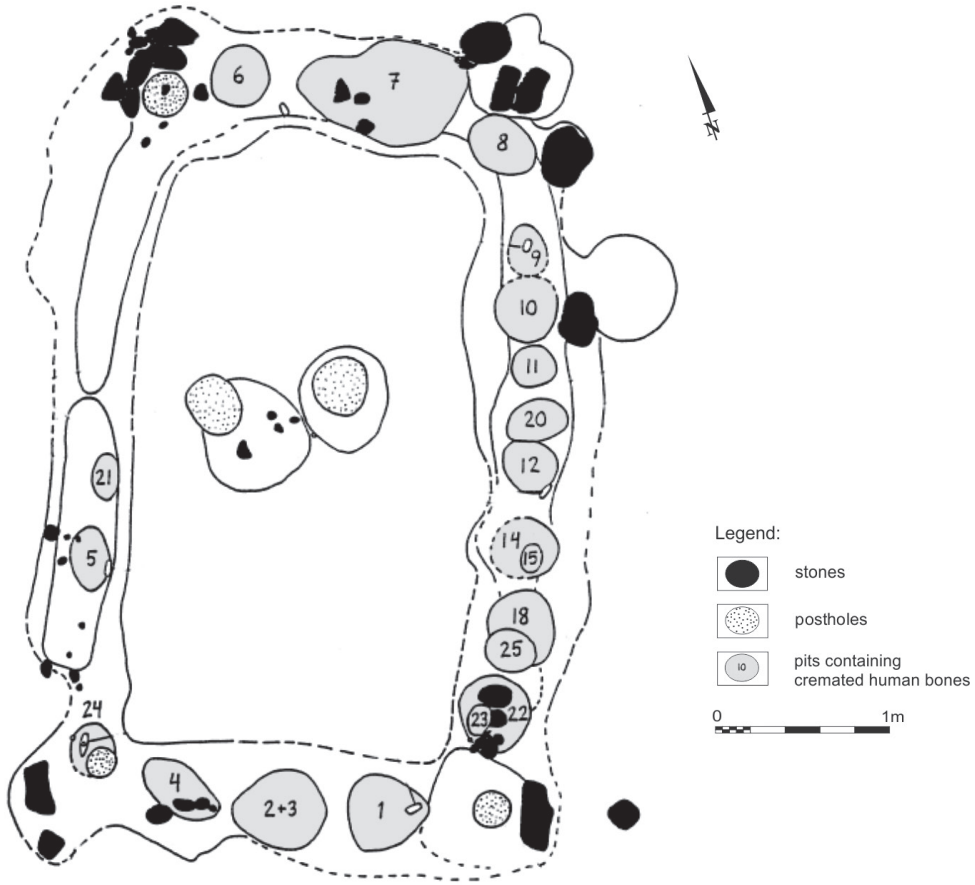

Fig. 32. An example of "a house for the dead" with walls of the internal chamber made of planks and posts placed in a groove, with the addition of vertical poles at their corners, which supported the roof over the chamber. There are "fire pits" around the construction – pits with burnt human bones and buried grave goods. Turinge, Nykvarns kommun, Södermanland (Sweden) – the Battle Axe Culture, late phase (according to Lindström 2000, 19, fig. 7).

final phase of the rituals. The structure is known as the "Ditfurt plank chamber".

Grave structures similar to those discovered in Sadowie, such as "houses for the dead", are known from the broadly understood circle of the Corded Ware Culture in Europe. Such examples are provided by, among others: sepulchral sites from central Germany (Thuringia and Saxony – Behm-Blancke 1953/1954; Hecht 2007, 126–129), the Netherlands (Lanting and van der Waals 1976) and western Ukraine (Czopek *et al.* 2016, 372–377, fig. 9.17).

The concept of a funeral house is a characteristic feature of the funeral rite of local the Corded Ware Culture groups in Scandinavia. A number of elements comparable to those found in the case of Sadowie are present at the site from Turinge, Nykvarns komun (Södermanland; SE Sweden; The Battle Axe Culture, late phase – Lindström 2000). The structure had a shape similar to a rectangle with dimensions of 3.1 × 4.8 m with postholes in the corners (Fig. 32). Between the side walls there was a groove slightly sunken into the ground. At its bottom, the remains of vertical plank were found, which formed the walls of the building – a rectangular burial chamber. The corner posts supported the roof, which was gable and rested on a ridgepole placed in the middle of the structure. On the E side, 15 shallow pits filled with burnt human bones, remains of the cremation pyre and elements of grave inventories (so-called "fire pits") were recorded. The researchers of the site believe that the aforementioned structure can be described as a decarnation house (charnel house), where corpses were stored for skeletonization. After some time needed for the decomposition of soft tissues, the bone remains were cremated and placed in pits under the wall of the building. Utilization of the structure according to the authors could have lasted for as long as several decades. Anthropological analyses proved that the remains of at least 25 individuals of different ages and sexes were buried here (ranging

from infants, children to the elderly), the inhabitants of a nearby settlement.

A funeral construction akin to the object from Sadowie was discovered in Spreitenbach-Moosweg (canton Aargau, district Baden in Switzerland – Spörri *et al.* 2012). The discussed structure had an approximately rectangular shape, measuring 3.7 × 4.5 m, with a wooden burial chamber measuring 1. 5 × 2.3 m, oriented NE-SW (Fig. 33). It was made up of planks placed vertically, next to each other like a palisade. On both sides of the chamber walls, near the lower parts, there were clusters of large rock rubble. On the longer and shorter sides, a wall groove was dug, in which traces of thick posts were preserved, supporting the structure interpreted by researchers as a superstructure or roofing. According to the researchers, access to the

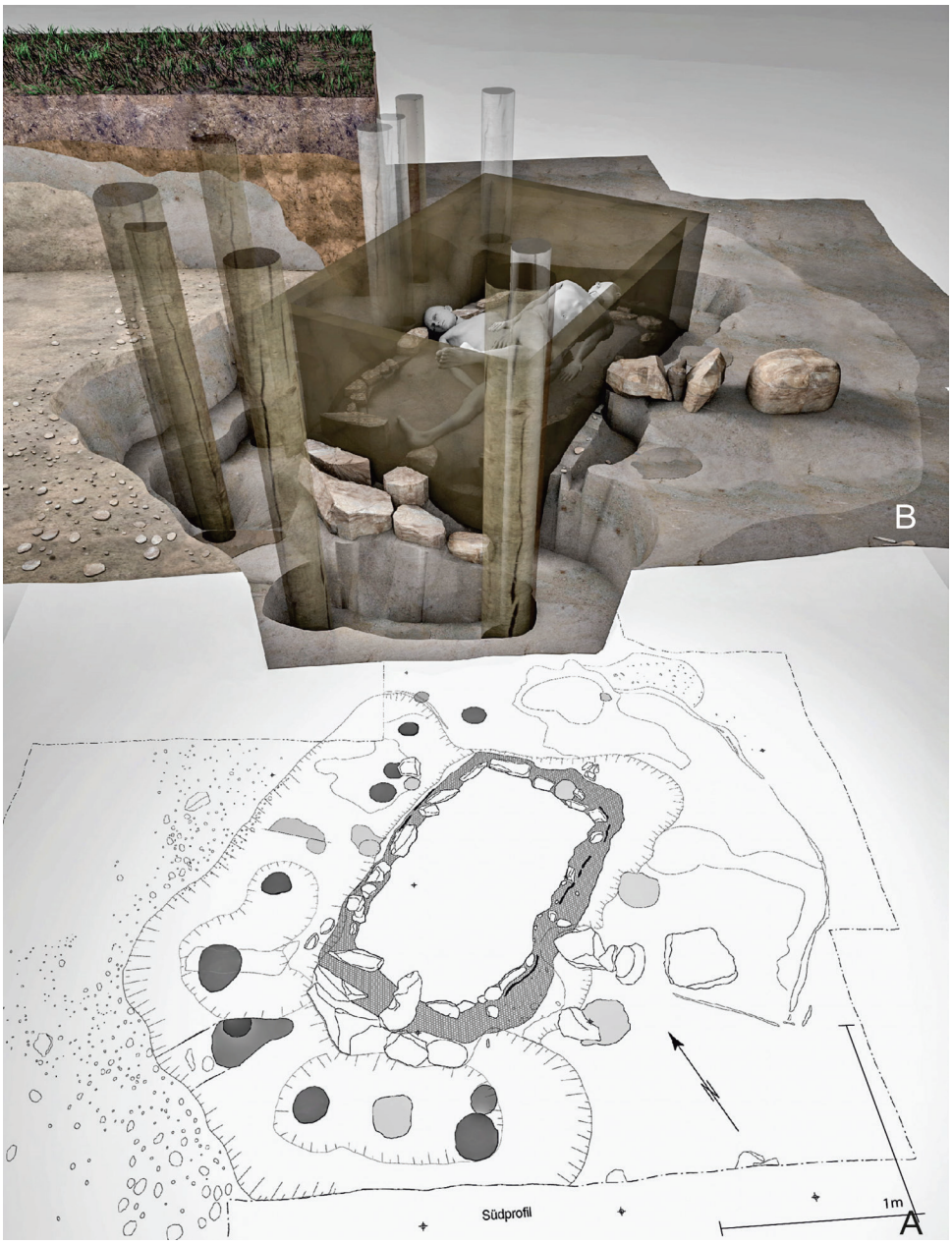

Fig. 33. "A house for the dead" with wooden and stone structures, including a collective burial of the Corded Ware Culture from the late Neolithic Period, Spreitenbach-Moosweg, Aargau canton, Baden district in Switzerland.
A – a horizontal view with traces of a wooden burial chamber and posts supporting the roof. On the ground level there is a concentration of large stones reinforcing the wall structure (according to Spörri *et al.* 2012, 38, fig. 15); B – computer reconstruction of a wooden and stone burial structure (according to Spörri *et al.* 2012, 47, fig. 39).

burial was probably near a pile of large stones found in one of the shorter sides of the SW part of the structure. Inside the wooden box, there were unburned remains arranged regularly of 12 individuals representing two generations of the local community, related to each other, placed at different time intervals. The entire grave, unlike in Sadowie, was not burnt after the end of the burial cycle, but covered with an earth mound.

Finally, it is worth mentioning the use of riven planks in the construction of the "grave house" in Sadowie. Speaking of the GAC settlement sites from the Uplands, it is worth noting that the remains of aboveground constructions were discovered, preserved in the form of lumps of daub bearing traces of wooden structures. They include traces of flat planks from the walls of daub dwellings with impressions of tree rings. Such examples are provided by the site 5 in Wilczyce, Sandomierz district (Balcer 2012, 138 referring to oral information from the researcher of this site) and the site 4 in Janowice, Opatów district (unpublished research results of Agnieszka Kubicka-Marek).

Conclusion – the significance of the discovery of grave no. 10 in Sadowie

In case of grave no. 10 from Sadowie, we have clear evidence of cremation performed by the GAC population. Cremation (understood as a pyre with burned corpses and accompanying artefacts) is one of the funeral practices used in prehistory. Unlike inhumation, it is not the last stage in the rite of burial of the deceased but can be used for other sepulchral purposes. Furthermore, it opens up enormous possibilities for the ritual use and handling of the remains of the deceased. Burnt bones could have been placed in various places - vessels, pits and other graves – as reburials (e.g. McKinley 2013, 151–152). The funeral of the remains might have taken place long after burning and was used in the cult of the dead (Barrett 1988; Williams 2015). Most researchers emphasize that the cremation ritual was more time consuming and demanding than other funeral practices. Therefore, it is worth considering the interpretation of this type of funeral rites. Was it intended for people playing a special role in the social life of the group who used the cemetery? Could the people buried here have come from outside and been unfamiliar to the local population?

The grave structure presented above is a unique construction among the sepulchral sites of GAC. Due to the good condition of the burial chamber, it was possible not only to recreate the details of the structure and stages of use related to the function of the feature, but also other aspects of the funeral rites. So far, there have been identified only a few analogies for the grave, originating from quite distant Neolithic cultural contexts in Western and Northern Europe. The described construction is unique as the earliest documented trace of a cremation pyre discovered in Polish areas. It significantly expands our knowledge of the burial practices of the GAC community and the phenomenon of the burial rites in "houses for the dead".

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Hook Pins in the Grave Inventories of the Wielbark Culture. A Case Study Based on the Finds from Cemeteries in Czarnówko, Lubowidz and Wilkowo Nowowiejskie, Lębork District (PL)

Abstract

Przymorska-Sztuczka M. 2024. Hook Pins in the Grave Inventories of the Wielbark Culture. A Case Study Based on the Finds from Cemeteries in Czarnówko, Lubowidz and Wilkowo Nowowiejskie, Lębork District (PL). *Analecta Archaeologica Ressoviensia* 19, 93–104

This paper presents a special category of textile-related artefacts, hook pins, interpreted as the remains of spindles. The study is based on tools discovered in burials of the population of the Wielbark culture in Czarnówko, Lubowidz and Wilkowo Nowowiejskie, Lębork district (PL). The collected materials were not only analysed typologically but were also examined for functionality and the presence of traces of use. They were also juxtaposed with artefacts discovered at other archaeological sites from the Roman Period, including those from the area of the Przeworsk culture.

Keywords: textile-related tools, hooks, spinning, Wielbark culture

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Introduction

The aim of this paper is to discuss in detail the so-called hook pins discovered during excavations at the cemeteries of the Wielbark culture from Czarnówko, Lubowidz and Wilkowo Nowowiejskie, Lębork district (PL). These cemeteries, explored almost in their entirety, provided a numerous set of textile-related tools. In addition to the hook pins, which are the subject of this paper, these included spindle whorls, distaffs, needles and a collection of over 700 textile fragments. Cemetery in Czarnówko is dated on B1–C1b phase of a Roman Period, Lubowidz on B1–C1a, while cemetery in Wilkowo Nowowiejskie is dated on phase B2a–C1a (Pruska and Andrzejowski (eds.) 2018, 8, 21, 47). Those three archaeological sites are located within several kilometres of each other (Fig. 1). Although they were in use almost simultaneously, they differ in the number of graves and the wealth of equipment. Czarnówko is one of the most well-equipped cemeteries of the Wielbark culture discovered on Polish territory and the numerous imports in grave furnishings indicate extensive and intensive trade contacts.

Aim of the article

Despite the considerable number of textile tools and textiles related to the population of the Wielbark culture, only textiles (Maik 2012; 2013; 2015a; 2015b; 2018; Przymorska-Sztuczka 2017; Maik and Wtorkiewicz-Marosik 2020; Cybulska and Maik 2023) and distaffs (Schuster 2010) have been fully studied. This article focuses on one category of tools, hook pins, which are the remains of spindles.

Hook pins (also referred to as hooks hereafter in the text) first appeared on the Polish territory in the pre-Roman Period. The oldest specimens found in Poland are dated to the A2 phase, i.e. around the end of the 2nd century BC and the first half of the 1st century BC (Stącel 2021, 106). They are found both among the

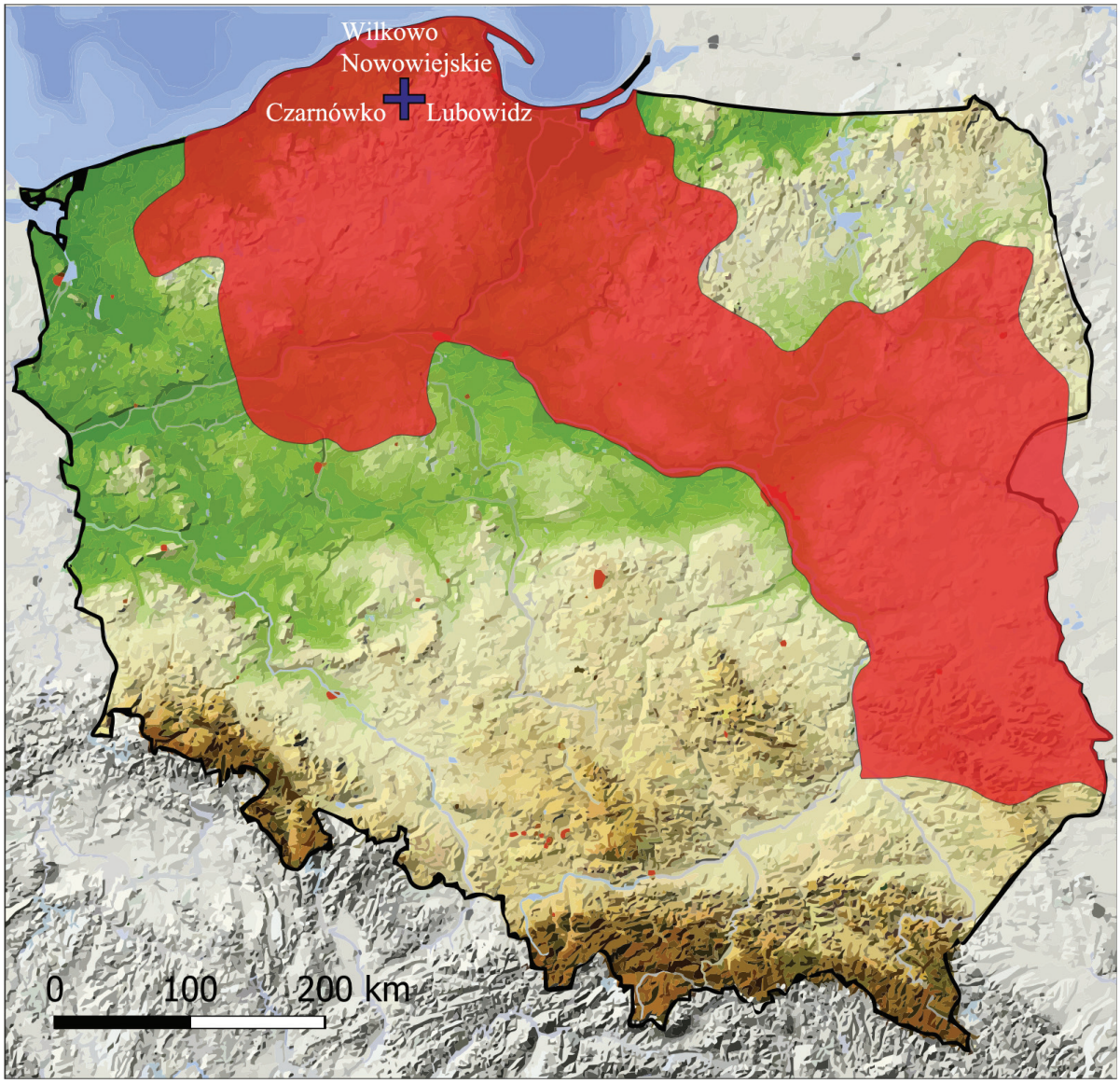

Fig. 1. Location of cemeteries in Czarnówko, Lubowidz and Wilkowo Nowowiejskie within the range of the Wielbark culture (elaborated by M. Sosnowski, based on Cieśliński 2016, fig. 8).

grave goods of the people of the Przeworsk culture, e.g. from Karczewiec, Opatów (Stącel 2021, 104) and of the Oksywie culture, e.g. from Podwiesk, Grudziądz-Rządz (Bokiniec 2008, 89; Kurzyńska 2020, 177). Their number among grave goods increases significantly in the Roman Period. Although already at the beginning of the 20th century, based on ethnographic analogies, these objects were correctly identified as parts of spindles (von Kimakowicz-Winnicki 1910; cf. Stącel 2021, 103), they were interpreted very differently in Polish literature – sometimes as crochet, needles or pins used to fasten clothing, hair or shrouds (Kostrzewski 1926, 18; Kmieciński *et al.* 1966, 78; Godłowski 1977, 41; Tempelmann-Mączyńska 1989, 71; Cieśliński 2010, 87; Stącel 2021, 103 – further literature there). Even though most researchers recognised a clear correlation between the frequent co-occurrence of hooks and spindle whorls in graves. The view that they were used for spinning purposes is already dominant in recent literature (Gostenčnik 2001, 571–572; 2003, 10; Dąbrowska 2008, 132; Gleba 2008, 103; Maik 2012, 57; Schuster 2015, 29; Tuszyńska 2020, 80; Mączyńska *et al.* 2021, 64; Stącel 2021, 104).

Typological and functional analysis of hook pins

In this article, spindle hooks are divided according to characteristic features based on data collected from the sites of the Wielbark culture where these ar-

tefacts were found (Przymorska-Sztuczka, in print). This classification is based on the division developed by T. Skorupka for artefacts from the cemetery of the Wielbark culture in Kowalewko (Skorupka 2001, 151). The main criterion is the shape of the hook shank. Group 1 comprises specimens with a twisted shank (Fig. 2: A), while Group 2 those with a plain shank (Fig. 2: B). A further subdivision, however, takes into account the material from which they are made. Thus, it is subtype A – hooks made of copper alloys, B – made of iron, and C – made of silver.

The analysed collection contains a total of 45 spindle hooks: Czarnówko – 35; Lubowidz – 6; Wilkowo Nowowiejskie – 4. Except for one item made of iron (Czarnówko, grave no. 204, Fig. 3A: 1), the other specimens are made of copper alloy wire. Iron objects were subject to a certain taboo in Wielbark culture and were placed in graves much less often (Wołągiewicz 1981, 169; Woińska 2018, 3–4). The low frequency of tools found in graves could be connected with another custom of the people of Wielbark culture – the elimination of tools from grave inventories (Cieśliński 2016, 243). Hooks with a twisted shank (type 1A) predominate in grave equipment from Czarnówko, Lubowidz and Wilkowo Nowowiejskie. For 9 items, it was not possible to determine whether the shank was twisted or plain due to the remains of wood on the hook (7) or the preservation of only the bent part of the hook (2). All artefacts were found in inhumation graves, usually in the northern part of the burial pit. It should be mentioned that some graves were disturbed in the past. However, in most cases, the textile tools were outside the area of the secondary trenches, so they were in situ, like in graves nos. 138, 403, or 513 in Czarnówko. The state of preservation of this category of finds varies. Due to the fact that the hooks were usually made of 1–2 mm thick wire, we often deal with broken specimens. It should be noted, however, that if the hook shank is plain and preserved without the characteristic bend, such an item can be easily classified as a fragment of another artefact, e.g. a needle. The length of fully preserved copper alloy hooks in the analysed collection varies from approximately 3 to 4.5 cm (Tab. 1). In the case of specimens with wooden remains, the total length of the whole object is given in the form of a table.

Five specimens (Czarnówko – graves no. 1153, 1882, Lubowidz – graves no. 249, 268, Wilkowo Nowowiejskie – grave no. 154) show traces of use in the form of hollows/grooves located at the bend of the hook (Fig. 2A: 5, 7). They were created as a result of the spun thread leaning and rubbing against the surface of the bronze hook. This indicates that these items must have been used very often. Remains of a wooden spindle shaft are found on 26 specimens (Fig. 3). However, it is necessary to take the shrinkage of the dried wood into account, which can reach several percent. The thicknesses of the wooden remains of the spindles varied between 0.4 and 0.7 cm, so they must have originally been slightly larger in diameter. These measurements, therefore, correspond to the average diameters of holes in spindle whorls from these three cemeteries (usually from approx. 0.6 to 0.9 cm). Unfortunately, the species of wood from which the spindle shafts were made has not yet been determined, although such studies are planned for the future. For example, analysis of the wood on the specimen from Grzybnica showed that the spindle was made of linden (Hahuła and Wołągiewicz 2001, 41).

This category of textile tools is much less common in grave furnishings than spindle whorls or needles. Out of approximately 2,239 excavated burials in Czarnówko, Lubowidz and Wilkowo Nowowiejskie, hooks were discovered in only 43 of them. Therefore less than 2% of all excavated burials had spindle hooks among grave goods. However, we must keep in mind that some artefacts, for some reason (like robbery trenches or excavation method), may not have survived to our time. In other cemeteries of the Wielbark culture, the number of hooks in grave equipment varies, e.g. in Pruszcz Gdański it is 31, in Weklice 21, while in Babi Dół-Borcz and Gostkowo it is 6 items and in Cecele only 4 (Przymorska-Sztuczka, in print). These tools are relatively often found together with spindle whorls, and less frequently needles, although this is not the rule. Hooks occur quite often among well-equipped grave that is, those containing a large number of items, such as sets of fibulas, bracelets, belt elements and necklaces, like in a grave no. R400 from Czarnówko (Schuster 2018, 18) or in a grave no. 268 from Lubowidz (Wołągiewicz 1995, 33). Would the hooks be linked to the high status of the buried women, who were representatives of the local elites? This theory, however, requires more research, analysis of the other cemeteries where hooks were discovered, and a comparison of their grave equipment.

The preservation of human remains in the three cemeteries included in this study was poor. It is difficult to estimate whether these cemeteries have been explored in their entirety and what percentage of the graves have been destroyed. In the majority of graves, skeletons were not preserved or only fragmentarily, which made it difficult to carry out anthropological analyses. Therefore, archaeological gender markers

Table 1. Compilation of metric data of spindle hooks from cemeteries of the Wielbark culture at Czarnówko, site 5, Wilkowo Nowowiejskie, site 1, and Lubowidz, site 1, Lębork district. (F) indicates fragmentary preserved – broken specimens

No.	Site	Grave no.	Lenght (cm)	Wire diameter (cm)	Wooden reamains diameter (cm)	Material	Shank	Hook type	Grave equipment
1	2	3	4	5	6	7	8	9	10
1.	Czarnówko, site 5	R349	3.00	0.14	–	copper alloy	plain	2A	fibula, few fragments of silver wire, copper alloy needle, pottery shreds
2.	Czarnówko, site 5	R371	2.10 (F)	0.11	–	copper alloy	twisted	1A	copper alloy key, copper alloy ring-shaped object with rivet, 2 copper alloy ring-shaped objects, rivets, fragments of a wire, copper alloy wire connectors, silver ring, copper alloy belt buckle, glass beads, amber beads, banded pendant with shell, conical beads, copper alloy banded pendant, spindle whorl
3.	Czarnówko, site 5	R400	4.80	–	0.60	copper alloy, wood	–	A	foot of a silver cup, fragment of a copper alloy vessel, 3 silver fibulas, 3 copper alloy fibulas, silver and gold-plated embossed applications, fragments of silver wires, glass and amber beads, stone disc, 2 copper alloy belt buckles and fittings, fragments of a wooden box with a lock fitting, sandstone spindle whorl, pottery shreds
4.	Czarnówko, site 5	R405	3.60 (F)	0.14	0.40	copper alloy, wood	twisted	1A	copper alloy belt buckle and belt end fittings, silver applications, fragments of silver wires, amber and glass beads, fragment of a copper alloy needle, spindle whorl, pottery shreds
5.	Czarnówko, site 5	R425	2.80 (F)	0,11	0.40	copper alloy, wood	twisted	1A	2 pairs of silver bracelets, fragments of wood with copper alloy ferrule, wooden elements joined by copper alloy caps, 2 copper alloy needles, pin, gold foil on silver plate, gold foil from fibula, necklace from glass and amber beads
6.	Czarnówko, site 5	R426	1.50 (F)	0.12	–	copper alloy	twisted	1A	3 copper alloy fibulas, copper alloy belt buckle, gold S-shaped clasp, glass bead, spindle whorl, copper alloy needle
7.	Czarnówko, site 5	138	2.50 (F)	0.20	0.30	copper alloy, wood	twisted	1A	2 spindle whorls, pottery shreds
8.	Czarnówko, site 5	164	3.60	0.20	–	copper alloy	plain	2A	copper alloy belt buckle and fittings, belt separators (linking pieces) and overlay, copper alloy S-shaped clasp, necklace of amber and glass beads, spindle whorl
9.	Czarnówko, site 5	204	4.62	0.25	0.52	iron, wood	plain	2B	clay cup, copper alloy pin and belt buckle, copper alloy bracelet, spindle whorl
10.	Czarnówko, site 5	403	3.20	0.12-0.20	0.40	copper alloy, wood	twisted	1A	silver biconical beads, silver S-shaped clasps and fragment of a silver ring, copper alloy belt buckle and fittings, spindle whorl, pottery shreds
11.	Czarnówko, site 5	458	3.10	0.30	0.50	copper alloy, wood	twisted	1A	amber bead, copper alloy needle, fragment of a pin, fragments of an iron crescent knife, fragment of a copper alloy fibula, copper alloy needle, spindle whorl
12.	Czarnówko, site 5	512	4.20	0.20	0.50	copper alloy, wood	–	A	copper alloy pin, 3 copper alloy fibulas, necklace of glass and amber beads, fragment of S-shaped clasps, copper alloy belt buckle and fittings and separators (linking pieces)

1	2	3	4	5	6	7	8	9	10
13.	Czarnówko, site 5	513	3.70	0.20	0.50	copper alloy, wood	twisted	1A	copper alloy fibula, necklace of glass and amber beads, copper alloy casket key, fragment of a copper alloy fibula, spindle whorl
14.	Czarnówko, site 5	562	4.30	0.18	0.40	copper alloy, wood	plain	2A	amber bead, copper alloy belt fittings and separators, copper alloy needle, clay cup
15.	Czarnówko, site 5	654	1.90 (F)	0.18	0.44	copper alloy, wood	–	A	copper alloy fibula and belt buckle, 2 spindle whorls
16.	Czarnówko, site 5	768	2.70 (F)	0.19	–	copper alloy	plain	2A	necklace of amber beads, copper alloy fibula with gold foil
17.	Czarnówko, site 5	821	4.30 (F)	0.20	0.50	copper alloy, wood	plain	2A	copper alloy fibula, silver S-shaped clasp, fragment of a bracelet and belt end fitting, spindle whorl
18.	Czarnówko, site 5	897	1.90 (F)	0.20	–	copper alloy	plain	2A	amber beads, fragment of a silver biconical bead, copper alloy belt end fitting, fragment of a pin, spindle whorl
19.	Czarnówko, site 5	1035	2.10 (F)	0.15	–	copper alloy,	twisted	1A	3 copper alloy fibulas with silver foil, 1 copper alloy fibula with gold foil, necklace od glass beads, copper alloy needle, spindle whorl
20.	Czarnówko, site 5	1079	4.00 (F)	0.20	0.50	copper alloy, wood	twisted	1A	copper alloy belt buckle and fittings, copper alloy bracelet with snake-head ends
21.	Czarnówko, site 5	1082	1.90 (F)	0.20	–	copper alloy	plain	2A	spindle whorl
22.	Czarnówko, site 5	1153	1.10 (F)	0.15	–	copper alloy	–	A	necklace of amber and glass beads, copper alloy fibula with gold elements, fragment of a copper alloy belt fitting, spindle whorl, pottery shreds
23.	Czarnówko, site 5	1270	4.20	–	0.50	copper alloy, wood	–	A	fragment of a copper alloy belt fitting, spindle whorl
24.	Czarnówko, site 5	1329	1.00 (F)	0.16	–	copper alloy	twisted	1A	spindle whorl
25.	Czarnówko, site 5	1343	4.00 (F)	0.20	0.50	copper alloy, wood	–	A	glass and amber beads, spindle whorl
26.	Czarnówko, site 5	1497	2.80 (F)	0.20	0.35	copper alloy, wood	plain	2A	copper alloy fibula with silver element, 2 copper alloy bracelets, 2 copper alloy fibulas, copper alloy belt buckle, fittings and belt separators (linking pieces) and overlay, S-shaped silver clasp, glass beads
27.	Czarnówko, site 5	1525	2.40 (F)	0.15	0.40	copper alloy, wood	twisted	1A	2 copper alloy bracelets with snake-head ends, S-shaped silver clasp, glass bead, fragment of a copper alloy or silver pin, 2 spindle whorls
28.	Czarnówko, site 5	1620	1.20 (F)	0.16	0.40	copper alloy	twisted	1A	necklace of amber and glass beads, clay vessel, spindle whorl
29.	Czarnówko, site 5	1753	3.50 (F)	0.18	0.45	copper alloy, wood	twisted	1A	copper alloy needle, spindle whorl
30.	Czarnówko, site 5	1764	2.70 (F)	0.18	–	copper alloy	twisted	1A	necklace of amber and glass beads, fragment of a copper alloy fibula, copper alloy ring-shaped object, copper alloy needle, spindle whorl

1	2	3	4	5	6	7	8	9	10
31.	Czarnówko, site 5	1794	2.20 (F)	0.14	0.35	copper alloy, wood	twisted	1A	necklace of amber and glass beads, silver fibula, bucket-shape silver pendant, bone comb, copper alloy belt buckle and fittings, fragments of a silver objects, glass vessel, 5 clay vessels, spindle whorl
32.	Czarnówko, site 5	1839	0.80 (F)	0.16	–	copper alloy	–	A	necklace of amber and silver biconical beads, S-shaped silver clasp, copper alloy fibula and belt buckle, copper alloy needle, 2 spindle whorls
33.	Czarnówko, site 5	1872	2.60 (F)	0.11	–	copper alloy	twisted	1A	2 copper alloy fibulas, necklace of glass beads, copper alloy belt buckle, copper alloy ferrule, spindle whorl
34.	Czarnówko, site 5	1882	3.00 (F)	0.18	0.40	copper alloy	plain	2A	copper alloy fibula, amber and glass beads
35.	Czarnówko, site 5	1962	3.50 (F)	0.13	–	copper alloy	twisted	1A	spindle whorl
36.	Lubowidz, site 1	18	2.40 (F)	0.18	0.62	copper alloy, wood	twisted	1A	copper alloy belt buckle
37.	Lubowidz, site 1	109	6.80 (F)	0.16	0.67	copper alloy, wood	twisted	1A	3 copper alloy fibulas, necklace of glass, amber and silver beads, banded copper alloy pendant, silver finger ring, 2 copper alloy bracelets, copper alloy S-shaped clasp, fragment of a copper alloy needle, iron belt buckle, copper alloy belt fittings, iron key and iron fragments of a casket
38.	Lubowidz, site 1	249	7.50	0.16	0.60-0.70	copper alloy, wood	–	A	glass and amber beads, copper alloy fibula, copper alloy belt fittings, fragment of a copper alloy needle, clay cup
39.	Lubowidz, site 1	268	2.30 (F)	0.13	–	copper alloy	twisted	1A	2 necklaces of glass and amber beads, 3 copper alloy fibulas, tweezer, copper alloy belt buckle, 2 bucket-shaped pendants, silver locking hook, finger ring, fragments of a copper alloy plates with rivets, 2 biconical silver beads, iron key and iron fragments of a casket, 3 clay vessels, copper alloy needle, 2 spindle whorls
40.	Lubowidz, site 1		3.20 (F)	0.13	0.45	copper alloy, wood	twisted	1A	
41.	Lubowidz, site 1		1.30 (F)	0.12	–	copper alloy	twisted	1A	
42.	Wilkowo Nowowiejskie, site 1	17	1.90 (F)	0.13	–	copper alloy	twisted	1A	copper alloy fibula and belt buckle, copper alloy needle, clay vessel
43.	Wilkowo Nowowiejskie, site 1	85	3.60 (F)	0.15	0.50	copper alloy, wood	twisted	1A	copper alloy fibula, S-shaped silver clasp, silver beads
44.	Wilkowo Nowowiejskie, site 1	91	3.80 (F)	0.19	0.45	copper alloy, wood	plain	2A	3 copper alloy fibulas, 2 copper alloy bracelets with snake-head ends, copper alloy pin, necklace of glass beads, copper alloy S-shaped clasp, copper alloy belt fittings and belt end fitting
45.	Wilkowo Nowowiejskie, site 1	154	3.40 (F)	0.15	0.55	copper alloy, wood	–	A	3 copper alloy fibulas, 2 copper alloy bracelets with snake-head ends, S-shaped silver clasp, amber and glass beads, spindle whorl

Fig. 2. Types of spindle hooks.

A – with a twisted shank: 1. Czarnówko, grave no. 1962; 2. Czarnówko, grave no. R371; 3. Czarnówko, grave no. 426; 4. Czarnówko, grave no. 1872; 5. Czarnówko, grave no. 1153; 6. Czarnówko, grave no. 1329; 7 and 8. Lubowidz, grave no. 268; B – with a plain shank: 1. Czarnówko, grave no. 164; 2. Czarnówko, grave no. 1882; 3. Czarnówko, grave no. 897; 4. Czarnówko, grave no. 1082 (photo by M. Przymorska-Sztuczka).

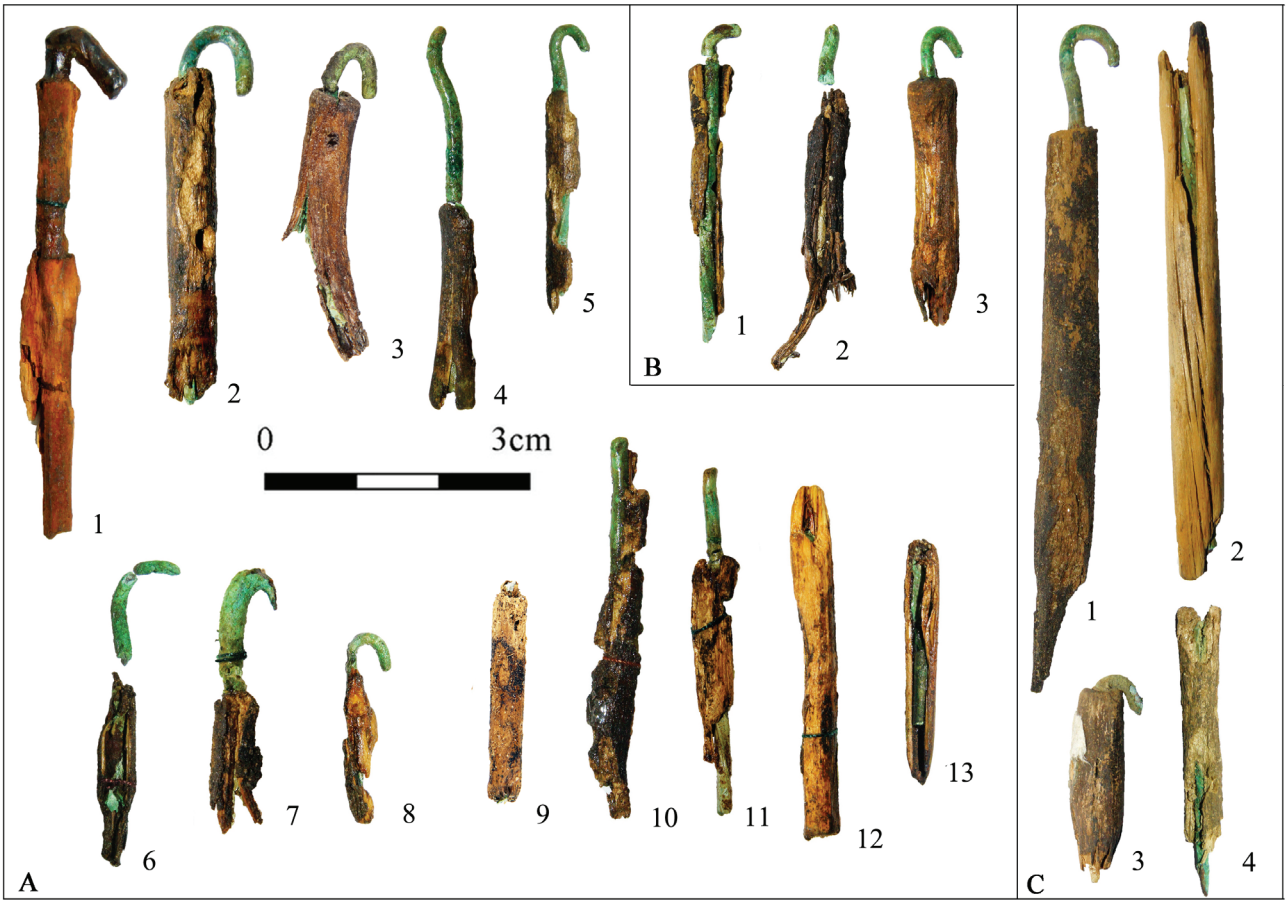

Fig. 3. Hooks with remnants of wooden shaft spindle from cemeteries of the Wielbark culture populations in Czarnówko (A), Wilkowo Nowowiejskie (B), and Lubowidz (C), Lębork district.

A: 1 – grave no. 204, 2 – grave no. 512, 3 – grave no. 163, 4 – grave no. 562, 5 – grave no. 403, 6 – grave no. 1753, 7 – grave no. 458, 8 – grave no. 1794, 9 – grave no. 1525, 10 – grave no. 821A, 11 – grave no. 1079, 12 – grave no. 1343, 13 – grave no. 1497; B: 1 – grave no. 85, 2 – grave no. 91, 3 – grave no. 154; C: 1 – grave no. 249, 2 – grave no. 109, 3 – grave no. 18, 4 – grave no. 258 (photo by M. Przymorska-Sztuczka).

were also used to determine the presumed sex of the individuals buried in Czarnówko, Lubowidz, and Wilkowo Nowowiejskie. These determinants are primarily based on identifying objects associated with the traditional division of roles and activities (Skóra 2015, 88). It was concluded that most individuals buried in those three cemeteries with hooks had typically adult female equipment (fibulas, glass and amber beads, bracelets, needles, spindle whorls). This category of tool is less frequently found in the burials of children and men (Skóra 2015, 90). Hook pins in burials anthropologically identified as male were discovered i.a. in Kowalewko – grave 451 (Skorupka 2001, 117) and Pruszcz Gdański, site 10 – grave 151 (Pietrzak 1997, 29). The more frequent occurrence of these artefacts in female graves is also evident in inventories associated with the Przeworsk culture (Stącel 2021, 122).

Functional analysis of hook pins

The infrequent occurrence of this category of items in burials may be due to the fact that the hook is not necessary for the proper functioning of the spindle. At this point, the mechanics of spinning need to be introduced and explained to the reader. Spinning is the process of drawing fibres out of fleece, with the simultaneous splicing, twisting and stretching them to form yarn of a desired diameter (Michałowska 2006, 310). It is carried out using a spindle, which consists of a wooden shaft and a spindle whorl attached to one of the ends. Placing the spindle whorl on the spindle increases the spinning time and also keeps the tension of the thread (Chmielewski 2009, 70). This results in an evenly twisted yarn with a similar diameter along its length. The spindle whorl can be placed on the spindle shaft from the top, bottom or in the middle (Andersson Strand 2015, 45). The spindle can rotate freely, hanging in the air on the spun thread, or its end can be rested on the ground (Barber 1991, 43). In the former case, the spindle is secured by a notch or hook, or by a loop made of yarn wrapped around the upper end of the spindle (Fig. 4: B). The process is as follows: one hand holds the raw material from which the thread is twisted; the other hand sets the spindle in motion, and then both hands are used to pull the fibres into the yarn. Occasionally, if necessary, the free hand turns the spindle again to keep it moving. When the thread is long enough for the spindle to reach the ground, it is wrapped around its shaft, reattached to the spindle tip, and the process is repeated (Kania 2017, 266).

Thus, the thread can be hitched to the top of the wooden shaft with a simple loop made from the spun thread, which also works perfectly well (Fig. 4: B). On the other hand, when spinning with a spindle fitted with a hook, there is no need for such an "eyelet" (Fig. 4: A). The author has carried out experimental work to find out whether a spindle fitted with a hook is more functional and efficient than those without one. The results of these experiments indicate that, above all, there are no differences in yarn parameters between threads twisted using a spindle fitted with a hook and those spun on tools without one (Przymorska-Sztuczka, in print). The spindle with a hook, on the other hand, is a little more convenient to use, as it is not necessary to make an additional securing loop each time after winding the thread onto its shaft. This may or may not speed up the whole spinning process a little, and thus may affect the length of the yarn. It should be noted, however, that this gains at most a few minutes or so, not hours, which translates into an extra several centimetres of yarn length. This is of no significance in the case where, for example, 2 km of thread is needed to make the fabric. The conclusion is, therefore, that the hook in the spindle does not affect either the spinning process or the parameters of the threads being produced. Consequently, since the functionality of the spindle does not change, the pres-

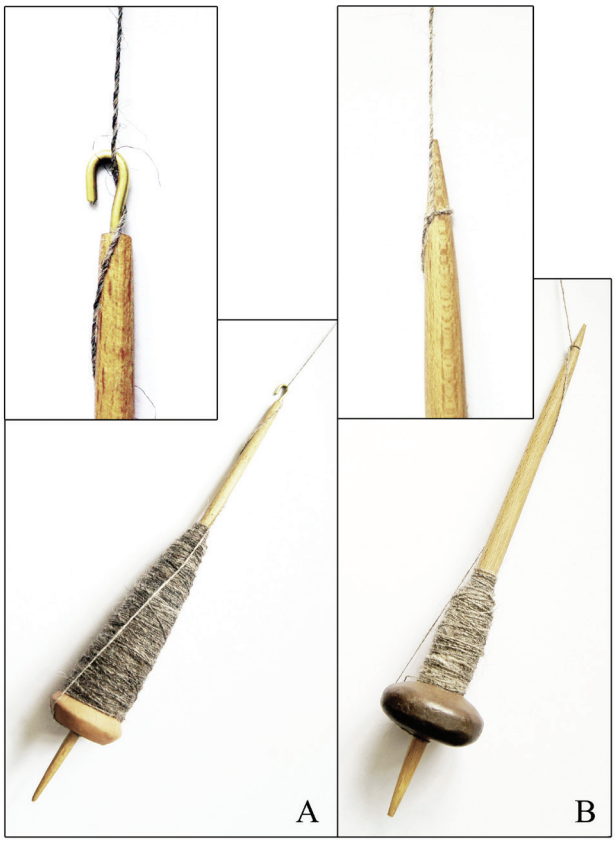

Fig. 4. Methods of attaching thread to the spindle with (A) and without a hook (B) (photo by M. Przymorska-Sztuczka).

ence of this "improvement" amongst the grave goods is difficult to explain. It may, for example, be related to the affiliation of the women buried with these tools to the higher social strata. Perhaps elite women, who were the first to have access to technological 'novelties' thanks to trade contacts, were more likely to use spindles equipped with hooks.

The presence of hooks in grave inventories of the Pre-Roman and Roman Periods in Central and Northern Europe could be related to a change in the spinning tradition from using bottom-loaded spindles to those in which the whorl is mounted at the top of a spindle. The difference is that top-loaded spindles are set in motion by twisting the shaft at the bottom or rolling it over the thigh, whereas the second type is set in motion by twisting the shaft at the top (Barber 1991, 43). It is traditionally assumed that European prehistoric communities used bottom-loaded spindles (Wild 1970, 33; Barber 1991, 53). This is supported by the few finds of spindles themselves from Late Neolithic pile dwellings settlements in Switzerland, e.g. Arbon Bleiche, Twann and Bronze and Iron Age Italy from Fiavè-Carera, Ledro, Longola di Poggiomarino, Verruchio (Barber 1991, 54; Leuzinger 2002, 116; Gleba 2008, 101; Grömer 2016, 81), as well as a rich iconography from Classical Greece (Barber 1991, 70–72). However, for Egypt and the Near East, a spindle with an upper whorl is typical. At the same time, specimens with a hooked top are also from Egypt (Wild 1970, 33; Barber 1991, 53). Therefore, it seems that the Egyptian specimens have inspired many researchers to link the hooks with the tradition of spinning with an upper whorl spindle (Gostenčnik 2013, 65). The insufficient data, however, does not allow for such far-reaching analogies. Nevertheless, the presence of these objects among the grave goods indicates certain, not yet fully understood, changes taking place in textile economy in the Polish lands at the turn of the century and in the first centuries AD.

Hook pins in other archaeological contexts – a brief overview

This category of tools in the Roman Period is also found in other cemeteries of the Wielbark culture (e.g. Cecele – Jaskanis 1996, 141; Gostkowo – Kurpiewski 2008, 58; Gronowo – Machajewski 2013, 47; Kowalewko – Skorupka 2001, 151; Malbork-Wielbark – Kleemann 2017, 227; Pruszcz Gdański – Pietrzak 1997, 82) and cultural group related to it, like Masłomęcz group (Kokowski 1999, 92), Dębczyno group (Schuster 2015, 29) and Černâkov culture (Ruta and Strobin 2015, 317). Hooks occur also at this time in Przeworsk culture (e.g. Chmielów Piaskowy, Karczewiec, Opatów – Stącel 2021, 104), with iron specimens dominating there. However, this is not the only area where they are found. The closest analogues from outside Poland are also known from Germany (e.g. Kemnitz – Geisler 1974, 93; Mühlberg – Laser 1987, 49; Ichstedt – Becker 1999, 54–55; Ammern – Bemmann 2014, 187), as well as from the Czech Republic and Slovakia (e.g. Stražnici, Kostolné pri Dunaji – Zeman 2017, 158–160; Chotin – Romsauer *et al*. 2019, 171; Cífer-Pác – Varsik and Kolnik 2021, 337) and Austria (e.g. Magdalensberg, Virunum, Frauenberg – Gostenčnik 2001, 571; 2003, 9; 2012, 70–72; Groh and Sedlmayer 2007, 186). At this point, reference should be made to the site at Magdalensbeg (Old Virunum) in Austria, where up to 127 specimens of these tools were discovered, including two specimens with a socket (Gostenčnik 2013, 63). Forms with a twisted shank made of copper alloy wire predominated there. Excavations have proved that these tools were made in local workshops (Gostenčnik 2003, 9). This category of tool also occurs in grave equipment at the end of the late Roman and in the Migration Period in Scandinavia (Sejflod, Fraugde in Denmark, Ytter Restad in Sweden – Schuster 2015, 29).

These items are also known from the late La Tène Period (mid-1st century BC) from the Celtic oppida, e.g. Velemszentvid in Hungary (Gostenčnik 2003, 9). Spindle hooks have also been discovered in archaeological material from Greece and Italy from earlier Periods (5th to 3rd century BC; Barber 1991, 68–69; Gleba 2008, 103). However, they have a different form, i.e. a bronze socket ending in a hook that was mounted at the top of the spindle.

It seems, therefore, that the presence of these tools in the Wielbark culture grave inventories may be related to the genesis of this cultural unit, which developed on the grounds of the Oksywie culture. Hence, the question of the original area of occurrence of these objects should be asked. Unfortunately, we do not have much data on hooks from Celtic or other Roman sites (Gostenčnik 2003, 9). It is, therefore, difficult to state with certainty where and by whom these tools were first used (Gostenčnik 2003, 10).

Conclusions

Spindle hooks are a very valuable and potentially highly informative category of textile-related artefacts since a number of specialised studies can be carried out on them. Metallographic analyses can indicate the quality of the raw material from which these

tools were made, as well as identify the copper alloy (bronze or brass) or type of iron. Wooden remains adhering to the hooks can be a valuable source of information about the species of trees that were used to produce the spindles. These artefacts can also be examined for traces of use, which are sometimes visible on them, as demonstrated by the examples from Czarnówko, Lubowidz and Wilkowo Nowowiejskie. Also, the spread and chronology of hook pins in different areas of Europe, and in particular their distribution in and north of the former Roman provinces of Noricum and Pannonia, require detailed and extensive cross-regional studies. These are, therefore, artefacts that can be analysed in multiple ways and whose in-depth study can yield valuable results.

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Jet Beads from Grave 436 from Masłomęcz. A Further Contribution to the Study of Contacts between the Gothic Population of the Masłomęcz Group and the Sarmatians

Abstract

Kokowski A. 2024. Jet Beads from Grave 436 from Masłomęcz. A Further Contribution to the Study of Contacts between the Gothic Population of the Masłomęcz Group and the Sarmatians. *Analecta Archaeologica Ressoviensia* 19, 105–115

In Gothic grave 436 in Masłomęcz, central-eastern Poland, beads were found that were made of a jet raw material rarely present in central Europe of the Roman period. It has been established that such a pattern was the most common in Crimea and the north-eastern part of the Black Sea basin. By the third century after Christ, it was found almost exclusively in the Crimea, in Sarmatian graves. Thus, another element confirming the thesis of contact between the population of the Masłomęcz group and the Sarmatians has been discovered.

Keywords: jet, Sarmatians, Goths, intercultural contacts

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Introductory remarks

One of the striking research problems in the Eastern European Barbaricum of the Roman Empire is the relationship between the Germanic tribes, especially the Goths, and the Sarmatians, an Eastern European steppe people. Their mutual contacts have been confirmed by ancient written sources (e.g. Müller 1998; Kokowski 2004); on the other hand, objects of Sarmatian origin have come to light in archaeological find complexes of the Gothic circle. Mainly metal elements of clothing and its ornaments produced by the Sarmatians reached the Goths: brooches, bells, belt buckles, amulets; less frequently mirrors and even clay vessels (Kokowski 2001; 2003). There are many indications that it was through the Sarmatians that coral products reached the Goths (Michalec 2004; Kokowski and Vynokur 2024) and glass beads produced in glassmakers' workshops operating in the Danubian Roman Provinces (Kokowski 2023, 82). In the Gothic cemeteries of the Masłomęcz group in Gródek nad Bugiem and in Masłomęcz (both in the district of Hrubieszów), burials of Sarmatian women have even been identified (Kokowski 1999a, 95–97), indicating specific, close contacts. It is also assumed that the Sarmatians were important intermediaries in trade with the Germanic tribes in the ancient world, as they transferred provincial Roman products to Germanic territory – a conference on this topic was organised at the time (see von Carnap-Bornheim (ed.) 2003).

In 1995, a grave with an interesting inventory was discovered in the cemetery in Masłomęcz (site 15), indicating relatively early contacts between the two peoples.

Grave 436

It lies at the edge of the northern, oldest part of the cemetery. A grave pit measuring 200 × 110 cm with a light-coloured fill was discovered at a depth of 35 cm, oriented on the N-S axis, with its deviation

towards W. At a depth of 70 cm it was regularly rectangular, measuring 185 × 80 cm. In the northern part, an oval, uniform grey darkening was visible, a trace of the reopening of the grave. At a depth of 118 cm, the outline of a tree coffin measuring 180 × 58 cm was revealed. The coffin walls were 3 cm thick, and the disturbance observed earlier only covered the northern part of the pit (Fig. 1). It indicates that the disturbance occurred when the construction of the tree coffin was still stable. At a depth of 130 cm, the coffin became regularly rectangular, measuring 180 × 45 cm; the walls were still 3 cm thick. The skeleton lay on its right side, the left hand across the pelvis. The skull, right shoulder blade, left arm and almost the entire left arm were missing. There was a brooch on the left arm and beads scattered around the neck. A large clay vessel fragment was found at the bottom of the legs and a comb on the left foot (Fig. 2).

Accoutrements:

1. copper alloy crossbow brooch, with folded foot, short spiral with axle pin, type FG.20 (Kokowski 1999b, 651f., fig. 2: d): length 55 mm, height 17 mm (Fig. 3: 1);

2. three-part bone comb with copper rivets, consisting of six segments, and low, semicircular handle, type G1 (Kokowski 1999b, 654, 655, fig. 3a), type Thomas I: length 102 mm, height 57 mm, handle thickness 11 mm (Fig. 3: 2);

3–12. 10 elongated, polyhedral beads, semi-transparent, blue, like type Tempelmann-Mączyńska XIII: 126 (Tempelmann-Mączyńska 1985): 10 × 6 × 6 mm (Fig. 3: 3–12);

13–22. 10 flat, square jet beads with openings in secondary sides of two opposite corners, type Alekseeva 37: 5 × 6 × 3; 6 × 6 × 3; 6 × 6 × 2; 6 × 5 × 3; 7 × 6 × 4; 6 × 7 × 3; 5 × 5 × 3 (damaged); 4 × 6 × 2; 7 × 6 × 2.5 (damaged); 5 × 5 × 2 mm (Fig. 3: 13–22; 4; Kokowska 2012, 126, fig. 7);

23–24. 2 eight-shaped amber pendants with slightly separated neck with transverse opening, type Masłomęcz II.2: h. 14–13 mm, dm. 9–8 mm (Fig. 3: 23, 24);

Fig. 1. Masłomęcz, site 15, grave 436. Plan at the level of the reopening of the coffin (drawn by A. Jączek).

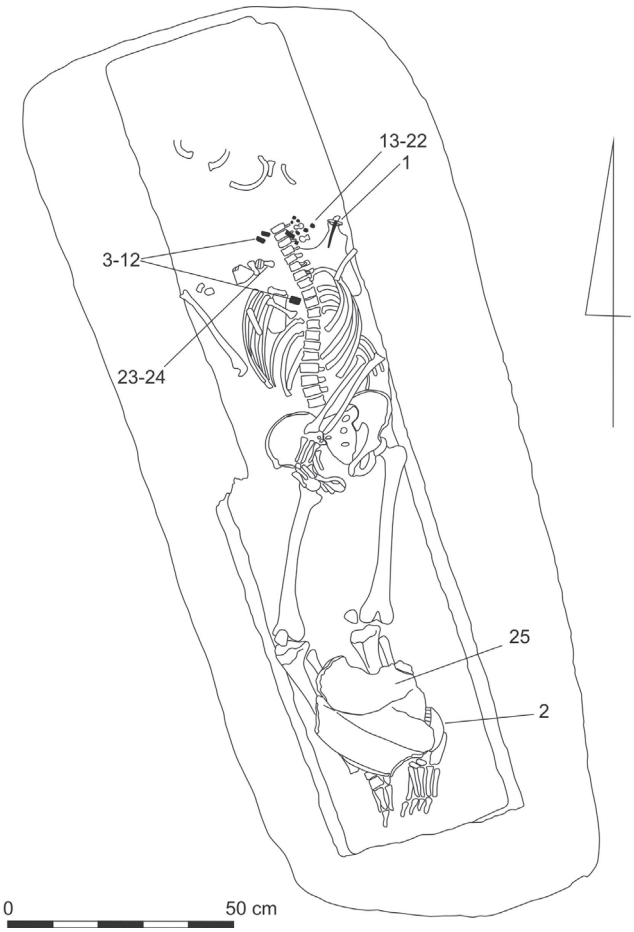

Fig. 2. Masłomęcz, site 15, grave 436 – the numbers on the grave plan correspond to those on Fig. 3 (drawn by A. Jączek).

25. large fragment of a handmade vase, with protruding, thickened rim and sloping, kinked neck; decorated with hanging triangles on the belly; smooth surface at the neck, brown, rough at the bottom; group VIB/A Schindler/Wołągiewicz (Kokowski 2017, 402, no. 57): height approx. 215 mm; base dm. approx. 95 mm, belly dm. approx. 310 mm, mouth dm. 250 mm (Fig. 5).

Dating finds include: a brooch, dated to the older section of level C1, and a vessel whose decoration is typical of the Middle Roman Period (B2/C1–C1 – Kokowski 1999b, 683, 708f.; 2017, 397–401).

Of the burial inventory, the most interesting for us are the jet beads. This raw material, unique to European antiquity, was recently characterised by Ewelina Kokowska. She not only presented the geological aspects of jet and the history of its presence in ancient cultures, but also the terminology associated with it in various languages (Kokowska 2011, 490–497; 2012, 117–119). The phenomenon highlighted by the author of the renaissance of jewellery made with jet during the reign of Queen Victoria is interesting. So-called mourning jewellery began to be made at this time, and the geological term "gagat" was replaced by the jeweller's term "jet" (Kokowska 2011, 496–497). In this wording it took hold in colloquial language and is still used today.

This text attempts to answer the question of the origin of the gagate beads from the Masłomęcz grave and to look at the history and extent of the occurrence of this specific type of pattern.

Typology – quantity – chronology

Ekaterina Mihajlovna Alekseeva (1978, 15–16) was the first to draw attention to jet beads of this type, defining them as type 37 in the group of jet artefacts. The type corresponds exactly to the finds from Masłomęcz. Additionally, it has separated variant 37a with faceted sides. According to the author, the type of necklace made of such jet beads has a broad chrono-

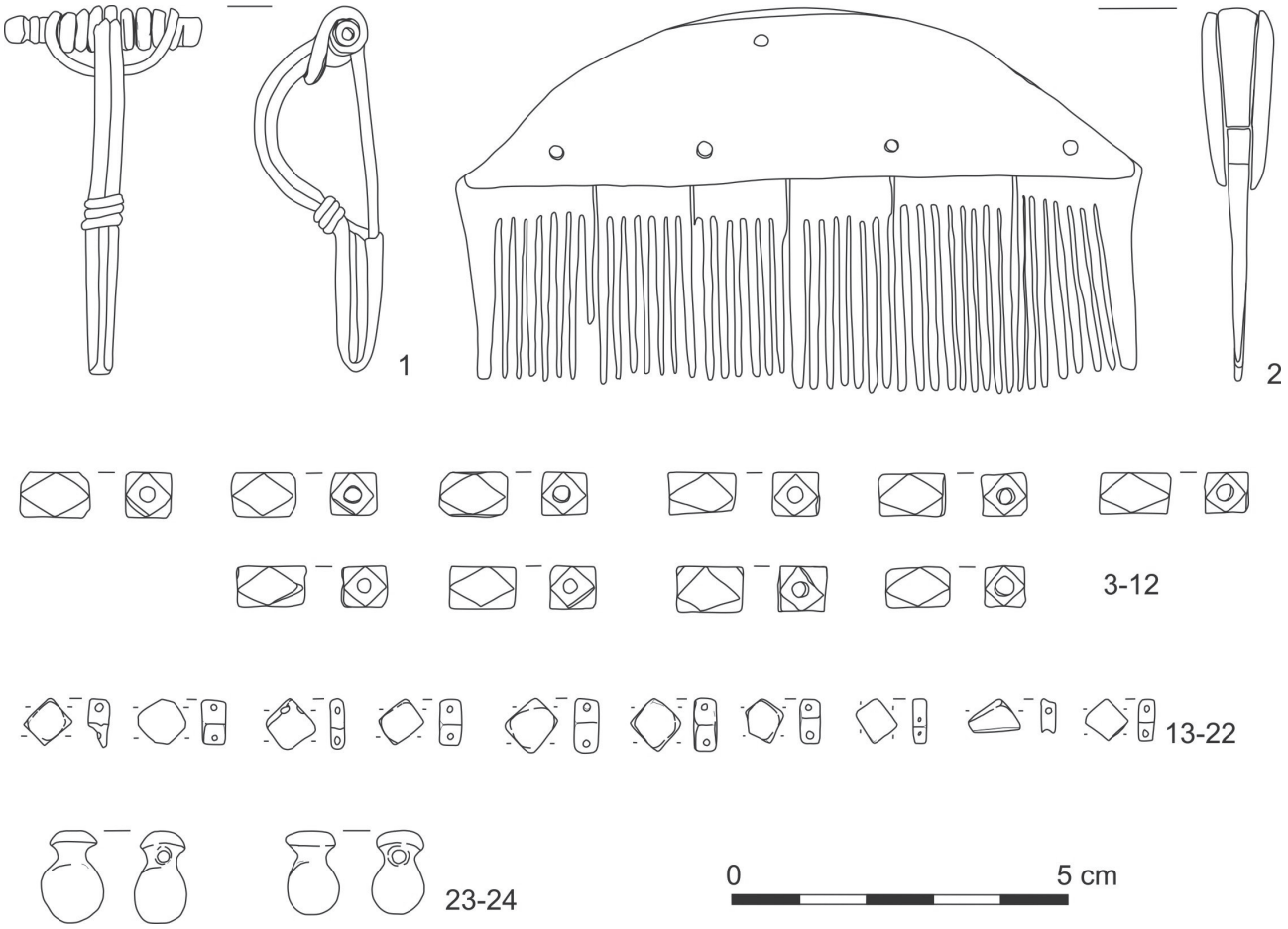

Fig. 3. Masłomęcz, site 15, grave 436, grave goods – numbers according to the description in the text (drawn by A. Jączek).

Fig. 4. Masłomęcz, site 15, grave 436, jet beads (photo by J. Kuśnierz).

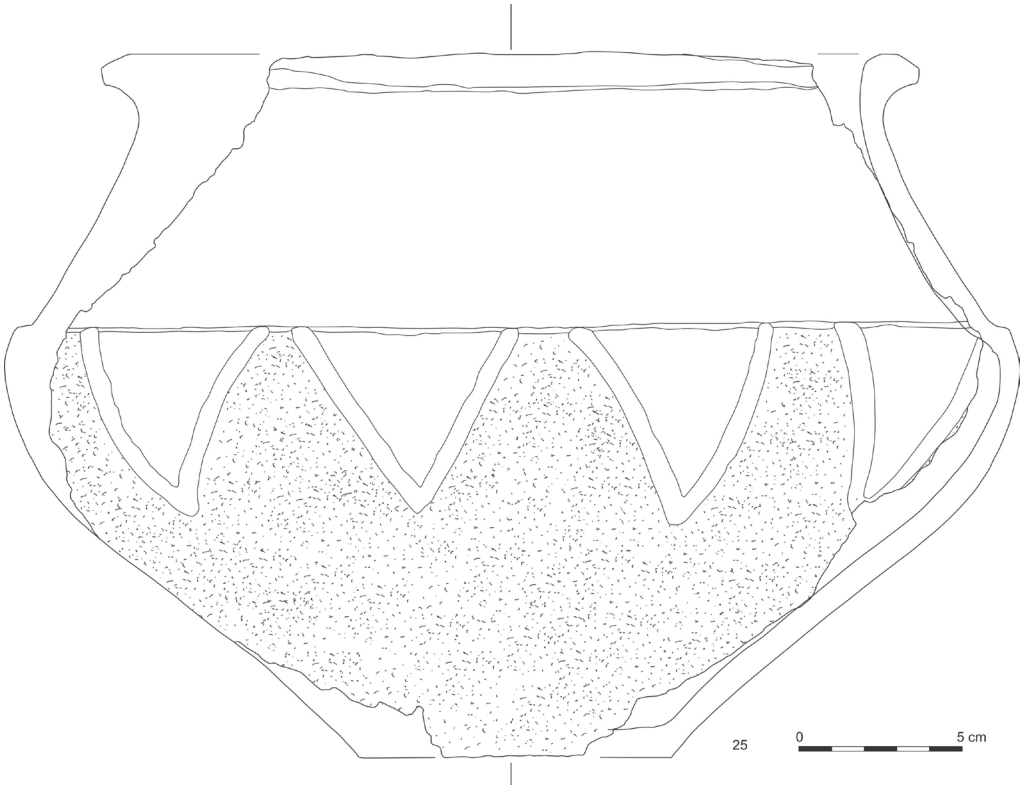

Fig. 5. Masłomęcz, site 15, grave 436, clay vase (drawn by A. Jączek).

logical framework and occurs in three different time periods: 1. 6th–5th century BC (includes stone beads made of allegedly non-jet, known only from a single cemetery near the ancient city of Olbia); 2. 2nd century BC (exclusively from Hellenistic funerary complexes); 3. 1st century BC – 3rd century AD, the beads of the late group, most widespread in the 1st–2nd century AD (at that time these beads probably came into use among the peoples living in the vicinity of ancient cities, who, according to the author, were not the inhabitants of these cities – Alekseeva 1978, 15f.). In my opinion, there is one more variant to be distinguished, namely the one decorated with circles (type 37b).

The author of the classification was aware of 251 such jet beads, all from eight necropolises with connections to the Hellenistic city centres (Alekseeva 1978, 86). Unfortunately, it is impossible to reconstruct the full number of beads from all the tomb complexes considered by Alekseeva.

Since the time of Alekseeva's research, the number of type 37 beads as well as their chronology and distribution have changed considerably. According to the literature available today, we have more than 712 finds – the number of beads in some find inventories is imprecise (see catalogue). It was assumed that in such cases there were always more than two pieces

(+2) – from 28 necropolises. They are also known from graves dated to the 4th century AD, e.g. in grave 21 in Družnoe in the Crimea. Although the grave has a broad date, in the second half of the 3rd–4th century AD, there were several burials in the burial chamber whose burial time is difficult to determine (Hrapunov 2002, 68). Tomb 21 also poses the problem of the exact chronology of other finds from the Crimea, where several bodies were buried in a burial chamber over the course of several or more decades (cf. Mul´d 2011, 99). Nevertheless, E. M. Alekseeva knew of no reasons to date the jet beads of type 37 later than the 3rd century AD.

Jet beads with circles on a relatively large surface are a new variant of major importance. They are known from the following archaeological sites: Čal´tyr, grave 10 with at least 19 specimens from the 1st century BC – 1st century AD (Larenok and Potapov 2004, 175, fig. 10: 14–17, 19; 176); Preobraženskoe, grave 5 in barrow 3: 3rd–1st century BC – 12 specimens (Abramova and Petrenko 1995, 55, fig. 12: 1); Tanais (most numerous), grave 209 from the 1st century BC – 14 specimens (Alekseeva 1982, 87, pl. 50: 9); tomb 180 – 17 specimens (Arsen´eva 1977, 139, pl. XLV/2; Alekseeva 1982, pl. 52: 1); grave 207 from the 1st century BC – 14 specimens (Arsen´eva 1977, 139, pl. XLV/3; Alekseeva 1982, pl. 50: 9) and tomb 48/1992, from the 1st century AD – 14 specimens (Arsen´eva *et al.* 2001, 58, 164, pl. 75: 970). It can be assumed that the gagat beads decorated with circles were widespread in the north-eastern part of the entire area of occurrence. Their period of use closes in the relatively narrow period from the 2nd (?) century BC to the end of the 1st century AD.

In comparison with the classification of E. M. Alekseeva, the chronology of the occurrence of jet beads of type 37 should be modified. Apart from considerable difficulties in the dating of individual find complexes (see catalogue), they are most numerous in five time horizons. The first corresponds to Alekseeva's findings and covers the 6th/5th century BC, when the type, represented by 22 specimens, appears for the first time. The second horizon includes 37 beads from the 3rd–2nd century BC; 8 from the 2nd century BC and 37 from the 2nd–1st century BC, totalling 81 pieces. Together with find complexes with a broad chronology from the 3rd to 1st century BC, the group comprises 101 specimens. The third horizon comprises burial inventories from the 1st century BC (91 pieces), the 1st century BC – 1st century AD (69) and the 1st century AD (21), totalling 181 beads, almost a third of the total number. The fourth horizon includes find complexes from the 1st–2nd century AD and from the end of the 1st and 2nd century AD (6 beads each), as well as from the 2nd–3rd century AD (18) and from the second half of the 3rd century (74), totalling 104 specimens, including the beads from Masłomęcz. Finally, only four specimens are known from the final horizon, dated to the end of the 3rd and 4th century.

It is quite possible that the third horizon would have looked different, assuming that the finds from the 2nd–1st century BC are basically closer to its younger section. The dominance of this horizon would then be even greater.

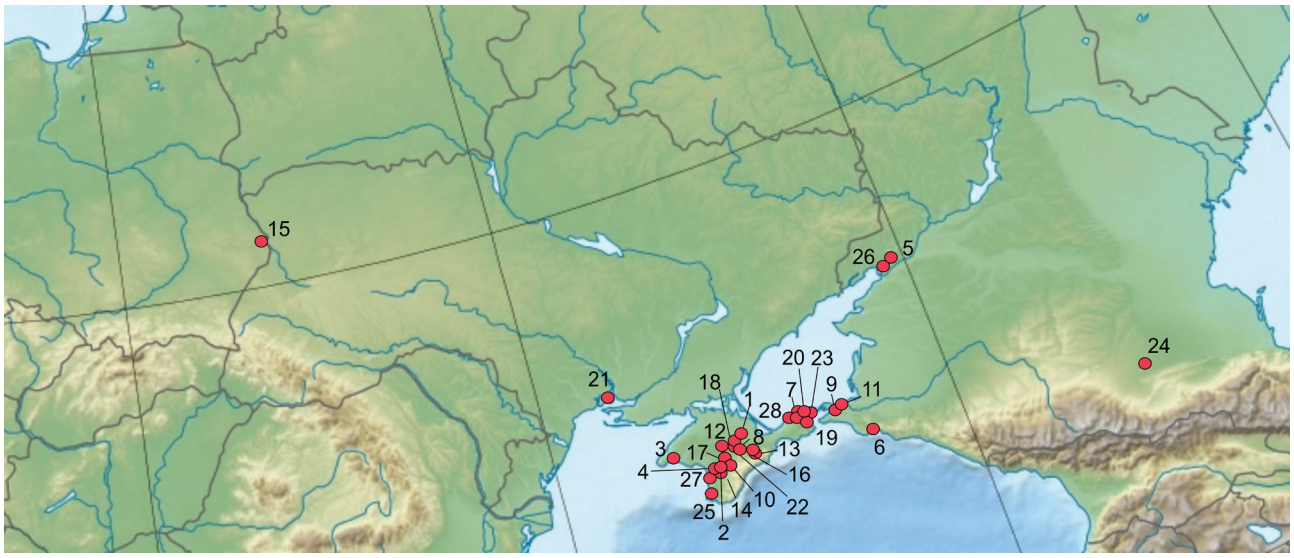

Fig. 6. Distribution of jet beads of the Alekseeva 37 type – the numbers correspond to those in the find catalogue (prepared by A. Kokowski).

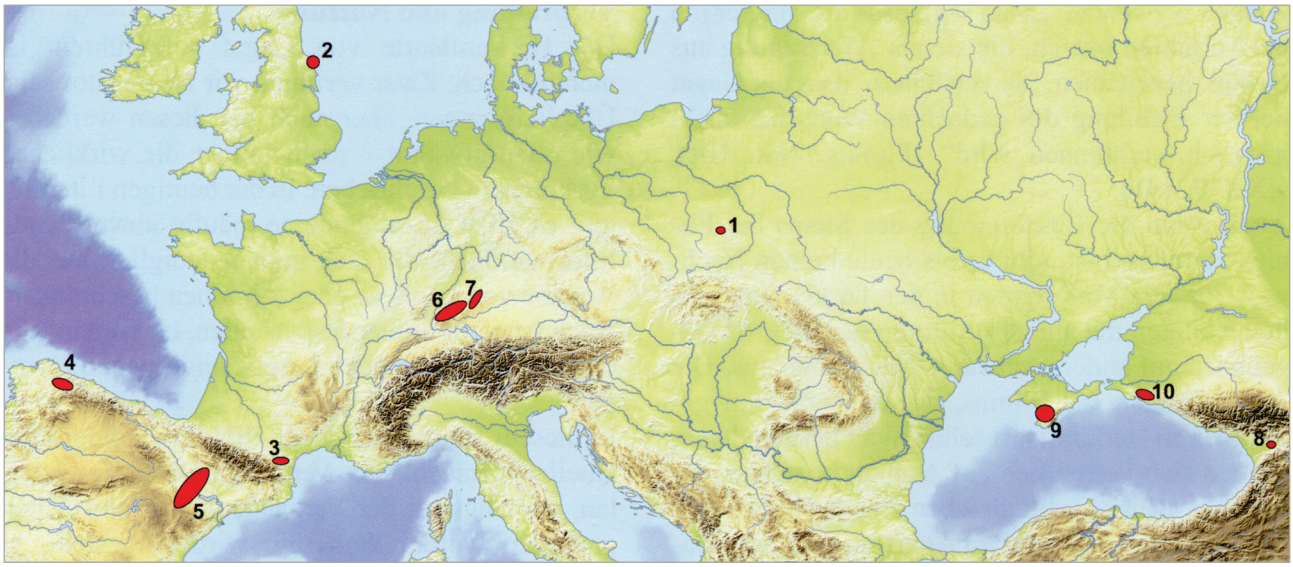

Fig. 7. European jet deposits (after: Kokowska 2012, fig. 2). 1. Świętokrzyskie Mountains; 2. Whitby / Yorkshire; 3. department of Aude; 4. province of Asturias; 5. province of Aragon; 6. Swabian Alb; 7. Franconian Alb; 8. Caucasus / Kutaisi; 9. Crimea / Balaklava; 10. Novorossijsk-Gelendžik.

The conclusions that can be drawn from this highly imprecise analysis can be formulated as follows: Alekseeva 37 type jet beads were favoured as part of the composition of necklaces especially in the 1st century BC – 1st century AD. A perhaps apparent revival, as we have no information on the dating of nine burial inventories from Nejzac in Crimea, took place in the second half of the 2nd and 3rd century AD, at the time when our beads arrived in Masłomęcz.

Origin and spread of the bead pattern

The origin of the discussed bead shape is closely linked to archaic Greek craftsmanship. In an impressive necklace from Olbia, grave 75/1910, there were eight specimens of type 37, according to M. V. Skržinskaâ made of lignite, a rock similar to jet, but also seven others made of gold, with circular decoration on the flat side, like Alekseeva type 37b (Skržinskaâ 1986, 124, fig. 5: 4). Identically decorated were the rhomboidal beads of unknown material, with a diagonal opening, discovered in grave 97/1913 in the same cemetery (Skržinskaâ 1986, 124, fig. 5: 3).

There remains the question of the distribution of square jet beads and presumably also the accessibility of this particular component of the necklace.

The vast majority of sites with our pearls – as many as 19 – come from the Crimea (Fig. 6). There are only three more outside the peninsula, albeit at a short distance from it, on the eastern side of the Kerč strait. Others are scattered; however, beads of type 37b were found in two necropolises in Tanais and Čaltyr´ at the mouth of the Don to the Sea of Azov. There is also a site in the Pre-Caucasus to the east and the cemetery in Masłomęcz to the north-west.

Summary

The "political distribution" of our beads is interesting. Almost a third of all finds were registered in the Bosporan Empire, and practically all others in the politically and economically dependent area of the "Scythian Empire" in the Crimea with its capital in Scythian Naples, which ruled over the Pontic steppes on both sides of the Dnieper and the Southern Bug – we have extensive literature on both areas. Especially recommended: Anohin *et al.* 1986; Hrapunov 2005, 120–148, 165–217. The prevalence of jet beads, which are rare outside the Crimea, means that either the Scythians, and after them the Sarmatians who lived to the north, were not interested in such jewellery, or they had no access to jet.

The explanation lies in the occurrence of jet in nature. The deposits lie from the province of Asturias and Aragon in present-day Spain; mutually from the Pyrenees to the latter in Département Aude; then further to the east are the Swabian Alb and Franconian Alb. On the British Isles they are known in Whitby/Yorkshire. Traces of jet have also been identified in Poland, in the Świętokrzyskie Mountains. In Eastern Europe, the area of Kutaisi (Caucasus) and an area between Novorossijsk and Gelendžik can be shown

(Fig. 7). The nearest deposits are in the Crimea, in the vicinity of Simferopol´ and Balaklava, in the small valleys of the Al´ma and Kača rivers (Kokowska 2011, 500–502, map 1; 2012). Hence a large number of jet beads, also of other types, in the necropolises of the Bosporan Empire and in Scythian and Sarmatian tombs not far away (Kokowska 2011, 503, map 2).

At the beginning of the 3rd century AD, type 37 jet beads were almost exclusively a component of necklaces worn in Crimea; the exception is grave 49 from the Cemdolinskij cemetery near Novorossijsk. The appearance of the type we are interested in far to the north, in the Hrubieszów Valley, may mean that the Goths living there were already in contact with the Crimean Sarmatians. Interestingly, these contacts took place before the historic attack of the Goths and their allies on Crimea in 253–254 and 254–256 AD (Wolfram 1990, 60–62; Kokowski 2007, 170–171).

However, it should be remembered that the early contacts of the Gothic tribes with the Sarmatians date back at least to the turn of the 2nd and 3rd centuries AD. This applies to communities living on the Great Hungarian Plain and the Black Sea steppes: areas of today's Moldova, southwestern Ukraine and Romania (Kokowski 2019, 59–61; Kokowski and Mazurek 2021, 228–229). Therefore, the discovery of jet beads from Masłomęcz is not only another confirmation of this fact, but also allows the Crimean Peninsula to be included in the area of contacts between these communities. Of course, with the reservation that type 37 jet beads, eagerly worn on the peninsula, could have reached the Goths from the Hrubieszów Valley via the Sarmatians living on the continent.

Catalogue of finds

The number in the catalogue corresponds to the number on the map in Fig. 5. It is followed by the number of finds in the locality in brackets; after the = sign the current number of all finds included in the catalogue.

1. [18 = 18] **Artezian / Артезиан**, Crimea, grave 112/2003, probably 18 specimens – uncertain, 3th century AD?, exact description lacking (Vinokurov 2014, 450, fig. 345: 5);
2. [+2 = 20] **Balta-Čokrak / Балта-Чокрак**, Crimea, grave 14, several specimens, end of 2nd – first half of 3rd century AD (Zajcev *et al*. 2005, 173, 192, fig. 14: 6);
3. [+58 = 78] **Belâus / Беляус**, Crimea, more than 58 specimens in 12 graves: grave 1 – 3 specimens (Daševskaâ 2014, 13, 115, pl. 6: 3; 118, pl. 9: 2, 9); grave 11 – 2 specimens (that one 15, 122, pl. 13: 4); grave 21 – 3 specimens (that one 26, 155, pl. 46: 5); grave 38 – 16 (?) specimens (that one 30, 175, pl. 66); grave 39 – 1 (?) specimen (that one 32, 179, pl. 70: 1); grave 61 – 16 specimens (that one 37, 196, pl. 46: 5); grave 61 – 16 specimens (that one 37, 196, pl. 46: 5); grave 61 – 1 (?) specimen (that one 32, 179, pl. 70: 1; 87: 2); grave 64 – 1 (?) specimen (that one 38, 199, pl. 90: 16) ; grave 90 – 6 (?) specimens (that one 43, 215, pl. 106: 4); grave 138 – 1 (?) specimen (that one 49, 233, pl. 124: 19); grave 141 – 1 specimen (that one 51, 234, pl. 125: 3); tomb 153 – "several" ex. (that one 52, 238, pl. 129: 16); tomb 156 – 8 ex. (that one 54, 242, pl. 133: 6); time period – 1st century BC – 1st century AD;
4. [+4 = 82] **Brânskoe / Брянское**, Crimea, grave 7 – probably several specimens, end of 2nd – first half of 3rd century AD (Trufanov 2005, 323, fig. 2: 8); burial chamber 19 – several specimens, 1/2th century – first half of 3rd century AD (Trufanov 1998, 142, fig. 1: 2; 2005, 319);
5. [19 = 101] Čaltyr´ / Чалтырь, obl. Rostov, RUS, grave 10, broad dating: 2nd century BC – 1st century AD – 19 (?) specimens with circular decoration (Larenok and Potapov 2004, 175, fig. 10: 14–17, 19; 176);
6. [2 = 103] **Cemdolinskij / Цемдолинский**, city Novorossijsk, RUS, grave 49, 2nd/3rd century AD (Dovgalûk 2008, 190, fig. 117: 13–14; 231, fig. 123: 1);
7. [21 = 124] **Chersones (Tavrijskij – Χερσόνησος, Sevastopol´) / Херсонéс Таври́йський**, Crimea, grave chamber 242/1910, the finds were determined "to be dated to BC" – 1 specimen; grave 1910, undated – 1 specimen (Alekseeva 1978, 17, 84);
8. [23 = 147] **Družnoe / Дружное**, Crimea, grave 24, single burial, second half of 3rd century AD – 21 specimens (Khrapunov and Muld 1999, 117, 120; fig. 120; Hrapunov 2002, 69, 121, fig. 21; 208, fig. 108: 3); burial chamber 21, 7 burials, second half of the 3rd–4th century AD – 2 specimens (Hrapunov 2002, 68, 118, fig. 18; 204, fig. 104: 37–38);
9. [16 = 163] **Fanagor**â (Φαναγόρεια) / Фанагория (Sennyj), Krasnodarskij Kraj, RUS, grave 8/1964, 1st century BC – 11 specimens; tomb 189/1965, undated – 5 specimens (Alekseeva 1978, 83);
10. [18 = 181] **Fontany / Фонтаны**, Crimea, grave 8, single burial, 2nd–3rd century AD (Hrapunov 2008, 12, 46, fig. 17: 19; 54, fig. 25: 5);
11. [26 = 207] **Керу / Кепы**, Krasnodarskij Kraj, RUS, grave 34/1960, 2nd century BC – 3 specimens; grave

38/1960, 2nd–1st century BC – 8 specimens; grave 81, skeleton 3, 3rd – beginning of the 2nd century BC – 6 specimens; grave 160/1962, 2nd century BC – 9 specimens (Alekseeva 1978, 77);

12. [+3 = 210] **Kermen-Kyr / Кермен-Кыр**, Crimea, barrow, 2nd–1st century BC – more than 2 specimens (Vysotskaâ 1968; Puzdrovskij 2007, 324, fig. 51: 11);
13. [4 = 214] **Kurskoe / Курское**, Crimea, grave 1 – more than 2 specimens, first half of 3rd century AD (Trufanov and Koltuhov 2002, 280, fig. 2); grave 5 – 1 specimen (Trufanov 2009, 248, fig. 78: 40), grave 22 – 1 specimen (Trufanov 2009, 248, fig. 78: 80); without dating;
14. [55 = 269] **Levadki / Левадки**, Crimea, grave 9, niche 1, mid-3rd century AD – 18 specimens (Hrapunov *et al.* 2001, 119, fig. 11: 3, 30; 161); grave 12 – 24 specimens (that one 127, fig. 17: 37); stray find (that one 129, fig. 18: 22); grave 18, 2 burials, 2nd–1st century BC – 1 specimen (Hrapunov 2004, 193, fig. 10: 52; 194, fig. 11: 4); burial chamber 60, more than 3 burials, 1st century BC – 3rd century AD – 12 specimens (Mul´d 2011, 107, 108, 114, fig. 6 : 29; 115, fig. 7 : 21);
15. [10 = 279] **Masłomęcz**, county Hrubieszów, PL, Masłomęcz Group, grave 436, early 3rd century AD (C1a);
16. [5 = 284] **Mičurinsk / Мичуринск**, Crimea, grave, single burial, first half of 3rd century AD (Mul´d 2001, 56, no. 32a; 66, fig. 5: 12);
17. [7 = 291] **Neapol´ Skifskij (Neápolis – Simferopol') / Неаполь Скіфский**, Crimea, grave 6, at least 3 burials, 1st century AD (Symonovič 1983, 32; 165, pl. XLVI/8);
18. [85 = 376] **Nejzac / Нейзац**, Crimea, burial chamber 306, 3rd – early 4th century AD – 2 specimens (Hrapunov 2011a, 18, 61, fig. 30: 20); grave 17 – 2 specimens (Hrapunov 2004, 218, fig. 35: 96); grave 20, single burial, second half of 2nd – first half of 3rd century AD – 17 specimens (Hrapunov 2006, 165, 233, figs. 34: 14, 16, 18); grave 1 – 8 specimens; grave 18 – 1 specimen; grave 23 – 2 specimens; grave 28 – 1 specimen, grave 36 – 3 specimens; grave 50 – 1 specimen; grave 53 – 1 specimen; grave 92 – 6 specimens; grave 139 – 4 specimens; grave 169 – 3 specimens (Stoânova 2004 – in the case of the tombs cited here, exact dating is not possible, as the author was only interested in the frequency of individual bead types.); grave 191, 2nd – early 3rd century AD – 18 specimens (Stoyanova 2013, 161, fig. 3: 3; 163, fig. 5: 2); grave 300, 2 burials, 3rd century AD – 30 specimens (Hrapunov 2011b, 198, 214, fig. 9: 19);
19. [6 = 382] **Nimfejon (Νυμφαῖον) / Нимфейон**, Crimea, grave A216, first half of the 3rd century AD? (Grač 1999, 85, 262, pl. 115: 4);
20. [3 = 385] **Novo-Otradnoe / Ново-Отрадное**, Crimea, grave 7, 1st–2nd century AD (Alekseeva 1970, 164, pl. IV/14; 1978, 77);
21. [32 = 417] **Ol´biâ** (Ὀλβία Ποντική) / Ольбия, Миколаївська область, UKR, burial chamber 47/1902, "post-Christian" – 3 specimens; grave 30/1907 – 3 specimens; grave 75/1910, 6th–5th century BC – according to Skudnova (1988, 68), the grave is dated to the 6th century BC – 8 specimens (Skržinskaâ 1986, 123f., fig. 5; Skudnova 1988, 69, fig. 87); grave 39/1912, 5th century BC – 12 ex. (Skudnova 1988, 113–114, figs. 172; grave 56b/1912, 6th/5th century BC – 2 specimens; and stray finds – 4 specimens (Alekseeva 1978, 77f.);
22. [2 = 419] **Opuški / Опушки**, Crimea, grave 5, single burial, 2th (?) century AD – 2 specimens (Stoânova 2012, 7, 9, fig. 4: 24);
23. [8 = 427] **Pantikapaion (Παντικάπαιον, Kerč) / Пантикапей (Керч)**, Crimea, grave 7/1860, 1st–2nd century AD – 3 specimens; stray finds, 2nd century BC – 4 specimens; single find – 1 specimen, undated (Alekseeva 1978, 79–80);
24. [32 = 459] **Preobraženskoe /** Преображенск**ое**, Caucasus, barrow 3, grave 5, single burial, 3rd–1st century BC – 32 specimens of which 12 with circular decoration (Abramova and Peterenko 1995, 55, fig. 12: 1; Fialko 2015, 72, fig. 43; Prokopenko 2014, 211, fig. 62);
25. [36 = 495] **Sovchoz 10 Inkerman / Інкерман**, Crimea, grave 69, second half of 2nd–3rd century AD – 4 specimens; grave 115, second half of 2nd–3rd century AD – 13 specimens; grave 181, second half of 2nd–3rd century AD – 19 specimens (Alekseeva 1978, 80);
26. [135 = 630] **Tanais (Τάναϊς) / Танаис (Nedvigovka)**, obl. Rostov, RUS, more than 135 specimens: grave 15/1955, 2nd century BC – 1 specimen (Šelov 1961, 13 – Šelov's descriptions of the grave inventories are highly generalised, so Alekseeva's determinations cannot be verified); grave 54 – 4 specimens; grave 70 – 6 specimens; grave 80 – 1 specimens (Šelov 1961, 32); tomb 209, single burial, 1st century BC – 17 specimens: 14 with circular decoration, 3 undecorated (Arsen´eva 1977, 35; Alekseeva 1982, 87, pl. 50: 9); grave 177, single burial 1st century AD – ca. 54 specimens (Arsen´eva 1977, 19–20; Alekseeva

1982, pl. 53: 6); tomb 180, single burial, 2nd–1st century BC – 17 specimens with circular decoration (Arsen´eva 1977, 21, 139, pl. XLV/2; Alekseeva 1982, pl. 52: 1); grave 207, single burial, 1st century BC – 14 specimens with circular decoration, 3 specimens undecorated (Arseneva 1977, 33–34, 139, pl. XLV/3; Alekseeva 1982, pl. 50: 9); grave 38/1992, single burial, "first century's after Chr." – 3 specimens (Arsen´eva *et al*. 2001, 56, 160, pl. 72: 925); grave 45/1992, single burial, 1st century BC – 1 ex. (that one 57, 163, pl. 74: 956); tomb 48/1992, 1st century AD – 14 specimens with circular decoration (that one 58, 164, pl. 75: 970);

27. [64 = 694] **Ust´-Al´ma / Усть-Альма**, Crimea, more than 64 specimens: burial chamber 92, 1st cent. BC (?) – 5 specimens? (uncertain) (Vysotskaâ 1994, 177, pl. 32: 22); tomb 598 – 1? ex. (Trufanov 2009, 246, fig. 76: 42); tomb 702 – 8 ex., 3th century AD (that one Trufanov 2010, 157, fig. 8: 5b); tomb 803 – 19 ex., 3th century AD (that one 159, 165, fig. 9: i); grave 824, skeleton 3 – 14 ex., 3th century AD (that one 169, fig. 19: 21: ž; 173); 825 – 1 ex., 3th century AD? (that one 174, fig. 22: l; 175); grave 995 – 16 ex., 3th century AD? (Trufanov 2012, 79–80, fig. 10: 3b);
28. [18 = 712] **Zolotoe / Золотое**, Crimea: grave 237, 2 burials, "ancient period" – 9 specimens (Korpusova 1983, 112, 114, pl. II/5–6 – on the signature to the plaque erroneously labelled as grave 273); grave 47, 7 (?) burials, 2nd–1st century BC – 9 specimens (that one 103, 138, pl. II/1).

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The Environmental Context of the Early-Slavic Culture Settlement at Zofipole, Site 1, Kraków District

Abstract

Dobrzańska H. 2024.The Environmental Context of the Early-Slavic Culture Settlement at Zofipole, Site 1, Kraków District. *Analecta Archaeologica Ressoviensia* 19, 117–130

The paper presents the settlement of the Early-Slavic culture on site 1 at Zofipole, Kraków district, framed in the context of changes of natural environment from the 5th to the 7th century AD. The Zofipole site belongs to the group of nine small settlements from that period located on the left-hand side loess terrace of the Vistula River. This area is well recognized from both the archaeological and the paleographic points view. Despite unfavorable climatic changes, life there was facilitated by the natural advantages of the place. The location of settlements on the border of two different ecosystems – a loess terrace and a floodplain – was convenient for land cultivation and stock breeding. The floodplain was also the source of raw material for pottery production. In such conditions, elementary agricultural activities were possible and secured the basic needs of the inhabitants of the small settlements in that zone, such as that at Zofipole.

Keywords: Early-Slavic culture, Zofipole settlement, environmental conditions, climatic impact, subsistence strategy

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1. Introduction

The multi-culture site 1 at Zofipole, Igołomia-Wawrzeńczyce commune, is located in the Vistula River valley, on its left-hand loess terrace, ca 28 km east of Kraków (Fig. 1). The traces of settlement discovered over the course of many years of field research have been dated from the Early Neolithic to the Late Middle Ages. The site in question was first excavated already in 1934–1935 by Jan Bartys, but mainly in 1946–1949 by the team led by Tadeusz Reyman from the Archaeological Museum of the Polish Academy of Arts and Science, with the participation of Stanisław Buratyński and Andrzej Żaki. Archaeological excavations were carried out on approximately 30 ares of the site. This place, referred in the literature as site 1, was recognized as an important production center of wheel-made grey pottery (Nosek 1967, 117–118). In the 1980s the area of the village of Zofipole was surface surveyed. As a result, the site was augmented with the area to the east of the unnamed creek that flows nearby. Altogether, archaeological materials are distributed over an area of ca 18 ha (Fig. 1, 2). In 1986, the eastern part of the site was rescue excavated by Halina Dobrzańska, with the participation of Władyslaw Morawski, from the Institute of the History of Material Culture of the Polish Academy of Sciences, Kraków Branch (*Informator* 1987).

In the years 1995–1999, studies on the Zofipole pottery production center were carried out as part of the multidisciplinary project funded by the Polish Committee of Scientific Research, no. 1 H01G040 09. It included the surface and geophysical survey of the Zofipole site. In 1997 two pottery kilns from the Roman Period were excavated (Dobrzańska 2000; 2020).

In the course of the elaboration of materials of the Przeworsk culture obtained over the years, the presence of traces of the settlement from the Early-Slavic Period was confirmed.

Over a 30-km-long section of the Vistula River valley to the east of Kraków is an area well recognized in

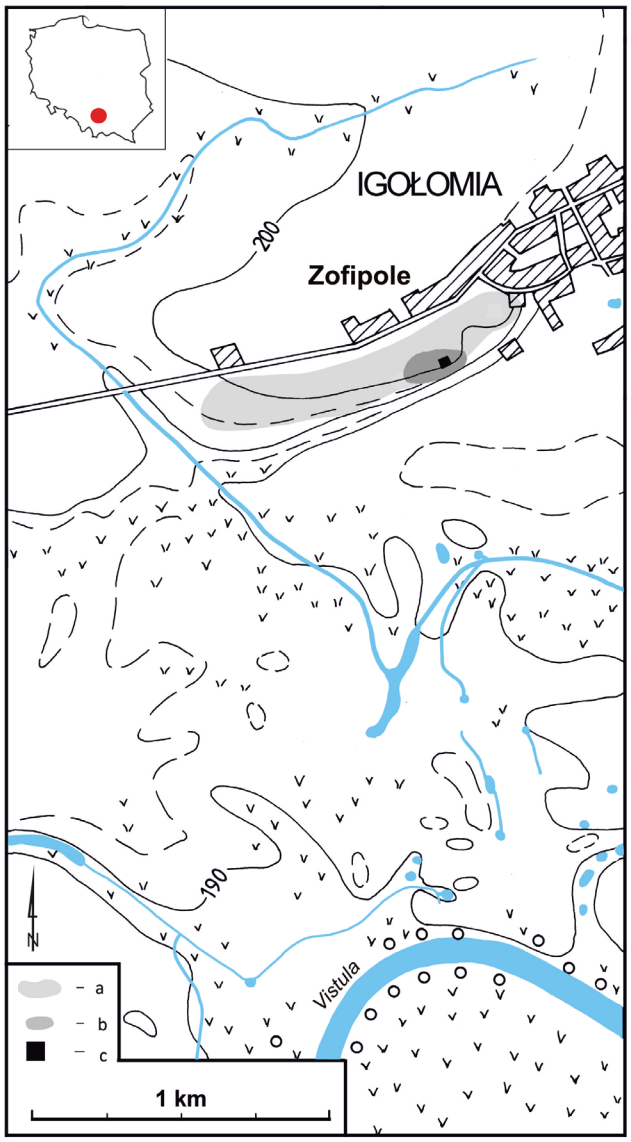

Fig. 1. Zofipole, site 1, Kraków district.
a – location of the site with its range marked according to the documentation of the Polish Archaeological Record Project, b – Early-Slavic settlement, c – archaeological reserve (drawn by I. Ściana).

the scope of archaeology and paleogeography (Kalicki 1991; 2006; Starkel *et al.* 1991; Kalicki *et al.* 1996; 2005). Settlement evidences from this area provided the basis for an interdisciplinary project focused on man-natural environment relations from the La Tène period to the Early Medieval Time, carried out by the Institute of Archaeology and Ethnology, Polish Academy of Sciences, in 2001–2008. It included geomorphologic studies and ^{14}C analyses of samples from the area of Zofipole and Igołomia, crucial for questions related to the functioning of the Zofipole settlement and the exploitation of the natural environment (Dobrzańska and Kalicki 2003; 2004; 2015; Dobrzańska *et al.* 2009; 2013).

2. Modern geographical environment

The settlement of the Early-Slavic culture at Zofipole, site 1, is situated in the Vistula River valley on a loess terrace ca 10 m above the bottom of the river floodplain and 1.8 km from its modern channel (Fig. 1).

Beneath the Kraków Gate, the Vistula flows through the western part of the Sandomierz Basin. Among the most distinctive features of this area is the erosional relief developed on Miocene clays covered with various Quaternary sediments. To the north, the valley is bordered by the erosional edge of the Proszowice Upland (Strzyż 2021), to which two Pleistocene Vistula terraces (8–12 and 15–25 m) are adjacent, covered by the Vistulian loess (Tyczyńska 1968; Gębica 2004). These terraces are drained by a few permanent streams from the upland and by a network of dry valleys (dellen).

The three-to-seven km wide floodplain, rising 4–5 m above the level of the Vistula River, has a very complex composition (Kalicki 1991a; 1991b; 2006; Gębica 2004). The floodplain is composed of a wide range of multi-age segments with numerous paleomeanders preserved in its relief. They testify to the lateral displacement and avulsions of the river channel (Starkel *et al.* 1991; Kalicki 1991a; 2006; Kalicki *et al.* 1996).

The alluvia of the floodplain are 4–15 m thick and are channel deposits – sands with gravels at the bottom, sands in upper parts, and higher up in the profile by overbank deposits of sandy silts, silts, and clayey silts (Kalicki 1991b; 2000).

On the loess fertile lessive soils developed, while alluvial and hydromorphic soils occur on the river floodplain and, on the valley bottom, mada are dominant (*Atlas* 1979, 16). The natural vegetation there (Fig. 3) has been almost completely destroyed by human activity. Potential natural vegetation consists of oak-hornbeam forests within higher and drier habitats, willow-poplar and elm, with alder-ash riverside forest in the bottom of the valley (*Atlas* 1979, 17). At present, this area is being cultivated and used agriculturally.

3. Changes of the natural environment at the turn of the Antiquity and the Early Medieval period in the upper Vistula basin

Development of the Early-Slavic culture corresponds with strong climatic cooling in the northern hemisphere known as the Dark Age, recently referred also as the Late Antique Little Ice Age (LALIA). Its beginning is dated by K. Harper (2021) to ca AD 530–

680. Among the evidence confirming climatic cooling at that time are tree-ring data which are the effects of three subsequent volcanic eruptions in the 6th century, as well as information in written sources. A characteristic element of this process, one not registered in the preceding two thousand years of the Holocene is its rapidness that led to the widespread crop failures. It was accompanied by a large scale outbreak of bubonic plague (Burroughs 2005, 258–260; Harper 2021).

Slow aggradations can be observed during the time in question in the Vistula River valley below Kraków, a process initiated already during the Roman period. Vertical accretion of mada on the floodplain occurred simultaneously with the channel aggradation. It is confirmed by the discovery at the Kraków Wyciąże site 6 of a layer with artefacts dating from the 4th century AD covered with clayey over bank deposits (Dobrzańska *et al*. 2013, 361). Climatic cooling and increased humidity have been registered in the Vistula alluvia. They caused intensive bank erosion, testified by increasing numbers of oak tree trunks in Vistula alluvia, dated to the period between AD 425 and 575 or 625 (Krąpiec 1996a; Kalicki and Krąpiec 1996, 82–85, fig. 25, 26, further references there). The severity of the winters is reflected by the appearance of moon rings in black oak trunks found in the river alluvia in southern Poland dated to ca AD 490 and 533. It is significant that they have not been registered in black oaks from the Roman period (Krąpiec 1998, 112, 124).

4. Materials

Materials from the Early-Slavic period from the Zofipole settlement, site 1, were spread over an area ca 3.5 ares (Fig. 3). Before their correct chronological recognition had been recognized (see unit 1), only one vessel referring to this period had been known – that from feature 16 (Zoll-Adamikowa 1985, 169, fig. 4: b), classified by Michał Parczewski as Type 4 (1988a, 199, 200, 294, pl. XXXII: 1).

Field documentation of excavations from the years 1946–1949 has not survived. Presently at our

Fig. 2. Zofipole, site 1, Kraków district. Early-Slavic features (drawn by A. Krzywda).

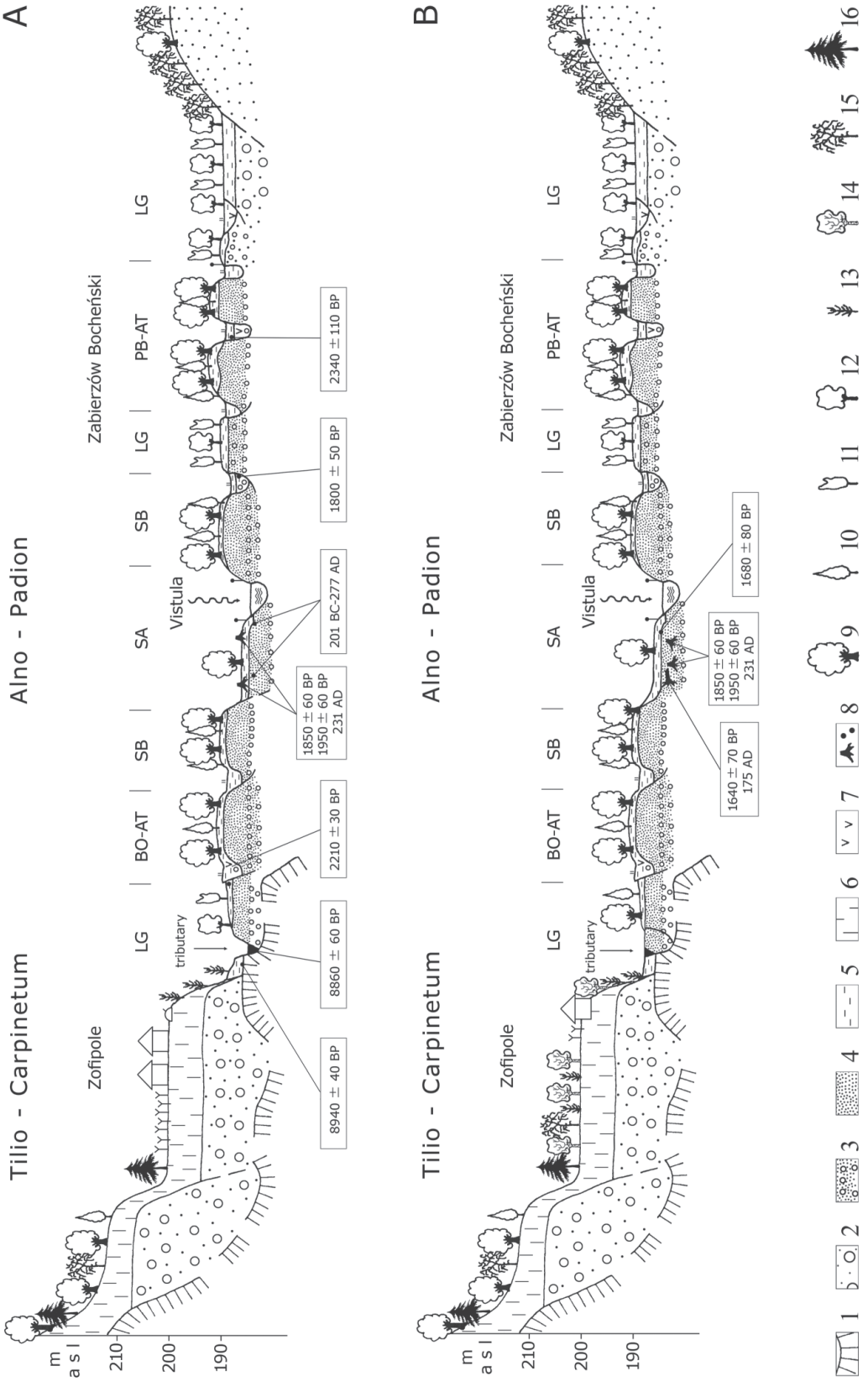

Fig. 3. Schematic palaeogeographical section across the Vistula River valley (after: Dobrzańska, *et al.* 2013, fig. 3).

A – Roman period; B – Early-Slavic period. 1 – Miocene clay, 2 – Pleistocene gravels with sands, 3 – Holocene gravels with sands, 4 – sands, 5 – silts (overbank deposits), 6 – loess, 7 – peats, 8 – trees and trunks cut by man, 9 – Quercus sp., 10 – Carpinus betulus, 11 – Alnus sp., 12 – Salix sp., 13 – Corylus avellana, 14 – Betula sp., 15 – Pinus sylvestris, 16 – Picea excelsa, 17 – Carex sp., 18 – meadows, 19 – cereals, 20 – dwelling zone of the settlement, 21 – production zone of the settlement. Age designations: AT – Atlantic, BO – Boreal, LG – Late Glacial, PB – Preboreal, SB – Subboreal, SA – Subatlantic. Radiocarbon and dendrochronological dating in boxes. Dating of redeposited detritus in brackets.

disposal there is only an incomplete outline plan of the site. From the very beginning, the research was focused on pottery kilns from the Roman period and those were documented by drawings and descriptions, unfortunately of low quality. Materials from Zofipole, site 1, are preserved in the Archaeological Workshop in Igołomia, Igołomia-Wawrzeńczyce commune, belonging to the Center of Mountain and Upland Archaeology in Kraków, Institute of Archaeology and Ethnology PAS.

In the Zofipole settlement at least 12 features and ceramic artefacts without context have been recognized as Early-Slavic (Fig. 2). They mainly came from the excavation trenches from the years 1946–1948. The stray finds are represented by pottery and clay roster discovered in house 19.

The analyzed pottery was made without using a potter's wheel, from potters paste of the first group according to the classification of Michał Parczewski (1988a, 28–29; 1988b, 14, 15). Its characteristic feature is the presence of crushed rock, gravel, or grog, occasionally all together. One can observe a high degree of diversity in terms of grain size and temper, and an uneven mix of their components. It makes it difficult to assess the size and amount of grains, especially in strongly fragmented vessels. Vessel surfaces were often coated with clay or smoothened with fingers. Nonetheless, temper grains are often visible or – beneath the clay layer – produce the effect of a slightly grainy surface. The composition of the pottery paste indicates a knowledge of the means to prevent the destruction of vessels during the firing process and their utilization. Early-Slavic pottery, apparently made without much care, in fact confirms the considerable technological expertise of their producers (more information: Dobrzańska 1998, 90, 91). For their classification, the criteria proposed by Michał Parczewski (1988a; 1988b) have been adopted.

Trench 1948 (Fig. 4)

Feature 2. Pit, partially explored
41 belly part fragments.

Feature 3. Hearth, partially explored
Pot 10.3 with drilled hole beneath rim Fd (Fig. 5: 1); fragment of pot, rim Fd (Fig. 5: 2); 3 small fragments (1 bottom and 3 rims).

Feature 7. Rectangular house, 2 × 1.2 m
Lower part of pot, gravel grains on the bottom surface.

Feature 9. Pit, circular outline, diameter ca 2 m
Rim Fe (Fig. 5: 3); 1 bottom fragment.

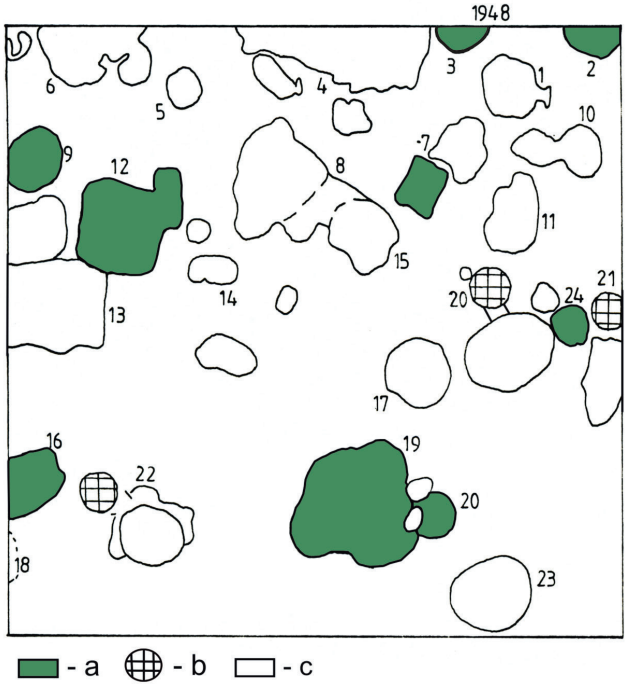

Fig. 4. Zofipole, site 1, Kraków district. Trench 1948: a – Early-Slavic features, b – Roman period pottery kilns, c – prehistoric features (drawn by A. Krzywda).

Feature 12. Rectangular house, 3 × 2.60 m, entrance in form of rectangular corridor, 2 × 1 m, orientation NW–SE
Depth 60–90 cm
Rim Fg (Fig. 5: 4); 2 bottom parts Kb2, Kc2 (Fig. 5: 5, 6); pot with proportions close to type 5.2, rim Fg (Fig. 5: 8).

Feature 16. Partially explored
Depth 40–60 cm
Bottom close to type Kd (Fig. 5: 7).
Depth 60–80 cm
Pot 4, rim Fg (Fig. 6); 1 belly fragment of pot.

Feature 19. Remains of irregular house, partially explored, dimensions ca 4.8 × 4.2 m
Depth 40–60 cm
2 rim fragments Fg; 2 bottoms Kc and Ke (Fig. 8: 2–4); 14 belly fragments; 12 clay roaster fragments (Fig. 7); 3 daub lumps; 2 iron slag lumps.

Feature 20. Kiln, circular outline, diameter 1.4 m, adjacent from E to feature 19
Depth 20–40 cm
Bottom Kc (Fig. 8: 5); 1 bottom fragment; 13 belly fragments.

Feature 24. Circular outline, diameter 1.2 m
Depth 160–180 cm
Rim Fd (Fig. 8: 6).

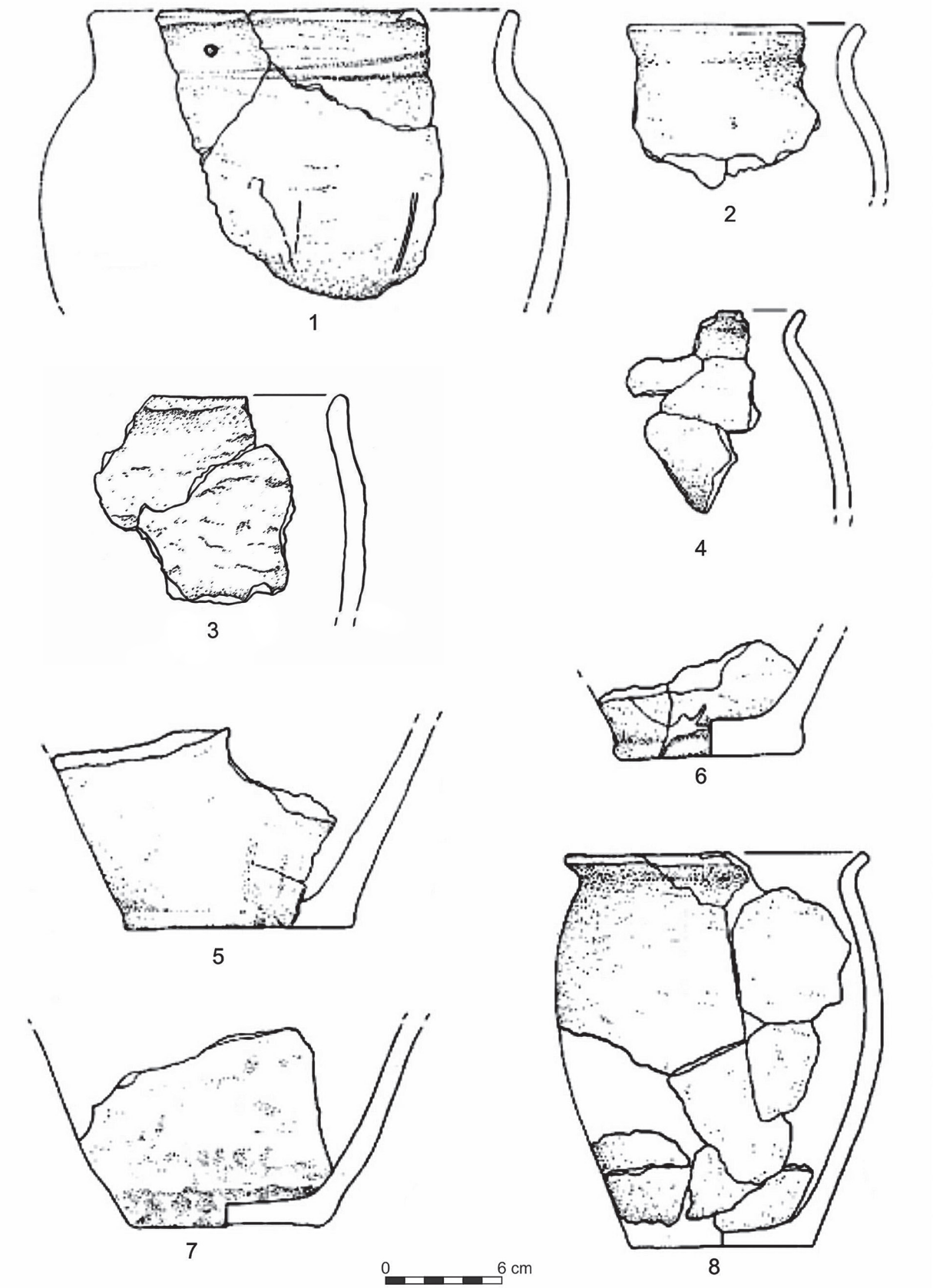

Fig. 5. Zofipole, site 1, Kraków district. Pottery. Feature 3 – 1, 2; feature 9 – 3; feature 12 – 4, 5, 6, 8; feature 16 – 7 (drawn by B. S. Szmoniewski and J. Ożóg).

Fig. 6. Zofipole, site 1, Kraków district. Ceramic vessel. Feature 16 (photo Oleksy).

Fig. 7. Zofipole, site1, Kraków district. Clay roaster. Feature 19 (photo M. Należny).

Depth 180–200 cm

Bottom Ka (8: 1); 3 damaged rims; 24 belly fragments.

Feature 25. No location information

Pot 4, rim Db (Fig. 8: 7).

Trench 1946 (Fig. 2)

Feature 52. Pottery concentration

Depth 20–40 cm

Pot type 2, rim Ba (Fig. 8: 8); pot type 2 or 3, rim Ba or Ca (Fig. 9: 1); upper part of pot (Fig. 9: 2); lower part of pot, bottom Kd (Fig. 9: 3); 1 belly fragment; 2 bottom fragments.

Feature 70. Circular outline, diameter 1.4 m

Rim Fc (Fig. 9: 4); 1 fragment of flat bottom, gravel grains on the surface.

Feature 72. Pottery concentration

Depth 40–60 cm

2 rims of pots Fc (Fig. 9: 5, 6); 1 rim Fa (Fig. 9: 7); 2 rims, burnt; 5 belly fragments.

Pottery from upper cultural layer of the fill of pottery kiln 20 from the Roman period (phases C1b–C2)

Depth 20–40 cm

2 rims of vessels Db and 1 Dc.

Pottery from the cultural layer of the settlement found outside features, with no precise location within excavation trenches

3 belly fragment Fc, Fa?, Bb (Fig. 9: 8–10); rim fragment Fc of small vessel 11; pot fragment, rim Fd (Fig. 9: 11); bottom Ka (Fig. 9: 12); 1 rim Db; 2 rim fragments Db of the same vessel; 2 rim fragments Db of the same vessel; 1 rim fragment Fd; 2 rim fragments Fd of the same vessel; 1 rim fragment Fe; 2 rim fragment Fg of the same vessel; lower part of pot, with bottom fragments with slightly visible plait impression (?); 6 pot belly fragments; 1 bottom fragment with gravel grains on the surface.

Conclusions

One can attribute 12 features to the Early-Slavic settlement at Zofipole, three of which (2, 3, 16) have been partially explored and two others (52, 72) are only represented by pottery concentrations. Feature 25 has not been plotted on the settlement plan. Three features were recognized as houses (7, 12 and 19).

Feature 19, sunken in the loess bed, had an irregular outline, possibly resulting from wall slides. At the time of exploration its surface was ca 20 sq m and adjacent to the east of it is feature 20 – a circular oven. Two analogous structures are known from the settlement in neighboring Igołomia. Feature 38/53 is irregular, with a circular oven to the NW, representing the remains of a house which probably had a square outline (Cygan 2006, 29). Feature 32/53 is smaller. In both cases, circular ovens situated to the NW and crossing the outlines of both structures, may illustrate a certain construction detail of the building. Due to safety reasons, the length of the wooden walls was limited by the ovens, and they did not extend beyond the oven domes (Dobrzańska 1998, 97, there further analogies). A similar wall construction was applied to house 19 at Zofipole, possibly squared.

Feature 12 is the rectangular house built on the area ca 8 sq m, with an entrance in the form of a corridor to the sunken structure. The absence of a heating device makes it difficult to attribute a domestic function to it. Houses with a corridor are known from the territories of the Early-Slavic culture in its European extent (Cygan 2006, 41, 42).

Irregular feature 7, of an rectangular outline and a surface area of ca 2.5 sq m, probably served as a utility structure. From the Zofipole settlement there are known 3 circular pits – nos. 9, 24 and 70, diameters 1 to 2 m, also probably of a similar use.

The pottery material from the Zofipole settlement is very fragmented. Pots prevail, but their forms can only be determined in 5 cases. There are vessels: 10.3 (Fig. 5: 1), 5.2 (Fig. 5: 8), 4 (Fig. 6), 4 (Fig. 8: 7) and 2 (Fig. 8: 8). A rare find is the clay roaster from domestic structure 19. It was made of yellow loess with no visible temper, slightly burnt. It has the form of rectangular plate ca 2 cm thick, with edges raised to ca 5 cm (Fig. 7). Artefacts of that type, used for drying and roasting grain, became common in the 7th–8th century AD (Parczewski 1988a, 66, 75, 76).

The most archaic material comes from feature 52, as testified by pot 2 with rim Ba, rated among the earliest (Parczewski 1988a, 61–63). The presence of the clay roaster in domestic feature 19 may indicate its younger age, probably the 7th century. A similar chronology can be attributed to feature 12 with a pot close to type 5.2 and rim Fg (Fig. 5: 8). As other types of rims are either long lasting (Fa, Db, Fg, Fc, Fd) or more often present in the younger horizon of the Early-Slavic culture (Fb and Dc), the remaining part of the material should be dated to the 6/7th century AD.

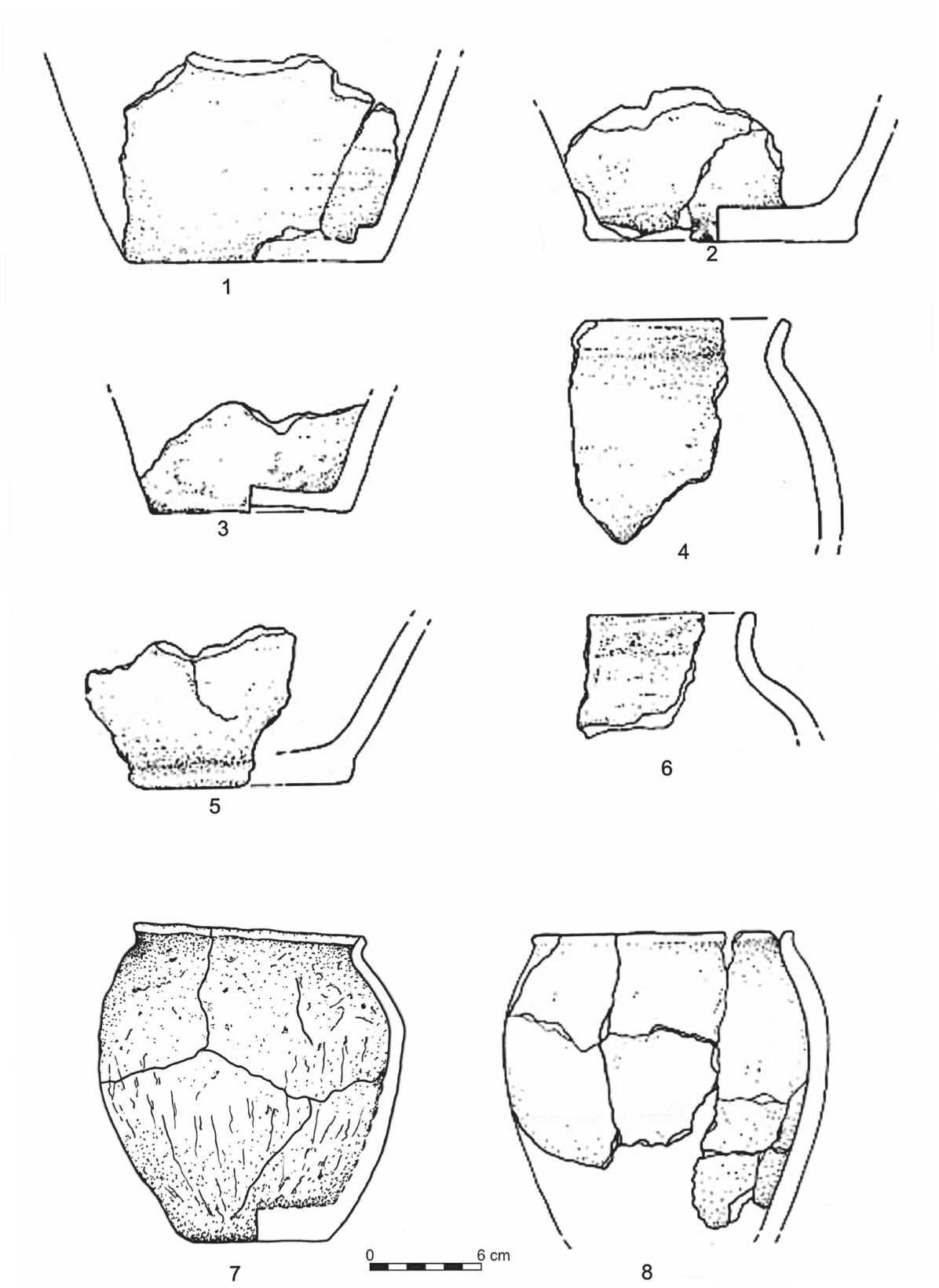

Fig. 8. Zofipole, site 1, Kraków district. Pottery. Feature 19 – 2, 3, 4; feature 20 – 5; feature 24 – 1, 6; feature 25 – 7; feature 52 – 8 (drawn by B. S. Szmoniewski and J. Ożóg).

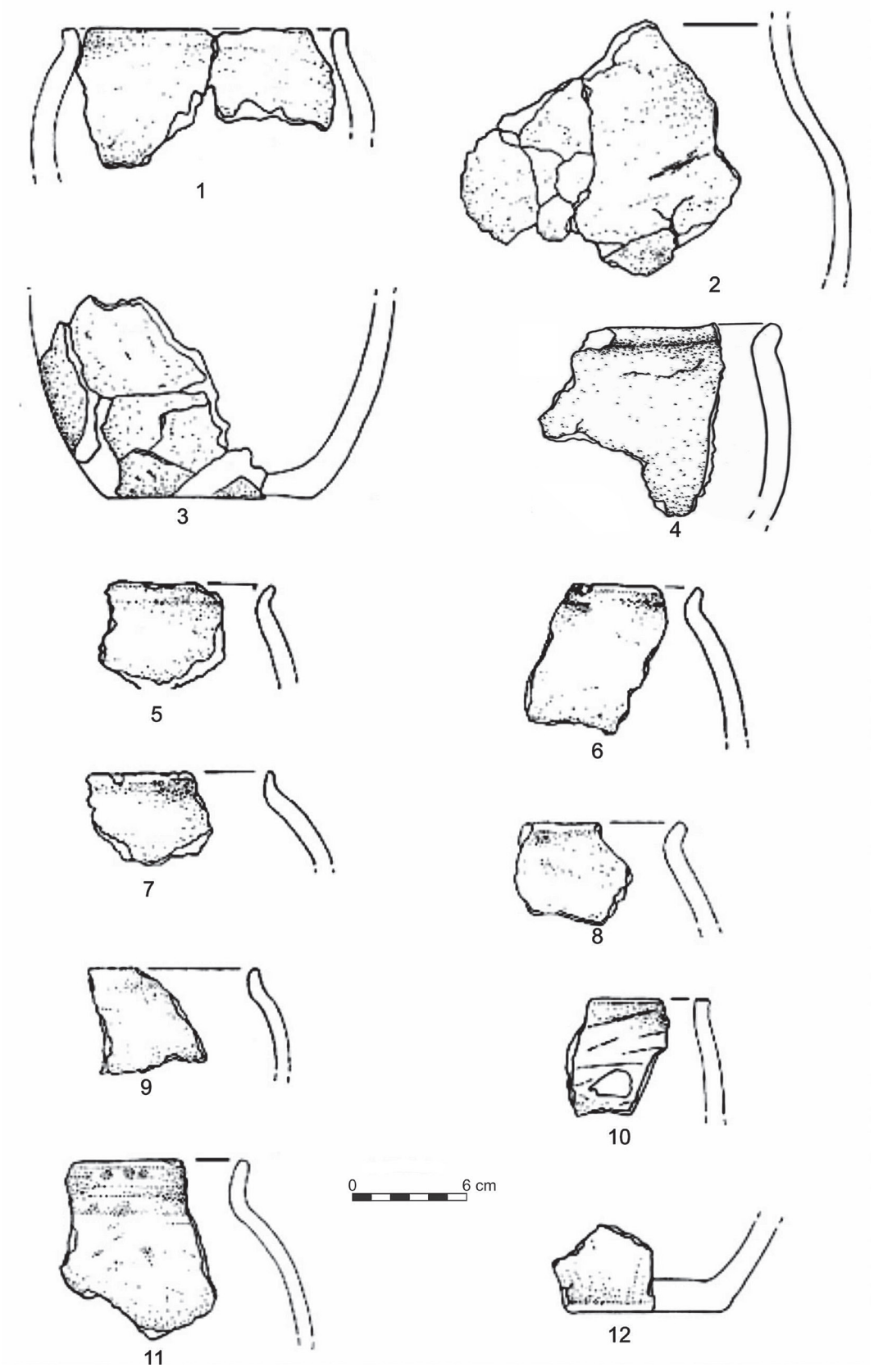

Fig. 9. Zofipole, site 1, Kraków district. Pottery. Feature 52 – 1, 2, 3; feature 70 – 4; feature 72 – 5, 6, 7; stray finds – 8, 9, 10, 11, 12 (drawn by B. S. Szmoniewski and J. Ożóg).

5. Final remarks

The Early-Slavic settlement in Zofipole, site 1, is one of nine sites of that type located over a well preserved 30-km-long section of the left-hand side of the Vistula River terrace, between Kraków-Nowa Huta and Nowe Brzesko. The settlements in question form a chain and are spread 1–3.5 km one from another (Dobrzańska 1998, 101, 102, fig. 11; Madyda-Legutko *et al.* 2005, fig. 6).

People of the Early-Slavic period living in the Vistula River basin preferred the promontories of the loess terraces, already intensively used in the Roman period. The decline of the settlement of the Przeworsk culture falls into the last quarter of the 4th century AD, as indicated by both archaeological and natural sources. The main reason for this crisis was the appearance of the Huns (Dobrzańska and Kalicki 2004, 120; 2018, 132). The Przeworsk settlements survived longer in interiors of the western Lesser Poland loess upland, until the beginning of the 5th century (Dobrzańska 1997, 359). The presence of the Huns on the territory of our interest has been confirmed by recent archaeological discoveries (Niebylski *et al.* 2024).

In comparison with the Roman period, Early-Slavic settlement sites in the Vistula River basin are much smaller, with infrequent traces of houses and utility structures. Their location was greatly influenced by hydro-morphological conditions (Dobrzańska *et al.* 2009, 170). The loess terrace edges were preferred (according to the geographical definition, this term refers to the area between the terrace edge and the terrace foot). The production zones of the Przeworsk culture settlements were previously located in this place (Fig. 10: A). The dry areas of the terrace were convenient for constructing sunken dwellings, structures typical in cold and wet periods (Fig. 10: B). A local stream flowing at the foot of the terrace provided water to the inhabitants of the settlement (Fig. 3: B).

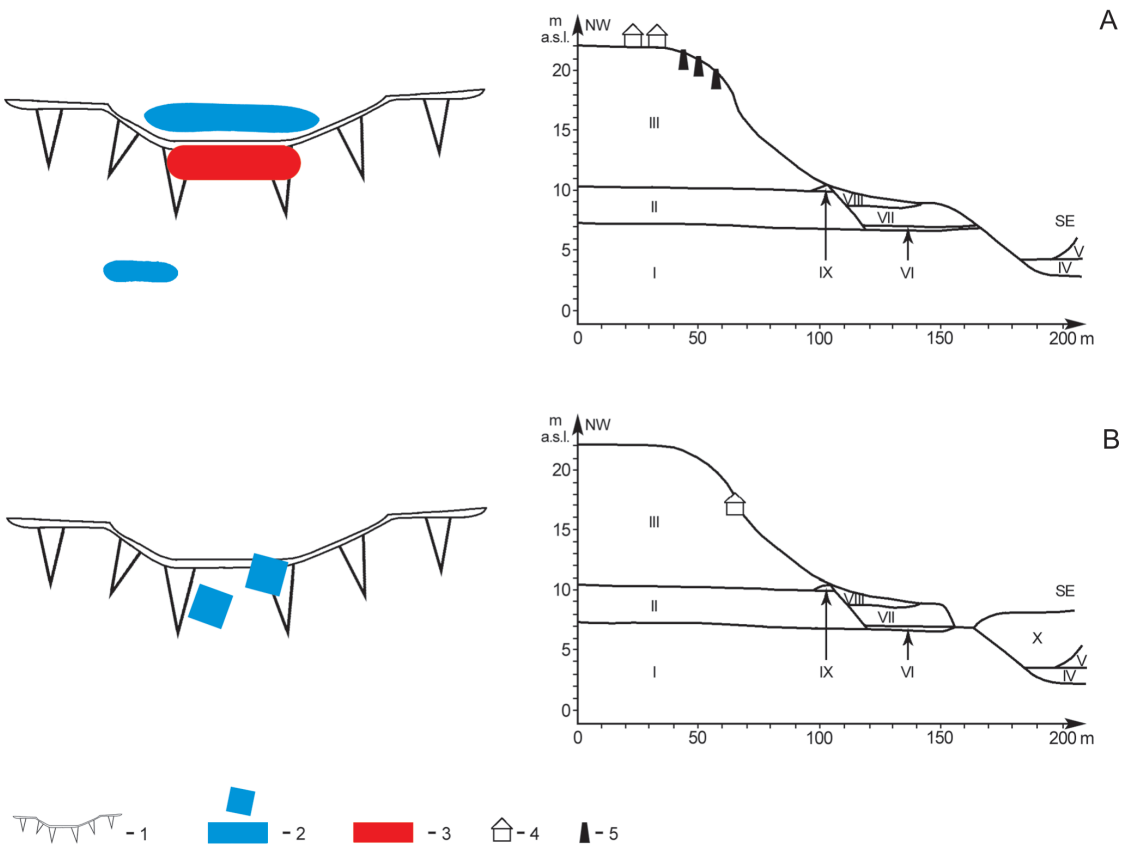

Fig. 10. Settlement models and changes of terrace edge in the Vistula River valley downstream of Kraków in the Roman (A) and Early-Slavic (B) periods (after: Dobrzańska *et al.* 2013, fig. 9).
1 – loess terrace plateau and edge, 2 – dwelling zones of settlements, 3 – production zone of the settlement, 4 – dwellings, 5 – pottery kilns; I – Miocene clay, II – Pleistocene channel alluvia, III – loess, IV – sandy-gravel alluvia of Young Pleniglacial/Late Glacial braided river, V – sandy alluvia of Young Pleniglacial/Late Glacial braided river, VI – lag deposits, VII – Neo Holocene overbank deposits, VIII – Neolithic (?) colluvia, IX – meadow ore, X – Roman/Early Medieval sandy alluvia.

The existence of people was based on cultivating the soil, growing crops, and raising livestock (Parczewski 1988b, 69f.; Szmoniewski 2016, 35f.).

Important from the economic point of view was the location of settlements on the border of two adjacent ecosystems (loess terrace and floodplain) of high biodiversity. For land cultivation, the flat part of the terrace with its fertile lessive soils was ideal. Geomorphologic research around the Zofipole settlement revealed the presence of fertile diluvia on the higher part of the floodplain at the terrace foot. They were convenient for garden crops cultivated not far from houses and close to creeks (Dobrzańska *et al*. 2009, fig. 3: B). With the intensive deforestation of the loess terrace, forest habitats of the floodplain, abundant with various plants, was a good source of fodder, also in winter. Especially remarkable is the presence of oak, as its acorns could be used as both food and as forage for pigs. The bones of these animals (4 individuals) were discovered in house 2/82 on the settlement at Igołomia next to Zofipole (Dobrzańska 1998, 100). Constructional wood came also from the floodplain, a good example of which is the house from Kraków Wyciąże, site 5b, built with wood from a 200-year-old oak (Poleska and Bober 1996; Krąpiec 1996b).

Birch used for making wood-tar probably came from the same environment (Fig. 3: B), the production of which was confirmed on the Igołomia settlement (Dobrzańska *et al* 2005). It was widely used as a medicinal agent, especially in the treatment of animals (Szmoniewski 2016, 42, 43, there further references). The floodplain was also the source of gravel, sand, and clayey silts, recognized in the pottery paste of the vessels produced in Zofipole.

The discovery of fishhooks in the settlements located in the zone in question may indicate that the floodplain was utilized as an additional food resource in the form of fishing places (Szmoniewski 2021, 181).

Despite the rising ground water level and local flooding, the floodplain remained accessible for people settling higher grounds (cf. discussion: Dobrzańska *et al*. 2009, 169, 170; 2013, 374). Increased river activity in the mid-5th century AD to the 6th century AD (resulting e. g. in massive oak felling) was not an obstacle that could not be overcome.

It should be underlined that climatic fluctuations AD 450–700 might have had various impacts on local Early-Slavic communities in Europe, depending on the local environmental conditions. Settling the border zone between two different ecosystems – those of the loess terrace and the floodplain, was advantageous for groups struggling to secure alimentary needs. As Przemysław Urbańczyk notices (2023) people of the 6th and 7th century AD, living in the difficult conditions of abrupt climatic cooling, were forced to turn to simpler forms of the rural economy.

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Military Accessories from the "Tursko Castle" Near Połaniec, Świętokrzyskie Voivodeship. A Contribution to Research on Mongolian and Mongolian-Ruthenian Raids on the Sandomierz Lands in the 13th Century

Abstract

Florek M. 2024. Military Accessories from the "Tursko Castle" Near Połaniec, Świętokrzyskie Voivodeship. A Contribution to Research on Mongolian and Mongolian-Ruthenian Raids on the Sandomierz Lands in the 13th Century. *Analecta Archaeologica Ressoviensia* 19, 131–141

The so-called Tursko Castle near Połaniec is the remnants of earth fortifications from the 17th century erected around an evangelical church. At the end of the 19th century it began to be associated with the Battle of Tursko, which took place during the first Mongolian raid in 1241. It was believed to be remains of a castle or stronghold located near the site of the battle, or the remnants of a Mongolian camp. At that time, no one knew where the clash had taken place. During a search for artefacts conducted within the perimeter of the castle in 2022–2023, a series of medieval military accessories were discovered. They included 12 tanged arrowheads and a fragment of a mace head. These artefacts should be associated with thirteenth-century Mongolian and Mongolian-Ruthenian raids on the Sandomierz lands.

Keywords: Middle Ages, military accessories, raids, Sandomierz lands, Battle of Tursko

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Introduction

The name "Tursko Castle" refers to the remains of earth fortifications located in a forest, ca. 8 km to the NE of Połaniec, at the border of the villages Tursko Małe, Tursko Wielkie, Tursko Kolonia and Strużki (Fig. 1). The discussed fortifications, which were probably never completed, date from the 17th century and were erected around an evangelical church built in ca. 1615 (Fig. 2). In the first half of the 19th century, between 1840 and 1849, the wooden church was dismantled due to its poor state of preservation and lack of worshipers. In the 1870s, the land on which the fortifications stand – together with the adjacent plots of land with residential and farm buildings – were sold by its proprietor, the local evangelical commune. As a result, they became part of the Staszów land assets owned by the Potocki family before subsequently being acquired by the Radziwill family from Sichów. A forest was planted at that time and it is currently known as the "Tursko Castle" natural reserve (Florek 2005; 2023).

As early as at the end of the 19th century, that is 50 years after the dismantling of the evangelical church, the fortifications (Fig. 3, 4) surrounding the building began to be referred to as the "Castle" and associated with the Battle of Tursko. It took place on the 13th February 1241 and was one of the most important events of the first Mongolian raid on Polish territories, albeit little known (Krakowski 1956, 131–133; Florek 2007, 35; 2023, 13). According to Jan Wiśniewski, the author of a monograph on the Sandomierz decanate published in 1915, the fortifications are the remains of a stronghold or castle near which the battle was

Fig. 1. Tursko Castle. Location on a topographic map of the Military Geographical Institute, Warsaw 1938 (prepared by the author).

Fig. 2. Tursko Castle. Location on Austrian map of West Galicia from 1801–1804 (so-called Hendelsfeld's Map) with marked building of the evangelical church (prepared by the author).

fought (Wiśniewski 1915, 95–97). On the other hand, an alleged local tradition written down by the then parish-priest of the Niekrasów congregation (which included Tursko) says that within the perimeter of the castle there was a church dedicated to St. Michael, erected as a votive offering for the victory over the Mongols in 1241. Closed and abandoned after an interdict was issued for the killing of a local priest, the church fell into ruin and was dismantled at the end of the 18th century (Wiśniewski 1915, 100; Florek 2005, 267). Nevertheless, no written sources mention a St. Michael's church having been built in Tursko or in its surroundings.

In 1955, a surface survey was conducted by Leszek Gajewski and Jan Machnik at the site of the castle and in its surroundings (Machnik 1957, 161–162). It did not lead to the discovery of any artefacts, but it confirmed that the stronghold had been fortified with a rampart. What is more, the scholars collected information on earlier serendipitous finds of weaponry of the "eastern type" at the site of the castle and in the nearby forests. In 1963, another surface survey in the vicinity of the castle was carried out by a team led by Elżbieta Dąbrowska (Ciuraszkiewicz *et al.* 1965; Dąbrowska 1965, 25). It also did not result in any artefacts being found, and it was acknowledged that the fortifications were remains of an unspecified defensive structure from the Late Middle Ages, possibly built in the place of an earlier stronghold (Dąbrowska 1965, 25). At the same time, some publications started to refer to them as remains of a Mongolian military camp established in February 1241 (Łoziński *et al.* (ed.) 1962, 114).

In his report, J. Machnik presented a fallacious piece of information that the castle is located in Tursko Małe, although J. Wiśniewski had located it earlier in Tursko Wielkie. This mistake was the reason why E. Dąbrowska wrote about two different structures (Dąbrowska 1965, 25). Another duplication of strongholds in the vicinity of Tursko can be found in a paper by Jerzy Gąssowski, who mentioned three constructions of this type (a castle in Tursko Małe – after the publication by J. Machnik; quadrangular fortifications in Tursko Wielkie – based on a description in the Catalogue of Art Monuments; an unspecified rampart of earth in Tursko – a direct reference to the paper by J. Wiśniewski) (Gąssowski 1969, 396–397). These strongholds, together with other supposed earth for-

Fig. 3. Tursko Castle. Moat and rampart from the eastern side (photo by the author).

Fig. 4. Tursko Castle. South-eastern citadel (photo by the author).

tifications (which were in fact dikes left after former ponds or natural forms located in Strużki, Luszyca, Rudniki, Okrągła and Niekrasów) were thought to have comprised a system of defensive structures protecting the border of the Połaniec castellany (Gąssowski 1969, 397).

During the previously mentioned Battle of Tursko, on 13th February 1241, troops of knights from Kraków under the command of the voivode, Włodzimierz, clashed with Mongolian forces – led by Baidar – retreating from the area of Skalbmierz towards Sandomierz. Some sources mention that knights from Sandomierz under the leadership of the voivode Pakosław also participated in the battle. Although the Polish forces had the advantage in the first phase of the battle, it ended in their utter defeat – at least according to Jan Długosz (Labuda 1959, 205). The chronicler mentioned that after the initial triumph of the Polish knights – which led to them capturing the Mongolian camp and releasing the captives – they focused on plundering. This allowed the Mongolians to counterattack and win the battle. Even so, their losses were high enough to make them draw back towards Zawichost and then in the direction of the region of Sieciechów (Krakowski 1956, 131–133; Labuda 1959, 205; Florek 2007, 34–35).

The Mongols appeared for the next time near Tursko during another raid, in 1287–1288 (Krakowski 1956, 216; 1973, 202–203). The Mongolian forces, led by Talabuga and supported by Ruthenian troops of Lev Danýlovych, prince of Halych, Volodymir, prince of Volhynia, and Mstitslav, prince of Lutsk, besieged Sandomierz. Having failed to take it, they sacked the surrounding area and headed towards Kraków where they were supposed to join the other group of the Mongolian army, led by Nogai, which had advanced from Przemyśl. However, the two armies never met and the author of the Galician-Volhynian Chronicle attributed this failure to the "enmity" between Talabuga and Nogai and the fact that they "feared each other" (*Kronika halicko-wołyńska* 2017, 241). The chronicle says that the troops led by Talabuga initially headed towards Kraków, but they retreated in *Торжку* (*Gali´ko-Volins´kij lìtopis* 1994, 113). According to some historians, the locality in question is Tarczek near Bodzentyn (Żmudzki 2000, 456; *Kronika halicko-wołyńska* 2017, 240–241), but others claim it is Tursko near Połaniec (Krakowski 1973, 203; *Gali´ko-Volins´kij lìtopis* 1994, 113).

The description of the raid appears to clearly indicate that *Торжкоу* mentioned in the Galician-Volhynian Chronicle should be associated with Tursko, instead of Tarczek. The aim of both Nogai and Talabuga was to reach Kraków as quickly as possible. This means that Talabuga probably did not choose an indirect route which bypassed the Holy Cross Mountains from the north and west, but rather chose the shortest road from Sandomierz, which led along the Vistula (Tursko was one of the localities situated along this way). When he learned that he had been forestalled by Nogai – which most likely aggravated the mutual hostility between the two leaders – he resigned from moving forward against Kraków. Instead, he turned back near Tursko and focused on plundering the Sandomierz lands.

The written sources do not allow us to determine the precise location of the Battle of Tursko, especially since there have been two localities bearing this name since the Late Middle Ages: Tursko Wielkie and Tursko Małe. According to Długosz, the battle was fought at Tursko Wielkie (Labuda 1959, 205).

Previous discoveries and archaeological research in the vicinity of Tursko Wielkie and Tursko Małe did not contribute much to determining the location of the battle fought in 1241 or the locality reached by the Mongolian-Ruthenian forces during the raid from 1287–1288. Until recently, we did not know of any weapons of nomadic or Ruthenian origin except for some information collected in 1955 on discoveries of weaponry with an "eastern" character which had been found in the forests surrounding Tursko. Interestingly, military accessories that could be linked with the Mongols or Ruthenians were also not found at the site of the stronghold "Okop" in Winnica, located several kilometers from Tursko. This stronghold is associated with the castellan fortress in Połaniec, which according to written sources was destroyed during the raid of 1241 (Chomentowska and Michalski 1994, 90–94). Archaeological research conducted there in the 1960s and 1980s only resulted in finding a dozen or so iron sleeved crossbow boltheads (weapons used by Polish knights rather than by eastern invaders). These artefacts have never been published (cf. Strzyż 2006). They are stored in the Centre of Culture and Art in Połaniec.

Results of research conducted at the site of Tursko Castle in 2022–2023

In 2022–2023, research with the use of metal detectors was conducted on the premises of Tursko Castle. The research team included, among others, the members of the Holy Cross Exploration Group from Ostrowiec Świętokrzyski. The research was enabled by a permit issued by the Voivodeship Monument Con-

servator. It led to the discovery of a relatively modest yet interesting set of medieval weaponry:

– mace head (Fig. 5): made copper-alloy, fragmentarily preserved (the dimensions are not given because of the poor state of preservation);

Fig. 5. Tursko Castle. Fragment of a bronze mace (photo by the author).

– arrowhead 1 (Fig. 6: 1): tanged, made of iron; tang clearly distinct, square in cross-section; slender leaf, rhomboidal, widest at ca. one third of its length, having a rhomboidal cross-section; dimensions: total length – 100 mm, leaf length – 69 mm, thickness of the tang at mid-length – 3 mm, max. width of the leaf – 12 mm, thickness of the leaf in the widest part – 4 mm; weight – 12.38 g;
– arrowhead 2 (Fig. 6: 2): tanged, made of iron; tang clearly distinct, circular in cross-section; slender leaf, rhomboidal, widest at ca. one third of its length and having a rhomboidal cross-section; lower edges of the leaf are slightly trimmed; dimensions: total length – 76 mm, blade length – 42 mm, tang dimeter at mid-length – 3 mm, max. width of the leaf – 10 mm, thickness of the blade in the widest part – 4 mm; weight – 8.64 g;
– arrowhead 3 (Fig. 6: 3): tanged, made of iron; short tang, clearly distinct, square in cross-section; slender leaf, with a nearly rhomboidal outline, max. width of the leaf ca. at its mid-length; rhomboidal in cross-section, somewhat flat; dimensions: total length – 76 mm, leaf length – 60 mm, tang thickness at mid-length – 3 mm, max. width of the leaf 15 mm, blade thickness in the widest part – 3 mm; weight – 7.29 g;
– arrowhead 4 (Fig. 6: 4): tanged, made of iron; short tang, slightly distinct, square in cross-section; slender leaf, with a nearly rhomboidal outline, max. width above the middle of its length, rhomboidal in cross-section; dimensions: total length – 67 mm, leaf length – 56 mm, tang thickness – 2 mm, max. width of the leaf – 16 mm, thickness of the leaf in the widest part – 4.5 mm; weight – 8.92 g;
– arrowhead 5 (Fig. 6: 5): tanged, made of iron; tang clearly narrowing down towards the end, square in cross-section; lancet-shaped leaf, broken away near the end, rhomboidal in cross-section, somewhat flat; the place where the leaf meets the tang is marked with a type of a ring; dimensions: total length – 70 mm (originally ca. 73 mm), leaf length – 42 mm, thickness of the tang at mid-length – 3.5 mm, max. width of the leaf – 13 mm, blade thickness in the widest part – 4 mm; weight 6.56 g;
– arrowhead 6 (Fig. 6: 6): tanged, made of iron; tang clearly distinct, slightly narrowing down towards the end, cross-section in the shape of a short rectangle; rhomboidal outline of the leaf, with the max. width ca. at mid-length, rhomboidal in cross-section; dimensions: total length – 68 mm, leaf length – 44 mm, tang cross-section at mid-length 3 × 2.5 mm, max. width of the leaf – 15 mm, leaf thickness in the widest part – 4.5 mm; weight – 8.81 g;
– arrowhead 7 (Fig. 6: 7): tanged, made of iron; clearly distinct tang, narrowing down towards the end, relatively short, square in cross-section; slender leaf, with a nearly rhomboidal outline, with the max. width slightly below its mid-length, rhomboidal in cross-section; dimensions: total length – 58 mm, leaf length – 40 mm, tang thickness – 2.5 mm, max. width of the leaf – 13 mm, thickness of the leaf in the widest part – 4 mm; weight – 5.66 g;
– arrowhead 8 (Fig. 6: 8): tanged, made of iron; clearly distinct tang, square in cross-section, narrowing down towards the end; slender, lancet-shaped leaf, rhomboidal in cross-section, somewhat flat; the place where the blade meets the tang is marked with a sort of a ring; dimensions: total length – 56 mm, leaf length – 40 mm, thickness of the tang at mid-length – 3 mm, max. width of the leaf – 12 mm, thickness of the leaf in the widest part – 2 mm; weight – 4.46 g;
– arrowhead 9 (Fig. 6: 9): tanged, made of iron; tang slightly distinct, square in cross-section; slender leaf, with a nearly rhomboidal outline, with the max. width at ca. one third of its length, rhomboidal in cross-section; dimensions: total length – 56 mm, leaf length – 37 mm, tang thickness – 3 mm, max. thickness of the leaf – 13 mm, thickness of the leaf in the widest part – 3.5 mm; weight – 4.56 g;

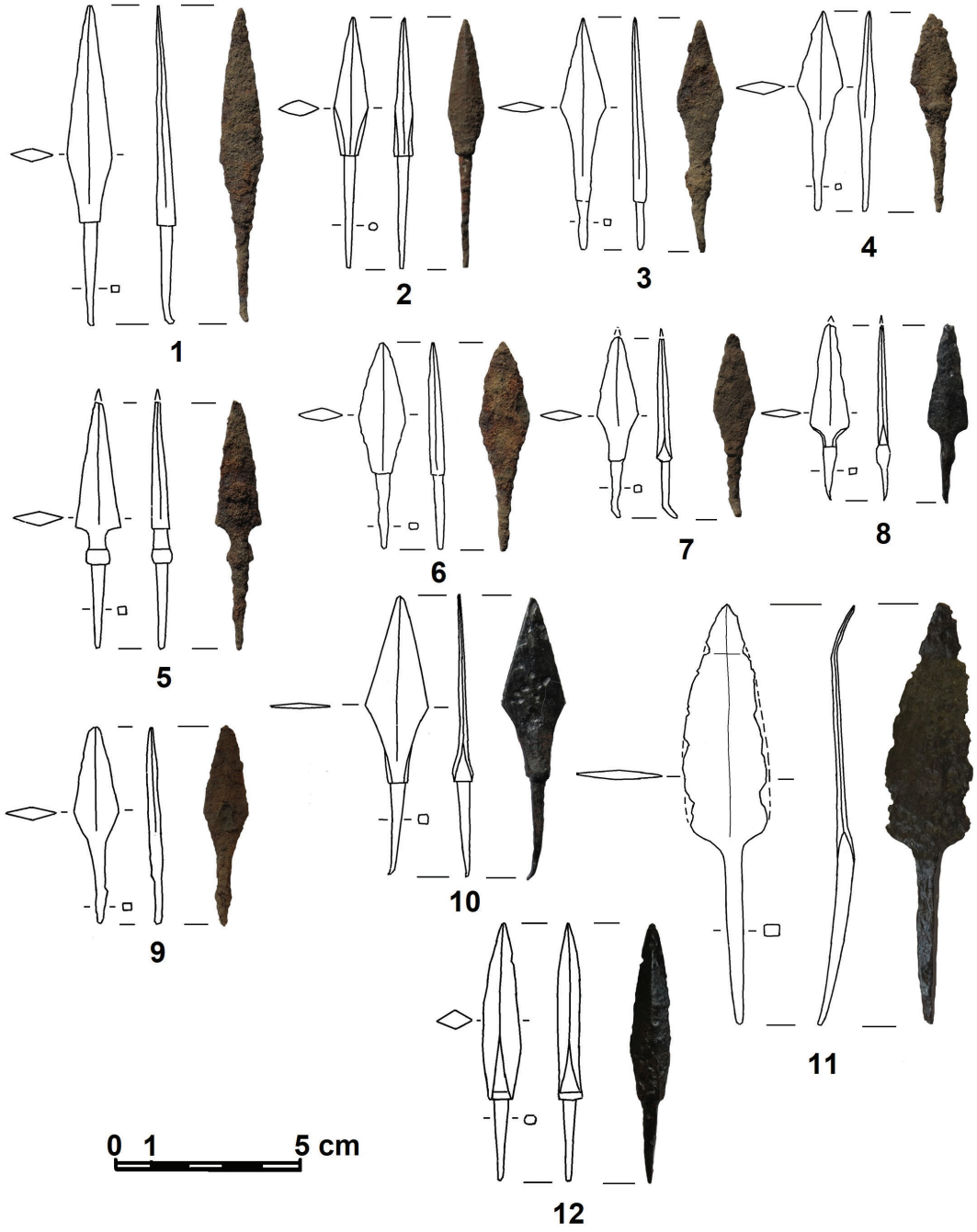

Fig. 6. Tursko Castle. Tanged arrowheads (prepared by the author).

– arrowhead 10 (Fig. 6: 10): tanged, made of iron; tang clearly distinct, square in cross-section; slender leaf, nearly rhomboidal in cross-section, widest ca. at its mid-length, resembling a flat rhombus in cross section, thickened in the place where it meets the tang; dimensions: total length – 86 mm, leaf length – 56 mm, thickness of the tang at mid-length – 3 mm, max. leaf width – 19 mm, thickness of the leaf in the widest part – 2 mm; weight – 9.18 g;
– arrowhead 11 (Fig. 6: 11): tanged, made of iron; long tang, rectangular in cross-section, narrowing down towards the end; leaf-shaped leaf, resembling a flat rhombus in cross-section; dimensions: total length – 140 mm, leaf length – 75 mm, thickness of the tang at mid-length – 5 mm, max. width of the leaf – 28 mm, thickness of the leaf in the widest part – 2 mm; weight – 27.23 g;
– arrowhead 12 (Fig. 6: 12): made of iron, tanged; clearly distinct tang, oval in cross-section, regularly narrowing down towards the end; slender leaf, with a nearly rhomboidal outline and max. width at ca. one third of its length, rhomboidal in cross-section,

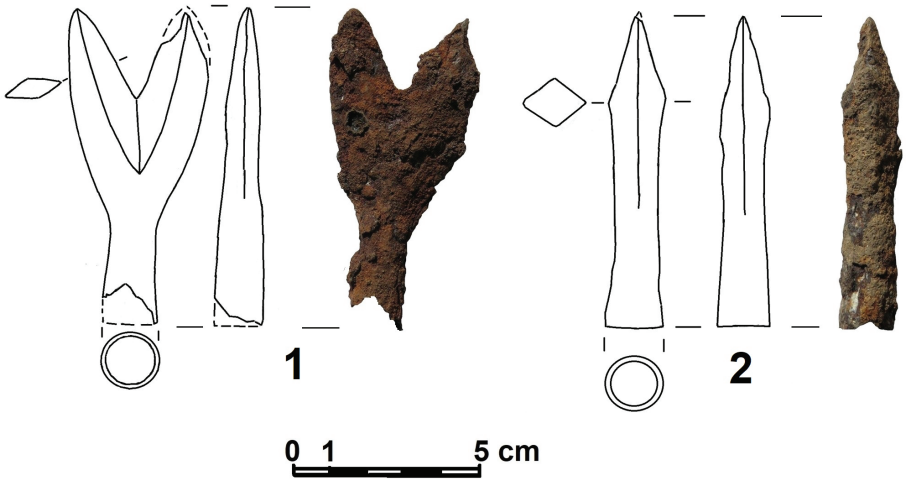

Fig. 7. Tursko Castle. Sleeved projectile heads (prepared by the author).

with a kind of a ring where the leaf meets the tang; dimensions: total length – 68 mm, leaf length – 45 mm, thickness of the tang at mid-length – 2.5 mm, max. width of the leaf – 10 mm, thickness of the leaf in the widest part – 5 mm; weight – 9.30 g;

- arrowhead or bolthead (Fig 7: 1): made of iron, sleeved; sleeve circular in cross-section; bifurcated leaf (both ends are rhomboidal in cross-section); dimensions: total length – 83 mm, leaf length – 55 mm, sleeve diameter –15 mm, max. width of the leaf – 35 mm, thickness of the leaf in the place of the bifurcation – 8 mm; weight – 48.54 g;
- bolthead (Fig. 7: 2): made of iron, sleeved; circular sleeve, turns gradually into the leaf, which has a similar thickness and rhomboidal cross-section, the leaf narrows down towards two thirds of its length; dimensions: total length – 83 mm, leaf length – 53 mm, sleeve diameter – 14 mm, cross-section of the leaf in the widest part – 14 × 15 mm; weight – 44.04 g.

Analysis

The fragment of the bronze mace head should be categorised as belonging to type IV (so-called star-shaped maces) of mace heads from medieval Ruthenia according to A. Kirpičnikov's typology (Kirpičnikov 1966, fig. 10). He dates them from the 12th century to the middle of the 13th (Kirpičnikov 1966, 55). According to R. Liwoch, the chronology of the head of type IV maces should be narrowed down to the first half of the 13th century, which may be used slightly longer (Liwoch 2006, 68). A similar mace head found in Veliky Novgorod is dated to the second half of the 13th century (Artem´ev 1990, 12). However, A. Michalak dates the finds of heads of this type of maces from Polish lands to the period of the 12th–14th centuries (Michalak 2005, 194).

In the Middle Ages, maces were used both as weapons and signs of power (cf.: Nadolski 1954, 70; Żygulski 1982, 51). Mainly maces with heads made of bronze, especially the so-called star-shaped maces, are considered as representing the latter category. The state of preservation of the mace from Tursko Castle indicates that it might have been broken as a result of hitting something hard, possibly in a fight.

Star-shaped maces are known primarily from medieval Russia (Kirpičnikov 1966; Liwoch 2006). The head of the mace found at Turski Castle probably also comes from Russia, although there are similar examples known from neighboring countries, including Hungary (Kovács 1971), Bulgaria (Popov 2015) and other Polish lands (Michalak 2005). Maces were also used by the Mongols (Tatars) but those attributed to them have a different shape (Świętosławski 1996, 38–39).

Tanged arrowheads were especially popular in the Early Middle Ages among nomadic tribes from Eastern Europe, including Ruthenia, who had actually borrowed them from nomads, but they are also found across other territories, e.g., in Scandinavia. (Medvedev 1966; Sedov (ed.) 1987; Świętosławski 1997, 74; 2006, 66–68; Linbom 2009). Copies found in Polish lands are usually interpreted as evidence of the 13th-century Mongol (Tatar) and Mongol-Russian invasions, or earlier ones, primarily of the Pecheneg, Polovtsian, and Hungarian nomads (Świętosławski 1997, 111–115; 2006, 117–124).

The great majority of tanged arrowheads (nos.: 1, 3, 4, 6, 7, 9, 10) from Tursko Castle appear to represent different variants of type 44 according to A. F. Medvedev's classification, dated from the 9th to the 14th century, but most frequently in use in the 12th and 13th centuries (Medvedev 1966, 66). Two arrowheads (nos. 5 and 8) are the closest to variant 3 of type 38 according to A. F. Medvedev's typology, used in the 13th and 14th centuries (Medvedev 1966, 64). W. Świętosławski refers to such caves as group VIII and connects their finds with the Mongol (Tatar) invasions of Central Europe in the 13th century (Świętosławski 1997, 83). Another two arrowheads (nos. 2 and 12) represent different variants of type 97 according to A. F. Medvedev's typology. They are so-called armor-piercing arrowheads, capable of penetrating chain armor, used in the 13th and 14th centuries (Medvedev 1966, 84). The last (and most sizeable) specimen (arrowhead no. 11), is unusual. Similar, but considerably smaller artefacts of this type were categorized by Medvedev as belonging to type 40 according to his typology and they were in use from the 10th to the 14th century (Medvedev 1966, 44–45).

The group of tanged arrowheads from Tursko Castle are the most numerous collection of such artefacts from Sandomierz lands and dating to the Middle Ages. Very similar arrowheads were discovered during excavations conducted in Sandomierz, on the Castle Hill, in layers formed as a result of the destruction of the stronghold during the Mongolian-Ruthenian raid of 1260. Recently they were found at the site of the settlement in Zawichost-Trójca, located near a ford on the Vistula River, where the Battle of Zawichost took place in 1205. Roman, prince of Halych, was killed during the skirmish (Florek 2021; 2022). We should remember that the ford was used by both the Mongolian and Ruthenian forces during their raids on Sandomierz lands from the east (Krakowski 1973; Szambelan 1989; Florek 2007), thus the arrowheads should perhaps be linked with those events.

The mace head and tanged arrowheads discovered at the site of Tursko Castle should probably be associated with the Mongolian and Mongolian-Ruthenian raids on the Sandomierz Land organized in the 13th century. Still, we cannot link them directly with the battle fought on February 13, 1241, although this assumption is highly probable. None of the arrowheads can be confidently identified as Mongolian. The mace head most likely comes from Russia. However, the distribution of finds of maces, including those with star-shaped heads, in Poland (Michalak 2005, fig. 4) indicates that they were also used by Polish knights.

Lack of thirteenth-century military accessories that could be associated with Polish knights (at least at the current state of research) is somewhat puzzling and is the opposite of the situation from the nearby stronghold in Winnica, which was destroyed by the Mongols during the invasion in 1241.

The two other projectile heads, both sleeved, are dated to the Late Middle Ages. Given their sizes and sleeve diameters, they should be both considered as crossbow boltheads. Especially interesting is the massive sleeved projectile head with a bifurcated blade. Such military accessories with bifurcated flat blades (but having tangs), usually smaller and flatter, were used in the medieval times by Eastern European nomads, the Hungarians and Ruthenians (Sebestyén 1932, 194; Medvedev 1966, 72–73; Ruttkay 1976, 327–328; Gáll 2013, 720). On the other hand, sleeved projectile heads with bifurcated blades not only come from later times, but they are also extremely rare. The closest analogies to the artefact from Tursko Castle are specimens dated to the 14th and 15th century, discovered in Zítkov Castle near Choceň and Týřov Castle near Karlova Ves (Czechia) as well as artefacts from Gajary-Posádka (Slovakia) (Durdík 1982, tab. VII; Vích 2017, 101). They are classified as belonging to type A2 according to A. Ruttkay's typology (Ruttkay 1976, 327), which corresponds to type BVa in R. Krajíc's classification (Krajíc 2003, 185). Two practically identical specimens were also discovered in the forests surrounding Ulów near Tomaszów Lubelski. These artefacts, previously unpublished, are kept in the J. Petera Regional Museum in Tomaszów Lubelski. Since they are loose finds, however, it is difficult to date them.

The other specimen should be classified as representing type I of crossbow boltheads according to A. Nadolski's typology, which were used from the 12th to the 16th century (Nadolski 1954, 86).

Summary

The so-called Tursko Castle is the remains of a modern earth fortification erected in the 17th century around an evangelical church. Military accessories discovered at this site (tanged arrowheads and a fragment of a bronze mace head) should be linked with the Mongolian-Ruthenian raids on Sandomierz lands organized in the 13th century. It is highly probable that they are material traces of the Battle of Tursko which was fought in 1241. Nevertheless, it cannot be ruled out that they should be associated with the Battle of Tursko on February 13, 1241, during the first Mongol invasion of Polish lands. At the same time,

the two sleeved projectile heads which were also discovered at the site of the castle should be linked with unspecified military activities from as late as the 14th or even 15th century.

Translated by Piotr Moskała

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Problems of the Continuation of Medieval Manufacturing Traditions in Modern Shoemaking Based on Archaeological Finds in Szczecin

Abstract

Kowalska A. B. 2024. Problems of the Continuation of Medieval Manufacturing Traditions in Modern Shoemaking Based on Archaeological Finds in Szczecin. *Analecta Archaeologica Ressoviensia* 19, 143–156

Research into modern leather footwear has only recently become a part of archaeology. In the case of Szczecin, a town on the Baltic coast in Western Pomerania, no comprehensive study on these types of finds has yet been compiled. This article discusses footwear dating to the period between the 16th and 19th centuries which has been uncovered during archaeological excavations in the Old Town in Szczecin, the issue of continuation of medieval shoemaking traditions as well as the issues of the methodology of studies and nomenclature used in Polish literature on the subject.

Key words: archaeology, footwear, modern times, Szczecin, Pomerania

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Current state of research into modern footwear in Poland

Modern footwear means goods manufactured between the end of the 15th/the beginning of the 16th century and the end of the 19th/beginning of the 20th century. The turn of the 16th century heralded cultural, political, economic, and ideological changes which clearly marked the transition from the medieval to modern times. In Western Pomerania, the beginning of the new era is connected with the official recognition of Protestantism as a state religion during a parliament session in Trzebiatów in 1534. The modern era, usually seen as spanning a few centuries, is usually divided into periods which are more adequate for describing movements in art rather than historical periods and signifying major political or economic changes: the Renaissance (the 15th to 16th centuries), the Baroque (from the end of the 16th to the beginning of the 18th centuries), the Enlightenment (the 18th century), and Romanticism (the first half of the 19th century). However, the most common terms to be found in Polish archaeological literature are *epoka wczesnonowożytna* and *nowożytna,* which come from English, namely the *post medieval period*, *early modern period* and *modern period*, although no exact chronology can be given.

It is only relatively recently that studies on modern times have become a part of archaeology; in Poland it is still a branch which is in its infancy, albeit one which has been developing quite dynamically in recent years. Of particular interest are ceramics, including ceramic vessels (the set of literature see e.g. Marcinkowski 2019; see also Blažková and Matějková (eds.) 2019; 2021; Blažková *et al.* 2023; https://www.europapostmed.eu/en, acces: 28.10.2024) and stove tiles (Majewski 2015) as well as glassware (e.g. Wilgocka 2019). Modern leather goods have perhaps attracted the least interest so far. It is well known that damp, anaerobic cultural layers favour the preservation of objects made of organic matter. In the modern period, such conditions were met primarily by wells-latrines and other "damp" places such as moats or utility rooms which were at the back of brick town houses or workshops.

It is beyond doubt that a study by Lidia Eberle, who was the first to undertake the issue of Renaissance archaeological footwear on the basis of artefacts uncovered in Warsaw, needs to be considered a pioneering one (Eberle 1971; 1979; 1984; 1985). She analysed technical solutions applied in the production process which were clearly different from their late medieval counterparts. However, a wider study required a more extensive database. It has been only in the last decade that more studies on modern footwear have appeared. Studies on collections of leather objects uncovered during archaeological excavations in Warsaw and Gdańsk have been resumed. Karolina Blusiewicz, who continued the outstanding studies which started in the 1970s (Eberle 1971; 1979; Milewska 1977), presented materials uncovered in over 50 digs in the New and Old Town in Warsaw, which were covered by various types of archaeological works, form the so-called supervision over investment works to rescue excavations as well as stationary excavations in the Royal Castle and Castle Square (Blusiewicz 2009a; 2009b; 2017). The collection includes artefacts which date back to the end of the Middle Ages and modernity until the 20th century. What needs to be emphasised is the multilateralism of the studies which were undertaken. The author presented elements of footwear in both a visual and descriptive form, tackling separately parts of the bottom and top, platforms and heels, as well as ways of finishing ready-made goods – the production stage of particular importance in the case of modern shoemaking. She separately presented the types of footwear in two groups: finds which date back to the late and the twilight of the Middle Ages (14th to the 15th centuries) and the modern era (the 16th to 18th centuries). The whole study is extensively illustrated with drawings of the construction of individual parts of footwear, ways of sewing and reconstructions of finished products. Subject to more extensive studies were also modern products from Gdańsk including, apart from footwear (Ceynowa and Trawicka 2016; Jędrzejczak-Skutnik 2016; 2021; Ceynowa 2018; 2020), Renaissance caftans (Ceynowa 2013) and footwear uncovered during excavations in Toruń (Drążkowska 2007a; 2007c). It should be noted that studies on the majority of archaeological finds are still pending and await publication.

Archaeological studies of interments in burial chapels provide specific finds (e.g. Drążkowska 2007b; Kulesz 2019; Kulesz and Grupa 2020). These finds are specific as they were often produced on an *ad hoc* basis for the purpose of the burial. The most precious pieces of footwear from the point of view of the history of footwear are those which were worn by the buried in their lifetime as they reflected their likes, taste, and how the shoe matched the whole clothing. However, publications in scientific literature are very scarce. Usually, archaeological studies conclude with studies and reports which are kept in the archives of the Voivodeship Cultural Heritage Conservator offices all over Poland.

Modern footwear is rarely found in cultural layers. Of particular interest are pattens made of wood and leather – protective footwear known since the Middle Ages (Ceynowa 2009a). The so called *trepy* [clogs] or *mule* [mules] from Toruń are exceptional finds (Drążkowska 2007a; 2007c). They are interesting for a number of reasons. First, all of them date back to the 16th century, a period when major changes in footwear manufacturing process which were relevant to the emergence of new style trends were taking place. Random finds of this type of footwear were also excavated in Wolin (Kowalska 2015). The issue of early modern footwear in the context of economic relationships between centres which were important at the turn of the era was undertaken by Beata Ceynowa based on finds from Lastadia in Gdańsk (Ceynowa 2009b). Considering the number of uncovered pieces, the excavations in Gdańsk are sensational. On Lastadia alone, about 22,000 leather objects were excavated; they survived in such good condition that it is possible to undertake the study of a variety of research problems of the development of crafts, forms of footwear, style, fashion, trade or health, to name but a few.

Interesting leather finds were uncovered during excavations carried out in the wreck of the vessel *General Carleton*, which dates to the second half of the 18th century. The excavated and functionally recognised objects included footwear, a glove, belt, wallets, a razor case, sheath, book covers and a spur with leather fastenings as well as characteristic bosun's gloves; a total of 237 various objects (Rodzik and Jakimowicz 2008). The biggest collection was made up of shoes and their pieces: 25 whole and 71 fragments out of which further 9 were successfully reconstructed.

Recently, an attempt has also been made to compile the total body of information that comprises the development of forms and types of leather footwear in the period from the 9th until the 19th centuries, in which special emphasis was placed on the changeable methods of construction and the co-existence of the same decorative motifs on various elements of clothing and garments (Drążkowska 2011). Archaeological journals are increasingly publishing articles discussing ways of preservation of excavated leathers, both medieval and modern (Drążkowska and Grupa 2009;

Jagielska 2009; Drążkowska *et al.* 2011; Ceynowa 2012), as well as objects made of various raw materials, e.g., leather and wood (Jakimowicz and Rodzik 2009, see also Grupa 2012a; 2012b, 159f.).

Comprehensive and in-depth research has recently been devoted to the question of the lexis of leatherworking crafts. Lexicographical studies have so far been devoted to selected issues only, including names of clothes manufactured in the period between the 14th and the 16th centuries, which included leather and textile goods lined with fur (Borejszo 1990). Vocabulary relevant to craft manufacture within a broad family of crafts based on leather as a raw material has been presented for the first time in linguistic literature from a historical perspective (Żurawska-Chaszczewska 2010).

In comparison, surviving guild statutes and post-mortem inventories from the previous period have considerably facilitated studies on modern footwear in Poland. To date, the most comprehensive use of such data in Poland (Turnau 1975; see also 1983) has been made in a study on leather clothing by Irena Turnau. An important achievement of the scholar in the field of the history of footwear is the development of a dictionary of clothes, which also includes the names of modern footwear (Turnau 1999). More comprehensive studies can only be found in works on the history of costumes based on iconographic sources. The oldest, more comprehensive studies date to the first half of the 19th century (Gołębiowski 1983). Post-war research which needs to be mentioned include a publication which has been considered a milestone until today: *Historia ubiorów* [*The History of Clothes*] by Maria Gutkowska-Rychlewska (1968), which is still considered a relevant compendium of knowledge. The scholar devoted a separate article to patten finds from Pyrzyce and presented them against the background of medieval fashion (Gutkowska-Rychlewska 1967). Of equal significance in the field of research into modern clothes is a study by Krystyna Turska (1987). Footwear is often accorded marginal importance and considered complimentary to clothing in studies on the history of costumes (Możdżyńska-Nawotka 2005; Sieradzka 2009; 2013). These questions have recently been given more focus in the second volume of *In gremio – in praxi*, which discusses *inter alia* modern children's shoes (Możdżyńska-Nawotka and Jędrysek-Skotnicka 2015; see also Drążkowska 2007d). A publication by Aleksander Olszewski is also a cross-sectional study of modern footwear; he collected iconography and described types of footwear most characteristic of a given era (Olszewski 1984).

Methodological issues

The list of literature on the subject above indicates that the methodology of research into modern footwear is a field which requires much supplementary work, hence the subject of archaeological research is not only footwear which has survived to our times intact and which is sufficient to undertake the issues of production, production techniques or ways of decoration to name but a few. A characteristic feature of the uncovered artefacts is their fragmentation into individual parts. Hence, considering the wealth of mainly iconographic historical sources, the question can be asked whether research into individual elements of often complicated, multi-component objects is necessary. In my opinion, using the same research methods as in the case of medieval footwear is absolutely justified. Of course, the point is to conduct the widest possible research into the methods of construction, a formal and typological study of source material. However, of no lesser importance is the consideration of the social and cultural context in which footwear is found, to which social group a particular find can be related: in other words, undertaking social and topographic problems on the basis of material sources. Supporting the results of these studies with iconography and economic history may contribute to a better understanding of economic and cultural principles governing the area subject to research.

An important element of research into modern footwear in Szczecin is the continual development of crafts since the early Middle Ages until the present day. To date, forms and types of footwear have been recognised since the 8th century; changes in production techniques spanning over several centuries of the medieval times have been illustrated with archaeological finds (Kowalska 2010; 2013; 2018; 2023). It has also been possible to observe stylistic changes of goods which resulted from foreign inspirations and under the influence of local preferences and production possibilities. Thereby a solid foundation was created which allows us to observe the changes taking place in local shoemaking. The problem which remains is the selection of relevant research methods.

The application of a statistical method to the so-called ready products will be very difficult due to the fragmentation of footwear into individual components mentioned above. Nevertheless, quantitative analyses can be undertaken in the case of separate components: soles, uppers and complementary elements. However, the fundamental issue is the development of the relevant nomenclature (Kowalska 2021).

Nomenclature issues arise at the very initial stages of studies on footwear. Paradoxically, using expressions from the language which used to be spoken in the past does not always favour comparative studies. Considerable confusion was brought about by the introduction of technical jargon relevant to modern and contemporary footwear to the dictionary of terms relevant to medieval footwear, particularly the early medieval examples. Some elements which are characteristic of modern times were simply non-existent in the Middle Ages, while the use of others was somewhat exaggerated. It seems worthwhile to mention how the perception of individual components of footwear has changed in the context of the nomenclature used in the Polish literature.

1. Soles/bottoms of shoes

The term bottom/sole raises the least controversy. It is the part upon which the foot rests, and which directly touches the ground. However, this definition is only adequate in the case of simple, one-part soles because a two-part sole does not meet this basic condition as it does not touch the ground, but on the other hand it touches a further layer, not the foot, hence the most proper definition would be the bottom, especially in case of modern footwear, the bottoms of which consist of a few elements. In this case, the sole should refer only to the part which directly touches the ground, to which a heel and parts of the bottom which touch the foot can be attached. According to such a definition, the bottom of medieval footwear consists of a sole, in late medieval footwear a sole with a padding appears, in contemporary language called an insole, while in the modern sense the bottom consists of a few elements discussed below.

2. Outer sole (treadsole)

An element of a multi-piece bottom in contact with the ground. It is an element of a bottom on which there is the padding, upon which the foot rests (made of leather or textile). An outer sole has the same shape, but different traces of sewing – stretched holes through which a thread joining the outer sole with a welt passed. Between the edges of the outer sole and the welt there was the edge of the upper. If there is no padding, the foot rests directly on the outer sole.

3. *Podsuwka* (a kind of outer sole)

An element of the bottom, the shape of which corresponded to the outer sole. It was cut from quite hard and thick leather. Placed between the inner sole and outer sole, the *podsuwka* was to stiffen and stabilise the bottom. It was not used in medieval footwear.

4. Welt

An element of the bottom of the shoe – a piece of leather joining the outer sole and the upper. The aim of the welt was to ensure the strong integration of the upper with the bottom, which the producer attained by pulling the crossing threads strongly. Due to the pressure of the foot the threads imprinted a characteristic pattern on the inner sole and the *podsuwka*. It seems that the beginnings of this construction element can be seen in the early medieval rand and were placed between the upper and the sole. The oldest rands took on the form of a flat piece of leather. Uncovered most often are their small fragments with characteristic round holes pierced with an awl. Over the course of the 12th century, along with the development of tanning techniques, rands started to take the form of a gusset cut from thick leather. Just as in the case of flat pieces, they had large holes pierced with an awl which corresponded to holes on the edge of the upper and the vamp. In time, the rand took on the shape of a welt.

5. *Zelówka*

An element of the bottom, the shape of which corresponded to a part of the sole – the tread or the quarter. It is cut out of stiff and thick leather. Its purpose was to strengthen the parts of the sole most exposed to friction. It is difficult to state when the outsole first appeared as it originates directly from a patch sewn on the outside of worn-out bottom. The difference between them is that the patch was sewn to conceal a hole or wear, thereby lengthening the period during which footwear was used. Outsoles were attached to new soles, often before a heel was nailed. The oldest outsoles can be dated to the late medieval period (Harjula 2008).

6. Heel

The youngest element of a complex bottom. It seems that it originates directly from the *zelówka*. The oldest heels were made of a few layers of leather called multi-layers (*składki*). Such a multi-layer heel was nailed with wooden pins to the outsole; sometimes it was also strengthened with an iron nail. The edges were made after the heel was nailed. In time, multi-layer heels were substituted with wooden ones, which were covered with a lining: either a leather or a textile one.

7. Heel lining and top piece

A leather or textile element wrapped around the wooden heel and attached directly to the top of a shoe. It performed a similar function in the case of platform type bottoms. The tip of the heel was often

finished with a top piece, today often identified with an outsole.

8. Platform sole

The bottom of a shoe made up of a sole, outer sole and padding. A piece of cork or pieces of wood could be used as the *podsuwka*, the whole was covered with a layer. A platform sole could be flat or raised in the heel counter part

9. Upper

There can be no doubt that more problems with terminology arise in the case of shoe uppers. In the history of European footwear in the temperate zone, single pieces attached to the leg with a piece of thong need to be considered as the oldest type of footwear. The sandal: a sole with strings or thongs attached to the leg was the prevailing type of shoe in warm zones of the continent. The development of footwear was at least two-fold: single pieces developed into shoes used in the Middle Ages and modernity in north-western Europe. In south-eastern regions, the original sandals perfected by Greeks and then by the Romans were of no use in the colder regions of Europe. Nevertheless, it cannot be ruled out that direct contacts resulted in mutual influence, taking over and adapting some elements to the needs of local shoemaking. However, without going deeper into the problem of the origin of various forms and types of footwear, it needs to be noted that the basic form, i.e. a shoe consisting of the bottom and upper gradually evolved to the present form.

The upper of a shoe is an element which covered the foot (in time also the calf or even the knee). The only element which raises no doubt is the correct recognition and the name of the one-piece upper, sewn directly to the sole. At the time when additional elements appeared *inter alia* various inserts, researchers are no longer in agreement regarding terms. It seems that the problem arose when attempts were made to define elements of medieval shoemaking with contemporary terms which are used to describe the production of modern and contemporary footwear.

10. Vamp

The upper covering the front and sides of a foot cut out of a single piece of leather is often called the vamp (Blusiewicz 2009b, 29). In most cases, the element of the upper covering the arch up to the waist is called the vamp, in contrast to the back part covering the heel and sides up to the ankles.

11. Quarter/*obłożyna*/shaft

In medieval terminology, the part of the upper covering the back of the foot, the heel counter to mid-foot (waist), is called the quarter (also in cases of single pieces). In modern Polish shoemaking this element, which is cut separately, is called the *obłożyna* unless the height goes beyond the ankle line, which in this case it is called the shaft. In medieval shoemaking the shaft, regardless of the way it joined other elements of the upper, covers the shin from the ankle upwards, hence it can be low, ankle, or high. In modern shoes, the shaft may also cover the knee. The difference between a medieval shaft and a modern one is that in the Middle Ages it was sewn directly to the sole while in the case of a modern shoe to the *obłożyna*. The *obłożyna* of a modern shoe often consists of two quarters joined along the heel counter. This element has a very old, early medieval origin, but it did not become popular at the early stages of the medieval period due to the discomfort while wearing them. It reappears at the end of the Middle Ages, marking the start of Renaissance shoemaking.

12. Inserts

Cutting the upper out of a single piece of leather was not economical. It was already the early medieval producers who started to apply various solutions to rationalise and optimise the cutting of the whole animal leather and to minimise the amount of waste. The simplest solution was to cut the largest possible piece of upper and to complement the missing parts with a piece of leather, the so-called construction insert, which was also called a connecting element (Blusiewicz 2009b, fig. 5.3). In my opinion, the oldest construction inserts – the connecting elements – were rectangular and were sewn on the inside part joining the edges of uppers – the front part, i.e. the vamp with the back one, i.e. the shaft. In the Szczecin collection I found a whole inside side sewn next to the heel counter, but not symmetrically. Along the perfecting production techniques, construction inserts were reduced to a small triangular insert sewn between the sole and the edges of the upper. This construction method rationalised the cut and offered the possibility to regulate the length of the upper considering that the problem was to make a three-dimensional object out of a flat one. In order to achieve such an effect, small cuts needed to be made, which were thereafter sewn as appropriate. In modern shoemaking, neither construction inserts nor connecting elements are used.

Other types of inserts are supplementary ones. They were sewn in all those places where parts of leather in the basic cut were "missing", with the upper parts of shafts and quarters supplemented most often. The cut of shoe uppers allowed the total elimination of supplementary inserts.

13. Strengthening inserts

The general term "strengthening inserts" defines different types of inserts sewn in various parts of the uppers. The oldest one was an insert strengthening the back of the shoe in the heel counter, which most probably originates from a sole of a specific cut: pointed towards the top, overlapping the back part of the shoe on the outside. This insert, also called the heel stiffener, protected the shoe from misshaping and has survived to our times. The other type of strengthening insert is the welt, strengthening the bottom part of the shoe. This insert has also survived in modern footwear to contemporary times, functioning in a manner akin to lace hole bindings which strengthen places for lacing up or fastening a shoe.

Excavation material from Szczecin

The collection of leather finds from modern times is characterised by, apart from the varying condition in which it has survived down to our times, a vast time span: from the 15th to the 19th centuries, which is undoubtedly an advantage in the case of studies on construction and stylistic changes. Considerable interpretational limitations arise from mixing the material in backfills and levelling strata. For that reason I have partly abandoned the principle followed in previous studies on leatherworking in Szczecin (Kowalska 2010; 2013, there set of literature; see also Cnotliwy 2014), namely equal consideration being given to all leather artefacts, regardless of how well preserved they are. I only discuss in detail footwear which has survived to our times as a whole and characteristic parts of footwear. The whole collection was catalogued after basic preservation and conservation work was carried out, with some part of the collection submitted for zoological analyses (Radek 2019), and wooden pins and soles of modern shoes for the analysis of wood species (Cywa 2019). In the catalogue part, I present in detail finds from individual digs and latrine no. 1 (see Uciechowska-Gawron 2019), in which the most chronologically consistent and simultaneously the first collection of modern shoemaking products in Szczecin was uncovered (Fig. 1).

Latrine no. 1, where most of the discussed leather finds come from, was discovered at Kłodna Street, within property no. 30 in the Old Town of Szczecin (quarter I). It was built of trapezoidal bricks laid without mortar in such a way that only the heads were visible in the face of the wall. It was built on four wooden foundations. The diameter of the latrine at the bottom was 2.25 m, and the preserved depth was

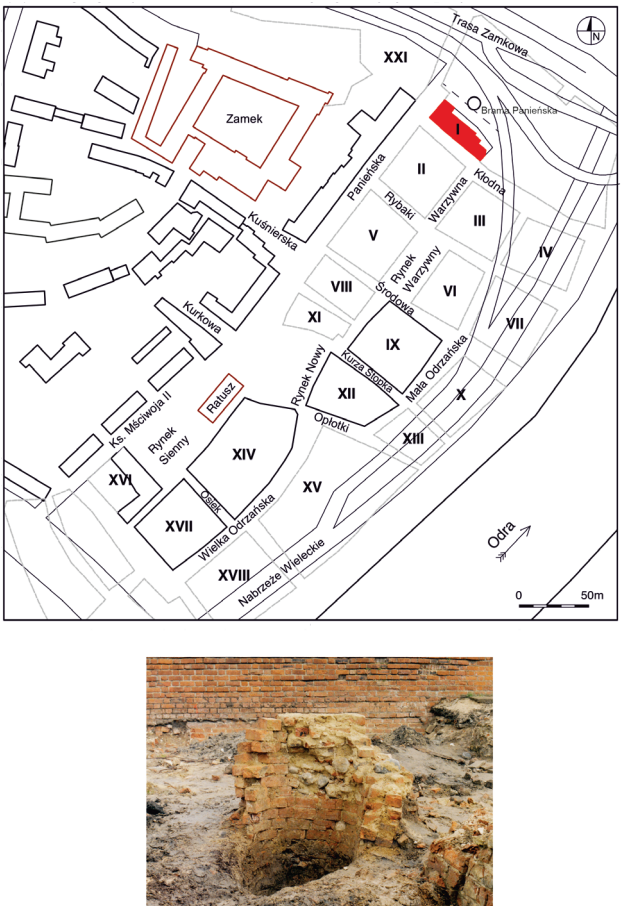

Fig. 1. Szczecin, quarter I within Podzamcze against the modern street grid (prepared by M. Gibczyński) and below latrine no. 1 (photo by A. Uciechowska-Gawron).

3.4 m. Below the foundation there was a conical funnel, probably created during periodic waste removal. There were three layers visible in the fill which, based on mobile sources, can be dated to the period from the end of the 16th to 18th–19th century. In addition to leather items, they included fragments of ceramics, tiles, clay pipes, bowls, turned pails and barrels, fabrics, a turned painted cup, pieces of glass, a glass cup, decorated glasses and glasses, two metal spoons decorated: tin and copper alloy, cover fittings, copper alloy hooks, fragment of a bone figurine, antler comb and grains, ichthyological and osteological remains (Kowalska (ed.) 2019).

Leather finds from a latrine in quarter I

1. Children's shoe, mule type (Fig. 2; inv. no. 17/1/S). All of the construction elements have survived: symmetrical soles: outer and inner; with a pointed toe; rounded counter and clear two-side waist; a cork gusset between them; a footwear stripe embracing

Fig. 2. Szczecin. Mule shoe (photo by I. Sukiennicka, A. Ryś).

the hole of the bottom, sewn to the outer and inner soles; wooden pins fastening the outer sole and the top; decorated, whole vamp. The decoration covered the upper part of the vamp and consisted of various striped cuts: crosses, three lines, a row of slanted cuts, a further three lines and a row of crosses and a further three lines separating the crosses and forming three small pyramids. The shoe is worn out, but it has not fallen apart, with even the threads punched with an awl surviving down to our times. Under the outer sole, on a cork gusset which consisted of a few elements, a layer of wool or fur leather survived (Radek 2019). The insert between soles which is marked with a question mark could be made of linden bast, one fragment submitted for analysis is not marked. A pin inserted in one fragment of the sole was whittled from the wood of common spindle (Cywa 2019). The 16th century?

2. Children's shoe, mule type (Fig. 3; inv. no. 46/1/S). Almost all of the construction elements have survived to our times: an outer sole with outsole; inner sole with extremely narrow waist and rounded seat (made of sheep skin and probably hide); shoe stripe probably of hide; gusset between soles made of poplar; pegs for fastening heel made of common spindle; and vamp made of hide, all of the surface was decorated. Starting with a decoratively cut edge, the following were also made: a strand of evenly spaced punched-through round holes; a motif embroidered using straight stitches (thread of plant origin); a strand of round holes (punched through); a strand of two wavy crossing lines in between two straight lines; a strand of slanted, crossing lines; a strand of semi-circles with lines crossing inside; and zig-zags encircling semi-circles – these motifs were made by cutting leather approximately down to half its thickness. The toe of the vamp is clearly worn-out, damaged, just like the whole outer sole to which the outsole and heel (which did not survive to our times) were nailed. The 16th century?

3. Large size slip-on shoe (Fig. 4; inv. no 47/1/S) with a leather, multi-layer heel, with a multi-layer sole fastened with a shoe stripe and a very worn-out, whole vamp without decoration. The outer sole is finished with a square toe, with outsole, reaching the heel and "wrapped" on it. The outer sole is also finished with a straight toe. Metal and wooden (common spindle) pins used to fasten the layers of the sole and the heel have survived to our times. Fragments of a wooden gusset between the soles have also survived. The vamp was completely destroyed, finished with an outer toe sewn on the outside, without decoration.

4. Shallow and low slip-on shoe (Fig. 5; inv. no. 210/1/S) with a wooden heel, all components have survived: an outer sole of very thick leather; inner sole of soft

Fig. 3. Szczecin. Mule shoe (photo by I. Sukiennicka, A. Ryś).

Fig. 4. Szczecin. Modern footwear (photo and drawing by I. Sukiennicka, A. Ryś).

Fig. 5. Szczecin. Modern low-cut slip-on shoes (photo and drawing by I. Sukiennicka, A. Ryś).

leather; wooden gusset between soles which survived up to the point where the heel begins; wooden, narrowing down beechen heel; and a decorated vamp. Both soles with pointed toes with a small point. The outer sole "wrapped" on the inside of the wooden heel. Very shallow vamp, decoratively cut-out, with the edge originally sewn (with colourful threads?). There are remains of embroidery (holes) about 1 cm from the edge. The vamp with a profiled throat reached approximately halfway along the instep. The 17th–18th centuries.

5. Children's shoe (Fig. 6; inv. no. 211/1/S) slip-on, mule type with a wooden heel, made of outer and inner soles, a heel and vamp. The heel is made of a few layers mounted directly on the outer sole, nailed with dogwood and beech pins. Both soles have rounded toes. The vamp had been mended – there are traces of outer toe and the welt on the inside of the shoe. The vamp reached quite high to the instep. Undecorated and dating to the 18th century?

6. Vamp of a small size shoe, mule type (50/1/S), richly decorated, most probably makes up a pair with a shoe catalogue number 46/1/S due to identically distributed ornaments and size. The 16th–18th centuries.

7. Three soles survived in whole:

a) a two-part sole, symmetrical, survived in two fragments (Fig. 7; inv. no. 48/1/S) large size, outer, finished with a rounded seat with a part of a heel of alder and a square toe, slightly bilaterally narrowing at the waist. Cut from hide. Metal studs and pins of common spindle used to nail a missing heel have survived. Together with the sole, a rounded part of a stripe was found, probably the back part of the shoe;

b) a two-part sole, symmetrical, cut out of hide, survived together with inner sole (seat), seat rounded and finished with a blunt, square toe, slightly narrowing at waist. In the seat part wooden studs used to nail the heel survive (50/1/S);

c) one-part outer sole, symmetrical, with a rounded toe and seat, without narrowing at the waist, with a heel made of several layers of leather held together with metal and wooden studs. This has survived in two pieces. The heel is nailed directly to the outer sole with pins of common spindle. It survived together with the sole remains of a shoe strap and a piece of the inner sole (212/1/S).

8. Four pieces of the front part of soles – treads:

a) tread of a one-part sole, outer, symmetrical, finished with a slightly rounded toe, with an outsole in the toe part with wooden studs, with a clear bilateral

Fig. 6. Szczecin. Children's shoe (photo and drawing by I. Sukiennicka, A. Ryś).

Fig. 7. Szczecin. Two-part sole of modern footwear with fragments of a rand (photo and drawing by I. Sukiennicka, A. Ryś).

narrowing at waist (50/1/S) The sole is cut out of hide, most probably the outsole was well;

b) tread of the inner sole made of hide or calf skin, finished with a slightly rounded toe (50/1/S);

c) part of the tread of an outer sole finished with a slightly rounded toe, with crossing imprints of twine, as a result of stretching the shoe strap (54/1/S);

d) tread of damaged inner sole finished with a rounded toe, most probably of hide.

Fig. 8. Szczecin. Fragments of modern footwear soles (photo and drawing by I. Sukiennicka, A. Ryś).

9. Three pieces of soles without seat:

a) a piece of a single-piece sole, inner, asymmetrical, finished with a rounded toe, with a slight bilateral narrowing. The sole survived in two pieces. It was probably cut out of goat or sheep skin or a young animal (a kid or lamb) (55/1/S);

b) a piece of a single-piece sole, inner, symmetrical, finished with a clearly pointed toe, with slight bilateral narrowing. Cut out of goat or sheep skin. Crossing imprints on the sole made by stretching the shoe strap twine (50/1/S);

c) two pieces of an outer sole with a sharp toe "wrapped" on the heel (55/1/S). Cut out of tough hide.

10. Remains of a multi-layer heel with a piece of sole (54/1/S).

11. Pieces of the seat parts of soles:

a) seat of a one-piece outer sole with a slightly rounded seat and bilateral, slight narrowing at the waist. Together with the sole, a heel made of several layers of hide nailed to the sole with wooden studs and a piece of a shoe strap have survived (Fig. 8; inv. no. 52/1/S);

b) a piece of a shoe strap;

c) fragments of an outsole made of hide;

d) a seat of a single-piece inner sole, symmetrical, finished with a rounded seat and extremely narrow waist. Seat with traces of pegs (53/1/S). Cut out of hide, probably cut vertically into two layers;

e) a seat and tread of a single-piece inner sole with a slightly rounded seat and bilateral, slight narrowing at waist, with imprints of stretching the shoe strap. A heel survived together with the sole made

of several layers nailed to the sole with wooden studs (54/1/S);
f) a seat of damaged sole, rounded with traces of wooden pegs fastening the heel (54/1/S);
g) a seat of damaged sole with remains of a leather heel (54/1/S);
h) seat of damaged sole with remains of a leather heel (212/1/S);
i) a piece of sole and remains of a leather shoe strap (212/1/S).

12. Damaged pieces of soles (53/1/S; 55/1/S), scraps of soles (50/1/S; 45/1/S).

13. Pieces of footwear (48/1/S; 50/1/S; 52/1/S; 54/1/S).

Finals remarks

From the point of view of archaeology, studies on leatherworking in the modern period remain in a considerable disproportion to medieval ones. At the beginning of the 16th century, transformations were taking place in the territory of Poland which resulted from following foreign fashion trends from both Western and Eastern Europe. Moreover, a strongly conservative approach can be noted as regards the choice of foreign elements, which in the future resulted in the appearance of a traditional national dress. These processes should also be seen in the context of changes in the construction of shoes, which were becoming a part of a dress matching its other elements (Drążkowska 2011, 156f.). It can be assumed with a large degree of probability that shoemaking in Szczecin in the Renaissance period, as well as in later periods, evolved just like other European trends.

What is particularly noteworthy while studying finds of modern footwear is the shape of soles which, other than the shape of medieval soles, is not aligned with the curves of a foot. Regardless of the shape of the toe and the seat and the thickness, they are symmetrical, sometimes very narrow at the waist. They can be clearly divided into inner and outer as well a single- and two-piece ones, while each one is only one element of the bottom consisting of a few layers, including a wooden or cork gusset. Particularly characteristic are soles of very thick and very hard leather, which were fastened to the inner part of wooden heels; the heel itself was in such cases nailed to quite a thick inner leather padding placed between the inner and outer sole and which reached approximately half of the length of the shoe.

The shape of the sole, mainly the ending of the tread, is very different from the one known from the Middle Ages. Firstly, there are no pointed soles and most of them are characterised by slightly rounded front parts, while some of the inner soles have pointed toes. Some of them, only the remains of which have survived, display very vivid imprints left by shoe strap twine. One tread of an inner sole cut from thick leather shows traces of an outsole.

Soles and their parts correspond well to finds excavated in Warsaw (Blusiewicz 2009a; 2009b). Shapes noted in the excavation material from Szczecin are easy to find. Bottoms with gentle lines date to the 16th and the first half of the 17th centuries; occasionally, there were also soles with pointed toes. The author is quite right to note that they are just remains of the Gothic style which was passing away (Blusiewicz 2009b, 36). Soles presented by Olaf Goubitz (Goubitz *et al* 2001, fig. 1–2, 82) as well as Dmitrij Osipov and Valentina Sobol are categorised in precisely the same way (Osipov and Sobol 2013, pl. 4–5).

Among finds uncovered in latrine 1 there were no soles with widening toes which were so characteristic of the Renaissance fashion (Możdżyńska-Nawotka 2005, 38–39). All of the soles discussed here have approximately the same proportions i.e. the biggest protuberance is the tread. Differentiating between men's and women's shoes by the shapes of the bottoms is simply impossible. Only finds of small sizes can be safely associated with children. It seems that in the transition period between Gothic and Renaissance fashion, a period when new construction solutions were introduced into shoemaking, the forms of shoes did not change much. Low, ankle and high shoes were still used, although it seems that the dominating form was the ankle shoe.

Mules, also called leather pattens, were protective shoes replaced wooden and leather pattens during the Renaissance period. In contrast to pattens, mules had vamps which covered the whole instep or reached the halfway point of the instep. They quite quickly gained the status of home footwear which were worn independently inside or placed over more refined leather shoes. The construction of mules was special. The bottom was always a multi-layer one, which consisted of an outer sole cut from thick leather, wooden, or cork pad, as well as an outer sole and inner sole on which the foot rested directly. All of these layers were wrapped in the so-called rand which was also called a shoe strap. A wooden or cork padding, either flat or in a form of a gusset, consisted of a few elements connected with wooden pegs.

Finds from Szczecin represent an early type of mule, one that preceded the elegant, heeled wom-

en's shoes worn inside in the 18th century. The small sizes of the Szczecin mules allow us to conclude that they were also worn by children, while the species of wood used for the insoles support the conclusion that at least some of them were made in local shoemaking workshops. It is possible that the cork oak which was used to make the insoles was brought from southern Europe, but xylological analyses are inconclusive due to a lack of comparative data.

Women's shoes, very low and shallow, on a wooden, profiled heel seem to be the youngest ones in this collection. Their outer sole is placed under the tread and waist creating in the back part the inner wall of the heel. Both the way in which the parts of the shoes were assembled and the heel was cut allow us to conclude this is an example of 18th century shoemaking.

Two slip-on, small size shoes were uncovered in the backfill of the latrine: children's, made of a multi-piece, wooden and leather bottom and a single-piece vamp covering the whole tread up to the talocalcaneonavicular joint. The heel counter is open. This type of a shoe, of various sizes, was known under a popular name of French origin: *mule* (Ceynowa 2007, 437f.; Blusiewicz 2009b, 70–72). In Polish literature on the subject, at least three other names were used, namely *trep* (Eberle 1985, 200), *pantofel* (Turnau 1991, 27) or *mulet* (Możdżyńska-Nawotka 2005, 155) or *muł* (Gutkowska-Rychlewska 1968, 870). This type of shoe is considered a protective one, just like medieval wooden and leather pattens.

The oldest shoes uncovered during archaeological excavations discussed here come from the period when there were guilds: associations of craftsmen from specific trades. The shoemakers' guild, one of the oldest in Szczecin, existed as early as at the end of the 13th century. In comparison to objects made of other raw materials, objects made of leather are relatively scarce. It seems that the overwhelming majority are craftsmen's products copying foreign forms and elements of decoration. It is best discerned in ceramics and products made of glass as well as some shoemaking objects, especially mules which were produced following West European fashion, but made of local wood. In the case of Szczecin, the series of late medieval and early modern objects which were uncovered during archaeological excavations are too limited to undertake a detailed analysis of the products of local craftsmen. This gap will undoubtedly be bridged by the results of archaeological excavations carried out in other parts of the town.

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Preliminary Conclusions Following Archaeological-Anthropological Studies in the Crypts of the Church of Saint John the Baptist and the Five Martyred Brothers in Kazimierz Biskupi, Kazimierz Biskupi Commune, Konin County, Greater Poland Province (2022 Season)

Abstract

Grupa M., Pawlak P., Dryjański W., Grupa D., Kozłowski T., Nowosad W. 2024. Preliminary Conclusions Following Archaeological-Anthropological Studies in the Crypts of the Church of Saint John the Baptist and the Five Martyred Brothers in Kazimierz Biskupi, Kazimierz Biskupi Commune, Konin County, Greater Poland Province (2022 Season). *Analecta Archaeologica Ressoviensia* 19, 157–170

Th studies conducted in the crypts in the Church of Saint John Baptist and the Five Martyred Brothers in 2022 allowed for the strata that have accumulated in specific features over the course of more than 200 years to be explored. The analysis of archaeological-anthropological and archival materials showed numerous inconsistencies that arose at the time when the crypts were being ordered and have neither been accounted for nor corrected in the Bernardine chronicles. This information along with other data obtained in the course of the conservation procedures provides a different take on the history of the church and the funeral and material culture in the modern era and the period of the Partitions of Poland.

Keywords: archaeology, the cult of the Five Martyred Brothers, crypts, modern era, identification of deceased persons, Kazimierz Biskupi, Poland

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Introduction

In May 2022, the first stage of archaeological-conservation works commenced in the Church of Saint John the Baptist and the Five Martyred Brothers in Kazimierz Biskupi, Konin county, Greater Poland province. After the information on the crypts in the southern part of the church was obtained, a decision was made to continue the studies to attain knowledge on the location of other crypts in the eastern part, predominantly under the presbyterium. These studies were conducted by Piotr Pawlak in collaboration with a research group headed by Małgorzata Grupa (students including doctoral students) and GRUPA LBT Małgorzata Wojtysiak company that scanned the church. The research involved also numerous volun-

teers who were extremely helpful. Undoubtedly, one should also mention Waldemar Dryjański who accompanied the researchers from the very beginning; an enthusiast of local history, he provided organisational and substantive support for this endeavour. As early as the stage of analysing the materials disinterred from the crypts, the team was joined by anthropologist from the Nicolaus Copernicus University in Toruń Tomasz Kozłowski and historian-archivist Wiesław Nowosad.

History of the church

The history of the place where the Benedictine monastery was erected in the 16th century stretches back to the early 11th century. According to *The Life of the Five Martyred Brothers* penned by Bruno of Querfurt, a Benedictine monk and a missionary bishop, an atrocious crime was committed somewhere in this area (*Żywot* 1966, 212–219) resulting in the murder of two hermits from Italy, namely the Benedictines Benedict and John along with two Slavic novices Isaac and Matthew, and their servant Christian. Bruno's work and the oldest Polish chronicles show that this event took place in November 1003. What proved even more troublesome was determining the very spot where the crime occurred, with three possible locations indicated by modern historiography, specifically, Kazimierz Biskupi, Kaźmierz near Szamotuły, and Międzyrzecz. Regardless of these disputes, it should be stated that at least since the 15th century, owing to Jan Długosz's *Annals*, among others, it was the village of Kazimierz Biskupi that has claimed to have been the seat of the hermitage and the crime scene (Sosnowski 2005).

This very event reverberated throughout Christian Europe; based on the information contained in the chronicle by Saint Bruno of Querfurt, Pope John XVIII (pontificate from 1003 to 1009) decided to canonise the Five Brothers. Since the 13th century, the 12th of November has been marked in the liturgical calendar as the day of the festivities in the memory of Martyrs from the Kazimierz Forest. The cult of the Five Martyred Brothers and the history of the Lubusz bishopric became intertwined throughout the subsequent ages in the course of the history of Kaziemirz Biskupi (Golemski 2020).

As stated in Długosz's account, there was already a church of the Five Brothers as early as in the 12th century. This was built in stone and had been founded by Piotr Włostowic (*Roczniki* 2009, 29–30). However, present-day studies suggest that the church bearing the name of Saint Martin and the entire village were both founded by Casimir II the Just after whom the latter was named. From the 12th century, the settlement (later town of the same name) was property of the Lubusz bishops (Soćko 2024). The Church of Saint Martin is not the subject of this study, however.

In 1504, Mikołaj Gardzina Lubrański, later a Poznań *wojewoda* or voivode, purchased from the Lubusz bishop of that time the town of Kazimierz (Fig. 1) together with a group of nearby villages, making them part of his private estate (Bieniak 1973, 85). Together with Rev. Jan Lubrański, a Poznań bishop, he

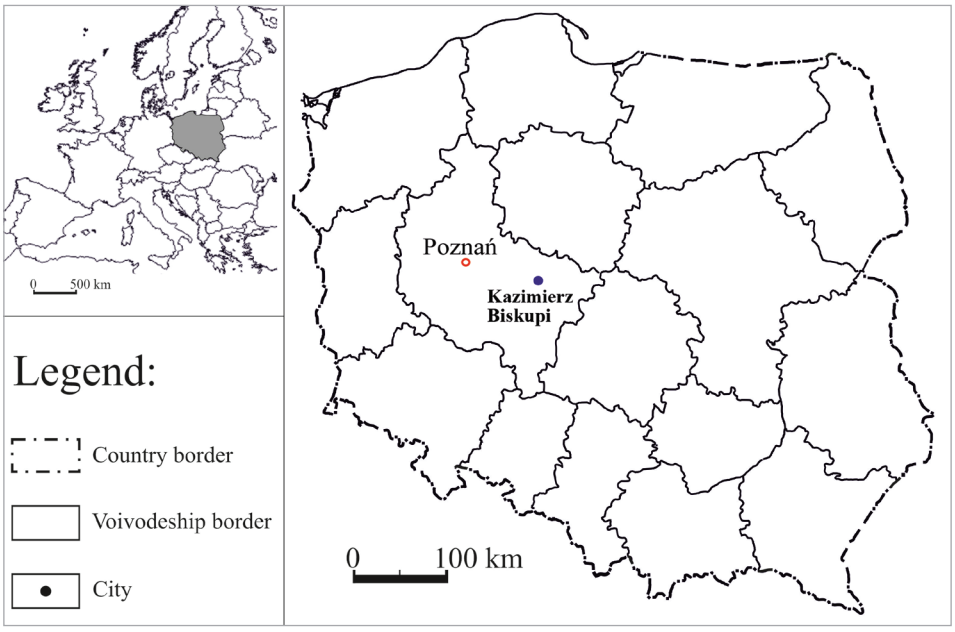

Fig. 1. Situation of Kazimierz Biskupi on the map of Poland (digitalization by W. Dryjański).

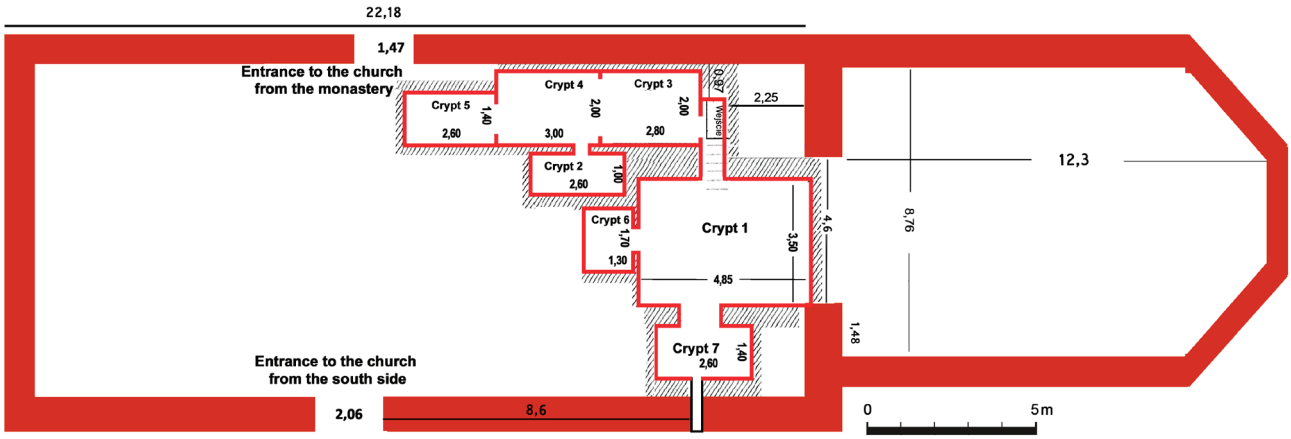

Fig. 2. Plan of the church with the marked situation of the crypts below the floor (digitalization by W. Dryjański).

rode the wave of the growing cult of the five martyred brothers and made the first effort to bring the Bernardines there and to provide them with lodging. It is not known how much time the formalities took. Whether this happened back before the year 1513 or during Pope Leo X's pontificate is impossible to tell. However, it was Leo X who ultimately issued the relevant breve on the 1st of January 1514, stating, […] *thus, looking on that humble request favourably, by virtue of our dignity and this document, we grant you permission to build the said house in the said place and to offer these friars to live in it, and to send word to the vicar of the Polish province and brothers of the Polish province of that order, in line with the custom of that order albeit without harming the Gniezno archbishopric, but instead, with its consent and with the consent of Sigismund King of Poland, our dear son, as well as with the consent of the diocese ordinary, that we hereby grant permission for building that house with all the privileges, graces, inviolability, freedom, and both spiritual and worldly indults, as well as for other brothers and houses of the Order of Friars Minor granted in the past or in the future, so that they could live freely by virtue of this document* […] (*Chronologia*, 1514). The papal letter was the first of the approvals that opened the door for the new foundation. Subsequent permissions had to be issued also by the primate, the ordinary, and the provincial prior of the monastery; however, most likely, the first works were commenced as early as in the year 1514. In order to quickly attain the goal, a small wooden monastery was first built. The efforts to erect a brick structure next to the wooden one were stretched over years. According to the chronicler, the consecration of the likely brick church took place ca. 1522, […] *when the church had been already completed and the relics of the Saint Martyrs were introduced by it* (*Chronologia*, 1514).

Archaeological studies

In the 1970s and the years 2008–2010, archaeological research was conducted in the area surrounding the body of the church, yielding a confirmation of the existence of a cemetery that operated from the early Middle Ages (the turn of the 12th century). Part of the medieval cemetery and subsequently built necropolis had been destroyed by foundation excavations at the time when the brick church and monastery were erected in the first half of the 16th century (Wysocki 2008; Gorczyca 2021, 15–20). After building these structures, the custom of burying them in the cemetery and the church the dead descendants of nobility and bourgeoisie were not abandoned. This was linked to the building of brick crypts under the church floor (Fig. 2). In Figure 2, only the crypts explored in 2022 are marked (according to the information provided by the congregation), these could be found in the western part of the church, as well, but in the 1970s, no one documented these crypts in the course of the conducted renovation works. It should be assumed that the newly raised brick church did not become a burial site until after the consecration, that is, ca. 1522. From then on, the deceased buried there included monks who died on the monastery premises and, occasionally, laymen, benefactors, and people who had rendered a great service to the monastery. One of the first secular individuals buried in the church (the crypt below the presbytery, inaccessible as yet) was the Biechowo castellan Mikołaj Rusocki, murdered in the church graveyard in July 1548. In 1573, in the very same place, in a shared sarcophagus, his widow Anna z Lubrańskich was laid to rest, daughter of the founder of the monastery Poznań voivode Mikołaj Gardzina (*Chronologia*, 585). Due to the attachment to the place

one has cared for, a deceased person was sometimes brought in from even a faraway location. Such was the case of, e.g., Jan Gosławski, who died in Germany in 1608, whose body was buried there in the year that followed (*Chronologia*, 586).

Nonetheless, the laypeople buried in the monastery church were not only noblemen. In 1640, it became the resting place of, e.g., a townswoman from Kazimierz named Jadwiga Dłubichna, also considered a benefactress of the monastery (*Chronologia*, 631). These, however, were exceptional burials substantially outnumbered by all those laid to rest within the church walls.

Written sources aside, one of the first hints suggesting the existence of the crypt was an air hole. In the described church, an opening of this kind has been recorded in the south wall. For this reason, it was on this side that an excavation covering the original width of the air hole was initiated at the end of May 2022. In the excavation trench before the air opening, at the depth of 90 cm, the original humus about 20 cm thick was recorded below the uppermost layer of the stone foundation. The raising of the ground level had caused the bricks in the wall to absorb moisture, which was the reason why the church became damp. Sadly, for centuries, this routine was practiced in an uncontrolled manner by custodians of sacral buildings. Due to inappropriate procedures of this kind, most of Poland's Gothic and modern-era churches were exposed to the danger of uncontrolled soil moisture absorption (Dudziński *et al*. 2013, 16; Majewski 2021, 110–111; Nowosad *et al*. 2024). Building a church on stone foundations, partly visible above the ground level, provided sufficient security against moisture.

After the completion of the exploration efforts in the excavation, an opening was made by removing bricks walled in in contemporary times. Nonetheless, access to the row of crypts remained severely hindered, regardless, since one could move inside them only on all fours. It was a situation typical of crypts used for a longer period. In this case, they likely served for at least 250 years. Despite the crypt being put in order, the space inside (at least 1) was systematically shrinking. In the chronicle by Rev. Dominik Elewski (Fig. 3), there is a piece of information about an order to rearrange the crypts – for instance, in the year 1802, previous burials were allegedly removed to provide room for new ones; this order was not fulfilled entirely, however. According to sources, previous burials lying in the crypts were allegedly moved to the ossuary, most likely with the funeral plot specified. Only Ignacy Lipski's burial was to be left. Originally, the crypts measured from 220 up to 260 cm tall, with the threshing floor or the floor clearly visible upon entering them.

In the unearthed crypts, the situation was completely different. The space between the barrel vault and the last coffins was only about 1 m (Fig. 4). As a result, the research programme had to be changed: firstly, an inventory of the preserved burials on the surface of the backfill was conducted and then an exploration of the layers deposited in crypt 1 commenced. After an initial confrontation, it became clear that access to the crypts has been granted throughout centuries, whereas the level of added burials has raised significantly. This was a common practice applied not only in churches in the Republic of Poland. However, in some cases, the spaces between the coffins allowed one to determine their height (Nowak and Wojciechowska 2013; Majorek and Grupa 2014; Dudziński *et al*. 2020, 245–248; Kulesz and Grupa 2020; Majewski 2021, 111–113; Nowosad *et al*. 2021, 50–54; 2024, 54–60; Dabralet *et al*. 2022; Grupa *et al*. 2022, 128–138). In the case of the Kazimierz crypts, this was completely unreadable, though.

The largest crypt, measuring 360 by 485 m, was marked as no. 1, as this very crypt was supposed to be the first one to be explored. Had a decision been made to explore crypt 7 situated closest to the air hole, that would have distorted the proper exploration of the strata in the biggest crypt. After photographic documentation had been taken, works on unearthing individual burials commenced. At that point, after the first layer of coffins had been removed, it turned out that below, there were ossuaries of various sizes holding interspersed human remains that filled the spaces between the next layer of coffins. This situation reoccurred twice, and after reaching down to the intact soil at the depth of 270 cm, likewise, an ossuary was recorded, buried into the original ground in the form of yellow clay. This was quite surprising, but the rearrangement of this crypt entailed levelling the ground by means of the systematic creation of ossuaries inside of it. Ossuaries that fill the space between coffins are a rare find (Grupa *et al*. 2015, 15–17; Szyszka 2017, 46–63; Kozłowski and Grupa 2019).

In the first crypt, as many as 20 coffins were unearthed, though not all of them held a single burial inside, which was also evidence of secondary relocations inside the crypt. The peculiar anatomical arrangement of many bones and mummified fragments of corpses placed additionally in an original burial coffin suggests that most likely, they were tossed into the coffin they were originally laid to rest with the coffin turned upside down. Such relocations are known from stud-

Fig. 3. Verso – title page of *Chronologia konwentu kazimierskiego oo. Bernardynów* by Rev. Dominik Elewski. Recto – from the *Chronologia*, bearing a depiction of the history of the foundation of the Bernardine monastery in Kazimierz Biskupi (digitalization by W. Dryjański).

Fig. 4. Situation from the initial exploration of crypt 1 (photo by W. Dryjański).

ies in the crypts below the presbytery of the B.V.M. Church in Szczuczyn. In Szczuczyn, the majority of corpses have been mummified naturally, which facilitated interpreting the relocations made and served as the basis for analysing situations in other crypts (Kozłowski and Krajewska 2013; Grupa *et al.* 2014, 111, 116, 122–125, 127, 130; Dudziński *et al.* 2015, 66, 89; 2017, 138–144).

In the Kazimierz crypts, many bones were lying with their front side turned downwards. The coffins were placed by the eastern and western walls of the crypt. Some of them were made using rough planed planks with a black cross on the lid, while others were painted red or black. Additionally, imitations of metal fittings and crosses were painted on them. One of them was upholstered with silk fabric on the outside, with an inscription made on the short sides with brass rivets. Sadly, as yet, they have not been deciphered in any logical manner. Sometimes, coffins were decorated with metal fittings and intricate cartouches (Pawlak 2022a; 2022b).

One of the cartouches bears the readable initials BL and information that the deceased person died at the age of 82, on the 4th of May, 1807. This brief mention provided an impulse for seeking hints of this event in the sources. In the death register for benefactors, under the burial date of the 11th of May, 1807, a noblewoman named Barbara Lipska née Żychlińska was found, wife of a master of the hunt from Wschowa and heir to the Kazimierz real estate who died exactly on the 4th of May that very year. The record yielded one more piece of information. Lipska was buried in her family's crypt below Saint Anne's altar. Therefore, it should be assumed that the explored crypt was the very place where the deceased of the Lipski family had been laid to rest. Importantly, in September of the same year, underneath that exact altar (probably in the same tomb), a noblewoman named after her last third husband Elżbieta Brzezańska née Bojanowska, was also buried (*Chronologia*, 607). According to the mentioned source, these were the two last burials made in that crypt, but is that really the case?

The coffin attributed to Barbara Lipska contained various human remains which had been tossed in loose. Nonetheless, those discovered in the lower part of the chest belonged to a female (died in the age category of *senilis* – >60 years) arranged in anatomical order (Fig. 5), on which relics of a silk gown were found, the style of which was similar to that of dresses with a train worn at the turn of the 19th century (the burial and the grave garments from that coffin are to be discussed in a subsequent study) (Gutkowska-

Fig. 5. Remains attributed to Barbara Lipska with a name cartouche (photo by W. Dryjański).

Rychlewska 1968, 734; Majorek 2014, 8–10; Nowosad and Grupa 2020, 247–252; Dobek 2022, 64–68).

The death register for benefactors listed also other burials in the crypt below Saint Anne's altar from the late 18th century. In the year 1792, it became the resting place of Ignacy Lipski, died at the age of 72, an heir to the real estate of Błaszki and Kazimierz Biskupi, whereas one year later, Paweł Doruchowski was buried there, too. In 1795, it became the resting place of Ewa Tymińska, an heir to Komorowo, and in 1796, Antoni Bogusławski (at the age of 60), a Radziejowo-based writer, and Anna Szoska née Bobrowska (*Chronologia*, 605). These records should be handled with a degree of caution, however. This is because it is not unlikely that there were at least two crypts under-

Fig. 6. Gown of Barbara Lipska before the conservation works (photo by D. Grupa).

Fig. 7. Fragments of Barbara Lipska's gown after the conservation works (photo by D. Grupa).

neath Saint Anne's altar. This is indicated by an entry made in 1783 informing that in the crypt below Saint Anne's altar, a nobleman named Łukasz Rosen was buried *inter fratres nostros, qua confrater* (among our brothers as a confrater) (*Chronologia*, 603). Perhaps this man was buried in a wool habit that underwent complete decomposition, thus rendering his burial site inside the crypt impossible to determine.

In coffin 2, remains of a male who died at the age of about 60 years were discovered, probably the mortal remains of Antoni Bogusławski, bearing relics of a smooth silk fabric. Some fragments were indicative of a *czechman* (a vestment, the style of which was reminiscent of a *kontusz*) – with a split on the front and a concealed fastener. The front part with loops was widened with triangles invisible to the bare eye, most often fastened underneath the right side of the garment with a single button or a hook and eye. Usually, this type of fastener was located near the opposite shoulder, allowing for the heavy piece of clothing to be fixed in the determined place (preventing it from sliding down and creasing), and also securing the concealed fastener from being ripped out from the surface of the base fabric (Grupa 2005, 56–57, 150–160; 2022, 101–135).

Czechman was an undergarment that replaced *żupan* worn by Polish nobility, which from the time of the Constitution of the 3rd of May called a national piece of clothing (Turnau 1991, 8; Grupa 2022, 9).

In crypt 6, one more woman's gown from the turn of the 19th century was found, but in this particular case, it was difficult to attribute it to specific bone remains. Perhaps it was the burial of one of the above-mentioned women, although the location of the crypt is somewhat different. The gowns differ in terms of details, yet their overall design is very similar (Fig. 6, 7), which can suggest a date of death from the same period.

The other grave goods belonged to at least about 50 individuals buried in crypt 1, who died at various times. Of these materials, only relics of a single set of liturgical robes and perhaps at the level of intact soil fragments of a wool habit have been identified. The

remaining ones are highly fragmented pieces of laymen's clothing made using silk fabrics (Fig. 8) since wool and linen have broken down completely.

This aside, 5 scapulars were identified (Fig. 9) which were also silk-based. Had the binding rules that specified wool fabric as the raw material used for scapulars been applied, then we would have never learned about the burials that involved the scapulars and the flourishing cult of a saint's scapular among the upper-class residents of the town and the area. The tradition of wearing a saint's scapular by laypeople came into being in the Middle Ages and was related to the growing cult of the Virgin Mary and the Order of the Brothers of the Blessed Virgin Mary of Mount Carmel (Grupa *et al*. 2015, 137; Grupa 2016, 67; 2018, 258–259). In the second half of the 13th century, relocated from the Holy Land to Europe owing to the initiative of their general Saint Simon Stock the friars were gifted by the Mother of God a wool scapular (Szkopek 2005, 10–13; Nowak and Przymorska-Sztuczka 2013, 53–54). The monasterial scapular had the form of a long rectangular piece of wool fabric with an opening for the head in the middle.

As the first who offered scapulars to the faithful, the Carmelites passed on the promises they were given by the Mother of God. Committing oneself to Mary's care was supposed to, among others, protect the one who was wearing her mark against burning in Hell. The faithful received a monasterial scapular of a smaller size. It consisted of two pieces of wool fabric joined with two tapes or strings. It was put on in such a way that the linking elements were resting on one's shoulders, whereas the fabric was cascading down the breast and the back. This shape was intended to reflect a friar's habit, with examples found in Catholic burials (Kwiatkowski 2005, 31; Szkopek 2005, 13–14; Nowak and Przymorska-Sztuczka 2013; Nowosad *et al*. 2024, 76–77). Just as today, those wearing a scapular had to fulfil duties that would allow them to be granted an indulgence. What is more, by putting the scapular on, one had the opportunity to join the Brotherhood which was allegedly a secular part of the congregation. Since the moment the believers were gifted with this symbol, those wearing it included, among others, Louis IX King of France, Władysław II and Saint Jadwiga (rulers of Poland) or Saint Pope John Paul II (Moisan and Szafraniec 1987, 96–97; Sterczewska and Praśkiewicz 2011, 13, 112–118; Nowak and Przymorska-Sztuczka 2013, 55).

The skeletal remains unearthed and disinterred from the crypts were anthropologically assessed during the exploration (Pawlak 2022a). However, in the

Fig. 8. Fragments of silk fabrics from grave garments (photo by D. Grupa).

Fig. 9. Scapular with the symbols of the Passion of Christ dated back to the 17th century (photo by D. Grupa).

course of such *ad hoc* analyses only some information can be acquired, usually quite general in nature, for that matter. Many of these findings obviously need to be verified but even these preliminary results provided certainty that in crypt 1, both men (Fig. 10) and women who died at various ages were buried. In general, however, males were by far the majority and while child remains were also found, their bones are not numerous. In this respect, one can take the preliminary view (Pawlak 2022a) that from crypt 1, remains that belonged to at least 185 individuals were exhumed.

In general, the disinterred bones are in good condition, though many skeletons are incomplete or represented solely by single bones that occurred in other coffin burials. Due to the crypt being used over an extensive period of time, some remains from destroyed and/or removed burials returned to the so-called bone clusters and ossuaries deposited in other coffins, pits, or between and under coffins (Fig. 11). In this respect, it should be added that some corpses underwent partial natural mummification (Fig. 12, 13). This is a phenomenon quite typical of burials placed in crypts whose climate (they are arid and ventilated/airy) is conducive to processes that preserve the corpse (Raszeja *et al.* 1990, 57; Kozłowski and Krajewska 2013; Grupa *et al.* 2014; Piombino-Mascali *et al.* 2017, 101–102) and organic matter in general. After bones had been accumulated in the crypt for at least two centuries, the layers below the coffins were not conducive to preserving mummified remains. Only a few of them were partly mummified, but time and increased humidity inside the crypt caused them to decompose further.

Fig. 10. Skull, most likely of a male who died at the age of over 50 years, from coffin no. 8A (photo by T. Kozłowski).

Fig. 11. Well-preserved skulls without mandibles from one of the ossuaries unearthed in crypt no. 1 (photo by T. Kozłowski).

Fig. 12. Partly mummified right foot of a male who died at the age of about 35 years from coffin no. 2 (photo by T. Kozłowski).

Fig. 13. Skull of a male from coffin no. 2. Visible mummification of soft tissues on the neurocranium – on the tip and the occiput (photo by T. Kozłowski).

During two several days long stays in Kazimierz Biskupi in the 2023 summer season, a general inspection was performed along with more detailed anthropological analyses of bone remains from 8 coffins. Their aim was to provide a general picture of the state of preservation of the skeletal material and its total number. This was supposed to help plan further detailed bioarchaeological research. On that occasion, a closer look was taken at selected burials that were assumedly likely to be identified even with a small chance of success; this entailed combining the information provided by the abundant movable historical artefacts that accompanied the dead, the data contained in the written sources, and lastly, the bone remains. We are fully aware of the fact that it is not an easy task, but we believe that an effort to produce such findings is worth making in at least a few selected cases.

Further anthropological research will also aim at describing the pathological changes recorded on the bones, of which there are plenty in this skeletal material (Fig. 14). Some of them can be even described as extraordinarily spectacular. Moreover, relatively rare cases of diseases that are quite infrequently found in osteological material from archaeological studies were identified.

A few more words on Rev. Dominik Elewski's account of the burials

Today, it is impossible to determine the exhaustive list of individuals buried in the church. Registers of the deceased for that church were either not kept or have not been preserved. This is due to the fact that it was a monastery temple and not a parish church. Instead, the monks kept a register in which they made collective entries of those accepted into the monastery, inventories of patrons and benefactors, and lists of the dead: friars associated with the monastery and donors, both clergymen and laymen of noble (Fig. 15) or plebeian standing alike. Obviously, lists of the dead are at the centre of our interest, though one should ex-

Fig. 14. Fragment of the spine of a male buried in coffin no. 2. Ossification of some ligaments and joints of the spine co-occurring with sacroiliac joint union. Most likely ankylosing spondylitis (AS), also known as Bekhterev's disease (photo by T. Kozłowski).

ercise extreme caution when approaching them. The monks kept records of the fact of death, often without specifying the place of burial. At the same time, they were trying to make an entry for every individual important to them, even if he or she had not died in Kazimierz and had not been buried there. Therefore, these registers are not equivalent to lists of people buried in the monastery graveyard and in the temple. For this reason, an attempt at devising a summary seems pointless at this stage. For the majority of these individuals, the place of burial is specified as the church. Few have their names marked with specific crypts. It is known that in the 16th century, such a crypt was a property of the Rusocki family, which at the end of that century was determined to be situated under the presbytery. Since the end of the 17th century, the crypt under Saint Anne's altar started being specified, somewhat later defined in more detail as located below the pulpit. The first person to be recorded as buried in that location on the day of 30 August 1689 was the noble Izabela Grabska, who had already reached old age. Others who were laid to rest there in the very same year are Jan Krasiński, Kasper Żychliński, a Kalisz chamberlain, and Andrzej Słoński. It can be assumed with a degree of caution that the crypt was raised

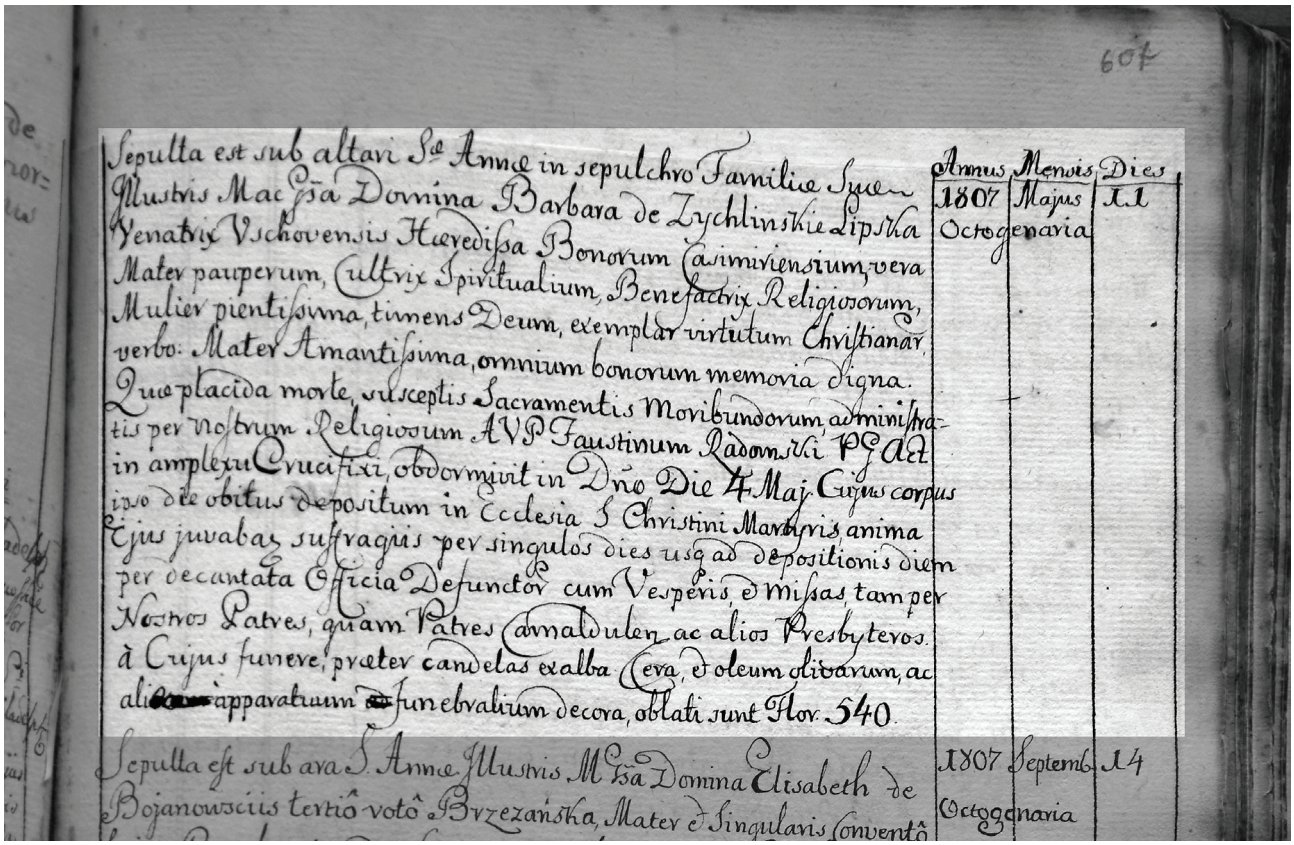

Fig. 15. Book of the dead – the record of the death of Barbara Lipska née Żychlińska (digitalization by W. Dryjański).

around that period for the purpose of holding noble burials. Three years later, in 1692, another crypt below this altar was first mentioned, described as a place intended for deceased friars but also where nobility was buried as well (in the analysis it has been assumed that it is crypt 2 – Fig. 2). In 1695, a mention of a tomb by a massive door appears. Other crypts remained unmentioned until nearly the mid-18th century. In 1741, the crypt next to Saint Catherine of Bologna was mentioned for the first time, where the noble Katarzyna Porczyńska had been laid to rest. In 1756, reference was made to a crypt between Saint Francis and Saint Anthony. Despite more of them being in construction, the one below Saint Anne was still most often pointed to as the place for the burials of the nobility. At the end of the 18th century, the crypt situated below the way of the cross by the door became just as "popular", perhaps the same as the one known since 1695, now called *sub ambitio viae Crucis ante fores Ecclesiae*, which somewhat disburdened the crypt under Saint Anne's altar which had been used continuously.

Conclusions

The number of individuals buried in the church in Kazimierz with a more-or-less specific place of burial in the records is probably significantly higher than a hundred. There is also the unspecified – and unfortunately much more numerous – group of people (particularly in the second half of the 17th century) for whom the church in Kazimierz has not been entered at all as the place of burial, as one might expect having analysed their names. Therefore, it is rather unlikely that an exhaustive list of the people buried in the examined crypts will be produced. These studies are preliminary, however, and extending this research in the future might bring results that are unexpected at this stage.

Undoubtedly, a highly valuable scientific material that carries a great cognitive load is the human bone remains unearthed in the course of the exploration works. These often allow one to learn a more detailed story of the life and death of the people who were most likely associated with the local community and had a direct link to the monastery and the church.

This information is further complemented by the discovered artefacts made of wood, fabric, hide, and metal. The way in which they were crafted and their style are not very different from those that had been found earlier at other archaeological sites in Poland and Europe. Nonetheless, each of them bears distinct traits that make them unique.

Until the research continues, as any other church or monastery, it hides secrets a mere mortal is oblivious to. For this reason, thanks to archaeological studies on the artefacts, by analysing and subjecting them to conservation works, it is possible to expand the knowledge of the history of the city and the people who lived there for centuries.

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REVIEW

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(review) Elżbieta Kowalczyk-Heyman. *Średniowieczne rękojeści antropomorficzne (próba klasyfikacji i interpretacji)* [*Medieval anthropomorphic handles (an attempt at classification and interpretation)*]. Warszawa 2021: Instytut Historii im. Tadeusza Manteuffla Polskiej Akademii Nauk, Wydział Archeologii Uniwersytetu Warszawskiego, 229 pages, 73 figures, 12 maps, 10 tables.

The author was a distinguished specialist who produced almost four hundred scientific works and focused her historical and archaeological interests on the medieval period. Throughout her career, she was affiliated with the University of Warsaw. Her work *Medieval anthropomorphic handles (an attempt at classification and interpretation)* was published in 2021. The monograph attempts to systematize knowledge on medieval anthropomorphic handles and includes 160 specimens collected by the author, namely the handles of knives, pins and spatulas, from 22 countries. The entire collection has been catalogued and described, with construction, raw materials, and dating all considered. Attention has been paid to the symbolism and clothing presented and their possible employment by the users.

The main part of the monograph is divided into eight chapters. These are preceded by an *Introduction*, in which we learn about the problems involved in obtaining information about the artefacts. These included their wide dispersion in many regions of Europe, as well as the form of handle publication, often far from perfect. Despite the large number of engravings, their quality and detail may leave one unsatisfied.

In the first chapter, Elżbieta Kowalczyk-Heyman introduces the readers to the state of the research and the subject matter undertaken in her work. It proved to be a difficult task due to the incomplete descriptions of previous researchers and the author repeatedly highlights misinterpretations and gaps in the descriptions. The studies used have numerous simplifications, misidentifications (reproduced without verification), and often methodological errors. The material collected has been supplemented by new sources and comments by the author. The second part of the chapter contains a catalogue in which the objects discussed are listed by country and place of storage. The area of the occurrence of the objects includes the countries of Western and Central Europe, including Italy, Spain, Great Britain, Ireland, Scandinavia and the Baltic states (p. 17). The chronological range of the monuments covers the High and Late Middle Ages.

The second chapter proposes a classification of handles. The collected monuments are grouped according to a number of characteristics into types, subtypes, varieties, and variants. A major advantage of the typology adopted is its open-ended nature, allowing for further expansion with new discoveries. The researcher has not included handles with reliefs, busts, depictions of incomplete silhouettes, or those found surrounded by architectural or natural elements. Outside the focus of attention are multi-figure narrative and religious representations. The basic division includes six types. The geography of the finds of each is presented in separate maps. Also useful are the tabular depictions, showing collectively the handle characteristics of each type. E. Kowalczyk-Heyman pointed out the differences between the handles of knives and the handles of pins and spatulas, with the key issue seemingly the presence or absence of a pin hole. The recognised handles of pins and spatulas do not have one, as they were made from a single piece of raw material (p. 112).

The next chapter marks the division of handles which are then discussed as to shape and proportion. Clamps or traces of them are sporadically preserved and the lengths of the handles and heads are considered to vary. Handles were able to be grouped together over a fairly large sample. In the case of the heads, the problem was the small percentage of monuments in which they were preserved. The lack of archaeozoological research and the inability to recognise the material also caused problems in assessing the raw material used. Because of this, about 15 per cent are in doubt (p. 119). The origin of the building material is, however, sufficiently documented to allow geographical correlations to be sought. The material of pins and spatulas has been worked out similarly.

The fourth chapter presents conclusions on the distribution of anthropomorphic handles across Europe. The author presents her own view on the distribution of handles and where they were made. Information on the manufacturing technique and style of the handles is shown along with proposed dating of the objects.

A brief fifth chapter is devoted to the places where the artefacts were found and their influence on the proposed dating. Some of the monuments are not associated with specific spaces. Other sites, however, have distinct characteristics. The main centres of origin and clusters where they occur more frequently than in other areas are indicated. It is noted that this is the state of current research which may change. The different intensity of the work depending on the location of the sites, in or outside the city, may distort the results obtained.

Chapter six deals with the symbolism of props and gestures. The scholar tried to determine from them the gender and social position of the figures depicted. Of the animals discussed, considerable attention was devoted to falcons, while separate sections deal with the attributes of saints, instruments, other objects and gestures.

In chapter seven, attention is given to selected elements of clothing. Differences in cut, arrangement and length can be indicative of gender or social group, as the author notes. Within the group of clothing, the variation of headgear and hairstyles is also addressed.

The final chapter discusses the use of pins, spatulas and knives. It is pointed out that carved knife handles may have been devoted to a different use than to those handles without decoration. The uses of the tools are cited and juxtaposed with the social groups to which specific types of artefacts may have belonged. The researcher has undertaken a consideration of the occurrence of criteria distinguishing workshops and whether their creations were serial or individual.

In the *Summary*, we find the quintessence of the content conveyed in the earlier chapters. The bilingual summary shows well the issues raised and helps to determine whether the content relates to the reader's interests. Finally, we find a list of sources and studies used, as well as an index of localities where the items are kept. The last element is a list of maps which present the locations of selected items divided thematically.

Elżbieta Kowalczyk-Heyman's publication marks a new stage in the work on medieval anthropomorphic handles from European sites. It is a very good and detailed work that will bring much to those interested in the subject.

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