

JAROSŁAW OŚCIŁOWSKI*

TWO EARLY MEDIEVAL SWORDS

FROM THE MASOVIAN-PRUSSIAN BORDERLAND

Abstract: The paper discusses two early medieval swords from the region of Zawkrze in Masovia. The first one was found in the cemetery in Dąbek near Mława and the other one was discovered near Żuromin at the River Wkra. Their blades belong to Type X according to Ewart Oakeshott's classification. Both swords underwent X-ray and metallographic examinations in the Laboratory of Bio- and Archaeometry of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences in Warsaw.

Keywords: swords, borderland, Masovia, Prussia, early Middle Ages

Twelve early medieval swords dated to between the 11th and the early 13th century have been known so far from the Masovian-Prussian borderland. Recently, two new discoveries have been made. One of them comes from the cemetery in Dąbek, Mława District and the other one was found in the vicinity of Żuromin, Żuromin District. Both discoveries were made in the region of Zawkrze (Fig. 1), situated to the north-east of the River Wkra. The Laboratory of Bio- and Archaeometry of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences carried out X-ray and metallographic examinations of these swords¹.

The sword from Dąbek

The sword from Dąbek was found in the early medieval cemetery². The discovery was made by a local farmer during agricultural works at an unspecified point in time. The farmer also discovered a human skeleton. In the course of exploration, the sword broke in two. The discoverer gave the upper part of the sword with the hilt, the crosspiece, the rain guard and the upper part of the blade to Ryszard Juszkiewicz, a judge from Mława, in the 1970s. The hilt of the sword is short and it is provided with a lens-shaped pommel. The grip tapers toward the pommel. The crosspiece is straight, somewhat asymmetrical (c. 1 cm longer from one side).

It slightly broadens in the central part. Its cross-section is square. The crosspiece belongs to Type 1 of Ewart Oakeshott's classification (henceforth: E.O.)³. The blade is provided with wide and shallow fullers on both flats. The total length of this fragment of the sword is 50.3 cm. The length of the preserved part of the blade is 36 cm, its width at the crosspiece is 4.5 cm and in the lower part of the surviving fragment it varies between 3.5 and 3.9 cm. The thickness of the blade at the crosspiece is 0.5 cm and in its lower part – 0.4 cm. The fuller is 2 cm wide, while the width of the edges is 1.5 cm. The thickness of the fuller in its lower part is 0.3 cm. The length of the asymmetrical crosspiece is 14.4 cm. Its height is 1 cm, its width in the central part is 1.5 cm and near the edges the crosspiece is 1 cm wide. The length of the grip is 10.3 cm. Its width in the lower part is 2.8 cm, and in the upper part – 1.4 cm. The thickness of the grip in its lower part is 0.6 cm and in the upper part – 0.4 cm. The pommel is 3.2 cm high. Its width is 6 cm and its thickness is 2 cm. It belongs to Type A (E.O.)⁴. This fragment of the sword is probably covered with a preservation layer of paraffin. The second part of the sword, that is, the lower part of the blade, was given by the discoverer to A. Grzymkowski from the Museum of the Zawkrze Region in Mława in the 1990s. This part of the blade is also provided with wide and shallow fullers which taper toward the point. The length of this fragment is 38.5 cm. The blade in its upper part is 4.2 cm wide and in its lower part

* Institute Archaeology and Ethnology Polish Academy of Science, Warsaw, oscilowski@iaepan.edu.pl.

¹ See Appendix. The analyses were managed by Paweł Gan, Waldemar Kaliński and Krzysztof Szuligowski also took part in the research.

² Rauhut 1971, 534-536.

³ Oakeshott 1964, 113.

⁴ Oakeshott 1964, 93.



Fig. 1. Map of sword finds from the Polish-Prussian borderland. Drawing J. Ościłowski.

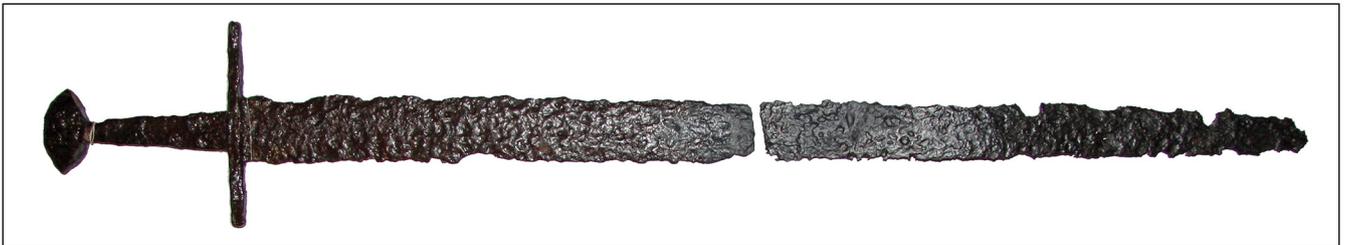


Fig. 2. Sword from Dąbek. Photo J. Ościłowski.

at the point is 3 cm wide. The thickness is between 0.3 and 0.4 cm. The total length of the sword is 90 cm. The blade is 75 cm long and belongs to Type X (E.O.)⁵. The sword can be tentatively dated to the 11th century (Fig. 2).

The Laboratory of Bio- and Archaeometry of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences made a photo which confirms that both fragments of the sword belong to one and the same artefact (Fig. 3). The sword from Dąbek was made using a rod technique⁶. The edge part of the blade may have been provided

with a steel cover, which did not survive, so it could not be sufficiently examined. The Laboratory also carried out X-ray examinations of the sword. It did not reveal any traces of inscriptions or marks on the blade (Fig. 4). The research confirmed that the pommel was solid, that is, it was made from one piece of iron (Fig. 4). The sword from Dąbek belongs to Type X,A,1 (E.O.). Blades of Type X were in use between the mid-10th and 11th centuries⁷. Lens-shaped pommels of Type A (E.O.) were also classified as Type alpha (α) according to A. Nadolski, Type V according to A.N. Kirpičnikov, Type IX according to A. Ruttkay,

⁵ Oakeshott 1964, 28-30.

⁶ See Appendix.

⁷ Oakeshott 1964, 28-30.



Fig. 3. Matching of broken parts of the artefact. Photo P. Gan.

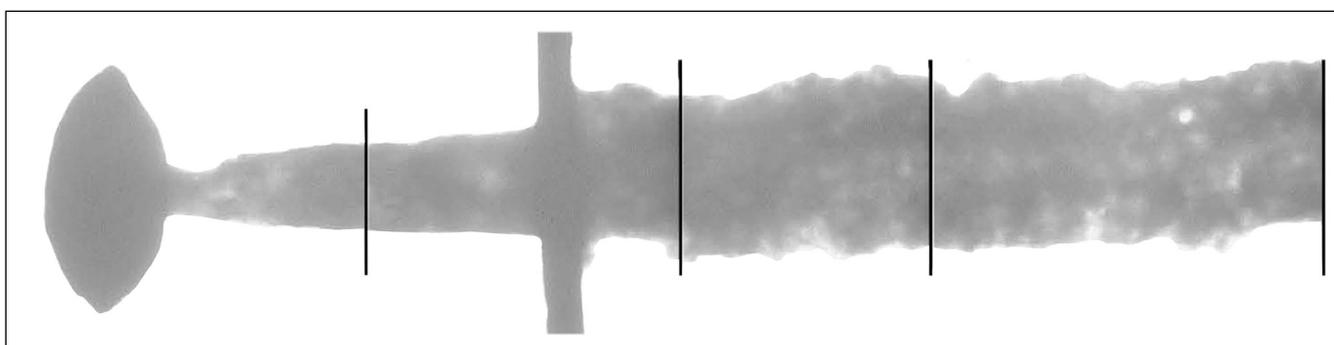


Fig. 4. Sword from Dąbek – radiographic survey. Photo M. Osiadacz.

Type 16-I according to A. Geibig, Types 3 and 4 according to Z.-K. Pinter and Type Ovalo according to V. Kazakevicius⁸. Most researchers date these pommels to between the mid- or late 10th century and the 12th century⁹. Such pommels are also known from swords dated to the 12th and 13th centuries, especially those from Rus and also from the Czech Republic, Estonia, Slovakia and Switzerland. Therefore, the chronology of these swords falls between the mid- or late 10th and the 13th centuries¹⁰. Crosspieces of Type A were in use between the 10th and 16th centuries¹¹. Therefore, the sword from Dąbek should be dated to between c. 950 and c. 1100 on the basis of its typology. Swords of similar typology swords are not known from the Polish-Prussian borderland. However, 12 swords of Type (X, A, 1, E.O) are known from Masovia. The most similar swords come from Staroźreby, Płock District, Czersk

(Burial 609), Piaseczno District and Warszawa-Królikarnia. The sword from Staroźreby is dated to the 12th century and it has almost identical dimensions as the sword from Dąbek¹². The sword from Warszawa-Królikarnia is dated to the 11th century¹³. An interesting trait of this sword is that its pommel is empty inside. The sword from Czersk (Burial 609) is dated to the 1st half of the 12th century¹⁴. Yet another sword from the Masovian-Prussian borderland is known from the cemetery in Grzebsk, Mława District. This find demonstrates a certain similarity to the artefact from Dąbek. The crosspiece differs, because its shoulders are slightly bent toward the blade. This trait is typical for

⁸ Nadolski 1954, 26-29; Oakeshott 1964, 93; Kirpičnikov 1966, 54-55; Ruttkey 1976, 252-255; Geibig 1991, 70-72; Kazakevicius 1996, 85-89; Pinter 2007, 130-131; Kucypera et al. 2011, 80.

⁹ Nadolski 1954, 28; Oakeshott 1964, 93; Ruttkey 1976, 254; Geibig 1991, 151; Kazakevicius 1996, 89; Aleksić 2007, 33-35.

¹⁰ Kucypera et al. 2011, 80.

¹¹ Oakeshott 1964, 113.

¹² The total length of the sword from Staroźreby is 90 cm, the pommel is 6.5 cm wide and 3 cm high. The width of the blade in the upper part is 5 cm. The crosspiece is longer (17.5 cm) and straight, Rauhut 1971, 500.

¹³ The lower part of the blade is missing and the preserved length is 60.2 cm. The length of the hilt is 14.3 cm and the crosspiece is 15 cm long. The width of the blade in its upper part is 5.4 cm, while the pommel is 6.1 cm wide and 2.8 cm high, Dunin-Karwicki 1978, 168-169.

¹⁴ Its total length is 91 cm. It has a somewhat wider blade (up to 6 cm). The same concerns its pommel, which is 8.5 cm wide and 5 cm high, Bronicka-Rauhut 1998, 42-43, 97.

crosspieces of Type 1a, which was isolated by M. Głosek¹⁵. The sword is provided with inscriptions on both flats of the blade. On one flat there is an inscription NNOMN-NAE, which should be read as IN NOMINE. The other flat is provided with an inscription OINN..NT. The sword is dated to between the 2nd half of the 11th century and the beginning of the 12th century¹⁶. Other swords of this type (X, A, 1) from Masovia or Masovian-Prussian borderland usually have longer blades or larger pommel. So far, no swords which would be similar to the weapon from Dąbek have been discovered in the regions of Warmia, Masuria and Powiśle. However, with regard to its typology, some similarity can be seen in the case of the sword from Wężina near Elbląg. It belongs to Type Xa, A, 1 (E.O.) and is dated to the turn of the 11th and 12th centuries. A certain difference is posed by the fact that the blade of this sword strongly narrows toward the point. Furthermore, the fuller of this sword is also somewhat narrower. The same can be said about the pommel. The sword from Wężina is lacking a small portion of the end part of the blade. The sword's total length is 83.5 cm. The blade is 71.7 cm long. The crosspiece is 12 cm long and the hilt is 11.8 cm long. The pommel is 2.6 cm high and 5.7 cm wide¹⁷. From other parts of Poland there are a few swords which are similar to the find from Dąbek. One of them was found in Grave 1 in the cemetery in Bochońnica, Puławy District. The sword is dated to between the 2nd half of the 11th and 12th centuries. Its end part is broken. Its preserved length is 84.6 cm and the blade is 71.5 cm long. Its pommel is 3.2 cm high and 5.3 cm wide. The crosspiece is 14.1 cm long¹⁸. Another similar sword was discovered in a settlement accompanying the stronghold in Ostrów Lednicki, Gniezno District. It belongs to Type Xa, A/B, 1 (E.O.). Its total length is 95.5 cm, its blade is 81.8 cm long and its crosspiece is 13.32 cm long. The pommel is 3.41 cm high and 7.74 cm wide¹⁹. The sword from Żalęcino, Stargard District is also similar, but its blade is not completely preserved. It belongs to Type X or XI (E.O.). The artefact has similar dimensions to the sword from Dąbek: the hilt is 14.1 cm long, the pommel is 3.5 cm high and 6.3 cm wide. The pommel belongs to Type A (E.O.). It is silver-plated and it bears a sign of a black cross pattée. The crosspiece is longer (21 cm) and belongs to Type 1 (E.O.). It is also silver-plated. The sword is dated to the 11th century²⁰. As mentioned above,

the blade of the sword from Dąbek was made using a rod technique. Overlays were forge-welded onto the soft core and then the blade underwent thermal treatment. A few blades of swords belonging to Type X,A,1 (E.O.) were made using this technique. They come from Lutomiersk, Pabianice District (1st half of the 11th century), Charlupia, Sieradz District (11th to the mid-12th century), Dąbrowa Zielona, Częstochowa District (11th to the mid-12th century) and Płock-Winiary (11th century). Cores of their blades were usually made from soft steel or the central part of the core was made from soft steel, while their overlays were made from harder steel. Edges and flats were made from bars of hard steel, rarely from semi-hard steel²¹. On the basis of the examinations it can be assumed that the sword from Dąbek can be dated to the 11th century, but a 12th century date cannot be excluded, either.

The sword from the vicinity of Żuromin

The other examined sword was discovered in the vicinity of Żuromin, to the south of the town, probably in the early medieval cemetery in Poniatowo. The weapon was found during gravel extraction in 1994. The sword survived in two parts which are heavily damaged by corrosion. The artefact has a long blade with wide and shallow fullers on both flats (poorly visible now). The fullers reach the narrowing point. The blade belongs to Type X (E.O.)²². The hilt is one-handed and the crosspiece is straight. It belongs to Type 1a (E.O.)²³. The pommel is solid and semicircular in the upper part. It has a slightly convex base. It belongs to Type B (E.O.)²⁴. Pommels of this type are transitional forms in the line of development from pommels of Type X according to J. Petersen to lens-shaped pommels²⁵. It is the first example of a sword with this kind of pommel in this part of Poland. The total reconstructed length of the sword is 90.2 cm. The blade is 75.2 cm long, its width is 5.5 cm in the upper part and 4.4 cm in the lower part. The thickness of the blade is from 0.4 to 0.5 cm. The crosspiece is 14 cm long. The pommel is 7.4 cm wide, 4 cm high and 2.7 cm thick. The width of the grip is between 1.4 and 2.9 cm. Its thickness varies between 0.3 and 0.6 cm. The sword can tentatively be dated to the 11th century (Fig. 5). On the basis of technological examinations it can be said that the blade was made from one piece of metal. The metal contains numerous slag inclusions. To provide the blade with proper hardness, the blacksmith probably applied thermal treatment with cooling²⁶. X-ray examinations did not reveal any traces of inscriptions or marks on the blade (Fig. 6). However, they confirmed that the pommel was solid, that is,

¹⁵ Głosek 1984, 39.

¹⁶ The crosspiece of the sword from Grzebsk is 17.5 cm long. The sword's total preserved length is 87.5 cm. The blade's preserved length is 75 cm. The pommel is 2.7 cm high and 6.5 cm wide, Głosek 1973, 19, 139, catalogue no. 10, Tabl. III, Fig. 2.

¹⁷ Kittel 2002, 171; Marek 2014, 48-50, 154, 189, catalogue no. 124, Fig. 19a.

¹⁸ Lis 1996, 200, Fig. 3.3; Strzyż 2006, 27, Fig. 3.2, table I.

¹⁹ Pudło et al. 2011, 43, 57, Tabl. III.

²⁰ Głosek 1984, 151, no. 177; Świątkiewicz 2002, 25, Tabl. IA, catalogue no. 22, Tabl. II, 5.

²¹ Żabiński et al. 2014, 181-197.

²² Oakeshott 1964, 28-30.

²³ Oakeshott 1964, 113.

²⁴ Oakeshott 1964, 93.

²⁵ Kucypera et al. 2011, 78-79.

²⁶ See Appendix.

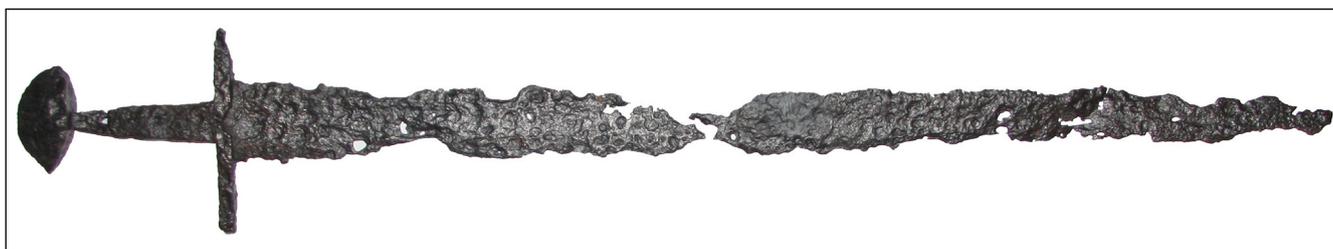


Fig. 5. Sword from the vicinity of Żuromin. Photo J. Ościłowski.

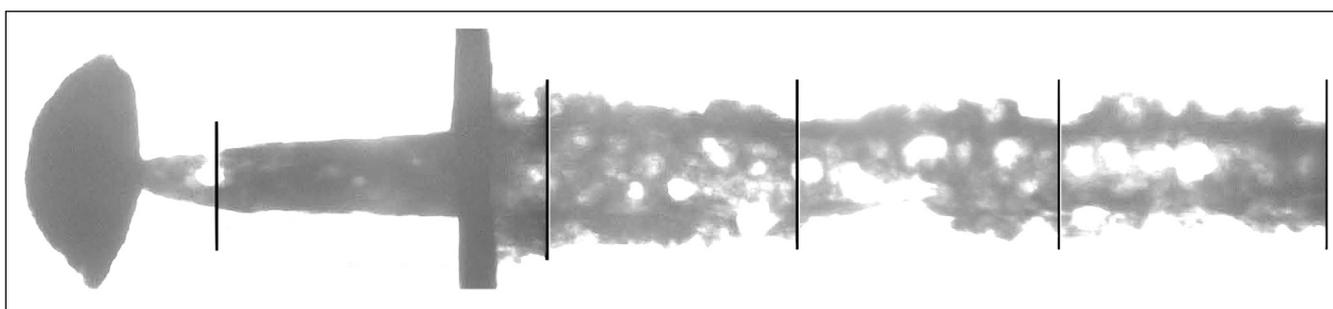


Fig. 6. Sword from the vicinity Żuromin – radiographic survey. Photo M. Osiadacz.

it was made from one piece of metal (Fig. 6). As mentioned above, the sword from the vicinity of Żuromin belongs to Type X, B, 1a (E.O.). Type X blades were mainly in use between the mid-10th and 11th centuries²⁷. Semicircular pommels of Type B with slightly pronounced bases (E.O.) were also classified as Type IV according to A.N. Kirpičnikov and Type 18 according to A. Geibig²⁸. E. Oakeshott dated these pommels to the period between the mid-11th and mid-12th centuries. According to A.N. Kirpičnikov, their chronology can be defined as c. 1100-c. 1300, while A. Geibig dated them to the 12th-early 13th centuries²⁹. After a repeated analysis of finds from Europe, P. Kucypera, T. Kurasiński and P. Pudło dated them to the 2nd half of the 10th-13th centuries³⁰. The earliest swords with this type of pommel come from England, Finland, Holland and Poland. The latest ones are known from Belarus, Czech Republic, Montenegro, Estonia, Switzerland and Ukraine³¹.

Crosspieces of Type 1a differ from those of Type 1, because their arms are of uniform thickness throughout their entire length. Crosspieces of this type were in use from the 11th to 17th centuries³². Therefore, the sword from the vicinity of Żuromin should be dated to the 11th century; however, a later chronology cannot be completely excluded. Swords with blades and pommels of this type and

with straight crosspieces (Type X, B, 1/a E.O.) are known from the territory of Poland: Bydgoszcz (from the River Brda), Rzeczków, Tomaszów Mazowiecki District, Trzciel, Międzyrzecz Wielkopolski District (from the River Obrą) and Żółwiniec, Konin District. Yet another sword comes from an unknown find place and is stored in the National Museum in Wrocław. It seems that the greatest similarity to the sword from the vicinity of Żuromin can be seen in the case of the sword from Żółwiniec. This find is dated to the 11th century³³. The sword from Trzciel has a similar pommel³⁴. Pommels of other swords are smaller. Other dimensions differ. These swords have longer crosspieces, from 18.7 cm to 25.5 cm³⁵. With regard to its technology of manufacture, the blade of the sword from the vicinity of Żuromin was made from one piece of metal. To provide the blade with additional hardness, the bladesmith probably used thermal treatment with fast cooling. The same technology was used to make blades of swords from Psary, Piotrków Trybunalski District and Rzeczków. The first one belongs to Type X,B,1 (E.O.) and is dated to the 2nd half of the 11th century. The other one can be classified as Type X,B,1a (E.O.)³⁶.

²⁷ Oakeshott 1964, 28-30.

²⁸ Oakeshott 1964, 93; Kirpičnikov 1966, 54; Geibig 1991, 75-77.

²⁹ Oakeshott 1964, 93; Kirpičnikov 1966, 59, Tabl. 4; Geibig 1991, 151.

³⁰ Kucypera et al. 2011, 78-79.

³¹ Kucypera et al. 2011, 79.

³² Oakeshott 1964, 113.

³³ Its total length is 93 cm. The hilt is 13 cm long. The width of the blade in the upper part is about 4.5 cm. The preserved part of the crosspiece is 14.3 cm long. A certain difference is posed by its smaller pommel, which is 5.3 cm wide and 3.5 cm high, Nadolski 1954, 154-155, 246.

³⁴ The pommel is 7.5 cm wide and 5.5 cm high, Głosek 1984, 163.

³⁵ Nadolski 1954, 150-153, 249-250; Głosek 1984, 162-163, 170.

³⁶ Żabiński et al. 2014, 205-211.

Bibliography

- Aleksić M. 2007. *Mediaeval Swords from Southeastern Europe. Material from 12th-15th Century*. Belgrade.
- Bronicka-Rauhut J. 1998. *Cmentarzysko wczesnośredniowieczne w Czersku*. Warszawa.
- Dunin-Karwicki J. 1978. *Analiza bronioznawczo-metalograficzna trzech mieczy wczesnośredniowiecznych ze zbiorów Państwowego Muzeum Archeologicznego w Warszawie*. „Wiadomości Archeologiczne” 43 (2), 165-172.
- Geibig A. 1991. *Beiträge zur morphologischen Entwicklung des Schwertes im Mittelalter*. Offa Bücher 71, Neumünster.
- Głosek M. 1973. *Znaki i napisy na mieczach średniowiecznych w Polsce*. Wrocław.
- Głosek M. 1984. *Miecze środkowoeuropejskie z X-XV w.* Warszawa.
- Kazakevičius V. 1996. *IX-XIII a. baltų kalavijai*. Vilnius.
- Kirpičnikov A. N./Кирпичников А. Н. 1966. *Drevnerusskoe oružie. Vypusk 1. Meči i sabli. IX-XIII vv. Leningrad/ Древнерусское оружие. Выпуск 1. Мечи и сабли. IX-XIII вв. Ленинград*.
- Kittel P. 2002. *Średniowieczne uzbrojenie zaczepne Prusów z obszaru północno-wschodniej Polski*. „Komunikaty Mazursko-Warmińskie” 2002 (2) (236), 155-188.
- Kucypera P., Kurasiński T., Pudło P. 2011. *Problem rozwoju jednolitych głowic mieczowych między połową IX a połową XIII w.* In: P. Kucypera, P. Pudło (eds.), *Cum Arma per Aeva. Uzbrojenie indywidualne na przestrzeni dziejów*. Toruń, 74-90.
- Lis P. 1996. *Wczesnośredniowieczne groby z miejscowości Bochotnica, gm. Kazimierz Dolny, woj. Lublin*. „Archeologia Polski Środkowowschodniej” 1, 199-209.
- Marek L. 2014. *Europejski styl. Militaria z Elbląga i okolic*. Studia Archeologiczne 47. Acta Universitatis Wratislaviensis No 3543, Wrocław.
- Nadolski A. 1954. *Studia nad uzbrojeniem polskim w X, XI i XII w.* Acta Archaeologica Universitatis Lodzensis 3, Łódź.
- Oakeshott R.E. 1964. *The sword in the age of chivalry*. New York, Washington.
- Pinter Z.-K. 2007. *Spada și sabia medievală în Transilvania și Banat (secolele IX-XIV)*. Sibiu.
- Pudło P., Sankiewicz P., Żabiński G. 2011. *Katalog mieczy z Ostrowa Lednickiego i Giecza*. In: A. M. Wyrwa, P. Sankiewicz, P. Pudło (eds.), *Miecze średniowieczne z Ostrowa lednickiego i Giecza*. Biblioteka Studiów Lednickich 22 B1 Fontes 3. Dziekanowice, Lednica, 41-68.
- Rauhut L. 1971. *Wczesnośredniowieczne cmentarzyska z grobami w obudowie kamiennej na Mazowszu i Podlasiu*. „Materiały Starożytne i Wczesnośredniowieczne” 1, 435-656.
- Ruttikay A. 1976. *Waffen und Reiterausrüstung des 9. bis zur ersten Hälfte des 14. Jahrhunderts in der Slowakei 2*. „Slovenská Archeológia” 24, 246-395.
- Strzyż P. 2006. *Uzbrojenie we wczesnośredniowiecznej Małopolsce*. Acta Archaeologica Lodzienia 52. Łódź.
- Żabiński G., Stępiński J., Biborski M. 2014. *Technology of sword blades from the La Tène Period to the Early Modern Age. The case of what is now Poland*. Oxford.

APPENDIX

PAWEŁ GAN*

METALLOGRAPHIC ANALYSIS OF THE SWORDS FROM DĄBEK AND ŻUROMIN

Upon the initiative of Dr J. Ościłowski, three fragments of early medieval swords were sent to the Laboratory of Bio- and Archaeometry of the Institute of Archaeology and Ethnology in Warsaw in order to carry out technological examinations. The aim of the study was to identify the technology of manufacture of the artefacts, and to confirm or exclude a supposition that two fragments of the sword from Dąbek are parts of one and the same weapon.

Samples underwent a standard research procedure. They were sunk in epoxy resin, and then were ground and polished using corundum papers and aluminium oxide. A Neophot 2 reflected light microscope was used for observations and 4% nital solution was used for etching the surface of the samples. Microhardness was tested using the Vickers method with a load of 98N. Each sample analysed in the Laboratory is provided with a subsequent internal ordinal CL number. For the sword from Dąbek it was CL19374. The first sample covered the entire surviving cross-section of the upper part of the blade. The other sample was taken from the lower part of the broken blade and it covered only part of the cross-section (Fig. 1:a-b; 2:a-b).

In the central part of the blade a pearlitic-ferritic microstructure was identified, with a microhardness value of HV (0.1) 170 (Fig. 1:c-d). It can be seen throughout the entire cross-section. The core was flanked on both sides by troostitic, sorbitic (HV (0.1) 342) and pearlitic microstructures, containing numerous slag inclusions along remains of welding (Fig. 1:e). No traces of cutting edges were found.

Four identical microstructures were identified in the second sample which came from the lower, broken part of the blade. This confirmed that both fragments came from one and the same artefact. In the core, a pearlitic-ferritic microstructure was found (Fig. 2:c-e). It was reinforced with rods, in which troostitic and sorbitic microstructures were found (Fig. 2:f). At the place where the presence of the cutting edge could be expected there was

a ferritic microstructure. From the point of view of utilitarian properties of the blade, we should rather expect the presence of a sharp, steel cover. However, it cannot be excluded that such a cover existed, but due to a higher carbon content it rapidly corroded and did not survive in the examined fragment.

Sword from Dąbek (CL19374) was made using a rod technique. Diffusion of microstructures indicates the uneven distribution of carbon – the high carbon iron rods with carbon content around 0.6-0.7 % C were welded with the elastic core made from soft metal with low carbon content around 0.1-0.3 % C. It could be supposed that the blade was also provided with a steel cover, including cutting edges. However, it did not survive.

The sample from the Żuromin sword was taken from the end of the blade and was provided with a CL19375 number. The macroscopic image is shown in Figure 3. Numerous single and multi-phase slag inclusions can be seen. They vary in size and shape (Fig. 3:a). An irregular weld (Fig. 3:b-c) does not separate any different microstructures. Therefore, it is probably related to processing of the raw material. Throughout the entire sample we can observe sorbitic (HV (0.1) 228) and pearlitic microstructures (Fig. 3:d), while soft ferritic metal occurs locally near the edge (Fig. 3:e). The differentiation of microstructures does not, however, demonstrate the use of several types of raw material but it results from uneven distribution of carbon, the contents of which must be assessed as medium 0.3-0.5 % C. It may even indicate surface decarburisation that occurred during thermal treatment. The examinations indicate that no rod technique was used for manufacturing of this blade. Instead, it was forged from one piece of iron. Numerous slag inclusions are typical for bloomery metal. In order to provide the blade with proper hardness the blacksmith probably used thermal treatment with tempering.

* Laboratory for Bio- and Archaeometry of the Institute of Archaeology and Ethnology, Polish Academy of Sciences, pawel.gan@gmail.com

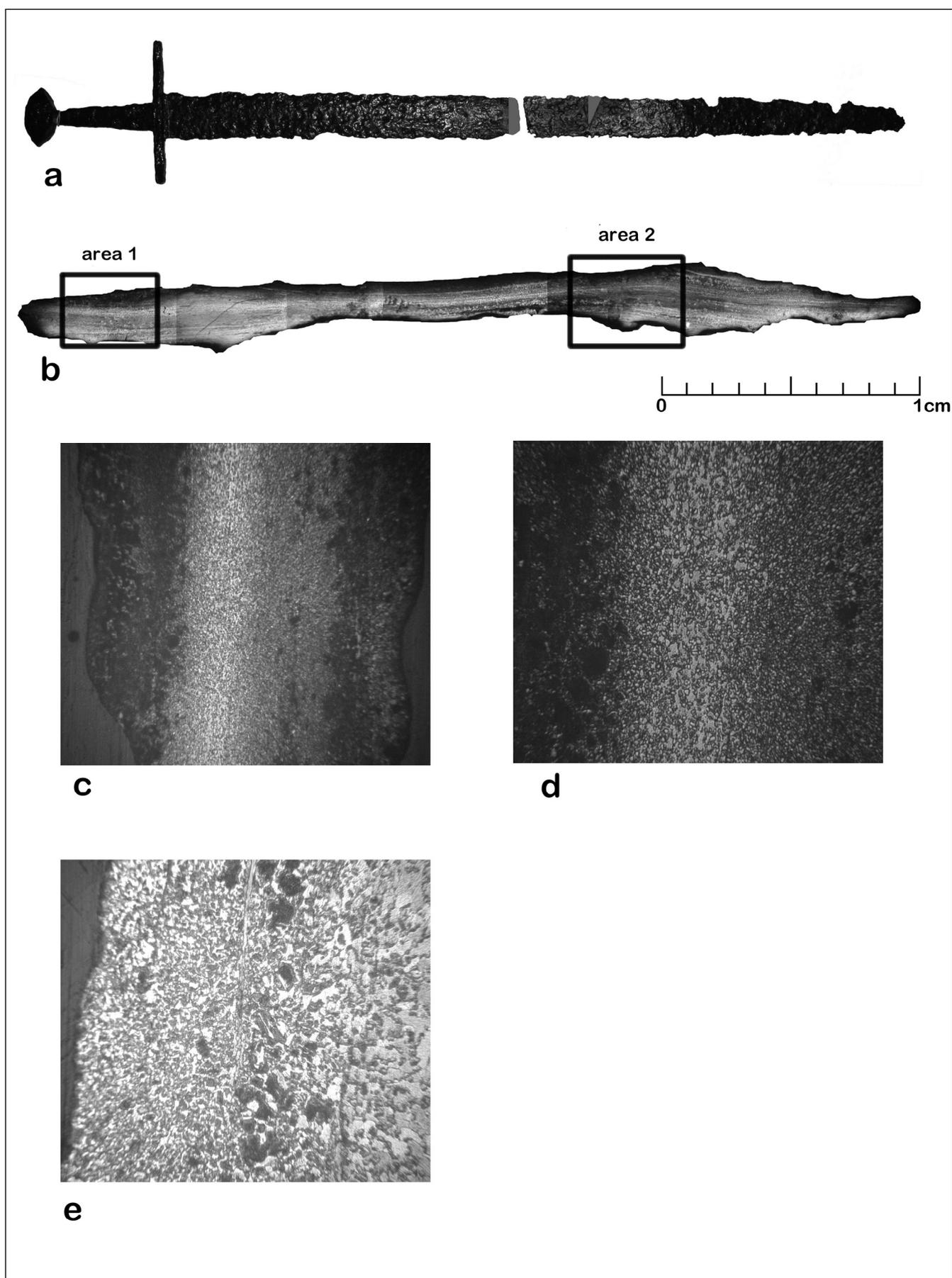


Fig. 1. Sword from Dąbek (CL19374), upper part: a – general view with places of taking samples; b – uneven carburisation; c – microstructures in the central part of the blade, Area 1, magnification 40x; d – microstructures in the central part of the blade, Area 1, magnification 80x; e – pearlitic microstructures, Area 2, magnification 200x. Photo P. Gan.

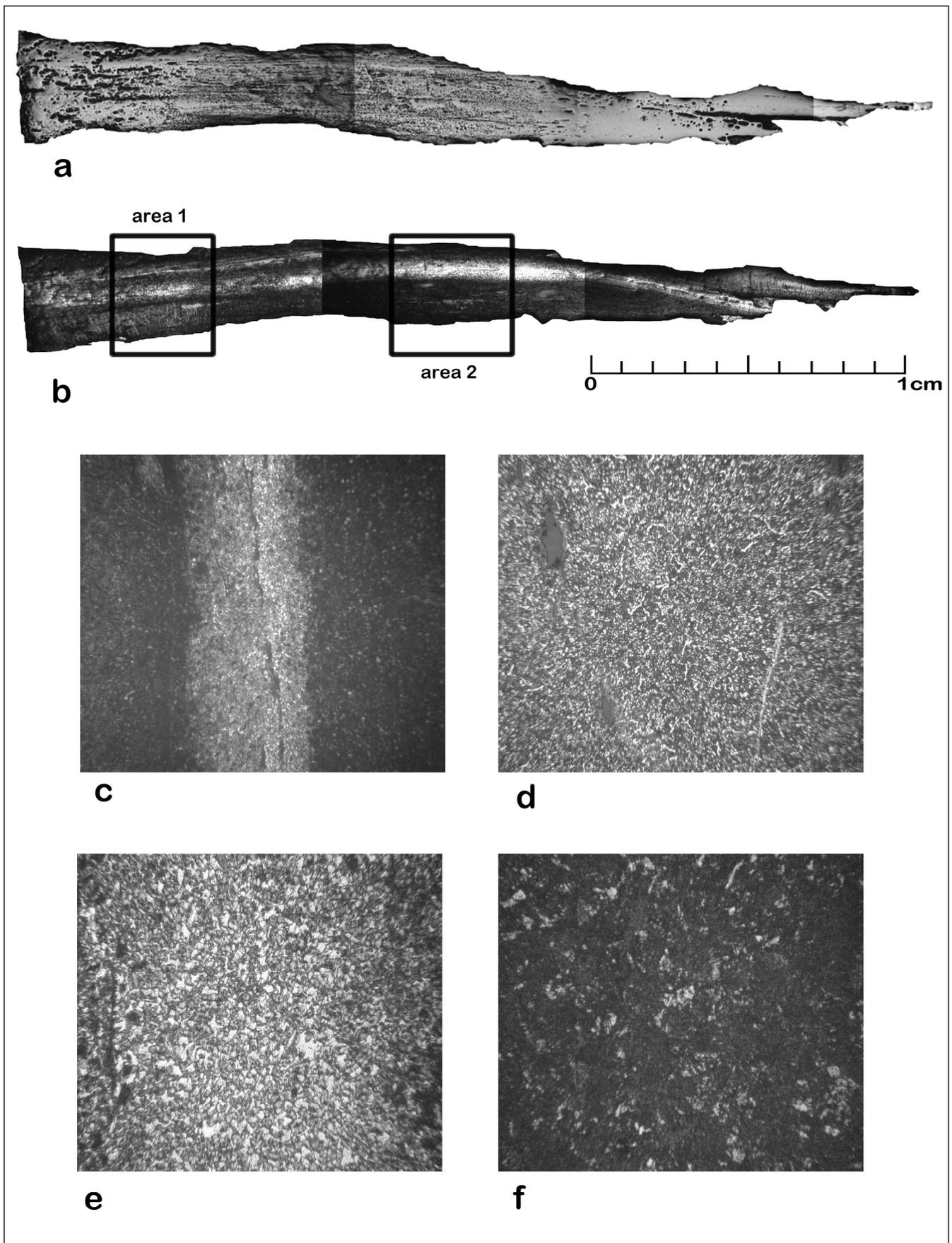


Fig. 2. Sword from Dąbek (CL19374), lower part, a – general view of the sample; b – uneven carburisation; c – microstructures in the central main part of the blade, Area 1, magnification 40x; d – microstructures around the central part of the blade, Area 1, magnification 200x; e – microstructures in the central part of the blade, Area 1, magnification 200x; f – sorbitic microstructures, Area 2, magnification 500x. Photo P. Gan.

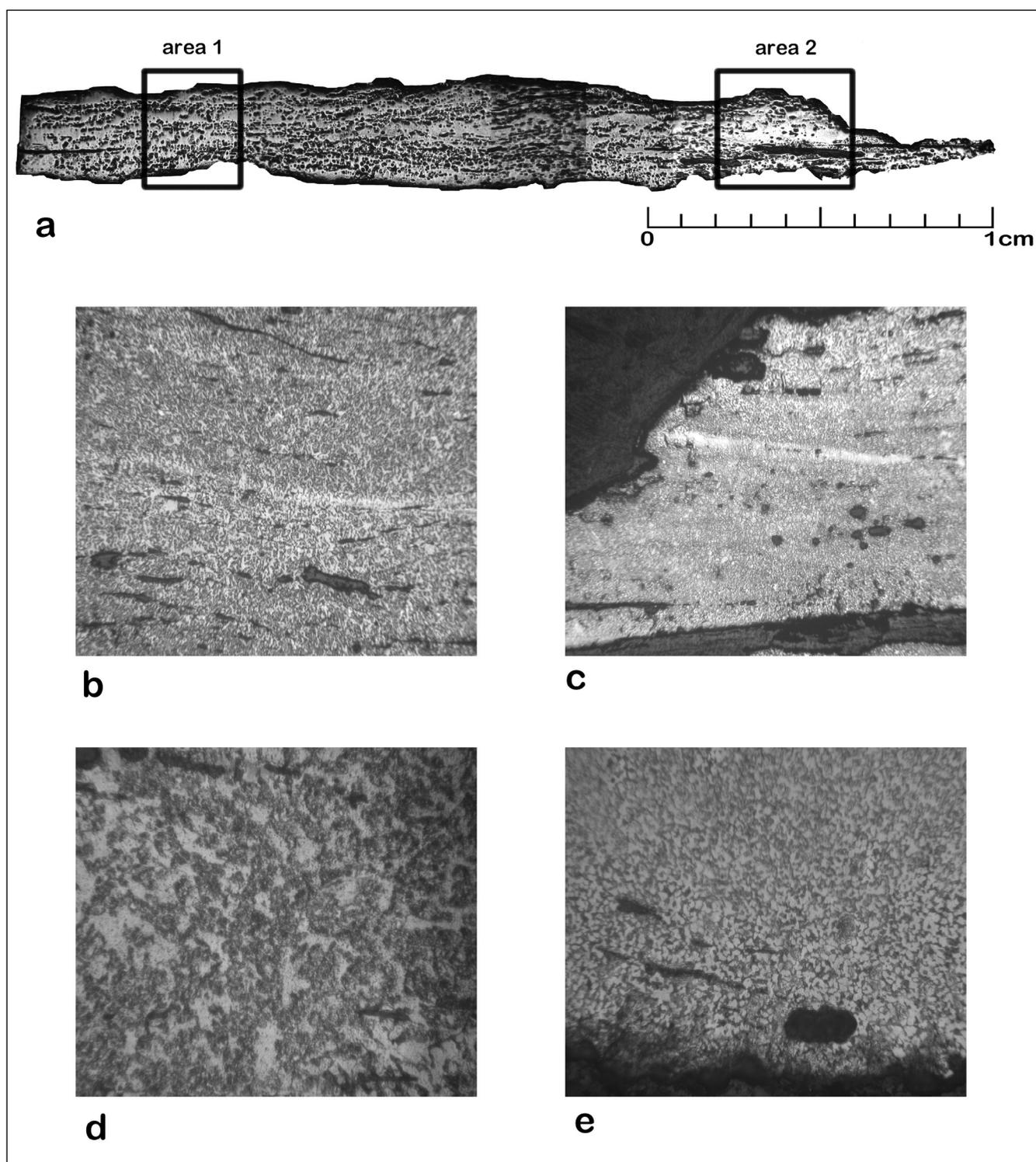


Fig. 3. Sword from Žuromin (CL19375): a – general view of the sample's cross-section, numerous slag inclusions can be seen; b – uneven carburation, Area 1, magnification 200x; c – irregular weld line, Area 2, magnification 40x; d – sorbitic microstructures, Area 1, magnification 500x; e – ferritic microstructures near the edge, Area 2, magnification 200x. Photo P. Gan.

Streszczenie**Dwa wczesnośredniowieczne miecze z pogranicza mazowiecko-pruskiego**

Z południowej części pogranicza mazowiecko-pruskiego pochodzą dwa miecze wczesnośredniowieczne. Pierwszy znaleziony został na cmentarzysku w Dąbku pod Mławą, a drugi w pobliżu Żuromina nad Wkrą. Oba mają około 90 cm długości. Ich główne należą do typu X według klasyfikacji Ewarta Oakeshotta, a jelce są proste, o długości 14 cm. Ich główce są do siebie zbliżone, z Dąbka ma kształt soczewkowaty, a z Żuromina półkolisty o nieznacznie uwypuklonej podstawie. W laboratorium Bio-i Archeometrii IAE PAN w Warszawie wykonano badania radio- i metalograficzne obu mieczy.

Badania rentgenowskie nie wykazały śladów inskrypcji oraz znaków na głowniach obu egzemplarzy. Główce ich były pełne, czyli wykonane z jednego kawałka żelaza. W laboratorium wykonano też serię zdjęć dokumentujących mikrostruktury na pobranych próbach. Potwierdziły one wcześniejsze przypuszczenie o wspólnym pochodzeniu, z jednego miecza, obu fragmentów znalezionych w Dąbku. Badania metalograficzne miecza z Dąbka ujawniły jego wykonanie za pomocą techniki prętowej. Do sprężystego rdzenia wykonanego z miękkiego metalu zgrzano ulepszone cieplnie pręty tworzące płazy. Ze względu na stan zachowania zabytku w sposób dostateczny nie rozpoznano krawędzi tnącej, która mogła posiadać niezachowaną obecnie stalową nakładkę.

Miecz z Dąbka należy do typu X, A, 1 według klasyfikacji E. Oakeshotta. Do tego egzemplarza najbardziej zbliżone pod względem metrycznym są mazowieckie okazy z Czerska, Staróżreb i Warszawy-Królikarni, a pod względem techniki wykonania okazy z Lutomska, Charłupi, Dąbrowy Zielonej i Płocka-Winiar. Na podstawie podobieństw do wspomnianych okazów chronologię miecza z Dąbka należy określić na XI-XII w. Miecz z okolic Żuromina należy do typu X, B, 1a według klasyfikacji E. Oakeshotta. Podobny zabytek nie jest znany z Mazowsza, natomiast z reszty ziem polskich najbliższe pod względem budowy oraz cech metrycznych są miecze z Żółwińca oraz Trzciela. Głownię tego miecza sporządzono z jednego kęsa metalu, poddanego ulepszeniu cieplnemu z odpuszczaniem. W zbliżonej technologii wykonano także miecze tego typu z Psar i Rzeczkowa. Na podstawie porównań miecz z okolic Żuromina należy datować na wiek XI, choć możliwe jest również jego XII-wieczne pochodzenie.

