FASCICULI ARCHAEOLOGIAE HISTORICAE, VOL 38 (2025), PP. 75-81

Early Medieval Iron Axe from a Stronghold in Szydłów near Lutomiersk (Central Poland)

Author: Łukasz Antosik, Paweł Gan, Tomasz Kurasiński

PL ISSN 0860-0007; e-ISSN: 2719-7069

DOI: https://doi.org/10.23858/FAH38.2025.004

https://rcin.org.pl/dlibra/publication/285690

Jak cytować:

Antosik, Łukasz, Gan, P., & Kurasiński, T. (2025). Early Medieval Iron Axe from a Stronghold in Szydłów near Lutomiersk (Central Poland). Fasciculi Archaeologiae Historicae, 38, 75–81. https://doi.org/10.23858/FAH38/2025.004

FASCICULI ARCHAEOLOGIAE HISTORICAE 38: 2025
ISSN 0860-0007, e-ISSN 2719-7069
DOI 10.23858/FAH38/2025.004

Łukasz Antosik*, Paweł Gan**, Tomasz Kurasiński***

Early Medieval Iron Axe from a Stronghold in Szydłów near Lutomiersk (Central Poland)

Abstract

This paper presents an iron axe discovered in 1960 during archaeological research carried out at the Szydłów stronghold near Lutomiersk (Central Poland). The weapon was discussed typologically (variant IB.12.2 according to Piotr Kotowicz's classification) and was subjected to metallographic and technological analyses. The axe head from Szydłów appears to be a product made with simple methods, without the use of more advanced manufacturing techniques to improve its fighting qualities. The analytical material obtained indicates the use of phosphorus iron from bog ores in the production of the axe. It can be assumed that the axe discovered at the Szydłów stronghold dates back to the 10th century. It could have been connected with the final stage of the stronghold's existence (a fire suggesting military action), or with its presumed later settlement.

KEYWORDS
- iron axe
- metallographic analyses
- stronghold
- early Middle Ages
- Central Poland
- Szydłów

Received: 16.09.2025 **Revised:** 14.11.2025 **Accepted:** 18.11.2025

Citation: Antosik Ł., Gan P., Kurasiński T. 2025. *Early Medieval Iron Axe from a Stronghold in Szydłów near Lutomiersk (Central Poland)*. "Fasciculi Archaeologiae Historicae" 38, 75-81, DOI 10.23858/FAH38/2025.004

The early medieval stronghold at Szydłów (Site 1, Pabianice District, Łódź Voivodeship) is located in the middle of the Ner River valley, to the north of the present-day buildings of the village.[1] Its remains are nowadays overgrown with forest and largely levelled. The first information about the site dates back to 1946, when a surface survey was conducted by Janina Kamińska. In 1954, Jerzy Kmieciński and Tadeusz Poklewski carried out investigations to verify the discovery and as a result, the site was described as an 'early medieval settlement' and incorrectly recorded as 'Jerwonice, site 1'.[2]

The first test excavations (one trench) were carried out by the above-mentioned T. Poklewski in 1960. The trench was set up on the edge of the destroyed part of the rampart, which provided a 25 m long section covering the rampart and partially the interior of the fortress (Fig. 1). As a result of these excavation works, archaeologists concluded that the defensive structure had been partially destroyed by fire. On the basis of a small number of artefacts (pottery, animal bones, lumps of iron slag, a few iron objects, including an axe and a knife), the early medieval dating of the fortification was

* Corresponding author; Institute of Archaeology and Ethnology, Polish Academy of Sciences, Łódź; https://orcid.org/0000-0003-4781-0476; l.antosik@iaeapan.edu.pl

** Institute of Archaeology and Ethnology, Polish Academy of Sciences, Warsaw; https://orcid.org/0000-0002-1679-0989; p.gan@iaepan.edu.pl

*** Institute of Archaeology and Ethnology, Polish Academy of Sciences, Łódź; https://orcid.org/0000-0002-8158-1104; t.kurasinski@iaepan.edu.pl

[1] Sikora et al. 2017, 230.

[2] Poklewski 1960; Rutkowska 1996, 590.

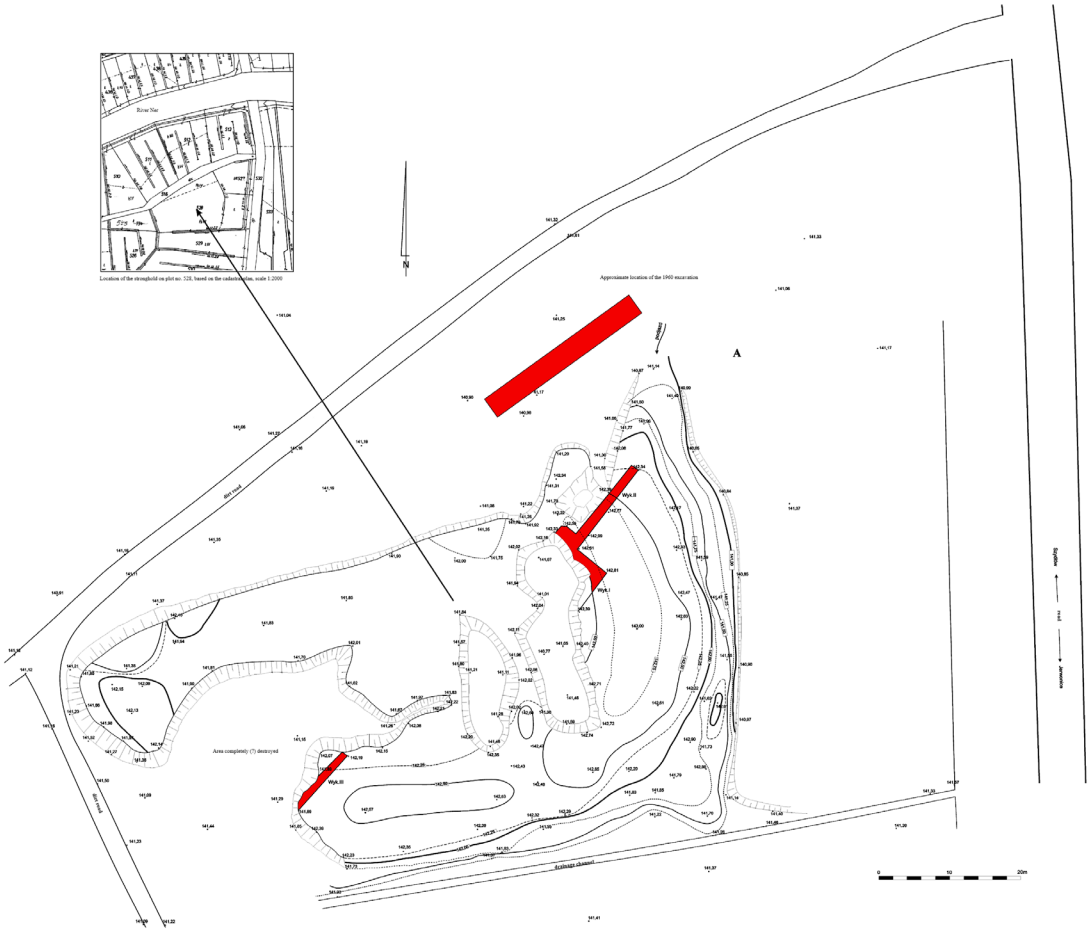

Fig. 1. Plan of the stronghold in Szydłów with the location of excavation trenches. Source: Muzolf 2012, fig. 5.

confirmed and determined to be between the 9th and mid-10th century (possibly the beginning of the 2nd half of the 10th century).[3]

Further mistakes connected with the identification of the location of the settlement took place in 1981, when during the survey carried out within the framework of the Polish Archaeological Record (*Archeologiczne Zdjęcie Polski*), the site of a former mill situated on the other (right) side of the river Ner[4] in the village of Charbice Górne, was incorrectly labelled as 'site 1 in Szydłów', while at the same time, the location of the discussed settlement was recorded as sites 'Jerwonice 2' and 'Jerwonice 3' and respectively described as 'an early medieval fortified settlement' and a 'defensive settlement of the Lusatian culture'.[5]

Next archaeological investigations of the defensive structure discovered in Szydłów and the above-mentioned site in Charbice Górne (proven to be remains of a mill) took place in 2005 and were carried out by Błażej Muzolf. At the time, archaeologists excavated three trenches (I-III) with a total area of 70 m2[6] (Fig. 1). Based on the ceramic material discovered in 2005 and during earlier investigations at the site, as well as the results of radiocarbon and dendrochronological dating of the burnt structural beam of the rampart, Błażej Muzolf concluded that all artefacts from the Szydłów site formed a coherent horizon stretching from the time of their creation at the end of the 8th century to the destruction of the stronghold by fire at the end of the 9th century or the beginning of the 10th century.[7]

The most recent investigations of the stronghold's relics took place in the years 2013-2016 and were associated with the research project on non-invasive studies of stronghold settlements in Central Poland carried out by Jerzy Sikora's team. They focused on the surroundings of the Szydłów stronghold, and the geophysical surveys carried out at the site were aimed at recognising the remains of the open settlement constituting the stronghold's hinterland.[8]

[3] Poklewski 1960; Łaszczewska 1975, 309.

[4] The incorrects location of the fortified settlement is indicated on the maps in the articles: Kamińska 1971, fig. 4; Chmielowska 1975, 332, fig. 1. The resulting inaccuracies were verified in the following publications: Łaszczewska 1975, 308, fig. 3; Chmielowska and Marosik 1989, 86, fig. 41.

[5] Muzolf 2012, 396-397.

[6] Muzolf 2012, 397-398.

[7] Muzolf 2012, 409, 412-413; see also Sikora 2017, 286, 291.

[8] Sikora et al. 2015, 284-288; Sikora et al. 2017, 229-240.

The aforementioned axe, which we would like to address in this paper, was one of the artefacts discovered during the first survey carried out in 1960 by Tadeusz Poklewski. However, over the years, this interesting find has only been briefly discussed in the literature of the subject,[9] hence the need for its in-depth formal, chronological and technological analysis.

The axe head is quite slender, slightly lowered in relation to its vertical axis. Its upper edge is to some degree raised towards the blade. The massive neck transitions into a narrow, asymmetrical and arched blade, ending in a well-defined, broad and slightly arched beard. The butt is rounded and socket is very slightly pronounced on both sides and encloses a circular eye for the haft. The state of preservation of the artefact can be assessed as good, with no major defects, apart from a small fracture between the socket and the neck (Fig. 2). No remains of wood from the haft were observed inside the haft hole. The dimensions of the axe head are as follows: overall length – 115 mm; blade height – 53 mm; smallest neck height – 13 mm; socket width – 34 mm; maximum socket height – 21 mm; haft hole diameter – approximately 23 mm. The weight (after sampling) is 161 g. The artefact is kept in the collection of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences in Łódź under inv. no. 11/60.

Metallographic and technological analyses were carried out at the Bio- and Archaeometry Laboratory of the IAE PAS in Warsaw.[10] The porosity of the metal, visible on the roentgenograms, is related to corrosion processes and overbaking of the raw material. No traces of welding high-carbon overlays in the cutting edge were found. The axe head was made by asymmetrically wrapping a single bar of iron counterclockwise (viewed from the dorsal side) and welding it to the neck (Fig. 3).[11] Both analysed specimens (samples were taken from the blade and from the end of the socket) showed structural similarities. In the unetched state, there are visible banded non-metallic inclusions of the sulphide and silicate types. Their slightly oblique position in the deposit cut from the working part of the axe head may be a result of forging – the direction of pressure to form the edge of the blade. After etching, the surface

Fig. 2. Axe head from Szydłów with marked sampling locations. Photo: Ł. Antosik. Graphic design: E. Wtorkiewicz-Marosik.

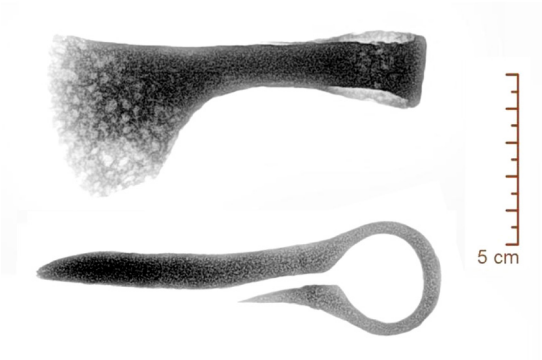

Fig. 3. X-ray photo of the axe head from Szydłów. Photo: P. Gan.

of the deposits revealed ferrite crystals of various sizes in a banded pattern. Reliefs associated with the high phosphorus content are highlighted throughout the surface. In the part cut out from the socket, igneous ferrite formations formed during overheating of the raw material were also identified. A ferritic structure of varying grain size with numerous slag inclusions indicative of the forging process was present throughout the samples (Figs. 4 and 5). The microhardness is 203 HV0,1 and is largely due to the high phosphorus content.[12] Chemical tests revealed a phosphorus content ranging from 0.28% to 0.49%, while silicon occurred in the range of 0.02-0.65%. The results obtained are given as weight percentages.

[9] Muzolf 2012, 411, table I:17; Sikora 2017, 290.

[10] Gan 2024. The samples were analysed using a Neophot2 metallographic microscope coupled with a DeltaOptical DLT-CAM PRO camera, and the chemical composition was determined using a Vega 4 scanning microscope with an Aztec UltimMAx series EDS analyser.

[11] See: Kucypera and Rybka 2013, 306, table IV:D; Kotowicz 2018, 27, fig. 5:5a-b.

[12] The phosphorus contained in ferrite hardens it strongly but at the same time increases the brittleness and reduces the impact strength of the alloy, Przybyłowicz 1999, 192; Blicharski 2004, 128.

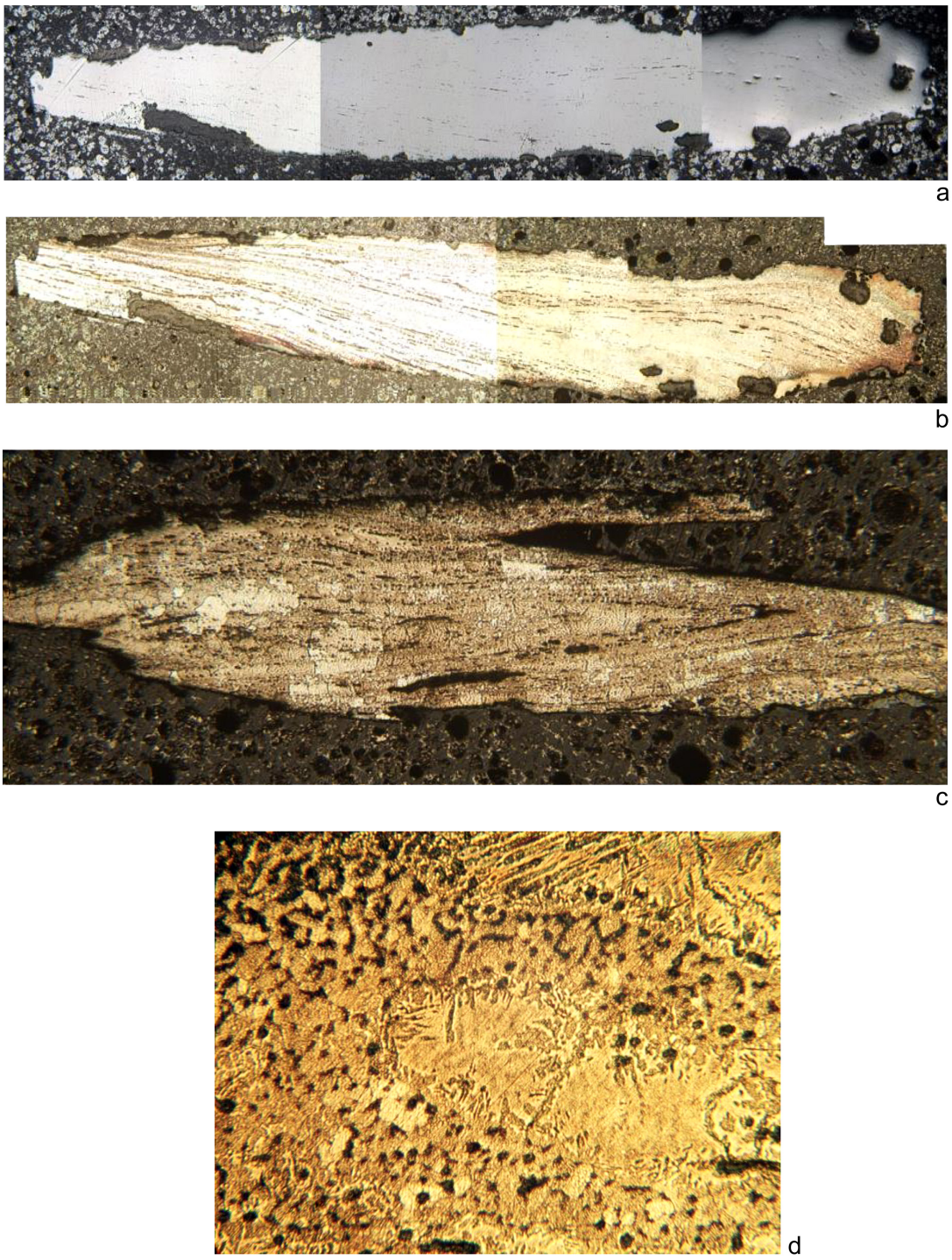

Fig. 4. Axe head from Szydłów. Photos of microstructures: a – Surface of the sample cut from the beard before etching; b – Surface of the sample cut from the beard after etching; c – Surface of the sample cut from the socket after etching; d – Acicular ferrite visible in the sample cut from the socket. Photo: P. Gan.

The analytical material obtained through metallographic and technological analyses indicates that the axe was forged using phosphorus iron derived from bog ores, resulting in a low-carbon iron with high elasticity and low strength. The numerous visible inclusions indicate that several iron billets were used to create an iron bar sufficient to make the discussed axe and, once the axe head was shaped, no additional heat treatment was applied to harden the blade. There were also no traces indicating the welding of high-carbon overlays in the cutting edge.

The axe head of the Szydłów axe appears, therefore, to be a product made with simple methods, without the use of more advanced manufacturing techniques to improve its fighting qualities. Neither overlay-type structures were identified on the working part of the analysed artefact, nor hardening or carburising treatment was observed. It could, therefore, have been used both as a weapon and as an everyday tool for woodworking.[13]

[13] On the complex issue of functionally distinguishing strictly battle axes from axes, see Kotowicz 2018, 155-165.

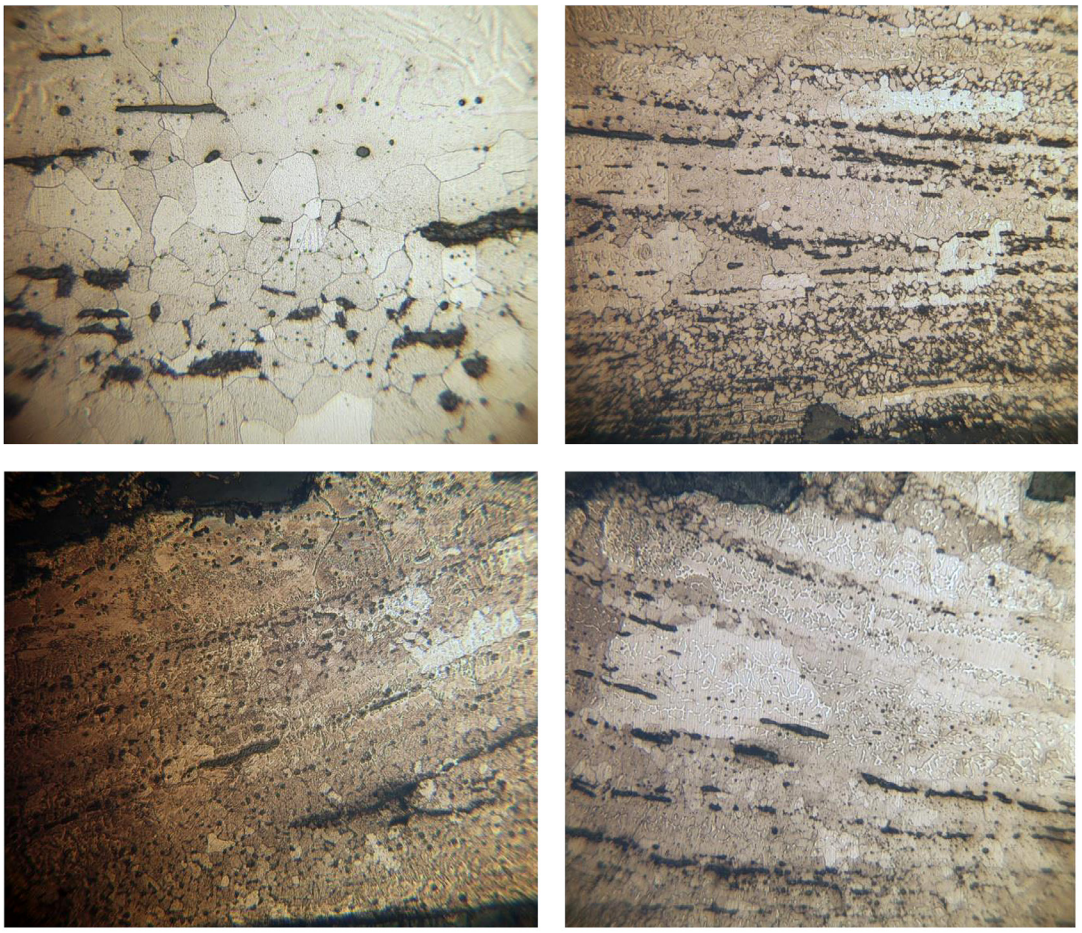

Fig. 5. Axe head from Szydłów. Ferrite structures visible on the metallographic microsections. Photo: P. Gan.

Little can be said about the circumstances in which the discussed axe was found, although we know that it was discovered in a 25 m-long trench located in the north-eastern part of the fortress, in a place where the rampart was relatively well preserved at the time of the excavations (now the area is completely destroyed). The excavation trench probably crossed the defensive fortifications diagonally.[14] As stated in the report of the 1960 survey, the axe was found in the „sediment layers of the rampart".[15] presumably on the inside of the stronghold.[16] The same report also mentions other 'historic material', mainly pottery, encountered during the excavations.

The axe from Szydłów can most generally be classified as 'type V' according to Andrzej Nadolski's classification.[17] However, the artefact does not find a strict equivalent among the varieties separated within this typological group of axes. In B. Muzolf's opinion , the analysed specimen is related to type Vd (lacking a cap and lugs), and to some extent to type Vc (the author means specimens with a faint lugs, without a cap), although their dating (10th-13th c.) does not correspond to the chronology established for the ceramic material obtained from the site in later studies.[18] This issue will arise later in the work.

In view of the above difficulties with the classification of the discussed find, it is worth referring to the most recent detailed typology of axes collected from the area of present-day Poland by Piotr Kotowicz. The set of morphological features characterising the specimen from Szydłów is most similar to variant IB.12.2,[19] which is represented by a very small group of axes, distinguished by a narrow, asymmetrical blade with a more or less distinct beard and a rounded butt. These include three specimens from Rybitwy-Ostrów Lednicki in Greater Poland, discovered near the relics of the bridges leading to the island,[20] although none of them is a direct match for the specimen from Szydłów, mainly due to the only slightly separated socket. There is also a resemblance to this group of axes in the form of an axe head found by chance when

[14] Poklewski 1960, 1; Muzolf 2012.

[15] Poklewski 1960, 2.

[16] Muzolf 2012, 411.

[17] Nadolski 1954, 45-47. This was already classified in this way by T. Poklewski 1960, 2.

[18] Muzolf 2012, 411.

[19] Kotowicz 2018, 133.

[20] Kotowicz 2014, 123 (cat. no. 479), 139 (cat. no. 538), 151 (cat. no. 584), table LXXXI:2, C:1, CXIII:2 (further literature there).

picking gravel at Radymno. It has a slightly damaged socket, although – as stated – without lugs and cap.[21] However, this artefacts was considered to be late medieval or modern.[22] There are also several examples from outside Poland – a few specimens from the territory of Russia (the area covered by the Vyatichi settlement) and Ukraine, whose chronology dates from the 2nd half of the 11th century to the 1st half of the 13th century.[23]

According to P. Kotowicz, the axe heads retrieved from Lake Lednickie were used in the period when both bridges were in operation, i.e., the period between the 2nd half of the 10th century and the 1st half of the 11th century.[24] This negates the possibility of their broader dating, including the 12th and 13th centuries, as suggested by other researchers.[25] Given that all known specimens belonging to variant IB.12.2 cluster in central and eastern Europe, this is probably where their main area of occurrence should be expected.[26]

When attempting to date the axe from Szydłów, it is necessary to take into account the results of previous research carried out at the site. As mentioned before, based on the dating of the ceramic material recovered during the excavations undertaken in 2005, as well as that from previous years, and the chronological indications obtained with dendrochronological and radiocarbon dating, it was established that the defensive settlement of Szydłów was built towards the end of the 8th century and functioned until the end of the 9th century or beginning of the 10th century, when it was burnt down.[27] Thus, B. Muzolf accepted the possibility that 'the Szydłów axe marks a new variety, dated within the 9th century to 10th century'.[28] However, in this case it should be linked to some unspecified settlement episode after the end of the stronghold's existence (2nd half of the 10th century), which would be indicated by the more technologically and stylistically advanced (completely worked and decorated with circumferential grooves) pottery acquired during T. Poklewski's 1960s research. Stratigraphically, it was associated with the upper deposits of the sedimentary layer of the rampart (similarly to the discussed axe) and the ceiling part of the cultural layer inside the stronghold.[29]

Taking into account all the findings made so far, it can be assumed that the axe discovered at the Szydłów settlement may date from the 10th century and may be connected with the final stage of the stronghold's existence (a fire suggesting military action) or with a presumed later settlement at the site of the destroyed fortifications. The iron axe was made using the readily available bog ore, which may suggest that it was forged in a local workshop.[30] The analysed artefact represents a rare form and is a valuable addition to the catalogue of the few finds of this type discovered in the territory of Poland.

Disclosure statement

No potential conflict of interest was reported by the author(s).

[21] Koperski 1980, 100 (cat. no. 31), fig. 32.

[22] Głosek 1996, 91, table XXII:D; Kotowicz 2014, 224 (cat. no. 71).

[23] With reference to the literature Kotowicz 2013, 60; Kotowicz 2018, 133.

[24] Kotowicz 2013, 60; Kotowicz 2018, 133-134; similarly in Głosek 2014, 86 (table 1, no. 68-69).

[25] See: Tokarski 2000, 78-79; Górecki 2001, table 14 [no. 25]; Borowczak 2008, 31-32.

[26] Kotowicz 2013, 60; Kotowicz 2018, 134.

[27] Muzolf 2012, 409, 412-413.

[28] Muzolf 2012, 411.

[29] Poklewski 1960, 3; see also Rutkowska 1996, 590; Sikora 2017, 291. Such a possibility is rejected by B. Muzolf (2012, 410-411), although verification of T. Poklewski's former findings is impossible at the moment due to the lack of "younger" ceramic material in the collection.

[30] Turf ores are a shallow-deposited mineral whose formation under humid and temperate climate conditions is favoured by wetlands and marshy areas such as meadows, river valley bends, bogs, etc. The typical landscape in which these accumulations can be expected is a periodically wet, gently undulating grassland, with a watercourse flowing through it. Such geomorphological and hydrographic conditions are generally characteristic of areas across the Polish Lowlands, Werońska 2009, 24; Ratajczak and Rzepa 2011, 108-109, 165. The Szydłów stronghold was located in a convenient environmental setting for the formation of ore, now subject to strong anthropogenic erosion (Sikora et al. 2017, 230). Geophysical surveys on the southern side of the fortifications revealed the presence of numerous anomalies indicative of natural iron precipitation. Disturbances were also found indicating the existence of probably remains of furnaces related to the subgarden settlement, although of unknown chronology, Sikora et al. 2017, 235, fig. 4.126.

References

Blicharski M. 2004. *Inżynieria materiałowa. Stal*. Warszawa.

Borowczak B. R. 2008. *Topory wojów piastowskich. Bitwa o Ostrów Lednicki*. Szczecin.

Chmielowska A. 1975. *Osadnictwo w Polsce Środkowej w okresie od połowy X do połowy XIII w.* "Prace i Materiały Muzeum Archeologicznego i Etnograficznego w Łodzi. Seria Archeologiczna" 22, 331-371.

Chmielowska A., Marosik P. 1989. *Wczesnośredniowieczne budownictwo obronne między Prosną i Pilicą*. Warszawa.

Gan P. 2024. *Szydłów ZL 1385/2024.* Typescript in the Archive of IAE PAS in Łódź, 1-4.

Głosek M. 1996. *Późnośredniowieczna broń obuchowa w zbiorach polskich*. Łódź, Warszawa.

Głosek M. 2014. *Militaria – broń obuchowa*. In: A. Kola, G. Wilke (eds.), *Wczesnośredniowieczne mosty przy Ostrowie Lednickim* 2: *Mosty traktu poznańskiego (wyniki archeologicznych badań podwodnych prowadzonych w latach 1986-2003)*. Kraków, 81-94.

Górecki J. 2001. *Gród na Ostrowie Lednickim na tle wybranych ośrodków grodowych pierwszej monarchii piastowskiej*. Biblioteka Studiów Lednickich 7. Lednogóra.

Kamińska J. 1971. *Grody Polski środkowej w organizacji wczesnopaństwowej*. "Prace i Materiały Muzeum Archeologicznego i Etnograficznego w Łodzi. Seria Archeologiczna" 18, 41-75.

Koperski A. 1980. *Zespół zabytków archeologicznych z Radymna w zbiorach Muzeum Okręgowego w Przemyślu*. "Materiały i Studia Muzealne" 3, 95-116.

Kotowicz P. N. 2013. *Analiza toporów z Ostrowa Lednickiego*. In: P. Sankiewicz, A. M. Wyrwa (eds.), *Topory średniowieczne z Ostrowa Lednickiego i Giecza*. Biblioteka Studiów Lednickich B1/2. Lednica, 43-101.

Kotowicz P. N. 2014. *Topory wczesnośredniowieczne z ziem polskich. Katalog źródeł*. Rzeszów.

Kotowicz P. N. 2018. *Early Medieval Axes from the Territory of Poland*. Kraków.

Kucypera P., Rybka K. 2013. *Badania materiałowe żeleziec toporów*. In: P. Sankiewicz, A. M. Wyrwa (eds.), *Topory średniowieczne z Ostrowa Lednickiego i Giecza*. Biblioteka Studiów Lednickich B1/2. Lednica, 303-349.

Łaszczewska T. 1975. *Polska środkowa w okresie wędrówek ludów i w początkach wczesnego średniowiecza*. "Prace i Materiały Muzeum Archeologicznego i Etnograficznego w Łodzi. Seria Archeologiczna" 22, 293-330.

Muzolf B. 2012. *Wczesnośredniowieczne grodzisko w Szydłowie koło Lutomierska*. "Prace i Materiały Muzeum Archeologicznego i Etnograficznego w Łodzi. Seria Archeologiczna" 45 (2010-2012), 393-425.

Nadolski A. 1954. *Studia nad uzbrojeniem polskim w X, XI i XII wieku*. Łódź.

Poklewski T. 1960. *Z badań sondażowych grodziska w Szydłowie, pow. Łódź.* Typescript in the Archive of IAE PAS in Łódź, 1-3.

Przybyłowicz K. 1999. *Metaloznawstwo*. Warszawa.

Ratajczak T., Rzepa G. 2011. *Polskie rudy darniowe*. Kraków.

Rutkowska G. 1996. *Szydłów*. In: A. Gąsiorowski, G. Labuda, A. Wędzki (eds.), *Słownik Starożytności Słowiańskich. Encyklopedyczny zarys kultury Słowian od czasów najdawniejszych do schyłku wieku XII*, 8(2). Warszawa, 590.

Sikora J. 2009. *Ziemie centralnej Polski we wczesnym średniowieczu. Studium archeologiczno-osadnicze.* Łódź.

Sikora J. 2017. *Grody wczesnośredniowieczne Polski centralnej w świetle archeologii*. In: A. Andrzejewski, J. Sikora (eds.), *Grodziska wczesnośredniowieczne Polski centralnej. Archeologiczne badania nieinwazyjne z lat 2013-2016*. Łódź, 281-318.

Sikora J., Kittel P., Wroniecki P. 2015. *Nieinwazyjne badania grodzisk wczesnośredniowiecznych Polski Centralnej i ich zaplecza osadniczego: Chełmo, Rękoraj, Rozprza, Stare Skoszewy, Szydłów*. "Prace i Materiały Muzeum Archeologicznego i Etnograficznego. Seria Archeologiczna" 46 (2013-2015), 251-293.

Sikora J., Kittel P., Wroniecki P. 2017. *Szydłów*. In: A. Andrzejewski, J. Sikora (eds.), *Grodziska wczesnośredniowieczne Polski centralnej. Archeologiczne badania nieinwazyjne z lat 2013-2016*. Łódź, 229-254.

Tokarski W. 2000. *Militaria – broń miotająca, obuchowa i drzewcowa oraz elementy rzędu końskiego i oporządzenia jeździeckiego*. In: Z. Kurnatowska (ed.), *Wczesnośredniowieczne mosty przy Ostrowie Lednickim* 1: *Mosty traktu gnieźnieńskiego*. Lednica, Toruń, 77-103.

Werońska A. 2009. *Wpływ warunków środowiskowych na powstawanie holoceńskich rud żelaza*. "Gospodarka Surowcami Mineralnymi" 25(2), 23-36.