JUSTYNA BARON · BEATA MIAZGA

SCYTHIAN *AKINAKES* OR MEDIEVAL KIDNEY-DAGGER?

ARCHAEOMETRIC STUDY OF A RECENT FIND FROM LEGNICA (SOUTH-WESTERN POLAND)

Scythian finds in Central Europe have been a subject of great interest for many decades (Bukowski 1977, 288 ff.; Topal 2004, 22; Kemenczei 2009, 7 ff.). Several hundreds of artefacts from the area covered by the so-called Lusatian culture, including mostly weapons, pieces of horse-gear and ornaments occurred in various contexts and thus allowed to develop several models of their inflow (Bukowski 1982 with further bibliography). According to one of them based on distribution of weapons (mostly bronze or iron arrowheads), large areas of Central Europe witnessed a Scythian ride – mirrored in destroyed strongholds where both killed inhabitants (sometimes with Scythian arrows) and hastily hidden bronze deposits were discovered. Another model assumed a regular trade and exchange with the Scythians evidenced by graves furnished with ornaments of Scythian type. Hitherto the only complete publication on Scythian artefacts in the area of the Lusatian culture comes from 1977 (Bukowski 1977) while the last Polish find of a dagger was published nearly 20 years ago (Czopek 1995). The presented find from Legnica (woj. dolnośląskie) completes the picture of eastern influences in Central Europe, especially in its older stages, i. e. the 7th-6th centuries BC.

THE FIND

In March 1966, an anonymous finder handed to the four-year-old Muzeum Miedzi (a museum of copper) in Legnica a corroded object reported as discovered in the course of ploughing near Legnica in south-western Poland. After the conservation work, the artefact turned out to be an iron double-edged dagger which then was identified as piece of 13th-century weapon. After nearly half a century the dagger was re-discovered during the research on medieval weapons done by one of our colleagues. Questions aroused both concerning the character, chronology and provenance of the item.

The slender specimen measures 32.2 cm in length, however, due to the conservation work carried out in the 1970s its original size might have changed (**fig. 1a**). The long (19.7 cm), double-edged blade has straight edges and a midrib. The dagger has a 12.5 cm long flanged hilt terminated by a bar-shaped pommel. Iron blade, hilt and pommel were forged as one piece while the c. 2 mm thin heart-shaped guard was made separately. A small crack may be observed in the pommel but it probably appeared in the originally complete bar (**fig. 1b**).

According to A. Melyukova's typology of Scythian weapons the dagger belongs to type 1 in group I (Melyukova 1964, 47 pl. 15). Referring to A. Vulpe's typology the artefact is assigned to the Suseni-Măcişeni type with many examples from Eastern and Central Europe (Vulpe 1990, pl. 45; Gawlik 1998, 56 f. with further bibliography). The occurrence on such a broad scale and the relatively formal homogeneity seem to prove that this type of daggers was not a local product (Vulpe 1990, 42).

Among the five *akinakai* of various types but of Scythian provenance from Poland (**fig. 2**) dated generally to the 7th-4th centuries BC, the studied dagger has no direct analogies and its origin remains unclear.

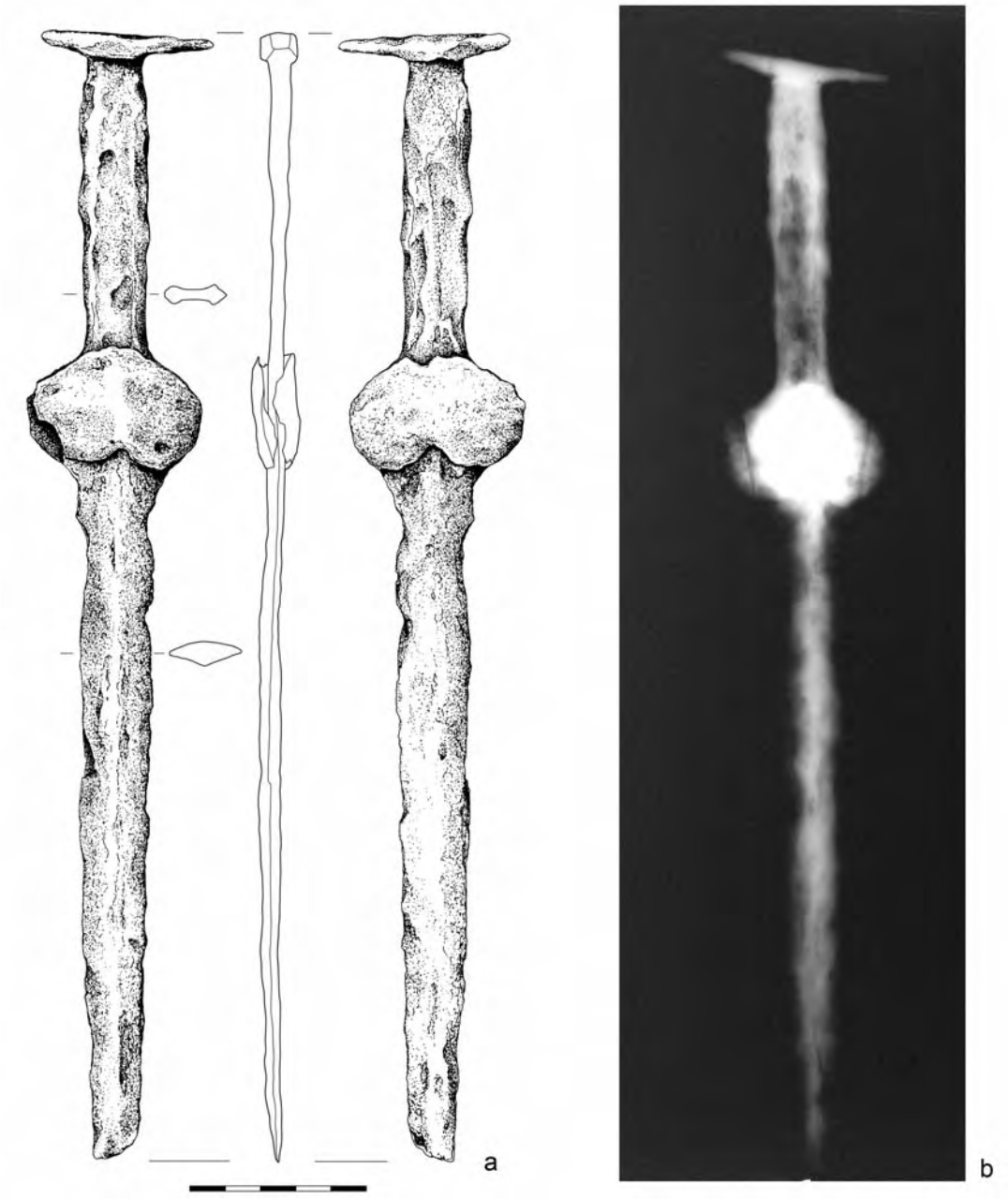


Fig. 1 The iron dagger from Legnica. Drawing (**a**) and X-ray picture (**b**). – (Drawing N. Lenkow). – Scale 2:3.

Despite their obvious morphologic and stylistic connections with the Scythian culture, due to their specific hilt construction and double-edged blades, which differs from original, usually single-edged Scythian forms, A. Melyukova considers all the daggers from Poland as examples of the Scythian style, but not as pure Scythian products (see comments on that in Bukowski 1977, 186). This might refer to the presented dagger, which is double-edged as well. A similar dagger but made of gold comes from the famous hoard Witaszkowo (former Vettersfelde; woj. lubuskie) discovered in 1882 and recently re-interpreted as connected with water cult (Nebelsick / Kobyliński 2006; Nebelsick / Kobyliński 2012).

Most of the Scythian swords and daggers (both sometimes generally labelled as *akinakai* – the problems with the proper definition have been discussed by D. Topal [2004]) are single stray finds (Vulpe 1990, 41;

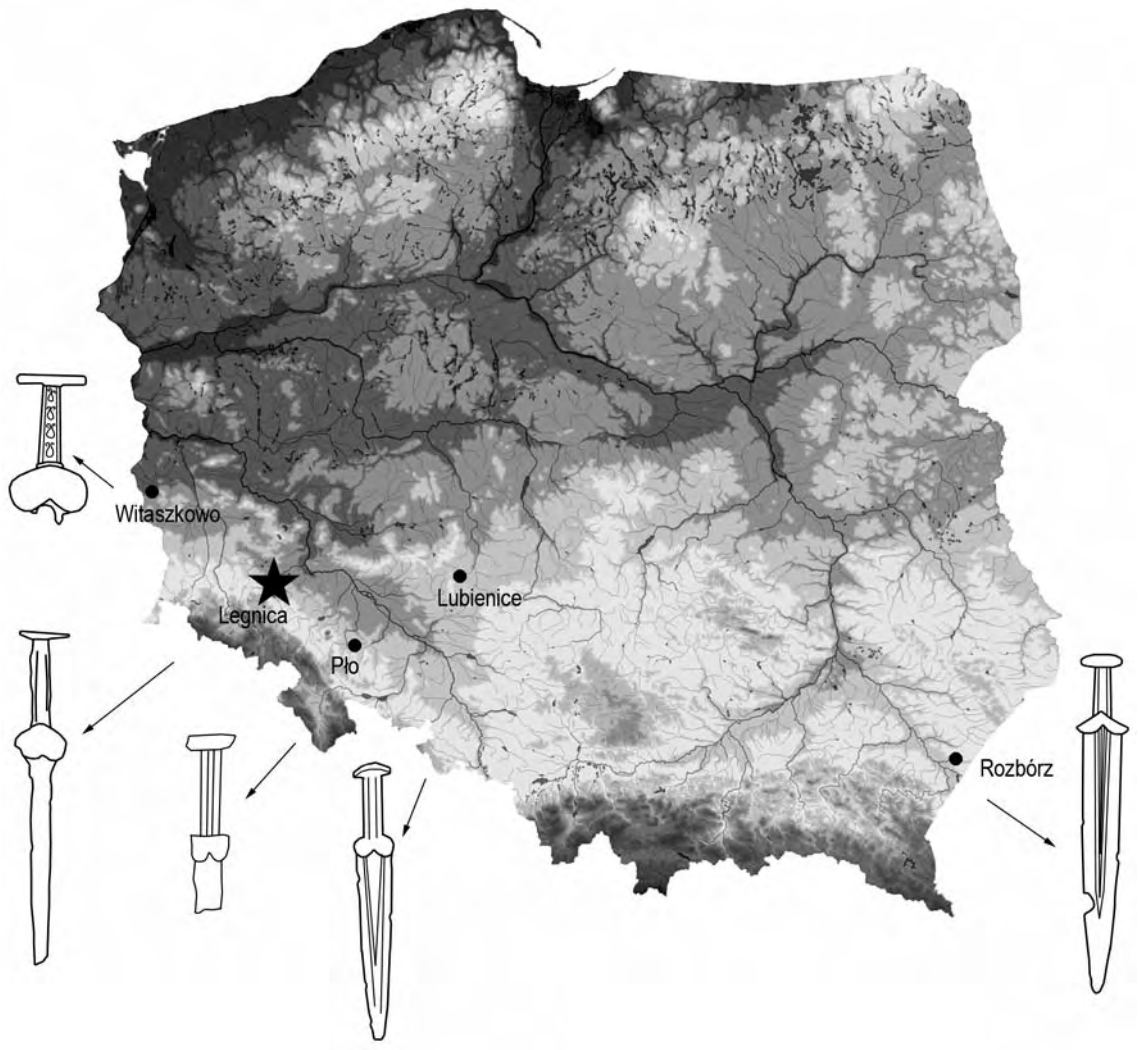


Fig. 2 Distribution and types of the Scythian daggers in Poland. – (Drawing J. Baron). – Various scales.

Topal 2004, fig. 2) what makes their dating complicated. Daggers of the Suseni type from Moldova and Bessarabia belong to the older horizon of occurrence of Scythian artefacts including mostly stray finds of swords, daggers and arrowheads, dated – on the basis of their correspondence to contemporary grave finds – to the 7th-early 6th centuries BC (Vulpe 1990, pl. 63; Gawlik 1998, 54). Some authors assume an even older date, as the graves furnished with early Scythian artefacts (e. g. in the cemeteries of the Criteşti type in Transylvania) including similar daggers are dated to the end of the 8th century BC (Chochorowski 2009, 15 fig. 15, 2). T. Kemenczei brings together all known daggers from Hungary and dates similar specimens to the second half of the 7th century BC (Kemenczei 2009, 35). Having these dates in mind, the studied object, would be therefore the oldest example of Scythian weapons in Poland, as the rest of militaria come rather from the mid-6th-4th centuries BC (Bukowski 1977, 267). It is difficult to connect the dagger with any particular exchange route e. g. from the Caucasus or the steppes north of the Black Sea, especially having in mind this is a stray find which represents a relatively common type. The analyses of distribution of the Scythian swords and daggers in Eastern Europe show that larger forms i. e. swords are typical for the Northern Black Sea, Crimea and the Caucasus (the »Scythian core« zone) while smaller

Fig. 3 The iron dagger from Legnica. Sampled areas (A-C). – (Photo Ł. Kapa).

daggers occur in Transylvania, Romania and Moldova and are considered to be rather of symbolic significance (Topal 2004, 27). The daggers in general have been regarded as bearing a significant symbolic meaning with many examples from Prehistoric and Medieval Europe (e. g. Bessonova 1984; Nøtveit 2006). If we consider at least some of the Scythian daggers from Central Europe as ceremonial, their production would probably involve (or exclude) some techniques making these items different from regular-used weapons.

METALLOGRAPHIC INVESTIGATION

The metallographic survey was undertaken to answer questions on the structure of the artefact, its composition and hardness. The results should reveal a degree of proficiency in iron production and thus presume the chronology of the dagger (or at least the exclusion of its medieval dating). There are only a few analyses of early iron artefacts in Poland; they are published mostly in the 1950s and the 1960s (e. g. Piaskowski 1959; Piaskowski 1960).

Three samples (A-C) from various parts of the dagger have been collected (fig. 3). All the specimens were cut into sections. Specimen A was sampled from the heart-shaped guard, specimen B from the point of the blade and specimen C was taken across part of the blade. The samples were then mounted in cold cast epoxy resin system (EpoFix Kit, Struers), grinded and polished with the proper abrasive materials to prepare for microhardness tests and microscopic analysis. The Zwick Roell ZHV 10 was used to microhardness measuring and the test involved the Vickers methods with a 500 g pyramidal diamond indenter operating for 15 s. The metallographic microscope Nikon Eclipse LV 1000 with visualisation system and Lucia General 5.10 software was used to sample the analysis before and after the nital etching (4 % HNO_3 in ethanol, 10 s).

Microscopic investigation of unetched specimens

The microscopic image of three unetched sampled microareas revealed metallic structures with non-metallic inclusions. The properties of the non-metallic inclusions vary representing both small nodules (fig. 4) and lenticular areas (most probably remains of casting processes; fig. 5). At the surface, numerous non-metallic corrosion products are observed (fig. 6).

Microscopic images of observed specimens represent typical changes of iron structure as a result of hammering operation (e. g. Scott 1991, 7) and thus the transformation of the slag globules into elongated and flattened structures. For example in figure 7, showing sample C, elongated non-metallic inclusions are observed. Although the inclusion sizes vary, they pass along the length of the section.

Microscopic investigation of etched specimens

After nital etching all three specimens display the ferrite structure. The specimen B shows the ferrite structure of various grain sizes with cementite grain boundaries and non-metallic inclusions (fig. 8a-b). The

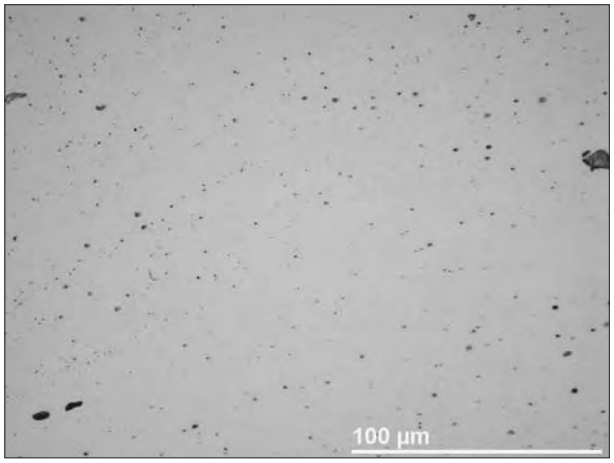


Fig. 4 Sample B showing small globular non-metallic inclusions. Unetched; ×500. – (Photo B. Miazga).

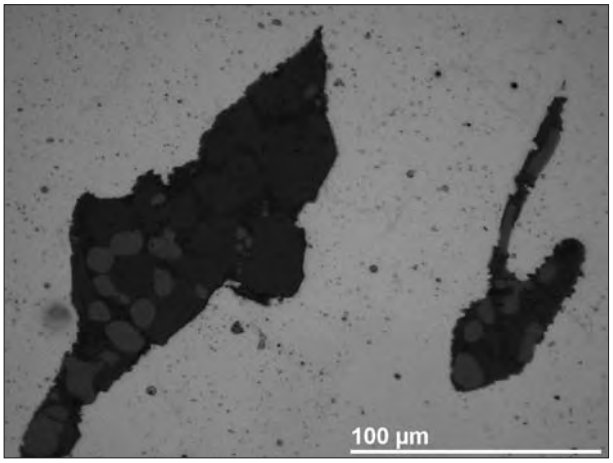


Fig. 5 Sample C showing elongated non-metallic inclusions at the surface. Unetched; ×500. – (Photo B. Miazga).

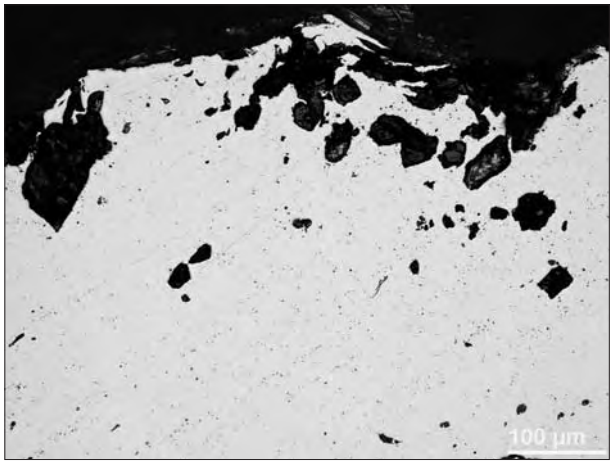


Fig. 6 Sample B showing non-metallic inclusions at the surface as a result of corrosion. Unetched; ×200. – (Photo B. Miazga).

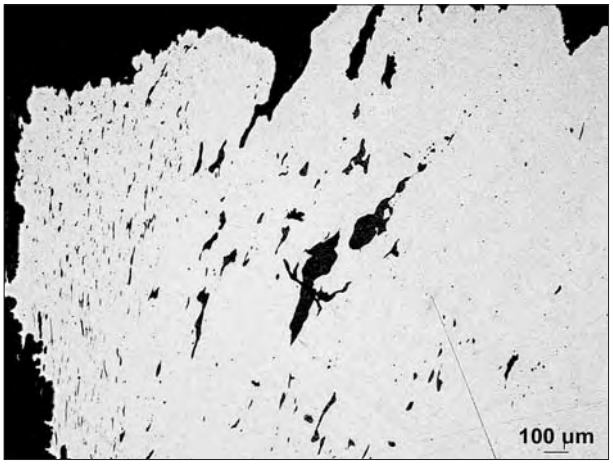


Fig. 7 Sample C showing elongated non-metallic inclusions. Unetched; ×50. – (Photo B. Miazga).

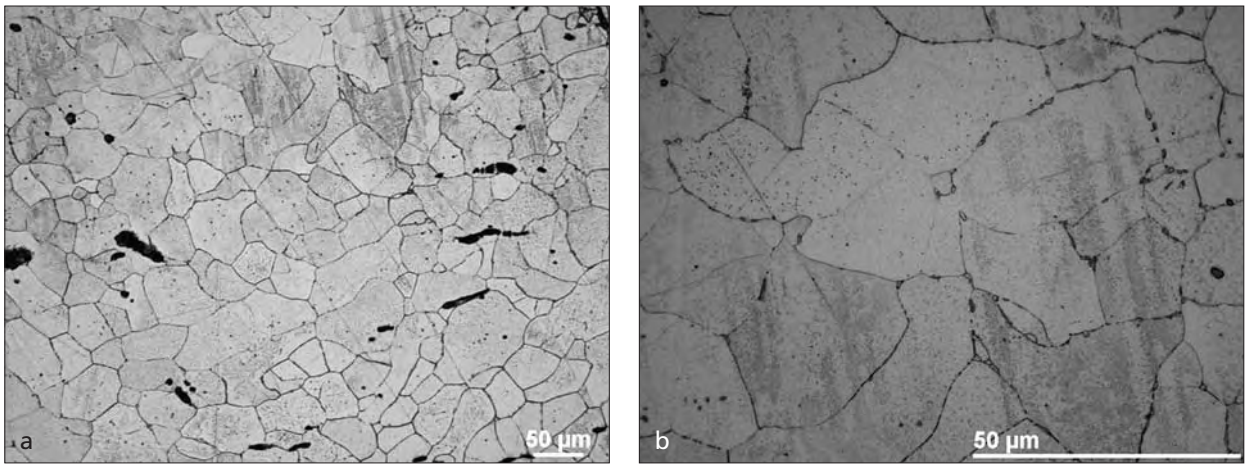


Fig. 8 Sample B showing ferrite grains of various sizes with elongated non-metallic inclusions (**a**) and grain boundary cementite (**b**). Etched: nital; ×200-500. – (Photo B. Miazga).

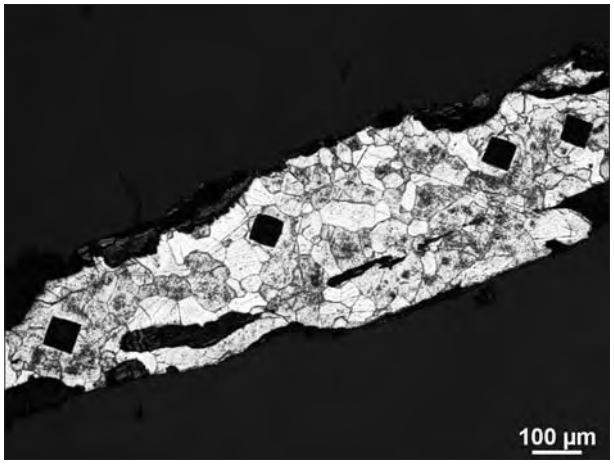


Fig. 9 Sample A showing ferrite grains of various sizes. The square spots are the areas selected for hardness tests. Etched: nital; ×100. – (Photo B. Miazga).

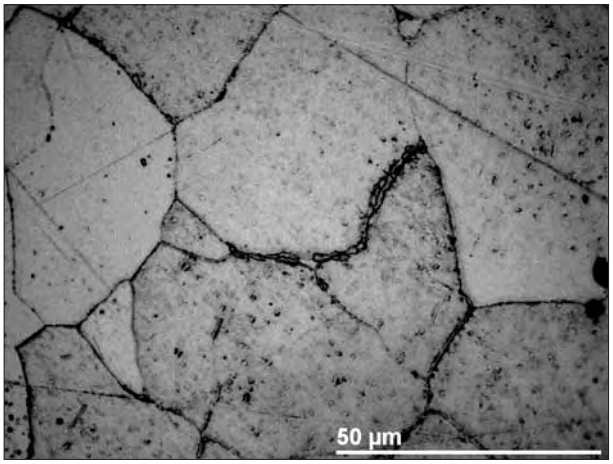
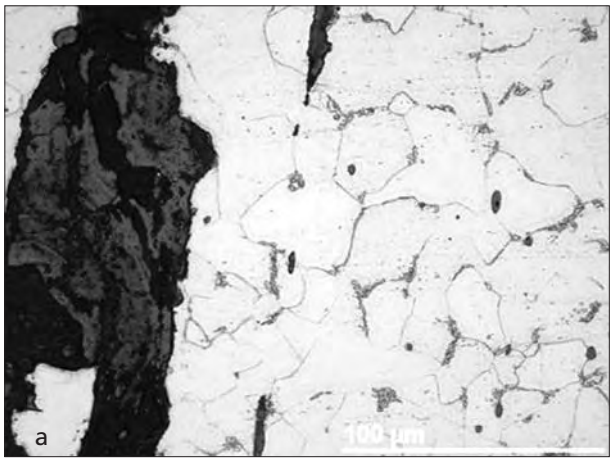


Fig. 10 Sample A showing ferrite grains of various sizes and cementite both as grain boundaries and in subgrain structure. Etched: nital; ×1000. – (Photo B. Miazga).



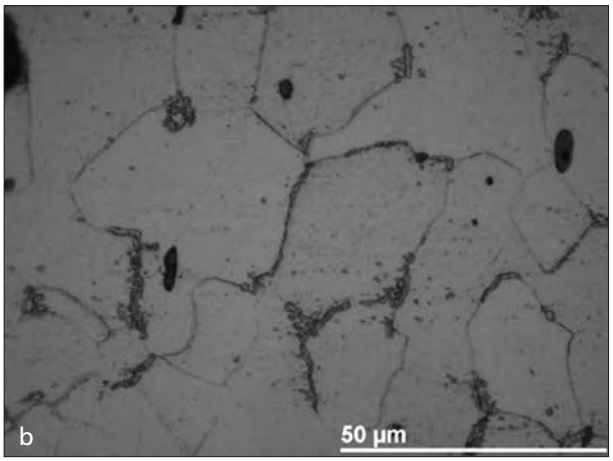


Fig. 11 **a** sample C showing ferrite structure with non-metallic inclusions and grain boundary cementite. Etched: nital; ×500. – **b** sample C showing cementite and pearlite structure (the darker areas at the grain boundaries). Etched: nital; ×1000. – (Photo B. Miazga).

sample A shows a similar ferrite structure. In figure 9, both prints of the microhardness tests and the inner structure of the material are observed. At the higher magnification, the same specimen shows the ferrite structure with cementite grain boundaries (fig. 10). The investigation of the sample C gave slightly different results. Although the ferrite structure with non-metallic inclusions and cementite grain boundaries prevails (fig. 11a), a new previously unseen pearlite structure appears (fig. 11b).

Microhardness testing

The specimens were tested for hardness and all obtained results are similar and display relatively low values (tab. 1). The mean hardness of the sample A measured 164 HV (average of six measurements) and 166 HV for sample B (average of seven measurements). These values are similar; this isunusual as archaeological

alloys are generally rather heterogeneous. Such a heterogeneity was demonstrated in the data set obtained for Early Iron Age artefacts from Poland (Piaskowski 1959, tab. 2). One of the analysed items (a chisel) showed significant differences in HV values depending on the measured area (135, 185, 205). The sample C was tested in a few microareas including metallic structures and non-metallic inclusions (**fig. 12**). The microhardness of the guard (sample A) proved that such a thinness must have been obtained with the bumping of the iron bar and this could have increased the hardness of the material. The properties of the blade itself do not reflect any particular attempts of improving its quality and probably the maker's main focus was on the point only. The microhardness of sample C is higher at its surface what corresponds well with the applied manufacturing method including forging the edge. The values in **table 1** are congruent with the data from Early Iron Age artefacts from Poland (Piaskowski 1959, tab. 2). Tools J. Piaskowski analysed displayed similar HV values (single measurements) – for example an axe from Wrocław Księże Wielkie (woj. dolnośląskie; 156) and a knive from Cieszków (woj. dolnośląskie; 187).

sampled area	average HV 500 g
specimen A	164
specimen B	166
specimen C section no. 1	170
specimen C section no. 2a	110
specimen C section no. 2b	104
specimen C section no. 2c	101
specimen C section no. 3	129
specimen C section no. 4	124

Tab. 1 Average microhardness values for the samples A-C.

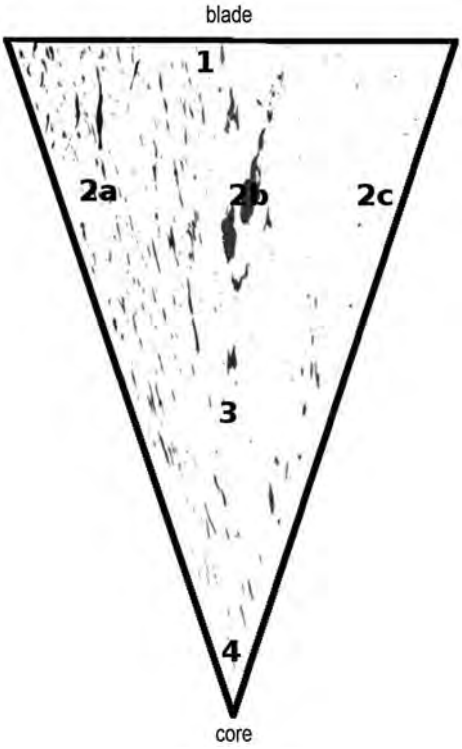


Fig. 12 Schematic cut of the sample C taken across part of the blade. Non-metallic elongated structures are visible. The numbers (**1, 2a-c, 3, 4**) refer to the areas selected for hardness tests. – (Photo B. Miazga).

DISCUSSION AND CONCLUSIONS

The iron dagger, previously identified as medieval was studied to identify its type and precise chronology. The morphologic and stylistic properties allowed to exclude the medieval dating and to identify the dagger as an item of Scythian provenance, belonging to a type common for large parts of Eastern Europe, mostly in the Carpathian Basin. Comparing to several well dated grave contexts, the dagger may be dated to the 7th-early 6th centuries BC what makes it the oldest example of five Scythian daggers from Poland. Most of the Scythian daggers from the western part of their distribution area are considered to be of rather ceremonial nature and thus are expected to be made with the use of different methods and materials. As very few iron items of such chronology have been analysed so far, and no archaeometric investigation of Scythian daggers have been published, there are no data we can compare with the obtained results. However, a specific structure and composition were proved by the investigation. It showed that the dagger is made of relatively soft material with the average hardness of investigated microareas not exceeding 170 HV with the hardest areas situated at the surface of the cutting edge and at the point of the blade. The high microhardness on the end of the blade (sample B) may correspond with the function of the artefact which was designed to be thrusting or stabbing the weapon. On the other hand, it could be an unwitting »by-product« of making the blade point even if the dagger itself was not to be used as a regular weapon. The hardness in the cutting edge (sample C) is an effect of forming the shape of the dagger.

The microscopic observations of the nitched specimens revealed the simple soft ferrite structure of the item with cementite grain boundaries and small amounts of pearlite. The metallographic investigation proved also that in the dagger production no particular material processing techniques (e. g. quenching, tempering) were involved. This situates the item in a group of Early Iron Age artefacts of ferritic and pearlitic structure which are considered to reflect simple production methods (Piaskowski 1959, 135).
The combined archaeological and archaeometric investigation enabled the identification of the dagger as prehistoric, not medieval piece of a probable ceremonial weapon. Due to the lack of analyses of similar items, the presented paper may be the starting point for further comparative studies.

Acknowledgements

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References

Bessonova 1984: S. S. Bessonova, O kul'te oružija u Skifov. In: E. V. Černenko (ed.), Vooruženije skifov i sarmatov (Kiev 1984) 3-21.

Bukowski 1977: Z. Bukowski, The Scythian influence in the area of Lusatian culture (Wrocław 1977).

1982: Z. Bukowski, Charakter oddziaływań tzw. scytyjskich w południowej Polsce. In: M. Gedl (ed.), Południowa strefa kultury Łużyckiej i powiązania tej kultury z Południem (Kraków 1982) 247-260.

Chochorowski 2009: J. Chochorowski, »Halsztatyzacja« wschodniej części Kotliny Karpackiej. In: S. Czopek / K. Trybała-Zawiślak, Tarnobrzeska kultura łużycka – źródła i interpretacje. Collectio Archaeologica Ressoviensis 11 (Rzeszów 2009) 89-118.

Czopek 1995: S. Czopek, Żelazny akinakes z Rozborza woj. przemyskie w kontekście innych znalezisk tak zwanych scytyjskich z południowo-wschodniej Polski. Archeologia Polski 40/1-2, 1995, 107-123.

Gawlik 1998: A. Gawlik, Znaleziska scytyjskie na Wyżynie Mołdawskiej i Besarabskiej. Materiały i Sprawozdania Rzeszowskiego Ośrodka Archeologicznego 19, 1998, 53-77.

Kemenczei 2009: T. Kemenczei, Studien zu den Denkmälern skythisch geprägter Alföld Gruppe. Inventaria Praehistorica Hungariae 12 (Budapest 2009).

Nebelsick / Kobyliński 2006: RGA^2 (2006) 317-330 s. v. Vettersfelde (L. D. Nebelsick / Z. Kobyliński).

2012: L. D. Nebelsick / Z. Kobyliński, »Skarb z Vettersfelde« czyli skarb z Kozowa: śledztwo archiwalne. In: A. Jaszewska (ed.), Z najdawniejszych dziejów. Grzegorzowi Domańskiemu na pięćdziesięciolecie pracy naukowej (Zielona Góra 2012) 55-76.

Melyukova 1964: A. Melyukova, Vooruženije skifov (Moskva 1964).

Nøtveit 2006: O.-M. Nøtveit, The Kidney Dagger as a Symbol of Masculine Identity – The Ballock Dagger in the Scandinavian Context. Norwegian Archaeological Review 39/2, 2006, 138-150.

Piaskowski 1959: J. Piaskowski, Metaloznawcze badania wyrobów żelaznych z okresu Halsztackiego i wczesnolateńskiego znalezionych na Śląsku. Przegląd Archeologiczny 12, 1959, 124-135.

1960: J. Piaskowski, Metaloznawcze badania wyrobów żelaznych z okresu halsztackiego i lateńskiego z Małopolski. Materiały Archeologiczne 2, 1960, 197-224.

Scott 1991: D. A. Scott, Metallography and Microstructure of Ancient and Historic Metals (Los Angeles 1991).

Topal 2004: D. Topal, Skifskiye akinaki: funktsional'noye razdeleniye i kontekst obnaruzheniya. Antropologicheskiye Issledovaniya v Moldove 2004, 19-32.

Vulpe 1990: A. Vulpe, Die Kurzschwerter, Dolche und Streitmesser der Hallstattzeit in Rumänien. Prähistorische Bronzefunde VI/9 (München 1990).

Zusammenfassung / Abstract / Résumé / Streszczenie

Skythischer *akinakes* oder mittelalterlicher Nierendolch?
Archäometrische Untersuchungen an einem Fund bei Legnica (Südwestpolen)
Der Artikel beschäftigt sich mit einem eisernen Dolch, der vor 50 Jahren nahe der Stadt Legnica im südwestlichen Polen als Einzelfund zutage kam und zunächst als mittelalterlicher Nierendolch aus dem 13. Jahrhundert gedeutet wurde. Nach der Analyse stellte sich jedoch heraus, dass es sich bei diesem Objekt um ein skythisches *akinakes* handelt. Somit gehört der Fund zu einer kleinen Gruppe von in Polen entdeckten Dolchen skythischer Herkunft, die bislang nur fünf Exemplare umfasst. Neben der typologischen Einordnung des Dolches wurden auch metallographische Untersuchungen und Härteprüfungen durchgeführt, die eine einfache Herstellungstechnik belegen.

Scythian *akinakes* or medieval kidney-dagger?
Archaeometric study of a recent find from Legnica (south-western Poland)
The paper presents an iron dagger discovered nearly 50 years ago near the city of Legnica in south-western Poland as a stray find, previously identified as a medieval kidney-dagger and dated to the 13th century. After the analysis, this unique find turned out to be instead a Scythian *akinakes* which belongs to a small collection of daggers of Scythian provenance discovered in Poland comprising only five specimens so far. Apart from the typological identification of the dagger, a metallographic survey and hardness tests were carried out which demonstrated a simple production technology.

Akinakes scythe ou dague médiévale à rognons?
Études archéométriques sur une découverte de Legnica (Pologne du Sud ouest)
Cet article présente un poignard en fer, découvert il y a près de 50 ans près de la ville de Legnica, dans le Sud-Ouest de la Pologne. Il s'agissait d'une découverte isolée, identifiée auparavant comme étant une dague médiévale à rognons, datée du 13e siècle. Après l'analyse, il semble plutôt qu'il s'agisse d'une découverte exceptionnelle, un *akinakes* scythe, appartenant à une petite collection de poignards de provenance scythe, dont cinq exemplaires ont été découverts en Pologne jusqu'à présent. En sus de l'identification typologique du poignard, un examen métallographique et des tests de dureté ont été effectués et ont démontré une production technologique simple.

Scytyjski *akinakes* czy średniowieczny sztylet nerkowaty?
Studium archeometryczne znaleziska z Legnicy w południowo-zachodniej Polsce
W artykule zaprezentowano żelazny sztylet odkryty niemal 50 lat temu koło Legnicy w południowo-zachodniej Polsce. Zabytek jest znaleziskiem bez kontekstu i został określony jako XIII-wieczny sztylet nerkowaty. Analiza stylistyczno-morfologiczna przedmiotu wskazała, że jest to raczej scytyjski *akinakes*, należący do niewielkiej grupy podobnych zabytków z terenu Polski, liczącej zaledwie pięć okazów. Przeprowadzone badania archeometryczne, w tym badania mikrostruktury i twardości materiału, z którego wykonano sztylet, wskazały, że przedmiot ten został wykonany za pomocą prostych technik.

Schlüsselwörter / Keywords / Mots clés / Słowa kluczowe

Polen / Niederschlesien / Hallstattzeit / Skythen / Archäometrie / Metallographie
Poland / Lower Silesia / Hallstatt / Scythians / archaeometry / metallography
Pologne / Basse-Silesie / Hallstatt / Scythes / archéometrie / métallographie
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