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TOUCHSTONES FROM EARLY MEDIEVAL CHAMBER GRAVES IN CIEPŁE, EASTERN POMERANIA

ABSTRACT

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The precious metals of the early medieval period were the same as those of today. Knowing their purity was essential, which means that assaying and refining were of great importance. Touchstones have been used to assess the quality of precious metals since antiquity. Stone artefacts initially identified as whetstones were unearthed in two of the most prestigious chamber graves discovered at the cemetery in Ciepłe. Traces of precious and non-ferrous metals on the surface of the object from Grave 42 proved that this artefact was a touchstone. It is probable that the phyllite stone from the other grave served the same purpose. Tools of this type are often found in high-prestige burials in Europe, in some cases together with balance scales and weights, which suggests that the individuals in whose graves they were deposited had access to precious metals. Therefore interpreting touchstones as a reliable indicator of the high social standing of the deceased seems entirely reasonable.

Keywords: early medieval archaeology, funerary practices, chamber graves, eastern Pomerania, touchstones, SEM-EDS

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INTRODUCTION

It is a truism to say that goldsmiths and merchants need to be familiar with the properties of precious metals (gold and silver) and base metals (copper, tin, zinc, *etc.*). By the same token, they should also know how to assess the quality of a given metal or alloy and what tools are required for this purpose. Three basic methods to assay gold and other precious metals were already in use in antiquity: fire assay, touchstone testing and the Archimedes method. Interestingly, all three are still used to this day. The oldest means of assaying used by goldsmiths involved rubbing the tested article on a touchstone. This method provides a relatively easy way of determining the purity of precious metals, primarily gold and silver, and was already known in the late Bronze Age. The earliest confirmed archaeological evidence for touchstones comes from Late Bronze Age sites in Europe dating to the 8-7th centuries BC (Eluère 1986). The method was fairly widely used in antiquity and throughout the Middle Ages (Oddy 1983, 55-57; Moore and Oddy 1985; Ježek 2012; 2013).

Touchstones were used to estimate the content of precious metals in an alloy. In addition to the fairly obvious advantages of this method, providing easy, rapid, cost-free analysis, it also had the important benefit of being non-invasive and non-destructive.

Nowadays, touchstones are usually made of lydite (black siliceous slate of organic origin with a 90-98% silica content) (Zastawniak 1957, 60) or radiolarite (organogenic siliceous rock with a silica content of up to 98%) of a red hue (Wälchli 1981, 155). During the early medieval period, touchstones were made of hard raw materials, often metamorphic rocks like schist, slate, phyllite and quartzite (Ježek 2014, 714). They were often carefully worked into an oblong or quadrangle cross-section with flat and smooth surfaces.

Touchstones should be kept clean so that subtle differences in the colour of the tested metal can be distinguished. They are cleaned using charcoal, water, wax and sand (Zastawniak 1957, 61; see also Ježek 2014, 714). In addition to the stone itself, a set of touch needles is required to assay a metal. The set should comprise needles of various composition and of as great a range of colours as possible (Zastawniak 1957, 62; see also Wälchli 1981, 156). Various types of acid solutions are also essential in the assaying process (Zastawniak 1957, 65, 66).

The gold, silver or other metal alloy to be tested is rubbed onto the surface of the touchstone in a series of adjacent lines covering an area of 1.5-2 cm in length and 0.5 cm in width. The lines should be uniform and compact producing an even streak on the touchstone (Zastawniak 1957, 68). The colour of the streak depends on the qualitative and quantitative composition of the alloy. Gold alloys will yield a range of colours from light green to red (Zastawniak 1957, 68). The colour of the streak is of greater significance when assaying silver alloys. Pure silver produces a white streak. The greater the amount of copper in the alloy the redder the streak will be. Conclusions can be drawn about the gold or silver content of the tested alloy from the colour alone; however, the accuracy of optical assessment is not fool-proof.

Both in antiquity and in the post-medieval period, the use of touch needles (standard alloys) is confirmed by written accounts. An accuracy of 2% was obtainable when testing precious metals using a set of needles (Oddy 1983, 55, 56). However, no touch needles or set of reference alloys has ever been found in any medieval contexts. Martin Ježek believes that individuals experienced in the use of this method were able to assess metal alloys from their colour alone (Ježek 2013, 713). As mentioned earlier, assays can be based solely on colour, and it is likely that during the early medieval period an error of 1-2% in the assessment of an alloy would not have been of any great significance.

PRESTIGIOUS GRAVES AT CIEPŁE CEMETERY

The cemetery at Cieple (northern Poland) is one of the most noteworthy burial sites dating from the 10th/11th centuries, the period that saw the emergence of the first Polish monarchy (Fig. 1). Until recently it was best known for a chance discovery made in the autumn of 1900, when six inhumation burials were found (*Amtlicher Bericht* 1901, 48,



Fig. 1. Location of Cieple in the context of the Piast state (according to Kara 2009, fig. 88).
Illustration S. Wadył

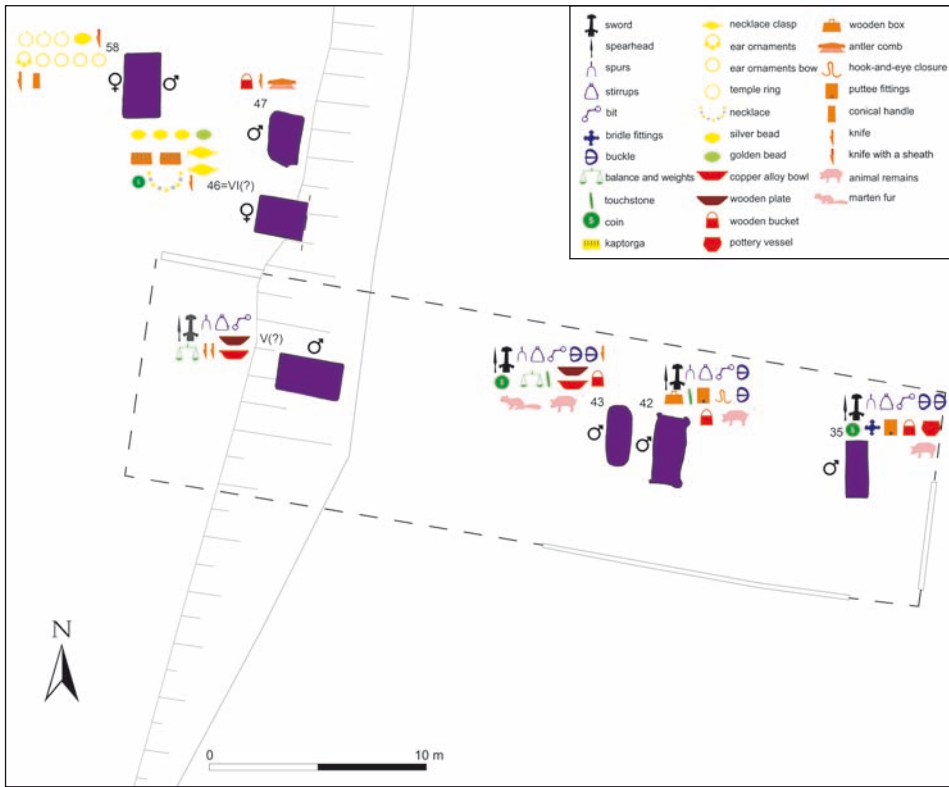


Fig. 2. Plan of the central part of the cemetery at Ciepłe showing the locations of grave goods. Illustration S. Wadył

49). Two of the graves were distinguished by their extremely rich and unusual goods that were quite different to the burial assemblages found at other Pomeranian cemetery sites. The two graves were instantly identified as those of a Scandinavian male and accompanying female (La Baume 1926, 94, 95; Langenheim 1933, 263; 1939, 61, 62; Łęga 1930, 157, 205, 206; Kostrzewski 1948, 87; Kara 1999; 2001). Jan Żak disagreed with this interpretation, stating that “(the purported Viking burial) is the grave of a wealthy knight, or possibly even a Pomeranian magnate” (Żak 1957, 178). A similar opinion has been expressed recently by Leszek Gardęła (2019). More than a hundred years after its discovery, this necropolis came to light once again during work on a new sewage system in the commune of Gniew (the excavations were directed by Zdzisława Ratajczyk of the Gdańsk Archaeological Museum). This initiated a series of planned excavations at the site, which led to the discovery of 51 burial features. These recent excavations revealed five graves that differ from the others at the cemetery in terms of their form, size, orientation, and burial goods

(graves no. 35, 42, 43, 47, and 58). They were classified as chamber graves, like the two other distinctive graves (V and VI) found in 1900 (Ratajczyk 2016; Wadyl and Ratajczyk 2019). The cemetery at Cieple is one of the few in the Vistula basin (alongside Bodzia, Dziekanowice, Kaldus, Pień and Sowinki) where chamber graves have been discovered (Janowski 2015).

Four chamber graves, located in the cemetery's central, demarcated section, are unique (Fig. 2). Graves 35, 42, 43, and V are without a doubt the most richly furnished burials of the early medieval period ever recorded in Poland. Similar sets of goods were deposited in each of these graves, consisting of swords, spears, and horse equipment in the form of spurs, stirrups, and bits. Graves 43 and V were each provided with a balance and a set of weights. Other items deposited in these graves included coins, a bronze bowl, and buckets.

Spatial analysis of the cemetery indicates that the earliest burials are those in the middle of the site, namely graves 35, 42, 43, and probably V. Marginally earlier graves (42 and 43) date from the early 11th century, as evidenced by a Bavarian pfennig struck in Cham during 1002-1009 (Wadyl 2019a).

PHYLLITE 'WHETSTONES' FROM GRAVES 42 AND 43

The grave goods in two of the lavishly furnished burials (42 and 43) at Cieple included items made of stone (Fig. 3). Initially, on account of their shape, they were deemed to be whetstones, in other words stones used for sharpening metal tools (Ratajczyk 2016, 92, 93). Both artefacts are made of fine-grained, dark grey phyllite. Because of its properties, phyllite was only used for making whetstones (Skoczylas 1990, 120). Central and western Norway are widely believed to be the source of origin of this rock (see, for example, Mitchell *et al.* 1984). Janusz Skoczylas (Majerowicz and Skoczylas 1983, 71; Skoczylas 1990, 51-53) was alone in suggesting that phyllite may have been sourced from the eastern Sudeten mountains. Recent research results show that phyllite whetstones were made from rocks of Scandinavian origin (Szydłowski 2011; Lisowska 2013, 216-220; see also Kara 2006).

The example discovered in Grave 42 takes the form of a rectangular prism with two holes at the top (Fig. 3: a). It survives intact and measures 130 mm in length, 5.8-9.2 mm in width, 3-6.8 mm in height, and weighs 16 g. It was found next to the left hip of the buried individual, suggesting that it may have been worn on a belt (Fig. 4).

The specimen recovered from Grave 43 takes the form of a flat, elongated, rectangular prism (Fig. 3: b). There are two holes at one end of it. Evidence of damage is visible at the opposite end: the stone cracked at the point where there had originally been a suspension hole, and an attempt was made to conceal the damage by grinding down and smoothing the edge (this attempt was not entirely successful as a small indentation was left). It was probably then that the two aforementioned holes were drilled. The fact that considerable trouble was taken to repair a 'simple whetstone' is rather surprising. The stone has an extant



Fig. 3. Touchstones from graves 42 (a) and 43 (b). Photo J. Szmit

length of 94 mm, and is 10-13 mm wide, 3.6-5 mm high, and weighs 16 g. It was found in the vicinity of the right hip, which could indicate that it was worn on a belt (Fig. 4).

Whetstones are relatively common features of early medieval burial assemblages. However, in recent years it has been demonstrated that a significant proportion of stone artefacts thought to be whetstones are in fact touchstones that were used to assess the quality of precious metal alloys and other non-ferrous metals (see Ježek and Zavřel 2010; Ježek 2013).

METHODS

The suspicion that items previously identified as whetstones were in reality used as touchstones prompted a study aimed at detecting any potential traces of metal on the surface of these artefacts. Given that touchstones need to be thoroughly cleaned after each use, marks left by the tested alloy end up being removed from the surface of the stone. In consequence there are usually no visible traces of metal on the surfaces of these objects. There are, however, microscopic traces and scratches that can be detected using specialist analyses. The current method of choice for identifying microscopic traces and scratches left by non-ferrous metals is SEM-EDS (scanning electron microscopy with energy dispersive spectroscopy). The first people to use this method of chemical microanalysis to detect traces of non-ferrous metals on the surfaces of stone artefacts were Christiane Elu re (1986, 58, footnote 5) and Frank Wietzichowski (1993, 38). However, it was Martin Je ek and Jan Zav el who were the first to employ this method more widely in studies of this type (Je ek and Zav el 2010; see also Je ek 2012; 2013).

The exact methodology used in this analysis has not yet been described. Our first attempts to detect metal residues were unsuccessful. As a result, we carried out an experiment in order to devise a method for detecting microscopic traces of metal. Scratches were made with silver and gold on a non-historic stone object. After cleaning its surface, the item was placed in a scanning electron microscope and an attempt was made to detect micro-traces left by the precious metals. The success of this experiment allowed us to apply the same method to historic artefacts. The analyses were carried out with an FEI Quanta FEG 250 scanning electron microscope and the beam voltage was 30kV. Backscattered electrons (BSE) detector was used for imaging of the surface. Analysis of the elemental composition was carried out using an EDAX Genesis APEX 2i ApolloX SDD detector.

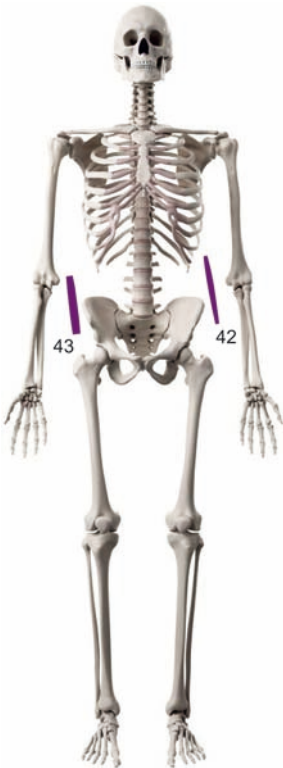


Fig. 4. Location of touchstones in graves 42 and 43. Illustration S. Wady 

RESULTS

The undertaken analyses revealed the presence of precious metals and non-precious metal alloys on the surface of the artefact from Grave 42. The following metals and alloys were identified: silver (Fig. 5: a), tin, tin-lead alloy (Fig. 5: b), tin-lead-copper alloy (Fig. 6: a), and copper-

zinc alloys (Fig. 6: b). No similar traces were detected on the surface of the object from Grave 43. There are a few traces of iron on it (Fig. 7), mostly in the form of linear scratches, which suggest that it may have been used occasionally for sharpening an iron tool, possibly a knife. However, it is not heavily worn as would be expected in the case of a whetstone. Due to the limitations of this method and its very time-consuming nature, an area of only 1 cm² was examined. Examining the entire artefact would probably yield different results. Thus it was confirmed that the item from Grave 42 was definitely a touchstone, and so probably was the one from Grave 43.

DISCUSSION

The weapons, equestrian equipment and numerous luxury goods found with the males buried in Graves 42 and 43 are evidence of their high social status, and possibly also their

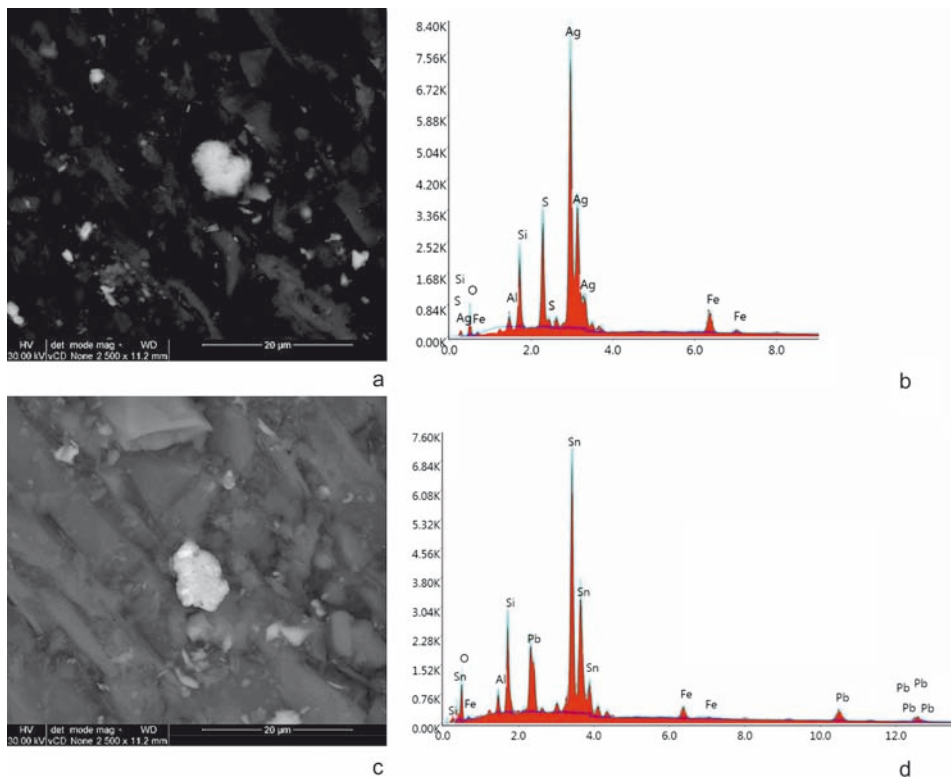


Fig. 5. Selected microphotographs (a, c) and spectra (b, d) of metal traces preserved on touchstone from grave 42. Photo J. Karczewski

profession. They were probably members of an elite military unit (Wadyl 2019b, 468, 469, 484, 485). Both graves were those of men. The individual buried in Grave 42 represents the *maturus* age group, whilst the one in Grave 43 belongs to the *adultus* category (Pudło 2019, 387). The goods found with the Grave 43 male also included a balance and a set of weights. A similar assemblage came from Grave V (La Baume 1926, 94, 95); however, there is no record of a ‘whetstone’ having been discovered with this burial.

Research carried out during the past decade, mostly by Ježek, shows that touchstones are quite often found in graves, and particularly in richly furnished ones, including chamber graves (Ježek 2013, 721-723; therein further references). In addition to the examples from Cieple, in Poland further touchstones have been recovered from chamber graves in Dziekanowice (Wrzesińska and Wrzesiński 2014; cf. Ježek 2018, 123-144) and Sowinki (Ježek *et al.* 2013). A carefully worked ‘whetstone’ was also found at a site in Pień (Błaszczuk 2020, 117-119), though in this instance no specialist analysis was carried out to determine whether it was used as a touchstone.

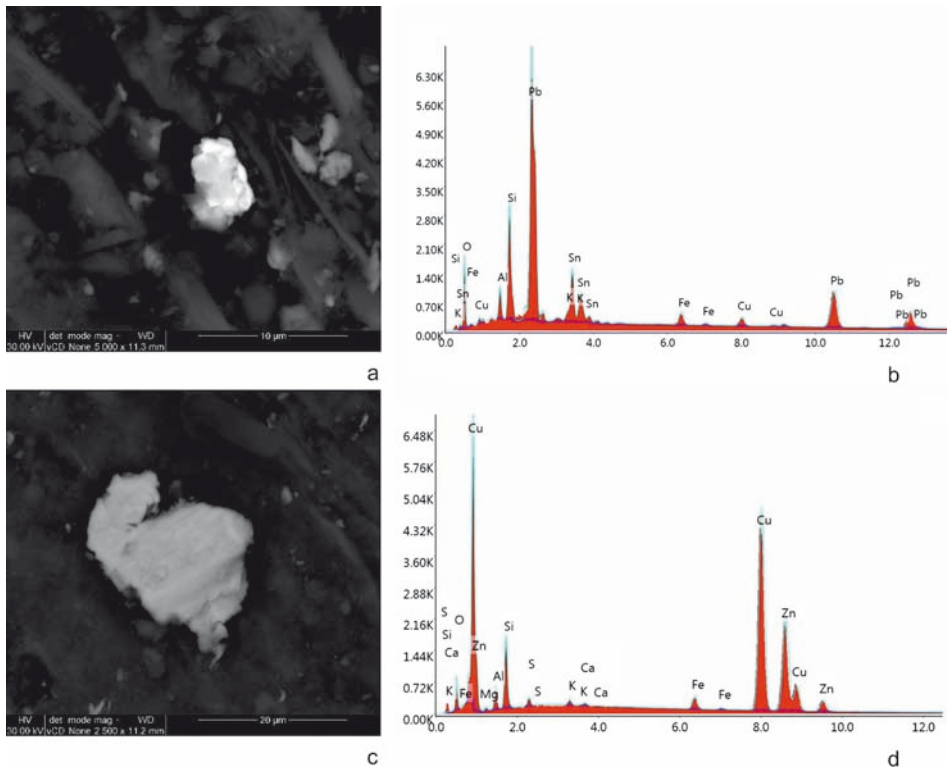


Fig. 6. Selected microphotographs (a, c) and spectra (b, d) of metal traces preserved on touchstone from grave 42. Photo J. Karczewski

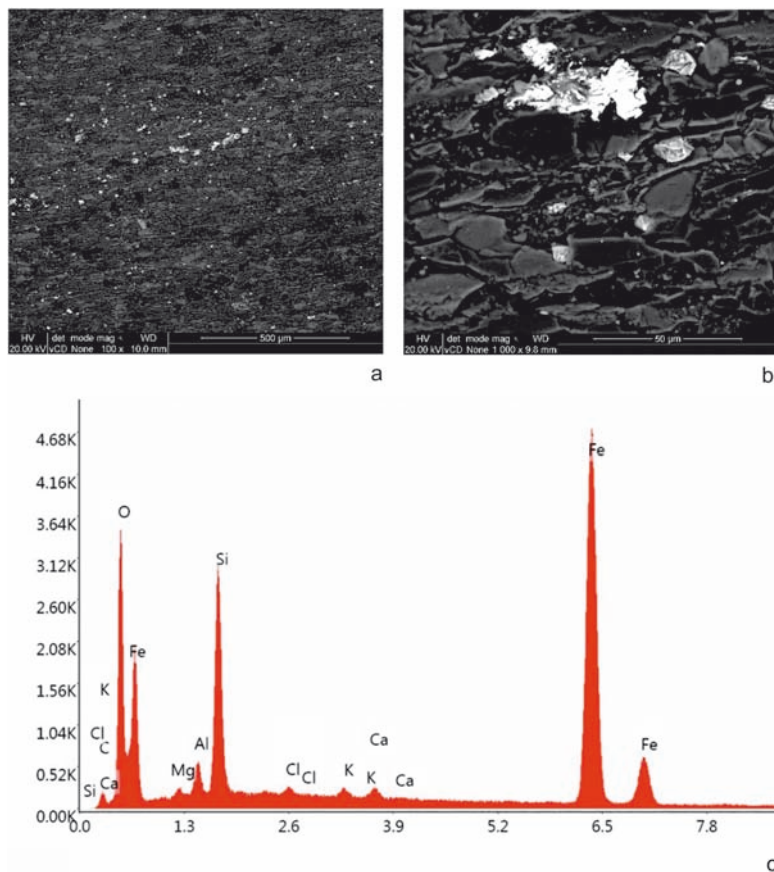


Fig. 7. Selected microphotographs (a, b) and spectra (c) of iron traces preserved on touchstone from grave 43. Photo J. Karczewski

There is no doubt that these artefacts should be interpreted as symbols of high social status. In many burials, particularly at sites in Scandinavia and the Baltic region, touchstones are often found together with balances and weights. The simplest interpretation of these assemblages is to see them as evidence of the deceased having been a merchant. The discovery of a burial containing merchant paraphernalia in conjunction with weapons usually results in the grave's occupant being identified as an armed merchant. This is exactly what happened at Ciepłe. A balance scale and 9 or 10 weights were found along with weaponry in Grave V (*Amtlicher Bericht* 1901, 48, 49), and in most articles on the subject the burial was classified as that of an armed merchant (Kara 1998; 2001). The individual buried in Grave 43 was also initially classified as an armed merchant (Ratajczyk 2013, 325). Many early medieval burials with weapons, balance scales and/or weights

found in the Baltic region have been interpreted in this way (Winkelmann 1977, 97-104; Arrhenius 1979, 413-414; Berga 1988; Apals and Apala 1994; see also Bogucki 2010; cf. Ježek 2013, 718-720, wherein further references).

In most cases it is difficult to attribute specific hierarchical positions to members of a population of burials. We do not know who these people were and the validity of the inferences we make about their professions and roles in society based on the goods deposited in their graves, be they weapons or, for example, merchant paraphernalia. This issue has been addressed in the literature on numerous occasions (Härke 1997; 2014; Williams and Sayer 2009). Irrespective of whether we treat the presence of touchstones in graves as evidence of their occupants having been merchants or merely as evidence of the fact that they had access to precious metals, the artefacts themselves should be regarded as attributes of high social standing.

Assaying tools are quite frequently encountered at early medieval sites, mostly in burial contexts in Central, Northern and Eastern Europe. Crucially, their geographical distribution coincides with that of Arab dirham and hacksilver hoards, as well as with discoveries of balances and weights. Ježek contends that touchstones should be recognised as an important feature of the *Gewichtsgeldwirtschaft* zone, where hacksilver was the principal currency (Ježek 2013, 726; see also Steuer 1987; 1997).

CONCLUSION

Traces of precious and other non-ferrous metals on the surfaces of stone artefacts commonly identified as whetstones show that, in reality, these objects are touchstones. This reinterpretation of their function casts a different light on the graves in which they were found.

The touchstones from Cieple are not the only items of this type to feature in assemblages recovered from richly furnished graves in Central, Northern and Eastern Europe. Without going into whether or not their presence indicates any connection with the profession of merchant, or whether it simply attests to access to precious metals, these objects must be regarded as significant attributes denoting the prestigious position of their owners (*i.e.* the individuals with whom they were buried). The fact that some of the touchstones found in prominent graves are larger than average and very finely worked suggests that they may have been ceremonial attributes that demonstrated high social status (see Ježek 2013, 715).

Traces of precious metals have survived on numerous touchstones, and marks left by other non-ferrous metals (copper, lead, tin or zinc) and their alloys are even more commonplace. As well as providing a means of verifying whether artefacts commonly referred to as whetstones really are whetstones, or whether they served as touchstones, the analysis carried out as part of this study also highlights the wider value of archaeo-metallurgical

research. Using SEM-EDS analysis it is possible to determine what metals were made and assayed in past times. Undertaking analysis of this type on a larger scale would significantly contribute to the quality of our knowledge of early medieval goldsmithing.

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