

RESEARCH ARTICLE – VÝZKUMNÝ ČLÁNEK

Marks on late medieval barrels from the southern Baltic coast: A contribution to classification based on visual features

Značky na pozdně středověkých sudech z jižního pobřeží
Baltského moře: Příspěvek ke klasifikaci na základě vizuálních znaků

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In late medieval trade, barrels were the most popular containers for transporting various commodities. They were often marked with various symbols, the meaning of which is difficult to interpret. The presented analysis included 112 fragments of barrels with carved or branded marks. All the specimens were dated between the 14th and 16th centuries AD and came from archaeological excavations in Elbląg, Gdańsk, and Puck. The investigated symbols are thought to have served different functions, including as merchants', craftsmen's, or ownership marks. The registered examples were divided into five groups: branded; compositions of multiple irregular lines; geometric figures; simple compact, often symmetrical symbols; and other that do not belong to any of the aforementioned categories. Analyses of the investigated artefacts and their comparisons with other published finds and written accounts revealed that simple compact marks were applied on barrels used in mercantile contexts. Determining the function of barrels based on marks of the other groups was proved to be ambiguous and requires further research.

archaeology – marks – barrels – Late Middle Ages – post-medieval period – Hanseatic League – Baltic towns

V pozdně středověkém obchodování byly sudy nejoblíbenějšími nádobami pro přepravu různých komodit. Často byly označeny různými symboly, jejichž význam je obtížné interpretovat. Předložená analýza zahrnovala 112 fragmentů sudů s vyrytými nebo vypálenými značkami. Všechny exempláře byly datovány do 14. až 16. století a pocházely z archeologických vykopávek v Elblágu, Gdaňsku a Pucku. Předpokládá se, že zkoumané symboly plnily různé funkce, například jako kupecké, řemeslnické nebo vlastnické značky. Zaznamenané příklady byly rozděleny do pěti skupin: vypálené; kompozice vícero nepravidelných linií; geometrické figury; jednoduché kompaktní, často symetrické symboly; a ostatní, které nepatří do žádné z výše uvedených kategorií. Analýzy zkoumaných artefaktů a jejich srovnání s dalšími publikovanými nálezy a písemnými zprávami ukázaly, že jednoduché kompaktní značky byly aplikovány na sudy používané v kupeckém prostředí. Určení funkce sudů na základě značek z ostatních skupin se ukázalo jako nejednoznačné a vyžaduje další výzkum.

archeologie – značky – sudy – pozdní středověk – postmedievální období – Hanzovní liga – baltská města

Introduction

The corpus of archaeological barrel fragments dated to the Late Middle Ages and Early Modern Period comprises a significant number of specimens with carved or, less often, branded marks. They usually take the form of single or multiple lines arranged with varying degrees of complexity. Sometimes, a geometrical or literal theme can be discerned in them, but many are random compositions with no visible pattern. Such multitude of marks and

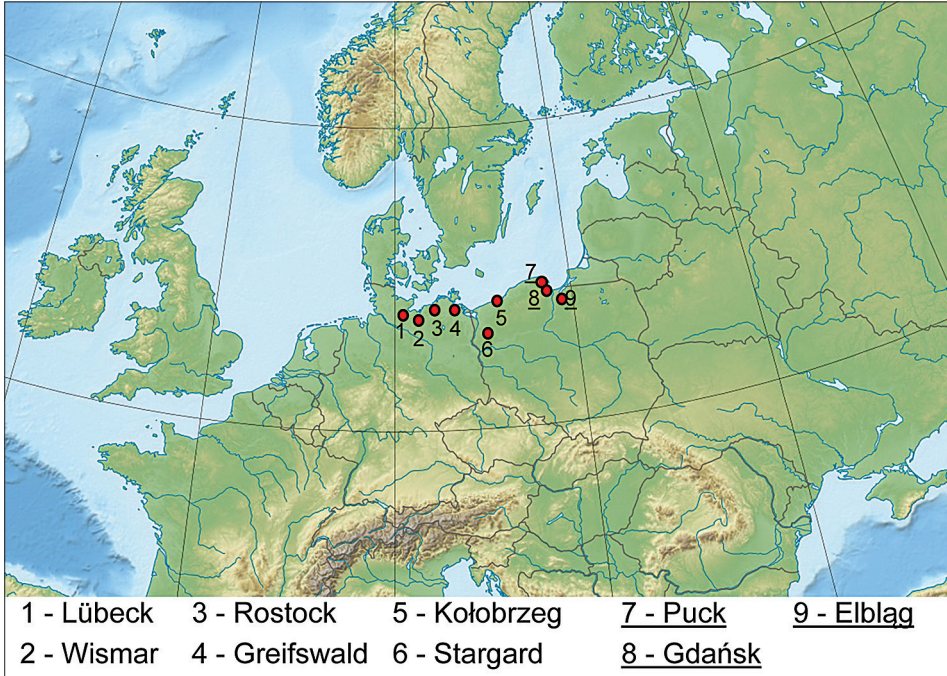


Fig. 1. Findspots of wooden vessels bearing marks mentioned in the paper with analysed assemblage underlined.

patterns requires systematisation and careful interpretation. The current state of research clearly indicates that this category of artefacts has been underrated as sources for the history of commercial exchange, trade relations, and cooperation as an important craft during the economic boom in late medieval towns. Previous scholarly works dealing with these artefacts have so far focused foremost on describing their morphological features and classifying particular specimens. The functions of these items, if determined at all, were usually simply correlated with their findspots and its context – which is not an error in itself but overlooks a number of interpretational possibilities related to their earlier exploitation. One should remember that barrels were reusable containers and thus often repaired, meaning that their lifespan could be quite long. In effect, research on the role of marks on barrels in the medieval economy is still wanting, especially regarding their place of origin and commercial use. In light of the already great and steadily increasing number of such finds, a revision of the current perspective on this category of artefacts seems necessary.

This, in turn, begs the question whether the visual features and complexity of a mark are indicative of a barrel's function or provenance: Did the mark indicate that a given barrel was a container or a commodity itself? Or perhaps it communicated the place of origin of the barrel or that of the goods transported in it? Were the symbols 'random', i.e. put on the vessel for reasons entirely unrelated to trade? To what extent can late medieval barrels with marks serve as supplementary sources in studies on commercial exchange and trade relations? The present paper addresses these questions based on late medieval and Early Modern archaeological finds from Pomerelia. During this period, the region saw significant

growth in long-distance trade, largely driven by the Hanseatic League, in which barrels played an essential role. These versatile containers were used for transporting goods such as beer, wine, grain, herring, nails, tar, and cloth, and also served as a unit of measure in both local and regional trade. This study examines finds from Elbląg, Gdańsk, and Puck to explore the similarities and differences in marking barrels between major urban centres and peripheries in a small, homogeneous area. They are considered in the context of the finds from other Hanseatic cities on the southern coast of the Baltic Sea (*Fig. 1*). In the broader geographical context, it may serve as a preliminary exploration of regionalisms and trans-regional universalisms in manufacturing and trade, shedding light on the involvement of investigated towns in urban culture and local commercial networks. Another aspect of the analysis is the previously underexplored circulation of barrels in domestic and long-distance exchange. By confronting archaeological data with written sources – namely guild regulations and town registers – the study provides a new perspective on the discussed questions, filling in important gaps in our understanding of late medieval economy and material culture. The findings are relevant not only for the investigated urban centres but also other parts of Europe with which they maintained trade relations. Due to the wide range of functions played by barrels and their connection to trade, other types of mark-bearing wooden vessels, typically used in household contexts, were not included in the analysis.

Background

Any consideration of the role of barrels and marks in trade and commerce in the late medieval towns of the southern Baltic coast must acknowledge the significant influence of the Hanseatic League on the whole region. A federation of merchants and towns, the League gained a dominant position between the 14th and 15th centuries AD. It was made up of the vast majority of important urban centres by the Baltic Sea and facilitated and controlled their mutual trade relations and exchange with other parts of Europe. The Baltic merchants traded grain, beer, forest products, wax, salt, herring, animal skins, textiles, as well as many other goods. The rise in sea transportation created a demand for barrels, the primary containers for most commodities, and provided a strong incentive for their mass production. Barrels themselves were even commonly traded as goods. In effect, this specialised craft saw rapid growth in many Hanseatic towns in the discussed period (*Dollinger 1997, 129*). The significance of cooperage is confirmed in written documents from Gdańsk, where the number of registered master coopers increased from 27 in the year 1416 to 100 in 1500. Moreover, the branch responded to demand by diversifying – Gdańsk registered not only master coopers but also barrel menders and hoop-makers (*Bogucka 1962, 82–84, 91–95*). In terms of trade volume, it is estimated that at the end of the 14th century, the import of salted herring from Scania to Vendic towns alone required 150,000 barrels (*Dollinger 1997, 202*). If we remember that herring were but one of the commonly transported goods, this example reveals the scale of barrel requirements in the investigated period, providing a crucial supplement to the scarce archaeological record.

In terms of percentages, wooden barrels with carved or branded marks still constitute a small fraction of all finds from this category, but the constantly growing source base has already rendered their study a worthwhile effort. Along the southern coast of the Baltic Sea, late medieval and post-medieval finds of vessels and barrels with marks are known, among

others, from Gdańsk (*Kasprzak 2007*, 9; *2010*, 173; *Ossowski 2014*, 260–261, 271–274; *Rembisz-Lubiejewska 2021*, 111; *Miścicki 2022*, 401, 408–409, 413), Puck (*Starski 2017*, 134, 137), Kołobrzeg (*Polak 1997*, 230; *Bobik 2016*, 148), Stargard (*Bobik 2012*, 186; *Bucka 2017*, 167), Lübeck (*Neugebauer 1975*, 117–137; *Falk 2002*, 422–434), Wismar (*Buchholz 1994*, 62–89), Rostock (*Schäfer – Patzelt 1992*, 48–49), and Greifswald (*Ansorge et al. 2003*, 133; *Robben 2008*, 77–86) (*Fig. 1*). They are usually mentioned in passing in publications and only sporadically addressed in detailed studies. This situation is certainly caused by the condition in which they are typically found, i.e. often fragmented, with the marks partly obliterated and surfaces heavily worn and barely legible. The marks consist primarily of variously arranged straight lines, so the number of possible reconstructions of incompletely preserved configurations is almost infinite. Typically stray and isolated finds, frequently retrieved from layers of waste or backfills of wells and cesspools, they are even more difficult to study because identical or similar marks are rarely registered within the same assemblage or archaeological site. Larger collections with recurring symbols are exceptions, but at the same time, they often come from well-defined, homogeneous archaeological contexts (such as shipwrecks), thus providing priceless data on the functions served by these marks (*Ossowski 2014*, 260–261, 271–274). However, when published, they are discussed as isolated cases, without direct analogies. Comparative analyses of the published assemblages rarely reveal similar symbols found at different sites, and even when they do, their accidental similarity is often difficult to rule out.

The research questions related to marks on wooden vessels are relevant to a broader group of artefacts. This observation has already been discussed multiple times in the literature. Researchers usually stress the difficulties in determining the exact functions of these marks, which could be the signatures of individual craftsmen, merchants, or owners. The research on the subject offers many interpretations, sometimes mutually exclusive (*Holl 1966*, 62; *Neugebauer 1975*, 129; *Śledź 1979*, 354; *Scholkmann 1982*, 128; *Schäfer 1992*, 60; *Buchholz 1994*, 64, 66; *Müller 1996*, 139–140; *Morris 2000*, 2260–2261; *Baran 2005*, 433–434; *Kostrouch 2009*, 493; *Nawrońska 2009*, 90; *Robben 2009*, 175; *Kasprzak 2010*, 173; *Haak – Russow 2012*, 162; *Szajt – Wieczorek-Kańczura 2018*, 327–328; *Szajt 2021*, 22, 74). Hence, to make the argument clearer, this paper focuses exclusively on barrels, leaving out the wide range of other medieval wooden vessels. This way, marks can be typologised for a single and, thus, precisely-defined category of artefacts – barrels – whose common use as containers in trade is well established. Marking vessels was crucial in mercantile contexts, resulting in barrels becoming the most frequently marked type of wooden items. Today, this makes it possible to not only typologise the symbols but also to interpret them more accurately.

The marks facilitate interpretation because one of the types most commonly discussed in the literature is believed to have served an explicitly trade-related function (*Śledź 1979*, 354; *Buchholz 1994*, 66; *Müller 1996*, 141; *Morris 2000*, 2260–2261; *Robben 2008*, 82–84; *Ossowski 2014*, 271–272). According to this interpretation, marks are usually understood as signatures of the owners of transported commodities (*Müller 1996*, 139; *Falk 2002*, 428; *Możejko 2014*, 67–68; *Ossowski 2014*, 273). Another possibility is that they indicated the intended recipient of a shipment (*Falk 2002*, 429; *Ossowski 2014*, 273). Marking containers was even more important in maritime trade, since a single ship could carry barrels filled with goods belonging to different merchants (*Możejko 2014*, 72). Hence, marks not only prevented mistakes, mishandling, or theft, but also facilitated inventorying the

cargo and controlling the payment of customs (*Falk 2002*, 428). The possibility to identify the owner of goods by their mark was especially helpful in retrieving assets lost in a maritime disaster (*Falk 2002*, 429; *Robben 2009*, 175; *Możejko 2014*, 65). One account of this very situation was presented by Stanisław Matysik based on historical sources detailing the dispute between Toruń merchants and a Danish magnate over the rights to the goods retrieved from a Gdańsk trader shipwrecked in 1377 (*Matysik 1949*, 18–19). Admittedly, the conflict continued for many years, but it was thanks to marks on the chests containing the cargo that the majority of goods were recovered. Moreover, legal documents for the commodities salvaged from the disaster included a detailed description of the marks, which made it possible to identify the owners of particular chests. Matysik mentions that the merchants could easily determine the contents of specific containers based on the marks (*Matysik 1949*, 24). A similar conclusion was proposed after an analysis of an inventory book from a ship which sank in the Meuse (*Robben 2009*, 176).

However, this does not explain the problematic cases of barrels bearing multiple different marks. Hypothetically, the additional marks may have indicated a partnership of several merchants or that a container was reused (*Robben 2008*, 84; *Możejko 2014*, 72). It has been pointed out, however, that this solution could easily have led to mistakes and frauds (*Falk 2002*, 429). Some scholars suggest that in such cases, the mark on the bottom of a barrel represented the owner of the vessel's content (*Kasprzak 2010*, 173), while the mark on the stave identified the addressee or both seller and buyer (*Falk 2002*, 429). Alternatively, the bottom mark could indicate the type of content (*Robben 2008*, 84; *Kasprzak 2010*, 173) or the maker of the barrel (*Holl 1966*, 62; *Scholkmann 1982*, 128; *Buchholz 1994*, 66; *Morris 2000*, 2260–2261; *Falk 2002*, 423; *Nawrońska 2009*, 90; *Rembisz-Lubiejewska 2021*, 111; *Szajt 2021*, 22). A carved symbol – usually placed in the middle of the bottom – was supposedly meant to enable identification of the workshop that produced the vessel and to certify its quality (*Falk 2002*, 423).

Marking wooden goods, especially within the cooperage craft, was also required by guild regulations. A barrel, which served simultaneously as a unit of volume, had to have precisely-defined dimensions in order to prevent fraud. Late medieval and post-medieval regulations of the coopers' guilds in Gdańsk and Toruń explicitly state that senior guild members were obliged to verify the quality of goods and mark all barrels coming from a specific workshop. Moreover, a cooper in Gdańsk would not be allowed to buy staves that had not been quality-checked by a checker (presumably attested by marking the positively-verified staves) (*Herbst 1933*, 227; *Bogucka 1962*, 101–102). Similar regulations are also known from Riga and Wismar, where master coopers had to put marks on their products (*Falk 2002*, 426, 428). There are written accounts documenting that staves would be marked by the makers and bottoms by the users, as they were replaced more frequently (*Robben 2009*, 175). Meanwhile, an agreement between Cologne and Dutch towns stated that bottoms were to be marked by the makers and staves by the urban authorities, to guarantee proper dimensions of the barrels (*Robben 2009*, 175). It remains possible, however, that several different marks could be used by the same person (*Homeyer 1870*, 268; *Śledź 1979*, 354–360; *Ossowski 2014*, 273).

Unfortunately, the appearance of a mark is not always specified in publications. In effect, it is difficult to determine whether a given mark is a trace of quality control by the guild or a personal signature of the maker, even though in Toruń and Lübeck an official municipal stamp was made specifically for making marks (*Herbst 1933*, 227; *Falk 2002*, 428).

As shown, there are multiple interpretative options, and each could potentially be true depending on the local circumstances, such as the internal regulations effective in a given town or region.

This underscores the need for a typology of marks found on barrels, as without it, their functions will be difficult to decipher precisely. At the current stage of research, comprehensive understanding and linking particular symbols to specific historical persons is nearly unimaginable. Nevertheless, even with such diversity (from simple marks composed of single lines to extremely sophisticated patterns), it should be addressed whether the complexity of a mark correlates with the function of a barrel or whether certain marks can be identified as related specifically to, e.g. trade (signifying a merchant, carrier, commodity, recipient, etc.), craftsmanship (makers or guild quality checkers), or other activities that remain as yet unidentified.

Description of the assemblage

The analysis was conducted on 112 mark-bearing barrel fragments from Elbląg, Gdańsk, and Puck, the majority of which have not been published to date. The main objective was to answer the questions listed above, taking into account parameters such as the number, density, and arrangement of lines. Multi-season archaeological investigations in the said urban centres yielded a very diverse collection of wooden vessels, with and without marks, dated between the mid-14th and mid-16th centuries. The three centres developed in similar cultural and political contexts, at first within the State of the Teutonic Order and later, from the mid-15th century, within the Kingdom of Poland (*Biskup 1967; Czaja 2000*). At the same time, being urban organisms of different stature and dynamics, they offer distinct perspectives – that of large economic hubs in Gdańsk and Elbląg, and of a small regional centre in the case of Puck. Likewise significant is that all three towns participated in Baltic trade under Hanseatic influence, because this feature facilitates comparisons with urban centres of the southern Baltic coast. It should also be noted that, although the forms and directions of commercial exchange were decided largely by the Hanseatic League, newer studies ascribe a more prominent cultural role to settlers from various parts of Germany, who arrived in the region as Elbląg, Gdańsk, and Puck were being chartered (*Suhonen 2001; Immonen 2007; Jahnke 2009; Müller 2014; Naum 2015; Pluskowski 2022, 238–244; Starski 2022, 96*). The factors mentioned above were consistent across all the towns discussed and pivotal to their economies and material cultures, which justifies the selection of sources for this analysis.

Elbląg

The history of Elbląg began in 1237, when the Teutonic Order built a stronghold at the mouth of the Elbląg River into the Vistula Lagoon. A settlement started to grow quickly around the stronghold and nine years later the Order granted the town a charter under the Lübeck Law (*Czaja – Nawrołski 1993, 60–70*). The favourable location enabled Elbląg to participate in long-distance trade connecting the Baltic region directly to Poland, Hungary, and Rus, and indirectly to many centres in Western and North-Western Europe. Under such circumstances, Elbląg thrived and developed rapidly from its chartering until the

mid-14th century. The town's economy faced a crisis at the turn of the 15th century due to strong competition from Gdańsk, which eventually dominated Elbląg and pushed it into a more peripheral position (*Czarciński 1993*, 147–152).

The largest collection, including 71 fragments of barrel bottoms and other stave-built vessels with marks, comes from the multi-season archaeological excavation in the Old Town of Elbląg, which started in 1979 and continued almost without interruption for the next 30 years (*Fonferek et al. 2012*, 16–19; *Nawrońska 2012*, 20–23; 2014, 44–50). All the finds are held by the Muzeum Archeologiczno-Historyczne in Elbląg, together with an inventory and visual documentation compiled already when the excavations were still ongoing. Thanks to this effort, the assemblage can be meaningfully researched even many years after the work ceased. Furthermore, as the discussed finds have not yet been studied or published separately, the present overview itself constitutes a valuable contribution, significantly enhancing research on the marks found on barrels.

Gdańsk

The earliest settlement within today's Gdańsk is dated to the turn of the 11th century. The first charter under the Lübeck Law was granted by Świętopełk, Duke of Pomerania, in the 1220s or 1260s (*Maciakowska 2022*, 19). During the Teutonic Order's invasion of Pomerania in the first decades of the 14th century, Gdańsk was razed to the ground and then founded again, which was confirmed by a new charter issued by the Order in 1342, this time under the Kulm Law (*Spors 1982*, 64–71; *Paner 2004*, 15–33; *Długokęcki 2009*, 27–42; *Maciakowska 2009*, 16–26). During the 14th century, the town developed rapidly, becoming one of the most important regional trade centres alongside Elbląg and Toruń. It connected the Baltic region with the Teutonic Order's domain and the Kingdom of Poland, and through them with more distant parts of Europe (*Bogucka 1962*, 7–9; *Litwin 2014*, 19–29). In the 15th century, especially after the Thirteen Years' War (1454–1466), Gdańsk emerged as the dominant commercial power on the Baltic coast, playing a key role in the development of several smaller centres under its influence (*Gierszewski 1966*, 184).

The wooden vessels found in Gdańsk were analysed based on available publications (*Kasprzak 2010*, 173; *Miścicki 2022*, 401, 408–409, 413) and during a study visit to the Muzeum Archeologiczne in Gdańsk. The assemblage comprises 26 mark-bearing fragments of bottoms of barrels and other stave-built vessels. Since these finds come from excavations conducted over a long period in different parts of the city and by different teams, many of them could be dated only approximately. Moreover, the complexity of Gdańsk as a research site and the large number of archaeological excavations taking place in the city suggest that the presented assemblage is but a part of the potentially available source base. Therefore, it should be seen as a preliminary contribution and foundation for future studies rather than an authoritative representation (*Paner 2006*, 11–88).

Puck

Puck was first mentioned as a village at the turn of the 13th century, but by the following decades of that century, it was referred to as a trade settlement (*Śliwiński 1998*, 55–68). The archaeological finds analysed here are related to the town chartered in 1348 by the Teutonic Order under the Kulm Law (*Bruski 1998*, 73–77; *Kruppé – Milewska 2015*, 11).

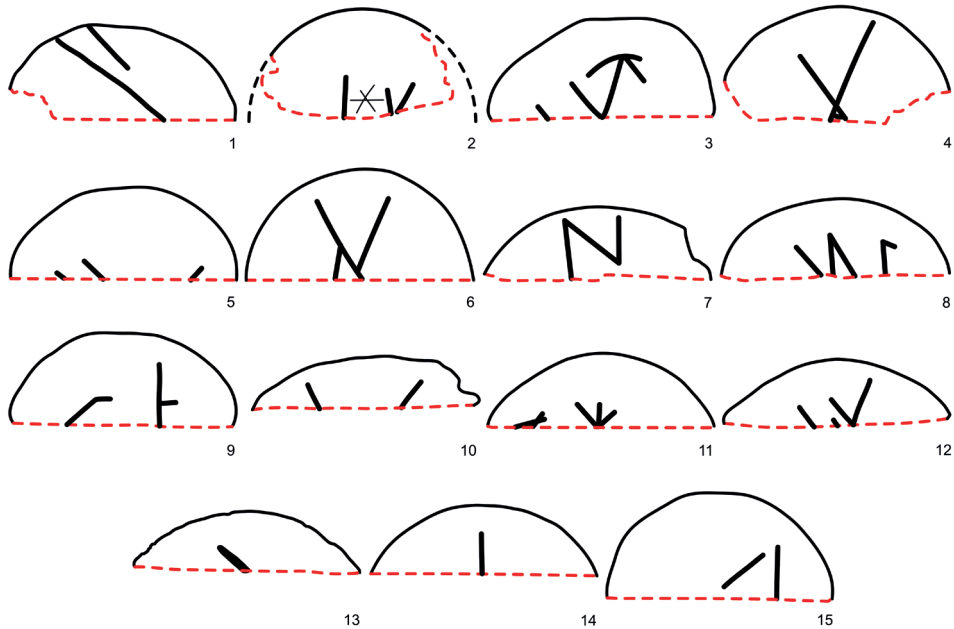


Fig. 2. Illegible marks from Elbląg (1, 3–5, 7–12, 14–15) and Puck (2, 6, 13). The finds are dated to the 14th century (1), late 14th–early 15th century (2), 14th–15th century (3–5), first half of the 14th century (6), and 15th century (7–15).

Throughout the discussed period, Puck remained a small settlement classified as a third-category town in the literature due to the occupational structure of its inhabitants – a local centre of craftsmanship, with part of the population engaged in farming (*Bogucka – Samsownik 1986*, 108). In regards to its participation in trade, Puck should be seen as economically dependent on the dominant Pomeranian power, Gdańsk. This relationship is also reflected in the archaeological record from the town (*Starski 2015*, 200–202). Simultaneously, it is worth emphasising that compared to other peripheral Pomeranian towns, Puck is described by a relatively rich array of written sources, including the Town Register (*Kardasz 2017*, 71).

The ongoing archaeological work in Puck, conducted systematically for more than 30 years, yielded 15 fragments of barrel bottoms with marks. Although the smallest of the analysed collections, the Puck assemblage is dated most precisely – predominantly to different parts of the 15th century. Moreover, it has been comprehensively elaborated and published, except for the excavation seasons after 2017 (*Starski 2017*, 134–137).

Preservation

The primary difficulty in studying this category of artefacts appears already during archaeological excavations. Wooden vessels are typically found fragmented, with no marks preserved in their entirety. Thus, the symbols, which were schematic by design, become completely illegible or so ambiguous that their meaning is impossible to infer with any precision. The staves and bottoms of barrels were often secondarily used to pad the yards

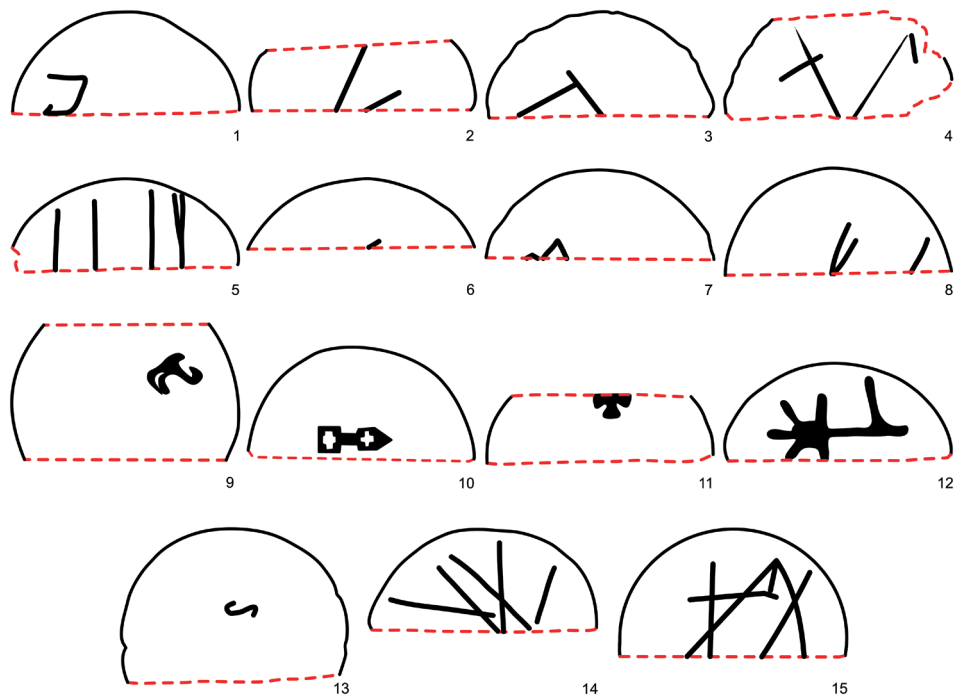


Fig. 3. Illegible marks (1–8), branded marks of group I (9–13), and marks composed of multiple irregular lines categorised as group II (14–15). Finds are from Elbląg (1–2, 5, 9–12, 14–15) and Gdańsk (3–4, 6–8, 13), dated to the 14th century (9), 14th–15th century (10, 14–15), 15th century (1–2, 11–12), 15th–16th century (3–5), and 14th–16th century (6–8, 13).

of urban plots or for casings of cesspools or drainages (Polak 1996, 332; Bobik 2016, 153; Blusiewicz 2017, 99, 115–116; Starski 2017, 134). As a result of such prolonged exploitation, marks on wood became blurred, which also complicates their proper identification. Moreover, soft wood heavily soaked with water deposited in compact and hard layers of manure can easily be damaged in the course of archaeological excavation. Immediately after removal from the ground, it is fairly easy to distinguish intentionally carved marks from random incisions left by archaeologists. These differences, however, become less evident over time and are no longer clear in post-excavation documentation. In addition, without proper chemical stabilisation wooden finds dry out quickly and uncontrollably, which leads to irreversible damage or deformation negatively affecting the legibility of the marks. To complicate things even more, conservation may be impossible due to a variety of reasons. Hence, the key to preservation of information on marks lies in their proper documentation – as much as practically possible, they should be documented already during excavation or shortly afterwards.

All the aforementioned finds are fragments, which usually means that the marks survived only partly, an effect particularly strong for barrels. Although their bottoms had originally consisted of at least two or three pieces, usually just one of them survived. On the best-preserved specimens, the mark on the surviving stave could be seen either in whole or in part sufficiently large to enable its plausible reconstruction. In the worst cases, only some

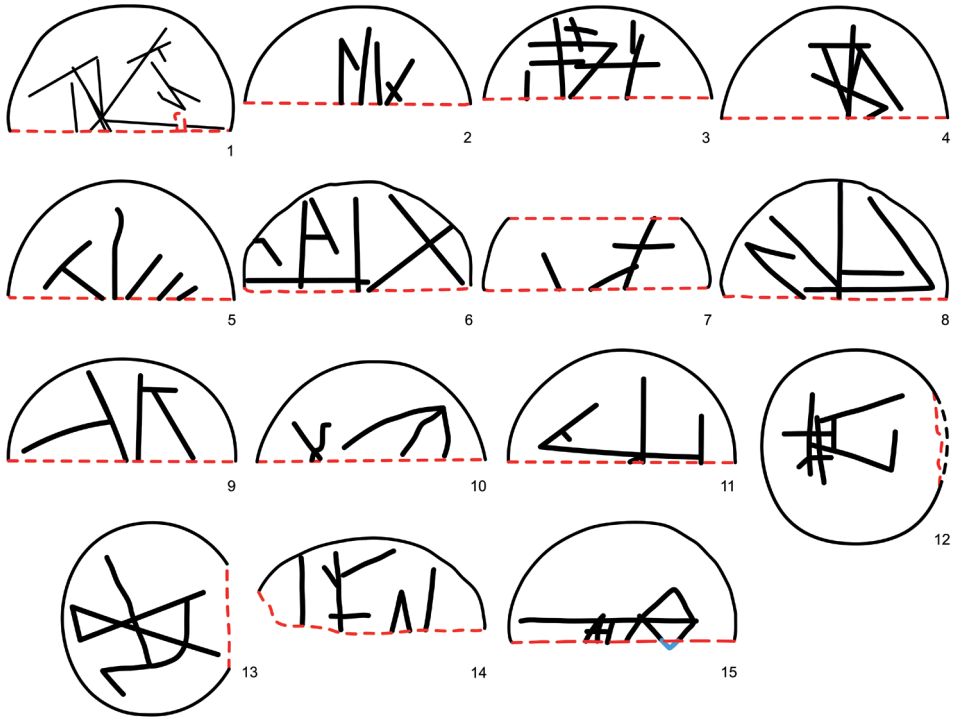


Fig. 4. Marks of group II composed of multiple irregular lines from Elbląg (1–12, 14–15) and Gdańsk (13). The finds were dated to the 14th–15th century (1–5), 15th century (6–12), second half of the 15th century (13), and 15th–16th century (14–15).

of the lines, single or measuring a few centimetres, could be seen (Fig. 2; Fig. 3: 1–8). Apart from the said 23 specimens, the rest are at least half-legible, thus allowing comparison and classification.

Categories of marks

Of all the categories of wooden vessels, barrel bottoms show the greatest diversity in the visual features of marks. Hence, five groups were distinguished within the discussed assemblage. The first (I) includes five branded symbols – four from Elbląg and one from Gdańsk (Fig. 3: 9–13). These marks are the least common in the archaeological record, as evidenced in relevant publications. It is unclear whether they were guild, craftsmen's, ownership, symbolic, or decorative symbols (Scholkmann 1982, 128; Müller 1996, 140–141; Falk 2002, 422–423; Kostrouch 2009, 493; Szajt – Wieczorek-Kańczura 2018, 327). These are usually not large marks and they occupy a small part of the barrel bottom.

The other three groups (II–IV), forming the vast majority of the assemblage, consist of stylistically diverse marks carved with a chisel or knife, with lines 0.5 to 1.0 cm in width. The most complex are composed of six to nine lines of various lengths arranged quite loosely and asymmetrically, not resembling any legible sign (II). The lines can be crossed, broken, or tangential, set at various angles. They can have a single discernible primary line

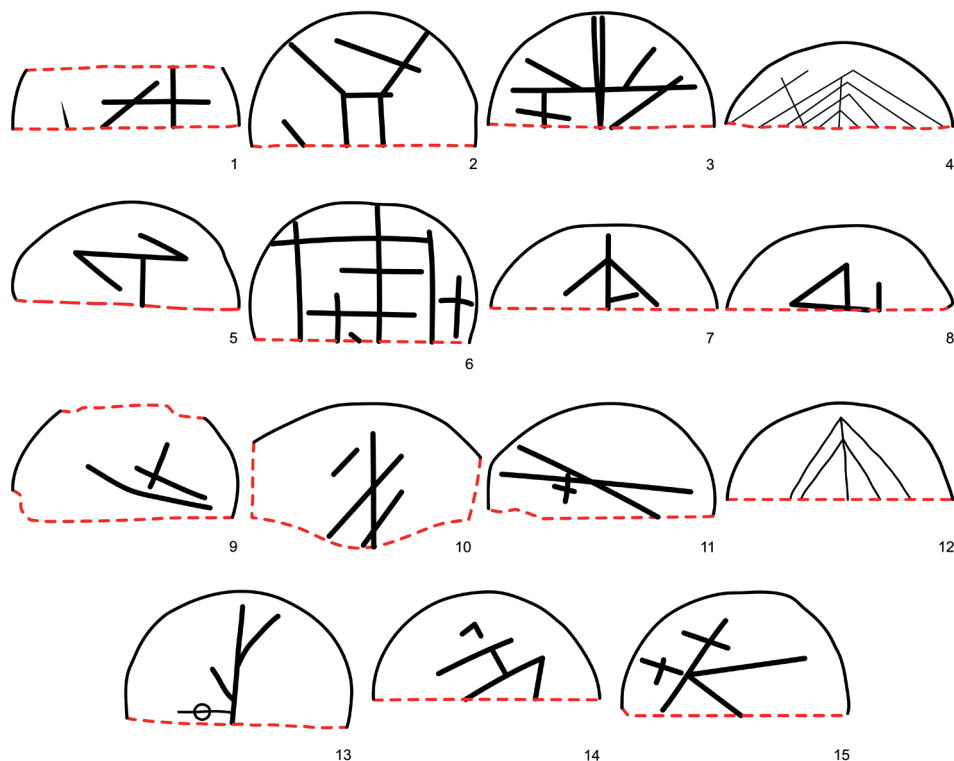


Fig. 5. Marks of group II composed of multiple irregular lines (1–3), and marks of group III composed of multiple regularly-arranged lines (4–15) from Gdańsk (1–4, 13), Elbląg (5–12, 15), and Puck (14). The finds were dated to the second half of the 14th century (4, 14), 14th–15th century (5–10, 15), 15th century (11–12), 15th–16th century (1), and 14th–16th century (2–3, 13).

or several long lines with shorter branches, as well as crossed or overlapping broken lines. The cut lines are usually straight, with only a few arched or rounded. The marks typically take up most of the space on the barrel bottoms, but they tend to concentrate in their central parts. A total of 20 such marks were found in the analysed assemblage (*Fig. 3: 14–15; Fig. 4; Fig. 5: 1–3*).

The third group (III) consists of marks featuring geometric figures, either standing on their own or in groups, which are sometimes connected or criss-crossed with single lines. The majority are roughly triangular or rectangular, with the addition of lines intersecting with or extending from them. The group also includes marks composed of multiple lines, not necessarily closed. Unlike the previous group, this category contains marks with less chaotic arrangements, making more frequent use of parallel and perpendicular lines, but also occupying most of the surface of the bottom of the barrel (*Fig. 5: 4–15; Fig. 6; Fig. 7: 1–6*). The assemblage of finds from Elbląg, Gdańsk, and Puck contains 33 such marks.

The next analysed group (IV), totalling 23 specimens, includes marks with a compact and legible composition most often placed in the central part of the bottom. They show greater regularity, better workmanship, and are more often symmetrically axial, resembling various kinds of arrows or closely-arranged lines – parallel, crossed, or broken with other

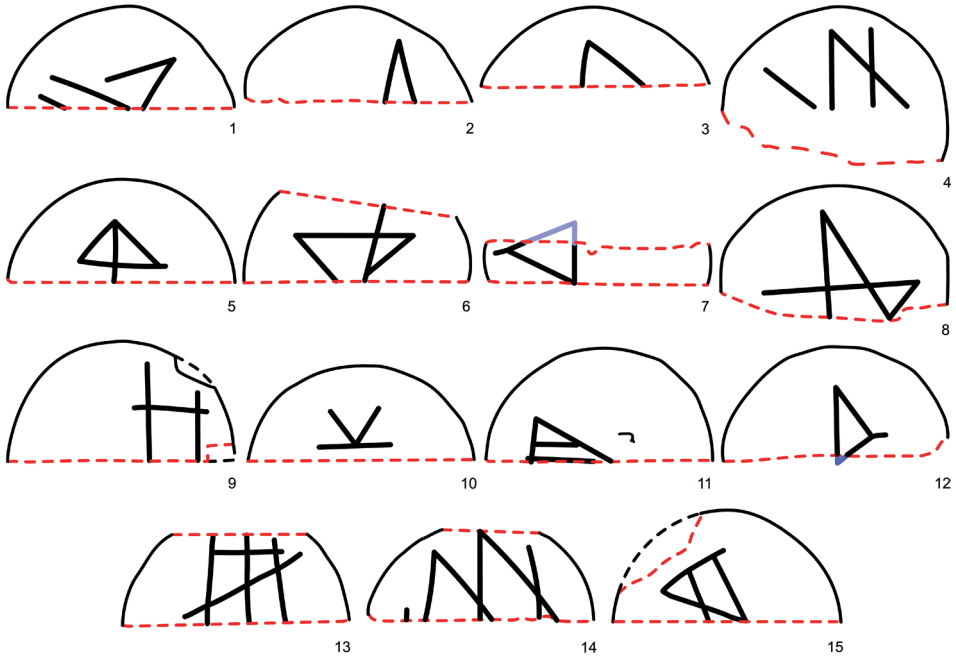


Fig. 6. Marks of group III composed of multiple regularly-arranged lines from Puck (1–4) and Elbląg (5–15). The finds were dated to the first half of the 15th century (1), the second half of the 15th century (2–4), and the 15th century (5–15).

lines or geometric figures (*Fig. 7: 7–15; Fig. 8*). Simple symbols predominate, although more complex examples are also present. Regardless of complexity, most of them make deliberate use of distinct patterns. It was only in this group that the same mark was used more than once (*Fig. 7: 11–12*).

The remaining eight marks are difficult to classify with certainty and were thus counted together as a single outlying group (V). Their forms resemble carved letters or Roman numerals, often combined with other symbols (*Fig. 9*). The most sophisticated in this regard is the mark from the barrel bottom found in Elbląg, where an uneven row of letters 'BBS' was carved together with lines – one parallel and one perpendicular – broken at the ends with two circles (*Fig. 9: 5*). Bottoms bearing only letters were also found in smaller stave vessels (buckets or pails) from Elbląg (*Fig. 9: 1, 6*). The crossed and straight lines recorded on barrel bottoms from Puck may look like Roman numerals, but such symbols are so intuitively simple and common that they may have had a different meaning (*Fig. 9: 3–4, 7*).

Results

The frequency distribution of mark-bearing finds in the discussed assemblage shows clear predominance of groups II–IV, with group III as the largest (*Fig. 10*). Some of the 23 incompletely-preserved and illegible marks might be tentatively connected to groups III or IV, but at the current stage of research labelling them as 'unidentified' seems more reasonable.

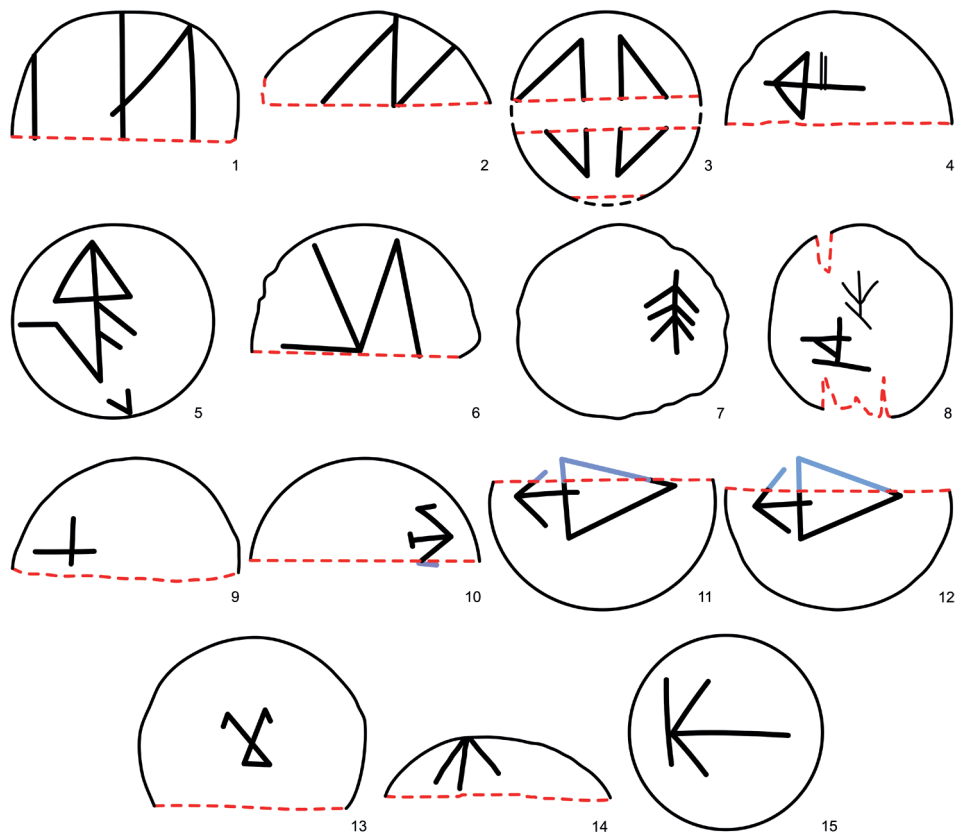


Fig. 7. Marks of group III composed of multiple regularly-arranged lines (1–6) and marks of group IV with compact composition (7–15) from Elbląg (1, 9–12), Puck (2, 15), and Gdańsk (3–8, 13–14). The finds were dated to the second half of the 14th century (7–8), 14th century (9), 14th–15th century (10–13), first half of the 15th century (14), 15th century (1, 15), second half of the 15th–first quarter of the 16th century (2), and 14th–16th century (3–6).

It should be noted, however, that in most cases, half of the preserved mark was enough to make a classification. It cannot be ruled out that if the full mark had been legible, it would have led to a different interpretation and assignment within the proposed groups or the separation of further types. However, based on the analysed material, it seems that these would not have been a common occurrence. The basic specified features can be legible even on an incomplete mark. Marks assigned to all of the aforementioned groups were found on the bottoms of barrels and other stave vessels from Elbląg, Gdańsk, and Puck dated to the period between the 14th and 16th centuries. The structure of the assemblage does not make it possible to statistically determine whether any of the mark types enjoyed greater popularity than the rest.

Assuming that the type of site (large or small city) has or does not have an influence on the occurrence of given groups, the correspondence analysis comparing finds from three sites showed that groups I and II are more frequent in Elbląg, group IV in Gdańsk and group V in Puck, and group III is present in Elbląg and Puck (23 illegible marks were not

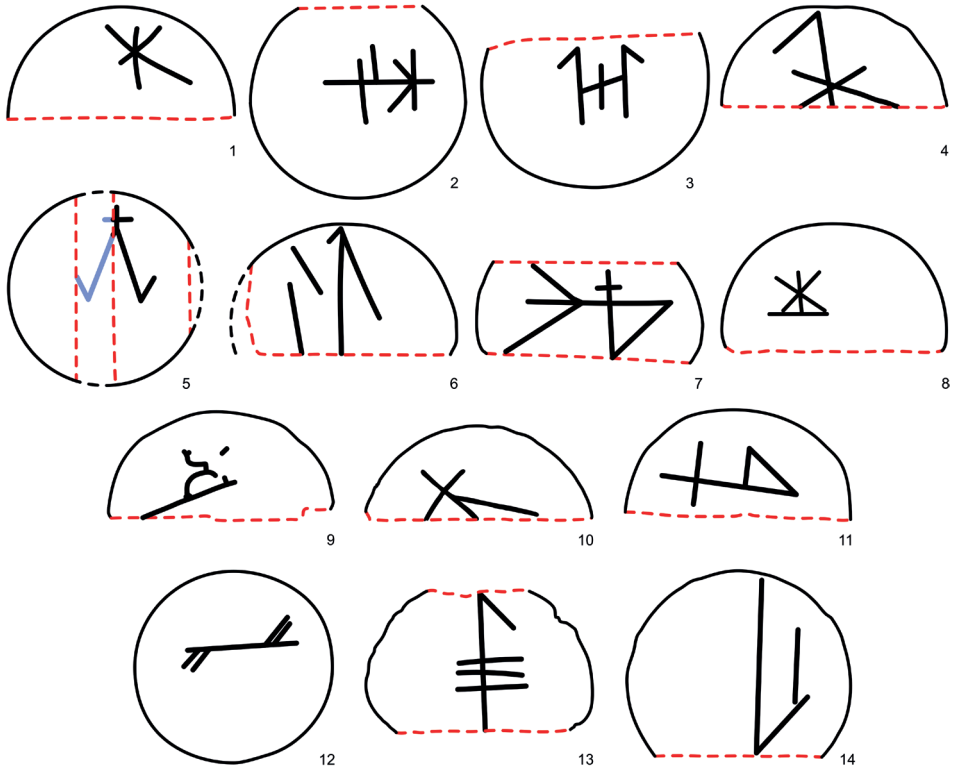


Fig. 8. Marks of group IV with compact composition from Elbląg (1–4, 7–9), Puck (5–6), and Gdańsk (10–14). The finds were dated to the first half of the 15th century (5), 15th century (1–4, 7–10), second half of the 15th century (6), and 14th–16th century (11–14).

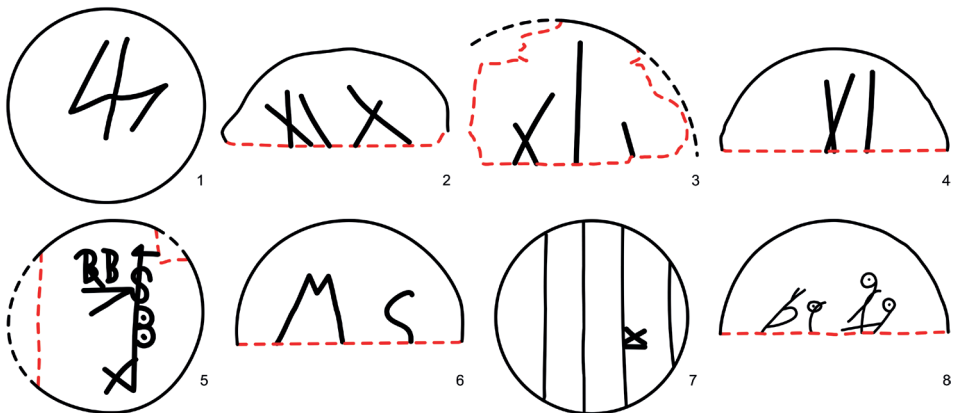
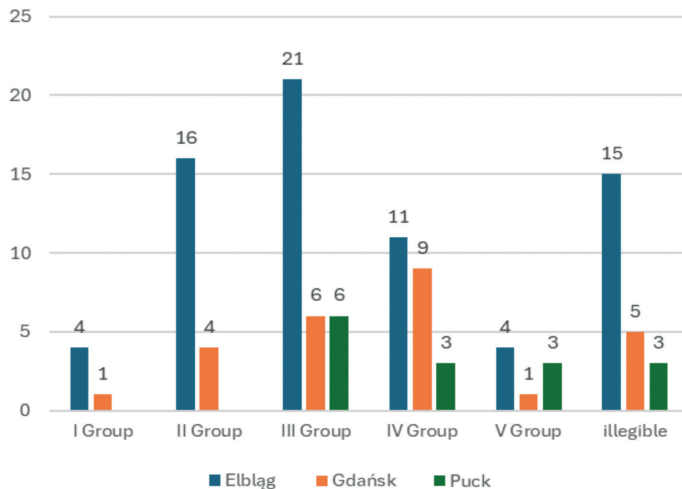


Fig. 9. Other marks found on stave-built vessels labelled as group V found in Elbląg (1–2, 5–6), Puck (3–4, 7), and Gdańsk (8). The finds were dated to the 14th century (1), 14th–15th century (2), late 14th–early 15th century (3), first half of the 15th century (4), 15th century (5–6), late 15th–first quarter of the 16th century (7), and 14th–16th century (8).

Fig. 10. Number of mark-bearing barrel fragments from each group, divided into analysed sites.



included) (Fig. 11). Such a great discrepancy between Gdańsk and Elbląg seems interesting and difficult to interpret. Nevertheless, the predominance of group IV in Gdańsk, as one of the most important trading cities on the Baltic Sea in this period, is not surprising. It should be noted, however, that with an assemblage of this size, the result is not statistically significant and with a larger number of finds, the proportions might show different trends. Still, even when the size of the assemblage is small, the correspondence analysis makes it possible to detect differences between frequencies and hints at possible relationships between mark groups which should be expanded upon in further research.

Among the 112 analysed marks, the majority are dated to various parts of the 15th century. However, with the data available today, none of the identified mark types seems characteristic of a particular time interval. Moreover, the marks are highly heterogeneous in form and almost never repeated. The only exceptions are a single symbol from Elbląg, which appeared twice (Fig. 7: 11–12), and one mark from Puck (Fig. 8: 5), found on four turned vessels from the same archaeological context (Starski 2017, 137, 147–149).

By compiling the available data on the barrel fragments found in Elbląg, it was determined that 67 out of 197 barrel bottoms bear marks (34%). The assemblages from Puck and Gdańsk were too small to serve as a statistically representative sample, but they still show a similar pattern. The presence of marks on approximately one-third of the finds may be taken to mean that barrels were routinely marked in the Late Middle Ages. As mentioned earlier, all of the many reasons for marking barrels can be linked to either mercantile or non-mercantile contexts.

Important sources for archaeological analyses of trade-related marks are wrecks of merchant ships preserved with their cargo. The shipwreck of *Miedziowiec* ('Copper Ship') from the Gdańsk Bay yielded several dozen barrels, or their fragments, whose bottoms and staves bore carved linear marks. The symbols showed considerable diversity, but it was still possible to distinguish a series of recurring patterns. Moreover, wainscot planks or single staves inserted in bundles of metal bars were also marked, and some of these marks matched those found on barrels (Ossowski 2014, 248, 260–280). This makes it possible to assess what part of the cargo belonged to the same owner – the barrels with multiple marks,

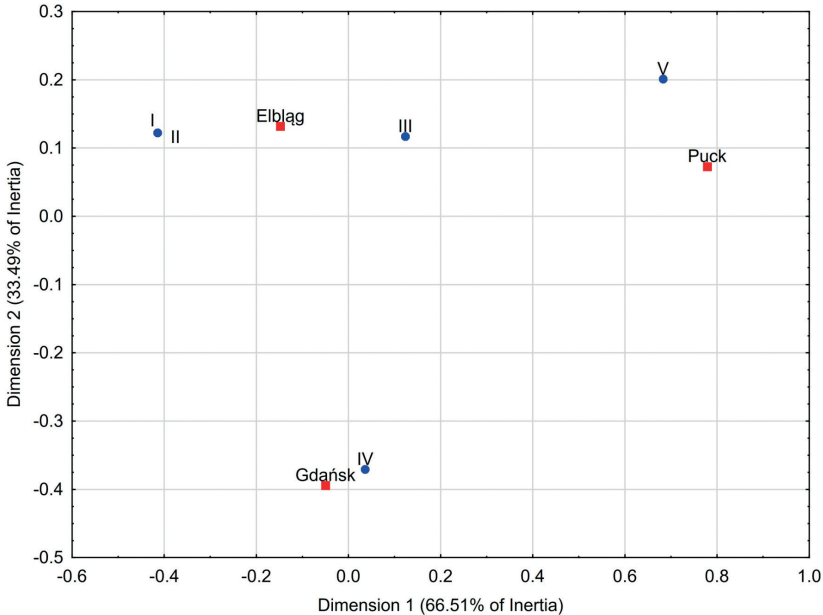


Fig. 11. A correspondence analysis for mark-bearing barrel findings from each group (chi-square=12.0, $p=0.12$). The number of finds from each city taken into account in the analysis: Elbląg – 56; Gdańsk – 21; Puck – 12.

however, remain problematic, as indicated earlier. Stylistically, the published marks from *Miedziowiec* should be assigned to group IV – regular and relatively simple symbols composed of several lines in compact arrangements.

The studies of marks found on wooden vessels benefit considerably from information supplied by written sources. The marks from the aforementioned *Miedziowiec* shipwreck, for example, revealed that one of the owners of the transported commodities was Johann Pilge, the *Großschäffer* of Königsberg. His family emblem showing a cross *pattée fichée*, known from accounting books, can be found on some of the barrels from the shipwreck. Moreover, the year when the ship sank dates to the period of Johann Pilge's service as the *Großschäffer* (*Możejko 2014*, 67–68). Another example may be a letter sent in 1470 by a merchant from Riga to his partner from Lübeck. It mentions a mark used to sign mead barrels shipped to Lübeck (*Falk 2002*, 428–429). In both cases, the discussed marks show the distinctive features of group IV.

Another example is customs registers, such as the list of *Pfundzoll* (a type of tax in the Hanseatic League) payers preserved in the Municipal Archives of Toruń and published by Leon Koczy. Apart from information on the types of transported goods (mostly cloth from Western Europe) and the amount of payments, the manuscript names 27 Hanseatic merchants along with their marks (*Koczy 1935*, 275–331). Similarly, an analysis conducted by Marian Gumowski on wooden shields, coats-of-arms on gravestones, church epitaphs, portraits of town councillors, stained glass, houses and entablatures, rolls of arms, and genealogy books revealed 114 marks which could be associated with patricians of Toruń living between the end of the 14th and beginning of the 18th centuries (*Gumowski 1970*, tabs. XXXV–XXXIX). These also appear stylistically closest to group IV.

An interesting account mentioning barrel-marking is a list of errands of a Polish nobleman, Jacek Roztworowski, written in the mid-18th century and containing detailed instructions for a skipper responsible for purchasing required goods in Gdańsk. One entry is particularly relevant for the question of barrel-marking: '*Scottish Herring, but only fresh, from the Ships – buy Barrels no. 11 and mark them, so that they don't get lost on someone else's ship*' (translated by the author from Polish into English; *Roztworowski 1935*, 357). The form of the mentioned mark is of course unknown, but the account still clearly documents that marked barrels were not uncommon in trade-related contexts, even when the mark represented a private buyer rather than a merchant.

Conclusion

The examples quoted above demonstrate that at least the marks of group IV should be linked to mercantile contexts, in which barrels served as containers for various traded commodities, and that the role of a mark was to identify a specific person engaged in the exchange. It is possible that coopers' goods with similar marks found in Elbląg, Gdańsk, and Puck were used in the same manner. Analogous written sources could not be found for marks of groups II and III, although both are common in the discussed assemblage and among archaeological finds from other Baltic sites (*Scholkmann 1982*, 103; *Buchholz 1994*, 79; *Falk 2002*, 431). The marks of group III show much greater compositional coherence than those of group II and are considerably more sophisticated than group IV. In the literature on the subject, it is sometimes pointed out that barrels could be marked multiple times if they were reused (*Falk 2002*, 429; *Robben 2008*, 84; *Możejko 2014*, 72). Hence, it must be borne in mind that complex marks may in fact be several overlapping simpler ones. However, the repeated marking of reused barrels does not seem to be a rational practice, since a 'renewed' mark would likely become obliterated quickly. It is possible that a mark was intentionally changed when a barrel was no longer used as a container for traded goods. Nevertheless, at the current stage of research, this remains conjecture in need of future systematic verification.

Based on the available sources and the conducted analysis, it is difficult to either prove or refute that groups II and III contained marks related to trade. It should be recalled that the primary function of a barrel is to hold various commodities. At the same time, the connection of these marks to guilds, craftsmen, owners, or other yet unknown contexts remains an open question. In the case of the chaotic marks of group II, it should not be immediately ruled out that they were random symbols, devoid of any particular meaning. They could, however, just as well be applied deliberately, perhaps in a manner resembling carpenters' marks – quick and schematic indicators of specific quantitative or ordinal relations in a workshop or ship's hold. Meanwhile, the small number of marks of groups I and V precludes drawing any sort of conclusion.

The present analysis of 112 marks on barrel bottoms from Elbląg, Gdańsk, and Puck demonstrated the following: wooden goods were commonly marked, as approximately one-third of all finds bear marks. Those found on barrels tend to be very diverse and rather stylistically loose, which led to distinguishing five groups of symbols: group I, consisting of a small number of branded marks; group II, characterised with very complex, chaotic compositions; group III, with complex and multilinear, though more orderly and geometrised

patterns; group IV, comprising simple, easily-legible motifs; and group V, with marks of unspecified forms, usually somewhat resembling letters or Roman numerals. The widespread use of marks on wooden vessels also seems documented by the small number of repetitions despite the large sample size and rich corpus of analogies known from the literature. In light of the present evidence, the sporadic formal similarities between marks should be considered random occurrences. However, it is worth noting that these parallels and apparent repetitions are observed only in the marks of group IV, which is interpreted as related to trade.

The present analysis of archaeological and historical data does not provide a clearcut answer to the question stated at the beginning of the paper, but it contributes to further studies. Crucial for future research on late medieval marks on barrels will be expanding the source base, particularly through the publication of finds. A larger sample of artefacts will increase the chances of identifying analogies for the already known symbols and improving our understanding of the reasons behind barrel-marking. However, future research should not be limited to the standard archaeological description of morphological features, but rather include careful analysis of written sources, such as tax rolls, waybills, town registers, guild records, etc. Such an approach may reveal mentions of barrel marks in the historical documents and thus provide information on the persons and social realities in which these symbols were used. This, in turn, may provide new insights into late medieval craftsmanship and trade. Important contributions may also be made by experts in heraldry, palaeography, and sphragistics, who are well-equipped to develop coherent and transparent methods of description and classification.

Nonetheless, the primary function of the marks was undoubtedly related to trade – they linked persons to commodities transported in barrels. The kinds of person-barrel relations could vary, as demonstrated earlier, but they always remain adjacent to trade. In particular, the marks of group IV promise important insights in the future, potentially shedding additional light on the history of local as well as long-distance trade. This does not mean that marks from other groups should be excluded from this role, but in light of the current source base, this interpretation is not strong enough to be applied unequivocally. Therefore, it seems justified to postulate that research on barrel marks should prioritise archaeological assemblages retrieved from well-defined cultural contexts, such as the Hanseatic sphere of influence and the Baltic urban network, whose inhabitants were predominantly of German origin. Against this backdrop, an interesting research avenue could be comparative studies of large and small towns functioning within the model of centres and peripheries. This approach has already been explored, though more holistically, by historians of medieval European culture and economy (*Wallerstein 1974; Braudel 1992; Dygo 2006, 122–123*), suggesting that it can be fruitfully applied to archaeological analyses of barrel marks. However, this methodological move, as stressed before, would require a stronger source base, particularly larger samples of archaeological finds from Baltic urban centres of varying sizes and economic and cultural stature.

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