



INSTITUTE OF ARCHAEOLOGY AND ETHNOLOGY
POLISH ACADEMY OF SCIENCES
PL ISSN 0860-0007, E-ISSN 2719-7069
DOI: 10.23858/FAH

FASCICULI ARCHAEOLOGIAE HISTORICAE

Fasciculus 37

The Archaeology
of Medieval and Post-Medieval
Kitchen and Cuisine:
Food - Utensils - Space



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THE ARCHAEOLOGY OF MEDIEVAL AND POST-MEDIEVAL KITCHEN AND CUISINE: FOOD - UTENSILS - SPACE

ŁÓDŹ 2024

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PIOTR STRZYŻ*

REMAINS OF COPPER ALLOY VESSELS FROM THE MEDIEVAL KNIGHTLY RESIDENCE IN MIERZYN, CENTRAL POLAND

Abstract

During investigations carried out at the site of a late medieval knightly residence in Mierzyn (Piotrków Trybunalski District, Central Poland), archaeologists discovered, among other things, numerous fragments of three-legged vessels cast from copper alloy, known as ‘Grapens.’ They were used for cooking and reheating food. The collection obtained from the above-mentioned site comprises 13 fragments from several different vessels, which distinguishes Mierzyn from other *motte* type knightly residences in Poland. In the course of research, including specialist analyses, at least four vessels were identified based on the discussed fragments. They varied in appearance – there were both classic forms with bulbous bodies and fitted with characteristic handles and legs, but also a form similar to cauldrons or frying pans – with a sleeve for a wooden handle. The fact that a fairly diverse assortment of metal Grapens was used at the excavated site testifies to the material status of the representatives of the knightly Nagodzice family of Mierzyn.

Received: 01.12.2024 **Revised:** 28.12.2024 **Accepted:** 30.12.2024

Citation: Strzyż P. 2024. *Remains of Copper Alloy Vessels from the Medieval Knightly Residence in Mierzyn, Central Poland*. “Fasciculi Archaeologiae Historicae” 37, 33-46, DOI 10.23858/FAH37/2024.002

INTRODUCTION


Despite many new studies, the medieval culinary culture of Polish knighthood is still a poorly recognised topic.¹ The lack of written and material sources is the most symptomatic in this case. In medieval Poland, the former focused mainly on the culture of the ruling court,² and were rarely devoted to the furnishing of knights’ residences. Our knowledge on this topic comes primarily from archaeological excavations, but also from numerous court records concerning cases of robbery and theft of property, which were common at the time. Naturally, these sources sometimes more accurately

describe lost objects and their value. On the other hand, archaeological investigations of knightly residences increasingly more often take the form of conservation interventions limited to one or two excavation trenches to identify the general stratigraphy of the site and its chronology. Under such conditions, it is difficult to get a more detailed overview of the material culture of the people who once inhabited the knightly seat than a limited glimpse of the collection (more or less numerous) of pottery and a few metal objects.

One of the most interesting elements of such equipment was cast copper alloy vessels. This group includes, among others, Grapenes and frying pans. We should begin with the explanation that a Grapen is a cauldron – a three-legged pot with two handles, cast in bronze (actually: copper alloy), which was one of the most popular cooking utensils in Northern

KEYWORDS

- Grapen
- knight’s manor house
- motte
- Poland
- Mierzyn
- Middle Age

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¹ E.g., Marciniak-Kajzer 2011; Korbelařová and Zezula 2018; Marciniak-Kajzer 2020.

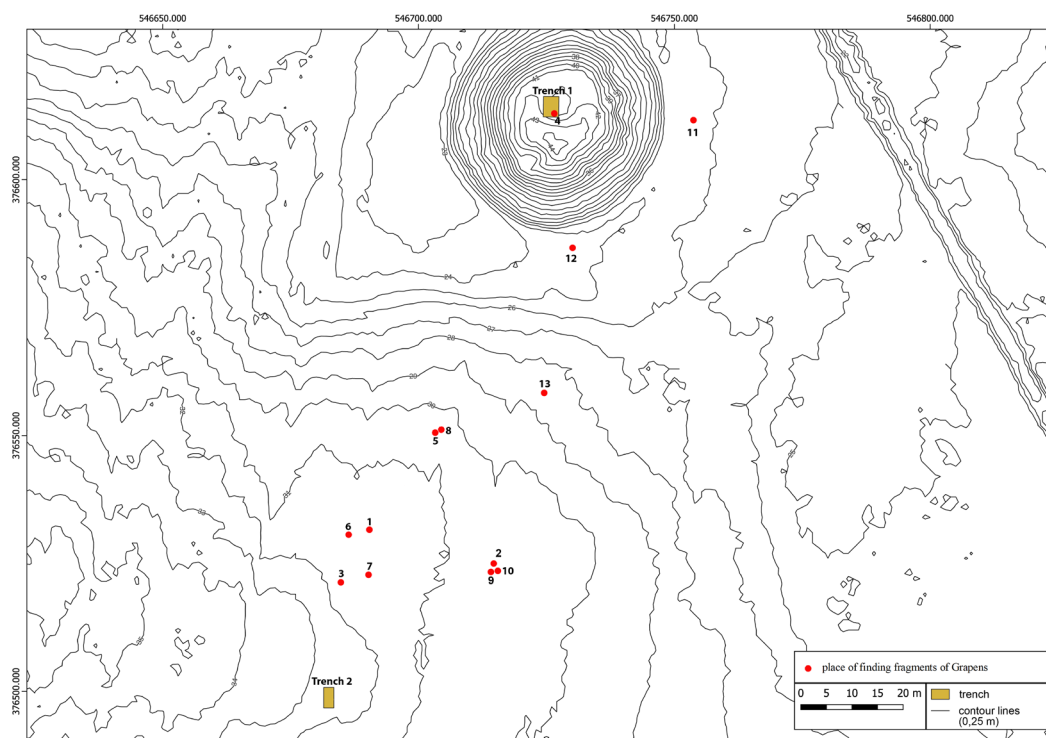
² E.g., *Rachunki* 1896.



Fig. 1. Aerial view of the Mierzyn motte, 2024.
Photo: P. Strzyż.



Fig. 2. The situation and elevation map of the settlement in Mierzyn with markings of archaeological excavations and the place of finding fragments of Grapens. The numbering of the points on the map corresponds to the numbers in Figure 3.
Prepared by J. Sikora and P. Strzyż.



Europe in the late Middle Ages and early Modern Period. It was placed directly over an open fire or suspended on an iron rod in the kitchen. Its form was similar to clay pots with a spherical bottom and three legs.³ Thus, specimens with three legs, without handles, but equipped with a sleeve-shaped handle, are called pans.⁴

³ Majewski 2021, 171.

⁴ Drescher 1982, 168.

THE KNIGHTLY SEAT IN MIERZYN IN THE LIGHT OF SURVIVING SOURCES

The village of Mierzyn (Rozprza Commune, Piotrków District) first appears in written records in a document issued in *Mirano* in 1248 by the Duke of Kujawy Konrad Konradowic. The analysis of that source indicates the location of the village in Sieradz or Łęczyca land, as many of the witnesses to the document in question came from

Table 1. Fragments of Grapens from Mierzyn. Own study

Inv. no.	Description/Notes	Dimensions (mm)			Weight (g)	Fig.
		Length × width	Rim diameter	Wall thickness/cross-section		
08/28/08	Fragment of the rim with body and triangular handle	86×50	120	1.6 (body) 3.5 (rim)	82	3:1
08/21/07	Fragment of the rim with body. Casting seam and sign on the body (?)	58	120-130	1.6 (body) 2.5 (rim)	40	3:9
08/21/07	Part of the fold of the body	44×26	-	0.8-2.0	8	3:10
15/21/07	Leg of the vessel with a fragment of the body	72.5	-	2.8 (body) 17×14.5 (leg)	86	3:2
05/13/07	Fragment of the rim with body	47,3×33	130-140	2.0 (body) 3.0 (rim)	21	3:3
Mr 45/2021	Fragment of the rim with body Trench 1, layer 21, depth ca. 250 cm	33×21	130-140	2.0 (body) 3.3 (rim)	9	3:4
12/13/07	Part of the body	27,6×11	-	1.1-2.8	4	3:6
30/13/07	Part of the body	33,8×30	-	1.6-2.4	9	3:11
11/28/08	Part of the body	24×22	-	2.0-2.5	5	3:7
06/26/06	Part of the body	44×30.5	-	1.9	15	3:12
21/05/06	Fragment of the body with a bottom part (?)	58,6×50	-	1.5-2.0	31	3:8
21/05/06	Part of the body	36.7×28.5	-	1.8-1.9	10	3:5
01/21/07	Sleeve (handle) with part of the body	95	25.5 32	3.0-4.5 (sleeve) 3.0 - body	220	3:13

this area.⁵ The next mention comes from 1306. At that time, the owners of the village were the Mie-rscy/Mirscy family of the Jelita coat of arms. This is evidenced by a document issued by Ladislaus the Short, in which one of the witnesses was *Clementis de Mirsin*. A record from 1342, mentioning an individual called Dziwisz of Mierzyn⁶ is also of importance. The next owner of Mierzyn was Jarosław of the Nagody coat of arms, known from sources from 1388.⁷ Later information concerning ownership divisions in the village comes from 1447 and 1452 and attests to the functioning of a *fortalicium* (a fortified residence) in Mierzyn at that time.⁸

COPPER ALLOY VESSELS FROM THE KNIGHTLY RESIDENCE IN MIERZYN

The knights' seat (*motte*) in Mierzyn (Fig. 1) has not been excavated so far, but it was investigated and verified in 2021 when a test excavation trench (no. 1) measuring 4×3 m (Fig. 2) was opened on the *plateau* of the *motte*. This archaeological research has provided, among other things, interesting data on the kitchen equipment used by the estate's owners. In the course of exploration, a small fraction of the belly of a vessel cast of copper alloy

was discovered in layer 19 at a depth of approximately 200 cm (Fig. 3:4). In the following season, in 2022, archaeological work was continued only around the mound with the use of metal detectors. To the south of the fortified site, i.e. the area tentatively identified as the location of the outbuildings, a total of a further 12 fragments of cast copper alloy vessels were recovered (Figs. 3:1-3 and 5-13). The best-preserved fragments include a part of the rim with a piece of the body and a handle (weight 82 g), a leg (weight 85 g), and a sleeve for the shaft (weight 219 g). The total weight of the discovered fragments is 526 g (Table 1). Archaeological materials from the investigations carried out at that medieval residence site (which are currently under study) can be dated to the 2nd half of the 14th-15th centuries.⁹

Taking into account the morphology of the discovered fragments and the spectrometric analysis of their chemical composition (Fig. 3; Table 2), we can conclude that we are dealing with at least four vessels, which differ from each other primarily in the shape of the rim part and the type of metal alloy used for their casting.

The first vessel is a Grapen with a distinct rim, a low cylindrical neck, and the edge of the rim clearly bent outwards. This part is preserved together with a triangular handle soldered to the body

⁵ Szyszka 2007b, 39. In the earlier literature, there is also information that this was the village of Murzyno in Kujawy, cf. Zajęczkowski and Zajęczkowski 1966, 199.

⁶ See Szyszka 2007a, 39-41.

⁷ Zajęczkowski and Zajęczkowski 1966, 199; Szymczakowa 1998, 26, 246-247.

⁸ Gieysztor 1963, 222, footnote 63; Nowak and Szymczak 1993, 86.

⁹ This dating is also confirmed by the ¹⁴C date obtained for a sample from the tower castle, which indicated the time around 1360-1370 as the most probable dating. The analyses were carried out by Professor Marek Krapiec from the Absolute Dating Laboratory in Kraków.

Fig. 3. Mierzyn, fragments of copper alloy vessels:
 1 – inv. no. 08/28/08;
 2 – inv. no. 15/07/21;
 3 – inv. no. 05/13/07;
 4 – inv. no. Mr 45/2021;
 5 – inv. no. 21/05/06;
 6 – inv. no. 12/13/07;
 7 – inv. no. 11/28/08;
 8 – inv. no. 21/05/06;
 9 – inv. no. 08/21/07;
 10 – inv. no. 08/21/07;
 11 – inv. no. 30/13/07;
 12 – inv. no. 06/26/06;
 13 – inv. no. 01/21/07.
 Photo: P. Strzyż.



of the vessel and protruding slightly above its edge (Fig. 3:1). According to H. Drescher's classification, it can be described as variant 4.¹⁰ The preserved fragment allows for a reconstructed stroke diameter of this graphene to be about 120 mm, and the maximum abdominal distension can be reconstructed to at least 148 mm. Based on the preserved fragment, the diameter of the rim of this Grapen can be reconstructed as approximately 120 mm and

the maximum bulge of the body as at least 148 mm. This is the most common form of Grapens known from analogous finds from Szczecin, Elbląg or Gdańsk (Fig. 5), and other settlement centres in Northern Europe.¹¹

As the second form, we identified a large fragment with a rim, neck and part of the body (Fig 3:9). Its estimated rim diameter is about 120-130 mm. Its

¹⁰ Drescher 2017, fig. 16.

¹¹ Krabath 2001, 32-35, figs. 3:4-5; Drescher 2017, 11-13, fig. 1.

neck distinguishes it from the previous fragment – in this case, the neck is considerably taller and tapers conically towards the body. Thus, this fragment would have come from a Grapen with a decidedly more ‘bulbous’ form, corresponding, for example, to specimens from Soest or Lahmen (Fig. 5). Significantly, this piece has a preserved casting seam, which was partially polished (Fig. 4:2). In addition, we should mention the presence of a sign on the body – to some extent it resembles a coat of arms shield, but without clear elements on its surface (Fig. 4:1). However, it does not seem to be the maker’s mark, as these were always convex and this was a common way of marking branded products, known, for example, in large numbers from wares from West Pomerania.¹² Instead, it may be a secondary sign, made later, for example, by the owner of the vessel.

The third form of the Grapens from Mierzyn can certainly include two fragments of rims, which probably came from one vessel (Fig. 3:3-4), which was characterised by a softer, bulbous form, in which the rim part passes directly into the body without a clear separation. The lip is clearly thickened. In the case of this specimen, the diameter of the rim was slightly larger than that of the above-mentioned vessels and was approximately 130-140 mm, with the maximum bulging of the body most probably not exceeding the diameter of the vessel’s rim. Here, it should be noted that the smaller fragment was found in trench 1 (layer 19, depth ca. 200 cm), while the second was found in the southern foreground of the residence. This also indicates that the remains of the broken vessel were discarded outside the plateau as ordinary rubbish. It is difficult to estimate whether this vessel had handles (Fig. 5).

The next characteristic element is the leg, triangular in cross-section and preserved with the part of the body (Fig. 3:2), which allows us to conclude that it was cast with the entire body of the vessel. However, it is impossible to determine which type of the above-mentioned vessels it originally came from. Tall, slender legs with a triangular cross-section are characteristic of the Grapens fitted with handles and with spherical or bulbous bodies, but this is not a rule (Fig. 5).

The last element worth discussing in more detail is the sleeve-shaped pan handle (Fig. 3:13). It is distinguished by its massive walls and weight (over 200 g), which allows us to assume that it was also intended for a large utensil. As in the case of the leg, it has survived together with part of the body, which indicates that this object was cast in one



Fig. 4. Mierzyn, fragment of copper alloy Grapen with preserved casting seam and a sign on the body.
Photo: P. Strzyż.

piece. The argument in favour of distinguishing it as a separate vessel is mainly the alloy used for its production (cf. Table 2), which is characterised by a high proportion of tin (exceeding 15%), while its content in the case of the remaining fragments is only a few per cent. It also seems that, given its massiveness, it may have been a large and robust object.

In addition to the fragments described above, other fragments are morphologically uncharacteristic parts of the bodies (Fig. 3:5-8, 10-12), which are difficult to match unambiguously to individual vessels. Specialist analyses also confirm the identification of the four vessels, although the results obtained for individual fragments differ (sometimes quite significantly) in detail, which is typical for historic heterogeneous copper alloys.

FRAGMENTS OF VESSELS FROM MIERZYN IN THE CONTEXT OF DISCOVERIES FROM POLAND AND NEIGHBOURING COUNTRIES

Metal Grapens are considered luxury items due to the raw material from which they were cast and their rather complicated production process.¹³ As already mentioned, they are relatively rare finds in the case of the knights’ residences from the territory of Poland. Until recently, in Silesia, only three sites provided finds of fragments of such vessels have been known. The most notable was Tarnów Jezierny (Wschowa District), where three fragments were discovered dated to the 2nd half of the 13th-15th centuries.

¹² Majewski 2021, fig. 7.

¹³ E.g., Marciniak-Kajzer 2011, 168; Drescher 2017, 22-28, figs. 10-14; Nowakowski 2017, 147.

Fig. 5. Fragments of copper alloy vessels from Mierzyn and corresponding selected analogies from Central Europe: 1 – Mierzyn, inv. no. 08/28/08; 2 – Mierzyn, inv. no. 08/21/07; 3 – Mierzyn, inv. no. 15/07/21; 4 – Mierzyn, inv. no. 05/13/07; 5 – Mierzyn, inv. no. Mr 45/2021; 6 – Mierzyn, inv. no. 01/21/07. Photo (1-6): P. Strzyż; 7 – Szczecin (PL), National Museum. Source: Majewski 2003, 66-67, no. 12; 8 – Gdańsk (PL), Długie Ogrody. Source: Ceynowa 2021, 163; 9 – Soest, Kr. *Loco* (DE). Source: Heinze and Tegethoff 2018, fig. 3; 10 – Lahmen, Kr. Rostock (DE). Source: Wollschläger 2022, fig. 335; 11 – Csongrad (HU), National Muzeum. Source: Polgár 2010, fig. 9; 12 – Rajhradice, Brno-venkov district (CZ). Source: Cejpková 2003, fig. 8.



In addition, individual, small fragments are known from *Ćwiklice* (Pszczyna District) (2nd half of the 14th- 1st half of the 15th century) and *Sądowel* (Góra District) (2nd half of the 13th-15th centuries), where the latter may have a trace of a detached handle. In most cases, we are dealing with rim parts, whose slightly outward-bent lips are also characterised by a clearly thickened edge.¹⁴ Recently, the remains

of *Grapens*, which can be dated to the 2nd half of the 14th-15th centuries, have also been discovered during excavations at the site of the knightly residence in *Czechowice* (Gliwice District). These include a leg with a triangular cross-section, part of the rim, and two body fragments.¹⁵ Older finds are fragments of legs, a triangular handle, and part of a body from at least two specimens found during the excavations of the stronghold in

¹⁴ Nowakowski 2017, 147, 289, 419-420, 444-446, cat. nos. 65, 319, 367, table 30:1-5.

¹⁵ Zdaniewicz and Ablamowicz 2024, 52-53, fig. 11.

Raciąż (Tuchola District), which can be dated to the 2nd half of the 13th-early 14th century. It is worth mentioning that on this site archaeologists discovered probable remains of a forge, where bronze vessels were also repaired.¹⁶ Confirmation of the practice of storing and repairing damaged vessels made of copper alloy can be found, for instance, in the inventory of the castle kitchen in Bytów, drawn up in 1538, which lists – apart from cauldrons, a spit and grates – also a damaged brass pot – *mes-sigen grapen, der ist oben am rande zu brochen*.¹⁷

Fragments of various metal vessels, which are difficult to classify unequivocally as Grapens, also come from several other knights' seats. One primitive product was mentioned in the excavation report from the investigations carried out in such a residence in Kiełbów Stary (Białobrzegi District). It was made of copper sheet and had a triangular shape, with one corner shaped into a spike for fastening the handle.¹⁸ From the residence in Nowe Miasto nad Wartą (Środa Wielkopolska District), two fragments of 'bronze' vessels come from the first phase of the manor's functioning. The larger of the two has been preserved in the form of a bulbous body with a rim and a fragment of a handle. Unfortunately, the bottom part has not survived, thus we do not know whether the vessel also had legs. The remains of these vessels can be dated to the 14th century, perhaps to the 2nd half of the 14th century.¹⁹ A small fragment of the rim part of a vessel, which can be dated to the 13th century, was recovered from the stronghold in Orszymów (Płock District),²⁰ whereas a small leg comes from the knightly seat in Włoszczowa (Włoszczowa District), which was interpreted as a part of a saucepan. However, it cannot be ruled out that we are also dealing with Grapen in this case. The exact time of the Włoszczowa manor's functioning is not known – mid-14th or 15th century.²¹ On the other hand, in the relics of the ducal manor in Warsaw (the so-called 'Pałac Pod Blachą'), archaeologists found a fragment of a 'bronze' vessel – probably a bowl with a diameter of about 26 cm and a thickened lip. It is dated to the period between the mid-13th

and the mid-14th century and was interpreted as coming from the ducal tableware.²²

The small number of Grapens found in knights' manors is mainly explained by the rather high price of these luxury wares. However, as shown by the example of Urszula, widow of Piotr Layp from Kościan, who donated gunmetal vessels (three bowls, a cauldron, and two pots) to a nearby church for the casting of a bell,²³ such objects may have been reused as a source of metal for new items, which also contributes to the fact that they constitute relatively rare finds. Due to the price of the raw material, obsolete or damaged vessels were willingly recycled.²⁴

One may wonder whether the small number of Grapens in the relics of knightly seats is not the result of poor archaeological identification of the *motte*-type sites. Such sites were usually investigated by establishing only a small trench, while larger-scale excavation work was rarely carried out.²⁵ The dissemination of metal detectors as tools used during archaeological research, also in the case of investigating knights' residences, has changed this statistic. The example of Mierzyn is most symptomatic here. Only one, fairly small fragment of a Grapen comes from trench no. 1 (Fig. 3:4), while the survey of the surface carried out with metal detectors yielded as many as 12 fragments.

Confirmation of this assumption is also brought by the research of a brick tower on a mound in Lubrza in the Lubuskie Province. This assumption is also confirmed by the studies on the *motte*-type brick tower castle in Lubrza in the Lubuskie Voivodeship. The mound was completely levelled with heavy construction equipment as a result of agricultural work. Following archaeologists' intervention, the site of the former knightly residence was surveyed using metal detectors. As a result, a wide array of metal objects was found, including four indisputable fragments of Grapens and several elements that were possibly used for their repair. This assemblage includes, among other things, two short massive legs, one of which appears to be a paw with three fingers/claws.²⁶ In addition, archaeologists also recovered three patches of bronze sheet metal used for repairs. These were cold riveted to the damaged bodies. They were accompanied by a characteristic, rhomboid folding rivet, which may have been used to repair smaller cracks or chipped

¹⁶ Kowalczyk 1976, 69, figs. 16 and 17; Kowalczyk 1986, 73, tables XLVII: b, XLVIII:a, c; Sikora and Trzciniński 2013, 113, fig. 10.

¹⁷ Szymczak 2024, 98.

¹⁸ Pyzik 1970, 467; Marciniak-Kajzer 2011, 168, 363-364; Marciniak-Kajzer 2020, 223.

¹⁹ Grygiel and Jurek 1996, 84, fig. 69: 3-4; Marciniak-Kajzer 2020, 222.

²⁰ Szymański 1968, 60, 62, fig. 8:2; Marciniak-Kajzer 2011, 168, 397; Marciniak-Kajzer 2020, 222

²¹ Pyzik 1998, 162, 164, table II:2; Marciniak-Kajzer 2011, 168, 448-449; Marciniak-Kajzer 2020, 222.

²² Mroczek 2007, 40, 44-45, table I:247.

²³ Marciniak-Kajzer 2020, 220.

²⁴ Wywrot-Wyszowska 2019, 105-106, fig. 4.

²⁵ E.g., Kajzer 1995, 186.

²⁶ Michalak 2022, 152-153, figs. 1:5-6, 10-11.

walls.²⁷ It is also worth mentioning that finds from Lubrza included a part of a copper alloy sleeve (?) with a small hole and a slightly turned-up edge. The authors consider this item to be a ‘tubular spout of a lavabo or a three-legged pitcher used for washing hands.’²⁸ However, the example of a preserved handle from Mierzyn also allows for the interpretation of the above-mentioned artefact from Lubrza as the remains of, for example, a frying pan. All these fragments of metal vessels from Lubrza can be dated from the 13th/14th to the 14th/15th century. An interesting example of a repaired Grapen also comes from the excavations at Lahmen, Lkr. Rosstock, site 7. This vessel had a crack, which somebody tried to repair by inserting ‘bronze’ patches and riveting them to the body of the Grapen.²⁹

More often than not, Grapens are found during archaeological investigations of urban centres – while within the present-day borders of Poland, these are primarily Baltic towns that, in the Middle Ages, were associated with the Hanseatic trade organisation. The largest number of Grapens and their fragments are kept in the collections of the National Museum in Szczecin and the nearby museums in Stargard and Koszalin. In total, there are four complete vessels and several legs. The artefact regarded as the oldest in the collection, as it is dated to the 13th/14th century (inv. no. MS/A/49), comes from the Stargard Museum. This dating is supported by, among others, the strong prominence of the neck and its outward tilt, as well as the characteristic shapeless legs³⁰ – features which quite clearly distinguish this vessel from the fragments found in Mierzyn. An artefact that is much more similar to the vessel from Mierzyn is another 14th/15th-century Grapen stored in the National Museum in Szczecin (inv. no. MNS/A/12825). It has a more spherical body and a rim distinctly bent outwards. Its legs are quite high and triangular in the cross-section, while the handles are profiled and in lateral projection and are triangular.³¹ Two more specimens from the collection of the National Museum in Szczecin (from Kolin, Stargard District, and the vicinity of Demmin) are considered younger finds, dated to the 15th/16th centuries.³² As analogies from

the area of Western Pomerania, we can also name the Grapens (sometimes incomplete) found near Drawsko Pomorskie and those from the Cistercian monastery in Kołbacz.³³ These vessels correspond quite faithfully to the fragments discovered in Mierzyn – especially in terms of the shape of the leg, the fragment of the rim with the handle, and the rim parts themselves. The leg from Mierzyn has close equivalents in the artefacts from the castle in Stare Drawsko (15th century), Dźwirzyno (Kołobrzeg District) or Szczecin-Podzamcze (generally dated to the Middle Ages).³⁴ It is also worth adding that archaeological research in Stargard systematically provides further finds, mostly fragments of Grapens, but also proves that Stargard was the centre of their production³⁵. Entire collections of Grapens, or more broadly of cooking utensils made of copper alloy (e.g., cauldrons), are also often discovered in towns located to the west of the Oder River. Examples include Bremen or Gützkow, Lkr. Vorpommern-Greifswald.³⁶

Two Grapens, dated to the 14th-15th centuries, were discovered during the excavations of the market square in Elbląg. They come from urban centres located further east but still under the commercial influence of the Hanseatic League. The body and handle of one of them are very similar in shape to the fragment from Mierzyn.³⁷ Another ‘bronze’ specimen, described as a small cauldron fitted with three soldered legs and one surviving triangular handle, comes from archaeological excavations in Gdańsk at Długie Ogrody Street. It dates from the 15th-16th century.³⁸

People also deposited hoards of coins and ornaments in Grapens as they were more luxurious and more durable vessels than their ceramic counterparts. One such example is the deposit from Podzamcze in Szczecin, in the form of over 300 gilded ornaments, buttons and appliquéés, and 358 coins, hidden around 1420-1430 in a Grapen fitted with a pair of triangular handles.³⁹ Someone

²⁷ Michalak 2022, 153-154, fig. 1:1-4.

²⁸ Michalak 2022, 154, fig. 1:9.

²⁹ Wollschläger 2022, 408-409, figs. 334-335.

³⁰ Majewski 2003, 66-67, inv. no. 11; Majewski 2006, 286, fig. 3. Its dimensions are: height 17.1 cm, rim diameter 11.6 cm, body diameter 15 cm.

³¹ Majewski 2003, 66-69, cat. no. 12; Majewski 2006, 286-287, fig. 5. Its dimensions are: height 16.8 cm, rim diameter 13.1 cm.

³² Majewski 2003, 68-69, cat. nos. 13-14; Majewski 2006, 286, fig. 4. Their dimensions are: height 11.8 and 26 cm, rim diameter 11.4 and 26 cm.

³³ Majewski 2006, 287, figs. 6-7. Their dimensions are: height 13 cm, rim diameter 11.3 and 10.2 cm, body diameter 14.2 and 10.9 cm.

³⁴ Majewski 2003, 70-73, cat. nos. 16-18; Majewski 2006, 287, fig. 8.

³⁵ Janowski 2016, 303, fig. 48:3-7; Janowski 2017, 136, fig. 14:2. For more on the manufacturing of Grapens in Stargard see Majewski 2021, 175-178, figs. 4-6.

³⁶ E.g., Rech 2004, 190-201, figs. 200-203, 207-208; Metzzen und Schirren 2014, 83-87, figs. 3-5, 7.

³⁷ Fonferek et al. 2012, 111; Nawrońska 2016, 109, 200, figs. 76 and 77, 196:3 – here it is described as made of iron, which, however, is contradicted by the appearance of the artefacts.

³⁸ Ceynowa 2021, 163. It is 155 mm high and has a rim diameter of 135 mm, while the diameter of the body is 180 mm.

³⁹ Majewski 2006, 287; Szczurek 2014, 53-54, figs. 20-23 – there further literature.

tried to secure a deposit of coins and ornaments dated to the early 15th century in a similar manner, which is known from Peetsch (Mecklenburg).⁴⁰

Regarding the area south of Poland, some interesting parallels can be found in material from Czechia, but there are clearly fewer finds of this type. A very well-preserved specimen with two triangular handles was found at Trosky Castle (Jičín District). The individual components of this Grapen were cast separately (body, legs, and handles) and then soldered together. It was deposited in a layer of burnt material associated with the siege of the castle by the Hussite army on 13 June 1429. Based on its shape, the vessel was considered to be of a northern German provenance.⁴¹ Finds of metal legs, which probably also came from Grapens, come from several sites, such as Tepenec (Olomouc District), Křivoklát (Rakovník District), and Kozojedy (Jičín District). The oldest in this group is a fragment from Tepenec Castle, dated to the 2nd half of the 14th century. On the other hand, melted Grapen (or aquamanila) from Křivoklát Castle was found in a fire layer dated to 1643, while two legs (from different specimens) from a brick tower in Kozojedy (which was demolished in the 19th century) do not have precise dating.⁴² Two legs, including one resembling a lion's paw, come from the royal residence of Matthias Corvinus in Vyšehrad, more specifically from the Franciscan Church of St Mary (HU). They were accompanied by coins that allow us to date the artefacts to the 2nd half of the 14th-1st half of the 15th century.⁴³

The vessel from Rajhradice (Brno-venkov District) has a different shape and structure. It is characterised by a bowl-shaped body without a distinct rim, three massive legs, and a sleeve for fitting a wooden handle (Fig. 5:12). It is dated to the 15th century⁴⁴, although we must remember that this find does not have an archaeological context. This artefact can be described as a frying pan rather than a Grapen (cauldron).⁴⁵ A similar utensil, but with an additional tubular spout, is kept in the National Museum in Csongrad, Hungary (Fig. 5:11). Its chronology was also set at the 15th century,⁴⁶ but the basis for this dating was a specimen from Rajhradice.

⁴⁰ Szczurek 2014, 54.

⁴¹ Cejpová 2003, 539-540, 541, figs. 2 and 3. It has a height of 14.6 cm, a rim diameter of 12.25 cm, and a body diameter of 14.4 cm.

⁴² Durdík 1978, 315, fig. 8; Brych 1998, LXVI, fig. 17: 1,6; Proházková and Kalábek 2000, 168; Cejpová 2003, 542-543, figs. 4:A-B, 5.

⁴³ Polgár 2010, 259-260, figs. 2 and 3.

⁴⁴ Stuchlík 2001, 344, fig. 35; Cejpová 2003, 545, fig. 8.

⁴⁵ Drescher 1982, 168.

⁴⁶ Polgár 2010, 263, fig. 9. The diameter of the vessel is 8.5 cm and its height is 11.7 cm.

ANALYSES OF THE RAW MATERIAL COMPOSITION OF THE GRAPEN FRAGMENTS FROM MIERZYN

The collection of Grapen fragments from Mierzyn was examined with the Bruker TRACER 5i XRF spectrometer for the chemical composition of the alloys from which the vessels were cast. Measurements were made point-wise on the cleaned surfaces (internal and external) of the vessel fragments and additionally in characteristic places⁴⁷ (Table 2). It was noted that the share of copper (Cu) oscillates between a modest 16-18% and 60%, an average of around 30-40%. At the same time, the share of lead (Pb), present in the range from a minimum of 17% to a maximum of 54%, should be considered significant – on average, its proportion is about 40%, therefore it is a significant admixture, which, on the one hand, reduced production costs (replacing much more expensive copper and tin), but, on the other hand, increased the brittleness of the products. What is striking about most of the measurements taken for the entire assemblage, is the low proportion of tin (Sn), which stands at 2-5%. The exception here is the handle, in which the share of tin was estimated at 15.2-17.7%. In the case of almost all fragments, the high percentage of antimony (Sb), which ranges from a minimum of around 7% to over 23% of the alloy, is very symptomatic. This result may provide some indication as to the place of production or the origin of the raw ore itself, as discussed below. The presence of mercury (Hg) in the range from about 0.55% to 1.13%, as used in the Middle Ages in jewellery production, can also be explained by the execution of graphene in the plant, where silver or gold processing was also carried out.

The small admixture of silver (Ag) observed through the analysis, at the level ranging from 0.31% to 0.84%, can also be linked to the site where the Grapens were made. It is also likely that silver may have been a minor admixture in the lead ores used in their casting.

In the late Middle Ages, copper ores in Central Europe were mainly extracted from mines located in the Upper and Lower Harz, Mansfeld, Upper Saxony, Vogtland, Thuringia, Fichtelgebirge, Tyrol, Carinthia, Bohemia and Moravia, Slovakia, and Transylvania. Northern European deposits in Sweden were also exploited. At that time, a significant amount of copper mined in Slovakia, i.e. Upper Hungary, was shipped north. Tin, on the other hand, which is an essential element of copper

⁴⁷ The analyses were done by Jacek Soida, MA, from the Department of Archaeology of the Silesian Museum in Katowice. The study carried out to date is preliminary in nature, showing the considerable diversity of the alloy.

Table 2. Raw material composition in individual fragments of Grapens from Mierzyn. Own study. Abbreviations: b – body; e – edge; h – handle; i – the inner surface; o – the outer surface.

Inventory no.	Element (% share)									Other/Notes
	Cu	Pb	Sn	Sb	Fe	Mn	Hg	Ag	Zr	
08/21/07 i	30.965	41.304	4.689	19.104	2.145	0.053	1.072	0.633	0.035	-
08/21/07 o	30.259	43.701	3.547	18.369	2.360	0.065	1.136	0.443	0.04	Ti 0.081
06/26/06 i	36.301	39.17	2.564	18.846	1.796	-	0.764	0.559	-	-
06/26/06 o	26.324	48.798	2.644	19.537	1.184	0.044	0.866	0.568	0.036	-
11/28/08 i	32.477	42.361	2.236	19.444	2.134	0.063	0.806	0.482	0.027	-
11/28/08 o	29.985	48.312	1.601	17.337	1.54	0.061	0.786	0.349	0.029	-
12/13/07 i	18.454	53.974	2.822	20.531	2.585	-	0.953	0.63	0.051	-
12/13/07 o	16.074	54.282	3.158	22.907	1.744	-	1.028	0.751	0.055	-
30/13/07 i	37.717	34.359	2.228	22.128	2.025	0.059	0.923	0.538	0.024	-
30/13/07 o	23.608	49.317	1.224	18.468	6.822	-	-	0.218	-	Ti 0.342%
05/13/07	43.485	35.879	2.507	16.058	0.354	-	1.048	0.355	0.023	Au 0.291%
05/13/07 i	60.215	19.670	9.122	7.222	3.398	0.033	-	0.341	-	-
05/13/07 o	55.34	25.608	8.68	7.211	2.254	0.036	0.557	0.314	-	-
21/05/06 i	31.174	42.400	2.695	19.937	2.325	0.061	0.807	0.565	0.036	Smaller body
21/05/06 o	31.788	43.008	2.527	19.365	1.76	-	0.909	0.551	0.038	Smaller body
15/21/07	38.641	40.313	3.324	13.110	3.493	-	0.874	-	0.027	Wall of the leg Ni 0.113%
15/21/07 i	42.708	36.022	4.62	14.072	1.304	-	0.878	0.373	0.023	Leg
01/21/07	35.149	28.542	17.771	12.594	4.26	-	0.712	0.84	-	Handle, near the hole, Ni 0.132%
01/21/07 i	41.958	24.107	15.232	10.146	6.99	0.043	0.679	0.574	-	Handle
01/21/07	39.227	27.051	15.669	10.775	5.994	-	0.691	0.615	-	Handle, burnishing above the hole
21/05/06 o	43.485	35.879	2.507	16.058	0.354	-	1.048	0.355	0.023	Larger body, Au 0.291%
21/05/06 i	63.237	17.338	3.435	15.032	-	-	0.563	0.395	-	Larger body
Mr/45/2021 i	40.835	36.876	9.626	9.17	2.188	-	0.713	0.452	0.042	From Trench 1
Mr/45/2021 o	29.879	38.310	13.788	11.472	4.869	-	0.975	0.707	-	From Trench 1
08/28/08 e	53.029	28.049	2.718	13.535	1.641	-	0.641	0.388	-	Behind handle, at the edge
08/28/08 h	52.310	29.255	2.402	13.338	1.398	0.031	0.884	0.359	0.022	-
08/28/07 i	30.562	40.506	2.905	23.037	1.205	-	0.938	0.73	-	With a rim, Pt 0.117%
08/28/07 b	37.484	33.042	4.065	23.879	-	-	0.843	0.688	-	With a rim, near the mark

alloys, came mainly from Bohemia and Saxony. Ore was exported along the main routes: via Orava, Kraków, and Gdańsk or via Žilina, Cieszyn, Wrocław and then the Oder River to Szczecin, or alternatively via Greater Poland to Szczecin and on to Lübeck and Hamburg. The market in Lübeck was dominated by Swedish copper (over Hungarian), while Gdańsk, for example, was more likely to import this raw material from the south.⁴⁸

We have relatively numerous comparative data for Grapens and their remains found during archaeological investigations. The most interesting thing is the high percentage of antimony (Sb) in the alloy. For example, specialist studies carried out for Grapen fragments and metal nuggets from excavations in Stargard, which was an important centre for their production in the late Middle Ages, showed the presence of antimony at levels ranging from 0.07 to a maximum of 4.67%, but mostly from 1 to 3%. They also have a significantly higher proportion

of copper (usually 50 to 96%) and tin and a more modest proportion of lead.⁴⁹ Analyses of the fragments from Stargard also confirmed the considerable uneven occurrence of the individual alloy components in the same artefacts, which resulted from the gravitational method of their casting and caused, for example, the gravitational segregation of lead. In turn, the presence of antimony worsened the mechanical properties of the alloy but made it more resistant to high temperatures. The above-mentioned studies also proved that tin was often replaced with lead, which was a much cheaper raw material.⁵⁰

In the case of the Grapen legs from the knightly seat in Lubrza, XRF analyses proved that they were cast from an alloy with a copper (Cu) content of 69.64 and 51.03%, respectively, with significant additions of tin (Sn) and lead (Pb). Like the fragments from Mierzyn, one of them has a significant

⁴⁹ Gan 2016, 357-358, 362, table 1; Gan 2017, 160, 163-164, table 1; Majewski 2021, 179, table 1.

⁵⁰ Gan 2016, 358; Majewski 2021, 179.

⁴⁸ Majewski 2021, 178.

share of antimony (Sb) – 14%.⁵¹ The body of Grapen from Soest in Germany was also cast from an alloy with a high copper content (76.8-84%) and an admixture of tin and lead in the range of 7.7-13%, while the proportion of antimony did not exceed 0.6%.⁵² In contrast, an analysis of bronze cauldrons from the area of north-western Germany showed a proportion of tin at the level of 0.45% and lead ranging from 2.62% to 12.80%.⁵³ In this case, a broad spectrum of comparisons allows us to analyse the assemblage Grapens, their fragments, and production moulds from Lübeck, Breite Strasse 26. Specialist analyses showed that they were made from an alloy with a copper content ranging from 71.8% to almost 99%. Where there was less copper, tin (Sn) was added up to about 16% and lead (Pb) at about 11%. The proportion of antimony is very low, typically between 0.1-0.2% and 1.9-2.7%, but only for two samples.⁵⁴ Generally speaking, similar results were obtained for materials known from other districts of the city of Lübeck and other centres on the southern Baltic coast.⁵⁵

However, there is no evidence of the possible production of Grapens in the territory of Czechia or Hungary. Miroslava Cejpová, when publishing information about the Grapen from Troský hrad, explicitly stated that it was produced in northern Germany.⁵⁶ This is all the more strange as these countries operated both mines of the raw material necessary for their production and numerous foundry workshops manufacturing such technologically complex products as bells and cannons.⁵⁷

SUMMARY

Archaeological excavations of the knightly seat (*motte*) in Mierzyn and the survey of its immediate surroundings carried out with metal detectors have resulted in the discovery of fragments of pottery as well as a large collection of metal artefacts. Some of them are definitely of a supra-regional nature, for instance, the bull of Antipope John XXIII (1410-1415). Also, the fragments of copper alloy vessels discussed in this paper – the Grapens – prove the strong

material position of the owners of Mierzyn⁵⁸. Indeed, the analysis has shown that at least four such vessels were used in the local kitchen, one of which was equipped with handles, allowing it to be hung over a fire (Fig. 4). Another kitchen utensil used in the Mierzyn residence was a pan fitted with a metal sleeve for the handle, which allowed it to be placed directly in the fireplace. It is worth noting that it is currently the most numerous set of such vessels known from knights' residences in the territory of Poland.

Analyses of the raw material composition of the discovered fragments of metal vessels showed that a heterogeneous copper alloy was used for their production. This alloy contained a lot of tin and lead, which definitely reduced manufacturing costs. However, the most symptomatic is the high proportion of antimony. It is difficult to determine the provenance of the vessels in terms of the region/location of the production centre(s) in which the discussed Grapens were cast. Still, we are most probably dealing with products from Pomeranian or North German workshops since, according to the current state of research, there are no identified centres of Grapen production from areas south of the Carpathian Mountains. Nonetheless, the valuable goods in the form of luxury vessels travelled hundreds of kilometres with merchants before they finally reached the seat of the Nagodzice family in Mierzyn.

ACKNOWLEDGEMENTS

The author would like to thank Professor Marcin Majewski from the Institute of History of the University of Szczecin for his consultation on the Grapens production techniques. I would also like to thank Jacek Soida, MA, from the Silesian Museum in Katowice, for performing spectrometric analyses of the fragments of Grapens from Mierzyn.

This paper was written as a part of the scientific project *Fortalicium Mirsin – interdisciplinary research of the knightly seat in Mierzyn, Rozprza commune* awarded in the IDUB – Excellence Initiative – Research University competition, carried out at the Institute of Archaeology of the University of Łódź in 2023-2024.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author.

⁵¹ See Michalak 2022, 153.

⁵² Heinze and Tegethoff 2018, 162. The legs of this Grapen, which were made as separate pieces (then riveted to the body) and which have a slightly 'cheaper' (higher proportion of tin and lead) alloy, have a somewhat different composition, see Heinze and Tegethoff 2018, 162.

⁵³ Gan 2016, 357-358; Majewski 2021, 179.

⁵⁴ Drescher 2017, 123, table 1.

⁵⁵ Drescher 2017, 125-127, table 2-3.

⁵⁶ Cejpová 2003, 539-540, 541.

⁵⁷ E.g., Varga 2013; Strzyż 2014, 214; Belényesy 2018.

⁵⁸ Skóra et al. 2022.

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