

GOING ROUND AND ROUND – COMPASS DECORATION IN THE LA TÈNE PERIOD OF THE LOWER TRAISEN VALLEY, LOWER AUSTRIA

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This article presents new discoveries from the Iron Age cemetery of Franzhausen, focusing on two ceramic bowls with exceptional interior decorations (ornaments), created and executed directly using a compass. The designs consist of intersecting semicircular arcs and swirling arms encircling the omphalos. Both patterns were incised directly into the surface using a compass, with the swirl additionally enhanced by stamped impressions. The study aims to reconstruct the compass-based design process and to find comparative examples within and beyond the cultural sphere. The finds raise the question of whether the mathematical and geometrical knowledge necessary for such constructions was introduced, directly or indirectly, into early La Tène culture and how it was put into practice. It further highlights the advanced and complex knowledge of the craftsmans of the earliest La Tène culture north of the Alps.

INTRODUCTION

Since the 1980s, rescue excavations in the Lower Traisen Valley in Lower Austria have uncovered extensive areas of prehistoric and historic settlements and cemeteries (Neugebauer 1992; Ramschl 2012a). As part of the FWF research project CATA “Celts Across The Alps”¹, several ceramic vessels featuring compass-drawn decorations or patterns were discovered in the La Tène period cemetery at Franzhausen. This article presents and analyses the examples (including previously published – Ramschl 2024), which appear on a wide variety of materials. Additionally, the compass-based designs will be examined within a broader context, exploring their origins, the geometric possibilities and use in Iron Age cultures north of the Alps (Fig. 1).

THE LOWER TRAISEN VALLEY, LOWER AUSTRIA

In the study of the La Tène culture, the Traisen Valley in central Lower Austria stands out as an archaeologically rich region, characterized by a high probability for the detection of archaeological sites for Central Europe. Its strategic location near important trade routes – such as the east-west corridor along the Danube and the north-south passage through the Traisen and Kamp valleys – provided ideal economic conditions for diverse communities. In this valley with its extensive terraced landscapes, discoveries of all periods have been made. For the Early Bronze Age and later for Early La Tène period many settlements and cemeteries were excavated by L. Karner, J. Szombathy, A. Zündel and J. Bayer, who can be called pioneer researchers. Later on, the research was successfully continued by the Department of Heritage under the direction of J.-W. Neugebauer in the 1990’s (summarized in Neugebauer 1992; 1993; Ramschl 2012a and in several „Fundberichte aus Österreich“). During the construction of the motorway S 33 and gravel extraction in the surrounding area, the most important discoveries of the Lower Austrian Central Area

¹ The Project „Celts Across The Alps“ was fully funded by the Austrian Science Fund (Project Nr. P36086-G).

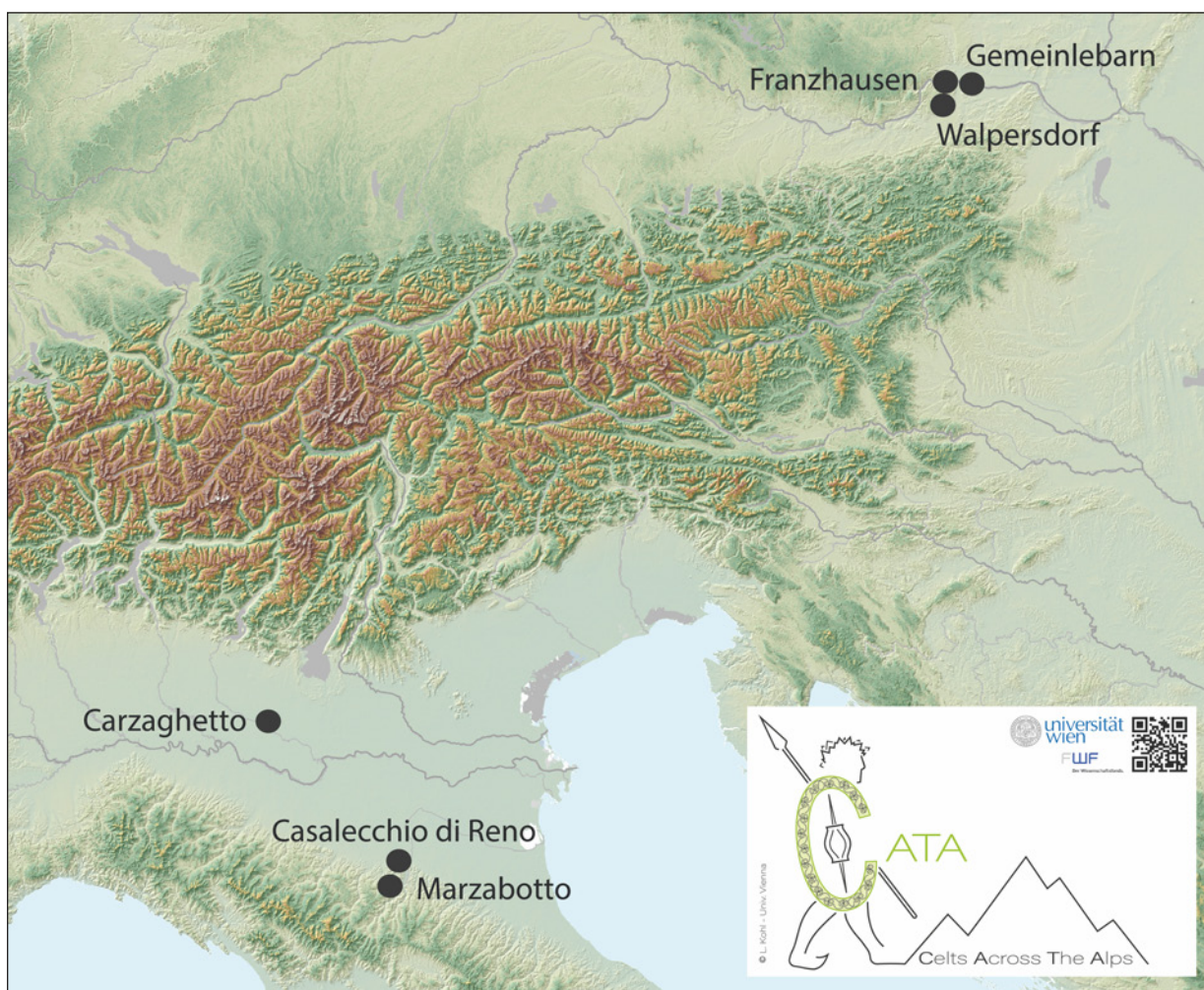


Fig. 1. Map of the sites mentioned in the CATA Project, incl. Logo (graphics L. Kohl, Th. Koch Waldner; Kartengrundlage EU-DEM).

were uncovered. Of particular interest is the fact that in several settlements and cemeteries a continuum from (at least) the Late Hallstatt period to the La Tène period can be discovered (e.g., the necropolis of Franzhausen is running from HAC to the early La Tène period). The most important Iron Age cemeteries are located at Kuffern (*Urban 2012a*), Oberndorf in der Ebene (*Ramsl 2012b*; *Ramsl, in preparation*), Ossarn (*Urban 2012b*), Gemeinlebarn (*Preinfalk A./Preinfalk F. 2014*; *Ramsl 2012c*), Herzogenburg-Kalkofen (*Urban 2012c*), Inzersdorf-Walpersdorf (*Ramsl 2012d*), Inzersdorf (*Urban 2012d*) and Getzersdorf (*Ramsl 2012e*), Reichersdorf (*Urban 2012e*), Franzhausen (*Ramsl 2012f*) and Pottenbrunn (*Ramsl 2002*). Of particular interest are the tumuli at Rassing in the Perschling valley, which were excavated during the construction of the high-speed railway (HLAG) of the Austrian Federal Railways (ÖBB; Fig. 2; *Preinfalk 2005*).

The compass decorated ceramics in the cemetery of Franzhausen, Lower Austria

As part of a research project funded by the Austrian Science Fund (FWF), the Iron Age cemeteries of Walpersdorf (1997/1998), Gemeinlebarn, and Franzhausen were analyzed. Therefore, a table with the pieces found in the Lower Traisen Valley and the adjacent Kamp valley to the north is included here to provide a brief overview (Tab. 1).

This article focuses on ceramics from the Franzhausen cemetery that feature compass-drawn decoration. The graves containing these decorated pieces are listed below, followed by an analysis of their significance.

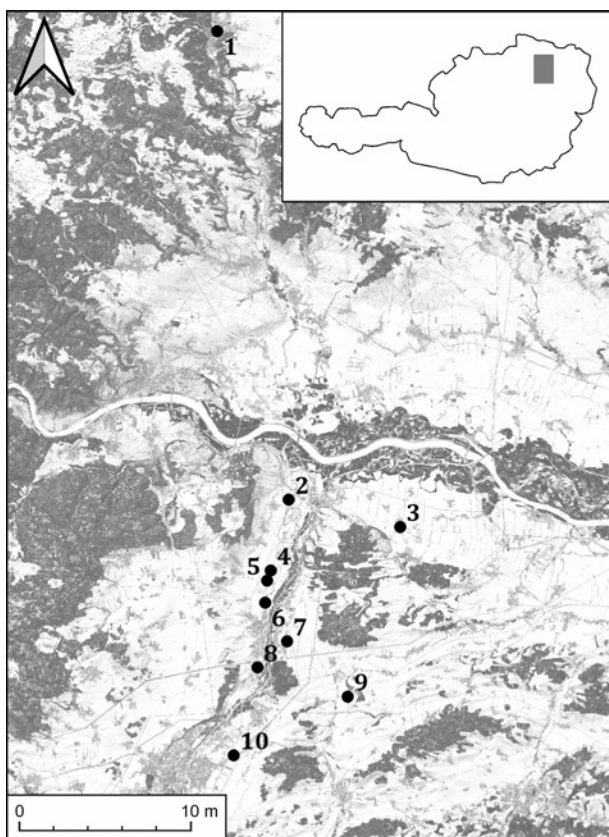


Fig. 2. Map of the Lower Traisen Valley with mentioned sites. 1 – Gars-Thunau; 2 – Franzhausen; 3 – Gemeinlebarn; 4 – Inzersdorf; 5 – Walpersdorf; 6 – Herzogenburg; 7 – Ossarn; 8 – Oberndorf/Ebene; 9 – Rassing; 10 – Pottenbrunn (graphics P. Urban; basics: www.basemap.at).

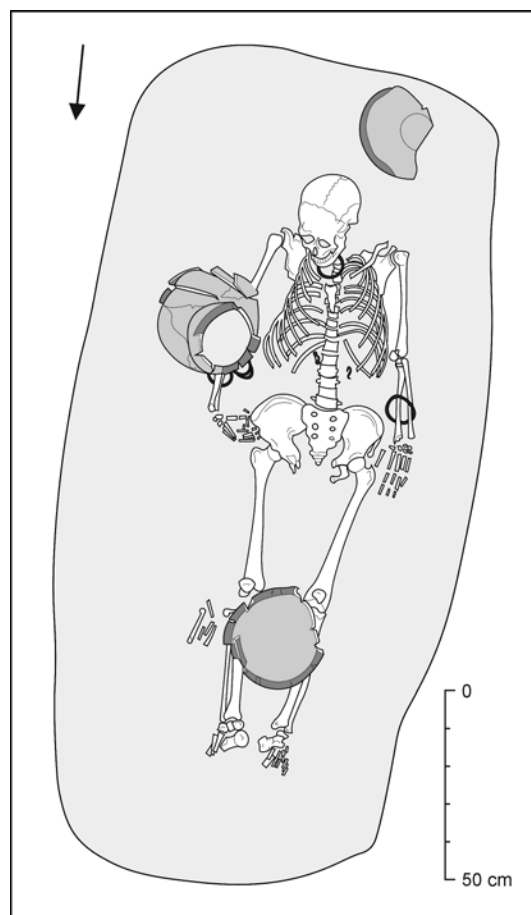


Fig. 3. Franzhausen (FH), Grave 23 (graphics L. Kohl, A. Gattringer).

Grave no. 23 – La Tène A (Fig. 3)

Female inhumation (20–25 years old), surrounded by the square enclosure no. 89. Burial shaft: rectangular with rounded corners, L 2.37 m, W 1.31 m, on the first documentary level. Burial: Skeleton in an extended supine position in the centre of the burial pit, oriented S – N. Grave goods: Iron necklace (fn. 2), two bronze fibulae under the ribcage, to the left and right of the spine (fn. 3–4). Bronze bracelets on the

Tab. 1. Compass decorated pieces (Lower Traisen valley and Kamp valley). All La Tène.

Site	Grave/settlement	Artefact	Kind of decoration	Material	Bibliography
Franzhausen	grave 23/10	bowl	frieze of halfcircles	ceramic	unpublished
Franzhausen	grave 24/6	bowl	Swirl	ceramic	unpublished
Gemeinlebarn	grave 94/13	Linsenflasche	complex ornamentation	ceramic	<i>Neugebauer 1994</i> , fig. 13 (FÖ33)
Gars-Thunau	no. 57353	Linsenflasche	complex ornamentation	ceramic	<i>Karwowski 2006</i> , fig. 32
Inzersdorf-Walpersdorf	feature 1843	bowl	frieze of halfcircles	ceramic	<i>Ramsl 1998</i> , tab. 108: 1043
Inzersdorf-Walpersdorf	feature 1636	sherd	frieze of halfcircles	ceramic	<i>Ramsl 1998</i> , tab. 102: 939
Inzersdorf-Walpersdorf	feature 76	handle	circles with leaves	bone	<i>Ramsl 1998</i> , tab. 31: 54
Oberndorf	grave 1982/9–16	bowl	friezes of halfcircles	ceramic	unpublished
Ossarn	grave 1984/17–10	bowl	Swirl	ceramic	<i>Neugebauer 1992</i> , fig. 12: 10
Ossarn	stray find	belthook	circles with leaves	bronze	<i>Neugebauer 1992</i> , fig. 27: 7
Pottenbrunn	grave 1930/1–55.230	pot	frieze of circles with leaves	ceramic	<i>Ramsl 2002</i> , tab. 22: 55.230

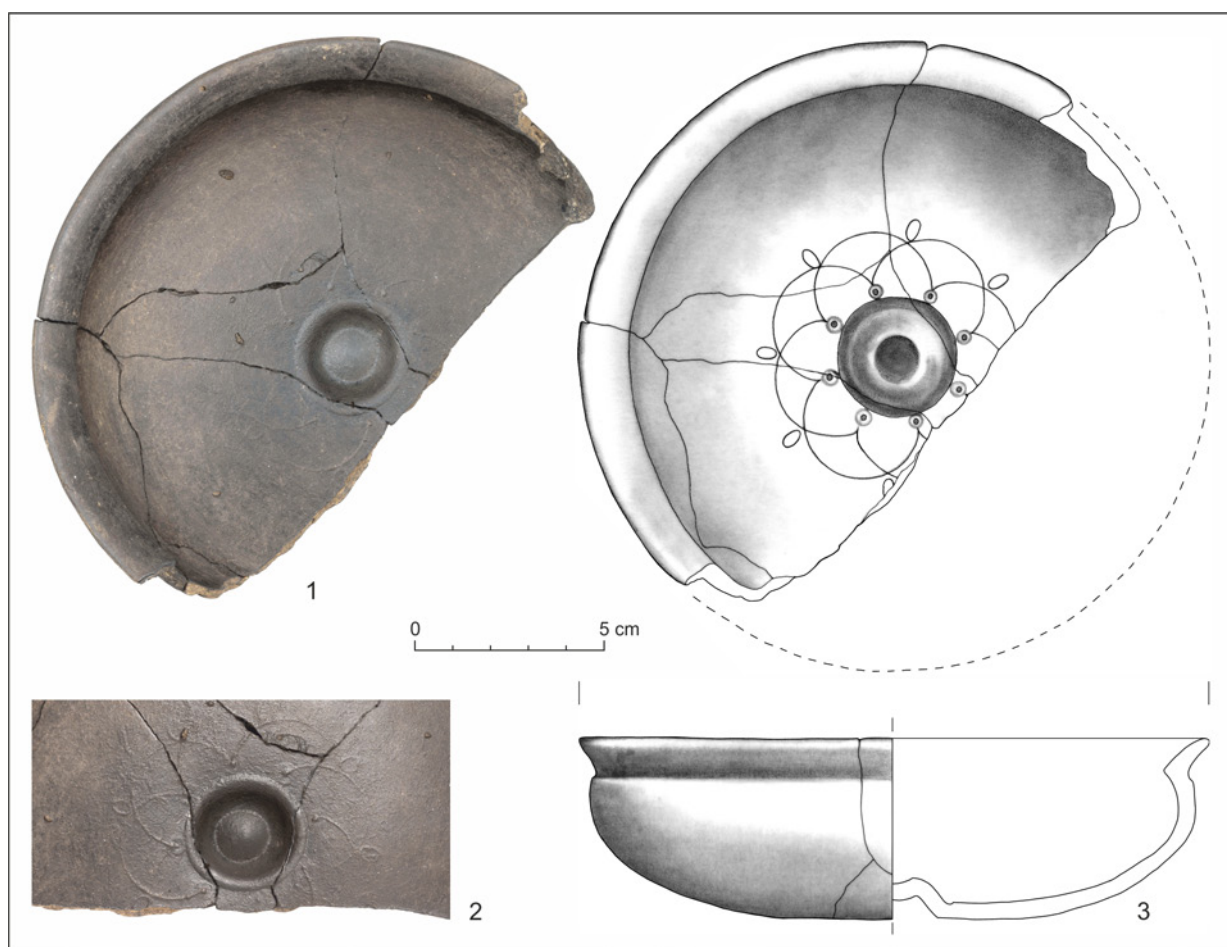


Fig. 4. Bowl from grave FH 23/10 (photo Chr. Bieber, UHA; drawing M. Mayrhofer).

forearms (fn. 5–6). Two iron rings between the right arm and the waist (fn. 7). Bowl fragment south of the head (fn. 8). A large vessel next to the right arm, containing a bowl and fragments of burnt bone (fn. 9–10, 14). Bowl on the lower legs, animal bones to the east (fn. 11–12), further pottery fragments (fn. 13).

Enclosure ditch around grave 23, almost square ditch, oriented S–N, south-western area not preserved, at the level of the documentation level, L 5.5–6 m, D 0.1–0.25 m, u-shaped cross-section, W 0.4–0.6 m.

The bowl no. 10 (Fig. 4)

Description of the bowl: calotte-shaped, inwardly thickened rim, bevelled rim with shoulder heel („Schulterabsatz“) on the outside, precisely crafted omphalos (bowl-like lowered inside) with smoothed frame and outer circular incision, strong/medium graphite-containing clay, dm 16 cm, Ws 0.3–0.4 cm, omphalos 2.3 cm.

Description of the decoration: Frieze of eight (8) semi-circular arches carved around the central omphalos (with smoothed framing and compass scratching) with another dm of 2.8 cm, which is also the dm of the arches; circular eye stamps on the compass puncture, oval stamps above the intersection of the compass arches.

Grave no. 24 – La Tène A (Fig. 5)

Indifferent (female?) inhumation (30–50 years old), surrounded by a rectangular enclosure no. 25. Grave shaft rectangular with rounded corners L 2.12 m, W 2.64 m at the documentation level. Burial: disturbed by ancient grave robbery, skeleton displaced, oriented SW – NE. Skeletal remains, pottery, bronze hollow-ribbed fragment and animal bone from grave filling (fn. 2–5). Small bowl within the bowl with large vessel located in the north-east corner of the grave shaft (fn. 6–8).

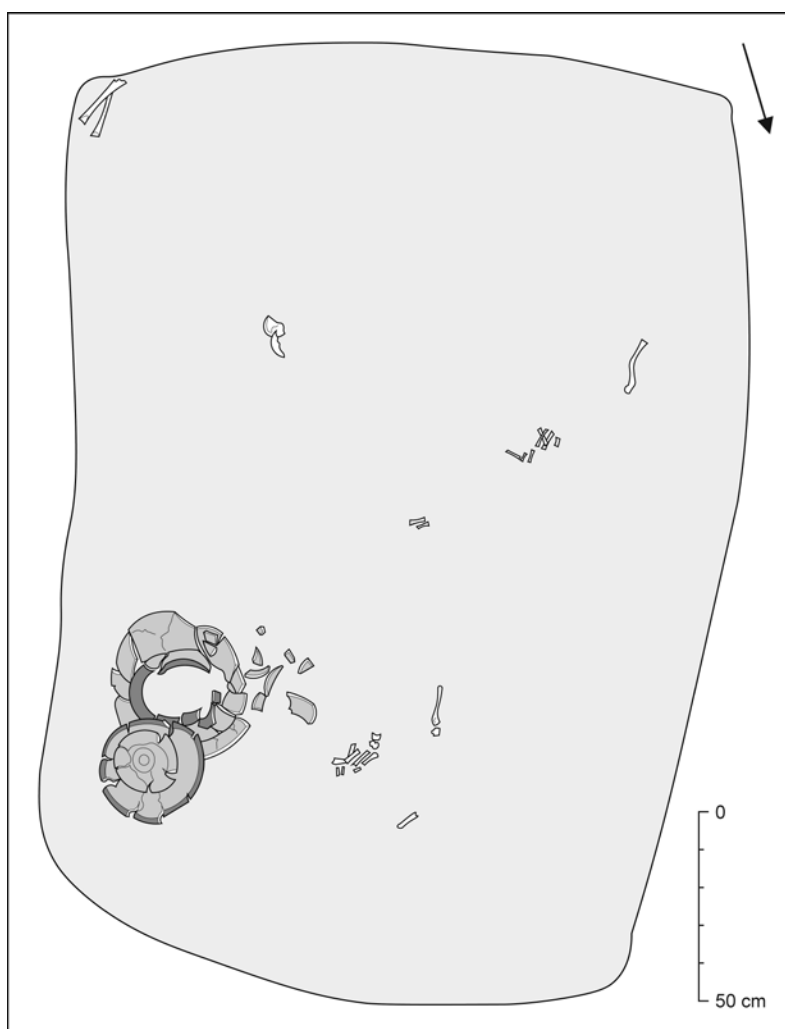


Fig. 5. Franzhausen, Grave 24 (graphics L. Kohl, A. Gattringer).

Enclosure ditch around grave 24, nearly square ditch, nearly orientated S – N, small entrance in the NE-corner, L 5.5–6 m, D 0.1–0.25 m, cross section u-shaped, W 0.4–0.6 m.

The bowl no. 6 (Fig. 6)

Description of the bowl: calotte-shaped, bevelled rim with shoulder heel („Schulterabsatz“) on the outside, precisely worked omphalos (bowl-like lowered inside) with smoothed frame and outer circular incision (?), strong/medium graphite-containing clay, dm 25.5 cm, Ws 0.5 cm, omphalos dm (out) 3.5 cm (inner) 1.75 cm.

Description of the decoration: precisely crafted omphalos (bowl-like lowered inside) with smoothed frame and outer circular incision (?), seven (7) swirl arms (clockwise rotating, open to the left) formed by 2 grooves (stamps?) converging at the top, at the beginning and end one circular eye stamp impression each. It may be interesting to note that the diameter of the inner part of the omphalos is about half the diameter of the outer part, from which the compass construction starts.

Technique of applying decorations

It is notable that, on the one hand, there are incisions of compass strokes (as shown above in the examples from Franzhausen) and circles, while on the other hand, there are also those with blunt tips, i.e. quasi smoothing. These appear as large circles, as in Modrá (Goláňová 2018, fig. 67: 4, 9), but also as small circles, as in Inzersdorf-Walpersdorf, (Walpersdorf Nord 73) obj. 1363, no. 861 (Ramsl 1998, fig. 23; tab. 97: 861) or Chlum-Bezdědovice (Eisner 1914, fig. 3: 2). These ‘smoothings’ were apparently applied in the middle of the drying phase of the pottery in a ‘leather-hard’ („lederhart“) condition.

It is reasonable to assume – and this has been demonstrated experimentally – that the exact moulding and the decorations were carried out or applied in the above-mentioned ‘leather-hard’ condition after a drying phase of 1–2 days. The exact shaping includes the repeated turning of the surface to create a slight faceting (Fig. 7: 1), as can also be seen in Strebersdorf (Burgenland; Fig. 7: 2). The inside and outside of the omphalos were also precisely shaped in this state (Fig. 7: 3). Fine and wider grooves (Fig. 7: 4) on the outside are as much a part of this as the exact execution of various bulges. The insides (and of course the outside) of bowls and flask-shaped ceramics were decorated with numerous motifs and compositions such as stamps, star-shaped semicircles and swirls.

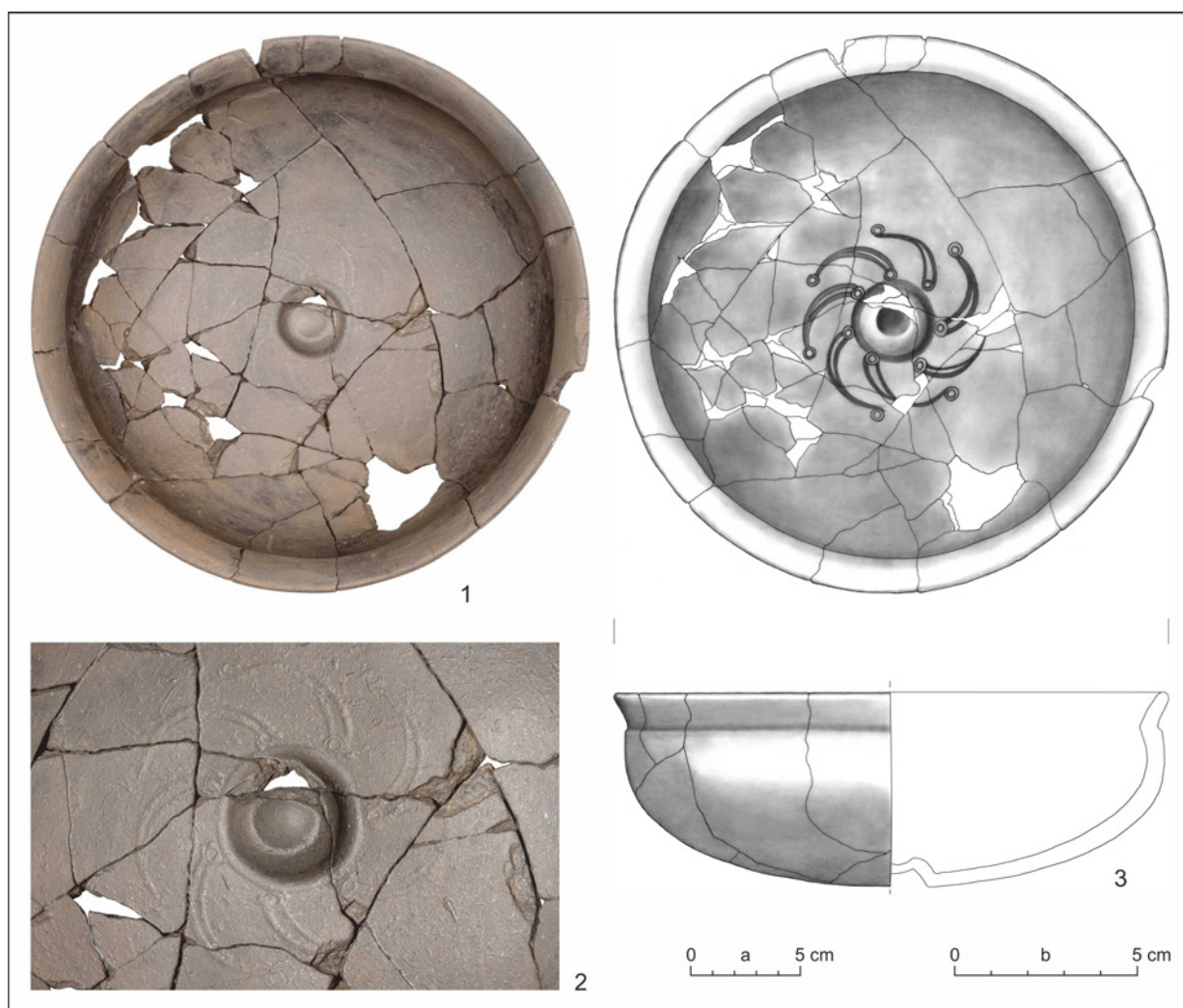


Fig. 6. Bowl from grave FH 24/6 (photo Chr. Bieber, UHA; drawing M. Mayrhofer). Scale: a – 1, 3; b – 2.

Different motifs and ornamentations

The specimens examined in this study, along with the nearby comparative examples, feature the following decorative motifs: 1. Frieze of intersecting semi-circular arches (Fig. 8: 1).

2. Circular eyes with connecting floral motifs (two-dimensional; Fig. 8: 2).

3. Circular eyes with connecting floral motifs (circular; Fig. 8: 3).

4. Swirl with seven arms (Fig. 8: 4).

Swirl patterns represent a special type of decoration and they occur in different forms on the inside of bowls, e.g. in Ménfőcsanak, tombs 16 and 18 (Győr, Hungary; *Uzsoki 1987*, pl. XIX: 1; XX: 1), in addition to the above-mentioned most comparable piece from Ossarn (Lower Austria). Simple vertebral patterns with three arms (triskele) are known, for example, from Milovice (Břežlav dist., Moravia; *Schwappach 1973b*, fig. 38: 1) or Leitzersdorf (Lower Austria; *Golániová 2018*, fig. 63: 50). These are to be followed by those from Schwabsburg (Rheinland-Pfalz, Germany) and Somme-Tourbe (Marne dist., France; *Frey 1992*, fig. 12: 2, 3).

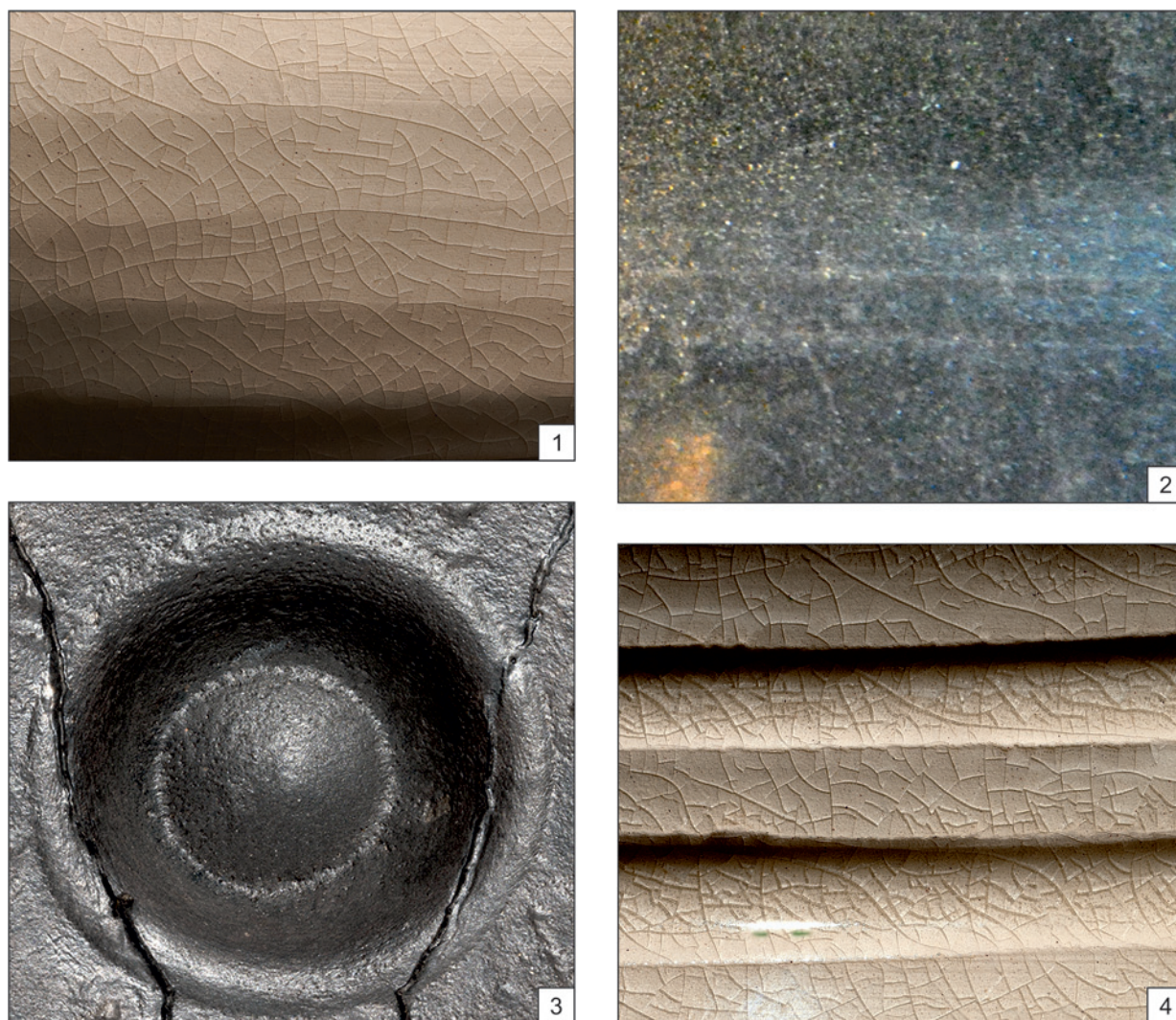


Fig. 7. 1 – surface with slight faceting; 2 – surface with slight faceting (ceramics from Strebersdorf/Bgld.); 3 – omphalos from a bowl (FH, UHA); 4 – grooves of/on ceramics (photo P. C. Rams, Chr. Bieber).

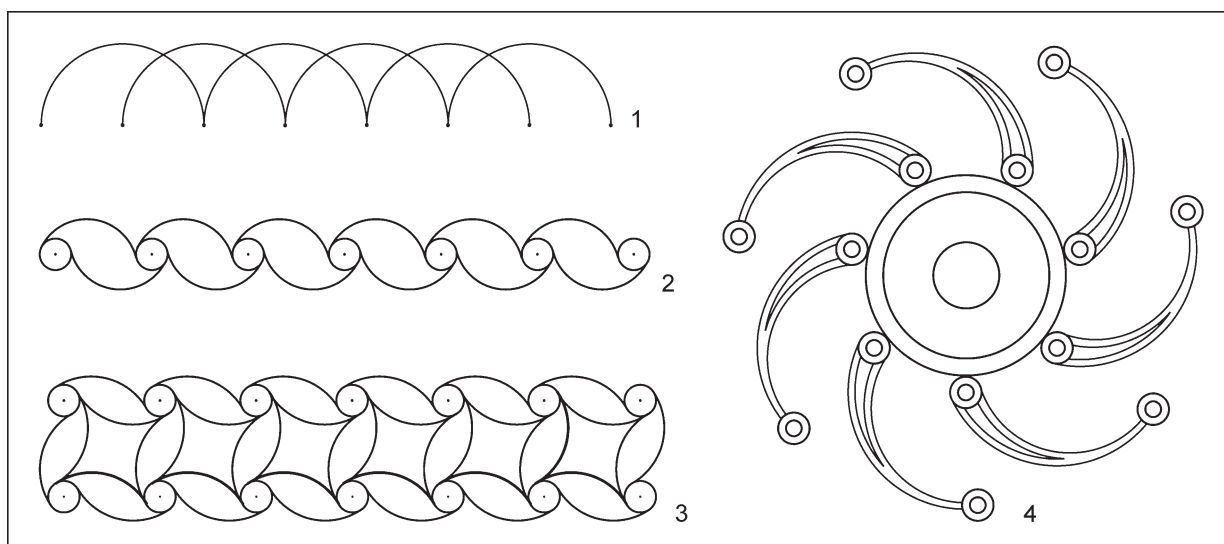


Fig. 8. Motives of mentioned decorations (drawing L. Kohl).

The construction of the motifs in Franzhausen

In principle, working with a compass and dividing a circle etc. requires a certain basic knowledge of mathematics and geometry. Geometric principles such as the golden ratio (*sectio aurea*) were already known to the Greeks (as well as the Egyptians) around 500 BC. The golden ratio and the division of the circle into three and five parts were already known. The most famous mathematicians were Euclid, Pythagoras and Hippasos (*Lenerz-De Wilde 1977, 16, 17*). The use of a ruler was likely possible, as evidenced by the patterns on the interior of bowls of Greek origin. (*Lenerz-De Wilde 1977, 77*).

Inside the bowl Franzhausen 23/10 (Fig. 9), we have the division of a circle into eight (8) parts. This can be done by dividing the circle once from the circle itself once by a diagonal (1 = 3 compass strokes, 1 straight line) and then construct a right angle on the circle, also by making compass strokes from the intersection points of the diagonal with the circle (2 = 2 compass strokes, 1 straight line). Finally, this 90-degree angle is divided in half by compass strokes through the intersections of the 2 diagonals (3 = 2 compass strokes, 1 straight line). This process is either continued along the entire circle or the distance of the 45-degree angle is taken from the circle and transferred to the rest (4 = 4 compass strokes, 2 straight lines).

Examples with the division of a circle into five parts include the phalerae from Ville-sur-Retourne (Ardennes dist., France; *Jacobsthal 1969, no. 194*), the fibula from Dürrnberg (Salzburg, Austria; *Penninger 1972, tab. 40A: 1*) and a phalerae from Mainz (Rheinland-Pfalz, Germany; *Jacobsthal 1969, 187, no. 190*).

In the bowl from grave 24 (fn. 6), a circle is divided into 7 parts (Fig. 10). This is a geometrically much more difficult task and requires a deep knowledge of geometry. For this reason, authors who have dealt with it in the archaeological field doubt that it is a construction, but rather an approximation and a 'trial and error' (*Bacault/Flouest 2003; Lenerz-De Wilde 1977, 18*). A seven-point division of a circle works as follows: a circle is first divided by its diameter (1 = 3 circles, 1 straight line), then a line is drawn from the intersections (A, C) of an inner arc of the circle with the main circle, which is at right angles to the diagonal and

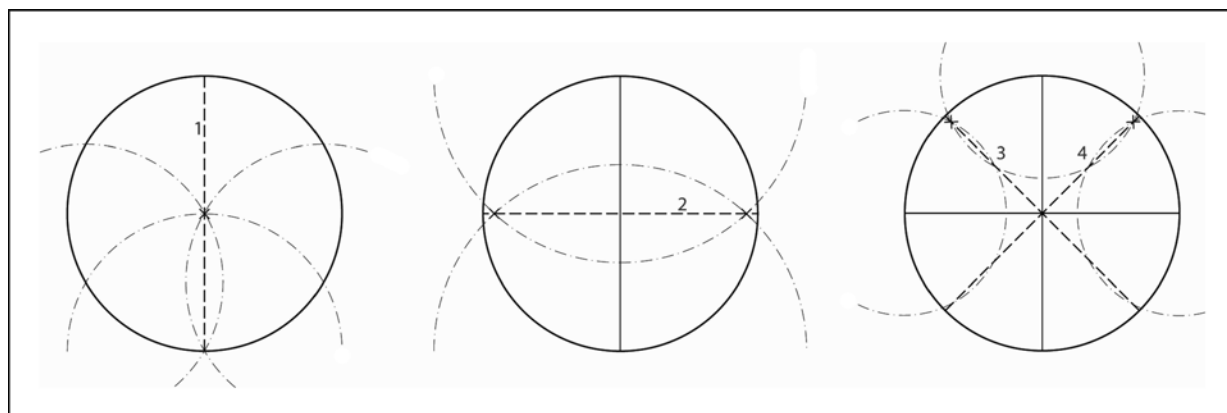


Fig. 9. Construction of the decoration FH 23/10 (drawing L. Kohl).

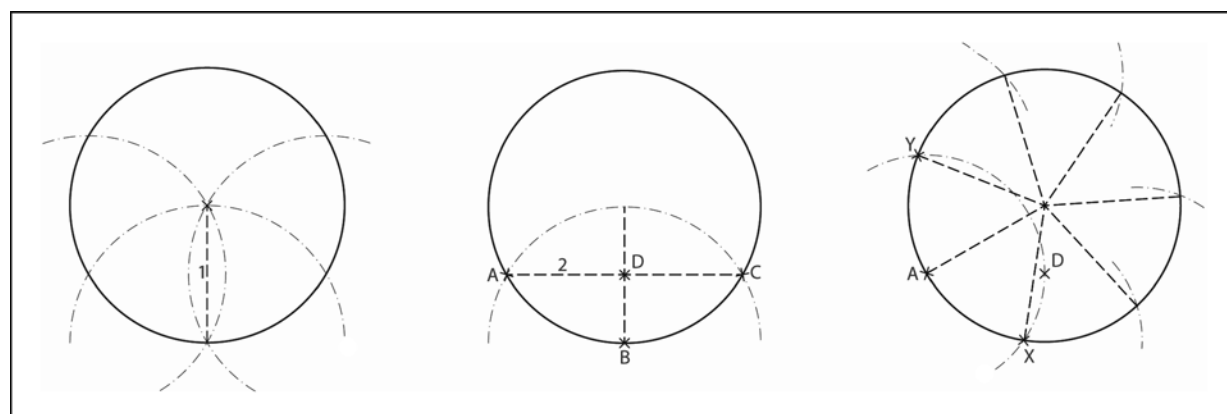


Fig. 10. Construction of the decoration FH 24/6 (drawing L. Kohl).

intersects it (D; 2 = 1 straight line). Finally, an arc with the radius is drawn from the insertion point A to the intersection point D and an arc is drawn to the intersection points with the main circle (X, Y – 1 circle). The distances AX and AY are now the seventh of a circle and can be plotted on it (another 4 compass strokes).

Examples with the division of a circle into seven parts are known, for example, on a fitting from Somme-Bionne (France) and the phalere from Langenhein (Hessen, Germany; *Lenerz-De Wilde* 1977, 26, 27).

M. Lenerz-De Wilde, as well as M. Bacault and J.-L. Flouest, question whether the division of a circle into five or seven parts was achieved using a compass (*Bacault/Flouest* 2003, 156; *Lenerz-De Wilde* 1977, 17, 18).

COMPARABLE PIECES IN THE UPPER TRAISEN VALLEY AND THE SURROUNDING AREAS

The most comparable examples for the bowl Franzhausen 23/10 with a frieze of halfcircles are a small bowl no. 9 in grave no. 16 (1982) at the cemetery of Oberndorf/Ebene (Upper Traisen vally; Fig. 11: 1; unpublished; *Ramsl, in preparation*) as well as a fragmented bowl out of a pit (Walpersdorf-Nord 73) no. 1843 (*Ramsl* 1998, fig. 108: 1043) and a sherd out of (Walpersdorf-Nord 73) no. 1636 (Fig. 11: 2; *Ramsl* 1998, fig. 102: 939) of the settlement Inzersdorf-Walpersdorf. The swirl (constructed with a compass) inside the bowl Franzhausen 24/6 with a swirl can be directly compared with the piece no. 10 from grave no. 17 from Ossarn in the Lower Traisen valley (Fig. 11: 3; *Megaw J. V. S./Megaw M. R./Neugebauer* 1989, fig. 6: 10; *Neugebauer* 1992, fig. 12: 10). Another compass decoration (with handmade leaves and stamps) can be found at the flask from Pottenbrunn 1930/1 (Fig. 11: 4; former „Ratzersdorf“: *Engelmayer* 1963, fig. 4; *Ramsl* 2002, tab. 22; *Schwappach* 1973b, fig. 14: 5).

Other compass decorations in Lower Austria include the bronze belt fitting from the cemetery of Ossarn (Fig. 11: 5; as a stray find, *Engelhardt* 1976, fig. 9: 7; *Ramsl, in preparation*), where the circular eyes are connected by floral motifs, and the same motif-combination on the turned bone handle from the settlement of Inzersdorf-Walpersdorf (Inzersdorf 72 – no. 76; Fig. 12: 1; *Ramsl* 1998, fig. 17; tab. 31: 54). The open-work bronze band from grave 18 of Oberndorf/Ebene (excavation 1982), which was also constructed with compasses, should not be forgotten here (*Neugebauer* 1992, fig. 10: 35; *Ramsl, in preparation*). Slightly more complex compass patterns with incisions (row of circular eyes with leaf-shaped motifs placed between them on the shoulder of lentil bottles) can be found at Gemeinlebarn (*Neugebauer* 1994, fig. 9: 13) and at Gars-Thunau (Fig. 12: 2; *Karwowski* 2006, fig. 32; *Ramsl* 2014, pl. 5: 6). Here, too, there are inaccuracies, as the end points of the arches sometimes miss each other.

At this point I would like to list some appropriate comparisons from some important find regions in the neighbourhood to illustrate the spread and concentration (workshops?) of this technology (no claim is made to completeness).

Starting with Moravia (where this topic was discussed in detail by P. Goláňová, see *Goláňová* 2012), which represents the natural geographical continuation of north-eastern Lower Austria (Weinviertel) to the north (as seen from the other side). Here, direct compass decorations (confirmed by puncture holes) can also be found on various materials. The decorations on pottery in Polešovice (*Goláňová* 2018, fig. 66: 3, 3a), Modrá (*Goláňová* 2018, fig. 67: 4, 9; see also the photo on the book cover) and Lešany (*Goláňová* 2018, fig. 66: 9) should be mentioned here. From metal, I would like to mention the piece from Pavlov-Děvín (*Goláňová/Navrátil* 2017, fig. 4: 13).

A special status has the unique site of Dürrnberg in Salzburg (with the associated salt mine), which can be seen as one of the other innovation centres of the La Tène culture in what is present-day Austria. So far, compass decorations have mainly been discovered on metal objects here. One exception is the Linsenflasche from grave 39/2 (*Penninger* 1972, pl. 36: 10), where an arched frieze runs below the shoulder moulding (cf. also *Schwappach* 1976, 67, fig. 3d). Compass ornaments with clear engravings can be found, for example, on the bronze flask from grave 44/2 (*Penninger* 1972, tab. 46: 34), on the bronze fibula from grave 59 (*Moosleitner/Pauli/Penninger* 1974, tab. 122: 2; *Schwappach* 1973a, fig. 7: 1) or on the bronze fitting from grave 29 (*Penninger* 1972, tab. 27: 10). Also noteworthy is the disc brooch from grave 42/1, which was at least constructed using a compass (*Penninger* 1972, pl. 40A: 1). If we turn to Bohemia, where also many very early La Tène culture finds have been discovered, making it one of the core regions. Here, too, mainly metal artefacts have been found, with the engravings of a compass in the decorations. Ceramic vessels or fragments or vessels, on which the compass constructions could be seen, come from Hlubyně (*Filip* 1956, fig. 53; pl. XIV; *Schwappach* 1975, pl. II: 5), Hostomice (*Schwappach* 1973a, fig. 12: 1), Tuchoměřice (*Sankot* 2007; *Schwappach* 1973a, fig. 10: 3), Počerady (*Koutecký* 1972, feat. 1/67; *Schwappach* 1973a, fig. 8: 2)

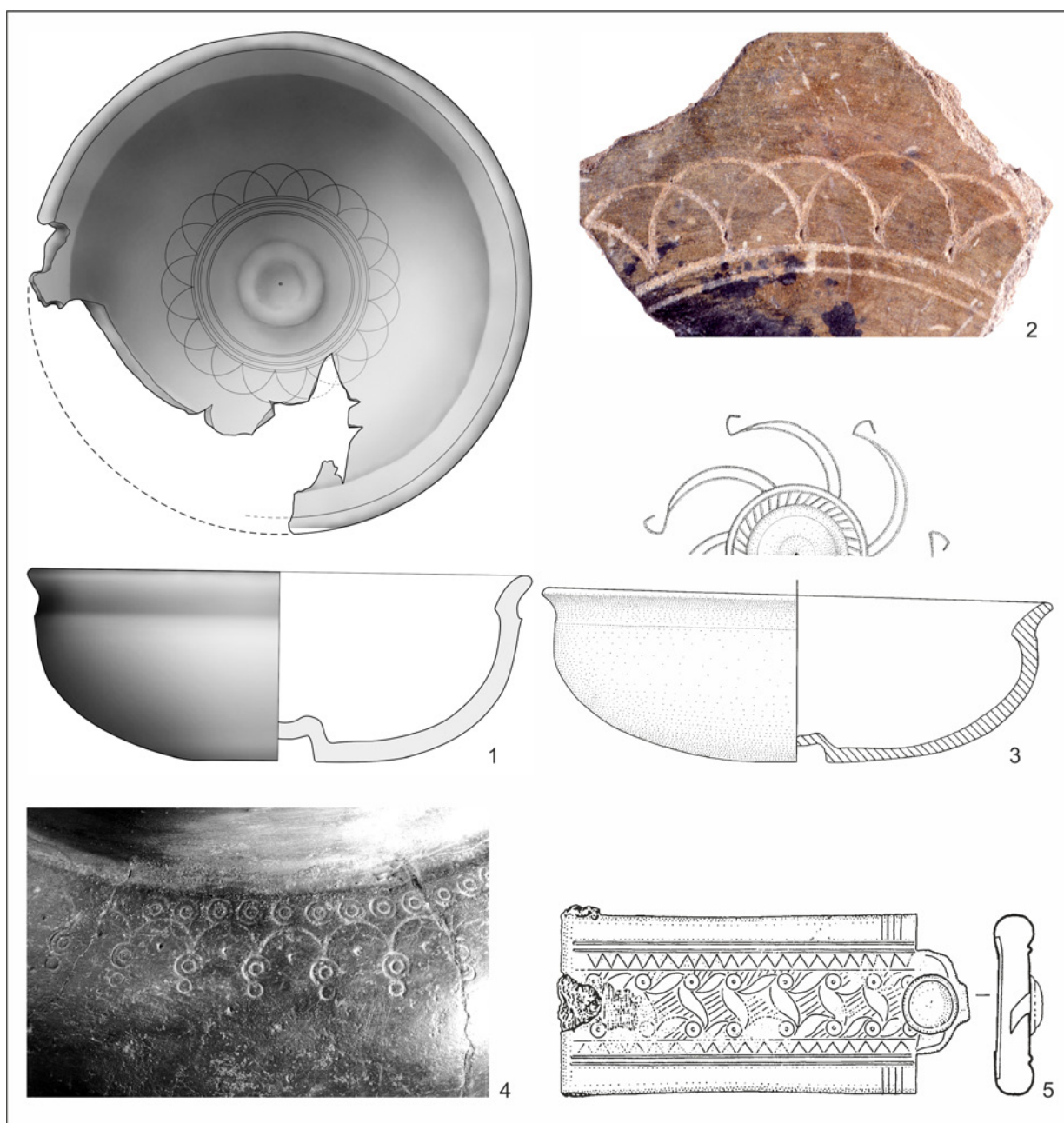


Fig. 11. Comparable pieces in Lower Austria. 1 – Oberndorf 1982, grave 9/16; 2 – Inzersdorf-Walpersdorf, pit 1636/939; 3 – Ossarn 1984, grave 17/10, 4 – Pottenbrunn 1930, grave 1; 5 – Ossarn 1966, Stray find (photos and drawing M. Mayrhofer, A. Schumacher, M. Imam, A. Schumacher, K. Engelhardt).

and Chlum-Bezdědovice (Eisner 1914, fig. 3: 2; 4: 7) and possibly Manětín-Hrádek (Cabanillas de la Torre/Goláňová 2020, fig. 5c). In terms of metal artefacts, I would like to highlight prominent finds such as the bronze sleeve/can from Chlum-Bezdědovice (Filip 1956, fig. 76: 2), the bronze phalerae from Nevěsice (Sankot 2002) and the beaked flagon from Hradiště (Písek dist.; Schwappach 1973a, fig. 13). The latter is described as ‘Etruscan’, leaving it uncertain whether the compass decoration was part of the original design or added later in the destination region (which is to discuss).

Several significant artifacts featuring compass decoration have also been discovered in France², though so far, based on published findings, only on metal. Notable examples are the dagger sheaths from Châtil-

² The examples from Brittany, presented exemplarily by Gadea Cabanillas de la Torre (e.g. in: Cabanillas de la Torre/Goláňová 2020), should not be included here.

lon (*Schwappach 1973a*, fig. 19: 1) and Bussy-le-Château (*Charpy 1991*, 65) with their friezes of semi-circular arches. Particularly interesting is the small disc from Molinons „Les Graisses“ with a similar frieze (*Baray 1999*, fig. 11: 8). Additionally, the openwork discs from Cuperly (*Jacobsthal 1969*, tab. 115: 185) and Somme-Bionne (*Jacobsthal 1969*, tab. 113: 180), for example, were also constructed with a compass.

In Germany, one notable example is the casket-shaped belt fitting from Mühlacker (*Schwappach 1973a*, fig. 1), which features floral ornamentation incorporated alongside an arched frieze. Further examples with arched friezes appear on the bronze application from Laumersheim (*Schwappach 1973b*, fig. 6: 5) and the bronze lid from the ‘Fürstengrab’ in Bad Dürkheim (*Schwappach 1973b*, fig. 7: 1). Individual circles with a central incision were discovered on the jug from Reinheim (*Echt 1999*, tab. 23), while compass marks on pottery can be observed on the fragment from Römhild (*Schwappach 1973a*, fig. 12: 5).

All in all, it can be said that the discussed decorated bowls from the Lower Traisen Valley fall well within the time horizon HaD3/LtA, which is also shown by the comparative pieces from the other innovation areas.

THE ORIGIN AND THE USE OF THE COMPASS AND THE COMPASS NORTH OF THE ALPS

It is noteworthy that many objects are crafted in a precise circular shape yet show no visible traces of compass strokes or engravings. This suggests that wax models for molds could have been created using compasses or turned on a lathe, a technique known since at least the 8th c. BC (*Armbruster 2003*). Examples include the shoe fittings (discs) from Gemeinlebarn, grave 66 (*Neugebauer 1994*, fig. 6: 5–7) or the drum fibula from Oberndorf, grave 121 (*Neugebauer 1992*, fig. 24: 1; *Ramsl, in preparation*). The wax model of the shoe buttons from Oberndorf 1982, grave 31/2–4 (*Ramsl, in preparation*) also appears to have been turned, or the finished bronze piece reworked with a compass. In general, the compass seems to have had a certain connection with the lathe as mentioned above. In her article ‘*Technologie und Transfer von Wissen in der prähistorischen Feinschmiedekunst Südwesteuropas*’ (*Armbruster 2003*), Barbara Armbruster discusses the possibilities of technology transfer with the lathe, among other things. The lathe is one of the earliest devices with rotary motion that was used in both metal and wood technology (*Armbruster 2003*, 67). The bone handle from Inzersdorf-Walpersdorf (Fig. 12: 1) and the depiction of turned furniture from the situla from Kuffern (*Urban 1999*, 199) as well as the amber-made handle from Inzersdorf (*Neugebauer 1996*, tab. 19: 6; 37: 2) are further evidence of its use in the Early La Tène Period in Lower Austrian Traisen Valley. Armbruster cites, among others, the necklace from Vix (Côte-d’Or). Here, several elements (including the discs on the pear-shaped ends) were cast from wax models made on a lathe. Bracelets with parallel structures, such as those from the late Hallstatt grave of Saint-Colombe (Côte-d’Or), are also indirectly related to the lathe. Turned wooden models served as a base into which the gold foil was pressed (*Armbruster 2003*, 73). In general, it is the attempt to get an exact circle or rounding.

It will never be possible to determine with certainty when and where a particular tool first appeared and in what form – whether north or south of the Alps. Rather, it depends on the state of research to be able to narrow down certain areas. As an example – a type of ‘wooden compass’ with a ‘rivet-like axis’ (*Stöllner 2015*, fig. 9) was excavated in the Nordstrecke of the Bronze Age mining area of the Arthurstollen (Mitterberg region, Salzburg). It may have been used there as a surveying tool but shows that the principle was already in use north of the Alps at this time.

In the Mediterranean area, from where many important impulses came to Middle and Central Europe, the northern Italian area with its ‘Etruscan’ colonisation, where many Greek imports also inspired ceramic decorations, should also be considered. Patterns incised with a compass appear on Greek black-figure ware from the 7th c. BC onwards, for example on an amphora (*Olivier-Trottenberg 2014*, 32, 33, tab. 12: 3). Examples of Etruscan wares include a ‘plate with high foot’ from Poggio Colla (*Perkins 2022*, fig. 6c), a cotyle(s) from Medio Valdarno (*Cappuccini 2022*, fig. 1a) or three examples from the tumulus of Montefortini a Comeana (*Bettini 2022*, pl. XII: b–e; XIII: a, b) as well as a bronze stamnos lid from Bad Dürkheim (*Bardelli 2017*, tab. 24: 2, 3; *Jacobsthal 1969*, no. 397, 203, tab. 262: 23). M. Lenerz-De Wilde believed that “overlapping half-arches drawn with a compass” appear only occasionally in Greek art (*Lenerz-De Wilde 1977*, 64; what is to be discussed), though they are frequently a dominant ornament in Etruscan art.

The origin of stamp-decorated Iron Age pottery in Central Europe probably lies somewhere between Bavaria and Transdanubia (*Goláňová 2018*, 127). There have been repeated speculation about inspiration from regions outside the region. Impressions of rotating motifs such as triskels and circles seem to have appeared in the area of the Vekerzug group from the Late Hallstatt period onwards.



Fig. 12. Comparable pieces in Lower Austria. 1 – Inzersdorf-Walpersdorf, pit 76/54; 2 – Gars-Thunau, Fnr. 57353 (photos and drawing A. Schumacher, P. C. Ramsel, B. Lethmayer).

CONCLUSION

This article presents two bowls from the Late Iron Age cemetery of Franzhausen, both decorated on the inside with compass and swirl patterns. These patterns were incised directly onto the surface with a compass and, in the case of the swirl, covered with stamps based on the many examples of compass-decorated artefacts, we observe a concentration of this technique in the Lower Traisen valley in Lower Austria. This could be an early indication of independent workshops in the region. Other materials such as bronze and bone, may also have been used, as demonstrated by the aforementioned turned handle from Walpersdorf (Fig. 12: 1) and the bronze belt fitting from Ossarn (Fig. 11: 5). This raises important questions about when and how knowledge of such compass designs spread north of the Alps and what influences facilitated their adoption. It also underscores the fact that even complex mathematical and geometric knowledge was present and utilized within the La Tène culture. Finally, it is important to emphasise once more that the Lower Traisen Valley is increasingly emerging as an independent regional center (or innovation area) during the Early La Tène Period, existing at the crossroads of tradition and innovation.

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Cesta v kruhu – výzdoba kružnicami v dobe laténskej na dolnom toku rieky Traisen, Dolné Rakúsko

P e t e r C . R a m s l

Súhrn

Prezentované misky s kruhovou výzdobou z pohrebiska vo Franzhausene prinášajú cenné poznatky o keramickej produkcii doby železnej na dolnom toku rieky Traisen. Autor analyzuje techniku a spôsob ich výroby, pričom sa porovnáva s podobnými nálezmi z blízkeho aj vzdialenejšieho okolia.

Dolný tok rieky Traisen je archeologicky bohatý región, ktorého výnimočné postavenie vyplýva zo strategickej polohy na severojužnej osi, sledovanej tokmi riek Traisen a Kamp a oblasťou Weinviertelu, ako aj na východozápadnej osi, ktorá zabezpečuje prepojenie významných sídelných a hospodárskych oblastí. Túto ideálnu polohu podporujú úrodné pôdy v bohatej terasovitej krajine.

Okrem starších nálezov z konca 19. a začiatku 20. storočia zohrali v poznaní regiónu zásadnú úlohu predovšetkým rozsiahle záchranné archeologické výskumy, ktoré od 80. rokov 20. storočia prebiehali pod vedením J.-W. Neugebauera, ako aj A. Gattringera, Chr. Blesla a ich tímov. Tieto systematické výskumy viedli k objaveniu viacerých sídlisk a početných pohrebísk z doby železnej, napríklad na lokalitách Inzersdorf/Walpersdorf, Franzhausen, Gemeinlebarn a Pottenbrunn. Výsledky týchto výskumov boli podrobne zhrnuté v prácach Neugebauer 1992; 1993; Ramsl 2012a, ako aj v príspevkoch vo „Fundberichte aus Österreich“.

Mimoriadne zaujímavým poznatkom je kontinuita osídlenia, ktorá je doložená na viacerých sídliskách a pohrebiskách regiónu – od neskoršej doby halštatskej až po obdobie včasnej doby laténskej. Výrazným príkladom je pohrebisko vo Franzhausene, ktoré vykazuje nepretržité využívanie od stupňa HaC až po začiatok laténskeho horizontu.

Predmetom štúdie sú dve misky z pohrebiska vo Franzhausene, konkrétne hrob 23 (číslo nález 10) a hrob 24 (číslo nález 6), ktoré sa vyznačujú nezvyčajnou ornamentálnou výzdobou na vnútornej stene, vyhotovenou pomocou kružidla. Ide o zložité vzory, ktoré zahŕňajú pretínajúce sa polkruhovité oblúky a pravotočivý sedemramenný vír okolo omfala. Tieto výzdoby boli vyryté do povrchu pomocou kružidla, pričom vrchol výzdoby bol dodatočne ukončený kolkom, vytvárajúcim sústredené krúžky. Podobné nálezy sú známe z lokalít v blízkom okolí, konkrétne z Inzersdorfu/Walpersdorfu, Gemeinlebarnu, Gars-Thunau, Pottenbrunn a Ossarnu.

V tomto príspevku je detailne popísaný a graficky znázornený postup výroby kruhovej výzdoby, ktorý sa vykonáva v niekoľkých krokoch (pozri obr. 9 a 10). Tento proces predstavuje zložitú geometrickú úlohu, ktorú dokázal výrobca úspešne zvládnuť už v dobe laténskej.

Uvedené artefakty možno porovnať s podobnými nálezmi z bezprostredného okolia, napríklad z Dolného Rakúska. Kruhový ornament sa vyskytuje nielen na keramike, ale je známy predovšetkým na kovových predmetoch. Vyskytuje sa na celom území výskytu včasnotaténskeho nálezov ako napr. Dürrenberg, Morava, Čechy, Champagne, južné Nemecko a Porýnie.

Predmetom diskusie je aj forma prevedenia výzdoby. Z techník sú použité ryhy kružidlom (ako v prípade Franzhausenu), ako aj stopy po vyhladzovaní povrchu. Tento typ výzdoby sa vyskytuje napríklad v Modrej (Goláňová 2018, obr. 67: 4, 9), v Inzersdorfe-Walpersdorfe (Walpersdorf Nord 73, obj. 1363, č. 861 – Rams 1998, obr. 23; tab. 97: 861) alebo v Chlume-Bezďedoviciach (Eisner 1914, obr. 3: 2).

Toto „vyhladzovanie“ vzniklo pravdepodobne počas procesu sušenia keramiky. Experimentálne bolo dokázané, že presné tvarovanie včasnotaténskej keramiky a aplikovanie výzdoby prebiehalo po fáze schnutia trvajúcej 1 až 2 dni. Tvarovanie zahŕňalo opakované otáčanie predmetu, pričom v tomto štádiu sa súčasne presne formovali aj vnútorné a vonkajšie steny stredu nádoby, označovaného ako omfalos (pozri obr. 7).

Dve zdobené misky podnecujú diskusiu o úrovni matematických a geometrických poznatkov v období včasnej laténskej kultúry. Zároveň poukazujú na vysokú úroveň remeselnej zručnosti ich tvorcov, ktorá presahovala rámec dolného toku rieky Traisen.

Obr. 1. Mapa lokalít zahrnutých do projektu CATA, vrátane loga (grafika L. Kohl, Th. Koch Waldner; mapový podklad EU-DEM).

Obr. 2. Mapa dolného toku rieky Traisen s príslušnými lokalitami. 1 – Gars-Thunau; 2 – Franzhausen; 3 – Gemeinlebarne; 4 – Inzersdorf; 5 – Walpersdorf; 6 – Herzogenburg; 7 – Ossarn; 8 – Oberndorf/Ebene; 9 – Rassing; 10 – Pottenbrunn (grafika P. Urban; podklady: www.basemap.at).

Obr. 3. Franzhausen (FH), hrob 23 (grafika L. Kohl, A. Gattringer).

Obr. 4. Misa z hrobu FH 23/10 (foto Chr. Bieber, UHA; kresba M. Mayrhofer).

Obr. 5. Franzhausen, hrob 24 (grafika L. Kohl, A. Gattringer).

Obr. 6. Misa z hrobu FH 24/6 (foto Chr. Bieber, UHA; kresba M. Mayrhofer). Mierka: a – 1, 3; b – 2.

Obr. 7. 1 – povrch s miernym fazetovaním; 2 – povrch s miernym fazetovaním (keramika z Strebersdorf/Bgld.); 3 – omfalos z misy (FH, UHA); 4 – žliabky v/na keramike (foto P. C. Rams, Chr. Bieber).

Obr. 8. Motívy použitej výzdoby (kresba L. Kohl).

Obr. 9. Štruktúra výzdoby FH 23/10 (kresba L. Kohl).

Obr. 10. Štruktúra výzdoby FH 24/6 (kresba L. Kohl).

Obr. 11. Analógie v Dolnom Rakúsku. 1 – Oberndorf 1982, hrob 9/16; 2 – Inzersdorf-Walpersdorf, jama 1636/939; 3 – Ossarn 1984, hrob 17/10; 4 – Pottenbrunn 1930, hrob 1; 5 – Ossarn 1966, Náhodný nález (foto a kresba M. Mayrhofer, A. Schumacher, M. Imam, A. Schumacher, K. Engelhardt).

Obr. 12. Analógie v Dolnom Rakúsku. 1 – Inzersdorf-Walpersdorf, jama 76/54; 2 – Gars-Thunau, č. nález 57353 (foto a kresba A. Schumacher, P. C. Rams, B. Lethmayer).

Tabela 1. Nálezy s kruhovou výzdobou (dolný tok rieky Traisen a údolie Kampu). Všetky datované do doby laténskej.

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