

## STRINGED INSTRUMENTS OF THE HALLSTATT CULTURE – FROM ICONOGRAPHIC REPRESENTATION TO EXPERIMENTAL REPRODUCTION

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The lyre shapes of the Hallstatt circle are depicted on ceramic and bronze vessels. They can be classified into three types, the Hallstattphorminx, the Situlae Lyra and the Hallstatt lyre. In the latter two types, two variants crystallize. The so-called Hallstatt lyre, represented as a simple frame construction, can also be interpreted as a zither – frame zither or box zither. Representations of the stringed instruments discussed here appear predominantly in richly furnished graves of both sexes. Through analyzation of the basic construction of the chordophones and their string holders, it is possible to reconstruct them experimentally. Simple manual measurements were used to determine the size of each instrument. Hallstatt lyres, a Hallstatt zither, a Hallstattphorminx and a Situlae Lyre were reconstructed and played in Vienna by music archaeologists and musicians.

Keywords: Central Europe, Early Iron Age, Hallstatt culture, musicarchaeology, chordophones, lyres, reconstructions, experimental archaeology.

### INTRODUCTION

While lyres have been known and played for a long time in the ancient advanced civilizations, they have only been proven in Central Europe from the older Iron Age onwards, namely through iconographic representations. We do not know whether these instruments were already known earlier in our geographical area – at any rate they appear in the Aegean area already in the 14<sup>th</sup> century BC. In Mesopotamia, Elam, Syria and the Persian Gulf they sounded already in the 3<sup>rd</sup> millennium BC (*Lawergren 1996*, 1012). All stringed instruments developed from the hunting- and war bow. In the course of time, various shaped sound boxes were attached to the simple string carrier to amplify the sound. The lyres of the Hallstatt culture and its neighbours differ in their form from those of the ancient advanced civilizations. According to the systematics of the musical instruments of Hornbostel and Sachs, lyres are to be classified to the compound chordophones and to the yoke lutes (system number 321.2; *v. Hornbostel/Sachs 1914*, 579; *MIMO 2011*, 14).

### LYRE FORMS OF THE HALLSTATT CULTURE, THEIR ARCHAEOLOGICAL EVIDENCE AND FRAGMENTS OF LYRES

The chordophones of the Hallstatt Circle are represented on clay and bronze vessels showing festivities and dance scenes. The pictures are carved

into the clay, painted on graphite or executed in dot-bump technique or driving technique onto bronze (*Eibner et al. 2011*, 8–14).

Among them there are lyres with rounded bottoms, stringed instruments whose resonators seem to be missing and lyres with strongly curved yokes and single or double bulging resonators. Their number of strings varies from two to ten.

Stringed instruments can be divided into three basic types:

Type 1 – I call it Hallstattphorminx<sup>1</sup> – has a semi-circular or segmented resonance body, slightly inwardly curved yoke arms and a straight or slightly inwardly curved transverse yoke. Its playing position is shown vertically or horizontally. The lyres on the cone neck vessel from Tumulus 27, Sopron (Hungary; *Eibner 1986*, pl. 1: 1–1a; *Eibner-Persy 1980*, 133, pl. 16; 17) and the urn from tomb object no. 20, cemetery of Reichersdorf (Austria; *Neugebauer 1987*, 10–12, fig. 16) as well as on the sheet metal fragment from the Býčí skála cave near Brno (Czechia; *Eibner 1986*, pl. 4: 2), are played vertically (Fig. 1: a–c). Lyres played horizontally (Fig. 1: d–e) are depicted in point buckling technique on the bronze cist XII by Klein Klein/Kröllkogel near Leibnitz (Austria; *Dobiat 1980*, pl. A; 7: 2) and the Golasecca culture in northern Italy, which is close to the Hallstatt culture, on a bronze situla, first warrior grave of Sesto Calende, Varese province (Italy; *Eibner 1986*, pl. 2: 5; *Ghislanzoni 1944*, 1–56). In most cases the transverse yoke seems to rest on the yoke arms or to be connected to the yoke arms by glue or dowels. Only the lyre from Klein

<sup>1</sup> For Eibner 'Hallstattleier'.

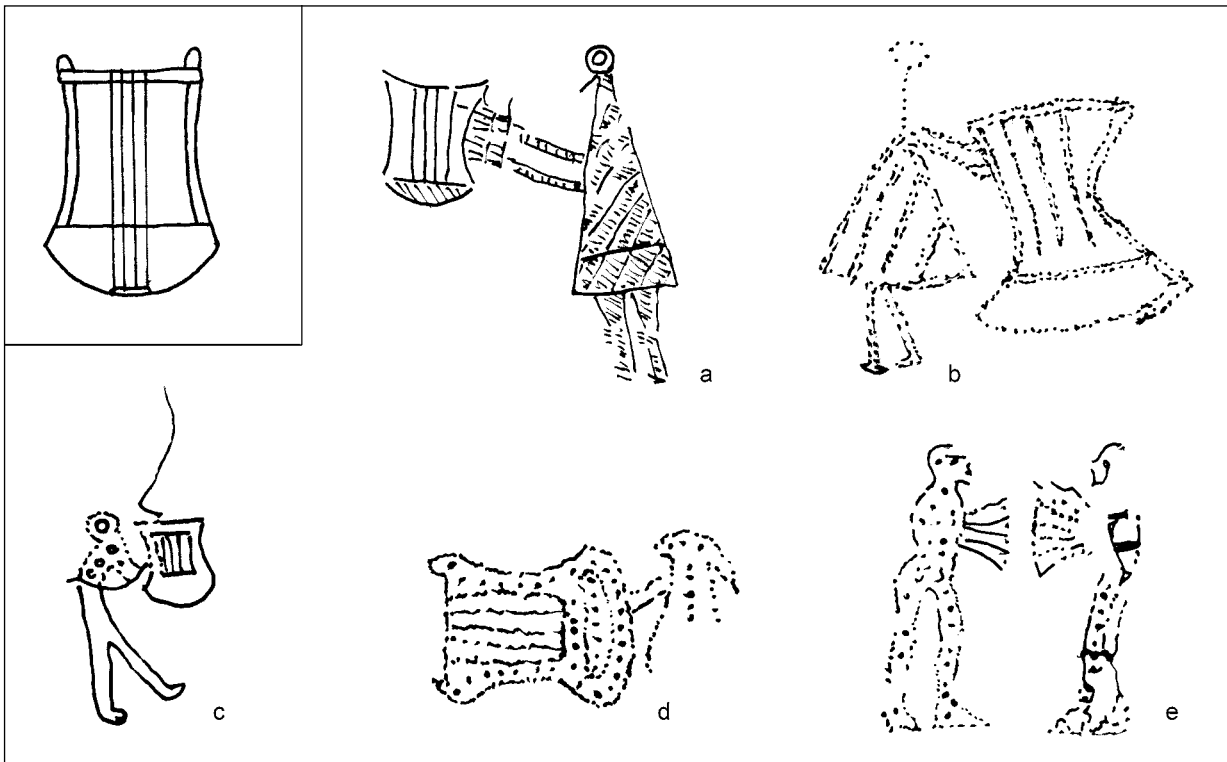


Fig. 1. Type 1 – Hallstattphorminx. a – Tumulus 27, Sopron (H); b – tomb object no. 20, Reichersdorf (A); c – Býčí skála cave near Brno (CZ); d – Klein Klein/Kröllkogel near Leibnitz (A); e – first warrior grave of Sesto Calende, Varese province (I). Graphics by B. M. Pomberger (a, c–e – after *Eibner 1986*, pl. 1: 1, 1a; 4: 2, 2: 7, 2: 5; b – after *Neugebauer 1987*, 10–12, fig. 16).

Klein/Kröllkogel (*Egg/Kramer eds. 2013*) shows knobs with pins driven through the cross yoke. The vessels with the representations of the Hallstattphorminx date from the 7<sup>th</sup>/6<sup>th</sup> century BC (*Eibner et al. 2011*, 9).

Type 2 – the Situlae Lyre – which stems from the area of the Situlae circle with strong ties to the Etruscan culture (*Eibner et al. 2011*, 14), consists of a mostly double-bellied sound box with a curved yoke. The yoke does not consist of three parts as in the Hallstattphorminx, but was probably bent from a single bar. Small one- or two-humped knobs sit on the outwardly curved yoke parts. It must not be a “decoration” but a rudimentary element of an original construction part: the connection of yoke arms and cross yoke of typical lyre forms, where the yoke arms pierce the cross yoke or are fixed from above with a knob and dowels. The Situlae Lyre is strung with five to ten strings and is played horizontally, supported by the upper body and thighs. We can distinguish two variations of this type of lyre: Variant A has an unevenly curved yoke. The upward pointing yoke part clearly has a larger radius and is therefore longer than the downward pointing smaller yoke part. Representatives of this variant (Fig. 2: a–d) are the representations of lyres

on the situla-finds of Providence – probably Certosa di Bologna (*Lucke/Frey 1962*, 1), art trade – and Certosa, Bologna/Certosa, Tomb 68 (Italy; *Eibner 1986*, pl. 5: 2; *Lucke/Frey 1962*, 59), Dürrnberg-Kranzbichl Tomb 346 B,<sup>2</sup> Hallein (Austria; *Zeller 2004*, 389–401, fig. 15) and Novo mesto, Kandija, Tumulus II/Tomb 33 (Slovenia; *Eibner 2018*, pl. 16: 31c, 31f; *Jereb 2016*, 55, pl. 54: 99). The variant B has a uniformly curved yoke (Fig. 2: e–f) and is represented by lyre illustrations on the situlae of Montebelluna, necropolis of Posmon (Italy; *Bianchi Citton 2014*, fig. 4: B) and Magdalenska gora (Slovenia; *Eibner 1986*, pl. 5: 3; *Lucke/Frey 1962*, 72, pl. 36: 69). The bronze vessels date from 6<sup>th</sup> century until the 3<sup>rd</sup> century BC.

The following chordophones can be found in the Eastern Hallstatt District (Austria, Slovakia and Hungary) and in the Upper Palatinate (Bavaria). The players hold frame-like or box-like stringed instrument in their arms stretched forward. All iconographies seem peculiarly reduced and schematically drawn. They decorate the surface of ceramic vessels. The chordophones are interpreted as frame- or box zithers (*Eibner 1986*, 276; *Pomberger 2016*, 64, 65), lyres without a sound box, or lyres with a sound box (*Reichenberger 1985*, 325) and sometimes also harps (*Eibner 1986*, 276;

<sup>2</sup> This tomb dates from the middle La Tène period.

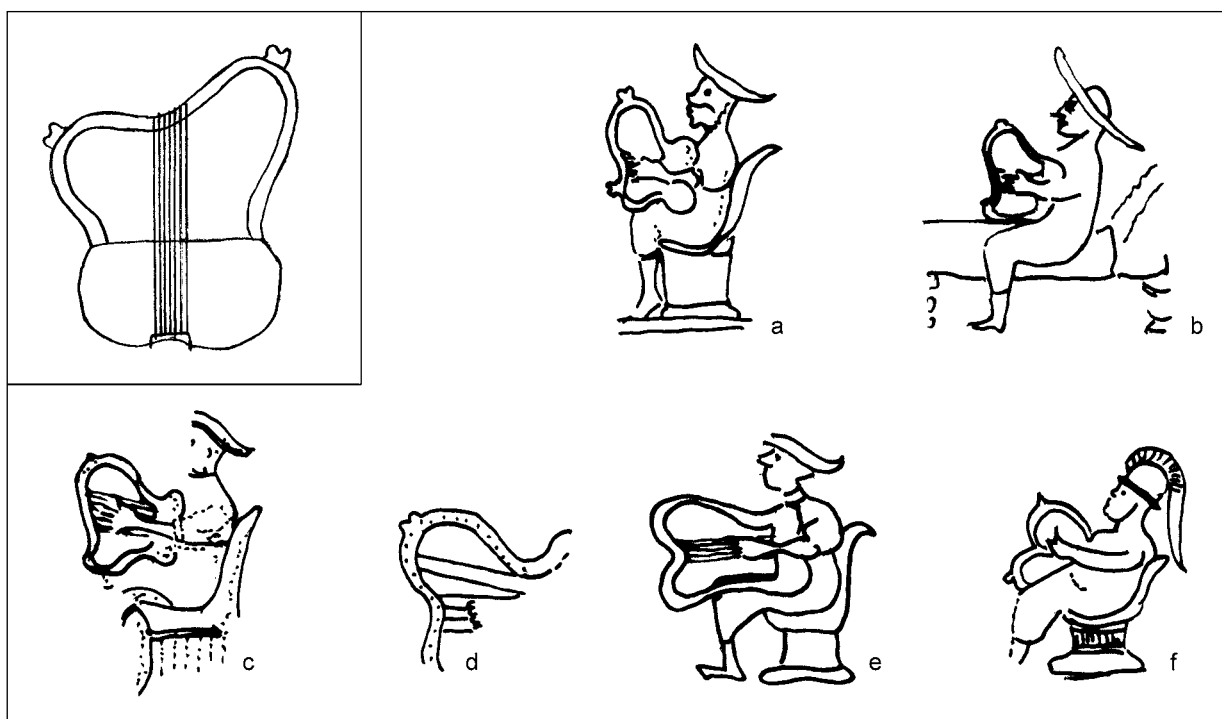


Fig. 2. Type 2 – Situlenlyre. Variant A – unevenly curved yoke: a – Providence, probably Bologna (I); b – Certosa, Bologna/Certosa, Tomb 68 (I); c – Dürrnberg-Kranzbichl (A); d – Nove mesto, Kandija Tumulus III/Grave 33 (SLO). Variant B – evenly curved yoke: e – Montebelluna, Necropolis of Posmon, Grave 244 (I); f – Magdalenska gora, Tumulus II (SLO). Graphics by B. M. Pomberger (a–d, f – after *Eibner 1986*, pl. 5: 1–3; 2018, pl. 16: 31f, 31c; e – after *Bianchi Citton 2014*, fig. 4: B).

*Pomberger 2016*, 66). While some time ago my opinion was still that they were zithers or harps, I now tend to interpret these chordophones as lyres. In my opinion the whole instrument is represented, but the sound box is not clearly emphasized in the representation: the respective ‘middle line’ in the frame is missing to mark the size of the resonance body. On the Schirndorf stringed instrument, the edge is marked only from the folded yoke arms. A kink would be a weak point in the frame construction, which should be able to withstand the tension of the strings. In my opinion, the resonance box starts at the bend. The yoke arms might reach to the bottom of the sound box. On the rectangular chordophone, the sound box probably goes to the middle of the frame construction. A closer examination of one of the figures with a chordophone depicted on a vessel from Nové Košariská reveals that the outstretched arms are not holding a simple triangle but a double trapezoidal object. This in turn reminds of the Schirndorf instruments. In this respect, a further type of lyre with two variants (type 3/variant A and 3/variant B) can be found in the area of distribution of the Hallstatt culture.

Type 3A is a lyre shape, in which the sound box and yoke arms together with the transverse yoke

form a rectangle: the rectangular eastern Hallstatt lyre. It is strung with three to six strings (Fig. 3: a–f). Examples of this type are known from Sopron, Tumulus 28 (Hungary; *Eibner-Persy 1980*, 28, pl. 28; 29), Ernstbrunn (Austria; *Eibner 1986*, pl. 3: 4), Leithaprodersdorf (Austria; *Eibner et al. 2011*, 12, fig. 13: 8) and Nové Košariská (Slovakia; *Eibner 1986*, pl. 1: 2a; 2: 1, 2; 3: 1, 2, 4; *Pichlerová 1969*, 24, 25, 73, pl. III: b; IV: 1; V; XX: 5; 237).

The double trapezoidal shaped Hallstatt lyre forms the type 3B. The sound box is designed as an isosceles trapezoid whose longer base side forms the bottom of the sound box. The frame, consisting of the yoke arms and the cross yoke, also forms an isosceles trapezoid. This form is proven seven times in the cemetery of Schirndorf, Oberpfalz (Germany; *Stroh 1979*, 191–194, pl. 134; 1988, 53–63, 137–149, pl. 87: 5; 89: 2; 110: 3; 111: 5). And don’t the two musicians on the ceramic vessels of Nové Košariská possibly also play lyres of this type? A closer look at the left figure (Fig. 3: g) reveals that between the outstretched arms there is a raised thick line representing the bottom of the stringed instrument. Thus, the lyre type 3B (Fig. 3: g–h) would have been played in present-day Slovakia as well.<sup>3</sup>

<sup>3</sup> The two triangular instruments were also interpreted as harps or membranophones.

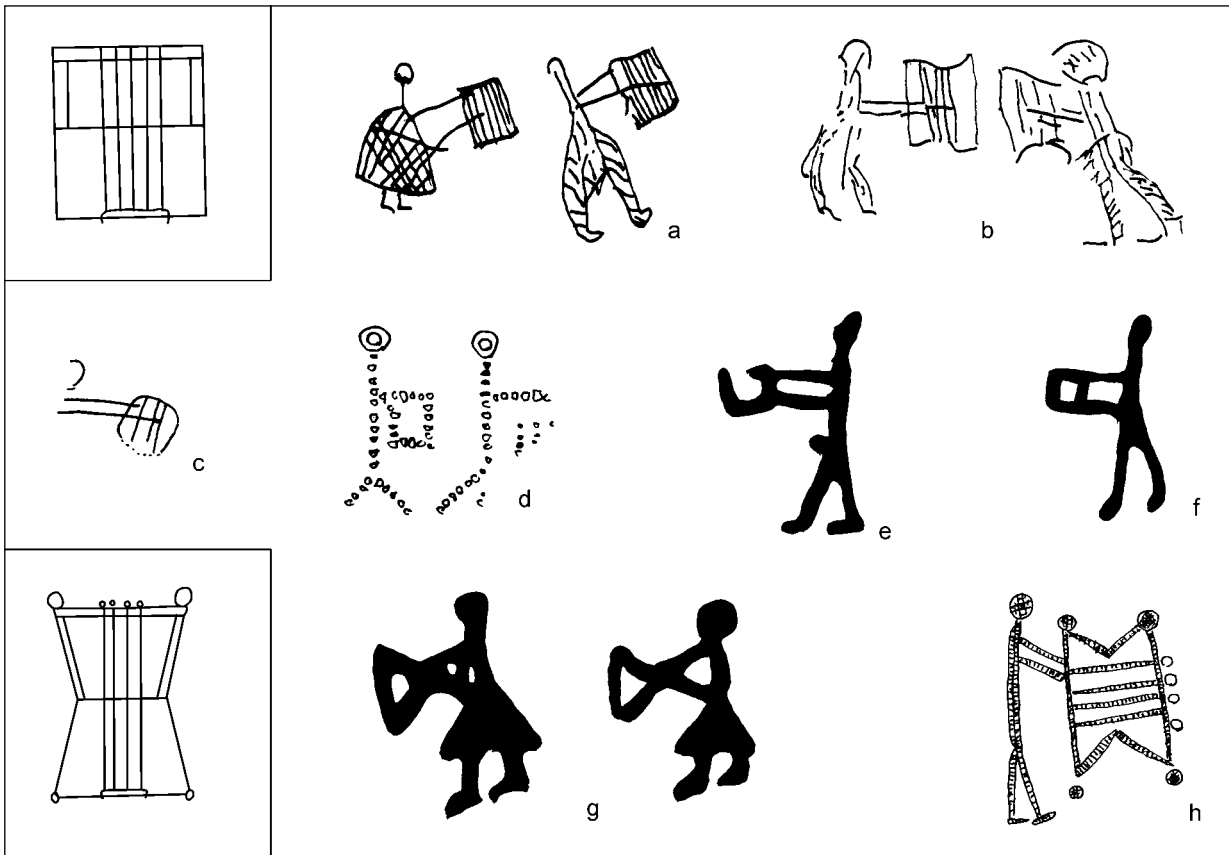


Fig. 3. Type 3 – Hallstatt lyre. Variant A – rectangular eastern Hallstatt Lyre: a – Sopron, unknown tumulus – Tumulus 96 or 98 (H); b – Sopron, tumulus 28 (H); c – Sopron, unknown tumulus – Tumulus 96 or 98 (H); d – Ernstbrunn, stray find (A); e, f – Nové Košariská, Tumulus 1 (SK). Variant B – double trapezoidal Hallstatt Lyre: g – Nové Košariská, Tumulus IV (SK); h – Schirndorf, Tumulus 65 (D). Graphics by B. M. Pomberger (after Eibner 1986, pl. 1: 2a; 2: 1, 3; 3: 1, 3a, 4).

### FRAGMENTS OF IRON AGE STRINGED INSTRUMENTS

Fragmented tuning pegs and bridges made of wood were discovered from the Iron Age industrial settlement in the Ramsau valley at Dürrnberg near Hallein. Lobisser is arguing that the bridge fragment, when mirrored, has ten notches for as many sides, which he concludes is a double stringing per string (Lobisser 2017, 165; Lobisser, *in print*). The lyre representations of the situlas from Dürrnberg/Kranzbichl, Certosa and Montebelluna, for example, each show ten strings (Eibner 2018, 103, pl. 16). The question arises here as to how tightly the tuning pegs would have to be attached to the transverse yoke to enable any lyre player – even those with slim fingers – to tune the double strings.

Possible further wooden tuning pegs were found in Glastonbury in Somerset in England (Bulleid 1938, 48, fig. 6; 7; pl. 17) and Biskupin in Poland (Slaski 1950, 165, fig. 6a). An Early Iron Age bridge fragment originates from High Pasture Cave in Scotland (Lawson 2019, 213–264). We do not know

any metal tailpieces from the Hallstatt culture, but there are finds from Magna Graecia (Bellia 2012, 51–84, fig. 56; 59; 64b; 65–68; 70; 72; 75; 76; 78–81; 83) dating from the late 6<sup>th</sup> to the 3<sup>rd</sup> century BC. Bone tuning sticks have been preserved from the same area (Bellia 2012, 74, fig. 77a).

### THE REPRESENTATIONS OF STRINGED INSTRUMENTS ON CERAMIC VESSELS FROM THE CEMETERY OF SCHIRNDORF, DISTRICT OF REGENSBURG, BAVARIA

The Hallstatt period cemetery of Schirndorf, district of Regensburg, is located on a lower terrace of the river Neeb, a tributary of the Danube. It was discovered in 1960. Archaeological excavations took place from 1964 to 1975 (Stroh 1979, 9, 10). 233 graves were uncovered and published in several volumes (Stroh 1979; 1988; Stroh/Hughes 1999; 2000a; 2000b; 2001). The necropolis dates to HC. Schirndorf is the Hallstatt period site where eight iconographic repre-

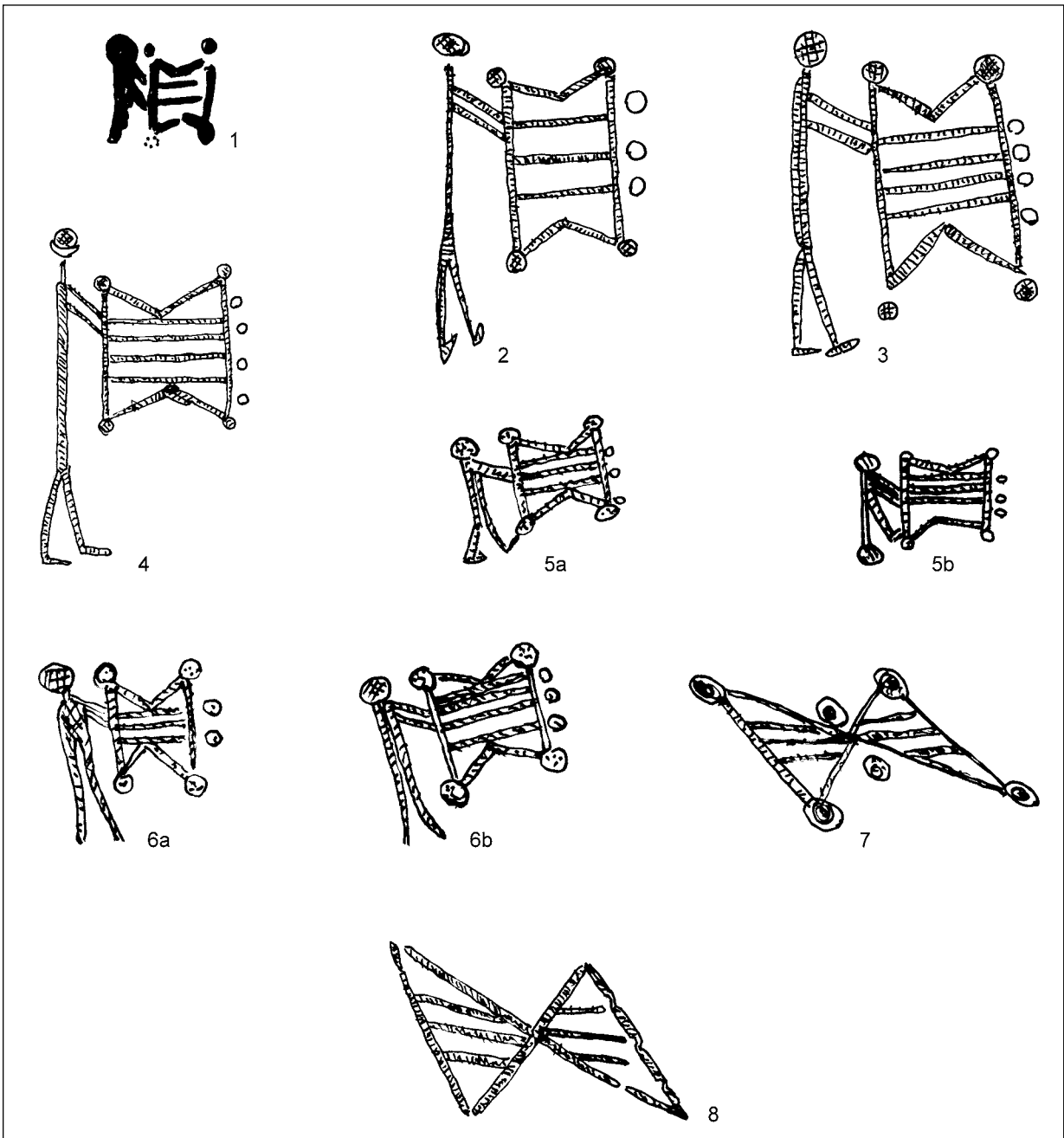


Fig. 4. Lyre representations from the cemetery of Schirndorf, Lks. Regensburg. 1 – bowl, tumulus 51; 2 – collar neck vessel I, tumulus 65; 3 – collar neck vessel 2, tumulus 65; 4 – bowl, tumulus 65; 5a, 5b – bowl I, tumulus 89; 6a, 6b – bowl II, tumulus 89; 7 – collar neck vessel I, tumulus 82; 8 – collar neck vessel II, tumulus 82. Graphics by B. M. Pomberger (after *Stroh* 1979, pl. 134: 6; 1988, pl. 87: 5; 89: 1, 2; 103: 6; 105: 14; 110: 3; 111: 5).

sentations of lyres were found. Two further incised drawings could represent lyres. Tumulus 51 contained a juvenile early-adult male skeleton, several ceramic vessels, charcoal and animal bones. Among the vessels there was a small fragmented bowl with collar and rolling – lattice stamp impressions. The abdominal wrap of the vessel was decorated by a musician playing a stringed instrument (*Stroh* 1979, 194, pl. 134: 6). The musicians and instruments

are represented by dot impressions. The figure of the player appears strong in its execution whereas the instrument somewhat looks more filigree. The instrument has a sound body which shows the shape of two trapezoids joined together at the narrower base sides. Two strings are strung parallel to the soundboard. The corners of the instrument are accentuated (Fig. 4: 1). In tumulus 65, burial chamber 1, the final resting place of three individu-

Table 1. The evidence of lyre representations (table by B. M. Pomberger).

Site	Complex	Burial	Sex	Age	Object	Type of stings/ lyre
Novo mesto, Kandija necropolis	Tumulus III tomb 33	inhumation	fem.	?	bronze situla fragment, 1 lyre player	Situlae Lyre/ Variant A
Sopron	Tumulus 27	2 cremations	fem. & child ?	Adult / infans	conical neck vessel 1 lyre player	Hallstattphorminx
Sopron	Tumulus 28	cremation	?	?	conical neck vessel, 2 lyre players	Hallstatt lyre/ Variante A
Sopron	Tumulus unknown (96 or 98)	?	?	?	conical neck vessel, 2 lyre players	Hallstatt lyre/ Variante A
Sopron	Tumulus unknown (96 or 98)	?	?	?	ceramic fragment, 1 lyre player	Hallstatt lyre/ Variante A
Reichersdorf	tomb objekt 20	inhumation	fem.	?	ceramic vessel, 1 lyre player	Hallstattphorminx
Býčí skála-Cave/Brno	Cultic cave	inhumations	?	?	bronze sheet fragment, 1 lyre player	Hallstattphorminx
Nové Košariská	Tumulus I	cremation	?	?	conical neck vessel, 2 lyre players	Hallstatt lyre/ Variant A
Nové Košariská	Tumulus IV	cremation	?	?	collar neck vessel, 2 lyre player	Hallstatt lyre/ Variant B
Schirndorf	Tumulus 65, chamber tomb 1	3 inhumations	1 fem. 2?	1 adult, 2?	collar neck vessel & bowl, 3 lyre players	Hallstatt lyre/ Variant B
Schirndorf	Tumulus 89, first occupancy	cremation	2 ?	2 ?	2 ceramic bowls, 4 lyre players	Hallstatt lyre/ Variante B
Schirndorf	Tumulus 51	inhumation	masc	juvenile/adult	collar neck bowl, 1 lyre player	Hallstatt lyre/ Variant B
Klein Klein near Leibnitz	Kröll-Schmiedkogel „prince's tomb“	cremation ?	masc.	?	bronze cist, 2 lyre players	Hallstattphorminx
Sesto Calende	Warrior tomb	inhumation?	masc.	?	bronze situla, 2 lyre players	Hallstattphorminx
Ernstbrunn	Stray find	?	?	?	ceramic fragment, 2 lyra players	Hallstatt lyre/ Variant A
Leithaprodersdorf	chamber tomb H/1953, site 41	?	?	?	bowl, 1 lyre player	Hallstatt lyre/ Variant A
Providence (Bologna?)	Art dealership, Certosa di Bologna? tomb ?	?	?	?	bronze situla, 1 lyre player	Situlae Lyre/ Variant A
Bologna – Certosa	tomb 68	cremation	?	?	bronze situla, 1 lyre player	Situlae Lyre/ Variant A
Montebelluna, necropolis of Posmon	tomb 244	inhumation	masc.	?	bronze situla, 1 lyre player	Situlae Lyre/ Variant B
Magdalenska gora	Tumulus II, tomb ?	?	?	?	bronze situla, 2 lyre player	Situlae Lyre/ Variant B
Dürrenberg-Kranzbichl/Hallein	tomb 346 B	inhumation	masc.	juvenile	bronze situla? fragment, 1 lyre player	Situlae Lyre/ Variant A

als, among them an adult woman, there was a flat bowl on which, in addition to four triangles, a lyre player was placed in a rolling wheel technique (*Stroh 1988*, 60, pl. 87: 5). Further representations of lyre players are depicted on two cone-necked vessels found in the same tumulus. One vessel bears on its shoulder surface a cycle of decorated triangles and three lyre players, the other a cycle of triangles, two stags and three lyre players. The figures are made by using rolling wheel technique (*Stroh 1988*, 61, pl. 89: 1, 2). While the figures resemble the sketches of stick figures, the instruments are more precisely depicted: they all have a symmetrical sounding body in the shape of a mirrored trapezium strung with four strings. These are held by clamping and tuning devices. All four corners of the instrument are emphasized by stronger point impressions. Obviously they are decorated by round knobs, or they are construction elements (Fig. 4: 2–4; *Reichenberger 1985*, 325, 326, fig. 1: 7). Two bowls with representations of lyre players were discovered in Tumulus 89, first occupation, with the cremated bodies of two individuals (*Stroh 1988*, 145, pl. 110: 3; 111: 5). On both bowls, triangles, rectangles and two lyre players appear in the cycle surrounding the vessels, using the proven rolling wheel technique. The instruments are strung with three strings each (Fig. 4: 5, 6). A conical neck vessel from Tumulus 87, burial of a youthful individual, bears on its shoulder a geometrical shape of two triangles joined together, the corners of which are accentuated by deeper punctures. Two further distinctive punctures are located at the point of contact of the two triangles (*Stroh 1988*, 128, pl. 103: 6). A similar image appears on another cone-necked vessel from the same tumulus (*Stroh 1988*, 129, pl. 105: 14). Both geometric figures could be very minimalistic depicted stringed instruments strung with three strings.

In the meantime, lyre representations of 18 grave complexes, a cult place and a stray find are known (Table 1). The finds – ceramic and bronze vessels – were mainly detected in richly decorated graves. Among these, eight inhumations and seven cremations are to be mentioned. Of five complexes more detailed information is missing. The burials mainly belong to the adult age, although here again only few data are known. Both sexes are represented. The cemetery of Schirndorf, Bavaria/Germany stands out with its seven lyre players, followed by the tumuli in Sopron with six representations. Four lyre players are known from Nové Košariská, and two each from the sites of Magdalenska gora, Klein-Klein and Ernstbrunn. The remaining sites Dürrenberg-Kranzbichl/Hallein, Novo mesto – Kandija necropolis, Reichersdorf, Býčí skála-Cave/Brno, Providence (Certosa/Bologna?), Bologna – Certosa,

Montebelluna – Necropolis of Posmon and Leithaprodersdorf, each have one representation of a lyre player. Lyre players perform music not only with a second lyre player (*Eibner 1986*, pl. 1: 2, 2a; 2: 1, 4, 5; 3: 3, 4) but also with panpipe players (*Eibner 2015*, pl. 5: a, c) and aulets (*Eibner 1986*, pl. 5: 1, 2; 2015, 55–84, pl. 5: b).

#### EXPERIMENTAL REPRODUCTION OF A DOUBLE TRAPEZOIDAL HALLSTATT LYRE FROM SCHIRNDORF, BAVARIA

The following research question stimulated me to do an experimental replication:

How could the Schirndorf lyre types and others have been constructed?

At the start of building of the string instruments there were considerations about the size and construction of the instrument. The string holder was assumed to be an equilateral trapezoid composed of bars. The sound box was to consist of boards glued together and envelop the lower half of the trapezoid. Tuning sticks should tension the strings, a bridge should hold the strings up. The Schirndorf lyres are obviously depicted somewhat oversized, possibly to illustrate their importance in people's lives. The instruments were played standing and walking, they should be handy. Considerations about the string length and experience with lyres I had made myself earlier brought me to a length of about 65 cm of freely swinging string, which in turn resulted in an instrument height of two cubits (about 70 cm). First a plan in scale 1:1 was drawn. I decided on the following material: spruce logs for the yoke arms, beech logs for the transverse yoke, a squared spruce log for the base, and 3 mm thin plywood boards and wooden strips 5 mm thick and 45 mm wide for the construction of the sound box. Thin beech logs were used for the tuning rods and a spruce board for the bridge. The work was carried out with modern tools. The first step was to build the string holder. For this purpose, the round bars intended for the yoke arms and the squared timber intended for the base were cut to the desired length. The lower ends of the yoke arms were filed slightly conical. In their upper ends a recess for the cross yoke was created by means of rasps. Two holes with yoke arm diameter were drilled into the squared timber and machined at the planned angle. Additionally, holes were drilled in the recesses for dowels. The yoke arms were fitted with dowels at their ends and inserted into the holes in the bottom squared timber and glued. The hard round timber was cut to size for the cross yoke, which should be slightly overhanging on both sides, fitted into the

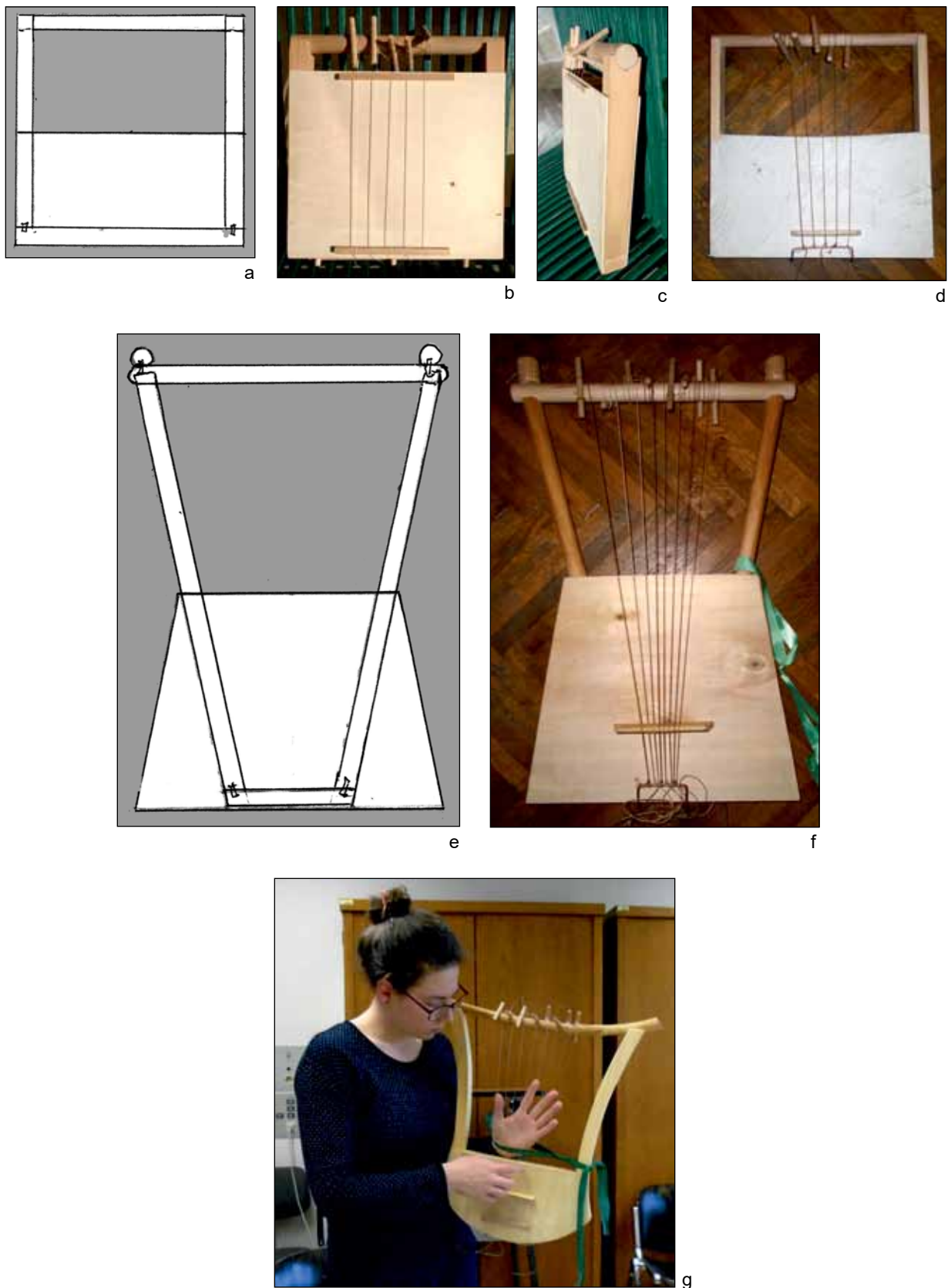


Fig. 5. Reconstructions of lyres. a – construction principle of the rectangular eastern Hallstatt Lyre and zither; b, c – reconstructions as a zither; d – reconstruction as lyre; e – construction principle of the double trapezoidal Hallstatt Lyre; f – reconstruction of the double trapezoidal Hallstatt Lyre; g – Hallstattphorminx constructed by Anna Magdalena Jaklin (plans, reconstructions, graphics and photos by B. M. Pomberger).



recessed yoke arm ends and glued. Knobs were carved and fixed on the yoke. The resonance body was assembled from boards and strips. First the bottom and top panels were sawn from plywood in the desired trapezoidal shape and the side panels were cut from the wooden battens to the appropriate length. The lower ends of the right and left side parts as well as the bottom strip were bevelled so that they fit at an angle to each other. Then these three side parts were glued to the floor panel and the top panel was placed on top of them. In addition, the construction was held together with screw clamps until the glue had dried. The string holder was pushed into the open upper side opening of the box and glued to the box bottom. The string holder was stabilized at the upper side opening inside the sound box by means of small pieces of wood. After drying, this opening was closed with a wooden strip into which semi-circular recesses for the yoke arms were previously cut at both ends. In this way an additional stabilization of the whole construction was achieved. To make the tailpiece, a thin copper rod was cut to the desired length, clamped in a vice and bent into shape with pliers. The tailpiece was inserted into two holes drilled in the baseplate of the sound box. The tuning sticks<sup>4</sup> were made from finger-thick, hand-wide hardwood rods and slightly half-rounded on one side to ensure a better grip on the cross yoke. For the bridge I cut a narrow wooden board three fingers high into a span length and sawed several recesses into it. I decided to string the lyre with eight gut strings instead of two, three or four in order to have all the notes of an octave available for playing. The gut strings were made from sheep gut by myself.<sup>5</sup> They are from 0.9 mm to 2 mm thick. With this stringing the lyre can be tuned in the ancient Greek keys (*Kothe* 1918, 23, 24) Dorian from E3–E2 and a little higher in Hypolydian from F3–F2<sup>6</sup> (Fig. 5: e–f).

EXPERIMENTAL RECONSTRUCTIONS OF  
THE RECTANGULAR CHORDOPHONE  
OF THE EASTERN HALLSTATT  
CULTURE (SOPRON, ERNSTBRUNN,  
LEITHAPRODERSDORF,  
NOVÉ KOŠARISKÁ)

This type of instrument can be constructed both as a zither and a lyre.

### Replica as zither

If we talk about a zither, there is the possibility to build it as a frame zither and as a box zither. I chose five hand widths for the side length of the rectangular string holder.

### Replica as frame zither

For the frame, spruce squared timber measuring 4 x 3 cm was selected and cut to the desired length. The side scantlings were fixed with dowels into the floor scantlings and glued. Recesses for the support of the cross yoke were sawn into the upper end of the side scantlings and filed to a semi-circular shape. The cross yoke itself was made of a beech round wood with a diameter of 3 cm, placed in the recesses of the side scantlings and glued. Three short round timbers inserted into the bottom squared timber fixed the tailpiece clamped behind it, which consists of a bar four hand widths long. The frame zither was strung with five gut strings, which were tied to the tailpiece and led up to the yoke, where they were fixed in the same way as on the Schirndorf lyre with round tuning sticks. The string diameter is 0.6 mm to 1 mm. Depending on the tension of the strings, tones from F4 to A5 can be heard. The sound is quiet because the resonance body consists only of the frame. It is reinforced by a thin tube which is clamped between the back squared timber and the strings.

### Replica as box zither

Since, as already mentioned, the sound of the frame zither is extremely quiet, the instrument was converted to a box zither. For this purpose, two rectangles measuring five hand widths by four hand widths were cut from a 3 mm thick spruce plywood board and glued to the frame. Enough space was left free towards the transverse yoke so that the tuning sticks can be turned. The upper side of the box was not closed. The bottom and top panels were additionally stabilized with three thin boards which were glued to the inside of the box. The bridge is made of narrow rectangular squared timber, through which the vibrations of the strings are transmitted to the soundboard and the box. The upper part of the strings hits the soundboard directly. This produces a buzzing sound. Another possibility would be to slide a second bridge under the strings at the top of the box (Fig. 5: b, c).

<sup>4</sup> Tuning pegs are an invention of Hellenism.

<sup>5</sup> From the Dictionnaire technologique in Gill's Repository, Mai 1824. S. 330. Juni 1824. S. 419. <http://dingler.culture.hu-berlin.de/article/pj014/ar014105> [21–12–2019].

<sup>6</sup> Hypolydian is actually composed of two tetrachords from f to F (F3 to F2). However, this low pitch would require twice the string length.

### Replica as a lyre

I chose for the measurements of the string holder an extended ulna (from the elbow to the tip of the little finger of my arm). The frame was constructed from spruce squared timber 3.8 x 2 cm thick. The cross yoke consists of a beech round wood. The sound box reaches up to half the height of the frame construction. The baseplate was cut from thin plywood and glued to the frame. The sound box was closed on the upper side with a narrow wooden plate, which was glued to two square timbers and the baseplate. The soundboard was made of raw goat skin. The skin was first softened briefly in a water bath and stretched over the soundboard by gluing and nailing. After drying, a good sounding soundboard was created. Tailpiece, bridge and tuning sticks were made as described above for the Schirndorf lyre.

The lyre was strung with five self-twisted strings of sheep gut with diameters of 0.9–0.7 mm. Shortly after stringing the instrument could be tuned as follows: D3–E3–F#3–G3–A3. As soon as the strings adjust the tension, further tunings can be achieved (Fig. 5: d).

A Situlae Lyre was built by Albin Paulus (Eibner et al. 2011, 49, fig. 48: 41). Anna Magdalena Jaklin constructed a Hallstattphorminx as part of my course Music Archaeology at the University of Vienna 2017 (Fig. 5: g).

### CONCLUSIONS

A detailed study of the iconographic representations of the stringed instruments of the Hallstatt

culture and their spatially adjacent cultures allows not only a rough classification into types but also the classification into variants. Some individual types differ greatly from those of the ancient Greek lyre forms. Thus, the types Hallstattphorminx, Situlae Lyre with two variants and the Hallstatt Lyre with two variants, which can also be interpreted as zithers – depending on the interpretation – crystallize. Vessels with representations of lyre players were discovered in richer burials of adults of both sexes. The representations of stringed instruments also allow us to consider the possibility of reproducing them experimentally. The construction of the string holder on which the resonance box is built is the key to the construction of the musical instrument. It can consist of four bars or be made from a bent bar. The soundboard, onto which the vibrations of the string are transmitted via a bridge, should be as thin as possible. Animal skin or thin wooden boards are suitable for this purpose. The strings themselves are made of self-twisted animal guts and are tensioned on the string holder by means of tuning sticks. The size of the lyres can be determined from the size of the representation in relation to the musician and usual craftsman's measurements such as span, ulna, hand width. Furthermore, the handiness and playability of the instrument are also decisive. The length of the vibrating string, material, strength and tension determine the pitches. The replicas of the Hallstatt Lyres presented here sound in the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> octave and are played by the Ensemble ArchäoMusik Vienna.

### LITERATURE

- Bellia 2012 – A. Bellia: *Strumenti musicali e oggetti sonori nell'Italia meridionale e in Sicilia (VI. – III. sec a.C.). Funzioni rituali e contesti*. Lucca 2012.
- Bianchi Citton 2014 – E. Bianchi Citton: Topografia e sviluppo di un centro preromano della fascia pedemontana veneta. Il caso di Montebelluna. In: G. Baldelli/F. Lo Schiavo (ed.): *Amore per l'antico. Dal Tirreno all'Adriatico, dalla Preistoria al Medioevo e oltre. Studi di Antichità in ricordo di Giuliano de Marinis. Volume 2*. Roma 2014, 999–1006.
- Bulleid 1938 – A. Bulleid: *The Lake Village of Somerset*. The Somerset Folk Series 16. London 1938.
- Dobiat 1980 – C. Dobiat: *Das hallstattzeitliche Gräberfeld von Kleinklein und seine Keramik*. Schild von Steier Beiheft 1. Graz 1980.
- Egg/Kramer eds. 2013 – M. Egg/D. Kramer (eds.): *Die hallstattzeitlichen Fürstengräber von Kleinklein in der Steiermark: der Kröllkogel*. Monographien des Römisch-Germanischen Zentralmuseums Mainz 110. Mainz 2013.
- Eibner 1986 – A. Eibner: Musikleben in der Hallstattzeit – Betrachtungen zur „Mousiké“ anhand der bildlichen Darstellungen. In: M. v. Albrecht/W. Schubert (Hrsg.): *Musik in Antike und Neuzeit, Quellen und Studien zur Musikgeschichte von der Antike bis in der Gegenwart*. Sources and Studies in Music History from Antiquity to the Present. Frankfurt/Main – Bern – New York 1986, 271–318.
- Eibner 2015 – A. Eibner: Feste und Rituale in der Situlenkunst. *Mitteilungen der Anthropologischen Gesellschaft in Wien* 145, 2015, 55–84.
- Eibner 2018 – A. Eibner: Motiv und Symbol als Ausdrucksmittel der Bildsprache in der eisenzeitlichen Kunst. *Przegląd Archeologiczny* 66, 2018, 77–136.
- Eibner et al. 2011 – A. Eibner/M. Lochner/A. Paulus/B. M. Pomberger 2011: *Sitularia: Klänge aus der Hallstattzeit. Mitteilungen der Prähistorischen Kommission der Österreichischen Akademie der Wissenschaften* 76. Wien 2011.
- Eibner-Persy 1980 – A. Eibner-Persy: *Hallstattzeitliche Grabhügel aus Sopron (Ödenburg)*. Wissenschaftliche Arbeiten Burgenland 62. Eisenstadt 1980.
- Ghislanzoni 1944 – E. Ghislanzoni: Una nuova tomba di guerriero scoperta a Sesto Calende. In: *Munera. Raccolta di scritti in onore di Antonio Giussani*. Milano 1944, 1–56.

- v. Hornbostel/Sachs 1914 – E. v. Hornbostel/C. Sachs: Systematik der Musikinstrumente. Ein Versuch. *Zeitschrift für Ethnologie* 46, 1914, 553–590.
- Jereb 2016 – M. Jereb: *Die Bronzegefäße in Slowenien*. PBF II/19. Stuttgart 2016.
- Kothe 1918 – B. Kothe: *Abriss der allgemeinen Musikgeschichte*. Leipzig – Prag 1918.
- Lawergren 1996 – B. Lawergren: Leier (Altertum). In: L. Finscher (Hrsg.): *Die Musik in Geschichte und Gegenwart*. Volume 5. Kassel 1996, 1011–1038.
- Lawson 2019 – G. Lawson: A Lyre bridge of the Early Iron Age from High Pasture Cave, Scotland: 1. Archaeology, Description, Comparative Organology. Function and Purpose. In: R. Eichmann/F. Jianjun/J.-Chr. Koch (Hrsg.): *Musikarchäologie aus anthropologischer Sicht*. Vorträge des 10. Symposiums der Internationalen Studiengruppe Musikarchäologie im Provinzmuseum Hubei, Wuhan, China, 21.–25. Oktober 2016. *Studien zur Musikarchäologie* 11, *Orient Archäologie* 40. Rahden/Westfahlen 2019, 213–264.
- Lobisser 2017 – W. Lobisser: *Die Kleinfunde aus Holz aus der eisenzeitlichen Gewerbesiedlung im Ramsautal am Dürrnberg bei Hallein*. Dissertation. Universität Wien. Wien 2017. Unpublished.
- Lobisser, in print – W. Lobisser: *Die Kleinfunde aus Holz aus der eisenzeitlichen Gewerbesiedlung im Ramsautal am Dürrnberg bei Hallein*. *Dürrnberg-Forschungen* 13. Abteilung Siedlung. Bochum, in print.
- Lucke/Frey 1962 – W. Lucke/O. H. Frey: *Die Situla in Providence (Rhode Island)*. RGF 26. Berlin 1962.
- Neugebauer 1987 – J. W. Neugebauer: St. Pölten – Wegkreuz der Urzeit: sieben Jahre archäologische Rettungsgrabungen im unteren Traisental (Niederösterreich) 1981–1987. *Antike Welt* 18/2, 1987, 2–18.
- Pichlerová 1969 – M. Pichlerová: *Nové Košariská. Kniežacie mohyly zo staršej doby železnej*. Bratislava 1969.
- Pomberger 2016 – B. M. Pomberger: The Development of Musical Instruments and Sound Objects from the Late Bronze Age to the La Tène Period in the Area between the River Salzach and the Danube Bend. In: B. Gediga/A. Grossmann/W. Piotrowski (Hrsg.): *Europa zwischen 8. Jhdt. v. Chr. Geb. bis 1 Jhdt. u. Zeit*. Biskupiner Archäologische Arbeiten 11 = Polnische Akademie der Wissenschaften – Abteilung Wrocław, Arbeiten der Archäologischen Kommission 21. Biskupin – Wrocław 2016, 45–76.
- Reichenberger 1985 – A. Reichenberger: Der Leierspieler im Bild der Hallstattzeit. *Archäologisches Korrespondenzblatt* 15, 1985, 325–333.
- Slaski 1950 – J. Slaski: Łużyckie wyroby drewniane z Biskupina, In: J. Kostrzewski (red.): 3. *Sprawozdanie z prac wykopaliskowych w Grodzie Kultury Łużyckiej w Biskupinie*. Poznań 1950, 160–171.
- Stroh 1979 – A. Stroh: *Das hallstattzeitliche Gräberfeld von Schirndorf, Ldkr. Regensburg. Band 1*. Materialh. Bayerischen Vorgesch. 35. Kallmünz/Oberpfalz 1979.
- Stroh 1988 – A. Stroh: *Das hallstattzeitliche Gräberfeld von Schirndorf, Ldkr. Regensburg. Band 2*. Materialh. Bayerischen Vorgesch. 36. Kallmünz/Oberpfalz 1988.
- Stroh/Hughes 1999 – A. Stroh/R. Hughes: *Das hallstattzeitliche Gräberfeld von Schirndorf, Ldkr. Regensburg. Band 6*. Materialh. Bayerischen Vorgesch. 79. Kallmünz/Oberpfalz 1999.
- Stroh/Hughes 2000a – A. Stroh/R. Hughes: *Das hallstattzeitliche Gräberfeld von Schirndorf, Ldkr. Regensburg. Band 3*. Materialh. Bayerischen Vorgesch. 37. Kallmünz/Oberpfalz 2000.
- Stroh/Hughes 2000b – A. Stroh/R. Hughes: *Das hallstattzeitliche Gräberfeld von Schirndorf, Ldkr. Regensburg. Band 4*. Materialh. Bayerischen Vorgesch. 38. Kallmünz/Oberpfalz 2000.
- Stroh/Hughes 2001 – A. Stroh/R. Hughes: *Das hallstattzeitliche Gräberfeld von Schirndorf, Ldkr. Regensburg. Band 5*. Materialh. Bayerischen Vorgesch. 78. Kallmünz/Oberpfalz 2001.
- Zeller 2004 – K. Zeller: L'aristocrazia del sale sul Dürrnberg, In: F. Marzatico/P. Gleischer (ed.): *Guerrieri, Principi ed Eroi fra il Danubio e il Po dalla Preistoria all'Alto Medioevo*. Catalogo della Mostra tenuta a Trento dal 19 giugno – 7 novembre 2004, Castello del Buonconsiglio, monumenti e collezioni provinciali. Trento 2004, 38–401.

## INTERNET

- Dictionnaire technologique in Gill's Repository, Mai 1824. S. 330. Juni 1824. S. 419 [online]. <http://dingler.culture.hu-berlin.de/article/pj014/ar014105> [21–12–2019].
- MIMO 2011 – MIMO Consortium, Revision of the Hornbostel-Sachs Classification of Musical Instruments by the MIMO Consortium, 1–26 [online]. <http://www.mimo-international.com/documents/Hornbostel%20Sachs.pdf> [26–09–2019].

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## Strunové nástroje halštatskej kultúry – od ikonografického vyobrazenia po experimentálnu reprodukciu

Beate Maria Pomberger

### SÚHRN

Podrobné štúdium ikonografických vyobrazení strunových nástrojov halštatskej kultúry a jej susedných kultúr umožňuje nielen ich hrubé zaradenie do typov, ale aj zatriedenie do variantov. Niektoré typy sa veľmi výrazne líšia od tvarov starogréckych lýr. Kryštalizujú sa teda typy: „Hallstattphorminx“, „situlová“ lýra s dvoma variantmi a halštatská lýra taktiež s dvoma variantmi, ktorá môže byť (v závislosti na výklade) interpretovaná aj ako kithara.

Nádoby s vyobrazením hráčov na lýre boli objavené v bohatšie vybavených hrobách dospelých osôb oboch pohlaví.

Zobrazenia strunových nástrojov nám tiež umožňujú zväziť možnosť ich experimentálnej reprodukcie. Kľúčom k stavbe hudobného nástroja je konštrukcia tela so strunníkom na ukotvenie strún, na ktorom je postavená

rezonančná skrinka. Môže sa skladať zo štyroch tyčí alebo môže byť vyrobená z ohnutej tyče. Rezonančná doska, na ktorú sa vibrácie struny prenášajú mostíkom, by mala byť čo najtenšia. Na tento účel je vhodná zvieračia koža alebo tenké drevené dosky. Struny sú vyrobené zo samostatne skrútených vnútorností zvierafa a sú napnuté na nosiči strún pomocou ladiacich kolíkov. Veľkosť lýr sa dá určiť z veľkosti zobrazení vo vzťahu k hudobníkovi a pomocou obvyklých remeselných meraní, ako sú rozpätie, lakťová kosť, šírka ruky. Ďalej je rozhodujúca aj ovládateľnosť a spôsobilosť nástroja na hranie. Dĺžka vibračnej struny, materiál, sila a napätie určujú výšku tónov. Repliky halštatskej lýry, ktoré sú prezentované v tomto článku, znejú v 3., 4. a 5. oktáve a hrá na nich Ensemble Archäo-Musik Vienna.