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Towards an Absolute Chronology at the Beginning of the Late Bronze Age in Slovenia. New Radiocarbon Dates from Ljubljana

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Abstract

The cemetery at Ljubljana – Dvorišče SAZU is of fundamental importance for the research into the Late Bronze Age in the territory of the southeastern Alps and beyond. The recently conducted revision of the entire cemetery revealed that the oldest cremations should be placed already at the very beginning of the Late Bronze Age period. Such observations have, furthermore, been confirmed by the new AMS dating results. The analysis of ceramic finds from Ljubljana cemetery showed that the best analogies for them can be found in the territory of the northern Carpathian Basin. Due to analogies in ceramic finds, cremated bones from cemeteries of the so-called Piliny Culture in Slovakia (Radzovce, Šafárikovo) were also sent for AMS analysis. Further typo-chronological analysis of the bronze grave goods revealed that connections with communities from the northern Carpathian Basin were decisive not only for the formative phase of the cemetery in Ljubljana at the very beginning of the Late Bronze Age but also later on during the Early Urnfield period. In conclusion, all cremation graves in Slovenia from the Initial and Early Urnfield period are considered. Although their number is exceptionally small, it seems possible to distinguish two separate phases. The oldest phase can be correlated with the Br D/Ha A1 period (Ljubljana Ia 1 phase) and is dated from the 13th century to the first half of the 12th century BC. The second phase, covering the major part of the Ha A period (Ljubljana Ia 2 phase), ends around the middle of the 11th century BC.

Keywords

Absolute chronology, Late Bronze Age, Initial and Early Urnfield period, Br D period, Ha A period, Ljubljana – Dvorišče SAZU cemetery, urnfields, cremation burials.

Zusammenfassung – *Zur absoluten Chronologie am Beginn der Spätbronzezeit in Slowenien. Neue Radiokarbondaten aus Ljubljana*

Das Gräberfeld von Ljubljana – Dvorišče SAZU ist für die Erforschung der Spätbronzezeit im Gebiet der südöstlichen Alpen und darüber hinaus von großer Bedeutung. Eine Neubewertung des gesamten Gräberfeldes ergab, dass die ältesten Brandbestattungen bereits an den Beginn der Spätbronzezeit zu stellen sind. Diese Beobachtungen wurden auch durch die Ergebnisse neuer AMS-Datierungen bestätigt. Die Analyse der Keramikfunde aus dem Gräberfeld von Ljubljana zeigte, dass die besten Analogien auf dem Gebiet des nördlichen Karpatenbeckens zu finden sind. Aufgrund dieser Parallelen im Keramikspektrum wurden auch AMS-Analysen von Leichenbrand aus Gräberfeldern der sog. Piliny-Kultur in der Slowakei (Radzovce, Šafárikovo) durchgeführt. Weitere typo-chronologische Untersuchungen der Bronzebeigaben legen nahe, dass Verbindungen zu Gemeinschaften aus dem nördlichen Karpatenbecken nicht nur in der Entstehungsphase des Gräberfeldes in Ljubljana am Beginn der Spätbronzezeit, sondern auch noch in der frühen Urnenfelderzeit bedeutsam waren. Zum Abschluss werden alle Brandgräber der frühen Urnenfelderzeit in Slowenien betrachtet. Trotz ihrer geringen Anzahl ist es möglich, zwei getrennte Phasen zu unterscheiden: Die ältere Phase kann mit der Br D/Ha A1-Periode (Ljubljana Ia 1-Phase) korreliert werden und wird vom 13. bis zur ersten Hälfte des 12. Jahrhunderts v. Chr. datiert. Die zweite Phase, die den größten Teil der Ha A-Periode (Ljubljana Ia 2-Phase) umfasst, endet etwa in der Mitte des 11. Jahrhunderts v. Chr.

Schlüsselbegriffe

Absolutchronologie, Spätbronzezeit, frühe Urnenfelderzeit, Br D-Periode, Ha A-Periode, Gräberfeld Ljubljana – Dvorišče SAZU, Urnenfelder, Brandbestattungen.

1. Introduction

The cemetery discovered in the courtyard of the Slovenian Academy of Sciences and Arts in Ljubljana (further: Ljubljana – Dvorišče SAZU) comprises more than 300 cremation graves (Fig. 1). The cemetery is of fundamental importance for the research into the Late Bronze and Early Iron Age periods in the territory of the southeastern Alps. The first excavations and subsequent studies in the second half of the 20th century clearly demonstrated that the cemetery site is crucial for the research on the chronology of

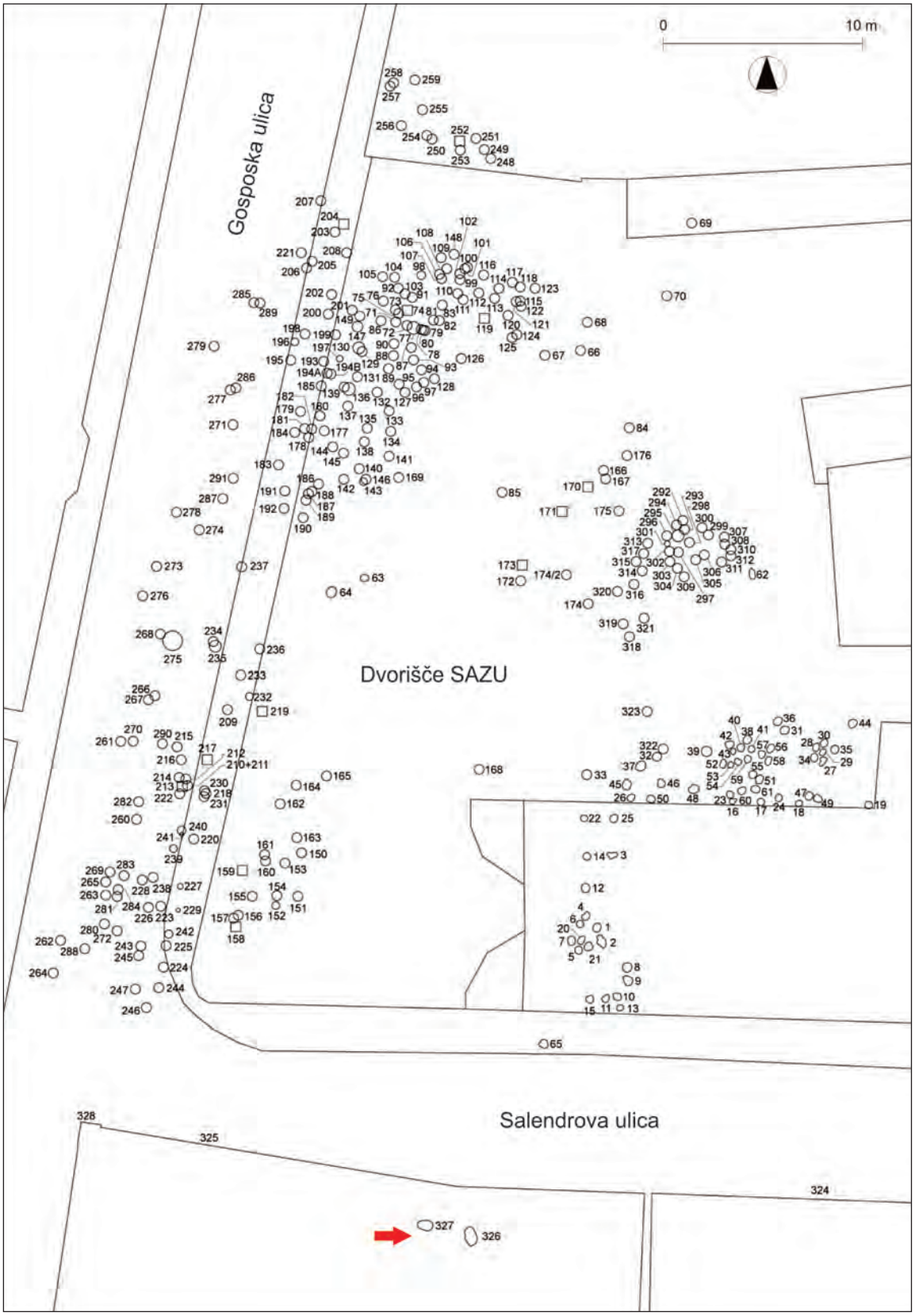

Fig. 1. Plan of the Dvorišče SAZU cemetery in Ljubljana with the location of graves 326 and 327 marked: circles = location of graves; squares = location of finds without cremated human remains (after Škvor Jernejčič 2014a).

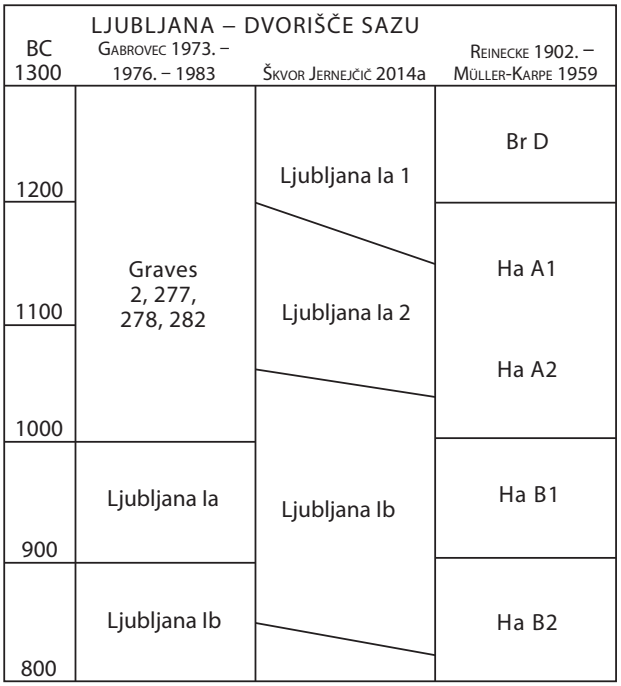

Fig. 2. Chronological table with phases of the Ljubljana group according to Stane Gabrovec correlated with the new periodisation of the Ljubljana cemetery.

the Bronze and Iron Ages in Slovenia.[1] Consequently, Stane Gabrovec used the analysis of the graves from Ljubljana as the basis for the elaboration of his chronological scheme. The latter, in turn, served as a reference point not only for other sites of the so-called Ljubljana group from Slovenia dating to the Late Bronze and Early Iron Age periods, but also for the sites from a wider neighbouring area.[2] Using the typo-chronological analysis of the grave goods, Gabrovec succeeded in differentiating six chronological phases ranging from the phase Ljubljana Ia (Ha B1) to the phase Ljubljana IIIb (Ha C2), which he dated in the period between the 10th and the 7th century BC (Fig. 2). The Ljubljana cemetery has been the subject of various subsequent studies.[3] Further archaeological research in the western part of the Dvorišče SAZU site and on Gosposka ulica revealed that occasional separate graves must be placed as early as the Ha A period.[4] However, the recently conducted revision of the entire cemetery, complemented by a detailed analysis of the ceramic material and new radiocarbon dating results presented here demonstrate that the oldest graves from Ljubljana should be dated to the very beginning of the Late Bronze Age, that is, in the 13th century BC or in the Br D period.[5]

2. The First Cremation Graves at the Dvorišče SAZU Cemetery in Ljubljana (Br D and Ha A periods)

The aforementioned revision and examination of the Dvorišče SAZU cemetery in Ljubljana comprised graves 1–323, which were excavated up to 1993 and are now kept either in the National Museum of Slovenia (NMS) or at the Museum and Galleries of Ljubljana (MGML).[6] In 2001, two further urn cremation graves were discovered during the renovation of the Auersperg or Turjak Palace,[7] which is positioned directly to the south of the Dvorišče SAZU cemetery area (Fig. 1). Both graves, together with their grave goods are presented here for the first time in drawings and catalogue descriptions (see Catalogue; Pl. 1).

The analysis of the graves from Ljubljana showed that the oldest graves at the Dvorišče SAZU cemetery must be dated to the very beginning of the Late Bronze Age or in the Initial Urnfield period (Br D). These new research results therefore led us to supplement the six-phase chronological scheme for the cemetery in Ljubljana and the Ljubljana group, which was originally proposed by Gabrovec (Fig. 2).[8] According to him, the phase Ljubljana Ia initially consisted above all of graves from the 10th century BC (Ha B1), whereas later he also placed graves 2, 277, 278 and 282 from the Ha A period in the very same phase. Hence, in my study I decided to divide the Ljubljana Ia phase into two separate stages, identified as phases Ljubljana Ia 1 and Ia 2. With regard to the relative chronology, they can be associated with the Br D and Ha A1/A2 periods, while the new absolute dating results point to the fact that both phases should be placed in the 13th and up to the middle of the 11th century BC at the latest. The next stage at the cemetery was designated by Gabrovec as the Ljubljana Ib phase and marked the period of the 9th century BC (Ha B2). In contrast, according to the chronological scheme proposed here, the Ljubljana Ib phase comprises the entire Late Urnfield

1 Stare 1954. – Puš 1971. – Puš 1982.

2 Gabrovec 1973. – Gabrovec 1976. – Gabrovec 1983.

3 For example Teržan 1987. – Parzinger 1988, 24–27. – Teržan 1992. – Teržan 1995. – Torbrügge 1995, 578–587. – Pare 1998. – Gleirscher 2006.

4 Puš 1982, 175. – Gabrovec 1983, 65–66. – Teržan 1995, 330 and Fig. 5.

5 Škvor Jernejčič 2018, 538 and Figs. 1, 3. The revision of the cemetery was undertaken as a part of my doctoral dissertation (Škvor Jernejčič 2014a), which is in preparation and is to be published within the Catalogi et Monographiae series of the National Museum of Slovenia (Škvor Jernejčič forthcoming).

6 Stare 1954. – Stare 1960–1961. – Puš 1971. – Puš 1982. – Vahen 1995.

7 Horvat 2002.

8 Gabrovec 1973, Table 1.

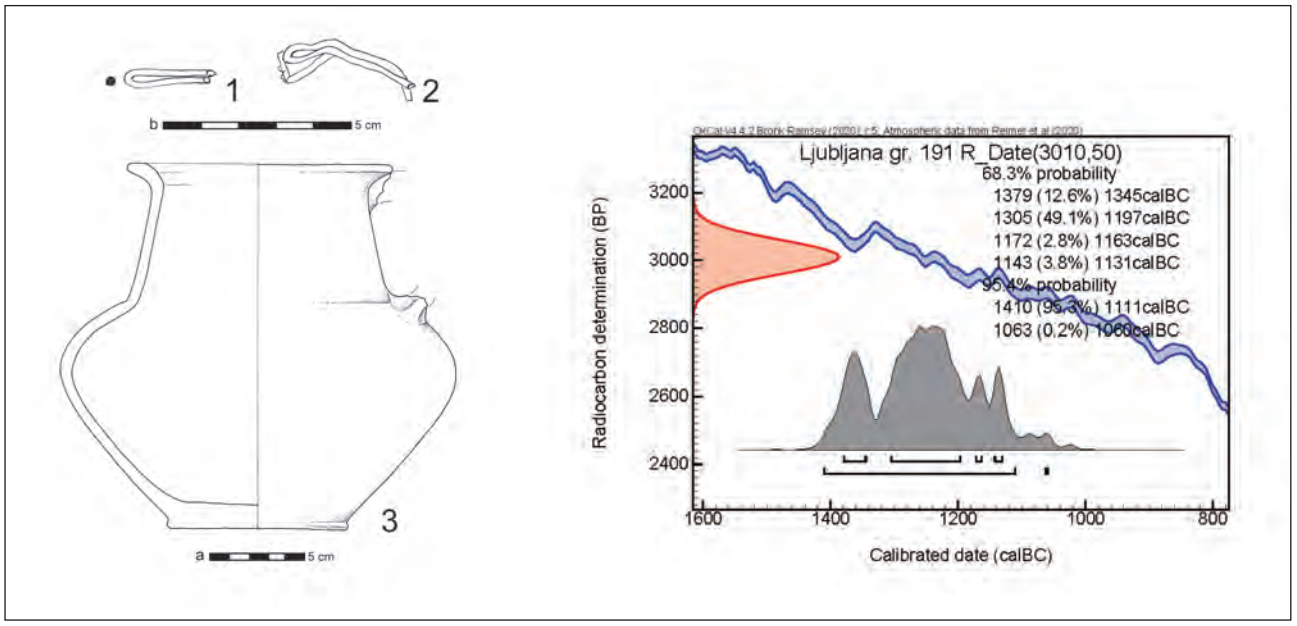

Fig. 3. Dvorišče SAZU cemetery in Ljubljana, grave 191. Result of the AMS radiocarbon analysis conducted on the cremated human bone sample from grave 191 in Ljubljana (KIA-47825) (1–2 after Puš 1971, Pl. 33/6; 3 drawing by I. Murgelj). Scale: 1–2 = b [1:2]; 3 = a [1:4].

period (Ha B1–Ha B2 periods), set between the middle of the 11th and the second half of the 9th century BC (Fig. 2).[9]

2.1. Initial Urnfield Period – Ljubljana Ia 1 Phase

The oldest cremation graves from Ljubljana are few in number and as a rule contain urns. They are distributed more or less over the entire area of the cemetery and form small groups of several graves.[10] The majority of these most ancient graves contained only the urn, while only exceptionally has a second vessel been attested, for example a dish that covered the urn (Pl. 1/1).[11] Bronze grave-goods are extremely rare in this phase and when present, they are placed above or between the cremated bones (Figs. 3/1–2; 10/2; 11/2). This fact is not surprising, as in other contemporaneous graves from nearby regions as well, such as, for example, in the Virovitica Group, pieces of bronze attire are almost completely absent.[12] The repertoire of ceramic forms used as urns from the Ljubljana Ia 1 phase is represented by one-handled vessels, either jugs or cups (Figs. 3/3; 11/1; Pl. 1/2, 5). Interestingly, the jugs contained the cremated remains of juvenile or adult female individuals, while the cups had been exclusively used as urns in infant graves (cf. Fig. 11; Tab. 1).[13]

Jugs at the Ljubljana cemetery are attested in graves 191, 326 and 327 (Figs. 3/3; 4/3, 5, 6; Pl. 1/2, 5). The examples from graves 12 and 13 are somewhat smaller and differently formed.[14] In grave 191 cremated human bones were found at the bottom of the jug, while above them lay fragments of two bronze hair-rings (Fig. 3/1–2). The cremated remains were discovered both in the urn and in the grave pit.[15] From the original archaeological documentation of the excavator Ivan Puš, it is apparent that under and around the urn larger pebble stones were found. Anthropological analysis revealed that most likely a juvenile individual had been buried in this grave, the sex of which, however, could not be determined (Tab. 1). The presence of hair-ring fragments in the grave suggests a female individual.

Graves 326 and 327 were discovered during the renovation of the Auersperg Palace (nowadays MGML) (Fig. 1) and also represent urn cremation burials. Both urns were covered with a dish with inverted rim (Pl. 1/1, 2, 4, 5). Each

9 For the view that the beginning of the Early Iron Age period in the southeastern Alpine area should be placed already in the Ha B3 period or in the Ljubljana II phase, see Škvor Jernejčič 2014c, 149 and Fig. 10.

10 Škvor Jernejčič 2014a, Figs. 6.2, 6.6.

11 Another such case is grave 147: Puš 1971, 39 and Pl. 22/4–5.

12 Cf. Vinski-Gasparini 1983, 559. – Teržan 1996, 244. – Teržan 1999, 111. – Ložnjak Dizdar 2011a. – Ložnjak Dizdar 2011b, 18.

13 Škvor Jernejčič 2014a, 59, 201, 203. The anthropological analysis of cremated bones from the Dvorišče SAZU cemetery in Ljubljana (graves 70–323) was conducted by T. Tomazo-Ravnik (Kranj). Cremated remains from graves 1–69 are not preserved.

14 Stare 1954, Pls. XIII/1; XIV/2. – Škvor Jernejčič 2014a, Pl. 6/7. – Turk, Turk 2019, Fig. 263.

15 Puš 1971, 56.

Site	Age	Sex	MNI	Anthropological analysis (authorship or references)
Ljubljana (SI), grave 191	Juvenis (14–20 years)?	Nd	1	T. Tomazo-Ravnik
Ljubljana (SI), grave 326	25–30 years	Probably female	1 + 2?	J. Wahl; see *Catalogue*
	+ subadultus?	Nd		
Ljubljana (SI), grave 327	± 30 years	Probably female	1	J. Wahl; see *Catalogue*
Radzovce (SK), grave 216/69	Maturus	Female	1, possibly 2 (see note 39)	Stloukal, Furmánek 1982, 45
	Infans (3–4 years)	Nd	1	
	Neonatus	Nd	1	
Šafárikovo (SK), grave 105/68	Adultus	Probably female	1	Stloukal, Furmánek 1982, 89

Tab. 1. Anthropological analysis of cremation graves containing jugs. Nd = not defined; MNI = minimum number of individuals.

grave contained one further grave good: grave 326, a ceramic spindle-whorl, and grave 327, a fragment of a bronze necklace; in both cases they were discovered within the urn (Pl. 1/3, 6). As regards the anthropological analysis, grave 326 contained a female individual, aged between 25 and 30 years. It cannot be ruled out completely that besides the latter two other individuals had also been interred in the grave, one of them allegedly younger (*subadultus*) (Tab. 1). In grave 327 a female individual, approximately 30 years old, was buried (Tab. 1).[16] A somewhat smaller jug from grave 12 was placed above the cremated remains and bones, which had been laid directly into the grave pit, hence, in this case, the vessel obviously did not function as an urn. Two pins and a double-cross-shaped belt clasp supposedly belonging to this grave were, in fact, discovered in the layer of charcoal and ash above the jug.[17] In grave 13 the burnt bones and some cremated remains were found both inside the jug as well as in the grave pit immediately below. Bronze grave goods and a glass bead with eyes were discovered beside the jug, while animal bones lay above it.[18] A fragment of a similar jug was also discovered in grave 2.[19]

The attested examples of jugs from the Ljubljana cemetery differ from each other as regards their size, the shape of separate vessel parts and also with regard to their decoration, what could indicate that they are not contemporaneous and that their form changed over time. The type of jugs featuring a handle, the height of which does not exceed the vessel rim, and decorated with knobs on the body-to-shoulder transition, has its roots as far back as the Middle Bronze Age. Precursors of the jugs from Ljubljana can thus be found in older jugs with a short neck and large flat knob, encircled with a groove, as attested, for example, at the settlement of Brinjeva gora.[20] A somewhat smaller jug decorated with a knob was also found in the cremation grave on the site of Potrčeva ulica at Ptuj.[21] A rather more curved neck and accentuated rim characterise the jug examples from Otočec in the Dolenjska region, Pritschitz/Pričica near Lake Wörthersee /Vrbsko jezero in Carinthia, Hörbing in Styria and from the Hungarian site of Mezőlak-Szélmező.[22] The latter has been attributed to the Middle Bronze Age Tumulus Culture. Specimens of small jugs at the Zagyvapálfalva cemetery in Hungary were dated to the Late Bronze Age period by Kemenczei, whereas their form is likewise believed to be developed from the tradition of the Middle

16 The anthropological analysis of cremated bones from graves 326 and 327 at the Dvorišče SAZU cemetery in Ljubljana was carried out by Joachim Wahl (Regierungspräsidium Stuttgart, Landesamt für Denkmalpflege, Konstanz, Germany).

17 Stare 1954, 29 and Pl. XIII/2, 3, 5.

18 Stare 1954, 29–30 and Pls. XIII/6–7; XIV/3. Animal bones from grave 13 include a tooth from a sheep/goat, a rib fragment of indeterminable animal species and another unidentifiable animal bone fragment (cf. Škvor Jernejčič 2014a, Appendix 4). The analysis of the animal bones was conducted by Borut Toškan (Institute of Archaeology ZRC SAZU, Ljubljana).

19 Stare 1954, Pl. V/12. – Škvor Jernejčič 2014a, Pl. 1/15.

20 Pahič 1981, Fig. 28/1–2. – Gabrovec 1983, Fig. 5/9.

21 Gabrovec 1983, 70–71 and Fig. 6/4–5, Pl. 1/13. – Jevremov 1988–1989, Fig. 4/1. – Teržan 1999, 111. See further below, under section 3, for more detailed information as regards the dating of this grave.

22 Pittioni 1954, Fig. 275. – Bernhard 2007, Pl. 2/3. – Schumann 2012, Fig. 3/4. – Horváth, Ilon 2017, Fig. 13/1.

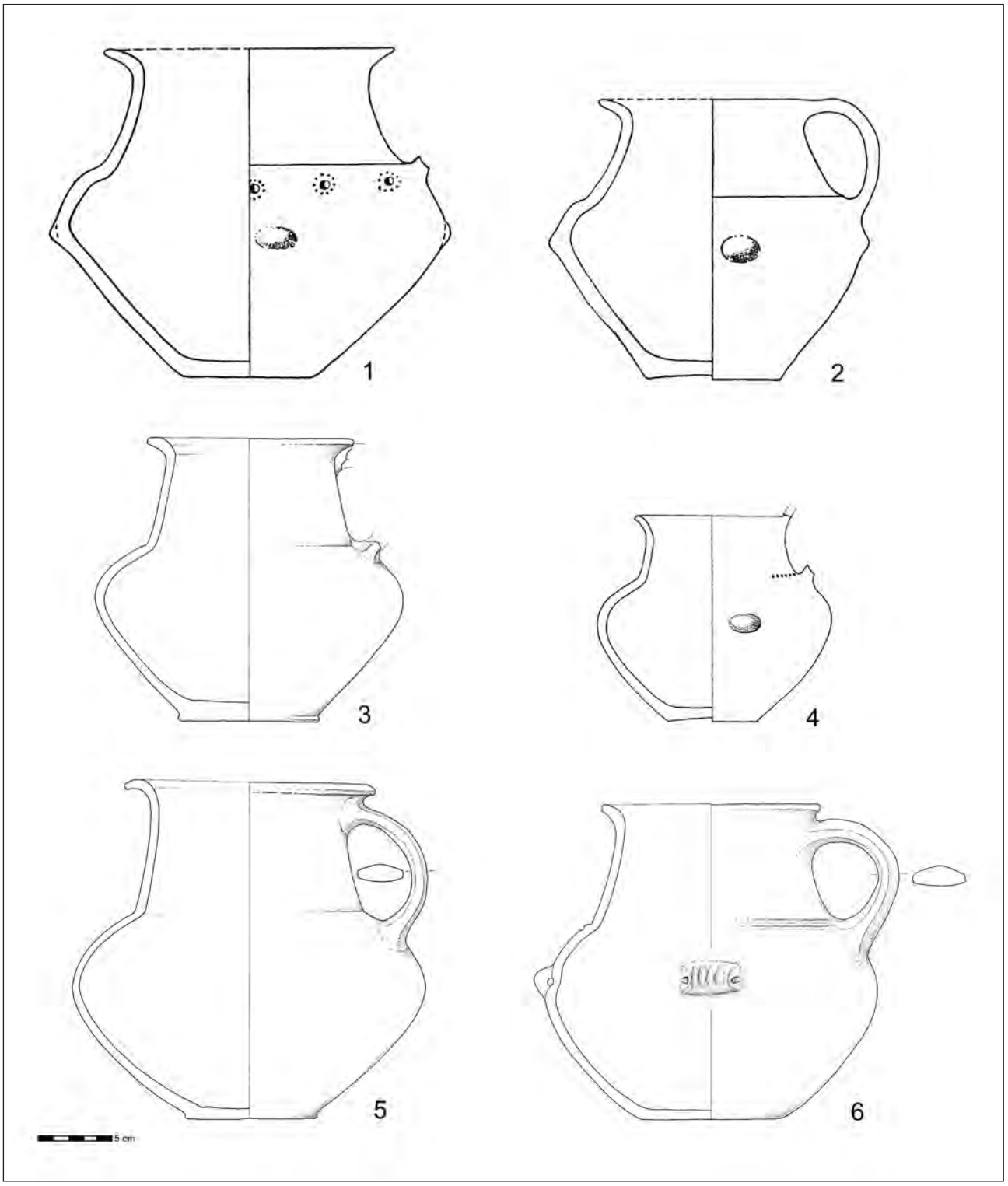

Fig. 4. Jugs: 1. Šafárikovo, grave 105/68. – 2. Šafárikovo, grave 90/68. – 3. Ljubljana – Dvorišče SAZU, grave 191. – 4. Radzovce, grave 216/69. – 5. Ljubljana – Dvorišče SAZU, grave 327. – 6. Ljubljana – Dvorišče SAZU, grave 326 (1, 2 after Furmánek 1977, Pls. XI/11; XII/20; 4 after Furmánek, Mitáš, Budaváry 2016, Pl. XXXVIII/16; 3, 5–6 drawing by I. Murgelj). Scale: 1–6 = 1:4.

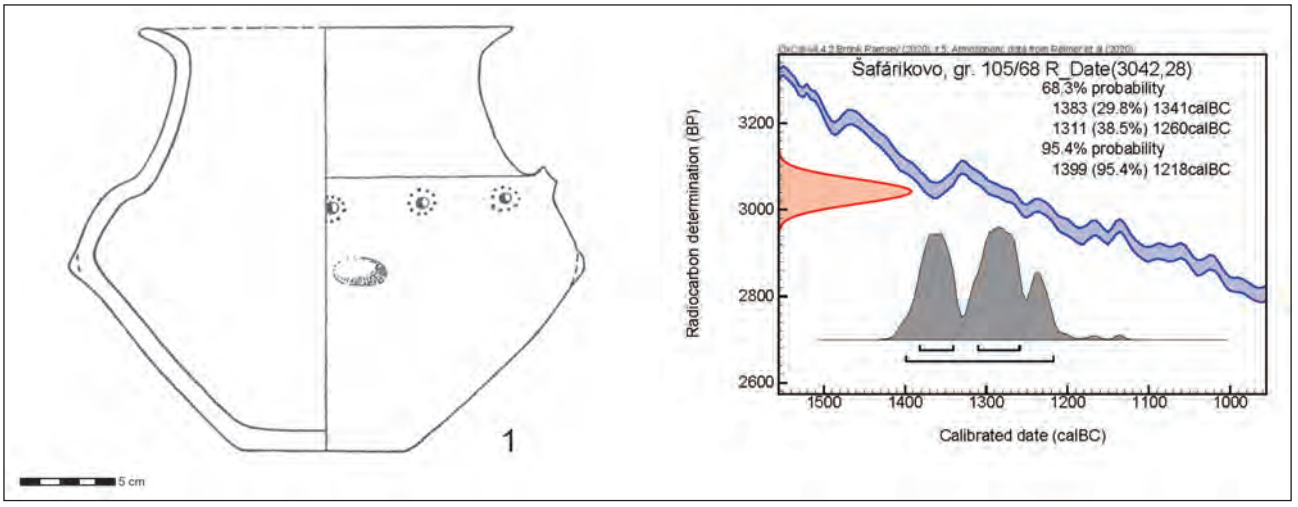

Fig. 5. Šafárikovo, grave 105/68. Result of the AMS radiocarbon analysis conducted on the cremated human bone sample from grave 105/68 at the Šafárikovo site (KIA-51989) (1 after Furmánek 1977, Pl. XII/20). Scale: 1 = 1:4.

Bronze Age Tumulus Culture.[23] A similar jug is also attested in grave 4 at the Panické Dravce site from Slovakia.[24]

The jugs from Ljubljana are set apart by a somewhat higher conical neck, a characteristic for which only rare analogies can be found in the southeastern Alpine area. Closely corresponding example is known only from the Ljubljanica River at Špica.[25] Surprisingly, such jug forms are known from the territory of the northern Carpathian Basin. The best parallels can be found in the southern part of the central Slovakia region or in the South Slovak Basin ('Juhoslovenská kotlina') at sites of the Piliny Culture, such as, for example, in Šafárikovo (nowadays Tornaľa) (Figs. 4/1, 2; 5/1) and Poltár.[26]

These jugs have been dated by Furmánek, who compared them with jug examples from Hungarian sites, to the Middle Bronze Age or the Br B1–B2 (Br C1) periods.[27] Similar jugs, although rarely attested, appear in infant graves at the cemetery of Radzovce, likewise located in the southern part of central Slovakia (Figs. 4/4; 8/8).[28] Identical jug examples were also discovered during the recent excavations of the Zagyvapálfalva-Salgótarján cemetery,[29] lying in the northernmost part of Hungary and only 18 km away from the Radzovce site. The excavation results of the Zagyvapálfalva-Salgótarján cemetery, however, have, until now, only been published in preliminary reports and articles.[30] According to the anthropological analysis undertaken, such jugs were attested at this cemetery only in female and infant graves.[31] Comparisons can also be found in grave pottery from the Zemplínske Kopčany site in eastern Slovakia, which is dated to the Br D period.[32] Additional jugs are known from the area of the Egyek Group, as, for example, at the Mezőcsát-Szőkehát cemetery in the Upper Tisza region.[33] Two further examples of smaller jugs with a somewhat more flattened shape of the handles, attached directly to the vessel rim, have also been attributed to the repertoire of the Egyek Group.[34] The jug specimen from grave 402 at the Budapest-Békásmegyer site, which features a shorter handle, connecting the vessel neck with the shoulders, is apparently younger and can be placed in the Late Urnfield period.[35] In view of the aforementioned examples,

23 Kemenczei 1967, 278–279 and Figs. 2/2; 3/5; 6/9.
24 Furmánek 1977, Pl. XXVI/8.
25 Gabrovec 1961, Pl. 58/17.
26 Furmánek 1977, 310 and Pls. XI/11; XII/20; XVII/17; XXXVII/9. – Furmánek, Veliačik, Vladár 1991, Fig. 18/7.
27 Furmánek 1977, 310. See also Kemenczei 1965, Figs. 4/7; 8/6, 16. – Kemenczei 1970, Pl. XIV/16.
28 Furmánek, Mitáš, Budaváry 2016, 34, 78 and Pls. IX/17; XXVI/13.
29 Guba, Vaday 2008a, Fig. 10/5.
30 Guba, Vaday 2008a. – Guba, Vaday 2008b. – Guba 2010. – Guba 2015. – Guba 2020.
31 The entire cemetery was examined by Szilvia Guba (Kubinyi Ferenc Múzeum, Szécsény) as part of her doctoral dissertation. I would like to take this opportunity to thank her sincerely for the information on anthropological analysis and for the opportunity to examine the finds and drawings from the Zagyvapálfalva site.
32 Demeterová 1984, Pls. III/9; VIII/8; XIII/8. – Furmánek, Veliačik, Vladár 1991, Fig. 19/21; Przybyła 2009, Fig. 15/30.
33 Kovács 1966, Fig. 17/5.
34 Kobály 2004, Cat. nos. 303, 317.
35 Kalicz-Schreiber 2010, Pl. 183/7. – Váczi 2010, 247, Typentaf. 1/7–11.

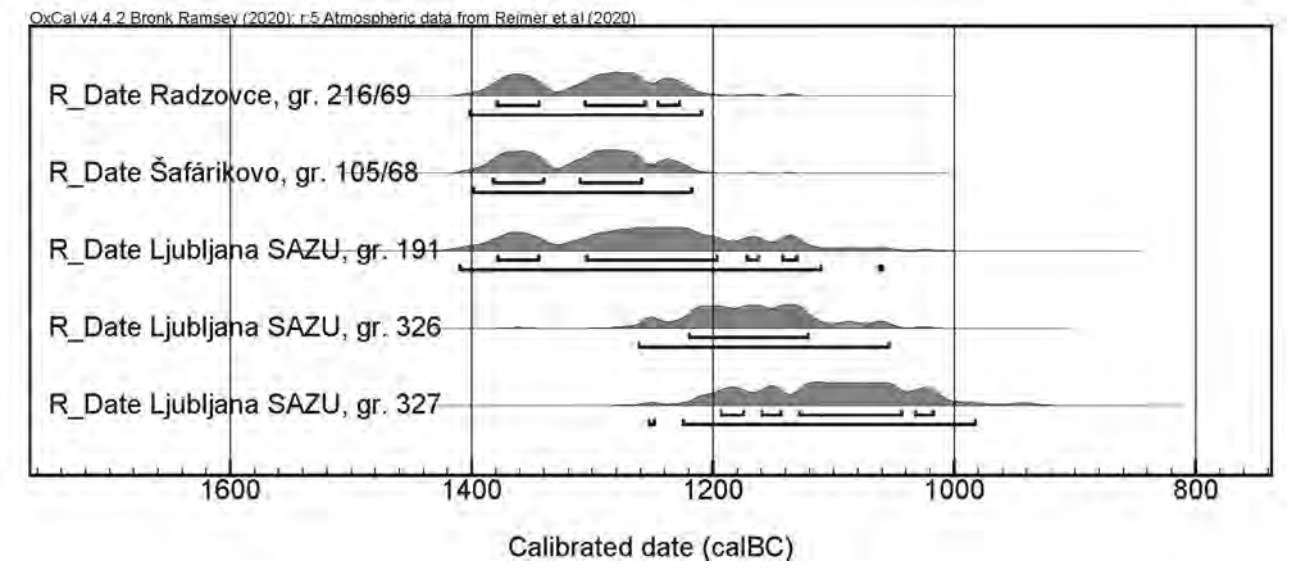

Fig. 6. Temporal spans of radiocarbon dating results from the sites of Ljubljana, Šafárikovo and Radzovce.

Lab number	Sample	Acetic Acid Leaching	C-Content	pMC†	Radiocarbon Age	$\delta^{13}C$‡
KIA-52145	Radzovce grave 216/69, Bio-Apatite	0.6%	0.30%	68.55 ± 0.27	3035 ± 30 BP	-25.5 ± 0.2‰
KIA-51989	Šafárikovo grave 105/68, Bio-Apatite – 1.0 M AA	2.3%	0.37%	68.47 ± 0.24	3042 ± 28 BP	-18.1 ± 0.2‰
KIA-51258	Ljubljana grave 146, Bio-Apatite	2.2%	0.24%	68.95 ± 0,25	2985 ± 30 BP	-22.89 ± 0,09‰
KIA-47825	Ljubljana grave 191, Bio-Apatite	1.1%	0.12%	68.77 ± 0.41	3008 ± 48 BP	-19.75 ± 0.11‰
KIA-51260	Ljubljana grave 278, Bio-Apatite	0.8%	0.27%	69.82 ± 0,24	2885 ± 30/25 BP	-17.81 ± 0,10‰
KIA-51648	Ljubljana grave 326, Bio-Apatite – 1.0 M AA	4.1%	0.29%	69.20 ± 0.25	2957 ± 29 BP	-14.9 ± 0.1‰
KIA-51649	Ljubljana grave 327 Bio-Apatite – 1.0 M AA	21.5%	0.38%	69.63 ± 0.32	2910 ± 40 BP	-20.1 ± 0.2‰

Tab. 2. Data on radiocarbon-dated samples of cremated human bones from the cemeteries of Ljubljana, Šafárikovo and Radzovce.

it can therefore be stated that jugs with a handle, the height of which does not exceed the vessel rim, and which bear decoration with knobs on the body-to-shoulder transition primarily appear in the Middle Bronze Age, whereas similar jug examples dating to the Br D period are attested especially in the Upper Tisza region and in the southern part of central Slovakia, that is, in the area of the Piliny Culture and Egyek Group.

The research revealed the need to check the relative chronological position of the mentioned jugs, both from the Piliny Culture and examples from the cemetery of Dvorišče SAZU in Ljubljana, with the help of radiocarbon dating. In order to achieve this, calcinated bones from five cremation graves containing such jugs from the cemeteries of Dvorišče SAZU, Šafárikovo and Radzovce have been sampled and sent for analysis (Fig. 6; Tab. 2). Regarding the graves from Ljubljana, the AMS dating results confirmed that jugs of this type were in use between the 13th and 12th centuries and up to the first half of the 11th century BC.

The AMS date obtained on cremated bone from grave 191 indicates that the grave should most likely be dated to the 13th century BC (Fig. 3; Tab. 2). Consequently, it represents

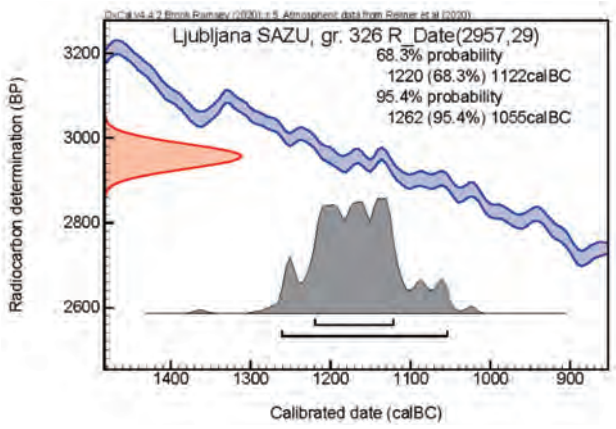

Fig. 7. Result of the AMS radiocarbon analysis conducted on the cremated human bone sample from grave 326 in Ljubljana (KIA-51648). Cf. also Tab. 2.

one of the oldest cremation burials in Slovenia, the age of which could be determined through the radiocarbon dating method (Figs. 18–19). Grave 326 has been dated at the close of the 13th or in the 12th century BC, while grave 327 ought to be placed at the end of the 12th or in the first half of the 11th century BC (Figs. 7, 16; Tab. 2).[36] Hence, jugs from the Ljubljana cemetery were evidently in use throughout several generations or in the phases Ljubljana Ia 1 and Ia 2 (Br D and Ha A periods).

At the same time, the recent radiocarbon dating analysis revealed that the graves from Šafárikovo in Slovakia, which contain jugs and represent the best analogies for examples from Ljubljana, are more or less contemporary with the graves including jugs at the Dvorišče SAZU cemetery. The AMS dating of cremated bone sample from grave 105/68 at Šafárikovo confirmed that the grave should be dated to the 14th or, more likely, to the 13th century BC (Fig. 5; Tab. 2). It represents an urn cremation grave, containing, besides the urn, also a glass bead and cremated animal bones.[37] In a similar fashion as was the case with the jug from Ljubljana grave 191, the jug from Šafárikovo also has a broken-off handle. According to the anthropological analysis, the jug from grave 105/68 in Šafárikovo contained the remains of an adult person, supposedly female (Tab. 1).

A very similar dating has been obtained from the AMS analysis conducted on the cremated bone of an adult person from grave 216/69 at Radzovce, which, among other things, contained a smaller jug decorated with a knob (Figs. 4/4; 8/8). The radiocarbon dating result demonstrates that the grave should be placed in the 14th or in the 13th century BC (Fig. 9; Tab. 2). Grave 216/69 from Radzovce represents one of the outstanding graves at the cemetery, containing a relatively large number of grave goods (Figs. 8–9).[38] It also stands out from the majority of other graves due to the presence of miniaturised grave goods, either bronze, including a small axe, dagger and a chisel, or ceramic, such as a portable oven or pyraunos and two small jugs (Fig. 9/2–3, 6–9). Several individuals had been interred in grave 216/69 at Radzovce, comprising the burials of an older female person,[39] a child and a new-born (cf. Tab. 1). The aforementioned smaller jug (Fig. 8/8), which had been used as an urn and contained the remains of a child, bears a knob decoration and is closely related to the urn from Ljubljana grave 191 as far as its form is concerned. According to Furmánek and Mitáš, grave 216/69 represents one of the oldest burials at the Radzovce cemetery and has consequently been placed in the Br B2 (C1) period.[40] However, in view of the newly obtained radiocarbon dating result, it would appear that the grave is somewhat younger and should be dated to the 14th or 13th century BC (Br C2/D period). Essentially, such dating is also supported by the two pin specimens from the grave, which show a rectangular or rhombic cross section of their necks and were found in two separate urns, the first containing the remains of an adult, while in the second a new-born individual was attested (Fig. 8/6, 10). The pin discovered in the urn of an adult can be classified as the Ilava type (Fig. 8/6), while the other example (Fig. 8/10) has been defined by Novotná as the pin with a mushroom-shaped head (*Nadel mit pilzförmigem Kopf*).[41] Novotná placed the Ilava-type pins to the Diviaky phase and the pins with a mushroom-shaped head to the Velatice-Očkov phase, thus dating both pin types to the older Urnfield period.[42] Bronze pendants of an open heart shape (Fig. 8/2–4), which were discovered in urn no. 1 (Fig. 8/1), were in use during a longer time period according to Furmánek, that is, already from the Early Bronze Age and throughout the entire Middle Bronze Age period.[43] Apparently, the use of these open

36 The result of the AMS dating analysis of the cremated bone sample from grave 326 in the Dvorišče SAZU cemetery at Ljubljana is somewhat problematic – see further below.

37 Stloukal, Furmánek 1982, 89. In the article from 1977, where the grave was first published, the glass bead is not mentioned (Furmánek 1977, Pl. XII/20).

38 Furmánek, Mitáš 2010, 76 and Figs. 12, 32. – Guba 2012, 105 and Fig. 4 – Furmánek, Mitáš, Budaváry 2016, 119–121 and Fig. 175, Pl. XXXVIII.

39 Taking into account the weight of cremated remains (2700 g), it could be presumed that they might represent remains of two individuals, which is also indicated by the two separate urns (Fig. 8/1, 5).

40 Furmánek, Mitáš 2010, 77, 82, 85, 93, 96.

41 Novotná 1980, 116–121, 125 and Pls. 36/728; 38/811.

42 Novotná 1980, Fig. 1.

43 Furmánek 1980, 20–23 and Pl. 10/179–181.

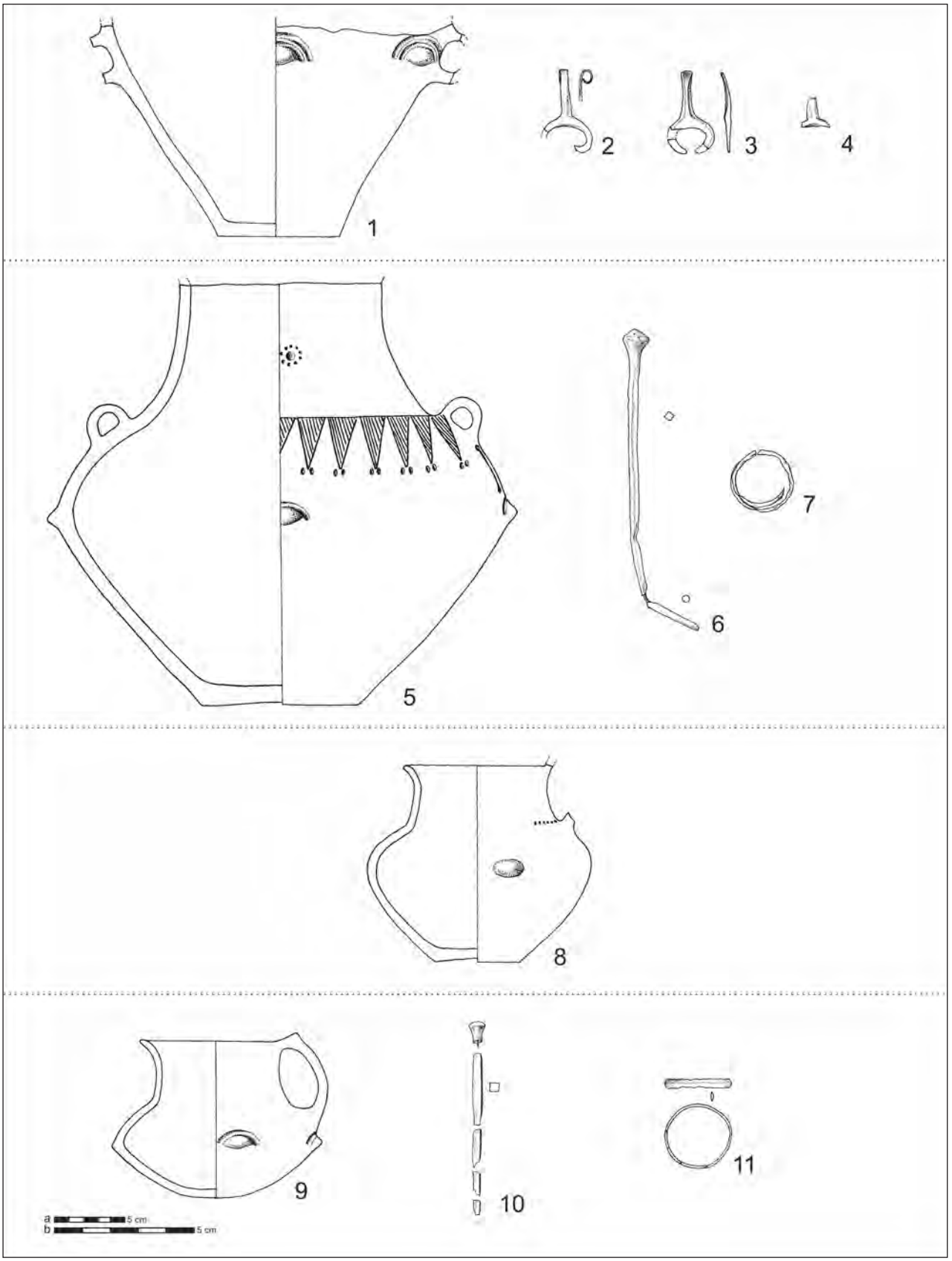

Fig. 8. Radzovce, grave 216/69 (1–11 after Furmánek, Mitáš, Budaváry 2016, Pl. XXXVIII/1–2, 5–9, 14, 16, 19–20). Scale: 1, 5, 8, 9 = a [1:4]; 2–4, 6–7, 10–11 = b [1:2].

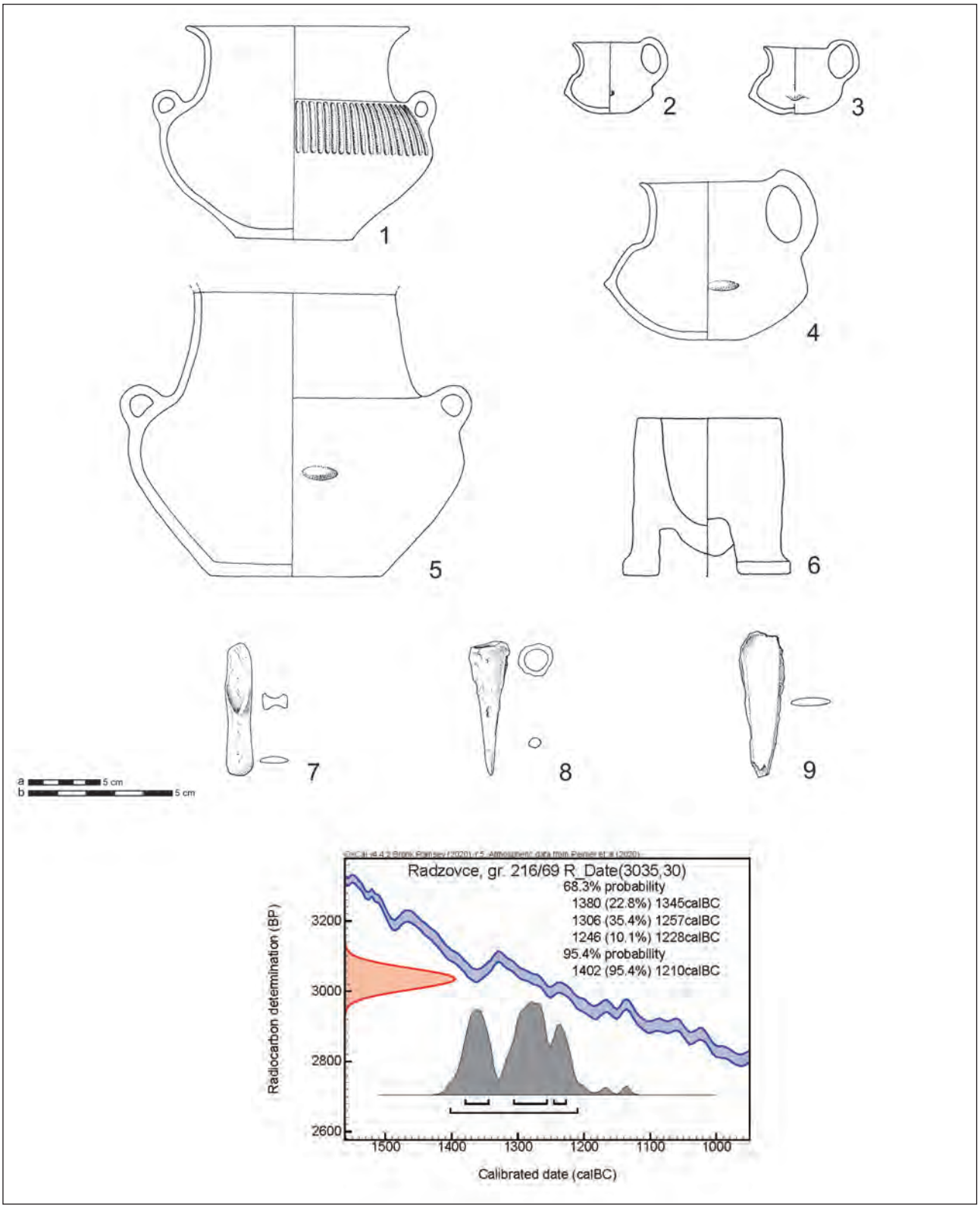

Fig. 9. Radzovce, grave 216/69 and the result of the AMS radiocarbon analysis conducted on the cremated human bone sample from grave 216/69 at the Radzovce site (KIA-52145) (1–9 after Furmánek, Mitáš, Budaváry 2016, Pl. XXXVIII/3–4, 10–13, 15, 17–18). Scale: 1, 5–6 = a [1:4]; 2–4, 7–9 = b [1:2].

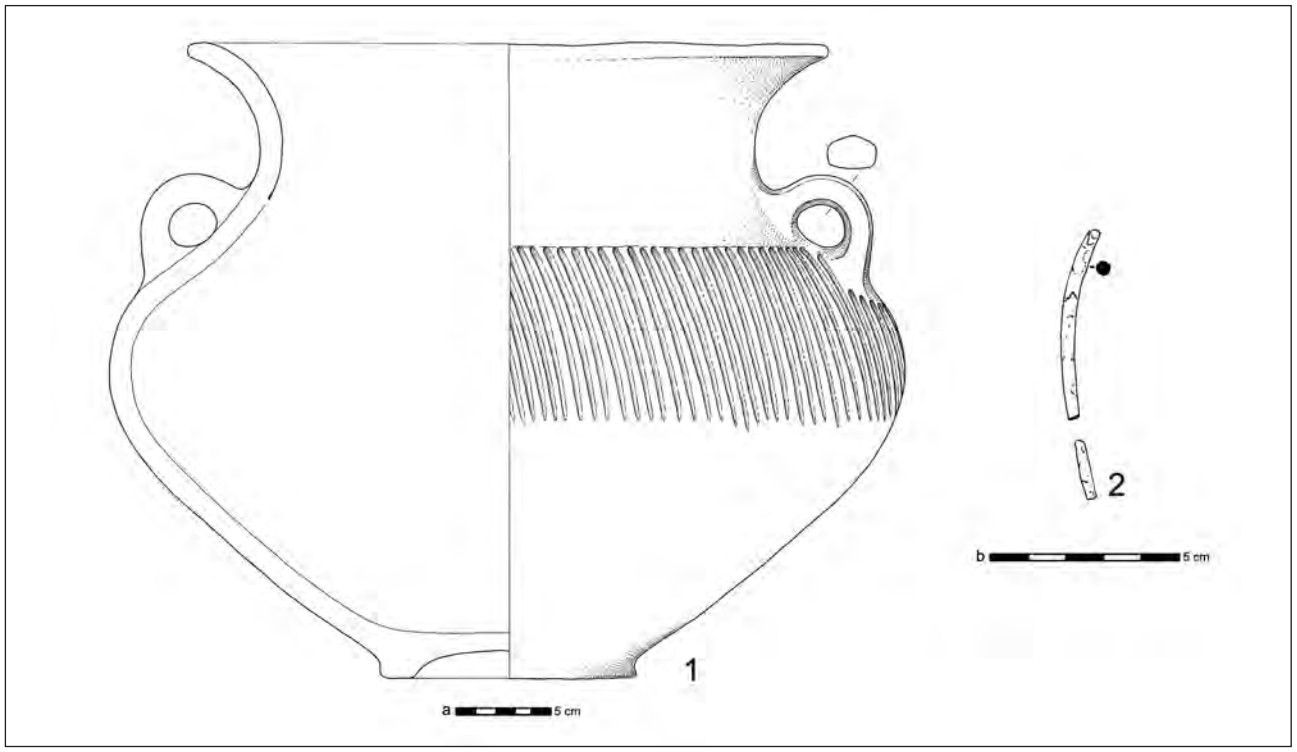

Fig. 10. Dvorišče SAZU cemetery in Ljubljana, grave 143 (1 drawing by I. Murgelj, 2 after Puš 1971, Pl. 21/4). Scale: 1 = a [1:4]; 2 = b [1:2].

heart-shaped pendants also persisted in the beginning of the Late Bronze Age, as is now demonstrated not only by the dating presented here from grave 216/69 at Radzovce (Figs. 6, 9) but also by the recently published radiocarbon dates from the cemetery of Tápé.[44]

In fact, the smaller jug with a knob from grave 216/69 at Radzovce, which offers a good analogy for the jug from Ljubljana (Figs. 3/3; 4/3–4; 8/8), is not the only item of interest in this grave. The presence of a double-handled vessel – an amphora decorated with vertical grooves on its shoulder – should also be pointed out (Fig. 9/1), as a very similar amphora is attested in the urn cremation grave 143 from Ljubljana, in which, besides the cremated remains, fragments of a bronze pin have also been found (Fig. 10).

Similar vessels, both as regards their form and their decoration, can be found in the territory of the Gáva Culture in Romania. This type of grooved decoration is believed to be characteristic of the Lăpus II-Gáva I horizon in northwestern Romania (Ha A period).[45] Longer vertical grooves decorate the vessel from the Šebastovce settlement in the southeast of Slovakia, the handles of which are, however, positioned somewhat lower. Demeterová dated this vessel to the first stage of the Gáva Culture in Slovakia (Br D/Ha A1).[46] I assigned grave 143 from Ljubljana to the oldest phase of the cemetery – phase Ljubljana Ia 1. It lay in the immediate vicinity of grave 146 (Fig. 11), in which, according to the anthropological analysis, a child (*infans*) had been buried.[47] Besides the cremated remains, the cup used as an urn within this grave also contained a pin with a decorated club-shaped head, partly damaged by fire (Fig. 11/2). AMS radiocarbon dating analysis of the cremated bone sample from grave 146 in Ljubljana made it clear that the grave should be dated to the 13th or the beginning of the 12th century BC (Figs. 11, 18–19; Tab. 2). A good analogy for the cup with a vertical, cylindrical neck from the grave (Fig. 11/1) can be found at the cemetery of Tápé within the Lower Tisza river basin in the southeast of Hungary, where the vessel was likewise discovered in an infant grave.[48] The pins with decorated club-shaped heads were recently discussed and mapped by János G. Tarbay.[49] His distribution map should be supplemented with pins from Slovenia, attested both at cemeteries, such as Pobrežje, Dobova and

44 O'Shea et al. 2019, Tab. 3, Fig. 5.
45 Ciugudean 2012, 231–233 and Fig. 5/1.
46 Demeterová 1986, 113 and Pl. IX/13.
47 Škvor Jernejčič 2014a, Appendix 3.
48 Trogmayer 1975, 22–23 and Pl. 6/61.
49 Tarbay 2015, 324 and Fig. 13.

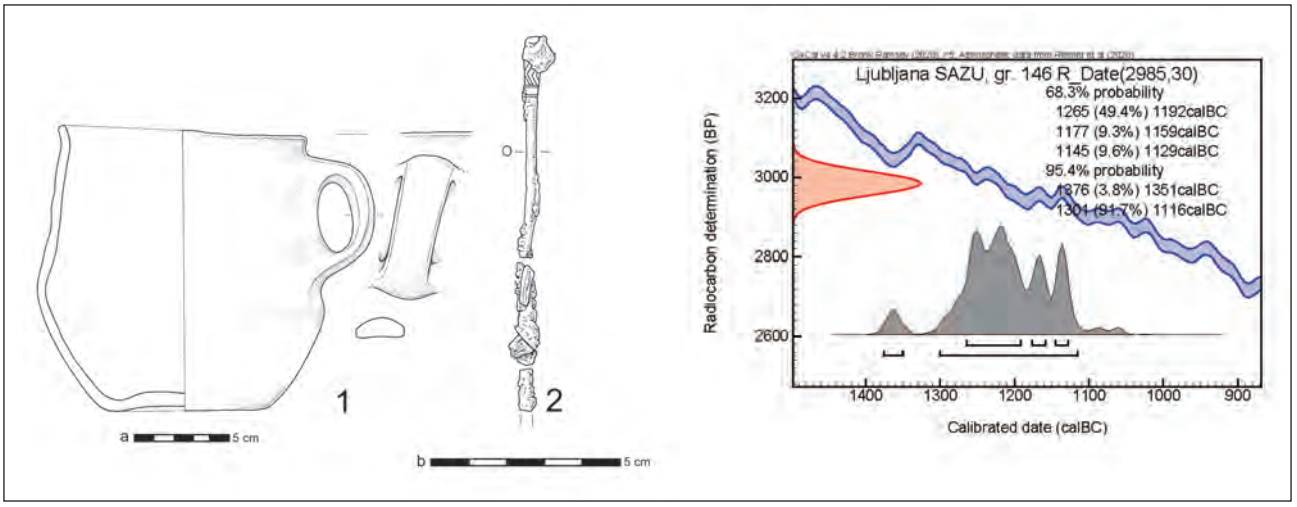

Fig. 11. Dvorišče SAZU cemetery in Ljubljana, grave 146. Result of the AMS radiocarbon analysis conducted on the cremated human bone sample from grave 146 in Ljubljana (KIA-51258) (1–2 drawing by I. Murgelj). Scale: 1 = a [1:4]; 2 = b [1:2].

Ljubljana – Dvorišče SAZU (Fig. 11/2), and the settlements of Rabelčja vas and Ivančna Gorica, or as individual finds from the Ljubljanica River.[50] Examples of club-headed pins from the Lavička collection most probably originate from the surroundings of Tržič.[51] Unfortunately, there are likewise no further details on the pin find from Sidol near Vodice.[52] New, decorated examples of such pins have been found in Croatia and Bosnia and Hercegovina.[53] Especially noteworthy are the examples at the far west of their distribution, discovered in the Celó hoard and in the settlement of Codroipo, both in the Friuli-Venezia Giulia region in the northeast of Italy.[54]

The discussed graves 143, 146 and 191 from the Dvorišče SAZU cemetery in Ljubljana belong to the very beginning of the Late Bronze Age or to the Initial Urnfield period. Interestingly, the mentioned graves were discovered very close to one another; it could even be stated that they form a smaller grave group in the western part of the researched cemetery (Cf. Fig. 1). The anthropological analysis revealed that an adolescent person had been interred in grave 191. In view of its grave goods, which consisted of two hair-rings, we could presume that this is a female individual. Next to it, grave 146 contained the remains of a child. Cremated bones from grave 143 were not preserved, although the presence of a bronze pin could indicate that in this case a male person had been buried in the grave. Hence, the sex and the age of the buried individuals (man, woman and child) suggest that the grave group may in fact represent a nuclear family unit. Also significant are observations emerging from the analysis of ceramic material from these three graves. As already pointed out, the best analogies for the vessels from Ljubljana can be found in the north of the Carpathian Basin and in the Tisza river basin and not, for example, in the territory of the Virovitica Group, which spread across the southern Pannonian area, in central and eastern Slovenia, along the Drava and Sava river basins (Podravina and Posavina regions) and all the way to northern Bosnia. Similarly unexpected is the fact that such vessels are, to date, likewise absent from the cemeteries of western Transdanubia.[55] These findings bring into focus several new questions on the nature of relations between Bronze Age communities as far apart as the northern Carpathian Basin region and the southeastern Alpine area.

What is more, such contacts were apparently not of short duration as they reach back already to the Middle Bronze Age, a fact which I tried to show in the recent analysis of the

50 Puš 1971, Pl. 22/3. – Pahič 1972, Pl. 8/18. – Stare 1975, Pl. 1/8. – Puš 1982, Pls. 7/1; 44/5. – Dular, Šavel, Tecco Hvala 2002, Fig. 21/1. – Gaspari, Trampuž Orel, Turk 2009, 231. – Plestenjak 2013, Pl. 4/1. – Škvor Jernejčič 2014b, Figs. 22.1.7/3; 22.1.8.

51 Gabrovec 1961, Pl. 65/3, 7, 10.

52 A. Preložnik, personal communication.

53 Kalafatić 2009, 23. – Belić 2010, Pl. VII/1. – Marijan 2010, Fig. 3/1, Pls. I/2; II/4; III/7. – Višnjić 2010, 16–17. – Pleština 2013, Fig. 24, Pl. 13/4. – Kulenović 2018, Pl. 3/1, 1a. – Galiot 2019, Fig. 17, Pl. 1/1.

54 Borgna 2007, Fig. 2/6. – Tasca 2015, Fig. 55.

55 Cf. for example Patek 1968. – Kőszegi 1988. – Jankovits 1992a. – Jankovits 1992b. – Horváth 1994a. – Horváth 1994b. – Horvath 1996. – Boulud 2002. I would like to thank S. Boulud-Gazo for allowing me to inspect her unpublished doctoral dissertation, which also includes the examination of Balatonmagyaród-Hídvégpuszta and Balatonmagyaród-Kiskányavár cemeteries.

oldest cremation graves from Slovenia dating to the Br B2/C1 period.[56] That is to say, vessels from cremation graves at Podmsreka near Višnja gora as well as from Krka and Krka Cave also demonstrate surprising connections with the pottery from the northern Carpathian Basin area. Relations of a kind also persisted further in the following generations, as evidenced by the bronze types of grave goods from the Ljubljana graves of the phase Ljubljana Ia 2.[57] Hence, it follows that connections with communities from the northern Carpathian Basin not only played a key role in the transmission of the cremation mode of burial to the area of the southeastern Alps in the Middle Bronze Age, but were also crucial for the formative phase of the cemetery in Ljubljana at the beginning of the Late Bronze Age and, moreover, continued further on through generations during the Early Urnfield period.

2.2. Early Urnfield Period – Ljubljana Ia 2 Phase

During the phase Ljubljana Ia 2, which can be equated with the Early Urnfield period or with the Ha A period, the new graves spatially adhere to the graves from the previous phase.[58] Their number remained small, only slightly more than ten graves pertaining to this phase could be discerned.[59] Of relevance is the observation that the cemetery was in use without any noticeable interruption from the 13th to the 12th and 11th centuries BC. Until now it has generally been considered that the rare graves from the Ha A period have no direct relationship with graves from the later Urnfield period.[60] Also, in the phase Ljubljana Ia 2 the burnt bones were laid in urns, while in some cases the rare bronze grave goods could be placed either above or below the cremated bones. New vessel shapes used as urns appeared, especially the vessels with cylindrical neck (graves 155 and 282)[61] and the pithos vessels with handles accentuated by concavely shaped platform and rib edges or so-called tunnel-like handles (grave 278; Fig. 12/1).[62]

Along with these new forms, the evolution of certain vessel types already attested in the previous phase can be observed, such as, for example, in the case of jugs (Fig. 4/3, 5–6) or amphorae (graves 143 and 314; Fig. 10/1).[63] The AMS radiocarbon analysis of cremated bone samples from graves 326 and 327 clearly indicates that the jug vessel form continued to be used throughout the 12th and possibly also in the first half of the 11th century BC (Figs. 6–7, 16, 18–19). As in the phase Ljubljana Ia 1, some of the graves also contained dishes with inverted rims which covered the urns (e.g. Pl. 1/4).[64] It should also be mentioned that some of the small cups were placed in the grave pit upside down, that is, with openings facing towards the ground (cf. graves 277 and 278; Fig. 12/9–10).[65] The new vessel shapes can, on the one hand, be associated with the pottery characteristic of the Baierdorf-Velatice circle, as for example the vessels with cylindrical neck and small cups,[66] while on the other hand, types of vessels are attested, comparisons for which are to be found in the Adriatic area and its hinterland, such as the pithos with tunnel-like handles (Fig. 12/1).[67]

As already pointed out, bronze grave goods were still rare in this phase. Changes are visible above all as regards jewellery, such as the attested example of the passementerie-type fibula from grave 4 (Fig. 15) or the preserved spiral from the spectacle fibula and the chain necklace with pendants from grave 174/2, as well as the necklace with rhombic cross section from grave 327 (Pl. 1/6).[68] In grave 278, however, besides the ring-shaped jewellery and pendant a miniature bronze chisel was also found (Fig. 12/2–8). Distribution maps of certain bronze grave goods also found in Ljubljana clearly point to connections with the Carpathian Basin. A surprising aspect is the distribution of a stemmed roof-shaped pendant (*dachförmiger Anhänger*) with a ring end or eyelet, which represents only a small hanging part of otherwise large composite sets or the so-called "*reiche Gehänge*" of the Tibolddaróc type,[69] an example of which has also been discovered in grave 278 from Ljubljana (Fig. 12/3). Such pendants are known primarily from hoards in the territory of the Carpathian Basin, while as grave finds they are attested only at three or four sites, that is, at the cemeteries

56 Škvor Jernejčič 2019. – Škvor Jernejčič 2020.

57 See further below, section 2.2.

58 Škvor Jernejčič 2014a, Fig. 6.6.

59 Škvor Jernejčič 2014a, 202.

60 Gabrovec 1988–1989, 118. – Turk 1996, 120, note 155. – Pare 1998, 340. – Gabrovec 1999, 180.

61 Puš 1982, Pl. 8/13. – Škvor Jernejčič 2014a, Pl. 78/1.

62 Puš 1982, Pl. 7/6.

63 Puš 1982, Pl. 23/10. – Škvor Jernejčič 2014b, Fig. 22.1.4/1.

64 Puš 1982, Pl. 7/5.

65 Puš 1982, Pl. 10/1. The cup was originally published as part of grave 286, while the recent revision revealed that the cup should be assigned to grave 277 (Škvor Jernejčič 2014a, 120–121 and Figs. 13.53–13.54).

66 Škvor Jernejčič 2014a, 15–16, 57.

67 Puš 1982, 175, note 26. – Gabrovec 1983, 64 and Fig. 7/3. – Teržan 1995, 330 and Fig. 5. – Škvor Jernejčič 2014a, 31–33 and Figs. 4.22–4.23.

68 Škvor Jernejčič 2014a, 202–211.

69 Furmánek 1980, 40 and Pl. 27/778, 780, 788–790. – Schumacher-Matthäus 1985, 80–81 and Tabs. 55–56; Pls. 48–49. – Wanzek 1992, 260–262. – Jankovits 2009. – Jankovits 2010. – Koledin 2014. – Jankovits 2017, 249–252, 254–258 and Pls. 84/3054; 85/3055–3056, 3058–3059, 3061; 86/3071–3072, 3075, 3077–3081, 3083–3088, 3090–3091; 87/3092–3094, 3097.

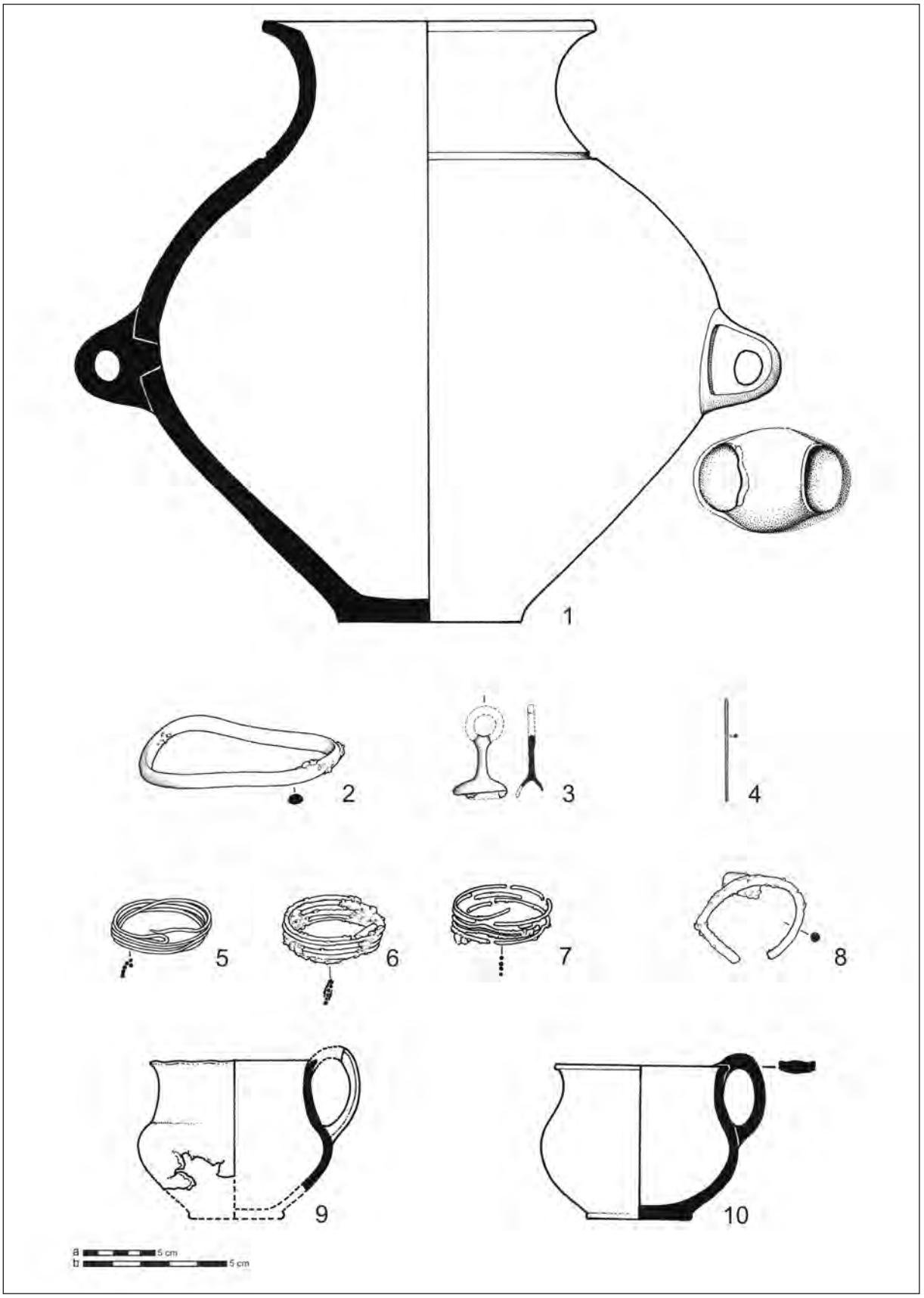

Fig. 12. Dvorišče SAZU cemetery in Ljubljana, grave 278 (1–10 after Puš 1982, Pl. 7/6–15). Scale: 1, 9–10 = a [1:4]; 2–8 = b [1:2].

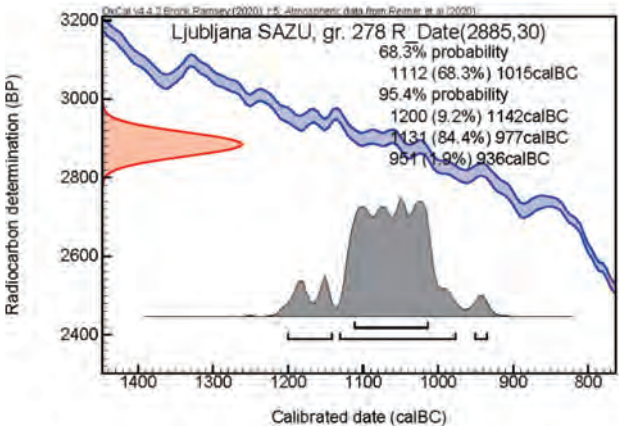

Fig. 13. Result of the AMS radiocarbon analysis conducted on the cremated human bone sample from grave 278 in Ljubljana (KIA-51260). Cf. also Tab. 2.

of Füzesabony-Kettőshalom in the Upper Tisza river basin, Jedenspeigen in Lower Austria, Ljubljana in central Slovenia and presumably at Piliny-Borsos, northern Hungary (Fig. 14). It should be stressed that the find from Ljubljana represents the most southwestern attestation of this pendant type.

Within the phase Ljubljana Ia 2, we can also place the chain necklace from the Ljubljana grave 174/2, on which pendants of various types had been threaded.[70] Unfortunately, the state of preservation of some of the pendants prevents a more specific typological determination. Nevertheless, one of them possibly represents a relatively rare triangular-shaped pendant, attested both in cemeteries and hoards from more or less the same period.[71] Completely preserved are the hourglass-shaped pendants, which have been studied already by Georg Kossack, while the examples from Ljubljana have been discussed by Ivan Puš.[72] A supplemented list of sites with such pendants was later published by Carol Kacsó.[73] The mould for pendants of this type has recently been found at the settlement of Teleac in Romania.[74] Hourglass-shaped pendants are attested in the Br D and Ha A periods as well as further on in the younger Urnfield period. In Slovenia they have also been discovered in grave 289 from Dobova, which can likewise be placed in the Ha A period,[75] and at the cemetery of Ruše.[76] The examples from Ruše, as well as those from Vukovar-Lijeva bara and Dalj-Busija, demonstrate that such jewellery pieces also persisted in the later Urnfield period.[77]

A novelty in the phase Ljubljana Ia 2 is represented by the appearance of fibulae, as shown by grave 4, where an almost completely destroyed passementerie fibula has been discovered (Fig. 15).[78] Interestingly, as in the case of the stemmed roof-shaped pendant (Fig. 12/3, 14), this passementerie fibula also represents the most southwesterly attested example of such jewellery. Besides the fragments from the Hočko Pohorje hoard and the example from grave 127 at Pobrežje, the passementerie fibula from Ljubljana represents one of the few finds from the southeastern Alpine territory.[79]

The distribution of necklaces with a rhombic cross section, an example of which was also discovered in grave 327 from Ljubljana (Pl. 1/6), shows a somewhat different picture. Such necklaces were found only at the cemeteries of Dobova and Ljubljana as well as in the Istrian Peninsula.[80] To the mentioned comparisons, which have already been reported by Biba Teržan,[81] we can now add the necklaces from the Kanalski Vrh I hoard and from the Sadnikar

70 Cf. Puš 1982, Pl. 49. The chain necklace was originally published as a find without grave context, while the revision demonstrated that it should be ascribed to grave 174/2 lying in the northeastern part of the researched cemetery (Fig. 1) (Škvor Jernejčič 2014a, Fig. 4.144/2 and Pl. 87/1).

71 Cf. for example grave 254 at Dobova (Stare 1975, Pl. 35/9) or the hoards of Zagreb-Medvedgrad and Kloštar Ivanić (Vinski-Gasparini 1973, Pls. 75/8; 96/17) or even the fourth hoard from Frattesina (Salzani 1987, Fig. 3/42). See also the example from Transylvania in Boroffka, Boroffka 2012, 55–57 and Fig. 4/3.

72 Kossack 1954, 23, 41, 97–98 and Pl. 20. – Puš 1978.

73 Kacsó 1995, 97–99 and List 3. In my opinion, examples from the hoard of Čermožiše and from graves in Maribor and Pobrežje, which were also enumerated by Kacsó, differ typologically from the pendants discussed here.

74 Ciugudean 2009, 69 and Pl. X/2a. Pendants of this type are regularly attested in the so-called Arpăşel-type deposits, for which a complemented list and distribution map has been published in Gogâltan, Sava 2014.

75 For the new radiocarbon dating of this grave, see further below.

76 Müller-Karpe 1959, Pl. 112/D3, 5. – Stare 1975, Pl. 40/11, 13.

77 Vinski-Gasparini 1973, Pl. 125/10. – Metzner-Nebelsick 2002, 456, 457 and Pl. 71/11.

78 In the fragments of a bronze fibula from this grave I was able to recognise a passementerie fibula, which most probably can be assigned to the Rimavská Sobota type (Škvor Jernejčič 2014a, 79–80 and Fig. 4.76).

79 Pabst 2012, 403–405 and Maps 35, 37. Cf. also the commentary in Blečić Kavur, Kavur 2019, 155, where the authors express the opinion that the passementerie fibula from Ljubljana cannot be typologically defined in a more precise manner. As regards the fibula examples of the Pobrežje type from Pobrežje and Velika Gorica, it should be pointed out that they feature a specific mode of uniting together the spiral elements. A possibly similar technique can be observed in the passementerie decorative object from the putative second hoard of Felsődobsza (Kemenczei 1984, Pl. XLVI/13).

80 Teržan 1995, 339, note 46 and Fig. 27. – Cf. Mihovilić 1972, Pl. 10/5, 6. – Stare 1975, Pls. 7/3; 14/5; 41/5; 52/12. – Mihovilić 1987, Pl. 1/2, 3. – Gabrovec, Mihovilić 1987, 303 and Pl. XXX/5. – Mihovilić 2013, 134 and Fig. 77. – Berden, Pavlin 2021, Pl. 9/25–26.

81 Teržan 1995, 339, note 46.

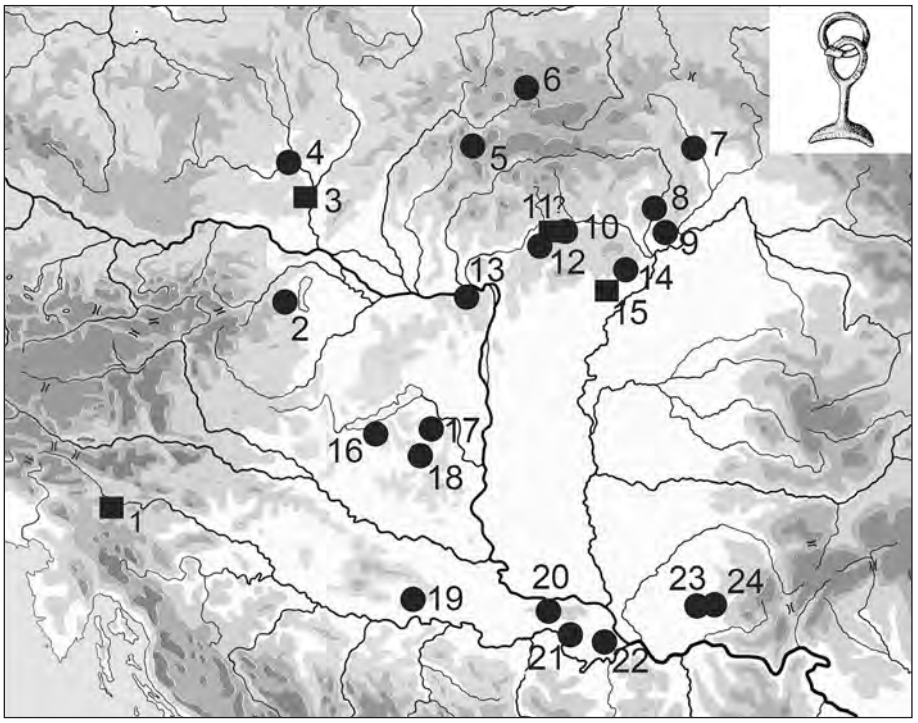

Fig. 14. Distribution map of stemmed roof-shaped pendants (*dachförmige Anhänger*) of the Tibolddaróc type; ● = hoard/individual find, ■ = grave find (supplemented after Wanzek 1992. – Jankovits 2009. – Jankovits 2010. – Koledin 2014. – Jankovits 2017). 1. Ljubljana – Dvorišče SAZU (Fig. 12/3; Puš 1982, Pl. 7/12). – 2. Draßburg. – 3. Jedenspeigen. – 4. Mušov 2 (Salaš 2002, Fig. 5/21). – 5. Blatnica. – 6. Nižná nad Oravou. – 7. surroundings of Košice. – 8. Felsődobsza II. – 9. Mád-Pádihegy (Schumacher-Matthäus 1985, 81). – 10. Gemerské Dechtáre/Détér. – 11. Piliny-Borsos (grave?). – 12. Szécsény-Benczúrfalva. – 13. Tibolddaróc. – 14. Esztergom-Szentgyörgymező (Schumacher-Matthäus 1985, 81). – 15. Füzesabony-Kettőshalom (Schumacher-Matthäus 1985, 81). – 16. Nadap. – 17. Regöly III. – 18. Kurd II. – 19 Brodski Varoš. – 20. Bingula-Divoš. – 21. Hrtkovci-Vukoder. – 22. Jakovo. – 23. Majdan near Vršac. – 24. Markovac-Grunjac (Jovanović 2010, Pls. 40/323; 52/545).

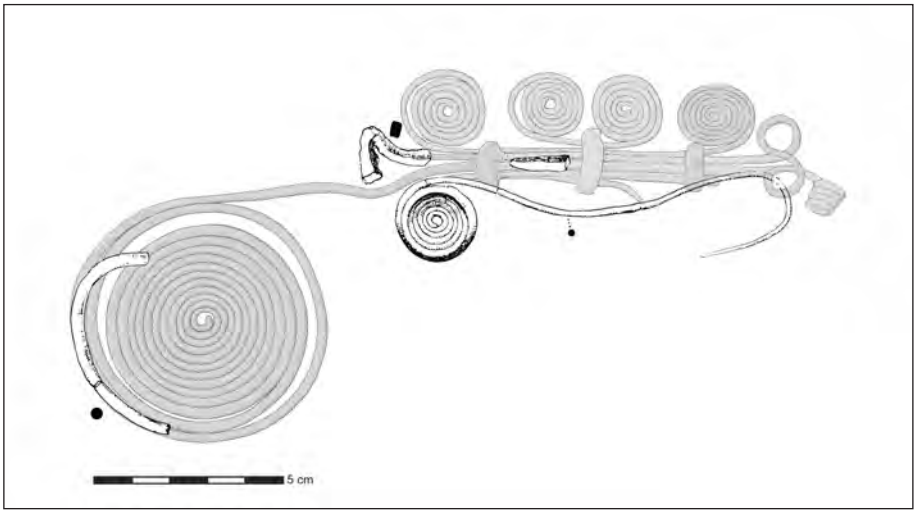

Fig. 15. Ljubljana – Dvorišče SAZU, grave 4, the proposed reconstruction of attested bronze fibula fragments on the background of the better preserved passementerie fibula type (Stare 1954, Pl. VIII/1–2; passementerie fibula background after Bader 1983, Pl. 8/35). Scale = 1:2.

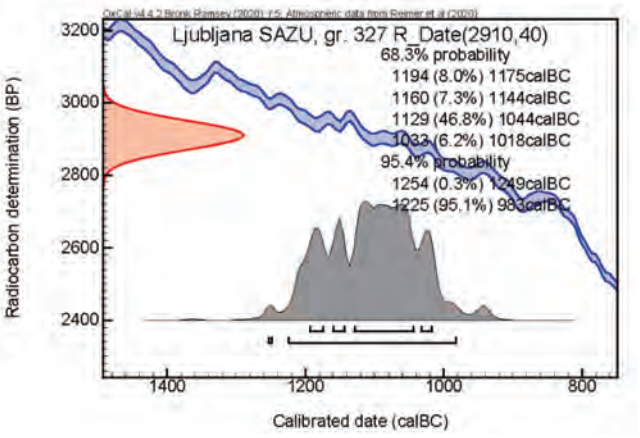

Fig. 16. Result of the AMS radiocarbon analysis conducted on the cremated human bone sample from grave 327 in Ljubljana (KIA-51649). Cf. also Tab. 2.

collection.[82] The specimen from collective grave 3 in the Bezdanjača cave might also represent a smaller necklace.[83] It should be mentioned that these bronze examples foreshadow the iron necklaces with rhombic cross section characteristic of the southeastern Alpine region during the so-called 'iron horizon'.[84] Taking into account the new AMS radiocarbon dating analysis of the cremated bone sample from grave 327 at Ljubljana (Figs. 16, 18–19), the bronze necklaces with rhombic cross section appeared in the southeastern Alpine region already in the 12th/11th century BC. Such an early chronological position has also recently been confirmed by the radiocarbon dating obtained from the cremated bone sample from grave 289 at Dobova.[85] Other finds from Dobova and the Istrian Peninsula demonstrate that the bronze necklaces with rhombic cross section remained in use during the transition to the Late Urnfield period.[86]

After this short overview, it can be concluded that the ceramic repertoire and single bronze objects from the oldest graves at the Dvorišče SAZU cemetery in Ljubljana attest to surprising connections with the territory of the northern Carpathian Basin. In part, such relations have already been pointed out with regard to certain bronze objects present in hoards, such as the two-arm pickaxes, decorative discs or phalerae and remains of belts, to mention only the most obvious examples.[87] The typo-chronological analysis of objects from the oldest graves in Ljubljana, as well as the new radiocarbon dating made it clear that the mentioned graves should be arranged into two stages, that is, the phases Ljubljana Ia 1 and Ljubljana Ia 2 (Figs. 3, 7, 10–13, 16, 18–19; Pl. 1). Taking into account the comparisons for ceramic material and for scarce bronze finds, I believe that the phase Ljubljana Ia 1 should be correlated with the Br D and the beginning of the Ha A1 period, whereas the phase Ljubljana Ia 2 designates the period of Ha A. In an absolute chronological sense, the phase Ljubljana Ia 1 encompasses the 13th and the beginning of the 12th century BC. Already in the first half/middle of the 12th century BC we can detect first changes, both as regards the ceramic repertoire as well as in the form and type of bronze grave goods. These changes denote the phase Ljubljana Ia 2, which seems to begin sometime in the first half of the 12th century BC and continues, according to the new radiocarbon dating results, all the way up to the middle of the 11th century BC (Fig. 2).[88]

3. Cremation Graves of the Initial and Early Urnfield Period from Slovenia

The number of discovered graves from the Initial and Early Urnfield period in Slovenia is exceptionally small and hence the new findings about the oldest graves from Ljubljana are all the more relevant (Fig. 17). Gabrovec placed at the beginning of the Urnfield period graves 1, 2 and 3 from Bled-Žale, three graves from Ptuj-Potrčeva ulica and the grave from Kamnik.[89] Considering their vessel shapes, he further associated the graves from Kamnik and Ptuj with the Virovitica Group. It should be pointed out here, however, that grave 2 from Bled-Žale, originally dated to the Late Bronze Age period, in fact represents an early medieval grave.[90] As already stated, the graves from Potrčeva ulica at Ptuj were dated to the beginning of the Late Bronze Age.[91] Later Teržan expressed the opinion that they could even be somewhat older, as the decoration of knobs on vessels from graves 2 and 3 can be linked to the pottery characteristic of the Middle Bronze Age Tumulus Culture (Br B1–Br C).[92]

82 Gabrovec 1965, Pl. 14/16. – Čerče, Šinkovec 1995, Pl. 97/10.
83 Drechsler-Bižić 1979–1980, Pl. XXIII/15.
84 Teržan 1995, 339, note 46. – Teržan, Črešnar 2014, 706–713. – Škvor Jernejčič, Vojaković 2020, 155–156.
85 See further below, section 3.
86 Teržan 1995, 339, note 46 and Fig. 27.
87 Teržan 1996, 245–246 and Fig. 1. – Tarbay 2019, 373 and Fig. 6.
88 The end of the cemetery in Slatina has similarly been dated to the middle of the 11th century or around 1060 BC (Forenbaher 2018, 251 and Fig. 26). For radiocarbon dates from the beginning of Ha B1 period see also Sperber 1987. – Rychner-Faraggi 1993. – Rychner et al. 1995. – Črešnar, Teržan 2014, 697 and Fig. 32. – Sperber 2017.
89 Gabrovec 1983, 70–71 and Fig. 6/2–7, 10; Pl. III/1–3.
90 Pleterski 2008, 35–36 and Fig. 2/1.
91 Gabrovec 1983, 70–71 and Fig. 6/5. – Jevremov 1988–1989, 177 and Figs. 2–4. – Dular 2002, 179 and Fig. 22/10–11.
92 Teržan 1999, 101, 111.

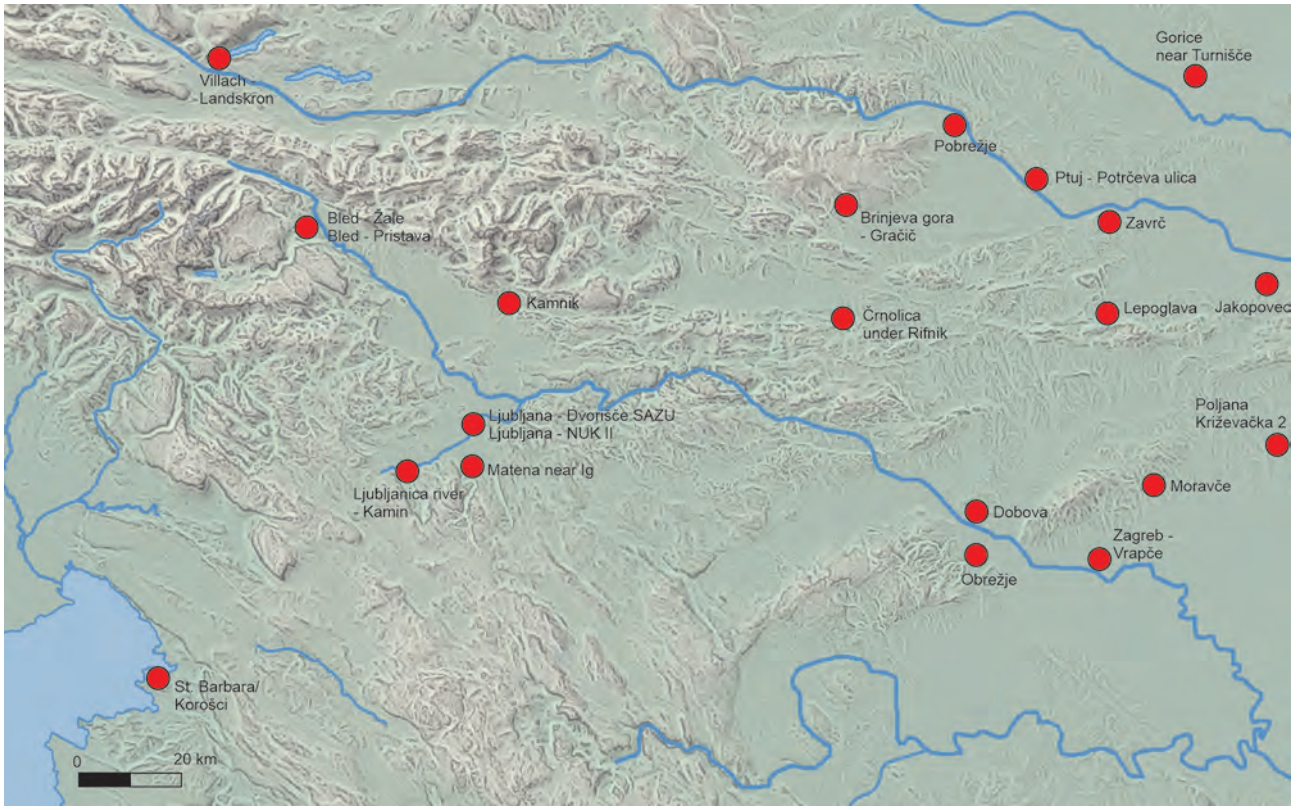

Fig. 17. Cemeteries and individual graves from the Br D and Ha A periods: Bled-Žale (Gabrovec 1960. – Gabrovec 1983); Bled-Pristava (Bitenc 1987); Gračič below Brinjeva gora (Pahič 1987. – Pahič 1988–1989. – Koprivnik 2021. – Teržan 2021); Črnolica under Rifnik (Vrenčur 2011); Dobova (Stare 1975); Gorice near Turnišče (Plestenjak 2010. – Plestenjak 2014); Jakopovec (Bekić 2006); Kamnik (Gabrovec 1983. – Gabrovec 1985. – Škvor Jernejčič, Železnikar 2018); Lepoglava (Šimek 2003); Ljubljana – Dvorišče SAZU (Figs. 3, 10–12; Pl. 1. – Stare 1954. – Puš 1971. – Puš 1982. – Škvor Jernejčič 2014a); Ljubljana-NUK II (Gaspari 2014); Ljubljanica-Lipovec, Kamin (?) (Gaspari 2004); Matena near Ig (Grahek 2017); Moravče (Sokol 1996); Obrežje (Mason, Kramberger in prep.); Pobrežje (Pahič 1972; Kramberger, Črešnar 2021, 55); Poljana Križevačka 2 (Ložnjak Dizdar 2012. – Ložnjak Dizdar et al. 2020); Ptuj – Potrčeva ulica (Gabrovec 1983. – Jevremov 1988–1989); Villach – Landskron /Beljak – Vajškra (Dolenz 1972–1973); Zagreb – Vrapče (Vinski-Gasparini 1973); Zavrč (Lubšina Tušek, Kavur, Kavur Blečić 2014).

For the vessel from grave 1 at Ptuj, a closely corresponding analogy can be found at the sites Vliněves and Slaný-Slánská hora in the Czech Republic, which are dated even as early as the younger phase of the Únětice Culture (Br A).[93] Characteristic decoration consisting of a pair of smaller knobs, which can be observed on the vessel from grave 1 at Ptuj, is, however, also attested on several other pottery vessels from the Early Bronze Age period in Slovenia.[94] Consequently, it appears that grave 1 from Ptuj is older than the other two graves, whereas its pottery reflects the tradition of the late Únětice Culture. Commentary is also needed in connection with the remark made by Gabrovec, that the vessel from the grave at Kamnik should be related to the Virovitica Group. Resemblances between the urn vessel from Kamnik and the urn from the prominent cremation grave under the tumulus at the site of Čáka in the western Carpathian Basin indicate that the influences of pottery from the Baierdorf-Velatice cultural sphere should not be overlooked.[95]

According to Gabrovec, occasional examples of graves from the cemeteries of Dobova and Ljubljana should also be placed in the Ha A period.[96] An attempt at the chronological phasing of the cemetery in Dobova was made by Janez

93 Cf. Jiráň, Venclová 2013, 45 and Fig. 19/9; Pl. 4/2. – Škvor Jernejčič 2020, Fig. 8.

94 Gabrovec 1983, Fig. 1/9, 14, (18).

95 Točík, Paulík 1960, Fig. 42/1. – Gabrovec 1983, T. III/3. – Škvor Jernejčič, Železnikar 2018, 24, 30–33.

96 Gabrovec 1983, 56–57, 65–66. – Cf. also Teržan 1995, 329–330, 338–339 and Fig. 5. – Turk 1996, 120. – Teržan 1999, 111. – Dular 2002, 177–181 and Figs. 22–23.

Dular, who placed the oldest graves in the Ha A1 period, but at the same time drew attention to problems in separating the first and the second chronological phases.[97] Afterwards, Teržan also pointed out that the first phase contains mostly female graves, while the second phase is represented above all by male graves and she accordingly decided to date the beginnings of the cemetery at Dobova to the Ha A2 period.[98] Peter Turk was somewhat more restrained in commenting on the chronological definition made by Dular and correlated the oldest graves at Dobova with the second (II.) hoard horizon.[99] Grave 289, which according to Dular represents one of the oldest graves at the cemetery, was also discussed by both Svend Hansen and Sabine Pabst, who placed the grave even as late as the Ha B1 period.[100] Recently, the oldest graves from Dobova have been debated by Miha Kunstelj, indicating once more that some of the bronze grave goods from these graves date back at least to the Br D/Ha A period.[101] The newly obtained radiocarbon dating result from the cremated bone sample from grave 289 has now shown that the grave should be dated between the end of 13th and the entire span of the 12th century BC.[102]

In the study on the cremation grave from Matena in the Ljubljana Marshes, Lucija Grahek mapped individual graves and cemeteries of the Oloris-Podsmreka horizon from Slovenia.[103] The greater part of these graves can, however, be dated to the beginning of the Late Bronze Age (Br D period), with the exception of graves from Podsmreka near Višnja gora and the putative grave from Krka, as well as the grave finds from Krka Cave, which, according to my recently published analysis, should be dated already in the Middle Bronze Age (Br B2/C1 period).[104] The map presented here includes graves from the wider southeastern Alpine area that can be dated to the Initial and Early Urnfield period and clearly demonstrates that the number of either cemeteries or separate graves is extremely small (Fig. 17). Here, the observations made by Teržan must be mentioned, according to which the finds from Butoraj in Bela Krajina, Štatenberk near Trebnje and from Magdalenska gora might tentatively be recognised as indications of tumuli burials containing weapons, which would be comparable to tumulus graves from the region of northwestern Pannonia and Slovakia, characteristic for the so-called Čáka Culture and related groups.[105]

Other finds from the Initial and Early Urnfield period, which have, however, been discovered at the Iron Age tumuli cemeteries should also not be overlooked. Such is the case of a bronze pin with a large, ribbed, vase-shaped head of the type Etting, variant Grünwald, found among the cremated remains of grave 20 in tumulus I at the site Grm near Podzemelj.[106] This Bronze Age pin was uncovered together with a smaller iron knife in the very centre of the tumulus, within the layer of ash and cremated remains (covering an area of 60 × 60 cm and 25 cm thick), while the urn vessel and iron spearhead from the Early Iron Age were discovered at the northern edge of this layer.

Only a few burial grounds from the Initial and Early Urnfield period (Br D and Ha A1/A2), in places represented only by separate graves, also remained in use during the transition from the older to the younger phase of the Urnfield period and beyond, that is, in the periods Ha A2/B1 and Ha B1–Ha B2. The transitional period Ha A2/B1 signals the appearance of extensive cremation cemeteries, which can contain several hundred graves.[107] Such continuity from the Early to the Late Urnfield period can, for now, be ascertained only at the cemeteries of Ljubljana – Dvorišče SAZU, Zavrč, Obrežje, Dobova, Pobrežje and possibly Gračič below Brinjeva gora.

Hitherto, only a small number of radiocarbon dating results were available from the grave contexts belonging to periods Br D and Ha A, which is understandable in view of the low number of graves from this period that have been discovered. The book on the absolute chronology of the Bronze and Iron Ages in Slovenia contained only five radiocarbon dating results which could be set in the Br D and Ha A periods and were obtained from grave contexts, that is, the graves from Gorice near Turnišče, the Ljubljana sites Dvorišče SAZU and NUK II as well as from Gračič below

97 Dular 1978, 37, Fig. 3, Tab. 1.

98 Teržan 1995, 338–339. – Teržan 1999, 138.

99 Turk 1996, 119–120.

100 Hansen 1994, 242. – Pabst 2012, 34, 227–234.

101 Kunstelj 2018.

102 New radiocarbon date of the cremated bone from grave 289 at Dobova (KIA-54730) was analysed in the framework of research project "Beyond Materiality: Prehistoric Communities and their Burial Customs in the Light of New Scientific Analyses", funded by the Slovenian Research Agency (Grant no. Z6-8252) and is to be published, together with other radiocarbon dating results from Dobova.

103 Grahek 2017, 109 and Fig. 6.

104 Cf. Murgelj 2013. – Murgelj 2018. – For the dating, see Škvor Jernejčič 2020.

105 Teržan 1996, 244–245.

106 Barth 1969, 113–114 and Pl. XVI/7. – Pabst 2012, 408 and Map 39.1. Pins of the same type, though of different variants, have also been found in Vičava at Ptuj and in Gračič below Brinjeva gora (Pahič 1988–1989, Pl. 1/3. – Čerče, Šinkovec 1995, Pl. 36/254–255. – Pabst 2012, 408. – Koprivnik 2021, Pl.11/15. See also Teržan 2021).

107 Teržan 1999, 111.

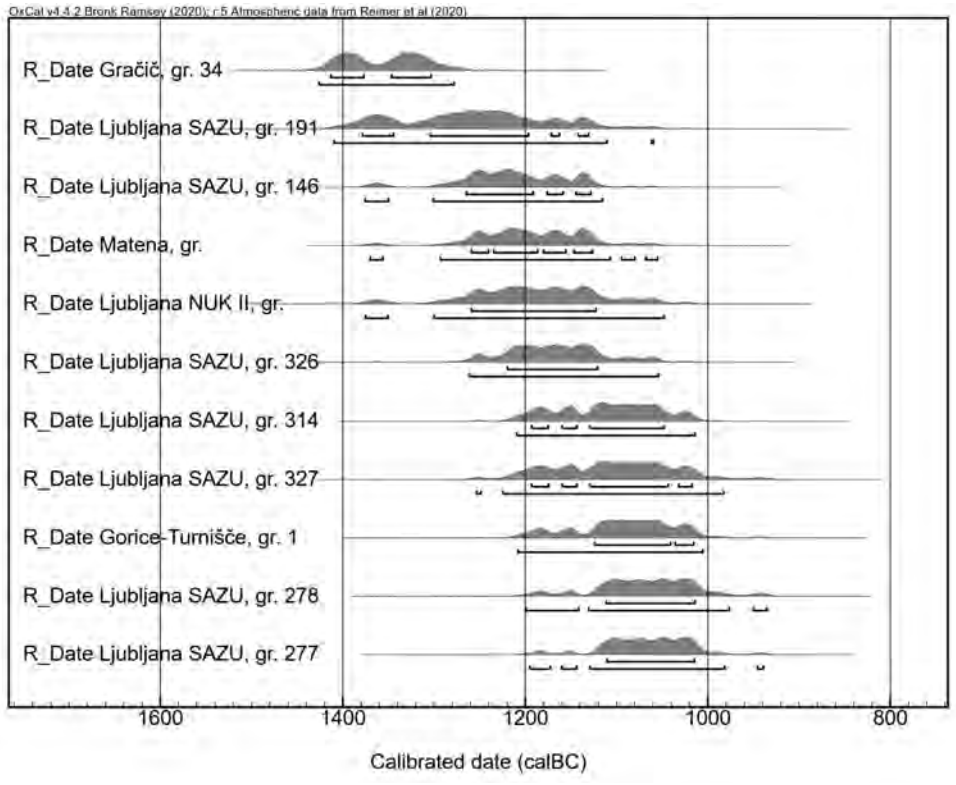

Fig. 18. Time spans of the radiocarbon dating results from analysed cremation graves in Slovenia dating to the Br D and Ha A periods (after Črešnar et al. 2014. – Gaspari 2014. – Plestenjak 2014. – Škvor Jernejčič 2014b. – Grahek 2017; for the remaining graves from Ljubljana treated in this article, see Tab. 2).

Brinjeva gora.[108] To these examples we should now add further graves from Ljubljana – Dvorišče SAZU presented here (Figs. 3, 7, 11, 13, 16; Tab. 2) and the recently published and dated grave from Matena.[109] The radiocarbon dating analyses of graves from the Initial and Early Urnfield period are presented in Figures 18 and 19.

Graves from the Initial Urnfield period or the late phase of the Oloris-Podsmreka horizon fall into the 13th century BC (grave 34 from Gračič below Brinjeva gora and graves 146 and 191 from Ljubljana – Dvorišče SAZU) and represent the oldest radiocarbon-dated cremation graves in Slovenia up to now. We should date the graves from Matena and Ljubljana (the grave from the NUK II site and grave 326 from Dvorišče SAZU) somewhere between the last third/the end of the 13th century BC and the span of the 12th century BC. The typo-chronological analysis of pottery from these graves demonstrates that the vessel shapes are characteristic of the Br D and the beginning of the Ha A1 period.

In view of the available radiocarbon dates, the graves from the phase Ljubljana Ia 2 (graves 277, 278, 314, 327) can be set in the period from the middle of the 12th to the middle of the 11th century BC (Figs. 13, 16, 18–19). The grave from Gorice near Turnišče should also be placed to the same time period.[110] Additional comment is needed as regards the radiocarbon dates obtained from graves 277 and 278 in Ljubljana. It appears that the AMS radiocarbon dating analysis of the cremated bone sample from grave 277 at the Dvorišče SAZU cemetery in Ljubljana is somewhat problematic due to the high percentage of carbon (C-content wt% = 0.93) and the high $\delta^{13}C$ value ($\delta^{13}C$ (‰) ‡ (-13.28 ± 0.18)).[111] Nevertheless, a very similar dating was obtained

108 Črešnar, Teržan 2014, 691–693 and Figs. 27–28. – Črešnar et al. 2014, 306–307. – Gaspari 2014. – Plestenjak 2014. – Škvor Jernejčič 2014b, 367–370. M. Črešnar and B. Teržan are of the opinion that the date for grave 34 from Gračič below Brinjeva gora is most likely too early (Črešnar, Teržan 2014, 692–693. See also Teržan 2021, 299–300).

109 Grahek 2017.

110 Plestenjak 2014, 92–95 and Figs. 5.3–5.4.

111 Škvor Jernejčič 2014b, 370, 384–385 and Figs. 22.1.8; 22.1.26. – Škvor Jernejčič, Hamann in prep. High C content and $\delta^{13}C$ values can indicate incomplete removal of foreign carbonates.

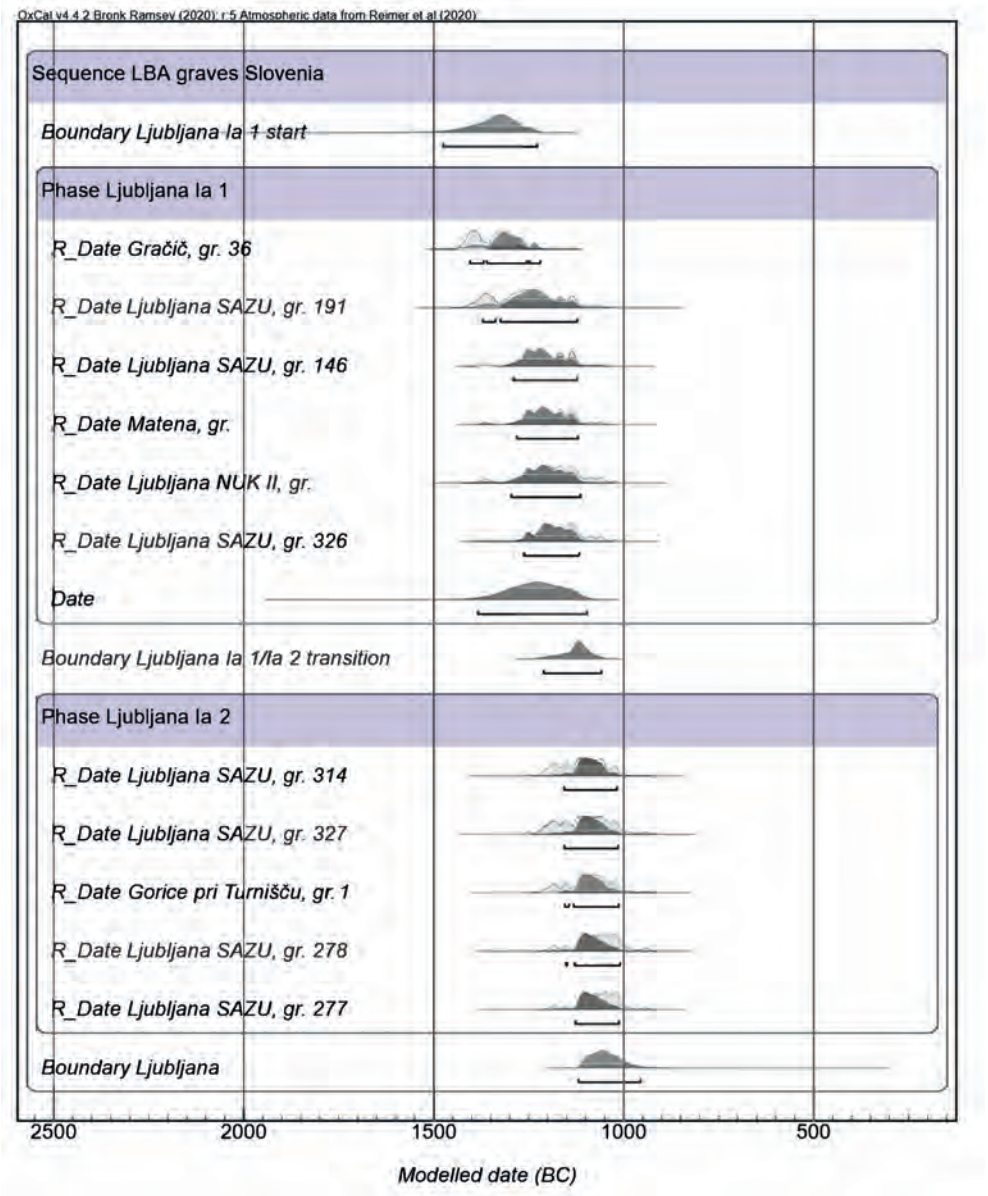

Fig. 19. Modelled time spans of radiocarbon dating results from analysed cremation graves in Slovenia dating to the Br D and Ha A periods (after Črešnar et al. 2014. – Gaspari 2014. – Plestenjak 2014. – Škvor Jernejčič 2014b. – Grahek 2017; for the remaining graves from Ljubljana treated in this article, see Tab. 2).

on the charcoal sample from the pit in Rogoza (KIA-37291: 2895 ± 30 BP), in which a vessel, practically identical to the example from grave 277 in Ljubljana, was discovered.[112] In the case of the analysis from grave 278, the percentage of carbon content lies within the normal range (C-content wt% = 0.27), while the value $\delta^{13}C$ (‰) (‡ -17.81 ± 0.10) once again falls outside the expected amount (Cf. Tab. 2). If we are to follow the analysis of grave goods, such as, for example, the stemmed roof-shaped pendant of the Tibolddaróc type; the pithos vessel with tunnel-like handles; the dish with inverted, obliquely channelled or so-called turban-like rim; and last, but not least, the club-headed pin, their comparisons and relative chronological position, the dating of graves 277 and 278 to the period before the 11th century BC would seem more probable.

Looking at both charts with gathered radiocarbon dates (Figs. 18–19), either the plain calibrated dating results or the modelled dates, it becomes evident that the division of

112 Črešnar 2014, 237, 241 and Figs. 13.11/1; 13.1.6.

Ljubljana's graves into two separate stages was well-founded. This division is, of course, more evident in the presentation of modelled dates, but at the same time also more excessive, to the point where the phase designated as comprising the major part of the Ha A period begins only in or as late as the second half of the 12th century. To some extent this is certainly due to the seemingly low dates mentioned above (graves 277 and 278), but on the other hand it is also true that the quantity of available radiocarbon dating results is still too limited to allow further fine-tuning.[113] In my opinion, the transition between the phases Ljubljana Ia 1 and Ljubljana Ia 2 is concurrent with the transition between the Oloris-Podsmreka and Rogoza-Orehova vas horizons, which has been set in the first half of the 12th century BC.[114] This is the time when settlements belonging to the Oloris-Podsmreka horizon had been abandoned, while at the same time new settlements were founded, a characteristic of which is the occurrence of new vessel forms. A similar continuity between the Br D and the very beginning of the Ha A1 period can also be observed at both cemeteries and settlements in the Podravina region.[115] Only during the course of the Ha A1 period (and not with the end of the Br D period) were settlements and some of the cemeteries abandoned in this region, while at the same time new ones appeared. Such is the case of the cemetery in Slatina, from which several radiocarbon-dated graves are available that place the cemetery in the period between the end of the 12th and the first half of the 11th century BC.[116] In the relative chronological sense, the graves can be placed at the transition of phases Ha A1/A2 and above all in the Ha A2 phase and are contemporaneous with the graves from Ljubljana belonging to the Ljubljana Ia 2 phase. Very similar are likewise the results of radiocarbon dating of two graves pertaining to the Ha A2 phase from the Hungarian cemetery of Ménfőcsanak.[117]

4. Conclusion

The recent revision of the entire Dvorišče SAZU cemetery in Ljubljana, extensive analysis of its ceramic material and the new radiocarbon dating results demonstrated that the first urn cremation graves must be dated as early as the very beginning of the Late Bronze Age in the 13th century BC or in the phase Ljubljana Ia 1. These findings supplement the picture of otherwise scarce cemeteries or separate graves from the early phase of the Urnfield period in Slovenia. Grave 191 from Ljubljana, which has been dated to the 13th century BC, represents one of the oldest radiocarbon-dated cremation graves from Slovenia. The repertoire of pottery forms attested in these oldest cremation graves from Ljubljana exhibits surprising similarities with the ceramic from the northern Carpathian Basin. What is more, the correlations go beyond the mere similarity of vessel forms and decoration, as the use of these vessels within the burial ritual demonstrates comparable, clearly defined principles as well. Both in the southeastern Alpine area and in the northern Carpathian Basin territory the jugs were used as urns in the female graves, while the cups served as urns in the graves of infants. Such observations pose numerous new questions in regard to the relations, mobility and even possible migration between the relatively distant communities from the southeastern Alpine area and the northern Carpathian Basin.

The next phase Ljubljana Ia 2 (Ha A period) is placed in the period from the first half/middle of the 12th century BC and up to the middle of the 11th century BC. During this period, we can trace the evolution of certain vessel shapes from the previous phase (for example jugs and amphorae), but above all new vessel forms appear, which can be related to the Baierdorf-Velatice cultural sphere. The bronze grave goods from this phase and, above all, the analysis of their distribution, which extends from Ljubljana all the way to the northern Carpathian Basin, point to rather intensive relations between these distant territories, relations which, until now, were primarily indicated by certain aspects of hoard finds.

Acknowledgments

I am especially grateful to the curators Irena Šinkovec and Martin Horvat (both MGML, Ljubljana) as well as Peter Turk (NMS, Ljubljana), who granted me full access to the excavated material and documentation of the Dvorišče SAZU site in Ljubljana. Special thanks are due also to the curator Alexander Botoš (Gemersko-Malohontské Museum, Rimavská Sobota) for giving me the opportunity to see the finds from Šafárikovo and to the curator Petr Velemínský (Národní muzeum, Prague), who allowed me to take cremated bone samples from the Radzovce and Šafárikovo sites for the AMS radiocarbon dating analysis. All radiocarbon dating analyses of cremated human bone samples were carried out in Kiel, Germany (Leibniz Laboratory for Radiometric Dating and Stable Isotope Research, Kiel). I am greatly indebted to Christian Hamann for all the AMS measurements conducted and for fruitful discussions on the AMS dating results. My sincere thanks also to Ida Murgelj (NMS, Ljubljana), who made the new drawings of grave goods from Ljubljana; to Tatjana

113 For problems regarding the radiocarbon dates falling around 1200 BC, cf. also Manning 2006–2007.

114 Črešnar, Teržan 2014, 687, 689, 693 and Fig. 24. In view of the new radiocarbon dates from northern Italy, the transition between the phases Bronzo Recente and Bronzo Finale was likewise placed in the middle of the 12th century BC (Cardarelli, Pellacani, Poli 2014).

115 Ložnjak Dizdar 2017, 88, 102.

116 Forenbaher 2018, Tab. 3, Figs. 25–26. – Ložnjak Dizdar 2018, 83, 101, 114, 124, 160, 181.

117 Ilon 2015, 248. – See also Wèber 2017, Fig. 18.

Tomazo-Ravnik (Kranj) and Joachim Wahl (Regierungspräsidium Stuttgart, Landesamt für Denkmalpflege, Arbeitsstelle Konstanz), who conducted the anthropological analysis of the cremated bones from Ljubljana; as well as to Borut Toškan (Institute of Archaeology, ZRC SAZU, Ljubljana) and Norbert Benecke (DAI, Berlin), who analysed the animal bone remains. Szilvia Guba (Kubinyi Ferenc Museum, Szécsény), Sylvie Boulud-Gazo (Université de Nantes, Nantes), Václav Furmánek and Vladimír Mitáš (both Archeologický ústav SAV, Nitra) enabled me to examine and clarified to me numerous unpublished data on cremation cemeteries from Hungary and Slovakia, for which I am extremely grateful. I would like to express my thanks also to Biba Teržan (University of Ljubljana, Ljubljana), whose comments were, as always, stimulating and invaluable. Heartfelt thanks go to Miha Kunstelj, my inexhaustible source of inspiration and support, not only for the English translation, but also for all the proposed improvements. Thanks are due also to anonymous reviewers for their comments and suggestions and to Nicola Wood for her English proofreading of this article.

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Catalogue

Excavations were conducted by Martin Horvat in 2001 on the site of the Auersperg or Turjak Palace (now housing the City Museum of the Museum and Galleries of Ljubljana) (Fig. 1).

Grave 326

The grave pit (Stratigraphic Unit = SU 915) contained an urn, covered by a dish with inverted rim. The pit was filled with cremated remains and fragments of burnt human bones (SU 914). Among the cremated remains in the filling of the grave pit, animal remains were also discovered. The urn contained cremated human bones, pieces of charcoal and a clay spindle-whorl.

Anthropological analysis
Weight: c. 1070 g (in the urn) and 85 g (outside the urn)
Colouring: brown-black, bluish grey, beige
Burning stage: II–V (mostly V)
Age at death: about 25–30 years
Sex determination: probably female
Pathologies: none
Remarks: very heterogeneous impression and measurements – perhaps commingled remains from two or three different accidentally (?) mixed individuals, one possibly *subadultus*. Two splinters with brownish-red colour (iron-induced). Roots from at least 4 teeth and 7 phalanges might indicate thoroughly collected remains.
Peculiarities: partially very thin calotte fragments in V; one greater sutural bone (probably *Sutura lambdoidea*)

Archaeozoological analysis
Six fish vertebrae of a pike-perch, the right dental of a carp fish and a fragment of a cattle (?) tooth were found in the filling of the grave pit.[118]

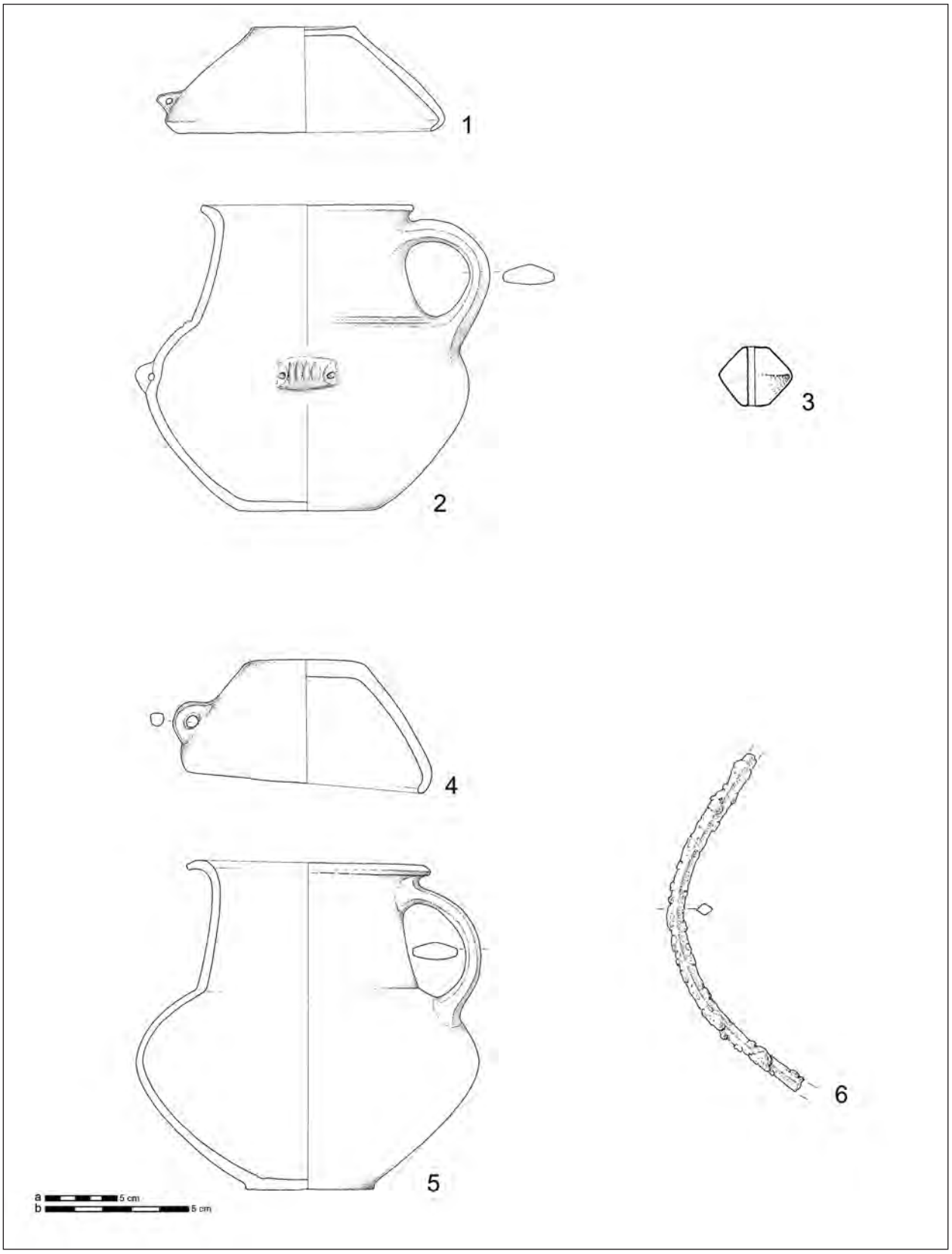
1. Dish with inverted rim made of brown fired clay. Well smoothed surface with visible traces of smoothing. Below the maximum diameter is a horizontally perforated lug of triangular cross section. The rim is internally facetted. Base diam. 7.2 cm; max. diam. 19.6 cm; rim diam. 17.8 cm; height 7.2 cm. Inv. no. 510:LJU;0035885. Pl. 1/1
2. Jug – urn made of brown fired clay. On the maximum diameter there are two (out of three) preserved lugs, triangular in cross section and horizontally perforated, while their tips are decorated with impressions. On the neck-to-shoulder transition and above the point where the handle is attached to the body, there are two horizontal grooves. The handle does not exceed the rim and shows a rounded triangular cross section. The surface of the vessel is well smoothed. Base diam. 11.5 cm; max. diam. 22.3 cm; rim diam. 14.7 cm; height 21.2 cm. Inv. no. 510:LJU;0035884. Pl. 1/2
3. Biconical spindle-whorl made of burnt clay. Height 2 cm; width 2.4 cm; weight 9.4 g. Inv. no. 510:LJU;0034860. Pl. 1/3
4. Two unidentifiable bronze fragments, one of flat and the other of rounded cross section. Length 1.2 and 1.45 cm. Without inv. no.

Grave 327

The grave pit (SU 920) contained an urn, which was covered by a dish with inverted rim. The pit was filled with cremated remains (SU 919). Within the urn were cremated human bones and a fragment of a bronze necklace.

Anthropological analysis
Weight: c. 580 g
Colouring: brown-black, bluish grey, beige
Burning stage: II–V (mostly III)
Age at death: about 30 years
Sex determination: probably female
Pathologies: questionable intravital tooth loss (tooth 47 = lower right wisdom tooth), *Cribra cranii*
Remarks: 3 fragments with bluish-green colour (copper

118 The archaeozoological analysis of animal bones from graves 326 and 327 was carried out by N. Benecke (DAI, Berlin, Germany). The radiocarbon dating result of the fish vertebra (KIA-51403: 3780 ± 30 BP) demonstrates that the bone is much older than the cremation itself.



Pl. 1. 1–3. Dvorišče SAZU cemetery in Ljubljana, grave 326. – 4–6. Dvorišče SAZU cemetery in Ljubljana, grave 327 (1–5 ceramic, 6 bronze). Scale: 1–2, 4–5 = a [1:4]; 3, 6 = b [1:2].

induced); roots from at least 5 teeth and several phalanges present that indicate thoroughly collected remains after the pyre had burnt down.
Peculiarities: *Foramen supratrochleare* (left humerus)

Archaeozoological analysis
A few splinters (questionable)

1. Dish with inverted rim, brownish grey in colour. Below the maximum diameter is a horizontally perforated lug of angular cross section. The vessel surface is well smoothed. Base diam. 8.4 cm; max. diam. 17.5 cm; rim diam. 17.1 cm; height 8.7 cm. Inv. no. 510:LJU;0034888. Pl. 1/4
2. Jug – urn made of brownish-grey fired clay. The exterior vessel surface and the inner part of the neck are well smoothed, while the remaining interior vessel surface remains coarse. The shoulder-to-neck transition is very pronounced. The rim is facetted on the inner side. The handle does not surpass the rim and shows a rounded triangular cross section. Base diam. 9 cm; max. diam. 24 cm; rim diam. 16.8 cm; height 22.8 cm. Inv. no. 510:LJU;0034887. Pl. 1/5
3. Fragment of a bronze necklace, rhombic in cross section. Preserved length 14.4 cm. Inv. no. 510:LJU;0046352. Pl. 1/6

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