DAVID VÍCH · JIŘÍ KMOŠEK

A BRONZE BROOCH CASTING MOULD IN EASTERN BOHEMIA FROM THE PERIOD OF THE MARCOMANNIC WARS

Until recently, direct evidence of non-ferrous metal casting products from the *Barbaricum* was limited (Bazovský 2009; Cociş/Bârcă 2013). This situation has been changed by the recent find of a half of a casting mould at the site of Kočí (okr. Chrudim/CZ) in eastern Bohemia. Finds of bronze casting moulds from the Roman Period are not very frequent. Apart from the collections of casting moulds for links of a Vimose type bridle from Dyjákovice near Znojmo (okr. Znojmo/CZ; Čižmář 2010, 127-131), we need to mention also a half of a casting mould for connecting links of the same type from Drösing in Lower Austria (Bez. Gänserndorf/A; Karl/Karl 1996, 496 fig. 509; Friesinger/Tuzar/Pollak 2000-2001, 268 fig. 14). Brooch casting moulds come from Eitzen (Lkr. Uelzen/D; Cosack 1973), Geldersheim (Lkr. Schweinfurt/D; Rosenstock 1984), Kleinhöflein (Bez. Hollabrunn/A; Kren/Pollak 2007, fig. 41, 1) and Neunheilingen (Unstrut-Hainich-Kreis/D; Walther 1996), a half of a mould with two negatives is deposited in the Naturhistorisches Museum Wien (Drescher 1973, 55. 57 fig. 7). Two examples of metal moulds for brooch casting are known from Great Britain (Bayley/Bucher 2004, 35-36). A unique collection including two halves of moulds for brooch and ring production was discovered in a craftsman's grave in Prusiek (woj. podkarpackie/PL; Madyda-Legutko/Rodzińska-Nowak 2014). Another find of a half of a mould for brooches with a high catch plate of Almgren Group VII comes from the Porolissum 1 *castellum* (Moigrad-Porolissum, jud. Sălaj/RO; Gudea 2009). It needs to be noted, however, that casting moulds made of metal are extraordinarily rare in the Roman milieu (Gudea 2009, 411; cf. Gralfs 1994, 67. 146 list 7) because apart from less frequent forging, brooches had been made using clay moulds, when a model was imprinted in the clay into which the melted metal was then poured, or using the method of lost-wax casting (Gugl 1995, 50-53; Cociş 2004, 24-26; Sedlmayer 2009, 97-99; Baumgartner 2014).

SITE AND FIND CIRCUMSTANCES

The Chrudim area is one of the eastern Bohemia's regions with the most favourable conditions for prehistoric settlement, with an altitude dropping below 250 m at places and only sporadically rising above 300 m, and loessic bedrock covered with fertile soils suitable for agriculture. Despite that, our knowledge of the occupation in the Roman Period based on excavations remains insufficient, with a few exceptions (a Late Roman/Early Migration Period settlement in Chrudim: Musil/Jílek 2012; a Roman Period settlement in Tuněchody [okr. Chrudim/CZ]: Jílek et al. 2017; Vích 2017, 80-81 fig. 4; earlier finds from Dřenice [okr. Chrudim/CZ]: Kašpárek 2016). Therefore, surface prospection becomes very important; the situation has changed in recent years above all due to the use of metal detectors by museum archaeologists and their collaborators[1].

The municipality of Kočí is situated 3 km east of Chrudim (**fig. 1, 3**). Despite numerous surface surveys focused on this cadastral area, the Roman Period occupation had been unknown there until 29 August 2014, when David Vích and Tomáš Bek discovered a Roman Period settlement during surface prospecting at a site called »Rozizna« in the northern part of the municipality on a long ridge between two watercourses. Sparse evidence of the occupation of the Urnfield, La Tène and Migration Periods came to light beside the finds from the Roman Period[2].

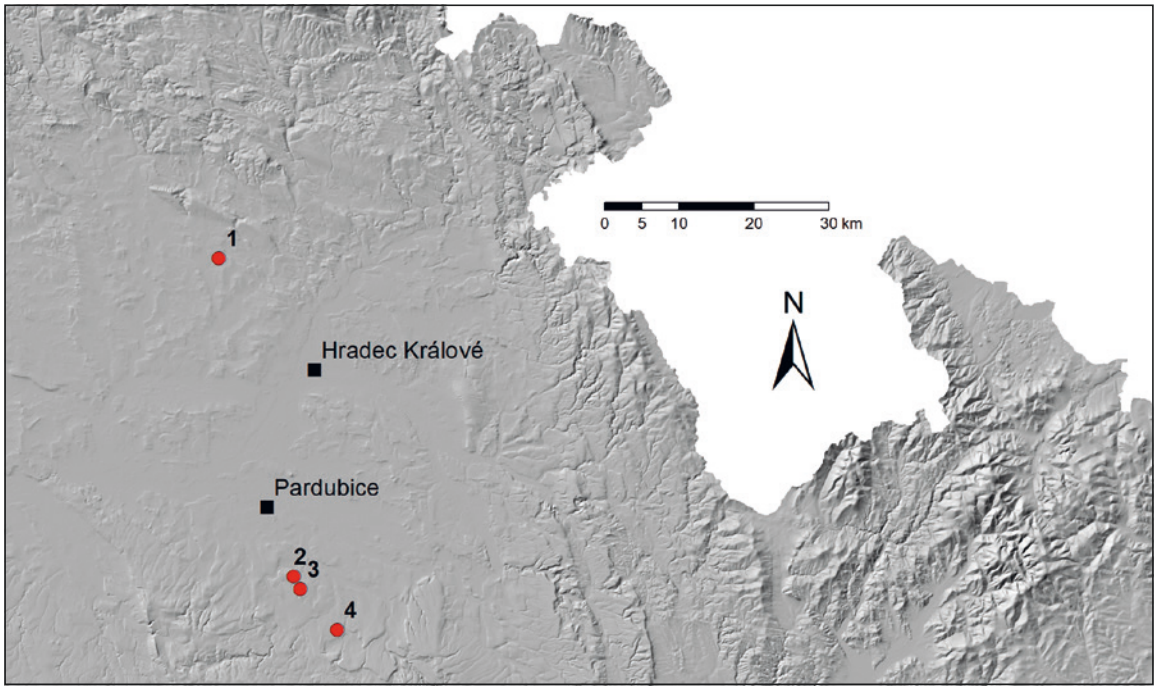

Fig. 1 Map of eastern Bohemian sites mentioned in the text: **1** Milovice u Hořice. – **2** Topol. – **3** Kočí »Rozizna«. – **4** Chrast. – (Map J. Kmošek).

BRONZE MOULD

The important find was made in the southern part of the settlement. Using a metal detector, D. Vích discovered half of a bronze mould there on 13 March 2015[3]. The subtle artefact with the dimensions of 29 mm × 25 mm × 8 mm and a weight of 26.74 g (before conservation) was used to cast brooches with a knee-shaped bent bow (**figs 2, 1; 3, 1**), particularly brooches of type Almgren 132, which are sometimes considered a transition between East-Germanic brooches with a cylindrical head and Elbe-Germanic knee-shaped brooches (Droberjar 2012, 237). Type A.132 brooches occur above all in the milieu of the Przeworsk Culture (**fig. 4**); small pieces of a size of up to 33 mm are reportedly typical of its later Phase B2 (Andrzejowski/Cieśliński 2007, 286-287 fig. 7; Droberjar 2012, 237). All specimens of A.132 brooches known from the territory of the Czech Republic as yet come from detector prospecting of the topsoil, having been removed from the original context by agricultural activity. There are only two examples from Bohemia, from the Central Bohemian site of Hořátev-Zvěřínek (okr. Nymburk/CZ) and Nová Ves (okr. Kolín/CZ; Droberjar 2012, 237). Other fasteners of this type have been recently published from southeastern Moravia, originating also from detector surveys (Zeman 2017, 107).

A traditionally discussed question is whether the metal moulds were used to cast final bronze products (e. g. Blažek/Ernée/Smejtek 1998, 13-14) or only models intended for the subsequent production of brooches by lost-wax casting (e. g. Tylecote 1986, 92; Machajewski/Maciejewski 2006, 143 with further literature). Although the model casting opinion generally prevails for metal moulds, the possibility of casting final bronze products under certain conditions (pre-heating of the mould, separation of the inner surface of the mould and the necessity of a rapid progress of the casting process itself) has been proved experimentally (Drescher 1957, 57-58; Mohen 1978, 27; Wirth 2003, XII-XVI). The use of some moulds

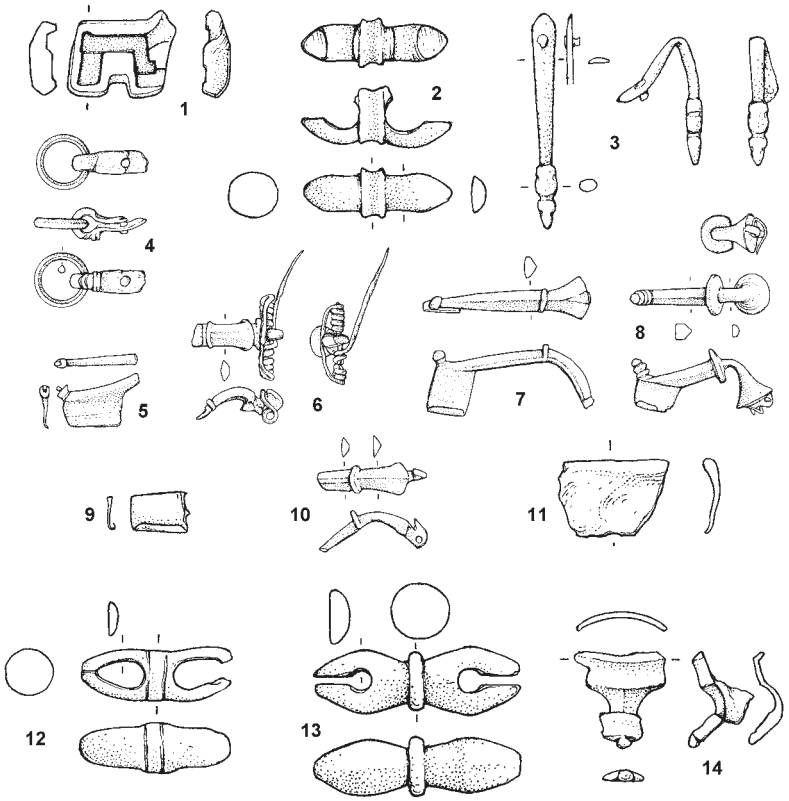

Fig. 2 Roman Period finds from the sites mentioned in the text: **1-11** Kočí »Rozizna«. – **12** Milovice u Hořic. – **13** Topol. – **14** Chrast. – (Drawings M. Černý). – Scale 1:2.

Fig. 3 Kočí »Rozizna« (okr. Chrudim/CZ). The mould (**1**) and presumed waste connected with non-ferrous metal working at the site (**2-5**). – (Photos D. Vích). – Scale 1:1.

for this purpose is indicated also by preserved traces of damage and other traces on the internal surface of the moulds (Jantzen 2008, 174-176). Recent analyses of Bronze Age axe casting moulds from the territory of Poland suggest that some moulds might have been used for casting both metal and wax models (Baron/Miazga/Nowak 2014). A certain clue for these reflections comes also from the elemental analysis

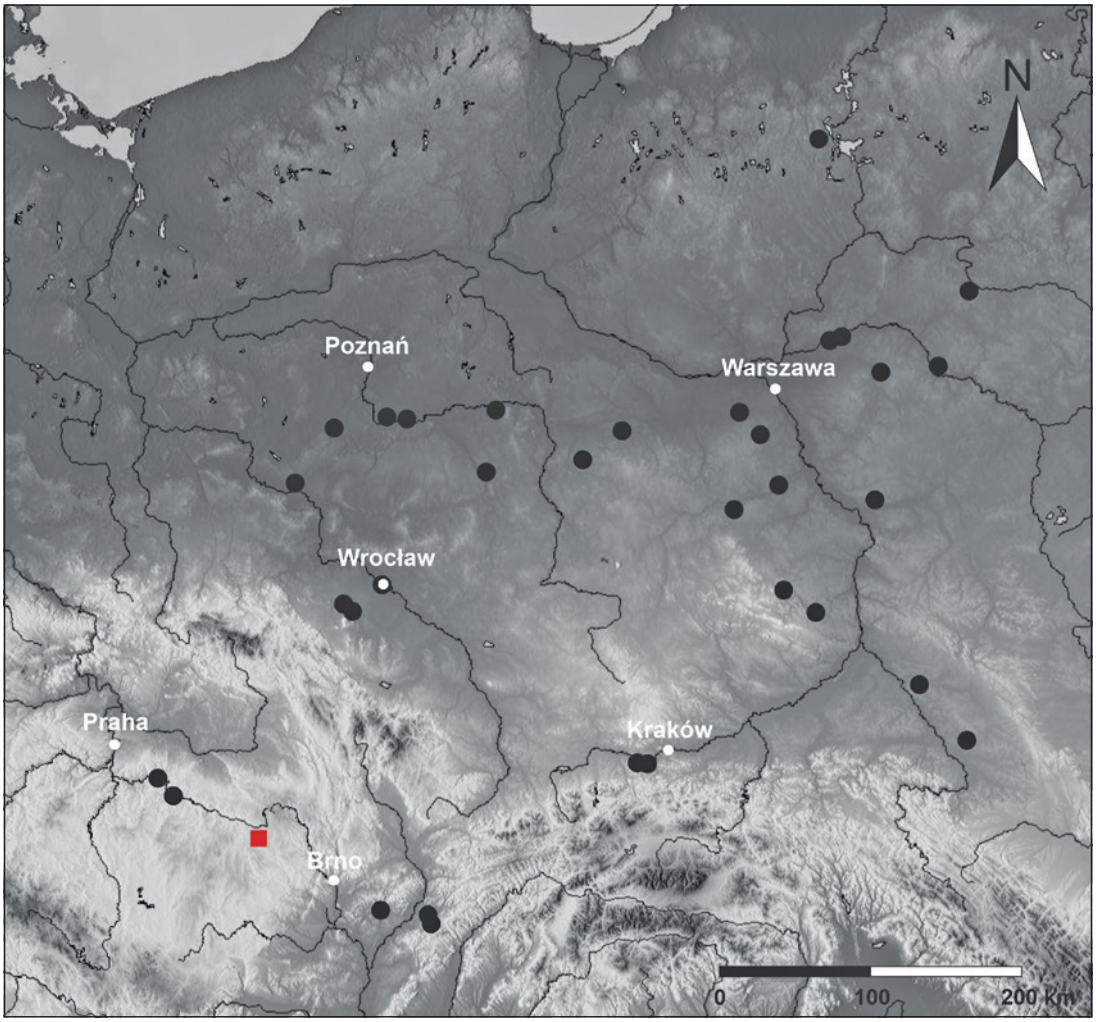

Fig. 4 Distribution map of brooches of Type A.132 (●) in the *Barbaricum* territory with the highlighted site of Kočí (■). – (After Andrzejowski/Cieśliński 2007; Droberjar 2012; Zeman 2017; map D. Vích).

of the mould from Kočí near Chrudim using the ED-XRF method (**tab. 1**)[4]. It proved high percentages of lead (19.7 %), zinc (9.8 %) and tin (3.7 %). Alloying these three elements considerably reduces the melting temperature of the alloy towards values around 950-980 °C (Perrot 2007, 414)[5]. This rather indicates the casting of models, but after a thorough separation of the contact area between the liquid alloy and the surface of the mould, the use of the mould for casting A.132 brooches from ordinarily used types of alloy could be considered as well.

no. of artefact	type of artefact	Cu	Sn	Pb	Zn	Fe	Co	Ni	As	Ag	Sb	S
artefacts from the Roman Period												
4	brooch bow, Type A.84	77.41	7.84	13.52	1.00	0.23	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
7	catch plate of an unspecified brooch	90.18	8.65	0.50	0.41	0.26	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
9	casting mould	65.57	3.67	19.70	9.80	1.26	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
11	vessel rim fragment	90.15	6.91	n. d.	2.60	0.12	n. d.	n. d.	n. d.	0.21	n. d.	n. d.
12	tubular brooch bow, Type A.77	90.71	3.74	1.36	3.93	0.25	<0.05	n. d.	n. d.	n. d.	n. d.	n. d.
13	foot of a distinctively segmented brooch	69.77	5.13	20.49	3.86	0.76	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
14	part of a drinking horn hanger	87.84	3.72	0.18	8.05	0.21	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
15	bent belt end, Raddatz Type O1	84.03	0.56	n. d.	15.41	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
16	bridle link torso, Vimose Type	60.05	5.66	33.94	0.18	n. d.	<0.05	0.13	n. d.	n. d.	n. d.	n. d.
32	part of a brooch bow, Type A.84	55.51	5.23	38.44	0.42	0.40	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
34	brooch bow, Jobst Type 4F	77.60	10.69	11.71	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
production waste												
6	cast of the mouth of a runner	92.32	5.21	n. d.	2.45	<0.05	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
26	ingot	52.87	6.21	39.87	0.34	0.71	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
35	ingot	86.03	10.04	3.55	0.10	0.27	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
36	massive cast	97.25	1.91	0.85	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
artefacts from the La Tène Period (No. 1) and the Bronze Age (the others)												
1	cone-shaped jewel	81.49	4.61	13.72	n. d.	0.15	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
8	fragment of sickle	87.58	1.96	n. d.	n. d.	3.22	n. d.	4.39	1.27	n. d.	n. d.	1.56
18	pin	84.53	3.78	11.67	n. d.	<0.05	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
23	fragment of axe	91.27	7.25	0.72	n. d.	0.37	n. d.	0.37	n. d.	n. d.	n. d.	n. d.
27	fragment of axe blade	93.28	5.45	0.84	n. d.	0.26	n. d.	0.15	n. d.	n. d.	n. d.	n. d.
28	fragment of axe blade	97.89	n. d.	n. d.	n. d.	<0.05	<0.05	0.11	0.79	0.84	0.27	n. d.

Tab. 1 Outcomes of the ED-XRF analyses of the artefacts from the Roman Period, the production waste and the artefacts of the La Tène Period and the Bronze Age (weight %).

OTHER ROMAN PERIOD FINDS FROM THE SITE

Apart from pottery fragments, ten metal artefacts[6] reliably dated to the Roman Period were discovered at the site in 2014-2017. In the following, other finds from the Roman Period are listed:

- No. 4: bronze brooch bow, Type A.84, 44 mm × 17 mm × 11 mm, weight: 7.98 g, E 0560900, N 5533998 (**fig. 2, 7**);
- No. 7: catch plate of an unspecified brooch, 15 mm × 11 mm × 3 mm, weight: 1.10 g, E 0560928, N 5533819 (**fig. 2, 9**);
- No. 11: vessel rim fragment, 29 mm × 20 mm × 3 mm, weight: 6.99 g, E 0560859, N 5533814 (**fig. 2, 11**);
- No. 12: tubular brooch bow, Type A.77, 39 mm × 16 mm × 11 mm, weight: 7.78 g, E 0561013, N 5533809 (**fig. 2, 8**);
- No. 13: foot of a distinctively segmented brooch, 23 mm × 13 mm × 3 mm, weight: 2.1 g, E 0561053, N 5533777 (**fig. 2, 5**);
- No. 14: part of a drinking horn hanger, 31 mm × 15 mm × 9 mm, weight: 3.23 g, E 0560982, N 5533731 (**fig. 2, 4**);
- No. 15: bent belt end, Raddatz Type O1, 39 mm × 22 mm × 6 mm, weight: 3.69 g, E 0561036, N 5533772 (**fig. 2, 3**);
- No. 16: bridle link torso, Vimose Type, 39 mm × 16 mm × 14 mm, weight: 18.42 g, E 0560987, N 5533751 (**fig. 2, 2**);
- No. 32: part of a brooch bow, Type A.84, 59 mm × 8 mm × 5 mm, weight: 3.07 g, E 0560972, N 5533758 (**fig. 2, 7**);
- No. 34: part of the bow of a distinctively segmented two-part brooch with a lacking trapezoidal foot, Jobst Type 4F, 38 mm × 23 mm × 10 mm, weight: 4.61 g, E 0560965, N 5533674 (**fig. 2, 6**).

Brooches of Type A.84 (**fig. 2, 7. 10**) are considered typical representatives of Phase B2b lingering into B2/C1, i. e. dated in the second third or second half of the 2nd century (Dąbrowska 1992, 106-107; Sedlmayer 1995, 29-30; Komoróczy 1999, 170-171; Tejral 2004, 333; 2008, 70). A part of the bow with the head, the complete coil spring and a deformed needle are preserved from brooch No. 34. The shape of the head and particularly the remnant of the broken off flat foot reliably categorise the brooch as Jobst Type 4F (**fig. 2, 6**). These are dated from the late 1st century to the first half of the 2nd century with a possible occurrence in the second half of the 2nd century (Jobst 1975, 36-37; Gugl 1995, 20; Sedlmayer 1995, 27-28; Tejral 1998, 392; Cociş 2004, 58-60; Schmid 2010, 24; Leitner/Färber 2013, 217-219; Komoróczy/Vlach/Zelíková 2017, 49) with a distribution in the Danube provinces, northern Italy, Raetia, Noricum, Pannonia and in the area of southern Moravia, Lower Austria and southwestern Slovakia (Jobst 1975, 36; Andrzejowski 1992, fig. 2; Leitner/Färber 2013, 215-217 fig. 2; Komoróczy/Vlach/Zelíková 2017, 51-52 fig. 10). One-part brooch No. 12 is a tubular brooch of Type A.77 (**fig. 2, 8**). Tubular brooches occur from Phase B1b (Droberjar 1999, 84. 163. 458) but above all in the second half of the 1st century, with a more advanced version persisting until the end of the 2nd century (Svoboda 1948, 65-66; Jobst 1975, 40; Droberjar 1999, 84; Tejral 2002, 204-205). Tubular brooches commonly appear in both Bohemia and Moravia (e. g. Svoboda 1948, 62-66; Peškař 1972, 82-85; Motyková 1981, 388 fig. 12, 4. 6. 10; eastern Bohemia: Jílek 2017, 145). Brooch bow fragment with a foot No. 13 (**fig. 2, 5**) belongs to the category of distinctively segmented brooches, according to the button on the bow and the shape of the catch plate generally of Type A.69 or 70/73, dating from the second half of the 1st century to the end of the 2nd century (Gugl 1995, 13-19; Cociş 2004, 49-51; Schmid 2010, 21-23); brooch catch plate No. 7 cannot be more precisely classified at all (**fig. 2, 9**).

Deformed belt end No. 15 (**fig. 2, 3**), originally about 6 cm long, poses a certain classification problem due to its considerable abrasion, caused either by the wear and tear or its long stay in the topsoil. While it can be

reliably categorised as an item with variously profiled ends of Madyda-Legutko Type 1, the determination of the variant is more difficult due to the damage. According to the preserved structure, it is most probably of Variant 3, but the possibility of Variant 6 cannot be ruled out with certainty. We must, therefore, settle for a general dating between the 1st century and the second third of the 2nd century (Madyda-Legutko 2011, 17-21).

Item No. 14 represents a part of a drinking horn hanger (**fig. 2, 4**) corresponding to Type S3, dating to Phase B1 and surviving until Phase B2 (Andrzejowski 1991, 59. 61). A strongly deformed vessel rim (**fig. 2, 11**) also falls into the Roman Period, above all because of the presence of zinc.

Horse equipment is represented by an artefact (No. 16) in the form of a bridle linking element (**fig. 2, 2**). Seven to ten of these linking elements interconnected by circles comprised a Vimose Type bridle (Lau 2008, 27; 2014, 39); the unit from the site under study corresponds to Wilbers-Rost Type Z 4 with the nearest analogue in Variant c (Wilbers-Rost 1994, 120 addendum 1) or possibly Type 6B (Ørsnes 1993, 191. 204-205). Vimose Type bridles form three spatial concentrations: in the Jutland Peninsula and southern Scandinavia, in the Baltic States, and the area of Austria, Slovakia and Hungary (Lau 2008, 30; 2014, fig. 29); Moravia must be newly added to the latter territory (Jílek 2007, 176; Čižmář 2010; Tejral 2015, 442-444), and Bohemia as well according to the latest discoveries. The find of one whole part of a bridle from Čelákovice (okr. Praha-východ/CZ) was published some time ago (Droberjar/Špaček 2003, 337-342; the find corresponds to Type I, Lau 2014, 42 fig. 31 by the composition of its parts); another find is an unpublished element of Vimose Type Wilbers-Rost Z 4i (Wilbers-Rost 1994, 120 addendum 1) discovered during a private detector survey on 1 March 2015 also in the Chrudim region not far from the site discussed here, in the neighbouring cadastral area Topol[7] (dimensions: 54 mm × 21 mm × 21 mm; **figs 1, 2; 2, 13**). The fact that these products were part of the material culture of the Germans living in present-day eastern Bohemia is evidenced also by another item of the same type found during a detector survey of a Roman Period settlement complex on 21 March 2015 in the cadastral area Milovice near Hořice (okr. Jičín/CZ), also in eastern Bohemia, this time in the Hradec Králové region[8] (dimensions: 40 mm × 14 mm × 13 mm; **figs 1, 1; 2, 12**). Vimose Type bridles occur in datable finds within two periods. On the Baltic Sea shore, they appear in graves of the period around the Marcomannic Wars, i. e. in the second half of the 2nd century; in southern Scandinavia, we encounter them as offerings in Phase C1b, which means that they were used there also during the second half of the second century (Lau 2008, 30-31 fig. 3). At least, some of the finds in the Central Danube region are related to the Marcomannic Wars (Lau 2014, 44-48), and the exemplar from Kočí would fit well into this pattern according to the accompanying finds gathered at the settlement.

The interpretation of the concentration of the finds of Vimose Type elements in the Central Danube region remains a question. According to some opinions (Kull 1996, 431-432), they might have got there together with the warriors during the Marcomannic Wars; a possible influence of trade connections with *Carnuntum* (Bez. Bruck an der Leitha/A) is also considered, via Bohemia to the Elbe region as well as along the Amber Route to the territory of present-day Poland and the western Baltic States (Wilbers-Rost 1994, 122-123; Lau 2008, 33-34 with further literature). According to the latest state of knowledge, however, the Central Danube region probably represented a production centre of this type of product (Tejral 2015, 442-444).

Apart from a not very numerous collection of rather common metal artefacts, the until recently quite unknown settlement in the Chrudim region dated to the Marcomannic Wars period has thus yielded several items important for the knowledge of the turn of the Early and Late Roman Periods in the territory of Bohemia. That the Roman Period (and especially the second half of the 2nd century) will deserve increased attention in the future is evidenced by another find made by Zdeněk Popilka in the Chrast cadastral area (okr. Chrudim/CZ), the position »Na horecké straně« using a metal detector on 19 August 2015[9]. It is a so far solitary find of a part of a brooch (24 mm × 23 mm × 16 mm; **figs 1, 4; 2, 14**) with three crosspieces on

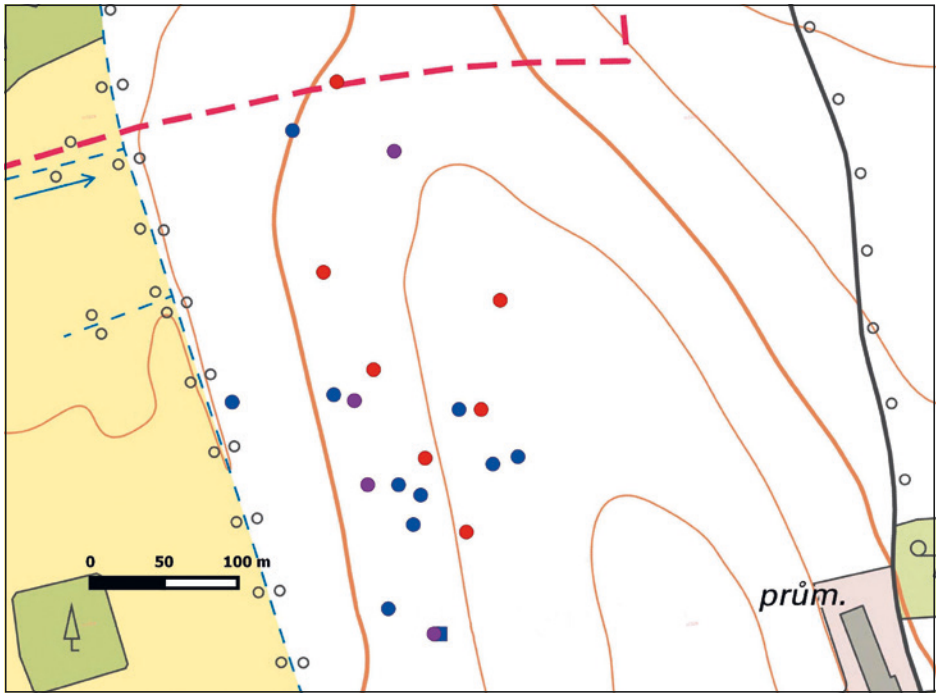

Fig. 5 Kočí »Rozizna« (okr. Chrudim/CZ). Spatial distribution of the finds at the site: ● finds from the Roman Period; ● production waste; ● Bronze Age and La Tène finds. – (Map D. Vích).

the bow (*Dreisprossenfibel*). Only a deformed part of the bow with a crosspiece on the heel and a crosspiece in the central part of the brooch with a remnant of the catch plate are preserved from the fastener. The brooch is broken off just after the central crosspiece, and the breakage bears the same signs of patination as the remaining surface of the artefact. Despite the considerable damage, the fastener can be classified as Thomas Hauptmann Series 1, Variant 1 (Hauptmann 1998, fig. 1). Brooches of Type A.94-96 represent a characteristic part of the Wielbark, Przeworsk and Luboszyce Cultures, where they were part of above all female clothing dated to Phase B2/C1 to C1a (Mączyńska 2009, 59-62); the brooch from Chrast increases the number of specimens known from Bohemia to four (Droberjar 2015, 40-41 fig. 5). This makes the brooch another, rather important addition to the items of northeastern origin from the territory of eastern Bohemia (cf. Jílek 2009).

EVIDENCE OF NON-FERROUS METAL WORKING AT THE SITE

The find of a half of a brooch casting mould necessarily leads to the consideration of whether non-ferrous metal casting took place at the given site. Currently, we have four artefacts that can be considered:

- No. 6: cast of the mouth of a runner, 12 mm × 10 mm × 8 mm, weight: 2.97 g, E 0560942, N 5533815 (**fig. 3, 3**);
- No. 26: ingot, 12 mm × 11 mm × 4 mm, weight: 2.35 g, E 0560951, N 5533758 (**fig. 3, 4**);
- No. 35: ingot, 13 mm × 11 mm × 5 mm, weight: 3.16 g, E 0560969, N 5533984 (**fig. 3, 5**);
- No. 36, massive cast, perhaps of the mouth of a runner, 23 mm × 23 mm × 14 mm, weight: 21.83 g, E 0561034, N 5533623 (**fig. 3, 2**).

Two of the artefacts have the form of amorphous ingots that are commonly encountered in surface surveys especially within settlements of the Late Bronze Age. Casts of the mouths of runners, represented by arte-

fact No. 6 (**fig. 3, 3**) and possibly also No. 36 (**fig. 3, 2**), however, are not among very frequent finds even in the Bronze Age (cf. Jantzen 2008, 216-217; Nessel 2012). The fundamental question that arises concerns the dating of these items. The answer is complicated by the fact that all the specimens come from the topsoil, having been moved there by agricultural activity, and that the La Tène and Bronze Age occupation has been documented at the site (**fig. 5**). We must, therefore, proceed from an analysis of the elemental composition of the alloy and the spatial distribution of the finds. The analysis of the composition of the individual artefacts' alloys reveals an interesting fact: the content of zinc in both morphologically determinable items and most exemplars connected with metallurgical activities (**tab. 1**). The percentage of zinc in the belt end No. 15 is so high (along with the minimum presence of tin) that we can describe the alloy as brass (**tab. 1**). The mould itself also shows a considerably higher percentage of zinc. The zinc ratio in other artefacts (including the drinking horn metal fitting, which undoubtedly represents a product of barbarian origin) and in the runner mouth cast No. 6 is in the order of several percents. Amorphous ingots Nos 26 and 35 contain only traces of zinc, and artefact No. 36 is the only item in the collection that does not contain zinc at all. As expected, zinc is lacking in artefacts that are demonstrably earlier than the Roman Period (Frána et al. 1997, 63; Danielisová/Militký 2014, 52). The identical elemental composition of ingot No. 26 and the Type A.84 brooch (No. 4) is noteworthy; it may indicate more complex metal working at the site. The most probable possibility is recasting of these brooches to produce other types of items. In terms of the spatial distribution, three of the four items connected with metal working correspond to a concentration of artefacts reliably dated to the Roman Period, even though they are not compatible with Bronze Age finds, either. A Bronze Age origin is ruled out by the presence of zinc in the alloy, however. Moreover, the fact that the runner mouth cast No. 36 (the only item without a zinc content) was found only a few metres from the mould to produce brooches of Type A.132 is probably not coincidental, either. The two items represent the southernmost finds within the whole settlement so far.

CONCLUSION

A half of a mould made of a ternary alloy of copper, tin, zinc and a considerable percentage of lead intended for the production of brooches of Type A.132 was discovered with the aid of a metal detector at a Roman Period (among others) settlement in the cadastral area of Kočí, eastern Bohemia, dated by other finds to the period of the Marcomannic Wars. Finds of production waste (ingots, runner mouth cast) because of the spatial distribution and the composition show that non-ferrous metals were most probably worked there sometime around the Marcomannic Wars.

Brooches of Type A.132 are known very rarely so far from the territory of Bohemia and Moravia (although the situation is being changed by intensive detector prospecting and the publication of its results), which corresponds to a certain extent to the situation at the Germanic settlement in Pasohlávky (okr. Brno-venkov/CZ), where belt ends of Raddatz Type J II 6-7 were cast; they occur above all in the area of the Wielbark Culture and the west of the Baltic States but appear only exceptionally with the Danube Germans (Tejral 2006, 139 fig. 13). The same author (Tejral 2006, 145-158) points out the specific situation in the Central Danube region after the Peace of Commodus, when we encounter there an intensive inflow of Roman products to the *Barbaricum* milieu at the one hand, while products of a presumed East Germanic and generally Nordic origin appear in the Central Danube region, such as specific forms of fasteners (brooches with a cylindrical head, brooches of Types A.41, A.43, A.129 and, last but not least, also brooches with three crosspieces on the bow, newly represented also in the Chrudim region, as well as spurs of Type Ginalski E, bracelets with shield-shaped ends, bridles of Vimose Type). Based on the accumulating finds, it is newly being considered

that even though the influence of northeastern elements on the Central Danube region is indisputable, the local specific material culture is the outcome of the interaction of the Roman provincial milieu and traditional barbarian forms. For many items that were regarded as imports until recently, the possibility of their direct production in the Central Danube region starts to be considered in the light of the new finds. This concerns brooches of Type A.129, whose number from the Central Danube region already exceeds the number of finds from their supposed »parent« area of the Przeworsk Culture, and bridles of Vimose Type, whose production has been documented by finds in Lower Austria and southern Moravia (Tejral 2015, 440-441. 444 fig. 9). Likewise, in the case of arc-shaped spurs with side buttons, the possibilities of a quick adoption of this product by the Danube Germans are being considered (Rajtár 2015, 388-389), or the necessity of their reassessment because of their quickly growing number is mentioned (Jílek 2014, 120). Only further discoveries and their publication will show what a role Bohemia played in this process.

Notes

1) All the artefacts presented below are the property of the Pardubice region deposited in the Regionální muzeum v Chrudimi; the only exception is a find from Milovice near Hořice deposited in the Muzeum východních Čech v Hradci Králové. We thank J. Jílek from the Ústav archeologie a muzeologie, odd. klasické archeologie, Filozofická fakulta Masarykovy univerzity for critical remarks.

2) For each site where detector prospecting is carried out (not excluding the site under study), there is a Microsoft Excel spreadsheet kept in which the gathered artefacts are gradually listed under their respective numbers (material, description, dating, dimensions, date of acquisition, etc.), regardless of the dating. The artefacts are listed under these numbers further in the text.

3) All coordinates presented in the text are given in the WGS 84, UTM format; the coordinates of the mould are E 0561000, N 5533657.

4) The items were analysed using energy dispersive X-ray fluorescence analysis (ED-XRF). Micro-samples of metal material were taken from the analysed items by drilling off using an HSS spiral drill with a TiN surface finish and a drill diameter of 1 mm. Elemental analyses were carried out using the electron scanning microscope Tescan Mira3 LMU with the EDS analyser Bruker Quantax 200, and the data was evaluated in the Bruker Esprit software. The measurement of the specimen took place in the high vacuum regime with an accelerating voltage of 20 kV, the detection of backscattered electrons and a data accumulation period of 300 s. The outcome of the analysis is the average of three independent measurements. The analyses were carried out by Jiří Kmošek at the Katedra chamické technologie, Fakulta restaurování, Univerzita Pardubice.

5) The melting temperature of the alloy was calculated based on the concentrations of the three most represented elements in the alloy (copper, zinc and lead).

6) A silver *denarius* remains outside our attention; it will be discussed separately within the analysis of new finds of Roman coins.

7) E 0558998.834, N 5534456.876.

8) E 0544130, N 5574891; we are obliged to P. Horník from the Hradec Králové museum for the possibility to publish the find.

9) E 0567443, N 5527357

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Zusammenfassung / Summary / Résumé

Fund einer Bronzegussform für Spangen aus Ostböhmen aus der Zeit der Markomannenkriege

In einer germanischen Siedlung in der Katastralgemeinde Kočí (Kotschy) in Ostböhmen, die durch andere Funde in die Zeit der Markomannenkriege datiert ist, kam eine halbe Gussform aus einer Legierung aus Kupfer, Zinn und Zink mit einem deutlichen Anteil an Blei zutage. Sie war zur Herstellung von Spangen des Typs Almgren 132 bestimmt. Die Funde von Produktionsabfällen zeigen, dass in der Zeit der Markomannenkriege in diesem Raum mit Buntmetallen gearbeitet wurde. Der Spangentyp Almgren 132 kommt auf dem Gebiet von Böhmen und Mähren allerdings nur selten vor. J. Tejral weist auf die spezifische Situation an der mittleren Donau hin, nachdem Commodus mit den Germanen Frieden schloss, denn man beobachtet in dieser Zeit einen intensiven Zuwachs an römischer Importware im ostgermanischen Raum. Zugleich begegnet man dort Produkten ostgermanischen Ursprungs. J. Tejral erklärt diese Situation dadurch, dass spezifische Bedingungen für einen gegenseitigen kulturellen Austausch entstanden, wobei das Hinterland von Noricum und Pannonien eine herausragende Stellung einnahm. Diese Entwicklungen betrafen aber wohl ein viel breiteres Gebiet, als man bisher vermutete.

A Bronze Brooch Casting Mould in Eastern Bohemia from the Period of the Marcomannic Wars

A half of a mould made from an alloy of copper, tin, zinc and a considerable percentage of lead intended for the production of brooches of Type Almgren 132 was discovered at a Germanic settlement in the cadastral area of Kočí, Eastern Bohemia, dated by other finds to the period of the Marcomannic Wars. Finds of production waste indicate that non-ferrous metals were worked there some time around the Marcomannic Wars. Brooches of Type Almgren 132 have been very rarely documented from the territory of Bohemia and Moravia. J. Tejral points out the specific situation in the Central Danube region after Commodus had made peace with the Germans, as we encounter an intensive inflow of Roman imports into the East Germanic milieu while products of East Germanic origin also appear there. J. Tejral explains this situation in the rise of specific conditions for mutual cultural exchange, in which the hinterland of Noricum and Pannonia held an extraordinary position. The territorial impact of these manifestations was probably much greater than it has seemed so far, however.

Trouvaille d'un moule de fibule en bronze en Bohême orientale daté de l'époque des guerres marcomannes

Une moitié de moule en alliage cuivreux contenant de l'étain, du zinc et une part importante de plomb, destiné à la production de fibules de Type Almgren 132, et daté de l'époque des guerres marcomannes a été trouvé dans un site d'habitat germanique dans le cadastre de Kočí en Bohême orientale. Des déchets de production indiquent que des métaux non ferreux étaient travaillés à cet endroit à l'époque des guerres marcomannes. Les fibules de type Almgren 132 sont très rarement documentées sur le territoire de la Bohême et de la Moravie. J. Tejral souligne la situation particulière de la région du Danube central après la paix de Commode où l'on constate un flux important d'importations romaines dans le milieu germanique oriental tandis que des produits germains apparaissent de manière simultanné dans la région du Danube central. J. Tejral explique cette situation par l'augmentation de conditions particulières favorables à l'échange culturel mutuel, dans lequel l'arrière pays du Noricum et de la Pannonie ont joué un rôle primordial. L'impact territorial de ces manifestations semble avoir été cependant plus important que ce que l'on supposait jusqu'à présent.

Schlüsselwörter / Keywords / Mots clès

Böhmen / Völkerwanderung / Gussform / Spangen Typ Almgren 132 / ED-XRF
Bohemia / Migration Period / casting mould / brooches Type Almgren 132 / ED-XRF
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David Vích
Regionální museum ve Vysokém Mýtě
Šemberova 125
CZ - 566 01 Vysoké Mýto
dvich@centrum.cz

Jiří Kmošek
Univerzita Pardubice
Fakulta restaurování
Katedra chemické technologie
Jiráskova 3
CZ - 570 01 Litomyšl
kmosekj@gmail.com