

MORAVIAN IRON MONEY

Model of the 9th-Century Axe-Shaped Bars' Genesis and Its Testing with the Assemblage from Staré Zámky near Brno-Líšeň

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The article offers a new perspective on the phenomenon of Moravian axe-shaped bars. It presents a new perspective seeing roots of axe-shaped bars in pre-Christian ritual behaviour. In this context, where practical function of original tools was suppressed, initial semi-finished products evolved into the earliest massive axe-shaped bars. These probably started to serve as a social currency (i.e. primitive money) and their value was probably derived from the weight of the iron commodity, and the intrinsic value of original tools (axes) respectively. The model presumes that since the beginning of their existence, the shrinking of their size and weight took place, probably because of gradual increase of iron scarcity. The shrinkage then gradually reached the stage when storing of a part of a weight unit was very difficult, because of the unforeseeable loss of iron mass during forging. As more precise weight could be projected into smaller bars only with difficulty, their values were probably disconnected from the intrinsic value of the iron, and started to be guaranteed by the issuing authority. The value started to be set arbitrarily in a different unit of account, and axe-shaped bars started to be used as substitute tokens of general-purpose money within the Great Moravian commercialized economy. This model was then confronted with the assemblage of 78 axe-shaped bars from one of the major Great Moravian strongholds at Staré Zámky near Brno-Líšeň. The results of the evaluation including their classification into size categories and mapping of their spatial distribution within the stronghold corresponds with the predictions of the model. Although a hoard of medium-sized bars (i.e. size/weight category IIIb) was present on the site indicating that part of the assemblage may still serve as a social currency, most of the bars fell into small size categories (size/weight categories IV or V) and their spatial distribution shows that they freely circulated within the acropolis of the stronghold, and were probably lost during this daily usage. It thus indicates that they were used in the commercial exchange that took place within the stronghold's market.

Keywords: 9th c., Moravia, Western Slovakia, axe-shaped bars, social currency, general-purpose money.

INTRODUCTION – TOWARDS A NEW MODEL OF AXE-SHAPED BARS' GENESIS AND EVOLUTION

Iron axe-shaped bars represent a particular variant of non-coin currencies that occurred in different regions of Europe in different periods. The region of southern Norway preserved the earliest evidence of these bars from the Early Iron Age, even the main period of their use was after the beginning of the Late Iron Age (Loftsgården 2019, 80). Iron Axe-shaped bars were also in use in areas around the Middle Volga and Kama rivers since the 4th to the 5th c. AD (Szmoniewski 2022). In Moravian and Slovakian territory, the core of the former Great Moravian realm, the first indication of their genesis has been demonstrated from the end of the 8th c. AD (Hájník 2019, 119), and in Lesser Poland, within the presumed domain of the Vistulans, they have been recorded from the first half of the 9th c. (Szmoniewski 2010, 290, 291).

Despite the striking morphological similarities, the economic role of these characteristic bars most probably vary within individual regions and periods. For understanding this phenomenon in

general, it is necessary to research their evolution, and the changes of their economic role in various contexts. For this the artefactual assemblage from 9th c. Moravia is especially suitable. It contains finds from multiple find contexts (Hlavica/Procházka 2020a, fig. 35; 36), and also shows variations of the shape and size of axe-shaped bars (Bialeková 1990; Bialeková/Turčan 2007, fig. 9; Pleiner 1961, 426, fig. 18) during the period ranging from the late 8th c. to the first decades of the 10th c., when axe-shaped bars vanished from the archaeological record.

R. Pleiner's size classification dividing Moravian axe-shaped bars into four size categories (Pleiner 1961, 426, fig. 18) has led some researches to the conclusion that size of axe-shaped bars preserved relicts of standardized 9th-c. Moravian weight units, which were going to be adopted from the Byzantine weight system. The iron commodity of standardized shape and weight then had to serve for storing the value and mediating the exchange, i.e. as the 9th-c. Moravian commodity money (Bialeková/Tirpáková 1989, 94; Pošváb 1963; Tirpáková/Bialeková/Vlkolínská 1989).

Leaving aside the fact that the concept of commodity money is problematic (Espinosa 2019; Graeber

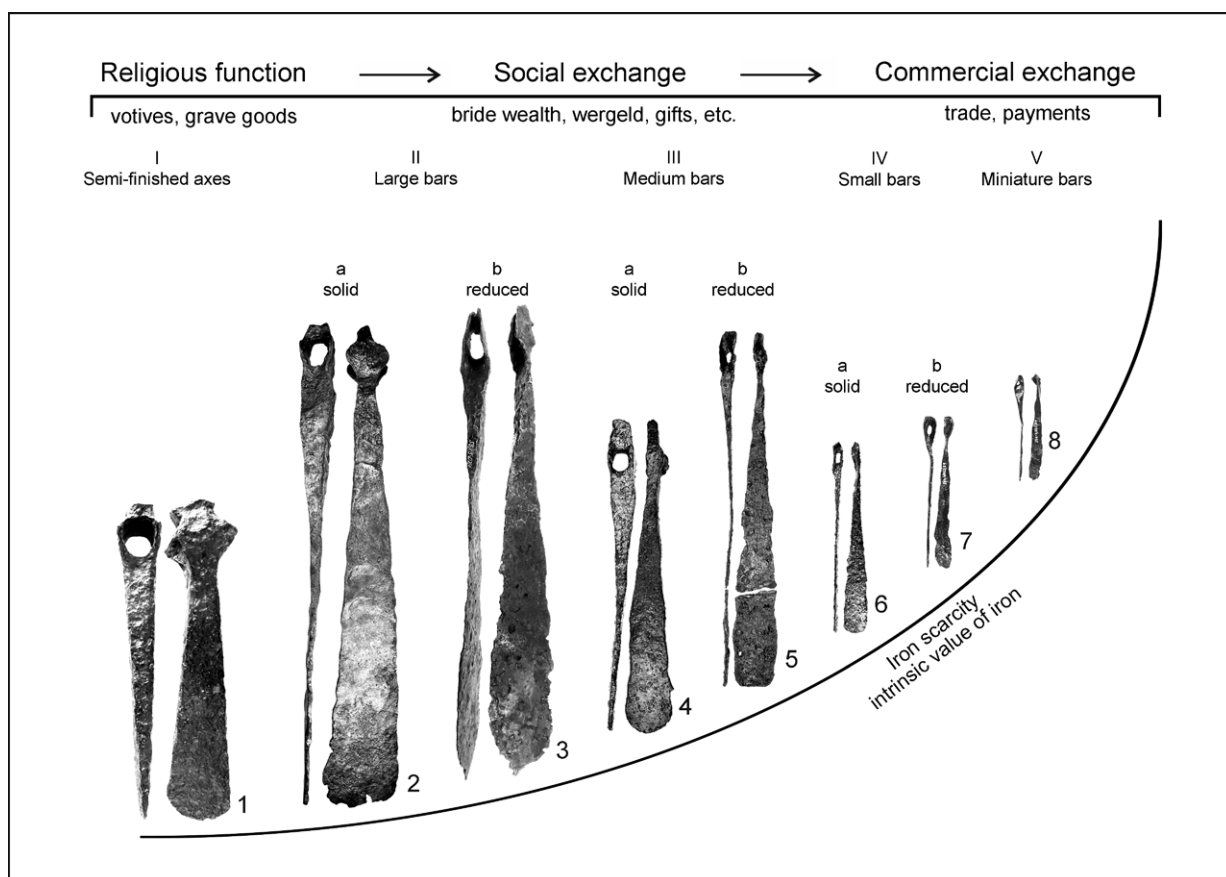


Fig. 1. Preliminary model of axe-shaped bars' evolution. 1 – Devínska Nová Ves, grave no. 555 (28 cm; 1,214 g; photo by V. Turčan); 2 – Devín, metal detector find (43 cm; 880 g; neck ca. = 8.1 cm); 3 – Klášťov, hoard no. 2 (42 cm; 365 g; neck ca. = 6 cm; photo by P. Halbšgutová); 4 – Blučina, solitary find (27.5 cm; 312 g; neck ca. = 5.5 cm); 5 – Brno-Líšeň, inv. no. 396/56e2 (31 cm; 74 g; neck ca. = 3 cm); 6 – Brno-Líšeň, non-professional find N05 (18 cm; 24 g; neck ca. = 1.8 cm); 7 – Mikulčice, inv. no. 4865/59 (13.5 cm; 14 g; neck ca. = 1.4 cm); 8 – Mikulčice, inv. no. 4785/59 (8.8 cm; 4 g; neck ca. = 1.4 cm).

2011, 21–41, 46–51; Ingham 2000, 22; Innes 2004, 14–17; Tcherneva 2016, 2–8), the explanation above suffers from some additional weak points. Firstly, the known axe-shaped bars show much wider variability, in terms of their size. Part of the known assemblage does not even fit into Pleiner's roughly defined size categories (e.g. Bialeková/Tirpáková 1989, 92), and even within the size classes, the distinct weight variability, which is certainly not a matter of iron corrosion, can be clearly observed (Fig. 1). The defined size and weight categories of the axe-shaped bars thus seems to be more artificial and reflect the desire of researchers more than past standardized measure and weight system. Secondly, the iron itself is a problem. Unlike precious metals (such as silver or gold), iron is not transitive (cf. Heymans 2018, 100). As has been proven experimentally (Hlavica/Bárta 2021, 17), it cannot be forged from a commodity into a final product (and vice versa) without significant loss of material in the form of iron scales. Due to unforeseeable events, such as the appearance of ruptures on iron mass, which need to be continually welded, the final loss of mate-

rial can be predicted only to a certain extent. Despite the fact that standardization of bar dimensions can be secured easily by shortening the bar's blade, the more precise weight standardization is very difficult, and the weight of individual pieces from the same original semi-product and of same length can differ on the order of tens of grams (cf. Hlavica/Bárta/Merta 2020, tab. 1). This makes especially the smaller pieces extremely unsuitable for storing parts of an arbitrary weight unit.

As a result of previous experimental observations combined with some cross-cultural analogies (Graeber 2011, 220; Peng 1994, xxiii–xxiv; Scheidel 2009, 139), an alternative explanation stressing the chronological aspect of axe-shaped bars' evolution was offered (Hlavica/Bárta 2021, 17–19). According to this hypothesis, the reduction of the bars' size and weight accompanied by a simplification of their punched eyes was gradual. It reflected dynamic changes in the Great Moravian economy transforming itself from a human economy to a commercial one and the original function of the axe-shaped

bars as social currency to the function of monetary tokens representing an arbitrarily defined value and used in commercial exchange (Fig. 1).

In the archaeological record, the proto-stage of axe-shaped bar genesis would be represented by axe semi-products, that were, even if quite rarely, found by archaeologists (e.g. *Eisner 1952*, 152, fig. 60: 7; *Kouřil 1994*, 155, fig. 85; *Pleiner 1961*, 414, fig. 3; see also *Szmoniewski 2022*).¹ Suppression of the practical function of axe tools and weapons was most probably caused by their parallel religious function, i.e. their usage as votive objects or grave goods. As in some other cases (cf. *Semenova 2011*; see also *Seignobos 2000*, 321–324), even the beginning of the Moravian currency could thus be seen in the Moravian pre-Christian religion.

A further need to save iron resulted in more expressive simplification and the appearance of long and robust bars with the eye imitating the bearded axe's side lugs (Fig. 1: 2). The main difference to the previous stage is that unlike axe semi-products, these bars could not be directly forged into axes anymore (cf. *Hlavica/Bárta 2021*, 16). Already during this initial stage, a significant reduction of the weight and simplification of the punched eye probably took place as can be illustrated by the lighter and reduced pieces of large bars (Fig. 1: 3). Even if the chronological sequence cannot be fully validated yet, this clearly shows that the length of the axe-shaped bars was not firmly connected to their weight, and the possible initial bond between the length and weight eroded over time. This can be further supported by the comparison of large reduced bars with solid bars of the medium size category of comparable weight (Fig. 1: 4). The cause of this gradual attenuation of the axe-shaped bars observed within this and all the following categories described below can be only estimated and should be a matter of future research. But a quite probable explanation is that it was a result of economic stress caused by the gradual increase of iron scarcity caused by increased demand for it.

A specificity of the heaviest pieces is that their robustness allows, even only rough, storage of the weight units, and their parts. Other than their symbolic function, these heaviest, and according to the model also earliest, pieces of large and medium bars, thus could still be perceived as a commodity because of its intrinsic value comparable to the original axe (cf. *Hlavica/Bárta/Merta 2020*, 25).² This is an important note especially when considering possibility of the integration of the axe-shaped bars into the nascent commercialized economy. When the intrinsic value of a bar is defined by the share of a weight unit, it allows an easier evaluation of its price in another unit of account (its value in weight of gold, for instance), and thus also the precise calculation of its exchange equivalency to other goods. These bars can thus serve as a substitute exchange medium in trade (cf. *Crew 1994*, fig. 1; *Raaflaub 2017*, 141).

But as in the previous case, even when medium-sized bars were in circulation, a significant reduction of their weight can again be observed. From hundreds of grams of solid bars, the weight of the reduced medium pieces was reduced up to tens of grams (Fig. 1: 5). Due to the specifics of iron, namely the impossibility to predict the precise weight of final product, projecting smaller parts of the weight unit into lighter types of axe-shaped bars would be quite challenging. Due to the reduction of the iron mass of the bars, their value for possible practical utilization was significantly reduced as well. The guarantee of the bars' value by the intrinsic value of the commodity thus probably started to erode at the time and was substituted by the guarantee of the issuing authority or authorities, who started to define the value arbitrarily (cf. *Hlavica/Bárta 2021*, 18, including references; *Innes 2004*, 17, 18). This can be thus seen as a transition period, when the function of axe-shaped bars as tokens, i.e. the representation of an arbitrarily defined value, probably started to prevail and when they gradually started to serve as medium of credit/debt relations between their producers (who safeguard their value) and their re-

¹ Burial no. 555 from the end of the 8th c. at the site Devínska Nová Ves-Pieskovňa included an artefact that was probably a roughly forged axe missing some of its final adjustments, such as narrowing of the oblique part of the axe containing the eye and processing of the cutting edge (Fig. 1: 1). Some archaeologists thus interpret it as the first evidence of the axe-shape bar in East Central Europe (*Hájník 2019*, 119; *Točík 1983*, 214). But as the presented artefact can be most probably turned into a functional axe with some final forging, unlike the typical axe-shaped bar, which has to be completely faggoted for further processing (*Hlavica/Bárta 2021*), it probably rather represents an axe semi-product. It should be thus interpreted as an intermediate evolutionary stage between utilizable axes and axe-shaped bars, rather than an axe-shaped bar itself.

² The referenced archaeological experiment was focused on the production of robust pieces of axe-shaped bars, and in the end concluded that it is possible to preserve parts of a same weight unit within different sizes of bars. Large-sized bars weighed approximately twice as much as medium-sized bars, and robust small bars represent approximately one quarter of a medium-sized bar. The only problem with this conclusion is that small but robust axe-shaped bars have not been found in the archaeological record, i.e. the real weight of the small bars was significantly less than that of the experimental products. The hypothesis presented in the referenced paper is thus most probably valid only partly – the first two size categories (large and medium) can potentially preserve the weight unit and its parts or multiples due their robustness, but due to nature of iron and the technology of its processing (unpredictable loss of material during forging), this is not possible in the case of small and very light pieces weighting only tens grams or even less.

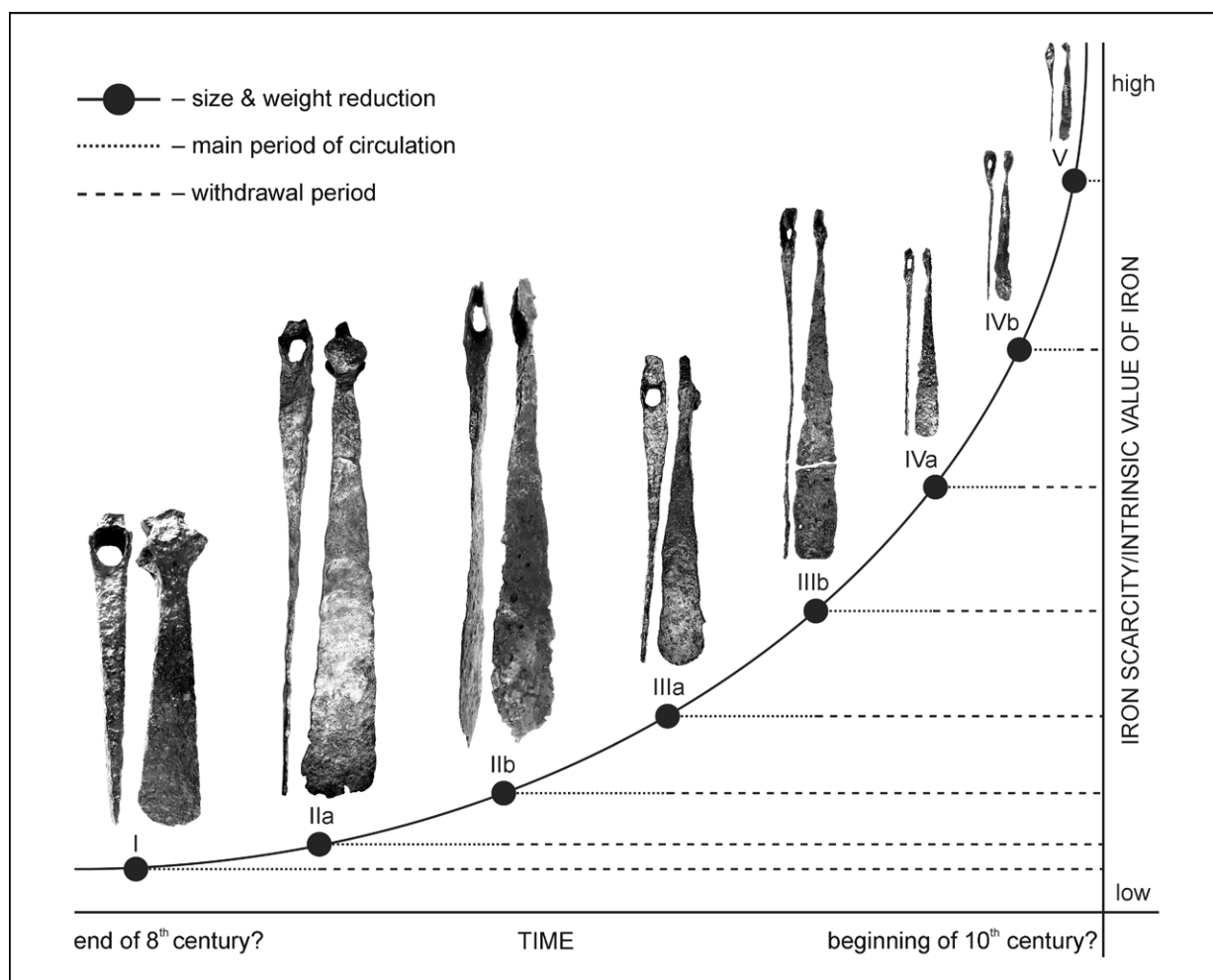


Fig. 2. Preliminary model of chronological occurrence, circulation and withdrawal periods of axe-shaped bars' individual size/weight categories.

ceivers (who accepted the value and were willing to offer a counter-value). This was thus probably when axe-shaped bars primarily started to fulfil their role within the commercialized economy and the elite's control and monopolization of bar production either started or was reinforced.

After this period, the reduction of the size and weight of axe-shaped bars gradually continued. It consequently reached the stage when small bars started to be produced (Fig. 1: 6) and the shrinking continued even within this category (Fig. 1: 7). It thus resulted in the production of smallest recorded, miniature pieces weighting just a few grams (Fig. 1: 8). According to the model, this was chronologically the last stage before the collapse of the Great Moravian economic system.

The above-described hypothesis offers an explanation for the gradual simplification and the size/weight reduction of axe-shaped bars and illustrates their shift from the use of the bars as a means of ritual and socially conditioned payments still

defined in utilitarian tools (and the commodity from which are they made) to monetary tokens representing an arbitrarily set value and then circulating within complex anonymised networks of credit-debt relations of the 9th-c. Moravian commercialized economy. The significant reduction of the size and weight of the bars indicates that during the stage when lighter types weighing just tens of grams appeared, their value ceased to be based on the intrinsic value of the commodity, and started to be defined arbitrarily in another unit of account. The reduction of size and weight is then perceived as a preventive precaution of the issuer resulting from the increasing scarcity of iron. The reason for this precaution is that the arbitrarily defined value of a monetary token (calculated in a widely accepted unit of account, for instance, a weight of gold) should never exceed the intrinsic value of a commodity used for its representation. If the intrinsic value of the commodity (of iron in this case) increases over time, the quantity of the commodity

used for tokens has to be reduced more and more, so its value never exceeds the arbitrarily defined value of the token, or in the specific case of iron, at least not by too much (cf. *Hlavica/Bárta* 2021, 18). If the opposite is true, the tokens would be started to be withdrawn from circulation, for practical utilization, and the whole monetary system collapses (*Hlavica/Bárta* 2021, 12, including references).

Nevertheless, the model of the Moravian axe-shaped bars' genesis still needs to be perceived as preliminary and be further tested. The first category of testing should deal with the chronological occurrence of the individual size and morphological categories of the bars. Research should focus especially on the earliest chronological evidence of individual types, as they could have existed for quite a long time concurrently with later types (Fig. 2), occur in the archaeological record together and thus confuse researchers. This kind of research will need a systematic evaluation of the assemblages from well-dated contexts. The second kind of testing should be focused on the presumed change of the role of axe-shaped bars within the 9th-c. Moravian economy. For this purpose, assemblages from 9th c. Moravian central places are especially suitable, as these localities are presumed to be nodes of Great Moravian market system (*Hlavica/Procházka* 2020b, fig. 33), i.e. nodes, where anonymised market exchange probably first occurred. In these centres, the archaeological record should preserve evidence of circulation of later (smaller) types of axe-shaped bars within a complex credit-debt exchange network. This sort of evaluation of axe-shaped bars from former early medieval Moravian centres might detect market exchange within the centre and, besides refining the genetic model of the Moravian axe-shaped currency, it can concurrently test the Great Moravian economic model.

Regarding the above-described theoretical basis, the following part of the paper focuses on an evaluation of the small assemblage of axe-shaped bars from the Great Moravian centre at Staré Zámky near Brno-Líšeň, one of the presumed nodes of the period regional market system (*Hlavica/Procházka* 2020b, fig. 33), and on an exploration of the testimonial potential of a similar sort of assemblages for testing and refining the model of axe-shaped bars' genesis. The study evaluates all the pieces currently available, including finds from multiple seasons of archaeological excavations, later metal detector surveys, and the existing non-professional finds. Besides their value for any future understanding of the phenomenon of Moravian iron currency, the conclusions based on the evaluation also present the value of this archaeological record to clarify specific aspects of the 9th-c. Moravian economy, and the eco-

nomic relations on which contemporary production and distribution of commodities were based.

MATERIAL:

AXE-SHAPED BARS FROM STARÉ ZÁMKY

During the 9th c., the stronghold at Staré Zámky was one of the major Moravian centres. It was located in the north-eastern part of today's city of Brno, in the Líšeň neighbourhood (Fig. 3). The occupation of the site has been demonstrated from the pre-Great Moravian early 8th or possibly even late 7th c. Even during the pre-Great Moravian period, the acropolis of the stronghold was probably already fortified and the archaeological record from this period contains evidence of prestige goods, such as hooked spurs or hammered bronze belt fittings connected to Moravian mounted elite warriors.

Most probably in the first half of the 9th c. an extensive fortification system encircling the area of ca. 4 ha was constructed, and the existence of a magnate court is also presumed from the mid-century. The outer wards of the stronghold occupied an area of ca. 7 ha at the time. At the turn of the 10th c., the centre was destroyed most probably by a nomadic attack resulting in an extensive fire. From the beginning of the 10th c., only part (ca. 0.8 ha) of the former fortified area was inhabited. Although previous research presumed that the settlement at Staré Zámky was abandoned early in the 11th c., later coin finds prove activities on the site even during the 12th c. (for more details see *Kalčík* 2015; *Kouřil* 2019, 82; *Měřínský* 2014; *Procházka* 2009, 152–159; *Videman* 2015, 214).

Based on its geographic position (*Hlavica/Procházka* 2020b, fig. 33; *Mikulec/Hlavica/Kmošek* 2022, fig. 1), it is presumed that the elites residing there supervised or even directly organized iron production on the territory of the Moravian Karst, the forested area with a lack of contemporary settlements, but with abundant evidence of early medieval iron smelting including large workshops from the 9th c. or even earlier period (*Souchopová* 1986, 14–39). The possible control over the production of the strategic iron commodity would make Staré Zámky an important node of the Great Moravian economic system. Some indirect evidence, such as the presence of iron blooms (*Merta* 2019, 8, fig. 11; *Mikulec* 2022, 107, fig. below; *Přichystal/Přichystal/Romanovský* 2019), unlike the only sporadic evidence of iron processing within the centre (*Mikulec* 2022, 41, 42, 50–52) indicates that the iron produced in an approximate total quantity of thousands of kilograms during the existence of contemporary workshops in the Moravian Karst (cf. *Souchopová* 1986, 31, 32) could flow through the centre, but it was not



Fig. 3. Staré Zámky near Brno-Líšeň. Area of the excavation campaign.

primarily intended for local processing.³ Staré Zámky might thus probably serve as a nodal hub redirecting the raw iron to another circle of consumers.

Despite the only sporadic archaeological evidence of smithing activities within the centre, the relatively abundant evidence of the use of iron axe-shaped bars is quite interesting. The assemblage of altogether 78 pieces or fragments (including four currently lost pieces), which represents approximately 1/4 of the quantity when compared to the known assemblage of axe-shaped bars from the contemporary primary power centre in Mikulčice (cf. Kučerovská 1989; Poláček

2007, 511; 2021, 195), has been collected. The assemblage evaluated in this study consists of 38 pieces of fragments of axe-shaped bars from archaeological excavation conducted in 1953–1956 (one is currently lost), three more pieces from the seasons 1958, 1959, and 1965 (all three are currently lost), 30 fragments (including one piece found in the more remote vicinity of the centre) discovered by metal detector surveys carried out between 2014 and 2017, and seven non-professional finds discovered between 2006 and 2022 (Fig. 4–9). Excluding the six bars from the hoard found in 1956 (Staňa 1959b, 55, fig. 11: 28–33; 12: 34–40),

³ The assemblage obtained during 12 season of archaeological excavation yielded less than 17 kg of slags, whereas 4.2 kg was classified as ceramic slags originated probably from body or bodies of early medieval pyrotechnical devices. The rest have mostly been categorized as iron working slags (Hauptmann 2021, 243–245) or have remained uncategorized (8.1 kg, and 4.1 kg respectively). A few smaller pieces (ca. 0.2 kg) can possibly represent smelting slags (Mikulec 2022, tab. 8). The possibility of significant extension of this assemblage by new finds is quite low, as no concentration of ferrous smithing slag at Staré Zámky was detected even during the geophysical survey of yet unexcavated parts of the stronghold and the area of its outer wards (Milo et al. 2020). Despite the fact that part of the slag assemblage from Staré Zámky was possibly discarded during the inventORIZATION (Kalčík 2015, 131), the site still yielded evidently less ironworking slag finds than a contemporary rural settlement in Bořitov. From there located smithy itself it came at least 21.5 kg of smithing slags (Mikulec/Hlavica/Kmošek 2022, tab. 3) and possibly even more as part of the assemblage was probably also discarded (cf. Součopová 1975). The assemblage from Staré Zámky is markedly smaller also when compared to the contemporary centre of Mikulčice. The northern bailey of Mikulčice currently being evaluated, which containing approximately 1/3 of all the slag finds from the centre, yielded about 288 kg of slags (Michael Lebsak, personal communication).

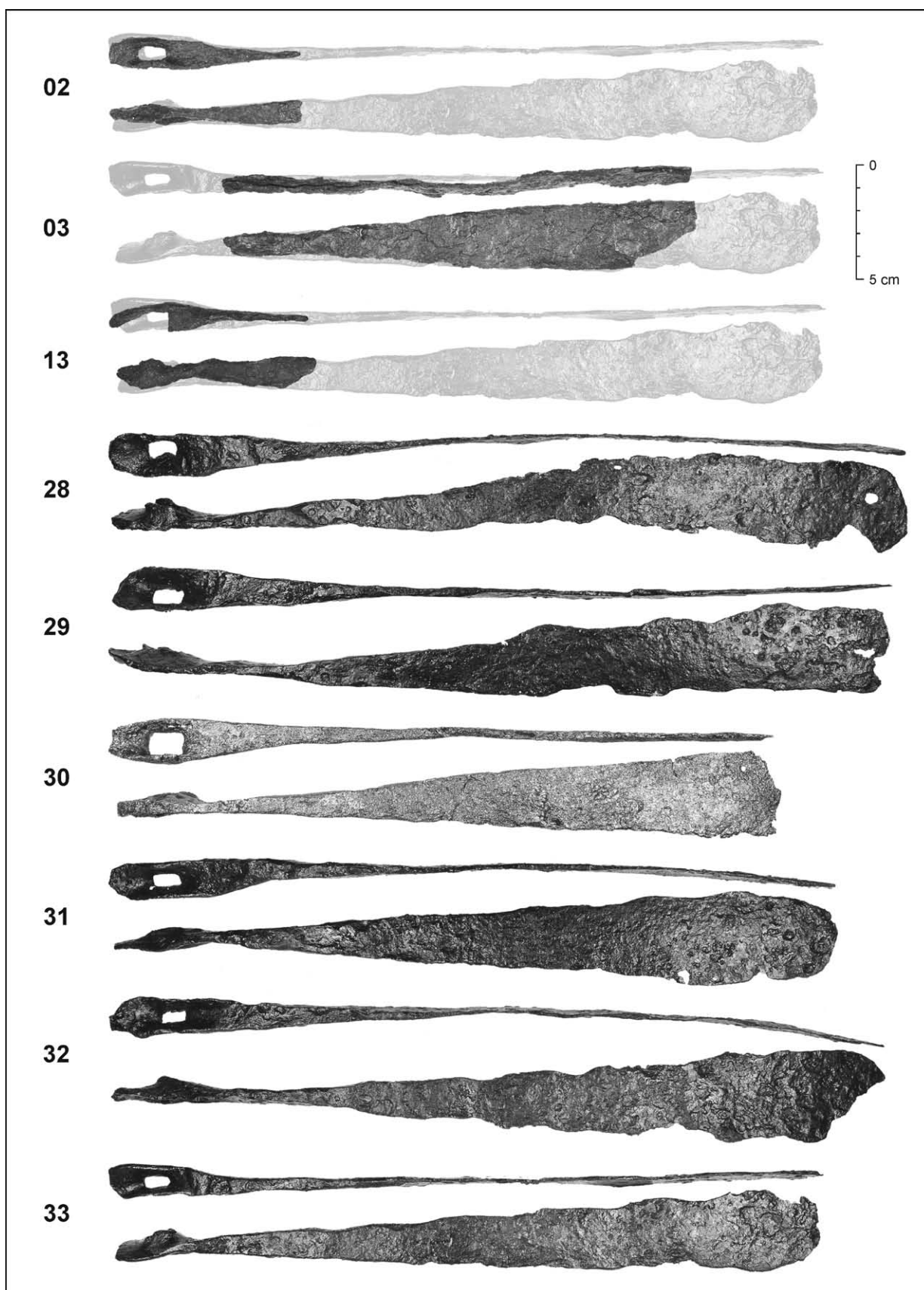


Fig. 4. Staré Zámky near Brno-Líšeň. Axe-shaped bars. Category IIIb, i.e. reduced medium-sized bars (numbering corresponds with Fig. 11; 12; Tab. 1). For comparison the fragments were superimposed on the bar inv. no. 396/56f (map no. 33).

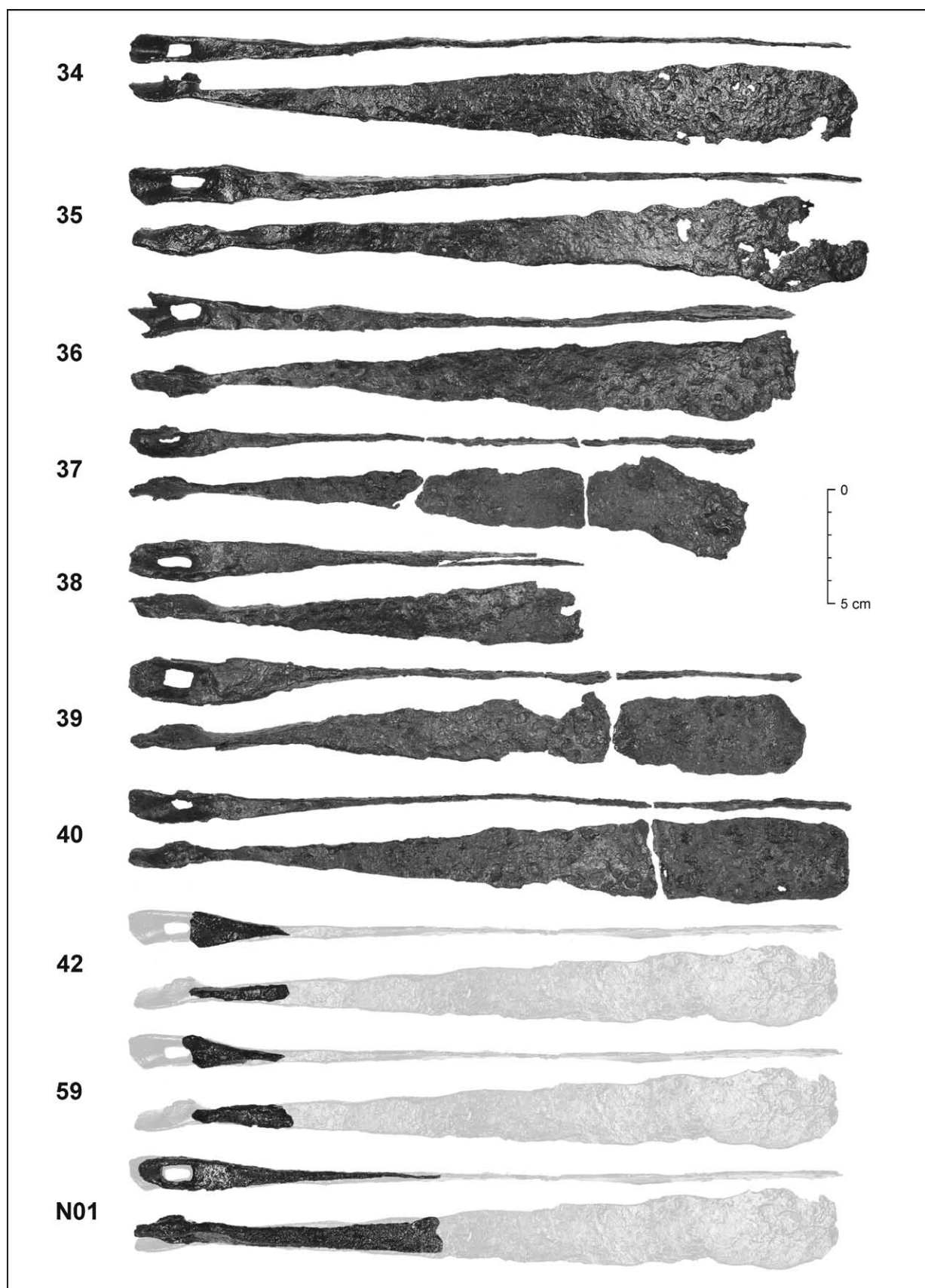


Fig. 5. Staré Zámky near Brno-Líšeň. Axe-shaped bars. Category IIIb, i.e. reduced medium-sized bars (numbering corresponds with Fig. 11; 12; Tab. 1). For comparison the fragments were superimposed on the bar inv. no. 396/56f (map no. 33).

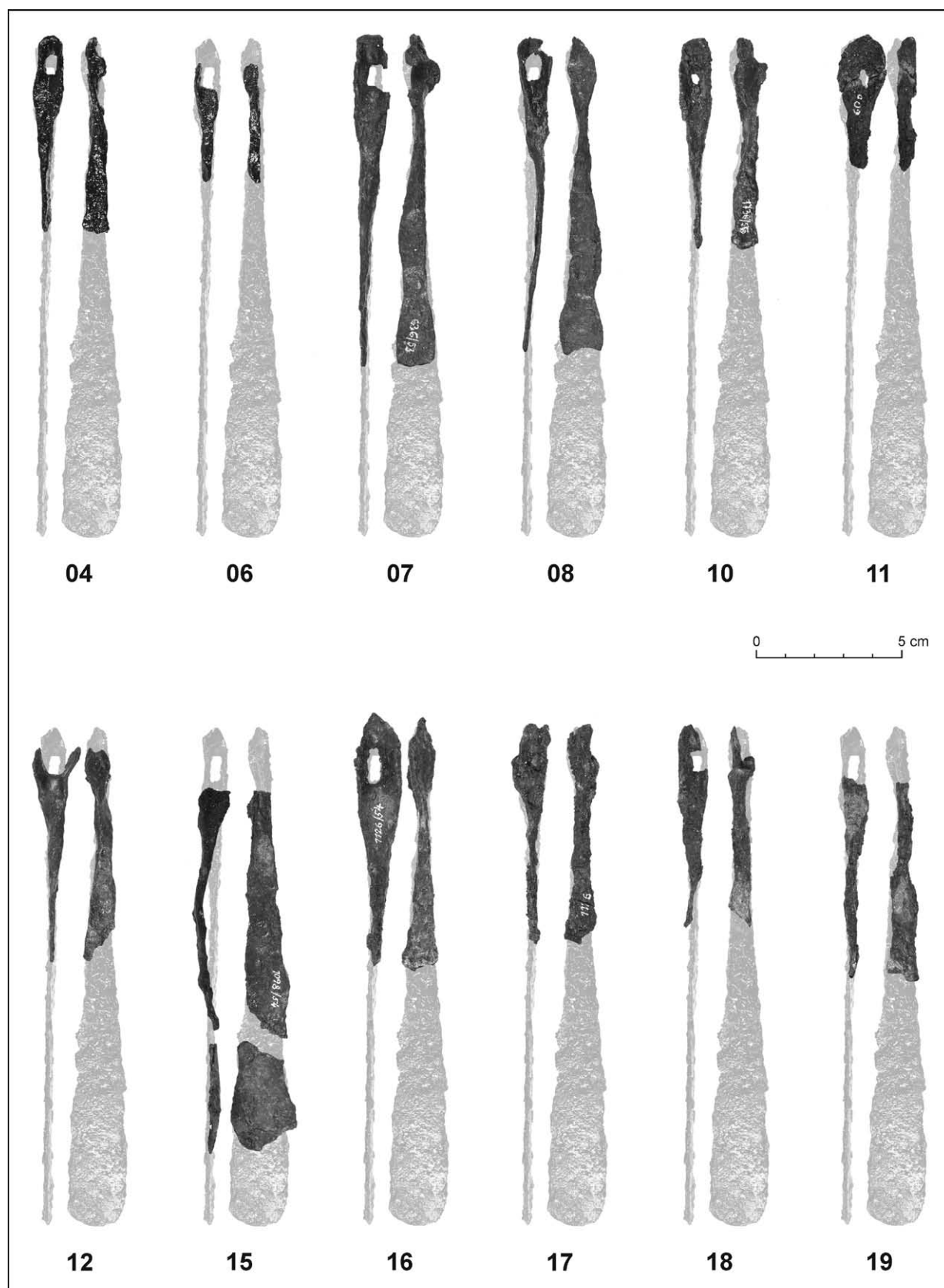


Fig. 6. Staré Zámky near Brno-Líšeň. Axe-shaped bars. Category IV (including subcategories IVa and IVb), i.e. small-sized bars (numbering corresponds with Fig. 11; 12; Tab. 1). For comparison the fragments were superimposed on the digitally straightened bar no. N05.

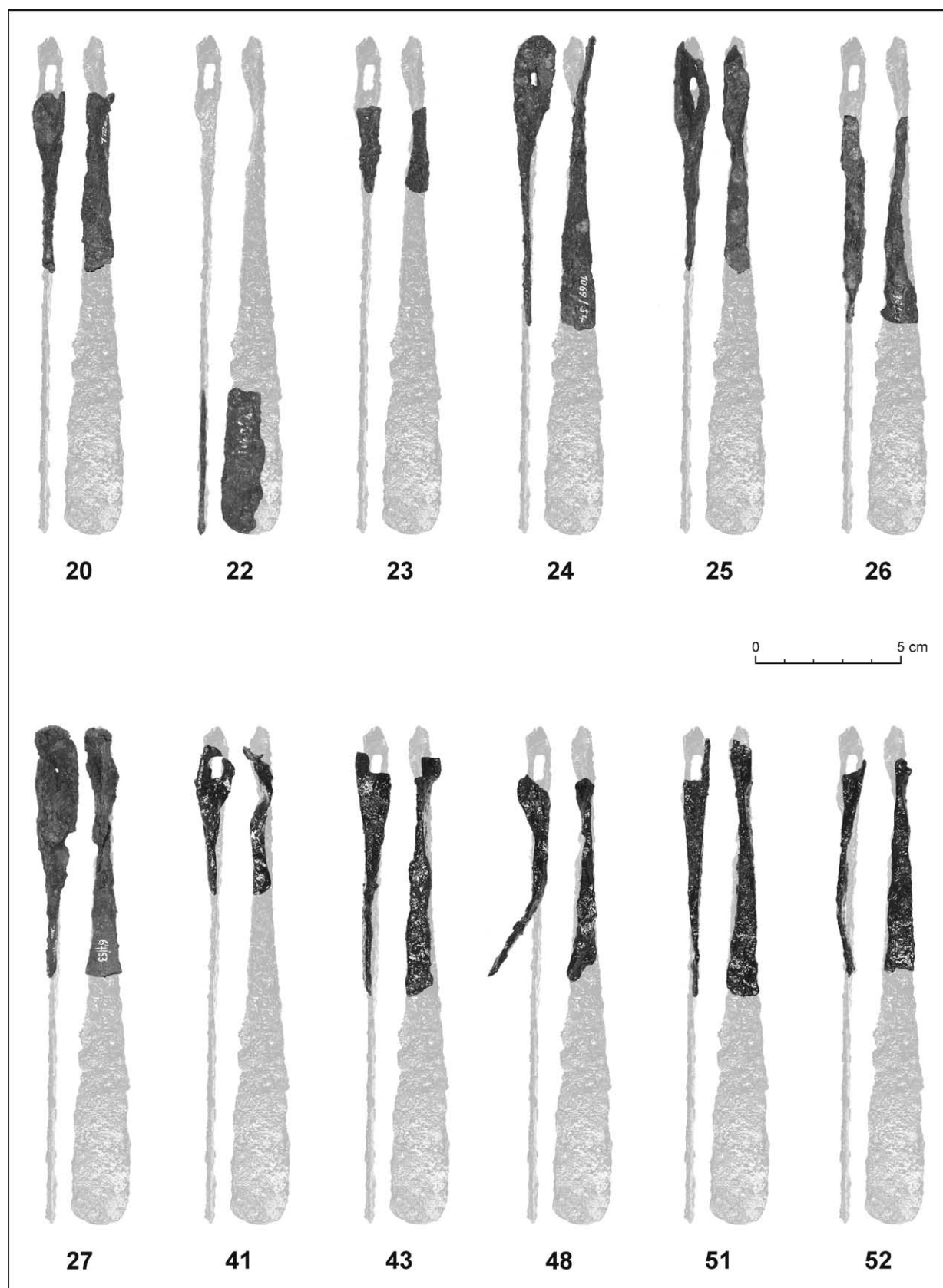


Fig. 7. Staré Zámky near Brno-Líšeň. Axe-shaped bars. Category IV (including subcategories IVa and IVb), i.e. small-sized bars (numbering corresponds with Fig. 11; 12; Tab. 1). For comparison the fragments were superimposed on the digitally straightened bar no. N05.

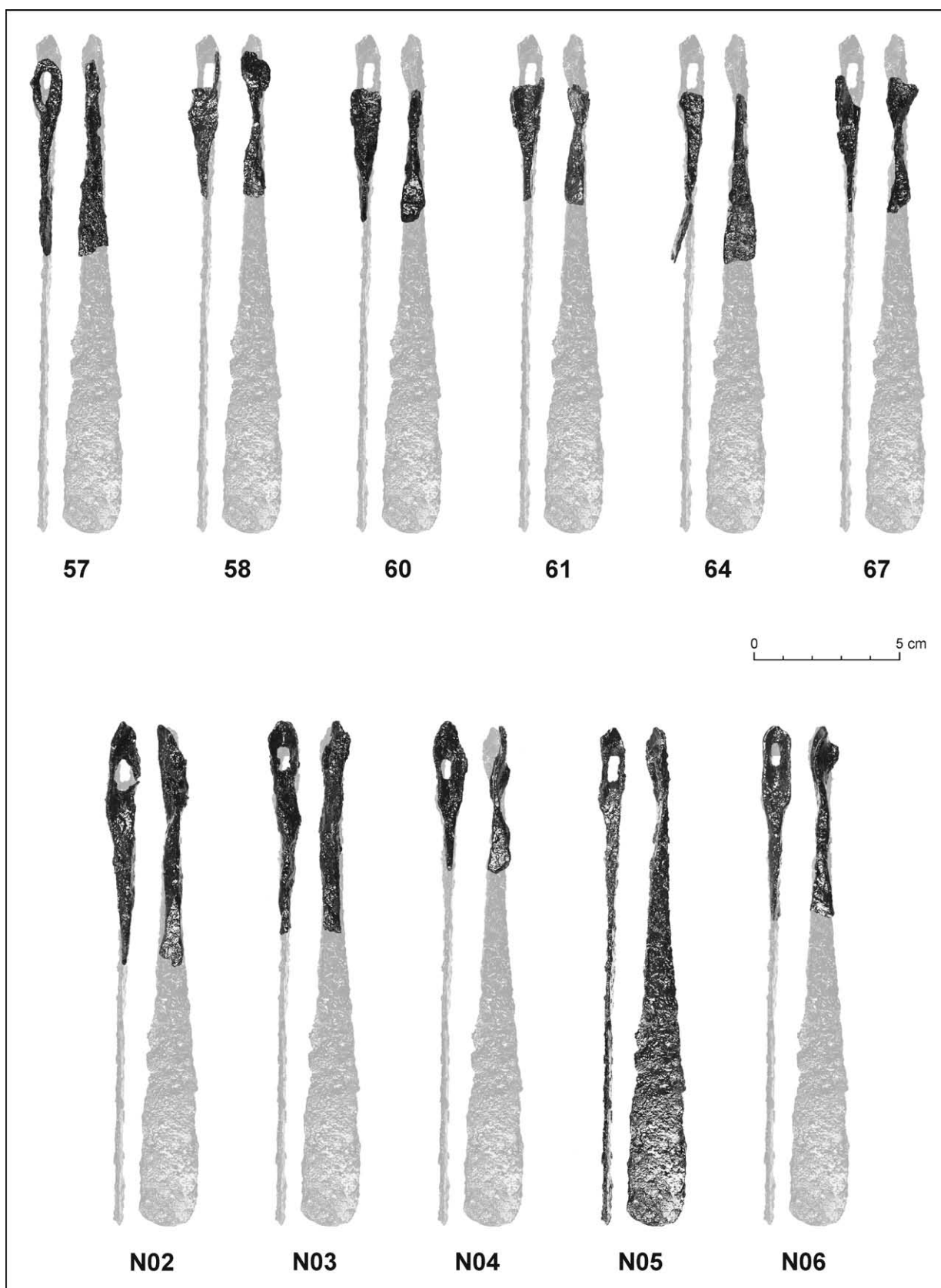


Fig. 8. Staré Zámky near Brno-Líšeň. Axe-shaped bars. Category IV (including subcategories IVa and IVb), i.e. small-sized bars (numbering corresponds with Fig. 11; 12; Tab. 1). For comparison the fragments were superimposed on the digitally straightened bar no. N05.

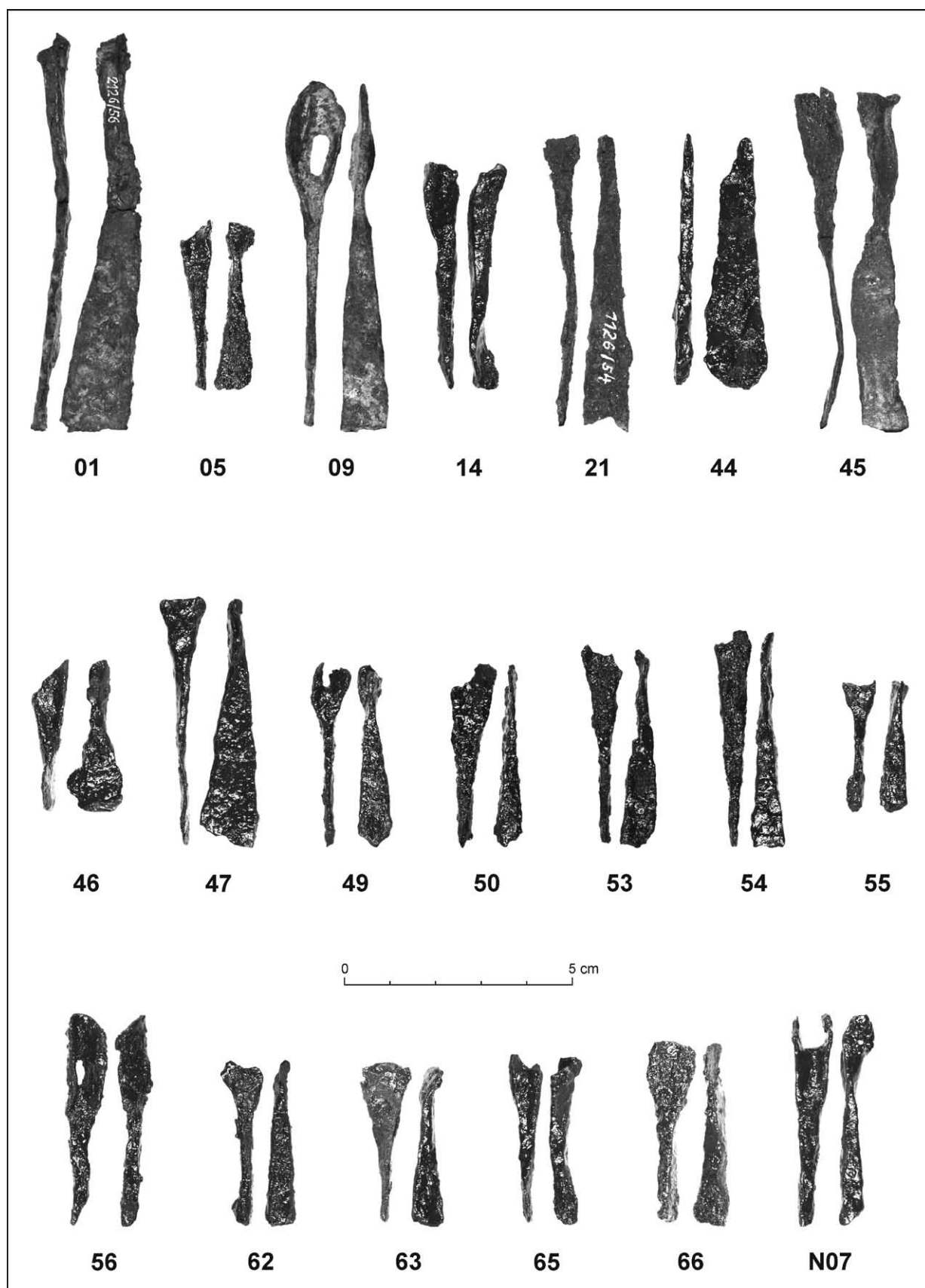


Fig. 9. Staré Zámky near Brno-Líšeň. Axe-shaped bars. Category IVb and V, i.e. reduced small-sized bars and miniature size bars (numbering corresponds with Fig. 11; 12; Tab. 1).

one non-professional find (Fig. 8: N05), and the bar reportedly found in one of the sunken huts (*Staňa 1960*, 244),⁴ all the axe-shaped bars were found incomplete. With the absolute majority (68 pcs., i.e. more than 90% of the evaluated finds), part or the entire blade was missing, and significant part of finds (43 pcs., i.e. almost 60% of evaluated finds) also lacked part or the whole ear.

The quality of the description of the find contexts varies depending on the circumstances of the find. Only the seasons 1953 and 1954 of regular archaeological excavation have more complex documentation, as their excavation reports have been published (*Staňa 1953; 1954*). Documentation of the other seasons of the excavation campaign were incomplete and have been partially lost (*Staňa 1955; 1956; 1958; 1959a; 1965*), they thus have not allowed more than a spatial localization of individual finds.⁵ All the finds obtained by metal detector survey were localized by GPS, allowing the spatial distribution to be mapped more precisely, but no more detailed documentation about the contexts of finds are available. Finally, the non-professional finds can be only roughly localized to the acropolis of the stronghold, as they were collected without more precise documentation.

METHODS OF EVALUATION

For the purpose of the size/weight classification of axe-shaped bars from Staré Zámky, the neck circumference in the area between the ear and the blade of the bar was measured. Fragmentary pieces were also compared to complete bars known from the site. According to these criteria, the bars were then classified to the size/weight categories including the probable subcategories (Fig. 1), where it was possible to determine them. With regard to the fact that the circumference of the bar's neck was in most cases deformed during the forging of the bar (cf. *Hlavica/Bárta/Merta 2020*, 25) and thus can slightly differ between different parts of the neck, the following classification of fragments into defined size/weight categories needs to be perceived as illustrative. Its purpose is to approximately determine the quantity of bars of distinct sizes and weights present at the site, but these results unfortunately cannot be further specified by any other data.

The preserved length and weight of bars and their fragments were also measured. It is valuable

especially in the case of six complete bars from the axe-shaped bars hoard, where the level of possible size/weight standardization can be determined.

Based on the available data, spatial distribution of individual axe-shaped bars was also mapped. Bars obtained during the archaeological campaign were mapped to the excavation square grid of the research, whereas metal detector finds were localized using the GPS coordinates. Undocumented non-professional finds were excluded from the distribution map, as they can be only roughly localized to the area of the stronghold's acropolis. The four currently lost pieces were also excluded.

RESULTS

Classification

According to results of the axe-shaped bars classification, the weight/size categories from III to V are present at the site (Fig. 10; Tab. 1).

Category III (approx. Pleiner's medium-sized bars) represents the largest axe-shaped bars at the site (Fig. 4; 5). It includes nineteen pieces. Beside thirteen bars known from the hoard (Fig. 4: 28–33; 5: 34–40), six more fragments (Fig. 4: 02, 03, 13; 5: 42, 59, N01) are most probably relicts of bars from this category. According to six complete pieces from the hoard, the documented length of the bars from this

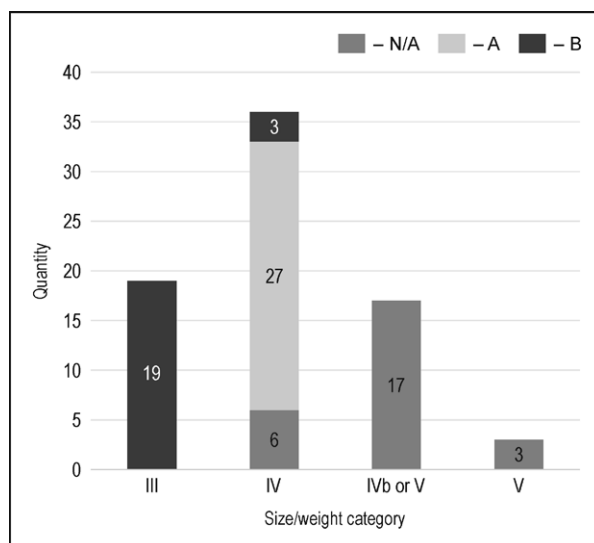


Fig. 10. Staré Zámky near Brno-Líšeň. Distribution of individual axe-shaped bars among the size/weight categories.

⁴ From the sunken hut located in trenches E-IX and F-IX, the author reported find of one broken axe-shaped bar of total length of 18 cm along with the fragments of nine more pieces. The Inv. Nos. of finds contain altogether 11 fragments of the axe-shaped bar, but, unfortunately, they cannot be combined into a bar of the reported length (Fig. 6: 15–19; 7: 20–25).

⁵ Incomplete excavation reports were based on Č. Staňa's scholarly legacy left to the Archive of the Archaeological Institute of the Czech Academy of Sciences, Brno.

Tab. 1. Staré Zámky near Brno-Líšeň. List of axe-shaped bars containing the evaluated attributes (size/weight category acc. to Fig. 1; eye type acc. to Fig. 1; eye type acc. to *BialekováTurčan 2007*, fig. 9).

Map No.	Inv. No.	Year	Preserved Length [cm]	Preserved Weight [g]	Neck Circumference [cm]	Size/Weight Category	Eye	Eye Type	Blade	Total Condition	Context	Dating
01	2126/56	1956	8.5	8	1.5	IVb or V	missing	n/a	incomplete	incomplete	square O-II	n/a
02	868/54	1954	8.5	17	2.6	IIIb	complete	II	incomplete	incomplete	layer with a hooked spur and ceramic slags	turn of the 9 th c.?
03	809/53	1953	20.5	59	3	IIIb	missing	n/a	incomplete	incomplete	undated layer	n/a
04	1/2018	2018	7.6	7	2.2	IVa	complete	II	incomplete	incomplete	metal detector find	n/a
05	5/2014	2014	3.7	3	1.5	IVb or V	incomplete	II	incomplete	incomplete	metal detector find	n/a
06	3/2014	2014	6	10	2.3	IVa	incomplete	II	incomplete	incomplete	metal detector find	n/a
07	636/53	1953	11.3	15	2.1	IVa	incomplete	II	incomplete	incomplete	fill of the fortification chamber	1 st half of 9 th c.
08	807/53	1953	11	10	1.9	IVa	complete	II	incomplete	incomplete	body of the fortification	1 st half of 9 th c.
09	1835/56	1956	7.5	6	1.5	IVb or V	complete	II	incomplete	incomplete	square A-0	n/a
10	1736/56	1956	7	7	1.9	IVa	complete	II	incomplete	incomplete	square A-I	n/a
11	600/54	1954	4.5	5	2	IVa	complete	III	incomplete	incomplete	fill of the feature	n/a
12	206/54a	1954	7.3	9	1.8	IVa	incomplete	II	incomplete	incomplete	undated layer	n/a
13	373/55	1955	9	13	2.7	IIIb	incomplete	II	incomplete	incomplete	small feature near half-sunken hut with spurs	n/a
14	5/2018	2018	5	5	1.5	IVb or V	incomplete	II	incomplete	incomplete	metal detector find	n/a
15	1098/54	1954	11	17	2.2	IVa	incomplete	II	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
16	1126/54a	1954	8.5	15	2.1	IVa	complete	II	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
17	1126/54b	1954	6	6	2	IVa	complete	II	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
18	1126/54c	1954	7	8	2	IVa	incomplete	II	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
19	1126/54d	1954	6.8	5	1.9	IVa	missing	n/a	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
20	1126/54e	1954	6	7	2	IVa	incomplete	II	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
21	1126/54f	1954	6.4	4	1.5	IVb or V	missing	n/a	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
22	1126/54g	1954	5	5	n/a	IV	missing	n/a	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
23	1126/54h	1954	3	3	2	IVa	missing	n/a	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
24	1069/54	1954	10	10	1.9	IVa	complete	III	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
25	1091/54	1954	7.8	10	2	IVa	complete	II	incomplete	incomplete	half-sunken hut with spurs	2 nd half of 9 th c.
26	70/53	1953	7	9	2.2	IVa	missing	n/a	incomplete	incomplete	fill of the ditch, destruction of fortification	beginning of the 10 th c.

Table 1. Continuation.

Map No.	Inv. No.	Year	Preserved Length [cm]	Preserved Weight [g]	Neck Circumference [cm]	Size/Weight Category	Eye	Eye Type	Blade	Total Condition	Context	Dating
27	67/53	1953	8.5	13	2.1	IVa	complete	III	incomplete	incomplete	fill of the ditch, destruction of fortification	beginning of the 10 th c.
28	396/56a	1956	35	108	3.6	IIIb	complete	II	complete	complete	hoard	n/a
29	396/56b	1956	34	136	3.4	IIIb	complete	II	incomplete	incomplete	hoard	n/a
30	396/56c	1956	30	144	3.6	IIIb	complete	II	incomplete	incomplete	hoard	n/a
31	396/56d	1956	32	131	3.6	IIIb	complete	II	complete	complete	hoard	n/a
32	396/56e	1956	34	91	3	IIIb	complete	II	incomplete	incomplete	hoard	n/a
33	396/56f	1956	31	99	3.3	IIIb	complete	II	complete	complete	hoard	n/a
34	396/56g	1956	32	88	2.8	IIIb	complete	II	complete	complete	hoard	n/a
35	396/56h	1956	32	118	3.8	IIIb	complete	II	complete	complete	hoard	n/a
36	396/56a2	1956	29	99	2.7	IIIb	complete	II	incomplete	incomplete	hoard	n/a
37	396/56b2+f2	1956	26	49	2.3	IIIb	complete	II	incomplete	incomplete	hoard	n/a
38	396/56c2	1956	21	84	3.8	IIIb	complete	II	incomplete	incomplete	hoard	n/a
39	396/56d2	1956	30	80	3	IIIb	complete	II	incomplete	incomplete	hoard	n/a
40	396/56e2	1956	31	74	2.5	IIIb	complete	II	complete	complete	hoard	n/a
41	4/2016	2016	5	5	1.7	IVb	complete	II	incomplete	incomplete	metal detector find	n/a
42	4/2018	2018	4	7	2.5	IIIb	missing	n/a	incomplete	incomplete	metal detector find	n/a
43	2/2014	2014	8.2	9	2.1	IVa	incomplete	II	incomplete	incomplete	metal detector find	n/a
44	7/2018	2018	5	5	n/a	IVb or V	missing	n/a	incomplete	incomplete	metal detector find	n/a
45	803/53	1953	7.5	5	1.6	IVb or V	incomplete	II	incomplete	incomplete	undated layer	n/a
46	6/2016	2016	3.3	>1	1.6	IVb or V	missing	n/a	incomplete	incomplete	metal detector find	n/a
47	6/2018	2018	5.5	3	1.5	IVb or V	missing	n/a	incomplete	incomplete	metal detector find	n/a
48	2/2018	2018	7	5	1.6	IVb	missing	n/a	incomplete?	incomplete	metal detector find	n/a
49	2/2016	2016	3.9	>1	1.3	V	incomplete	II	incomplete	incomplete	metal detector find	n/a
50	7/2014	2014	4	2	1.4	IVb or V	missing	n/a	incomplete	incomplete	metal detector find	n/a
51	1/2014	2014	8.5	9	1.7	IVb	incomplete	II	incomplete	incomplete	metal detector find	n/a
52	3/2016	2016	7.5	7	1.8	IVa	incomplete	II	incomplete	incomplete	metal detector find	n/a
53	10/2018	2018	4.3	2	1.4	IVb or V	missing	n/a	incomplete	incomplete	metal detector find	n/a
54	5/2016	2016	4.6	4	1.6	IVb or V	missing	n/a	incomplete	incomplete	metal detector find	n/a

Table 1. Continuation.

Map No.	Inv. No.	Year	Preserved Length [cm]	Preserved Weight [g]	Neck Circumference [cm]	Size/Weight Category	Eye	Eye Type	Blade	Total Condition	Context	Dating
55	1/2017	2017	2.9	>1	1.3	V	missing	n/a	incomplete	incomplete	metal detector find	n/a
56	4/2017	2017	4.5	2	1.4	IVb or V	complete	II	incomplete	incomplete	metal detector find	n/a
57	1/2016	2016	7.6	5	1.6	IV	repaired?	IV	incomplete	incomplete	metal detector find	n/a
58	4/2014	2014	5	5	2	IVa	incomplete	II	incomplete	incomplete	metal detector find	n/a
59	9/2018	2018	4.5	8	2.7	IIIb	incomplete	II	incomplete	incomplete	metal detector find	n/a
60	8/2018	2018	4.5	5	1.9	IVa	missing	n/a	incomplete	incomplete	metal detector find	n/a
61	6/2014	2014	4.2	6	1.7	IV	incomplete	II	incomplete	incomplete	metal detector find	n/a
62	5/2017	2017	3.5	3	1.3	V	missing	n/a	incomplete	incomplete	metal detector find	n/a
63	3/2017	2017	3.4	2	1.6	IVb or V	missing	n/a	incomplete	incomplete	metal detector find	n/a
64	3/2018	2018	5.8	5	1.7	IV	missing	n/a	incomplete	incomplete	metal detector find	n/a
65	2/2017	2017	3.6	3	1.5	IVb or V	incomplete	II	incomplete	incomplete	metal detector find	n/a
66	1/2015	2015	4	3	1.5	IVb or V	incomplete	II	incomplete	incomplete	metal detector find	n/a
67	6/2017	2017	4.5	3	1.7	IV	incomplete	II	incomplete	incomplete	metal detector find	n/a
N/A 01 (acropolis)	1/2007	2006, 2007	13	30	2.5	IIIb	complete	II	incomplete	incomplete	non-professional surface find	n/a
N/A 02 (acropolis)	2/2007	2006, 2007	8	13	2.2	IVa	complete	II	incomplete	incomplete	non-professional surface find	n/a
N/A 03 (acropolis)	3/2007	2006, 2007	7.2	8	2.2	IVa	complete	II	incomplete	incomplete	non-professional surface find	n/a
N/A 04 (acropolis)	4/2007	2006, 2007	5	5	2	IVa	complete	II	incomplete	incomplete	non-professional surface find	n/a
N/A 05 (acropolis)	1/2022	2022	18	24	1.8	IVa	complete	II	complete	complete	non-professional surface find	n/a
N/A 06 (acropolis)	2/2022	2022	6.5	8	1.9	IVa	complete	II	incomplete	incomplete	non-professional surface find	n/a
N/A 07 (acropolis)	3/2022	2022	4.6	4	1.6	IVb or V	incomplete	II	incomplete	incomplete	non-professional surface find	n/a
N/A (lost)	294/65	1965	n/a	n/a	n/a	n/a	n/a	n/a	n/a	incomplete	groove, square J-III	n/a
N/A (lost)	306/58	1958	n/a	n/a	n/a	n/a	incomplete	n/a	n/a	incomplete	fill of the feature	n/a
N/A (lost)	414/53	1953	14.5	n/a	n/a	IV	complete	II	incomplete	n/a	half-sunken hut with sheep shears	1 st half of the 10 th c.
N/A (lost)	490/59	1959	n/a	n/a	n/a	n/a	n/a	n/a	n/a	incomplete	square VVX, among rocks	n/a

category vary between 31 and 35 cm, the weight of already preserved pieces vary between 74 and 144 g (the heaviest bar from the hoard was the incomplete piece 396/56c; Fig. 4: 30). This makes them significantly lighter than the known piece defining category IIIa weighing 312 g (Fig. 1: 4). Based on their weight and in the case of fragments on the neck circumference (ranging between 3.2 and 3.8 cm), all these pieces were thus classified in category IIIb (reduced medium-sized bars).

Category IV (approx. Pleiner's small-sized bars) includes a major part of the assemblage, as 36 pieces, including one complete bar, fall into it (Fig. 6–8). Based on the weight and the neck circumference comparison between the complete bar from Staré Zámky (Fig. 8: N05) with the known reduced piece (Fig. 1: 7), most of the bars (27 pieces) were classified in category IVa (standard small-sized bars, neck circumference ranging between 1.8 and 2.3 cm), three more were classified to category IVb (reduced small-sized bars, neck circumference ranging from 1.6 to 1.7 cm). Six pieces were only roughly classified in category IV, as it was not possible to determine whether they belong to category IVa or IVb (they possibly represent something in between). The only complete piece representing category IVa weighs 24 g and measures 18 cm. The size/weight attributes of pieces of category IVb from Staré Zámky can be only roughly estimated as the category contains no complete specimen. A slightly shorter reduced piece from Mikulčice (Fig. 1: 7) with a neck circumference of about 1.4 cm measures 13.5 cm and weighs approximately 14 g.

Category IVb or V (Fig. 9, excluding nos. 49, 55, 62) defined as the smallest pieces of the assemblage were impossible to classify more precisely due to only minor differences in the neck circumference (ranging from 1.4 to 1.6 cm) and the high level of fragmentation (no complete piece was recorded from the site). 17 pieces are included in this transitional category.

Category V (Fig. 9: 49, 55, 62) included fragments of miniaturized parts of the bars with the smallest neck circumference (1.3 mm). These three pieces, including one with a ruptured eye (Fig. 9: 49) most probably represents the smallest known category of axe-shaped bars. As no complete specimen from the site is known, no precise information about size and weight attributes of pieces from this category can be given, except the fact that the fragments are hardly distinguishable from the category IVb. It is thus uncertain if these miniature pieces really existed on the site or if they are just specific cases of category IVb (i.e. quite similar with a view to their length and weight attributes).

Dating

Only small part of the assemblage obtained by the excavation campaign is roughly datable, and it consists almost entirely of pieces from category IVa. The circulation of category IVa bars in the first half of the 9th c. is indicated by two pieces (Fig. 6: 7, 8), which were found in the fill of the fortification chamber, and the body of the fortification (Staňa 1953, 143, 144). This roughly defined period is thus probably the time of the first occurrence of this type at the site. Eleven fragments including the nine shortened pieces classified to IVa (Fig. 6: 15–19; 7: 22–25) were discovered in the context of one of the sunken huts dated to the second half of the 9th c. (Kalčík 2015, 146; Staňa 1960, 242–244). But the assemblage also contained one piece classified in category IVb or even V. Reduced versions of small bars thus already existed in this period. As to the chronologically latest occurrence of the bars, there are some indications that axe-shaped bars of category IVa remained in circulation at the time of the collapse of the centre at the beginning of the 10th c. This is indicated by two pieces (Fig. 7: 26, 27) found in the fill of the ditch containing the destruction of the fortification (Staňa 1953, 47, 48), as well as by the occurrence of category IV (unfortunately lost) bar (see Staňa 1953, tab. 267) discovered within the hut roughly dated to the first half 10th c. (Staňa 1960, 250, 251; Kalčík 2015, 191). This supports the hypothesis that the economic role of small (category IV, and possibly V) axe-shaped bars may have continued to exist at the site for some time even after the collapse of the centre and Great Moravian political organization.

As regards category III, most of its representatives originated from the undatable hoard context. The only indication about their chronology is a fragment (Fig. 4: 2) discovered in the layer containing also part of a hooked spur and some atypical ceramic slags (Hauptmann 2021, 245, 246; Staňa 1954, 140, 141). The first occurrence of the category III bars is thus possible during the turn of the 9th c. or even in the 8th c., but the current data base is insufficient for presenting any firm conclusion.

Spatial distribution

Mapping the spatial distribution of axe-shaped bars from the studied assemblage indicates circulation of the bars within all parts of the stronghold's acropolis, no distinct concentration or separation of individual categories can be observed (Fig. 11). No data is available from outer wards of the stronghold, but a solitary find in a forested area ca. 1 km to the



Fig. 11. Staré Zámky near Brno-Líšeň. Spatial distribution of axe-shaped bars' individual size/weight categories within the acropolis. Aerial photograph by State Administration of Land Surveying and Cadastre of the Czech Republic.

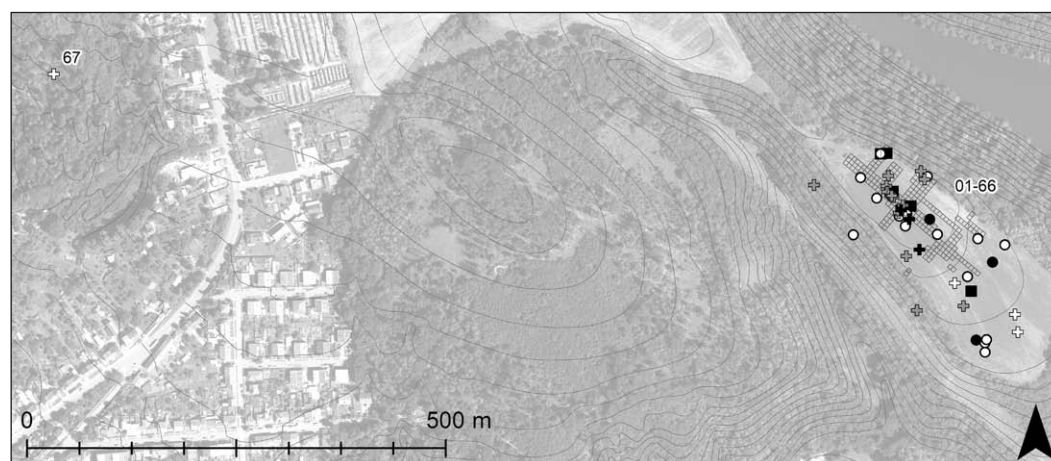


Fig. 12. Staré Zámky near Brno-Líšeň. Spatial distribution of axe-shaped bars' individual size/weight categories including the metal-detector find from the area of the stronghold's hinterland. Aerial photograph by State Administration of Land Surveying and Cadastre of the Czech Republic. For the legend see Fig. 11.

west of the stronghold (Fig. 12: 67) indicates that the movement of axe-shaped bars was not restricted to the stronghold itself, but they can be discovered even in the immediate surroundings of the stronghold. As only the solitary find is yet known from the hinterland of the centre, so far, the economic role of the bars in the hinterland can be only estimated.

DISCUSSION

Compared to the known assemblages of other major strongholds of Great Moravia (*Bialeková/Tirpáková* 1989, 92; *Galuška* 1992, 145; *Poláček* 2007, 511; *Vidlák* 2018, 65), the assemblage of axe-shaped bars from Staré Zámky can be considered as less abundant. Despite this fact, its detailed evaluation yielded stimulating results for further discussion about the role of axe-shaped bars within the Great Moravian economy.

Distribution of individual pieces and fragments among axe-shaped bars' size/weight categories (Fig. 10) indicates that category IV, and IVa respectively, mainly circulated within the centre. This conclusion is not without limits, however, as significant quantity of smaller pieces (categories IVb or V) was found by later metal detector survey. Their relatively small presence in the assemblage from the excavation campaign may indicate that fragments of smaller and miniature bars were not recognized or were later discarded (cf. *Kalčík* 2015, 131). The circulation of smallest bars on the site could be thus originally more frequent than presented by this evaluation.

The category IV probably occurred on the site during the first half of the 9th c. and the find from one of the sunken huts indicates that they may have in circulation even at the beginning of the 10th c. Some of the pieces were thus possibly in use also shortly after the collapse of Great Moravia and its regional economy. The distribution of the fragments within the stronghold, as well as multiple contexts including the presence of these bars within sunken huts with spurs, and the another with sheep shears respectively (see also *Staňa* 1960, 242–244, 252, 253) indicate that access to them was not socially restricted. They were thus probably used widely on a daily basis instead of systematically accumulated and stored. The archaeological record also shows that they possibly circulate in bundles (as they were found within the hut with the spurs), or solely (hut with the sheep shears). This observation corresponds with the hypothesis that the axe-shaped bars' evolution reached the stage, when they were

used as general-purpose money tokens mediating the trade within the centre, or between the centre and its hinterland. But to reinforce this conclusion, an appropriate evaluation of assemblages from other major Great Moravian centres is indeed still needed.

What is striking within the assemblage of category IV bars is that most of the pieces are lacking the blade. Some fragments indicate that the absence of the blade is not a matter of post-depositional processes, but that they were intentionally removed (cf. *Galuška* 1992, 145; *Pleiner* 1961, 429; *Szmoniewski/Rozmus* 2022). Especially testimonial are the bars from category IVb (reduced small bars). A study of similar pieces from Mikulčice (e.g. Fig. 1: 7) shows that thickness of these pieces is homogeneous throughout the body of the bar. Despite this fact, the upper part including the eye survived archaeologization often in quite good shape (e.g. Fig. 9: 09) unlike the blade or its part that seems to be missing. The thesis about the intentional removing of the bar's blade is also supported by the finds of more massive

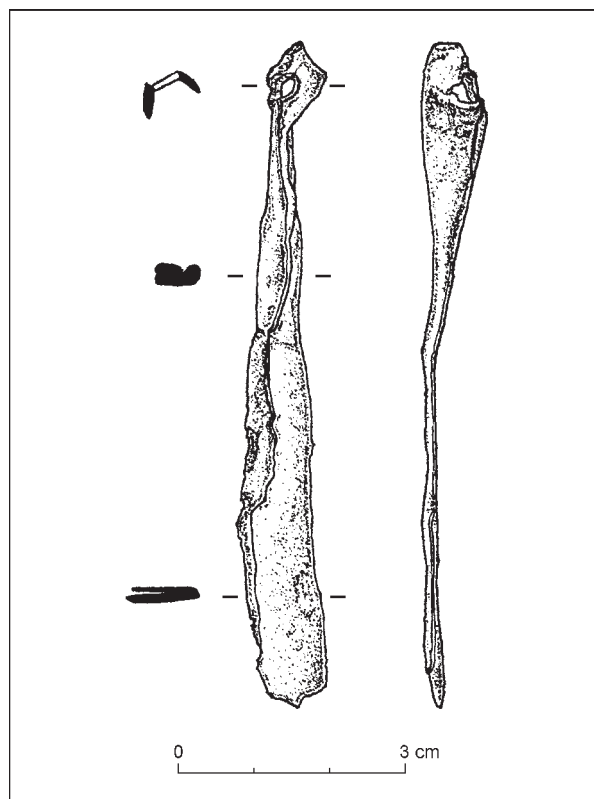


Fig. 13. Great Moravian centre of Mikulčice. Small reduced or miniature axe-shaped bar (inv. no. 4785/59; 8.8 cm; 4 g; neck ca. = 1.4 cm) probably made from blade of a larger axe-shaped bar (drawing by K. Augustinová).

⁶ See note 3 above.

category IIIb pieces. Non-hoarded pieces were also found without the blade (Fig. 4: 02, 13, 42, 59, N01), or the blade was found without the eye (Fig. 4: 03). Regarding the fact that the blades of axe-shaped bars were found on the site only rarely indicates that easily workable parts of bars were further utilized (cf. *Dostál* 1983, 194; *Pleiner* 1961, 429). Some finds outside Staré Zámky (Fig. 13; see also *Galuška* 1992, 145, 149, fig. 12: 11) also indicate that at least part of axe-shaped bar blades could have been used for making smaller bars. The blade removal phenomenon is observable on all axe-shaped bar categories present on the site, and as indicated by the (unfortunately only rough) dating of the pieces from the stronghold fortification body possibly from the first half of the 9th c. The phenomenon included also miniature (category V) pieces, which in complete shape weighed no more than a few grams. But in the latest case, the practical utilization of miniature axe-shaped bar blades weighing only a few grams is hardly conceivable.

The phenomenon of devaluation of axe-shaped bars corresponds with part of the model of axe-shaped bar genesis and evolution predicting the practical use of axe-shaped bars, when the intrinsic value of iron exceeded the value attached to the earlier and more massive token (Fig. 2). It is quite striking, however, that the phenomenon that was going to be caused by the increasing iron scarcity occurred at the centre that probably controlled iron production sites (*Mikulec/Hlavica/Kmošek* 2022) and also affected the smallest recorded pieces of category V. The possibility that breaking the bars had another meaning thus cannot be completely excluded as it also indicated by the rare find of a riveted axe-shaped bar (*Turčan* 2021; see also *Szmoniewski/Rozmus* 2022, fig. 5: 17; 8: 17). Based on the evaluation it is also difficult to definitely decide if the removal of the part or the whole blade of the bar definitely devaluated the token, or if the shortened bar was able further circulate and fulfil its economic role. The spatial distribution of axe-shaped fragments within the centre with many of them possibly lost by their wearers (as indicated by ruptured eyes of approx. 60% of the available finds, and 70% of the finds excluding the hoard of IIIb bars respectively) as well as the presence of a bundle of bars including pieces of reduced length within one of the sunken huts however indicate that not even these pieces were discarded immediately after their blade was removed or shortened.

The only more significant part of the assemblage that escaped devaluation is the hoard of 13 axe-shaped bars of category IIIb. Considering the practical utilization of the rest of the non-hoarded IIIb pieces, it is possible that the hoard was deposited

during the stage when axe-shaped bars were still perceived as social, i.e. non-monetary currency (*Hlavica/Bárta* 2021, 17), and the practical utilization of the bars on the site was not advantageous. Their deposition could thus have happened before the appearance of category IV bars, i.e. the turn of the 9th c. or earlier. But unfortunately, this hypothesis cannot be tested at this time by any other data.

The final point that deserves discussion is the occurrence of axe-shaped bars at the Staré Zámky centre at all. Evaluation of relics of iron production at the site⁶ (*Mikulec* 2022, 41, 42, 50–52) shows that iron processing was only marginally present there. It is thus possible that axe-shaped bars were originally not forged at the site, but was brought there from elsewhere, first as the social currency building the relationship between Moravian kinfolk (*Hlavica/Bárta* 2021, 17), and then as tokens of general-purpose money, when the centre was integrated into the 9th-c. Moravian market system (*Hlavica/Procházka* 2020b). Even this hypothesis deserves more attention in future research. A comparison with properly evaluated assemblages of axe-shaped bars from other central places of Great Moravia will be vital for solving the issue about the place or places where axe-shaped bars were originally made and from which they might possibly have been spread.

CONCLUSION

The paper offers a new perspective on axe-shaped bars as a distinct phenomenon of the Great Moravian economy and society. It first presents a new diachronic model of axe-shaped bars' genesis and evolution. The model sees the roots of axe-shaped bars in the pre-Christian religion when original tools were part of ritualized behaviour. The first axe-shaped bars started to appear within this context where the symbolic function of axes was accented at the expenses of their practical function. Large and massive pieces were probably produced first and perceived as social currency used in non-commercial contexts. Because of the economic stress (increasing demand for iron, and thus increase of its scarcity), these bars, originally possibly also preserving some standardized weight of iron, were gradually made smaller until the stage where there was almost impossible to project any part of a weight unit into them. At this point they started to be perceived as tokens, their value was calculated in another unit of account and guaranteed by the emitting authority or authorities and they were implemented in the credit/debt, i.e. commercial, relations of the 9th-c. Moravia. With the continual

increase of iron's scarcity, their shrinking continued until the stage where small and at the end of the Great Moravian period possibly even miniature pieces were produced.

The next part of the paper confronted the above-described model with the data from one of the major centres of the 9th-c. Moravia at Staré Zámky near Brno-Líšeň. The evaluation of 78 pieces and fragments of axe-shaped bars showed that majority of the bars belonged to size/weight categories, which, according to the model, were utilized in commercialized exchange. Analysis of their spatial distribution shows that they circulated with no limits within the stronghold, and they were not hoarded, but probably used on daily basis, used individually as well as in bundles. Thanks to insufficiently documented and evaluated find contexts, the period of their usage can be dated only roughly and only uncertainly from the first half of the 9th c. possibly up to the first half of the 10th c.

According to the model, the bars from the only present hoard on the site belong to the latest phase of the period where the axe-shaped bars could still have been perceived as social currency. These pieces thus could be still exchanged in non-commercial contexts and can be thus of slightly earlier origin. This conclusion is also supported by the fact that unlike most pieces found on the site the bars from the hoard were not devaluated by the removal of their blade.

The model also explains the phenomenon of cutting off the axe-shaped bars' blades, which would have been the result of the increasing iron scarcity and thus the increase of the intrinsic value of the iron used for the production of 9th-c. Moravian tokens of general-purpose money. Since the value of iron significantly exceeded the arbitrarily defined value of the token, the tokens were devaluated by cutting off part or the entirety of its blade. There are some indications, however, that even devaluated pieces further circulated within the site, unlike the blades, which were most probably further processed. The possibility that the blades were forged into smaller and lighter types of axe-shaped bars cannot be excluded and deserves future attention.

The paper also touched on the issue of the origin of the bars present on the site. According to the data obtained by the evaluation of iron slags from Staré Zámky, which shows that iron processing works were conducted only marginally at the site, the possibility that axe-shaped bars are not produced at the centre itself needs to be considered. However, only further research can resolve this issue satisfactorily.

The data from the Staré Zámky near Brno-Líšeň thus are not in any fundamental way contradictory to the model defined in the initial part of the paper, which gives it some basic credibility. But only further evaluation of larger assemblages from other Great Moravian central sites can essentially test and refine its fundamentals.

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Moravské železné peníze

Model vzniku a vývoje sekerovitých hřiven 9. stol. a jeho prověření souborem ze Starých Zámků v Brně-Lišni

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SOUHRN

Předkládaná práce prezentuje novou perspektivu, s jejíž pomocí reviduje fenomén sekerovitých hřiven, charakteristický projev hmotné kultury velkomoravského období středo-evropských dějin. V úvodu nabízí diachronní model jejich geneze a vývoje. Model vidí počátky vzniku sekerovitých hřiven v předkřesťanském kultu, v němž byly originální nástroje v podobě seker součástí ritualizovaného chování a sloužily též coby votivní obětiny či hrobová výbava. Právě tento specifický kontext, v němž byla symbolická funkce seker akcentována na úkor jejich funkce praktické, umožnil vznik prvních masivních železných hřiven stylizovaných do podoby původních nástrojů. Oproti klasickým polotovarům z nich však již není možno vytvořit sekeru bez zpětného pakování do původního polotovaru v podobě železného hranolového prutu. Největší hřivny, které model považuje také za chronologicky nejstarší, pravděpodobně nabývaly role tzv. společenských platidel (starším termínem „primitivních peněz“), které zpravidla cirkulují v nekomerčních kontextech. Nejspíše působením ekonomických tlaků, jejichž součástí byla postupně se zvyšující poptávka po železe, a paralelně s tím jeho narůstající nedostatek, jenž se projevoval i růstem hodnoty této komodity, se původně masivní hřivny postupem času zmenšovaly. Ačkoliv největší a nejtěžší exempláře mohly železnou komoditu zhruba zachovat v nějaké předem definované váze, byly tyto hřivny postupně nahrazeny lehčími a následně též kratšími verzemi. Do nich bylo díky specifickým kovářskému zpracování, tedy nepředvídatelnému úbytku suroviny během kování, již jen velmi obtížně jemnější podíl arbitrárně stanovené váhové jednotky přesněji promítnout. Nejspíše v této fázi pak začala být hodnota sekerovité hřivny garantována jejich producentem (či producenty) a hřivny se postupně transformovaly v úvěrové tokeny integrované do komerčních ekonomických vztahů uvnitř velkomoravské společnosti. S další narůstající hodnotou železa v průběhu času pak pokračovalo zmenšování hřiven, a to až do fáze, kdy se na sklonku velkomoravského období objevují nejmenší dokumentované kusy měřící jednotky cm a vážící pouze několik málo gramů.

Představený vývojový model práce prověřuje konfrontací s menším a dosud nepřilíh dobře známým souborem sekerovitých hřiven z významného velkomoravského centra na Starých Zámcích v Brně-Lišni. Vyhodnocení 78 kusů či fragmentů zde nalezených sekerovitých hřiven ukázalo, že naprostá většina z nich náleží do nejmenších velikostních, resp. váhových, kategorií typu IV a V. U těch již model předpokládá možnou integraci do komercializované směny. Analýza jejich prostorové distribuce ukazuje, že v rámci hradiska obíhaly bez větších omezení a nebyly systematicky deponovány, ale naopak užívány na denní bázi. Jak následně naznačují nálezy z obytných objektů, kolovaly nejen jednotlivě, ale i ve svazcích. Trvání této „komerční fáze“ Starých Zámků může být na základě zdejších nálezů vymezeno jen velmi hrubě a nejistě. Jeho počátek lze snad položit do období

před, či okolo vzniku komorové hradby, tj. před polovinu 9. stol. Nález v pravděpodobně povelkomoravské zemnici pak naznačuje, že hřivny se v dobové hmotné kultuře mohly vyskytovat ještě v první polovině 10. stol., tj. období po kolapsu velkomoravské společnosti a regionální ekonomiky. Patrně ztrátový nález z polohy mimo vlastní hradisko (obr. 12: 67), pak naznačuje, že mohly být vynášeny i do zázemí centra, byť zde jejich ekonomická role není zcela jasná.

Dosud ojedinělý depot hřiven ze Starých Zámků, který vyhodnocení zařadilo do váhové a velikostní kategorie IIIb, náleží podle modelu do závěru fáze, kdy hřivny mohly být stále ještě vnímány jako společenské platidlo (tzv. primitivní peníze). Kusy shromážděné pravděpodobně prostřednictvím nekomerční společenské směny (např. vzájemného obdarovávání) mohly být deponovány v období před nástupem menších hřiven. Naznačený závěr je do jisté míry spekulativní, je však rovněž podpořen zjištěním, že oproti soliterně nalezeným kusům (zahrnujícím i několik izolovaných fragmentů kategorie IIIb), nebyly hřivny z depotu devalvovány odseknutím listu.

Jev odsekávání hřiven, který je predikován v úvodu prezentovaným modelem, je v souboru na Starých Zámcích přítomen v masivní míře. Na základě teoretických východisek této práce je možno jej přisoudit narůstající hodnotě železa, z níž byly hřivny vyrobeny. Ta v průběhu času převýšila arbitrárně stanovenou hodnotu tokenu v podobě sekerovité hřivny. Devalvací tokenů sesekáváním listu hřivny je možno interpretovat jako snahu o zvrácení nepříznivého poměru hodnoty železné komodity vůči stanovené hodnotě hřivny. Vyhodnocení tohoto souboru poskytuje indicie, že i devalvované hřivny nadále obíhaly, zatímco odsekuté listy byly zpracovávány. Nelze zcela vyloučit ani možnost, že z jejich částí byly vyráběny menší a lehčí hřivny.

V závěru se studie dotýká též otázky provenience hřiven na Starých Zámcích. Ačkoliv ta zatím postrádá přírodovědná data umožňující provenienci železných artefaktů postihnout, předcházející vyhodnocení souboru železných strusek z lokality ukázalo, že kovozpracující aktivity byly na hradisku pouze sporadické, a to i ve srovnání s některými venkovskými lokalitami. V úvahu tak musí být brána možnost, že hřivny na Starých Zámcích nemusely být produkovány, ale dostávaly se tam v důsledku směny. V případě větších exemplářů snad ještě směnou společenskou (tj. vzájemným obdarováním za účelem budování, utužování či korekce společenských vztahů) a v případě masivně zastoupených menších kusů pak již komerční, v níž hřivny plnily funkci směnného média, tedy peněz.

Data obdržena vyhodnocením dostupného souboru ze Starých Zámků v Brně-Lišni tak nejsou v žádném zásadním rozporu s modelem definovaným v počátcích této práce, což mu dává základní kredibilitu. Avšak pouze podobná vyhodnocení dalších objemnějších souborů mohou jeho validitu testovat v plné míře a celý model v budoucnu zpřesnit či korigovat.