RESEARCH ARTICLE – VÝZKUMNÝ ČLÁNEK

The sword from Vlčí Pole: A unique find of a late Merovingian weapon in Bohemia

Meč z Vlčího Pole: Unikátní nález pozdně merovejské zbraně v Čechách

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Finds of early medieval Schlingen-type swords are mostly concentrated in present-day southern Germany, where they are known from a number of graves dating to the end of the late Merovingian period. On the contrary, these swords are completely absent in contexts of the early Carolingian and Great Moravian periods. This paper presents a new find of Schlingen-type sword from Vlčí Pole in the northeastern part of Central Bohemia and its archaeometric analysis. We consider the sword from Vlčí Pole to be the only unambiguous find of a fully preserved long-bladed weapon of the late 7th to 8th century in Bohemia. As it is one of the few late Merovingian swords to have been examined using X-ray computed tomography and metallography, it also contributes to a general understanding of phenomena such as the development of the use of pattern-welded marks and blades with cutting edges of hardened steel.

sword – Bohemia – late Merovingian period – metallography – pattern welding – pattern-welded marks

Nálezy raně středověkých mečů typu Schlingen se soustřeďují především v dnešním jižním Německu, kde jsou známy z řady hrobů z konce merovejského období. Naopak tyto meče zcela chybějí v kontextech časně karolinského a velkomoravského období. Příspěvek představuje nový nález meče typu Schlingen z katastru Vlčího Pole na severovýchodním okraji středních Čech a jeho archeometrickou analýzu. Meč z Vlčího Pole považujeme za jediný jednoznačný nález kompletně dochované zbraně s dlouhou čepelí z konce 7. až 8. století v Čechách. Vzhledem k tomu, že se jedná o jeden z mála pozdně merovejských mečů, který byl podroben rentgenové počítačové tomografii a metalografické analýze, přispívá také k obecnému poznání jevů, jako je vývoj používání damaskových značek a čepelí s břity z kalené oceli.

meč – Čechy – pozdně merovejské období – metalografie – svářkový damask – damaskové značky

Introduction

The paper presents a new find of a Schlingen-type sword from Vlčí Pole in the northeastern part of Central Bohemia. As this type of weapon is characteristic of the area of southern Germany at the end of the Merovingian period, the study focuses particularly on three main issues.

The first can be described as a regional contextualisation emphasising the uniqueness of the find in the Bohemian milieu. A major cultural breakthrough attributed to the arrival of the Slavs occurred in Bohemia in the 6th century. It is generally characterised by a relatively poor material culture and little evidence of social stratification. This notion is influenced by the absence of archaeologically recordable central sites and burial practices (a cremation with very poor grave goods or an undetectable burial rite). Significant progress in knowledge has been made recently from finds of exclusive metal artefacts coming

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mainly from detector surveys. In the archaeological record, Bohemia of the late 7th to early 9th century is characterised by a gradual rise of the upper classes of society. These were influenced by the culture of the late Avar Khaganate and the European West, which was represented by the Frankish realm and political entities from the eastern periphery of the late Merovingian world. In finds, the upper classes are manifested almost exclusively in the male component, to which we attribute the status of mounted warriors.[1] However, finds of weapons and war gear from this period are rare in Bohemia. A greater amount of archaeological evidence of swords and other long-bladed weapons is available only from the beginning of rich inhumation burials in the 9th century (*Hošek et al. 2019*; *2021*). The oldest early medieval hillforts belong to this period and represent such an important phenomenon for several centuries that the time span between the second half of the 7th century and the turn of the 12th century is referred to as the Hillfort period in traditional Czech archaeological periodisation (*Eisner 1933*; *Bubeník 1994*). The most important hillforts, covering several dozen hectares, became supraregional centres with evidence of specialised production and the presence of mounted warriors (e.g. *Profantová et al. 2020*). The construction and maintenance of the hillforts, which did not come without a considerable labour force, led to an increase in the intensity of social interactions and required persons endowed with authority and extraordinary organisational skills.

The territory of Bohemia comes into regular view of Carolingian written sources after the end of the Avar Wars (specifically in 805 AD). Records from that time onwards continuously show that the inhabitants of Bohemia were perceived (and even perceived themselves) as a single entity (e.g. *Třeštík 1997*, 63–73). In the 9th century, the representation of the Bohemian tribe (*gens Bohemanorum*), the highest elite of Bohemia, consisted of a larger number of dukes (written sources mention up to 14 dukes acting together). The pillar of the tribal structures was the council, which is enshrined in Kosmas' rendering of the Přemyslid dynastic legend. Sources also indicate the existence of the institution of the chief duke, which was hereditarily held by the Přemyslid family from the 880s at the latest (summarised in *Třeštík 1997*; *Kalhous 2012*; *2018*). The baptism of Přemyslid Duke Bořivoj I (c. 883/4 AD), which marks the beginning of the continuous building of ecclesiastical structures, launched the next phase in the transformation of society (e.g. *Třeštík 1997*, 312–347). Christianity became one of the ideological instruments of the legitimacy of power. The means of Christianisation were controlled by the Přemyslid dukes, guaranteeing them a privileged position in communicating with the surrounding Christian powers and also becoming a tool for the definitive breaking of traditional tribal structures. The importance of the rise of the Přemyslid dynasty, which ruled Bohemia until 1306, is reflected in attempts to label the period between the end of the 7th century and the mid-9th century as the pre-Přemyslid period (e.g. *Hasil et al. 2020*).

The second issue examined in this paper concerns the unambiguous classification of the sword from Vlčí Pole; a comprehensive typological analysis has been carried out, including a discussion of the weapon in terms of Petersen's typology. The result is an important expansion of our knowledge of Schlingen-type swords.

[1] The most recent archaeological synthesis of Bohemia before the rise of the Přemyslid dynasty, based mainly on exclusive metal finds, is the subject of studies by *Hasil et al. 2020* and *Profantová – Hasil in print*.

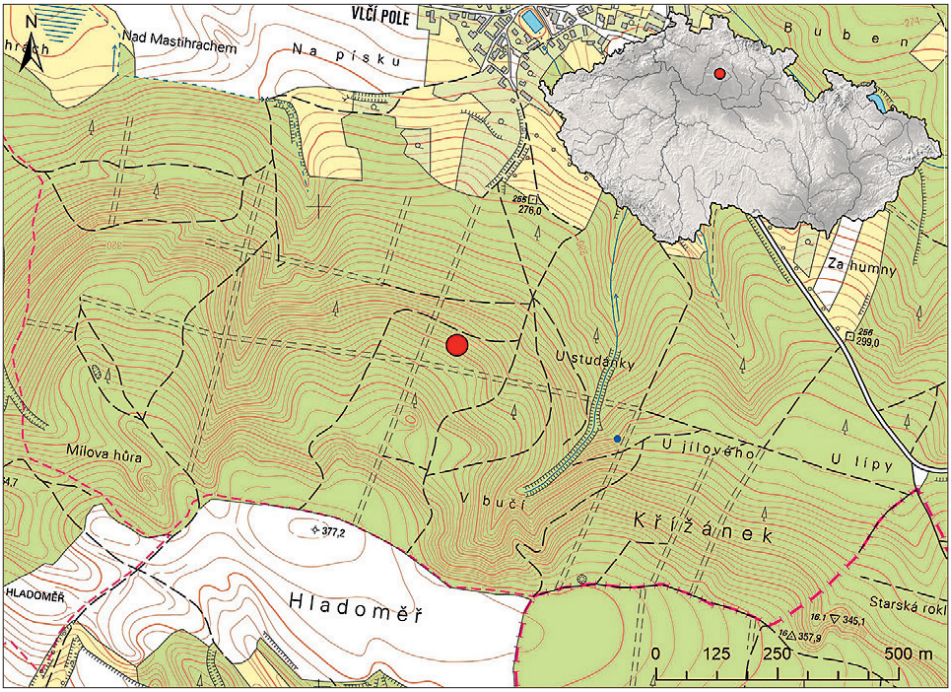


Fig. 1. Discovery site of the sword (©ČUZK, ZTM10; edited by R. Novák).

Last but not least, the paper deals with the importance of the documentation and technological assessment of swords and the contribution of the find from Vlčí Pole to an understanding of the development of swords in the Early Middle Ages. During the heyday of early medieval sword research in Germany, which took place in the last quarter of the 20th century (e.g. *Menghin 1983*; *Geibig 1991*; *Westphal 2002*), archaeometric methods were not as sophisticated as they are today, and some of the then ideas about weapon production are now outdated (c.f. *Stelzner 2016*; *Schreiner 2020*). The analysis therefore has important implications for the understanding of late Merovingian swords in terms of the construction and application of iron inlays.

Find context and analytic methods

Circumstances of the discovery and location of the find

The find was made on 15 August 2020 on land parcel no. 580/1 in the cadastre of Vlčí Pole (Mladá Boleslav district) in sloping wooded terrain at the ‘U Studánky’ site south of the village (*Fig. 1*). Here, the northeast-facing slope rises unevenly from the confluence of unnamed watercourses (258 MASL) feeding the Olšovský Pond near Vlčí Pole, to its highest point at Hladoměř Hill (377 MASL). The place of discovery is situated on a 20-degree slope bounded by a gentler slope above the contour line at 330 MASL and a similar slope

Fig. 2. Discovery site: a – terrain situation in the immediate vicinity of the find (photo by J. Skala); b – original position of the uncovered sword (photo by T. Kverek).

below the 320 m contour line, along which forest roads run (50.4086822N, 15.1340258E; 327 MASL).[2]

The finder, Tomáš Kverek, visually recognised an iron sword-blade point protruding from the forest floor while descending the steep slope. According to the clear tyre tracks, an off-road quad-bike had recently passed there several times, so the shallowly deposited sword (-0.1 m) was obviously deformed and partially uncovered. The finder later excavated the sword (*Fig. 2*), took it home and put it in a bath of water to prevent the corrosion products from drying out and disintegrating. He then contacted archaeologist Radek Novák from the Regional Museum and Gallery in Jičín, who took possession of the find and organised both a geodetic survey of the findspot and an archaeological field survey of the surround-

[2] The site was localised using the Trimble Catalyst device (RTK, subcentimetre).

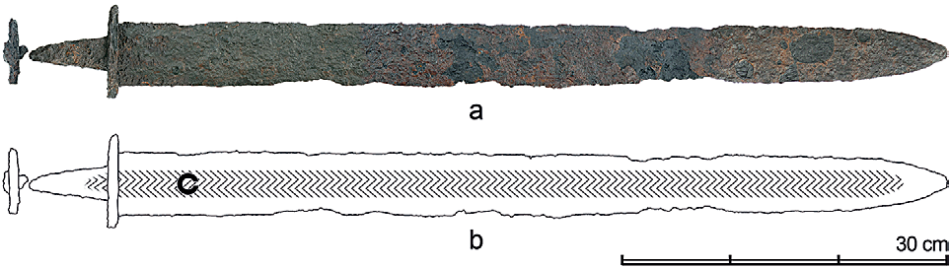


Fig. 3. Reconstruction of the original shape and appearance of the sword from Vlčí Pole (with a non-deformed blade): a – composition of a series of adapted photographs (photo by J. Košta, compiled by J. Hošek); b – schematic representation of the main components and decoration of the sword (drawing by J. Hošek).

ing area. However, no other archaeological finds related to the sword were discovered. The sword was later handed over to the territorially competent museum (the Museum of the Mladá Boleslav Region) and registered there under inv. no. MML-A-40000 (91/2020).

Methods

In order to obtain detailed information on the construction and decoration of the weapon, which is essential for its complete and reliable description and classification, the sword was subjected to radiographic and metallographic examination before standard archaeological documentation methods were applied. As the sword blade was deformed, we also decided to make a photographic and schematic reconstruction (see *Fig. 3*).

The radiographic examination included both standard X-ray imaging and a CT scan. The CT data was acquired using the LometomArc CT software and the Testima X-Test universal X-ray system (equipped with a 200 μm resolution detector) with a primary X-ray generator (set in the mode for a maximum voltage of 225 kV, maximum power of 800 W and focus of 0.4 mm) and a secondary X-ray generator (with maximum voltage of 120 kV, maximum power of 36 W and focus of 50 μm).

Metallography was carried out on a miniature sample of the cutting-edge tip, taken at a distance of 523 mm from the lower guard (*Fig. 4*). The sample was prepared according to standard procedures. It was examined in an unetched state to assess the purity of the metal and after etching with 3% Nital and Beraha I reagent to determine the nature and distribution of the micro-constituents. Metal purity (slag content) was determined (in the tradition of the laboratory of the Institute of Archaeology in Prague) according to the Jernkontoret standard and grain size using the ASTM E112 standard. Microhardness testing was omitted due to the small dimensions of the sample.

Description of the sword

The sword was preserved deformed but almost complete (*Fig. 3*; *Fig. 5*: a). The upper hilt is broken off and a part of the tang is missing, as is a very small part of the point of the blade (less than 5 mm). The blade was bent in two places, first slightly, about 17 cm below the lower guard, and then significantly, 20 cm before the point. These large deformations

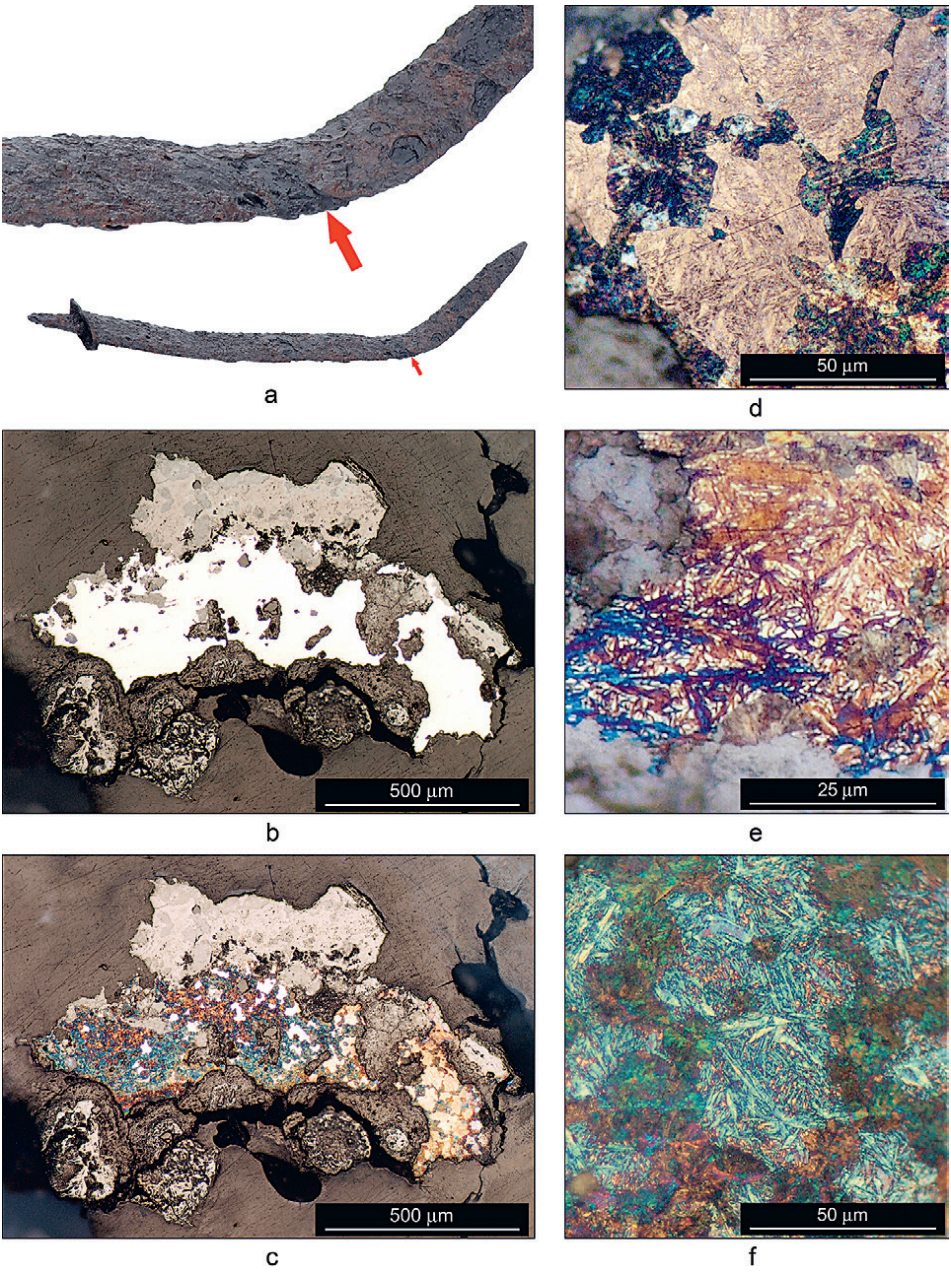


Fig. 4. Metallographic examination of the sword: a – marked place of sampling; b – the examined sample in unetched state; c – the sample etched with Nital; d – microstructure of fine (or even irresolvable) pearlite and martensite; e – detail of the martensitic structure; f – pearlite and martensite; etched with Nital (c–e) and Beraha I (f) (photo by J. Hošek).

Fig. 5. Details of the sword: a – deformed blade; b – upper hilt; c – lower guard and the tang (photo by T. Janek and J. Košta).

occurred after the blade had corroded, so they can be considered the result of recent damage to the sword. The preserved length of the sword is 844 mm, with the original length in the range of 860–870 mm. The surviving parts of the weapon weigh 1009 g. The point of balance could not be precisely measured, but it had to be situated at a greater distance from the guard (about 250 mm). This corresponds to the robust blade and a small upper hilt. The dominant component of the upper hilt is a low and in horizontal view lenticular upper guard that is 60 mm long, 21 mm wide, and 8 mm high (*Fig. 5*: b; *Fig. 6*). There are some indications that its sidewall had a roof-like ridge running along the entire circumference. A small pommel trapezoidal in front view, rectangular in horizontal view, 20 mm long, 13.5 mm wide, and 6 mm high, is attached from above, bringing the total height of the upper hilt to 14 mm. The third individual component of the hilt is the lower guard

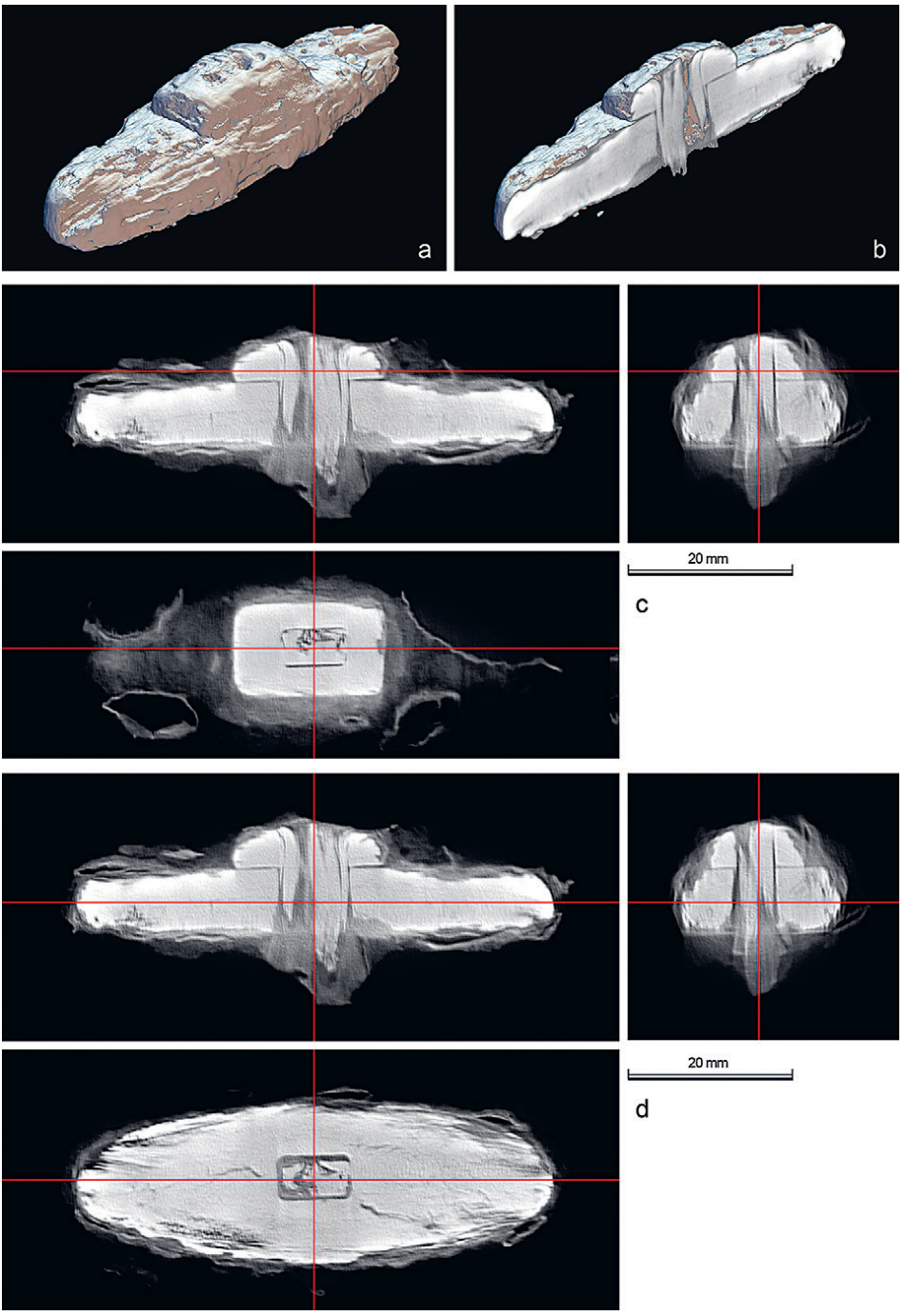


Fig. 6. X-ray CT sections of the upper hilt: a – three-dimensional X-ray CT image; b – longitudinal cross-section of the three-dimensional X-ray CT image; c – sections of the pommel; d – sections of the upper guard (by J. Hošek).

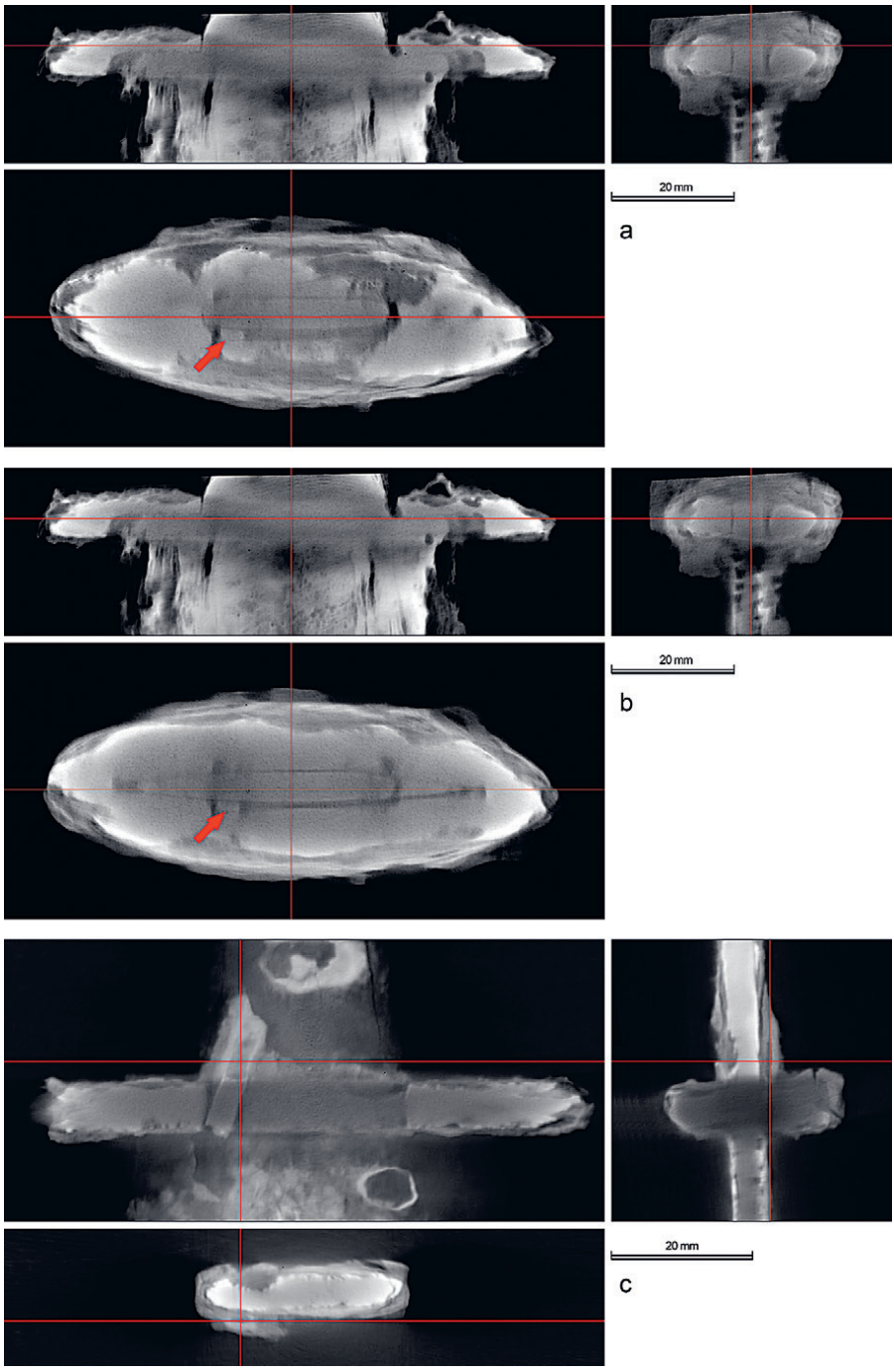


Fig. 7. X-ray CT sections of the lower guard: a – form and size of the opening for the tang; b – form and size of the opening for the blade shoulders; c – detail of a tiny iron prismatic rod fixing the guard in a stable position. The red arrow shows the position of the prismatic rod in the lower guard (by J. Hošek).

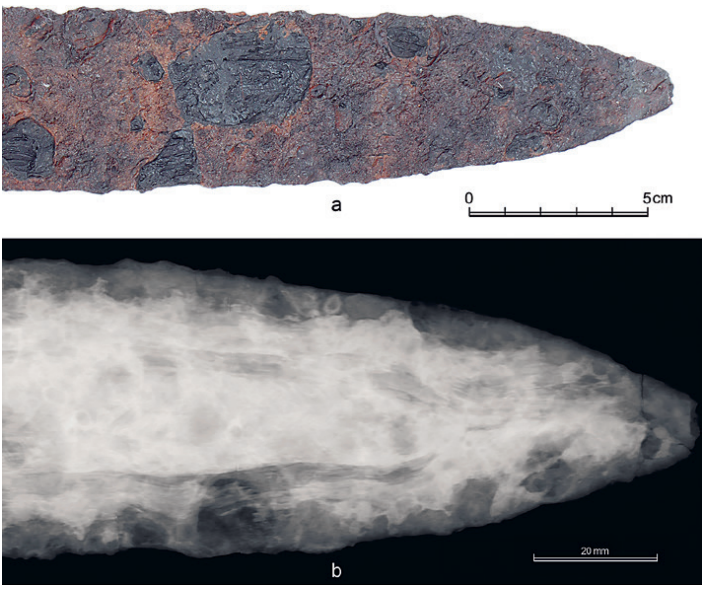


Fig. 8. Photo (a) and X-ray image (b) of the blade point (photo by T. Janek, X-ray image by J. Hošek).

(*Fig. 5*: c, *Fig. 7*), which, like the upper guard, has a long lenticular shape when viewed horizontally. It is 86 mm long and 9 to 10.5 mm high. One of the sides is damaged, so its current width does not correspond to the original state; we should therefore add about 5 mm to the preserved width of 26.5 mm. A tang with a rectangular cross-section passed through rectangular openings in the lower and upper guard as well as the pommel, on the top of which the tang-end was peened (*Fig. 6*). The tang was quite wide (7 to 9 mm) and narrowed considerably towards the upper hilt (from 31 mm to 12.5 mm). While the tang fits perfectly into the opening of the upper hilt, the opening of the lower guard, broadened in step-like fashion, did not precisely match the thickness of the tang or the blade. Therefore, the lower guard was held in a stable position by a tiny iron prismatic rod inserted into the hole from the side of the tang and partially protruding into the gripping part of the hilt (*Fig. 7*). The shape of the grip, delimited by its organic covers, is evidenced by an oval-shaped imprint preserved on the lower guard at a distance of 4 mm from the longer and 2.5 mm from the shorter side of the tang (*Fig. 5*: c). There is a distinct ridge on both shorter sides of the tang documented 1.5 mm below the upper guard, which was probably related to guard fixation (*Fig. 5*: b).

The blade is robust, 765 mm long, and for most of its length of the same width (*Fig. 3*). Up to 400 mm from the lower guard, it is roughly 59 mm wide and at the beginning of the pointed part, it is still 50 mm wide. In the last 100 mm, the blade ends with a significant parabolic taper resulting in a distinct point (see *Fig. 8*). The thickness of the blade decreases continuously from 7.5 mm under the lower guard to 4.5 mm at the pointed part. In cross-section, the blade has an approximately hexagonal shape formed by cutting edges welded onto a prismatic central part. The fuller is practically imperceptible; only in a section 200 mm before the point; traces of a very shallow depression can be observed in the central part of the blade. The middle of the tang is also slightly reduced in thickness in the area above the lower guard. Although remains of pattern-welded decoration can be seen

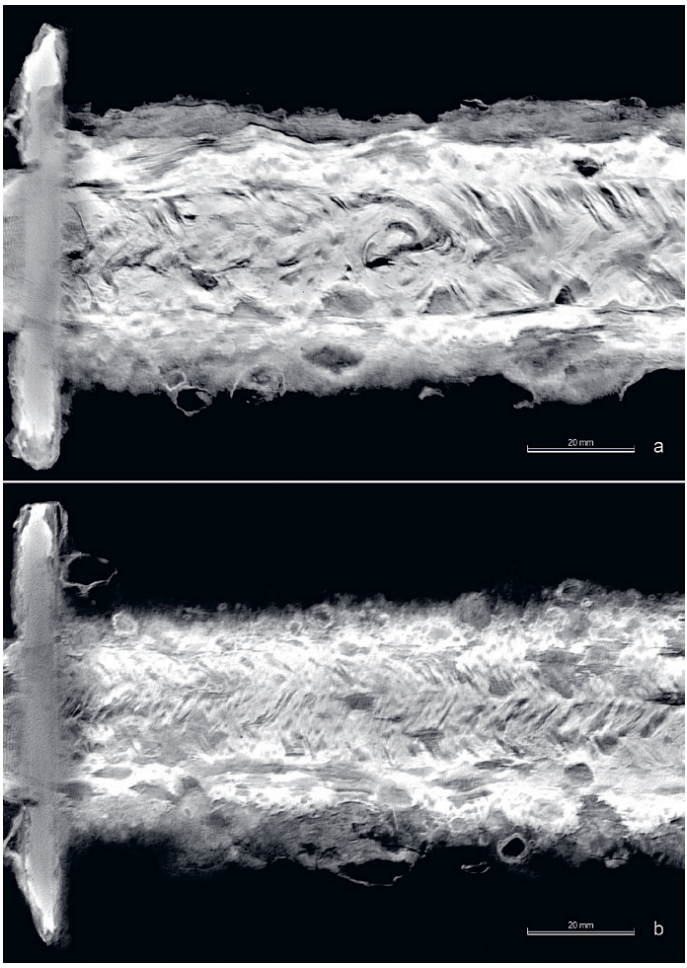


Fig. 9. X-ray CT sections of the blade below the lower guard showing the 'ZSZ' motif of pattern-welding (a, b) and a circular symbol/mark on its front side (a) (by J. Hošek).

in places with the naked eye, the overall reconstruction of its original appearance was only possible thanks to the X-ray CT examination (*Fig. 3*: b), which revealed pattern-welded surface panels with a plain core in between, welded-on cutting edges, and a composite iron inlay.

Each of the pattern-welded panels consists of three rods twisted in the ZSZ pattern. The surface pattern welding was 20 to 24 mm wide and was not set regularly in relation to the longitudinal axis of the blade. The width of the individual twisted rods was also not uniform but varied between 6 and 8.5 mm. In the lower part of the blade the patterning ends 45 mm before the point (*Fig. 8*: b), while in the upper part, the patterned panels continue into the tang.

One side of the blade was provided with a simple symbol (mark), which was located 54 mm below the lower guard. The sign consisting of a 3- to 5-mm-wide, untwisted, pattern-welded bar in the form of a slightly irregular circle that opens towards the point (external dimensions 17.5 × 19 mm; see *Fig. 9* and *Fig. 15*).

As the metallography shows, the edges were (at least in the place of sampling) made of high-carbon steel and were hardened by quenching. Both the preserved matrix and the corrosion products contain single-phase inclusions of medium size. The metal purity corresponds approximately to level 2 on the Jernkontoret scale (good purity). Etching with Nital and Beraha revealed a mixture of martensite (accompanied by some bainite) and very fine (or even irresolvable) pearlite (see *Fig. 4*: c–f).

Typological classification and dating

The weapon from Vlčí Pole is similar to two types of early medieval swords that differ both in the area of their occurrence and in their dating. These are the Schlingen type defined by *Stein* (*1967*, 9) on the basis of finds from the end of the Merovingian period in present-day southern Germany, and the Petersen type F (*Petersen 1919*, 80–84) defined on the basis of Norwegian finds from the early Viking period. Since the dating of the sword from Vlčí Pole cannot be based on its find context, let us examine the two groups of representatives of these types in more detail.

Petersen type F swords

According to *Petersen* (*1919*, 80–84), type F swords are characterised by undecorated hilts with a low solid pommel that is quadrangular in front view (usually rectangular, but in rare cases with bevelled or rounded ends). The lower and upper guards are usually rectangular in horizontal view with distinctly convex walls, or they are narrowly oval. Petersen suggested that some examples of type F swords may have been created by modifying the damaged two-part upper hilts of other types. He included 18 swords in this group, ten of which had a single-edged blade and only seven a double-edged blade. Neither marks nor surface pattern welding were identified on the blades; however, most of the blades have been examined macroscopically, only a few by X-radiography so far. Unfortunately, Petersen's study does not include a complete list of type F swords known to him. As a result, we can only identify a few of the swords he used to define this type. Those that we have been able to review, mainly through the database of archaeological finds from Norwegian museums (*Unimusportalen database*), show a relatively large variability in the shape of the hilt components – there are significant differences in the shape of both the pommels and the guards, as well as in the length and robustness of the guards (for examples, see *Fig. 10*: a–e). In his master's thesis on Viking Age swords from eastern Norway, *Hernæs* (*1985*) mentioned that the number of type F swords increased twofold between 1919, when Petersen's study was published, and 1980 (from 12 to 24, of which he localised 18). It was an average increase compared to other types of swords that were the subject of theses. In any case, we can conclude that type F swords are represented very sporadically among the thousands of swords from Viking Norway.

Outside of Norway, type F has very rarely been attributed to Viking Age swords (*Fig. 11*). In all of these cases, their classification is questionable or blatantly inaccurate. For example, a sword from Eura-Kauttua (Finland) provided with a low circular-segment shaped pommel with a hint of triangular profiling (*Fig. 10*: f; *Kivikoski 1973*, 112, Cat. N. 830) ranks among the early Carolingian weapons that best correspond to Geibig's type 1

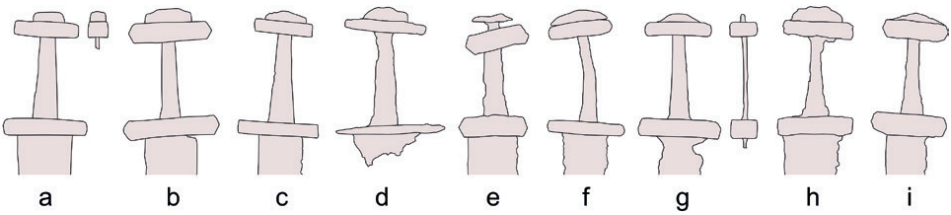
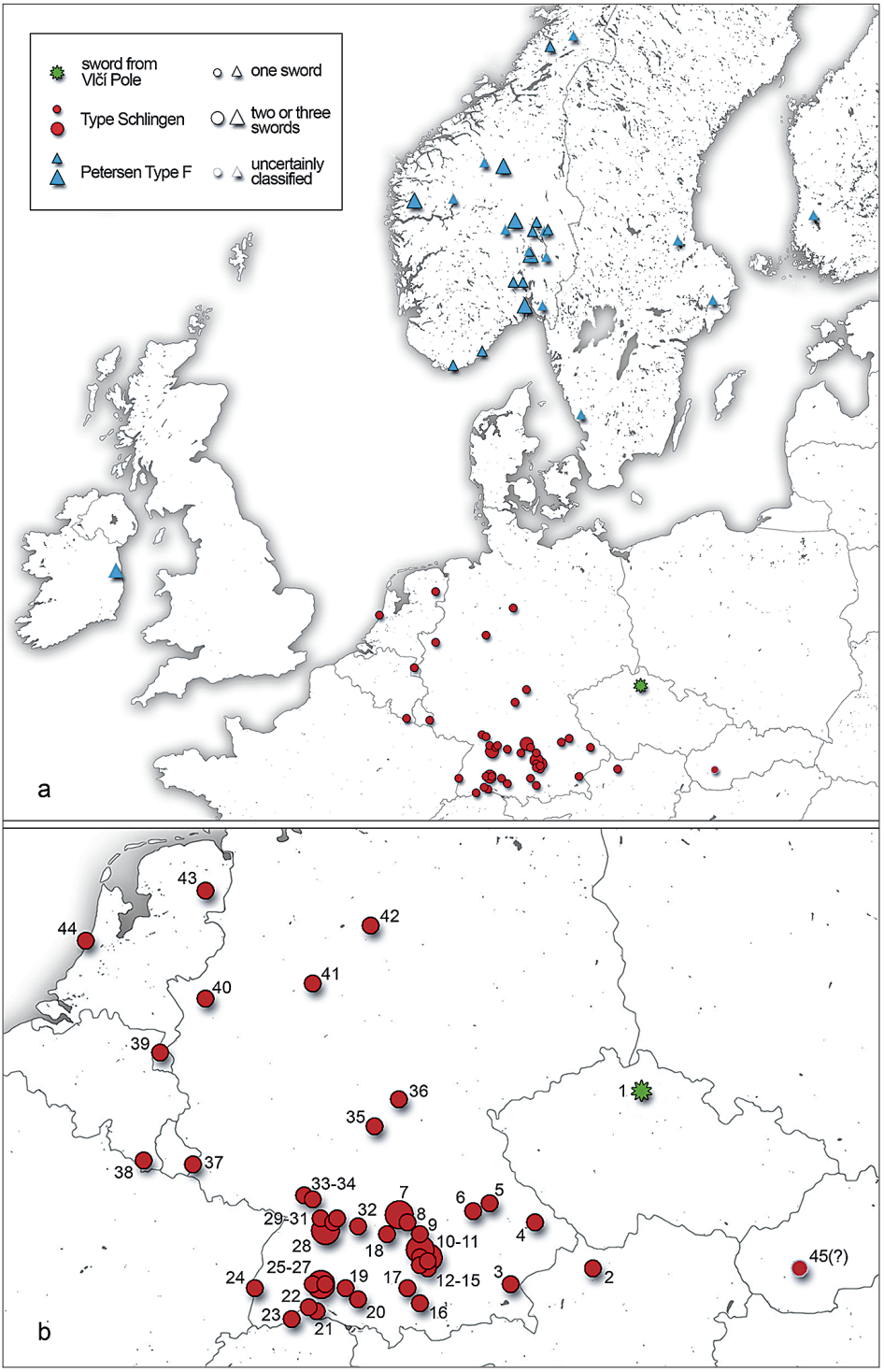


Fig. 10. Examples of Petersen Type F hilts: a – Haberstad, Eisvoll, Akershus, Norway (*Petersen 1919*, Fig. 67); b – Hammer, Grong, Nord-Trondelag, Norway (*Petersen 1919*, Fig. 68); c – Bagn Søndre, Sør-Aurdal, Norway (UNIMUS); d – Vestre Framstad, Gran, Norway; e – Sande, Sogn og Fjordane, Norway (*Norgård-Jørgensen 1999*, Taf. 39); f – Eura-Kauttua, Finland (*Kivikoski 1973*, 112, Cat. N. 830); g – Solna-Ulriksdal, Uppland, Sweden (*Androshchuk 2014*, Pl. 32); h – Kilmainham (D360), Ireland (*Harrison – Ó Floin 2014*, Fig. III.36); i – Kilmainham (D361), Ireland (*Harrison – Ó Floin 2014*, Fig. III.36) (not in scale, drawing by J. Hošek).

(Petersen's type B). Androshchuk registered three specimens of type F swords from the territory of Sweden. The first, a find from Solna-Ulriksdal in Uppland (*Androshchuk 2014*, 55, 436, Pl. 32), has an upper hilt of an atypical construction with the broad peened end of the tang used instead of a pommel to fix the upper guard (*Fig. 10*: g). According to Petersen's scheme, it would be classified rather as a special variant of type M with a low prismatic one-part upper hilt. Similarly, a single-edged sword from Ovansjö – Norrbergs-by in Gästrikland fits the description of the type M (*Androshchuk 2014*, 344–345). The third Swedish specimen, probably of Halland province, was known to Androshchuk only from a brief mention without a description (*Androshchuk 2014*, 352). Finally, two finds of single-edged swords classified as type F come from the Dublin-Kilmainham burial ground in Ireland (*Harrison – Ó Floinn 2014*, 81–82). Buried in the 9th century, these weapons are equipped with short and massive guards and with low pommels, one semi-round and the other triangular in front view. As such, these are also not typical examples of type F swords. Although among the weapons found outside Norway they are the closest to some specimens mentioned by Petersen, their hilts were probably made as imitations of early Carolingian swords (*Fig. 10*: h, i).

Since the introduction of Petersen's typology in 1919, type F swords have not been systematically studied. We are missing information on new finds with well-documented find contexts, and consequently we lack sufficient data to assess the chronology of this type. Still based on Petersen's traditional dating, type F is dated to the first half of the 9th century, i.e. to the beginning of the Viking Age. When Petersen attempted to date the type, he had virtually no swords at his disposal that could be clearly dated based on their archaeological context (by associated grave goods, etc.). The only assemblage that meets these standards comes from a grave in Sande in Sogn og Fjordane (*Fig. 10*: e) and within the evaluation of Scandinavian early medieval graves with weapons it was dated to the beginning of *Nordische Stufe V*, i.e. around the middle of the 8th century (*Norgård-Jørgensen 1999*, 150, 227, Abb. 115, Taf. 39:1). In several cases, type F swords were part of heterogeneous assemblages consisting of finds gathered from a single site (several disturbed graves with artefacts dating to periods either before or after the early Viking Age).

The Petersen type F thus seems to include a wide variety of swords, some of which are probably repairs of Carolingian hilts, and some of which can be imperfect local imitations of more luxurious weapons. Single-edged blades fitted with hilts with metal components


sword from Vlčí Pole
Type Schlingen
Petersen Type F
one sword
two or three swords
uncertainly classified
a
b
1
2
3
4
5
6
7
8
9
10-11
12-15
16
17
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33-34
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45(?)

imitating the hilts of double-edged swords (*spathae*) are typical for local production in the Norwegian milieu of the early Viking Age. The occurrence of type F swords remains virtually limited to the territory of Norway, and even there they were rare. Without a detailed revision of the Norwegian finds, it is not even possible to decide whether the type F can be regarded as an intentionally produced group of artefacts, or whether it is a group of randomly sorted swords of comparable shape originating from a broader chronological range.

Schlingen-type swords

Schlingen-type swords (*Stein 1967*, 9) have a low two-part upper hilt, with the pommel considerably shorter and narrower than the upper guard. In horizontal view, the pommel is usually rectangular, with the longer sides sometimes slightly convex (*Fig. 12*). When viewed from the front, the shape varies from rectangular to trapezoidal up to a low circular segment (the given details of the pommel shape are influenced by the state of preservation as well as the method of conservation and documentation). The lower and upper guards are relatively low and in horizontal view usually have a lenticular or sometimes long oval shape. Both parts of the upper hilt are attached directly to the tang. The hilts are almost exclusively undecorated; Stein mentioned only several exceptions: a sword from Rechberghausen (Baden-Württemberg) with bronze plating (*Stein 1967*, 286, Taf. 35: 2) and a sword from Marchtrenk (Upper Austria). The guards of this sword were equipped at their ends with rivets (generally unusual for Schlingen-type swords) whose heads were decorated with rings of a beaded wire (*Fig. 12*: e; *Stein 1967*, 374, Taf. 14 :1; *Hausmair 2006*, 48–56, Abb. 15, Taf. 8: 1). Stein also classified a find from Kreuzhof in Bavaria as a Schlingen-type sword; the bronze pommel in the shape of a low circular segment was decorated with embossed circles (*Fig. 12*: d; *Stein 1967*, 235, Taf. 13: 1). To date, this is the only known example of a sword assigned to the Schlingen type with a hilt component

Fig. 11. Spatial distribution of finds of both Petersen type F and Schlingen-type swords (a) and Schlingen-type swords (b): 1 – Vlčí Pole, Mladá Boleslav; 2 – Marchtrenk, Wels, grave 7 (*Hausmair 2006*); 3 – Trotsberg-Mögling, Traunstein; 4 – Schwarzach, Deggendorf, grave; 5 – Barbing-Kreuzhof, Regensburg, grave; 6 – Kelheim; 7 – Kirchheim am Ries, graves 298 and 324 (*Neuffer-Müller 1983*); 8 – Kleinsorheim, Nördlingen, grave; 9 – Mertingen, grave (*Trier 2002*); 10 – Gablingen, graves 67 and 69a (*Trier 2002*); 11 – Friedberg (Bayern), graves 3 and 16 (*Trier 2002*; *Sauer 2019*); 12 – Augsburg-Göggingen, grave 28 (*Trier 2002*); 13 – Bobingen, grave (*Trier 2002*); 14 – Kissing, grave (*Trier 2002*); 15 – Steindorf, Fürstenfeldbruck, grave '1961' (*Trier 2002*); 16 – Burggen, Schongau, grave; 17 – Schlingen, Kaufbeuren, grave B2; 18 – Giengen an der Brenz, grave 11 (*Paulsen – Schach-Dörges 1978*; *Sauer 2019*); 19 – Ostrach, Sigmaringen; 20 – Weingarten, grave 612 (*Roth – Theune 1995*); 21 – Öhningen, Konstanz, grave 13; 22 – Dornflingen, Schaffhausen; 23 – Lienheim, Waldshut, grave 16; 24 – Munzingen, Freiburg im Breisgau, grave 214 (*Groove 2001*); 25 – Fridingen an der Donau, graves 115 and 265 (*Schnurbein 1987*); 26 – Wurmlingen, Tuttlingen, grave; 27 – Buchheim, Stockach, burial mound; 28 – Sindelfingen, graves (*Ade 2010*); 29 – Weissach, Leonberg, grave 1; 30 – Stuttgart-Feuerbach, grave; 31 – Öffingen, Waiblingen, grave; 32 – Rechberghausen, Göppingen, grave; 33 – Heidelsheim, Bruchsal, grave; 34 – Oberderdingen-Strümpfeläcker, grave 71 (*Banghard 2009*); 35 – Reuchelheim, Karlstadt, grave; 36 – Bad Königshofen, Grabfeld, grave; 37 – Oberleuken, Merzig-Wadern; 38 – Virton (surroundings); 39 – Valkenburg, Limburg, grave 1 (*van Tongeren 2021*); 40 – Walsum, Dinslaken, graves 35 and 38 (*Stampfuß 1939*); 41 – Paderborn-Kiesgrube Siering, water find (*Westphal 2002*); 42 – Anderten, Burgdorf, grave (*Westphal 2002*); 43 – Zweeloo, Drenthe, grave 47 (*van Tongeren 2021*); 44 – Katwijk-Binnen, Zuid Holland, grave 30; 45 – Nitra, grave (*Štefanovičová 2005*, 256, Abb. 2; *Jócsik 2024*). Unless a reference to the source is given, the sword was included in the catalogue in the study by *Stein* (*1967*, 410, Taf. 101) (edited by J. Hošek and J. Košta).

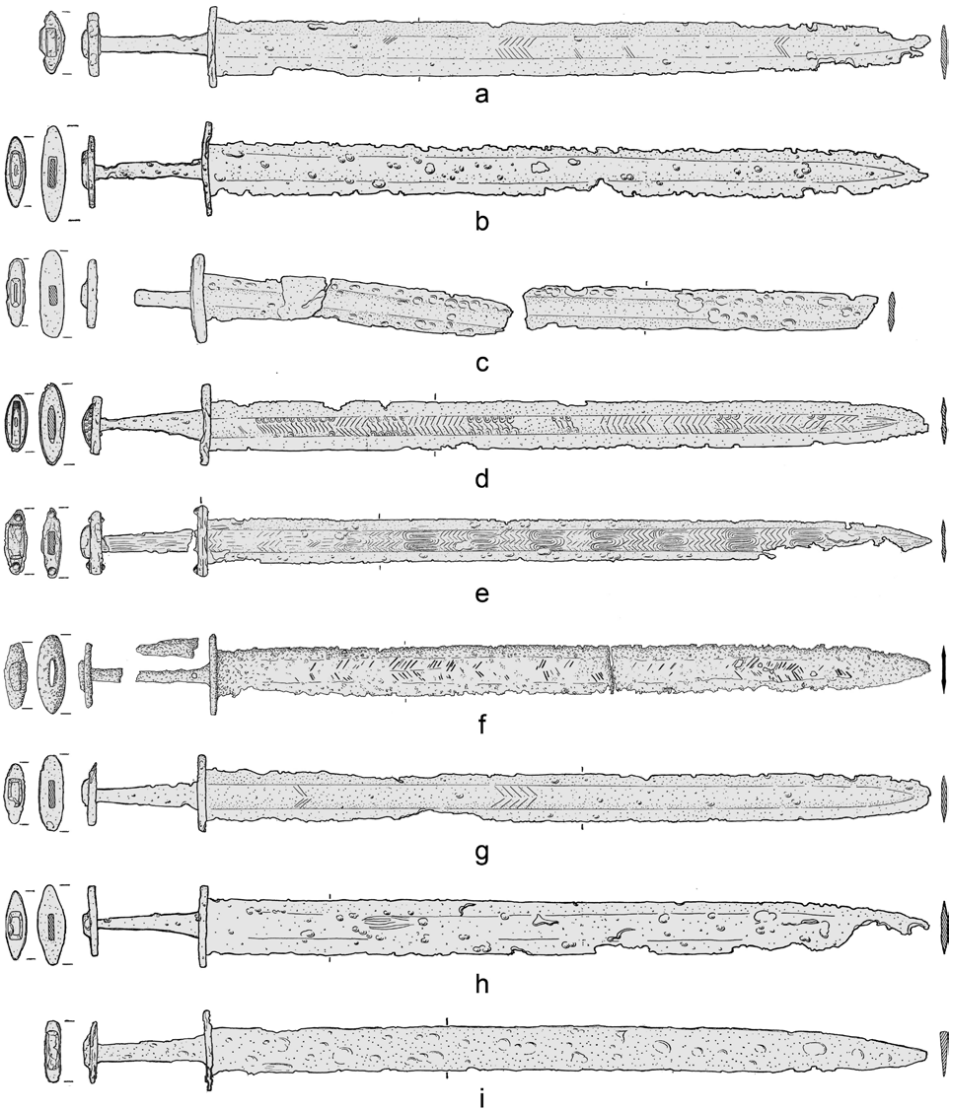


Fig. 12. Examples of Schlingen-type swords: a – Göggingen (*Stein 1967*, Tafel 10: 1); b – Heidelsheim (*Stein 1967*, Tafel 30: 1); c – Konigshofen (*Stein 1967*, Tafel 12: 1); d – Kreuzhof (*Stein 1967*, Tafel 13: 1); e – Marchtrenk (*Stein 1967*, Tafel 14: 1); f – Munzingen 214; g – Reuchelheim (*Stein 1967*, Tafel 19: 29); h – Stuttgart-Feuerbach (*Stein 1967*, Tafel 37:12); i – Finning-Westerschondorf (*Stein 1967*, Tafel 23: 10) (not to scale).

made of non-ferrous metal. The character of the blades corresponds to the Merovingian period *spathae* – the cutting edges run parallel, the fullers are shallow and wide (sometimes almost indistinct), and it is often possible to see surface pattern-welding consisting of various compositions of twisted or alternately twisted and untwisted panels (*Fig. 12*: a–h). Occasionally, the hilt of the Schlingen type was also applied to single-edged blades (e.g. the find from Finning-Westerschondorf, Bayern; see *Fig. 12*: i).

To date, finds of Schlingen-type swords have been systematically studied only by Stein, who also defined the type (*Stein 1967*, 9, 23–26, 104–110, 410, Taf. 101). We succeeded in identifying later examples particularly in southwest Germany, where the number of finds has more than doubled since the 1960s (e.g. *Neuffer-Müller 1983*; *Schnurbein 1987*; *Trier 2002*; *Ade 2010*; *Sauer 2019*). However, the overall distribution of Schlingen-type swords has not changed much since the definition of the type. Most of the swords were found in a distinct west-east strip of land stretching north of the Alps from the upper reaches of the Rhine to Upper Austria (*Fig. 11*). This roughly corresponds to the historical duchies of Alamannia and Bavaria. Towards the north, they usually do not appear beyond the valley of the lower Neckar and the ridge of the Franconian Jura; east of Regensburg, the Danube formed their northern boundary. The exceptions are two grave finds from the central Main basin: Reuchelheim (*Fig. 12*: g) and the more easterly situated Bad Königshofen near Schweinfurt that almost touches the border of Lower Franconia with Thuringia (*Stein 1967*, 234, 245, Taf. 12: 1, 19: 29). Schlingen-type swords are rarely documented in areas west of the middle course of the Rhine. Several finds are also known from northwestern Germany (Lower Rhineland and Westphalia) and the Netherlands (e.g. *Westphal 2002*; *van Tongeren 2021*; see *Fig. 11*).

The vast majority of Schlingen-type swords come from graves, often along with other grave goods, which improves the possibilities of dating based on the archaeological context. They belong to the very end of the Merovingian period, late Merovingian phase III (JM III; see *Ament 1976*; *1977*). Stein correctly distinguished that they represent the earliest type of late Merovingian swords with guards of solid iron, which appeared during the last third of the 7th century. They replaced swords with layered guards (i.e. consisting of layers of different materials; see *Menghin 1983*, 135–137). Swords of the Schlingen type became typical representatives of Stein's combination group A, defined mainly on the basis of war gear, especially the characteristic types of spears and shield bosses, which she dated between 680 and 710/20 AD (*Stein 1967*, 23–26, 104–110). Further research, based on the study of a much larger number of archaeological assemblages, has supported the dating of the Schlingen-type swords to the end of the Merovingian period. It has also made it possible to systematically examine their relationship to groups of other artefacts and features (belt sets, types of decoration, spurs, etc.).

The advent of the Schlingen type is associated with belt fittings decorated with honeycomb-patterned inlays or low variants of Walsum- and Göggingen-type shield bosses (summarised in *Brendle 2017*, 234–284; *Sauer 2019*, 138, 155–166, Beil. 4). It turns out that although the greatest development of the discussed swords dates back to the last quarter of the 7th century and the very beginning of the 8th century, they remained in circulation even in later times, when they were combined, for instance, with high-shaped shield bosses or wide chapes with pointed ends. The latter can be seen, for example, on the sword from grave 28 in Göggingen, which is similar in shape to the weapon from Vlčí Pole (*Fig. 12*: a; *Trier 2002*, 338–339). It is not certain whether swords of the Schlingen type disappeared completely before the end of the late Merovingian period, which essentially corresponds to the end of burials with weapons in most of southern Germany, but it seems that they were already in decline for most of the first half of the 8th century. Their remission before the middle of the 8th century is indicated by the fact that they do not occur along with objects typical of the early Carolingian period (e.g. artefacts decorated in the Tassilo Chalice style). In contrast to other swords of the end of the Merovingian period – the Niederram-

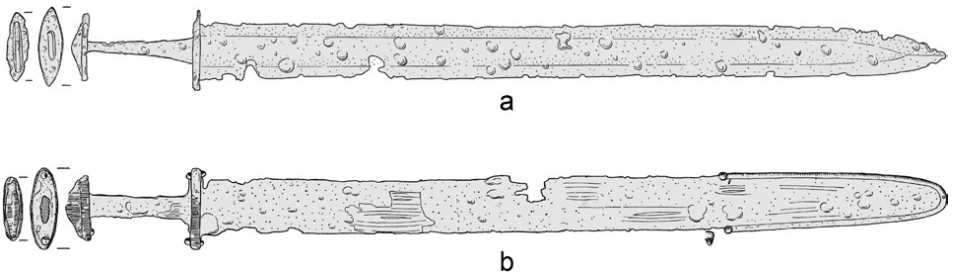


Fig. 13. Examples of swords of other types contemporary with the Schlingen type: a – Niederamstadt-Dettingen-Schwabmühlhausen-type sword from Wurmlingen (*Stein 1967*, Tafel 40:20); b – Haldenegg-type sword from Haldenegg (*Stein 1967*, Tafel 29: 18) (not to scale).

stadt-Dettingen-Schwabmühlhausen type with a low triangular pommel (*Fig. 13*: a) and the Haldenegg type with a low three-lobed pommel (*Fig. 13*: b) – the Schlingen type was not followed by the early Carolingian swords, whose origin is sought in the second third of the 8th century (*Stein 1967*, 9–11; *Menghin 1980*, 252–270, Abb. 26; *Geibig 1991*).

The predominant burial context of Schlingen-type swords raises the question of whether the distribution of the archaeological finds (*Fig. 11*) truly reflects their distribution in the past. In the core of the Merovingian realm, which extended over the areas west of the Rhine as well as in present-day France and Italy, it was no longer customary to bury weapons and war gear in graves at the time Schlingen-type swords were used. The burial rites in the Slavic regions, which were located northeast of the core area of Schlingen-type swords, also did not allow for the preservation of weapons. In the Netherlands and northwestern Germany, weapons were buried as grave goods in the late 7th and early 8th centuries, but double-edged swords (*spathae*) were almost completely absent (e.g., *Kleemann 2002*; *Westphal 2002*).

The only verifiable limit to their occurrence is to the east, towards the Avar cultural sphere, where long-bladed weapons made in the Avar tradition were widely used, while double-edged swords were rare. Worth mentioning is the late Merovingian spatha of the Niederramstadt-Dettingen-Schwabmühlhausen type found at the Avar-period burial ground of Želovce in Slovakia (*Čilinská 1973*, 23–24, 57, 199, Tab. XXII; *Hošek – Haramza 2018*). Another interesting find from the area east of Bohemia is a sword found, along with other late Merovingian finds, at a burial ground in the centre of Nitra, Slovakia. Unfortunately, a simple sketch is the only documentation of this (now probably lost) find. It suggests a hilt construction similar to the Schlingen type or its imitation, and a relatively short, probably single-edged(?) blade. Therefore, it is not possible to classify it with certainty (*Štefanovičová 2005*, 256, Abb. 2; *Jócsik 2024*). We also do not know of any Schlingen-type swords from Thuringia, although 8th-century swords with triangular pommels have been documented there (*Timpel – Spazier 2014*).

All in all, it can be summarised that the distribution of Schlingen-type swords may have originally extended beyond the area of their archaeological record, at least to the west, and that these swords may have been typical for the entire Frankish cultural sphere. Considering the specimen from Vlčí Pole, their occurrence near Bohemia is important, whether along the Upper Danube in the Principality of Bavaria or near the middle Main, through which an important route led to the Ohře River basin.

We consider the sword from Vlčí Pole to be a typical representative of Schlingen-type swords. In addition to the main features, it is similar to swords of this type in a number of details, which include the shape and low height of components of the hilt, the very small dimensions of the pommel compared to the size of the upper guard, the shape of the blade with parallel cutting edges, and the use of surface pattern-welding. Besides the formal features, this determination is also supported by the small distance between Bohemia and the core area of Schlingen-type swords (see *Fig. 11*).

Decoration and construction of the blade

A detailed X-ray CT examination of the sword revealed that the blade has cutting edges welded onto a central part consisting of a plain core to which three-row pattern-welded panels (with rods twisted in the ZSZ scheme) were attached from either side (*Fig. 3*: b; *Fig. 9*). The blade can therefore be classified as the E-C3$(PW3)_{III}$ construction type as defined by *Hošek et al.* (*2021*, 16–18). The construction of the blade, with the cutting edges welded onto a middle portion, corresponds to the long-standing traditions of bladesmithing. Pattern-welded blades also enjoyed long-term popularity, but the time of the appearance of Schlingen-type swords was a turning point, after which this popularity began to wane. It is also a period in which we can still see a continuation of the long-term trend towards the less frequent use of pattern-welded blades with a non-pattern-welded core between the cutting edges (i.e. E-C3(PW3) blades according *Hošek et al. 2021*, 28–33). It seems that about a third of the patterned blades of the time had such a core, but then their popularity began to increase significantly. Non-patterned blades were then generally in the minority, but their actual proportion may have varied from place to place. For example, their incidence was relatively higher in the southern part of Germany compared to the northern part (*Westphal 2002*, 165–167, 268). The majority of such blades that may have been in circulation at the same time as the Schlingen swords were either of the type with cutting edges welded to a plain core, or were made from a single piece of metal. Unfortunately, in most cases it is difficult to reliably distinguish between the two constructions, when they were assessed only by X-ray CT (see *Stelzner 2016*, 107–109, 204–206).

Hardening of at least one of the cutting edges by quenching was evidenced by transverse cracks (see *Fig. 14*) documented by X-radiography in the place of the more significant bend of the blade. This was subsequently confirmed by metallography. No other cracks were observed in the softer material of the core or the other cutting edge in the bent section.

Metallography confirmed the quench hardening of cutting edges and revealed that they were made of a single steel piece, i.e. no combination of iron and steel in one of the construction systems was used. However, it is not possible to have a meaningful discussion of the cutting-edge construction or the heat treatment of the blade, as there are only a few metallographically examined swords from the period in question. Nevertheless, the vast majority of the edges were made from just a single piece of metal in this period, although surface pattern-welded blades may have cutting edges of their own construction (usually a sandwich construction). It seems that the first half of the 8th century was the turning point, after which blades with edges made from a single piece of steel subjected to quench hardening began to dominate in Europe.

The shape of the blade and the use of pattern welding are consistent with dating the sword to the late Merovingian period, although the combination of pattern-welded surface

Fig. 14. X-ray image showing cracks in the cutting edge in the section where the blade is bent (by J. Hošek).

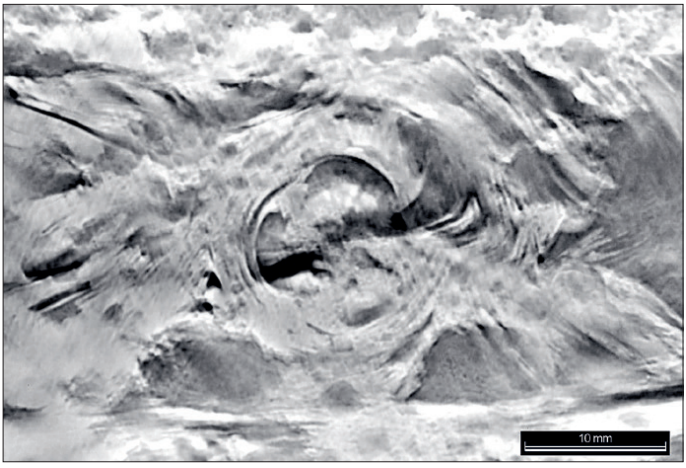


Fig. 15. X-ray CT section showing the detail of the blade with the circular mark (by J. Hošek).

panels with a plain core does not rule out production in later centuries. However, the presence of a single circular mark may raise questions (*Fig. 15*). Contemporary evidence suggests that the popularity of the use of pattern-welded composite marks gained ground at the beginning of the Carolingian period, during which pattern welding of blades gradually declined and was replaced by the application of marks. The use of simple symbols and their simultaneous appearance with pattern welding (generally *Hošek et al. 2021*, 109–112) is characteristic of the early stage of the development of Carolingian marks; we can also see this feature on the sword from Vlčí Pole. The question arises as to whether and to what extent the massive quantitative and qualitative development of marks from the second half of the 8th century was a continuation of earlier development.

Simple marks, including the symbol of an open circle, have been found on Merovingian swords dated already to the 6th century, even though the number of known finds is relatively small. In the region of southern Germany, from where the sword in question is thought to have originated, blades decorated with marks from pattern-welded composites were in circulation (summarised in *Westphal 2002*, 158–159, 166). In the Merovingian period, marks

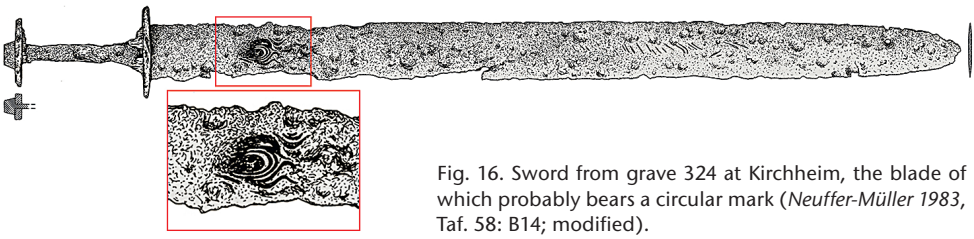


Fig. 16. Sword from grave 324 at Kirchheim, the blade of which probably bears a circular mark (*Neuffer-Müller 1983*, Taf. 58: B14; modified).

were usually applied to fullers of pattern-welded blades (which dominated at the time), i.e. on patterned backgrounds. However, marks applied to a patterned surface are difficult to detect using standard 2D radiography, because the projections of both patterned sides of a blade overlap in the resulting image. X-ray CT examination is therefore more suitable for documenting such blades, as in the case of the sword from Vlčí Pole. X-ray CT was used, for example, to identify an almost identical mark in the shape of an open circle on the pattern-welded blade of a sword from grave 11 at Dortmund-Asseln dated to the last third of the 6th century AD (*Lehman 2016*, 158, 395–396, fig. 166). Traces of a simple mark are most likely to be found on another Schlingen-type sword from grave 324 at the Kirchheim burial ground (*Fig. 16*; *Neuffer-Müller 1983*, 171, Tafel 58). Simple marks could therefore have appeared on pattern-welded blades before the early Carolingian period, from which marks are recorded already as a standard element of blade decoration, and even before the end of the Merovingian period, to which the sword from Vlčí Pole is typologically dated.

Discussion – the find in the context of pre-Přemyslid Bohemia

Based on the typological assessment, the sword from Vlčí Pole was identified as a weapon of Frankish, Alamanic, or Bavarian provenance from the late Merovingian period. In southern Germany, where most of the finds come from, such weapons occurred in the last third of the 7th century and disappeared from the material culture before the mid-8th century. We have pointed out that the presence of a simple mark on a pattern-welded blade cannot be taken as a reliable indicator of a relatively later dating, although the number of known signed blades increased significantly from the early Carolingian period onwards. It is of course possible that a long period of time could have passed between the production of the sword and the events that ended its use. In areas on the periphery of the occurrence of such prestigious products, where they represented a valuable import, much less cultural pressure can be assumed for their replacement induced by western European fashion trends. An example of such processes can be the atypical, most likely later modified swords found without a metal pommel and guards in exceptionally rich graves 55 and 120 at Stará Kouřim. These swords were, according to the grave goods and the context, deposited during the first half or rather the first two-thirds of the 9th century (*Košta – Hošek 2012*; *Hošek – Košta 2013*; *Hošek et al. 2019*, 125–126; *2021*, 101–102, 252–253). On the other hand, Schlingen-type *spathae* are no longer found in graves of the Great Moravian period, which began at the latest in the early 9th century. We can therefore assume that the sword from Vlčí Pole reached Bohemia in the late 7th or 8th century.

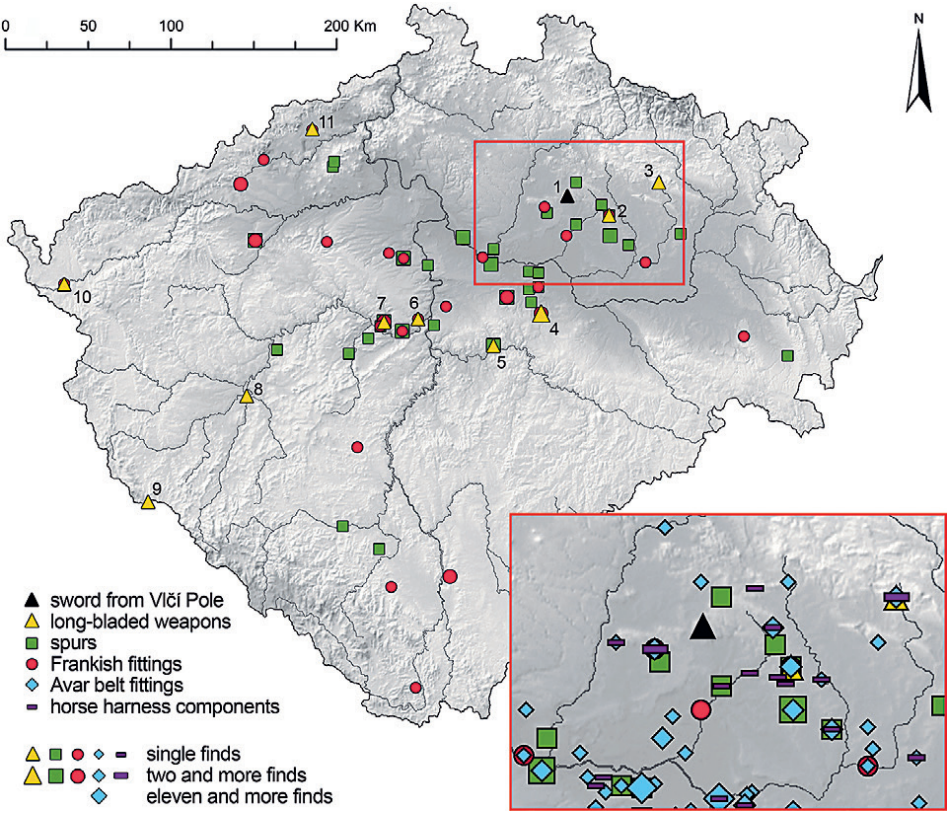


Fig. 17. Finds of long-bladed weapons or their parts, spurs and Carolingian fittings from the late 7th to the mid-9th century in Bohemia. 1 – Vlčí Pole, double-edged sword, Schlingen type; 2 – Češov, seax (?), lost (*Profantová 2012*, 315); 3 – Kal-Valy, pointed part of slender blade (*Kalferst – Profantová 1999*, fig. 8: 18; *Profantová 2023*, 27, fig. 5: 7); 4 – Kouřim – Stará Kouřim, two double-edged swords without a hilt, one long with asymmetrically set tang from grave 55, the other with a later shortened pattern-welded blade from grave 120 (*Hošek – Košta – Žákovský 2019*; *2021*); 5 – Senohraby, guard of a sabre (*Profantová – Hasil in print*); 6 – Kosoř, pointed part of a double-edged (?) sword blade (*Profantová 2017*, fig. 4: 19; *Profantová – Hasil in print*); 7 – Svatý Jan pod Skalou, inlaid crossguard of a sword (*Profantová – Hasil in print*); 8 – Plzeň-Doudlevce, double-edged sword, type Immenstedt/Petersen B (*Hošek et al. 2019*; *2021*); 9 – Horní Folmava, long seax (*Profantová 2020*); 10 – Jindřichov u Chebu, long seax (*Hasil 2018*, 180–191; *2019*); 11 – Teplice region?, long seax (*Hošek et al. 2021*, 18).

The sword is an isolated find; no other archaeological artefacts were found during subsequent archaeological investigation of the site. There is no evidence of either settlement or burial activity in the immediate vicinity that would correspond to the dating of the sword (i.e. early medieval). Although the circumstances under which the use of the sword ended remain unclear, the wider archaeological and geographical context can shed some light on the matter.

The site where the sword was discovered is located at the western edge of the north-eastern Bohemian concentration of pre-Přemyslid finds (i.e. from the late 7th – mid-9th century), which attests to the presence of warriors or cavalrymen (*Fig. 17*; *Fig. 18*). Such evidence of upper classes includes a number of finds that unfortunately almost exclusively lack

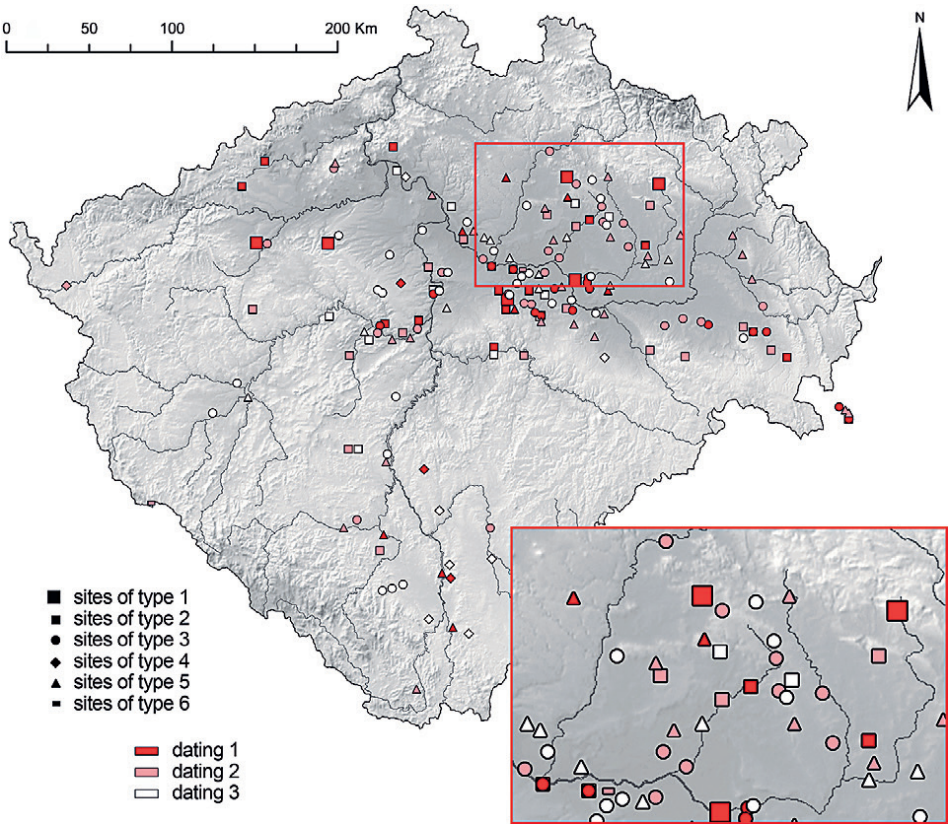


Fig. 18. Sites of the pre-Přemyslid period reconstructed on the basis of the corpus of significant metal artefacts: 1 – agglomerations with a central function, usually in elevated or otherwise specific locations; 2 – hillforts/elevated sites or finds from their narrow spatial context; 3 – finds from areas with conventional evidence of settlement activity; 4 – sites with burial activity; 5 – finds of metal artefacts outside the areas with conventional evidence of settlement activity, i.e. hypothetically lost items, hoards or new evidence of settlements; 6 – reliable evidence of hoards; points in red – finds of artefacts dating from the late 7th to mid-8th century; pink – finds generally dated to the 8th century and first half of the 9th century; white – finds from the second half of the 8th and the first half of the 9th century (according to *Hasil et al. 2020*, modified and supplemented).

a clear archaeological context: hook spurs, cast fittings of belts and horse harnesses made in the late Avar style, and less frequent finds of late Merovingian or early Carolingian fittings (*Hasil et al. 2020*; *Hasil – Profantová in print*). The intensity of settlement in the region is evidenced by the network of sites known from the conventional archaeological record, which is based mainly on finds of pottery fragments (*Hasil et al. 2020*, fig. 8). This concentration of objects is also accompanied by fortified or hilltop settlements with a presumably central, refuge or guard function, dating back to the Early Hillfort period (approximately from the late 7th to the early 9th century; summarised in *Čtverák et al 2003*; *Profantová 2016*). The discussed area was located mainly in the Jičín region, in the basin of the Cidlina and Mrlina rivers. It was bordered in the north by the hillforts of Kal-Valy and Vesec u Sobotky – Poráň, in the west by Chlum Ridge in Jizera River basin, and in

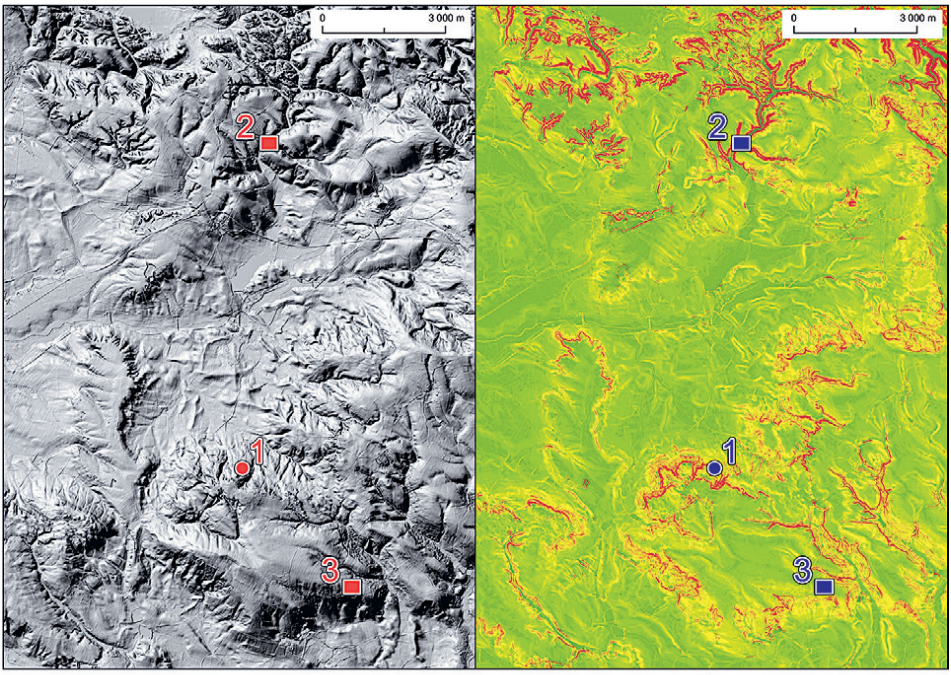
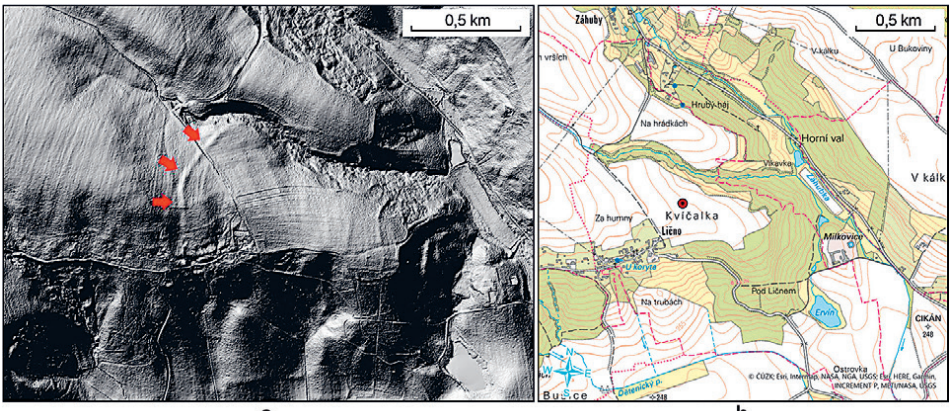


Fig. 19. Terrain relief of the area where the sword was found: a – shaded landscape relief (Z-factor 10); b – slope gradient; 1 – site of sword discovery; 2 – the early medieval hillfort of Poráň near Vesec u Sobotky; 3 – the undated hillfort of Lično-Kvíčalka (©ČUZK, digital relief model DMR 5G).

the south by the most significant area with evidence of important centres and significant metal artefacts of the Early Hillfort period in Bohemia, which spread along the Elbe in central-eastern Bohemia, especially in the area of the Kolín and Nymburk districts.

The site of the discovery lies on the northern slope of the terrain block, which is bounded by steep slopes above watercourses. This part of the Jičíněves Upland is characterised by a slightly undulating plateau (Markvartice Plateau), which rises 100–150 metres above the surrounding landscape and is bordered for most of its extent by ravines and furrowed valleys formed by a number of small watercourses. The summit plateau consists of a larger southeastern part with the highest point Kopanina (374 MASL) and a smaller northwestern part known as Hladoměř (377 MASL). From the summit of Hladoměř, on whose northern terraced slope the sword was found, it was possible to control the important pass between the Petkovy Plateau and the eastern edge of the Chlum Ridge to the west and the Markvartice Plateau to the east (*Fig. 19*).

The plateau is situated on a local watershed between two tributaries of the Elbe – the streams on its eastern and southern sides flow into the Mrlina River, which flows into the Elbe at Nymburk, while from the north and northwest the plateau is bounded by watercourses that flow into the Klenice River, which empties into the Jizera River in Mladá Boleslav (*Demek – Mackovčin et al. 2006*). A south-northern route could pass through this landscape, connecting the Elbe with the Poráň hillfort near Vesec u Sobotky, which is situ-



a b

Fig. 20. Líčno-Kvíčalka hillfort: a – location of the site (©ČUZK, ZTM10); b – shaded landscape relief (©ČUZK, DMR 5G, Z-factor 10), red arrows indicate the course of the fortification (supplemented by R. Novák).

ated 8 km north of the place where the sword was found. Poráň hillfort is the closest site, which is assumed to have had a central function in the Early Hillfort period (summarised in *Čtverák et al. 2003*, 338–339; *Profantová – Waldhauser 2007*). Another west-east route could have passed through the area along the Chlum Ridge to the surroundings of Jičín. Remnants of a fortification of an unknown dating were also identified on the promontory at Líčno-Kvíčalka, situated at the southeastern edge of the plateau 4 km from the place where the sword was found. Nonetheless, its possible early medieval dating will have to be confirmed by further research (*Fig. 20*; *Novák 2024*).

The archaeological survey did not yield any evidence of the deliberate deposition of the sword, and a burial context is highly unlikely. Evidence of burials is very rare in the Early Hillfort period and is limited to cremation burials in mounds documented in some Bohemian regions, including Northeast Bohemia. Close barrow burial grounds are known from Bojetice and Vinařice on the Chlum Ridge, from Prachov Rocks, Nadslav and Mužský-Hrázka (*Hejhal et al. 2023*; *Lutovský et al. 2023*, 258, 273, 277–279, 288). Cremation burials in these mounds were generally very poor in finds and war gear is almost absent. This notion has been modified to some extent by recent metal-detector surveys in southern Bohemia, during which exclusive metal clothing accessories were found in the subsurface layers or immediate vicinity of some large mounds (*John – Ciglbauer 2023*). However, the deposition of these types of artefacts, for which we have no evidence in Northwest Bohemia so far, cannot be considered a general phenomenon (*Lutovský 2023*, 47). The improbability of the burial context of the sword is underlined by the fact that neither human remains nor surface traces of burial mounds have been documented in its vicinity.

The most likely answer to the question of why the sword was found there lies in the aforementioned strategic importance of Hladoměř, where we can assume the existence of an (archaeologically unrecognised) guard point. The sword found just below the surface on the northern slope of the hill could then be seen as evidence of combat, whether it was lost directly at the site or was carried there by erosion from the edge of the slope.

Finds of weapons are rare in contexts of the late 6th to the mid-9th century Bohemia, when the inhumation burial rite, accompanied in the earlier stage by a variety of grave

goods, began to spread.[3] So far, only a few, mostly typologically insignificant sword fragments could be assigned to the 7th and 8th centuries (see *Fig. 17* with references to publications of individual finds). For this period, the connection with the late Avar milieu is evidenced by the increasing number of finds of decorative fittings of warrior belts, the suspension system of which was originally designed for Avar weapons. The only find of a sabre crossbar comes from a hilltop site near Senohraby in the Prague-East district (*Profantová et al. in print*; *Profantová – Hasil in print*). As far as long-bladed weapons of western origin are concerned, there are two weapons recorded from Bohemia which hypothetically do not rule out a dating to the 8th century, but could also have been deposited/lost or even made in the early 9th century. Apart from a sword of the Immenstedt type (Petersen type B) from Plzeň-Doudlevce, to which we find close parallels in Austria and at the Great Moravian stronghold of Břeclav-Pohansko (*Hošek et al. 2019*, 205–206, plate III:a; *2021*, 118, 284–285), there is also a newly found inlaid crossguard from Svatý Jan pod Skalou (*Profantová – Hasil in print*). It is also worth mentioning the finds of long seaxes from the western peripheries of Bohemia (Jindřichov u Chebu, Horní Folmava, and perhaps a specimen without an archaeological context held in the Regional Museum in Teplice; *Fig. 17*). Although the finds of seaxes, at least those from Folmava near the Vyšší Brod Pass, indicate contacts between Bavaria and Bohemia (*Hasil 2019*; *Profantová 2020*), they cannot be taken as evidence of the penetration of these weapons into the local cultural milieu. However, the proof of the use of seaxes is complicated, as fragments of these weapons, their straps, and sheaths are not sufficiently morphologically conclusive. On the other hand, the use of *spathae* in pre-Přemyslid Bohemia is repeatedly proven by rare finds of characteristic fittings of sword-belt sets, which, based on stylistic assessment, can usually be dated to the Carolingian period.

In the 8th and early 9th centuries, more frequently than prestigious weapons and parts of their belts we encounter equestrian equipment, especially hook spurs and horse harness fittings. Not only these groups of artefacts, but also the beginning of the construction of hillforts, clearly testify to the growing importance of mounted warriors, who formed the elite of early medieval Bohemia.[4] Their equipment shows a dominant orientation toward western militaria (most of the weapons, spurs), which can be proven already deep in the pre-Přemyslid era. On the other hand, there is also a strong influence of late Avar fashion manifested not only in horse harnesses, but especially in the variability of decorative belt fittings. Their popularity in Bohemia clearly stems from the Avar warriors. The dominance of single finds unfortunately mostly does not allow a reconstruction of the detailed arrangement of individual belts. Typical warrior equipment, corresponding to the aforementioned spectrum of finds, is best represented by the famous find from Hohenberg (Styria, Austria) featuring a luxurious early Carolingian sword and a belt set in the late Avar style

[3] The description, detailed analysis, and evaluation of war gear and other significant metal finds from pre-Přemyslid Bohemia is the subject of a study by *Profantová – Hasil in print*.

[4] To highlight the sites where significant metal artefacts chronologically close to the sword were found, we have attempted in *Fig. 18* to distinguish sites with finds dating approximately from the late 7th to mid-8th centuries (late Merovingian period and late Avar period I-II finds) from those containing only late Avar period III-IV and early Carolingian finds, as well as finds from the early stage of the Carolingian plant style, i.e. dating from the second half of the 8th century and the early 9th century. Sites with finds dated only generally to the 8th and the first half of the 9th century are displayed separately.

(*Nowotny 2005*). A similar find with a seax from Grabelsdorf (Carinthia, Austria) indicates a lower social status and therefore a higher incidence of this phenomenon (*Szameit – Stadler 1993*; *Eichert 2010*, 112–113, 121–122, Taf. 17–18). Examples from Bohemia and Carantania suggest that the described way of adopting cultural patterns may have been more widespread in areas where Avar and Frankish influences overlapped.

Conclusion

The sword from Vlčí Pole was identified as a typical representative of the Schlingen type from the end of the late Merovingian period. It was found to the northeast of the main concentration of finds of these swords, which are known mainly from Alamanic and Bavarian burial grounds in southern Germany. Within the typological assessment, we updated our knowledge of Schlingen-type swords, which have not been the focus of scholarly attention since their definition by Stein. The addition of new finds and the incorporation of later dating perspectives has not brought about a fundamental change in the view of the sword type under discussion; we date its occurrence to the late 7th and early 8th century, with a possible overlap to the middle of this period.

Archaeometric analysis of the sword blade revealed pattern-welded surface panels and welded-on cutting edges made of high-carbon steel hardened by quenching. Pattern-welded swords dominated at the time. At the end of the Merovingian period, the construction of blades with pattern-welded surface panels was less frequent compared to the variant with a fully pattern-welded middle portion but was gradually becoming the standard. The first half of the 8th century was most likely the turning point after which blades with edges of steel subjected to quench hardening eventually outnumbered the blades with iron edges. What is important is the identification of the simple circular mark on the blade. The application of the marks to sword blades is recorded to a greater extent from the early Carolingian period, i.e. from approximately the second half of the 8th century, but new research suggests that their occurrence may have been more frequent in the Merovingian period as well. Small marks applied to blades decorated with surface pattern welding may have been reliably recognised only when X-ray computed tomography was used. In summary, we can conclude that the sword from Vlčí Pole had a high-quality blade for its time and must have been a valuable weapon despite its simple hilt design.

It is quite possible that the sword from Vlčí Pole entered the society of the forming Bohemian elite as a valuable western import and reached the place of discovery during some local conflict. Of course, we cannot rule out the possibility that it was brought there by foreign forces. The absence of written sources and the weakness of the late Merovingian Frankish realm speak against a large-scale military campaign; less improbable is a smaller military intervention, which could be carried out, for example, by Bavarian elites or a skirmish of small armed groups, like merchant or diplomatic expeditions. In any case, the specific events surrounding the end of the life of this weapon, which is extraordinary in the Czech context, will remain shrouded in a fog of uncertainty.

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