

Austro-Prussian War of 1866, Landscape Archaeology of the Battlefield of Sadowa-Königgrätz

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The article attempts to present current results of landscape archaeology concerning a military conflict between Prussia and Austria in the summer of 1866 near Hradec Králové (Sadowa/Königgrätz). The aim is to introduce the possibilities of analysing individual available sources using the methods of battlefield archaeology, which is a sub-discipline of post-medieval archaeology. The historical period in question is not only a regional issue. This topic is mainly important with regard to protection of constantly endangered war relics, whose number in East Bohemia has been increasing in the past decade. The knowledge acquired from systematic and rescue excavations conducted in various parts of battlefields in the territory of Hradec Králové region demands new analysis to be appropriately evaluated and interpreted. The primary processing and treatment of finds are equally important as their spatial information and a successful setting into the chronological frame of well-known historical events. Archaeological knowledge thus sheds a new light on these events. The paper presents basic research topics and methods, to which increased attention is currently being paid within the context of archaeological sites. All of them use a wider view of the 1866 historical landscape, which was not distinctly modified for the purpose of military operations, but on the contrary significantly influenced their course and sequence. In order to properly interpret the acquired spatial data, it is necessary to reconstruct this historical landscape and to define the form of various activities which took place there during the war.

KEYWORDS: Battlefield archaeology, landscape archaeology, Austro-Prussian War of 1866, 1866 War archaeology

INTRODUCTION

The Austro-Prussian War of 1866 was an important milestone for Europe. The Habsburg Monarchy fought an almost existential battle with the Kingdom of Prussia

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and this battle did not take place only in Bohemia. The Austrian Army faced the Italian enemy on the southern front all alone because the allies (Hanover, Bavaria, Saxony) were defeated with lightning speed by the Prussians in Central Germany. The final decision about supremacy in Central Europe and about the future of the German Confederation was thus meant to be made in the territory of the Czech lands. The Prussians wanted to make the enemy surrender by a fast advance to Vienna with separated armies in order to win supremacy in Europe. The Austrian Northern Army numbered 240,000 men. Its troops massed near Olomouc and in June they set out for a flanking march to Bohemia against three Prussian armies. The largest Prussian II Army Corps numbered 115,000 men who were meant to enter the territory of the Monarchy through Silesia. The smaller I Army Corps with 100,000 men advanced forward from North Bohemia, being supported by the Elbe Army (40,000 men). After the initial battles of the war, Austrian forces suffered a series of grave defeats which led all armies to the ultimate battle nearby the river Elbe in the neighbourhood of Hradec Králové (Wawro 1996).

The landscape archaeology of the Austro-Prussian War of 1866 is still a novelty among the topics of battlefield archaeology. Archaeologists in the Czech Republic usually concentrate on battlefields from the 15th to the 18th centuries (Krajč *et al.*, 2017). The origins of the archaeological study of modern battlefields date back to the early 20th century, but large-scale and systematic excavations have been conducted since the 1980s, using a wide spectrum of modern methods to this day (Matoušek 2017; Preusz 2019). The development of conflict archaeology thus continues, including a variegated spectrum of new research questions with clearly defined objectives and frequently presented results (Matoušek and Sýkora 2018). For example, in East Bohemia we can now see a solid basis for the scientific and rescue research tradition concerning the Austro-Prussian conflicts, which seriously affected the surrounding landscape already in the 18th century (Drnovský *et al.*, 2020; 2021; Drnovský and Průchová 2021).

The relics of the 1866 War remained almost neglected by archaeologists in the 1990s. Most frequent were finds of war graves, whose intensity has been constantly increasing since 2003 and the graves are usually explored within rescue research (Holas 2017). The theme of archaeological exploration of the 1866 War relics, not only with destructive methods, was for the first time comprehensively published in 2019 (Holas 2019). The battlefield landscape research has so far paid most attention to defunct field fortifications of the Austrian artillery near Hradec Králové (Hejhal and Holas 2018). However, the scientific research projects¹ for students, offered by

¹ Name of the project: *The survey of battlefields from the Austro-Prussian War of 1866 in the territory of Hradec Králové region.*

the Philosophical Faculty of the University of Hradec Králové, extended the research interest also to other battlefield sites in East Bohemia. The following text therefore summarises the present knowledge and results of non-destructive analyses, reconstructions of historical landscape or partly destructive detector surveys, which will be paid more attention to in the future.

METHODS

The principal method of studying a battlefield is the traditional military terrain analysis, the so-called KOCOА, which is mostly used by researchers in the USA. KOCOА is an acronym which stands for Key Terrain, Obstacles, Cover and Concealment, Observation and Fields of Fire, and Avenues of Approach and Retreat. The methods of this analysis are also used within the American Battlefield Trust's programme for protection of battlefields from the American Revolutionary War (1775–1783), bringing new information by interlinking historical, cartographic and archaeological sources. In order to define a modern battlefield, the analysis uses landscape aspects which influenced the historical event in the past and enable the better definition of the battlefield today (Maio *et al.*, 2013).

All acquired spatial data were processed in the ArcMap 10.2 software, which offers possibilities and tools for their analysis and virtual visualisation. An important tool in reconstruction of historical landscape were always the current LiDAR data, which were purchased from the Czech Office for Surveying, Mapping and Cadastre within the above-mentioned student project of specific research. The possibilities of using these data of course depend on the type of the studied site and the extent of its recent transformation into the present-day form. Therefore it is always necessary to first determine the degree of usability of LiDAR data in the issues of reconstruction of an almost recent appearance of the landscape and thereby prevent inaccurate results. The digital elevation model helped to better interpret particular historical source maps and to integrate into them e.g., the simple viewshed analysis. The resulting visualisation of 3D models was made in the ArcScene 10.2 software.

The main cartographic sources which were chosen for the analysis were the Imperial Obligatory Imprints of the Stable Cadastre (1840–1841, scale 1:2880) and maps of the Second Military Survey (1851–1852, scale 1:28 800). In order to make a reconstruction of the historical landscape, these main sources were supplemented by various maps from works of military character in the form of memoirs or chronicles of military units. The newly created maps of reconstructed landscape were subsequently analysed using the above-mentioned KOCOА method, which followed

up leading elements in the landscape and used them as a base for spatial evaluation of various historical activities. Basic elements of the analysis include the study of unpaved roads in the area of the battlefield, which considerably influenced the access of individual military units, above all artillery, to particular firing positions. The same roads were also used for fast movements, changes of firing positions or withdrawal from the fighting lines. Distinct landmarks provided for a good view of the enemy and an ideal field of fire. Uneven terrain enabled a concealed movement out of the enemy's sight and thereby also a decrease in the efficiency of his firing. The movements of troops may have been hindered by various obstacles, mostly natural barriers in the form of watercourses or waterlogged meadows or floodplains in their neighbourhood.

The mentioned study involves a gradual exploration of available historical sources, such as official documents from the bureaus of general staffs. The Prussian Staff published an official statement one year after the war and the Austrian Staff another one year later. The texts were certainly written with a clear primary intent. However, they play an important role in the given topic, because many authors used them as a source of information. Nevertheless, particular events were described much more accurately in the above-mentioned memoirs and chronicles of individual military units, which included very exact descriptions of battlefields. Comprehensive works as well as isolated studies on particular military episodes were then gradually elaborated in the course of time. Worth mentioning is a study on the fighting in the Svíb Forest, where about four thousand men were killed and another seven thousand were left behind injured (Fig. 1). In 1902, the author of the study Ernst Heidrich combined the memoirs of all troops fighting in this legendary episode of the Battle of Hradec Králové and described the events in the forest minute by minute. His work shows how accurately we can follow up the history of this war and reconstruct the course of events.

ANALYSIS OF HISTORICAL LANDSCAPE

In the following text, two locations on the battlefield near Hradec Králové will be presented, which were investigated by destructive and non-destructive research with a reconstruction of the war landscape from the past. The first of them is the reconstruction of the wooded location of the Svíb Forest [Swiep] (Fig. 1:1), which is located on the Hradec Králové battlefield and is a complete novelty within the topic of archaeology of the 1866 War.

In historical sources, the fight in this forest is often considered a synonym of the whole Battle of Hradec Králové and the main reason why Austrian forces did not

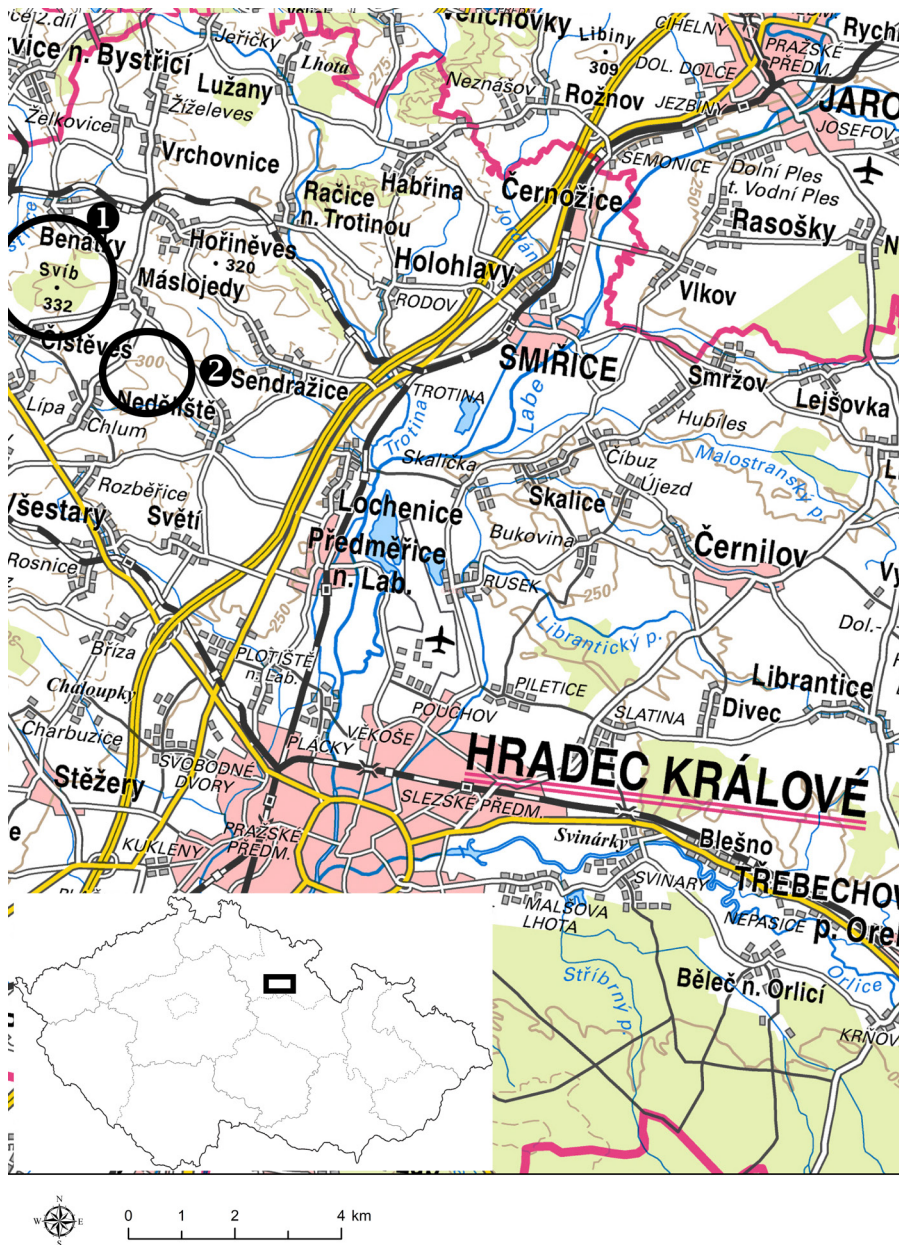


Fig. 1. Hradec Králové region. 1 – Svib Forest; 2 – fortified point No. 3. Source: base maps ZM50 from the Czech Office for Surveying, Mapping and Cadastre (ČZÚK). Map created by the author.

keep the advantageous defensive position near Chlum [Chlum]. However, historians never paid attention to details of this event, although the conditions of individual forest plots decisively influenced the fight in the forest.

The investigation of the second location (Fig. 1:2) focused on the evaluation of the previously known information about a specific fortified point at Chlum, which was supposed to stop the advance of the Prussians.

It may have been considered a key strongpoint in the planned linear route, but its role on the day of the battle was different. The neighbourhood of this strongpoint became the venue for only a partial episode of the Battle of Hradec Králové, but its outcome opened the Prussians a way to the centre of the Austrian position at Chlum and decided the result of the whole battle.

SVÍB FOREST FROM THE PERSPECTIVE OF LANDSCAPE ARCHAEOLOGY

On the last day of June of the war year, all Austrian forces began a rapid retreat to the Elbe to the areas near the Hradec Králové fortress. Both the military units that had lost the previous battles in the part of the front near Jizera River at Mnichovo Hradiště [Münchengrätz] or Jičín [Jičín] and those that had lost the clashes at Trutnov [Trautenau], Náchod [Nachod/Wysokow] or Česká Skalice [Skalitz] retreated to these places. The decisive Battle of Hradec Králové, which is also referred to as one of the twenty most important battles in the world, was approaching (Mitchell and Creasy 1964). Its result later sealed the entire course of the war and enabled Prussia to lead further battles for the final unification of Germany. The battle later became known as the largest field clash in the history of the Czech Republic.

The Austrian Supreme Command chose the central position for them on an elevated place near Chlum with a view to the northwest into the valley of the swollen river Bystřice [Bystric], from where the Prussian 1st Army had advanced forward. Although the Prussian Elbe Army lagged behind in its advance, it later occupied the Austrian left wing near Probluz [Problus] and Horní Přím [Ober Přim] all day long. But the above-mentioned Prussian 2nd Army together with a Guards Division already approached the battlefield from the north. They were encouraged by previous success and marched quickly without baggage, so that they reached the battlefield just in time to support the advance to the river Bystřice by attacking the right side of the Austrian position (K. k. Generalstabs-Bureau für Kriegs-Geschichte 1868: 275–286; Strobl 1903: 34–47).

The Austrian IV Army Corps was deployed by the Supreme Command to places to which the Prussian 2nd Army was heading. Following the instructions of the command, the corps positioned itself in the prepared field fortifications between the

villages of Nedělišťe [Nedělišť] and Chlum. These trenches for riflemen and mainly for artillery were dug here on the previous day upon instructions of the commander of the Engineer Corps, Colonel von Pidoll. But the front guards of the corps were already in contact and in severe combat with the Prussian 7th Division in the Svíb Forest. This made the commander of the Austrian corps deploy his men to a rise in terrain near Máslojedy [Maslowěd] and thereby in fact force the neighbouring II Army Corps to do the same (K. k. Generalstabs-Bureau für Kriegs-Geschichte 1868: 266). The forest extends on a rugged ridge running from Máslojedy in western direction to the valley of the river Bystřice. The following text will thus attempt to present new information acquired by the reconstruction of its original appearance in 1866, which is very different from that of the present-day terrain. The result was also achieved by studying relevant sources concerning the effective defence of Prussian soldiers in forest plots, where they managed to resist for a certain time despite being outnumbered four times by the Austrians.

Of great importance for the reconstruction of the forest is also the information on its appearance after the day of the clash. Judging from the mentioned numbers, the Austrian casualties in the area of forest plots and in their neighbourhood were 127 officers and 3964 soldiers. Prussian casualties in this forest are reported to have been 32 officers and 457 soldiers (Heidrich 1902: 21). The later burial process was therefore very demanding and lasted as long as 19 days. In some places, dead bodies were pulled out from forest plots and brought to large mass graves. Elsewhere in the deep forest, grave pits were dug directly on site. However, many graves within this unorganised burial activity were made imperfectly without any unified rules, so that in August it was ordered that they must undergo an extensive disinfection and adjustment, also due to spread of a cholera epidemic (Feltl 1867: 4–13; Volf 1934: 111–112; Svatoňová *et al.*, 1991: 96).

Thanks to increasing interest in this history before the World War I, the battlefield at Hradec Králové became a fundamental pillar for the formation of the so-called memory of the War of 1866, whose character is still a vividly discussed topic (Kessler and Šrámek 2016; 2017; 2020; Šrámek 2017). A total of 104 war graves and places of memory are marked in the Svíb Forest to this day. They represent one quarter of all graves on the battlefield at Hradec Králové (Brůha *et al.*, 1996).

The *genius loci* in this part of the battlefield has already for decades aroused a sort of sympathy with soldiers who were killed here and the bloody clash in the forest even became a synonym for the whole Battle of Hradec Králové for many generations. In recent years, the area of the forest became a venue for countless commemorative events, which also comprised large-scale battle re-enactments attended by hundreds of soldiers with replicas of uniforms and weapons. Such undertakings took place in

the northern part of the forest near Havranec [Havranec] in 2016 or in the southern part of the forest across from the memorial of the Austrian 8th Jaeger Battalion in 2020 (Fig. 2).

Despite this increased interest in a single location on the battlefield, nobody has yet really paid attention to its true appearance and effect on historical events. The above-mentioned works of military historiography often deal only with the description of individual forest plots and their localisation on the attached plans (K. k. Generalstabs-Bureau für Kriegs-Geschichte 1868: 287; Heidrich 1902: 19–21). The best factographic work so far on the War of 1866 addresses in great detail the problem of erroneous interpretation of the strategic location of the forest in older literature and disproves it quite successfully, but its description of forest plots lacks again any detailed interpretation of their influence on the battle events (Bělina and Fučík 2005: 356). According to some authors, the forest does not seem to have considerably changed to this day (Kessler 2017: 32).

To get a more accurate idea of how the Svíb Forest looked in 1866, it is necessary to reconstruct the shape of individual plots and identify the character of particular woody plants that grew there. Relatively detailed information is preserved in the chronicle of the Prussian 3rd Magdeburg Infantry Regiment No. 66, more precisely in plan No. 1, which contains an important legend to the woody plants on forest plots. The plan describes in minute detail not only the plots themselves, but also the species composition of trees and their age at the time of the battle. When we use this more accurate map together with maps of the Stable Cadastre from 1840, maps of the Second Military Survey and other plans from the 1902 study, we can now quite exactly define the appearance of Svíb Forest and reinterpret the historical events that took place in its area on the day of the battle. During creation of the base map, the plot borders were identified solely on the basis of the Stable Cadastre, which should be the most accurate among all map sources because it was created for reasons of property rights so that it is rather an official source.

The forest was therefore divided into 105 research polygons, representing individual plots and metalled roads. The borders of wooded plots currently delimit an area of 107.4 hectares. This area was about 7 hectares smaller in 1866. The reconstruction has confirmed that the largest area in the Svíb Forest belonged to plots with high-grown coniferous forest, which represented 30% of the total forest area (Fig. 3:3). In the western part of the Svíb Forest, 23% of the area were covered with a mixed forest of strong oaks and firs without shrubs. The wooded plots were surrounded by meadows of an almost identical spatial extent (Fig. 3:1), which certainly also influenced the events around the northern side of the forest. They mainly bordered a large part of the so-called Havranec, a young forest consisting predominantly of bushes of alder



Fig. 2. Austrian Jaeger (Rifles) during a battle re-enactment in the Svíb Forest. 2020. Photo: O. Littera.

and lime covering a total of 3.2% of the entire forest area (Fig. 3:2). Another 11% of the whole area was covered with a mixed forest of pines, spruces, oaks and firs (Fig. 3:4). The much-discussed plots which were fully cleared of trees and contained piles of felled wood together with low and young undergrowth (Fig. 3:5) represented a total of 14.5% of the whole area of Svíb. Moreover, the forest glade was bordered from the east (Fig. 3:7) by a young deciduous forest (10.8%), which reached the height of an adult man and consisted of oak, lime and hornbeam. A high-grown deciduous forest composed of oak, beech and lime, which covered the area of the tip of the forest projecting towards Máslojedy (Fig. 3:6) may have been relatively easy to see through. Many places on the northern and eastern sides of the forest were bordered by fruit trees and, moreover, the border of the eastern side of the forest towards Máslojedy was lined with bushes.

The character of the forest thus considerably changed in the course of time. Several places have retained their original form to this day. Such an example might be the area (Fig. 3:A) between deciduous forest plots on slopes falling down into a waterlogged and grassed valley, whose terrain is currently levelled and raised (Fig. 4). The reason



Fig. 3. Reconstructed appearance of the Svíb Forest. 1 – grass meadows; 2 – Havranec forest comprising bushes of alder and lime; 3 – plots with high-grown conifers; 4 – mixed forest of pines, spruces, firs and oaks; 5 – forest glade with piled-up pieces of felled trees and young undergrowth; 6 – high-grown deciduous forest with oak, beech and lime; 7 – young deciduous forest with oak, lime and hornbeam with the height of an adult man; 8 – road leading to Máslojedy. A – the place of taking the photos in Fig. 4; B – preserved crosses in the so-called Alley of the Dead; C – accumulation of preserved crosses on graves in the area of highest death toll of the Austrian infantry units. Map created by the author.



Fig. 4. Photos of a grassed plot in the northern part of the Svíb Forest. Top photo – beginning of the 20th century (photo: Heidrich 1902); bottom photo – 2021. Photo: M. Holas.

why the Austrians wanted to fight for these places was that they were difficult to overlook and their terrain relief hindered any place in the neighbourhood of Máslojedy from overlooking the whole bed of the river Bystřice, flowing from Benátky [Benátek] to Sadvá [Sadowa]. The view was all the more complicated by the nearest plot covered with a high-grown deciduous forest, and by more distant parts of Svíb

on its north-western side, where high conifers and mixed stands formed a visual barrier. The attempt to seize these plots in order to deploy one's own troops to the terrain ridge and prevent the enemy from capturing the location and directly attacking Máslojedy, thus seems to be relatively logical. When we take a look at the following brief description of events mentioned in written sources and consider the types of individual forest plots, we will see the clash in the Svíb Forest in a new light. When we overlay the borders of particular wooded plots of the Svíb Forest with spatial data on the distribution of war graves with still visible marking (Fig. 5) in the forest area, we can preliminarily reconstruct the appearance of the battlefield after the clash according to concentrations of graves in the deep forest. Such concentrations are visible in the north-western corner of a plot covered with young forest, where Prussian fire broke the second Austrian attack on the forest and where many killed soldiers were left lying in place (Fig. 3:C). The Prussians fired at this area from two nearby glades, where the piles of felled wood provided the Prussian gunmen with an ideal shelter. The so-called Alley of the Dead, which begins in this area and continues to the northwest (Fig. 3:B) over a falling slope and a deciduous forest which was easy to overlook at that time, might indicate the position of other killed soldiers in these places, where the men probably fought head to head in the morning mist and in the smoke from hand weapons. On the other hand, the sparsely distributed graves in the neighbourhood of the northern plots of the Svíb Forest probably confirm an equally matched firefight between attackers and defenders. But they also indicate the possibility of a better access to these places during the burial process, when dead bodies were pulled out from the forest and laid into large mass graves. In these places we can presently identify a distinctly lower number of such marked graves.

A case study of the above-mentioned sources of different type thus can produce a great deal of new information concerning the exact location of the battlefield, in this particular case represented by a variously divided forest area.

LOCALISATION OF A FIELD FORTIFICATION NEAR CHLUM

In the next theme connected with the Battle of Hradec Králové, we will first return to the retreating units of the Austrian Army. The abandoned trenches between Chlum and Sendražice [Sendrašitz] became in the morning of that day the last shelter for soldiers who were shattered by the bloody clash in the Svíb Forest. We will mainly concentrate on the fortified point No. 3, which was built by 140 engineer soldiers during three hours one day before the battle and consisted of three fortified features: two wing posts for riflemen and one central post for artillery (on the problem of the fortification line, see Holas 2019: 90–101).

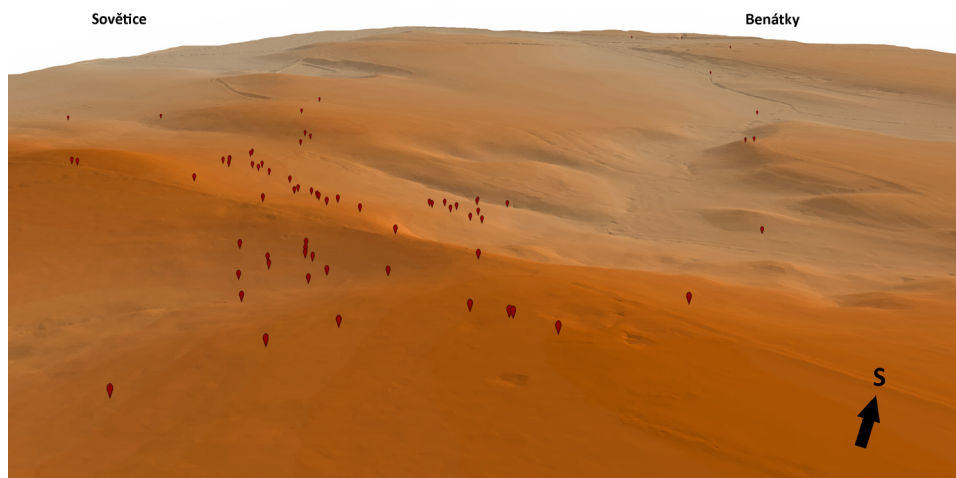


Fig. 5. Relief model of the Svíb Forest without vegetation cover according to LiDAR data with included spatial distribution of the still marked war graves and monuments. Source of LiDAR data: Czech Office for Surveying, Mapping and Cadastre (ČZÚK). Graphics created by the author.

The retreat of Austrian troops from Svíb should have been covered by five still undeployed battalions of the Brigade of Archduke Joseph from the IV Army Corps, which took their positions in a line between the fortified points 2 and 3. The nearby artillery battery of the IV Artillery Regiment moved to one of the trenches at the fortified point No. 3 (K. k. Generalstabs-Bureau für Kriegs-Geschichte 1868: 320).

The advance of the Prussian 1st Guards Division in the following half an hour almost decided the whole battle – it caused the centre of the Austrian position on Chlum, seized by the Prussians, to become indefensible. At that time, all Austrian troops withdrew from the area of previous fight and because of a rise in the terrain they could not notice the advance of Prussian guardsmen from the hills near Hořiněves [Hořeňowes] to Máslojedy. The sparsely manned Máslojedy thus fell into the hands of guardsmen, who were barely 2000 steps away from the fortification. Their further advance forward to grain fields also remained unnoticed by the defenders, so that Prussian vanguards soon marched into the depression north of the Austrians. Without being noticed, the units of the 1st Brigade suddenly stood before the artillerymen and immediately began to fire at them.

“Field fortification of the enemy suddenly emerged from behind the mist in sight of the right wing of the Brigade, formed by the 1st Battalion. Grenades and grapeshots

fired from close proximity flew over the heads of grenadiers. But the unexpected attack of our companies and their penetration into the field fortification forced the enemy to give up further resistance and the field fortification was seized. One more salute was sent to us by the enemy artillery, but the shots flew harmlessly over the grenadiers hidden in the trench” (Kessel 1881: 80).

The attacked artillery battery positioned in the central artillery fortification tried to repel the enemy by grapeshots and then leave quickly but they got stuck in the muddy soil behind the fortification. Moreover, one ammunition carriage exploded shortly before in the nearby battery positioned in the field fortification for riflemen. Their fight and retreat were so unsuccessful that both fortified posts eventually fell into the hands of the enemy. At the same time, all Austrian infantry battalions of the Brigade of Archduke Joseph standing east of the fortification also retreated towards Světí (K. k. Generalstabs-Bureau für Kriegs-Geschichte 1868: 343).

The right defensive wing of the Austrian Army thus ceased to exist and the Prussian guardsmen got the possibility to attack directly the central part of the position on Chlum. The battle day had come to the most critical phase for the Austrian forces and the result was finally decided in favour of the Prussians.

It is beyond any doubt that the important clash in the Svíb Forest and further retreat through the fortified point No. 3 near Chlum became the key moment when the Austrians had the last possibility to stop the Prussian advance to the centre of their position. The location of the fortification itself was not chosen by chance. It was arranged in a line with other fortifications and this element probably was of key importance for Colonel von Pidoll, despite its malfunction as regards the view of the field of fire. The location of the fortification (Fig. 6:B) did not offer good view (Fig. 6:C) in northern direction to the village of Máslojedy (Fig. 6:D), which was situated on a distinct unevenness in terrain. It represented a serious obstacle which hindered the observation of events and firing at the Svíb Forest (Fig. 6:A). On the other hand, the view in south-eastern direction to Lochenice [Lochenitz] and farther to beyond the river Elbe was ideal in this regard but unusable for defensive fight. The location of the fortification still enabled oversight of events on the hill Chlum in its rear (Fig. 6:E). The length of the field of fire for a potential artillery fight in front of the fortification was only one kilometre, which was barely one-third of the effective range of Austrian cannons.

Geophysical survey (Fig. 7) conducted over 7.5 hectares identified the exact location of all three fortification features on the site and the total length of all trenches, namely 781 metres. The measurement has confirmed standard forms of fortifications for riflemen (Fig. 8:1) in the shape of a lunette and a barkan, and a fortification for artillery in the shape of a barkan (Fig. 8:2), of which M. Sýkora made a reconstruction (Fig. 10).

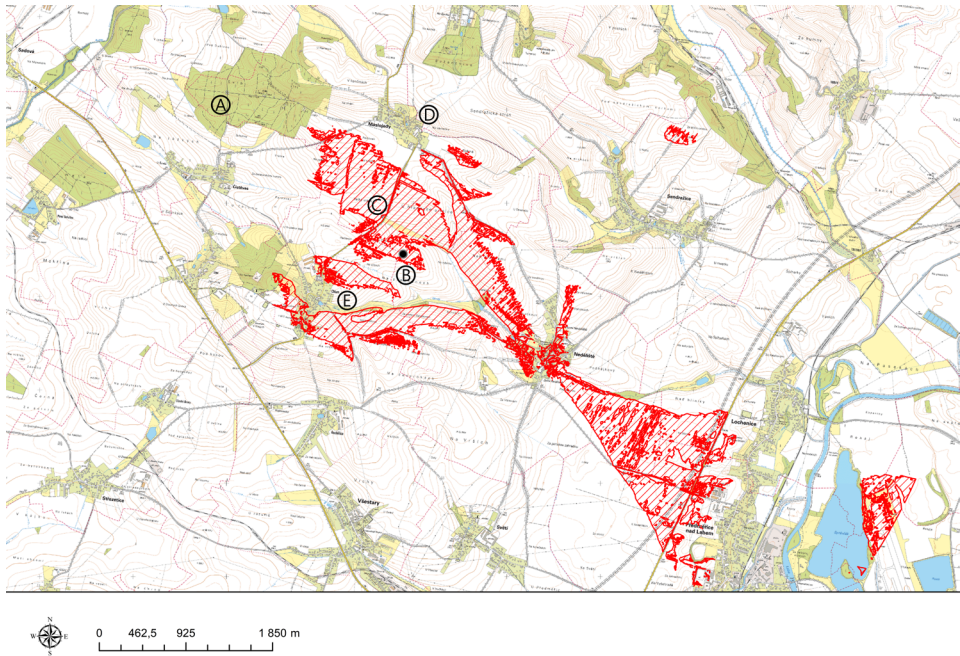


Fig. 6. Viewshed from the artillery fortification at the position of fortified point No. 3 (height of the observer or horse rider = 2.3 m). A – Svíb Forest; B – observer's post; C – viewshed; D – Máslojedý village; E – Chlum village. Source: base maps ZM10 from the Czech Office for Surveying, Mapping and Cadastre (ČZÚK), source of LiDAR data: ČZÚK. Map created by the author.

It was the best fortified point in the whole line of field fortifications on the battlefield, which indeed had the potential to stop the Prussian soldiers. However, this only would happen if the fortified features, both the two wing posts for riflemen and the central post for a battery of guns, were fully manned. Moreover, the infantry firing posts were supplemented in their rear by trenches for other parts of the crew. When we compare the length of all trenches, we can also identify the number of soldiers who could be positioned in these fortification features. Considering the standards for sufficient distance between individual shooters in the line, each of them would need at least one metre distance to the next soldier standing on the right in order to appropriately handle the weapon. In that case, the first line of both fortifications in the firing position behind the rampart would accommodate at least 260 shooters, the same number would be positioned as a support behind the line in



Fig. 7. Magnetometer measurement at the location of fortified point No. 3. Photo: P. Vrba.

the inner lowered trench and another 200 men would be positioned in linear trenches to the rear of both firing posts.

The artillery fortification was built with an important tactical advantage, namely a metalled road. The input of data from magnetometric survey into the maps of Stable Cadastre from 1840 has shown that the artillery fortification was built directly on a road between two plots (Fig. 8:5). The road was undoubtedly important for transfer of cannons to the fortification and for their possible withdrawal. The assumption was also confirmed by metal detector survey (Fig. 9), which was conducted on the site in three phases by many volunteers from various archaeological departments in East Bohemia (Regional Museum in Vysoké Mýto, East Bohemian Museum in Pardubice, Museum and Gallery in Rychnov nad Kněžnou). This road led to the west where it joined a metalled road in the direction Chlum – Máslojedy and the above-mentioned prospection detected here projectiles which had not been deformed during the battle. The projectiles (Fig. 8:A) were literally flattened by the wheels of wagons, which moved on the road during cultivation of fields over many years after the war.

However, the most important information source were again the above-mentioned friction primers for Austrian cannons (Fig. 8:C), which confirmed the exact position of batteries during their firing at the Prussians advancing from Máslojedy (Fig. 8:6). The discrepancies about this information in historical sources were thus corrected by the metal detector survey.

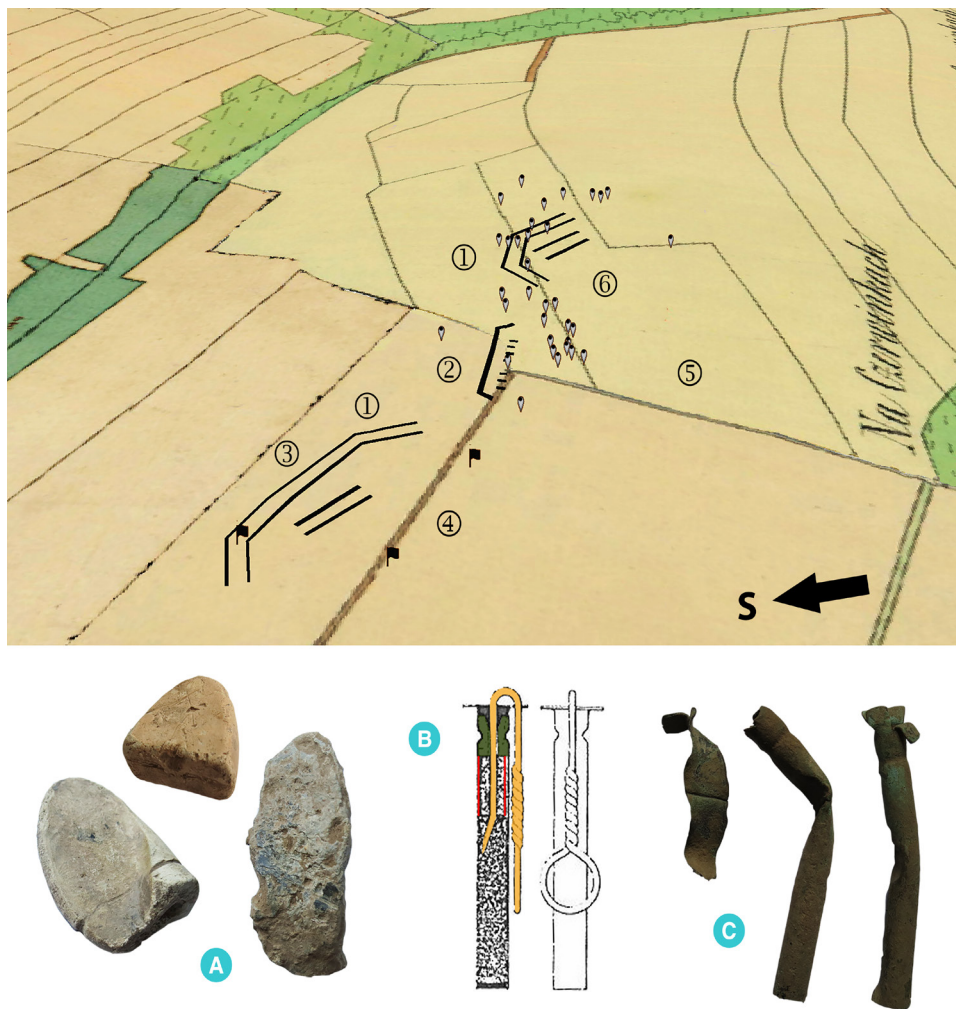


Fig. 8. Distribution of selected finds and the results of geophysical survey in the area of fortified point No. 3 near Chlum. 1 – line of trenches of the fortification for riflemen; 2 – line of trenches of the fortification for artillery; 3 – distribution of ammunition of the Austrian and Prussian Armies, which was destroyed by later activity on unpaved roads; 4 – unpaved road leading from the artillery fortification to the road Chlum – Máslojedy; 5 – unpaved road leading to field plots; 6 – distribution of friction primers for Austrian cannons in places of field fortifications. A – deformed lead projectiles of the Austrian and Prussian Armies collected on defunct unpaved roads; B – drawing of a friction primer for Austrian cannons (Müller 1864); C: finds of friction primers for Austrian cannons in the area of fortified point No. 3 (Museum of East Bohemia in Hradec Králové). Graphics by the author.



Fig. 9. Metal detecting in the area of fortified point No. 3. Photo: M. Bulat.

ANALYSIS OF RESULTS

The landscape archaeology of the 1866 War becomes an important source for understanding the historical events that swept with lightning speed through the territory of East Bohemia and influenced the outcome of the whole war. The first investigated location was the legendary Svíb Forest, whose appearance greatly influenced the fighting taking place in this area.

A reconstruction of the forest's appearance using the methods of landscape archaeology thus shed a new light on historical events, which took place there. The majority of wooded areas with high-grown trees, which were easy to see through, were used predominantly for Prussian scattered shooting combat rather than for the tactics of Austrian infantry and their effort to hold the infantry units together. Other Austrian attacks on the forest plots thus always ended with a catastrophe. This condition did not change with the revived Austrian advance in the southern part of the forest,

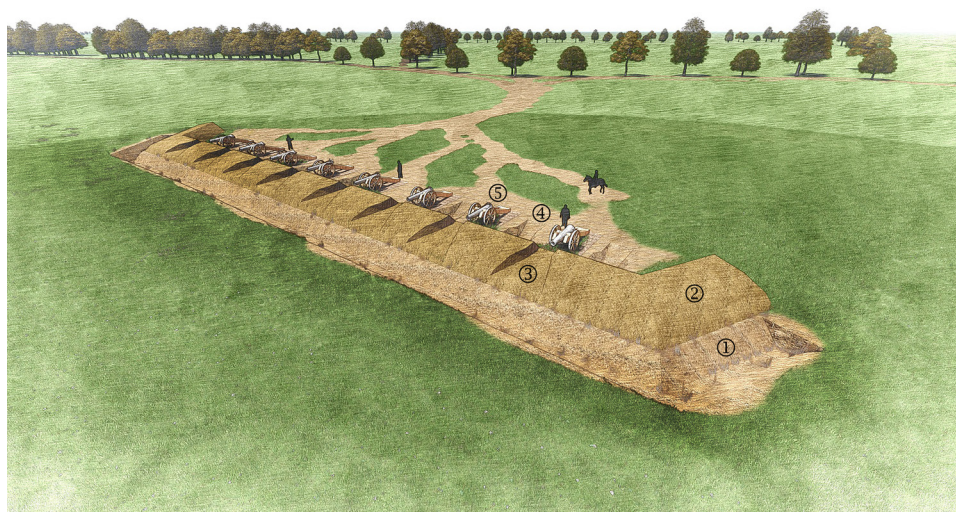


Fig. 10. Example reconstruction of the appearance of a field fortification in the area of fortified point No. 3 according to results of non-destructive survey and written sources. 1: front ditch closest to the enemy; 2: rampart made of earth from the ditch; 3: loopholes for cannons in the rampart; 4: sunken spaces for ammunition storage; 5: firing position of a cannon. Modelling and visualisation by M. Sýkora.

which was conducted through a large densely wooded plot with young deciduous forest, reaching the height of an adult man and being difficult to see through. The attack completely stopped in the north-western corner of the plot, because the Austrian infantrymen began to come out from the dense forest into light forest glades, where they were bloodily repelled by the Prussian riflemen hidden behind piles of felled trees. The Austrians therefore concentrated on the eastern part of the forest and launched another attack, whose first phase consisted of a successful shooting combat accompanied by artillery fire. The deployment of other infantry troops and their numerical superiority then finally completely repelled the exhausted Prussians from the forest. However, the Prussians with their 14 thousand men were able to occupy in the forest fight an unbelievable number of as much as 43 thousand Austrian infantrymen, who eventually seized the forest but were later forced to quickly retreat because the Prussian 2nd Army already advanced from the north with the aim to attack the centre of the Austrian position on Chlum. Such example reconstruction of a delimited location on a battlefield with so many usable sources can as a result provide a great deal of new knowledge of particular historical events and at the same time define its

influence on the sequence of events, which is a great benefit in archaeology of battlefields from the year 1866.

The second investigated location is related to the research of the fortified point at Chlum, where the Austrian units, who were shaken by the clash in the Svíb Forest, had the last chance to stop the Prussian army. The results of research conducted on this defence post, comprising landscape analysis, geophysical measurement, metal detector survey and landscape reconstruction, has also yielded very important knowledge. The Austrian troops retreating from the fights in the Svíb Forest unfortunately did not stay longer in these places, where three massive field fortifications were dug. The trenches and earthen ramparts thus were not manned to the full extent at the time of Prussian advance or they were only equipped with 16 guns without necessary support of infantry. A reconstruction of the number of infantrymen in both infantry firing posts based on their detected dimensions has shown that artillery might have been defended in this position by as many as 720 infantrymen. With the possible addition of other reserve shooters behind the fortification, this post might have been used to defend a whole infantry battalion, that is about 1000 men. The Prussians attacked this position, as we know, with three times more infantry soldiers representing three and a half battalions, but the Austrian infantrymen positioned in trenches would have equalized this numerical superiority. However, another analysis confirmed the very inappropriate location of these trenches for defensive combat, mainly for reason of an insufficient view of the field of fire in the north. The location of the fortification at this place thus could not significantly influence the course of events which took place farther away and this was also the reason why it was abandoned during the clash in the Svíb Forest. In view of new information, this site can be rightfully classed among places of key importance. This area with ramparts and trenches of field fortifications still gave the Austrians a possibility to influence the course of the battle, but they repeatedly failed and the battle ended for them in a total fiasco. Now we already know, also thanks to archaeology, what this position all involved and why it did not succeed in the defensive fight against the enemy.

CONCLUSIONS

The article presents the current results of archaeological research into the landscape of the military conflict of 1866, specifically the Battle of Hradec Králové, which were obtained by various methods. The sites count among key locations with regard to their role in the decisive Battle of Hradec Králové. Landscape research using the methods of battlefield archaeology now enables us to take a new look at these places

and get rid of any deep-rooted historical misconceptions. First of all, there is the perspective of a ruthless fight for the reputedly strategically unimportant Svíb Forest. However, the reconstruction of its appearance elucidates why these fights took place there and how it is possible that the Prussians were able to resist an even fourfold superiority so long. It is more than obvious that this course of events was caused by the form of individual forest plots, which were overgrown with a variegated spectrum of woody plants of different species and age. The data on appearance of these plots together with their input into a reconstructed historical map and definition of a complicated forest terrain relief causing difficulties to foot combat reveal the main reasons why this fight in the forest had such a contradictory, but fully justified outcome.

Subsequent events, which resulted in penetration of a Prussian Guards Division into the centre of the Austrian position on Chlum, could have been almost immediately prevented by the Austrian units. It was meant to happen at the fortified point No. 3 in the defensive line of Austrian field fortifications, which extended from Lípa over Chlum to Neděliště. On the site between the two last mentioned villages, soldiers built the largest trenches and earthen ramparts for riflemen and artillery in the form of three features, which should have been of key importance during the battle. However, the landscape analysis revealed a very inappropriate location of these fieldworks. The view from this place to the important north direction was completely blocked. Geophysical measurement has accurately identified the dimensions of trenches, in which the Prussian attack might have been hindered by 8 cannons and about 1000 infantrymen. But this unfortunately did not happen and all of the isolated 16 Austrian cannons later fell into the hands of the enemy. Prussian guardsmen thus easily seized the unmanned field fortification and destroyed the last distinct obstacle on their way to Chlum with the aim to ruin the Austrian position here and to finish the Battle of Hradec Králové to their advantage.

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reconstruction of the appearance of a field fortification for the Austrian artillery was made by Milan Sýkora on the basis of data from terrain survey and historical sources. The model was created in the Allplan programme, the textures, objects and figures were made in the Lumion programme.

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