Archaeologia Polona, vol. 61: 2023, 1–4
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3707

Editorial

The goal of archaeology as a scientific discipline – in the classical approach used since the mid-19th century – has been to learn about the history of societies from the earliest times to the appearance of the first written sources. This definition, although still valid, has begun to undergo significant revision in the last half-century. First – in European areas – the acquisition of sources using the method of archaeological research covered medieval and early modern times, then, gradually, closer and closer to the present day. These shifting boundaries were not sharp, just as the boundaries between historical eras are blurred.

About fifty years ago, the methodology of archaeology first began to be applied more consistently to the issue of obtaining historical data concerning events and processes of the 20th century, up to the end of World War II and the immediate post-War period. The archaeology of these times gradually grew into an essential and attractive branch of the historical sciences. It covered a broad spectrum of cultural phenomena in the first half of the last century. However, there was a noticeable concentration of interest on the sites and phenomena related to the Great War (later called World War I), and the issues of World War II. Generally, this area of research can be called conflict archaeology (Theune 2018). This can be divided into more detailed sections – the archaeology of battlefields, sea and air skirmishes, prisoner of war camps, concentration camps and places of extermination, military structures, etc.

There are several reasons for the increased interest in this phenomenon. It seems to us that one of the most important is – or should be – providing objective information in cases where written sources are missing, incomplete, censored, intentionally falsified or destroyed. Contrary to appearances, such situations are relatively numerous. An additional important aspect of the discussed activity has a cultural or social dimension; this concerns the use of such research in the creation of an emotional attitude to a specific area by obtaining data allowing one to recognize a fragment of space as a place of memory, with all the consequences resulting from this designation (Traba 2000; Szpociński 2008; Zalewska 2019). Equally important is the recovery and dignified burial of human remains related to violent events of the period, including efforts to identify the victims of conflict and commemorate them (Florek 2020). It is also essential to obtain finds during archaeological work that can be used as museum objects as part of giving the results of scientific research an educational role.

Conflict also leads to other kinds of losses, for example in culture. In studying periods like this, it is also worth emphasizing the importance of attempting to trace the fate of various objects – often of high historical and scientific value – which changed owners during wars or were lost, perhaps irretrievably. The plunder of conquered countries is nothing new in recent history, it is basically a rule in the history of conflicts (Fig. 1). What has survived to our times, what is housed in museums and non-museum collections, is a tiny part of the heritage of our culture. Each of the wars that have swept through time and space has led to the loss of a significant part of the material record of history. We are currently observing this process in Ukraine during the full-scale war declared by the country's eastern neighbour. The full scale of the losses in this respect already signalled there will only later be fully known...

In the current volume of *Archaeologia Polona*, we present a set of articles with varied content, presenting archaeological echoes of wars that have swept through the areas of Central Europe in recent times. The volume opens with the article Matouš Holas, which is an archaeological and historical record of the so-called Battle of Sadowa, during the Franco-Prussian War in 1866, the result of which shaped the history of the centre of our continent for many decades (*Austro-Prussian War of 1866, Landscape Archaeology of the Battlefield of Sadowa-Königgrätz*, pp. 7–29).

The following three articles concern research into the material remains of the Great War. Martin Vojtas, Jakub Těsnohlídek, Michaela Prišťáková, Jan Petřík, Martin Fojtík, Jiří Zubalík, Radim Kapavík and Peter Tajkov present the issue of the archaeology of battlefields in north-eastern Slovakia (*Battlefield Archaeology of the First World War in Northeastern Slovakia*, pp. 31–59). In the following paper (pp. 61–74), Angelika Bachanek focuses on the issue of restoring historical memory to places of military activity of soldiers of the Great War (*Why is Archaeology Inalienable in Learning about the Traces of the Great War in Kozienice Forest and Restoring the Memory of the Forgotten History of a Century Ago?*). This is followed by the text of Natalia Bułyk and Roman Berest describing the archaeological community of the Lviv region in the Austro-Hungarian monarchy during the Great War (*The Lviv Archaeological Milieu During World War I*, pp. 75–104).

The following nine articles cover various archaeological aspects of World War II. This opens with a text by Piotr Alagierski, Katarzyna Kuczara-Alagierska and Maciej Sokołowski describing research on the site of the fall of a German V-2 rocket – a miracle of technology at that time – in the Chodzież area, against the background of German tests with this weapon in Nazi-occupied Poland (*Discovery of a German V-2 Rocket Fall Site in the Area of Chodzież, in Greater Poland*, pp. 105–126). Krzysztof Tunia presents the results of archaeological-and-exhumation work at the site of the execution of 125 people in Cracow-Glinik (*Cracow's Glinik – World War II Executions*

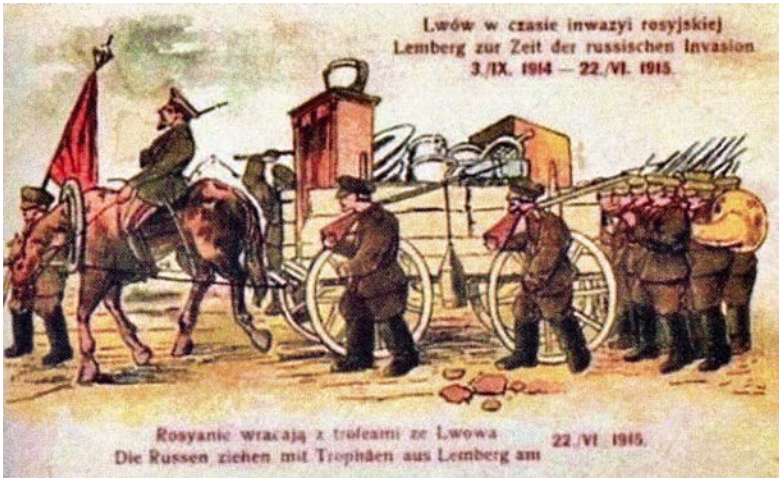


Fig. 1. Austro-Hungarian propaganda graphic from the Great War – *The Russians return with trophies from Lviv. June 22, 1915*. Author's collection.

Place, Forgotten over the Years and Restored to the Collective Memory. Preliminary Results of Archaeological-and-Exhumation Research, pp. 127–142). In a presentation also connected with investigations of war-crimes, Anna Drążkowska dealt with the identification of the Polish victims of the Soviet atrocity in Kharkiv, based on the analysis of finds from the graves (*Importance of Particular Groups of Objects in the Identification of Victims of the Katyn Massacre in the Case of Finds from Kharkiv*, pp. 143–158).

The next three articles concern archaeological research on the Auschwitz-Birkenau concentration camp complex – Sylwia Foks, Dariusz Goiński and Błażej Targaczewski present an outline of the archaeological research on this facility (*Archaeological Research on the Former KL Auschwitz I and KL Auschwitz II-Birkenau site*, pp. 159–171), Wojciech Tabaszewski and Kamila Peschel dealt with the finds of plastic from excavations conducted there (*Plastic Artefacts from Archaeological Investigations Carried out at the Auschwitz-Birkenau Camp Complex in 2015–2022*, pp. 173–200), while Paweł Lewicki and Magdalena Mazurkiewicz discuss attempts to create a system for classifying finds from excavations in concentration camps (*Classification and Significance of Material Culture from Archaeological Research of Section BIb of the Former KL Auschwitz II – Birkenau*, pp. 201–218). Still, on the subject of Nazi concentration camps in Poland, Kamil Karski and Dawid Kobiałka presented the archaeological issues of the concentration camp in Cracow – KL-Plaszow (*If Archaeology is Not Just About the Past. The Landscape of the KL Plaszow Memorial*, pp. 219–237).

In the following paper, focussing on the people involved in, and often displaced by conflict, Piotr Włodarczak and Urs Leuzinger described archaeological works in Switzerland carried out by Polish soldiers interned there (*Soldiers on the Digs. Archaeological Excavations in Switzerland Involving the Deuxieme Division des Chasseurs*, pp. 239–267). The paper of Jakub M. Niebylski, Damian Stefański and Przemysław Wierzbicki explores how archaeological methods, including the use of LiDAR, can be applied to research on the activity of the Polish People's Army units in eastern Poland at the end of World War II (*The Formation of the Units of the Polish People's Army (1944–1945) in Eastern Poland. The LiDAR Evidence*, pp. 269–287).

The thematic block of the volume ends with an article by Gediminas Petrauskas on investigations of the site of a training camp of the Lithuanian Liberation Army in Samogitia, Lithuania, in the times immediately after the end of the military operations of World War II employing landscape archaeological techniques and a metal detector survey (*Landscape of Resistance. Traces of the Military Training of the Lithuanian Liberation Army in Plokštinė Forest, Samogitia, Northwestern Lithuania*, pp. 289–313).

The volume ends with a review by Magdalena Sudoł-Procyk (pp. 315–323) of Laure Fontana's book (*Les Sociétés de Chasseurs de Rennes du Paléolithique Récent en France – Économie, Écologie et Cycle Annuel du Nomadisme*) devoted to the reconstruction of reindeer migrations in the context of territorial movements of reindeer hunters in France at the end of the Pleistocene – 30,000–15,000 cal BC.

Krzysztof Tunia
Marzena Woźny

REFERENCES

Florek, M. 2020. Ekshumacje czy badania archeologiczne? *Raport* 15: 369–375.

Szpociński, A. 2008. Miejsca pamięci (lieux de mémoire). *Teksty Drugie* 4: 11–20.

Theune, C. 2018. *A shadow of war. Archaeological approaches to uncovering the darker sides of conflict from the 20th century*. Leiden.

Traba, R. 2000. Symbole pamięci: II wojna światowa w świadomości zbiorowej Polaków. Szkic do tematu. *Przegląd Zachodni* 1: 52–67.

Zalewska, A. (ed.). 2019. *Archeologiczne przywracanie pamięci o Wielkiej Wojnie w rejonie Rawki i Bzury (1914–1915)*. Warszawa.

CONTENTS

BOOK REVIEW

Online access to previous volumes of Archaeologia Polona is available at the address: https://journals.iaepan.pl/apolona
Archaeologia Polona is regularly indexed in the International Bibliography of the Social Sciences; in IBZ – International Bibliography of Periodical Literature; IBZ – CD-ROM; IBR – International Bibliography of Book Reviews of Scholarly Literature; IBR – CD-ROM. Archaeologia Polona is included within the database of the Anthropological Index Online of the Royal Anthropological Institute of Great Britain and Ireland (http://www.aio.anthropology.org.uk).

Archaeologia Polona, vol. 61: 2023, 7–29
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3177

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

Matouš Holas[a]

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

[a] Archaeological Department, Museum of East Bohemia in Hradec Králové 1 (Czech Republic), Muzeum východních Čech v Hradci Králové, Opletalova 334, 500 03 Hradec Králové 1, e-mail: m.holas@muzeumhk.cz, ORCID: 0000-0002-5591-6193

Received September 20, 2022; Received in revised form August 4, 2023; Accepted September 13, 2023

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 (Krajíc *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 projects[1] 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 KOCOA, which is mostly used by researchers in the USA. KOCOA 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 KOCOA 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

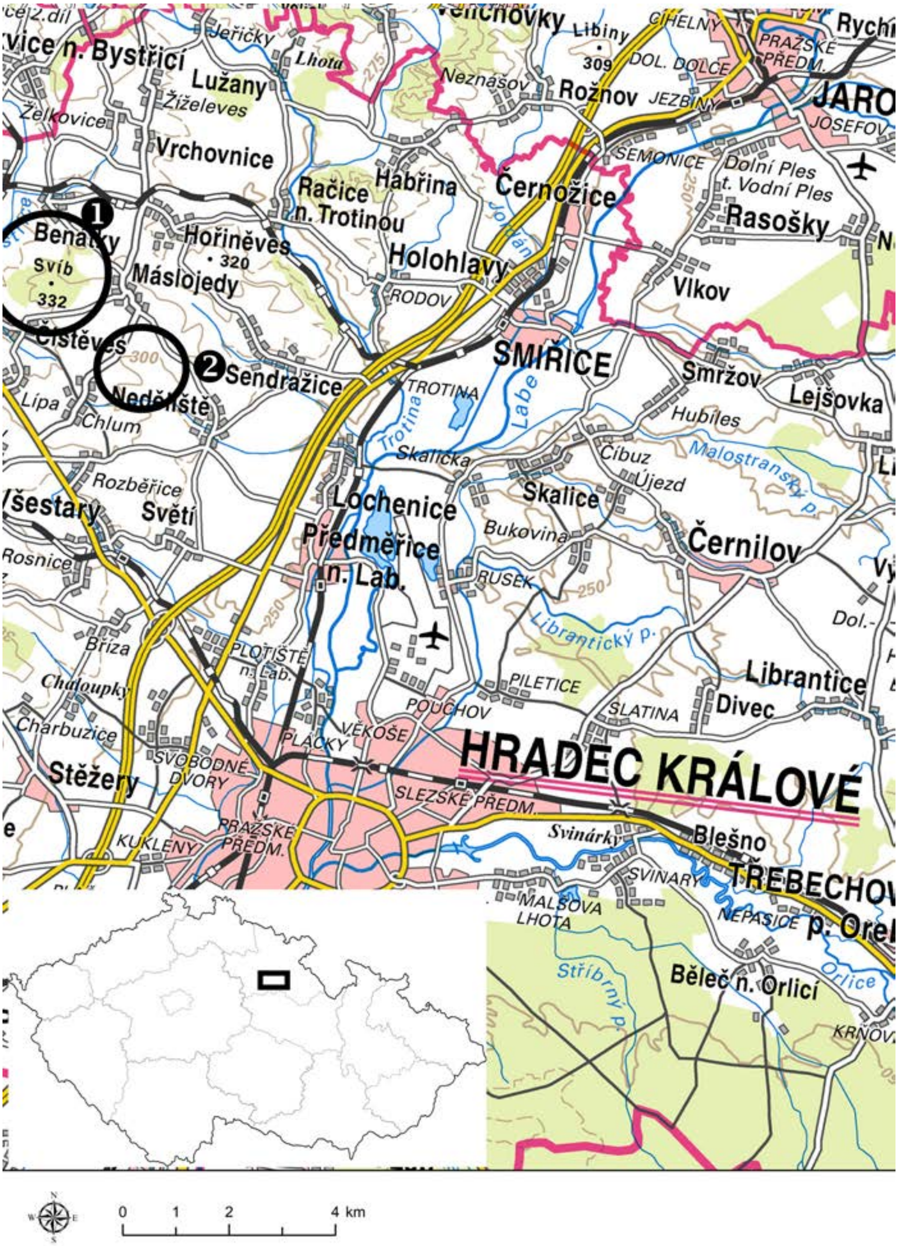


Fig. 1. Hradec Králové region. 1 – Svíb Forest; 2 – fortified point No. 3. Source: base maps ZM50 from the Czech Office for Surveying, Mapping and Cadastre (ČZÚK). Map created by the author.

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 [Jičin] 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 Neděliště [Nedělišt] 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 Sadová [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).

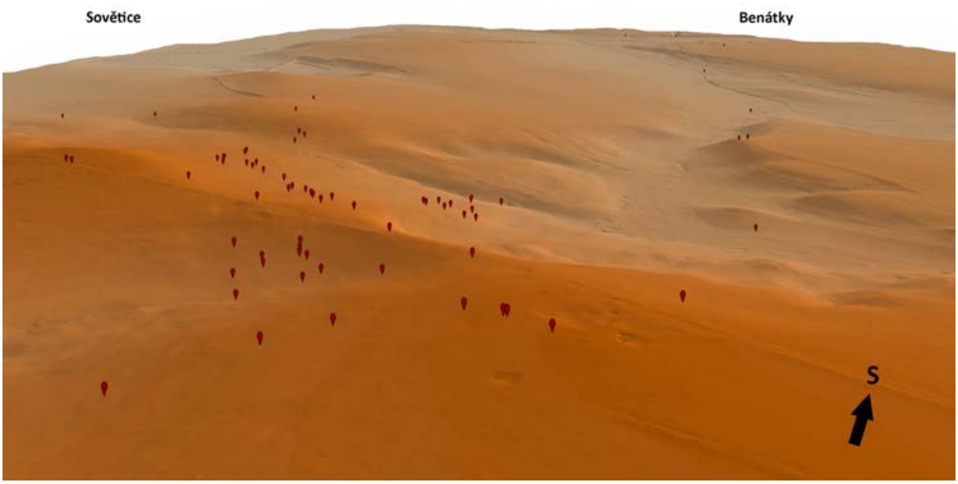


Fig. 5. Relief model of the Svíb Forest without vegetation cover according to LiDAR data with included spatial distribution of the still marked war graves and monuments. Source of LiDAR data: Czech Office for Surveying, Mapping and Cadastre (ČZÚK). Graphics created by the author.

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 send 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 Větí (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).

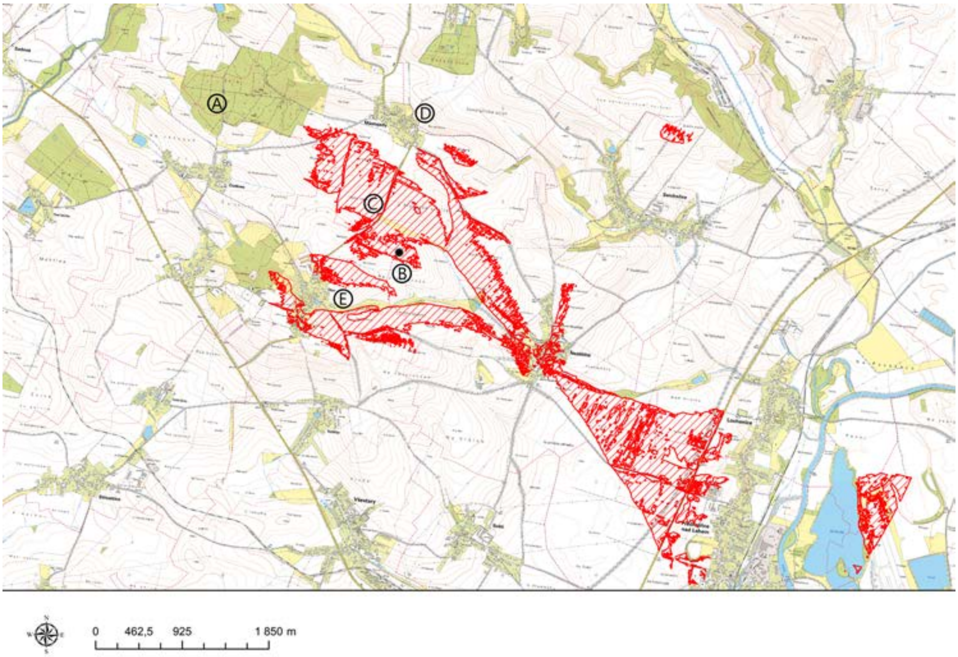


Fig. 6. Viewshed from the artillery fortification at the position of fortified point No. 3 (height of the observer or horse rider = 2.3 m). A – Svíb Forest; B – observer's post; C – viewshed; D – Máslojedy village; E – Chlum village. Source: base maps ZM10 from the Czech Office for Surveying, Mapping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

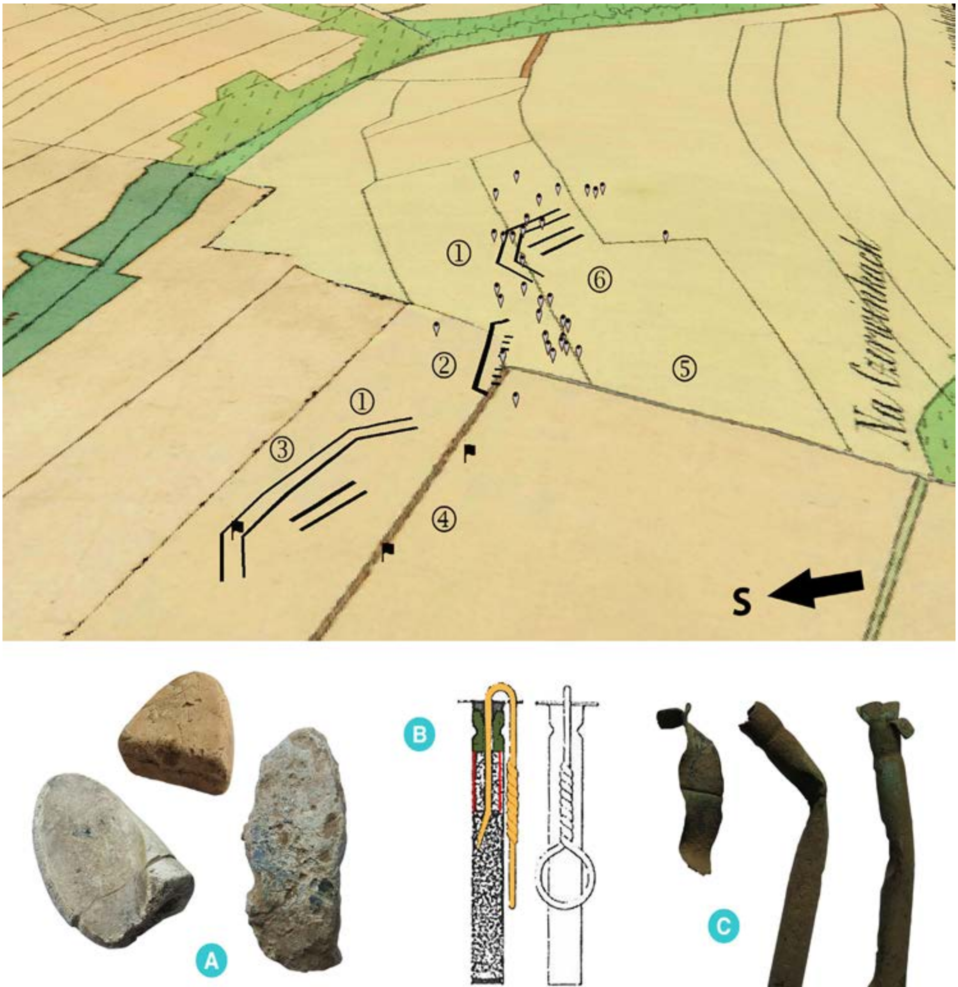


Fig. 8. Distribution of selected finds and the results of geophysical survey in the area of fortified point No. 3 near Chlum. 1 – line of trenches of the fortification for riflemen; 2 – line of trenches of the fortification for artillery; 3 – distribution of ammunition of the Austrian and Prussian Armies, 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 (Müeller 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,

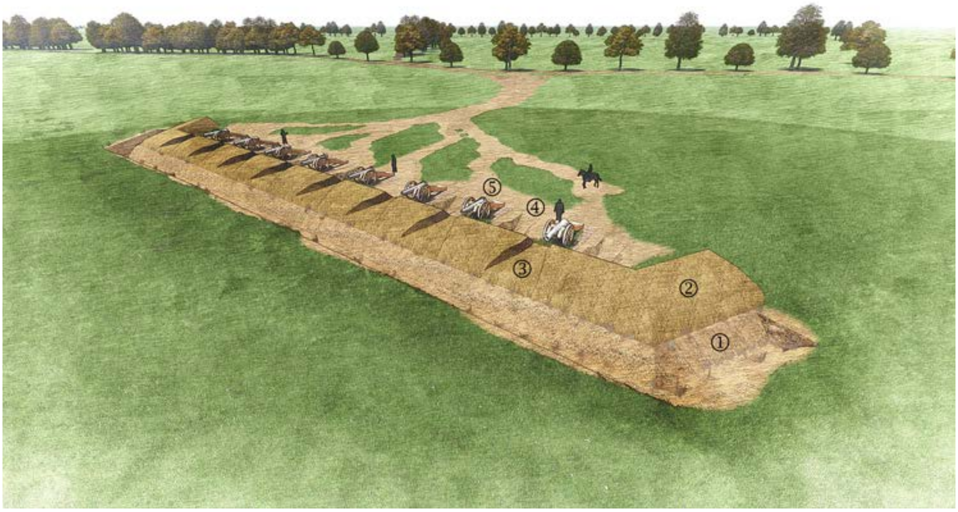


Fig. 10. Example reconstruction of the appearance of a field fortification in the area of fortified point No. 3 according to results of non-destructive survey and written sources. 1: front ditch closest to the enemy; 2: rampart made of earth from the ditch; 3: loopholes for cannons in the rampart; 4: 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 is it 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.

ACKNOWLEDGEMENTS

An important part of the non-destructive research methods used was geophysical survey with a thorough processing of results, which was carried out by Ass. Prof. Peter Milo and Dr. Tomáš Tencer from the Department of Archaeology and Museology, Faculty of Arts, Masaryk University in Brno. Professional guarantors of the prospecting were Dr. Petr Hejhal from the Department of Archaeology, Philosophical Faculty, University of Hradec Králové and Prof. Václav Matoušek from the Department of Social and Cultural Ecology, Faculty of Humanities, Charles University in Prague. Important geodetic work was carried out and the results were analysed by Mgr. Martin Lanta. An example

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.

The author would like to express sincere gratitude to all colleagues mentioned above!

REFERENCES:

Bělina, P. and Fučík, J. 2005. *Válka 1866*. Praha.

Brůha, J., Dvořák, J., Poláček, B. and Vycpálek, M. 1996. *Průvodce po bojišti u Hradce Králové z roku 1866*. Hradec Králové.

Drnovský, P., Hejhal, P. and Holas, M. 2020. The Austro-Prussian Wars in the territory of East Bohemia and their reflection in archaeological sources. In P. Drnovský and P. Hejhal (eds), *Archaeology of Conflicts*, 123–131. Červený Kostelec.

Drnovský, P., Hejhal, P. and Průchová, E. 2021. Novověký vojenský tábor jako archeologická lokalita. Výzkum polního ležení v Semonicích u Jaroměře. *Archeologické rozhledy* 73: 102–141.

Drnovský, P. and Průchová, E. 2021. Problematika vícečetných pohřbů v novověku. Případová studie pohřebiště z 18. století v Semonicích u Jaroměře. *Památky archeologické* 112: 385–432.

Feltl, F. 1867. *Die Desinfection des Königgrätzer Schlachtfeldes und der Feldlazarethe im Jahre 1866*. Teplice.

Heidrich, A. 1902. *Kampf um den "Svíbwald" am 3. Juli 1866*. Sadová.

Hejhal, P. and Holas, M. 2018. Archeologický nedestruktivní průzkum dělostřeleckých polních opevnění na královéhradeckém bojišti. In J. Hutečka and J. Šrámek (eds), *Mlhy na Chlumu. Prusko-rakouská válka v optice moderní historiografie*, 324–330. Hradec Králové.

Holas, M. 2017. Interpretace stavu výstroje padlých z prusko-rakouské války roku 1866 ve chvíli pohřbení do hromadného hrobu nedaleko České Skalice (okres Náchod). *Archaeologia historica* 42(1): 297–317.

Holas, M. 2019. *Archeologie prusko-rakouské války z roku 1866.* Červený Kostelec.

K. K. Generalstabs-Bureau Für Kriegs-Geschichte 1868*: Österreichs Kämpfe im Jahre 1866*. Vol. 3. Vienna.

Kessel, G. von 1881. *Geschichte des königlich preussischen ersten Garde-Regiments zu Fuss, 1857–1871, unter Fortsetzung der Personalnotizen bis zum Jahre 1880*. Berlin.

Kessler, V. 2017 Groeben, von Petr – hrdinové Prusko-rakouské války na pomezí fikce a metareality. *Acta Musei Nationalis Pragae – Historia litterarum* 62(3–4): 31–36.

Kessler, V. and Šrámek, J. 2016. Obrazy války v historii aneb Mantinely recepce válečných událostí na příkladu války roku 1866. *Marginalia Historica* 2: 106–131.

Kessler, V. and Šrámek, J. 2017. „Kdybychom na ty padlé zapomněli, je to, jako by zemřeli podruhé". Sepulkrální památky na královéhradeckém bojišti z roku 1866. In J. Roháček (ed.), *Epigraphica et sepulcralia* 8: 279–302. Praha.

Kessler, V. and Šrámek, J. 2020. Krajina jako fixátor lidské paměti – příklad královéhradeckého bojiště z roku 1866. In L. Jarošová and J. Tyranová (eds), *Krajina a lidé. Recenzovaný sborník z mezinárodního odborného workshopu. Konaný dne 20. 10. 2020 v Opavě*, 83–98. Opava.

Krajíc, R., Měřínský, Z. and Vařeka, P. 2017. Archaeology of the 16th–20th century in the Czech Republic. *Archaeologia historica* 42(2): 367–399.

Maio, CH. V., Tenenbaum, D. E., Brown, C. J., Mastone, T. V. and Gontz, A. M. 2013. Application of geographic information technologies to historical landscape reconstruction and military terrain analysis of an American Revolution Battlefield: Preservation potential of historic lands in urbanized settings. *Journal of Cultural Heritage* 14(4): 317–331.

Matoušek, V. 2017. Archaeological Research into Battlefields and Military Action in the Czech Lands in the Early Modern Age. History, state of knowledge, discussion. *Archaeologia historica* 42(1): 233–243.

Matoušek, V. and Sýkora, M. 2018. *Válečné události 17.–19. století z interdisciplinární perspektivy*. Praha.

Mitchell, J. B and Creasy, E. C. 1964. *Twenty Decisive Battles of the World*. New York: Macmillan.

Müeller, F. 1864. *Das Österreichische Feld Und Gebirgs Artillerie Material Vom Jahre 1863*. Vienna.

Preusz, M. 2019. Historicko-archeologický výzkum doby třicetileté války (1618–1648). Současný stav studia a perspektivy / The historical and archaeological investigation of the period of the Thirty Years' War (1618–1648). The current state of research and its perspectives. *Archaeologia historica* 44(1): 151–183.

Strobl, A. 1903. *Königgrätz. Kurze Darstellung der Schlacht am 3. Juli 1866*. Vienna.

Svatoňová, S., Šůla, J. and Zimmermman, P. 1991. *Válka roku 1866 na Královéhradecku pohledem současníků. Výbor z obecních, farních a školních kronik regionu*. Hradec Králové.

Šrámek, J. 2017. Proměna královéhradeckého bojiště z prusko-rakouské války v pietní památkové území v letech 1866–1936. In E. Macková (ed.), *Monumenta vivent*, 22–58. Josefov.

Volf, J. 1934. *Vzpomínky na válku roku 1866*. Hradec Králové.

Wawro, G. 1996. *The Austro-Prussian War. Austrian's War with Prussia and Italy in 1866*. Cambridge: Cambridge University Press.

Archaeologia Polona, vol. 61: 2023, 31 – 59
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3262

Battlefield Archaeology of the First World War in Northeastern Slovakia

Martin Vojtas[a], Jakub Těsnohlídek[b], Michaela Prišťáková[c], Jan Petřík[d], Martin Fojtík[e], Jiří Zubalík[f], Radim Kapavík[g] and Peter Tajkov[h]

On the Slovak side of the Carpathian mountains, the archaeology of the World War I had long been completely outside the scope of research interest. At the same time, conflicts in this region had played a very important role in the initial phase of the war. Here, the Austro-Hungarian army blocked the invasion of the Russian army into Hungary with all its might. This lack of attention changed in the last decade with surveys conducted by our team from Masaryk University. In this short overview we describe and evaluate our main research conclusions so far based on surveys conducted at sites bearing the names of the hills of Staviská, Kobyla, Cingov and Wertyszów. Each of the sites is a place where various military events took place, so we have applied different, mostly non-destructive, methods to their study. Our results are mostly an introduction to the state of research and a review of a decade of expeditions to this unique field of conflict, where the armies learned how to fight in mountainous areas.

KEY-WORDS: First World War, spring 1915, Eastern Slovakia, Carpathian battlefield, Easter battle in the Carpathians, geophysics, metal detecting, non-invasive survey, trenches[a]

[a] Department of Archaeology and Museology, Masaryk University, Joštova 220/13, 662 43 Brno (Czech Republic), e-mail: MartinVojtas55@gmail.com, ORCID: 0000-0003-1522-5934
[b] Archaia Brno z.ú, Bezručova 15/78, 602 00 Brno (Czech Republic), e-mail: j.tesnohlidek@seznam.cz, ORCID: 0009-0001-8747-0472
[c] Department of Archaeology and Museology, Masaryk University, Joštova 220/13, 662 43 Brno (Czech Republic), e-mail: pristakova@phil.muni.cz, ORCID: 0000-0001-6178-8522
[d] Department of Geological Sciences, Masaryk University, Kotlářská 267/2, 611 37 Brno (Czech Republic), e-mail: petrik.j@mail.muni.cz, ORCID: 0000-0002-5269-2411
[e] Department of Archaeology and Museology, Masaryk University, Joštova 220/13, 662 43 Brno (Czech Republic), e-mail: martinfojtik@mail.muni.cz, ORCID: 0009-0004-0018-1726
[f] Institute for Archaeological Heritage, Kaloudova 1321/30, 614 00 Brno (Czech Republic), e-mail: zubalik@uapp.cz, ORCID: 0009-0001-8704-8722
[g] Signum Belli 1914, U Trati 409, 667 01 Vojkovice (Czech Republic), e-mail: kapavikr@gmail.com, ORCID: 0009-0005-9317-3289
[h] Department of Theory and Art History, Faculty of Arts, Technical University of Košice, Watsonova 1561/4, 042 00 Košice (Slovakia), e-mail: peter.tajkov@tuke.sk, ORCID: 0000-0003-4227-6681

Received January 17, 2023; Received in revised form August 10, 2023; Accepted September 13, 2023

INTRODUCTION

The frontline of the Carpathian battlefield (1914–1915) ran along mountain ridges, where severe conditions challenged every single soldier as well as whole armies. The specific setting of the battlefield is reflected in the state of preservation of the relics of war and the specific demands of field research in this environment. On one hand, previous extensive research on archival sources has created a relatively precise big picture (e.g., Čaplovič *et al.*, 2016). On the other hand, we have quite detailed but subjective sources of oral history or story telling (e.g., Englund 2012). In between, there is a gap that has the potential to be filled with insights from archaeology and anthropology, as has been done in the research of battlefield on the Polish side of Carpathians, where the team of Jagiellonian University led by Marcin Czarnowicz is closest to our environment. They are focused on survey of trenches and localisation of lost cemeteries or soldiers buried in the place of their death (Kołodziejczyk *et al.*, 2016; Czarnowicz and Ochał-Czarnowicz 2019). The most modern conflict archaeology approach in area is made by Anna Izabella Zalewska and Dawid Kobiałka in lowlands of eastern Poland (Zalewska and Czarnecki 2019; Zalewska ed. 2021; Kobiałka 2022), by Uroš Košir and Matia Črešnar in the mountain environment of Slovenia (Mlekuž *et al.*, 2016; Košir 2019), and in Romania by Roxana-Talida Roman (Roman 2020), who extends the scope of researched topics by not studying just a place of battle or basic survey, but the full aspect of components tied to topic of conflict from archeological point of view. In the Carpathian region this approach is however in the beginnings.

In archaeological surveys of First World War remains, it is important to look at the conflict's specific position in the contemporary history of the area, especially at sites yet to be surveyed. During our archaeological surveys we mostly take a non-destructive or slightly intrusive approach. Standard methods of archaeological research have to be adapted when surveying sites of relatively modern events. It has been demonstrated that remote sensing, especially light detection and ranging (LiDAR), is an effective tool for mapping of World War I relics in montane regions (Mlekuž *et al.*, 2016). However, field surveys are still needed to obtain more detailed information and shed new light on extensive defensive structures.

This article presents four case studies from the Carpathians in present-day eastern Slovakia, spanning from the Kobyla hill in the east to the Staviská hill in the west. The main aim however is not to present all knowledge and research efforts, but to provide a preview into Slovakia's mostly underestimated area of archeological interest and to illustrate the varied nature of this battlefield and the results of different methodological approaches. Most of the sites are overgrown by dense forests or woodlands,

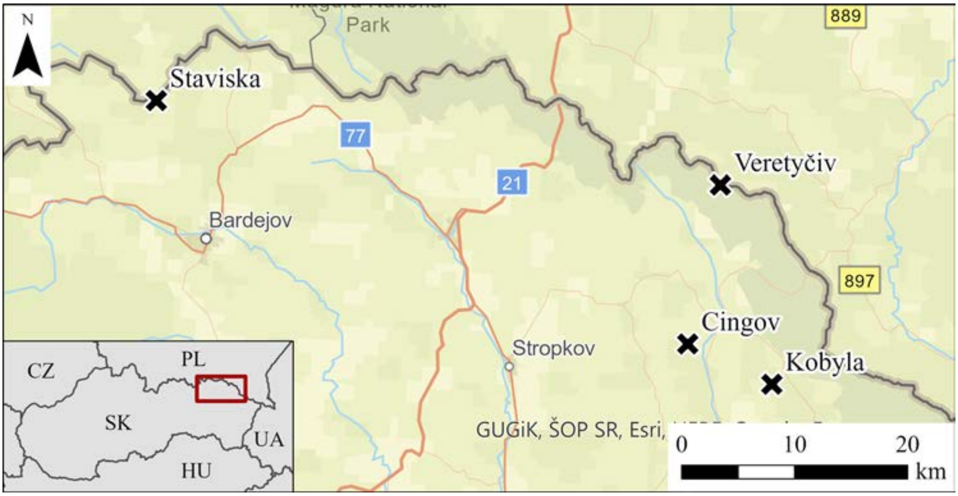


Fig. 1. Location of investigated sites. Graphics created by the authors.

and there are still no published LiDAR data for most of north-eastern Slovakia. This limitation currently precludes us from carrying out more extensive research in this landscape, so we mainly focus on places with a known history and different fates.

REGIONAL SETTING

The area of interest is part of the Eastern Carpathians, where Carpathian flysch rocks build a hilly landscape covered mostly (about 60%) by beech or beech-fir woodland, which is reflected in the name of the range Bukovské vrchy (Bukovec Mountains – meaning "beech mountains"). Mountain ridges in the area are mostly oriented approximately in a north-west to north-east direction and are separated by valleys with sparse settlements of small or medium size (Veda 1979: 298) and pastures or small fields. The area is divided into several administrative districts, of which Bardejov and Medzilaborce include the sites under investigation (Fig. 1).

The Staviská site (Bardejov district), which has received the most archaeological attention, is located north of the town of Bardejov (Slovakia) on the Slovak-Polish border, between the settlements of Stebník, Vyšný Tvarožec (Slovakia) and Blechnarka (Poland). It is a mountain ridge oriented in the south-east to north-west direction and reaching 806 metres above sea level. Old maps from the 18th century call

Fig. 2. Trenchline with two square shelters at Staviská hill, highlighted by snow symptoms. Photo: Authors.

it Porsutschina Berg (Badger Mountain). During the First World War it was called Plazini, and today the name of the hill is Staviská. The site Kobyla hill (638 m a.s.l.) above the village of Výrava is located on the ridge between the Laborec river valley and Výrava brook, which is situated in a narrow valley connecting the towns of Medzilaborce and Snina. The two remaining sites are situated in the Laborec Valley. The Cingov site is a grassland above the village of Sukov, south of Medzilaborce. The site of Wertyszów (742 m a.s.l.) is located near the Polish-Slovak border. It lies at a distance of 4 km from the nearest Slovak municipality of Habura in the Medzilaborce district (at the time of the World War I called Laborcfő). The top of the hill is covered by forest, but the foot of the hill is a pasture without woody vegetation. Today, it is almost the same environment as a hundred years ago (see Fig. 8).

METHODOLOGY

The main methodological procedures are taken from other archaeological subdisciplines and adapted to use in the environment of the Carpathians. Our methodological approach is based on field surveys of deserted mediaeval settlements or mediaeval siege positions in the Bohemian-Moravian Highlands (e.g., Dejmal *et al.*, 2016; Mazáčková *et al.*, 2016: 59–92;; Těsnohlídek *et al.*, 2017). The survey itself was divided into several phases. Each surveyed place was chosen according to the historical events that happened there and its distinctions compared to the other places.

Archival resources

One of the first steps is archival research. Thanks to our colleagues from the research groups "KVH Beskydy" (Slovakia) and "Signum Belli 1914" (Czechia), who have in-depth knowledge of the historical frontline movements, we are able to trace the military units that built and used the trenches under investigation. Very useful sources for information about the activities of the Austro-Hungarian army, Czech units and Tyrolean regiments are the War Archive (*Kriegsarchiv*) in Vienna, the Military History Institute (*Vojenský Historický Ústav*) in Prague and the Tyrolean Land Archive (*Landesarchiv*) in Innsbruck, respectively. Due to the language barrier preventing us from reading Hungarian written sources, we cooperated with the "Nagy Háború" association in Hungary. Because of the complicated geopolitical and social situation in the study area during the last hundred years, like changing of borders, the rise and fall of states, removal and replacement of the population, which is the topic for a separate article, other sources of information are now not available for study, or lost.

The most frequently used documents are personal and regimental diaries, reports and military plans drawn directly by officers at all levels of military structure, from platoons and regiments to divisions and armies. Other useful resources are period manuals describing how to build trench lines, barriers, etc. Every country printed its own manuals, which were updated every few years. It is enlightening to compare manuals from the pre-War period, which depict the then-idealized state, with those from the War period and that following it, which were modified based on newly learned skills and practical experience (*Voyennaya tipografiya* 1910; *Druck und Kommissionsverlag der k. k. Hof- und Staatsdruckerei* 1915). This allows us to deeply study the development of military techniques and to relate it to the actual situation on the battlefield.

Field survey

We conducted our field surveys in two different manners depending on their particular aims. One small-scale survey was intended to document a specific historic event at the Wertyszów site, and another aimed to identify a specific part of the battlefield at Cingov. Both these sites also served to test a specific method of geophysical surveying. The other two surveys, carried out at the Kobyla and Staviská hill sites, were large-scale surveys intended to identify larger parts of the trench line.

Regardless of the scale of the survey, fieldwalking and metal detecting were conducted. During the small-scale surveys, fieldwalking was done only in close proximity of the site, aiming to identify only war relics connected to the particular historic event.

In the large-scale surveys, fieldwalking was carried out in three stages. During the first, it was necessary to get to know the site, the environment, the vegetation cover and the quantity and state of preservation of field fortifications. In the next stage, either a short section of a trench or a specific structure was chosen for a more comprehensive survey. The research group was split into two teams: the first one followed the main trench line, and the second one surveyed structures at the rear of the trench line to identify a suitable spot for more detailed research. We thus explored the intensity of artillery bombardment and infantry fights, as well as construction details of the trenches and sunken structures. In the last stage we mapped each site's wider surroundings to identify as much of the fortified area as possible. With the use of GPS, we recorded several kilometres of trench lines along with some other structures. In some areas we also used a metal detector.

Because of a dense canopy cover at most of the sites, a GPS receiver was used only to record the position of the trench lines. The recording of smaller structures such as foxholes was inaccurate, with a deviation reaching 20 metres in some cases. Because of this, the GPS receiver was used only to record the start and the end of an axis, which was used for a drawn documentation of these structures.

For the drawn documentation of trench lines and other larger structures, a scale of 1:100 was used, as it was suitable for documenting a large extent of them. Excavated structures and sections were drawn at the standard scale of 1:20. Both types of plans were used to record the positions of artefacts.

In some cases we used an auger to characterise depth and stratigraphy of sunken feature infills. This approach is useful especially in sites with developed soils (e.g., Kobyla hill). Patches of snow provide some more help because in trench depressions snow stays longer (Fig. 2). During our research we also tried to use geophysical methods at places where the trenchline is not preserved, mostly in open fields. Geomagnetism was tested at two sites, Wertyszów and Cingov, with a Magneto DLM magnetometer device from Sensys, with five gravimetric sensors. The survey was conducted by geophysicists from the Herman Ottó Museum in Miskolc, led by Daniel Kiss (2018). However, its results are questionable (see Zubalík *et al.*, 2019; Kapavík *et al.*, in print).

The remote landscape of the eastern Carpathians is an ideal environment for metal detecting. Despite all large metal artefacts being long gone because of three decades of illegal plundering, there is still great potential for archaeological exploration by this method. It can be used for quick non-destructive large-scale reconnaissance of metal concentrations in places such as battlefields, camping grounds, firing lines, etc. (see the discussion of Wertyszów below) or for classic "invasive" metal detecting, such as at Staviská hill. By contrast some places in the Carpathians are littered with so many metal artefacts that manageable detecting is nearly impossible to process (for example at Kobyla hill, where heavy fighting took place).

In terms of coordinating the data collection process, it turned out that best performance was achieved with a total station, or by old-school marking on the paper plans printed at 1:20 or 1:100 scale. GPS plotting often has inconsistent accuracy caused by forest density and satellite signal unavailability. Systematic metal detecting could be used as a way to protect endangered historical sites. Artefact looting took place mainly around the turn of the century and has harmed every single one of the sites which we have studied. It seems that illegal activities in the Carpathian battlefield have slowed down, partly because Slovakia adopted a new archaeological act in 2009, but mainly because it is much harder to find "valuable" war artefacts now (Michalík 2009: 524, 535; Zubalík *et al.*, 2017: 520).

Remote sensing and GIS processing

Part of the research included the evaluation of available LiDAR data that are freely accessible through the Polish service *Geoportal Infrastruktury Informacji Przestrzennej*. Such data were only available for sites close to the Slovak-Polish border. Data from Slovakia had not yet been published for the surveyed area (as of October 2022). A digital elevation model of the sites was processed in ArcGIS Pro with the help of its relief visualization toolbox, specifically the "Multidirectional hillshade" and "Local relief" functions (Zakšek *et al.*, 2011). These functions helped us with the reconnaissance of sections that were poorly visible during the field surveys. Visibility analysis for the site Staviská was performed by a "visibility" function with two different settings. The first was visibility from the ground level (e.g., by a soldier in a trench) and from the height of 1.5 m (e.g., by a standing soldier outside of a trench). The second was visibility from the ground level (e.g., by a soldier in a trench) and from the height of 0.5 m (e.g., by a crawling soldier).

We processed the results of our field surveys in ArcGIS. The data were negatively affected by several factors such as inaccurate maps, GPS device accuracy and problematic RTK corrections. Therefore, we had to conduct a geodetic survey within a relative network and spatially adjust the GIS layers during post processing. LiDAR data served to visually review the postprocessing corrections. During our field campaigns, we use a simple, lightweight commercial quadcopter (Mavic), mainly to create pictures of whole sites and their emplacement in a broader context (e.g., Fig. 10).

Considering that all the preserved parts of the First World War fortifications we researched are located on wooded land, there is no point in trying to map/picture them from the air. Nevertheless, a quadcopter can also be used for the aerial documentation of excavated structures.

RESULTS

Staviská

The site had been occupied by the Austro-Hungarian army since the end of March 1915. On the morning of 3rd April, a Russian attack at nearby Stebnik caused the annihilation of the 28th infantry regiment. One remnant of it, about 50 men strong, retreated to the ridge of Staviská. During the day, the empty space in the frontline was quickly reinforced by the 4th regiment of the Tirolean Jägers (TKJR4), who kept the positions until 24th of April, when it was replaced by the 97th Infantry regiment (IR97). This regiment held the line for the next few days until 5th of May, when the whole place was left by the army, due to the success of Gorlice-Tarnów offensive[1] (Vojtas 2018: 25).

An archaeological survey has been conducted in several expeditions since 2013. During this period we have mapped and analysed a large part of the frontline and the structures behind the line; one of which was excavated (Fig. 3). The main aim of the survey was concentrated in the area between the top of the Staviská hill and the place where the frontline bent at the end of the ridge to the saddle to the south. The whole area is built of sandstone flysch, which rises almost to the surface. Fortification systems were thus built primarily of rock. Without the need of excavation it is still possible to trace and document the stone walls of the trenchline, standardized hideouts/shelters, firing ports, and probably also machine gun nests, which, however, is yet to be confirmed (Fig. 3; Vojtas 2018: 67). Behind the trenchline was a plateau with structures, situated mostly behind the ridge, hidden from the enemy eyes and connected with the frontline by connection trenches. Metal detector surveys of these places prove that they were used mostly for camping (Vojtas 2018: 53).

One of the largest rearline structures was excavated in 2020. In the middle of the north side, a stone oven with metal plates was built. In the ash filling of the oven there was a bone from a sheep or goat. Other finds consisted of eight metal meat cans, utensils and a fragment of window glass. Walls built of boards were joined by nails and insulated using cardboard, and the roof was supported with posts (Fig. 4, top). Another important fact connected to this structure in this place is the location of the

1 Feldakten der Tiroler Kaiserjäger, Tiroler Landesarchiv, TKJR 4, Gruppe II, Karton 32, Akten IV.

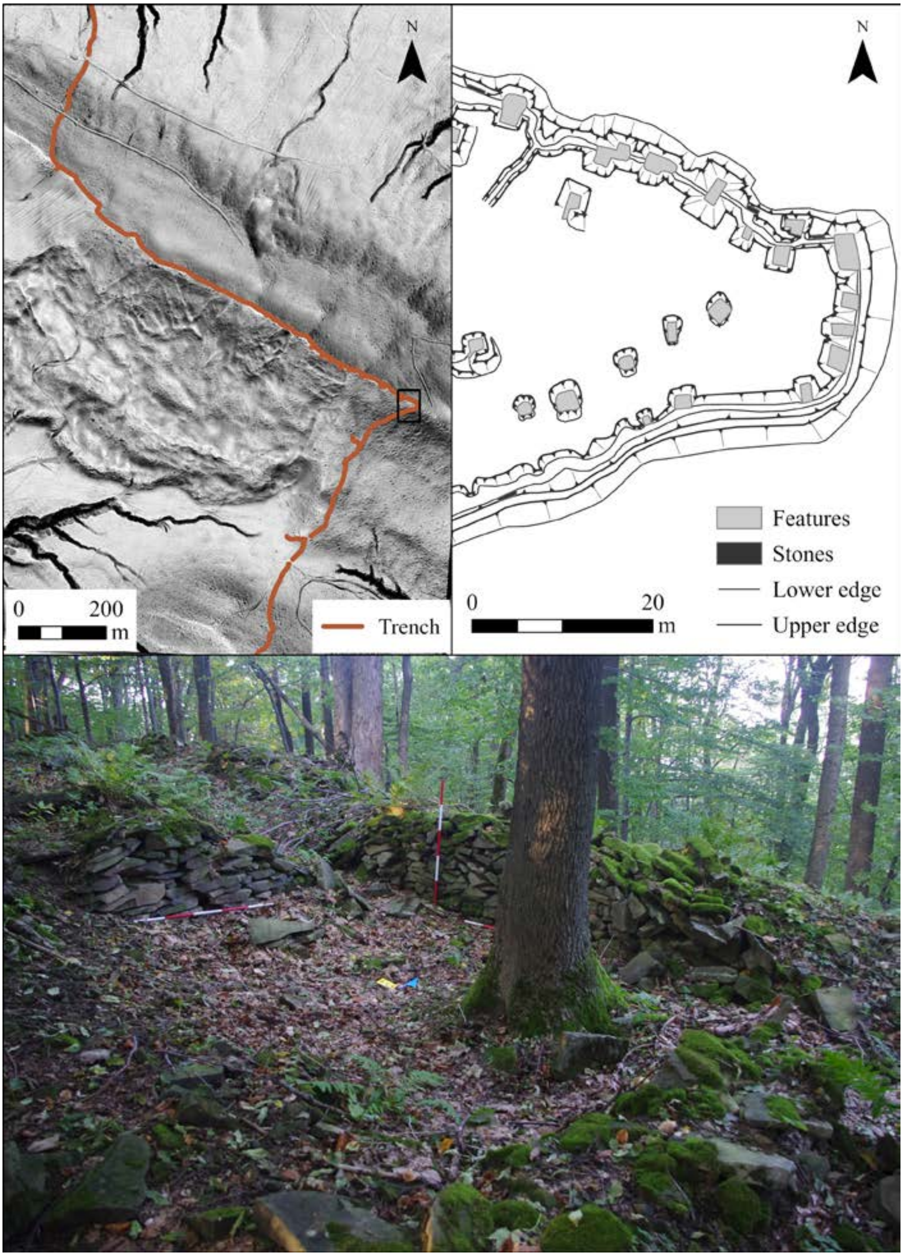


Fig. 3. Top left: preserved trenchline at Staviská; top right: documented trenchline at Staviská ridge. Bottom: preservation state of trenchline at Staviská. Graphics created by the authors.

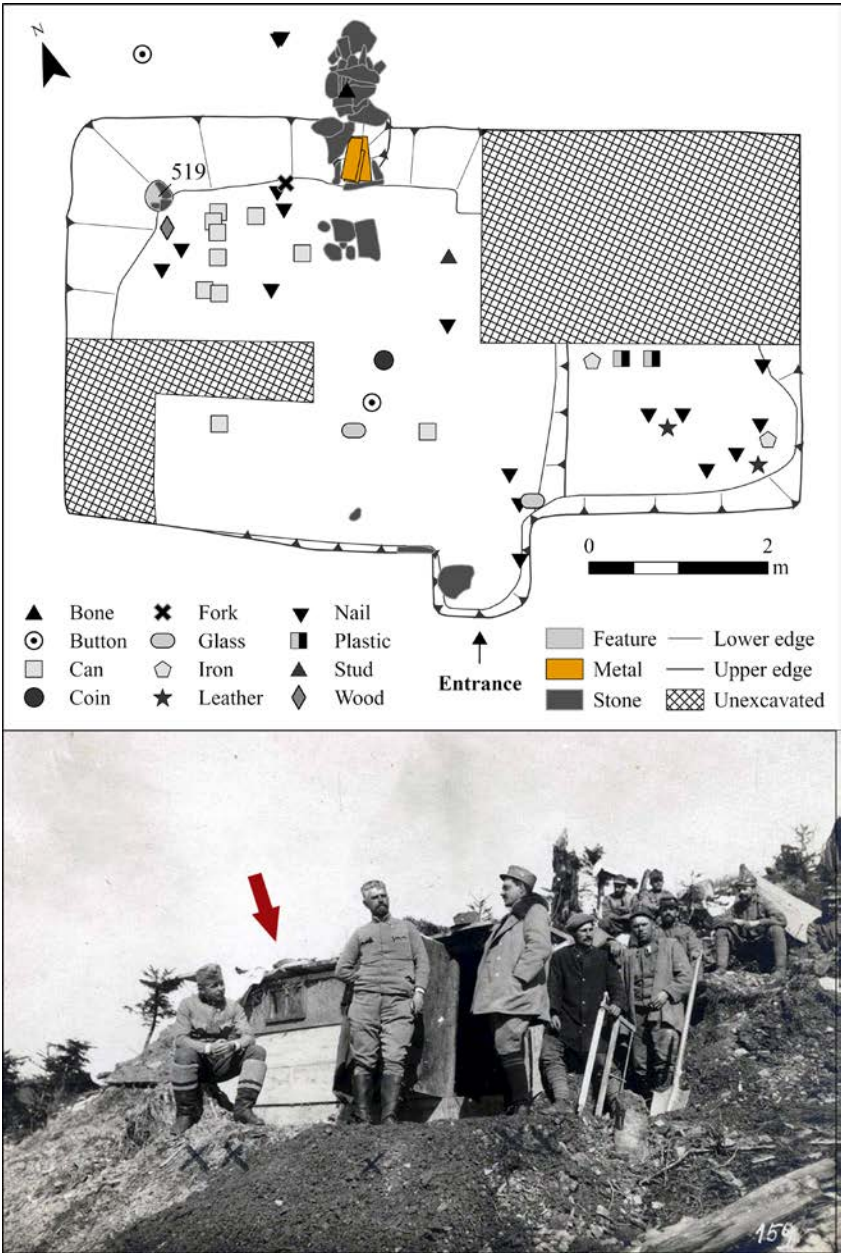


Fig. 4. Top: rearline structure at Staviská. Bottom: HQ of 28th Infantry Regiment (Opravil 1917, modified). Graphics created by the authors.

"Gruppenkomando Plazini" headquarters. According to period plans[2], it is located somewhere in this area, without closer specification. Photographs of other comparable officer huts allow us to think about this possibility (Fig. 4, bottom).

The whole fortified ridge was never attacked by the Russians, who occupied the opposite hill, Lieštiny. In historical sources, we have only found one mention of the ridge, stating that "On 7th April, hptm. Szmarzenka at Plazini was hit by shrapnel to his butt and went to seek first aid; the new commander is hptm. Kern"[3]. At the entrance of the excavated structure, we have actually found one shrapnel ball. Other than that, of all the ammunition found at Plazini, which was the most common find here, only two rifle and two pistol cartridges were shot. The rest of the empty cartridges were emptied to obtain gunpowder, possibly to use as a firestarter.

Besides ammo, most of the artefacts found are construction and fortification remains (nails, barbed wire), parts of equipment and personal belongings (buttons, coins, *Zeltbahn* loops, a FJI cockade/head badge, a table fork and a folding table knife, and a pocket watch attachment). Together with reports from the archive, where new supplies of cardboard and boards were often mentioned [4], this led to the idea of well built trenches with wooden roofs. These constructions are also captured in historical photographs (Fig. 5). The absence of a bigger amount of materials at present could be connected with later organized disassembly of these structures by the army or by the local population for further use. We quite often encounter information from locals to the effect, "our grandpa built a barn of these boards".

Kobyla hill

One of the fiercest fights in the territory of today's Slovakia took place in the hills above the village of Výrava during the winter of 1914/1915. The hills on its northeastern side were occupied by the Russian army (800 m a.s.l.), while the Austro-Hungarian army built its defences on the hills opposite: Kobyla hill (638 m a.s.l.) and Dielec hill, directly above Výrava. It was here that the Russians launched one of their main assaults in March 1915, in a battle which became known as the "Easter battle in the Carpathians". Their first target was Dielec hill. After they conquered it, the assault continued towards Kobyla hill for several days. In the end, the Russian army seized the Austrian trenches. However, several days later, the combined forces of the Austro-Hungarian army and German *Beskidenkorps* launched a successful counterattack

2 Neue Feldakten, Divisionkaommandos, Österreichisches Staatsarchiv, Kriegsarchiv Wien, Karton 1614, 1615 (28. ITD; April 1915).

3 Feldakten der Tiroler Kaiserjäger, Tiroler Landesarchiv, TKJR 4, Gruppe II, Karton 32, Akten IV; 7th April

4 Feldakten der Tiroler Kaiserjäger, Tiroler Landesarchiv, TKJR 4, Gruppe II, Karton 32, Akten IV; 8th, 15th, 17th and 21st April)

Fig. 5. Constructions behind lines (Opravil 1917, modified). Graphics created by the authors.

and took back the original positions[5] (Kapavík 2016). These hills are forested nowadays, which creates favourable conditions for preserving the remains of fortifications, which are endangered only by forest machinery and artefact looting.

5 Combat report on the activities of the 2nd Infantry Division 23 March – 4 April 1915, Österreichisches Staatsarchiv, Kriegsarchiv Wien, Neue Feldakten b: Gefechtsberichte und Umstürzberichte, Karton 1802 (Alt).

The survey on Kobyla hill brought some difficulties not encountered at the other sites. The main drawback is the absence of LiDAR data for this area (January 2023). Therefore, the only way to track the trench lines is to study historical documents first and then to conduct field research. However, the interpretation is also complicated here because the whole ridge, including the Kobyla hill and the Dielec hill, changed ownership several times during two different assaults. Therefore, several trench lines belonged to different armies, and some fortifications could have been used by both armies at different stages of battle (Zubalík *et al.*, 2017: 539–540).

The most important historical documents for studying the course of the front are staff maps of the Austro-Hungarian 2nd Infantry Division, which defended its positions here. These maps were created on 25th March, 26th March, 27th March, 29th March, 31st March and 3rd April 1915.[6] Most of them depict the 2nd Infantry Division holding the trenches on the hills Javirská and Kobyla; the Russian army was already situated on Dielec hill (Fig. 6, top).

There are several trenches and other field fortifications directly on the tops of Kobyla hill, Javirská hill, and Dielec hill, which continue to the ridge in the southeast direction. Some sections of the trenches are well preserved to this day, reaching the depth of 1 to 1.5 metres. However, there are also sections that have almost disappeared. The whole complex, documented by GPS, has an overall length of more than 5 km. Directly on Kobyla hill, there are at least two trench lines – one is oriented to the north-east, facing the Russians, the other one is on the opposite side of the hill. The latter is shallower, indicating that it was prepared in a shorter time, so it perhaps belonged to the Russian army (Fig. 6, bottom). This situation should be similar to the opposite situation described by Simon Verdegem at Messines Ridge, where a fight occurred in June 1917 and where the German trench system was taken over by the Allied forces (Verdegem 2021: 49). In both situations neither of the sides fully used the trenches of opponents, but built their own due to different expectations, tactical situations and customs.

For the more detailed survey, we selected one part of the Austro-Hungarian trench on Kobyla hill. The trench line has three bends here, each making an angle of almost 90 degrees. Here, a greater number of structures than average were situated directly on the trench line. Six of them were connected in a standard manner to the rear wall of the trench; however, three more were connected to the front wall of the trench. As far as we know, these are only structures connected to the front wall of the trench in the whole fortified area. Approximately 100 metres eastwards, the base of the trench line goes up to the surface. From this point, the field fortification continues as a rampart for several dozens of metres before it changes into a trench again (Zubalík *et*

6 Ibidem.

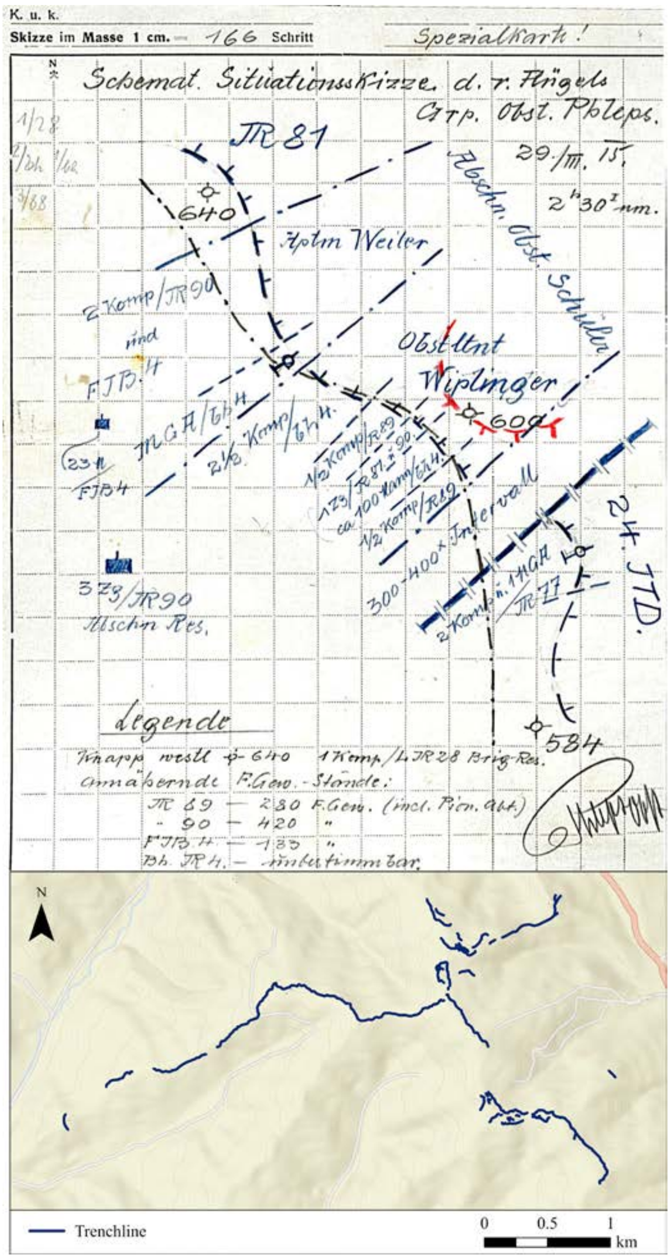


Fig. 6. Top: staff map of 2nd division at Javoriská and Kobyla hill. Bottom: GPS of trenchline at Kobyla hill. Graphics created by the authors.

al., 2017: 544–548). Historical accounts state that ramparts were built if there were many roots in the soil.[7]

Approximately 50 metres behind the bends of the trench line, there is a group of five connected structures. Their dimensions are 2.3–3.4 m by 1.2–1.8 m; the fifth one is a little larger and has two entrances. The function of these structures is unclear. Perhaps they served as rearline shelters for soldiers or as ammunition depots, as might be indicated by a hoard of 8×50 R Mannlicher cartridges, found in a wall (Fig. 7; Zubalík *et al.*, 2017: 549–550).

Wertyszów

The first fights in the area between Austro-Hungarian and Russian soldiers took place in November 1914. At that time, the 3rd Army (of Austria-Hungary) was forced to retreat here from Galicia by attacks of The Russian 8th Army. It was decided to make a defence line in the territory around Medzilaborce, including Wertyszów (the name of the hilltop from the Polish side). However, the defence was not successful and since December quite a large area was controlled by the Russians. For the next few months, numerous skirmishes occurred in the area of the hill, but in terms of positions, nothing changed. The turning point came after the Gorlice offensive (2nd May 1915), which brought a great retreat of Russian forces.

At the time, the Austro-Hungarian forces were ordered to attack and pursue the retreating Russian troops. On 6th May, they reached the village of Habura, which was the night before burned by the enemy. A Russian rearforce (Siberian riflemen from the III Russian army), created a defence line around Wertyszów hill (742 m) and Revejka (752 m). The Austro-Hungarian headquarters decided to attack early in the morning on 7th May. Responsible for chasing out the last Russians from sovereign Hungarian land were the 17th and a mix of the 1st, 2nd, 3rd and 4th Royal Honvéd Regiments. After a full day of fighting, the Russians were put to flight (Kriegsarchiv Wien 1932; Rozsáfi 2017).

The Russian defence line is well preserved at the edge of the Polish–Slovak border forest (Fig. 8). We have recognized three types of structures. Most recognizable is a line of rectangular foxholes with their smaller side facing down the hill. According to Russian sources (Sytin 1914: 6–9), these are firing pits for single riflemen. In some sections of the frontline, groups of firing pits start to connect together. Thus we can study the process of trench-making. The distances between foxholes document the

7 Combined Fund of the Headquarters of Infantry Regiments, Military Central Archive Prague- Military Historical Archive Prague, Combined Fund of the Headquarters of Infantry Regiments K. und K. Infantry Regiment No. 81, k. 7, Gefechtsberichte - Situationen, Description of the regiment's battles from the beginning of the war to 30.3.1915.

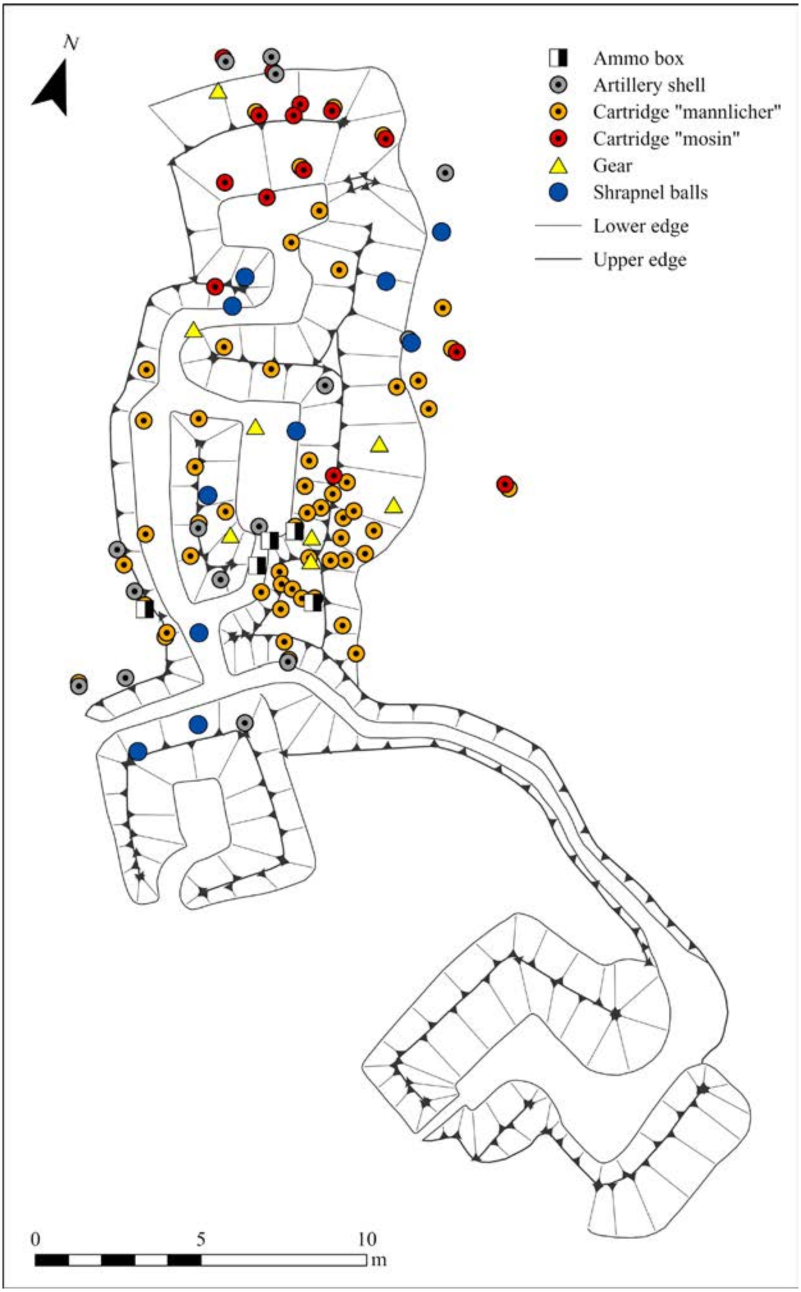


Fig. 7. Investigated structure at Kobyla hill (Zubalík *et al.*, 2017: 549–550; modified).

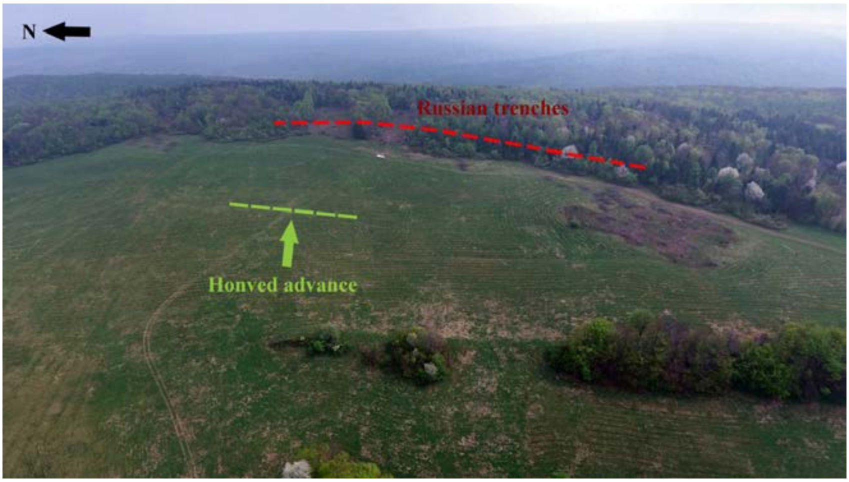


Fig. 8. Aerial view of Wertyszów – Habura. Photo: Authors.

inconsistent density of Russian soldiers. The second type are irregular dugouts with visible entrances. Because of the presence of artefacts inside, we can assume that they possibly belonged to Austro-Hungarian positions from 1914. The most recent ones that can be distinguished are possibly connected with the end of the Second World War. Large dugouts for Soviet artillery are superimposed on imperial Russian firing pits. Especially in mountainous areas, where the choice of positions is strongly influenced by the configuration of the terrain, it may happen that similar terrain positions are used in various conflicts.

In 2017, we decided to find the approximate place of the Honvéd attack. To achieve that, we followed the right angle from the Russian defence line down the hill into the pasture and by random use of a metal detector we found a large linear concentration of ammunition cases. These results allowed us to set two polygons (total area 50×50 m) for a detailed metal detector survey. The position of every single artefact was determined by a total station and then spatially evaluated in GIS. The total number of 173 artefacts can be divided into three categories. The most common finds are connected with the attack of Austro-Hungarian soldiers. These consist of 120 finds of spent 8×50 R cartridges for Mannlicher rifles, two bullets, ammo clips and a cleaning rod. The second category are shell fragments from Russian artillery support. The last one are recent artefacts, including a Czechoslovak coin from the communist era. Spatial analysis allowed us to recognize the exact firing line of Austro-Hungarian troops, which is nowadays invisible in the terrain (Zubalík *et al.*, 2019: 83). However, the exact place of the breaching point remains to be located (Fig. 9).

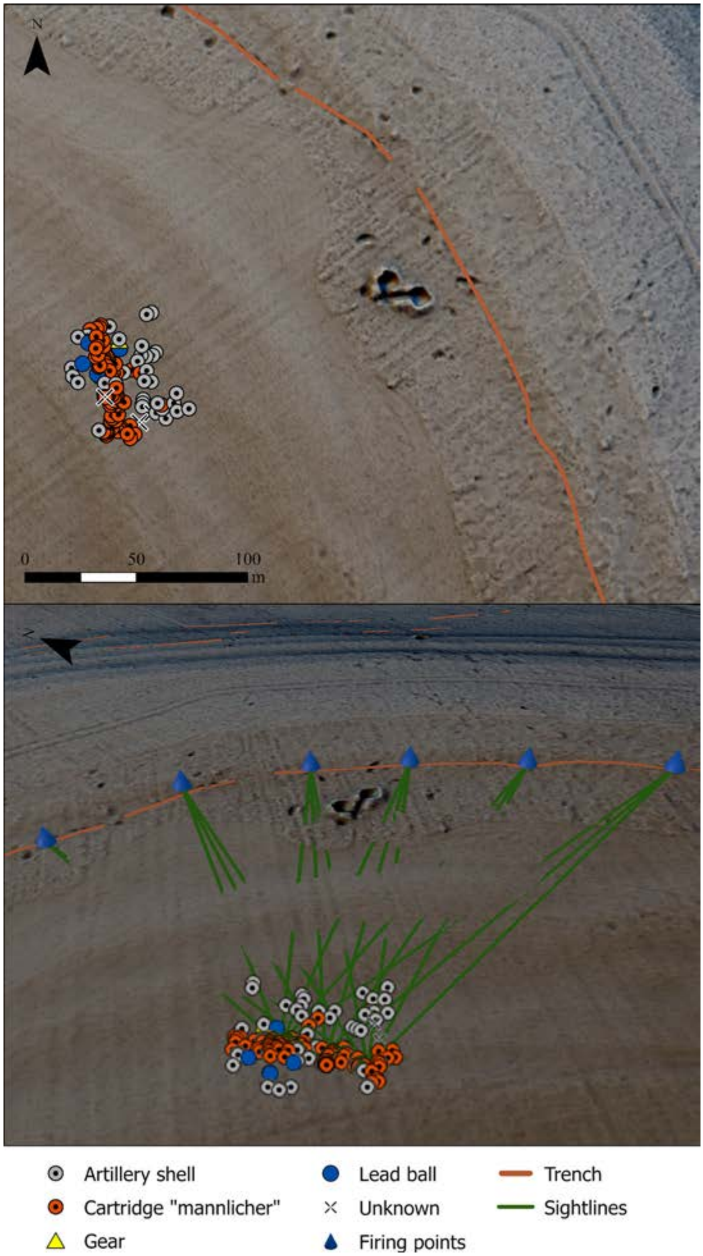


Fig. 9. Top: located Austro-Hungarian fire line and Russian trenches at Wertyszów – Habura hill. Bottom: results of visibility analysis. Graphics created by the authors.

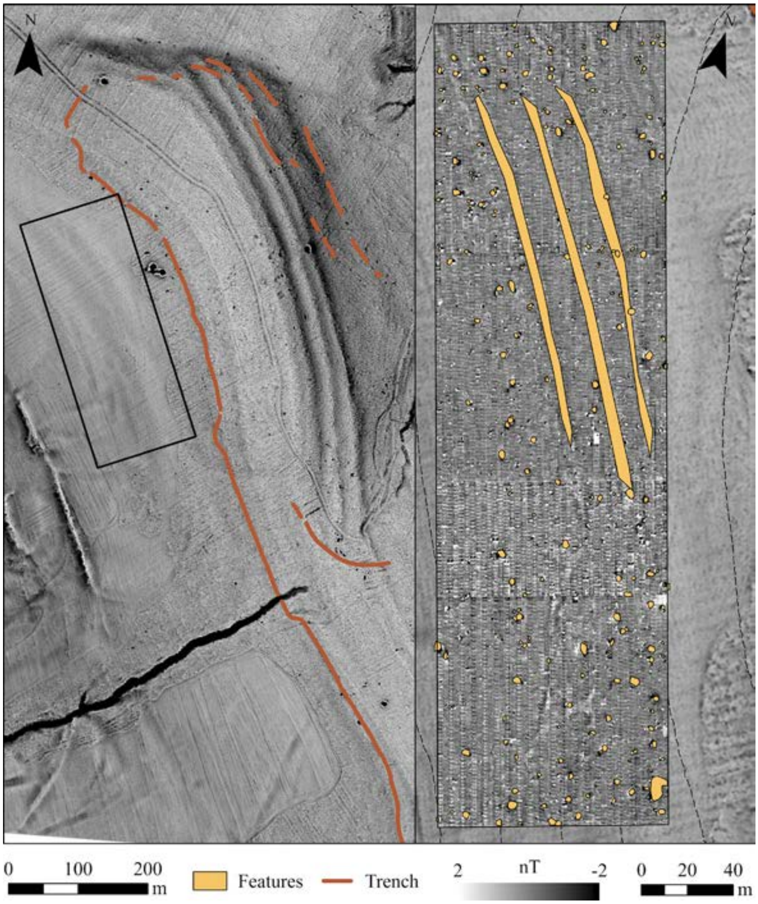


Fig. 10. Left: preserved trenchline at Wertyszów – Habura hill.
Right: eesults of geophysical survey. Graphics created by the authors.

The last part of our survey for the time being was a geophysical survey. It was carried out in summer 2018 by colleagues from the Ottó Herman Museum in Miskolc. They covered an area of 100×350 m. The results confirmed that there are no trenches in the area in front of the Russian line, but there are visible magnetic and ferromagnetic objects all over the place, which can be identified as possible artillery shell fragments. Interesting are three visible ditches of unknown function. They are not filled with magnetic and ferromagnetic objects. There is a possibility that they are results of older agricultural activities (Fig. 10; Kiss 2018).

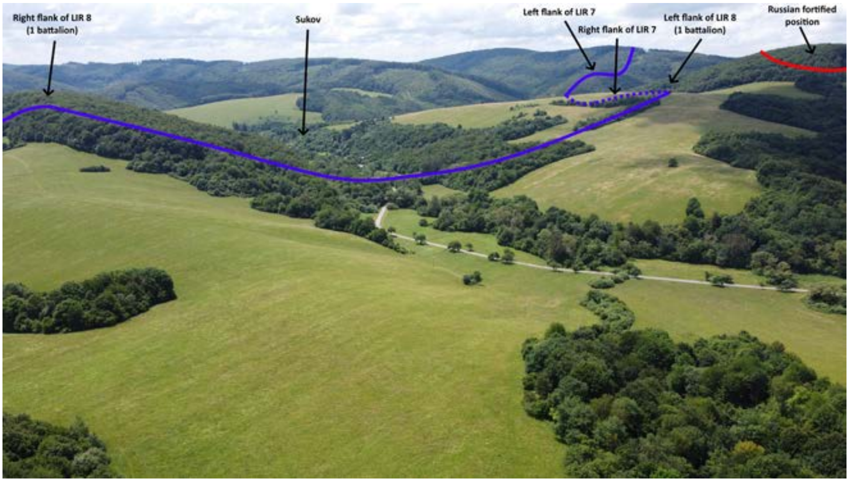


Fig. 11. Position above Cingov – Sukov after the end of the Austrian counteroffensive – 18 February – 20 March 1915. Photo: Authors.

Cingov

The Cingov site is situated in one of the most important areas of the conflict between the Russian and Austro-Hungarian armies due to its strategic location (the railway line leading through the Lupkow Pass through the Carpathian ridge). The front line settled near the village of Sukov for a month (from February to March), when a surprise attack by Russian troops took place here. Due to this attack, a large part of the Austro-Hungarian 8th Landwehr Infantry regiment, defending the positions above the village, was captured. The vast majority of the north-east Slovak trench lines are situated in forested areas, so they are well preserved. Above the village of Sukov, on Cingov hill (411 m a.s.l.), however, the section of the trench line passes through a grazed meadow (Fig. 11). Aerial photography did not reveal any crop marks and soil marks that would indicate the presence of belowground remains. Even a surface survey of the site did not reveal any remains of trenches, whose positions can be estimated only from an officer's report sketch dated to 10 March 1915[8] (Kapavík *et al.*, in print).

The main purpose of the survey was to find the trench line and thus to confirm or refute its presence in this tactically unfavourable position. Another issue was the documentation of combat operations in the area. A geophysical survey with a magnetometer

8 Neue Feldakten, Divisionkommandos, Österreichisches Staatsarchiv, Kriegsarchiv Wien, Karton 1195 (21. Schützendivision 1 March – 30 April 1915).

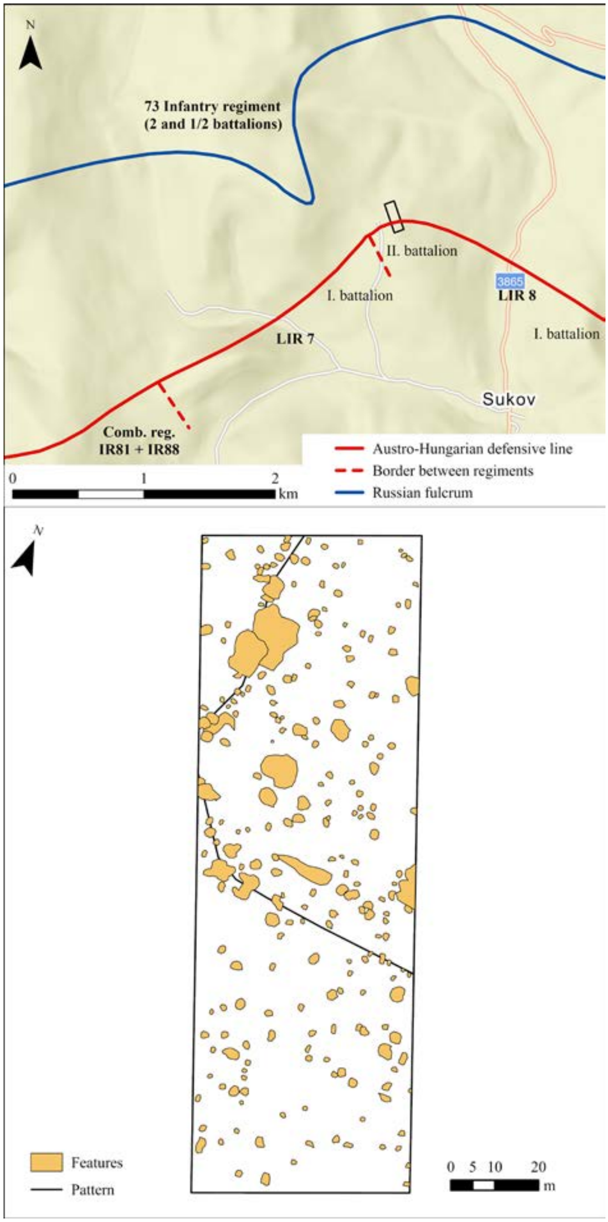


Fig. 12. Top: view of the area around Cingov – Sukov. Bottom: visualisation of magnetometric measurement results at the site Cingov – Sukov. The line marked the expected course of the trench according to the concentration of magnetic objects in the ground (Kiss 2018: 8). Graphics created by the authors.

was conducted in the summer of 2018 in an area of 150×50 m (Fig. 12). This survey was the first application of geophysical methods aimed at the First World War battlefield archaeology in the Carpathians. The survey did not reveal the presence of the trench itself, as the body of the trench line did not appear in the data of the resulting magnetogram. However, its results are affected by the presence of magnetic and ferromagnetic objects, such as metal artefacts or magnetic substrates. In our case, where we assume a larger amount of metal artefacts on the site, this information was used to our advantage. In a certain section, bipolar signals are clearly concentrated in a line passing through the entire measured field from the north to the west and from the west to the east. This indicates the existence of a firing line in these places and the accumulation of metal artefacts in the trench. In addition, the area contained small burnt surfaces, which, however, did not correspond to any pattern and were distributed randomly. It could be the result of an explosion of artillery ammunition.

DISCUSSION

One of the basic questions during field surveys is the reason for building trenches in their current positions. First of all, we need to know the military manuals from this period. For the Russians it is manual from 1910 (*Voyennaya tipografiya* 1910). The most relevant for the Austro-Hungarian army at the Carpathian front are manuals from 1906 and 1911 (K. u. k. Kriegsschule 1906; Steffen 1911). A reprint from 1915 corresponds to a doctrine change and the advent of positional warfare, due to experiences of the first year of war on the Carpathian battlefield (*Druck und Kommissionsverlag der k. k. Hof- und Staatsdruckerei* 1915; *Druckerei des k. u. k. Kriegsministeriums* 1915). Nevertheless, even these did not represent the specifics of mountain warfare. This opens the opportunity for comparison.

The character of the entire field fortification at Staviská hill suggests a certain level of improvisation during its construction. The terrain is almost never ideal for a trench system to be built exactly according to the manuals, but the Carpathian battlefield and static positional warfare was something to be dealt with. Two classes of structures identified at Staviská trenchline can be interpreted as shelters, in manuals defined as *Untertritte*, which should be underground in the frontal side of the trench (*Druck und Kommissionsverlag der K. K. Hof und Staatsdruckerei* 1915: 33–34), and the third class represents bigger shelters known as *Unterkunft* (*Druckerei des K. u. K. Kriegsministeriums* 1915: 12, 16). In contemporary reports, there are machine guns pictured there, which should be located in a special type of structure. There is not a single structure like that, but some of them can be considered. The emplacement for the machine gun should protrude into the front wall of the firing line and there are some structures, which are situated on the trench line in this manner, but we found no physical evidence of the presence of heavy weapons (Vojtas 2018: 67).

In military manuals, it is recommended not to build trenches at the top or on the slope, but at the foot of the hill (*Druck und Kommissionsverlag der K. K. Hof und Staatsdruckerei* 1915: 15). However, this recommendation was not being followed by either army at any of our surveyed sites.

To understand why the trenchline was built on such spots, contrary to the contemporary military manuals, where different procedures are proposed (*Voyennaya tipografiya* 1910: 36; *Druck und Kommissionsverlag der k. k. Hof- und Staatsdruckerei* 1915: 15), we must use the data from the LiDAR. At Staviská hill, we were able to map the course of the line, compare it with old military plans and use GIS analysis tools. This analysis made it clear that the positions were built to keep a good overview of the opposite hill and stream in the pass; on the other hand, it was impossible to observe the space directly in front of the trenchline which was still hard to cover without leaning out of the trench (Fig 4, right). Other answers are provided by the profile of the hill, which offered limited space for building a trenchline with rear structures.

At Wertyszów and Kobyla hill, the terrain is comparable. Defending soldiers simply used the advantage of a relatively flat hilltop, with a long climb. At a distance of about 150 metres from trenches, located close to the ridge, there is a rise in the terrain that allows advancing troops to be quite effectively covered from defenders, but the rest is open field, which makes the area in the defenders' firing range easy to control. According to the maps of the Third military Survey from the second half of the 19th century (1869–1885), these areas of both of the hills were deforested and used as pastures. This was the background to the successful Russian defence and high losses of attacking Honvéd soldiers. On 7th May 1915, more than 100 men were killed and hundreds were wounded, when Honvéd troops were pinned down on the meadow, exposed to enemy infantry and artillery fire for a whole day (Zubalík *et al.*, 2019: 115–116).

Unfortunately, there are no available LiDAR data for the sites of Cingov and Kobyla hill, so we utilized other methods to map trench lines and other features. The Cingov site is mostly situated on an arable field with no visible morphological features. One of the main reasons was probably the situation when the main fighting took place over the possession of the hills and whoever was at a lower spot was at a dissadvantage. The enemy could fire from higher ground directly into the trenches. We have learnt there that using magnetometry to search for military trenches is difficult, but in this given area, where we know the trenchline was present, it was possible to locate a line of ferromagnetic anomalies, which we put down to metal objects left in the trench. The line marked this way traces the trench line. In addition, burnt surface signals can indicate locations of the impact of artillery ammunition and thus can help us to evaluate the extent of combat operations. (Kiss 2018: 2–4; Kapavík *et al.*, in print). The reason for building trenches at positions on Cingov hill makes less sense and they are the result of a disadvantageous tactical situation.

There is a difference between the Austro-Hungarian and the Russian trenches in the way they were built. The Russian trenches were supposed to be dug in a zig-zag manner (*Voyennaya tipografiya* 1910: 32), but quite often they were just straight lines. These trenches have not yet been specifically surveyed, as we focused on the Austro--Hungarian remains, but for the sake of a comprehensive understanding, we will give them more attention in the near future. Austrian trenches were constructed with a traverse system, in which the line is interrupted every few metres by a rectangular bypass (*Druck und Kommissionsverlag der K. K. Hof und Staatsdruckerei* 1915: 17). There had to be shelters in trenches, but in the conditions of Carpathian winter, it was very difficult to build such underground shelters. At Staviská, we have a special situation, where trenches and shelters could not be dug, so shelters were built at the level of trenchline (see Fig. 3).

Another possibility was to build shelters close to the trenchline. In the case of Staviská, this was on the far side of the hill, where geological platforms served as bases for encampments (findings of *Zeltbahn* loops). Constructions of another kind were built of wood, earth and with insulation of cardboard, as the one described above. It is quite clear that it served the purpose of a shelter, where food was prepared in an oven, and according to period photographs, it possibly also served as a headquarters. The manuals propose to build such constructions and camps deeper in the rear of the combat zone, but here it is placed on the other side of the hill in a place where it was protected from shelling by its steep slopes.

The other rear structure was investigated at Kobyla hill. Here, no heating was found, but the area was under heavy gunfire from infantry and artillery weapons. The presence of a bigger amount of ammo, equipment and personal items suggest that this area was not just a shelter, but maybe a depot (Fig. 7).

The whole area of Kobyla hill is unfortunately well known for illegal metal detecting. Still, it was littered with artillery ammunition, namely frag grenade fragments and lead shrapnel projectiles that contaminated the soil in a way that metal detecting was very time-consuming and nearly meaningless (Zubalík *et al.*, 2017: 550–555). This is the clear evidence of how intense was the clash that we are trying to unravel.

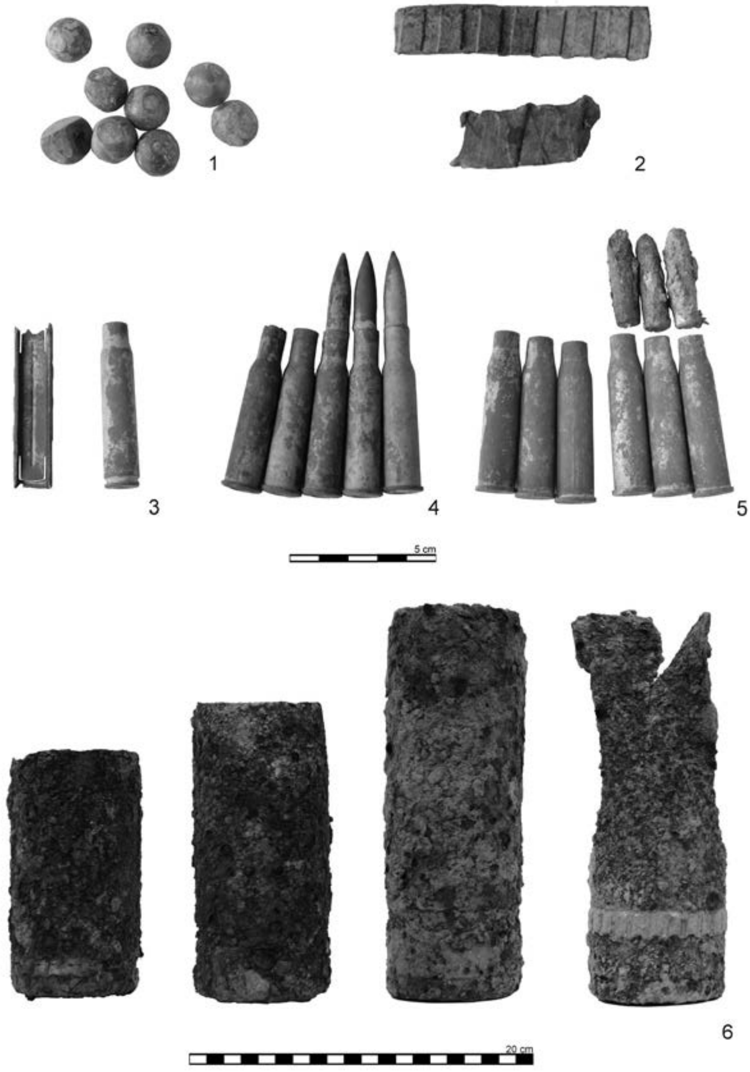


Fig. 13. Examples of handgun and artillery ammunition from Kobyla hill: 1. shrapnell lead projectiles; 2. copper driving bands; 3. 7,92x57 mauser clip and spent cartridge made in 1914 – evidence of German troops at Kobyla hill; 4. 7,62x54R mosin projectiles and cartridges; 5. 8x50R Mannlicher projectiles and cartridges; 6. Russian 76 mm shrapnel grenades. Photo: J. Těsnohlídek and J. Petřík; Zubalík *et al.*, 2017: 551.

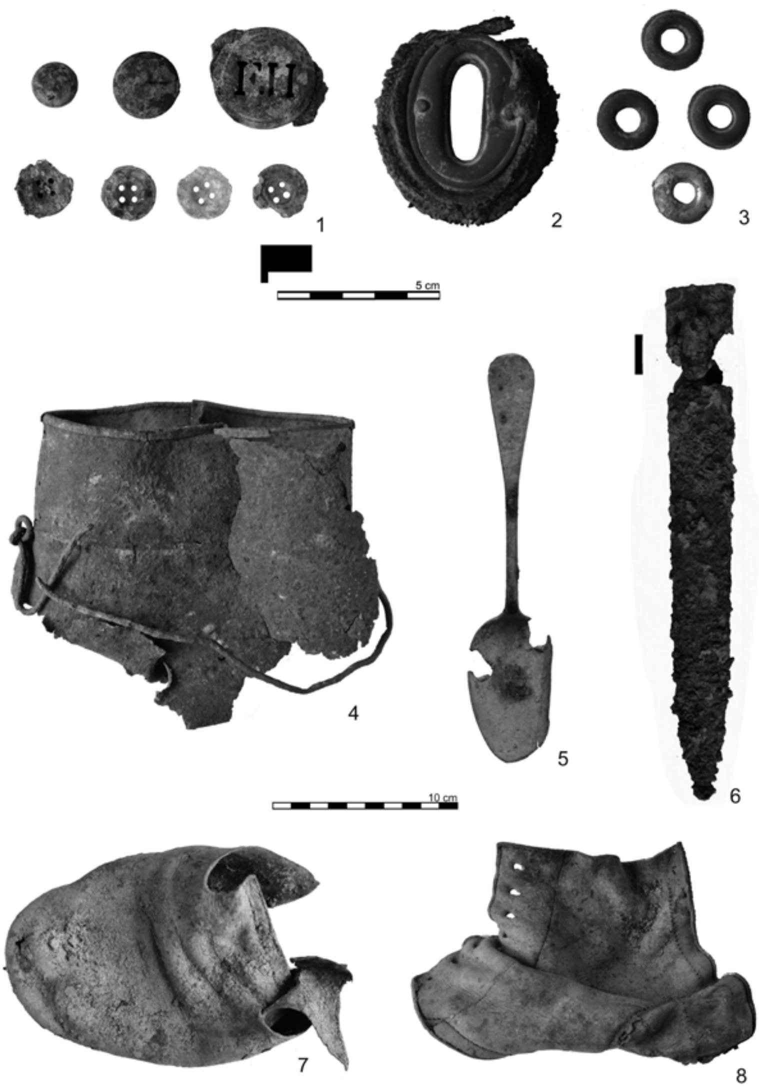


Fig. 14. Examples of Austro-Hungarian equipment from Kobyla hill: 1. FJ-I headbadge/cocarde and various uniform buttons; 2. and 3. *Zeltbahn* loops; 4. M1888 Austro-Hungarian mess kit body; 5. kitchen spoon with impact holes; 6. Mannlicher bayonet scabbard; 7. and 8. remains of service ankle boots. Photo: J. Těsnohlídek; Zubalík *et al.*, 2017: 554.

CONCLUSION

Every one of the sites discussed here has its unique situation and history during the same time period of the Carpathian war of spring 1915. In this paper, we have briefly described each of them and examined their common features and differences. The main benefit of studying the site Staviská is because it represents a place where there was enough time to build a solid trench line into the rocky ground. This gives us an opportunity to study this place as a unique set of relatively organized positions in the chaos of war. The trenches and the rear structures are well preserved, deserted in a short time with a lot of artefacts found in situ. At Kobyla hill and Javirská hill, intense fights took place, and our metal detecting survey yielded a lot of Austro-Hungarian and Russian rifle ammunition, an M1888 Austro-Hungarian mess kit, several parts of infantry ankle boots, a Mannlicher bayonet scabbard, an alpacca spoon with an impact holes, some Austro-Hungarian buttons, an FJ-I headbadge/cocarde and *Zeltbahn* loops (Figs 13 and 14). The trenches were of short-term use, built by all three armies of the conflict, and their affiliation and mutual relations deserve to be subjected to further research. The strongpoint structure was also investigated by a metal detector and the results indicate that it was heavily shelled. Wertyszów is at this moment the perfect place to describe a single-event battlefield utilizing archaeological and geo-information data (even with disruptive superpositions from World War II). We were able to delimit the positions of attacking and defending soldiers, their activities and directions of advance. They were strongly affected by the local terrain. The survey at Cingov was done to locate the line of the Austro-Hungarian army. The overall results are significant not only because of the successful localization of the trench line, but also from a methodological point of view. It turned out that it is not necessary to search directly for the belowground structure (i.e., the body of the trench), but that it is possible to evaluate secondary symptoms of its presence, such as metal artefacts inside the trench.

This article is an initial report on surveys of a set of remarkable war-time relics, and progress in archaeological science will bring about a more complete picture of the Carpathian battlefield.

REFERENCES

Czarnowicz, M. and Ochał-Czarnowicz, A. 2019. Cmentarze wojenne w masywie Kamenia nad Jaśliskami. In M. Karczewska (ed.), *Cmentarze i pomniki I wojny światowej po stuleciu. Stan badań i ochrony*, 67–82. Białystok.

Čaplovič, M., Drobňák, M., Szabó, V. and R. Turík (eds). *Karpatský front 1914/1915*. Bratislava: Vojenský historický ústav – Klub vojenskej histórie Beskydy.

Dejmal, M., Knápek, A., Machová, B., Prišťáková, M., Těsnohlídek, J. and Vágner, M. 2016. Opevnění v poloze "Na šancích" u Ledče nad Sázavou. *Studia Archaeologica Brunensia* 21(1): 185–205.

Druck- und Kommissionsverlag der K. K. Hof- und Staatsdruckerei 1915. *Feldbefestigung und technischer Unterricht. Instruktionsbuch für Reserveoffiziersschulen* 6. Wien.

Druckerei des K. u. K. Kriegsministeriums 1915. *Anhaltspunkte für die Anlage von Kampfstellungen*. Wien.

Englund, P. 2012. *The Beauty And The Sorrow: An intimate history of the First World War*. Profile Books.

Kapavík, R. 2016. Působení 81. pěšího pluku v Karpatech na jaře 1915. In M. Čaplovič, M. Drobňák, V. Szabó and R. Turík (eds), *Karpatský front 1914/1915*, 87–99. Bratislava.

Kapavík, R., Vojtas, M., Petřík, J., Těsnohlídek, J., Zubalík, J., Čmelák, O., Tajkov, P. and Balogh, A. in print. Archaeological survey of trenchline from First world war over Sukov (NE Slovakia). In P. Drnovský, and P. Hejhal (eds), *Archaeology of Conflicts* 2. Hradec Králové.

Kiss, D. 2018. *Non-Invasive Research into a First World War Battlefield on Kobyla Hill. Geophysical work. Part (Habura, Laborcfő)*. Unpublished geophysical Survey Report by Herman Ottó Múzeum, Miskolc.

Kobiałka, D. 2022. Curating The Great War In Poland. The prisoner-of-war camp at Czersk. In P. Cornish and N. J. Saunders (eds), *Curating The Great War*. Routledge.

Kołodziejczyk, P., Czarnowicz, M. and Czarnowicz-Ochał, A. 2016. Traces of the Great War in the Carpathian Mountains: research and documentation of elements of fortifications in the region of Jaśliska and Moszczaniec in the years 2015–2016. *Journal of Heritage Conservation* 46, 110-118.

Košir, U. 2019. Legacies of the Soča Front – from rubbish to heritage (1915–2017). In U. Košir, M. Črešnar and D. Mlekuž (eds), *Rediscovering the Great War. Archaeology and Enduring Legacies on the Soča and Eastern Fronts*: 181-198. Routledge.

Kriegsarchiv Wien 1932. *Österreich-Ungarns letzter Krieg 1914–1918 (Band 2)*. Wien, Verl. der Militärwiss.

K. u. k. Kriegsschule 1906. *Studienbehelf für Feldbefestigung*. Wien.

Mazáčková, J., Doležalová, K. and Těsnohlídek, J. 2016. Zaniklé středověké vesnice na Moravě, dějiny bádání a stav výzkumu. In. P. Nocuń, K. Fokt and A. Przybyła-Dumin (eds), *Wieś zaginiona. Stan i perspektywy badań*, 59–92. Chorzów. Monografie i materiały MGPE 5.

Michalík, T. 2009. Právne aspekty ochrany archeologického kultúrného dedičstva v Európe. *Archeologické rozhledy* 61(3): 524–546.

Mlekuž, D., Košir, U. and Črešnar, M. 2016. Landscapes of Death and Suffering: Archaeology of Conflict Landscapes of the Upper Soča Valley, Slovenia. In B. Stichelbaut and D. Cowley (eds), *Conflict Landscapes and Archaeology from Above*, 127–145. Routledge.

Opravil, A. 1917. *Personal belongings of Antonín Opravil (officer of Infranterie Regiment 28)*. Personal archive of PhD Kateřina Bečková.

Roman, R.-T. 2020. *The Edge of Europe. Heritage, Landscape and Conflict Archaeology. First World War material culture in Romanian conflictual landscapes*. Oxford. British Archaeological Reports. International Series 2987.

Rozsáfi, J. 2017. *Győzelem – minden áron?* https://nagyhaboru.blog.hu/2017/05/18/gyozelem_minden_aron

Steffen, A. 1911. *Feldbefestigung*. Olmütz.

Sytin, I. D. 1914. *Voyennaya entsiklopediya 17*. Sankt Peterburg.

Těsnohlídek, J., Duffek, P., Kochan, Š., Hrubý, P. and Maršíčková, M. 2017. Detektorový průzkum zázemí tvrze v Ústrašíně. *Vlastivědný sborník Pelhřimovska* 23: 7–14.

Voyennaya tipografiya 1910. *Nastavleniye po voyskovomu inzhenernomu delu.* Sankt Peterburg.

Veda, 1979. *Encyklopédia Slovenska III. K–M*. Bratislava.

Verdegem, S. 2021. Cutting the landscape: Investigating the 1917 battlefield of the Messines Ridge. In N. J. Saunders and P. Cornish (eds), *Conflict Landscapes: Materiality and Meaning in Contested Places*, 34–50. Routledge.

Zakšek, K., Oštir, K. and Kokalj, Ž. 2011. Sky-View Factor as a Relief Visualization Technique. *Remote Sensing* 3(2): 398–415.

Vojtas, M. 2018. *Rakousko-Uherská zákopová linie na vrchu Staviská (okr. Bardejov) z roku 1915 ve světle archeologického výzkumu*. Master thesis manuscript. Masaryk University, Faculty of Philosophy. Brno.

Zalewska, A. I. and Czarnecki, J. 2019. An archaeology of 'No Man's Land'. The Great War in central Poland. In U. Košir, M. Črešnar and D. Mlekuž (eds), *Rediscovering the Great War. Archaeology and Enduring Legacies on the Soča and Eastern Fronts*: 122-139. Routledge.

Zalewska, A. I. (ed.). 2021. *Archeologia frontu wschodniego Wielkiej Wojny jako wyzwanie*. Warszawa-Lublin.

Zubalík, J., Těsnohlídek, J., Bíško, R., Petřík, J., Vojtas, M., Kapavík, R., Petr, L., Tajkov, P. and Drobňák, M. 2017. Nedestruktivní průzkum bojiště 1. světové války na kótě Kobyla (o. Medzilaborce). *Archaeologia historica* 42(2): 539–559.

Zubalík, J., Fojtík, M., Kapavík, R., Těsnohlídek, J., Vojtas, M., Petřík, J. and Tajkov, P. 2019. Maďarská palebná linie pod vrchem Veretyčiv u obce Habura: Prvotní výsledky výzkumu bojiště první světové války. *Studia Archaeologica Brunensia* 24(2): 75–88.

Archaeologia Polona, vol. 61: 2023, 61–74
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3208

Why is Archaeology Inalienable in Learning about the Traces of the Great War in Kozienice Forest and Restoring the Memory of the Forgotten History of a Century Ago?[1]

Angelika Bachanek[a]

The article presents the preliminary results of historical and archaeological research on the relics of the Great War in the Kozienice Forest. The aim of the article is to demonstrate the need to use archaeological methods in restoring the memory of the events of 1914 and 1915. The use of these methods to study the battlefield and its hinterland provides new information and allows for the analysis of battlefield elements. Preliminary spatial analyses of the war cemetery in Wysokie Koło showed that its boundaries had changed, and the graves had been destroyed during the renovation in the years 2004–2006.

KEY-WORDS: Warsaw-Dęblin operation, Kozienice Forest, archaeology of the Great War, Dęblin Fortress

INTRODUCTION

The Kozienice Forest is in central Poland on the Kozienice Plain, between Radom and the Vistula River. In the autumn of 1914, one of the largest battles of the Great War was fought here (Nielipowicz 2015: 11). In the first stage (from 10 to 21 October 1914), the Army of the Russian Empire and the German and Austro-Hungarian Armies

[a] Doctoral School of Humanities and Art at the Marie Curie-Skłodowska University, Weteranów 18 Street, 20–038 Lublin (Poland), e-mail: angelika.bachanek@vp.pl; ORCID: 0000-0002-9097-8971

1 This text is based on the author's master's thesis written in the years 2017–2019 and entitled: "Archaeology of the present day as a way of restoring memory and creating a common identity of local communities. An example of the cognitive and social value of material remnants of armed conflicts of the nineteenth and twentieth centuries in the Sieciechów commune".

Received October 31, 2022; Received in revised form November 17, 2023; Accepted November 22, 2023

fought heavy battles for the Dęblin Fortress. In the Russian nomenclature, these battles are called the Warsaw-Dęblin operation, and in the German nomenclature the Battle of Ivangorod or the Battle of the Vistula. In contemporary studies, the following terms are used: the First Battle of Dęblin, the Second Battle of Dęblin and the Battle of the Kozienice Bridgehead (see Rypulak 2014). The German army attacked the defensive positions of the Russian army to take control of the Dęblin Fortress. An attempt to take control of the Dęblin fortress ended in failure for the German troops. Another attempt to break through the Vistula was made by the German army in the summer of 1915. Several days of fighting were successful, the Russian army evacuated from the Fortress. During the retreat, Russian troops destroyed the defensive infrastructure. Until 1918, the area was occupied by the Austro-Hungarian army (Bystrzycki 1976: 201–202).

The military operations of 1914–1915 left material remnants in the landscape of the Kozienice Forest. Extensive sections of trenches, artillery emplacements, warehouses, dugouts, and other elements of military infrastructure were built (Schwarz 1922: 70; Bystrzycki 1976: 183; Trzaskowski 2014: 21). After the fighting, there were also traces of destruction and the resting places of fallen soldiers. The bodies of the fallen were buried in dug war graves and in cemeteries near the battlefield. Together with the relics of human activity, national uprisings, and World War II, they form a kind of palimpsest that can only be deciphered using archaeological methods. Thanks to the combination of archaeological methods, advanced spatial research, and analysis of historical sources, it is possible to critically analyse the material culture. This fact is confirmed by previous research on the Great War on the Gallipoli Peninsula in Turkey, or on the Rawka and Bzura rivers in Poland (Birkett-Rees 2012; Zalewska 2016) and many other sites. The aim of the article is to show the need to use archaeological methods in the study of traces of the Great War in the Kozienice Forest (Fig. 1).

Analysing the material remains of the Great War, several components of the historical landscape of the battlefield can be distinguished: I. The battle area; II. The battlefield; III. Resting places of the fallen soldiers. Using these categories, the arguments in favour of the validity of using archaeological methods to study the traces of the Great War in the Kozienice Forest area are presented below.

RESEARCH METHODS

During the first stage of the research, archival materials (military diaries, plans, orders, diaries, cemeteries) were analysed. Based on the results achieved, areas for non-invasive

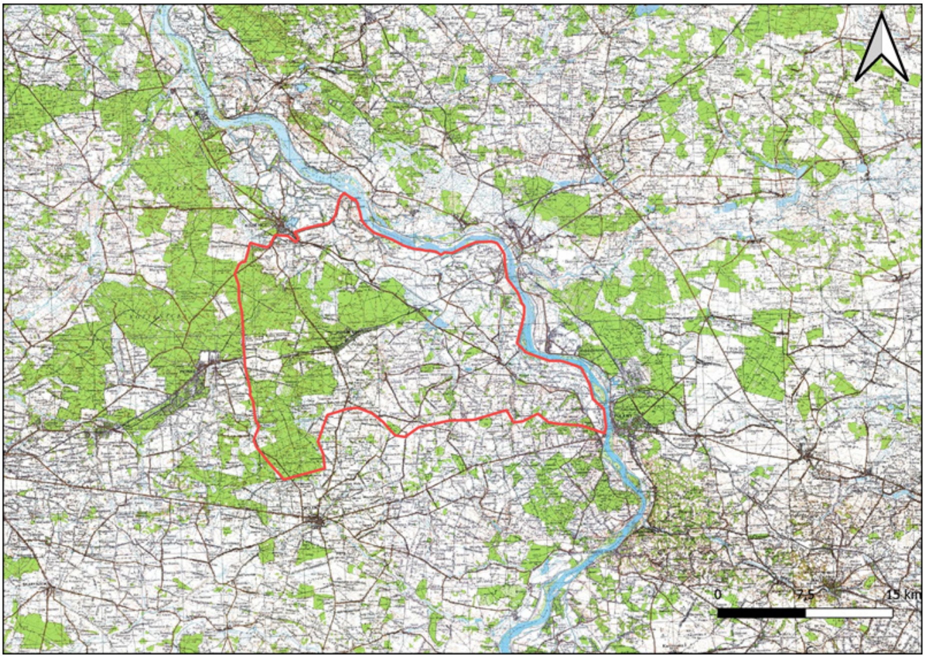


Fig. 1. Study area. Graphic elaborated: A. Bachanek.

archaeological research were designated. This stage of the research consisted of the use of two basic remote sensing methods: the analysis of aerial photographs (including archival ones) and the analysis of a digital terrain model, based on data from the Central Office of Geodesy and Cartography. The aerial photographs were taken between 1959 and 2012 and their analysis consisted of computer editing of the photographs, i.e., changing the colours (colour channels, saturation, contrast, brightness, gamma) to capture elements that the human eye does not easily perceive. Then, the photos were georeferenced in the QGIS georeferencing module, using characteristic terrain points. The georeferencing base comprises the topographic maps and orthophotomaps made available as part of the WMS and WMTS services on the geoportal.gov.pl website. To study hard-to-reach areas covered with dense vegetation, ALS data was used in the form of a point cloud converted into raster files (NTM). The main purpose of using ALS data was to obtain information enabling the recognition of the spatial form of field fortifications and cemeteries. The remote sensing analysis also uses historical and contemporary cartographic data functioning in public domains such as Mapster, Google Maps, Geoportal, as well as archival maps of Polish and Central Europe available on the portal http://igrek.amzp.pl/.

The next stage was to conduct field verification of the areas selected as a result of the above-described activities, to:

– conduct reconnaissance, determination of the condition and registration of relics with their own terrain forms, such as field fortifications,
– enable identification of cemeteries and previously unlocated resting places of soldiers of the Great War,
– allow verification of data obtained because of remote sensing analyses.

I. The battle area

The battlefield area in the Kozienice Forest covers an area of about 50,000 km^2, during the years 1914–1915, the belligerents heavily fortified the forest. Both natural and anthropogenic factors were considered in determining the heading. During the battles fought in 1914, the terrain and the Vistula River played a crucial role. An analysis of historical sources and studies on the existing literature, such as the records of the Imperial and Royal District Headquarters in Kozienice, State Archives in Kielce, and Documentation of the Army of the Russian Empire, provides a description of Russian defensive positions. At a distance of 7 km from the Vistula River and 4 km from the ring of permanent forts, the crew of the Dęblin Fortress built a line of trenches. The fortifications consisted of a single line of trenches with gun emplacements. They were protected by lines of wire entanglements, with additional entanglements placed in sensitive places (Schwarz 1922: 69; Bystrzycki 1976: 182; Trzaskowski 2014: 21). They were situated in an undeveloped area, mainly on farmland. To facilitate the transport of troops and supplies to the front, paved roads were built to connect field fortifications with permanent fortifications. An innovative element was, through construction of a special system of ponds and dams, the use of the Vistula River to flood the area of the so-called no-man's land, to prevent the enemy from attacking effectively (Schwartz 1922: 72).

Current knowledge about the Russian line of defense is based on the accounts of combatants and cartographic materials. These data do not accurately reflect the combat situation at that time[2] (Glaise-Horstenau 1932). It is known that units of the German and Austro-Hungarian armies dug in at about 3 km from the Russian positions. According to accounts, the Germans built a heavily fortified area from the village of Gniewoszów to Mozolice, Kozienice district (Schwartz 1922: 62). Shelters were built in the rear, surrounded by barbed wire entanglements made of wood and wire (Schwarz 1922: 63). According to the account of the commander of the

2 *Opisaniye boyevykh deystviy kreposti Ivangorod v techeniye avgusta, sentyabrya i oktyabrya 1914-go goda*, p. 383, https://gwar.mil.ru (access: 28 IV 2022); *Opisaniye boyevykh deystviy pod Ivangorodom (s 8-go iyulya po 22-ye iyulya 1915 goda*, p. 222, https://gwar.mil.ru (access: 28 IV 2022).

15th Reserve Infantry Brigade, General Hans von Below, they ran through the area of the current war cemetery in Bąkowiec (Rypulak 2014: 41). The location of these fortifications is confirmed by the account of Jan Karsznia,[3] a participant in the battles in Słowiki. The author described the location of the Austrian positions on a hill in the village of Słowiki. The way these fortifications were organized and built shows that the Germans expected long-lasting fighting.

The offensive of the German 9th Army and the Austro-Hungarian and 1st Army on the Dęblin Fortress was unsuccessful. The defence system of the Dęblin Fortress was expanded, which was to ensure that the crossings over the Vistula River were maintained in the next battle. To achieve this, the entire battlefield was cleaned up, levelling all fortifications built by the attackers. Their land was the site of three groups of fortifications: Gniewoszów, Bąkowiec, and Mozolice. They constituted the main line of Russian defence (Bystrzycki 1976: 197). When the Germans approached the Fortress in 1915, the defensive system consisted of four lines. The heaviest fighting occurred within the Gniewoszów group. During the July 1915 assault, the German army occupied the entire front from Gniewoszów to Mozolice.[4]

Contemporary relics of field fortifications and the destruction wrought by the fighting sides stretch for miles. Some limited insight into the war landscape on a cartographic level is, of course, provided by German and Russian sketches made during the War. However, an analysis of archival materials that can be used in the process of interpreting the contemporary landscape of the Kozienice Forest leads one to conclude that they are characterised by a significant lack of accuracy. Here, the conclusion arises that the existing knowledge relating to military activities in this area is severely limited by the nature of these sources. Hence, the need to make inferences using archaeological data. The analyses carried out so far show that the dynamics of the fighting in the area are reflected in the surviving relics. We can observe that from one line of trenches, the attack was conducted both in the eastern direction (towards the Fortress) and in the western direction (towards the enemy). This can be ascertained from the analysis of the numerical terrain model and field verifications (see Figs 2 and 3). Not all the main features of the original battle landscape are currently visible in the field. An important reason that has affected the legibility of the relics of the field fortifications in the present day is the long-term reclamation of these areas, especially in the foreground of the Fortress, because of which even the permanent forts, although under conservation protection, are undergoing intensive transformation (Figs 2 and 3).

3 The report was written and made available by Stefan Siek: https://izbasieciechow.pl/galeria-2/filmy/stefan-siek-filmy/cmentarze-z-i-wojny-swiatowej/ (access: 28 IV 2022).

4 *Opisaniye boyevykh deystviy pod Ivangorodom s 8-go iyulya po 22-ye iyulya 1915 goda*, p. 222, https://gwar.mil.ru/ (access: 28 IV 2022).

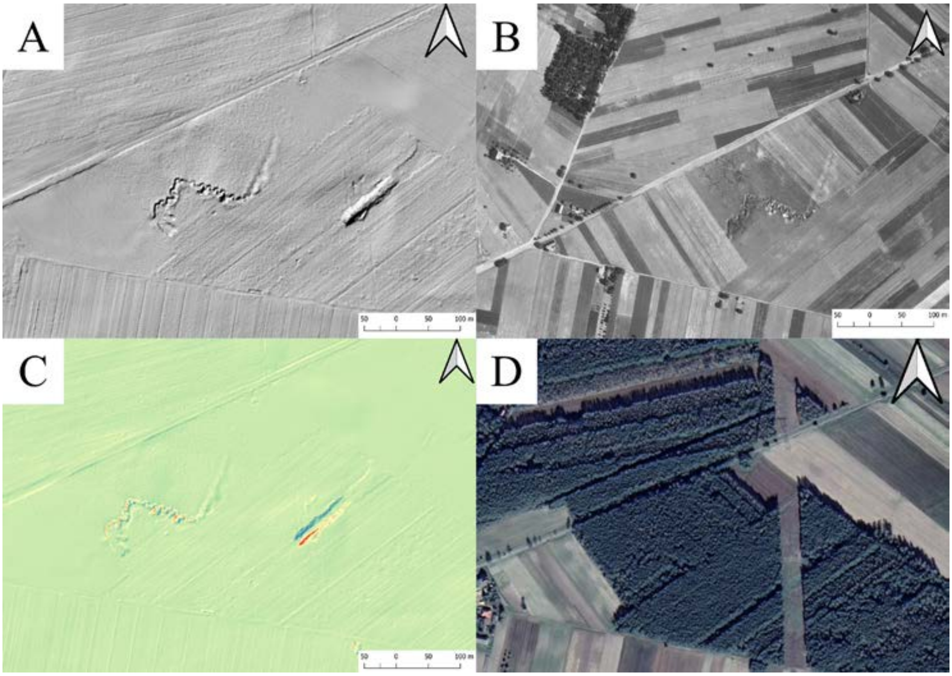


Fig. 2. Field fortifications around the village of Sarnów (A, C): Digital Terrain Model showing the current state of the fortifications; (B) Aerial photograph taken in 1959 showing fortifications located on farmland; (D) Contemporary satellite imagery indicates that the area where the relics of the trenches are located is overgrown with forest. Source: Head Office of Geodesy and Cartography, Google Earth. Graphic elaborated: A. Bachanek.

II. The battlefield

The battlefield is not only kilometer-long lines of trenches and "death zones", but also the rear of the front. This issue will be discussed based on a selected example from the vicinity of the village of Gniewoszów. A photograph taken in 1914 clearly shows a military camp consisting of several tents/barracks (see Fig. 4). This photograph does not contain any landmarks that would suggest a more precise location of the site. The issue of identifying encampments in the open space, which was intensively used after the War, is more difficult because we have only cursory information about battlefield features. They are very rarely discussed in themselves, although there are exceptions (cf., Zalewska *et al.*, 2021).

Researching the hinterland of the battlefield depends on several factors, such as the terrain in which they were built, the type of building material, and the use of the terrain after the end of the fighting. Clear relics of the camps in the form of rows

Fig. 3. Relics of field fortifications around the village of Sarnów. Field verification, Autumn 2021. Photo: A. Bachanek.

of dugouts are visible in the forests, e.g., near Gniewoszów. The use of archaeological methods of field prospection and remote sensing made it possible to find a group of dugouts around the villages of Bąkowiec and Słowiki-Nowe. The German and Austro-Hungarian armies dug in this area in 1914, and Russian fortifications were constructed here a year later. The exact date of construction of these elements therefore requires further research. Based on the maps, direction, and location of the features described here, it can be concluded that they were built by the Russian army during the Second Battle of Dęblin or in 1915. The change in state of knowledge about these features is helped by archaeological methods, which allow for the acquisition of new data for interpretation, to determine the nature of the remains.

III. Resting places of fallen soldiers

The war cemeteries are the most significant relics of the conflict in the Kozienice Forest. According to historical estimates, 100,000 soldiers participated in the fighting. The

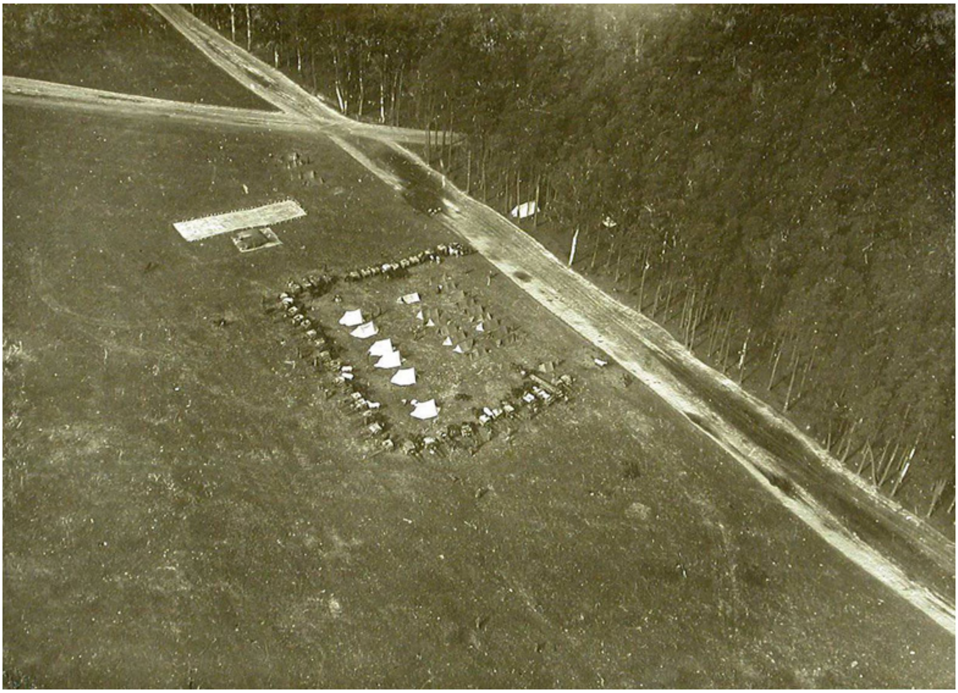


Fig. 4. Photo of a military camp near Gniewoszów from 1914. Private collection of the author.

number of dead is not known. Archival documents illustrate the extent of the losses suffered by both warring sides.[5] It is not known how many soldiers were buried in the existing cemeteries. In the Kozienice Forest, there are many undiscovered cemeteries and war graves.

Case study: Resting place of fallen soldiers – Cemetery in Wysokie Koło, Kozienice district.

The cemetery is in the village of Wysokie Koło, Gniewoszów commune, Kozienice County, by provincial road No. 738. Unfortunately, the exact date of burial of the

5 *Akta der Kriegergraber – Abteilung beim k.u.k. Kreiskommandes*, Register of Cemeteries, Graves, and Fallen Soldiers from the World War, Kielce Provincial Office I, ref. 21/100/0/13.10/15183, State Archive in Kielce; *Akta des k. u. k. Militargeneralgvuvernements in Polen – Kriegergraber – Abteilungen des k.u k. Kreiskommandos.* Cases of maintenance and arrangement of war cemeteries from the World War period, Provincial Office in Kielce I, ref. 21/100/0/13.10/15219, State Archive in Kielce; Records of the Office for the Care of Military Graves. D.O.G. in Kielce – records of graves, cemeteries and fallen soldiers from the World War; Kielce Provincial Office I, ref. 21/100/0/13.10/15184, State Archive in Kielce; Consolidations of war cemeteries and scattered graves; Kielce Provincial Office I, ref. 21/100/0/14/17477, State Archives in Kielce.

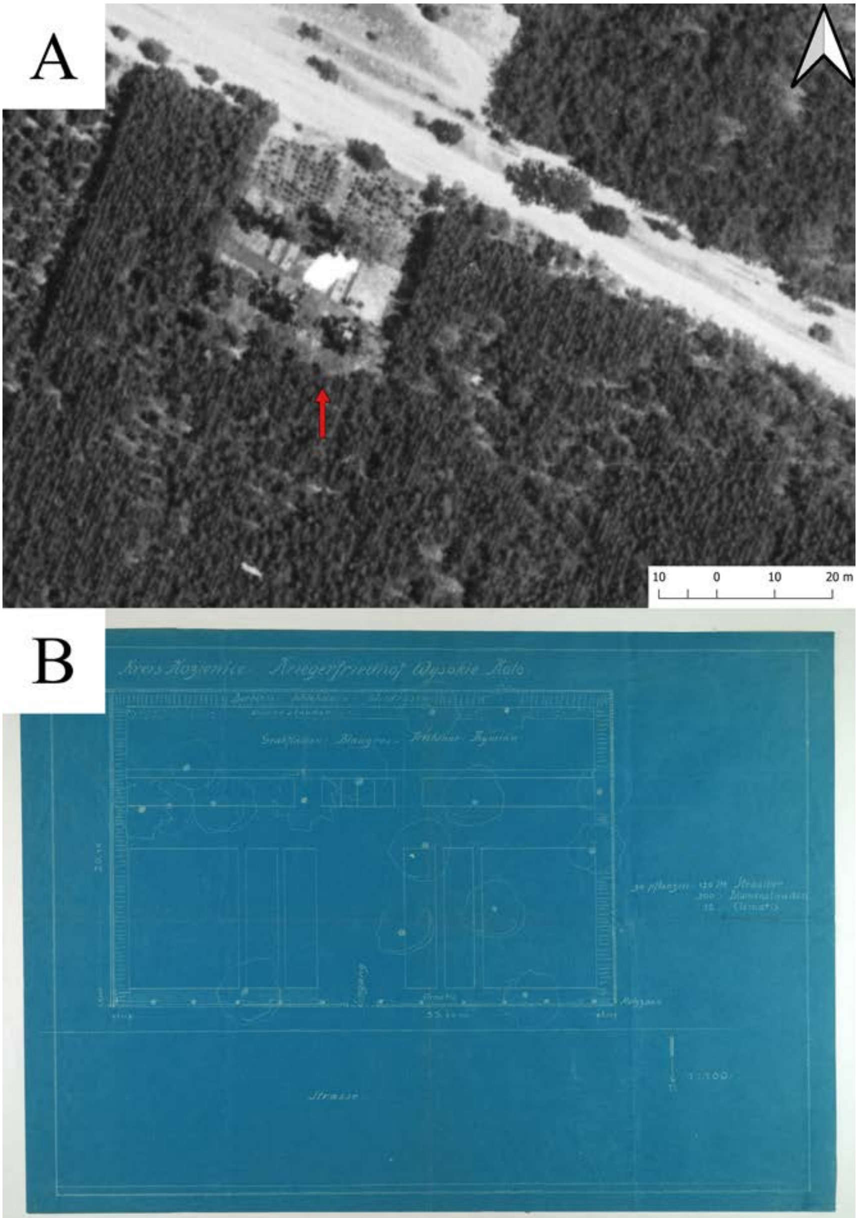


Fig. 5. War cemetery in Wysokie Koło, Kozienice district. (A) Aerial photo taken in 1959, source: Central Office of Geodesy and Cartography; (B) Archival plan of the cemetery in Wysokie Koło from 1917, source: Central Archives of Historical Records in Warsaw, *Militärgouvernement in Lublin*, ref. 1168

soldiers is unknown. The earliest documents concerning this cemetery date back to 1917,[6] when the Austro-Hungarian funeral services organized war cemeteries in this area (Fig. 5). Analysing the course of battles in this area, it may be concluded that soldiers killed in the battles for the Dęblin Fortress in October 1914 were buried here. Correspondence between the German Embassy and the Voivodeship Office in Kielce[7] from April 1939 confirms that Adolf Dickeut was buried in grave no. 20. People who died in the next stage of the battle for the Fortress in 1915 were also buried here (Fig. 5).

The cemetery occupied a small area, about 21 m × 34 m, according to the original plan (see Fig. 5). There were ten burial fields, which were planted with perennials, blue grass, sedum, and thyme. The main alley leading north-south led to the cemetery. It branched off just behind the first group of graves in an east-west direction in front of the next group of mass graves, forming the letter "T". Trees were planted between the graves. A hedge of barberry, blackthorn and rose hip marked the boundaries of the cemetery. Information on the actual number of soldiers buried is contradictory. A list of war cemeteries from 1938 indicates that 70 soldiers of Germany, 78 of the Austro-Hungarian Army, and 239 of the Russian Army were buried in mass graves here.[8] The correspondence regarding the commemoration of this cemetery indicates that 359 soldiers were buried there in collective graves and 28 in single graves. Due to its location on private property, the cemetery was scheduled for relocation.[9]

During World War II, soldiers from the Wehrmacht were buried in this cemetery. After the War, the cemetery was forgotten and turned into forest, according to the architect's intentions. In 1969, there were still wooden crosses in the cemetery with partially preserved details of soldiers. Based on *Preussische Verlustliste* No. 81 of 20.11.1914, PVL No. 299 of 12.08.1915 and PVL No. 331 of 18.09.1915 the data of the German soldiers buried in this cemetery was verified:

Ltn. [Obln.] Viktor Hartmann, L.I.R. 46, † 23.7.1915 (decorated with Eisernes Kreuz)
Wehrm. Stanislaus Kaczmierczak, L.I.R. 19, 5th company, † July/August 1915
Utffz. Dietrich Warnken, G.R.R. 2/5, † ??.10.1914

---

6 Plan *Kriegerfriedhof Wysokie Kolo*, The Central Archives of Historical Records in Warsaw (MGGL, ref. number 1168).

7 Records of cemeteries and war graves in the Kozienice district; Kielce Provincial Office I, ref. 21/100/0/13.10/15202, State Archives in Kielce.

8 Files of the Office for the Care of Military Graves. D.O.G. in Kielce – records of graves, cemeteries and fallen soldiers from the World War; Kielce Provincial Office I, ref. 21/100/0/13.10/15184, State Archive in Kielce.

9 A photocopy of the correspondence of the Ministry of Internal Affairs with the Provincial Office in Kielce from 1939 is in the library in Gniewoszów. The original documentation in the State Archive in Kielce has not yet been found.

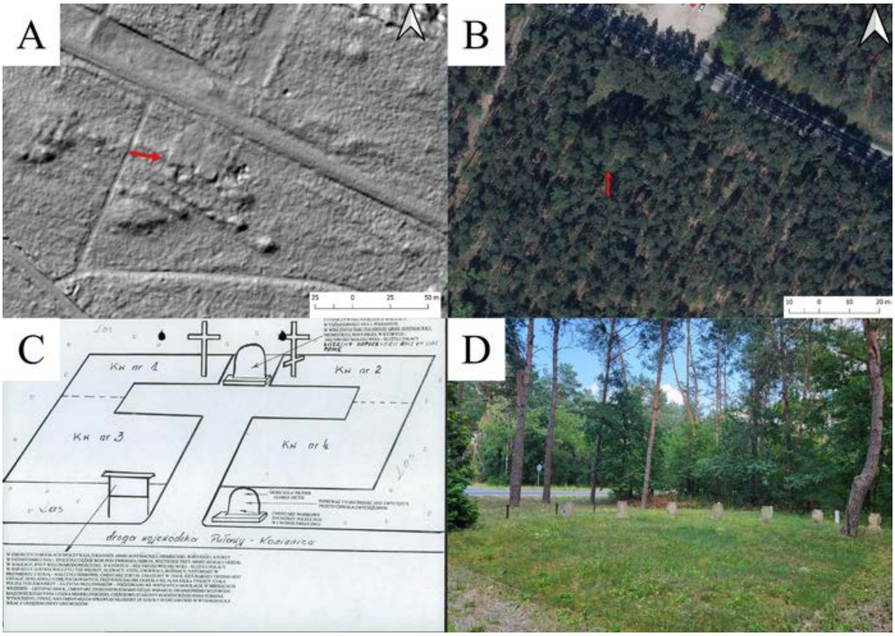


Fig. 6. Cemetery in Wysokie Koło, Kozienice district. (A) Digital Terrain Model; (B) Contemporary aerial photograph, source: Head Office of Geodesy and Cartography; (C) Plan of the cemetery included in the Register Card of the National Memorial Site; (D) The current space of the cemetery, north-eastern part. Photo: A. Bachanek.

In the thick grass lay the rotten elements of crosses. The location of the crosses is not provided, which makes it impossible to identify the graves. There is also no information about the renovation of this cemetery in the period from 1939–2004. In the years 2004–2006, the Gniewoszów Commune Office and the Austrian Black Cross renovated the cemetery. The work involved clearing the bushes and levelling the cemetery area, which destroyed its original appearance. Four quarters were designated to symbolize war graves (see Fig. 6). The radical transformation of the area is confirmed by a comparison of aerial photographs taken in 1959, which shows the same arrangement of graves as on the plan from 1917. The photograph taken after 2006 shows a thoroughly different layout of the cemetery, identical to the plan made for the renovation. On the current plan of the cemetery, we can observe four separate plots with mass graves (Fig. 6). The quarters are separated by a T-shaped alley. In the central part of the cemetery, there is a stone with information about the fallen soldiers. On either side of the stone there are two large marble crosses, Latin and Orthodox.

Another argument for the necessity of archaeological research in this cemetery is the results of surface surveys. During field verifications conducted by the author in 2020–2022, it turned out that the vegetation described on the cemetery plan from 1917 is located outside its current boundaries.

The example of this place highlights the problem of how war cemeteries are reconstructed and commemorated. Although these actions are often motivated by good intentions, they may end up with the destruction of the cemetery. The result is a radical change in space because of clearing of the area, changes in boundaries and the creation of artificial graves. The factors described above raise doubts whether the remaining war cemeteries located in the Kozienice Forest can also be located within their original, actual borders. Does the arrangement of graves in the cemeteries (often very illegible) correspond to the original features of a given cemetery? Often (e.g., Gródek, Bąkowiec, Brzeźnica) it is only with the help of archaeological methods that we can obtain answers to the above-mentioned questions. This is necessary to reverse the process that led to the destruction of the cemetery in the process of commemorating it.

The number of cemeteries and graves established in this area in the years 1914–1918 is not known. Two main reasons are responsible for this. Firstly, the fact that the funeral services operating in the area did not know all the resting places after the end of the fighting, so we do not find any information about them in the documents. During hostilities, fallen soldiers were buried near the battlefield in field cemeteries (Oettingen 1988: 15–36). In 1916, the Austro-Hungarian Board of War Graves was established. The burial places of fallen soldiers were inventoried, and new cemeteries were established. The documentation was sent to the office in Kielce and then to Lublin. In 1918, the files were compiled and sent back to the archives in Vienna (Gaul 1997: 66–67). After World War I, the records of the General Government Office were moved to Lublin. In 1925, they were transferred to the Military Archives in Warsaw. Based on the Polish-Austrian archival agreement of 1932, the missing files were handed over to the Polish side. In the autumn of 1939, German troops confiscated the records of the partitioning powers. In 1950, the documentation was transferred to Polish, and then to the Central Archives of Historical Records in Warsaw. Polish archival materials from the interwar period do not facilitate the study of this issue either. They are inaccurate and scattered, so it is sometimes impossible to analyse them accurately. Therefore, we do not know which of the cemeteries were exhumed and to what extent. Secondly, the state of preservation of war graves and cemeteries has been significantly influenced by the attitude of the population towards the resting places of those killed in World War I. For many decades, they were considered strangers and left unattended. This situation was also influenced by the outbreak of World War II and the time of occupation. The Germans forced the inhabitants to take care of these cemeteries. This is not an isolated situation on a national scale (cf., Zalewska and Cyngot 2020).

The analysis of documents, cartographic and archaeological data in the Kozienice district shows how much archaeology in the Kozienice Forest can contribute to this issue.[10] Today, the increasing expansion of human settlement into forested areas in this region means that buildings often encroach on unknown cemeteries. As a result, they are destroyed. In such cases, only archaeology provides methods and tools to counteract such situations, by finding, investigating, documenting, and protecting such sites from further destruction.

CONCLUSIONS

The relics of the Great War are an indispensable element of the landscape of the Kozienice Forest. They are witnesses to events that have changed the strategic plans of the warring parties, which has affected the situation on all fronts. The rapidly developing archaeology of the present day (cf., Zalewska 2016) provides tools and theoretical foundations for the study of these features. The task of researchers dealing with this topic should be to broaden the knowledge of both the art of war and the state of preservation of the material remnants of war. This is not an easy task, as the extensive archival documentation shows significant deficiencies. This is where archaeology comes in, as it provides insight into the processes that took place at these sites over the course of over one hundred years. Analysing the source data for specific relics continues to raise more questions than answers, and this creates a need for further research.

The most problematic issue is the protection of battlefields. The considerable extent of the area with trenches, dugouts, etc., causes numerous problems in terms of adequate protection (cf., Zalewska 2018). The research methods provided by modern science allow us to precisely document these objects. This allows the enrichment of knowledge of the contemporary depositaries of the material legacy of the Great War and providing answers to persistent questions, some of which I have outlined above. This requires both systematic identification and documentation

10 List of war cemeteries in the pre-war Kielce district, State Archives in Kielce, Voivodeship Office in Kielce, ref. 17474; Collection of Kazimierz Mróz's documents, State Archives in Radom, ref. 58/1209/0; Documentation concerning the exhumation and commemoration of war cemeteries in the Kielce Provincial/State Archives in Kielce, Voivodeship Office in Kielce I, ref. 15218; Monument Care Programme in Kozienice County for 2017–2020.

of the traces of the Great War. It is also necessary to valorize them, i.e., to determine which relics are worth preserving for future generations. It is also beneficial to ask follow-up questions. Archaeology has tools at its disposal that allow both the accurate documentation of these relics and indicates those of special scientific and social value that should be protected from destruction. By analysing archival spatial data with the use of tools such as GIS, we can precisely reconstruct the past and locate features in the contemporary landscape.

REFERENCES

Birkett-Rees, J. 2012. Geospatial science and the archaeology of the First World War: context for conflict. *Geospatial Science Research 2*.

Bystrzycki, A. 1976. Twierdza Dęblin (1837–1915). *Rocznik Mazowiecki* 6: 171–204.

Gaul, J. 1997. Registratura w austriackiej kancelarii wojskowej w XIX i początkach XX w. *Krakowski Rocznik Archiwalny* III: 66–73.

Glaise-Horstenau, E. 1932. *Österreich-Ungarns letzter Krieg 1914–1918*. Wien.

Nielipowicz, S. 2015. *Krwawy październik 1914*. Oświęcim.

Oettingen, U. 1988. *Cmentarze I wojny światowej w województwie kieleckim*. Warszawa–Kraków.

Rypulak, A. 2014. *Wielka Wojna 1914 roku pod Dęblinem.* Dęblin.

Schwartz, A. V. 1922. *Oborona Ivangoroda v 1914–1915 g.: iz vospominaniy komendanta kreposti Ivangoroda*. Moskwa.

Trzaskowski, J. 2014. Fortyfikacje polowe na ziemi kozienickiej powstałe podczas Wielkiej Wojny 1914–1915. *Ziemia Kozienicka* 29: 19–31.

Zalewska, A. I. 2016. Archeologie współczesnych konfliktów zbrojnych jako praktykowanie prospołecznej archeologii. Przykład wartości epistemologicznej i aksjologicznej. In A. I. Zalewska (ed.), *Archeologia współczesności*, 125–140.Warszawa.

Zalewska, A. I. 2018. Ewidentne relikty wojen XX wieku w ewidencji zabytków. Oddziaływanie wyników badań z zakresu archeologii współczesności w przestrzeniach konserwatorskiej i publicznej. *Kurier Konserwatorski* 15: 83–94.

Zalewska, A. I. and Cyngot, D. 2020. Wpływ wojennych wydarzeń dziejowych (res gestae) i relacji o nich (historia rerum gestarum) na kondycję materialnych pozostałości po tych wydarzeniach. Studium przypadku na temat dziedzictwa konfliktów zbrojnych jako wyzwania poznawczego, społecznego. *Folia Praehistorica Posnaniensia* 25: 409–441.

Zalewska, A. I., Czarnecki, J. and Bachanek, A. 2021. Relikty infrastruktury zapleczowej zbadane w ramach planowych, proaktywnych badań archeologicznych na terenie gminy Nieborów w latach 2014–2018. In A. I. Zalewska (ed.), *Archeologia frontu wschodniego Wielkiej Wojny jako wyzwanie*, 125–140. Warszawa–Lublin.

Archaeologia Polona, vol. 61: 2023, 75 – 104
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3299

The Lviv Archaeological Milieu During World War I

Natalia Bulyk[a] and Roman Berest[b]

The article deals with the scientific and museological activities of Lviv archaeologists during World War I. The focus is on the fate of archaeologists who were forced to serve in the army (Y. Pasternak, V. Hrebeniak); the state of scientific institutions of Lviv, and the living and working conditions of professors and teaching staff of the University of Lviv, as well as museum workers of the city, were analyzed. In addition, it is about stocking and inventorying the museum collections with archaeological finds, and attempts to restore the activities of museum institutions regardless of conditions (National Museum of Jan III Sobieski, Dzieduszycki Museum). The issue of the loss of human lives is not the least. During these years, Lviv archaeology lost a Polish professor of archaeology Karol Hadaczek and his student, the talented Ukrainian archaeologist Volodymyr Hrebeniak. It was found that the War stopped the development of archaeological science in Lviv and pushed it back for some time. Only in the post-War years, was it possible to restore field research, and publishing activities, replenish museum collections, and educate new personnel.

KEY-WORDS: Lviv archaeological environment, World War I, Karol Hadaczek (1873–1914), Bohdan Janusz (1887–1930), Yaroslav Pasternak (1892–1969), Volodymyr Hrebeniak (1892–1915), museum archaeology

INTRODUCTION

Every war in history is a test for humanity. Wars bring devastation, death, and destruction. In addition to human and economic losses, there are always losses of cultural values, destruction of historical and architectural sites, etc. The scientific elite of society was and remains one of the most vulnerable strata. On the one hand, it is called to preserve and prevent the erasure of cultural heritage, and on the other hand, it is deprived of the means of subsistence, because scientific research becomes

[a] Ivan Krypiakevych Institute of Ukrainian Studies of NAS of Ukraine, Lviv (Ukraine), e-mail: nata_bnm@ukr.net, ORCID: 0000-0001-9040-2676

[b] Ivan Franko National University of Lviv, Lviv (Ukraine), e-mail: berest_liet@ukr.net, ORCID: 0000-0001-7405-2020

Received December 9, 2022; Received in revised form July 25, 2023; Accepted September 13, 2023

superfluous under such conditions, there are other problems in society that require human and material resources; often, the same scientific elite leaves the pen and takes up weapons... "Here I have the opportunity to experience a lot of good mental impressions, received with a victorious march forward" – wrote the young talented archaeologist Volodymyr Hrebeniak (1892–1915) on June 6, 1915, the day before his death. So it was a century ago, and so it is today.

The events of February 24, 2022, will forever go down in history as the beginning of Russia's full-scale war against Ukraine. This date divided the history of the 21st century into "before" and "after", stopped the usual rhythm of life, made archaeological expeditions impossible, forced paying renewed attention to the preservation of archaeological collections, and prompted us to reflect and draw parallels. The historian of archaeology, involuntarily, thinks about what happened in the archaeological milieu during the past wars. In the conditions of war, it is natural to write about war. This problem acquires special content and relevance.

Various aspects of the daily, cultural, and scientific life of Lviv (then Lwów) during the Great War have been reflected in a large number of monographic studies and articles. Among historians, it is worth mentioning the names of O. Mazur, I. Pater (Mazur and Pater 1996), I. Berest (Berest 2015), whose works are devoted to the events of World War I in a rather broad context. There are also several articles reflecting the conditions of Lviv museology during the devastation of the War (Oliinyk 2005; Berest 2008). The memories of direct participants in the events of the Great War in Lviv were an important source for our research (Beck 1935; Parandowski 2014). Despite the rather extensive historiography dedicated to the history of World War I, there is no information about the life of scientific circles in the city during the War and Russian occupation of the city.

In this article, we will try to reconstruct the daily life, scientific, site-preservation, and museum activities of a small group of archaeologists who remained to work in Lviv during World War I; the fate of scientists who joined the army; in general, outline the state of the archaeological milieu of Lviv and Eastern Galicia in these turbulent years of more than a century ago.

The outbreak of World War I brought many disasters to the lands of Galicia (in Ukrainian: Halychyna). The beginning of the Russian occupation of Lviv and Galicia (3 September 1914 to 22 June 1915) suspended the development of culture and science, including archaeology. In the autumn of 1914, the so-called Russian "inventory" began, in fact, a real robbery of the population of Galicia, state institutions, and museums, which were turned into weapons warehouses (Berest 2015: 132–134). Of course, this did not bypass the museums, which were famous for their archaeological collections. The Russians took the archive of Metropolitan Andrey Sheptytsky from the National Museum and sealed the correspondence. After the revision of the Academic House, barracks were made in its rooms for Russian soldiers (Mazur and Pater 1996: 307).

LVIV ARCHEOLOGY ON THE EVE OF THE WAR

At the turn of the 19th and 20th centuries, Lviv archaeology developed quite intensively. The University of Lviv had a Department of Archaeology, the museums of Lviv had large collections of prehistoric artifacts, and there was the Regional Archaeological Society [original name: Towarzystwo Archeologiczne Krajowe], which had its printed organ *Przegląd Archeologiczny*.

The protection of prehistoric sites was properly organized. Conservators and correspondents on the ground took care of the preservation of the archaeological heritage (Bulyk 2014: 148–155; Woźny 2018: 73–110). The archaeological map of Eastern Galicia was annually supplemented with new sites, where research was carried out not only by local archaeologists but also by scientists from Cracow, Warsaw, and other cities (Bulyk 2006; Woźny 2013).

On the eve of World War I, there were two archaeological milieus in Lviv – Ukrainian and Polish, which were formed mainly around the Shevchenko Scientific Society (hereinafter referred to as the ShSS) and University of Lviv (Bulyk 2008; Lech 2006: 27–29). Mykhailo Hrushevsky, Volodymyr Hrebeniak, Yaroslav Pasternak, and Bohdan Janusz focused their work on the Ukrainian ShSS. A museum with an archaeological department was created at the Society, a publishing house was founded, and scientific sections were organized (Berest and Taravska 2000: 229–231).

The figure of Mykhailo Hrushevsky is inextricably linked with Lviv archaeology. And even though the scientist was devoted to historiography all his life, his archaeological research falls precisely in the Lviv period of activity. As a student of Volodymyr Antonovych's Kyiv Archaeological School, M. Hrushevsky transferred the methodology of large-scale research to the Lviv ground and successfully used it during the study of burial sites of the Vysotsk culture in Chekhy and Vysotsko (then Czechy and Wysocko Wyżne), Brody district. It was he who caused the formation of Ukrainian academic science in Lviv (Bulyk 2012: 58–67).

The Polish archaeology of pre-war Lviv was represented by the Department of Classical Archaeology and Prehistory of the University of Lviv in the person of Professor Karol Hadaczek (1873–1914; Fig. 1). After successful habilitation (1903) and receiving the headship of the department (1905), he was the only professional archaeologist. Young, talented, and ambitious, with European studies under his belt, K. Hadaczek received

Fig. 1. Karol Hadaczek (1873–1914). From the collection of the Archive of the State Museum of Natural History of National Academy of Sciences of Ukraine.

equal amounts of praise and criticism during his lifetime (Bulyk and Lech 2009). Good cooperation was observed between both institutions. For example, M. Hrushevsky held the position of head of the Shevchenko Scientific Society, worked at the university, and maintained scientific communication with K. Hadaczek. In his diary for June 14, 1910, M. Hrushevsky made a note: "I was teaching, chatting with Hadaczek, who was showing me photos of the Konyshovetsky[1] finds" (Hyrych and Todiichuk 2002: 119). Although in fairness, we should note that M. Hrushevsky did not always speak positively about K. Hadaczek, in particular, in a letter dated June 21, 1903, to F. Vovk, he disparagingly noted: "*Habemus Papam*, Hadaczek is habilitating in prehistoric and classical archaeology... this habilitation was baked with an unprecedented speed…" (Vynar ed. 2001: 188).

A new generation of specialists was formed around the Department of Archaeology at the University. Young Ukrainian archaeologists Y. Pasternak and V. Hrebeniak were students of K. Hadaczek. B. Janusz, although he was not a university student,

1 Archaeological finds from excavations in Koshylivtsi (then Koszyłowce), Ternopil region were meant here.

Fig. 2. Department of Anthropology of the University of Lviv. Sits in the center: Jan Czekanowski (1882–1965). Standing: Volodymyr Hrebeniak (1892–1915, fourth from the left), Yaroslav Pasternak (1892–1969; second from the right). After: Czekanowski 1956.

attended the lectures of the professor of archaeology and considered him his teacher. In 1913, the Department of Anthropology was opened at the University of Lviv. It was headed by Polish anthropologist Jan Czekanowski (1882–1965). From the very beginning, he involved archaeologist students, among whom were V. Hrebeniak and Y. Pasternak (Fig. 2). They participated in an anthropological expedition that explored the Verteba cave in the Ternopil region (Romaniuk 2007: 717).

As J. Czekanowski mentioned, to collect material, he divided the Polish students into groups that were supposed to work in Eastern Galicia in the summer. Ukrainian archaeology students planned joint field trips for the summer of 1914. However, the beginning of the War prevented this plan from being realized (Czekanowski 1956: 19).

On the eve of World War I, Lviv archaeology gained a powerful stimulus for scientific research. A methodology of field research was developed and successfully applied. A powerful professional environment for archaeological researchers was formed. A new building was purchased for the needs of the ShSS (Fig. 3). Numerous

Fig. 3. Lviv. Building of the Shevchenko Scientific Society. From the collection of the Archives of the Department of Archaeology of the I. Krypyakevych Institute of Ukrainian Studies of the National Academy of Sciences of Ukraine.

museum collections were organized and everything indicated that Lviv was becoming one of the most powerful archaeological centers (Berest and Taravska 2000: 230–231). But World War I slowed down this development and forced some changes.

MUSEUM ARCHAEOLOGY

Museums are particularly vulnerable during wars. Lviv at the beginning of the XX century was no exception. As of 1914, large archaeological collections were kept and exhibited in several museums, in particular, the Community Hall, the Stauropegion Institute, the ShSS, the National Museum, the University of Lviv, and the Dzieduszycki Museum.

Among the Ukrainian museum institutions on the eve of the War, the leading place belonged to the Museum of the ShSS. In 1913, representatives of the Museum of the ShSS and the Polish National Museum negotiated on the narrower specialization of both institutions. Thus, the museum of the ShSS was to become an archaeological and ethnographic museum, and the National Museum was to become a historical

Fig. 4. Yaroslav Pasternak during the Ethnographic expedition in 1913.
From the collection of the Archive of the National Museum in Lviv.

and cultural one (Svientsitskyi 1931: 18). At that time, Yaroslav Pasternak (Fig. 4) worked in the National Museum and it was he who organized and inventoried the archaeological collections. In June 1914, an agreement was concluded between the museums on the division of rights to collect exhibits, according to which the museum of the ShSS had to collect ethnographic, archaeological, and physiographic exhibits (Khyt 2003: 93; Oliinyk 2005: 13). However, this agreement was never implemented due to the War.

Since 1913, the archaeologist V. Hrebeniak worked as an assistant at the Museum of the ShSS. He was engaged in organizing the exhibits: "Hrebeniak arranged the archaeological collections into the showcases and organized the exact inventory of this department. Unfortunately, the outbreak of War stopped the well-begun work for many years" (Fig. 5; Polianskyi 1920: 102). The temporary catalogue of the museum was prepared by Hrebeniak's efforts and endeavours (Fig. 6). At that time, the archaeological collection consisted of 5012 items[2] and had grown quantitatively

2 Central State Historical Archive in Lviv, f. 391, description 1, file 85 (The documents of the Museum of the ShSS), p. 219.

Fig. 5. Lviv. A fragment of the exhibition of the Museum of ShSS during World War I. After: Temporary Catalogueue of the Museum 1913.

very rapidly. Summarizing the work of the museum in 1913, Hrebeniak reports on 6500 exhibits in the archaeological department (Hrebeniak 1914a: 6). On the eve of World War I, the archaeological collection of the Museum of the ShSS was the largest in Eastern Galicia.

During 1914–1919, when the government changed several times, as a result of numerous revisions, the museum exhibits were destroyed. At the time of the occupation of Lviv by Russian troops in the period from the fall of 1914 to the beginning of the summer of 1915, part of the ethnographic collection disappeared from the museum, and the building was sealed for a long time (Khronika 1918: 141–144). In addition to the loss of official museum assemblages, some private collections were also confiscated. Y. Pasternak mentions prehistoric and medieval finds from Zvenyhorod near Lviv from the private collection of priest Ivan Bilinkevych,[3] which were confiscated

3 Among the materials of I. Bilinkevych's collection, the find of the palm-sized figure of goddess Artemis-Diana with a doe found on field in Zvenyhorod seems interesting. The collection was examined by K. Hadaczek, who believed that this find appeared in the field by accident, was lost by someone, since by all indications it "is an unquestionably ancient object" (National Museum in Lviv, coll. unit o./n., sheet 41–42).

ТИМЧАСОВИЙ КАТАЛЬОГ

УКРАЇНСЬКОГО НАЦІОНАЛЬНОГО

МУЗЕЯ

ПРИ НАУКОВІМ ТОВАРИСТВІ ІМЕНИ ШЕВЧЕНКА

У ЛЬВОВІ.

ВІДДІЛИ АРХЕОЛЬОГІЇ І ЕТНОГРАФІЇ.

Коректурові відбитки.

У ЛЬВОВІ.

З друкарні Наукового Товариства ім. Шевченка.

Fig. 6. Title page of the Temporary Catalogueue of the Museum.

by Hungarian soldiers in the fall of 1914 as war trophies (Pasternak 1931a: 279). After the retreat of the Russian troops in 1915 and the recapture of the region as a result of the Gorlice-Tarnów offensive (May–July 1915), the Museum gradually continued the work of organization, but several times this work had to start from the beginning due to the decision to send the most valuable items to Vienna for temporary storage during the possible re-occupation of Lviv.

In 1917, the museum board was headed by the famous geographer, cartographer, and ethnographer Stepan Rudnytskyi (1877–1937) and anthropologist and zoologist Ivan Rakovsky (1874–1949). They developed a plan for arranging and placing museum exhibits in five departments: archaeological, ethnographic, naturalistic, portrait gallery, and church art (Polianskyi 1920: 103; Tomeniuk *et al.*, 2017). The archaeological department was headed by Yosyp Pelenskyi (he published his works as Józef Pełenski; 1879–1957; see Fig. 7), known in archaeology for his research on medieval Halych (Lukomskyi and Romaniuk 2002: 313). In 1914, his synthetic work *Halicz w dziejach sztuki średniowiecznej: na podstawie badań archeologicznych i źródeł archiwalnych* was published in Cracow. The results of his field research carried out in 1909 and 1911 were included here (Pełeński 1914). In the same year, his habilitation as

Fig. 7. Yosyp Pelensky (1879–1957). From the collection of Z. Fedunkiv's family archive.

an associate professor of the Jagiellonian University in Cracow was supposed to take place, but the beginning of the war cancelled these hopes. Due to his health, Y. Pelenskyi was released from service on the front and sent for treatment to the sanitary unit of the 89th infantry regiment of the Austrian army in Przeworsk. However, Y. Pelenskyi was able to achieve full release from military service only in November 1917 thanks to the patronage of Metropolitan Andrey Sheptytskyi (Lukomskyi and Romaniuk 2002: 316). At this time, Y. Pelenskyi became a full member of the ShSS, a member of the Conservators' Circle of Eastern Galicia, and began working in the Museum of the ShSS. It is worth noting that during the War, the museum, although rather sluggishly, was still being replenished with archaeological exhibits. These were usually accidental finds, such as a cinerary urn from Zolochiv (then Złoczów) district found in 1916, or a stone axe found in 1906 near Brody (Polianskyi 1920: 105).

In the years of World War I, the National Museum of in Lviv (a Polish historical museum documenting the history of Lviv and its surroundings, mainly during the reign of Jan III Sobieski in the 17th century), almost completely stopped its work (Berest 2008: 429–434). Exhibitions were rarely organized, the arrival of new exhibits to the museum almost ceased, and the only full-time archaeologist of the institution (as archaeological finds were just a small part of the whole, mostly historical and

Fig. 8. Yaroslav Pasternak during army service. From the collection of the Ukrainian State Archive of Film and Photography named after H. S. Pshenychny.

art museum collection), Yaroslav Pasternak, served in the army (Fig. 8). The statistics confirm this: in 1908, 65 archaeological finds came to the Museum's foundations, in 1913 – 39, in 1914 – 29, then during 1915–1917, only one (Svientsitskyi 1920: 76–77).

The revival of research activity of the National Museum in Lviv under the direction of his founder and director Aleksander Czołowski (1865–1944) fell in the first post-War years. One of the first to support the activities of the museum was Yaroslav Pasternak (Fig. 9), who returned to Lviv from the Italian front in the fall of 1917 even during the War. At that time, Y. Pasternak was engaged in the museum work twice a week for several hours. After returning to Lviv, Metropolitan Andrey Sheptytskyi supported Pasternak's initiative to take visitors to the museum twice a week for two hours (Pasternak 1931b: 31). His work was very important for saving historical items hidden from robbers. He was one of the first who found, catalogued, preserved and salvaged from destruction priceless historical rarities during the War. However, it did not last long. In January 1918, Pasternak again returned to military service.

The situation in the Dzieduszycki Museum (a Polish natural history museum, where apart from natural specimens, geological, prehistoric and ethnographic collections were also collected) during the War was also difficult. Before the beginning

Fig. 9. Yaroslav Pasternak. From the collection of the Andrey Sheptytsky National Museum in Lviv.

of World War I, the Archaeological Department of the Museum developed and was replenished with new exhibits. The department was supervised by the professor Karol Hadaczek. He conducted archaeological research at the expense of the Dzieduszycki family, and materials from the excavations replenished the Archaeological Department of the Museum (Berest 1998: 78–79). Among the last pre-War works of Hadaczek, it is worth mentioning the study of the Trypillia settlement in Koshylivtsi (then Koszyłowce; 1908–1912), the results were monographically published in 1914 (Fig. 10; Hadaczek 1914). It is not known for certain whether all the materials from this site appeared in the Dzieduszycki Museum. In particular, several ceramic vessels were exhibited in the office-museum of the University in Lviv, which existed at the Department of Classical Archaeology and Prehistory. Part of the private collection of finds that belonged to Hadaczek was added to the foundations of the Dzieduszycki Museum only after his death. In May 1915, 212 exhibits from Kosylivtsi were transferred to the museum.[4]

The unique collection from Koshylivtsi was mentioned in 1918 during a posthumous auction of Karol Hadaczek's private collection. Then the Polish archaeologist

4 Legacy of K. Hadaczek in Scientific Archive of the Department of Archaeology of I. Krypiakevych Institute of Ukrainian Studies of NAS of Ukraine, Lviv.

DR. W. DEMETRYKIEWICZ
Konserwator zabytków,

Osada przemysłowa w Koszyłowcach z epoki eneolitu.

(Studya do początków cywilizacyi w południowo-wschodniej Europie).

Odkopał i opracował
Karol Hadaczek.

	str.
I. Wstęp	1.
II. Osada przemysłowa w Koszyłowcach.	6.
III. Przegląd ruchomych wykopalisk	17.
A) Wyroby krzemienne, kościane, ślady metalu	17.
B) Ceramika	23.
C) Terrakotowa plastyka	53.
D) Inne wyroby z gliny	77.
IV. Charakter kultury, związki z południem, chronologia.	79–95.

Fig. 10. The first page of the manuscript of K. Hadaczek's work on research in Koshylivtsi. From the collection of the Archive of the Archaeological Museum in Cracow.

Włodzimierz Antoniewicz (1893–1973), who considered the possibility of buying and transporting Koshylivtsi materials to Academy of Arts and Sciences in Cracow, was delegated to Lviv. Among the Lviv institutions, there were also several contenders for the scientific legacy of K. Hadaczek. However, the commission created for this purpose resolved the issue in favour of the Dzieduszycki Museum, since it was not appropriate to disperse the collections, and a large part of the exhibits from these sites, which were in the archaeologist's private collection, was in the Museum (*Licytacya zbiorów…* 1918).

During the War, the museum sometimes received random finds discovered during the digging of defensive trenches and entrenchments. However, the fate of many archaeological sites and finds remained unknown and undetermined. On the pages of the magazine *Rozprawy i Wiadomości z Muzeum im. Dzieduszyckich* we can find information about a site in Nezvysko, where the Polish geologist Bolesław Bujalski (1888–1945) emphasizes that the artefacts collected by him were lost in 1914 as a result of military actions. He transferred the individual finds that were preserved to the Dzieduszycki Museum (Bujalski 1920: 102).

During the 1914–1915 Russian occupation of Galicia, scientific work in the museum was almost stopped. The office under the leadership of Tadeusz Dzieduszycki (1841–1918) tried to find finances for the basic needs of the museum and museum staff. Despite the difficult conditions, the publication of the magazine *Rozprawy i Wiadomości z Muzeum im. Dzieduszyckich* was maintained, however, the volume for the years 1919–1920 was the last.

Despite the War, those archaeologists who did not enter military service continued to work on museum collections. This is evidenced by the memories of Józef Kostrzewski (1885-1969; a Polish archaeologist from Poznań) of his stay in Lviv at the beginning of 1918, where, while waiting for his habilitation, he studied the collections in the Lubomirski and Dzieduszycki museums, "since it was in February during the War, both museums were not heated, so I was getting over a cold because I spent many hours at both institutions. I was so hoarse that I was already worried that I wouldn't be able to give my habilitation speech..." (Kostrzewski 1970: 101–102).

During the War, the museum suffered irreparable human losses. Archaeologist Karol Hadaczek, curator of the museum, geologist Marian Łomnicki (1845–1915), and representative Tadeusz Dzieduszycki died.

The end of the War and the economic and financial changes that took place had a very negative impact on the situation in museums. In fact, it was necessary to start from the beginning the work that had been established in previous years. First of all, this concerned replenishment of collections, inventory, and construction of expositions. The lack of qualified personnel was very noticeable.

HUMAN ACHIEVEMENTS AND LOSSES

At the beginning of the War, the Shevchenko Scientific Society lost its long-time head, Mykhailo Hrushevsky, an ardent supporter of archaeology. World War I found him and his family on vacation in Kryvorivna, Hutsul region (Siromskyi 2016–2021: 235). From there, before the offensive of Russian troops on Galicia, the Hrushevsky family moved to Italy via Vienna, and from there to Kyiv. M. Hrushevsky never returned to Lviv. From the first days of the War, Y. Pasternak and V. Hrebeniak were called to military service.

The situation at the University of Lviv was no better. Some of the professors left Lviv. Those who remained found themselves in difficult conditions, because even the university building, where the Russian soldiers were stationed, was no longer a safe place. On September 9, 1914, a meeting of the Academic Senate was held, at which the current dean of the Faculty of Philosophy, Karol Hadaczek, was present (Fig. 11). The agenda was changed, urgent matters related to the War, such as the election of the rector and deans, were postponed (Beck 1935: 6). University professors and employees remained in a difficult psychological and financial situation.

Fig. 11. Karol Hadaczek. From the collection of the Archive of the State Museum of Natural History of National Academy of Sciences of Ukraine.

Whatever the losses associated with the removal of collections, the destruction of sites, and the interrupted educational process, they fade into the background when it comes to the human losses. World War I took the lives of two young and talented researchers from Lviv archaeology. Their deaths were felt by science for a long time. This concerns Karol Hadaczek and his student Volodymyr Hrebeniak. And even though one was a representative of Polish archaeology, the other – of Ukrainian; one was a famous professor, the other was a student who wrote several articles; one did not cope with depression and the fear of occupation, the other – died as a hero with a weapon in his hands – the loss of both is, without exaggeration, irreparable for science. Both of them became victims of military disasters, and if it were not for the War, everything could have been different...

Karol Hadaczek stayed in Lviv during the War and the Russian occupation. Studies at the university were conducted intermittently. However, the professor did not leave his native *alma mater*, continued to work and supported students as best he could. The famous Polish writer, essayist, and translator Jan Parandowski (1895–1978), who attended Karol Hadaczek's lecture course on classical archaeology, left interesting memories of these events. The author makes it possible to imagine what happened at the University of Lviv during the Russian occupation, and also reproduces the psycho-emotional state of the leading Lviv archaeologist, in particular, we read: "not only was the University closed, but its library could not be used. I stood

Fig. 12. Bohdan Janusz (1887–1930) during the Russian occupation of Lviv (January 1915). Janusz – second from left; Aleksander Czołowski (1865–1944) – third from the left. They are leaving the headquarters of the Archive of Historical Records, Lviv. From the collection of the Polish National Library, Warsaw.

helpless under its gate with the hope that someone would open it... and here I met my professor of archaeology, Karol Hadaczek. He was strange. He began to ask me about my research (the main topic is Colosseum), which I had given him back in the spring as a practical assignment... And began to talk nervously about the War, about the capture of Belgium, about the victories of the Germans on one side, and the Russians on the other, about the chaos which absorbed the world of archaeological research. In the end, he became concerned about me and wondered whether I would make up for the lost time with my studies" (Parandowski 2014: 38).

The student was most impressed by the fact that the professor understood his problem with the closed library, borrowed the book himself, brought it to him, and said that he would be able to return it when he had studied it well. A few weeks later, J. Parandowski wanted to return the book, but the meeting with Professor Hadaczek did not take place.

Under the influence of the War, Karol Hadaczek became depressed. "Under the influence of a huge nervous breakdown, caused by a pessimistic attitude towards a hopeless situation in winter, he attempted his own young life and on December 19, 1914, he passed into eternity. His unexpected death made a huge impression on the whole city and great regret accompanied him to the grave at the Lychakiv cemetery, where he rested at noon on December 21" – Bohdan Janusz wrote (Janusz 1915: 184–185). Worst of all he could not accept the real situation and find something to do that would distract him. Ten years after this death, Bohdan Janusz recalled that the director of the City Archive Aleksander Czołowski (Fig. 12) offered K. Hadaczek to work on archival collections and live in the Łoziński Palace, where at that time a group of people gathered who continued to conduct scholarly work, regardless of the circumstances. However, K. Hadaczek rejected this proposal (Janusz 1924: 74).

The Russian occupation authorities banned any public meetings. The teaching staff of the University, or rather the small number of professors who remained in the occupied city, were not able to bury their colleague, dean, professor, and teacher appropriately. The funeral ceremony was attended by professors and docents of the University of Lviv, Lviv Polytechnic, the director and employees of the university library, and the students (Beck 1935: 29). As Ludwik Finkel (1858–1830), Polish professor of history and a good friend of K. Hadaczek noted 10 years later: "Now, like a ghost in the recent future... the figure of a scientist – quiet, full of energy, plans, and dreams who left us suddenly during tragic events, broken like a tree by a storm on the slopes of the Tatras. It already seemed that we were all used to the sudden changes that had occurred in our lives since the beginning of September 1914, when his death, the death of our friend and colleague, showed that it was only an illusion" (cited by: Beck 1935: 29).

The memories of this tragic day were left by the then vice-rector of the University, Adolf Beck (1863–1942), who, in his work on the Russian occupation, devoted an entire chapter to K. Hadaczek under the title "Death of Professor Hadaczek" (Beck 1935: 26–30). In particular, he noted that K. Hadaczek "from the first wave of the invasion of Russian troops began to fall into despair, which grew into depression". On December 19, 1914, when there was a meeting of university professors led by the vice-rector, K. Hadaczek's servant came with the news that the professor was no longer alive (Beck 1935: 27). It is interesting that in Lviv at that time there was Russian censorship and it has proven impossible even to print mourning posters. The funeral ceremony had restrictions, in particular, public speeches were not allowed. Therefore, his colleagues said goodbye to him in the university chapel.

As L. Finkel, noted later: "There was something majestic in that group of people who gathered around the chapel of anatomy, illuminated by the yellow rays of the December sun, addressed by the respectable, grey-haired old man Tadeusz Wojciechowski, and two other white heads bowed nearby: Ludwig Kubala and Wojciech Kętrzyński. He spoke, contrary to the prohibitions expressed by powerful invaders, that there should be no funeral speeches, referring to the permission of Rector Beck,

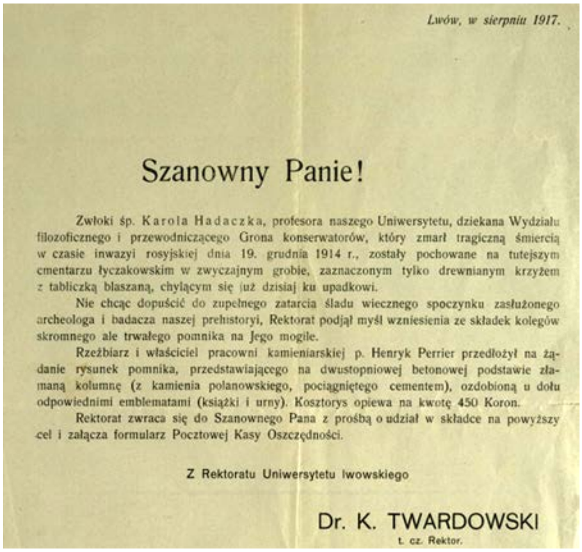
Fig. 13. Lviv. Tomb of Karol Hadaczek in Lychakiv cemetery. Photo: I. Lutsyk.

who was standing next to him surrounded by professors who remained in Lviv" (cited by: Beck 1935: 29).

Karol Hadaczek is buried in the Lychakiv cemetery (Fig. 13). A document was found that somewhat clarifies the situation. It is dated August 1917 and signed by the rector of the University Kazimierz Twardowski (1866–1938; Fig. 14). It states that "the grave, since the death of Dr. Hadaczek... who was buried at the Lychakiv cemetery in an ordinary coffin with a wooden cross and a tin plate, is already decaying today. We do not want to allow the destruction of the place of eternal resting of an honoured archaeologist and researcher of our prehistory" and therefore the rectorate asks all employees to collect money for the installation of a "modest but durable" monument.[5]

When it comes to Lviv's archaeological milieu during World War I, we cannot ignore Ukrainian archaeologist Volodymyr Hrebeniak, who gave his life fighting in the battle with the Russians in the summer of 1915 near Halych. V. Hrebeniak was

5 Call of the rector of the Lviv University K. Twardowski to collect funds for a monument on the grave of Karol Hadaczek, Department of Manuscripts of the Vasyl Stefanyk National Scientific Library of Ukraine in Lviv, f. 26, file 13d, p. 71.



Lwów, w sierpniu 1917.

Szanowny Panie!

Zwłoki śp. Karola Hadaczka, profesora naszego Uniwersytetu, dziekana Wydziału filozoficznego i przewodniczącego Grona konserwatorów, który zmarł tragiczną śmiercią w czasie inwazyi rosyjskiej dnia 19. grudnia 1914 r., zostały pochowane na tutejszym cmentarzu łyczakowskim w zwyczajnym grobie, zaznaczonym tylko drewnianym krzyżem z tabliczką blaszaną, chylącym się już dzisiaj ku upadkowi.

Nie chcąc dopuścić do zupełnego zatarcia śladu wiecznego spoczynku zasłużonego archeologa i badacza naszej prehistoryi, Rektorat podjął myśl wzniesienia ze składek kolegów skromnego ale trwałego pomnika na Jego mogile.

Rzeźbiarz i właściciel pracowni kamieniarskiej p. Henryk Perrier przedłożył na żądanie rysunek pomnika, przedstawiającego na dwustopniowej betonowej podstawie złamaną kolumnę (z kamienia polanowskiego, pociągniętego cementem), ozdobioną u dołu odpowiednimi emblematami (książki i urny). Kosztorys opiewa na kwotę 450 Koron.

Rektorat zwraca się do Szanownego Pana z prośbą o udział w składce na powyższy cel i załącza formularz Pocztowej Kasy Oszczędności.

Z Rektoratu Uniwersytetu lwowskiego

Dr. K. TWARDOWSKI
t. cz. Rektor.

Fig. 14. Notice of fundraising for a monument on the grave of K. Hadaczek. From the collection of the Department of Manuscripts of V. Stefanyk National Scientific Library in Lviv.

buried in Lviv, where "his body was transported to the Lychakiv cemetery from the battlefield near Halych" (Holubets 1932). Despite his young age, V. Hrebenyak managed to prove himself in the best possible way in the scientific community of Lviv. His path in archaeology is connected with the University of Lviv, where he studied archaeology and anthropology, and the ShSS. His good university friends were W. Antoniewicz and Y. Pasternak. Together with Y. Pasternak, V. Hrebeniak took part in the archaeological and anthropological expeditions to study the Verteba cave, which took place under the leadership of the famous Polish anthropologist professor Jan Czekanowski. It was in the scientific environment of the ShSS that the 4th year student of the university began to form as a scientist-archaeologist. In April 1914, V. Hrebeniak became a member of the Ethnographic Commission of the ShSS. At this time, he already had some scientific achievements in the field of archaeology. In particular, the newspaper *Dilo* published the articles "The Importance of Recent Archaeological Finds for Our Prehistory" in 1910 and "The Importance of Prehistory and Prehistoric Sites" in 1911, as well as works on the pages of "Notes of ShSS" (Hrebeniak 1914b; 1915). In addition, V. Hrebeniak was a regular contributor to the "Scientific Chronicle" column in that magazine. A large number of reviews of archaeological works and scientific forums came from his pen. In cooperation,

M. Hrushevsky and V. Hrebeniak published several reviews of the works of Czech archaeologist Lubor Niederle (1865–1944), the Ukrainian archaeologist of Czech origin V. Khvoika, V. Antonovych, M. Bilyashivsky, as well as the Polish archaeologists Adam H. Kirkor (1818–1886), Włodzimierz Demetrykiewicz (1859–1937), Karol Hadaczek (Petehyrych and Pavliv 1991: 414). Having experience in the field of anthropology, V. Hrebeniak initiated the creation of an anthropological section in "Materials for Ukrainian Ethnography".

In practical archaeology, V. Hrebeniak was deeply interested in the sites of the Scythian period. He also had special merit in the study of sites of the Vysotska culture. He was the first to make a comprehensive comparison of artefacts of the Vysotska culture and reasoned for their uniqueness among other cultures (Bandrivskyi 1998: 80).

An important place in the activities of V. Hrebeniak was occupied by the work in the public organization "Society for the Protection of Ukrainian Antiquities", which was created on the model of the Polish association Conservators' Circle of Eastern Galicia and was intended to take over the functions of preserving the historical heritage of Ukrainians. V. Hrebeniak wrote in this regard: "The fact of the destruction of our antiquity is well known, it is not necessary to prove that the most valuable sites of our culture either perish pointlessly or fall into the hands of others, hostile to us..." – and called to prevent this by joint efforts (Hrebeniak 1913).

He was not destined to continue his work in the field of Ukrainian science. At the beginning of the War, V. Hrebeniak was mobilized into the Austro-Hungarian army and sent to petty officer courses in Gleichenberg (Romaniuk 2007: 725). In May 1915, the 19th Regiment of Regional Defense, to which V. Hrebeniak belonged, was sent to Budapest, and finally was transferred to Galicia, where it launched an offensive against the Russian army. On June 6, V. Hrebeniak sent his last letter from the front, in which he wrote that he felt physically and spiritually exhausted and that he was on his feet for 16 hours every day, overcoming kilometers of the road.[6] On June 7, 1915, V. Hrebeniak died in battle near the village of Slobidka, Kalush district (in today Ivano-Frankivsk region, Ukraine). In December of the same year, the family managed to find his grave and transport the remains to Lviv. The hero was reburied at the Lychakiv cemetery, on field No 82, where only his burial has been preserved from all the graves in the military cemetery of the Austro-Hungarian army destroyed by the Soviet authorities. On the grave we read a modest inscription: "Here rests Volodymyr Hrebeniak, a student of the IV year of philosophy, a promising researcher of archaeology and anthropology. He died on June 7, 1915, at the age of 23 as a cadet-graduate

---

6 Letter of V. Hrebeniak from the front dated June 6, 1915, Central State Historical Archive in Lviv, F. 309, description 1, file 2243, p. 59.

Fig. 15. Lviv. Tomb of Volodymyr Hrebeniak in Lychakiv cemetery. Photo: I. Lutsyk.

student of the 19th Regiment of Regional Defence in the battle for the Fatherland in Slobidka on the border between Kalush and Halych. Eternal memory to the deceased!" (Fig. 15).

Stepan Tomashivsky left a substantive obituary about him, and there are also small postmortem notes by Osyp Zaleskyi and Włodzimierz Antoniewicz. V. Hrebeniak was also honoured by the Shevchenko Scientific Society on the pages of the "Chronicles of the ShSS" for 1914–1918, here we can also find a small obituary, which includes a photo of the archaeologist (Fig. 16) and an overview of his scientific achievements (Anon. 1914–1918: 127–128).

In addition to a detailed description of his appearance[7] and some general feelings about the bereavement, the obituary describes him in sufficient detail as a researcher of prehistory and the author of several articles: "these were popular articles mostly, which showed unusual early signs of his talent: a wide knowledge of the subject with

7 "(…) the Deceased had an almost non-Ukrainian appearance. A slender tall figure, a pale, very intelligent face, beautiful clear eyes, a high forehead, blond hair, unusual respectability of movement and speaking as for a young man, with great fluency, even rapidity in speech, careful simplicity in clothing, cultural politeness in behaviour – all that made his person noticeable in the circles of our youth. No less is the fact that already from the gymnasium bench, he took an interest in science and scientific research in the specified branches" (Tomashivskyi 1915: 5).

an easy and charming way of presentation. More than one reader wondered how it was possible to extract so many interesting facts and conclusions from small prehistoric finds. But the deceased never regretted the fame of the popularizer, and his ideal was to become an effective scientist, who is fascinated by the greatness of science itself. He had a lot of plans and ready-made thoughts in his head, which were impressive by their quickness and originality, and he dreamed after finishing the university courses prescribed by law to supplement his knowledge and methodical education outside Galicia (in Lviv, he studied mainly under the late Prof. Hadaczek and Prof. Czekanowski"; Tomashivskyi 1915: 6).

We find confirmation of V. Hrebeniak's extraordinary talent in the postmortem mention of his close university friend W. Antoniewicz, who in one of his letters to professor from Cracow, W. Demetrykiewicz, wrote about V. Hrebeniak with great regret: "Died near Halych in 1915 Volodymyr Hrebeniak from Lviv, an archaeologist whose works, which are currently being published (I know them only in manuscripts), will place him in the ranks of young, very capable researcher-synthetics. The loss is unspeakable... His most interesting work, »Consequences of the Influence of Scythian Culture on the Civilization of the Dnipro Region« was published just before the War. Science has lost in the deceased Hrebeniak a very good researcher, and I have lost a dear friend".[8]

Undoubtedly, archaeology lost a talented and persistent researcher in this War. "The Ukrainian nation lost in this young soldier (...) an already made, blossoming individuality, in whose place, perhaps, even in a whole human generation, it will not be found an equal candidate to take his place" (Tomashivskyi 1915: 6). In several years of work, he made a significant contribution to the development of Ukrainian archaeology.

SCIENTIFIC WORK IN TIMES OF WAR DISRUPTION

In fact, throughout the War, only the archaeologist Bohdan Janusz remained in Lviv (for details, see: Bulyk 2018). It is worth noting that Bohdan Janusz was not a figure of official science, he did not have a university education or high scientific degrees, and he belonged to the group of historians who did not even have a full secondary education, however, "despite the lack of a high school diploma, he represented a high level of historical knowledge, professional experience, the ability to write and conduct research" (Toczek 2013: 47).

8 Letter W. Antoniewicz to W. Demetrykiewicz, 1915, Archive of the Archaeological Museum of Cracow, No SP 8/36.

Fig. 16. Volodymyr Hrebeniak. Postal card.
Source: https://violity.com/en/114696543-volodimir-grebenyak

The military events of 1914 found Bohdan Janusz in Lviv. Due to his health, he was not accepted into the army. In the conditions of the Russian occupation of Galicia, it was necessary to find a way to feed himself, because during the War the popularity of the newspapers, in the editorial offices of which he earned a small salary, decreased. During this difficult period, B. Janusz continued to write, although the topic changed. During this time, he wrote three works in Polish: *293 dni rządów rosyjskich we Lwowie* (1915) and *Dokumenty urzędowe okupacyj rosyjskiej Lwowa* (1916), which still remain an interesting source for studying these events. The archaeological theme was reflected in the work *Z pradziejów Bukowiny* (see Kozłowski 2009: 258), however, this work was never published.

World War I was to some extent a turning point in B. Janusz's scientific interests. After the War and until his death (1930), the protection of sites comes to the fore, and he also began to engage in ethnography and art. As W. Antoniewicz noted in a letter to W. Demetrykiewicz, dated December 5, 1915, "there are rumors that E. Bulanda will be invited to replace Hadaczek. If this happens, it is not difficult to predict the fate of prehistory and Lviv collections, as well as their future development, will be »unhappy« – the absence of a prehistorian will soon be revealed, because B. Janusz dealt with the history of culture and art of Lviv" (Kozłowski 2009: 258).

Probably, this was caused by the situation around prehistory. The period of War and the first post-War years were a kind of gap in the development of this discipline. After all, Y. Pasternak, L. Chykalenko, W. Antoniewicz, R. Jakimowicz left Lviv, and K. Hadaczek and V. Hrebeniak were gone.

Bohdan Janusz by himself obviously could not do anything. And to this was added a difficult emotional state and hard living conditions. B. Janusz kept to himself and stopped communicating even with his friends. W. Antoniewicz, who also went to the front, but was wounded and soon returned to studies and scientific work, was very worried about this. While in Vienna, he received news of the death of his teacher from Lviv, Karol Hadaczek. From there, Antoniewicz wrote a letter to Janusz, in which he was interested in the fate of Karol Hadaczek's scientific heritage (this concerns primarily the private archaeological collection and library). And in the summer of 1915, Janusz and Antoniewicz were united by a common loss – their good friend Volodymyr Hrebeniak died in battle. A few years later, Antoniewicz offered Janusz to write a joint work about him.[9]

In this not the best period for science, B. Janusz published two of the largest and, without exaggeration, the best works (in Polish). This is primarily about *Zabytki przedhistoryczne Galicyi Wschodniej* (1918; Fig. 17), which is the first catalogue of sites that covered the entire branch of prehistory. B. Janusz began collecting material for the catalogue in 1906. He tried to use not only articles devoted to archaeological sites but also short newspaper notes (Kostrzewski 1931). This work is a valuable source for modern archaeologists, although it has certain defects. In particular, the author did not involve unpublished materials from Lviv museums, which were nearby. In his review of the book, J. Kostrzewski, in addition to positive comments, noted that "the addition of unpublished materials to the work would significantly increase its scientific value; it would, of course, require longer journeys for which the author may not have had enough" (Kostrzewski 1919: 67) and it is hard not to agree with this. The second equally important work is *Kultura przedhistoryczna Podola Galicyjskiego* (1919). It is worth noting that the work was written several years earlier, W. Antoniewicz mentioned it at the end of 1915 in a letter to W. Demetrykiewicz, at the same time giving it a high rating: "It will be next to the works of Kostrzewski – an interesting work in our prehistory this year" (by Kozłowski 2009: 258). Of course, this work did not avoid criticism too. In addition to favourable reviews, W. Antoniewicz considered the lack of illustrations "so necessary in the archaeological publication" to the weak points of the work (Antoniewicz 1919: 153). The comments to both archaeological catalogues of sites were the same – the lack of new materials from excavations

9 Letter W. Antoniewicz to B. Janusz, 22 December 1920, Archive of the Polish Academy of Sciences, Warsaw, No. III–166, file 27.

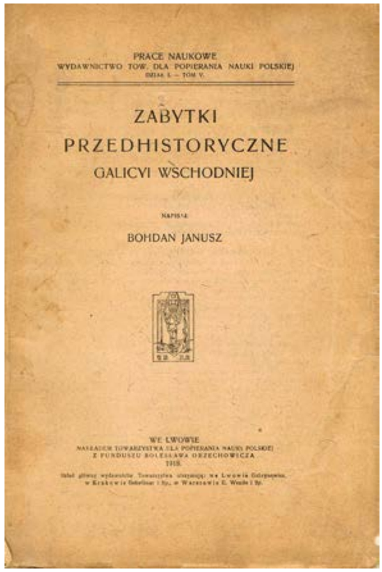


Fig. 17. Title page of Bohdan Janusz's 1918 publication.

in Galicia, the absence of inclusion of archaeological exhibits from Lviv museums, and the lack of interpretation and a critical approach. However, this does not negate the importance of what B. Janusz did for the development of archaeological science.

Outside of work on catalogues, at the end of the First World War, B. Janusz carried out field research. In 1918, he discovered and surveyed many sites in the Stanisławów (today: Ivano-Frankivsk) region. In particular, barrow cemeteries in Demyaniv, Kolodiiv, Korostovychy, Zhukotyn, Tyshkivtsi, Vynohradiv, Honcharivtsi, etc. (*Ivano-Frankivska oblast* 2015: 179–182).

Returning to archaeology at the University of Lviv, we can note that since the death of Karol Hadaczek there was a question about searching for a professor. In July 1916, the Council of the Faculty of Philosophy of the University of Lviv wrote a petition for the recommendation of Polish archaeologist Edmund Bulanda (Fig. 18), a private docent of classical archaeology at the Jagiellonian University in Cracow, for the post of extraordinary professor of classical archaeology at the Department of Archaeology and History of Material Culture and head of the Institute of Archaeology of the University of Lviv.[10]

10 Document on admission of E. Bulanda for the post head of the Institute of Archaeology of the University of Lviv, State Archives of Lviv Region (later SALR), Fonds 26 (Lviv University), Series 174, p. 6; Series 793, p. 119.

Fig. 18. Edmund Bulanda (1882–1951). From the collection of the Archive of the Polish Academy of Sciences in Warsaw.

In November 1916, E. Bulanda received the title of extraordinary professor.[11] From December 1, 1916, he began to perform his duties as the dean of the Faculty of Humanities of the University of Lviv. In fact, Bulanda spent the entire period of the War on organizational issues, mainly the arrangement of the department and the filling of its library, "because, after his predecessor, who dealt more with prehistory, he received only 117 books. Initially, the War, and then the period of inflation did not contribute to this work" – Jerzy Kowalski later wrote.[12]

Józef Kostrzewski was a candidate to head the Prehistory Department of the University of Lviv after the death of Karol Hadaczek, but the War also prevented this. This Lviv episode was described in detail by J. Kostrzewski in his memoirs: "On February 19, 1918, he habilitated in prehistory in Lviv with professors J. Czekanowski, E. Bulanda, and J. Siemiradzki. Jan Casimir University sought to leave me as the successor of Karol Hadaczek, who, after the occupation of Lviv by the Russians,

11 Document on admission of E. Bulanda the title of extraordinary professor, SALR. Fonds 26, Series 174, p. 5, 11–14.

12 Memories of Jerzy Kowalski, Archive of the Wrocław University, No. File RK-120 / Bulanda Edmund, p. 16.

oppressed by illness and deprived of his livelihood,[13] committed suicide. Since there was no prehistorian, the habilitation had to take place in front of professors closest to prehistory, and therefore an anthropologist, a classical archaeologist, and a geologist..." (Kostrzewski 1970: 101).

Thus, after the habilitation, J. Kostrzewski was offered to head the department, which was vacant, and he accepted this offer. However, the circumstances turned out differently. "The confirmation of my habilitation, sent in the fall of 1918, reached me as late as the spring of 1919 having previously spent a long time at the university and at the post office, when the document reached me, at that time I already had a university in Poznan, so I decided to reject teaching in Lviv" – wrote professor Kostrzewski many years later (Kostrzewski 1970: 103). Thus, Lviv remained without a department of prehistory until 1921, when Leon Kozłowski (1892–1944; later the prime minister of Poland) was invited to the position of professor, having obtained his habilitation in Cracow a year before. Assessing university archaeology during World War I, Jan Czekanowski noted that it was not the worst time for this field because "on February 8, 1918, with Professor of Classical Archaeology Edmund Bulanda, we conducted the habilitation of Józef Kostrzewski, and later Leon Kozłowski" (Czekanowski 1956: 20).

In summary, we can affirmatively say that World War I caught the archaeology of Lviv at a time when it was moving forward and developing. A powerful archaeological community was formed here, which worked on the accumulation of the source base, the development of fieldwork methods, and the marking of new sites on the archaeological map. World War I and the Russian invasion of Eastern Galicia slowed down the planned development of archaeological science, led to numerous human losses, and paralyzed the work of societies, museums, archives, libraries, and other scientific, cultural, and educational institutions. It was the War and its consequences that slightly pushed back the development of archaeology in the Lviv scientific center, however, it was not possible to stop it, since the mechanism was launched, and very soon after the War, it started working with a new force.

REFFERENCES

Anon., 1914–1918. Volodymyr Hrebeniak. *Khronika Naukovoho tovarystva imeny Shevchenka u Lvovi* 60–62: 127–128.

Antoniewicz, W. 1919. [Rec.]: Janusz Bohdan. Kultura przedhistoryczna Podola galicyjskiego. Lwów, 1919. 171 s. *Przegląd Archeologiczny* 1–2: 153–155.

Licytacya zbiorów… 1918. Licytacya zbiorów archeologicznych ś.p. profesora K. Hadaczka. *Wiek Nowy* No 408.

13 This was J. Kostrzewski's opinion.

Bandrivskyi, M. 1998. Vse shche nedootsinenyi arkheoloh Volodymyr Hrebeniak (1892–1915). *Materials and studies on archaeology of Sub-Carpathian and Volhynian area. Figures of Ukrainian archaeology* 7: 79–81.

Beck, A. 1935. *Uniwersytet Jana Kazimierza we Lwowie podczas inwazji rosyjskiej w roku 1914/15.* Lwów.

Berest, I. 2008. Vtraty Natsionalnoho muzeiu u Lvovi v chasy Pershoi svitovoi viiny. *Materials and studies on archaeology of Sub-Carpathian and Volhynian area. Figures of Ukrainian archaeology* 12: 429–434.

Berest, I. 2015. *Persha svitova viina na zemliakh Skhidnoi Halychyny i Zakhidnoi Volhyni: liudy, podii, fakty.* L'viv.

Berest, R. 1998. Karol Hadachek: shtrykhy biohrafii ta naukovoi diialnosti. *Materials and studies on archaeology of Sub-Carpathian and Volhynian area. Figures of Ukrainian archaeology* 7: 78–79.

Berest, R. and Taravska, L. 2000. Do pytannia pro formuvannia arkheolohichnykh zbirok Muzeiu NTSh u Lvovi v kintsi XIX – na pochatku XX st. *Arkheolohichni doslidzhennia Lvivskoho universytetu* 4: 228–231.

Bujalski, B. 1920. Prehistoryczna osada w Niezwiskach. *Rozprawy i Wiadomości z Muzeum im. Dzieduszyckich* IV: 100–102.

Bulyk, N. 2006. Z istorii arkheolohichnykh doslidzhen u Skhidnii Halychyni v XIX– na pochatku XX st. [From the history of archaeological research in Eastern Galicia in XIX – beginning of XX centuries]. *Materials and studies on archaeology of Sub-Carpathian and Volhynian area* 10: 298–317.

Bulyk, N. 2008. Arkheolohichni oseredky Lvova (1875–1914): naukovi poshuky ta polovi zdobutky [Archaeological centers in Lviv (1875–1914): scientific researches and field achievements]. *Lviv university archaeology studies* 11: 209–237.

Bulyk, N. 2012. Naukove tovarystvo imeni Shevchenka ta arkheolohichni studii na Zakhodi Ukrainy do Pershoi svitovoi viiny [Shevchenko Scientific Society and archaeological studies in Western Ukraine before World War I]. *Archaeology and Early History of Ukraine* 9: 58–67.

Bulyk, N. 2014. *Lvivska arkheolohiia XIX – pochatku XX stolittia: doslidnyky, naukovi ustanovy, muzei* [Lviv archaeology of XIX – to beginning of XX of century: researchers, scientific establishments, museums]. Lviv.

Bulyk, N. 2018. The Life and Work of Bohdan Janusz (1887–1930) in the Context of the Intellectual Environment of the Galicia Region. In D. H. Werra and M. Woźny (eds), *Between History and Archaeology: Papers in honour of Jacek Lech*, 403–418. Oxford.

Bulyk, N. and Lech, J. 2009. Karol Hadaczek (1873–1914) and the beginnings of archaeology in universities of the North-East borderland of the Austro-Hungarian Monarchy. *Archaeologia Polona* 47: 59–89.

Czekanowski, J. 1956. *Sto lat antropologii polskiej 1856–1956. Ośrodek Lwowski*. Wrocław.

Hadaczek, K. 1914. *Osada przemysłowa w Koszyłowcach z epoki eneolitu.* Lwów.

Holubets, M. 1932. Panteon Halytskoi Zemli. *Dilo* 237.

Hrebeniak, V. 1913. Zasnovanie tovarystva okhorony ukrainskoi starovyny. *Dilo* 216.

Hrebeniak, V. 1914a. Muzei Naukovoho Tovarystva im. Shevchenka u 1913-tim rotsi. *Dilo* 38.

Hrebeniak, V. 1914b. Slidy skytskoi kultury v Halychyni. *Zapysky NTSh* 117–118: 9–23.

Hrebeniak, V. 1915. Novi arkheolohichni nakhidky na terytorii Skhidnoi Halychyny. *Zapysky NTSh* 122: 5–28.

Hyrych, I. and Todiichuk, O. 2002. Shchodennyk M. Hrushevskoho za 1910 rik. *Ukrainskyi istoryk* 1–4(152–155): 96–127.

Ivano-Frankivska oblast 2015. *Skhema planuvannia terytorii*. Vol. III. *Okhorona nerukhomykh obiektiv kulturnoi spadshchyny*. Kyiv.

Janusz, B. 1915. *293 dni rządów rosyjskich we Lwowie (3.IX.1914–22.VI.1915).* Lwów.
Janusz, B. 1916. *Dokumenty urzędowe okupacyj rosyjskiej Lwowa.* Lwów.
Janusz, B. 1917. Z wojennej archeologji. Kamień w Podgrodziu pod Rohatynem. *Kurjer Lwowski* 408: 6–7.
Janusz, B. 1918. *Zabytki przedhistoryczne Galicyi Wschodniej.* Lwów.
Janusz, B. 1919. *Kultura przedhistoryczna Podola Galicyjskiego*. Lwów.
Janusz, B. 1924. Wspomnienie o śp. Karolu Hadaczku. *Wiadomości Konserwatorskie* 3: 73–76.
Khronika 1918. *Khronika Naukovoho Tovarystva im. Shevchenka u Lvovi*. 60–62. L'viv.
Khyt, M. 2003. Istoriia muzeiu Naukovoho tovarystva imeni Shevchenka u dokumentakh fondu NTSh TsDIA Ukrainy u Lvovi. In V. Golubko (ed.), *Materialy II naukovoi kraieznavchoi konferentsii "Istorychni pamiatky Halychyny", 21 lystopada 2002 r.*, 89–94. L'viv.
Kostrzewski J. 1919. Janusz Bohdan: Zabytki przedhistoryczne Galicyi Wschodniej (Prace naukowe). Lwów, 1918. 310 s. *Przegląd Archeologiczny* 1–2: 66–68.
Kostrzewski, J. 1931. Z żałobnej karty: ś.p. Bohdan Janusz. *Z Otchłani Wieków* 6: 13.
Kostrzewski, J. 1970. *Z mego życia. Pamiętnik*. Wrocław–Warszawa–Kraków.
Kozłowski, S. K. 2009. *Włodzimierz Antoniewicz, profesor z Warszawy.* Warszawa.
Lech, J. 2006. Z badań polsko-ukraińskich związków w archeologii do II wojny światowej. *Przegląd Archeologiczny* 54: 5–57.
Lukomskyi, Y. and Romaniuk, T. 2002. Storinky zhyttia i diialnosti Yosypa Pelenskoho. *Zapysky NTSh* 244: 312–319.
Mazur, O. and Pater, I. 1996. Lviv pidchas Pershoi svitovoi viiny. In Y. Isaievych, F. Steblii and M. Lytvyn (eds), *Lviv: Istorychni narysy,* 304–324. L'viv.
Oliinyk, V. 2005. Muzeinytstvo Zakhidnoi Ukrainy pidchas Pershoi svitovoi viiny (1914–1918 r.). In V. Golubko (ed.), *Istorychni pamiatky Halychyny: materialy tretoi naukovoi kraieznavchoi konferentsii 19 lystopada 2004 r.*, 12–19. L'viv.
Parandowski, J. 2014. Corso. *Kwartalnik Cracovia Leopolis* 2(78): 36–39.
Pasternak, Y. 1931a. Kniazhyi Zvenyhorod v doistorychnii i rannie-istorychnii dobi. *Zhyttia i znannia* 9: 279.
Pasternak, Y. 1931b. Moia pratsia v Natsionalnomu muzeiu 1913–14 r. *Dvaitsiatpiat-littia Natsionalnoho muzeiu u Lvovi*, 29–32. L'viv.
Pełeński, J. 1914. *Halicz w dziejach sztuki średniowiecznej (na podstawie badań archeologicznych i źródeł archiwalnych).* Kraków.
Petehyrych, V. 1996. Dolia arkheolohichnykh kolektsii muzeiu NTSh. In L. Ilnytska (ed.), *Biblioteka Naukovoho tovarystva im. Shevchenka: knyhy i liudy materialy kruhloho stolu* 59–67. L'viv.
Petehyrych, V. and Pavliv, D. 1991. Arkheolohiia u doslidzhenniakh chleniv NTSh. *Zapysky NTSh. Pratsi istoryko-filosofskoi sektsii* 222: 412–426.
Polianskyi, Y. 1920 (1918–1920). Stan Muzeia u 1914–1920 r. *Khronika Naukovoho tovarystva imeny Shevchenka u Lvovi* 63–64: 102–113.
Romaniuk, T. 2007. Vnesok Volodymyra Hrebeniaka u rozvytok ukrainskoi arkheolohii. *Zapysky NTSh. Pratsi arkheolohichnoi komisii* 253: 716–725.
Siromskyi, R. 2016–2021. "Velyka pohybelna ruina": Persha svitova viina v istoriosofii Mykhaila Hrushevskoho. In K. Kondratiuk (ed.), Spetsialnyi vypusk: Mykhailo Hrushevskyi – vchenyi, polityk, hromadskyi diiach: 234–245. Visnyk Lvivskoho universytetu. Seriia istorychna.
Svientsitskyi, I. 1920. *Pro muzei ta muzeinytstvo: (narysy i zamitky)*. L'viv.
Svientsitskyi, I. 1931. XXV lit diialnosti Natsionalnoho muzeiu. *Dvadtsiat piat-littia Natsionalnoho muzeiu u Lvovi*, 4–18. L'viv.
Toczek, A. 2013. *Lwowskie środowisko historyczne i jego wkład w kulturę książki i prasy: (1860–1918).* Kraków.

Tomashivskyi, S. 1915. Volodymyr Hrebeniak. *Dilo* 27: 4–6.

Tomeniuk, O., Bogucki, A. and Sytnyk, O. 2017. V opitsi nad ukrainskoiu starovynoiu: Yurii Polianskyi i Muzei NTSh [To the guardianship over Ukrainian ancientness: Yuriy Polanski and the Museum of Shevchenko Scientific Society]. *Materials and Studies on Archaeology of Sub-Carpathian and Volhynian Area* 21: 11–40.

Vynar, L. (ed.) 2001. *Lystuvannia Mykhaila Hrushevskoho*. II. Kyiv–New York–Paris–Toronto.

Woźny, M. 2013. Archaeological studies of Volodymyr Demetrykevych (1859–1937) in the Eastern Galicia. *Naukovi studii: zbirnyk naukovykh prats* 6: 19–41. L'viv.

Woźny, M. 2018. *Włodzimierz Demetrykiewicz (1859–1937). Prehistoryk z przełomu epok.* Kraków.

Archaeologia Polona, vol. 61: 2023, 105–126
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3554

Discovery of a German V-2 Rocket Fall Site in the Area of Chodzież, in Greater Poland

Piotr Alagierski[a], Katarzyna Kuczara-Alagierska[b] and Maciej Sokołowski[c]

"Earthlings are the terror of the Universe!
If other planets aren't now in danger from Earth, they soon will be.
So tell me the secret so I can take it back to Earth and save us all:
How can a planet live at peace?"
Kurt Vonnegut, *Slaughterhouse-Five*.

In the 1930s, in the town of Peenemünde on the northern edge of the Usedom Island in the Baltic Sea, the Germans established a military research centre to work on rocket engines. In Peenemünde, the Aggregat 4 – the first ever rocket to cross the space frontier – was constructed and launched. However, it went down in history under the name V-2. This weapon was the world's first ballistic missile used in combat. At the end of World War II, V-2 rockets were a technological marvel of the time. Reaching supersonic speeds, they were an unrecognized design for the Allies in terms of control and targeting principles. They were a weapon almost impossible to shoot down. The RAF's destruction of the Peenemünde facility in 1943 was the reason for its relocation to the Heidelager military training ground in the village of Blizna, Subcarpathian province, out of the range of Allied aviation. Threatened by the Soviet Army's offensive, it was moved again in 1944 to the Heidekraut training ground in Wierzchucin, Kuyavia-Pomerania province. As a result of archaeological work in the area of Chodzież, in northern Greater Poland province, the so far unknown site of the fall of a German V-2 rocket fired from the Heidekraut training ground, from a distance of 108 kilometres, has been located. Analysis of the finds, the appearance of the fall site and GPR surveys lead to the conclusion that a version of the rocket with little or no

[a] Pracownia Archeologiczna Alagierscy Katarzyna Kuczara-Alagierska, Piekary str. 17, 64–800 Chodzież (Poland), e-mail: archeologia.alagierscy@gmail.com; ORCID: 0009-0007-4978-3738
[b] Pracownia Archeologiczna Alagierscy Katarzyna Kuczara-Alagierska, Piekary str. 17, 64–800 Chodzież (Poland), e-mail: archeologia.alagierscy@gmail.com; ORCID: 0009-0007-5114-6041
[c] Karbonado Maciej Sokołowski Budzyń. Zaciszna str. 1, 64–800 Oleśnica (Poland), e-mail: carbonado@wp.pl; ORCID: 0009-0003-0599-0488

Received September 20, 2023; Received in revised form November 14, 2023; Accepted November 22, 2023

explosive material exploded in Chodzież. The current state of research into the active use of the Heidekraut training ground at the end of the War leads to the conclusion that the Chodzież region, located in northern Greater Poland, was a zone of not very intensive experimental firing of V-2 rockets. Much more intensive was the firing of the Kalisz region located in southeastern Greater Poland. Further research into the sites of V-2 rocket falls both in Greater Poland and in other parts of Poland may contribute to a better understanding of the poorly known German experiments with ballistic missiles. The Polish lands are particularly interesting in this regard, as they were training grounds for rocket experiments at the end of World War II.

KEY-WORDS: World War II, German V-2 rocket, Chodzież, Heidekraut training ground, experimental flights of V-2 rocket, V-2 rocket explosion crater

INTRODUCTION

In 2017, LiDAR airborne laser scanning data of the Chodzież area, in the Greater Poland province, became available. At that time, for the purposes of the project "Recognizing the cultural heritage resources of the Chodzież area", carried out by Piotr and Katarzyna Alagierski, landforms with unusual morphology were analyzed. Particularly notable among them was a feature located southwest of the town of Chodzież. It has the form of a crater with a diameter of 20 metres and a depth of 2 metres. Around it, an earth mound several centimetres high and up to 2 metres wide is visible. Among a number of possibilities for the genesis of this form, the possibility was considered that it could be the remains of a meteorite crater. This would have been supported by the presence of the aforementioned circumferential earthen bank that is characteristic of impact sites (the so-called postdetonation ring). The true origin of the newly discovered structure was only determined by field verification and identified as the site of the fall of a German V-2 type rocket during World War II (Fig. 1).

FIELD RESEARCH

The location of the newly discovered feature is in the Chodzież lake district – a mesoregion located in northwestern Poland, an area dominated by moraine hills covered with dense mixed forest, which makes it rather difficult to conduct classical surface surveys (Alagierski and Kuczara-Alagierska 2022: 190). The site of the rocket fall is located about 2 km to the southwest of the current administrative borders of the city of Chodzież (Fig. 2).

Prior to the field research, a cartographic search was performed, which turned out to be very interesting. It was established that the feature of our interest does not

Fig. 1. Peenemünde 1943. Launch of a German V-2 type rocket. Public domain.

appear on maps from before 1945 (Fig. 3). It should be noted that these maps, especially the Polish editions of the pre-War Military Geographical Institute (in Polish: Wojskowy Instytut Geograficzny, abbrev. WIG), were made with extreme care, and as a rule, characteristic points were placed on them, to which the form in question undoubtedly belongs. This observation made it possible to tentatively rule out a me-

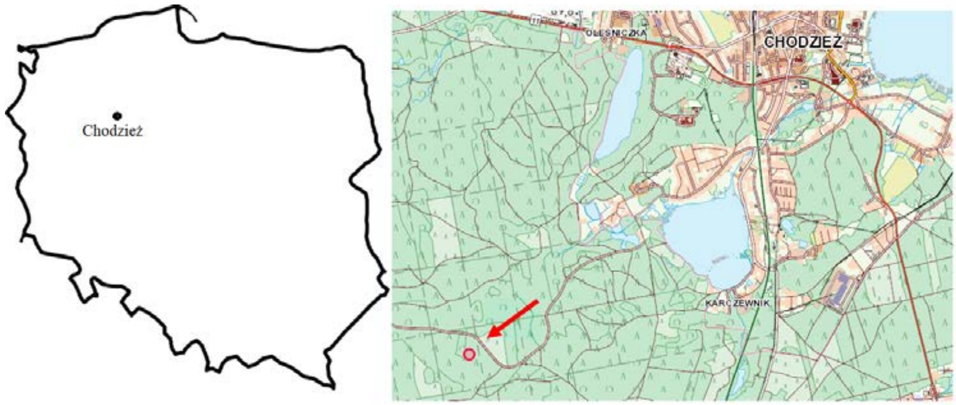
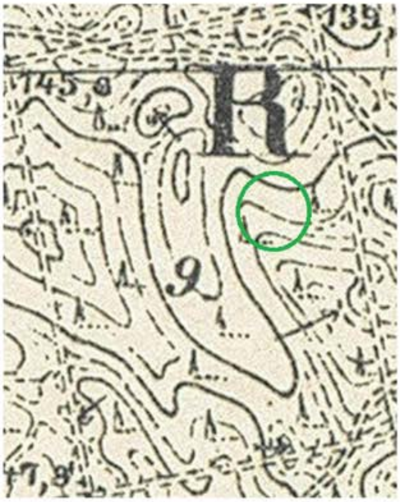


Fig. 2. Chodzież district. Location of the place where the V-2 rocket fell. Graphics created by the authors.

teorite crater. A search carried out in the Podanin Forest District, in the area of which the discovery was made, also ruled out the presence at the site of pits associated with the extraction of minerals after 1945. At the same time, the authors adopted a working hypothesis assuming that the discovery may be related to an explosion that took place in 1944 in the Podanin forests mentioned in the literature (Szymankiewicz 1977: 81; Kaczmarek and Szymankiewicz 1998: 394) and surviving in the oral accounts of indigenous residents of Chodzież and the surrounding area.[1] However, both residual references in the literature and memoirs located the alleged site of that explosion in an area 3 to 5 km away from the location of the object of interest. In order to verify the above findings, in May 2017 the authors conducted archaeological surface investigations at the site of the above-mentioned feature.[2] The point visible on the current map (Fig. 3) and the LiDAR image (Fig. 4) revealed a well-visible crater measuring 18 m x 20 m, with a preserved so-called post-detonation ring. Two metal detectors – a Rutus Proxima 5.0 with a 6.6 kHz T20 coil and a Minelab [E-Trac] with an 11“ DD-type coil – were used during the surface survey. For both detectors, the maximum theoretical range is specified at a depth of 2 metres and applies only to very large objects. The actual effective range of the equipment used when searching for small objects is about 40–50 cm. The crater and its immediate surroundings were searched within a radius of 30 metres to this depth. The total search area was 1600 m². In the case of both detectors, no metal discrimination was used to obtain all of the

1 Report by Anna Kruszwicka born in 1908, resident of Chodzież. Piotr Alagierski's archive

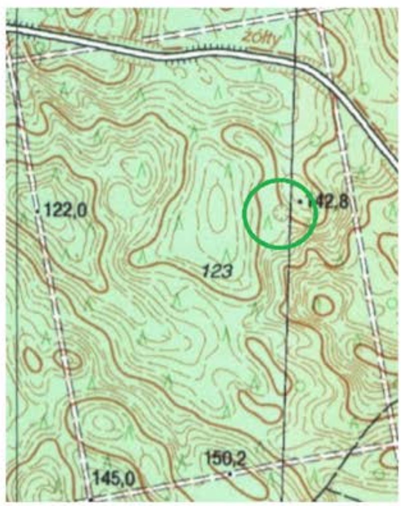
2 Geographic coordinates of the area – N: 52°57'52.8" E: 16°52'29.4". Podanin Forest District, Karczewnik Forestry, forest division no. 123.



map scale 1:25 000
status for the year 1888

map scale 1:25 000 (from WIG)
edition from 1934

map scale 1:10 000
status from the year 1987
edition from 1991



map scale 1:50 000
status and edition from 2000

Fig. 3. Chodzież area. Cartographic records of the research area. What is noteworthy is the lack of a crater shape on maps published before 1945. Maps from the collection of M. Sokołowski.

Fig. 4. Chodzież area. View of the site where the V-2 rocket fell. Shot in the form of LiDAR laser scanning. Graphics created by the authors.

findings. The work was facilitated by the fact that the surveys were conducted in a forested area where there were no modern metal objects to disturb the search (Figs 5 and 6).

As a result of the work, it was unambiguously established that the study area is indeed the so far unknown site of the fall of a World War II German rocket, classified on the basis of the characteristic structural elements discovered as a V-2 type. Most

Fig. 5. Chodzież area. The place where the V-2 rocket fell. View of the crater interior. 2017. Photo: P. Alagierski.

Fig. 6. Chodzież area. The place where the V-2 rocket fell. The crater during a surface survey using a metal detector. Measurement poles indicate the location of discovered diagnostic rocket components. Photo: P. Alagierski.

of the rocket fragments were found within the crater and its immediate vicinity. In the further vicinity, there were smaller fragments, mostly elements of plating or fuel

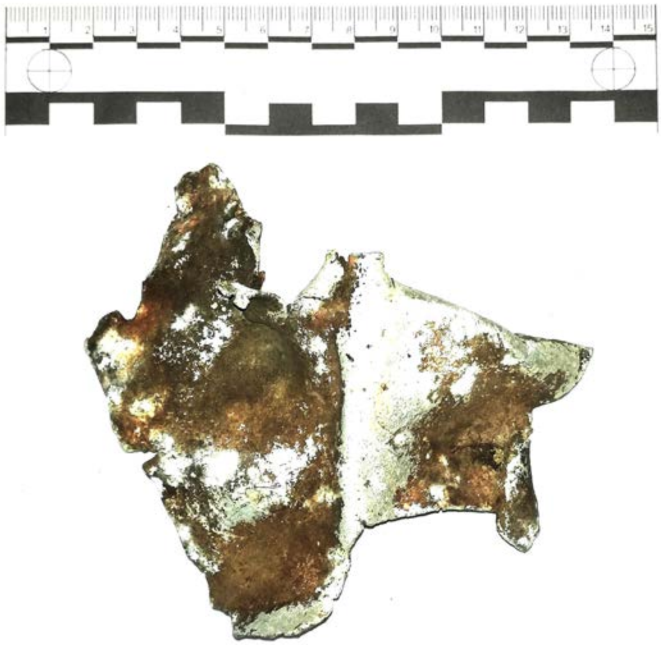


Fig. 7. Chodzież area. Fragment of the duralumin shell of the fuel tank of the V-2 rocket. Photo: P. Alagierski.

tanks made of duralumin. Discoveries in the field were documented using GPS to distinguish clusters of individual structural elements and determine the presumed trajectory of the missile. A total of 197 rocket fragments were recovered during the two days of research, including 30 fragments suitable for identification. Based on a search of the literature, it was determined that the site of the fall should be linked to the September 1944 explosion. As mentioned, this fact was recorded at the time, but the exact location of the rocket explosion was so far unknown.

FINDS

As mentioned, of the collection of finds acquired during the survey, only 15% are diagnostic parts of the rocket. These are mainly duralumin parts of the fuel tank shell (Figs 7

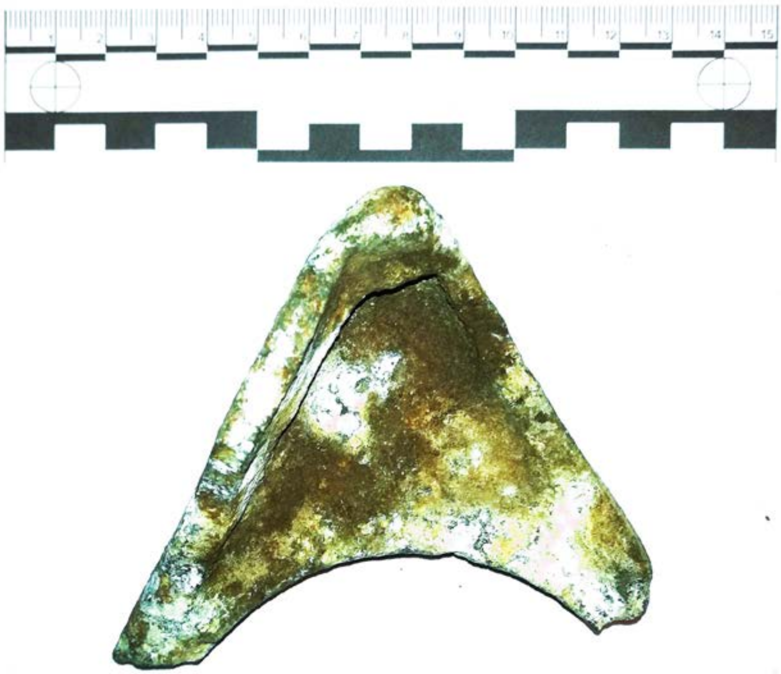


Fig. 8. Parts of the fuel tank shell made of duralumin, discovered at the site of the V 2 rocket crash near Chodzież. Photo: P. Alagierski.

and 8). Fragments of the engine cover (Fig. 9) and turbopump (Fig. 10) were also made from duralumin. In addition, fragments of metal tubes and rods were also obtained. The tubes are remnants of fuel pipes, while the rods are remnants of the control system. In addition, two fragments of burned-out gas rudders made of graphite were discovered (Fig. 11A). Rudders of this type were used during the first phase of the rocket's flight and in the thinner layers of the atmosphere. At that time they replaced non-functioning aerodynamic rudders. The use of graphite allowed the rudders to work in the combustion environment of the rocket engine gases. They made it possible to change the direction of the exhaust gases (Fig. 9B and 11B). These rudders gradually burned out as they flew (Woźny 2011: 114). This process is evident on the acquired specimens. Finding such relics was extremely important, as these types of rudders were only used on V-2 type rockets.

During the analysis of the acquired collection, it turned out that all the structural components suitable for identification came from the tail section of the rocket.

Fig. 9. A – Chodzież area. Cover of the rear part of the V-2 rocket engine. Photo: P. Alagierski; B – The location of the uncovered fragment of the rear engine cover in the photograph of the preserved specimen. Graphite rudders are visible in the central part of the outlet. Public domain. Wikimedia Foundation, RAF Museum collections, London.

They represented structural elements of the engine, control system and fuel tank. What was puzzling was the fact that no fragments were obtained from the centre section and the rocket's warhead. The form of the crater itself also raised questions. Compared to analogous forms, the structure discovered by the authors is relatively shallow, at about 2 metres. The remains of other craters are definitely deeper. For example, the crater after the explosion of a V-2 rocket in Lisiny, Tuchola district, is up to 10 metres deep (Zawadzki 2003: 74.). Craters discovered in recent years near Kalisz are also characterized by a much greater depth (oral information of Przemysław Kurkowiak). There are more examples. The authors seem to know the answer to these two important questions – why is the studied field form noticeably shallower than analogous objects, and why were only elements from the rear parts of the rocket discovered during the tests? The main purpose of the rocket's test firings was to conduct research on its behaviour in the air. German engineers, according to surviving accounts, were mainly interested in manoeuvrability and propulsion performance during the test phase. A fully combat-armed rocket carried almost a ton of explosive (Woźny 2011: 106), with the amount of explosive being significantly reduced in test specimens. There are known cases when the weight of the charge was only 50 kg. There were also specimens in which explosives were replaced with cement (Woźny 2011: 113). Such procedures were caused both by economic aspects due to the value and scarcity of explosives, especially in the final period of the War, and by safety aspects, since some rockets exploded right after launch, and the places where they fell were not fully controlled either. Thus, there are known cases of rockets being topped up with concrete or scrap metal. It was important that the weight of the materials placed in the warhead had to be 880 kg. The secondary thing was the type of fill used. This is an important piece of information, because in light of it, not every metal element found at the site of the fall must come from the rocket's construction, and they can also be metals that made up the payload. In the community of explorers of Second World War features, there is a known case of the discovery in the crater after the explosion of a V-2 rocket of artillery ammunition shells originating from the First World War, used as ballast for the rocket (oral information of Przemysław Kurkowiak).

Assuming that in the analyzed case we were dealing with just such a "depleted" test version of the rocket, it can be assumed that there was a limited explosion on impact with the ground. In such a situation, the warhead of the rocket would have penetrated deeply into the ground, the central part could have been damaged to a lesser extent and broken through, and only the fuel tanks would have exploded, resulting in a significant defragmentation of the tail section. Such a situation is reflected in the finds from the feature we studied.

Immediately after the explosion, German authorities secured the Karczewnik Forestry area by sending police formations from Chodzież there (Szymankiewicz

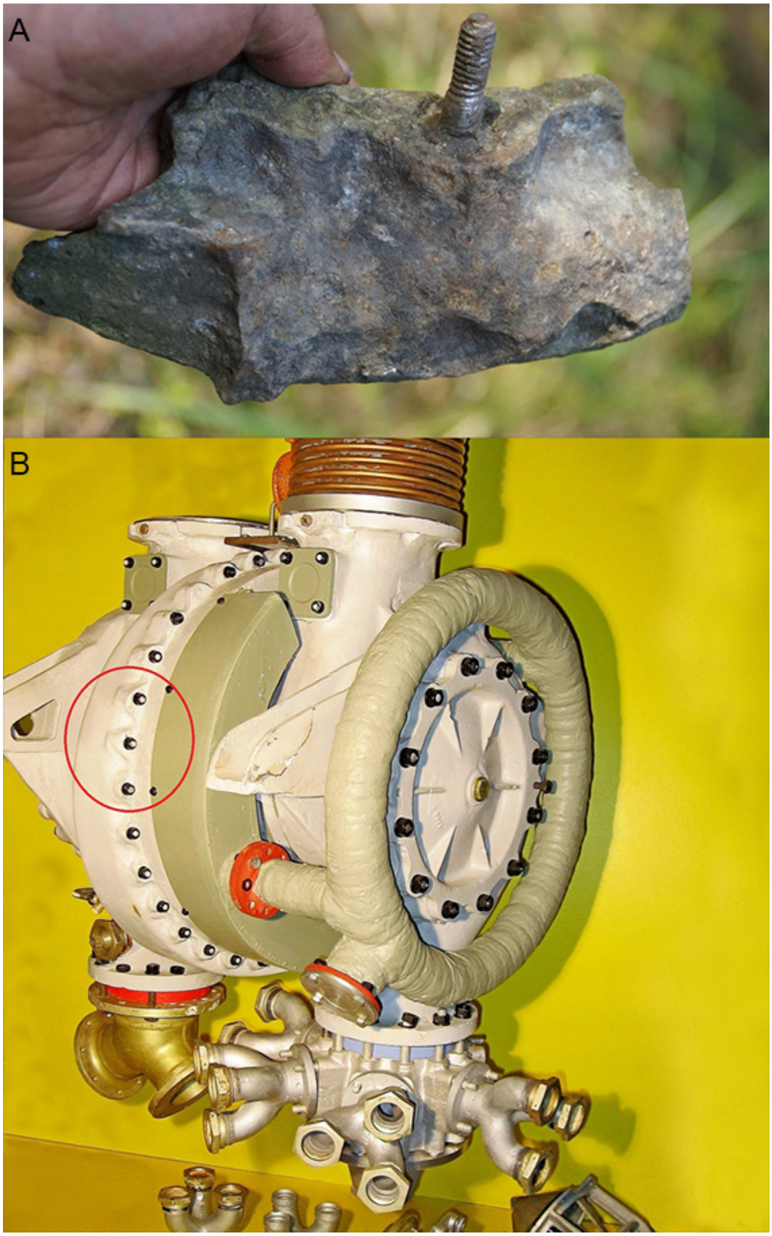


Fig. 10. A – Chodzież area. Fragment of the turbopump of the V-2 rocket at the time of discovery. Photo: P. Alagierski; B – Location of the uncovered fragment of the turbopump in the photograph of the preserved specimen. Public domain. Sources: https://v2rockethistory.com/gmedia-album.

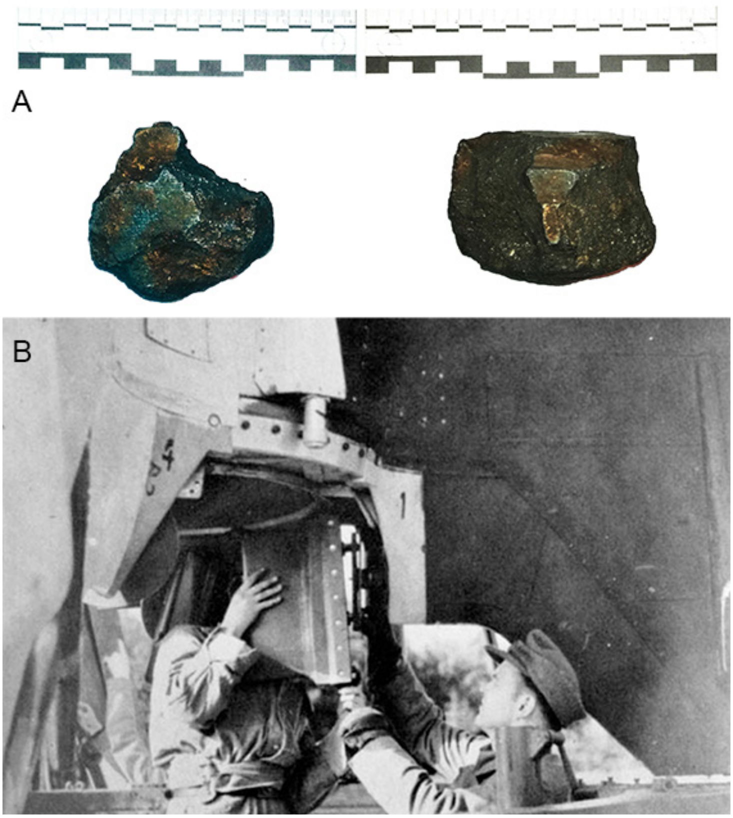


Fig. 11. A – Chodzież area. Fragments of burnt graphite rudders of the V-2 rocket. Photo: P. Alagierski; B – Installing graphite gas thrusters in the V-2 rocket. Public domain. Source: https://v2 rocket.forummotion.com. Accessed on 17.09.2023.

1977: 81). Usually, in analogous cases, special Wehrmacht troops arrived at the site of the rocket fall with the task of securing any fragments of the structure. In the case under review, these would mainly have been the relatively well-preserved fragments of the central section. During the search at the time, the small, heavily damaged and sand-covered parts of the rudder and engine compartment and the turbopump could easily have been overlooked. The adoption of such a sequence of events is explained not only by the finding of small structural fragments coming only from the rear of the rocket, but also by the relative shallowness of the crater. The well-preserved, intact post-detonation rim of the crater proves that its shallowness is an original phenomenon, and not caused by intentional man-made backfilling after the explosion.

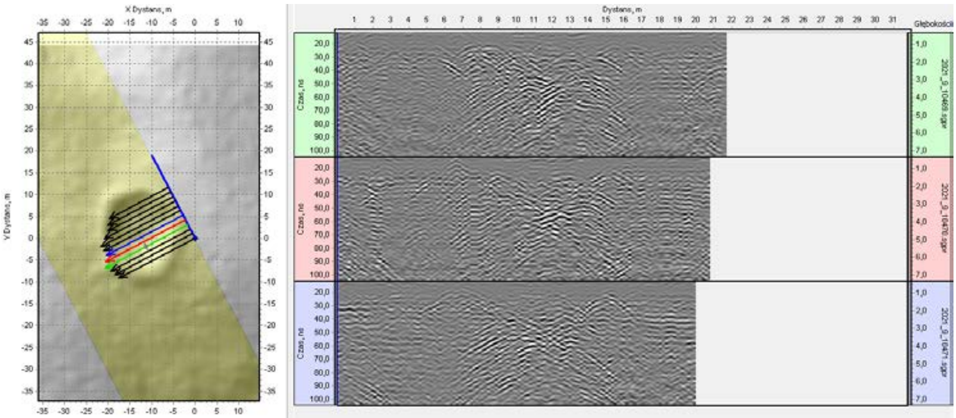


Fig. 12. Chodzież area. GPR reading of the crater centre. Visible anomalies at a depth of 3 to 4.5 m from the level of the crater bottom. According to K. Kuczara-Alagierska.

If this inference is correct, there should be fragments of the warhead and structural elements of the rocket's front end buried deeper within the crater. Given the range limitations of the range of the metal detectors used, they may not have been located during the 2017 survey. In order to confirm this theory – for the purposes of this publication – the authors carried out GPR surveys within the crater in December 2022. The work was carried out using a 300 MHz antenna with a range of up to 8 metres. Prior to the survey, test measurements were taken and the antenna was tuned to the moisture content and geological structure of the soil. The data were entered into the Synchro 3 program. 12 profiles of 15–22 metres were established within the crater. Profiles were established at 1-metre intervals. As a result of the measurements, a strong anomaly was observed at a depth of 3 to 4.5 metres from the level of the crater floor, located in the central part of the study site. It is best seen in the visualization of profiles No. 5 and 6 (Fig. 12). Given the context of the research and the analogies, it can be assumed that in this case we are dealing with the structural elements of the front of the rocket, which penetrated the ground when it fell and exploded. This assumption is verifiable. Currently, verification studies are being prepared in consultation with the Podanin Forest District, which may result in the acquisition of more elements of the V-2 rocket in question. The crater area and its immediate surroundings are protected, having been excluded from forest management in order to preserve its landscape form. Work is also currently underway to launch a cultural tourism trail in the Chodzież area, which also includes the remains of the site of the V-2 rocket fall.

HISTORICAL CONTEXT. CHODZIEŻ REGION

As mentioned above, the fall of a V-2 type rocket and the accompanying explosion were recorded in the literature, and the event survived in the form of oral accounts among indigenous residents of the Chodzież area. Interestingly, the Germans during the occupation spread information that the explosion had occurred as a result of an airplane accidentally dropping an aerial bomb (Szymankiewicz 1977: 81). However, this information was not believed by the Poles. Rumours quickly spread that "near Chodzież, a secret German rocket fell in the forest" (see footnote no. 1). In the collective consciousness of the locals functioned the belief that the explosion was caused by the fall of a V-1 rocket. We can also find information about the V-1 missile in the publications of Zenon Szymankiewicz cited above and in later regional publications. Only in an article on the "Heidekraut" German rocket range by Jacek Woźny in 2011 (Woźny 2011) does the correct identification of the cause of the explosion near Chodzież appear, as a result of V-2 rocket tests.

Taking into account the date of the explosion of interest to us, i.e., the beginning of September 1944, the only place from which a V-2 type rocket could have been launched at that time was the Heidekraut training ground located in the Tuchola Forest, in the village of Wierzchucin, Tuchola district. The distance between the Heidekraut training ground and the site of the explosion in question is 108 km (Fig. 13). Testing at this location began after the Russian army occupied the Heidelager training ground in Blizna, Ropczyce-Sędziszów district, in August 1944, where V-1 flying bombs and V-2 rockets were tested in 1943–1944. The Blizna training ground was located there after the RAF had bombed the Peenemünde training ground on the Usedom Island in the Baltic Sea in August 1943. The area designated for detonation – the target of the rockets launched from Heidelager training ground in Blizna was the village of Sarnaki, Łosice district, on the Bug River. In the spring of 1944, a spectacular operation of the Polish Home Army took place there, seizing an unexploded V-2 rocket and sending it to Warsaw, and then to London (Wojewódzki 1984; Wnuk and Zapart eds 2012)[3]. The Germans evacuated the training ground from Blizna to Wierzchucin before the Russian army arrived (Wojewódzki 1984).

Three more rockets were fired from the Heidekraut firing range in the direction of Chodzież. Another explosion took place in the area of the now-defunct forest settlement of Papiernia, located about 4 kilometres to the west of Chodzież. Chronologically

3 See also: report by Dominik Kurek and Łukasz Sroka presented at the conference *Archeology of Modern Times*, Wrocław, October 21, 2016, entitled – "Excavation of the remains of the V-2 rocket in Dobrynin, Subcarpathian province and their further fate. An example of difficult cooperation between scientists, monument protection services and metal detecting groups".

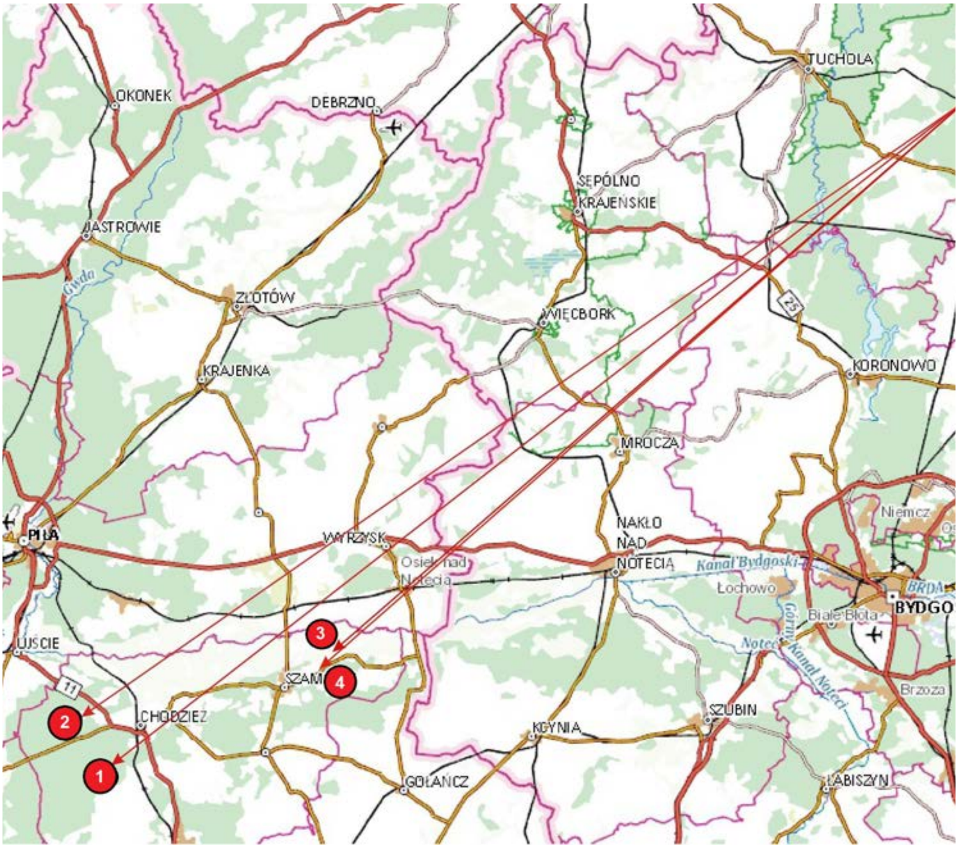


Fig. 13. Places of fall of V-2 rockets test fired from the Heidekraut training ground towards the Chodzież area between August 1944 and January 1945. 1 – Chodzież, Chodzież distr. (the site investigated in 2017); 2 – Papiernia, Chodzież distr. ; 3 – Heliodorowo, Chodzież distr.; 4 – Borówki, Chodzież distr. According to P. Alagierski.

it was earlier than the case we are discussing, taking place in late August 1944. The area has been repeatedly surface surveyed by the authors, and its image analyzed based on LiDAR data. Unfortunately, without success. The area is currently home to young commercial forests, as well as swamps and ponds, in addition to old forest communities. It can be assumed that if the crater after this explosion was also relatively shallow and located on sandy ground, it may have been destroyed as a result of forest management and not preserved until our time. Further explosions of V-2 rockets in the Chodzież area took place in December 1944. On December 7, a V-2 rocket fell in an area of meadows on the Noteć River in the area of the village of Heliodorowo, Chodzież district, located about 20 km northeast of Chodzież. The site of the rocket fall was peat meadows, and the crater probably filled with water fairly quickly. The location of the crater near Heliodorowo has not yet been determined. The last explosion of a V-2 rocket in the Chodzież area took place on December 13, 1944 in the area of the village of Borówki, Chodzież district, located 18 km northeast of Chodzież, near the aforementioned Heliodorowo (Szymankiewicz 1977: 82). The crater near Borówki was listed as existing in 1978, but is currently invisible in LiDAR scans of the area (Fig. 13).

The four explosions of V-2 type rockets in the Chodzież district are not the only traces linking the region to the German V-weapons project. It is worth mentioning the activities of Chodzież resident Jan Sznajder, commander of one of the Home Army units operating in the Tuchola Forest in the area of Wierzchucin. He was a witness to the organization of the Heidekraut testing ground, a direct observer of V-2 rocket launches and a collector of intelligence on the activities of the testing ground (Szymankiewicz 1977: 88).

HISTORICAL CONTEXT. KALISZ REGION

In light of the state of research, the area around Chodzież, located in northern Greater Poland, can be considered a zone of not very intensive experimental shelling by V-2 rockets. Until recently, the area around Kalisz, located in southeastern Greater Poland, was also considered a similar zone. In recent years, however, it has become apparent that the Kalisz area was shelled much more intensively than the Chodzież area. In the absence of German sources, the reasons for this phenomenon can only be guessed at, but they were probably twofold. One is the practical one, the targets near Kalisz were located twice as far from the Heidekraut firing range as those near Chodzież, so the flight of rockets provided more data. A second reason could have been the political aspect, the Kalisz region was less Germanized area. Concentrating the experimental shelling in this area made the risk of causing property damage and German population losses lower. The real dimensions of the rocket shelling of the Kalisz area, especially the vicinity of Grabów nad Prosną, Ostrzeszów district, located about 30 km to the south of Kalisz, are yet to be known. As late as the 1970s, it was believed that fewer than 20 missiles had fallen there (Szymankiewicz 1977: 85). For the past three years Przemysław Kurkowiak, together with members of the *Denar* association, has been carrying out a project to discover and map the sites of V-2 rocket falls in the Kalisz area. By the time of writing this text, about 80 locations of V-2 rocket explosions had already been identified. Such a significant increase in sources was possible

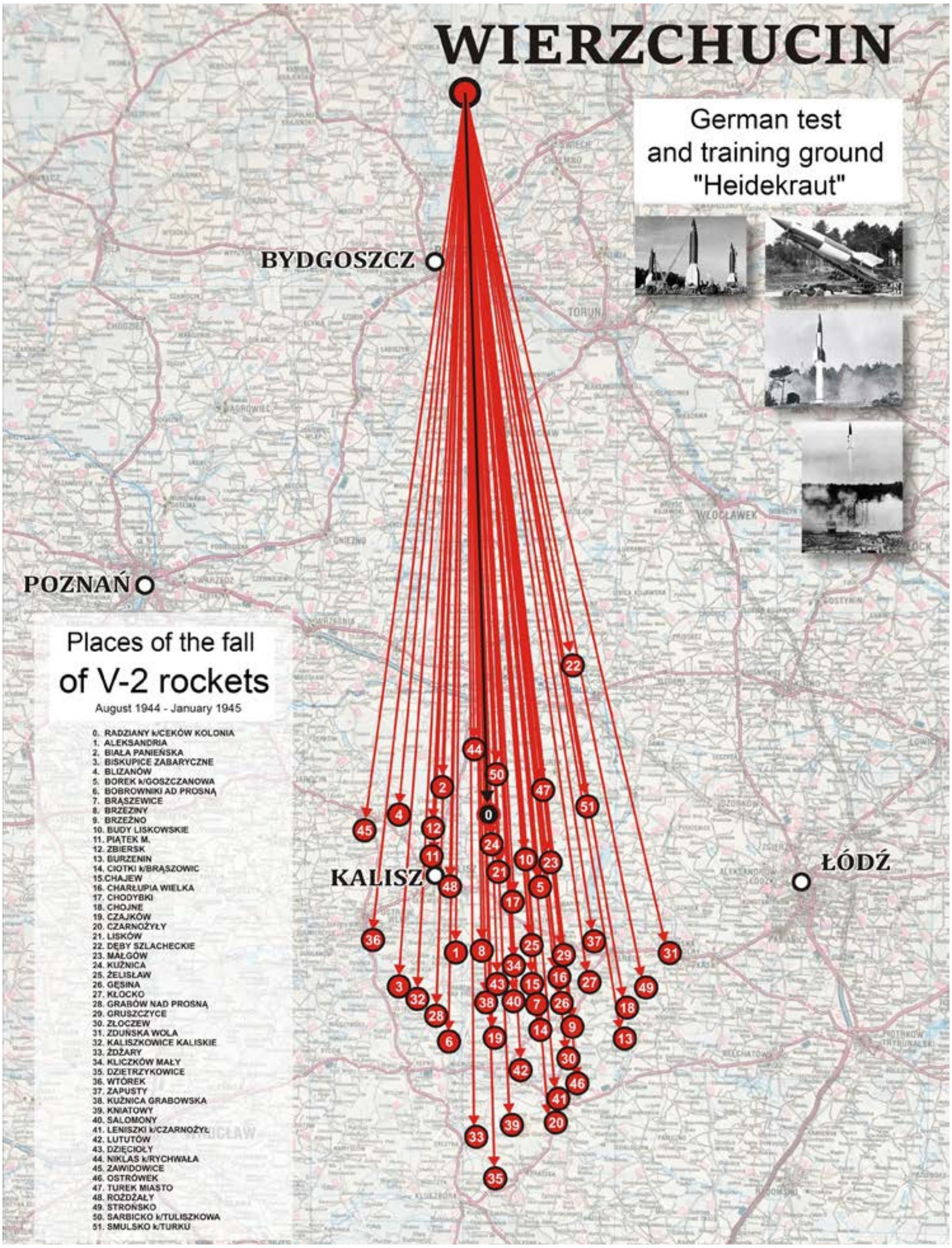


Fig. 14. Places, known so far, of the fall of V-2 rockets test fired from the Heidekraut training ground towards the Kalisz area in 1944. According to P. Kurkowiak.

Fig. 15. Kuźnica Grabowska, Ostrzeszów distr. Fragments of the V-2 rocket were obtained during research into the crater after the rocket explosion. Photo: P. Kurkowiak.

thanks to the notes of Kalisz regionalist Wacław Klepande, who has been collecting witness accounts of V-2 rocket falls in the region since the 1970s. Contemporary field interviews and LiDAR data analysis are also helpful in this activity. So far, a preliminary map of the area's shelling from the Heidekraut training ground in Wierzchucin has been produced (Fig. 14). This is the first map of its kind in the world, with the understanding that it is no longer up to date, as new confirmed locations are still coming in. Taking into account that more than 320 rockets were launched from the Heidekraut training ground, 25% of the sites of their falls have already been identified in the Kalisz area. It is worth noting, however, that the total of about 320 rockets launched from this training ground also included those rockets that exploded immediately after takeoff and also failed launches. Thus, the above figures lead us to consider the Kalisz area as the main target of experimental firing conducted from the Heidekraut training ground. In the course of the work carried out by members of the *Denar* association, a rocket explosion crater in Kuźnica Grabowska, Ostrzeszów district, was verified by excavation methods. This feature had a diameter of 14 metres, and its depth reached 4 metres. The site of the fall is 223 kilometres from the launch site. At a depth of 5 metres from the bottom of the crater (9 metres from ground level) were found, among other things, elements of the turbocharger and air injectors from the V-2 rocket. It is worth noting that the depth of the relics in Kuźnica Grabowska is similar to the depth of geomagnetic anomalies recorded in the crater near Chodzież, as written above. The project to study the remains of traces of V-2 rocket experiments in the Kalisz area is a developmental one – a museum of rocket technology is currently under construction in the area – similar to those in Peenemünde and Blizna – a 1:1 scale recreation of the V-2 rocket and a presentation of the excavated remains is planned (Fig. 15). Further exploration and excavations are also included in the project.

CONCLUSION

The V-2 rockets at the end of World War II represented one of the miracles of technology at the time. It was a rocket of this type that became the first man-made object to cross the Kármán Line (100 km above sea level), entering space. The weapon represented the world‘s first ballistic missile used in combat (Dungan 2005). Reaching supersonic velocities, it represented a design unknown to the Allies in terms of control and targeting principles. It was a weapon almost impossible to shoot down. Although, by the time the V-2 came into use, its employment in combat could no longer change the fate of the Third Reich, it made a huge psychological impression in the Allied camp, especially on the British community, as a result of the effective strikes on what at the time seemed to be an already secure London. During combat operations in the final phase of World War II, German forces fired about 5500 V-2 missiles, and it is assumed that about 70% of them successfully achieved their intended targets (Lüdeke 2010). The post-World War II seizure of research results on German rocket technology and German scientists by the Allies, mainly the US, during Operation "Project Paperclip" contributed significantly to the development of US space projects and the development of ballistic nuclear weapons carriers (Akens 1960: 24–29). Widely known in this aspect is the role of Wernher von Braun co-developer of the V-2, who surrendered with his team to the Americans at the end of the War. Also, the Soviet takeover of a large number of technicians from the Peenemünde facility and parts of V-2 rockets resulted in the rapid development of Soviet ballistic nuclear weapons (Toktay 1963). All these factors resulted in the fact that German tests on V-2 weapons initiated processes that cast a shadow over the future and shape of geopolitical power balances to this day. Suffice it to mention that, as a result of the development of the Soviet version of the V-2 missile designated R-1 (Širokorad 2003: 544), the Soviet Union announced as early as 1956 that it was in possession of missiles equipped with thermonuclear warheads capable of striking any target on Earth (Toktay 1963).

It seems clear that further research into the sites of V-2 rocket falls both in Greater Poland and in other parts of Poland may contribute to a better understanding of the poorly known German ballistic missile experiments. The Polish lands are of particular interest in this regard, as they were training grounds for the rocket experiments of the end of World War II. The situation in the Chodzież area, where of the four craters known in the literature to have been created by the explosion of V-2 rockets, only one has survived to this day, emphatically shows how important it is to protect and professionally study such sites. Fortunately, interest in the material relics of the conflicts of the 20th century ceases to be, as it was not long ago, the exclusive domain of amateurs, collectors and metal detectorists (Rzepecki and Ryba-Kaczorowski 2013: 395; see also footnote no. 3). The discovery and professional examination in 2017 of the site of a fallen V-2 rocket in the Chodzież area is an interesting contribution to the issue of studying objects that make up the landscape of conflict in forest areas (see Table 1; Banaszek and Rączkowski 2010: 117–131).

Tab. I. Chodzież. Inventory of materials acquired during the 2017 survey.

Inventory no.	relic	amount	notes
1/2017	Metal plating components, metal structural components	110	damaged elements unfit for identification
2/2017	Plating fragments made of aircraft duralumin with clear explosion marks	38	damaged elements unfit for identification
3/2017	Small aluminum elements with partially preserved form (screws, clamps)	4	elements are suitable for further identification
4/2017	Fragments of the steering system, graphite rudders	2	Diagnostic elements
5/2017	Small, melted, damaged, uncharacteristic fragments made of non-ferrous metals	24	damaged elements unfit for identification
6/2017	Separated distinctive aluminium fragments, engine and turbo pump components	13	elements are suitable for further identification
7/2017	Characteristic elements made of iron including 4 fuel tubes, control system rods, 5 structural fragments with preserved bolts and milling cutters	11	elements are suitable for further identification
8/2017	Melted objects made of non-ferrous metals	2	damaged elements unfit for identification

It can be hoped that the coming years will bring – not only at the micro-regional level – further development of conflict archaeology as an already full-fledged sector of archaeology, both in the field of the archaeology of the Great War (Saunders 2002) as well as World War II archaeology (Moshenska 2013).

REFERENCES

Akens, D. 1960. *Historical Origins of the George C. Marshall Space Flight Center*. Huntsville.

Alagierski, P. and Kuczara-Alagierska, K. 2022. *Ziemia chodzieska. Terra Incognita – Terra Cognita*. Chodzież.

Banaszek, Ł. and Rączkowski, W. 2010. Archeologia w lesie. O identyfikacji stanowisk archeologicznych w gminie Polanów (i nie tylko). *Historia i kultura Ziemi Sławeńskiej* X: 117–131.

Dungan, T. 2005. *V-2: A Combat History of the First Ballistic Missile*. Chicago.

Kaczmarek, M. and Szymankiewicz, Z. 1998. Pod okupacją hitlerowską. In S. Chmielewski (ed.), *Dzieje Chodzieży*, 339–394. Chodzież.

Lüdeke, A. 2010. *Andra världskrigets vapen: infanterivapen, opansrade fordon, pansarfordon, artilleri, specialvapen, flygplan, fartyg*. Bath : Parragon.

Moshenska, G. 2013. *The Archeology of the Second World War: Uncovering Britain's wartime heritage*. Bransley.

Rzepecki, S. and Ryba-Kaczorowski, A. 2013. Pozostałości działań wojennych zarejestrowane na stanowisku Borkowo 16, gm. Pruszcz Gdański. *Raport* 8 (2007–2008. Vol. II): 395–402.

Saunders, N. 2002. Excavating memories: Archaeology and the Great War, 1914–2001. *Antiquity* 76: 101–108.

Szymankiewicz, Z. 1977. Na tropach hitlerowskich rakiet V w Wielkopolsce. *Kronika Wielkopolski* 4(13): 80–94.

Toktay, G. A. 1963. Soviet Rocket Technology. *Technology and Culture* 4: 515–528.

Wnuk, R. and Zapart, R. (eds). 2012. *Tajemnice Blizny. Wywiad Armii Krajowej w walce z rakietami V-2.* Gdańsk.

Wojewódzki, M. 1984. *Akcja V1 i V2*. Warszawa.

Woźny, J. 2011. Poligon rakietowy "Heidekraut" w Borach Tucholskich w świetle badań archeologicznych. In *Najciekawsze epizody II wojny światowej w Borach Tucholskich*, 103–129. Tuchola.

Zawadzki, W. 2003. Eksterminacyjna działalność okupanta wobec ludności polskiej poprzez dokonywanie prób rakietowych. Poligon rakietowy broni ,,V" w Borach Tucholskich. In W. Zawadzki (ed.), *Polacy w walce z bronią V-1 i V-2*, 59–80. Bydgoszcz.

Širokorad A. B. (ed.). 2003. *Ènciklopediâ otečestvennogo raketnogo oružiâ 1918–2002*. Minsk.

Archaeologia Polona, vol. 61: 2023, 127–142
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3538

Cracow's Glinik – World War II Executions Place, Forgotten over the Years and Restored to the Collective Memory. Preliminary Results of Archaeological-and-Exhumation Research

Krzysztof Tunia[a]

The article is the first English-language publication presenting the topic of one of the places of executions during World War II in Cracow, bearing the local name of Glinik. It was located in a claypit for a brick factory operating nearby before the War. Executions were carried out in Glinik from mid-November 1939, basically until the end of 1943. The victims were mainly brought from the Cracow prisons. In the post-War years, it was decided not to carry out exhumations in Glinik. Only several stone obelisks were erected there, and in 1967 a larger memorial was built to commemorate the victims shot in Glinik. The area was only granted the status of a war cemetery in 2012. In the years 2013–2015, exploration works were conducted in the area of Glinik using archaeological research methods. This work was focused on finding the exact location of the place of executions, carrying out exhumations and reburying of the human remains. As a result, 25 graves were located, and the remains of 125 people were excavated from these graves. In many cases, small artefacts were found with them. In only one case, was it possible to identify the remains by name, based on a found identity document. And she is the only certain identified victim of Glinik. The anthropological analysis showed that the vast majority of victims were men (114 persons), while there were 11 women. The cause of death in most cases was a gunshot to the head. All the skeletons were subjected to DNA tests, with the aim of possible future identification of the victims. Their remains were reburied in an interreligious ceremony in Glinik, in two mass graves in the foundation part of the existing monument there. An important stage in restoring the memory of those shot in Glinik were such undertakings as the renovation of the memorial in 2016–2017, which is the dominant feature of the war cemetery. One of these commemorative activities was also an exhibition devoted to the events in Glinik, organized at the Museum of the Home Army in Cracow in 2020, together with accompanying publications. In preparation, there is also a historical-and-archaeological monograph devoted to the war and post-war history of Glinik.

KEY-WORDS: World War II, Cracow, Glinik, the place of prisoners' executions, archaeological-and-exhumation works, restoring the memory of the victims

[a] Institute of Archaeology and Ethnology, Polish Academy of Sciences, Sławkowska Street 17, 31–016 Cracow (Poland), e-mail: ktunia@gmail.com; ORCID: 0000-0002-1243-6536

Received August August 22, 2023; Received in revised form December 7, 2023; Accepted December 7, 2023

Glinik – one of the terrifying names in wartime Cracow.[1] It was there, in the village of Przegorzały near Cracow, and later – from 1941 – in Cracow-Przegorzały (Krakau-Wartenberg), that one of the places of execution during World War II was located.[2] It was located in a claypit for Salomon Finkelstein's brickyard operating nearby before the War (Figs 1 and 2). This area was locally known in Polish as Glinik (the name means "the claypit").[3] This location was well in line with the tendency to search for secluded places for the liquidation of prisoners in the vicinity of Cracow (Kotarba 2012: 47; 2013: 297). The victims were mainly brought from the court prison at 3 Senacka Street in Cracow, the so-called St. Michael's prison, as well as – probably – from the prison of the German Security Police at 7 Montelupich Street. Executions were carried out from mid-November 1939, basically until the end of 1943. Perhaps also later, sporadic shootings took place in this place (Kotarba 2012: 48; 2013: 293).

It would seem that the tragic history of this place would have been worthily commemorated in the immediate post-War period, when the memory of the fate of the victims shot there was still fresh. But, the history of this area was different from other places of martyrdom in Cracow. In 1945, the exhumation of people shot in Cracow-Krzesławice was carried out,[4] and in many cases their identity was established. It was a similar situation in Cracow-Kobierzyn. However, similar work was not undertaken in Cracow-Przegorzały. The reasons for this could not be determined, and there is only speculation. The only decision made then was to buy the area of the former clay pit and create a memorial site on it. The abandonment of exhumation works in Glinik soon after the end of the War has in many respects had an impact on explaining the issues related to this site.

Immediately after the end of the occupation, thanks to the efforts of the local population, wooden crosses were erected in Glinik. It was probably also in those times that the first commemoration of an unspecified shape, not recorded in any sources, was created there, the base of which, measuring 0.7 x 1 x 0.8 m, made of fragments

1 This article is a slightly extended version of the Polish-language text which appeared in the post-conference publication of the Historical Museum of the City of Cracow, titled *Miejsca (nie)pamięci*, Cracow 2019 (Tunia 2019).

2 The change of administrative affiliation was introduced by a decree of the General Government (*Regierung des Generalgouvernements*) of May 28, 1941, which entered into force on 1 June of that year. At that time, the areas of the surrounding 27 rural communes and parts of 2 other communes, including the area belonging to the village of Przegorzały (then Wartenberg), were annexed to the city of Cracow, *Verordnungsblatt für Generalgouvernement*, No. 51, June 20, 1941.

3 Today, the area at Bruzdowa Street in Cracow.

4 Protocols from the exhumation in Krzesławice, Archive of the Historical Museum of the City of Cracow, ref. MHK R, inventory no. 425/1.

Fig. 1. Cracow-Glinik. Location of the former claypit for Salomon Finkelstein's brickyard.

Fig. 2. Cracow-Glinik. Arrangement of the graves (A–Ż). M – Memorial erected in 1967, renovated in 2016–2017, C – contemporary erected iron cross on the mound. Research in 2013–2015 – measurements and drawings by M. Podsiadło; 2018 by I. Pieńkos and T. Borkowski; 2019 by T. Borkowski.

of worked stone, was discovered during the excavations in 2015. As the building material, waste material of a stonemason's workshop, which was "reutilizing" German tombstones obtained from some cemetery, probably from the western territories of Poland, was used (Tunia ed. 2015: 9, Figs 67, 68). In 1949, the area of the former claypit was bought from the heirs of S. Finkelstein, and probably soon afterwards the gradient of its slopes was reduced, and bushes and trees were planted, without any inquiring into which part of the purchased land the graves of the victims were located. It was at that time that this area underwent significant transformations. During this period, or shortly before, garbage was transported to the area of Glinik. In several places, during excavations, clusters of various types of waste of post-war chronology were found there. In later years, the grassy area of Glinik also served as a recreation area.

The decision to construct a more permanent memorial, in the form of a granite boulder, was made in 1955. The memorial was unveiled on August 22 of the following year. Another memorial – with a paved square in front of it – was unveiled in Glinik on October 19, 1967. During its construction, as discovered during the excavations in 2015, one of the mass graves was disturbed (Tunia ed. 2015: 6–7, Fig. 18). In the same year, a small obelisk with an inscription was erected nearby. In the following years, this area did not draw the interest that was due to a memorial site, and it was only on October 12, 2012 that the site was granted the status of a war cemetery.

It is worth mentioning that the crimes of the German occupation authorities in Cracow-Przegorzały have been investigated since the late 1940s. There have been – and are – further investigations aimed at trying to explain as many aspects of Glinik's history as possible. The first one was initiated in 1949 by the District Commission for the Investigation of Nazi Crimes in Cracow, the next ones – opened in the 1960s – were run by the same institution. The third one was started in 2009 by the Branch Commission for the Prosecution of Crimes Against the Polish Nation of the Institute of National Remembrance in Cracow (Woźny 2013: 67).

The wartime history of this area, based on a critical analysis of all sources available at the time was compiled by Ryszard Kotarba (2012; 2013). His important conclusions – in terms of archaeological work – were the suggestion that no more than 300–400 people must have been shot there, as well as the conclusion that it is basically impossible to reliably determine the identity of the victims (Kotarba 2012: 55, 60; 2013: 295). It is also worth mentioning that other publications give different, usually higher, numbers of people shot there, reaching as many as 1340 (Ścisło 1981: 9). One should also note the tendency to gradually increase the number of victims in publications over the years, starting from the immediate post-War period. The topic of the war crime in Glinik was discussed in a number of press and Internet publications, in a polemic with R. Kotarba's study (Bujas-Spyra 2013), and even in a bachelor's thesis written at the Institute of History of the Jagiellonian University at Cracow (Rolińska 2016; 2017).

In 2013–2015, exploratory work was conducted in the area of Glinik using archaeological research methods (Tunia ed. 2013; 2014; 2015). Its purpose was to determine the area of the execution site, carry out exhumations and rebury the found remains. These activities, conducted by the Institute of Archaeology and Ethnology of the Polish Academy of Sciences – Mountain and Upland Archaeology Centre in Cracow, were conducted – under the direction of the author of this text – on behalf of the Małopolska Voivodship Office in Cracow.

The fieldwork was preceded by archival research by Marzena Woźny (Woźny 2013), whose aim was to obtain information helpful in the archaeological work – mainly to collect data on the location and shape of the graves. This archival work covered both historical sources and materials published on the wartime and post-war history of Glinik, including the only reliable study of this topic by Ryszard Kotarba, mentioned above.

The fieldwork in 2013 began with archaeological prospection using geophysical methods employed in non-destructive archaeology – such as magnetic, electrical-resistance and Ground Penetrating Radar methods. The first two were carried out by the team of Marcin Przybyła's *Pryncypat* company, the third by the team of Jerzy Ziętek from the University of Science and Technology in Cracow (in Polish Akademia Górniczo-Hutnicza im. Stanisława Staszica w Krakowie, abbrev. AGH). These methods generally did not meet the expectations. The factors that hindered the conduct of geophysical research and the interpretation of the results in the area of Glinik were the type of soil, significant transformation of the terrain and heavy saturation with ferrous garbage. Ground Penetrating Radar surveys had a particularly low efficiency. Based on the relatively indistinct anomalous zones registered in the magnetic and electro-resistance studies, a series of excavation test units was marked out, and the location of others was proposed based on the morphology of the terrain.

Proper archaeological-and-exhumation research was conducted in the seasons 2014–2015. As a result, a series of excavation units were made throughout the entire former clay mining site and on its outskirts, some of which – where graves were discovered – were combined into open area excavation units. Their depth ranged from 2 to over 4 meters. During the excavations, it was possible to identify two zones where the burials of people shot in Glinik were located – the western zone, covering the flat area located to the NW of the present-day mound with an iron cross, and the eastern zone, in the area of the monument with the paved square dedicated to the victims of Glinik (Fig. 2). In these zones, 25 graves were located – they were marked with letters (A–Ż). Four graves (A, F, M, N) were located in the western zone. The other twenty-one were in the eastern zone. In total, the remains of 125 people were excavated from all the graves. Graves in which one person was buried prevailed in Glinik. Eight such single graves have been discovered. Remains of two people were discovered in two graves, three individuals in five graves, four in one, six in two, seven in two and eight in one. The large grave was N with the remains of 10 people. Graves K and U contained the remains of 12 people. The largest was grave C with the remains of 26 people. It had the shape of a ditch, about 7 m long and about 2 m wide. It was partially damaged during the construction of the monumental memorial to the victims of this place in 1967. In two cases, a stratigraphic arrangement of the graves was observed. In grave B, most likely, a younger burial with two persons was dug into an older one, containing five persons. The lower part of the pit of grave J was dug into the deeper grave K. It was also observed that the bodies of the deceased were tightly packed in relatively small pits.

An anthropological analysis, performed by Anita Szczepanek, showed that the vast majority of the victims were men – 114 people. The remains of women – 11 people. The cause of death was also established. Most of the time it was a shot to the head (see Fig. 5). It was also found that those buried in Glinik were mostly adults, who died at the age of 20–35. Material for DNA tests was obtained from the skeletons, and the DNA tests were performed at the Department of Forensic Medicine of the Pomeranian Medical University in Szczecin, with the aim of possible future identification of the shot persons.

During the research, much information was collected about the ritual of death accompanying the executions – pre-mortem binding of hands behind the back, blindfolds, wooden poles to which the victim might be attached when the executions were carried out (Fig. 3), etc. The small objects found on the victims say a little about them. As the vast majority of them were people brought to the place of execution from pri sons, they had already been deprived of most of their personal belongings. Nevertheless, in a number of cases single objects were found. For example, prayer books (by the three skeletons in grave L), a set of corrective glasses in a leather case by one of the skeletons in grave Z (Fig. 4), fragments of a necklace made of white and red beads by another skeleton in this grave, fragments of two rosaries with beige and black plastic beads found by other skeletons in the same grave, a Bakelite cosmetic box by one of the people buried in grave C, a watch in a silver case with a leather strap and a steel buckle in grave D (Fig. 5), a silver medallion on a chain belonging to one of the people buried in grave P, a brass medallion on a chain with a bullet hole in grave L (Fig. 6), a double-sided black plastic lice comb with the signature of the manufacturer "Matador", found with the remains of one of the people buried in grave Y, etc. A large number of buttons were obtained, including the particularly interesting buttons from the uniforms of former Polish State Railways (Polskie Koleje Państwowe, abbrev, PKP) employees, discovered

Fig. 3. Cracow-Glinik. Grave P. Wooden pole used during executions. Photo: K. Tunia.

with the remains of two people in grave N. In the same grave, one of the skeletons was missing the bones of the lower part of the limb below the knee, which must have been replaced with a wooden prosthesis reinforced with poorly preserved iron elements.

Time-consuming conservation work and examinations of small movable objects found with the dead are still in progress, the analysis of which broadens our knowledge of Glinik's victims. Determining the identity of the victims encounters, over time, difficulties which are rather insurmountable. As a result of archaeological research in Glinik, it was possible to determine the name of only one person, and she is the only victim of Glinik identified with certainty. It is Zofia Eichenbaum née Kühn, identified on the basis of the identity card (*Kennkarte*) found in the grave. Based on

Fig. 4. Cracow-Glinik. Grave Z. Set of corrective glasses in a leather case purchased from the optician K. Zieliński, Kraków, Rynek Główny 39. Photo: K. Tunia.

archival data, it was established that in the early years of the War she was a milliner and the owner of the "Zofia Kühnówna" company located in Cracow, Burgstrasse No. 36 (Grodzka Street). The Eichenbaums lived at 29/1 Westring (Dunajewskiego--Podwale-Straszewskiego Street). Zofia's remains were found in grave B, in the part where the chronologically "younger" dug-in grave with two skeletons was located. It cannot be ruled out that the skeleton in the immediate vicinity is the remains of her husband – Leon. The victim was holding the remains of a suitcase filled with a variety of items. This proves that they were detained outside the house (while escaping ?) and directly – as Jews – escorted to the place of execution. Both were registered after the War at the Yad Vashem Institute in Israel as missing during the Holocaust. The presumed date of their death, determined on the basis of the Kennkarte and data from Yad Vashem, is the end of 1941, the time when the Cracow ghetto had already been established (Kotarba 2022: 49 ff.).

It is also worth mentioning that one of the people buried in grave U is a high-ranking German (Wehrmacht?) officer, with whose remains an epaulette with insignia (*Rangabzeichen*) for a major was found. The time of his execution is 1943 or later. This was determined on the basis of the remains of the uniform and equipment, including the remains of model 43 trousers – the so-called *Rundbundhose* (Sáiz 2009: 40–43).

Fig. 5. Cracow-Glinik. Grave D. On the left hand, watch in a silver case with a leather strap and a steel buckle. On the skull is visible a bullet hole. Photo: K. Tunia.

In 2018–2019 on the eastern outskirts of the zone explored in 2013–2015, supplementary excavations were carried out under the auspices of the Search Department of the Office of Search and Identification of the Institute of National Remembrance headed by Tomasz Borkowski. They did not lead to the discovery of further wartime graves (Borkowski 2019; 2020).

Based on the results of the search in the area of Glinik, it can be stated with high probability, bordering on certainty, that during this search the remains of almost all the victims shot and buried there were located and excavated. The results of archaeological work negatively verify the information previously published about

Fig. 6. Cracow-Glinik. Grave L. Brass medallion with a bullet hole. Obverse – the Sacred Heart of Jesus, reverse – Our Lady. Photo: K. Grzyb.

the number of victims killed and buried there, and the allegedly observed large transports of people destined for execution. However, it is impossible not to note Ryszard Kotarba's important, universal reflection here that it is not important to bid on the number of victims – their tragedy remains the same regardless of the number… (Kotarba 2012: 67).

All the remains were buried in an interreligious ceremony in Glinik, in two mass graves in the foundation part of the memorial. These ceremonies took place after each year's excavations and exhumations – on October 29, 2014 and October 21, 2015 (Figs 7 and 8).

An important stage in restoring the memory of those shot in Glinik were several undertakings, which consisted of the renovation of the memorial dedicated to the victims buried under it in 2016–2017, which is now the dominant feature of the war cemetery, and the placement of an information board nearby. One of the commemorative activities

Fig. 7. Cracow-Glinik. Preparations for funeral ceremony on October 21, 2015. Photo: K. Tunia.

Fig. 8. Cracow-Glinik. Interreligious funeral ceremony on October 29, 2014. Photo: K. Tunia.

Fig. 9. Cracow. Street information pole with a poster advertising an exhibition about the wartime history of Glinik at the Museum of the Home Army in 2020. Photo: K. Tunia.

included an exhibition devoted to the war history in Glinik, organized in 2020 according to the script by Krzysztof Tunia at the Museum of the Home Army named after General Emil Fieldorf "Nil" in Cracow (Figs 9 and 10), together with publications accompanying this exhibition (Fig. 11; Tunia 2020a; 2020b). In preparation, there is also a historical and archaeological monograph devoted to the wartime and post-war history of Glinik.

Translated by Monika Sobejko

Fig. 10. Cracow. Fragment of exhibition devoted to the wartime history of Glinik at the Museum of the Home Army in 2020. Photo: K. Tunia.

Fig. 11. Cracow. Publications accompanying exhibition on the wartime history of Glinik at the Museum of the Home Army. Photo: K. Tunia.

REFERENCES

Bujas-Spyra, H. 2013. Cmentarz Ofiar represji okupanta niemieckiego w Glinniku-Przegorzałach przy ul. Bruzdowej w Krakowie. *Zeszyty Historyczne WiN-u* 37: 261–292.

Borkowski, T. 2019. *Sprawozdanie z archeologicznych badań wykopaliskowych na działkach 126/1, 127/1, 128/1, 129/1 i 153, obręb 0016 w Krakowie-Przegorzałach (Glinnik) w dniach 15.10.2018–26.10.2018*. Unpublished typescript. Archive of the Multi-person Unit for Search and Identification of the Institute of National Remembrance in Cracow.

Borkowski, T. 2020. *Sprawozdanie z archeologicznych badań wykopaliskowych na działce 126/2, obręb 0016 w Krakowie-Przegorzałach (Glinnik) w dniach 21.10.2019–23.10.2019*. Unpublished typescript. Archive of the Multi-person Unit for Search and Identification of the Institute of National Remembrance in Cracow.

Kotarba, R. 2012. Przegorzały, Kamedulska, „Glinik"… Zapomniane miejsce hitlerowskiej kaźni. *Zeszyty Historyczne WiN-u* 35: 47–67.

Kotarba, R. 2013. W odpowiedzi Pani Henryce Bujas-Spyrze. *Zeszyty Historyczne WiN-u* 38: 289–298.

Kotarba, R. 2022. *Żydzi Krakowa w dobie zagłady (ZAL/KL Plaszow)*. Kraków–Warszawa.

Rolińska, J. 2016. *Miejsce straceń obywateli polskich w Glinniku-Przegorzałach w Krakowie pod okupacją niemiecką w latach 1939–1944*. Unpublished bachelor thesis. Institut of the History, Jagiellonian University at Cracow.

Rolińska, J. 2017. Miejsce straceń obywateli polskich w Glinniku-Przegorzałach w Krakowie w latach 1939–1944 – przegląd źródeł. *Sowiniec* 28(50–51): 95–116.

Sáiz, A. 2009. *Deutsche Soldaten. Mundury, wyposażenie i osobiste przedmioty żołnierza niemieckiego 1939–1945*. Poznań.

Ścisło, J. 1981. *Przegorzały – miejsce masowych egzekucji Polaków w Krakowie w latach 1939–1944*. Warszawa.

Tunia, K. 2019. Krakowski Glinik – zapomniane przez lata i przywrócone zbiorowej pamięci miejsce egzekucji z II wojny światowej. Wstępne wyniki badań archeologiczno-ekshumacyjnych. In *Miejsca (nie)pamięci*, 106–117. Kraków.

Tunia, K. 2020a. *Glinik. Miejsce grozy w okupowanym Krakowie*. Kraków.

Tunia, K. 2020b. *Glinik. A place of horror in German-occupied Kraków*. Kraków.

Tunia, K. (ed.) 2013. *Wyniki prac rozpoznawczych przeprowadzonych metodami stosowanymi w archeologii celem określenia i udokumentowania faktycznego zasięgu obszaru miejsca straceń na działce 154/1 przy ul. Bruzdowej w Krakowie-Przegorzałach*. Unpublished typescript. Archive of the Mountain and Upland Archeology Center of the Institute of Archeology and Ethnology of the Polish Academy of Sciences in Cracow.

Tunia, K. (ed.) 2014. *Wyniki prac rozpoznawczych przeprowadzonych metodami stosowanymi w archeologii celem określenia i udokumentowania faktycznego zasięgu obszaru miejsca straceń z II wojny światowej oraz ekshumacji szczątków z ujawnionych grobów na działce 154/1 na stanowisku „Glinnik" w Krakowie--Przegorzałach przy ul. Bruzdowej*. Unpublished typescript. Archive of the Mountain and Upland Archeology Center of the Institute of Archeology and Ethnology of the Polish Academy of Sciences in Cracow.

Tunia, K. (ed.) 2015. *Wyniki prac rozpoznawczych przeprowadzonych metodami stosowanymi w archeologii celem określenia i udokumentowania faktycznego zasięgu obszaru miejsca straceń z II wojny światowej na działce 154/1 przy ul. Bruzdowej w Krakowie-Przegorzałach na stanowisku „Glinnik" oraz ekshumacji szczątków z ujawnionych grobów w roku 2015*. Unpublished typescript. Archive of the Mountain and Upland Archeology Center of the Institute of Archeology and Ethnology of the Polish Academy of Sciences in Cracow.

Woźny, M. 2013. Sprawozdanie z poszukiwań archiwalnych grobów ofiar egzekucji hitlerowskich z czasów II wojny światowej w Krakowie-Przegorzałach, w tzw. Glinniku. In K. Tunia (ed.), *Wyniki prac rozpoznawczych przeprowadzonych metodami stosowanymi w archeologii celem określenia i udokumentowania faktycznego zasięgu obszaru miejsca straceń na działce 154/1 przy ul. Bruzdowej w Krakowie--Przegorzałach, Kraków*. Unpublished typescript. Archive of the Mountain and Upland Archeology Center of the Institute of Archeology and Ethnology of the Polish Academy of Sciences in Cracow.

Archaeologia Polona, vol. 61: 2023, 143–158
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3397

Importance of Particular Groups of Objects in the Identification of Victims of the Katyn Massacre in the Case of Finds from Kharkiv

Anna Drążkowska[a]

The researchers have been focused increasingly on war crime archaeology in recent years, e.g. the most significant until now scientific and logistic achievements which were archaeological-exhumation works carried out 30 years ago, related to searching for mass hidden graves of Polish officers, policemen and other civil servants murdered in spring of 1940 by NKVD in Katyn, Kharkiv and Mednoye. These were the first survey researches performed abroad on such a huge scale by Polish archaeologists. Obtained information concerning exact burial locations, the number of victims, burial ground sizes and final identification of the method and murder weapon which contributed to confirmation, verification and completion of our knowledge included in documents concerning the truth of The Katyn Massacre. Experience gained and excavation methodology of those mass graves exploration was presented and reported in detail in numerous publications (Głosek 1995; 2001; 2011; 2021; Kola 1995; 1996; 1998; 2001; 2005; 2021; Młodziejowski 1995) outlining cognitive possibilities and research directions for future studies and challenges. One of the most important tasks was the victims identification which was possible thanks to objects found with the bodies. This article objective is to present new obtained knowledge, using particular types of objects (personal movable property) and their systematization. Moreover, the article authoress, also working on the restoration of these objects and deciphering inscriptions placed on them, wanted to indicate particular object groups significance in the victims identification.

KEY-WORDS: The Katyn Massacre, war crime archaeology, graves of Polish officers, victim identification

Polish researchers have been focused increasingly on war crime archaeology in recent years. A good example of this, and the most significant scientific and logistic achievement until now have been the archaeological-exhumation works carried out 30 years

[a] Institute of Archaeology, Faculty of History, Nicolaus Copernicus University in Toruń, 44/48 Szosa Bydgoska Str., 87–100 Toruń (Poland), e-mail: annadr9@wp.pl; ORCID: 0000-0002-8180-7273

Received February 20, 2023; Received in revised form July 25, 2023; Accepted October 31, 2023

ago, related to The Katyn Massacre. This was the search for mass hidden graves of Polish officers, policemen and other civil servants murdered in spring of 1940 by the NKVD [The People's Commissariat for Internal Affairs; in Russian: Наро́дный комиссариа́т вну́тренних дел (*Narodnyi Komissariat Vnutrennikh Del*)] in Katyn, Kharkiv and Mednoye. These were the first research projects of this type performed abroad on such a huge scale by Polish archaeologists. The information obtained concerned exact burial locations, number of victims, burial ground sizes and final identification of the method and murder weapon which contributed to confirmation, verification and completion of our knowledge included in documents concerning the truth of The Katyn Massacre. The experience gained and excavation methodology of those mass graves exploration was presented and reported in detail in numerous publications (Głosek 1995; 2001; 2011; 2021; Kola 1995; 1996; 1998; 2001; 2005; 2021; Młodziejowski 1995) outlining the cognitive possibilities and research directions for future studies and challenges. One of the most important tasks was the identification of victims which was possible thanks to objects found with the bodies. The objective of this article is to present this newly obtained knowledge, using particular types of objects (personal movable property) and their systematization. Moreover, the author, based on her work on the restoration of these objects and deciphering inscriptions on them, also indicates the significance of particular objects groups in the victims identification.

Between 1995–1996, the fourth forest-park zone in Kharkiv, now Ukraine, was explored by a Polish expedition supervised by professor Andrzej Kola from the Institute of Archaeology of Nicolaus Copernicus University in Toruń, conducting archaeological-exhumation works connected to research concentrated on establishing the circumstances of the murder by the Russian authorities Polish prisoners of war and locating places of their burials. The task was to determine the exact location of the mass graves, measure the sizes of the burial pits and estimate the number of human remains (Florkowski 1998: 57). The research was also to confirm if the identified graves include bodies of Polish officers brought to Kharkiv from the camp of Starobilsk from 5th April till 12th May 1940 (Kola 2005: 56). Based on survey drilling (4674 boreholes) made over an area of about 1.5 ha, using manual geological drills every two meters, 75 mass graves of various size with shapes close to rectangles or squares were identified (Kola 2001: 131). All pits were dug manually to the depth of about 2 m. 60 burial pits included remains of representatives of the local community killed by the Soviet authorities and the next 15 were identified as graves containing Polish victims (no: 5/91, 22a/91, 5/94, 6/94, 7/94, 17/95, 19/95, 26/95, 28/95, 29/95, 30/95, 36/95, 40/95, 45/95, 52/95). Due to time limitation not all of the located graves were completely explored and exhumed. The others, both Soviet and Polish were exhumed only partially and the number of victims was evaluated basing on anthropological measurements (Kola 2005: 102, 111). The researchers were able successfully to count 4302 persons buried in the Polish graves, including two women. Four graves called "dry" contained skeletonized human remains, the remained burial pits contained remains preserved in the form of adipocere (putrefied tissue). The average density of the layer with human remains and Polish personal objects was about 70–80 cm (Florkowski 1998: 60; Kola 2001: 133), with bodies placed in general composing layers in 6 or 8 levels. In graves called "wet", the level of water during their exploration reached from 60 to 75 cm above the pit bottom (Kola 2001: 132). Water from precipitation collected in the basins created by the burial pits dug into impermeable loess sediments, creating an environment which slowed down significantly the decomposition of the dead bodies. Exploring the Kharkiv pits, the archaeologists reported bodies in various stages of decomposition: from skeletonized remains found in dry graves or the highest top levels of wet pits to a partially decomposed compact putrefied body mass (Florkowski 1998; Kola 2001: 147; 2011: 132; Drążkowska 2010: 97–100). Removing soil layers from the first grave it turned out that the pits contained not only human remains, but also a great number of various objects made of materials like: wood, textile, leather, metal, paper, glass, plastic and rubber. The condition of the graves contents was varied and depended generally on deposition environment, but also on the decomposition state of the bodies and the murderers attempts to obliterate the traces of crime made in various periods, like burning the officers' belongings directly after the execution (evidenced by a layer of burned objects observed in one of the graves; no 26/95), but also drilling through graves in the 1970s–1980s using mechanical bores with diameter of 60–80 cm, which caused grinding and destruction of the remains and many objects placed there (Kola 1998: 34; 2001: 132). The condition of several items also resulted from the material they had been made of.

Objects excavated from wet graves were covered with a fat and wax mass difficult to remove, sealing them completely deforming their shapes and making difficult to identify (Drążkowska and Grupa 1996: 78–90; Grupa 1998: 75–83; Drążkowska 2001: 145–153). The most time-consuming treatment was cleaning objects made of organic materials – wood, leather, flax, cotton, woollen clothes and wool (Drążkowska 2010: 97–98). Removing all these impurities was a great challenge for the restorers of the archaeological objects, although on the other hand that mass coating caused the objects to be preserved in a relatively good condition isolated from an unfavorable destructive environment and protected them from excess drying. The researchers found about several thousand objects in the graves, part of which were in a very poor state and not suitable for further successful conservation. These were initially cleaned *in situ*, if it was possible. They were redeposited in the grave after first being examined to detect whether they contained any information useful in the identification of a person. Some thousand artifacts were prepared for transportation and taken to Poland for proper conservation work, which proved to be very difficult and demanding for our restorers. New methods had to be implemented very often and apart from conservation work, researchers had to decipher and note all the information found, because in the investigation, every item was evidence of crime (Drążkowska 2001: 145–150; 2011:183–190). All conservation treatments were performed very carefully, precisely cleaning the objects' surfaces not to destroy written information.

Complete analyses of inscriptions were made after completing conservation work. Several persons read and noted the texts and later other persons read them anew and verified them. The knowledge served for victims identification in the broad meaning, because some inscriptions were very detailed giving exact personal data, while the others, unfortunately the majority were very general and basic. That basic identification was possible thanks to objects without any inscriptions found the most often. The first basic stage of recognition started with those very items when graves of soldiers, civilians, local people were distinguished, and when later Polish officers' graves were searched for among the many others in the Kharkiv NKVD cemetery. The first determinant used for verification of the graves were Polish military buttons with the image of an eagle, found inside the drill during first survey boreholes. Particular pits included various numbers of found objects like: uniforms and their elements, military caps, footwear, belts, clasps, report bags, epaulettes, headgear, medals and distinctions. Some other elements – objects manufactured in Poland, sometimes with names of their producers were also very helpful (Kola 2005: 74, 142, 146, 187, 203–206):

- toothbrush with inscription: J. OSETOWSKI SKŁAD APTECZNY MIŃSK MAZOWIECKI
- china cups with inscription: ĆMIELÓW (grave 7/94)
- soapdish with inscription: MYDŁO PRZETŁUSZCZONE OLIWKOWE E. MARYNOWSKI I S-KA WARSZAWA (grave 26/95)
- bottle with inscription: MORSZYŃSKA SÓL GORZKA (grave 26/95)
- container with toothpaste and inscription MYDEŁKO DO ZĘBÓW WARSZAWSKIE LABORATORIUM CHEMICZNE S.A.(grave 26/95)
- mug with inscription: KRYNICA W ZIMIE NOWE ŁAZIENKI (grave 26/95)
- mug with inscription: PRACA (grave 5/94)
- medicine bottle with inscription: SANOK (grave 6/94)
- pocketknife with inscription: GERLACH NIERDZEWNE (grave 26/94)
- mug with inscription: WŁOCŁAWEK (grave 7/94)
- glass with inscription: KONSERWY PUDLISZKI WŁAŚĆ. ST. FENRYCH (grave 19/95)

– brass tin with inscription KOMUNIKANTY (grave 7/94)

All objects with Polish language words: printed, or handwritten documents, books, letters, postcards, single notes, inscriptions on wedding rings and devotional objects served as the basis for identification of the victims' nationality, for instance:

– holy medal with inscription: PAMIĄTKA Z PIELGRZYMKI DO LOURDES (grave 7/94)
– holy medal with inscription: O MARYJO BEZ ZMAZY POCZĘTA MÓDL SIĘ ZA […] KTÓRZY SIĘ DO CIEBIE UCIEKAMY (grave 26/95)
– gorget with inscription: PAMIĄTKA PROMOCJI NA PODPORUCZNIKÓW OSTRÓW MAZOWIECKA 15.X.1938 (grave 6/94)

Notes engraved on cigarette cases are also worth attention (Grupa 2001: 119–144), although they did not include names and surnames of their owners (Kola 2005: 143, 175, 187, 207):

– wooden cigarette case with inscription: PAL DRANIU SWOJE (grave17/95)
– wooden cigarette case with inscription: KW NAJDROŻSZEJ ZOCHNIE – KOCHAM I TĘSKNIĘ (grave 7/94)
– wooden cigarette case: UCZUCIE TO POTĘGA – MAŁY ADAŚ (grave 19/95)
– wooden cigarette case with inscription: ZACNEMU KUMPLOWI W NIEDOLI JC. 1939–1940 (grave 7/94; Fig. 1)
– metal cigarette case: KOCHANEMU MĘŻOWI I TATUSIOWI W DNIU IMIENIN OD WIŚKI I RYSIA, ZAMBRÓW 15.XII.1935 (grave 26/95; Fig. 2)

Items of Polish origin helped to identify graves as Polish ones and that was the first and basic stage of the recognition, but the same objects served for obtaining more detailed knowledge. Some of them, particularly wooden cigarette cases, had inscriptions confirming the fact that the officers murdered and buried in Kharkiv were brought there from the Starobilsk camp (essential information for the investigation). The place name was often completed with the date –1940 or 1939–1940, which marked the time of imprisonment. The researchers reported many objects, including personal items containing various inscriptions helping to identify people. Data consisted of monograms, but also complete names and surnames. They were classified into groups and placed in diagrams marking on what kind of objects they were found (Kola 2005: 114–292; Grupa 2001: 119–144). Many texts on metal objects had been professionally engraved before the war – inscriptions on cigarette cases, watches, wedding rings and other rings, seal-rings and a gorget. A pre-war origin was also attributed to cufflinks, leather wallets, a pen, a lighter, wooden walking stick, textile handkerchieves and clothes labels. On pipes, flasks (Fig. 3), mess tins, but also some metal and especially wooden cigarette cases the inscriptions were scratched during the officers stay in the Starobilsk camp (Figs 1 and 4).

Fig. 1. Cigarette case with an inscription inside the cover: TO A NOBLE MATE IN MISERY JC. 1939–1940. After: Kola 2005: fig. 81.

Fig. 2. Silver cigarette case with engraved inscription: TO OUR BELOVED HUSBAND AND DAD ON HIS NAMEDAY FROM WIŚKA AND RYSIO, ZAMBRÓW 15.XII.1935. After: Kola 2005: fig. 134.

Fig. 3. Aluminium flask with scratched inscription: J. GIBASIEWICZ BF. After: Kola 2005: fig. 76.

Fig. 4. Wooden cigarette cases with inscriptions: STAROBIELSK 193 –1949. After: Kola 2005: fig. 78.

Table with inscriptions

KINDS OF INSCRIPTIONS: INITIAL LETTERS
REPORTED ON: handkerchieves, wedding rings, seal rings, cutlery, mirror, lighters, cigarette holders, pipes, metal and wooden cigarette cases, cufflinks, drinking glass fragments, mess tins, flasks, metal box, leather wallets and horse-shoe shaped coin purses, a pen, wooden walking sticks, a toothbrush, scapulars, wooden device for taking off officer boots, clothes brushes
KINDS OF INSCRIPTIONS: INITIALS WITH DATES
REPORTED ON: wedding rings, obverse of a holy medal, metal and wooden cigarette cases, cigarette holder, watch
KIND OF INSCRIPTION: INITIALS WITH DATES AND TEXT
REPORTED ON: wedding rings – L.J. 18 II.1939 BOŻE BŁOGOSŁAW NAM – HK 17XI.1937 USQUE AD FINEM
KIND OF INSCRIPTION: DATE WITH TEXT
REGISTERED ON: seal ring with inscription: 15.10,1936 Od Rodziców
KIND OF INSCRIPTIONS: COMPLETE MALE OR FEMALE NAMES WITH DATES
REGISTERED ON: ring and a wedding ring
KINDS OF INSCRIPTIONS: COAT-OF-ARMS AND INITIALS
REPORTED ON: seal ring, wooden cigarette case, pocket watch
KIND OF INSCRIPTION: NAME INITIAL AND COMPLETE SURNAME
REPORTED ON: – cover of a metal cigarette case: E. RZEWUSKI – metal spoon handle: TOKARSKI CZ.
KIND OF INSCRIPTIONS: COMPLETE NAMES AND SURNAMES
REPORTED ON: wooden cigarette cases, flasks, canteens, medical doctor's stamp
KIND OF INSCRIPTION: COMPLETE NAMES, SURNAMES, DATE AND DEDICATION
REPORTED ON: – gold watch: KOCHANEMU DOWÓDCY PPOR. STANISŁAWOWI SITKOWI W DNIU IMIENIN WDZIĘCZNI …. BORUJSK 8.V.20 (grave; Fig. 5) – silver cigarette case: W DNIU IMIENIN PANU POR. ALBERTOWI HOLANDOWI MAŁŻ. F. M. RUCZYŃSCY 17/II.34 – wooden cigarette case: STAROBIELSK 15.IV.1940 R. NA PAMIĄTKĘ WSPÓLNEGO POBYTU W NIEWOLI RUDECKI

Fig. 5. A golden pocket watch with engraved inscription: TO OUR DEAR COMMANDER LIEUTENANT STANISŁAW SITEK ON HIS NAMEDAY GRATEFUL …. BORUJSK 8.V.20. After: Kola 2005: figs 81, 224.

Fig. 6. Dog tag – obverse: Tadeusz Bukowski KAT., reverse: PŁOCK 1911. After: Kola 2005: fig. 37.

However, there were also objects univocally identifying the victims – these were military dog tags (Fig. 6). These small aluminium oval discs with transverse cuts contained personal data – name, surname, religion on one side and on the other – identification number/first letter of district, name of local command and the date of birth. Some inscriptions were difficult to decipher due to the material which was deposited on them by decomposing bodies, or they were damaged, covered with corrosion and impurities. The cemetery in Kharkiv delivered a total of 62 dog tags: 10 items in 1991, 10 in 1995, and 42 in 1996 (Kola 1998: 36).

More detailed information was read in found letters, postcards (Fig. 7), documents and handwritten notes made by the prisoners in calendars, notebooks, on cigarette paper and newspaper margins. Documents containing personal data included school certificates, ID cards, postcards, doctor's certificates, a book of sports club membership, military booklet, visit cards, employment contract, rent receipt (Fig. 8), free train tickets card, medal certificate, distinction card for Lviv defense. These objects were kept in wallets and uniform pockets.

Archaeologists found some other material indicating the time of the committed crime and being direct evidence – these were newspapers found in graves printed in Russian, Ukrainian and Polish propaganda papers from March and April of 1940.

Handwritten notes found in some concentrations are particularly interesting. Texts written in pencil have preserved in the best condition. The collection of documents included a PKO bank cheque book, visiting card, postcards, a pocket calendar was found in a leather wallet belonging to Alojzy Babiński, Lieutenant of 73 regiment of Katowice. The calendar pages were covered with handwriting in pencil reporting his every day of imprisonment starting with 3rd of October, when he was taken prisoner until the night of 5/6th April

Fig. 7. Postcard of lieutenant Władysław Wejsflog. After: Kola 2005: fig. 62.

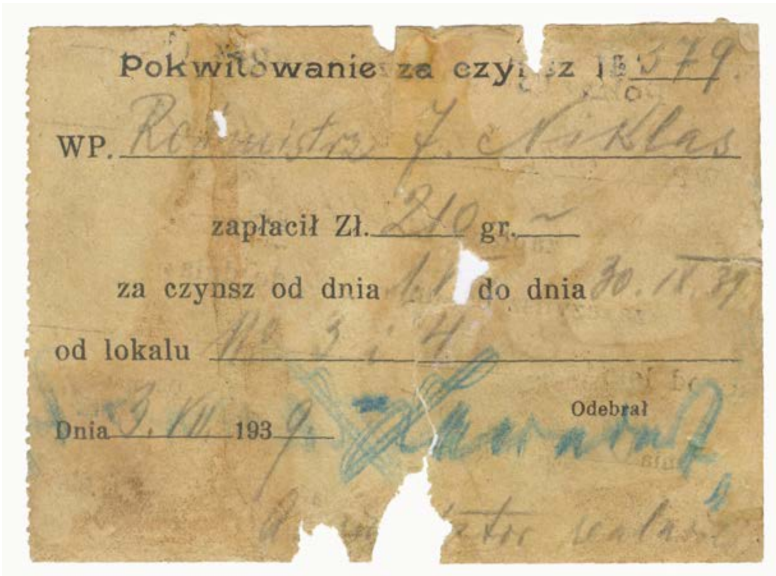


Fig. 8. Rent receipt for captain J. Niklas from July 1939. After: Kola 2005: fig. 73.

when he was taken with prisoners transport from Starobilsk to Kharkiv (Kola 1998: 38; Grupa 2001: 157; Grupa and Kaźmierczak 2001). These notes are a priceless source of information concerning the camp life, but it also registers several other names of co-prisoners, also successfully identified. Another invaluable document and knowledge source concerned four tiny and delicate pieces of cigarette paper hidden in a leather glasses case (Fig. 9) which contained pencil-written names of Starobilsk camp prisoners (Grupa and Kaźmierczak 2001). The verses composition suggests that 98 of them were written with division into groups and blocks, but unfortunately not all of them were identified (Kola 1998: 41). Some other information was delivered by the notes called the "Socha List", and fragments of reports of the block commander? (Grupa 2001: 157).

We successfully deciphered 347 names found in dog tags, various objects, documents and handwritten notes, although these deductive results are not identical with particular persons or identification of their remains (Grupa and Kaźmierczak 2001: 3). Conservation treatments lasted four years and the objects went afterwards to the Katyn Museum in Warsaw. Despite the period of nearly 30 years from completing the works, the article's author has been maintaining restoring protection over the exhibits and the Museum staff has still been working on identification of next victims (Karwat and Kowalska 2017).

Fig. 9. Cigarette paper with Starobielsk prisoners' names found in a leather glasses case. After: Kola 2005: fig. 30.

As the range of that research has become popular recently, there are more and more sites concerning archaeology of crime. Human remains are frequently accompanied by objects belonging to victims, depending on a site category and a kind of studied crime. Items containing written information and personal data are found rarely, but every object, based on the experience of the researchers of the Katyn massacre, should be treated with particular care and attention, because it can bear precious information helpful in victims' identification.

REFERENCES

Drążkowska, A. 2001. Wybrane aspekty konserwacji przedmiotów z grobów oficerów polskich w Katyniu i Charkowie. In A. Kola and J. Sziling (eds), *Charków–Katyń–Twer w sześćdziesiątą rocznicę zbrodni*, 145–153. Toruń.

Drążkowska, A. 2010. Conservation of textiles excavated from Polish officers' collective graves in Katyń and Kharkiv (Russ. Kharkov). *Fasciculi Archaeologiae Historicae, From Studies into Ancient Textiles and Clothing* XXIII, 97–102.

Drążkowska, A. 2011. Przedmioty z mogił polskich oficerów w Katyniu i Charkowie jako dowód zbrodni, zadanie konserwatorskie i relikwie narodu polskiego. In A. Kola and J. Sziling (eds), *Charków–Katyń–Twer–Bykownia. W 70 rocznicę zbrodni katyńskiej*, 183–190. Toruń.

Drążkowska, A. and Grupa, M. 1996. Uwagi o konserwacji przedmiotów znalezionych w grobach oficerów polskich w Katyniu i Charkowie. In M. Tarczyński (ed.), *Zbrodnia nie ukarana, Katyń–Twer–Charków*. Zeszyty Katyńskie 6, 78 –90. Warszawa.

Florkowski, A. 1998. Niektóre aspekty badań antropologicznych cmentarzyska NKWD w Charkowie. In M. Tarczyński (ed.), *Zbrodnia katyńska. Upamiętnienie ofiar i zadośćuczynienie*, 57–74. Warszawa. Zeszyty Katyńskie 9.

Głosek, M. 1995. Prace sondażowe i badania archeologiczne w Katyniu. In M. Tarczyński (ed.), *II półwiecze zbrodni. Katyń–Twer–Charków*. Zeszyty Katyńskie 5, 115–123. Warszawa.

Głosek, M. 2001. Wyniki prac archeologiczno-ekshumacyjnych przeprowadzonych w 1994–1995 r. na cmentarzu oficerów polskich w Katyniu. In A. Kola and J. Sziling (eds), *Charków–Katyń –Twer w sześćdziesiątą rocznicę zbrodni*, 103–117. Toruń.

Głosek, M. 2011. Z problematyki badań cmentarzy polskich oficerów zamordowanych przez NKWD na terenie Rosji. In A. Kola and J. Sziling (eds), *Charków–Katyń–Twer–Bykownia. W 70 rocznicę zbrodni katyńskiej*, 129–130. Toruń.

Głosek, M. 2021. Badania archeologiczno-ekshumacyjne mogił polskich oficerów w Katyniu i nowe ślady zbrodni. In E. Kowalska and K. Sachnowska (eds), *Ślady zbrodni. Oblicza pamięci*, 159–188. Warszawa.

Grupa, M. 1998. Z badań archeologiczno-ekshumacyjnych na cmentarzu oficerów polskich w Charkowie 1995–1996 r. – Impresje konserwatorskie. In M. Tarczyński (ed.), *Upamiętnienie ofiar i zadość uczynienie*, 75–83. Warszawa. Zeszyty Katyńskie 9.

Grupa, M. 2001. Inskrypcje na przedmiotach wydobytych w trakcie ekshumacji szczątków oficerów polskich w Charkowie. In A. Kola and J. Sziling (eds), *Charków–Katyń–Twer w sześćdziesiątą rocznicę zbrodni*, 119–144. Toruń.

Grupa, M. and Kaźmierczak, R. 2001. *Dowody wydobyte z ziemi: nazwiska oficerów Wojska Polskiego odczytane na dokumentach i przedmiotach wydobytych podczas prac archeologiczno-ekshumacyjnych w Charkowie w latach 1995–1996*. Warszawa.

Karwat, S. and Kowalska, E. 2017. *„…Wierzymy mocno że wrócisz…" Korespondencja wydobyta z dołów śmierci Charkowa i Miednoje ze zbiorów Muzeum Katyńskiego*. Warszawa.

Kola, A. 1995. Prace sondażowe i badania archeologiczne w Charkowie, wrzesień 1994. In M. Tarczyński (ed.), *II półwiecze zbrodni. Katyń–Twer–Charków*. Zeszyty Katyńskie 5, 124–135. Warszawa.

Kola, A 1996. Wstępne wyniki prac sondażowo-ekshumacyjnych przeprowadzonych w 1995 roku w Charkowie. In M. Tarczyński (ed.), *Zbrodnia nie ukarana, Katyń–Twer–Charków*. Zeszyty Katyńskie 6, 60–77. Warszawa.

Kola, A. 1998. Uwagi o identyfikacji nazwisk polskich jeńców ze Starobielska odnotowanych na przedmiotach wydobytych podczas prac archeologiczno-ekshumacyjnych w Charkowie. In M. Tarczyński (ed.), *Upamiętnienie ofiar i zadość uczynienie*. Zeszyty Katyńskie 9, 34–51. Warszawa.

Kola, A. 2001. *Prace archeologiczno-ekshumacyjne na cmentarzu oficerów polskich w Charkowie*. In A. Kola and J. Sziling (eds), *Charków–Katyń–Twer w sześćdziesiątą rocznicę zbrodni*, 119–144. Toruń.

Kola, A. 2005. *Archeologia zbrodni. Oficerowie polscy na cmentarzu ofiar NKWD w Charkowie*. Toruń.

Kola, A. 2011. Prace archeologiczno-ekshumacyjne na cmentarzu ofiar NKWD w Kijowie-Bykowni. In A. Kola and J. Sziling (eds), *Charków–Katyń–Twer–Bykownia. W 70 rocznicę zbrodni katyńskiej*, 135–134. Toruń.

Kola, A. 2021. Pochówki polskich ofiar reżimów totalitarnych w zachodnich państwach byłego ZSRR – poszukiwania i ekshumacje. In E. Kowalska and K. Sachnowska (eds), *Ślady zbrodni. Oblicza pamięci*, 159–188. Warszawa.

Młodziejowski, B. 1995. Prace sondażowo-topograficzne w Miednoje wrzesień 1994. In. M. Tarczyński (ed.), *II półwiecze zbrodni. Katyń–Twer–Charków*. Zeszyty Katyńskie 5, 78–90. Warszawa.

Archaeologia Polona, vol. 61: 2023, 159 – 171
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3541

Archaeological Research on the Former KL Auschwitz I and KL Auschwitz II-Birkenau Site

Sylwia Foks[a], Dariusz Goiński[b] and Błażej Targaczewski[c]

For many years Auschwitz-Birkenau State Museum has been conducting excavation works on the site of the former German concentration and extermination camp Auschwitz II-Birkenau, related to the implementation of projects to preserve the authenticity and other *ad hoc* maintenance works, as well as those related to the extension of the necessary infrastructure network in the area of the former camp. These works, carried out in various parts of the former Birkenau, are subject to obligatory archaeological research. Over the years, a large number of reports on archaeological works have been collected. Researchers faced the challenge of accumulating dispersed archaeological information, mainly about the location of archaeological research sites and about the findings that were noted during the works. The chosen solution was the use of GIS software. Initially, this was QGIS, which is to be replaced by ArcGIS Pro over time. This makes it possible to place excavation sites in a generalised form on a map (contemporary or historical) or on a properly prepared aerial photo (for any year from the years available: 1944–2022). The outline of the excavation in the above-mentioned programs is interactive with the user. The description of the findings from a given place is added to it. The set of data thus prepared can then be filtered and selected, like in a popular spreadsheet. The amount of information on one map can be enhanced with underground infrastructure networks (as information about possible collisions) and road and construction infrastructure of the camp area which enables better orientation in the surroundings. Introduction of the possibilities of deeper analytics of large data sets is the main basis for outlining the possibilities of Geographic Information Systems.

KEY-WORDS: KL Birkenau, GIS, 3D documentation, archaeological research

[a] Auschwitz-Birkenau State Museum, Więźniów Oświęcimia st. 20, 32–600 Oświęcim (Poland), email: sylwia.foks@auschwitz.org; ORCID: 0009-0007-8371-7160

[b] Zagłębie Museum in Będzin, Gzichowska st. 15, 42–500 Będzin (Poland), email: d.goinski@wp.pl; ORCID: 0009-0009-5779-9662

[c] Auschwitz-Birkenau State Museum, Więźniów Oświęcimia st. 20, 32–600 Oświęcim (Poland), email: blazej.targaczewski @auschwitz.org; ORCID: 0009-0005-6623-2204

Received August 30, 2023; Received in revised form October 30, 2023; Accepted October 30, 2023

PRELIMINARY INFORMATION

Roads paved with stone, pavements lined with bricks, foundations of buildings that do not exist today, drainage systems, thousands of items, hidden, lost. These are just some of the items that testify to the historical image of the former KL (*Konzentrationslager*) Auschwitz II-Birkenau camp. Identification, documentation and, above all, protection of material post-camp remains are the main aim of archaeological research conducted in this area. The exploration on the site of the former German Nazi concentration and extermination camp Auschwitz I and Auschwitz II-Birkenau is conducted as accompanying works undertaken by the Auschwitz-Birkenau State Museum in Oświęcim (hereinafter: the Museum) within its statutory activities aimed at preserving and protecting the remains of the Camps (Foks 2018). The activities in question mainly include comprehensive conservation works, carried out to a great extent as part of the Master Plan for Preservation (MPP)[1] and investment tasks. Archaeological works in this special place are accompanied by the concern to preserve authenticity.

The history and area of the former KL Auschwitz I and KL Auschwitz II-Birkenau camps are relatively well researched. Construction of the Birkenau camp began in October 1941. According to the plan approved by the occupier on October 14, 1941, the camp was to be divided into two parts by the main road, with a railway siding designed next to it. The entire area, with dimensions of 720 x 1130 m, formed a compact rectangle surrounded by a barbed wire fence, guarded by watch towers. 174 brick residential barracks were supposed to be located inside (Czech 1998). Construction began with the levelling and drainage of the swampy area. By August 1942, two separate sections, BIa and BIb, were built in the place intended for the quarantine camp. In section BIb, a men's camp was established, which functioned from March 1942 as a branch of KL Auschwitz. In the first half of August a women's camp was established in the BIa section, which also operated as a branch of KL Auschwitz. Due to the designation of Auschwitz as a place of extermination of the European Jews, from 1941 the construction plan of Birkenau had to be changed. Only section I with camps BIa and BIb remained from the previous plan. The next plan assumed the expansion of the camp with sections BII and BIII to the north of the main road and section BIV to the south of section BI (Fig. 1). The pace of construction of the barracks itself was

1 The Master Plan for Preservation is a comprehensive and long-term programme of conservation works developed and implemented by the Museum, aimed at preserving the relics of the German Nazi concentration and extermination camp. The implementation of the plan takes place through the deployment of conservation projects covering specific elements of the complex or comprehensively treated conservation problems. The Master Plan for Preservation is financed by funds provided by the Auschwitz-Birkenau Foundation.

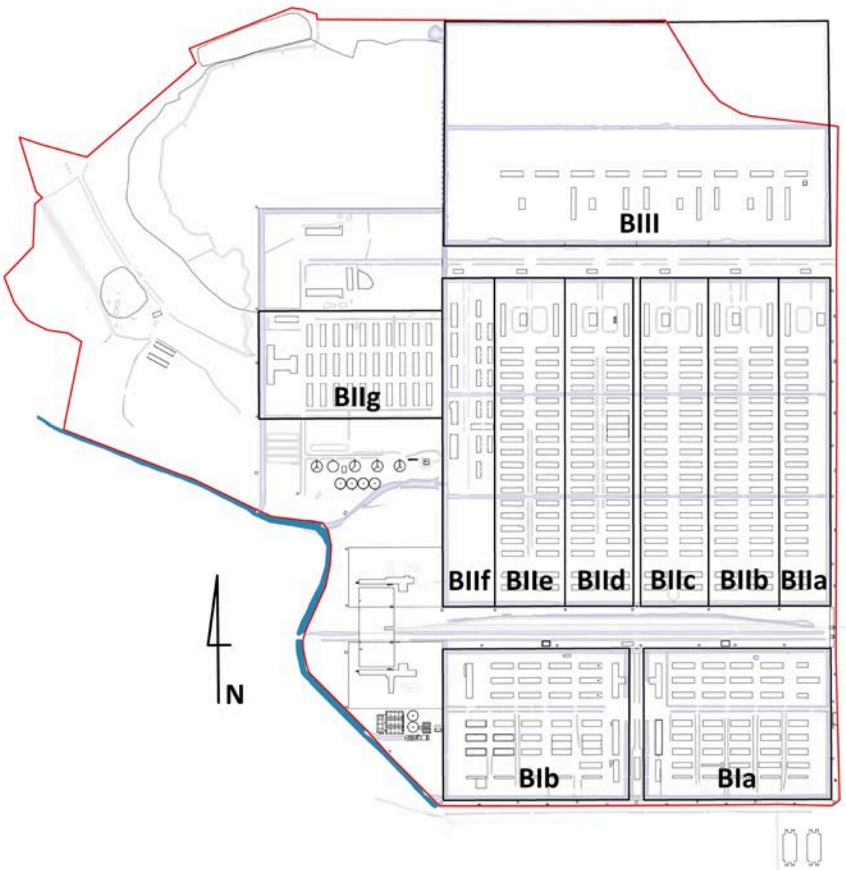


Fig. 1. Division of the former KL Birkenau into sections. Graphic elaborated: B. Targaczewski.

very fast. Between March and June 1943, the construction of four crematoria was completed. In 1943, the construction of section II, divided into 6 residential camps: BIIa, BIIb, BIIc, BIId, BIIe, BIIf, and a looted goods warehouse BIIg (the *Effekten-lager*) was completed (Czech 1998: 28–32).

We know the boundaries of the camp and the functions of individual buildings. The Archives of the Museum are in possession of significant resources of historical documents and witness testimonies concerning its functioning. Some might therefore question the conducting of archaeological research on the site of the former

KL Auschwitz I and KL Auschwitz II-Birkenau. What then is the purpose of undertaking research? Is it possible to broaden one's knowledge in addition to securing historical objects? Do we need additional material evidence knowing the history of a given place, having testimonies of witnesses and other historical documents? Are silent, fragile, corroded items, preserved only in fragments, able to reveal any knowledge? And if so, of what kind? In the article, we will attempt to answer these questions, by drawing on the results of the work of a team of archaeologists who are constantly present during conservation works and development tasks on the site of the former Auschwitz II-Birkenau.

Nowadays, in the above-mentioned area, the barracks are surrounded by green areas or passageways for visitors to the Memorial site. However, during the period of the camp's operation, the area looked completely different. The memories of former prisoners, as well as historical documents, indicate that the camp space was transformed many times in a relatively short period of operation. The land was levelled, drainage systems were created, roads were built, and subsequent, often overlapping each other, ground-hardening works were carried out. Contemporary archaeological research, related to specific features or sections of land, provide information that enriches the historical knowledge documented in written sources. Thanks to its research methodology, archaeology allows us to reconstruct the course and formation of the camp space, and consequently also fragments of camp life.

OUTLINE OF THE HISTORY OF ARCHAEOLOGICAL RESEARCH ON THE KL AUSCHWITZ II-BIRKENAU SITE

The first archaeological work was undertaken in KL Birkenau (Brzezinka) by Professor Jerzy Kruppé in 1967. This was a single trench, established on the northern side of Crematorium III (B-39; Hensel 1973: 171). The research was conducted for the purposes of production of the film "Archaeology" by Wytwórnia Filmów Oświatowych in Łódź.

Since 2005, archaeological research has been conducted on an ongoing basis, in parallel with the tasks implemented by the Museum, aimed at securing and protecting both the area and the premises for which it holds responsibility. Archaeological research primarily accompanies conservation and renovation works performed in individual facilities, as well as investment activities related to securing premises and equipping the area with the infrastructure network. The first research related to securing the facilities on the site of the former KL Auschwitz II-Birkenau was carried out by Marian Myszka in the area of the southern wall of the gas chamber of Crematorium II. During the research, among others, the extent of the foundation pit related to the construction of the facility was identified (Myszka 2005a; 2005b). Since the scope of archaeological research conducted at the Museum is closely related to the extent of the tasks it accompanies, this was initially small, as was the scope of the investment works themselves. The research, in the form of supervision, was primarily related to the recognition of the structural condition of the facilities before the development of an appropriate comprehensive method of protection. Supervisions were mainly limited to construction and structural pits done for the purpose of preparing project documentation. Research also accompanied small-scale renovation and construction works or works related to the current operation of the Museum.

In 2009, archaeological research was conducted accompanying the renovation works of the wooden residential barrack B-171 (Petrykowski 2010), located in section BIIa. The above work initiated comprehensive conservation and construction activities at five other wooden barracks on the site of the former KL Auschwitz II-Birkenau. Further extensive renovation and construction works on a wooden barrack, which was part of a complex of hospital barracks located in section BIa were undertaken in 2010 under the supervision of Marian Myszka (Myszka 2010). The last renovation works covered three residential barracks located in section BIIa. The research was conducted under the supervision of Małgorzata Grupa (Grupa *et al.*, 2010; 2011a; 2011b). A discovery made in 2010 is worth noting (Myszka 2010). Fragments of a brick pavement laid on a granite foundation constituting the remains of communication routes between the barracks were documented in the excavations located around the wooden barrack.

The year 2009 marked the beginning of systematic comprehensive conservation works to the preserved barracks. The first complex renovation of the brick barracks began in 2015. The works were conducted in two residential barracks with historical numbers 7 and 8, connected by a separated courtyard, located in section BIb. Conservation and construction works, as well as the accompanying archaeological research, were carried out entirely by a team of Museum employees. The result of the research was the recognition and documentation of several stages of transformation of the inner courtyard development between the barracks and the area in the immediate vicinity of the barracks (Foks *et al.*, 2020). The conducted research provided new information on land development during the camp's operation. On this basis, five phases of transformations within the courtyard were distinguished, which, in correlation with the historical data, make it possible to reconstruct the transformations of the researched area. Moreover, the remains were identified of objects/structures in the courtyard, that probably had decorative functions, about which written sources do not provide any information. During the works, 79 immovable objects were identified, including the remains of no-longer extant buildings, land drainage systems, communication routes and objects constituting unusual development of the courtyard, such as flower beds or other decorative elements. To illustrate the saturation of movable artefacts within the area in question, it is worth noting that over 6700 movable monuments were inventoried there, of which 1662 separate artefacts were secured. The others, e.g., fragments of metal objects, nails, glass fragments, fragments of animal bones, were redeposited in the backfilled research excavations or inside barracks due to their poor state of preservation.

The presence of well-preserved archaeological relics over a large area had a significant impact on the renovation and preservation works, which led to changes in the project's documentation being made. It also demonstrated the need to take issues of archaeological premises into account at the stage of their development in subsequent project documentation.

Currently, at the stage of developing project documentation for the purposes of the planned works, advance archaeological research is being carried out on the site of the former KL Auschwitz II-Birkenau, aimed at a wider recognition of the nature of the layers and relics or the infrastructure around the building to be preserved. This allows the development of a method of dealing with the archaeological relics identified and located in advance during the research. It should be noted that the need to perform pre-emptive archaeological research had to some extent been recognised earlier; however, due to the desire to keep interference with the historical area as limited as possible, research was undertaken only to a very limited degree. In the years 2006–2008, archaeological exploration was conducted to identify the layout of the camp roads. During three seasons of examination conducted by Małgorzata Grupa, research excavations were made in the area of sections BIb, BIIe, BIIf and BIIg (Grupa *et al.*, 2007; 2008). In 2012 and 2013, research was conducted on a larger scale, aimed at archaeological recognition of the BI section and the sewage treatment plant on the western side of this section. This exploration was conducted by Andrzej Bartczak, Zbigniew Rybacki and Krzysztof Janicki on the basis of the research programme developed by Marian Myszka (Myszka 2012; Bujnowicz-Zgodzińska and Zgodziński 2013). The general recognition of the section BI area was directly related to the planned commencement of conservation works of brick structures. In 2014, the surveying studies carried out by Maciej Bobrek (Bobrek 2013) were preceded by the performance of geological and hydrological works in section BII. In the area of the former KL Auschwitz I camp, the first pre-emptive surveying research was undertaken by Kamila Peschel and Wojciech Tabaszewski in 2017 in connection with the planned investment to build a new Museum Visitor Service Centre (Peschel and Tabaszewski 2017).

Historical and contemporary development of the site of the former camp makes it difficult to conduct non-invasive research on a larger scale. Conducting exploration with the use of ground-penetrating radar and the electro resistance method was possible only in section BIII of the former KL Auschwitz II-Birkenau. This is mostly an open meadow with no disturbances in the form of existing barracks or fences. These works were conducted by Marcin M. Przybyła and Patrycja Obrębalska-Majdak in 2018 (Przybyła and Obrębalska-Majdak 2018). As a result, the remains of barracks and roads currently invisible in the field were identified.

DOCUMENTATION OF ARCHAEOLOGICAL RESEARCH CONDUCTED BY THE AUSCHWITZ-BIRKENAU MUSEUM

The area of the former KL Auschwitz I and KL Auschwitz II-Birkenau camps is archaeologically diverse and covers almost 200 hectares. Data obtained during archaeological research complement the knowledge on what the camp looked like historically. A significant number of detected objects, related primarily to communication, sewage and construction infrastructure, resulted in the creation of an internal database. In order to systematise the information obtained for the purposes of the Museum's activities, guidelines for the documentation of archaeological research were developed. These include, above all, a template for an immovable object card, which allows data to be obtained in a form ready to be included in the internal resource. The relics discovered in the area were assigned to four main categories: structural building elements, paved surfaces, utilities network (water facilities) and underground features. The most frequently discovered types of objects were separated in each of the categories. Such a system allows for consistent identification of the relics uncovered during the research. The database concerning archaeological exploration was built on the basis of the GIS environment, which allows information about the relics and layers located in a given area to be obtained quickly (Iwańczuk 2016). Photographs and historical plans were also included in the archaeological resource. The capabilities of the GIS platform allow for the integration of a wide variety of graphic data, which improves searching, enhances the ability to see the characteristics of a wider area and facilitates the performance of preliminary analyses. Archaeological excavations, drawn in the GIS program with the preservation of the actual field location, can be displayed on any previously prepared geometric plan, aerial photo or satellite imagery (Litwin and Myrda 2005). For instance, plans of the utilities network, both contemporary and historical, compiled in the GIS environment with the planned archaeological excavation, make it possible to avoid collisions at the stage of works

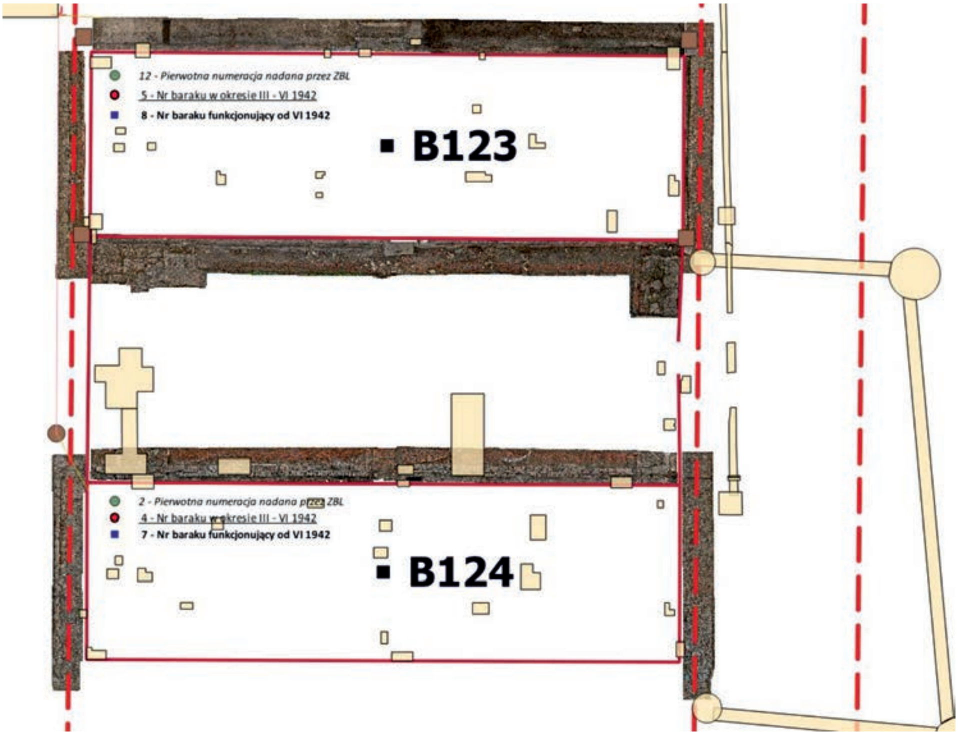


Fig. 2. Selected data concerning barracks 7 and 8 located in section BIb presented using QGIS software. Graphic elaborated: S. Foks.

implementation. Camp premises, existing on the plan, in combination with the archaeological excavations, facilitate orientation in the area and help in the study of the context of the analysed space. Objects on the digital plan can be assigned such content as barracks number, construction year, function of the object, type of archaeological finding. Photos can be attached to them, enriching the scope of information perception (Fig. 2). By increasing access to data in this way, the selection of optimal design and executive solutions for the preservation of objects is significantly accelerated. The flexibility of the system enables its continuous expansion in the direction of saturation with records.

The large number of camp relics being uncovered poses new challenges to archaeologists and conservators regarding the issue of how to protect them. Most of the objects were made of brick. Uncovering them and leaving them exposed on the surface would

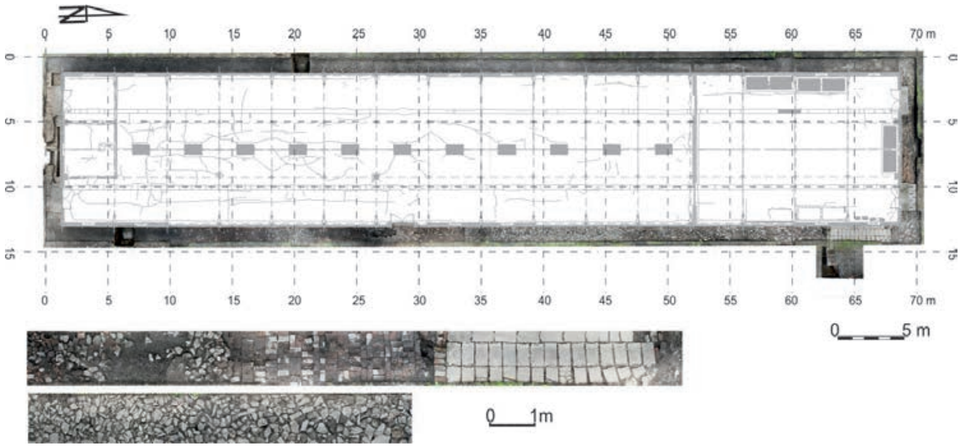


Fig. 3. Photo plan of the camp kitchen in section BIa with an approximation of the exposed archaeological relics. Graphic elaborated: D. Goiński.

cause them to be degraded by erosion. Such solutions are thus not applied and the relics do not remain uncovered after completion of the works and research. For this reason, a special role during exploration is attached to the most accurate descriptive, drawing and digital documentation. Thinking about the future, the Museum introduced digital documentation in the form of colour photo plans and three-dimensional models as a standard. Thanks to the use of photogrammetric software and taking a great many photos, objects and layers are documented *in situ* in the traditional form and in the form of digital documentation. Data obtained in this way allows for the analysis of individual objects in a multi-dimensional way, both in terms of structure, shape and location context. Digital documentation is a significant complement to traditional archaeological documentation, where detailed drawings are made at an appropriate scale along with a descriptive part.

In the course of the work of acquiring the data for the planned rendering, a number of technical issues arise that must be considered individually for each area targeted for documentation. This applies to documentation of both inside and outside the barracks. As part of digital visualisation, three methods, presented below, are used, which give a satisfactory result, albeit with varying data intensity.

Documentation based on metric values obtained from geodetic measures visible in the photos was adopted to document the features or excavations of small area or volume, most often located inside barracks. This method allows an unscaled 3D

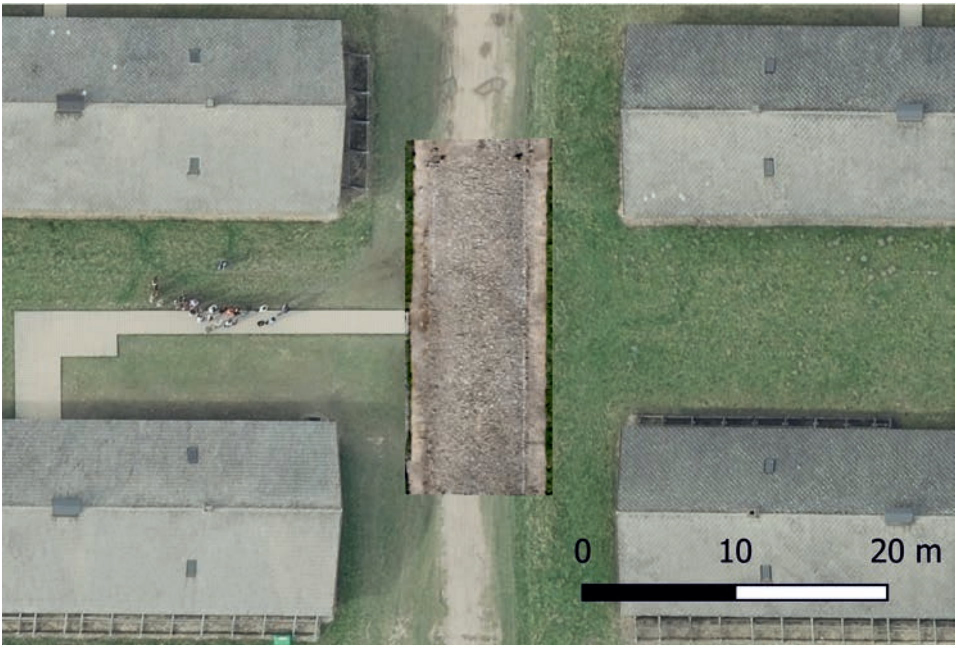


Fig. 4. Orthophotoplan of a fragment of the camp road documented during archaeological research in section Bia. Graphic elaborated: D. Goiński.

visualisation to be created at the initial stage. The model obtained is used to perform a macroscopic analysis of the feature or uncovered layers. Only the use of the measurements visible in the photo in the XYZ axial system allows an illustrative scale to be created and the required dimensions applied.

In cases where preservation works are conducted inside a barrack, the location of documented relics is easier, and the use of precise measuring equipment is not required. The photo plan obtained does not have full metric values, but it allows for analysis in terms of the location of individual objects within the range of the excavation and the barrack itself. This form of documentation was used in the case of relics uncovered around the camp kitchen barrack located in section BIa and residential barracks in section BIb of KL Auschwitz II-Birkenau (Fig. 3).

For objects located in an open space or in places that allow the use of a GPS transmitter or internal network, measurement points are made to obtain accurate geo-referencing. Thanks to the photogrammetric software, an orthophoto plan is generated in the coordinate system, which will eventually be placed on the internal

Fig. 5. A generated three-dimensional model of the camp road from the area of BIa. Graphic elaborated: D. Goiński.

museum platform with spatial data. Such a documentation process was used in the case of archaeological research during the uncovering of the top of the former camp road (Figs 4 and 5) or in the case of stone pavements in the drainage ditches in section BIa. In addition, it should be noted that this is the most commonly used method due to its accuracy and practical use on geo-information platforms.

Acquisition of movable material is an inseparable part of any archaeological research. The area of the former camp is no exception here. Most of the movable artefacts collected during the research were the property of the prisoners – hidden, lost or taken from them by the camp staff. Among the movable objects, items made of materials available in the camp (mainly animal bones, omnipresent fragments of wires) and items allowing the identification of a given prisoner deserve special attention. During the conducted research, large amounts of movable historic objects are obtained, most of which are mass material. An internal classification of archaeological artefacts based on the functional division of objects was developed for the needs of the Museum (more: Mazurkiewicz and Lewicki in this volume). Ultimately, it is planned to create a layer containing the planigraphy of the acquired material, as part of the internal database.

SUMMARY

Archaeological research conducted on the site of the former KL Auschwitz I and Auschwitz II-Birkenau accompany works aimed at protecting and securing the remains of the former camp. A considerable number of movable and immovable artefacts were located and recognized in the course of these studies. New data are acquired to complement historical information. On the basis of research carried out at barracks, whether wooden or brick, one can notice a relatively large number of changes taking place in this area over a relatively short period of their operation. Collection, development and full systematisation of all data is one of the major challenges faced by archaeologists working at the Museum, and the amount of this information is constantly developing and expanding.

REFERENCES

Bobrek, M. 2014. *Sondażowe badania archeologiczne wraz z nadzorem nad pracami ziemnymi przeprowadzone na odcinku BII oraz obszarach przylegających, na terenie byłego hitlerowskiego obozu Auschwitz II-Birkenau*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Bujnowicz-Zgodzińska, W. and Zgodziński, B. 2013. *Opracowanie wyników badań archeologicznych*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Czech, D. 1998. *Geneza obozu, jego budowa i rozbudowa*. In F. Piper and T. Świebocka (eds), *Auschwitz. Nazistowski obóz śmierci*, 15–42. Oświęcim. Publishing House of the State Museum in Oświęcim-Brzezika.

Foks, S. 2018. Archeologia w miejscu pamięci Auschwitz – odkrywanie materialnych świadectw historii. *Memoria* 11 (08/2018).

Foks, S., Lewicki, P., Mazurkiewicz, M. and Rolski, M. 2020. *Opracowanie wyników badań archeologicznych przeprowadzonych w rejonie baraków 7 (nr inw b-124) oraz 8 (nr inw b-123) zlokalizowanych na odcinku BIb byłego KL Auschwitz II-Birkenau w latach 2015–2020*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Grupa, M., Majorek, M. and Słomczewska, M. 2007. *Sprawozdanie z badań archeologicznych na terenie obozu Auschwitz-Birkenau, Oświęcim 2007*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Grupa, M., Majorek, M. and Słomczewska, M. 2008. *Sprawozdanie z badań archeologicznych na terenie Obozu w Brzezince*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Grupa, M., Majorek, M. and Słomczewska, M. 2010. *Dokumentacja i wyniki badań archeologicznych uzyskanych podczas prac ziemnych na terenie byłego obozu KL Auschwitz II-Birkenau – barak B-166 towarzyszących pracom konserwatorskim i robotom budowlanym*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Grupa, M., Majorek, M. and Słomczewska, M. 2011a. *Dokumentacja i wyniki badań archeologicznych uzyskanych podczas prac ziemnych na terenie byłego obozu KL Auschwitz II-Birkenau – barak B-210 towarzyszących pracom konserwatorskim i robotom budowlanym*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Grupa, M., Majorek, M. and Słomczewska, M. 2011b. *Dokumentacja i wyniki badań archeologicznych uzyskanych podczas prac ziemnych na terenie byłego obozu KL Auschwitz II-Birkenau – barak B-155 towarzyszących pracom konserwatorskim i robotom budowlanym*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Hensel, W. 1973. *Archeologia żywa*. Warsaw.

Iwańczuk, B. 2016. *Quantum GIS. Tworzenie i analiza map*. Gliwice.

Litwin, L. and Myrda, G. 2005. *Systemy Informacji Geograficznej. Zarządzanie danymi przestrzennymi w GIS, SIP, SIT, LIS*. Gliwice.

Myszka, M. 2005a. *Dokumentacja archeologiczna wykopów konstrukcyjnych.* Kraków. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Myszka, M. 2005b. *Sprawozdanie z nadzoru archeologicznego wykopu wykonanego w 2005 roku przy murze krematorium nr II w Brzezince.* Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Myszka, M. 2010. *Dokumentacja i wyniki badań archeologicznych przeprowadzonych w 2010 roku przy baraku nr B-80 na terenie dawnego KL Auschwitz II – Birkenau.* Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Myszka, M. 2012. *Program badań archeologicznych odcinka BI na terenie byłego KL Auschwitz II-Birkenau*. Kraków. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Peschel, K. and Tabaszewski, W. 2017. *Sprawozdanie z archeologicznych badań sondażowych prowadzonych na obszarze obozu koncentracyjnego Auschwitz I w Oświęcimiu (nr rejestru zabytków A-714/95).* Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Petrykowski, S. 2010. *Sprawozdanie z nadzoru archeologicznego i badań wykopaliskowych przy baraku B-171 dawnego obozu Auschwitz – Birkenau w Brzezince*. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Przybyła, M. M. and Obrębalska-Majdak, P. 2018. *Opracowanie wyników badań nieinwazyjnych przeprowadzonych na terenie Państwowego Muzeum Auschwitz-Birkenau w Oświęcimiu (na części odc. B III dawnego KL Auschwitz II-Birkenau) w okresie od kwietnia do maja 2018 roku*. Kraków. Typescript in the archive of Auschwitz-Birkenau State Museum in Oświęcim.

Archaeologia Polona, vol. 61: 2023, 173–200
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3159

Plastic Artefacts from Archaeological Investigations Carried out at the Auschwitz-Birkenau Camp Complex in 2015–2022

Wojciech Tabaszewski[a] and Kamila Peschel[b]

This article is a study of the results of archaeological research conducted at the site of the former German concentration camp Auschwitz-Birkenau and the Jawischowitz forced labour sub-camp attached to it. It discusses historical objects produced from plastics, as a result of chemical modification of natural products or synthesis of products of chemical processing of coal, oil or natural gas. The history of previous archaeological research at the site of the former Auschwitz-Birkenau camp complex and its sub-camps is outlined. The scope and regions of research that were carried out by the authors between 2015 and 2022 are discussed. Plastic products have been characterised by grouping them in terms of raw material and function, distinguishing among other things everyday objects and parts of clothing. On this basis, a comparative base was created, which can serve as a basis for applying a preliminary chronological division of plastic products.

KEY-WORDS: Auschwitz-Birkenau, concentration camp, plastics, comb, button, pocket, knife, pipe

INTRODUCTORY INFORMATION

Oświęcim and the neighbouring Brzezinka lie in the broad forks of the Vistula and Soła, in the centre of the Vistula valley (Fig. 1). The terrain is flat and rather marshy, largely covered by meadows and riparian forests. Geographically, the area is located within the Oświęcim Basin, in the part known as the Upper Vistula Valley (Kondracki 2002: 515–517; Solon *et al.*, 2018: 170). The Oświęcim Basin is an area bounded to the south by the Carpathian foothills (the Carpathian Foreland) and to the north and northwest by the Silesian Uplands. The riverbed of the Vistula and its tributaries (including the Soła, Przemsza and Skawa) runs through the middle of the Basin. In

[a] Independent researcher (Poland), e-mail: panq1@wp.pl, ORCID: 0009-0005-9390-5128
[b] Atia – Prace archeologiczne, Niepołomice (Poland), e-mail: kpeschel@o2.pl, ORCID: 0009-0008-7269-0780

Received December 12, 2022; Received in revised form July 25, 2023; Accepted September 13, 2023

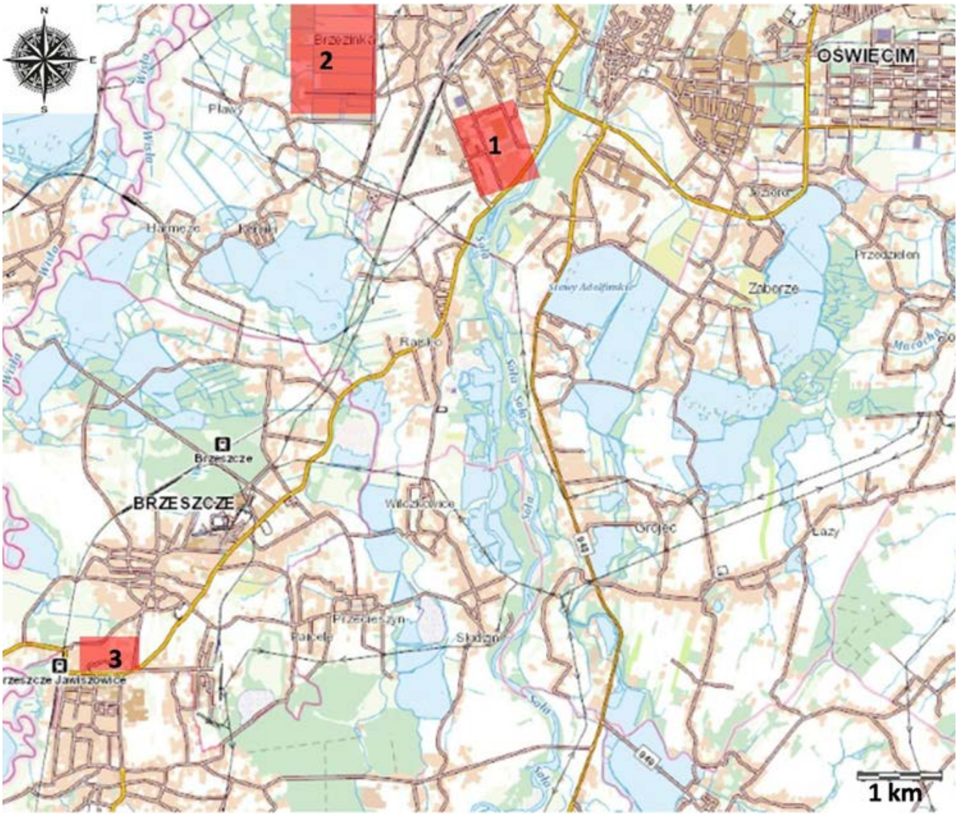


Fig. 1. Location of the elements of the former Auschwitz-Birkenau camp complex included in the present archaeological research: 1 – Auschwitz I; 2 – Auschwitz II-Birkenau; 3 – Auschwitz-Jawischowitz, scale 1:50000. Drawn: W. Tabaszewski.

the Oświęcim area, the Vistula flows through a wide lowland valley, with an average height of about 230 m above sea level, on its right side are the inflow cones of the Soła and Skawa (Lencewicz 1938: 365–366; Kondracki 2002: 516–517). Such a location, described by Heinrich Himmler, as "advantageous in terms of communication, and also because of the possibility of isolation and camouflage" (Smoleń 1980: 9), influenced the organization of one of the largest extermination centres here.

The first research work at the Auschwitz II-Birkenau site was carried out in 1961. During this work, an excavation pit was established on the site of Crematorium III. Its exact location is unknown, as is its nature. However, it is known that a tin containing the diary of one of the prisoners was discovered at that time (Myszka 2009: 4).

Six years later, research work began at the camp. This research was led by Jerzy Kruppé. A trench of approximately 1 are was then established adjacent to the undressing room of crematorium III, preceding the entrance to the gas chamber (Hensel 1983: 199; Kajzer 1984: 10; Gurba 1996: 26). At the end of 1967 and in 1968, earthmoving took place in connection with the renovation of the sewage network (rainwater and sanitary sewage) and the extension of the fire pipe and drains around some of the barracks. Further earthworks were conducted between 1986 and 1989 around the foundations of the barracks, which were eventually replaced from brick to concrete. Some of the foundations were dredged and waterproofed. For some of the barracks, drainage was then installed in the form of ceramic drains and a layer of gravel and sand. No archaeological supervision was carried out during the renovation work until 1995. This became a requirement only after the Auschwitz-Birkenau site was entered into the register of monuments (Myszka 2011: 2; Tabaszewski and Wardas-Lasoń 2022: 55).

The first, archaeological survey research after 1995 took place on the camp kitchen building at Auschwitz I and on the wall of crematorium II at Auschwitz II – Birkenau in 2005, conducted by Marian Myszka (2005a; 2005b). The next research in 2006 was been implemented by Małgorzata Grupa. At that time, a trench was excavated between barracks B-135 and B-136 in section BIb, exposing a paved road that consisted of three layers of brick rubble and bricks (Grupa 2006: 1). Also in the same year, seven small construction trenches at barrack B-113 were subjected to archaeological supervision (Myszka 2007: 1–2). A large amount of archaeological work was conducted in 2007 within the BIb section of the Birkenau camp, where M. Grupa's team established a total of 13 trenches uncovering, among other things, preserved roads and drainage structures (Grupa *et al.*, 2007: 2–6). During this period, work was also carried out on barrack B-80 and work in the area of the gas chamber and crematoria II and III (Grupa *et al.*, 2008: 2–6; Myszka 2009: 1; 2011: 2). In the following years, minor earth moving was conducted at the camp under the archaeological supervision of, among others, M. Myszka or as part of archaeological research undertaken by the consortium of companies "Barta" Pracownia Archeologiczno-Konserwatorska A. Bartczak, E. Wójcik s.c., Pracownia Archeologiczna "Grandor" Weronika Bujnowicz-Zgodzińska, "ARCOS" Zbigniew Rybacki (Smajek-Mądrzycka 2015: 9).

Starting in 2014, work was undertaken to complete the fire protection installation. The earthmoving associated with the first phase of the completion of this installation were supervised by Ilona Smajek-Mądrzycka (2015). Subsequent phases of research related to the completion of the fire protection installation, between 2015 and 2020, were conducted under the direction of M. Myszka, Kamila Peschel and Wociech Tabaszewski (Peschel and Tabaszewski 2015; 2018; 2019; 2020; Myszka *et al.*, 2017). Throughout this time, various works under archaeological supervision, as well as excavations and soundings, were performed, mainly related to conservation work in individual barracks, as well as to the museum's infrastructure expansion projects (Banaś-Maciaszczyk 2017; Peschel and Tabaszewski 2017). Between 2020 and 2022, archaeological work related to the renovation of barracks B-167, B-91 and B-141, led by K. Peschel and W. Tabaszewski (2021; 2023a; 2023b), was also carried out on the former camp. Also in the area, which was once inextricably linked to the camp as its economic zone, soundings were dug aimed in order, among other things, to identify the extent of the ash pits and potential mass graves. The first survey of this type happened in 2007, using the method of small diameter boreholes from which soil samples were taken to determine the extent of the zone containing elevated concentrations of phosphorus compounds. A further survey using this method in the area on the western side of the Birkenau camp was carried out in 2018 (Sikorski 2018: 10). In the same year, verification surface surveys were carried out in this area of the Birkenau camp, which identified the location, associated with the camp, of aircraft dismantling facilities (Bartczak *et al.*, 2018: 126). These were supplemented the following year by survey research (Ostrowski and Kowalczyk 2019: 49 and 51). In 2020, archaeological research covered the site of the former IG Farben Werk plant and the former Auschwitz III – Monowitz camp (Lasota-Kuś 2020). The picture so far is completed by rescue excavations at the site of the former Auschwitz-Jawischowitz sub-camp in Brzeszcze-Jawiszowice, realised in 2021 by W. Tabaszewski (Tabaszewski and Wardas-Lasoń 2022).

RESEARCH 2015–2022

The present analysis concerns the results of archaeological research conducted in the former concentration camps Auschwitz I, Auschwitz II-Birkenau, and Auschwitz-Jawischowitz. The work was connected with investments by the Auschwitz-Birkenau State Museum in Oświęcim, i.e., in connection with the construction of a fire protection system at the site of the former Auschwitz II-Birkenau Concentration Camp and conservation work on barracks B-167, B-141 and B-91 located at the site (Fig. 2). In addition, surveying work took place in the former camp workshops located at the Auschwitz I camp site (Fig. 3) and rescue excavation work at the site of the former Auschwitz-Jawischowitz labour camp (Fig. 4). All the work discussed has been or is currently being continued by the authors.

Fig. 2. Location of the study area within the former concentration camp Auschwitz II-Birkenau. Drawn: K. Peschel.

HISTORY AND TECHNOLOGY OF PLASTICS

Plastic artefacts are organic materials obtained by chemical modification of natural products or synthesis of products resulting from the chemical processing of coal, oil or natural gas (Saechtling and Zebrowski 1978: 25). The archaeological artefacts discussed below can be associated with two main raw materials groups. The first group consists of artefacts made from petroleum raw materials. The second group consists of artefacts made from plastic masses derived from synthetic phenol-formaldehyde resins and polymers. With the development of oil extraction, refineries were set up where different types of asphaltenes were obtained through the distillation of crude oil. Bitumen, a by-product of distillation, found various applications and, after further processing, was used, among other things, in the production of roofing felt.

Fig. 3. Location of the study area within the former Auschwitz concentration camp. Drawn: K. Peschel.

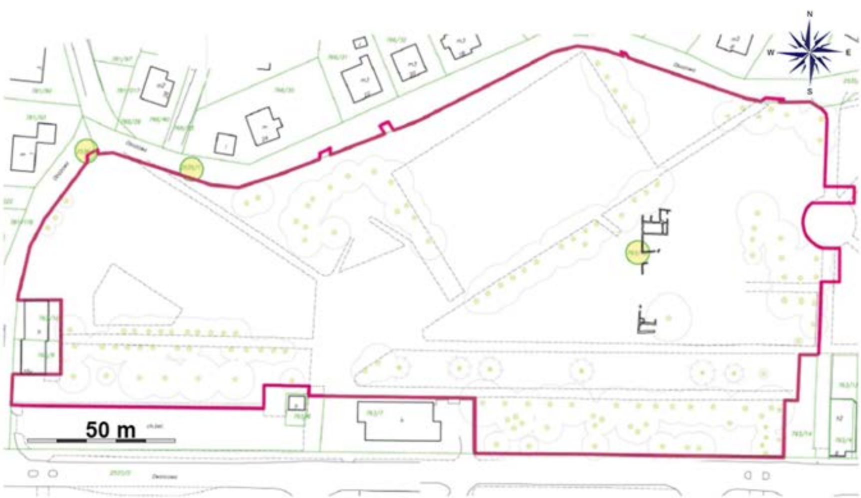


Fig. 4. Location of the study area within the former Auschwitz-Jawischowitz labour sub-camp. Drawn: A. Piekarczyk.

1

2

Fig. 5. Remains of a preserved insulating layer under the floor in the form of a sheet of tar paper: 1– Birkenau, barrack B-167; 2 – Jawischowitz, block no. 6. Photo: K. Peschel and W. Tabaszewski.

Fig. 6. Summary of rubber products discovered at the site of the former Auschwitz II – Birkenau cam. 1–4 – heels; 5–6 – fragments of tyres reused as shoe soles. Photo: K. Peschel, W. Tabaszewski and A. Żydzik.

Fig. 7. Rubber wellington boots discovered at the site of the former Auschwitz II – Birkenau camp. Photo: W. Tabaszewski.

By using soft asphaltenes to impregnate the cardboard and covering its outer surface with harder asphaltenes, a waterproof raw material was obtained, which was used to construct layers of damp-proofing (Balada 1966: 171–173; Ziomkowski 1997: 14).

Such layers were found during investigations carried out in the interiors of the camp buildings, where they occur directly under the thin concrete screed constituting the floor of the barracks (Fig. 5). This type of insulation was identified during work carried out, among others, in Barrack B-167, located in Section BIIa of the former Auschwitz II-Birkenau camp. The floor found in the remains of Block 6, the former Auschwitz-Jawischowitz forced labour sub-camp, was similarly insulated from below (Tabaszewski 2021: 14; Tabaszewski and Wardas-Lasoń 2022: 56).

The introduction of synthetic rubber, obtained by the polymerisation of butadiene obtained during the distillation of crude oil, into mass production was no less important for the production of plastic products (Balada 1966: 360; Woźniacki 1979: 19). The objects associated with synthetic rubber products are mainly the remains of shoe bottoms (Fig. 6), some of which are objects formed secondarily from tyre fragments (Fig. 6:5 and 6). In addition, fully preserved rubber footwear can also be found (Fig. 7). The fully preserved wellingtons (Fig. 7) represent a type of footwear used from the second half of the 19th century onwards, in the form of a shoe cover to protect the shoes from moisture. A specimen was encountered which bears the mark “4877 26.10.40 T”, indicating the batch number, date of manufacture and the Berlin

Fig. 8. A selection of buttons made of plastic mass discovered at the site of the former Auschwitz and Auschwitz II- Birkenau camp. Photo: W. Tabaszewski.

company Tack und s.p. (Peschel and Tabaszewski 2019: 33). Other products made of synthetic rubber are shoe heels, one of which bears the signature of the British company BULLDOG WOOD-MAN (Fig. 6:5; Peschel and Tabaszewski 2020: 27). Two other heels bear the mark CONTI T-REX (Fig. 6:1 and 3), denoting the Hanover company CONTINENTAL (Peschel and Tabaszewski 2019: 33; 2020: 27). No legible marks have survived on a further two heels, but one (Fig. 6:4), due to its small size, can be associated with women's footwear. The other unsigned heel corresponds in size and spacing of the shoe marks – a trace of shoeing, to heels used in German military footwear (Wrona 2008: 32–33). The group of rubber products is closed by two fragments of shoe soles made secondarily from tyre fragments (Fig. 6:6 and 7). One of them bears a fragment of the Pneumant logo, which is the designation of the products of the Berlin-based company Deka Pneumatik GmbH. Both fragments are parts of shoe repair components and were made by prisoners incarcerated in the camp (Peschel and Tabaszewski 2019: 33–34).

The last group of plastics are products made from resin or polymer-based materials, which date back to the beginning of the second half of the 19th century. At that time, J. W. Hyatt invented a method of producing celluloid, which, as a substitute for ivory, was used to make billiard balls (Springate 1997: 65).

Gradually, plastics became more common, gaining more applications. The development of the production of plastics and products made from them particularly intensified in the third decade of the 20th century. This is linked to the invention of phenol-formaldehyde resins – Bakelite – by Z. W. Beakeland in 1910 (Niebojewski and Brzezinski 1965: 3; Saechtling and Zebrowski 1978: 29–32; Zajachowski and Tomaszewska 2014: 181). Among the wares from this material group, parts of costume such as buttons (Fig. 8), stocking clasps (Fig. 9:3) and jewellery (Figs 9:1 and 2) dominate. Parts of the costume are also complemented by fragments of eyeglass frames (Fig. 10). Among the buttons, there are both flat, underwear-type buttons, provided with two or four symmetrically placed holes for attachment (Figs 8:1, 2, 4 and 5), as well as flat, shield-type buttons, provided with an eye on the underside (Figs 8:3, 8 and 9) and hemispherical buttons (Figs 8:7, 9, 11 and 12). Many buttons had ornaments on their obverses in the form of floral (rosettes) or geometric elements, characteristic of the Art Deco and Bauhaus styles, dominant in the industrial design of the 1920s and 1930s (Tołłoczko 2010: 34). Some of the buttons bear the makers' marks, which make it possible to link the products to Bulgarian (*СОФИЯ VII А. ШИЛИЯНОВ*Ъ) or Hungarian (*HUNGARY FUTURIT 7299)* factories. Unfortunately, a significant proportion of the buttons do not have any markings or other features to link them to a specific factory. In addition to the buttons, a plastic garter belt clip was among the items associated with the costume. This type of costume item

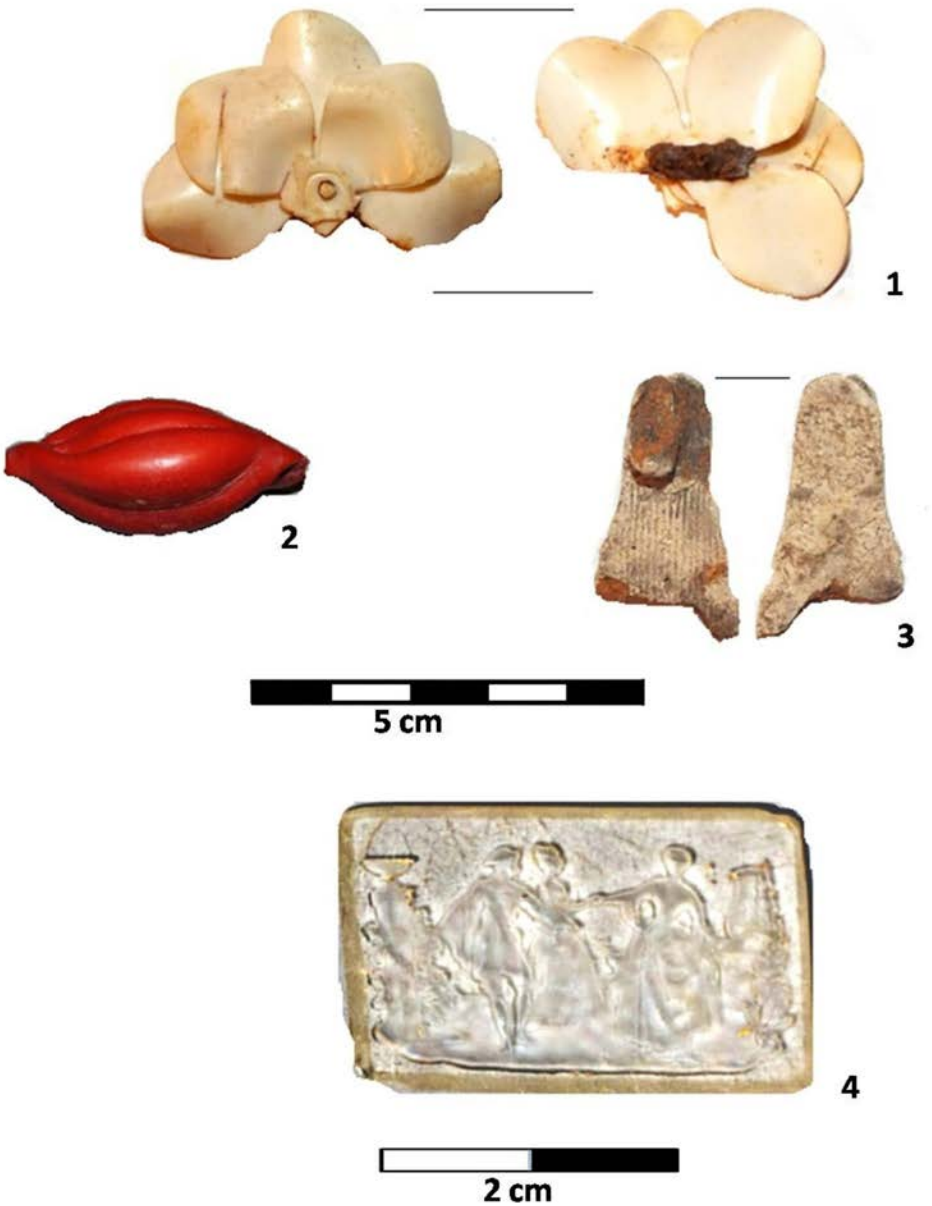


Fig. 9. Selection of garment elements of plastic mass discovered during the research at the site of the former Auschwitz II-Birkenau camp. Photo: W. Tabaszewski.

was commonly used in the 1930s and 1940s. During this period, hand-sewn nylon stockings attached usually to garters in the form of a special belt worn on the hips were very popular (Myszka *et al.*, 2017: 30). Among the items of the costume are also the remains of brooches made of polyester masses (Fig. 9:1 and 2). Items of this type were usually in the shape of flowers or floral compositions. Jewellery and costume ornaments made of artificial plastic masses appear in common use as early as the 1920s (Piskorz--Barenkova 2008: 40). During the war period, artificial jewellery became very popular and the Protectorate of Bohemia and Moravia remained its largest producer (Mruk 2017: 113). The last objects in this group are the remains of eyeglass frames (Fig. 10). The fragments of eyeglass frames were mostly made of Bakelite or black polyester pulp.

The second group of items made from plastic masses are items related to health and personal hygiene, such as combs (Figs 11 and 12), toothbrushes (Figs 13–15), remnants of hygiene products and drug packaging (Fig. 16), razors (Fig. 17:1) and dental bridges (Fig. 18). Most of these objects were discovered in the BIb section of the former Auschwitz-Birkenau camp, near barracks B-140 and B-141, as well as B-122 and B123, which originally housed the prisoners' baths (Strzelecka and Setkiewicz 2000: 87). The combs discovered during the present research present both bilateral (Fig. 11) and unilateral (Fig. 12) types. Only a few combs have marks that can be linked to specific makers. Prominent among them is a fully preserved comb of the HERCULES KAMM line, produced by the German-American concern G.W C° GARANNERT, which operated from 1933 and had factories in New York and Hamburg (Peschel and Tabaszewski 2015: 11). The REGINA KAMM line comb (Fig. 12:5) is of the single-sided comb type, and is also associated with this factory (Duma 2016: 240; Peschel and Tabaszewski 2017: 29). The double-sided comb type is also represented by a product of the Austrian company W MASEING MOD called MATADOR. It is followed by fragments of single-sided combs, among which there are two fragments signed ELASTIC (Fig. 12:4 and 6), whose fragmentary nature, however, does not allow direct attribution of the product to a specific manufacturer. Among the remaining combs, there are also female combs used to secure hairstyles (Fig. 12:1). In addition, clear attempts can be seen to make the products more attractive through the use of, among other things, multi-coloured masses (Fig. 12:1–3, 8 and 9) and the enrichment of the product forms with decorative elements (Fig. 12:2 and 7). Toothbrush fragments are mostly made of a transparent polymer. The majority of the toothbrushes bear poorly legible and partially obliterated embossed brand markings, among which products of Czech, German and British manufacturers can be distinguished. A British product is represented by one toothbrush bearing the mark of the London manufactory PICCADILLY DENTAL BRUSH. German products include brands such as COSMOS, additionally bearing the REGISTRED TRADE MARK

Fig. 10. Fragments of eyeglass frames discovered at the site of the former Auschwitz II-Birkenau camp. Photo: K. Peschel.

(Fig. 14:1) and EXACTOR (Fig. 14:2; Peschel and Tabaszewski 2017: 28–29). In addition, fragments of brushes bearing the mark DEUTSCHEZ ERZUNGINS without preserved factory marks were also found (Peschel and Tabaszewski 2017: 28). Among the

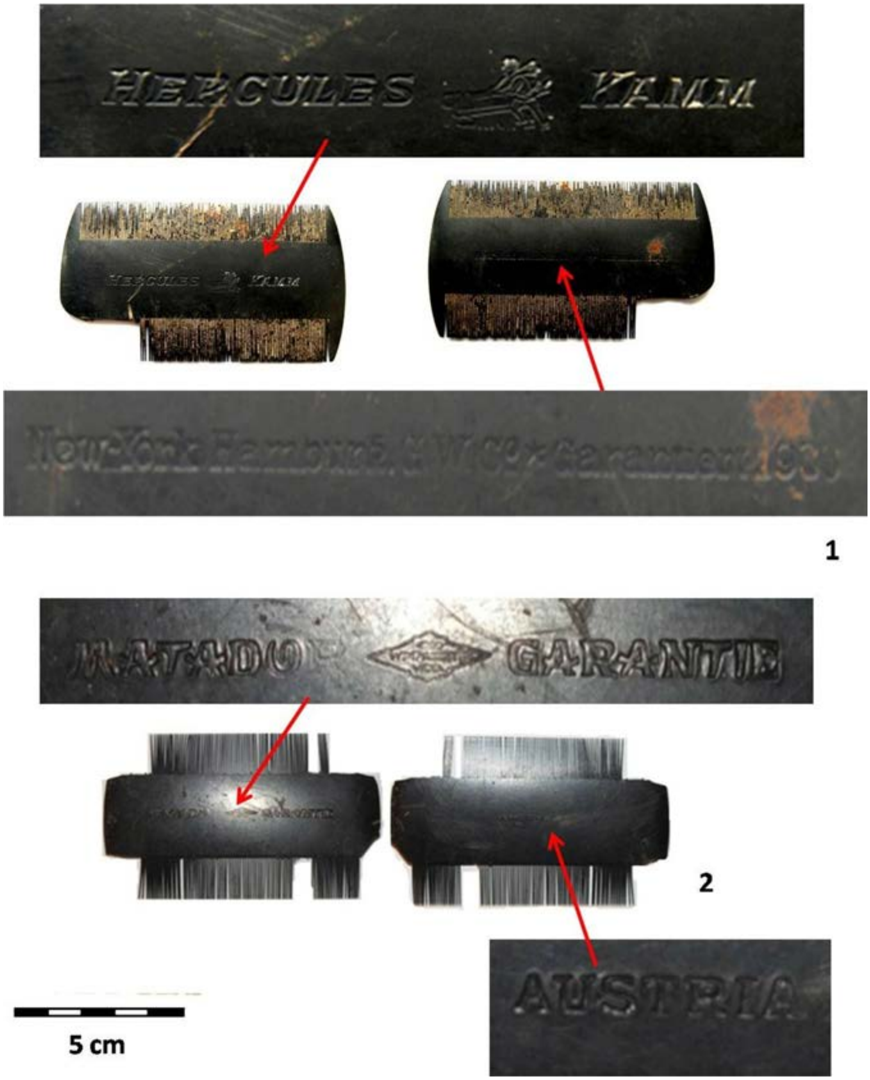


Fig. 11. Fragments of plastic combs discovered at the site of the former Auschwitz II-Birkenau camp. Photo: K. Peschel.

products of Czech factories, there is a toothbrush bearing the mark of the KOH-I-NOOR factory, operating in Budějovice.[1] The group of products related to health and hygiene

1 https://www.koh-i-noor.cz/en/history (Access: December 03, 2022).

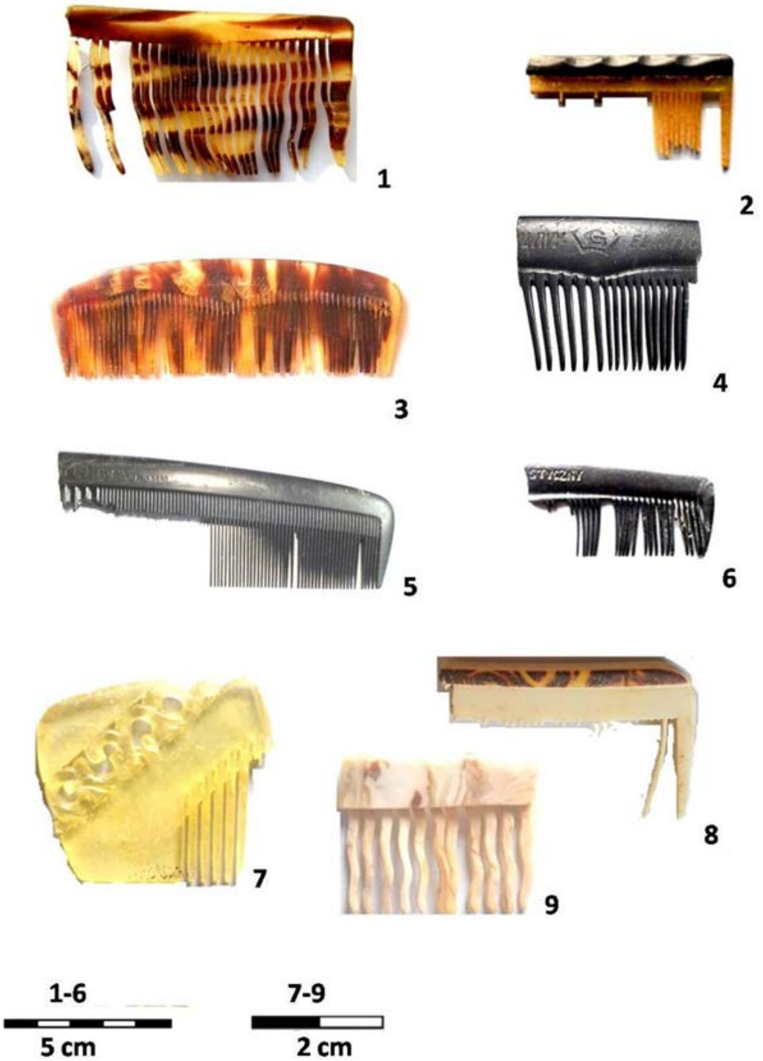


Fig. 12. Fragments of plastic combs discovered at the site of the former Auschwitz II-Birkenau camp. Photo: K. Peschel.

includes packaging residues of hygiene products (dental powders, creams) and medicines. During the survey of the BIb section, fragments of dental powder packaging were discovered (Fig. 16:1 and 3), one of which had the name of the product printed

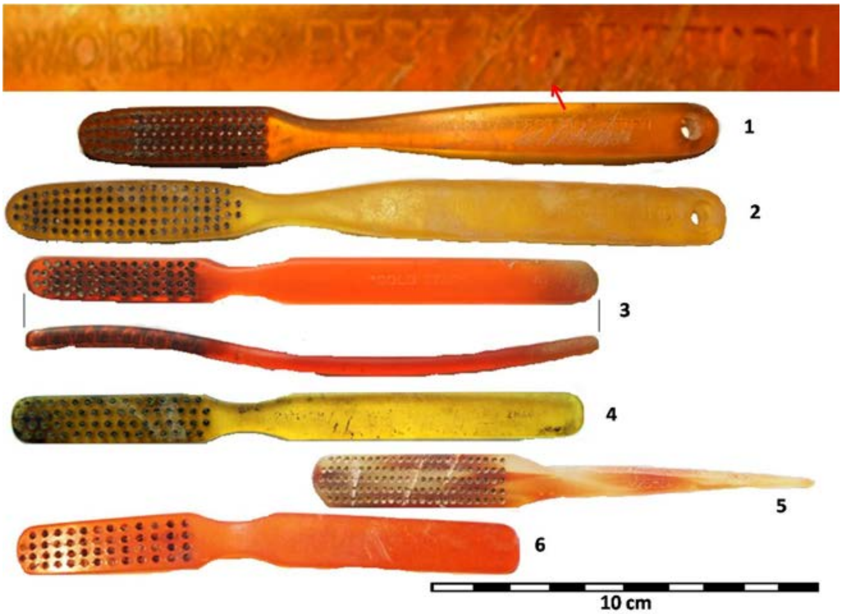


Fig. 13. Fragments of toothbrushes discovered at the site of the former Auschwitz II-Birkenau camp. Photo: W. Tabaszewski.

on it: AHA-BERGMANN AHAB WALDHEIM-SA. Dental powder from this company was part of a hygiene kit issued to SS officers. The second was the lid of a dental powder box (Fig. 16:3) made of dark red, opaque paste. It is decorated in the central part with a convex five-pointed star but has no other markings to associate it with the product of a specific company. During the research, drug packaging is also often discovered, among which an all-plastic box with Bayer's name printed on it stands out (Fig. 16:2). The box measured 6.5 x 5.5 cm and originally held 20 aspirin tablets. The lid bore the inscription 20 ORIGINAL TABLETTEN ASPIRIN ZU 0.5g and the BAYER company seal, EINGETRAGEN WARENZEICHEN (ACIDAM ACETYLO-SALICYLIUM) BAYER I.G. FARBEN INDUSTRIE AKTIENGESELLSCHAFT LEVERKUSEN. The format of the company's lettering and logo is consistent with the logo used between 1925 and 1945 (Peschel and Tabaszewski 2019: 32). Plastics found use in the manufacture of packaging for creams or ointments (Figs 16:4 and 19:2), as well as dishes (Fig. 19:1), most of which do not bear markings to link them to a specific manufacturer. Plastics materials, mainly of the Bakelite or Ebonite type, provided the raw material for all kinds of caps to close containers for

Fig. 14. Fragments of toothbrushes discovered at the site of the former Auschwitz II-Birkenau camp. Photo: W. Tabaszewski.

example for medicines (Fig. 20:1, 3 and 4), toothpaste (Fig. 20:2) or shoe polish (Fig. 21). Excavated prosthetic bridges consist of porcelain teeth set in a bridge usually also made of ebonite or Bakelite, which was fixed in the mouth with steel brackets. The design and material of exposed bridges are typical of the type used in the 1930s and 1940s (Peschel and Tabaszewski 2020: 26).

Other types of objects were also manufactured from plastics, such as cutlery handles (Fig. 17:3), rapidographs (Fig. 17:4) or oilcloths (Fig. 17:2; Springate 1997: 63). An interesting example of a product is a small rectangular plate (Fig. 9:4) made of colourless, transparent paste and decorated on the underside with an embossed figural scene composed of three figures. This object originally served as a plate for a toy photoplasticon or as a decorative application (Peschel and Tabaszewski 2020: 27). Fragments of Bakelite or ebonite pipe mouthpieces constitute numerous groups (Fig. 22). This type of object appears in use during the interwar period. They are applied to pipes made of wood (Olbromska 2004: 35; Rapaport 2004: 102). The group of wares for which plastic was used closes with folding knives. Three pocket knives with preserved plastic facings were discovered during the survey. Two of them

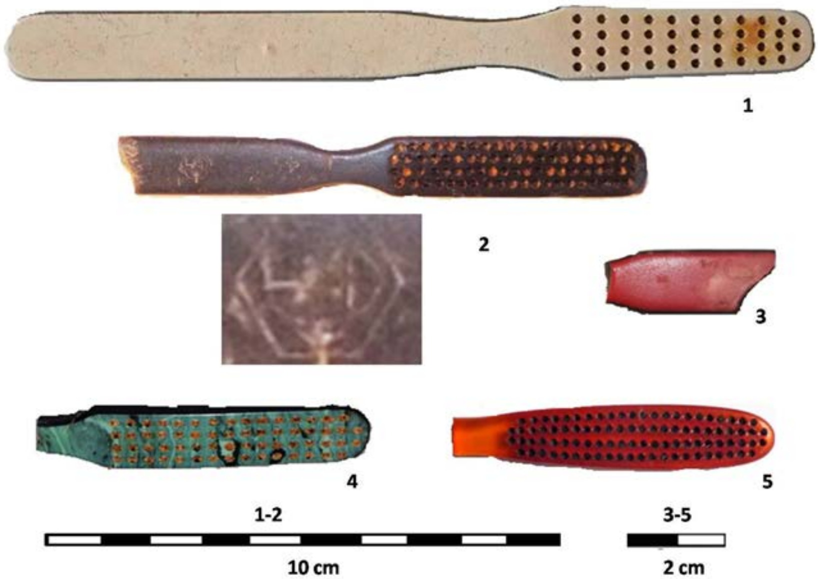


Fig. 15. Fragments of toothbrushes discovered at the site of the former Auschwitz II-Birkenau camp. Photo: W. Tabaszewski.

(Fig. 23) had engraved marks on the blade, which made it possible to link them to the Gottlibe Hammesfahr factory located in Solingen-Foche, North Rhine-Westphalia, which operated between 1684 and 1971 (Królikiewicz 2002: 234). A third penknife, on which the plastic facings were preserved (Fig. 24), had the inscription GZALOSITZER FIELBRLEMEN, CZALOSITZ a/ε C embossed on one, indicating a factory owned by the Fielbreleman family, established in the town of Žalhostice (Peschel and Tabaszewski 2019: 23).

CONCLUSION

Developments in technology and the availability of materials have made plastic products such as asphalt, synthetic rubber, Bakelite, Ebonite, celluloid, polyester resins, Plexiglas, etc. widely available. The ease of production, as well as their high flexibility and resistance, meant that plastics quickly became substitutes, imitating natural materials. Mass production meant that the objects created over the past 150 years

Fig. 16. Hygiene product and medicine packaging discovered at the site of the former Auschwitz II-Birkenau camp: 1 – lid of a packet of dental powder; 2 – lid of a packet of aspirin; 3 – lid of a packet of dental powder; 4 – lower part of a jar for cream or ointment. Photo: K. Peschel and W. Tabaszewski.

are often still present in the human environment. Today's global production of plastic products exceeds 300 million tonnes per year (Zalasiewicz *et al.*, 2016: 5). Products from this group of raw materials are increasingly included among the artefacts discovered during archaeological excavations, allowing the chronology of the objects studied to be detailed. Items of everyday use made on the basis of materials from the plastics group take on particular significance when dealing with research conducted at sites related to the history of 20th-century armed conflicts. It is on the basis of finds from sites such as concentration camps (Peschel and Tabaszewski 2015; 2017; 2018; 2019; 2020; Albert and Brandt 2016; Myszka *et al.*, 2017; Karski 2019; Tabaszewski and Wardas-Lasoń 2022) or prisoner of war camps (Augustyniak *et al.*, 2012), mass graves (Kola 2016; Popkiewicz 2016; Wrzosek 2016),[2] battlefields (e.g., Mazurek *et al.*, 2020; Podsiadło 2021) or airplane crash

2 http://www.muzeumkatynskie.pl/pl/2713/11387/grzebienie_mk_103_1_32_k.html (Access: December 03, 2022).

Fig. 17. Plastic products discovered at the site of the former Auschwitz II-Birkenau camp: 1 – razor; 2 – piece of oilcloth; 3 – handle of a tool or cutlery; 4 – holder of a rapidograph. Photo: A. Żydzik.

sites related to warfare during World War II (Karasiewicz *et al.*, 2021; Tabaszewski 2022), it is now possible to establish a comparative base and basis for the chronological division of plastic products. In the case of archaeological investigations at archaeological sites other than those mentioned above, plastic objects are inventoried very sporadically (Duma 2016; Peschel 2022: 506–507). Plastic objects discovered during research at the Auschwitz-Birkenau site enrich the information base concerning both the life of prisoners in German concentration camps and the state of material culture in the first half of the 20th century.

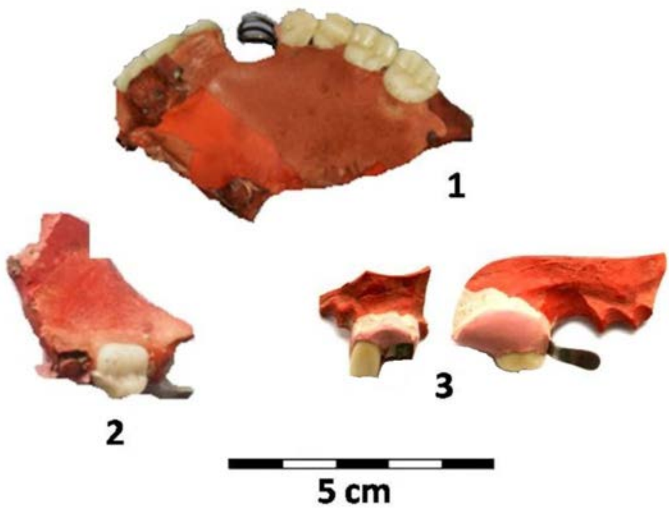


Fig. 18. Dental bridges discovered at the site of the former Auschwitz II-Birkenau camp. Photo: A. Żydzik.

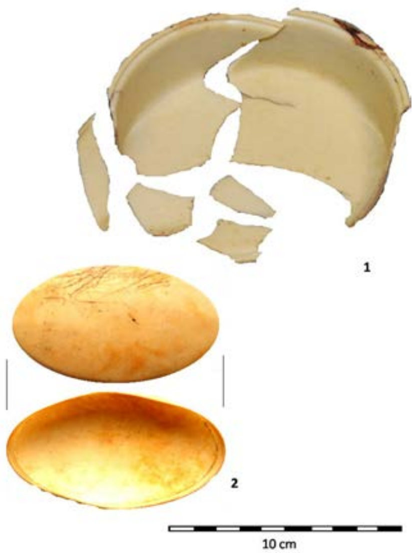


Fig. 19. Plastic products discovered at the site of the former Auschwitz II-Birkenau camp: 1 – fragment of a bowl; 2 – lid of a medicine package. Photo: A. Żydzik.

Fig. 20. Plastic caps discovered during excavations at the site of the former Auschwitz II-Birkenau camp. Photo: A. Żydzik.

Fig. 21. Plastic caps discovered at the site of the former Auschwitz II-Birkenau camp. Photo: A. Żydzik.

Fig. 22. Pipe mouthpieces made of Bakelite discovered at the site of the former Auschwitz II-Birkenau camp. Photo: W. Tabaszewski.

Fig. 23. German penknives with plastic cladding discovered at the site of the former Auschwitz II-Birkenau camp. Photo: K. Peschel.

Fig. 24. Czech penknife with plastic cladding discovered at the site of the former Auschwitz II-Birkenau camp. Photo: K. Peschel.

The sites of former concentration camps are increasingly the subject of archaeological work. To date, however, there is a lack of broader publications on the results of archaeological investigations, focusing on the analysis of movable artefact assemblages from such investigations. The subject of archaeological work carried out at the Auschwitz-Birkenau site has only been addressed in a handful of publications (Hensel 1983; Gruba 1996; Banaś-Maciszczak 2017; Tabaszewski and Wardas-Lasoń 2022). The subject of plastic products signalled above, allows us to look at the issue of the functioning of the concentration camp through a fragment of the material culture inextricably linked to the people imprisoned there. It also gives us a picture of the material culture of the entire period. The objects presented above form a compact ensemble, which at the same time reflects a picture of the material culture of Europe in the 1930s and 1940s.

REFERENCES

Albert, D. and Brandt, J. M. A. 2016. *Archaeological plastics – a growing challenge for conservators*. Electronic document: https://www.researchgate.net/publication/320805197 (Access: December 03, 2022).

Augustyniak, H., Kałagate, S. and Stachowiak, P. 2012. *Opracowanie wyników badań archeologicznych prowadzonych na terenie niemieckiego obozu jenieckiego Stalag 1B Hohenstein (Królikowo, stan. 8 AZP 28-59/24, gm. Olsztynek, pow. olsztyński, woj. warmińsko-mazurskie).* Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad], Olsztyn Branch.

Balada, A. 1966. *Od ropy naftowej do tworzyw sztucznych.* Warszawa.

Banaś-Maciszczak, J. 2017. Prace konserwatorskie. In B. Bartyzel and P. Sawicki (eds), *Memorial Auschwitz-Birkenau*, 54–56. Oświęcim.

Bartczak, A., Gwóźdź, B., Nierychlewska, A., Pajor, M. and Święcicki, J. 2018. *Wyniki archeologicznych badań powierzchniowych na trasie projektowanej drogi ekspresowej S1 od węzła „Kosztowy II" w Mysłowicach do* *węzła „Suchy Potok" w Bielsku-Białej.* Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad], Katowice Branch.

Duma, P. 2016. Archeologia w obliczu masowej produkcji przedmiotów na przykładzie byłego śmietniska w Lesie Rakowieckim we Wrocławiu. *Śląskie Sprawozdania Archeologiczne* 58: 227–246.

Gurba, J. 1996. Nowa archeologia. *Annales Universitatis Mariae Curie-Skłodowska. Sectio F Historia* 51: 23–29.

Grupa, M. 2006. *Sprawozdanie z badań archeologicznych na terenie obozu Oświęcim-Brzezinka.* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Grupa, M., Majorek, M., and Słomczewska, M. 2007. *Sprawozdanie z badań archeologicznych na terenie obozu Auschwitz-Birkenau.* Typescript in the archives of the State Museum of Auschwitz-Birkenau.

Grupa, M., Majorek, M. and Słomczewska, M. 2008. *Sprawozdanie z badań archeologicznych na terenie obozu Auschwitz-Birkenau.* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Hensel, W. 1983. *Archeologia żywa*. *Wydanie drugie przejrzane i uzupełnione*. Warszawa.

Kondracki, J. 2002. *Geografia regionalna Polski.* Warszawa.

Kajzer, L. 1984. *Wstęp do badań archeologiczno-architektonicznych.* Łódź.

Karasiewicz, K., Kiełbasińska, M., and Rogusz, M. 2021. Nadma, gm. Radzymin, woj. mazowieckie: miejsce upadku samolotu Messerschit 110 – archeologiczny przyczynek do badań historii walk powietrznych we wrześniu 1939 r. *Raport* 16: 169–234.

Karski, K. 2019. *KL Plaszow. Archeologia miejsca pamięci*. Kraków.

Kola, A. 2016. Archeologia cmentarzysk katyńskich w Charkowie (Piatichatki) i Kijowie (Bykownia). In A. Zalewska (ed.), *Archeologia współczesności* 1: 65–90. Warszawa.

Królikiewicz, T. 2002. *Bagnety. Historia rozwoju, konstrukcje, zastosowanie i dane techniczne wielu typów bagnetów*. Warszawa.

Lasota-Kuś, A. 2020. *Opracowanie wyników prac archeologicznych prowadzonych na zlecenie GDDKiA w Krakowie, w rejonie skrzyżowania ul. Fabrycznej i ul. Unii Europejskiej w Oświęcimiu (DK 44 od km 60+627 do km 60+982).* Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad], Cracow Branch.

Lencewicz, S. 1938. *Polska. Wielka geografia powszechna*. Warszawa.

Mazurek, M., Sznajdrowska-Pondel, A. and Wrzosek, J. 2020. Badania archeologiczne reliktów fortyfikacji polowych z XX wieku na inwestycjach drogowych. Procedury, metodologia i metodyka pracy. *Raport* 15: 347–368.

Mruk, J. 2017. *Moda kobieca w okupowanej Polsce*. Łódź.

Myszka, M. 2005a. *Dokumentacja archeologiczna wykopów konstrukcyjnych, zamieszczona w opinii konstrukcyjnej dla budynku kuchni obozowej A-31*. Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Myszka, M. 2005b. *Sprawozdanie z nadzoru archeologicznego wykopu wykonanego w 2005 roku przy murze krematorium II w Brzezince.* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Myszka, M. 2007. *Sprawozdanie z nadzoru archeologicznego wykopów wykonanych w 2006 roku na terenie dawnego KL Birkenau.* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Myszka, M. 2009. *Sprawozdanie z nadzoru archeologicznego prowadzonego w związku z wykonaniem konstrukcji oporowej i drenażu wokół komory gazowej krematorium nr II i III, na terenie dawnego obozu koncentracyjnego w Brzezince, gm. Oświęcim.* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Myszka, M. 2011. *Program badań na odcinku BI.* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Myszka, M., Peschel, K., and Tabaszewski, W. 2017. *Opracowanie wyników nadzoru archeologicznego związanego z wykonaniem instalacji przeciwpożarowej na terenie obozu Auschwitz II – Birkenau w Oświęcimiu (nr rejestru zabytków A-714/95).* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Niebojewski, J. and Brzeziński, J. 1965. *Obrabiamy tworzywa sztuczne*. Warszawa

Olbromska, U. 2004. *Fajki i tabakierki z Muzeum w Łowiczu w Muzeum Dzwonów i Fajek w Przemyślu.* Przemyśl.

Ostrowski, M. and Kowalczyk, P. 2019. *Opracowanie wyników archeologicznych rozpoznawczych badań sondażowych wraz z opisem historycznym i dokumentacją krzyży wiejskich, kapliczek oraz mogił na trasie planowanej inwestycji pn.: Budowa drogi ekspresowej S1 od węzła „Kosztowy II" w Mysłowicach do węzła „Suchy Potok" w Bielsku-Białej*. Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad], Katowice Branch.

Peschel, K. 2022. Nowożytność. In D. Minta-Tworzowska and M. Kruger (eds), *Opracowanie wyników badań archeologicznych na stanowisku Zagaje Smrokowskie 10, woj. małopolskie, AZP 98-57/70*, 501–542. Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad], Cracow Branch.

Peschel, K. and Tabaszewski, W. 2015. *Opracowanie wyników nadzoru archeologicznego związanego z wykonaniem instalacji przeciwpożarowej na terenie obozu Auschwitz II – Birkenau w Oświęcimiu (nr rejestru zabytków A-714/95)*. Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Peschel, K. and Tabaszewski, W. 2017. *Opracowanie wyników archeologicznych badań sondażowych prowadzonych na obszarze obozu koncentracyjnego Auschwitz I w Oświęcimiu (nr rejestru zabytków A-714/95)*. Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Peschel, K. and Tabaszewski, W. 2018. *Opracowanie wyników nadzoru archeologicznego związanego z wykonaniem instalacji przeciwpożarowej na terenie obozu Auschwitz II – Birkenau w Oświęcimiu (nr rejestru zabytków A-714/95), prowadzonego w ramach pozwolenia MWKZ 338/18*. Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Peschel, K. and Tabaszewski, W. 2019. *Opracowanie wyników nadzoru archeologicznego związanego z wykonaniem instalacji przeciwpożarowej na terenie obozu Auschwitz II – Birkenau w Oświęcimiu (nr rejestru zabytków A-714/95).* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Peschel, K. and Tabaszewski, W. 2020. *Opracowanie wyników nadzoru archeologicznego związanego z wykonaniem instalacji przeciwpożarowej na terenie obozu Auschwitz I i Auschwitz II – Birkenau w Oświęcimiu (nr rejestru zabytków A-714/95).* Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Peschel, K. and Tabaszewski, W. 2021. *Opracowanie wyników prac archeologicznych związanych z konserwacją baraku nr B-167 zlokalizowanego na terenie byłego obozu koncentracyjnego Auschwitz II – Birkenau w Oświęcimiu (nr rejestru zabytków A-714/95)*. Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Peschel, K. and Tabaszewski, W. 2023a. *Sprawozdanie i Opracowanie wyników prac archeologicznych związanych z konserwacją baraku nr B-91 zlokalizowanego na terenie byłego obozu koncentracyjnego Auschwitz II – Birkenau w Oświęcimiu (nr rejestru zabytków A-714/95)*. Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Peschel, K. and Tabaszewski, W. Opracowanie wyników prac archeologicznych związanych z konserwacją baraku nr B-141 zlokalizowanego na terenie byłego obozu koncentracyjnego Auschwitz II – Birkenau w Oświęcimiu (nr rejestru zabytków A-714/95). Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Piskorz-Barenkova, E. 2008. *Biżuteria ludowa w Polsce*. Warszawa.

Podsiadło, R. 2021. Okres II wojny światowej. In D. Minta-Tworzowska and M. Kruger (eds), *Opracowanie wyników badań archeologicznych na stanowisku Smroków 4, gm. Słomniki, woj. małopolskie, AZP 97-57/145*, 568–645. Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad], Cracow Branch.

Popkiewicz, O. 2016. Poszukiwania mogił ofiar rzezi wołyńskiej na terenie Ukrainy na podstawie wyników prac archeologiczno-ekshumacyjnych w Ostrówkach i Woli Ostrowieckiej. In A. Zalewska (ed.), *Archeologia współczesności 1*, 107–124. Warszawa

Rapaport, B. 2004. Jak palimy – akcesoria i przyrządy. In S. L. Gilman and Z. Xun (eds), *Dym. Powszechna historia palenia*, 100–107. Kraków.

Saechtling, H. and Zebrowski, W. 1978. *Tworzywa sztuczne*. Warszawa

Sikorski, D. 2018. *Sprawozdanie i opracowanie wyników badań archeologicznych w formie nadzoru archeologicznego przy badaniach gruntu na zawartość prochów i szczątków ludzkich na projektowanej obwodnicy miasta Oświęcim w ramach inwestycji p.n.: Budowa drogi ekspresowej S1 od węzła „Kosztowy II" w Mysłowicach do węzła „Suchy Potok" w Bielsku-Białej.* Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad], Katowice Branch.

Smajek-Mądrzycka, I. 2015. *Opracowanie z przeprowadzonego nadzoru archeologicznego podczas budowy kanalizacji kablowej dla systemu sygnalizacji pożaru (SSP) na terenie byłego obozu koncentracyjnego Birkenau (pozwolenie nr 286/14)*. Typescript in the archive of the State Museum of Auschwitz-Birkenau.

Smoleń, K. 1980. *KL Auschwitz.* Warszawa.

Solon, J., Borzyszkowski, J., Bidłasik, M., Richling, A., Badora, K., Balon, J., Brzezińska-Wójcik, T., Chabudziński, Ł., Dobrowolski, R., Grzegorczyk, I., Jodłowski, M., Kistowski, M., Kot, R., Krąż, P., Lechnio, J., Macias, A., Majchrowska, A., Malinowska, E., Migoń, P., Myga-Piątek, U., Nita, J., Papińska, E., Rodzik, J., Strzyż, M., Terpiłowski, S. and Ziaja, W. 2018. Physico-geographical mesoregions of Poland: Verification and adjustment of boundaries on the basis of contemporary spatial data. *Geographia Polonica* 91: 143–170.

Springate, M. E. 1997. Cellulose nitrate plastic (celuloid) in archaeological assemblages: identification and care. *Northeast Historical Archaeology* 26: 63–72.

Strzelecka, I. and Setkiewicz, P. 2000. The construction, expansion and development of the camp its branches. In W. Długoborski and F. Piper (eds), *Auschwitz 1940–1945. Tom I*, 63–138. Oświęcim.

Tabaszewski, W. 2021. *Sprawozdanie i opracowanie wyników archeologicznych badań wykopaliskowych prowadzonych na obszarze dawnego obozu pracy przymusowej Jawischowitz.* Typescript in the Archive of the Provincial Monument Preservation Office in Krakow.

Tabaszewski, W. 2022. *Opracowanie wyników badań poszukiwawczo-sondażowych przeprowadzonych w miejscu katastrofy samolotu B-24 Liberator KG-890 w Nieszkowicach Wielkich*. Typescript in the Archive of the Małopolska Provincial Office For Monument Protection in Tarnów.

Tabaszewski, W. and Wardas-Lasoń, M. 2022. Results of archaeological rescue excavations AT the site of the former German forced labour camp KL Jawischowitz, Oświęcim district. *Acta Universitatis Lodziensis. Folia Archaeologica* 37: 51–87.

Tołłoczko, Z. 2010. Z problemów koincydencji Art Deco i ekspresjonizmu. Część I. *Wiadomości Konserwatorskie* 28: 31–48.

Woźniacki, A. 1979. *Materiałoznawstwo*. Warszawa-Kraków.

Wrona, B. 2008. *Umundurowanie niemieckich wojsk. Siły lądowe.* Warszawa.

Wrzosek, J. 2016. (Nie)zapomniana mogiła. Grób masowy żołnierzy bolszewickich poległych pod Ossowem w sierpniu 1920 roku. In A. Zalewska (ed.), *Archeologia współczesności 1*, 159–178. Warszawa.

Zajachowski, S. and Tomaszewska, J. 2014. Kompozyty polimerowo-drzewne – nowy materiał dla budownictwa i nie tylko. In T. Klepka (ed.), *Nowoczesne materiały polimerowe i ich przetwórstwo. Część 1*, 180–193. Lublin.

Zalasiewicz, J., Waters, C. N., Ivar do Sul, J. A, Corcoran, P. L., Barnosky, A. D., Cearreta, A., Edgeworth, M., Gałuszka, A., Jeandel, C., Leinfelder, R., McNeill, J. R., Steffen, W., Summerhayes, C., Wagreich, M., Williams, M., Wolfe, M. A. and Yonan, Y. 2016. The geological cycle of plastics and their use as a stratigraphic indicator of the Anthropocene. *Anthropocene* 13: 4–17.

Ziomkowski, A. 1997. *Karty z historii polskiego przemysłu chemicznego. Tom 5. Historia polskiego przemysłu wielkiej syntezy chemicznej.* Warszawa.

Archaeologia Polona, vol. 61: 2023, 201–218
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3542

Classification and Significance of Material Culture from Archaeological Research of Section BIb of the Former KL Auschwitz II - Birkenau

Paweł Lewicki[a] and Magdalena Mazurkiewicz[b]

This article discusses the analysis of material discovered during archaeological excavations conducted in the areas of former concentration camps, based on the results of work carried out on the site of the former German concentration and extermination camp Auschwitz II-Birkenau. The specificity of the sites from the 20th century forces the development of new research methods and procedures, slightly different from those traditionally used in archaeology. One of the significant problems is the mass nature of the discovered artefacts. These items were substantially made of decay-resistant materials such as plastic, glass or metal alloys. In addition to the amount of acquired items, difficulties are also caused due to the way they are classified and processed. The classifications used in traditional archaeology, focusing primarily on the type of raw material used to produce the artefact, have proven to be unsuitable.

Keywords: Auschwitz II-Birkenau, concentration camp, material culture, contemporary archaeology

PRELIMINARY INFORMATION

Archaeological research of places related to the activities of totalitarian states of the 20th century is a relatively young and constantly developing branch of modern archaeology. A significant increase in research interest in the subject of contemporary archaeology, and in particular in the conflicts that took place in the 20th century, has been clearly visible for the last 30 years or so. The ratification of the European Convention

[a] Auschwitz-Birkenau State Museum, Więźniów Oświęcimia st. 20, 32–600 Oświęcim (Poland), e-mail: pawel.lewicki@auschwitz.org; ORCID: 0009-0005-0413-3593
[b] Auschwitz-Birkenau State Museum, Więźniów Oświęcimia st. 20, 32–600 Oświęcim (Poland), e- mail: magdalena.mazurkiewicz@auschwitz.org; ORCID: 0009-0001-4119-787X

Received September 17, 2023; Received in revised form November 7, 2023; Accepted November 9, 2023

on the Protection of the Archaeological Heritage (also called the Malta Convention) has significantly contributed to this. It waived previous chronological limitations in relation to the traces of human activity researched by archaeologists (Theune 2018: 14–16). The large increase in research at the sites of former extermination, concentration and internment camps is also related to the social desire to commemorate these places by building monuments, museum facilities and marking their locations and their remains in the field. Several such initiatives have been undertaken in many European countries, mainly in Poland, Germany and Austria, but also in the USA and Canada. In accordance with Polish legislation, archaeological research is obligatory if excavation work is performed in the areas entered in the register of monuments. In the course of their execution, the relics of historical buildings and infrastructure hidden underground, as well as significant amounts of movable items related to the functioning of the camps, are secured. Contemporary archaeology, using the methods of field research and material analysis that have been developed in science so far, faces the need to adapt them to the specificity of these sites. One of the major challenges is the processing of the acquired historic material. This usually begins with the creation of a chronological and typological classification combined with a description of the production technique, shape and function of the obtained objects (Theune 2018: 33). Correctly conducted classification is extremely important, because errors at this stage may lead to issues in the interpretation phase (cf., Minta-Tworzowska 2012).

CURRENT ARCHAEOLOGICAL RESEARCH AT THE GERMAN NAZI CONCENTRATION AND EXTERMINATION CAMP AUSCHWITZ II-BIRKENAU

Birkenau camp consisted of three main parts, corresponding to the construction sections Bauabschnitt I, II and III (the planned Section IV was never completed). Bauabschnitt I (BI), which was additionally divided into the eastern (BIa) and western (BIb) parts, was located at the southern end of the complex. Further north, Sections BII and BIII were built (Strzelecka 1995: 63–80; Bartosik *et al.*, 2017: 15–26). Current archaeological work accompanying excavations are mainly conducted as part of the comprehensive conservation tasks performed by the Master Plan for Preservation.[1] Most of this work is concentrated in Section BI.

1 The Master Plan for Preservation is a comprehensive and long-term programme of conservation works developed and implemented by the Museum, aimed at preserving the relics of the German Nazi concentration and extermination camp. The implementation of the plan takes place through the deployment of conservation projects covering specific objects or comprehensively

Currently, its largest part is related to comprehensive conservation of the brick barracks in Section BIb.

Section BIb is the oldest part of the Birkenau camp. Works on its construction had been started by the Germans in October 1941. In March 1942 a men's camp, which became a branch of KL Auschwitz, was established there. In July 1943, the men were moved to another part of the camp, and Section BIb was attached to the women's camp (so far located only in Section BIa). On January 27, 1945, the camp was liberated by the Red Army – the soldiers of the 60th Army of the First Ukrainian Front (Czech 1992; Strzelecka 1995: 68–71). Between January 1945 and March 1946, Soviet NKVD[2]-administered camp No. 78 operated on the site of the former Birkenau camp. Prisoners of war and civilians were kept there. Most of the inmates were later taken for forced labour deep into the territory of the USSR (Dębiński 2014: 68–69).

Archaeological research performed in Section BIb is closely related to conservation and renovation works, the objective of which was to secure and strengthen the structure of the brick residential barracks. The scope of the research is subordinate to the execution of excavation works for the purposes of drainage and stabilisation of the barracks' foundations. The area of work is limited to the necessary minimum. This is due to the awareness that excavation is an invasive method. In addition, movable material obtained during the research requires processing and conservation, which in the case of 20th-century sites may mean the need to analyse and secure a vast number of items. The above-mentioned issues have already been discussed in the literature on the subject (see Sturdy Colls 2015; Müller 2017; Bernbeck 2018: 365). The most significant ones include the results of archaeological research conducted in connection with the renovation and conservation of Barracks no. 7 and 8 (Foks *et al.*, 2020). Material obtained during the work on Barracks 26 and 27 are still being processed. The problems encountered and the experience gained during the analysis of numerous complexes of objects collected during the aforementioned research are the starting point for this article.

PROPOSALS FOR THE CLASSIFICATION OF MASS ARTEFACTS FROM WORLD WAR II CONCENTRATION CAMPS

In particular, it should be emphasised that a large number of items was found, which is no surprise given the history of the site under research. Due to the development

treated conservation problems. The Global Conservation Plan is financed by funds provided by the Auschwitz-Birkenau Foundation.

2 NKVD – The People's Commissariat for Internal Affairs (in Russian: Наро́дный комиссариа́т вну́тренних дел [*Narodnyi Komissariat Vnutrennikh Del*]).

of civilisation in the 20th century, the number of belongings produced and owned by people have drastically increased (Theune 2015: 37). This phenomenon has intensified in connection with the increasingly common use of synthetic raw materials, more resistant to post-deposition processes, as well as the introduction of large-scale mass production in the 19th and 20th centuries (Duma 2016: 242–244). As a result, during archaeological research at sites from the period of World War II, a large set of objects is usually obtained, the vast majority of which do not have individual characteristics. This has also been the case in relation to the items from the research in the area described.

In the years 2015–2020, as a result of archaeological research conducted in the area of Barracks 7 and 8 in Section BIb of the former KL Auschwitz II-Birkenau, 6751 artefacts were collected from excavations having a total area of 1086 m^2. The almost-completed research at Barrack 26 has provided 5712 finds from excavations of 335.5 m^2 area. Discovering such a large number of movable objects was possible thanks to the research methodology applied, based on careful exploration, combined with sifting of anthropogenic layers and searching the surface of the excavations using a metal detector. Most of the items obtained are objects characterised by a high repetition of forms resulting from serial production. Their state of preservation varies. A great many of them are everyday objects – elements of clothing, dishes, cutlery or small tools. The most numerous group of finds are objects related to the camp infrastructure and facilities – fragments of window glass, nails and other metal construction elements (hooks, anchors, construction clamps). The large number of objects made it necessary to develop a specific method of ordering and classifying the materials obtained.

The main problem was to choose the method of analysis. Traditional division of artefacts in terms of raw material, used in archaeology, seems to be completely useless in the case of researching the material culture of the 20th century, which includes excavated objects. Items made of one raw material, e.g., glass, can have various functions, such as windowpanes, dishes for various purposes, parts of clothing or other items, such as pairs of glasses, torches or mirrors. Similarly, one type of item, e.g., a clothing button, can be made of many types of raw materials, such as metal, plastic, mother-of-pearl, bone or wood, so they cannot be assigned to one material group. This has already been pointed out in the literature on the subject, emphasising that in modern times the relation between the function and the material of which the item was made has been lost (cf., Schute 2013a: 39; 2013b: 10). It seems much more appropriate to divide the material into functional categories when analysing artefacts from the 19th and 20th centuries.

Such a system was used for the development of material obtained during the archaeological research of the internment camp in Manzanar, California which operated during World War II. Japanese and Americans of Japanese origin were held there (Burton 1996). The classification division adopted at this site was a continuation of the scheme developed for the analysis of materials from the turn of the 19th and 20th centuries from archaeological excavations in Skagway, Alaska (Blee 1988). The excavated items were divided into five main categories: 1 – structural artefacts, 2 – domestic artefacts, 3 – personal artefacts, 4 – artefacts associated with other activities and 5 – unclassified artefacts. Each of the main groups was divided into smaller subclasses (Blee 1988: 28–35; Burton 1996: 194–195). Thanks to this system, the review of the historic material from individual excavations was structured, and it was also easier to compare the obtained groups of items. In addition, annexes containing more detailed analyses of glass, metal and ceramic artefacts, and clothing buttons separately, were added to the treatment of the results of the Manzanar research (Burton 1996).

In European archaeology, too, there have been attempts to analyse historical material obtained as a result of archaeological work in former concentration, extermination or internment camps. Ronald Hirte (2000) was the first to raise the issue of a detailed study of artefacts from such sites. He discussed the results of a large pile of items lying in the area of the former, so-called small KL Buchenwald camp in Thuringia. From a relatively small area of 4 x 4 m, a total of 6407 items were obtained, of which as many as 3843 were buttons. Then, the finds were classified in terms of functionality into 17 groups (1 – camp, 2 – international, 3 – location, 4 – work, 5 – health, 6 – hygiene, 7 – food, 8 – jewellery, 9 – religion, 10 – leisure, 11 – prisoners functionaries, 12 – women, 13 – children, 14 – numbers, 15 – name, 16 – transport and 17 – death). Artefacts could be assigned to more than one category at the same time (Hirte 2000: 31–54).

The results of archaeological research conducted on the site of the former KL Sachsenhausen in Brandenburg were also of great importance in the development of research on the material culture of concentration camps. In 2006, during geophysical research, a large waste pit with dimensions of 30 x 5.6 m and a depth of 2 to 3 m was found. During its exploration, 5556.3 kg of finds were collected, including about 3000 kg of iron, 800 kg of glass and 300 kg of porcelain items (Theune 2010: 5–7). Comprehensive classification of this material proved to be extremely difficult. Finally, it was decided to select about 1600 items, the study of which became the basis for writing a master‘s thesis (Theune 2010: 7; Kersting and Müller 2015: 171–172). The collection of artefacts was divided according to the functional criterion. There were seven main groups: 1 – construction, 2 – clothing, 3 – toiletries, 4 – household, 5 – militaria, 6 – coins, 7 – other, which were then split into smaller subgroups.

The artefact classification system adopted during the research in Sachsenhausen became the basis for the analysis of the material collected during the work conducted on the site of the former transit camp in Westerbork, the Netherlands (*Judendurchgangslager* Westerbork). At the turn of 2011 and 2012, archaeological research was conducted on a landfill located to the north of the camp. Thanks to topographical and geophysical research and drilling, the size of the landfill was estimated at approximately 3200 m^2 and its capacity at approximately 900 m^3. This site was identified through excavations, establishing 3 trenches, from which a total of 19,525 items with a total weight of 466 kg were obtained. Based on the acquired results, it was estimated that there may be about 5.8 million items in the landfill (Schute 2013a; 2013b: 8–11). The finds were assigned to 14 functional groups (1 – methods of payment, 2 – construction, 3 – consumption, 4 – electronics, 5 – identity, 6 – interior and garden, 7 – office supplies, 8 – clothing, 9 – medicines, 10 – military, 11 – hygiene, 12 – transport, 13 – leisure, 14 – other), also divided into smaller subcategories. The publication summarising the research results does not only discuss the division itself, but also includes a table with a description of characteristic items (Schute 2013a: 38–61).

A slightly different view on the classification division of artefacts obtained as a result of work conducted on the area of the former German Nazi concentration camps was presented by Gilly Carr (2018). Her concept assumes the division of items into six categories: 1 – objects of identity, 2 – objects of the body, 3 – objects of daily life and survival, 4 – objects of repression, 5 – violence, and power, 6 – objects of the world of the camp, unidentified or fragmentary objects. Groups 1–3 are additionally divided into subcategories: a – prisoners and b – guards, while group 4 is assigned only to overseers and guards. The presented classification tries to put the individual prisoners and their bodies in the centre, gradually moving to the camp world that surrounds them. As the author of the concept herself notes, the proposed categories overlap and are not completely unambiguous (Carr 2018: 539–541).

In Polish archaeological literature, the subject of classification and analysis of artefacts from the research on concentration, extermination and internment camps has remained on the margins of interest. Usually, the focus was on the exposed remains of architecture and the planning of the camp layout. Despite very advanced excavation works in some cases, the authors of the reports often limited themselves to a brief mention of the number of finds, combined with the presentation of selected, more characteristic items in the case of the obtained artefacts. There have been several publications presenting objects excavated during archaeological work carried out in the former extermination and concentration camps in Chełmno on the Ner river (Kulmhof am Ner), Koło distr. (Grzegorczyk 2014), Sobibor, Włodawa distr. (Kranz *et al.*, 2018), in Kraków-Płaszów (KL Plaszow; Karski 2019). Although they have great educational value, they are more album-like and less analytical in nature.

Attempts to analyse the historic material more thoroughly were made in the case of research work in Sobibor. The authors of these undertakings paid attention to the need to analyse the artefacts in order to fully understand the discovered structures. They also emphasised the information potential contained therein, as well as its role in education about the Holocaust (Gilead *et al.* 2009: 30-36). In subsequent seasons, a Dutch archaeologist, Ivar Schute, and others were invited to the research. He helped with the reviewing of items brought to the camp in transports of Dutch Jews, (Schute 2013b; cf., also Schute 2018). Unfortunately, no collective summary of the results of many years of archaeological work conducted in Sobibor has been published so far.

Kamil Karski has recently provided a bit more information on archaeological artefacts obtained during the research of the KL Plaszow concentration camp. The collection of artefacts was divided into 3 main categories: 1 – prisoners' personal belongings, 2 – objects associated with oppressors, 3 – constructional elements of the camp infrastructure. In addition, smaller subcategories were separated including, e.g., items related to life in the ghetto, Judaica, valuables, items related to food, work tools. Separate attention was paid to the so-called mass artefacts, dividing them both into raw material categories, e.g., glass and specific types of items, e.g., soles, ceramic tiles, electrical installation elements (Karski 2020: 59–63).

ANALYSIS OF ARCHAEOLOGICAL FINDS OF KL AUSCHWITZ II-BIRKENAU

The analysis of the historical material obtained during the work carried out in Section BIb of the former KL Auschwitz II-Birkenau was based on the functional classification of objects. This was caused by the already mentioned lack of a close relationship between the function of the item and the raw material from which it was made. The creation of this classification was mostly influenced by the concept used in the description of the Manzanar materials (Burton 1996: 194–195). This was, however, slightly changed and adapted to the nature of the objects discovered in KL Auschwitz II-Birkenau. Efforts were made to separate as few functional main groups as possible, dividing them into more detailed subcategories, corresponding to specific types of artefacts. Unfortunately, functional classification in the context of materials from concentration camps is highly complicated and carries a high risk of interpretation error. In extreme living conditions, prisoners were often forced to modify or improvise the items they needed (Myers 2007: 62; Levi 2008: 37). What is more, items were often used in many different ways. Their purpose could have been changed as a result of practices related to the specific requirements of living conditions and the environment, which usually remain intangible to archaeologists (Hausmair *et al.*, 2021: 409–410).

Despite the awareness of the described limitations, in order to organise the collected material and to enable deeper analyses, it was decided to divide it according to functional criteria. The artefacts were grouped into six main categories: 1 – personal items, 2 – food and health, 3 – elements of the camp's buildings and infrastructure, 4 – activities and free time, 5 – military items and 6 – other. Each of the main groups is additionally divided into subcategories.

Group 1 includes items that were in the prisoners' direct possession. Some were given to them by the camp administration – e.g., clothes. Others, such as jewellery, usually came from smuggling or illegal trade inside the camp. Group 2 includes items related to food and health. Group 3 consists of all items related to structural and building elements, as well as tools used in the construction and extension of the camp. The most diverse group, no. 4, contains items related to various, mostly illegal activities of the prisoners. It also includes examples of camp art. Military items, constituting group 5, were classified separately. This includes all items produced for the needs of the armies of various countries. The last, 6th group was left for unidentified items (usually due to their poor state of preservation), as well as individual items that did not fit into previous groups.

As in the case of other functional categorisations, problems occur with some items that can be assigned to several groups at the same time. The dilemmas concern, for example, the following situations. Should jewellery made illegally by a prisoner be included in group 1 or 4? Should a knife made of a sheet of metal or a piece of flat metal bar (group 4) be assigned to the subgroup of handicrafts, or rather to small tools? Eventually, the superiority of illegal manufacturing activities of prisoners was assumed, and these were assigned to categories related to handicrafts. Such dilemmas are a significant limitation of classification based on the function of items. This problem can be solved by linking the described products into association groups related to a specific sphere of camp life (cf., Hausmair *et al.*, 2021: 410–414).

It was decided not to divide the items into those belonging to the prisoners and those left by the guards. Attempts to make such a distinction can lead to very ambiguous conclusions. While some artefacts, such as clogs or badges with prisoners' markings and numbers (Fig. 1:1), can almost certainly be attributed to a group of prisoners, a number of other items, such as small elements of uniforms, do not provide grounds for identifying their user. From the memoirs of the survivors, it is known

Fig. 1. Selected finds from the excavations in former KL Auschwitz – II Birkenau: 1 – prisoners badge, 2 – French post uniform button, 3 – miniature cup, 4 – coin, 5 – ring. Photo: P. Lewicki.

that some groups of prisoners were dressed in uniforms. For instance, Wiesław Kielar describes a group of Jewish women dressed in uniforms of murdered Soviet prisoners of war (Kielar 1976: 170). This is confirmed by the finds of uniform buttons of various armies and services from different parts of occupied Europe (Fig. 1:2). In this regard, the finds made during the archaeological research of the camp for German prisoners of war in Riding Mountain in Canada also seem to be significant. The buckle discovered there was identified as coming from Wehrmacht uniform trousers, however, during a literature search, it turned out that an identical buckle was located, among others, on a striped prisoner's uniform from KL Buchenwald (Myers 2013: 199, fig. 9.5). Thus, any conclusions and judgments regarding the use and the user of a given item should be made with appropriate caution.

The classified material makes it possible to perform a deeper analysis and compare the results of research conducted in various parts of Section BIb of the former KL Auschwitz II-Birkenau. The above analyses enable the nature and use of some of the barracks to be determined. A good example may be the spatial analysis of artefacts classified as medicines (2nd functional group). The results of research conducted in the area of Barracks 7 and 8 and at Barracks 26 and 27 were used for comparison. During the operation of the camp, in Section BIb of the men's camp, Barracks 7 and 8 housed a hospital (Foks 2018: 19–23). This is also confirmed by the results of archaeological research, during which 58 artefacts from the group of medicines were obtained. For comparison, research conducted at Barracks 26 and 27 brought only 28 finds of this type. This discrepancy would be even greater if we were to remove the glass ampoules from the analysed collection (Fig. 2:3). The vast majority of these correspond in terms of shape to the ampoules that were in the first-aid kits of German soldiers. A storage tin (Fig. 2:2) was found during cleaning works in one of the barracks in Section BIb. Being aware of the large number of prisoners of war staying in the NKVD camp in KL Birkenau, the vast majority of finds of ampoules can be associated with the post-war phase. It is worth emphasising another problem of conducting research in the areas of concentration and extermination camps here. In many places, the discovery of objects is made almost on the surface or between the construction elements of barracks and bunks. Interpretation of such finds is additionally difficult and requires caution.

Attention should also be drawn to the nature and individual characteristics of the items found and what they contribute to our knowledge of the camp. Part of the collected material has trademarks or manufacturer's brands that make it possible to determine where it was manufactured. Some, such as coins, can be associated with the individual countries from which transports of deported people were sent to the camp. Others allow for a more precise determination of their origin. Examples

Fig. 2. Selected finds from the excavations in former KL Auschwitz – II Birkenau: 1 – knife, 2 – tin, 3 – ampoules, 4 – spoon. Photo: P. Lewicki.

include a souvenir cup from the Bad Reichenhall spa in Bavaria (Fig. 1:3) or a beer bottle from the Trieste brewery (Fig. 3:1). Analysis of all the material obtained provides an insight into the genocidal activities of the Third Reich in Europe. Items related to the ghetto in Łódź are an interesting group among the objects of specific origin. Along with the transports to KL Birkenau camp, such items as characteristic jewellery with motifs of life in the ghetto (Fig. 1:5) and coins constituting the official currency of the ghetto (Fig. 1:4) were brought.

Objects found during the research in Section BI are evidence of the living conditions in the camp. The shortage of basic items needed for life made it necessary to make tools. The basis of the prisoners' diet, apart from bread, was soup, and to eat it a dish and a spoon were needed. The extremely high status of these items in the camp is confirmed by the memories of prisoners (Levi 2008: 98). Their production within the camp is confirmed by archaeological finds (Fig. 2:4). In addition to spoons, other everyday items were also produced, such as clothes hangers (Fig. 3:2–3) or knives (Fig. 2:1). An interesting material witnesses of adapting to the constraints of camp life is a lamp made of a mackerel tin with a wick made of a piece of cloth put inside (Fig. 3:4). All these finds could be interpreted also as examples of prisoner's survival strategies (see Theune 2018: 127–130).

In addition to the production of utility items, a number of objects constituting examples of handicrafts were also created in the camp. Most often, small items of jewellery are found in the form of rings (Fig. 4:2–3) or pendants (Fig. 4:1), sometimes associated with religious worship. The production of at least some items of this type directly in the camp is evidenced by finds of items, semi-finished items and production waste from animal bones (Fig. 4:4–7). During the research conducted in Barrack 26, among others, an ornament in the shape of a heart cut out of animal bone was found whereas within this barrack a fragment of a bone with a heart sketched on its surface, probably ready to be cut out in the future, was also found. This occurrence fits into the wider context of the phenomenon known as trench art (Myers 2007: 63). Finds of handmade jewellery or decorated objects are also examples of prisoners expression of self-assertion (Theune 2018: 129–136).

In addition to the above-mentioned information contained in the material from archaeological research in the BI section of the former Birkenau, one of the most important and interesting aspects of the analysis of artefacts for archaeologists and researchers is the possibility of linking them to specific people. Among similar, anonymous objects found, there are infrequently single objects that relate to specific people imprisoned in the camp, which makes these items even more valuable to us. Sometimes we know these people only by name, as in the case of the metal frame with a female name, Szidi (Fig. 5:1), or the four-leaf clover pendant with the date

Fig. 3. Selected finds from the excavations in former KL Auschwitz – II Birkenau: 1 – bottle, 2,3 – clothes hangers, 4 – lamp made of mackerel tin. Photo: P. Lewicki.

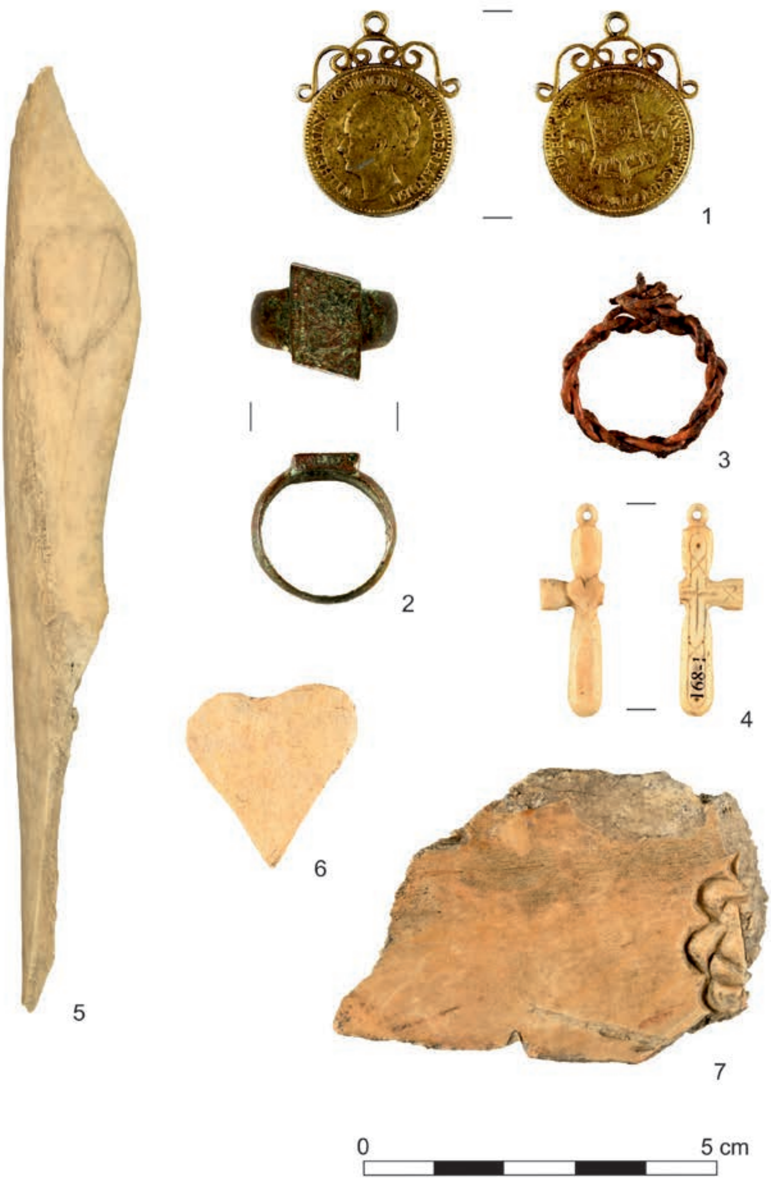


Fig. 4. Selected finds from the excavations in former KL Auschwitz – II Birkenau: 1 – pendant made of coin, 2 and 3 – rings, 4–7 – items and production waste from animal bones. Photo: P. Lewicki.

May 23, 1944 and a male name, Gerrit (Fig. 5:2). In exceptional cases, however, we can identify a specific person. This was the case with the penknife signed J. Zelikow (Fig. 5:3) and the patch with the prisoner number 15513 (Foks *et al.*, 2020: 92–93, 114–115). Discoveries of this type are extremely important, not only because of their rarity. They can also fill gaps in the archival documentation of the camp; something that can be particularly important, especially in the context of people looking for information about their relatives.

SUMMARY

Research conducted in places associated with 20th-century totalitarianism is special due to the emotional charge they carry. Thus, it is important that it is carried out as accurately as possible. In the case of research undertaken in the areas of former camps, archaeologists face the challenge of describing, classifying and securing thousands of items whose origin and function are ambiguous. Interpretations are often impeded by the disturbed contexts from which objects are drawn. The relatively short period of operation of the camps, the attempts to cover up traces of them, as well as the post-war activities within them do not help in consolidating the archaeological record. The stratigraphy is often strongly disturbed. Some items are buried in the humus layer or between the construction elements of the barracks. In addition, work with the material is impeded by the huge number of mass-produced items, often without individual characteristics. This not only creates problems in terms of the analysis of the investigated material, but also the costs and methods of their preservation and subsequent storage (cf., Müller 2017; Wiśniewski 2017). Archaeology of the 20th century is still relatively young. The researchers do not yet have good comparative material. There is a lack of syntheses and typological arrangements for many types of objects, especially the most common ones.

Nevertheless, the significant potential that lies in the discovered objects should be noted. Preliminary analyses of the material make it possible to determine the nature and manner of use of individual areas of the camp and provide information about the origin of the transports. They also provide an insight into the living conditions of the prisoners and how they struggled to preserve their humanity. The collections of artefacts thus acquired have invaluable research and educational worth. Their role in complementing our knowledge about various facets of the genocide that took place during World War II is increasing. They shall remain witnesses when all living witnesses are gone.

Fig. 5. Selected finds from the excavations in former KL Auschwitz – II Birkenau: 1 – frame, 2 – pendant, 3 – penknife. Photo: P. Lewicki.

REREFENCES

Bartosik, I., Martyniak, Ł. and Setkiewicz, P. 2017. *Początki obozu Birkenau w świetle materiałów źródłowych*. Oświęcim.

Bernbeck, R. 2018. An Emerging Archaeology of the Nazi Era. *Annual Review of Anthropolgy* 47: 361–367.

Blee, C. H. 1988. *Archeological Investigations in Skagway, Alaska, Volume 2: The Moore Residences, Klondike Gold Rush National Historical Park*. Denver. Denver Service Center, National Park Service, Denver, Colorado.

Burton, J. 1996. *Three Farewells to Manzanar: the Archeology of Manzanar National Historic Site*. Tucson, Arizona. Western Archeological and Conservation Center. Publications in Anthropology 67. doi:10.6067/XCV8DR2TCP

Carr, G. 2018. The Small Things of Life and Death: An Exploration of Value and Meaning in the Material Culture of Nazi Camps. *International Journal of Historical Archaeology* 22: 531–552.

Czech, D. 1992. *Kalendarz wydarzeń w KL Auschwitz*. Wydawnictwo Państwowego Muzeum w Oświęcimiu-Brzezince.

Dębiński, J. 2014. *Komunistyczne obozy w Polsce pojałtańskiej*. Studia Włocławskie 16: 60–78.

Duma, P. 2016. Archeologia w obliczu masowej produkcji przedmiotów na przykładzie byłego śmietniska w lesie rakowieckim we Wrocławiu. *Śląskie Sprawozdania Archeologiczne* 58: 227–246.

Foks, S. 2018. Archeologia w miejscu pamięci Auschwitz – odkrywanie materialnych świadectw historii. *Memoria* 11 (08/2018).

Foks, S., Lewicki, P., Mazurkiewicz, M. and Rolski, M. 2020. *Opracowanie wyników badań archeologicznych przeprowadzonych w rejonie baraków 7 (nr inw b-124) oraz 8 (nr inw b-123) zlokalizowanych na odcinku BIb byłego KL Auschwitz II – Birkenau w latach 2015 – 2020*. Typescript in the Archives of the Auschwitz-Birkenau State Museum in Oświęcimiu.

Gilead, I., Haimi, Y. and Mazurek, W. 2009. Excavating Nazi Extermination Centres. *Present Past* 1: 10–39.

Grzegorczyk, A. 2014. *Rzeczy zagłady*. Chełmno nad Nerem.

Hausmair, B., Misterek, K. and Stern, J. 2021. Kategorisierung und Kategorien in der Archäologie der NS-Zeit. In Abar, A., D'Anna, M. B., Cyrus, G., Egbers, V., Huber, B., Kainert, C., Köhler, J., Ögüt, B., Rol, N., Russo, G., Schönicke, J. and Tourtet, F. (eds), *Pearls, Politics and Pistachios: Essays in Anthropology and Memories on the Occasion of Susan Pollock's 65th Birthday*, 399–417. Heidelberg. Propylaeum.

Hirte, R. 2000. *Offene Befunde - Ausgrabungen in Buchenwald: Zeitgeschichtliche Archäologie und Erinnerungskultur*. Braunschweig. Hinz und Kunst Graph. Werkstatt und Verl.-GmbH.

Karski, K. 2019. *KL Plaszow. Archeologia miejsca pamięci*. Kraków.

Karski, K. 2020. Archeologia nadmiaru. Podsumowanie wyników badań archeologicznych KL Plaszow z lat 2016–2019. *Krzysztofory. Zeszyty Naukowe Muzeum Historycznego Miasta Krakowa* 38: 41–68.

Kersting, T. and Müller, A. K. 2015. Orte der Zeitgeschichte in der Landesarchäologie Brandenburg. Geschichte von oben oder von unten?. *Mitteilungen der Deutschen Gesellschaft für Archäologie des Mittelalters und der Neuzeit* 28: 165–180.

Kielar, W. 1976. *Anus Mundi*. Kraków.

Kranz, T., Surdacka, A., Szymula, A. and Stein, M. 2018. *Wydobyte z popiołów: przedmioty osobiste ofiar niemieckiego obozu zagłady w Sobiborze*. Lublin.

Levi, P. 2008. *Czy to jest człowiek?*. Kraków. Wydawnictwo Literackie.

Minta-Tworzowska, D. 2012. Klasyfikacja i typologia w archeologii. In S. Tabaczyński, A. Marciniak, D. Cyngot and A. Zalewska (eds), *Przeszłość społeczna. Próba konceptualizacji*, 409–428. Poznań.

Müller, A. K. 2017. A tough choice? Suggestions for dealing with finds from the contemporary past. *Historische Archäologie* 1: 1–14.

Myers, A. 2007. Portable Material Culture and Death Factory Auschwitz. *Papers from the Institute of Archaeology* 18: 57–69.

Myers, A. 2013. *The Archaeology of Reform at a German Prisoner of War Camp in a Canadian National Park during the Second World war (1943–1945)*. Electronic document: http://works.bepress.com/adrianmyers/32/ Accessed: 10. Dec. 2022.

Schute, I. 2013a. *De vuilstort van Kamp Westerbork, Gemeente Aa en Hunze. Een archeologisch onderzoek*. RAAP-Rapport 2575. The Westerbork Archaeological Research Project Volume 2.

Schute, I. 2013b. *Comparison of artefacts from Camp Westerbork and Sobibor Establishing Research Potential (campaign autumn 2013)*. Electronic document: http://sobibor.info.pl/wp-content/uploads/2014/02/Report-by-I.Schute-autumn-2013.pdf. Accessed: 14 Dec. 2014.

Schute, I. 2018. Collecting Artifacts on Holocaust Sites: A Critical Review of Archaeological Research in Ybenheer, Westerbork, and Sobibor. *International Journal of Historical Archaeology* 22: 593–613.

Strzelecka, I. 1995. Budowa, rozbudowa oraz rozwój obozu i jego filii. In T. Świebocka (ed.), *Auschwitz 1940–1945. Węzłowe zagadnienia z dziejów obozu, t. 1 Założenie i organizacja obozu*, 49–98. Oświęcim-Brzezinka.

Sturdy Colls, C. 2015. *Holocaust Archaeologies. Approaches and Future Directions*. New York.

Theune, C. 2010. Historical Archaeology in National Socialist Concentration Camps in Central Europe. *Historische Archäologie* 2: 1–14.

Theune, C. 2015. Archäologische Fundmassen und Massenfunde aus ehemaligen Konzentrationslager. *Fundberichte aus Österreich, Tagungsband* 2: 37–42.

Theune, C. 2018. *A Shadow of War: Archaeological Approaches to Uncovering the Darker Sides of Conflict from the 20th Century*. Leiden.

Wiśniewski, M. 2017. Selekcja zabytków „masowych" w badaniach archeologicznych – założenia i uwagi konserwatorskie do zagadnienia. *Ochrona Zabytków* 2: 155–174.

Archaeologia Polona, vol. 61: 2023, 219 – 237
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3201

If Archaeology is Not Just About the Past. The Landscape of the KL Plaszow Memorial

Kamil Karski[a] and Dawid Kobiałka[b]

In the years 2016–2019, interdisciplinary research was carried out related to the German Nazi concentration camp KL Plaszow. Its key component was non-invasive and invasive archaeological works. They resulted in uncovering thousands of artefacts and the documentation of the material heritage related to the camp, which has been preserved to this day in the local landscape. The discoveries made were also a trigger for broader reflection and investment activities. The results bring new insight into the role and meaning of the past, present and future of the landscape of KL Plaszow. Such a landscape ties the dead and the living, various people with their objects and comprises the legacy of unimaginable events during the Second World War.

KEY-WORDS: Poland, Germany, Second World War, Nazi, Plaszow camp, landscape, materiality

INTRODUCTION – BRINGING BACK THE LANDSCAPE OF KL PLASZOW TO THE DEAD (AND LIVING)

As opposed to the places that have the established status of memorial sites, and which are supervised by the museums or local authorities in Poland and elsewhere, it is a commonplace to say that the site of the *Konzentrationslager Plaszow bei Krakau* (KL Plaszow) is a green area where historical relics of the past are not discernible at first glance (e.g., Charlesworth and Addis 2002; Drozdzewski 2012). This is significant due to the post-war history of the terrain. The official historiography and memory of the Second World War and Holocaust has long been dominated by the

[a] KL Plaszow Memorial, Rynek Główny 35; 31–011, Cracow (Poland), e-mail: k.karski@plaszow.org; ORCID: 0000-0002-4887-1310
[b] Institute of Archaeology, University of Lodz, G. Narutowicza Str. 65; 90–131 Łódź (Poland), e-mail: dawid.kobialka@filhist.uni.lodz.pl; ORCID: 0000-0003-3806-4408

Received October 27, 2022; Received in revised form July 25, 2023; Accepted September 13, 2023

KL Auschwitz memorial, which is located only 70 kilometers from Cracow. The first commemorations in KL Plaszow took place in 1947 being an initiative of the local community and authorities. The official unveiling of the largest monument located there today dates back to 1964. Over the next few decades, the concept of commemoration has evolved from a focus on buildings to numerous forms of commemoration including a park that allows for a reflection upon the camp's history in various ways (Kocik 2017).

Archaeology plays an important role in contemporary commemoration and protection projects concerning concentration and death camps as it provides information and pieces of evidence about a painful past (e.g., Kola 2000; Gilead *et al.,* 2009; Bernbeck and Pollock 2018; Carr 2018; Karski *et al.*, 2018; Sturdy Colls and Branthwaite 2018). It is an important complement to a traditional historiographic approach. Human witnesses of the event, former prisoners of KL Plaszow and other concentration and death camps, unfortunately, pass away every year. The history of KL Plaszow is slowly transforming into the domain of archaeological research. Material witnesses such as spatial structures and artefacts can broaden our knowledge and understanding of the site and the lives of its prisoners. They help in reconfiguration of the very idea of the landscape of KL Plaszow as well.

Following the above premise, the Historical Museum of the City of Cracow launched a series of projects that were realised between 2016–2019. In short, their underlying concept was always the same, which was bringing back the landscape of KL Plaszow to the dead (and living). The idea was to rediscover the abandoned and supposedly empty landscape of the previous camp. Historical, archaeological, and social approaches were combined and used by a team consisting of numerous researchers to document various aspects related to the history, archaeology and after-War "life" of the camp's site. This is the first such an attempt to holistically address various issues related to the camp. We tried to show the complexity of this supposedly empty landscape – as it has often been presented by scholars and mass media. The past, present and future of the landscape was under our scrutiny. The results of the research have already been incorporated into the idea (and material realisation) of a new museum dedicated to those who lived and died behind the barbed wire in KL Plaszow. We start our discussion with what the terrain of the previous camp looked like before the project began in 2016.

THE LANDSCAPE OF KL PLASZOW IN 2016

In the southern part of Cracow there is a green refuge commonly called Krzemionki. The huge area of 2.3 km² consists of limestone hills covered by greenery, bushes and

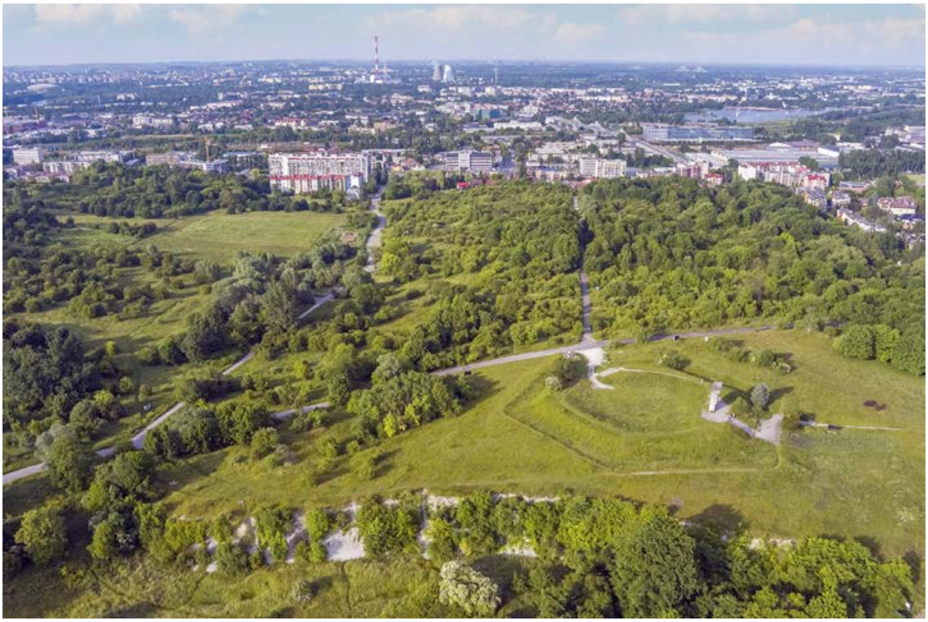


Fig. 1. The present-day area of KL Plaszow's campscape. 2016. Photo: Ł. Czech © KL Plaszow Museum.

woods stretching from the historic buildings of the Podgórze district through areas with traces left by mining and quarries. There are numerous buildings and structures that make up the specific landmarks of this part of the city. From the Krakus' Mound, which is one of the best-known archaeological sites in the city, through more notable destinations such as the St. Benedict's church, remnants of the Cracow Fortress, with Fort Benedict included and picturesque post-mining areas. Nevertheless, along with its cultural value, this area is also a noteworthy natural complex, treated partly as an ecological reserve. This place is attractive both for tourists and residents of the overcrowded city.

On the edge of the southern part of Krzemionki there is a large, open and accessible area. It is partially marked by the paths that run along the valley. The place is a convenient terrain for walks and recreation activities. However, it hides a dark side of its history (Fig. 1). A very similar landscape and its use was presented already two decades ago by Andrew Charlesworth and Michael Addis (2002) and a decade later by Danielle Drozdzewski (2012). For example, as observed by the first authors: "there is evidence of informal management practices involving small-scale piecemeal private activities. The site is used by locals from the neighbouring houses and high-rise complexes for fly-tipping and informal recreation ranging from dog walking, strolling, and children's and adult play to motorbike scrambling and mountain biking" (Charlesworth and Addis 2002: 232).

In 2016, the Historical Museum of the City of Cracow gained a grant to document existing material and non-material relics related to the camp. A methodology consisting of historical, archaeological, and social sciences approaches was applied in order to research the history, archaeology and ethnography of KL Plaszow (see also Sturdy Colls 2015; Kostyrko and Kobiałka 2020; Kobiałka 2022; Kobiałka *et al.*, 2023). Due to the abundance of the collected data, information and material relics, this paper sketches only some of the results related to the past, present and future of the landscape of KL Plaszow. Each aspect of the landscape is discussed in a separate section.

THE LANDSCAPE OF KL PLASZOW BEFORE 2016 – A HISTORICAL PERSPECTIVE

A historical account of KL Plaszow goes much beyond the limits of this article. This has previously been presented in detail elsewhere by the authors, both in Polish (e.g., Karski 2021) and English (Karski *et al.*, 2018; Karski and Kobiałka 2021). We highlight here only some of the most important historical facts regarding the camp's opening and functioning, development, razing to the ground as well as the later re-use of its remains. Much of this information is omitted in articles published by non-Polish authors (e.g., Charlesworth and Addis 2002; Drozdzewski 2012).

Wola Duchacka and Podgórze, two districts of Cracow, were selected in the second half of 1942 by the Nazis as the location for a forced labour camp called *Zwangsarbeitslager Plaszow des SS- und Polizeiführers im Distrikt Krakau – ZAL Plaszow* (Kotarba 2009: 23–24). The first construction work took place on the terrain of two Jewish cemeteries in these districts. The camp was originally planned as a site of imprisonment of 2000–4000 Jews from Cracow (Bieberstein 1983: 101). The concept later underwent some important modifications.

A few weeks after the liquidation of the Cracow ghetto in March 1943, around 10,000 people were imprisoned in the camp. During the next few months, Jews from adjoining minor towns were also sent to *ZAL Plaszow*. In July 1943, a special area was separated for Poles, called *Arbeitseerziehunglager – AEL* (Kotarba 2009: 78–80). Members of Roma communities were transported to the camp as well.

In January 1944, the camp was transformed into a concentration camp – *Konzentrationslager Plaszow bei Krakau*. This stage of the camp's development is presented in Steven Spielberg's *Schindler's List* (see also Karski and Kobiałka 2021). In the spring of that year, it became a transit camp for Jews from Slovakia and Hungary on their way to KL Auschwitz (Kotarba 2009: 71–72). At that time, prisoners from the eastern districts of occupied Poland were systematically gathered in KL Plaszow. Additionally, a few thousand Poles became imprisoned in KL Plaszow as a result of so-called "Black Sunday" – a preventive action aimed to catch Poles who may have been capable of fighting in a plausible uprising in the city (Kotarba 2009: 80). From March 1943 to the autumn of 1944, mass executions took place at the camp. As well as KL Plaszow's inmates, people caught by the Gestapo were executed in the camp and then buried there (Blumental *et al.*, 1947).

At its peak in the middle of 1944, the camp imprisoned up to 20,000 people. It consisted of approximately 200 camp structures. Among them were barracks for prisoners (separate ones for men and women, and one for children), buildings used by the camp's administration, various warehouses, workshops, stores for food, and so on. The camp covered approximately 80 hectares (see more in Karski 2020).

In August 1944 the camp was liquidated. The prisoners were transported toward camps located further to the west. The camp's infrastructure was systematically dismantled and transported to the west as well. Mass graves were exhumed, and the corpses of the victims were burned to cover up the evidence of the crimes that took place in the camp. The last prisoners left the camp on 14 January 1945. From 18 January 1945, the campscape was occupied by the Red Army, whose soldiers further destroyed the camp's material remains.

During the post-War period, the campscape was partially overbuilt by shops, stores, warehouses, and blocks of flats, among other things. In 2002, 37 hectares of previous KL Plaszow were listed on a local heritage register. From that moment on, the terrain of the former camp has been officially protected as a cultural heritage site. This area became the target of archaeological research that took place between 2016 and 2019.

THE LANDSCAPE OF KL PLASZOW BETWEEN 2016 AND 2019 – AN ARCHAEOLOGICAL PERSPECTIVE

It seems that the landscape of KL Plaszow is usually understood as an empty place. Consider just two cases functioning in an Anglophone discourse – the papers written by Andrew Charlesworth and Michael Addis (2002) and Danielle Drozdzewski (2012). In both articles, the contemporary landscape of KL Plaszow is almost completely erased of its historical, original relicts. Discussed are only monuments that were built on the campscape after the war and some of the remains of tombstones that have been preserved until the present. Both articles present the landscape of KL Plaszow as an area of meadows, trees and bushes – an empty site without history (material heritage of the past; see also Owoc and Karski 2018).

The impact of nature on KL Plaszow is ambivalently presented by the authors too. Its role is usually perceived as something negative that increases the destruction of material relicts of the camp. This is true, but it is a one-sided perspective. Trees, bushes etc. in many cases prevent further destruction of each site made by human beings (e.g., Kobiałka 2014). This is exactly what takes place in the landscape of KL Plaszow. Nature helps in preserving many examples of heritage related to the camp. Our archaeological point here is simple: a landscape does not only consist of what is seen above the ground. Its inherent and constitutive part is also what is below the ground and unseen at first glance. As we will show below: to fully grasp the complexity of the landscape of KL Plaszow, one has to make use of archaeological methods and techniques. Then one can easily come to the conclusion that the problem is not that there is almost nothing left of the camp. The problem is the opposite: we discovered using archaeology so much heritage of the camp that it will take years to analyse the materials. It is a true case of abundance (Fig. 2).

Our landscape research at KL Plaszow had three main objectives: 1) mapping the topography of the camp with a special focus on locating a mass grave related to the liquidation of the Cracow ghetto in 1943, 2) cataloguing the preserved ruins in the landscape of the camp, 3) unearthing material culture (material witnesses) related to day-to-day life and death in the camp which were understood as an essential element of the local landscape and history.

The first step was to carry out archival research in Poland and in institutions abroad. Historical and contemporary aerial images enabled us to document the landscape during the opening, functioning, and final abandoning of KL Plaszow and post-War transformations of the campscape. The research team obtained LiDAR data for the terrain of the camp. The data were processed in order to prepare a Digital Terrain Model, which was interpreted apropos of mapping camp remains. The next steps were to carry out surface surveys, which included the use of metal detectors, and to create an inventory of above-ground remains (e.g., ruins of concrete foundations of barracks).

Relying on the results obtained, terrains for below-ground non-invasive research were carefully selected. Magnetic and Electromagnetic, Ground Penetrating Radar, and Electrical Resistivity Imaging surveys were carried out. These permitted us to document the buried remains of the camp infrastructure. The scale of research is worth highlighting. An area of about 20 hectares was researched during the magnetic survey, while 8100 m^2 were researched through the electromagnetic method.

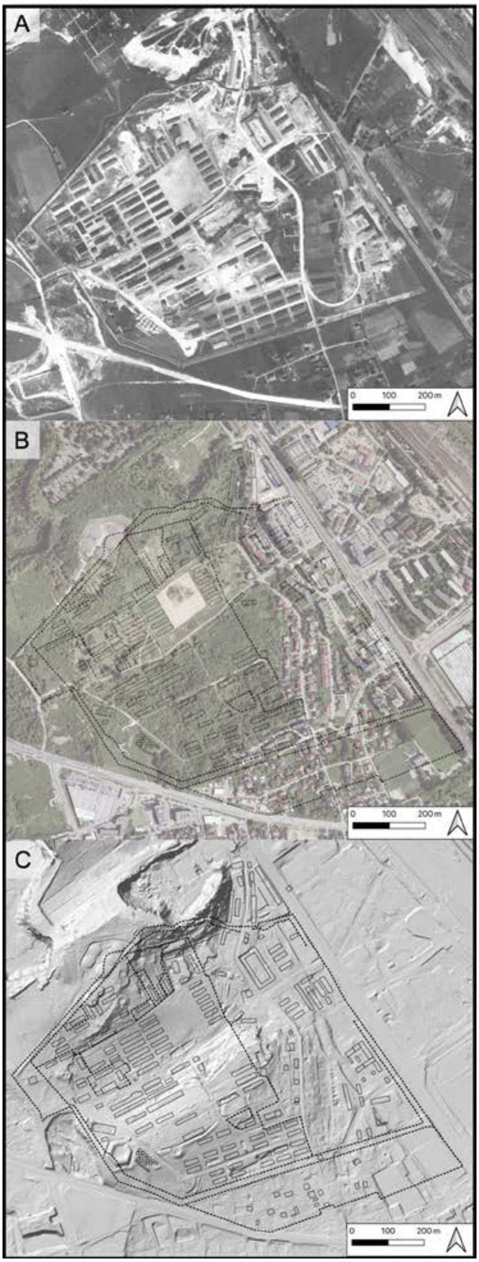


Fig. 2. Overview of historical and present-day campscape maps. 2022. Graphic elaboration: K. Karski © KL Plaszow Museum.

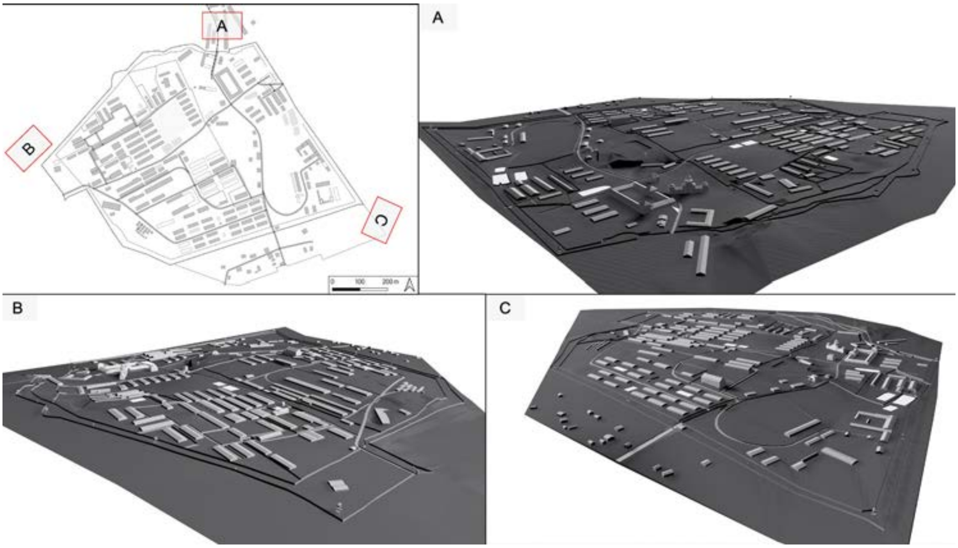


Fig. 3. 3d model of KL Plaszow in mid-1944.
Graphic elaboration: R. Kulig and K. Karski © KL Plaszow Museum.

2700 m^2 were documented through the application of Ground Penetrating Radar. Additionally, Electrical Resistivity Imaging was used to survey an area of 3000 m^2. There were cases where two or even three methods were used in the same area.

Finally, relying on the results of non-invasive surveys, the research team carried out excavations in various zones of the camp landscape. In total, an area of 1600 m^2 was excavated between 2017 and 2018. Fragments of barracks for men (Building no. 24), children (Building no. 5) and for surgery use (Building no. 20) were unearthed and documented. Barracks used as various workshops (Buildings nos 84, 90, 92) were also researched, as well as the remains of two laundries and a male latrine (Buildings nos 23, 27, 32), bakery (Building no. 38), food warehouse (Building no. 31), and a first aid station (Building no. 17). During the excavations, elements of the camp infrastructure such as pathways and fire-prevention ponds were also mapped (Fig. 3).

The excavation took the form of test trenches of various sizes. An exception was Building no. 24, which was completely excavated in the preserved area. Respecting Jewish beliefs, human remains discovered during the research were documented and left in situ (see more in Sturdy Colls 2015). The results of the field research give a general insight into fragments of the landscape of the camp during its various stages of functioning and their contemporary preservation. As always, as archaeologists, we study the fragments of (material) past in the present (Shanks 1992). Additionally, 13,730 artefacts and their fragments related to life and death behind the barbed wire at KL Plaszow were found. We present and discuss some of them below.

YOU CALL THIS AN EMPTY LANDSCAPE?

An astonishing variety of material culture was discovered during field research that shed light on various aspects of life and death behind the barbed wire at KL Plaszow. The first category includes objects related – as we named it – to living in the ghetto before imprisonment in KL Plaszow. Objects related to life in the ghetto constitute a relatively large (over 60 pieces) assemblage of artefacts discovered on the terrain of the camp (Karski 2019). These are mainly badges and armbands, and they may be related to the marking of prisoners as some of them were working outside the camp in the city. Most of the preserved artefacts are made of light, cream-coloured plastic with a blue pattern of a braided Star of David. Some of them have also additional fasteners, such as framed eyelets or a place to thread an elastic band or string (only one is complete).

After the transport to Bełżec in October 1942, additional workplace markings were used for the remaining Jews. They were worn in the form of plastic or metal framings that bore letters indicating employment in a specific sector: "R" – *Rüstung* (defence industry); "W" – *Wehrmacht* (Nazi army) and "Z" – *Zivil und Landarbeit* (civil). The tags were applied on pieces of white plastic or embroidered with black thread on a white cloth. The artefacts were made of both materials embroidered with black thread and a material similar to the bands previously discussed. They were worn pinned directly onto clothes at the height of the chest or tucked into a metal frame with transparent plastic surfaces (two objects are complete, while a few pieces of plastic bear faded traces of painted letters). An object related to life in the ghetto and in the camp is the only known *Ordnungdienst* badge from Cracow, which took the form of a round pin attached to the clothes (Fig. 4).

Another category of the uncovered artefacts can be linked with the religion and beliefs of those who were kept behind the barbed wire at KL Plaszow. The group of Judaica from KL Plaszow is small. In total, just four items were discovered during our work on the terrain of Barrack 24: a dreidel, a fragment of a metal atara, a Kiddush cup, and a pendant in the shape of the Star of David. The cup, in the form of a typical, small vessel with a tulip-shaped cross-section, is decorated with a four-field engraving showing alternating architectural decorative motifs (city views) and a bouquet of different species of plants. Less typical is the dreidel – a spinning top

Fig. 4. Fragments of armbands directly after excavation. 2017. Photo: K. Karski © Cracow Museum.

traditionally associated with the game cultivated during Hanukkah. Usually, these spinning tops have a tetrahedral shape and are described with Hebrew letters. The specimen discovered in KL Plaszow is cubic and contains inscriptions in German. A fragment of an atara (an embroidered strip of fabric or a metal ornament sewn on the upper edge of a tallit) is equally unique. Small, silver, shell-shaped pieces are decorated with pseudo-filigree. There is only one item related to the Christian religion. It is a small pendant with a figure of Saint Bernardine.

The third type of objects consists of personal belongings of the prisoners and their day-to-day life behind the barbed wire in KL Plaszow. Valuable items such as parts of jewellery (12 items), watches (10 items), metal pencil holders (4 items), glasses (5 items) and cufflinks (4 items) are usually preserved only in fragments. The exceptions are a small brooch with a pink glass element, a silver locket engraved with "SR84" and "EG" (the initials of the goldsmith) as well as a wedding ring. Particularly noteworthy are also clasps (brooches?) made of insulated wires formed in the shape of the names Marek, Jonas(z), Jerzy, Helenka, Susi (?). Similar artefacts were found on other post-camp areas, e.g., in the Kumholf extermination camp. As far we cannot be sure about their functions and meaning. Few interpretations are possible, while most possible is that those small brooches with names rendered in the familiar form, could be treated as a gift for children. These are practically the only items in the entire collection that contain additional information about their owners' details. This group of personal items also includes toiletries: hairpins and combs (19 items), 5 toothbrushes, toothpaste (about 15 items), and 2 brushes, soap packaging, razor and tweezers. Another category of the discussed objects are items related to eating and drinking – dishes and cutlery. Some of the group of more than 20 pots and pans have the signatures of their manufacturers, such as the ones made in the Westens' factory in Olkusz (later Emalia Olkusz), as evidenced by the characteristic marking in the shape of a teapot with the letter "W" inscribed in it, or the factory in Bielsko.

The collection also includes a single, severely damaged pot produced in Deutsche Emaliewarenfabrik (DEF), managed by Oskar Schindler. Most of the cutlery are tablespoons (17 items), forks (7 items) and teaspoons (6 items) from various, often quite exclusive, tableware. In addition to items made of alpaca, there is also plated cutlery, such as a small mocha spoon or a fork made by the company of the Fraget family in Warsaw. The group of glass items among the artefacts is represented by various types of round-shaped glass medicine bottles and containers (about 20 items). Characteristic of them are containers for shoe polish, decorated on the bottom with the stylized inscription "Dobrolin", and the so-called "pharmacy glass" – small bottles, containers, and ampoules (18 complete items in total). Work tools are the last characteristic group of artefacts. They include hammerheads, an axe, pincers and pliers, among other things.

The above discussion on material culture discovered during the excavation at the landscape of previous KL Plaszow shows how simplified was an assumption that almost nothing was left of the camp until the present. Materiality that is unseen at first sight is the very part of every landscape. The last component of the applied methodology concerns an ethnographic understanding of the role and meaning of the camp landscape among the living. We present only a selection of social and cultural initiatives that took place between 2016 and 2019.

THE LANDSCAPE OF KL PLASZOW BETWEEN 2016 AND 2019 OR HOW ARCHAEOLOGY WORKS SOCIALLY

Education in places of genocide is one of the basic activities of martyrdom museums, sometimes referred to as the "pedagogy of remembrance". It was drawn directly from the necessity to treat memorials of the difficult past and dark heritage as partners of the researchers, who share responsibility for the functioning and future of these places (Wysok 2018: 89–90). It is not without reason that a critical reflection on the possibilities of "circum-martyrdom" and this model of education arose around research on memorial sites. They were created relatively early, and knowledge about them became common, mainly due to the availability in the mass media. Nevertheless, according to Elke Gryglewski (2018: 76), the work of museologists and their current activities are not widely known at all, and the perception of the general public of the educational content generated by museologists remains negligible.

We believe that archaeology may be a kind of remedy for this situation. Its importance in the community of educators in martyrdom and archaeology of the contemporary past is not obvious. Nevertheless, archaeology opens up a new field of experience and participation for the public. On the one hand, it destroys the feeling of isolation of archaeological objects in the context of a museum exhibition, highlighting the fact of detailed field research. As Tomasz Kranz noted (2017: 56), it is significant here that the education is supposed to bring the museum pieces closer, but at the same time enables them to be experienced. Contrary to educational activity, its task is not so much to popularise museum collections but to spark cognitive and creative processes in connection with the artefacts. Thus, museum education should be understood as a reflective process embedded in the interpretation and internalization of cultural heritage, and museums as spaces of self-reflection and dialogue, places of meetings with objects, with the content they generate.

In the case of KL Plaszow, the situation seems more complicated. There is no museum space in which there is an exhibition about the history of the former camp and prisoners. The main goal of education is to build awareness of the place *in situ*. Most of the educational activities focus on guided tours and lecturers presenting various threads from the past and present of the memorial site. The first walks devoted to the archaeological heritage of KL Plaszow were carried out in 2017. They consisted of two parts. The first of them was carried out stationary in the buildings of the Cracow Museum (Krzysztofory Palace, Podgórze Museum, Oskar Schindler's Enamel Factory). It was a popular science lecture on the results of archaeological research. During it, the main assumptions and goals of the archaeological project as well as artefacts, sometimes excavated just a few weeks earlier, were presented. The second part included a guided walk dedicated to both the history and archaeology of KL Plaszow. It included traditional narrative methods as well as the possibility of independent exploration of a memorial site. The strategy of educational activities of the KL Plaszow Museum is based primarily upon the mutual interaction of the guide with the visitors. With a few people in a group, it is possible to create what one might call a "knowledge laboratory" where participants not only receive "ready-to-go"

Fig. 5. *Archaeology of KL Plaszow* – guided walks in 2021. Photo: K. Bednarczyk © KL Plaszow Museum.

information but are also encouraged to interpret and make conclusions of their own (Figs 5, 6).

The main goal is to get to know the place each time through its chronology, covering not only the Second World War. The issues are presented in the framework of a historical process that is not finished. Hence, for example, the metaphor of a multi-layered archaeological site is used. Such treatment of the memorial site resulted in the first walk devoted to the archaeology of KL Plaszow in September 2017. The meeting entitled *Mental Archaeology* was based on the idea of using

Fig. 6. *Archaeology of KL Plaszow* – guided walk in 2021. Photo: K. Bednarczyk © KL Plaszow Museum.

archaeological terms and descriptions to learn about the past and the functioning of the memorial site today.

The modern topography is the second key to getting to know the post-camp area. Each of the participants of the classes receives maps with the buildings of the camp in 1944. Thanks to the guidance, it is possible to transfer and track the paths of the walks on maps. Anyone can also choose their path or set a route through free Google Maps tools. Sometimes the route can be modified depending on the needs of the group. Awakening the will to observe the natural landscape of KL Plaszow gives people the chance to discover the memorial site on their own.

The popularity of guided walks has shown that the archaeology of the contemporary past is an attractive way of talking about the past of a memorial site. Thanks to this, a decision was made to introduce them to the permanent features of the Museum. However, their scenario has been modified. The nearly three-hour meetings took place only in the field. Apart from maps, the participants also had access to the original documentation of excavations. And thanks to the acquired knowledge, they could also interpret archival photographs of the outdoor exhibition. From 2020, the guides also have small models of 3d buildings and archaeological objects discovered during excavations.

Due to such great interest, two popular science publications were also released. The first of them is a free album, in which, apart from photographs of nearly 100 artefacts, photographs from archaeological research are presented. The album is also available for free download in a PDF file from the Museum website. The second publication is an archaeological guide to KL Plaszow that presents the reader the site during the fieldwork (Karski 2019; 2020).

THE LANDSCAPE OF KL PLASZOW – PROSPECTS FOR THE FUTURE

Archaeological research conducted between 2016 and 2019 had also a significant impact on the planned construction of the infrastructure of the KL Plaszow Museum (Fig. 7). In view of the earlier plans, major modifications were made. In line with previous arrangements, prior to the commencement of field work, the area of the memorial site will not be significantly transformed. However, thanks to the surface research and field inventory, new markers will be introduced. These will be small pedestals about 30–40 cm high, on which brief information will appear with the number of the building and its function. Thanks to this procedure, each visitor to the memorial site will be able to follow or set a path on their own. The unveiling of authentic relics of the infrastructure and architecture of KL Plaszow will be arranged. Structures of this type will be located at Barracks 24, a bakery, and a hospital.

The permanent exhibition of the Museum will be located in the building of the so-called Memorial. The building will be located outside the historic area of KL Plaszow, in its immediate vicinity. Blended into the natural landscape of Krzemionki Podgórskie, it will be an introduction to the past of a memorial site. The last segment of the exhibition, however, will also be devoted to the period after 1945. As a result of the excavations, several thousand artefacts were discovered. Apart from historical materials, such as photographs, documents, they will be the objects presented at the permanent exhibition. Thanks to conscientious maintenance, it is also possible to make them available. An important aspect of the Museum's activity will also be the presentation of not only special objects, but also mass artefacts, such as nails, fragments of installations and infrastructure of the camp.

The so-called "Grey House", a villa re-used by the Nazi during functioning of KL Plaszow, will be incorporated into the main exhibition too (Karski and Kulig 2020). The building consists of a few small rooms which are difficult to arrange to present a lot of artefacts related to the history of the camp. However, the idea is to use the building as a kind of "media library". Each visitor will have the possibility to do "own research" regarding the prisoners kept behind barbed wire at KL Plaszow.

Fig. 7. Comparison of memorial site's landscapes from 1944 and 2021. The archival photography panorama was created using sources from the collection of Institute of National Remembrance of Poland (by W. Jodłowski and K. Karski), contemporary images were taken by Ł. Czech in 2021 © KL Plaszow Museum and Cracow Museum.

The media library will consist of a database, archival materials and information about archaeological discoveries made between 2016 and 2019. Thanks to this, knowledge about the works being carried out will be generally available. In a way, each tourist will become a historian or archaeologist for a moment.

CONCLUSION

After the Second World War, many former concentration and death camps were changed into museums and memorials. Sites of unimaginable and unspeakable evil became places of remembrance and commemoration. However, for a long period of time, the former KL Plaszow was not one of them. The terrain of the former camp was partially overbuilt, and the other part became a park.

When starting the archaeological project at KL Plaszow, a very important assumption was made. The key to understanding the future of the memorial site is the present. And thanks to this relationship, the landscape of KL Plaszow can be an important place for education for future generations. The amalgamation of various perspectives, methods and scientific disciplines enabled us to discover, document, map and interpret approximately 200 camp structures. No less relevant is the fact that one of the research results was unearthing 13,730 artefacts related to day-to-day life at the camp. Broken *matzevoth*, spoons, rusted nails and shells, personal belongings of the prisoners and even such small and intimate artefacts as pieces of metal wires changed into names uncover various aspects of life and death in the shadow of the Holocaust. They are at the same time the material evidence that gives some insight into what happened at the KL Plaszow between 1942 and 1945. The landscape of KL Plaszow cannot be perceived as consisting only of what is seen above the ground. Its part is also hidden and buried material witnesses of the crime that archaeology is able to discover, document and interpret (e.g., Karski and Kobiałka 2021).

Our research has also broader social and cultural implications. Its idea was to integrate the past, present and future of the landscape of former KL Plaszow. Archaeology is always about these three horizons of time which overlaps with each other. Our multidisciplinary research at KL Plaszow was carried out as a part of the plan related to building and opening the museum. The memory about the camp's prisoners is alive and vibrant today, among other reasons because the enormous success of *Schindler's List* movie directed by Steven Spielberg. These memories will also live on through the museum, which is dedicated to telling the story of KL Plaszow and its prisoners. Part of this will be said, presented and materialized through those small, usually broken and rusted objects and their fragments which were collected during the archaeological research at KL Plaszow.

ACKONWLEDGMENT

The work described here is part of a research co-financed by the Ministry of Culture and National Heritage of the Republic of Poland and Municipality of Cracow.

REFERENCES

Bernbeck, R. and Pollock, S. 2018. Quotidian and Transgressive Practices in Nazi Forced Labour Camps: The Role of Objects. *International Journal of Historical Archaeology* 22(3): 454–471. doi.org/10.1007/s10761-017-0434-1

Bieberstein, M. 1983. *Zagłada Żydów w Krakowie.* Kraków.

Blumental, N., Kermisz, I., Borwicz, M. and Wulf, J. (eds). 1947. *Proces ludobójcy Amona Goetha przed Najwyższym Trybunałem Narodowym*. Kraków–Łódź–Warszawa.

Carr, G. 2018. The Small Things of Life and Death: an Exploration of Value and Meaning in the Material Culture of Nazi Camps. *International Journal of Historical Archaeology* 22: 531–552. doi.org/10.1007/s10761-017-0435-0

Charlesworth, A. and Addis, M. 2002. Memorialization and the Ecological Landscapes of Holocaust Sites: The Cases of Plaszow and Auschwitz-Birkenau. *Landscape Research* 27(3): 229–251. doi.org/10.1080/01426390220149502

Gryglewski, E. 2018. Gedenkstättenpädegogik – wybrane zagadnienia teoretyczne i metodologiczne. In T. Kranz (ed.), *Pedagogika pamięci. O teorii i praktyce edukacji w muzeach martyrologicznych*, 67–85. Lublin.

Drozdzewski, D. 2012. Knowing (or not) about Katyń: The Silencing and Surfacing of Public Memory. *Space and Polity* 16(3): 303–319. doi.org/10.1080/13562576.2012.733570

Gilead, I., Haimi, N. and Mazurek, W. 2009. Excavating Nazi Extermination Centers. *Present Past* 1: 10–31. dx.doi.org/10.5334/pp.12

Karski, K. 2019. *KL Plaszow. Archeologia miejsca pamięci (=KL Plaszow. The Archaeology of memorial site).* Kraków

Karski, K. 2020. *KL Plaszow. Archeological Guide.* Kraków.

Karski, K. 2021. Archeologia nadmiaru. Podsumowanie wyników badań archeologicznych KL Plaszow z lat 2016–2019. *Zeszyty Naukowe Muzeum Historycznego Miasta Krakowa* 38: 41–68. doi.org/10.32030/KRZY.2020.02

Karski, K., Różycki, S. and Schwarz, A. 2018. Memories of Recent Past. Objectives and Results of Non-invasive Archaeological Research Project at KL Plaszow Memorial Site. *Analecta Archaeologica Ressoviensis* 12: 221–246. doi.org/10.15584/anarres.2017.12.13

Karski, K. and Kulig, R. 2020. Szary Dom w kontekście badań interdyscyplinarnych. *Krzysztofory. Zeszyty Naukowe Muzeum Historycznego Miasta Krakowa* 38: 87–108. doi.org/10.32030/KRZY.2020.04

Karski, K. and Kobiałka, D. 2021. Archaeology in the Shadow of Schindler's List. Discovering the Materiality of Plaszow Camp. *Journal of Contemporary Archaeology* 8(1): 89–111. doi.org/10.1558/jca.43381

Kobiałka, D. 2014. Let Heritage Die! The Ruins of Trams at Depot no. 5 in Wrocław, Poland. *Journal of Contemporary Archaeology* 1(2): 351–368.

Kobiałka, D. 2022. The Devil Burns Gold There – the Heritage of Nazi Germany Crimes in Death Valley, Chojnice, Poland. *International Journal of Historical Archaeology* 26: 359–378. doi.org/10.1007/s10761-021-00604-9

Kobiałka, D., Pawleta, M., Karski, K., Kostyrko, M., Lokś, A., Rezler-Wasielewska, V., Stanek, P., Czerner, A., Góra, E., Michalski, M., Tomczak, S., Kowalczyk Z., Ważyński, S. and Wroniecki, P. 2023. Camp Archaeology at the Site of National Remembrance in Łambinowice (Formely Lamsdorf), Poland. *International Journal of Historical Archaeology* 27: 1035–1067. doi.org/10.1007/s10761-023-00700-y

Kocik, K. 2017. Płaszów. Próby upamiętnienia (1945–2007). In. I. Kraśnicka-Wilk (ed.), *Płaszów odkrywanie*, 97–141. Kraków.

Kola, A. 2000. *Bełżec, The Nazi camp for Jews in the light of archaeological sources. Excavations 1997–1999*. Warsaw–Washington.

Kostyrko, M. and Kobiałka, D. 2020. Small and Large Heritage of the Great War: An Archaeology of a Prisoner of War Camp in Tuchola, Poland. *Landscape Research* 45(5): 583–600. doi.org/10.1080/01426397.2020.1736533

Kotarba, R. 2009. *Niemiecki obóz w Płaszowie (1942–1945).* Warszawa–Kraków.

Kranz, T. 2017. Krajobrazy pamięci – podmioty kultury – obiekty turystyczne – przestrzenie edukacji. O współczesnych znaczeniach muzeów w poobozowych miejscach poobozowych. In T. Kranz (ed.), *Muzea w poobozowych miejscach pamięci. Tożsamość, znaczenia, funkcje*, 19–68. Lublin.

Owoc, T. and Karski, K. 2018. 'Fundamenty pamięci'. O doświadczeniu przestrzeni i pozostałości po byłym obozie koncentracyjnym w miejscu pamięci KL Plaszow. *Ochrona Dziedzictwa Kulturowego* 6: 135–148.

Shanks, M. 1992. *Experiencing the Past. On the Character of Archaeology*. London.

Sturdy Colls, C. 2015. *Holocaust Archaeologies: Approaches and Future Directions*. New York.

Sturdy Colls, C. and Brainthwaite, M. 2018. "This is Proof"? Forensic Evidence and Ambiguous Material Culture at Treblinka Extermination Camp. *International Journal of Historical Archaeology* 22(3): 430–453. doi.org/10.1007/s10761-017-0432-3

Wysok, W. 2018. Teoretyczne założenia pedagogiki pamięci. Wokół podstawowych definicji i pojęć. In T. Kranz (ed.), *Pedagogika pamięci. O teorii i praktyce edukacji w muzeach martyrologicznych*, 87–125. Lublin.

Archaeologia Polona, vol. 61: 2023, 239–267
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3468

Soldiers on the Digs. Archaeological Excavations in Switzerland Involving the Deuxieme Division des Chasseurs

Piotr Włodarczak[a] and Urs Leuzinger[b]

During the Second World War, Polish soldiers of the 2nd Rifle Division (Deuxieme Division des Chasseurs) were interned in Switzerland. Some of them were briefly employed on archaeological excavations in the cantons of Aargau, Lucerne, Solothurn, and Thurgau. In this last location, Karl Keller-Tarnuzzer organised the most productive cooperation with the Poles, investigating the pile-dwelling settlements of Pfyn-Breitenloo and Arbon-Bleiche 2 in 1944 and 1945, respectively. Earlier, Polish soldiers had been employed in the investigation of Roman villas at Aeschi (Solothurn) and Bellikon (Aargau), and the Neolithic pile-dwelling settlement of Burgäschisee-Ost (Solothurn), among other sites. The work involving the Poles was usually carried out efficiently, to the satisfaction of both sides. It has earned a worthy place in the history of Swiss archaeology, with the results often cited in various publications.

KEY-WORDS: 2nd Rifle Division, Second World War, Switzerland, archaeology

INTRODUCTION

"Polenweg" is a name permanently inscribed in the Swiss landscape, referring to a road built by Polish soldiers interned during the Second World War. Another term, "Polengrabung", is established among archaeologists to refer to excavations carried out with the participation of Poles at the time (Bleuer 2022: 71). During the War, interned soldiers from various countries, including France (e.g., research at Avenches in the canton of Vaud) and Italy (e.g., work at Burgäschisee in the canton of Solothurn), were employed for excavations in Switzerland. Yet, it was the excavations involving Polish soldiers that were the most frequent and have become permanently

[a] Institute of Archaeology and Ethnology, Polish Academy of Sciences, Sławkowska st. 17, 31–016 Kraków (Poland), e-mail: wlodarczak.piotr@gmail.com; ORCID: 0000-0003-0359-7386
[b] Amt für Archäologie Kanton Thurgau, Schlossmühlestrasse 15, 8510 Frauenfeld (Switzerland), e-mail: urs.leuzinger@tg.ch; ORCID: 0009-0007-6403-062X

Received April 14, 2023; Received in revised form August 21, 2023; Accepted October 31, 2023

inscribed in the history of Swiss archaeology. Information about them can be found in monographs of important sites (e.g., Hochuli *et al.*, 1994; Leuzinger 2007; Rigert 2008; Hafner and Hostettler eds 2022), and general publications discussing the history of individual regions, but there are relatively few mentions in the Polish literature (Włodarczak 2008).

Located in the Swiss canton of Thurgau, the Pfyn-Breitenloo site is a pile-dwelling settlement from the 4th millennium BC, well known to Neolithic researchers. The site yielded highly important finds, which is reflected in the distinguishing of the Pfyn culture. The main work on the site took place in autumn 1944, when Polish soldiers interned in Switzerland between 1940 and 1945 were recruited. These men came from the Polish 2nd Rifle Division [French: Deuxieme Division des Chasseurs, Polish: Druga Dywizja Strzelców Pieszych; before May 1940 named as Deuxieme Division d'Infanterie Polonaise/Polish: Druga Dywizja Piechoty]. The Polish excavation team contributed significantly to the success of the digs led by Karl Keller-Tarnuzzer, an archaeologist from the Thurgau Museum in Frauenfeld (Brem and Leuzinger 2020: 94–106). The employment of interned soldiers for excavations in neutral Switzerland presents an interesting case in the history of wartime archaeology. The best-known example of the Pfyn digs is taken below to highlight the archaeological accomplishments of the soldiers of the 2nd Division, with basic information about other "Polish" excavations also provided.

CONTEXT

The 2nd Rifle Division was formed in France in the autumn of 1939. Most of the rank-and-file soldiers were pre-War Polish economic migrants to France mobilised after the outbreak of the War. The officers and non-commissioned officers came mostly from Poland and were veterans of the September Campaign of 1939 (Smoliński 1992: 11–27). Commanded by Brigadier-General Bronisław Prugar-Ketling, the division was incorporated into the French 45th Corps. The division fought at the Battle of France in Alsace, including against Heinz Guderian's armoured troops. After a heavy two-day battle at the Clos-du-Doubs hills, it covered the corps' retreat towards Switzerland. The 2nd Rifle Division crossed the Swiss border in the Jura region in good order on 19–20 June 1940. Some 12,000 troops were deployed in internment camps. Initially, they were temporarily stationed in various towns in the canton of Neuchâtel, to be then mostly clustered in large camps in the eastern part of the cantons of Bern and Aargau. In agreement with the Polish authorities in London, General Prugar-Ketling tried to confine his soldiers to the Swiss camps, maintaining

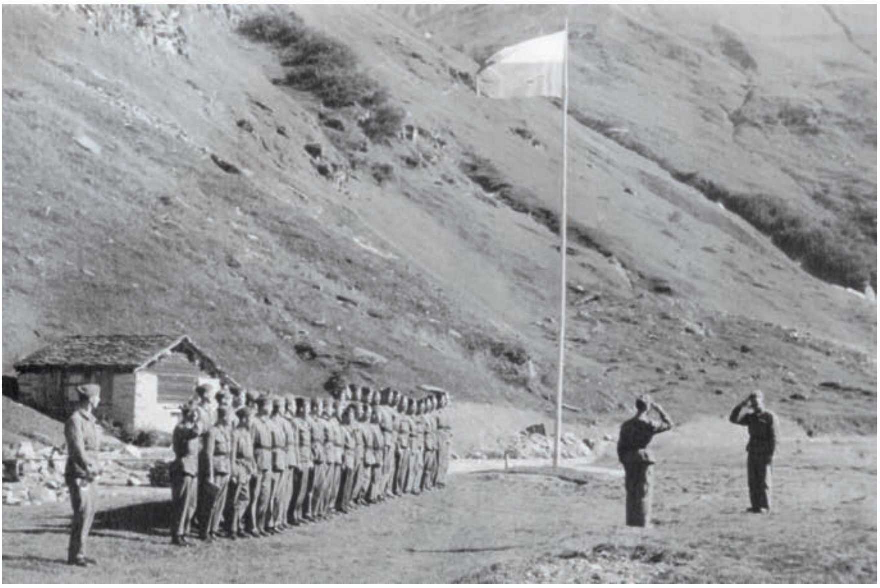


Fig. 1. One of the Polish camps in Switzerland. Morning assembly of Polish interned soldiers before leaving for work. Photo from the collection of the Polish Museum in Rapperswil.

organisation and discipline as much as possible (Fig. 1). This decision was not universally approved by his subordinates: some of them wanted to cease fighting and return to their families in France, while others hoped to join the Polish forces in the West and continue the fight against the Germans. In the first year of internment alone, the soldiers made more than 2000 escape attempts, of which 1228 were successful (Smoliński 1992: 108).

During the internment, the interests of the Polish and Swiss sides collided. The Polish command, in consultation with the authorities in London, wanted to maintain the functional efficiency of the division, with a view to its potential military use at a later stage of the War. Another important consideration was the concern for human capital, in the belief that it would be used in the future to rebuild the war-ravaged country. In turn, the Swiss politicians, representing various political orientations, tended to put the interests of their country's endangered independence and neutrality first. This made them appear hostile to the Polish soldiers, especially by comparison with the generally supportive Swiss society. There were therefore various frictions and misunderstandings throughout the internment period. In general, however, agreement and cooperation were reached on most issues in order to safeguard the interests of both sides. At the end of the internment period, both sides could express their sincere gratitude to each other, and the stay in Switzerland, albeit forced, turned out to be a fondly remembered period in the lives of many Polish soldiers.

The efforts of the Polish command to organise instruction at various levels for the interned soldiers were crowned with success. Among other things, approval was gained for university teaching. University camps were established, including the "Zurich" academic camp at Winterthur, not far from Pfyn (e.g., Vetulani 1976; Cieszkowski *et al.*, 2010: 123–134; Stempowski 2015: 148–203). The good organisation of this schooling gave the impression that the high level of archaeological research carried out with the participation of Polish soldiers was due to their professional training, unlike, for example, the excavations organised with Italian soldiers (Bleuer 2022: 71). Nevertheless, the vast majority of the interned Poles were simple, poorly educated private soldiers. Therefore, while some soldiers received university and high school education, other groups were offered vocational training and even literacy courses.

At the end of 1940, the Swiss authorities began to implement a plan devised by Friedrich Wahlen (head of the Military Provisions Office), an element of which was a work order for interned soldiers. Poles were put to work in sensitive sectors of the Swiss economy, including mostly road construction, land reclamation, ore mines, and agriculture. They also worked on the expansion of military fortifications. The wages, often less than 1 franc per day, were starkly lower than Swiss wages, and their imposition sometimes led to protests and acts of disobedience. Over time the situation stabilised, helped by the position of the division command, which pointed to the positive impact of work on the mental and physical condition of the soldiers, as well as to the need for good relations with the Swiss authorities and society. In this context, however, the specifics of employment on archaeological excavations in Switzerland should be highlighted. Such work, often based on various types of sponsorship, was generally low-paid and often used a "free" workforce. Consequently, even the starvation wages for interned soldiers were a major expense in the excavation budget, as indicated by financial reports (e.g., Flükiger 1941; JBer. GPV 1941–1942; Drack 1943).

In August 1944, the Polish military authorities lifted the ban on escapes from internment camps, beginning a period of clandestine evacuation. From this point on, attempts were made to smuggle groups of soldiers mainly to France, from where they either made their way to partisan units or the Allied armies. Prior to 1945, this action did not go smoothly and only a fraction of the soldiers decided to escape. It was during this period that the archaeological research at Pfyn, discussed in more detail here, was carried out. Linked to this is the story of the chief photographer of the excavations, named Domaradzki. In his diary, Keller-Tarnuzzer notes with appreciation that Domaradzki had trained his successor (named Kieszek) before his planned escape to France, so that the work on the excavation could continue undisturbed. Likely being close to the Polish soldiers, the Swiss archaeologist was familiar with their problems. However, it can also be assumed that, as a representative of Swiss state institutions, he was not privy to the escape plans and found out about such situations after they occurred.

In 1944, Soviet troops seized eastern Poland (the home area of many soldiers of the 2nd Division), and the manifesto of July 1944 announced the creation of a government vassal to the USSR. The Swiss press gave extensive coverage to these events. In issue 15(127) of 1945, which includes a note about the excavations at Pfyn, the *Goniec Obozowy* (the main magazine for interned soldiers) mentions the "Lublin Committee" and the new situation in Poland. The soldiers working on the excavations were probably already planning their future, aware that it would be different from what they assumed when they crossed the Swiss border in 1940. It is possible that they saw their participation in archaeological research as an escape from everyday life and a postponement of difficult life choices.

From the very beginning of the internment, the Swiss authorities would issue ordinances limiting, or restrictively regulating, the soldiers' contacts with local communities. The pinnacle of these restrictions was the "Orange Befehl" (orange ban, from the colour of the paper it was printed on), which introduced draconian restrictions. Among other things, it decreed bans on social contacts and marriages with interned soldiers. Regardless of the harsh consequences, the strict regulations were hardly adhered to and were the subject of vociferous public criticism (although denunciations also occurred). The situation loosened up over time, and social contacts intensified. The number of children conceived by Swiss women and Polish soldiers is telling: official records note 369 cases (Matyja 2013: 115). This does not change the fact that there were misunderstandings and tensions, as well as many personal dramas (e.g., Volland 1993; Bill 2020). In the context of the events presented here, serving as evidence is a 1945 letter from Keller-Tarnuzzer to the commandant of the camp in Matzingen, which contains a suggestion from a Polish commander to exclude one of the soldiers from the team for the planned excavations in Arbon-Bleiche, who "is too attracted to women and they to him, which can cause a lot of trouble in the environment of a small town or a small village" (document in the archive of the Amt für Archäologie Thurgau). As a result, even in a climate of clearly loosening restrictions at the end of the War, Keller-Tarnuzzer referred to the officially binding regulations. He may have done so only in order to remove a troublesome employee from his team, or out of official duty. For at that time, his own daughter Inga Keller was dating a Polish interned soldier, her future husband Henryk Węgier.

ORGANISATION OF EXCAVATIONS AT PFYN

Planning his research during wartime, Keller-Tarnuzzer (Fig. 2) encountered problems finding workers for the excavation of the Neolithic settlement at Pfyn. A contract with the Federal Commissariat for Internment and Hospitalization dated 15 August 1944 mentions the employment of 35 English soldiers. For unspecified reasons, the Swiss archaeologist heard from Lieutenant Colonel Hermann Siegrist (then military commander of the Polish university camp in Winterthur – Fig. 3) that Poles were instead being sent to work on the excavation: five of them "educated", i.e., students from his camp (for technical work) and 30 workers from the camp in Matzingen, near Pfyn (Leuzinger 2007: 16). The first internees in that camp were 245 soldiers of the 2nd Warsaw Light Artillery Regiment, under the command of Major Kazimierz Napieralski, who arrived there in December 1941. They worked mainly on river regulation. In 1942, the Matzingen camp was transformed into a vocational training centre (Fig. 4), making it possible to find specialists in various crafts, including professions useful for "engineering" work on a waterlogged archaeological site. This was probably why the research at Pfyn was carried out with outstanding technical proficiency (by the standards of the time). Indeed, among the soldiers one could find locksmiths, carpenters and specialists in other professions useful for work on a pile-dwelling site.

In his diary entries, Keller-Tarnuzzer expressed his concern about the decision to dispatch soldiers from an exotic eastern country to the excavation. He probably expected that internees from western European countries would be easier to work with. By the end of the War, Poles were already a minority among the interned soldiers. However, the Swiss archaeologist's attitude towards working with Poles can also be seen as surprisingly distanced. After more than four years of internment, the soldiers of the 2nd Division were already well known to the Swiss, working effectively in various sectors of the economy (primarily agriculture and construction). We have official documents and private witness accounts emphasizing how the work of the Poles was considered superior to that of interned soldiers from other countries (e.g., Rettenmund 1995: 278; Bleuer 2022: 71). Cooperation with the Swiss academic community, including the universities of nearby Zurich, was also well established, for which great credit is due to the aforementioned Lieutenant Colonel Siegrist (regarded in many studies as an advocate of Polish soldiers), among others. In his academic life, Keller-Tarnuzzer must have been in contact with lecturers working in university camps. All in all, the various Polish internment camps in the Pfyn area were the best source of manpower for archaeological excavations.

Unlike other national groups, the interned Poles retained the internal organisation of the large unit, the division. As a result, the commanders had effective control over

Fig. 2. Karl Keller-Tarnuzzer. Photo from the collection of the Amt für Archäologie Thurgau.

the appropriate organisation of the teams sent to particular jobs. Swiss camp commanders often relied on the suggestions of Polish commanders when posting people for work. This was also true of the excavations at Pfyn, where people with the right skills for the job were sent. It was possible to rotate men in and out of the digs, as evidenced by three soldiers who were expelled from the excavations for disciplinary reasons. On the other hand, the work of the Poles in archaeological research was not a major concern for the Swiss military authorities, and little importance was attached to expediting suitable personnel for research. Much therefore depended on the efficiency of the organiser of the excavations and his good relations with Swiss camp commanders and Polish commanders. As for the research in the canton of Thurgau, Keller-Tarnuzzer managed to establish a good rapport with both Swiss and Polish military officers.

Work at Pfyn began on 8 September 1944. The soldiers built a two-storey heated barrack supplied with electricity and water (Fig. 5). In addition to living quarters, the barrack also housed a kitchen, kitchen storage, and an office. Keller-Tarnuzzer purchased a radio for the soldiers out of the expedition budget. The management of the barrack, discipline, and provisions were entrusted to a non-commissioned officer. The living conditions – both provided by the organiser and created by the soldiers for themselves – were therefore very good, especially considering the harsh realities of wartime.

Fig. 3. Lieutenant Colonel Hermann Siegrist with Lieutenant Colonel Jan Narzymski. Well-cooperating military Swiss and Polish commanders of the university camp in Winterthur. Photo: L. Bialy/bildarchiv.winterthur.ch

The Polish team was led by Second Lieutenant Henryk Dawid (Fig. 6), the maintenance platoon commander in the 4th Warsaw Rifle Regiment (Smoliński 1992: 217), a reserve officer, and an engineer by training. Keller-Tarnuzzer referred to him as "his assistant" (Keller-Tarnuzzer 1944a: 66; 1944b; 1945; also notes in the excavation diary). In many of his papers the Swiss archaeologist emphasizes Dawid's significant role in the organisation of the excavations at Pfyn and at Arbon. Second Lieutenant Dawid's education and technical experience proved to be of great help in the proper organisation of the research. Getting to know the expectations of the Swiss archaeologist, Dawid selected the right people for certain positions. Looking at the staffing possibilities, one can even envy the excavation manager's comfortable situation, which is in many aspects better than in the present day. The team included carpenters and locksmiths who did the day-to-day work for the rest of the team, such as building scaffolding for the photographer, drafting tables, chairs, measuring aids and, finally, elements for the museum reconstruction of a Neolithic house. They built

Fig. 4. Soldiers of the camp in Matzingen (canton of Thurgau) during the visit of General Prugar-Ketling – division commander. Photo from the collection of the Polish Museum in Rapperswil.

the formwork necessary for the exploration of the lacustrine site and also laid the tracks for carts in which the soil was removed (Fig. 7).

The excavation diaries show that Keller-Tarnuzzer was gradually becoming fascinated by the capabilities of the team created by Second Lieutenant Dawid. He soon found it possible to cede all organisational work to Dawid, along with the engineering and technical work that was extremely important in the study of a pile-dwelling site. Once the field research was completed, Keller-Tarnuzzer left, leaving the tasks of cataloguing, drawing the artefacts and packing the finds to the Poles (Fig. 8). He soon requested a Polish team for another excavation,

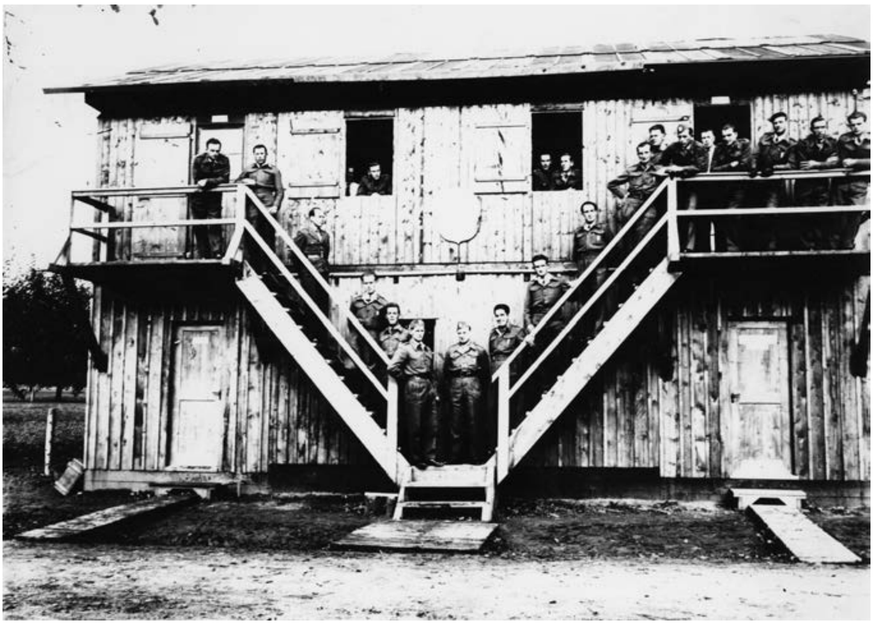


Fig. 5. Participants of the excavations in Pfyn at a self-built residential barrack. Photo from the collection of the Amt für Archäologie Thurgau.

on an Early Bronze Age settlement at Arbon-Bleiche. According to surviving correspondence, with an officer representing the office for internment troops, he had by then completely entrusted Second Lieutenant Dawid with the assembling of the team. On Dawid's behalf, he asked the camp commandant at Matzingen for the already experienced draftsmen and photographer.

During the digs, Dawid drew up site and height plans along with one assistant and a soldier who had been involved in machine construction before the War (Figs 9 and 10). When working with pile-dwelling settlements and their complex wooden structures, this is an extremely difficult job. At Pfyn, the documentation made by the Poles made it possible to link the test surveys done in 2002 and 2004 by Urs Leuzinger to the old excavations. These surveys were aimed at obtaining timber for dendrochronological dating of the remains of Pfyn-culture buildings discovered in the 1940s. Thanks to the new excavations, the age of the settlement was determined to be 3706–3704 BC, and the plans made by the Polish soldiers proved to be quite accurate (Leuzinger 2007). Even though measurement errors sometimes reached 15–20 cm, it was easy to relate the newly discovered wooden structures to the previously documented finds.

Fig. 6. Second Lieutenant Henryk Dawid with his team during excavations in Arbon-Bleiche. Photo from the collection of the Amt für Archäologie Thurgau.

In the course of the research, the soldiers Edward Giszczyński, Roman Kończak, and Jan Gorlak made ink drawings of small finds, which were then used in scientific publications (Figs 11 and 12). According to Keller-Tarnuzzer, the drawings were both accurate and visually appealing. Furthermore, "like the other participants in the excavations, they were particularly pleased when an exceptionally beautiful or important artefact came into their hands" (Figs 13 and 14; Keller-Tarnuzzer 1944a: 71). Another of the soldiers (the aforementioned Domaradzki) was involved in photographic documentation. Numerous glass negatives of photographs of floor plans with details of the uncovered wooden structures have survived. What is missing, however, is documentation of the profiles. Creating the inventory, in turn, was entrusted to a person with a good knowledge of German who had worked in a legal office before the War.

In the course of the research, Dawid shared the responsibility of guiding numerous visitors with Keller-Tarnuzzer. The Swiss archaeologist placed great emphasis on popularising archaeological research in the region. School excursions were particularly numerous. In addition to his knowledge of the subject, Dawid was also distinguished by his "great talent for embellishing details and putting together interesting stories". According to Keller-Tarnuzzer, this was a positive side of the soldiers' involvement in

Fig. 7. Excavations at Pfyn-Breitenloo in 1944.
Photo from the collection of the Amt für Archäologie Thurgau.

the excavations. He enjoyed the soldiers' discussions about the finds. He noted, for example, an argument between members of the team about the type of grain discovered. He further recorded that one of the soldiers disagreed with his interpretation of a wooden object as part of a house structure, claiming that it was a typical wooden mangle, still frequently found at that time in Polish and Ukrainian houses in the East. Having analysed the analogies, the Swiss then agreed with the soldier's interpretation.

Keller-Tarnuzzer's articles on the Pfyn-Breitenloo site emphasise the contributions of Second Lieutenant Dawid and the entire Polish team. In one paper, as an expression of his positive attitude, he wrote: "There is no denying: The Poles have erected with this work a small monument to themselves, to themselves and to their nation. When they will have long been back in their country, when they will once again be gripped by everyday life, they will recall that they contributed to the interesting cultural work in our country. And us? Even decades later, when we talk about the excavations of the Pfyn pile-dwellings or when we look at the expensive exhibits in the Pfyn museum that is to be built, we will recall that these were Poles who devoted their efforts to it and who did it with devotion and love. There was a Polish museum in Rapperswil, which was something of a holy place for us Swiss, and through which we felt deeply connected to this country in the East. Something in this vein will

Fig. 8. Excavations at Pfyn-Breitenloo. Polish soldier signing finds. Photo from the collection of Amt für Archäologie Thurgau.

Fig. 9. Excavations at Pfyn-Breitenloo. Second Lieutenant Henryk Dawid and his assistant during the measurements. Photo from the archive Amt für Archäologie Thurgau.

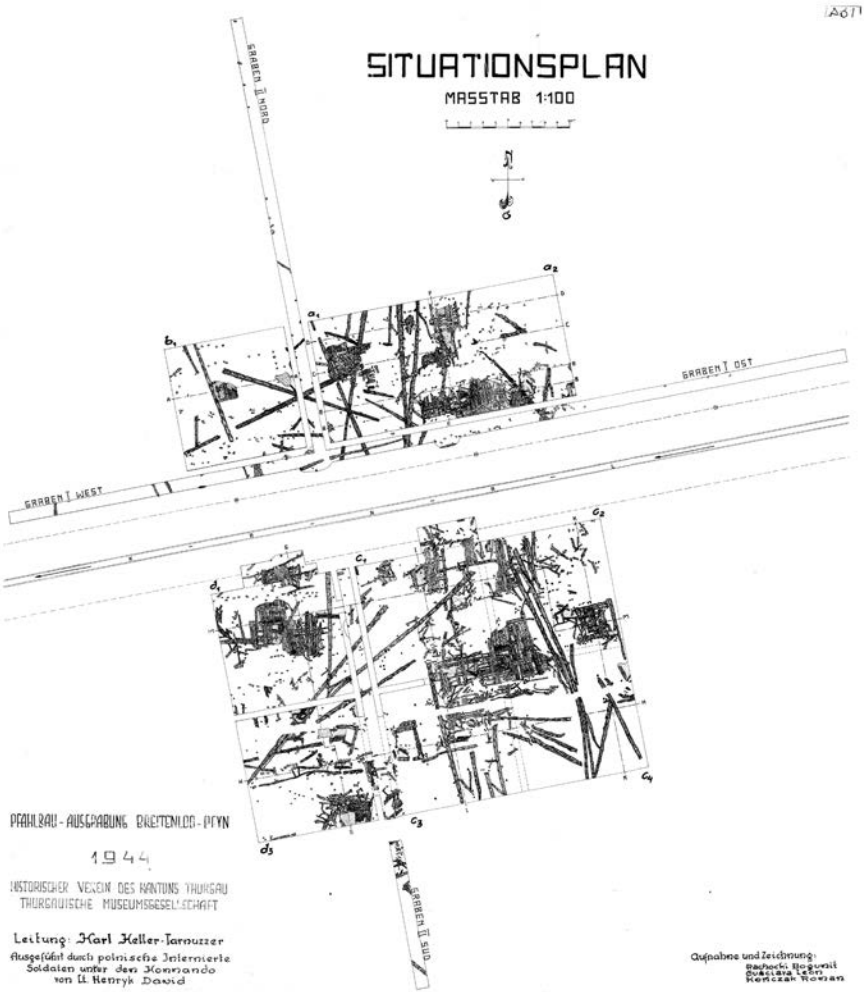


Fig. 10. Plan of the Neolithic settlement in Pfyn-Breitenloo, made by Polish soldiers. From the archive Amt für Archäologie Thurgau.

remain in our thoughts about Breitenloo near Pfyn" (Keller-Tarnuzzer 1944a: 71, 72). Keller-Tarnuzzer sent one of his early articles on the research at Pfyn to General Bronisław Prugar-Ketling, the division commander. A reply from the Polish general is kept in the archives of the Amt für Archäologie Thurgau.

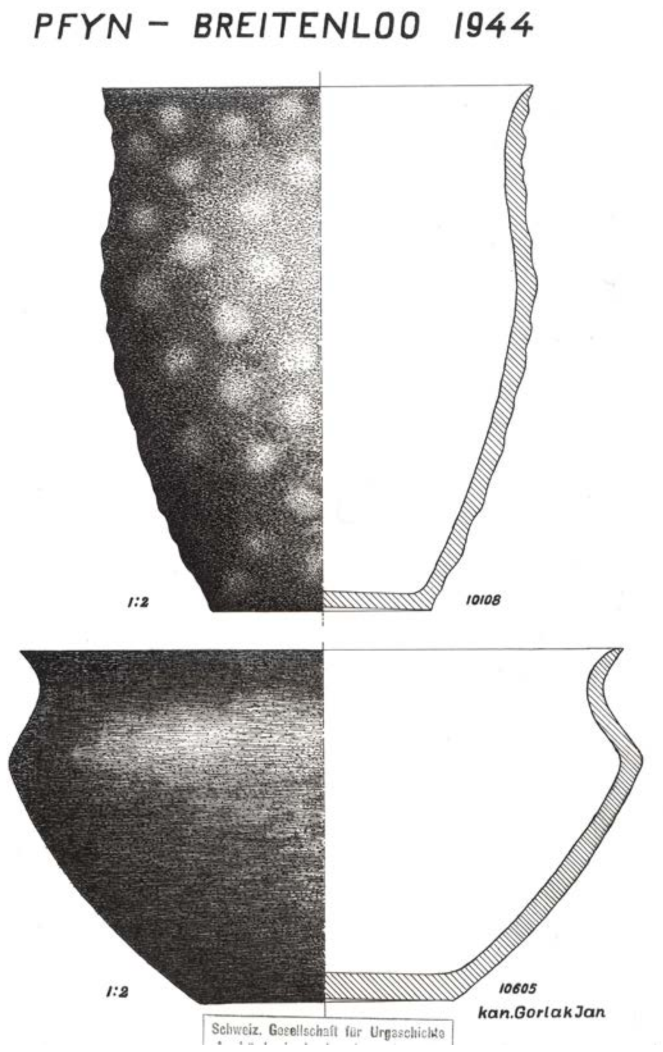


Fig. 11. Drawings of ceramic vessels from Pfyn-Breitenloo made by cannoneer Jan Gorlak. From the archive Amt für Archäologie Thurgau.

RESULTS OF THE WORK AT PFYN-BREITENLOO

Keller-Tarnuzzer only managed to provide a preliminary description of the results of his research at Pfyn, and he did not process the results of his other major excavation

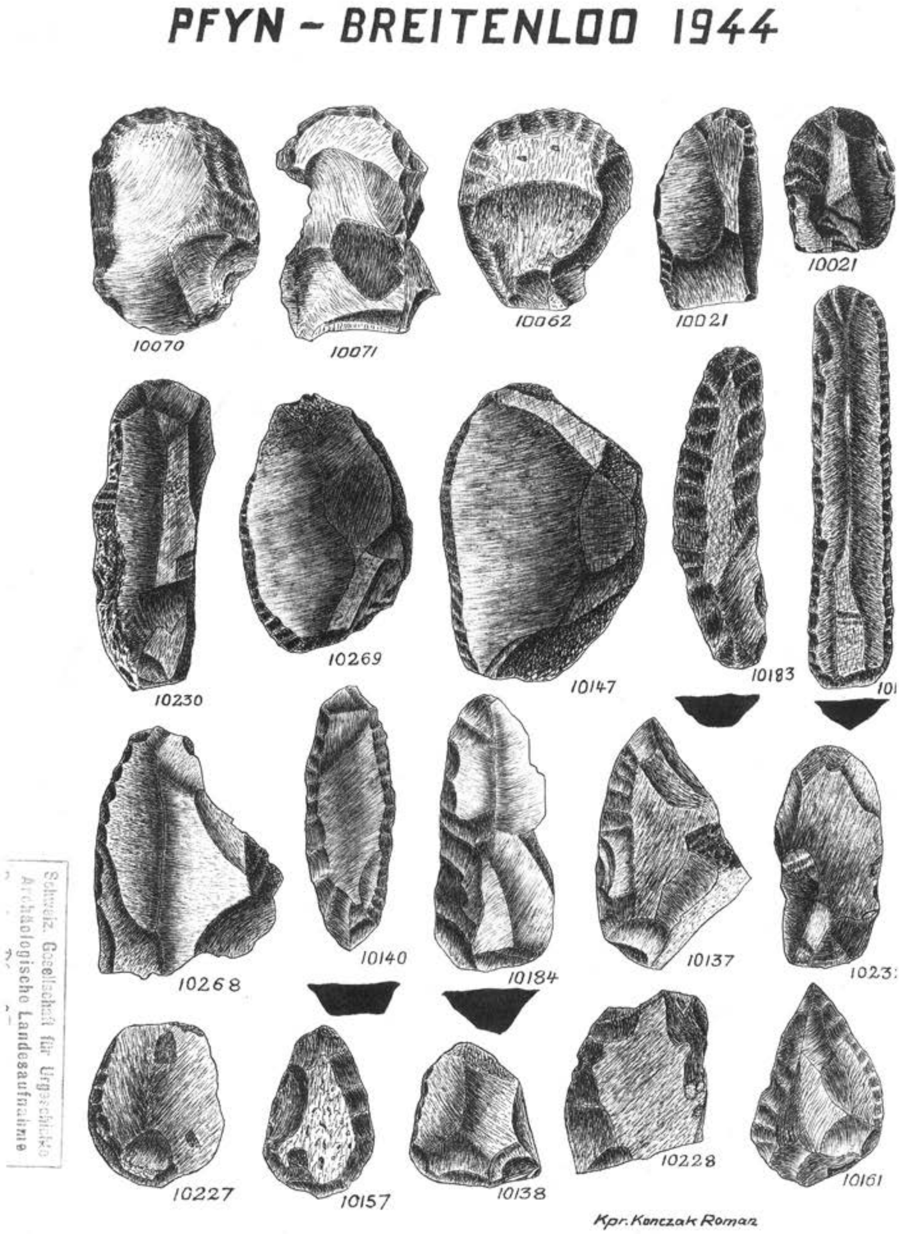


Fig. 12. Drawings of flint finds from Pfyn-Breitenloo made by corporal Roman Kończak. From the archive Amt für Archäologie Thurgau.

Fig. 13. Excavations at Pfyn-Breitenloo. Polish soldier at work.
Photo from the archive Amt für Archäologie Thurgau.

projects (Brem and Leuzinger 2020: 109). It was not until the end of the 20th century that the results of the excavations with Polish soldiers became the subject of in-depth studies. Monographs of the sites Arbon-Bleiche 2 (Hochuli *et al.*, 1994) and Pfyn-Breitenloo (Leuzinger 2007) were published, and various articles on the subject always highlighted the involvement of the team of Polish soldiers (e.g., Leuzinger 2004/2005; 2005).

The 1944 excavations encompassed an area of approximately 1000 m^2. The complex plan of the Neolithic settlement drawn up by the Polish soldiers has proven to be highly accurate and detailed, given the realities of mid-20th century methodology, and the surveys of 2002 and 2004 can easily be linked to the 1944 documentation (Leuzinger 2005: 28; 2007: 20). Based on drawing and photographic documentation, the outlines of 17 Neolithic houses were identified, and the field documentation made it possible to establish many details of their construction (Leuzinger 2007: 25–43). Dendrochronological verification determined that this was a single-phase settlement from 3706–3704 BC. Many details of the settlement's layout were established. The 1944 research produced the following finds: 416 flint artefacts, 69 axe haft elements, 67 stone artefacts, 16 bone and antler products, 242 animal bones,

Fig. 14. Excavations at Pfyn-Breitenloo. The discovery of a Neolithic flint knife in the hands of a Polish soldier. Photo from the archive Amt für Archäologie Thurgau.

26 wooden artefacts, 10 textiles, and 15,057 pottery fragments (Leuzinger 2007: 43). Both the settlement layout data and the portable objects have become a major source of information on the 4th millennium BC in the Alpine zone. The name of the site is still in use to describe a characteristic cultural phenomenon from this region.

OTHER ARCHAEOLOGICAL RESEARCH INVOLVING POLISH SOLDIERS (FIG. 15)

Karl Keller-Tarnuzzer's research was not the only excavation activity involving Poles. The following brief descriptions present other cases.

Aeschi-Dornacker (canton of Solothurn)

Polish soldiers took part in excavations of a Roman villa in Aeschi/Dornacker as early as the autumn of 1940 (Wullschleger 2016: 216). This work, led by Walter Flükiger, took place even before the regulations covering the work of interned soldiers under the Wahlen Plan were implemented (Fig. 16). The idea of using Poles came from

Fig. 15. Location of archaeological sites in Switzerland investigated with the participation of Polish interned soldiers. 1 – Burgäschisee-Ost, 2 – Aeschi-Dornacker, 3 – Sursee, 4 – Vindonissa, 5 – Bellikon, 6 – Pfyn, 7 – Arbon.

Dr Allemann, a chemist from Basel residing in Aeschi (Flükiger 1941: 174). He gained the support of the local scientific elite, as well as the organisational and financial help of the Pro Polonia organisation from Solothurn. Among the participants was the Egyptologist Henri Wild, who by a stroke of luck, knew the architect Tadeusz Górski, a cadet interned in one of the camps in Emmental, from his excavations in Egypt. The Polish colleague then became the chief documentarist for the excavations at Dornacker (Fig. 17). Meanwhile, another cadet, J. Morawski, a surveyor by training, was charged with the measurements and making plans (Fig 18). Apart from Górski and Morawski, there were 46 other Polish soldiers on list of those employed (Flükiger 1941: 176). The Swiss archaeologist noted that as the weather worsened, the enthusiasm of the team waned. There was even a strike that lasted a day and a half. Flükiger tried to blame this situation on the harsh conditions and lack of warm clothing. The crisis was finally averted by providing the team with cigarettes and suitable clothing, with the support of Pro Polonia (Flükiger 1941: 177). In his summary, the research director spoke highly of the quality of the work, particularly that of Górski and

Fig. 16. Excavations at Aeschi-Dornacker (canton of Solothurn). Walter Flükiger with his team. Photo from the archive Amt für Denkmalpflege und Archäologie - Kanton Solothurn.

Morawski. He noted that "despite occasional troubles, the nine weeks spent together were a time of good understanding and fruitful cooperation, which will remain in the fond memory of all participants" (Flükiger 1941: 191).

Research at Aeschi was also carried out in 1944, this time under the direction of Henri Wild. In addition to ten interned Italian soldiers, he engaged his friend Tadeusz Górski again as a draftsman (JbSGUF 1945: 69). The surveying group also included two Polish officers, surveying technicians by training (see below).

Burgäschisee-Ost (canton of Solothurn)

Excavations of a Neolithic lakeside settlement were carried out in 1944 (from 2 August for 13 weeks) under the direction of Otto Tschumi (Bern) and Stefan Pinösch (Solothurn), with the actual fieldwork on site directed by Walter Flükiger (Hafner and Hostettler eds 2022). These excavations primarily employed interned Italian soldiers (Bleuer 2022: 71–75), but working alongside them were two Polish surveyors (Fig. 19): Corporal Paweł Suchon [Suchoń?] from Katowice and Corporal Włodzimierz Rybkowski from Sandomierz (based on a list of employees kept in the archives of the Kantonsarchäologie Solothurn).

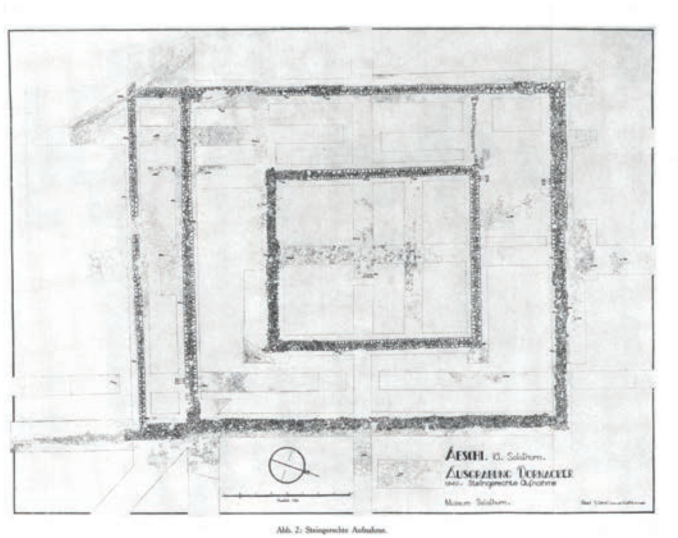


Fig. 17. Drawing documentation of the excavations in Aeschi-Dornacker, signed by Tadeusz Górski. After: Flükiger 1941.

Fig. 18. Excavations at Aeschi-Dornacker (canton of Solothurn). J. Morawski, who was in charge of geodetic measurements, together with his assistants. Photo from the archive Amt für Denkmalpflege und Archäologie - Kanton Solothurn.

Fig. 19. Excavations of the Neolithic settlement of Burgäschisee-Ost (canton of Solothurn). Poles performing geodetic measurements (first and third from the right) together with interned Italian soldiers. Photo from the archive Amt für Denkmalpflege und Archäologie - Kanton Solothurn.

Sursee-Zellmoos (canton of Luzern)

Research in Sursee on the Zellmoos peninsula was carried out from 13.03 to 09.05 1941 under the direction of Dr Reinhold Bosch (Rigert 2008: 12, 13). Ten Polish interned soldiers, whose names have not been established, took part (Fig. 20). The digs carried out during the construction of the Fischerhaus revealed the foundations of a church and a cemetery from the 11th century (Fig. 21), along with remains of Late Bronze Age houses and single finds from the Neolithic and Bronze Age.

Vindonissa-Schutthügel (canton of Aargau)

A group of more than 20 soldiers from the nearby camp at Gebenstorf (JBer. GPV 1940–1941: 17, 18; Zimmermann 2016) were deployed to research the well-known Roman legion camp at Vindonissa (Fig. 22). Led by Karl Hürbin, they performed simple physical work on the *Schutthügel*, or camp rubbish dump. For their work, the soldiers were paid a low but statutory rate of 1 franc per day. In the beginning, Karl Hürbin wrote with satisfaction in his excavation diary about the good training of the soldiers, noting that they were paying attention to the finds as they dug (Zimmermann 2016).

Fig. 20. A group of Polish soldiers during excavation at the Sursee-Zellmoos site in 1941. Photo from the archive Kantonsarchäologie Luzern.

Later, however, cooperation did not go well and the Poles were soon dismissed. Hürbin reverted to engaging patients from the psychiatric institution in Königsfelden, who were in his opinion "more industrious and reliable" and, in addition, usually worked without pay (JBer. GPV 1941–1942: 7).

Bellikon-Villa rustica (canton of Aargau)
The research of a Roman villa rustica was carried out from 27.10–17.12 1941 by Walter Drack on behalf of the "Vereinigung für Heimatkunde" society (Drack 1943). Drack was a student doing his military service, with the rank of lieutenant (Zubler 2000: 104–106). To carry out the task, he managed to recruit Polish soldiers from the accommodation camp in Hasenberg, which operated under a larger camp in Lupfig and then, from December 1941, in Wettingen (Fig. 23). Initially, six soldiers were employed, and in the course of the research their number increased to 15. They performed simple physical work, mainly uncovering stone structures of the Roman villa located in the forest. For this reason, Drack requested workers who were forestry labourers by profession. Unfortunately, the only person in this profession, Julian Nowakowski, only worked until 15 November, when he successfully escaped from

Fig. 21. Polish soldiers surveying the Sursee-Zellmoos site.
Photo from the archive Kantonsarchäologie Luzern.

internment. In his excavation diary, the Swiss archaeologist described his workers, including their personal details and occupations (his team lacked people with higher education). Drack recorded the nationality of his workers in a characteristic way: he listed ten Poles from Poland, two Poles from France and one from Germany. Next to the last two entries he wrote: Antoni Przybylski from Alsace and Ignacy Bury from Poznań (Zubler 2000: 106). Whether this was a politically motivated precaution or an expression of the Swiss's convictions, it is difficult to say.

What draws attention is the high fees offered to the soldiers for their work at Bellikon, as much as three and a half francs per day. This is exceptionally good payment for work performed by rank-and-file interned soldiers (the fee usually hovered around one franc). Such conditions must have benefited the atmosphere of the work, and the

Fig. 22. Polish soldiers during the excavation of the Roman legionary camp in Vindonissa (canton of Aargau). Photo from the archive Kantonsarchäologie Aargau.

tensions and mutinies among soldiers which often occurred early in internment were thus avoided.

RECAPITULATION

On the sixtieth anniversary of the research, a meeting of Polish veterans, archaeologists, and the Polish ambassador to Switzerland was held in Pfyn (Leuzinger 2004/2005: 111, 112). A commemorative monument with inscriptions in German and Polish was unveiled at the excavation site (Fig. 24). This was the last moment for the surviving soldiers of the 2nd Rifle Division to take part in the ceremony. Many

Fig. 23. Group of Polish soldiers researching a Roman villa in Bellikon (canton of Aargau). Photo from the archive Kantonsarchäologie Aargau.

years after the War, the work at Pfyn and other excavations by Poles are commemorated in various ways, and their work is remembered with sentiment and appreciation (e.g., Zubler 2000; Zimmermann 2016). That said, the overview of excavations involving Poles presented above indicates that they were carried out with varying degrees of success. These works took place at the beginning (1940–1941) and the end of the internment period (1944–1945), which means they were conducted under two distinctly different circumstances. During the difficult initial period, there were many misunderstandings between the Poles and the Swiss concerning, among other things, working conditions and pay. Attempts to employ soldiers only as cheap labour were not very successful. Engaging people with the right qualifications – as in the case of the surveyors and the architect on the Aeschi excavations – produced better results. Much depended on the organisational skills of the Swiss archaeologists and their good relations with the Polish soldiers. In this initial period, the problems with discipline and work efficiency on archaeological excavations were similar to those encountered when internees were employed on other work.

The research at Pfyn-Breitenloo described more extensively here is an example from the late internment period. The work was carried out remarkably effectively

Fig. 24. Monument unveiled on the 60th anniversary of the excavations at Pfyn-Breitenloo. Photo Amt für Archäologie Thurgau, Daniel Steiner.

thanks to the good cooperation between Karl Keller-Tarnuzzer and Henryk Dawid, the Polish commander of the recruited team. The Swiss archaeologist proved to be a good organiser, and he had a team of very good performers with either the right education or the right talents. The conditions for this research were special, as their location made it possible to recruit well-qualified workers from the nearby internment camps. Crucial to the final success, however, was the attitude of Keller-Tarnuzzer, who, with no previous experience, succeeded in dealing with the Polish soldiers in difficult wartime realities. After all, the internees had already been doing forced labour for several years, isolated from their loved ones and uncertain of their future. While this work was no doubt significantly different in nature from the involvement of prisoners in archaeological research in Nazi Germany (see comments in Brem 2003), it was nevertheless difficult to expect adequate motivation from the soldiers. With good communication, however, they produced very good results.

ACKNOWLEDGEMENTS

The illustrations used in the article come from the archives of the archaeological cantonal offices in Aargau, Luzern, Solothurn and Thurgau. We would like to thank Elisabeth Bleuer, Albert Hafner, Marco Hostettler, Anna Kienholz, Andrea Nold and Jürgen Trumm for help in obtaining these materials.

REFERENCES

Bill, M.-I. 2020. *Interniert. Polnisch-schweizerische Familiengeschichten*. Zürich. Chronos-Verlag.

Bleuer, E. 2022. *Italienische Internierte in der Schweiz zur Zeit des Zweiten Weltkriegs mit Blick auf das Seeland und das italienische Kavallerieregiment «Savoia Cavalleria»*. Bern. Bibliothek am Guisanplatz (BiG), Philippe Müller.

Brem, H. 2003. Die Schweiz als Zufluchtsort für Nazi-Archäologen? – Eine Replik auf die Rezension von Martina Schäfer, St. Gallen, zum Werk von Uta Halle. *Archäologische Informationen* 26(2): 520–523.

Brem, H. and Leuzinger, U. 2020. Archäologe ohne Vergangenheit? In U. Leuzinger (ed.), *Thurgauer Köpfe. Katalog zur Sonderausstellung*, 96–113. Frauenfeld. Museen Thurgau, Kulturamt und Amt für Archäologie Thurgau.

Cieszkowski, W., Kulikowska, I., Kulikowski, K., Mazur, G. and Smoliński, J. 2010. Żołnierze polscy internowani w Szwajcarii (1940*–1945) / Die in der Schweiz internierten polnischen Soldaten (1940–1945)*. Warszawa. PAT.

Drack, W. 1943. Die römische Villa rustica von Bellikon-Aargau. *Zeitschrift für Schweizerische Archäologie und Kunstgeschichte* 5(2): 86–122.

Flükiger, W. 1941. Die römische Ausgrabung in Aeschi 1940. *Jahrbuch für Solothurnische Geschichte* 14: 173–191.

Hafner, A. and Hostettler, M. (eds). 2022. *Burgäschisee 5000–3000 v. Chr. Siedlungsdynamik und Mobilität, Landnutzung und Subsistenz*. Leiden. Sidestone Press. Open Series in Prehistoric Archaeology 2.

Hochuli, S., Kesselring, R. and Joos, M. 1994. Arbon-Bleiche. *Die neolithischen und bronzezeitlichen Seeufersiedlungen. Ausgrabungen 1885–1991*. Frauenfeld. Departement für Erziehung und Kultur des Kantons Thurgau. Archäologie im Thurgau 2.

JBer. GPV 1940–1941. Die Ausgrabungen. *Jahresbericht/Gesellschaft Pro Vindonissa* 1940–1941: 13–18.

JBer. GPV 1941–1942. Die Ausgrabungen. *Jahresbericht/Gesellschaft Pro Vindonissa* 1941–1942: 4–11.

JbSGUF 1945. Aeschi (Bez. Kriegstetten, Solothurn). *Jahrbuch der Schweizerischen Gesellschaft für Urgeschichte* 36: 69.

Keller-Tarnuzzer, K. 1944a. Wie wir den Pfahlbau im Breitenloo bei Pfyn ausgruben. *Ur-Schweiz* 8(4): 65–75.

Keller-Tarnuzzer, K. 1944b. Pfyn (Bez. Steckborn, Thurgau). Pfahlbau Breitenloo. *Jahrbuch der Schweizerischen Gesellschaft für Urgeschichte* 35: 28–33.

Keller-Tarnuzzer, K. 1945. 4000 Jahre sind es her! *Schweizer Schüler* 11, 17. März 1945.

Leuzinger, U. 2004/2005. Polnische Soldaten graben 1944 in Pfyn-Breitenloo. *Plattform* 13/14: 111–113.

Leuzinger, U. 2005. *Die jungneolitische Siedlung Pfyn-Breitenloo, Thurgau (Schweiz)*. In P. Della Casa and M. Trachsel (eds), *WES'04. Wetland Economies and Societies. Proceedings of the International*

Conference. Zurich, 10–13 March 2004, 25–32. Zürich. Schweizerisches Landesmuseum Zürich. Chronos Verlag.

Leuzinger, U. 2007. *Pfyn Breitenloo. Die jungsteinzeitliche Pfahlbausiedlung*. Frauenfeld. Departement für Erziehung und Kultur des Kantons Thurgau. Archäologie im Thurgau 14.

Matyja, M. 2013. *Niespełnione nadzieje. Losy 2. Dywizji Strzelców Pieszych w latach 1940–1945*. Toruń. Wydawnictwo Adam Marszałek.

Rettenmund, J. 1995. Polnische internierte in der Region Napf 1940/41. Teil I. *Jahrbuch des Oberaargaus* 38: 233–288.

Rigert, E. 2008. *Sursee. Bronzezeitliche Siedlungen auf der Landzunge Zellmoos. Die Grabung 1991*. Luzern. Bildungs- und Kulturdepartement des Kantons Luzern. Archäologische Schriften Luzern 12.

Smoliński, J. 1992. *2 Dywizja Strzelców Pieszych (Francja-Szwajcaria)*. Warszawa. Agrotechnika.

Stempowski, T. 2015. *Polskie drogi przez Szwajcarię / Auf Polenwegen durch die Schweiz*. Warszawa-Rapperswil. Instytut Pamięci Narodowej, Polenmuseum Muzeum Polskie Schloss Rapperswil.

Vetulani, A. 1976. *Poza płomieniami wojny. Internowani w Szwajcarii 1940–1945*. Warszawa. Wydawnictwo Ministerstwa Obrony Narodowej.

Volland, B. 1993. Polen, Schweizerinnen und Schweizer. Militärinternierte und Zivilbevölkerung 1940–1945. *Jahrbuch der Historisch-antiquarischen Gesellschaft von Graubünden* 123: 197–321.

Włodarczak, P. 2008. Wykopaliska 2. Dywizji Strzelców Pieszych. *Z otchłani wieków* 63(1–4): 163–171.

Wullschleger, M. 2016. Im römischen Weltreich. In P. Harb and H. Spycher (eds), *Fundort – Archäologie im Kanton Solothurn*, 195–243. Solothurn. Amt für Denkmalpflege und Archäologie.

Zimmermann, E. 2016. Polnische Soldaten halfen als archäologische Ausgräber aus. *Aargauer Zeitung*, https://www.aargauerzeitung.ch/aargau/brugg/polnische-soldaten-halfen-als-archaologische-ausgraber-aus-ld.1553868 (Access: 13 February 2023).

Zubler, K. 2000. Ausgegraben – Sammler, Sammlung und Sammlungsgeschichten. Zum 125-Jahr-Jubiläum der Gründung des Historischen Museums Baden. *Badener Neujahrsblätter* 75: 92–113.

Archaeologia Polona, vol. 61: 2023, 269–287
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3499

The Formation of the Units of the Polish People's Army (1944-1945) in Eastern Poland. The LiDAR Evidence

Jakub M. Niebylski[a], Damian Stefański[b] and Przemysław Wierzbicki[c]

This article provides an overview of landforms that are remnants of military camps created during the formation of the Second Polish Army in the area of Łuków, Międzyrzec Podlaski and Radzyń Podlaski (East Poland) in 1944-1945. These landforms were discovered while conducting surveys for the construction of the S19 expressway and were further investigated for a comprehensive understanding. The focus of this article is on mapping and visualizing these structures and identifying individual military units at the division and regiment levels. The research was conducted using non-destructive prospection methods, utilizing publicly available LiDAR data obtained through the ISOK project, which scanned the Polish area. The identification of military units was based on existing literature, providing a framework for establishing specific connections. However, due to the level of detail in the descriptions, there are cases where clarity is lacking, leaving room for further historical study of the military activities during the discussed period. The article acknowledges that the limited scope necessitates omitting details regarding the internal organization of military structures, their connection to military instructions, and historical records of their construction and use.

KEY-WORDS: archaeology of modern conflicts, conflict archaeology, landscape archaeology, LiDAR, military camps, Second Polish Army, World War II

INTRODUCTION

LiDAR and publicly available satellite imagery are useful tools employed in archaeological research of modern settlement sites, especially in the context of military

[a] Institute of Achaeology and Ethnology, Polish Academy of Sciences, Sławkowska Street 17, 31-016 Cracow (Poland), e-mail: jakub.m.niebylski@gmail.com; ORCID: 0000-0002-6507-6087

[b] Archaeological Museum in Cracow, Senacka Street 3, 31-002 Cracow (Poland), e-mail: damian.stefanski@ma.krakow.pl; ORCID: 0000-0002-7203-6796

[c] „Archeoplan" Pracownia Archeologiczno-Konserwatorska Przemysław Wierzbicki, Do Wilgi Street 20/5, 30-419 Cracow (Poland), e-mail: archeoplan.pw@gmail.com; ORCID: 0009-0007-2756-741X

Received June 5, 2023; Received in revised form October 19, 2023; Accepted October 30, 2023

installations (Zalewska and Kiarszys 2015; Kobiałka 2017; Zalewska *et al.*, 2019; Niebylski 2020; Niebylski *et al.*, 2021; Zalewska and Kiarszys 2021; Niebylski and Czarnowicz 2022; Szubski *et al.*, 2022). This study is based on the high-resolution data from the IT Country Protection System (in Polish: Informatyczny System Osłony Kraju, abbrev. ISOK), which ranges from 4 to 16 measurement points per square meter (Kurczyński *et al.*, 2014), and enables a detailed reconstruction of well-preserved structures. These data were applied during archaeological surface and reconnaissance surveys preceding the construction of the S19 expressway in the Lublin Province (Wierzbicki and Oleszczak 2021a; 2021b) revealing the presence of numerous distinctive landscape structures that intersect with the proposed route. A preliminary study of these structures (Stefański 2021a; 2021b) has already established a connection between them and the formation process of the Second Army of the Polish People's Army (abbrev. 2nd Polish Army, 2nd Army), which took place in the area of Łuków, Międzyrzec Podlaski, Radzyń Podlaski, Lublin Voivodeship and Siedlce, Masovian Voivodeship in the second half of 1944 and the beginning of 1945. This initial finding prompted a more extensive investigation, covering a broader area, which resulted in the identification of a significant collection of remnants that document this historical process (Fig. 1). While historical sources provide a relatively well-described account of the subject, the well-preserved landscape remains have the potential to provide additional valuable data.

2ND POLISH ARMY

At the end of World War II, as German troops were being pushed out of present-day Poland, the communist Polish Committee of National Liberation unified the Polish Army formed in the territory of the Union of Soviet Socialist Republics with the People's Army (Stępniowski 1962). This led to the creation of new military units, namely the 2nd and 3rd Polish Armies. The structure of the 2nd Army and its formation area in the Lublin region were outlined in the first order (No. 8/Org.) issued by the Supreme Command on August 20, 1944. The formation of the 3rd Army followed later, as per order No. 041 on October 6, 1944 (order No. 041 of October 6, 1944; Dideńko 1978).

According to the initial order, the 2nd Army consisted of four infantry divisions (5th, 6th, 7th, 8th), the 4th Sapper Brigade, the 33rd Independent Motorized Pontoon Battalion, the 3rd Independent Anti-chemical Defense Battalion, the 5th and 8th Independent Tank Regiments, the Independent Tank Regiment, the Independent Heavy Tank Regiment, the 9th Independent Anti-tank Artillery Brigade, and the

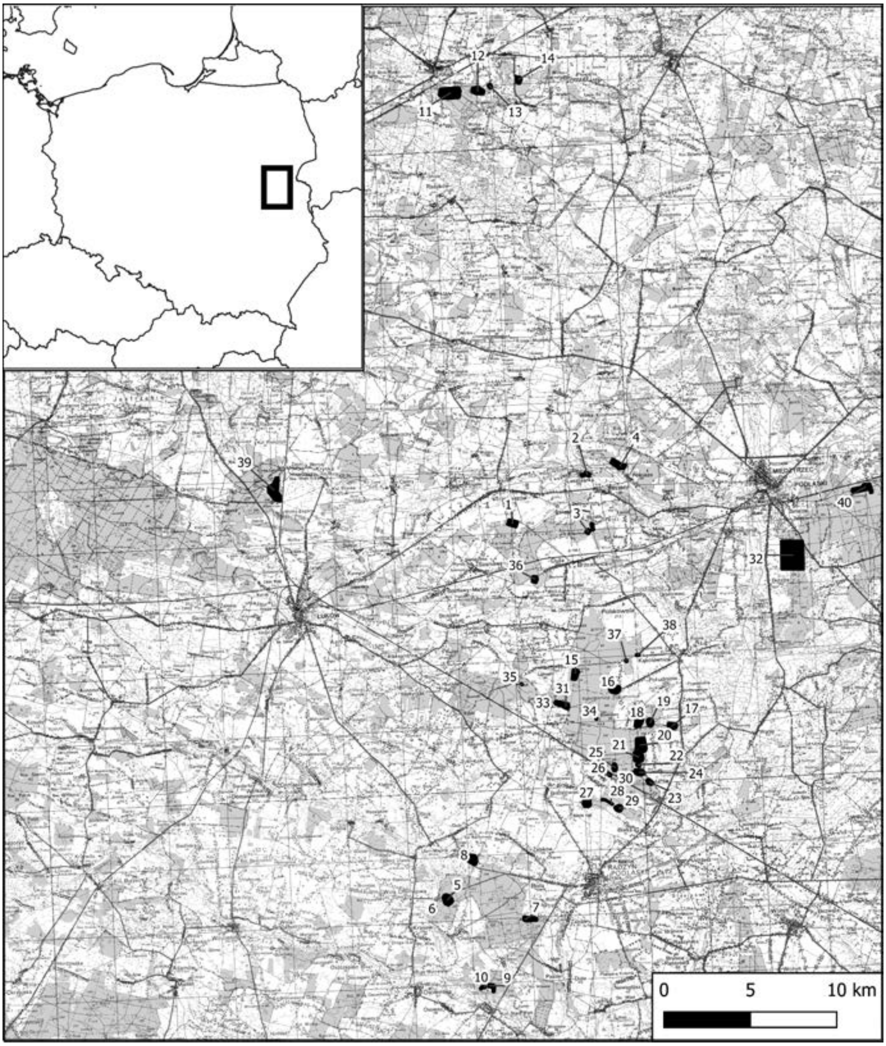


Fig. 1. The distribution of individual structures documenting the process of forming the 2nd Polish Army in the second half of 1944 and the beginning of 1945. Graphic design: D. Stefański.

3rd Anti-aircraft Artillery Division. Annex No. 4 specified the establishment of an additional 9th Infantry Division (Stępniowski 1962; Ginalski and Wysokiński 1984). This unit consisted primarily of volunteers and conscripts born between 1921 and 1924, and the formation area was referred to as Lublin, Poland. Approximately 85%

of the soldiers were of Polish descent, while the commanders from battalion level and above were exclusively Russian soldiers (Szostak 2005). Residents were also recruited into these units (Geresz 2001).

The area in question had been liberated by the Red Army troops, who had entered Międzyrzec Podlaski on July 26, 1944 (Geresz 2001; Maraszek 2019) and established the quarters of the commander of the Russian 70th Army there. By the end of January 1945, the newly formed 2nd Army consisted of the 5th, 7th, 8th, 9th, and 10th Infantry Divisions, the 3rd Anti-aircraft Artillery Division, the 9th and 14th Anti-tank Artillery Brigades, and the 4th Sapper Brigade. The total number of soldiers and officers was approximately 60,000 (Szostak 2005). The commanders of the 2nd Army were Major General Karol Świerczewski and Major General Stanislaw Popławski. At the time of its formation, the 2nd Army comprised 69,895 soldiers, including 44,685 regular corps soldiers, 16,807 non-commissioned officers, 290 cadets, and 8113 officers. The equipment at its disposal included 36,259 units of long guns, 1229 mortars and cannons, 7038 horses, 2875 cars and tractors, 22 armored cars, and 140 tanks and assault guns (Komornicki 1984). In late January 1945, the 2nd Army departed from the Lublin region to distribute Polish People`s Army units more evenly across the country and secure the main lines of communication for the Red Army troops (Stępniowski 1962). Subsequently, in February 1945, it was redirected towards Pomerania, reaching the Gorzów Wielkopolski region in March. From there, it moved in a southeastern direction and was assigned to the 1st Ukrainian Front in the Berlin Operation, taking part in the Lusatian Operation. The 2nd Army later regrouped to form a southbound front with the Russian 5th Guards Army and participated in the Prague Operation against the German Army Group Centre (Kaczmarek 1978; Szostak 2005; Niebylski and Tunia 2018). After the end of hostilities, some subunits of the 2nd Army were engaged in fights with the Ukrainian Insurgent Army.

METHODOLOGY

The search for military features was conducted using a hillshade map from the geoportal.gov.pl online service – GEOPORTAL 2 Project of Polish Head Office of Geodesy and Cartography. These features were predominantly located in forest complexes, which facilitated and focused the prospecting efforts. Visualization was carried out using ISOK LiDAR scan data in the form of .laz files. Data processing involved software such as SAGA GIS, QGIS, and the Relief Visualization Toolbox (RVT). In the initial stage, the LiDAR data were reclassified based on land categories (2) and then gridded using the Natural Neighborhood Triangulation method with a resolution of 0.25 meters. These files were subsequently converted to the GeoTiff format specific to the RVT program (Zakšek *et al.*, 2011; Kokalj and Hesse 2017). Various imaging methods were employed during the analysis, including multidirectional hillshade, Principal Relief Component, slope map, simple Local Relief Model, Topographic Position Index, and Local Dominance. These methods were tested to achieve optimal visualization, and ultimately, the Sky-View Factor visibility index was selected as the most useful. Figures were generated at scales of 10,000 to capture the entire structure and 2500 to highlight essential details. Depending on the size of the structure, either the first or second option was chosen for individual cases. The linkage of specific military units with individuals was accomplished based on descriptions of their dislocation. Published maps, such as those by Stępniowski (1962) and Gać (1971), proved to be particularly valuable in this regard. The probability of accurate interpretation is relatively high for the 5th and 7th Infantry Division units. However, due to the higher density of structures, it becomes more challenging and less certain for the 9th Infantry Division.

STRUCTURE OF THE 2ND ARMY

During the initial stage of the formation of the 2nd Army, the army consisted of 13,817 soldiers as of August 31, 1944. By October 1, the number had increased to 49,673 soldiers, and by January 1, 1945, it had reached 55,909 soldiers (Stępniowski 1962). Detailed data on the army's subdivisions, numbers, and armaments can be found in the report of the Chief of Staff of the 2nd Army, dated January 7, 1945 (Lewandowicz *et al.*, 1965). The commander's quarters and headquarters of the 2nd Army were initially located in Kąkolewnica, along with the area of the village of Polskowola. They were moved to this location on October 11 and 12, 1944, from Lubartów due to the increasing manpower and the dislocation of the 7th Infantry Division to the Radzyń Podlaski area (Geresz 2001). In Kąkolewnica, an airstrip for liaison aircraft was prepared, a field power plant was established for the electrification of buildings, and telephone communications with Lublin and division headquarters were established (Stępniowski 1962). During the period from fall 1944 to late January and early February 1945, the Information Branch, Field Court, and Staff of the 2nd Army were also stationed in Kąkolewnica.

5TH INFANTRY DIVISION

The 5th Infantry Division was established on July 5, 1944, in the Zhytomyr region (present-day Ukraine). From August 19 to September 2, it was located in the area of the villages of Trzebieszów, Dębowierzchy, and Leszczanka (Wolski 1996). The headquarters of the 5th Infantry Division was situated in the village of Trzebieszów. Within the village, the regiment's headquarters, sick bay, certain special subdivisions, and senior officers were located. The eastern part of the village was occupied by the regiment's artillery (Ginalski 1974). The division's units established forest camps in the present-day Łuków District, constructing living dugouts that served various purposes. By September 20, most of the subsistence-related dugouts were completed, along with kitchens, bathhouses, laundries, guardhouses, warehouses, and stables. The identified structures in the area have been attributed to the 13th Infantry Regiment (in Polish: 13. Pułk Piechoty, abbrev. 13pp; Fig. 2:1), 15th Infantry Regiment (15pp; Fig. 2:2), 17th Infantry Regiment (17pp; Fig. 2:3), and the 22nd Light Artillery Regiment (in Polish: 22. Pułk Artylerii Lekkiej, abbrev. 22pal; Fig. 3:4). There were also other units present whose remnants in the terrain have not been identified, including the 1st Sapper Battalion stationed in Karwów, the 7th Vehicle Company stationed in Nurzyna, the 6th Self-propelled Artillery Squadron, and the 23rd Field Bath and 17th Field Laundry stationed in Trzebieszów.

7TH INFANTRY DIVISION

The 7th Infantry Division was dislocated in the region of Radzyń Podlaski from October 19 to 23, 1944. The division's headquarters and command were located in the Borki estate. The construction of dugouts in the area involved trenches boarded with wood. There were no specific guidelines given to the soldiers, resulting in variations in the design of the dugouts. The most common type of dugout was built to accommodate one platoon, or approximately 30 soldiers. These dugouts typically had 15 bunk beds made of planks, a stove, and a gun rack. In some companies, one large dugout was constructed to house the entire company of 120 soldiers, while another was built for headquarters, command, and storage purposes. The dugouts had doors and windows, which were covered with metal sheets, cardboard, or boards. Stoves for heating were often constructed using grease or gasoline barrels, as well as buckets. Besides living quarters, there were other functional structures such as field baths and disinfection chambers. The bathhouses followed a uniform plan with three rooms: the undressing room, the bathhouse, and the dressing room. They also served as saunas, equipped with stone furnaces that produced steam. The bathhouses were situated on slopes for water drainage. Disinfection chambers were wooden devices on a rectangular plan, measuring 1.9×1.6 meters and 1.9 meters in height, with a furnace. They were used to disinfect 20 sets of uniforms using a high-temperature iron stove

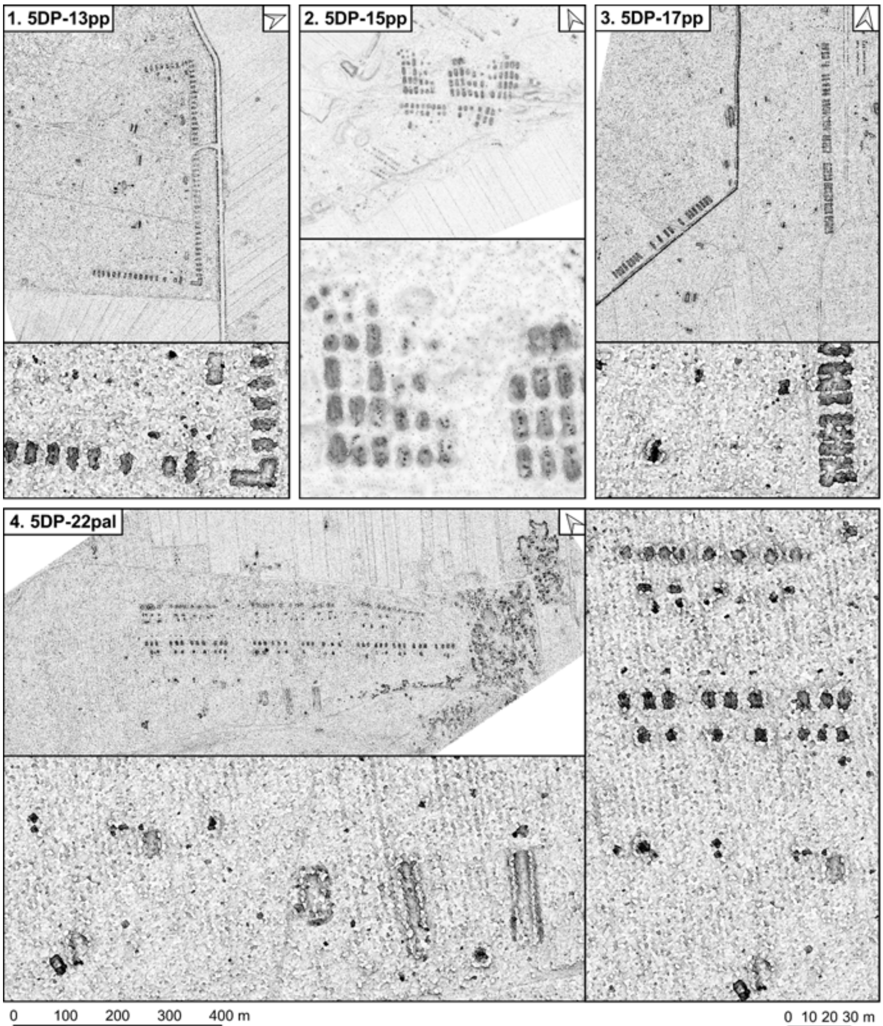


Fig. 2. The Sky View Factor visualisation of the 5th Infantry Division military camps west of Międzyrzec Podlaski, the numbers correspond to the designations in Fig. 1. Graphic design: D. Stefański.

or an oven made from a barrel of grease and oil. Pipes connected to the stove, and wooden grilles were placed above the clothes to limit contact with the stove. The construction work was completed within a span of 10 to 20 days. Additionally, air-raid trenches were dug in areas where troops were stationed, along with rear equipment

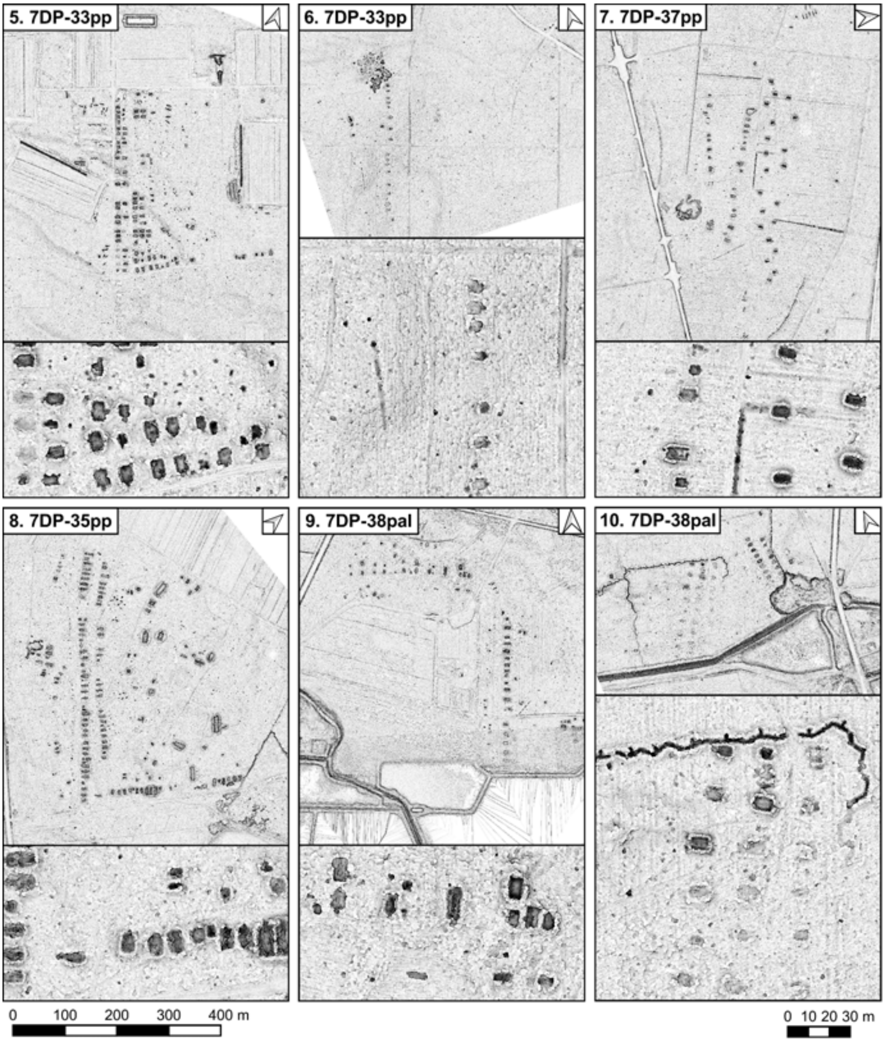


Fig. 3. The Sky View Factor visualisation of the 7th Infantry Division military camps west of Radzyń Podlaski, the numbers correspond to the designations in Fig. 1. Graphic design: D. Stefański.

(Gać 1971).The structures identified in the area have been attributed to the 33rd Infantry Regiment (33pp; Fig. 3:6, 7), 35th Infantry Regiment (35pp; Fig. 3:8), 37th Infantry Regiment (37pp; Fig. 3:7), and the 38th Light Artillery Regiment (38pal; Fig. 3:9, 10). Other units associated with the division that have not been identified in

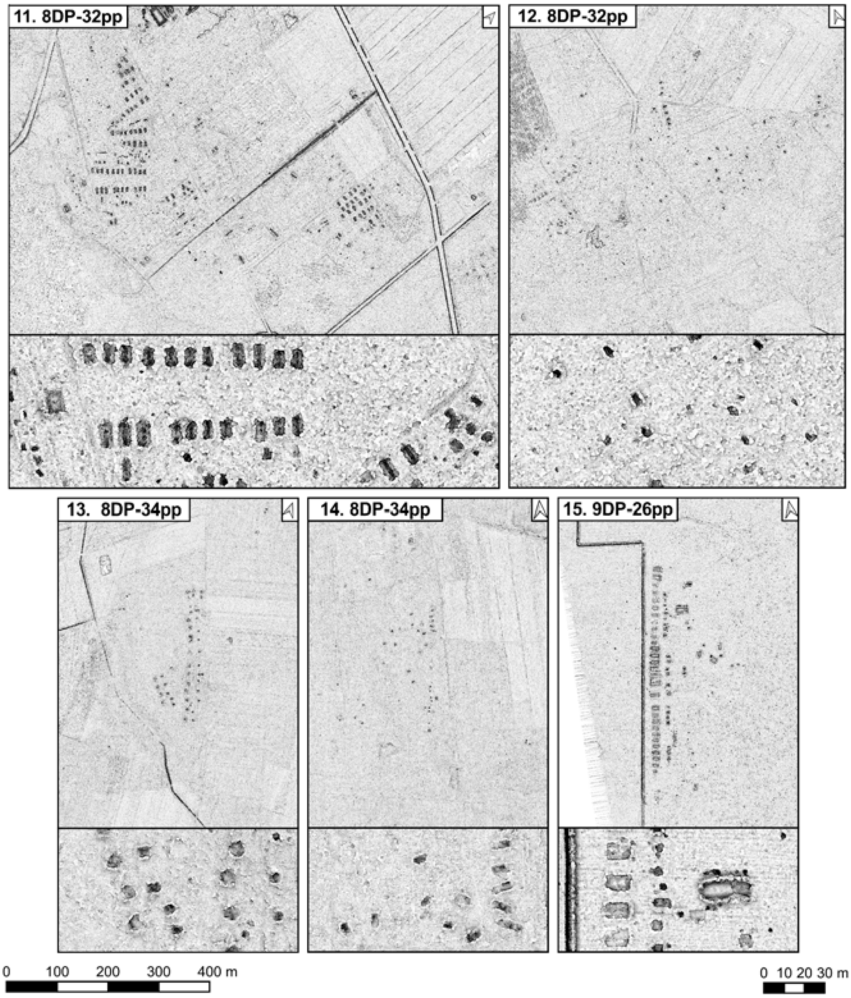


Fig. 4. The Sky View Factor visualisation of the 8th Infantry Division military camps east of Siedlce and 9th Infantry Division military camps southwest of Kąkolewnica, the numbers correspond to the designations in Fig. 1. Graphic design: D. Stefański.

the terrain include the 7th Independent Reconnaissance Company, 14th Independent Communications Company, and Communications Battalion stationed in the Borki estate. The Training Battalion was stationed in the forest southwest (or northwest according to other data) of the village of Paszki Małe, east of the village of Paszki

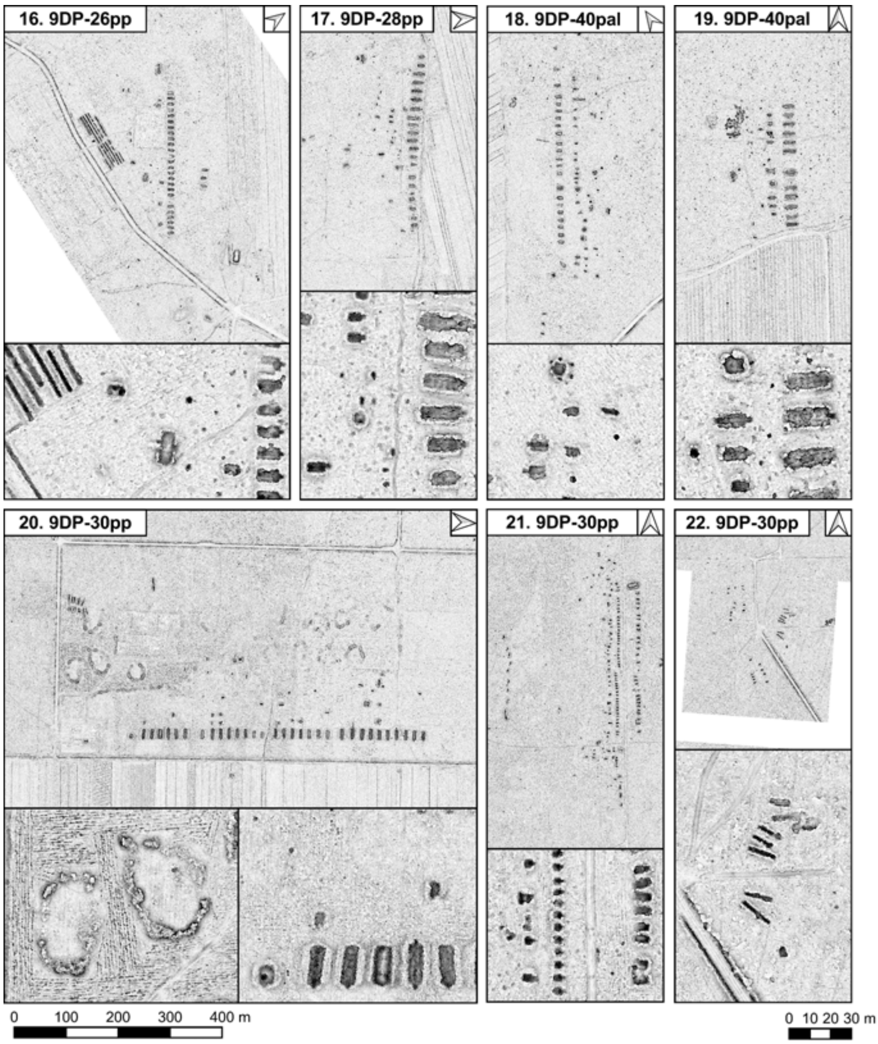


Fig. 5. The Sky View Factor visualisation of the 9th Infantry Division military camps southwest of Kąkolewnica, the numbers correspond to the designations in Fig. 1. Graphic design: D. Stefański.

Duże. The 18th Sapper Battalion was located in the village of Paszki Małe (or in the forest near the Pasieka forester's lodge, north of the Borki manor, according to other data). The 10th Independent Self-propelled Artillery Squadron was stationed north of the Wrzosów colony, in the forest north of the Borki manor (east of the 38th Light

Artillery Regiment). The Independent Medical-sanitary Battalion was stationed at the Olszewnica estate, and the quartermasters were stationed in the villages of Sitno and Zabiele. The 13th Independent Chemical Company was located in the village of Osowno, and divisional warehouses were situated in the village of Adamki.

9TH INFANTRY DIVISION

The unit, which was formed in Białystok, became part of the 2nd Army and was stationed in the region of Kąkolewnica from late autumn until its march to the front on January 28, 1945 (Ginalski 1964; Szkurtatowicz 2014). The Division's Headquarters was located in the village of Jurki. The forest camps accommodated a significant number of soldiers. The earthworks at the edge of the forest in Turów, which were constructed during that time, are still visible in the field today (Ginalski and Wysokiński 1984; Kospath-Pawłowski 1995b; Szczepaniuk 2014a; 2014b; Szkurtatowicz 2014). The soldiers constructed dugouts with improvements based on the mistakes made during the initial formation of their quarters. Most of the dugouts were large and housed one company of soldiers. They had two entrances and rows of bunk beds along the longer walls. Inside each dugout, there were separate rooms for weapons storage and the company commander. Since straw was not available, the soldiers used tent sheets, military coats, and spruce branches for bedding. Cast iron stoves or brick and clay ovens were built for heating. The window openings were covered with translucent greased paper since glass was not available, resulting in a semi-dark environment. The dugouts were also utilized for lectures on regulations, political classes, and weapons science. Construction of the camps was completed on December 10, and some of them were equipped with telephone connections to the headquarters. Wells were built where possible for water supply, while in other cases, barrels from neighbouring villages were utilized. Various other structures were constructed, including rooms for guards, inspection service, regulation car parks, regulation artillery parks, insulated stables for horses, kitchens, battalion baths, and warehouses. Infrastructure elements such as alarm yards and delineated district boundaries were also established in the area. The identified structures in the area have been attributed to the 26th Infantry Regiment (26pp; Fig. 4:15, 5:16), 28th Infantry Regiment (28pp; Fig. 5:17), 30th Infantry Regiment (30pp; Fig. 5:20–22), 40th Light Artillery Regiment (40pal; Fig. 5:18, 19), and the 5th Reserve Infantry Regiment (in Polish: 5. Zapasowy Pułk Piechoty, abbrev. 5zpp; Fig. 7:31, 33, 34). Undetermined remains of structures belonging to this unit have been documented south of the area occupied by the 30th Infantry Regiment (Fig. 6:25–30). Other units associated with the division, for which

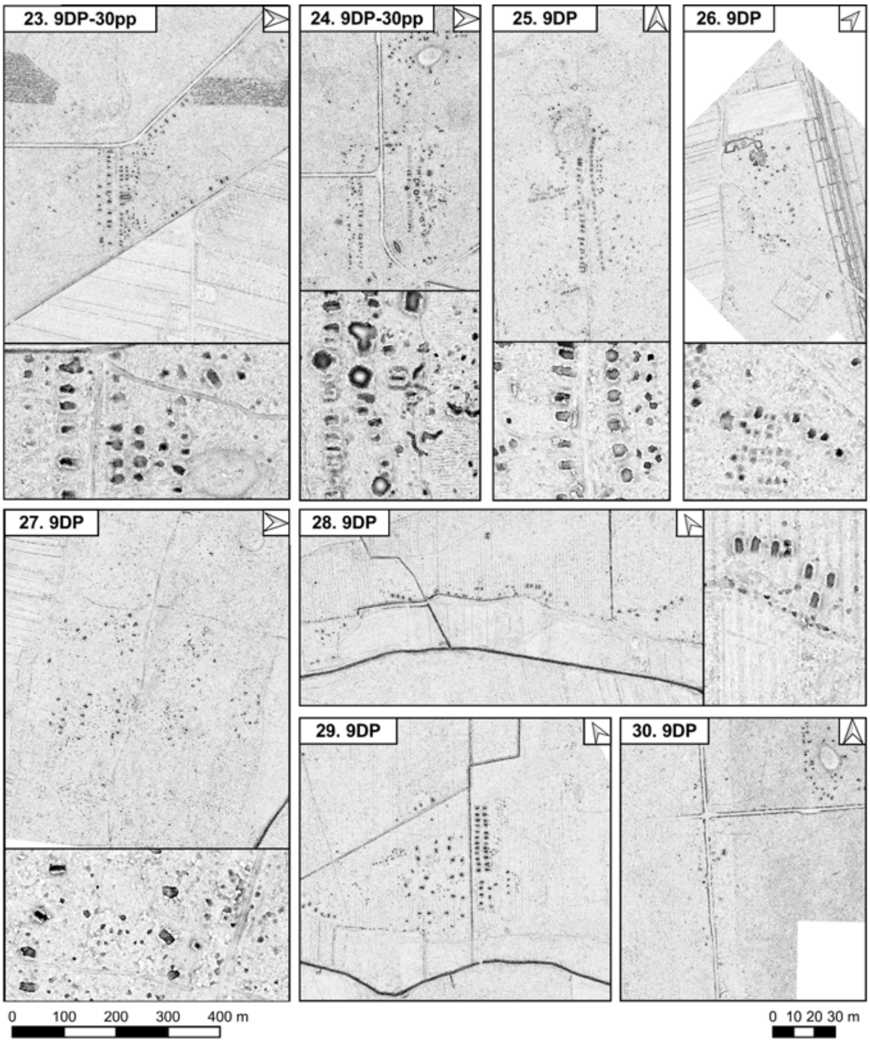


Fig. 6. The Sky View Factor visualisation of the 9th Infantry Division military camps southwest of Kąkolewnica, the numbers correspond to the designations in Fig. 1. Graphic design: D. Stefański.

landscape structures were not identified, include the Training Battalion stationed in the villages of Kobylak and Krętawki (part of the village of Grabowiec), the 20th Sapper Battalion stationed in the area of the villages of Wygnanka and Rudnik (part of the village of Kąkolewnica), the 9th Reconnaissance Company stationed in the

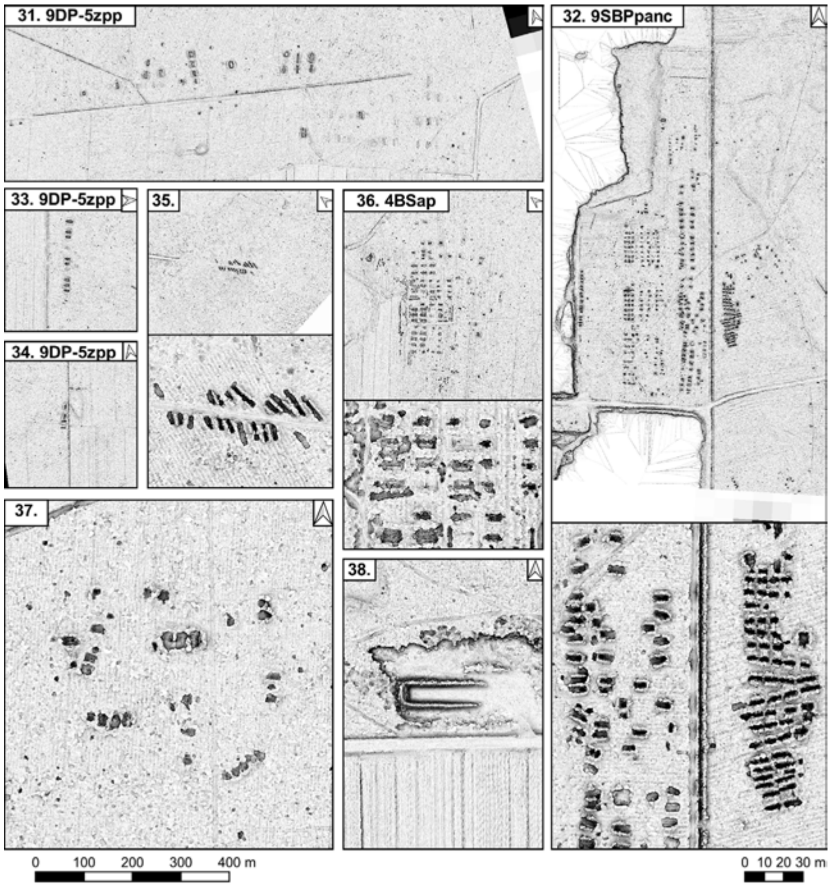


Fig. 7. The Sky View Factor visualisation of the 9th Infantry Division military camps southwest of Kąkolewnica; 4th Sapper Brigade military camps southwest of Międzyrzec Podlaski and 9th Independent Anti-tank Artillery Brigade military camps southeast of Międzyrzec Podlaski, the numbers correspond to the designations in Fig. 1. Graphic design: D. Stefański.

area of the village Kruszyny (part of the village of Grabowiec), the 16th Communications Company stationed in the area of the village Grabowiec, and the 3rd Independent Airborne Communications Squadron in the area of the village Kownatki. The division's rear was located in houses north of the village of Starowieś (part of the

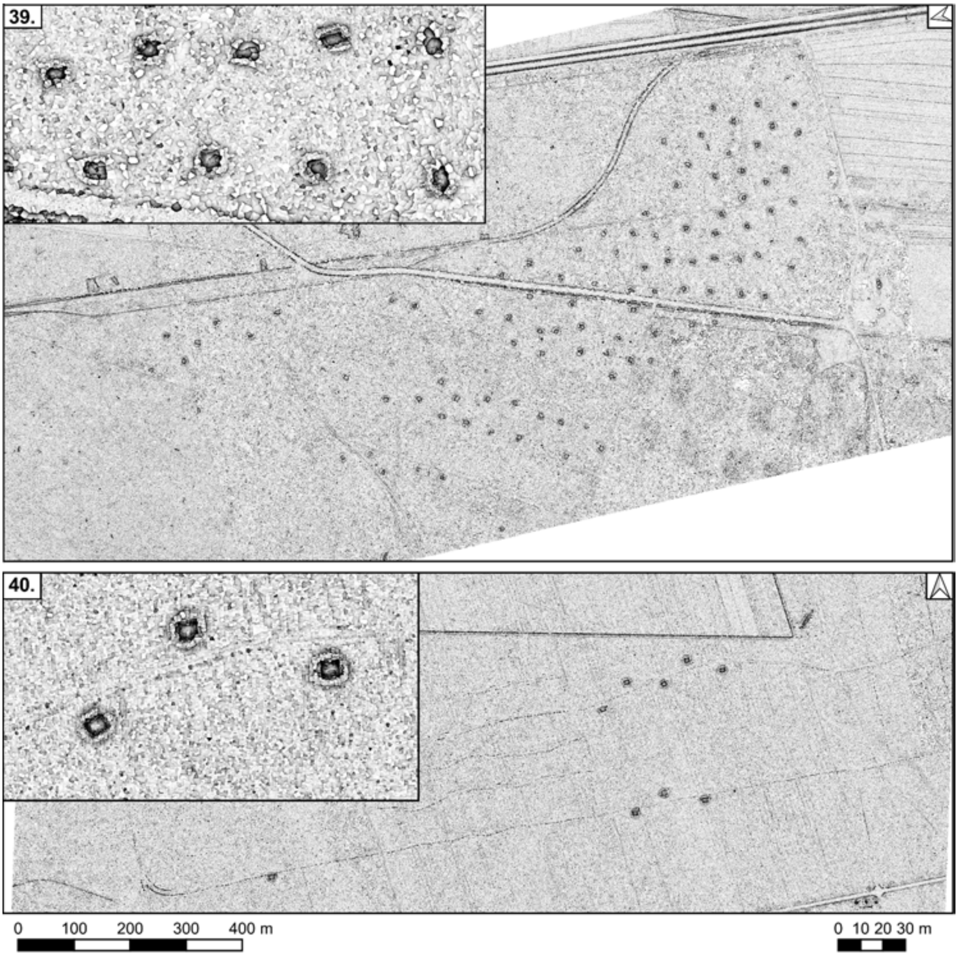


Fig. 8. The Sky View Factor visualisation of unidentified railroads and military camps, the numbers correspond to the designations in Fig. 1. Graphic design: D. Stefański.

village of Kąkolewnica), while other unnamed subdivisions of the division were positioned in the area of the village of Kruszyny.

OTHER UNITS

In addition to the mentioned units, the 2nd Army consisted of other large units such as the 8th Infantry Division, as well as smaller artillery, engineering, sapper, armoured, training, and logistics units (Ponahajba 1958; Stępniowski 1962; Lewandowicz *et al.*, 1965; Ways 1967; Płoński 1969; Malczewski and Polkowski 1970; Dideńko 1978; Komornicki 1987; Kospath-Pawłowski 1995a; Geresz 2001). However, many of these units were not recognized during the surveying process. The largest of these, the 8th Infantry Division, had only four identified features representing the 32nd and 34th Infantry Regiments in the area of Mordy (32pp, 34pp; Fig. 8:11–14). This could be due to the relative proximity to the city of Siedlce and the military unit that later operated there. Another significant feature was associated with the 9th Independent Anti-tank Artillery Brigade (in Polish: 9. Samodzielna Brygada Artylerii Przeciwpancernej, abbrev. 9SBPpanc; Fig. 7:32), and additional features were linked to the 4th Sapper Brigade (in Polish: 4. Brygada Saperów, abbrev. 4BSap; Fig. 7:32), which consisted of several sapper battalions and a reconnaissance company dislocated to the area of Duża Brzozowica, where the soldiers built numerous dugouts. In the study area, numerous small structures were also identified, but their interpretation was not clear. Some small structures in the forest west of the 9th Infantry Division's grouping were likely remnants of small detachments or training exercises (Fig. 7:35). Unusual groupings of features were also observed near railroad stations, particularly notable being the extensive structure near Wólka Świątkowa (Fig. 8:39) and a smaller one near the Sitno station (Fig. 8:40).

LANDSCAPE FEATURES AROUND THE "UROCZYSKO BARAN"

In Kąkolewnica, there was a makeshift prison that began operating on October 23, 1944. The trials for the prisoners were held in the local school (Geresz 2001). Additionally, there were two People's Commissariat for Internal Affairs (in Russian: Наро́дный комиссариа́т вну́тренних дел [*Narodnyi Komissariat Vnutrennikh Del*]; abbrev. NKVD) camps and a Main Intelligence Directorate (in Russian: Главное разведывательное управление [Glavnoe razvedyvatelnoe upravlenie], abbrev. GRU) agency in the vicinity of the village. The nearby village of Baran, also known as "Mały Katyń" or "Katyń Podlaski" is associated with the execution of individuals who were considered members of the Polish anti-communist resistance. It is estimated that between several hundred and around 1800 people lost their lives at this site (Magier 2008). Although imaging efforts conducted in the area did not uncover

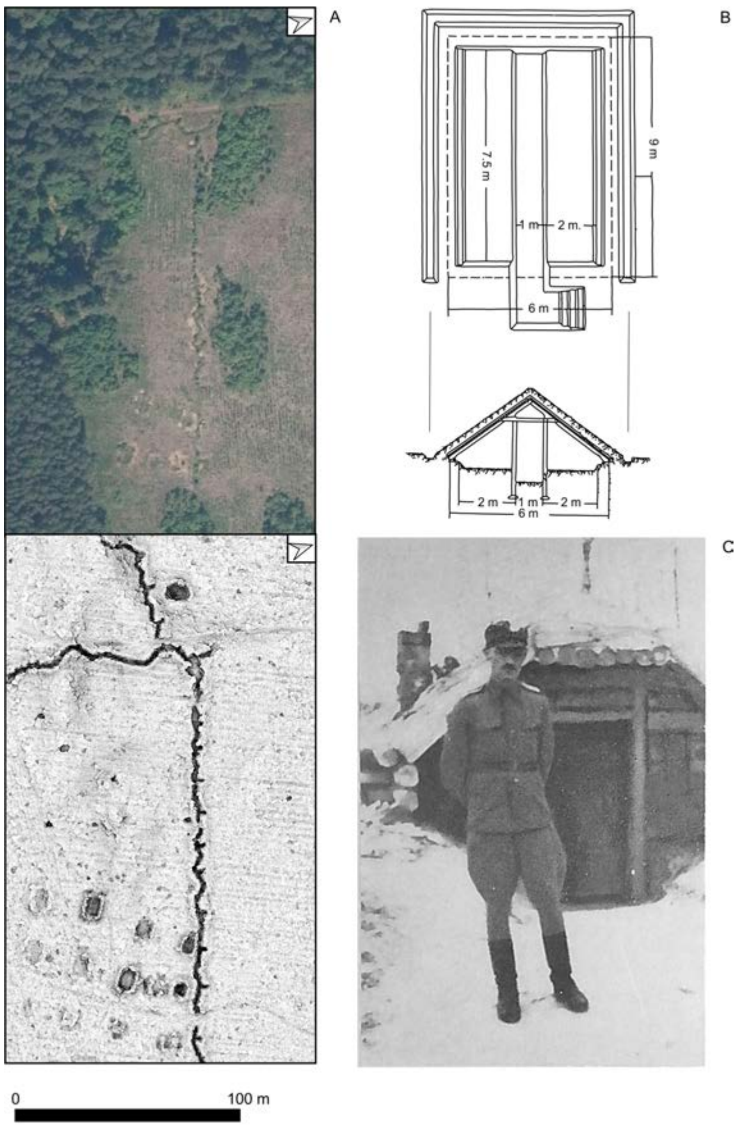


Fig. 9. A: Satellite and Sky View Factor view of 38th Light Artillery Regiment military installations of 7th Infantry Division at 51°43’56”N 22°31’16”E (Geoportal, October 13, 2023, https://geoportal.gov.pl); B: Schematic plan of a 20-person dugout, modified after Rudominer (1941, 82, Ris. 89, 83, Ris. 90); C: photo of staff dugout of 1st Battalion of 26th Infantry Regiment east of Lipniaki (9th Infantry Division, Fig. 4.15), December 1944 – January 1945 (Lubecki 1960: 49). Graphic design: D. Stefański.

traces indicating the presence of mass graves (Stefański 2021a), unspecified structures were found nearby. However, the field reconnaissance of these structures did not provide clear interpretations. Among them were a shooting range (Fig. 7:37) and a small set of dugouts (Fig. 7:36). While these structures are identified with the 2nd School Battalion (Stępniowski 1962), their potential connection with the prison described in the literature cannot be ruled out. Surviving witness accounts suggest that the prison cells were relatively deep dugouts, making their remains relatively easily recognizable. Given the absence of similar structures in the vicinity of Kąkolewnica, this hypothesis can be considered (Jadczak 1990).

SUMMARY

The purpose of this article is to bring attention to the concentration of military remains from World War II in the area. It is crucial because some of these remain collide with the planned route of the construction of the S19 expressway. Due to the limitations of this brief communication, many aspects regarding the internal organization of these military structures, their relationship to military instructions (Fig. 9B; e.g., Rudominer 1941) and historical records of their construction process and use (Fig. 9C) cannot be discussed in detail. However, since these topics are extensively covered in the written sources, the visualizations of theses still clearly distinguishable structures (Fig. 9A) presented in this article can serve as a foundation for further research and exploration.

REFERENCES

Dideńko, K. 1978. *Wojska inżynieryjno-saperskie LWP 1943–1945 (organizacja i działania bojowe).* Warszawa.

Gać, S. 1971. *7 Dywizja Piechoty. Historia 7 Łużyckiej Dywizji Piechoty.* Warszawa.

Geresz, J. 2001. *Międzyrzec Podlaski. Dzieje miasta i okolic.* Międzyrzec Podlaski.

Ginalski, E. 1964. *Byliśmy za Łabą. Z dziejów 28 pułku piechoty.* Warszawa.

Ginalski, E. 1974. *22 pułk artylerii lekkiej. Zarys dziejów 1944–1947.* Warszawa.

Ginalski, E. and Wysokiński, E. 1984. *Dziewiąta drezdeńska. Z dziejów 9 Drezdeńskiej Dywizji Piechoty (1944–1947).* Warszawa.

Jadczak, S. 1990. Kąkolewnica. Ślady zbrodni. *Dziennik Lubelski* 17: 3–4.

Kaczmarek, K. 1978. *Druga Armia Wojska Polskiego.* Warszawa.

Kobiałka, D. 2017. Airborne Laser Scanning and 20th Century Military Heritage in the Woodlands. *Analecta Archaeologica Ressoviensia* 12: 247–270.

Kokalj, Ž. and Hesse, R. 2017. *Airborne laser scanning raster data visualization: a guide to good practice*. Ljubljana.

Komornicki, S. 1984. *Wojsko Polskie 1939–1945.* Warszawa.

Komornicki, S. 1987. *Regularne jednostki Ludowego Wojska Polskiego. Formowanie, działania bojowe. Organizacja, uzbrojenie, metryki jednostek kawalerii, wojsk pancernych i zmotoryzowanych*. Warszawa. Wojsko Polskie. Krótki informator historyczny o Wojsku Polskim w latach II wojny światowej Tom 3.

Kospath-Pawłowski, E. 1995a. 8 Drezdeńska Dywizja Piechoty im. Bartosza Głowackiego. In Z. Radzio (ed.), *8 Dywizja Piechoty w dziejach oręża polskiego*, 161–176. Pruszków.

Kospath-Pawłowski, E. 1995b. 9. Drezdeńska Dywizja Piechoty w latach 1944–1947. In Z. Radzio (ed.), *9 Dywizja Piechoty w dziejach oręża polskiego*, 128–142. Pruszków.

Kurczyński, Z., Stojek, E. and Cisło-Lesicka, U. 2014. Zadania GUGiK realizowane w ramach projektu ISOK. In P. Wężyk (ed.), *Podręcznik dla uczestników szkoleń z wykorzystania produktów LiDAR*, 22–58. Warszawa.

Lewandowicz, L., Malczewski, J., Ponahajba, L., Stawecki, P. and Wrzosek, M. 1965. *Organizacja i działania bojowe Ludowego Wojska Polskiego w latach 1943–1945. Wybór materiałów źródłowych. Tom 3.* Warszawa.

Lubecki, L. 1960. *Na południe od Berlina. Z walk 26 pp*. Warszawa.

Magier, D. 2008. *Codzienność w cieniu sowietyzacji. Eseje z życia Radzynia Podlaskiego i okolic w latach 1944–1956.* Radzyń Podlaski.

Malczewski, J. J. and Polkowski, R. L. 1970. *Regularne jednostki Ludowego Wojska Polskiego. Formowanie, działania bojowe. Organizacja, uzbrojenie, metryki jednostek inżynieryjno-saperskich, drogowych i chemiczncych*. Warszawa. Wojsko Polskie. Krótki informator historyczny o Wojsku Polskim w latach II wojny światowej Tom 4.

Maraszek, M. 2019. *Nasze dzieje. Międzyrzec 1390–2019.* Międzyrzec Podlaski.

Niebylski, J. 2020. The remains of the "Battle of Kraków", fought during World War I, as exemplified by site Sadowie-Kielnik 1, Kraków district. *Sprawozdania Archeologiczne* 72(2): 555–584.

Niebylski, J. M. and Czarnowicz, M. 2022. Rola pozycji polowej z bitwy pod Krakowem z I wojny światowej odkrytej na stanowisku archeologicznym Wola Więcławska 10, pow. krakowski. *Raport Archeologiczny* 17: 73–118.

Niebylski, J. and Tunia, K. 2018. The German-Russian Front in Southern Poland, Winter 1945: History and Archaeology. In K. Kleinová (ed.), *24th EAA Annual Meeting. Reflecting Futures*, 932–933. Barcelona.

Niebylski, J. M., Czarnowicz, M. and Micyk, P. 2021. Bitwa pod Krakowem z 1914 r. w świetle badań archeologicznych stanowiska Zalesie 1, pow. krakowski, gm. Iwanowice. *Raport* 16: 103–167.

Płoński, K. 1969. *W szeregach służby zdrowia 2 AWP. Ze wspomnień lekarza 2 Armii WP.* Warszawa.

Ponahajba, L. 1958. *Organizacja i działania bojowe Ludowego Wojska Polskiego w latach 1943–1945. Wybór materiałów źródłowych. Tom 1.* Warszawa.

Rudominer, M. S. 1941. *Polevye neoboronitelnye postroyki. Nastavlenie dlia voysk Krasnoy Armii.* Moskva-Leningrad.

Stefański, D. 2021a. *Opracowanie danych lidarowych w ramach badań powierzchniowych na trasie planowanej drogi ekspresowej S19 – odc. 3 Międzyrzec Podlaski (koniec obwodnicy) – Radzyń Podlaski*. Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad].

Stefański, D. 2021b. *Opracowanie danych lidarowych w ramach badań powierzchniowych na trasie planowanej drogi ekspresowej s19 – odc. 4 Radzyń Podlaski – Kock (początek obwodnicy)*. Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad].

Stępniowski, T. 1962. *Z dziejów 2 Armii Wojska Polskiego. Zarys formowania i organizacji.* Warszawa.

Szczepaniuk, K. 2014a. Jurki. In P. Szkurtatowicz (ed.), *Szkice z dziejów Kąkolewnicy i okolic*, 240–243. Radzyń Podlaski.

Szczepaniuk, K. 2014b. Turów. In P. Szkurtatowicz (ed.), *Szkice z dziejów Kąkolewnicy i okolic*, 245–254. Radzyń Podlaski.

Szkurtatowicz, P. 2014. Lata wojny i okupacji (1939–1945). In P. Szkurtatowicz (ed.), *Szkice z dziejów Kąkolewnicy i okolic*, 67–119. Radzyń Podlaski.

Szostak, J. 2005. 2 Armia Wojska Polskiego w operacji berlińskiej i operacji praskiej w 1945 roku. In Szafran, C. and Szostak, J. (eds), *Walki 1 i 2 Armii Wojska Polskiego na froncie wschodnim w końcowej fazie drugiej wojny światowej w Europie (styczeń-maj 1945)*, 43–58. Warszawa.

Szubski, M., Niebylski, J., Grużdź, W., Jakubczak, M. and Budziszewski, J. 2022. Modern flint mining landscapes and flint knapping evidence from the Kraków Gunflint Production Centre – What we know from LiDAR and field survey. *Sprawozdania Archeologiczne* 74(1): 247–268.

Ways, W. S. 1967. *Regularne jednostki Ludowego Wojska Polskiego. Formowanie, działania bojowe. Organizacja, uzbrojenie, metryki jednostek artylerii*. Warszawa. Wojsko Polskie. Krótki informator historyczny o Wojsku Polskim w latach II wojny światowej Tom 2.

Wierzbicki, P. and Oleszczak, Ł. 2021a. *Opracowanie wyników archeologicznych badań powierzchniowych, prowadzonych na odcinku planowanej drogi ekspresowej S19: odcinek 1 – granica województw lubelskiego – Międzyrzec Podlaski (początek obwodnicy) oraz odcinek 3 Międzyrzec Podlaski (koniec obwodnicy) – Radzyń Podlaski*. Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad].

Wierzbicki, P. and Oleszczak, Ł. 2021b. *Opracowanie wyników archeologicznych badań powierzchniowych, prowadzonych na odcinku planowanej drogi ekspresowej S19: odcinek 4 – Radzyń Podlaski-Kock (początek obwodnicy) oraz odcinek 6 – koniec obwodnicy Kocka i Woli Skromowskiej – węzeł „Lubartów Północ", bez węzła*. Typescript in the archive of the General Directorate for National Roads and Motorways [Polish: Generalna Dyrekcja Dróg Krajowych i Autostrad].

Wolski, Z. 1996. *Łuków i Ziemia Łukowska. Kalendarium 1233–1994.* Łuków.

Zakšek, K., Oštir, K. and Kokalj, Ž. 2011. Sky-View Factor as a Relief Visualization Technique. *Remote Sensing* 3: 398–415.

Zalewska, A. I., Czarnecki, J. and Kiarszys, G. 2019. *Krajobraz Wielkiej Wojny: Front nad Rawką i Bzurą (1914–1915) w świetle teledetekcji archeologicznej i źródeł historycznych*. Warszawa.

Zalewska, A. I. and Kiarszys, G. 2015. Sensing the material remains of the forgotten Great War in Poland. Sensibly or sensationally – The dilemma in front of presenting results of the Airborne Laser Scanning visualizations. In A. G. Posluschny (ed.), *Sensing the Past. Contributions from the ArcLand Conference on Remote Sensing for Archaeology*, 72–73. Bonn.

Zalewska, A. I. and Kiarszys, G. 2021. The forgotten Eastern Front: dealing with the social and archaeological legacies of the Battle of the Rawka and Bzura Rivers (1914–1915), central Poland. *Antiquity* 95(384): 1565–1583.

Archaeologia Polona, vol. 61: 2023, 289–313
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3324

Landscape of Resistance. Traces of the Military Training of the Lithuanian Liberation Army in Plokštinė Forest, Samogitia, Northwestern Lithuania

Gediminas Petrauskas[a]

In recent years, fortified and open-type campsites of the Lithuanian Partisan War (1944–1953) have become the subject of archaeological research in Lithuania. The military training camp for soldiers of the Lithuanian Liberation Army (the so-called Vanagai, or Hawks) in Plokštinė Forest (Plungė district), Samogitia region, northwestern Lithuania was investigated by the author of this paper in 2019 and 2020. From 15 to 25 August 1944, in the face of the impending second Soviet invasion, the Plokštinė Forest camp was used to train the Samogitian youths in the basics of armed resistance. Archaeological field research carried out in the Plokštinė Forest allowed the determination of the exact location of the Vanagai military training camp and firearms training ground, the collection of archaeological data on the camp, its layout and equipment, as well as the everyday life of the Vanagai, and the weapons they used. This paper presents the results of the archaeological research of the Vanagai military training camp and their analysis. Based on the research data, the importance of the landscape in the selection of the campsite and firearms training ground, their spatial layout and the identification of activity areas are discussed.

KEY-WORDS: Lithuanian Liberation Army, Lithuanian Partisan War, military training, Plokštinė Forest, landscape, campsites, modern conflict archaeology, metal detector survey

INTRODUCTION

Wars and armed conflicts leave tangible and intangible traces on the landscape. Above--ground and underground military structures, mass graves and archaeological finds

[a] Institute of Baltic Region History and Archaeology, Klaipėda University, Herkaus Manto St. 84, LT-92294 Klaipėda (Lithuania), e-mail: petrauskasgediminas@gmail.com; ORCID: https: 0000-0002-3328-819X

Received December 22, 2022; Received in revised form October 3, 2023; Accepted October 9, 2023

bear witness to past wars. On the other hand, however, the locations of battles, camps and armed conflicts in general have often been determined by the landscape and natural environment, as well as by the presence of water bodies, railways, roads and other human-made features in the area. The archaeology of World War II is a growing sub-discipline of modern conflict research, and the landscape of conflict, its diversity, the environmental consequences of warfare, and the impact on soldiers and civilians is a subject of increasing interest (Carr 2009; Passmore *et al.*, 2013; 2016; Tunwell *et al.*, 2015; Shepherd 2016; van der Schriek and Beex 2017; van der Schriek 2020; Saunders and Cornish 2021).

The landscape of modern conflicts is defined by the terrain, surface cover, traces of human activity and various physical features of a given area. Military, defence, resistance, occupation, oppression, urban, forest and many other types of landscape are distinguished according to their nature, purpose and use (Carr 2009; Woodward 2014; Asadpour 2016; Reinsone 2016; Souza 2019). Conflict sites are undoubtedly an integral part of modern conflict landscape.

Over the past two decades, a large number of World War II sites have been investigated in Europe, North America and the Pacific, including fortifications, bunkers and shelters, military supply facilities, prisoner of war, forced labour, internment, concentration and extermination camps, battlefields, mass graves, etc. (Gaffney *et al.*, 2004; Gilead *et al.*, 2009; Theune 2010; Banks 2011; Price and Knecht 2012; Early 2013; Tunwell *et al.*, 2015; Camp 2016; Mushynsky *et al.*, 2018; Konczewski 2020). Archaeological research has documented the darkest and deadliest moments of the War, revealing the spatial patterns of the sites and their relationship to the surrounding landscape. The regular army and partisan camps, which have left distinct traces in the landscape, testify to the variety of military structures and the daily life of the soldiers and partisan fighters who used them (Kirby *et al.*, 2013; Mikhajlov and Podgornaia 2018; Seitsonen 2021).

The archaeology of modern conflicts is also a new and growing field of Lithuanian archaeology (Petrauskas and Petrauskienė 2020). Over the last decade, archaeological research on modern conflict sites has increased significantly, and attention has been paid to the fortified and open-type campsites of the Lithuanian anti-Soviet Partisan War (1944–1953). Fortified campsites consist of a complex of bunkers and dugouts, surrounding ramparts, trenches and machine-gun nests. Underground food and weapon caches, as well as water wells are often preserved in such campsites. In contrast to fortified camps, open-type campsites usually have no external relief features and their location can only be inferred from archaeological, archival and oral history data (Petrauskienė and Vaitkevičius 2017: 63–64).

Since 2016, four fortified and two open-type campsites have been investigated in Lithuania, but most of the surveys were limited to small-scale metal detector prospection (Petrauskas 2020a). Among all the campsites, the fortified Žadeikiai Forest camp (Pasvalys district) and the open-type Dulgininkai Forest camp (Druskininkai Municipality and Lazdijai district) are the most noteworthy. The examination of the Žadeikiai Forest camp, where two dugout pits surrounded by a ring of 28 foxholes have preserved, revealed the partisans' working and resting area. Moreover, archaeological research has shown that the dugouts were attacked by Soviet troops. All this demonstrates how archaeological data can change the perception of the "silent" Lithuanian Partisan War sites, which are not directly linked to any historical events or narratives (Petrauskas and Vaitkevičius 2020: 461–465). A partisan fireplace and a dugout a little further away from the camp were discovered in the Dulgininkai Forest camp used in the spring of 1945, and the remains of a hydroelectric power station located in the Dulgelė stream were recorded. The hydroelectric power station consisted of a pine stump with a metal structure that was half-submerged in the water and was supposed to generate electricity when batteries were dead (Petrauskas *et al.*, 2018: 641–644).

In the summer of 1944, as the Red Army units were pushing the Wehrmacht westwards through Lithuania, thousands of Lithuanian Liberation Army (LLA) soldiers (the so-called Vanagai, or Hawks) gathered in the forests of Samogitia, Western Lithuania. One of the gathering places of the Vanagai was the Plokštinė Forest on the south-eastern shore of Lake Plateliai. Remembering the repressions that took place during the Soviet occupation of Lithuania in 1940 and 1941, and in order to muster a force to avoid their repetition, a military training camp of the LLA was organised in Plokštinė Forest in August 1944. It was a training camp where the Samogitian youths were trained in the basics of armed resistance in the face of the impending Soviet invasion (Kasparas 1999: 122; 2002: 96–97).

Archaeological field surveys carried out in 2019 and 2020 in the Plokštinė Forest (Plungė district) allowed the determination of the exact location of the Vanagai military training camp and firearms training ground, the collection of archaeological data on the camp, its layout and equipment, as well as the everyday life of the Vanagai, and the weapons they used (Petrauskas 2020b: 452–460; 2021). This paper presents the results of the archaeological research and their analysis. Based on the research data, the importance of the landscape in the selection of the campsite, its spatial layout and the identification of activity zones are discussed. This paper examines the Plokštinė Forest military training camp through the lens of the landscape and aims to contribute to the understanding of the training of the local population for armed anti-Soviet resistance.

WORLD WAR II AND THE LITHUANIAN LIBERATION ARMY

The Republic of Lithuania, which restored its statehood and declared independence in 1918, lasted for twenty-two years. In March 1939, Nazi Germany handed Lithuania an ultimatum to surrender the Klaipėda region (Memelland), depriving Lithuania of its western territories with the Baltic Sea port of Klaipėda (Memel). Just over a year later, on 15 June 1940, the Red Army entered Lithuania and the country was occupied by the Soviet Union. However, on 22 June 1941, when Nazi Germany launched a war against the Soviet Union and opened the Eastern Front, the Wehrmacht invaded Lithuania.

Taking advantage of the changing geopolitical situation, the outbreak of the Soviet Union's war with Nazi Germany and the desire to restore independence from the Soviet Union, the Lithuanian Activist Front (in Lithuanian: *Lietuvių aktyvistų frontas*) launched a nationwide armed uprising (known as the June 1941 Uprising; for more see Brandišauskas 1998; 2006: 15–19; 2015: 129–133). During the uprising, the then capital Kaunas was liberated, the Lithuanian national flag was hoisted on the tower of Vilnius Gediminas castle, and battles were fought in many smaller towns. Moreover, the Provisional Government of Lithuania was formed and the restoration of independence was proclaimed, but after a week the active fighting in Lithuania ended.

A number of different unarmed resistance organisations were formed during the Nazi occupation of Lithuania (Bubnys 2003; 2015: 207–211). Among these, special attention is given to the LLA, which was founded in Vilnius on 13 December 1941 by Kazys Veverskis (codename Senis; 1913–1944), a former student of the Kaunas Military School (though he did not graduate), and a student of law at the Vytautas Magnus University and Vilnius University (Kasparas 2002). It was the largest secret military, national and political organisation of unarmed anti-Nazi, and later also armed anti-Soviet resistance in Lithuania. It mainly sought by military means to resist the occupation and restore an independent state of Lithuania with its capital in Vilnius and the Klaipėda region (Kasparas 1994; 2002; Kuodytė 2015: 271–272).

The structure of the LLA was similar to that of the inter-war Lithuanian Army, replicating its hierarchical, territorial and functional principles, but also not avoiding new structural forms (Kasparas 2002). The entire territory of Lithuania was divided into military districts, which in turn were organised into detachments, companies, platoons and divisions. From July 1944, the LLA consisted of two sectors – operational and organisational. The former were armed fighters, known as Vanagai, while the latter were legally residing sedentary fighters (often gymnasium students) who, as reserves of the operational sector, were responsible for providing the operational sector with transport, food, stationery, clothing and medical supplies, as well as communications and information (Kuodytė

1995; Kasparas 1999: 113–114; 2002). However, the LLA operated in difficult underground conditions, and not all decisions of the leadership reached the lower organisational structures and their members.

As the Eastern Front broke through and the Red Army pushed the Wehrmacht westwards, due the imminent second Soviet invasion, the LLA declared martial law on 1 July 1944 and ordered LLA members who were able to bear arms to join the Vanagai detachments. At that time, there may have been around 10,000 Vanagai in the forests of Lithuania. The retired Brigadier General Motiejus Pečiulionis (codename Miškinis; 1888–1960) was given the authority to organise and lead the partisan resistance (Kuodytė 1995; Gaškaitė *et al.*, 1996: 124–125). Pečiulionis was the only General from the inter-war period of Lithuania who fought in the ranks of the Lithuanian partisans (unpublished data by Dr Darius Juodis).

At the beginning of July, the Red Army entered Lithuania, and on 13 July captured Vilnius, the historical capital of Lithuania. In response to the changes taking place at the front, the LLA Vanagai were ordered to retreat to Samogitia, and if they failed to resist the Soviets, to continue the struggle underground (Gaškaitė *et al.*, 1996: 125–126; Kasparas 1999: 103–104). In the Soviet-occupied territory, units of repressive structures were established, forced mobilisation of Lithuanians into the Red Army was announced, battalions of *istrebiteli* (collaborant militia, from the Russian: destroyers, exterminators) were formed, and part of the farms were nationalised and their size limited (Kasparas 1999: 163–165; Kuodytė 2015: 274–277). Soviet repression also included mass arrests and imprisonment, deportations to Siberia, and various punitive operations, often resulting in mass executions of civilians (Gaškaitė-Žemaitienė 2006: 27; Anušauskas 2015). The Red Army occupied the entire territory of Lithuania on 30 January 1945, after almost seven months of fighting.

The Lithuanian Defence Committee, established in August 1944, became the political headquarters of the LLA. This committee, like the LLA General Staff, was composed of a number of young and enterprising officers, in addition to its founders Veverskis and Pečiulionis. After the formation of the political and military command staff, and the approval of the programme and statutes, the joint leadership of the anti-Soviet resistance for the whole Lithuania was established (Kasparas 1999: 117–118). The LLA General Staff drafted normative documents regulating the activities of the partisans, which had a significant impact on the further partisan resistance, and organised the training of the Vanagai.

By disseminating the instructions of the headquarters and organising partisan units according to the LLA structural scheme, the members of the LLA, many of whom had served in the inter-war Lithuanian Army, had belonged to the Lithuanian Riflemen Union, or had fought in the June 1941 Uprising (cf., Noreika 2015), became active freedom fighters in a decade-long Lithuanian Partisan War that lasted into the 1950s. Until March 1945, the LLA was the most important organisation uniting the armed anti-Soviet resistance. However, the influence of the LLA on the resistance was uneven. The LLA was mainly active in Samogitia and Aukštaitija (Eastern Lithuania), while its role in the rest of Lithuania was much weaker (Kuodytė 2015: 280–281). After the arrest of Pečiulionis and several members of the General Staff in November 1945, the LLA ceased to function as a unified structure, and in 1944–1946 the members of the LLA, together with the representatives of other organisations of the anti-Nazi underground, formed the basis of the partisan units (Kasparas 2002).

MILITARY TRAINING IN THE PLOKŠTINĖ FOREST

In the summer of 1944, as the Eastern Front was moving westwards, the Plokštinė Forest became one of the largest gathering places of the LLA Vanagai in Samogitia. From 15 to 25 August 1944, a military training camp was held on the south-eastern shore of Lake Plateliai, where young men from Samogitia (mainly students) with no military experience were trained in military tactics, formation, shooting, weapon maintenance, handling explosives and other fundamentals of war and armed resistance (Kasparas 1999: 122; 2002: 96–97). The Vanagai were trained by Lithuanian officers, based on the experience and example of Soviet partisans operating against the Nazis (Gečiauskas 2010: 13). The claims made by some camp participants that the training lasted three weeks are considered unfounded (Kasparas and Paulauskaitė 2008: 221–222).

On 25 August, the Vanagai were sworn in by Brigadier General Pečiulionis, and Lieutenant Juozas Barzda (codename Klevas; 1913–1944) was appointed camp commandant. According to contemporaries, even Veverskis, the founder of the LLA, visited the military training camp in Plokštinė Forest. Although some camp participants tend to exaggerate the number of trainees to more than 800 or even several thousand (Beresnevičius 2012: 225; Kaunietis 2014: 181; Patamsis 2015: 68), it can be assumed that the number of Vanagai participating in the camp was initially between 400 and 500, and later decreased to 250. The Vanagai were divided into companies, platoons and sections, and the camp was subject to military discipline, with great attention paid to uniforms and neat appearance. Some of the Vanagai, however, wore plain civilian clothes in the camp, as can be seen in photographs taken during military training (Kasparas 1999; 2002; Kasparas and Paulauskaitė 2008). At the end of the training, the Vanagai were ordered to disperse, cross the front line and organise armed partisan resistance in their home areas.

The LLA military training camp in the Plokštinė Forest and the training itself are considered to be a significant event at the beginning of the Lithuanian Partisan War. Its importance has been stressed by researchers of the history of the LLA (Kasparas 1999; 2002), as well as by the participants of the military training camp who have left their memories (Kasparas and Paulauskaitė 2008; Beresnevičius 2012; Kaunietis 2014; Patamsis 2015: 67–70; Klimas 2018). Published works, including collections of memoirs of camp participants, provide a wealth of information on the size, layout, equipment, duration and organisation of the camp. However, the recorded individual accounts are usually contradictory, and details of the camp and military training are often only general. The Plokštinė Forest camp has not been the subject of extensive research to date.

According to the recollections of the participants of the military training, the Plokštinė Forest camp was equipped with a kitchen and a wooden-framed outdoor latrine with a back support (a 5–6 m long, 0.7 m wide and 1 m deep ditch). The Vanagai used horse-drawn carts (the horses were kept in a nearby homestead), one or two anti-tank guns mounted on two wheels with spokes and a low-powered Russian truck (*polutarka*) were taken, as well as 40 kg bundles of explosives were brought to the camp from the military intelligence school in Germany. The guarded camp had a military tarpaulin headquarters tent secured with ropes and nails, but the Vanagai themselves used both German fabric tents and tents made of cut poles covered with spruce branches and straw. In addition, two dugouts were set up in the camp and another had to be built on the slope of Lake Plateliai to serve as a temporary detention centre for the camp.

Historical data reveal that the firing exercises took place outside the Vanagai camp. This must have been on the small Jakumas stream flowing into Lake Plateliai, and the shooting targets were hanging on a high slope of the stream (on the side of the homestead of the farmer Stanislovas Mickevičius), where thick old pine trees were growing (Kasparas and Paulauskaitė 2008; Beresnevičius 2012). For example, Justinas Stonys from Plateliai took part in the exercises twice and fired a total of 10 shots with a Czechoslovakian Mauser rifle made in 1924 and decorated with Lithuanian symbols (Kasparas and Paulauskaitė 2008: 260–261). The witness of bullet holes in the trunk of the pine tree that was the target of the shooting reinforce the image of the pine tree that was “shot” during the exercise. All this indicates that the target area must have been littered with hundreds of cartridge cases and bullets fired by the Vanagai.

Finally, it should be noted that during the exercise, three or four shots were fired from an anti-tank gun at a target in Pliksalė, one of the islands of Lake Plateliai (Kasparas and Paulauskaitė 2008: 260). Although it is not clear whether these weapons were stored near the homestead of Mickevičius or at the firearms training ground, the recollections of the camp participants suggest the variety of trophy weapons collected by the Vanagai from the front and their preparation for large-scale partisan resistance.

LANDSCAPE OF THE MILITARY TRAINING CAMP

The military training of the Vanagai in the Plokštinė Forest is associated with the hill, known as Vanagas Hill (in English: Hawk Hill) by contemporaries and camp participants, and the commemorations that were held on it in recent decades. In 2004, on the occasion of the 60th anniversary of the camp, a commemorative sign was erected on Vanagas Hill due to the efforts of the partisan war chronicler Alfonsas Beresnevičius (2012: 64–65). However, the military training and the camp have not yet received due attention from researchers, local authorities and heritage institutions.

The military training took place in a coniferous forest with an undergrowth of deciduous trees on the southeastern shore of Lake Plateliai. The Vanagai camp was located on a massive elongated hill on the edge of a hilly plateau and its eastern foothills (Fig. 1). The hill is 25 by 60 m in size, its northern, western and eastern slopes are sloping, 2.5–3 m high, while the southern slope is moderately steep, reaching 13.5 m high. Vanagas Hill is over 400 m away from the lake, and the same distance separates it from the forest road leading to the *Didieji Vartai* (in English: Great Gate) of Lake Plateliai (to the south and southeast). The marshy 60 to 160 m wide lake strait is situated about 150 m west and southwest of Vanagas Hill (Fig. 2).

Today, the Vanagai campsite is located in a wooded uninhabited part of the Samogitia National Park. However, according to the 1943 Soviet military topographic map (scale 1:50,000), the forest was cleared 100 m east and southeast of the camp during World War II. Unlike today, there were three homesteads 300 to 600 m from the Vanagai camp, one of which was occupied by the family of partisan liaison Razma (information from Antanas Vaškys, a resident of Plokščiai village, April 2019). These homesteads must have played an important role in providing food and water to the camp. The fact that farmers from the neighbouring villages provided the camp with food and water is also mentioned by the participants of the military training camp themselves (Kasparas and Paulauskaitė 2008: 259; Beresnevičius 2012: 51, 84, 227).

Two dugout pits measuring 4.8 by 5 m and 5 by 5 m in size and 1.7–1.9 m deep, with traces of entrance trenches, have preserved on Vanagas Hill. The remains of a rampart can be seen next to one of the dugouts, and its half-filled pit is likely to be an incompletely collapsed dugout roof. Although some authors claim that the dugouts housed the headquarters and commandant's office of the military training camp

Fig. 1. LLA military training camp (Vanagas Hill), seen from the east. 2019. Photo: G. Petrauskas.

(Patamsis 2015: 67–68), the recollections of the camp participants indicate that the first dugout was used for storing food and the second one for weapons (Beresnevičius 2012: 62, 83–84, 227). The location of the temporary detention centre in the camp remains unclear. Two single foxholes were dug at the northern foot of Vanagas Hill and on its southern slope. Four more massive irregularly-shaped training trenches surrounded by ramparts and with traces of an entrance were located at the southern foot of the hill.

The firearms training ground is an integral part of the military training camp landscape. According to the camp participants, it was built on the high bank of the Jakumas stream. The name of this stream, which is commonly used by the local population, comes from the surname of the forest owner Jakumas. The coordinates of the firearms training ground given in the literature are erroneous (Beresnevičius 2012: 62), and its true location was revealed by archaeological field survey carried out in the Plokštinė Forest (the distance between the indicated and the exact location is about 220 m; Petrauskas 2021). It was here, on the right slope of the Žemgrindas stream, that stands a pine tree used as a shooting target, a photo of which graced the cover of the collection of memories compiled by the partisan war chronicler Beresnevičius (2012).

As archaeological research has shown, the Vanagai shooting practice took place on the picturesque coniferous forested edge of the second terrace of Lake Plateliai, as well as on the slope of the right bank, the top of the left bank and in the valley of the meandering Žemgrindas stream (146.5–152 m a.s.l.; Fig. 3). The firearms training ground was bounded to the north by the high escarpment of the lake terrace and to the southeast by marshy lowland. The stream, which is only 600 m long, has slopes of up to 5 m in the north, but the terrain gently slopes downwards in the south where the high banks end.

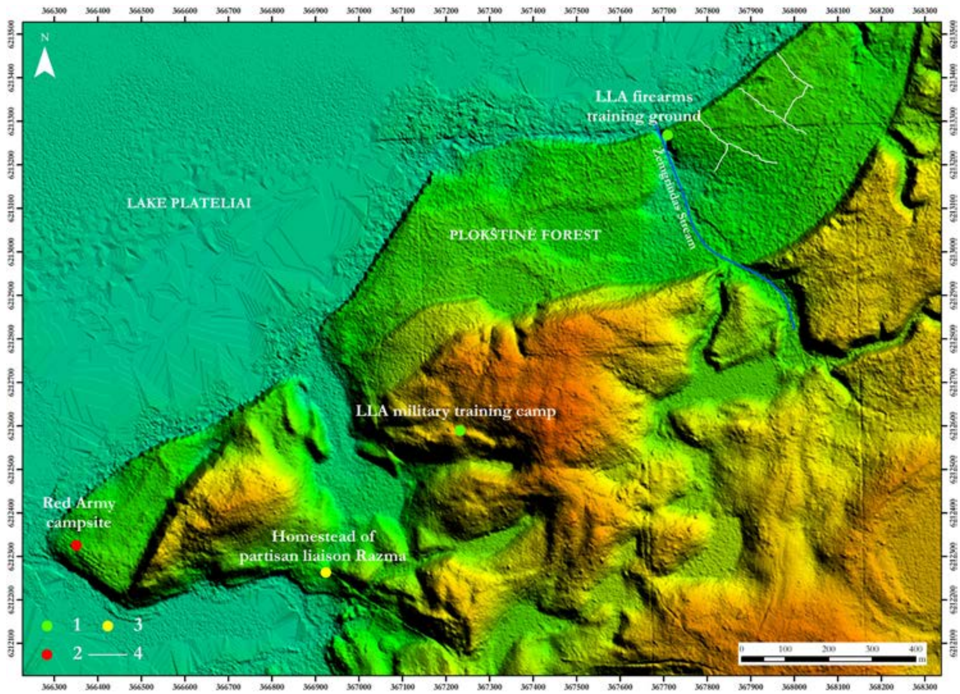


Fig. 2. Situation plan of the LLA military training camp in the Plokštinė Forest: 1 – LLA sites (August 1944), 2 – Red Army site (late 1944), 3 – homestead of partisan liaison, 4 – World War II trenches. Graphic elaboration: G. Petrauskas.

The southern part of the firearms training ground is crossed by a forest road which, according to the 1948 Soviet military topographic map (scale 1:25,000), connected the firing range with the Vanagai training camp 800 m to the northeast. This was the most direct and convenient route from the Vanagai camp to the firearms training ground, and vice versa. Another forest path followed the edge of the terrace, crossed the firearms training ground and joined this road. Furthermore, as can be seen from this and the aforementioned 1943 Soviet military topographic map, the natural environment of the firing range was somewhat different from the present day. During World War II, a large amount of forest was cleared on the right bank of the Žemgrindas stream near Lake Plateliai.

Two dugout pits measuring 3 by 4 m and 2.3 by 3.2 m with traces of ramparts have been preserved on both sides of the forest road on the left bank of the Žemgrindas stream. The dugouts are associated with firing exercises, but their purpose, whether

Fig. 3. North-northwestern view of the LLA firearms training ground, seen from the mouth of the Žemgrindas stream. 2020. Photo: G. Petrauskas.

for training or storage, is unknown. They are separated by a distance of 48.5 m and are about 15 m and 70 m respectively from the stream bank. The firing exercise is also evidenced by 13 square and elongated curved training foxholes. Eight foxholes were dug on the left bank of the Žemgrindas stream (foxholes spaced at intervals of 2.85–12.7 m), and one foxhole was located on the edge of the second terrace of Lake Plateliai. Two foxhole pits have been preserved to the north and one to the south of the forest road, while another foxhole was dug on the right bank of the stream on the same side of the road.

After the camp was abandoned, in October 1944, Red Army troops settled on the shores of Lake Plateliai, thus adapting and reusing the lakeside landscape once again. Three to four rows of dugout pits can be seen on a promontory of the lake called *Beržų ragas* (in English: Birch Horn), with a total of about 100 dugouts. This Red Army camp and the Vanagai military training camp were separated by 800 meters. In addition, another similar Red Army camp was set up on the shore near the *Mažieji Vartai* (in English: Small Gate) of Lake Plateliai, 1.85 km to southwest of the Vanagai camp. According to Stanislovas Jundulas (b. 1943), a commemorator of the Lithuanian Partisan War, up to 1,000 Red Army dugouts and tents may have been dug and erected on the shores of Lake Plateliai (Kaunietis 2014: 201), but their exact number is unknown.

The trench lines recorded on the right bank of the Žemgrindas stream near the Vanagai firearms training ground, and marked on the 1948 map with a conventional symbol in the cleared forest area, are also associated with the Red Army units. These trench lines extend from the southeastern edge of the second terrace of Lake Plateliai to the southeast. The distance between the Vanagai firearms training ground and the nearest trench line (in the east–northeast) is only 75 meters. All this reveals how the landscape of the southeastern shore of Lake Plateliai was adapted and transformed by two different armies for their own defensive purposes in the course of a few months in 1944.

MATERIALITY OF MILITARY TRAINING IN THE PLOKŠTINĖ FOREST

In order to collect scientific data on the military training of the LLA in the Plokštinė Forest, archaeological field surveys were carried out at the Vanagai military training camp in September 2019 and at the firearms training ground in September 2020 (Petrauskas 2020b: 452–460; 2021). Archaeological research has become an integral part of the freedom fights remembrance camps organised by the Directorate of the Samogitia National Park for Lithuanian university students and local schoolchildren.

During the investigation of the Vanagai military training camp and firearms training ground, archaeological data was collected on the camp equipment, weaponry, and the everyday life of the Vanagai, as well as the territory of the firing exercise and the camp areas were identified. At the military training camp, a metal detector was used to examine a 120 by 120 m area on Vanagas Hill, its slopes and foothills (almost 1.5 ha in total). The survey of the firearms training ground covered an area of 100 by 190 m (about 1.8 ha in total) on both sides of the Žemgrindas stream. All metal detector signals were verified during the investigation, and the detected structures and finds were recorded with a total station. This allowed the reconstruction of a detailed plan of the military training camp and firearms training ground, and provided new insights into the Vanagai training that took place in August 1944 in the Plokštinė Forest.

The military training camp yielded 503 finds, the majority of which consisted of construction elements (250 finds, or 49,8% of the total), as well as ammunition and related artefacts (137 finds, or 27.3%). The construction elements included bolts, nuts, hinges and other finds, while the factory-made nails scattered throughout the campsite (228 finds) can be attributed to tents supported by nailed poles. Judging by the ammunition found at the campsite, the Vanagai had a stock of cartridges of various calibres, the largest of which were Soviet 7.62×54 mm R (88 finds) and German 7.92×57 mm Mauser (27 finds). In addition, the Vanagai camp contained isolated Soviet 7.62×25 mm TT and 5.6mm, German 9×19 mm Parabellum, French 7.5×54 mm MAS and British 7.7×56 mm R cartridges (mostly unfired rounds), as well as a Soviet 30 mm signal cartridge base and different stripper clips.

The archaeological research also uncovered a Soviet Mosin rifle bore brush, an unexploded Soviet F-1 hand grenade (without fuse), and a German Eihandgranate 39 hand grenade fuse. Two artillery shell fragments found at the foot of Vanagas Hill testify to the World War II front that passed through the Plokštinė Forest, and a German 37×249 mm R cartridge case is associated with the anti-tank gun mentioned by the participants of the military training camp, which was taken over from the Wehrmacht (Beresnevičius 2012: 51, 75).

Fig. 4. Finds discovered in the LLA military training camp: 1 – Soviet parachute ring, 2 – German gas mask case belt clip, 3 – part of a Wehrmacht officer's cockade, 4, 5 – Wehrmacht uniform shoulder insignias, 6 – Wehrmacht uniform tunic button, 7, 8 – Wehrmacht uniform trouser buttons. Photo: G. Petrauskas.

The pieces of equipment provide information about the inventory of the Vanagai camp. They consisted of a Soviet parachute ring, ammunition belt buckles, a German gas mask case belt clip and a tent flysheet ring (Fig. 4). Uniform and footwear items included a part of a cockade from a Wehrmacht officer's uniform, shoulder insignias, tunic and trouser buttons, and a shoe heel plate. According to the camp participants, the Wehrmacht uniforms were worn by forcibly mobilised and escaped Lithuanian soldiers (Beresnevičius 2012: 228).

Among the household and personal items found in the Vanagai camp were broken glass bottles, a red enamel jug, a spoon, a fork, a part of an axe head, multi-functional, folding and scale knives, files, a key, a German lighter ring, a galvanic cell cover, fragments of a tablet bag, pouch or other leather article, a clothes hook, a devotional medal and 16 coins of different denominations of the Republic of Lithuania, the Soviet Union and the Third Reich. The parts of a star and a bicycle or motorcycle wing badge suggest that the Vanagai had a bicycle in their camp. Meanwhile, a comb, a German razor, a shaving brush made from a Mauser cartridge case and a German porcelain hygiene jar with remnants of Vaseline are evidence of the attention to cleanliness and neat appearance.

A further 369 finds were collected from the firearms training ground, of which 87.3% (322 finds) were unfired rounds, spent cartridge cases and bullets. The Soviet ammunition included 15 7.62×54 mm R cartridge cases and 106 bullets, an unfired 7.62×25 mm TT round, 48 cartridge cases and 39 bullets, as well as a 26 mm signal cartridge base. Judging by the recovered ammunition, the 7.62×54 mm R cartridges could have been fired from both the Mosin rifle and the SVT semi-automatic rifle, while the 7.62×25 mm TT cartridge cases indicate 46 shots from the PPSh submachine gun and 2 shots from the TT pistol.

The German ammunition consisted of 5 7.92×57 mm Mauser cartridge cases and 11 bullets, a 9×19 mm Parabellum cartridge case and nine bullets, and a shortened 7.65 mm cartridge case. One of the 7.92×57 mm Mauser cartridge cases manufactured in 1916 was unfired and its powder had been removed. In addition, three French 7.5×54 mm MAS and two British 7.7×56 mm cartridge cases were recovered at the Vanagai firearms training ground. No bullets of these calibres were found or could not be identified due to their poor condition and other circumstances. Many of the bullets were flattened, bent and badly rusted, making it impossible to identify their calibre. They included 43 rifle-type bullets and two pistol or submachinegun-type bullets, while another 35 bullets were not identified due to fragmentation.

In contrast to the military training camp, construction elements accounted for only 7.3% of the finds, and household and personal items were also less numerous and varied. Among the latter were a multi-functional knife with a handle decorated with plastic scales, a rubber part of a radio receiver(?) antenna, a part of a harmonica, an unidentified lock, a fastener and a wheel axle. Moreover, a letter from a printing press with a mirror image of the number 2, a staple, part of a horseshoe and many other artefacts were found during a metal detector survey at the firearms training ground. The relationship between these finds and the training of the Vanagai remains unclear.

DISCUSSION

The archaeological research of the LLA military training camp and the firearms training ground has provided significant knowledge about the camp and the Vanagai who took part in the training, filled the gaps in the historical data, and significantly supplemented and clarified the sparse accounts of the camp participants. The structures and finds recorded during the research and their distribution have enabled the precise location of the camp and the firing exercises, as well as the definition of its size, boundaries and individual spaces. Moreover, the survey provided documented

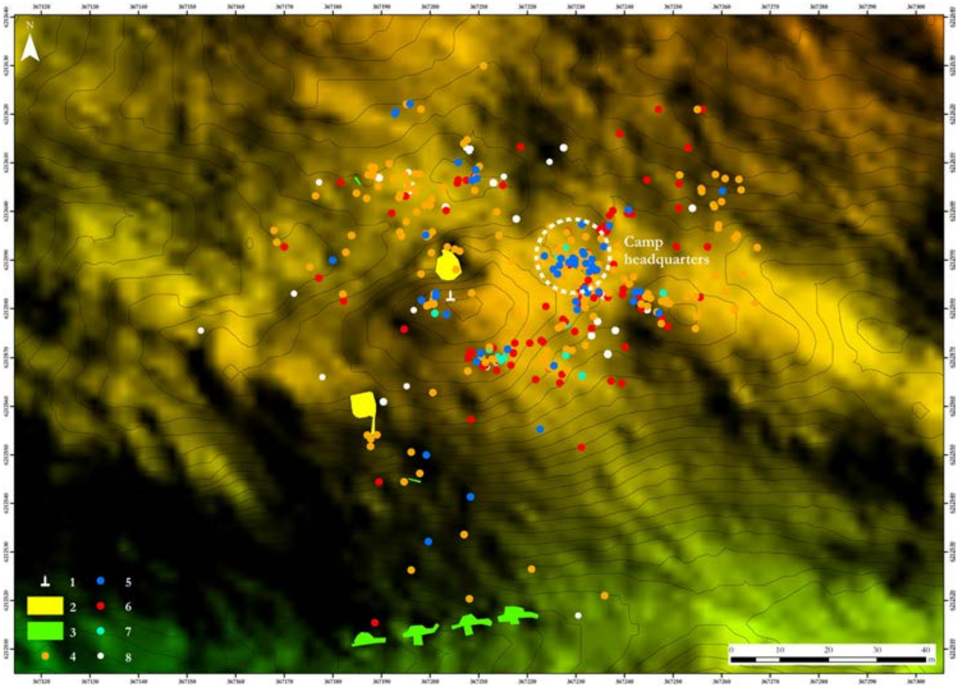


Fig. 5. Situation plan of the LLA military training camp: 1 – monument, 2 – dugout pit, 3 – trench pit, 4 – nails and other construction elements, 5 – household items, 6 – ammunition, 7 – weapons and parts of uniforms, 8 – other finds. Graphic elaboration: G. Petrauskas.

data on the weapons used by the Vanagai and the shots fired during the exercise. All this helps to answer some questions and raise new ones.

Military training camp

Contrary to the prevailing narratives about the Vanagai camp and military training, only 30 isolated finds were found on the highest part of the hill and near the food storage dugout, which did not form any significant assemblage (Fig. 5). The western part of the hill also appeared completely empty of finds. The largest assemblage of finds from the campsite was recorded in a 30 m long and 10 m wide strip at the eastern foot of Vanagas Hill, in a 5 by 10 m area on the southeastern edge of the hill and in a 7 by 10 m area on the western part of another 1 m high hillock east of Vanagas Hill. This assemblage contained 236 finds, representing 47% of the total finds from the military training camp, with the two largest clusters of finds recorded in the northern part of the eastern foothill. Both clusters were particularly rich in nails, unfired rounds and household items. A number of nails and unfired rounds were also recovered at the southeastern foot of Vanagas Hill, but almost no household items were found here. At the northern foot of the hill, nails also made up the bulk of the finds.

The construction elements were scattered throughout the military training camp. There were 98 nails (42.6% of the total) collected at the eastern foot and southeastern edge of Vanagas Hill, and a further 49 nails (21.3% of the total) at the northern foot of the hill. Single nails were also present near the dugouts and foxholes. Nails were scattered around the campsite, both singly and in groups of 11–12 nails. There is no doubt that these nails, and especially the accumulations of them, indicate the presence of tents supported by nailed poles. In total, at least four groups of tents can be discerned in the campsite. The hinge found next to the weapon storage dugout was probably used to secure the dugout door or window.

Ammunition was collected throughout the entire area of the Vanagai camp, and was most densely scattered at the eastern foot of Vanagas Hill. Unfired rounds accounted for 78.4% of the total ammunition, some of which, such as a cluster of 7.62×54 mm R cartridges (contents of one ammunition box) found on the northwestern slope of the hill, are considered to be ammunition stocks. Unlike the unfired rounds, spent cartridge cases and bullets were mainly scattered around the area of the military training camp and not in the main assemblage of ammunition. The cartridge cases and bullets recovered during the investigation indicate that at least 15 shots were fired, confirming the accounts of the camp participants that the firing exercise took place outside the camp.

The equipment and uniform items found at the campsite were concentrated in two locations at the eastern foot of Vanagas Hill and at its southeastern edge. With the exception of a Soviet parachute ring, all the finds in this group belong to Wehrmacht uniforms, such as a part of a cockade, shoulder insignias, buttons, a gas mask case belt clip and a tent flysheet ring. This suggests that parts of at least two different Wehrmacht uniforms were found in the camp, one of which was worn by an officer during World War II. This uniform probably ended up in the Vanagai camp as a war trophy.

Household items were also scattered mainly over an area of 9 by 11 m at the eastern foot of Vanagas Hill, with only isolated finds in other parts of the military training camp. It was in this part of the camp that 10 coins were recovered, in addition to numerous nails, pieces of equipment and uniforms, and a further three coins were found on the western slope of a nearby hillock. All this indicates that the eastern foot of Vanagas Hill was the central part of the camp. Although some camp participants recall that the camp command post was located in a separate tent in the higher part of the forest (Beresnevičius 2012: 228), a small 4 by 7 m area in the northern part of the find assemblage is considered to be the headquarters of the Vanagai camp. This

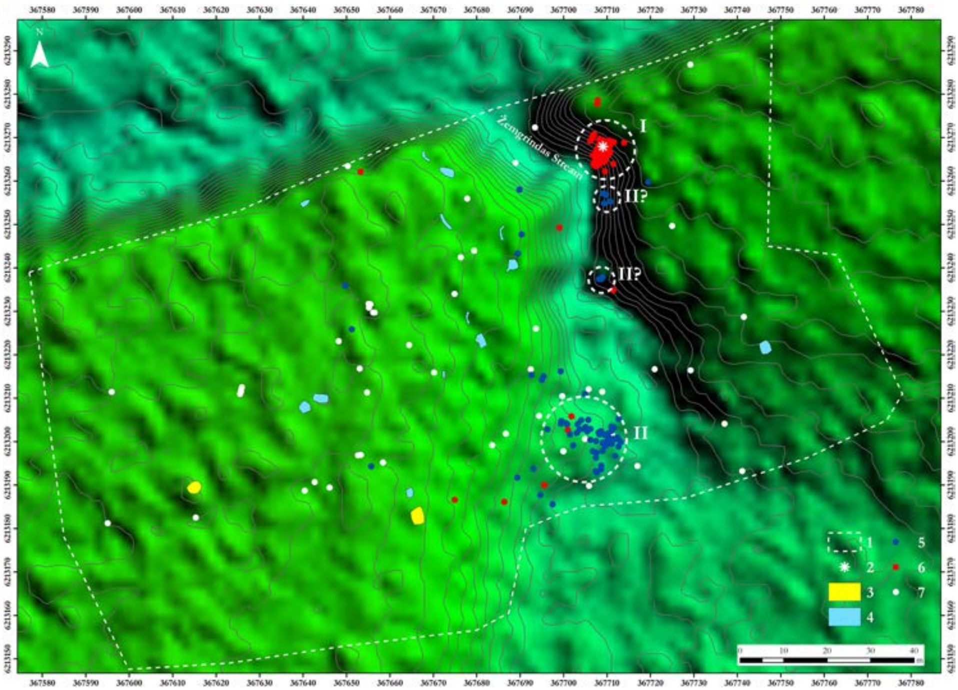


Fig. 6. Situation plan of the LLA firearms training ground: I – cluster of bullets (target), II – cluster of cartridge cases (firing position), 1 – surveyed area, 2 – pine tree (target), 3 – dugout pit, 4 – foxhole, 5 – cartridge cases, 6 – bullets, 7 – other finds. Graphic elaboration: G. Petrauskas.

is evidenced by eight coins, a Mosin rifle bore brush, Wehrmacht uniform tunic and trouser buttons, a comb, a multifunctional knife, etc.

No dugouts, trenches, or foxholes were excavated in the campsite. However, the areas empty of finds indicate that no significant activity or fighting took place in the vicinity of the food and weapons storage dugouts. Although the massive irregularly-shaped training trenches were located in a deep and well-camouflaged area at the foot of Vanagas Hill, surrounded by high hills, it was strategically unsuitable for defence. This suggests that the trenches were dug for training purposes, and each of them was probably installed by a separate Vanagai platoon.

Firearms training ground

Investigation of the Vanagai firearms training ground revealed the largest assemblage of finds on the right bank of the Žemgrindas stream (Fig. 6). On the high slope of the stream, in an area of 7 by 8 m, 238 finds were found (64.5% of the total number of finds from the site), the majority of which consisted of intact, bent and badly flattened bullets. Most of the bullets were of Soviet origin, with 97 bullets classified as 7.62×54 mm R and 38 bullets as 7.62×25 mm TT. The German ammunition consisted of 11 7.92×57 mm Mauser bullets and 8 9×19 mm Parabellum bullets. The calibre of the remaining 80 bullets could not be determined due to corrosion, poor preservation and fragmentation.

As many as 91.8% of the bullets (214 out of 233) were recovered in a small area of 3.5 by 4.8 m on the slope of the stream in front of and next to the pine tree (as seen from the left bank of the stream; Fig. 7). Bullets were also found in broken pieces of wood, bark and even embedded in the trunk of the pine tree at a height of between 0.2 and 1.4 m, while some of the bullets found deep in the ground had remnants of wood on their surface. The southwestern and western sides of the pine trunk were riddled with bullets and had numerous bullet marks. Although metal detector signals can be detected throughout the entire pine tree, the exact number of bullets that penetrated deep into the trunk is unknown.

The composition of the find assemblage and the number of fired bullets found suggest that the pine tree was the target of the Vanagai firing exercises. The pine tree was fired at with different weapons and many shots were fired directly at it. The single bullets detected on the opposite side of the pine tree must also be related to the firing exercises. Based on the fact that no other similar bullet deposits were recorded during the survey, the Vanagai had only one target at the firing training ground. The U-shaped staple found near the pine tree was probably used to attach the target to the trunk.

The age of the pine tree is about 120 to 150 years, and at the end of World War II it must have been one of the oldest trees (45 to 75 years old) on the right bank of the Žemgrindas stream (consultation by Donatas Grigalauskas and Juozas Bernius, forester and deputy forester of Plateliai Forest Inspectorate, September 2020). At that time, the forest on this side of the stream had been cleared and only a few mature trees remained. The trunk of the pine tree has a circumference of 1.75 m (measured at a height of 1.3 m), but the "wounds" left by the bullets have practically stopped the tree from growing. The trunk grew mainly on the other side of the tree, which was not fired at by the Vanagai. The irregular crown of the pine tree is also an indication of impaired growth.

Many of the bullets recovered on the right bank of the Žemgrindas stream were not found on the surface itself, but at a depth of 10–25 cm or even deeper. However, a cross-section carried out near the pine tree refuted the initial assumption that a protective embankment may have been built at the Vanagai firing target. No layer

Fig. 7. Pine tree (target area), seen from the north-northwest, from 2020. Photo: G. Petrauskas.

of poured sand was observed near the trunk of the pine tree, indicating that the bullets lodged deep in the slope of the stream had been covered with loose hillside sand during the 75 years after the firing exercise.

The second find assemblage from the Vanagai firearms training ground was recorded in the valley of the left bank of the Žemgrindas stream. Although the boundaries of this assemblage were conditional and less clear than those of the first assemblage, 57 finds (15.4% of the total) were recovered in an area of approximately 14 by 16.5 m, bounded by a forest road and a meandering stream. In contrast to the first assemblage, 91.2% of the finds consisted of cartridge cases (52 finds). These were mainly 7.62×25 mm TT (33 finds) and 7.62×54 mm R (12 finds) cartridge cases, but the assemblage also included single unfired rounds, spent cartridge cases and bullets of other calibres, as well as a multi-functional knife and a part of a harmonica. This was obviously the main firing position of the Vanagai.

During the firing exercises, different types of weapons were fired at a target on the left bank slope of the Žemgrindas stream. These included a Mosin rifle and a SVT semi-automatic rifle (7.92×54 mm R), a Mauser rifle (7.92×57 mm Mauser), a MAS-36 rifle (7.5×54 mm MAS) and a PPSh submachine gun (7.62×25 mm TT). In addition, a spent cartridge case from a 9×19 mm pistol was also found here. The firing position was approximately 65–75 m from the target and the firing trajectory followed the bottom of the stream valley surrounded by high hills. All this shows that the firing position was well thought out. However, the PPSh cartridge cases found raise doubts about the excessive distance between the firing position and the target. When firing this type of weapon, the target should be no more than 15–50 m away from the shooter.

Single cartridge cases were also detected in other areas of the Vanagai firearms training ground. Two clusters of 7.62×25 mm TT cartridge cases were located on the right bank slope and in the valley of the Žemgrindas stream. They were separated from the firing target by a distance of 10.85 m and 30 m respectively. Although only nine spent cartridge cases were found here, the topography of the site and the short distance to the target suggest that many of the cartridge cases may have been collected after the exercise, and that the significance of this site was greater than the number of cartridge cases found today.

The ammunition collected at the firearms training ground allowed us to recreate the scale and intensity of the Vanagai firing exercises. The recovered cartridge cases and bullets suggest that at least 226 shots were fired during the firing exercises (35 small unidentified bullet fragments are not included in this figure). The most shots were fired from a Mosin rifle or a SVT semi-automatic rifle (106 shots) and a PPSh submachine gun (46 shots). At least 11 shots were fired from a Mauser rifle, nine shots from a pistol of unknown type, at least three shots from a MAS-36 rifle, and two shots each from a TT pistol and a Lee-Enfield rifle. Due to the poor condition and fragmentary nature of the bullets, the origin of another 45 shots remained undetermined.

Soviet 7.62×54 mm R and 7.62×25 mm TT cartridges, as well as German 7.92×57 mm Mauser and 9×19 mm Parabellum cartridges, which were widespread in the military training camp and firearms training ground, were the main types of ammunition used by the Lithuanian partisans (Zikaras 2013: 219–234). Until the end of World War II battles in Lithuania and for many years to come, replenishing this ammunition did not pose any major difficulties for the partisans. The British Lee-Enfield rifle may have been left over from World War I or the Lithuanian Wars of Independence (1918–1920), and the discovery of the rifle's cartridge cases at the firearms training ground and the unfired round at the military training camp confirm the direct links between the two sites. The French MAS-36 rifle was not common among the Vanagai and Lithuanian partisans in general, but ammunition of this weapon has been found in several investigated bunkers and dugouts of the Lithuanian Partisan War (Petrauskienė *et al.*, 2017; Petrauskas and Petrauskienė 2018).

A comparison of the number of bullets found at the firing target with the number of cartridge cases recovered at the firing positions revealed a distinct lack of cartridge cases (233 bullets and 76 cartridge cases were collected in total). The fact that spent cartridge cases remain lying near the site of the shot, and some bullets ricochet, do not reach the target, and simply do not remain in the archaeological context, makes the lack of cartridge cases even more obvious. The Vanagai firearms training ground is the first case in Lithuanian Partisan War research where the number of bullets found exceeded the number of cartridge cases. It is therefore concluded that, as a matter of routine, in order not to leave evidence or for any other reason, a large number of spent cartridge cases were collected and the area was cleaned up at the end of the firing exercises.

Similarly to the military training camp, no finds related to the firing exercises were found near the dugouts and foxholes dug at the firearms training ground. This indicates that the training trenches were not used for defence purposes and that no significant activity took place in this part of the Vanagai training ground. Only future archaeological research could reveal their true purpose and construction.

CONCLUSIONS

The military training of the LLA Vanagai held in the Plokštinė Forest in Samogitia on 15–25 August 1944 marked the preparation for the anti-Soviet armed resistance and, in a way, witnessed the beginning of the decade-long Lithuanian Partisan War. Extensive archaeological surveys carried out in the Plokštinė Forest in 2019 and 2020 have identified the exact location of the military training and firing exercises, and have provided valuable data on the layout and equipment of the camp, as well as on the everyday life and weaponry of the Vanagai. In setting up the military training camp, the Vanagai cleverly adapted and transformed the hilly landscape of the shoreline of Lake Plateliai, shaping the space of the camp and defining its activity areas. The training and firing exercises that took place in a separate part of the military training camp are evidenced by the dugout pits, massive training trenches and foxholes, as well as the trunk of the pine tree riddled with bullets and hundreds of archaeological finds scattered throughout the area.

The military training camp in Plokštinė Forest is the first archaeologically investigated Lithuanian Partisan War site, dating back to the origins of the partisan war itself. It is also the most comprehensively researched Lithuanian Partisan War campsite to date. The study of the Plokštinė Forest camp has revealed how the landscape was adapted and used to shape the camp and the military training site, in order to prepare the youth of Samogitia for the armed resistance. In order to uncover the phenomenon of the Lithuanian Partisan War, which has its origins in World War II, landscape studies need to be continued. Landscape archaeology is undoubtedly a very promising and highly potential approach of modern conflict research.

ACKNOWLEDGMENTS

This research was funded by the European Social Fund (project No 09.3.3-LMT-K-712-23-0007) under the No 09.3.3-LMT-K-712 "Development of Competences of Scientists, other Researchers and Students through Practical Research Activities" measure. The article is based on a paper of the same title presented at the 11th Fields of Conflict online conference organised by the University of Edinburgh and the University of Barcelona on 8 May 2022.

The author is grateful to the Directorate of Samogitia National Park and especially Aldona Kuprelytė, without whose support the research in the Plokštinė Forest would not have been carried out. Special thanks are given to research assistants Gabrielė Aputytė and Ieva Šimanauskaitė and all the participants of the archaeological expedition. The author would also like to thank Staff Sergeant Ernestas Kuckailis of the Lithuanian Armed Forces, military reenactor Egidijus Kazlauskis and archaeologist Gytis Grižas for their contribution to the identification of the finds, as well as Stasys Mickevičius, contemporary of the historical events, the foresters Donatas Grigalauskas and Juozas Bernius, together with surveyors Vytautas Beržinis and Tomas Milierius, and also the conservator Regina Ulozaitė. Finally, special thanks are given to Dr Darius Juodis for proof-reading part of the manuscript and providing valuable comments on the article.

REFERENCES

Anušauskas, A. 2015. The terror (1944–1953). In A. Anušauskas (ed.), *Lithuania in 1940–1991: The History of Occupied Lithuania*, 244–269. Vilnius.

Asadpour, A. 2016. From landscape of conflict to landscape of defense. Concepts and relations of landscape to war. *Manzar* 34: 50–57.

Banks, I. 2011. Control or repression: contrasting a prisoner of war camp and a work camp from World War II. In A. Myers and G. Moshenska (eds), *Archaeologies of Internment*, 111–128. New York. doi:10.1007/978-1-4419-9666-4_7.

Beresnevičius, A. (ed.). 2012. *Lietuvos laisvės armijos desantininkai Žemaitijoje: kovojusiems ir žuvusiems atminti*. Panevėžys.

Brandišauskas, V. 1998. The June Uprising of 1941. *Lithuanian Historical Studies* 3: 49–72.

Brandišauskas, V. 2006. Anti-Soviet resistance in 1940 and 1941 and the Revolt of June 1941. In A. Anušauskas (ed.), *The Anti-Soviet Resistance in the Baltic States*, 5th edition, 8–22. Vilnius.

Brandišauskas, V. 2015. The June Uprising and the Provisional Government. In A. Anušauskas (ed.), *Lithuania in 1940–1991: The History of Occupied Lithuania*, 129–138. Vilnius.

Bubnys, A. 2003. *Nazi Resistance Movement in Lithuania: 1941–1944.* Vilnius.

Bubnys, A. 2015. Anti-Nazi resistance. In A. Anušauskas (ed.), *Lithuania in 1940–1991: The History of Occupied Lithuania*, 207–219. Vilnius.

Camp, S. L. 2016. Landscapes of Japanese American internment. *Historical Archaeology* 50(1): 169–186. doi:10.1007/BF03377183.

Carr, G. 2009. Landscapes of occupation: a case study from the Channel Islands. In N. Forbes, R. Page and G. Pérez (eds), *Europe's Deadly Century: Perspectives on 20th Century Conflict Heritage*, 35–43. Swindon.

Early, R. 2013. Excavating the World War II prisoner of war camp at La Glacerie, Cherbourg, Normandy. In H. Mytum and G. Carr (eds), *Prisoners of War: Archaeology, Memory, and Heritage of 19th- and 20th-Century Mass Internment*, 95–115. New York. doi:10.1007/978-1-4614-4166-3_6.

Gaffney, C., Gater, J., Saunders, T. and Adcock, J. 2004. D-Day: geophysical investigation of a World War II German site in Normandy, France. *Archaeological Prospection* 11: 121–128. doi: 10.1002/arp.233.

Gaškaitė, N., Kuodytė, D., Kašėta, A. and Ulevičius, B. 1996. *Lietuvos partizanai 1944–1953 m.* Kaunas.

Gaškaitė-Žemaitienė, N. 2006. The Partisan War in Lithuania from 1944 to 1953. In A. Anušauskas (ed.), *The Anti-Soviet Resistance in the Baltic States*, 5th edition, 23–45. Vilnius.

Gečiauskas, G. 2010. Lietuvos partizanų Žemaičių apygarda 1945–1953 m. In V. Grigoraitis, R. Masiulionytė, N. Maslauskienė, K. Remeika and T. Remeikis (eds), *Lietuvos partizanų Žemaičių apygarda 1945–1953 m.: dokumentų rinkinys*, 11–36. Vilnius.

Gilead, I., Haimi, Y. and Mazurek, W. 2009. Excavating Nazi extermination centres. *Present Pasts* 1: 10–39. doi:10.5334/pp.12.

Kasparas, K. 1994. Laisvės kovų pradžia antrosios rusų okupacijos metu (istorinės apžvalgos metmenys). *Laisvės kovų archyvas* 10: 51–70; 11: 47–55; 12: 65–74.

Kasparas, K. 1999. *Lietuvos karas: antroji Sovietų Sąjungos agresija. Pasipriešinimas. Ofenzyvinės gynybos tarpsnis 1944 m. vasara – 1946 m. pavasaris*. Kaunas.

Kasparas, K. 2002. *Lietuvos Laisvės Armija*. Kaunas.

Kasparas, K. and Paulauskaitė, M. 2008. *Lietuvos laisvės armijos kovos Žemaitijoje*, vol. 1. Plungė.

Kaunietis, R. (ed.). 2014. *Laisvės kovotojų prisiminimai*, vol. 9. Vilnius.

Kirby, M., Ross, A. and Anderson, S. 2013. The excavation of a World War II army camp at Mortonhall, Edinburgh. *Journal of Conflict Archaeology* 8(2): 106–135. doi:10.1179/1574077313Z.00000000021.

Klimas, A. (ed.). 2018. *Kovojusiems ir žuvusiems atminti: prisimena įvykių liudininkai. Taip pat medžiaga iš archyvų*. Plungė.

Konczewski, P. 2020. Searching for *Living Ghosts*: the archaeology of Communist repression in Poland. In J. Symonds and P. Vařeka (eds), *Archaeologies of Totalitarianism, Authoritarianism, and Repression: Dark Modernities*, 125–147. Cham. doi: 10.1007/978-3-030-46683-1_7.

Kuodytė, D. 1995. Lietuvos laisvės armija ir jos reikšmė pokario pasipriešinimui. *Laisvės kovų archyvas* 14: 5–13.

Kuodytė, D. 2015. The Lithuanian Resistance Movement (1944–1953). In A. Anušauskas (ed.), *Lithuania in 1940–1991: The History of Occupied Lithuania*, 270–308. Vilnius.

Mikhajlov, A. V. and Podgornaia, R. G. 2018. Arkheologicheskie issledovaniia na territorii partizanskogo lageria Vtoroj Leningradskoj partizanskoj brigady [Archaeological research on the territory of a guerrilla camp of the 2nd Leningrad partisan brigade]. In N. V. Lopatin and E. V. Salmina (eds), *Arkheologiia i istoriia Pskova i Pskovskoj zemli: Ezhegodnik Seminara imeni akademika V. V. Sedova*, vol. 33, 221–226. Moskva–Pskov. doi: 10.25681/IARAS.2018.978-5-94375-278-0.221-226.

Mushynsky, J., McKinnon, J. and Camacho, F. 2018. The archaeology of World War II karst defences in the Pacific. *Journal of Conflict Archaeology* 13(3): 198–222. doi: 10.1080/15740773.2018.1583470.

Noreika, D. 2015. Šauliai, Birželio sukilimas ir partizaninis karas: Šiaurės rytų Lietuvos atvejis. *Lituanistica* 61(3): 221–234. doi:10.6001/lituanistica.v61i3.3193.

Passmore, D. G., Tunwell, D. C. and Harrison, S. 2013. Landscapes of logistics: the archaeology and geography of WWII German military supply depots in Central Normandy, North-west France. *Journal of Conflict Archaeology* 8(3): 165–192. doi:10.1179/1574077313Z.00000000025.

Passmore, D. G., Tunwell, D. C. and Harrison, S. 2016. World War II conflict and post-conflict landscapes in Northwest France: an evaluation of the aerial photographic resource. In B. Stichelbaut and D. Cowley (eds), *Conflict Landscapes and Archaeology from Above*, 185–204. Farnham.

Patamsis, R. 2015. *Paskutinis iš Žemaičių legiono štabo: biografinė istorinė apybraiža*, 2nd ed. Klaipėda.

Petrauskas, G. 2020a. Lietuvos partizaninio karo archeologijos dešimtmetis: tyrimų kryptys ir ateities perspektyvos. *Acta Historica Universitatis Klaipedensis* 40: 97–139. doi:10.15181/ahuk.v40i0.2131.

Petrauskas, G. 2020b. Lietuvos partizaninio karo vietų žvalgymai Žemaitijos nacionaliniame parke. In G. Zabiela (ed.), *Archeologiniai tyrinėjimai Lietuvoje 2019 metais*, 449–461. Vilnus.

Petrauskas, G. 2021. Lietuvos laisvės armijos „Vanagų" šaudymo pratybų vietos žvalgymai Plokštinės miške. In G. Zabiela (ed.), *Archeologiniai tyrinėjimai Lietuvoje 2020 metais*, 624–635. Vilnus.

Petrauskas, G. and Petrauskienė, A. 2018. Blinstrubiškių miško partizanai: istorija, archeologija ir paveldosauga. In A. Astramskas and D. Juzėnas (eds), *Iš Panevėžio praeities: Miško broliai. XX konferencijos pranešimai*, 54–72. Panevėžys.

Petrauskas, G. and Petrauskienė, A. 2020. Archaeology of the Lithuanian Partisan War: case of the partisan bunker ir Daugėliškiai Forest. In J. Symonds and P. Vařeka (eds), *Archaeologies of Totalitarianism, Authoritarianism, and Repression: Dark Modernities*, 149–170. Cham. doi: 10.1007/978-3-030-46683-1_8.

Petrauskas, G. and V. Vaitkevičius, V. 2020. Partizaninio karo vietos Pasvalio in Radviliškio rajonuose. In G. Zabiela (ed.), *Archeologiniai tyrinėjimai Lietuvoje 2019 metais*: 461–467. Vilnus.

Petrauskas, G., Vaitkevičius, V., Petrauskienė, A. and Kuckailis, E. 2018. Lietuvos partizaninio karo vietų žvalgymai. In G. Zabiela (ed.), *Archeologiniai tyrinėjimai Lietuvoje 2017 metais*, 641–653. Vilnus.

Petrauskienė, A., Petrauskas, G. and Vaitkevičius, V. 2017. *Partizanų bunkeris Daugėliškių miške: kompleksinių tyrimų studija ir šaltiniai*. Raseiniai.

Petrauskienė, A. and Vaitkevičius, V. 2017. Atrandant partizaninio karo paveldą. *Nepriklausomybės sąsiuviniai* 3(21): 62–71.

Price, N. and Knecht, R. 2012. Peleliu 1944: the archaeology of a South Pacific D-Day. *Journal of Conflict Archaeology* 7(1): 5–48. doi: 10.1179/157407812X13245464933786.

Reinsone, S. 2016. Forbidden and sublime forest landscapes: narrated experiences of Latvian national partisan women after World War II. *Cold War History* 16(4): 395–416. doi:10.1080/14682745.2014.986108.

Schriek, van der M. 2020. The interpretation of WWII conflict landscapes. Some case studies from the Netherlands. *Landscape Research* 45(6): 758–776. doi:10.1080/01426397.2020.1776231.

Schriek, van der M. and Beex, W. 2017. The application of LiDAR-based DEMs on WWII conflict sites in the Netherlands. *Journal of Conflict Archaeology* 12(2): 94–114. doi:10.1080/15740773.2017.1440960.

Saunders, N. J. and Cornish, P. (eds). 2021. *Conflict landscapes: materiality and meaning in contested places.* London and New York.

Seitsonen, O. 2021. *Archaeologies of Hitler's Arctic War: heritage of the Second World War German military presence in Finnish Lapland.* London and New York.

Shepherd, E. J. 2016. Mapping unexploded ordnance in Italy: the role of World War II aerial photographs. In B. Stichelbaut and D. Cowley (eds), *Conflict Landscapes and Archaeology from Above*, 205–217. Farnham.

Souza, R. A. 2019. Landscapes of resistance and counterinsurgency in Brazil: an archaeology of the Araguaia guerrilla (1972–1975). *World Archaeology* 51(5): 778–793. doi:10.1080/00438243.2020.1745681.

Theune, C. 2010. Historical archaeology in national socialist concentration camps in Central Europe. *Historische Archäologie* 2: 1–14.

Tunwell, D. C., Passmore, D. G. and Harrison, S. 2015. Landscape archaeology of World War Two. German logistics depot in the Forêt domaniale des Andaines, Normandy, France. *International Journal of Historical Archaeology* 19: 233–261. doi:10.1007/s10761-015-0287-4.

Woodward, R. 2014. Military landscapes: agendas and approaches for future research. *Progress in Human Geography* 38(1): 40–61. doi:10.1177/0309132513493219.

Zikaras, K. (ed.). 2013. *Žymiausi Lietuvos mūšiai ir karinės operacijos.* Vilnius.

Archaeologia Polona, vol. 61: 2023, 315–323
PL ISSN 0066-5924
DOI: 10.238558/APa61.2023.3632

BOOK REVIEW

Laure Fontana, Thierry Aubry (préface), *Les sociétés de chasseurs de rennes du Paléolithique récent en France – Économie, écologie et cycle annuel du nomadisme*, 2023. Collection: Les cahiers de la MSHE Ledoux nº 9, Série: Homme et environnement nº 3, Presses Uniyeau Franche-Comte, pp. 248, 92 illustrations, 2 annexes

Reviewed by Magdalena Sudoł-Procyk[a]

The scientific work under review was published in 2023 by the University of Franche-Comté (France) and focuses on the reconstruction of the migrations of reindeers, being the main wild game for hunters living in the territory of France at the decline of the Pleistocene, in order to understand the mobility of human groups in the last cold episode of the Palaeolithic, i.e., between 30,000 and 15,000 cal BC. The book was written by Laure Fontana, a research scientist at the CNRS, archaeozoologist at the Laboratory Arscan in Nanterre (France), engaged in studies upon economy and reconstruction of an annual cycle of nomadism based on exploitation of animal resources in the Late Palaeolithic.

The book consists of four major sections containing expanded chapters. They are preceded by a few introductory chapters, including a Preface written by Thierry Aubry, Scientific and technical manager in Côa Parque (Foundation for the preservation and enhancement of the Côa valley, Vila Nova de Foz Côa in Portugal), in which the author included a synthetic and substantive description of results of studies presented in the work by L. Fontana. The entire publication was published in French language.

In the first section, entitled "Contextes et objet d'étude", in four chapters, the author presented introductory issues into the topics of studies upon remains of reindeers in the context of archaeological assemblages of the Upper Palaeolithic in the territories of France.

The first section starts with the Chapter 1, entitled "De l'Aurignacien au Magdalénien: des cultures Paléolithiques?", in which the author presents the issues of

[a] Institute of Archaeology, Nicolaus Copernicus University in Toruń, 44/48 Szosa Bydgoska Street, 87–100 Toruń (Poland), e-mail: sudol@umk.pl; ORCID: 0000-0003-4099-5893

Received November 22, 2023; Accepted November 25, 2023

identification of the Palaeolithic cultures based on the typology of lithic industries, before they were perceived as cultural systems, frequently equated with ethnic groups. Having applied this approach, other sources, including tools made of other types of organic materials, are investigated within the previously established frames. L. Fontana draws an attention to the fact that other aspects, such as management of animal resources in the Upper Palaeolithic, evolved at a rate not corresponding with the changes in chronological and cultural complexes. Therefore, presenting data within accepted chronological timeframes, with reservation that a significant number of samples lack absolute chronology, is a certain inconsistency.

In Chapter 2, entitled "L' environnement de la France au Pléniglaciaire supérieur et au tardiglaciaire", the author presents, in a concise though comprehensive manner, the environment of the Upper Pleniglacial during the last Glaciation period in the territory of France. Archaeological periodisation of the Late Palaeolithic in Western Europe was discussed clearly, correlating particular Palaeolithic cultures with changeable environmental factors. The author indicates difficulties in univocal identification of the impact of climate in the period under scrutiny on the changes in fauna and flora, being the major elements of the ecosystem. The complexity of these relationships, which are not always global and vary depending on the species, environment and climatic changes, is confirmed by the existing scientific works referring to ecology and biogeography.

The following Chapter 3, entitled "Le renne (*Rangifer tarandus*)", provides data referring to ethnology and biology of present populations of reindeers and caribous, based on the existing literature. The species *Rangifer tarandus* was described in detail in the scope of its morphology and genetics, referring this information to the regions and various environments where it lives currently. An interesting thread of this Chapter, providing the grounds for analysis on fossil materials, is presentation of the species in question as an animal with a wide spectrum of environmental adaptation ability. Despite the fact that a reindeer is perfectly adapted to survive in the coldest environments and the extent of its occurrence within the Subarctic zone is the most widespread amongst all other ungulates, it is also encountered in various habitats with changeable weather conditions depending on the season of the year, from Arctic tundra, through Subarctic taiga, to boreal coniferous and deciduous forests. This Chapter ends with an interesting discussion on the origins and evolution of *Rangifer tarandus* through the recent two million years, in particular, referring to the oldest bone remains recorded at the Palaeolithic sites from the period MIS 10 in Western and Central Europe.

This section of the book ends with the Chapter 4, entitled "Constitution des corpus et des espaces d'étude", which presents data collected from excavated and recorded sites. The sites were listed in a table, and were divided into 10 regions of their concentrations, with an appropriate location on the map. Graphical presentation of this data was very well designed – every region was marked with different colour (the same colours were used in the Figures nos. 23 and 24), thanks to which the reader can easily understand this multi-aspect summary of caves and open sites ascribed to particular archaeological cultures. Apart from this synthetic description, additional data on fauna, coming from 117 sites from the territory of France, since the Early Gravettian to the Late Magdalenian, was presented in greater detail in the Appendices I and II. It should be stressed that a great value of this section is the graphical material, namely aptly selected and well-designed figures, which facilitate the easy understanding by the reader of the discussed issues.

The second section, entitled "La place du renne dans l'économie des ressources animals entre 30000 et 14000 cal BP", describes the significance and position of reindeers, amongst other species of wild game, in the management of animal resources in the Late Palaeolithic societies. The author rightly considers this issue with reference to the significance of hunting and antler shedding, on one hand; on the other hand, she addresses the strategy of obtaining and exploitation of antlers. These choices entailed successive decisions on the entire economic and technical system, habitat and mobility. The successive research stages were designed properly, which helps the reader fully understand the topic determined by the title of this section.

In Chapter 1 of this section, entitled "La part du renne dans les chasses" the author presents a quantitative contribution of hunted reindeers known from the Late Palaeolithic sites in the territory of France, in order to facilitate understanding of the observed variability. This Chapter contains information that provides the grounds for questioning various environmental and anthropogenic parameters considered as factors determining the selection of reindeer hunting zones. Colourful representation of data referring to sites and regions where the investigated material was discovered is consistent and coherent with the graphical markings proposed in the first section of the book under review. Also in this section, the high quality of the graphic presentation is noteworthy, which is very helpful in effective tracing of multi-aspect results of the analyses.

The following Chapter 2, entitled "Les stratégies de chasse au renne" describes hunting strategies and indicates that animals were chased in certain seasons of the year, depending on their availability in the particular environment and characteristic traits, such as weight, antler size, and the nature of their coat. An analysis of available data revealed that various configurations of hunting seasons were adopted depending on the region, for instance, all-year-round hunting was recorded for Dordogne/Charente and the central-western Pyrenees, winter and spring hunting was confirmed for the Black Mountains (Noire), spring, summer and autumn for the Massif Central and the region Lot/Quercy, hunting exclusively in autumn was recorded for the Paris Basin (in the southern part of the region even in winter). The author proved that the variability of data within particular regions is, in general, very low, except for the Pyrenees and, to smaller extent, the central-western region. This conclusion raises a question whether the evidenced variability recorded merely in two regions reflects the factual situation or it is rather due to poor state of the evidence available. Regardless of this, proving that, in all of the regions except for the Paris Basin, the reindeer hunting seasons in the territory of France were contained in at least two seasons of the year is an important premise for further considerations on the migration of reindeers, discussed in the following parts of the book under review (section 3).

In Chapter 3, entitled "Les bois de renne: stratégies et saisonnalité d'acquisition et d'exploitation", L. Fontana addresses the issue of manners of antler exploitation. This material was obviously obtained through cutting it off from an already dead, hunted animal; although there was another manner, namely collecting antler dropped in the process of shedding, which takes place, at least, during three seasons of the year, depending on whether it belonged to a male or a female, adult or juvenile individual. Since the properties of animal carcass and antler differ, the manners of their exploitation are also different in terms of processing, conservation, transportation, and utilisation. The author evidenced that the exploitation of an animal and its antler throughout the year followed two separate logic paths (either partly or entirely) due to the fact that their availability and properties varied. Amongst significant conclusions, especially noteworthy are the following: antlers of adult females were not collected; selected antlers of males obtained in the autumn-winter season constitute a predominant part of the finds; human societies obtained antler regularly in the course of hunting, where non-selected antler of males was acquired in autumn, while in winter and early spring antler of females and juveniles were gathered.

In the final Chapter of this section, namely Chapter 4, entitled "Conclusion: le statut économique du renne", conclusions referring to the economic status of reindeers at the decline of the Palaeolithic are presented. The discussion held by scholars engaged in studies on prehistory has been oriented, until the present, on the issues of the exploitation of reindeers by human societies at the end of the Pleistocene, resulting from their quantity, availability practically all-year-round, herding and mobility, which facilitated hunting in open environments. L. Fontana in her book does not question the significance of the reindeer population in the territory of France in the period between 30,000 and 14,000 cal BP, instead, she points out the variability in the number of reindeers, which was mainly due to geographical conditions, namely occurrence in various environments, and more or less significant, hunting for other species. From the economic viewpoint, reindeers seem to have been the most important wild game species in six out of ten regions under scrutiny, and as important as horses in two out of three mountainous regions. Moreover, the author indicates that the specific status of reindeer in human economy was also based on exploitation of antler, which seems to be exceptional in comparison with the antler of other hunted species. These observations confirm a convergence between an occurrence of artefacts made of reindeer antler and the regions where reindeer was a predominant species amongst other hunted wild game.

The third section, entitled "Mobilité des rennes et mobilité des groupes humains" addresses the very important issue of reindeer migration as a factor affecting the phenomenon of nomadism of prehistoric hunters from Western Europe, in terms of frequency, duration and the extent of migration. Since the half of the 20th century, thanks to research works published by French scholars (e.g., Bouchud *et al.*, 1952; 1953), there has been held a view on the existence of non-migrating reindeers in the territory of south-western France, staying in one habitat throughout the entire year, which might indicate a sedentary, at least partly, lifestyle of human groups. This approach was questioned until the 1990s, mainly due to results of studies oriented at typological classification and determination of the provenance of lithic materials (e.g., Sonneville-Bordes and Perrot 1954–1956; Bordes 1961) and insufficient state of knowledge on a microregional scale, particularly in the scope of integrated analyses on the management of animal and lithic resources. A certain response to this insufficient state of knowledge were investigations initiated in 2000 in the region of the Massif Central (Fontana *et al.*, 2009), and the obtained results encouraged scholars to extend the research area over other regions as well. This is covered in Chapter 1 of this section, entitled "État de la question et objectifs", where the author formulated questions referring to the scope of exploitation of reindeers throughout the year in association with other factors, including exploitation of lithic deposits. An attempt to answer these questions was made in the successive parts of the book under review.

Chapter 2, entitled "Rennes migrateurs et rennes sédentaires au Pléniglaciaire supérieur et au Tardiglaciaire", is a synthetic summary of our knowledge on reindeer migrations within particular regions. An interesting observation, made based on the analysed data, is a decrease in the frequency and extent of migration of reindeers in the territory of France at the end of Upper Pleniglacial and the Late Glacial. The results of these considerations prove that a low mobility of these animals, particularly legible within the zone between the Paris Basin and the Pyrenees, was undoubtedly connected with the environment they lived in, and the behaviour of reindeers was correlated with parameters of the natural environment. L. Fontana, referring to the ecology of populations of reindeers and caribous living presently in the territories of northern Eurasia and America, univocally indicates two aspects that are significant from the viewpoint of mobility of these species, namely vegetation and the nature of landform. A basic food for reindeers are lichens, which can grow throughout the entire year but only on acidic soils, and strong development of reindeer populations was conditioned by an appropriate abundance of this type of food. This reasoning seems to be confirmed by isotopic analyses performed for fossil bones of the species in question (Drucker 2001). Taking into account all of these issues, the author negates the commonly accepted canon of perception of the Late Palaeolithic France, as a large, open space with herds of reindeers migrating on a great scale. Apart from the vegetation factor, she also points out a series of other factors, such as the size of population, predator pressure (including humans), or the direction of the winds, which might have affected, to greater or smaller extent, the mobility of animals.

The latter issue was discussed in greater detail in the following Chapter 3 entitled "Cycle annuel de nomadisme: plusieurs configurations ou plusieurs visibilités?". This presents a wide spectrum of occurrence, availability and exploitation of the Turonian flint deposits in the region of the Massif Central and the context of occurrence of artefacts made of this raw material, already known to flintknappers since the Middle Palaeolithic. To summarise this chapter, the author comprehensively presented a reconstruction of activity of hunters-gatherers in the Late Palaeolithic of France, referring it to exploitation of regional animal and lithic resources within particular seasons of the year, and finally indicating that it was undertaken all-year-round, almost in all regions of France, except for its south-western part.

The final, fourth section of the book under review, entitled "Discussion", is a skilful discussion upon the issues presented in this research work, taking into account the current state of knowledge. The fourth section starts with the Chapter 1, entitled "L'environnement de la France entre 30000 et 15000 cal BP: des écosystèmes à définir", being an attempt of an objective presentation of the environment of France in the period under scrutiny, based on palaeoclimatic and palaeobotanical data. L. Fontana strongly underlines that current knowledge has led to France in the period between 30,000 and 15,000 cal BP being seen as an open terrain, in general, with dry and cold environment, whereas, the new data suggests the existence of various ecosystems in this territory, which may influence their characteristics, at least, on the regional level. With regard to a series of formulated questions associated with the vegetation and organisation of animal populations, L. Fontana quotes the characteristics of the mammoth steppe proposed by R. Dale Guthrie (e.g., 1990) and confronts it with the new data obtained in the recent ten years. The author wonders whether the geographical localisation of France, on the western fringe of this very specific and widespread biome, resulted in development of specific climatic and environmental properties, and whether this can provide the grounds for undermining an affiliation of this region to the mammoth steppe. On the other hand, she raises an interesting issue, whether this specific region could have had its analogues, for instance, in certain regions of Central Europe, with favourable conditions for lichens to grow in abundance, namely between the zone of the plains and the zone of icecap. Until present, there has not been published any synthetic elaborations of fauna from Central-Eastern Europe that could confirm the uniqueness of the territory in question. Regardless of the specifics of the mammoth steppe, on its western fringes it can be divided into a few ecosystems, which are referred to the ability of effective adaptation of animals to this new environment. The possibilities of such interpretation are suggested by the results of isotopic analyses, based on the diets of animals living presently and in the past, namely in the Upper Pleniglacial and the Late Glacial, such as saiga antelope, deer or horse (e.g., Drucker *et al.*, 2009). With regard to these results, L. Fontana formulates a hypothesis that mobile reindeers could have adapted to favourable conditions of France, indicating a possibility of varied structure of reindeer populations in uplands and valleys abundant with lichens and herbaceous plants. In such an environment, reindeers might have lived in small groups, without forming large herds, except for the breeding season.

Chapter 2, entitled "Durant 15 000 ans, un système unique au-delà des particularités", is a proposition of a concept of an annual cycle of hunters-gatherers' lifestyle in the territory of France, based on hunted large fauna from the period between 30,000 and 14,000 cal BP. Referring to the conclusions gathered based on fauna remains, one can assume that the environmental conditions during cold seasons of the year could have fostered permanent settlement. If this assumption is true, expeditions could have been restricted mainly to local resources, namely wild game, shed antler and certain forms of flints. In the remaining parts of the year the mobility certainly could have been greater. L. Fontana suggests that the organisation of an annual cycle of hunting groups' lifestyle (except for the Paris Basin) was not dependant on a presence or absence of reindeers. Such decisions could have been made based on seasonal biological traits of this animal and the environment. However, one cannot forget that the organisation of an annual cycle, apart from these environmental factors, was also based on cultural choices, which are very difficult to identify.

The final, synthetic chapter entitled "Conclusions" summarises the major research findings presented in the particular chapters.

The research work by L. Fontana is the first such comprehensive publication discussing various issues based on remains of reindeers, being the animals with the highest level of adaptation ability to live in the cold environment, and coming from the sites of the Gravettian, Solutrean, Badegoulien and Magdalenian cultures, located in various regions of France. The author strives to reveal the guidelines that would allow her to reconstruct an annual cycle of reindeer migrations, before she tries to understand how it affects the groups of hunters-gatherers' lifestyle, hunting strategies in particular. She proposes a few hypotheses referring to seasonal migrations of reindeers within the defined regions. The analyses indicate that the share of hunted reindeers slightly varied between 28,000 and 14,600 cal BP, which could suggest moderate climatic changes during this cold period. A suggestion that these were the climatic changes that influenced technical variability in flint assemblages seems to have lost its justification recently, and the lithic technique seems to be as stable and independent of the climatic changes as the animal resources management. The studies presented in the book under review represent a change in perception on strategies employed by hunting groups that, during 15,000 years, in the territory of France, except for the Paris Basin, hunted reindeers a few times a year, or even all-year-round, with hunting areas near their camps, and utilising various fragments of animal carcasses as food or materials, both, soft and hard, for production of various utilitarian objects. A selection of hunting strategy of low risk level satisfied major needs of these societies and provided them with nutritional safety. This picture contradicts the vision of a human struggling to survive in the cold environment of the Upper Pleniglacial of Central Europe. In this respect the work under review is of great significance from the viewpoint of the mobility of groups of hunters-gatherers from the decline of the Pleistocene. Assuming that this specific region had its palaeoenvironmental analogues, for instance, in some regions of Central Europe, further studies on the picture of a lifestyle of our Palaeolithic ancestors remain an open issue. In my opinion, the work exhausted the subject of the hypotheses set by the author, and the questions that were raised and left open can be considered research postulates rather than uncompleted research tasks.

In terms of the content and technical preparation, the book under review represents a high level. Analytical investigations were performed with great competence and were thoroughly prepared. The high quality graphics and well designed summaries in tables do not raise any objections. The layout of the book is well planned. Properly construed references are followed by a very helpful summary of sources, chronology, locations and illustrations contained within the text. The only drawback, from the viewpoint of a reader not speaking French, is the lack of English summary for particular sections of the book, which would significantly facilitate primary acquaintance of the issues raised. Some other minor defects, such as missing reference to the chapter 4 in the table of contents (p. 224), do not affect the general positive assessment of the work.

REFERENCES

Bouchud, J., Cheynier, A. and Guillie, Y. 1952. Les bois de renne de Badegoule. *Bulletin de la Société préhistorique française* 49(1–2): 1–3.

Bouchud, J., Cheynier, A. and Guillie, Y. 1953. Dents de Renne et migrations. *Bulletin de la Société préhistorique française* 50: 127–132.

Bordes, F. 1961. *Typologie du Paleolithique inferieur et moyen*, 1-111, Bordeaux. Delmas, Publications de l'Institut de Préhistoire de l'Université de Bordeaux, Mémoire n°1.

Drucker, D. 2001. *Validation méthodologique de l'analyse isotopique d'ossements fossiles et apports aux reconstitutions paléoécologiques du Paléolithique supérieur du sud-ouest de la France*. Doctoral thesis. Paris. Université de Paris 6 Pierre et Marie Curie.

Drucker, D., Bocherens, H. and Billiou, D. 2009. Quelle valence écologique pour les rennes et autres cervidés au Tardiglaciaire dans les Alpes du Nord et le Jura? Résultats de l'analyse des isotopes stables (13C, 15N) du collagène. In G. Pion (ed.), *La fin du Paléolithique supérieur dans les Alpes du Nord et le Jura méridional. Approches culturelles et environnementales*, 73–86. Paris. Société préhistorique française.

Fontana, L., Digan, M., Aubry, T., Mangado L. X. and Chauvière, F. 2009. Exploitation des ressources et territoire dans le Massif central français au Paléolithique supérieur: approche méthodologique et hypotheses. In F. Djindjian (ed.), *Le concept de territoires dans le Paléolithique supérieur européen. Actes du XVe Congrès Mondial de l'UISPP (Lisbonne, 2006)*, 201–215. Oxford. Archaeopress. British Archaeological Reports S2028.

Guthrie, R. D. 1990. *Frozen Fauna of the Mammoth Steppe: The Story of Blue Babe*. Chicago. University of Chicago Press.

Sonneville-Bordes, D. and Perrot, J. 1954–1956. Lexique typologique du paleolithique superieur. *Bulletin de la Société préhistorique française* 53: 327–335.