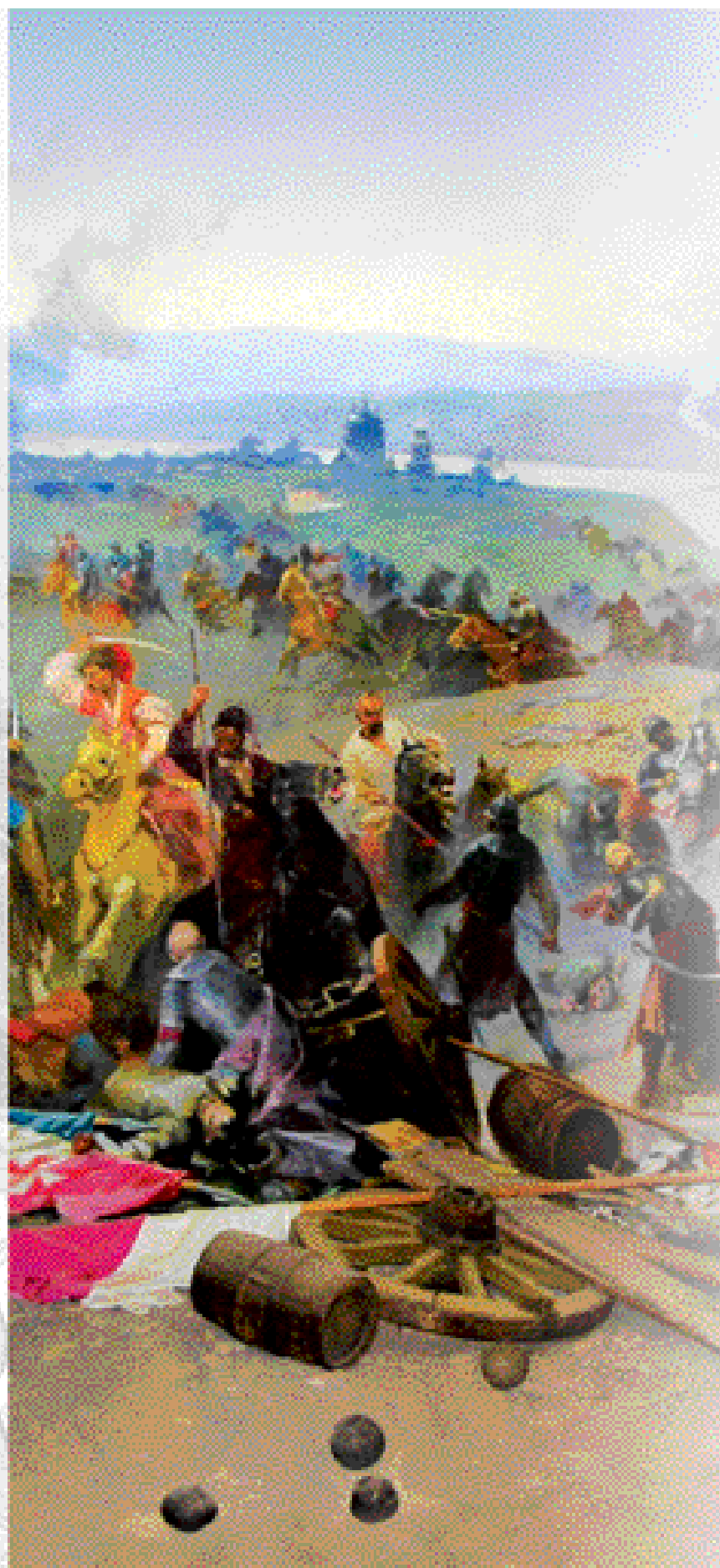




‘The conflict between nobles and Cossacks would periodically boil over into outright Cossack revolt and rebellion, most of which were crushed without much mercy.’



FIGHTING FOR FREEDOM: THE 1649 WAR BETWEEN THE COSSACKS AND THE POLISH- LITHUANIAN COMMONWEALTH

To most westerners, the Cossacks remain a mysterious and romanticized people. Nineteenth century writers and artists depict the Cossacks as extraordinary horsemen. This image is often reinforced by descriptions of Cossacks immune to the vigour of the Russian winter as they continued to nip at the heels of Napoleon’s Grand Army in 1812. Novels, like Gogol’s *Taras Bulba*, and the opera *Mazepa*, suggests the Cossacks were both cruel and crafty, while others highlight their barbarity and backwardness.

By Dr Adrian Mandzy

SUCH STEREOTYPES ARE OF LIMITED VALUE, the term Cossack has evolved over time. Initially the term was used as a verb to indicate a specific part-time activity that men undertook when in the ‘unsettled’ or ‘wild lands’ of the steppe. In the sixteenth, seventeenth, and eighteenth centuries, the Cossacks lived in independent communities along the frontiers of Muscovy, the Polish-Lithuanian Commonwealth, and the Ottoman Empire. Like the *courier-de-bois* and cowboys of the Americas, Cossacks hunted, fished, traded, and explored sparsely settled regions. Periodically, males journeyed to the open frontier, spent their time ‘cossacking’ and returned home. Others joined the Cossacks and spent their lives raiding settlements in search of loot.

Throughout the sixteenth century, as magnates began to place ever-increasing restrictions on peasants and subjugate them to ever-increasing servitude, many villagers fled to the steppe frontier. Not all Cossacks, however, were previously farmers - nobles, burghers and former priests could also be found amongst this social estate. Over



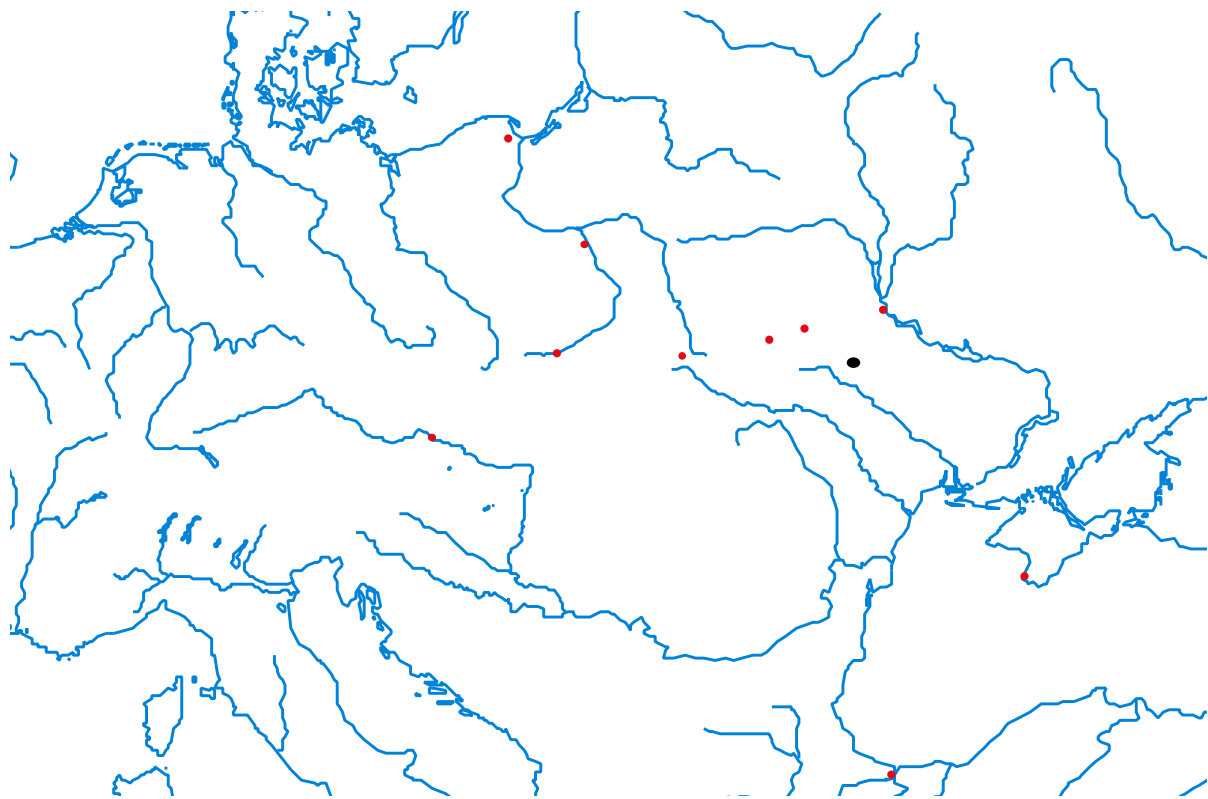
Nineteenth century artistic depiction of a Cossack Officer.

time, as these social outcasts became ever more skilled in the military arts, Cossack year-round fortified camps developed. Royal officials of the Commonwealth, fearful of the growing number of armed Cossacks, began recruiting these freemen as border guards. So successful were the Cossacks in their military abilities that by the end of the sixteenth century foreign governments appealed to the Cossacks for aid.

Since the Cossacks saw themselves as defenders of the frontiers, they believed that they had the same rights and privileges as the nobles who defended the realm. In times of war monarchs reaffirmed Cossack privileges and in times of peace, nobles sought to limit Cossack authority. The conflict between nobles and Cossacks would periodically boil over into outright Cossack revolt and rebellion, most of which were crushed without much mercy. Yet of all the Cossack wars for rights and freedom, Bohdan Khmelnytsky’s successful war against the Polish-Lithuanian Commonwealth changed the face of Europe forever.

Bohdan Zenovij Khmelnytsky (c. 1595-

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General Map of Central Europe. Showing the locations of the battlefield.

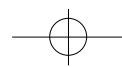
1657) was born on his father's estate at Subotiv, in what is today Central Ukraine. After completing his education, Bohdan joined his father in a war against the Ottoman Turks and in 1620 he was captured following the battle of Cecora (Moldavia). After two years of captivity in Istanbul, Khmelnytsky's ransom was paid and he returned home to his estate at Subotiv. In time, he rose to the rank of colonel, but in 1638, based on a rumour of his participation in a failed Cossack rebellion he was demoted to captain. Over the next decade, Khmelnytsky offered his services to the monarchy and was involved in the development of his estate. In 1646, a raid by a Polish nobleman on Khmelnytsky's property resulted in the death of his youngest son. Khmelnytsky tried to find redress to his claims in the courts of the Polish-Lithuanian Commonwealth, which then ruled Ukraine. While the modern day Polish state considers itself to be the direct



A 1651 engraving of the Ukrainian Cossack leader, Hetman Bohdan Khmelnytsky.

successor of the Polish-Lithuanian Commonwealth, it was in fact a multi-ethnic and multi-religious state in which class was more important than nationality or religion. During the mid-seventeenth century, many old established Ukrainian nobles held key offices within the Polish-Lithuanian Commonwealth.

As a Cossack, Khmelnytsky could not attain justice in a legal system controlled by nobles and in the autumn of 1647, he was placed under arrest on the orders of the local magistrate. After escaping custody, in January 1648, Khmelnytsky fled to the Zaporozhian Sich, the Cossack armed camp located south of the Dnipro River rapids. Now beyond the reach of Polish authorities, Khmelnytsky persuaded the local Cossacks that they needed to defend their rights and rebel against their injustices. Unlike other previous Cossack rebellions, which failed due to the lack of cavalry, Khmelnytsky created an alliance with the Muslim Crimean Tatars.



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Together, these two traditional enemies faced the largest and one of the most powerful states in Europe - the Polish-Lithuanian Commonwealth.

In May 1648, Hetman Khmelnytsky defeated two Polish-Lithuanian armies, one at Zhovti Vody and another at Korsun. Ukrainian regiments, who served in the Polish-Lithuanian armies, defected to Khmelnytsky's banner. Invigorated by the success of the Cossacks, serfs, peasants and urban dwellers also rebelled. In this 'Great Revolt', Jews, Catholics and Polish nobles were killed or driven out from what is today Central Ukraine. Polish nobles responded to the massacres in kind and employed their own terror tactics. Following the destruction of a third Polish-Lithuanian army at Pyliavtsi, Khmelnytsky returned to Kiev where the Ukrainian Orthodox hierarchy treated him as a liberator.

Yet in spite of these dramatic victories, the relationship between the rebellious Ukrainians and the Commonwealth remained unclear. The Cossack elite and long-serving rank and file had fought to secure the rights and privileges of noblemen. Others within the Orthodox hierarchy fought for parity with Catholics. Serfs, peasants and the lower urban classes struggled against economic exploitation. Since neither Khmelnytsky nor the monarch could propose a peaceful solution to the ongoing conflict, the war continued into 1649.

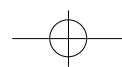
In preparation for the spring campaign, more Cossacks, peasants, townsmen, and nobles joined Khmelnytsky and his Tatar ally Khan Islam Girei. Against this force stood three separate Polish armies and a Lithuanian army. The Polish armies struck first and consolidated their forces at the fortress of Zbarazh under Prince Jeremi Wiśniowiecki, while the Lithuanian army moved south to attack Khmelnytsky's forces. In such a manner, the Commonwealth hoped to trap Khmelnytsky between the Polish and the Lithuanian army. Unfortunately for the Commonwealth, the Cossacks were able to turn back the Lithuanian army and advance on the Polish army at Zbarazh. On 29 June, Khmelnytsky reached Zbarazh and besieged the Polish army. Surrounded and outnumbered, the only hope of salvation lay in the timely arrival of a relief force.

The newly elected King Jan Casimir, personally led a second army to free the Polish troops trapped at Zbarazh. Leaving a force behind to maintain the siege, Khmelnytsky moved to intercept the king. Outside the



A 1649 military engineering map of the 1649 Battle of Zboriv; most likely completed by Christopher Houwaldt, a Saxon. Original map is in Berlin.

town of Zboriv, less than a day's ride from Zbarazh, Khmelnytsky ambushed the monarch's army as it crossed the Strypa River. Suffering heavy losses, the Polish-Lithuanian forces established a defensive perimeter and as evening fell, the king's army constructed earthworks in preparation for the coming battle. In the morning, Cossacks and Tatars breached the partially completed defensive works. German troops in the service of the crown successfully counter-attacked and sealed the breaches in the line, but in doing so the king exhausted his only remaining military reserves. Surrounded and with no hope for rescue, the crown



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opened negotiations with the rebels. The resulting Treaty of Zboriv created an autonomous Ukrainian Cossack state.

Not surprisingly, the Wars of Bohdan Khmelnytsky are among the most important events in the history of East Central Europe. Over the last few centuries, Ukrainian, Polish and Jewish scholars have devoted a great deal of time and energy in the pursuit of this topic and the documentary evidence was thoroughly examined. While new discoveries are periodically made in the archives of Western Europe and Turkey, those in Central and East Europe have been well studied since the end of the nineteenth century. Thus, while perceptions of Khmelnytsky and the Cossack Wars periodically undergo change, these interpretations rely almost exclusively on the same body of knowledge.

With the development of battlefield studies and battlefield archaeology, it is possible to provide a new



The newly elected Polish King, Jan Casimir.

perspective of people who are poorly represented within the documentary record. This applies to non-literate societies who left no historic record, those ignored in the historical record (the poor, illiterate or marginalized groups), and those whose documents were destroyed. As the Cossacks were both a group that developed on Europe's eastern fringes and whose records were later deliberately destroyed by order of the Russian monarchy, to learn more about the Cossacks and their wars, we need to go beyond just the diplomatic history of the

Cossack elite. We need to look at the material culture of the Cossacks to understand more about the people who lived on Europe's eastern frontier.

Although scholars have provided differing interpretations of the events at Zboriv and Zbarazh, little work has been previously attempted to incorporate the local topography, historical accounts and the

Late twentieth century artistic depiction of the 1st day's fighting at the Battle of Zboriv. Mural on display at the Zboriv Regional Museum.



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archaeological record into a holistic interpretation of these events. The first attempt to link the historical accounts of the battlefield with the local topography was undertaken by the Ukrainian historian Ivan Krypiakevych, who created a series of maps of the battle based on his two-day visit to Zboriv in July of 1929. The Soviet regime made a concerted effort to downplay the significance of the events of 1649 and Krypiakevych's initial survey work did not continue. While new information related to the Treaty of Zboriv was published in the West, it was only in the early 1990s that Ukrainian and Polish scholars had the opportunity to turn their attention to the 1649 campaign. Perhaps the most important contribution of the last decade was the publication of two engineering field military maps from the 1649 campaign (one from Zboriv and one from Zbarazh), which illustrates the disposition of forces and the extended fieldworks.

In Ukraine, battlefield studies have a long tradition, but as elsewhere, it has focused almost exclusively on



Seventeenth century engravings of Cossack infantry and a mounted officer.

sites such as camps, castles and fortresses. The best-known exception to this was Shvechnikov's excavations at the 1651 Cossack Battle of Berestechko, where, over the course of multiple field seasons, he excavated numerous graves from a swamp bog. The waters of the swamp prevented the looting of the dead and preserved significant amounts of organic materials. These particular environmental conditions preserved significant quantities of military arms and accoutrements as

well as many personal items. By focusing on the swamps to the rear of the actual battlefield, Shvechnikov recovered items such as stocked muskets, arrows with preserved shafts, belts, and leather cartridge boxes. Since he found these artefacts with individual combatants, it is possible to reconstruct how these forces were armed and equipped.

While the Berestechko excavations provide an unparalleled view of the peasants and Cossacks who died while fleeing after their defeat, Shvechnikov's excavations follow the traditional archaeological field



Cartridge box and its contents, recovered from the Berestechko Battlefield. Item on display at the Berestechko Battlefield Museum.

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methods of digging in a very small area. Since battles occurred over a wide area, sometimes encompassing hundreds of square kilometres, an excavation method that relies on the analysis of a few square metres produces, in most instances, very few results. At Berestechko, researchers did not subject the rest of the battlefield to significant testing. Even with the identification of individual artefacts, no research methodology existed at that time which could document the distribution of artefacts over many kilometres. Not surprisingly, when, in the mid-1990s, archaeologists used traditional testing methods at the Zboriv battlefield, they failed to find anything from the seventeenth century battle.

The study of open warfare, being publicized successes such as Berestechko, began in earnest only after the work on the Little Bighorn battlefield was published. The use of metal detectors at the Little Bighorn provided a way for archaeologists to deal with the limitations of identifying the distribution of battlefield artefacts over great distances. This data, coupled with extensive primary historical research and topographic information, allowed scholars to deal with the conditions specific in the study of battlefields. Using a similar approach, it was hoped to learn more



Equipment and weapons of a Polish Hussar from the mid-seventeenth century, Warsaw Military Museum.

at the Cossacks and their wars for freedom by studying the battlefields of these wars.

In 2001, the author, working with scholars in both Poland and Ukraine, started the Cossack Battlefield Expedition to explore and study Cossack battlefields. Beginning in 2002, the author, working in conjunction with the Lviv Institute of Ukrainian Studies and Bohdan Strotsen, the regional director in charge of preservation of historical and cultural monuments for the Ternopil oblast, began a joint survey, the purpose of which was to identify any possible remaining cultural resources associated with the military events of 1649. After integrating the primary accounts of the battle with the historical and geographic topography of the area, we conducted a visual inspection of the territory. Based on this preliminary analysis, areas that appear to have been least impacted by modern development were selected in Zboriv and Zbarazh.

The methodology employed was a variation on the one initially employed by Scott. As at the Little Bighorn

The terrain surrounding the town of Zboriv.



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Volunteers and students working together in Zboriv.

battlefield, where both Native Americans and White Americans worked together to gain a better understanding of their shared past, both Polish and Ukrainian students laboured jointly in the fields of Zboriv and Zbarazh. Once a possible area was identified, students swept the fields using metal detectors. The types of metal detectors used locate small artefacts on the surface and reach an optimal depth of up

to twenty centimetres. However, since the cone of the detector produced an egg shaped ellipse, the area scanned at the apex of the cone was very small - only the size of a coin. Along the ground surface the instrument surveyed an area directly proportional to the 8 1/2" diameter of the detector's sensing coil. As water, rain, atmospheric pressure and a host of other factors affect the detectors, many scholars return to the same fields year after year and continue to retrieve artefacts.

Once a detector registered an object, the artefact was retrieved from the disturbed soil. Since the areas around Zboriv and Zbarazh have been subject to repetitive ploughing for generations, all the artefacts are lacking stratigraphic provenience and were treated as coming from the surface. Each recovered artefact was placed in a separate plastic bag and the find spot was marked with a wooden stake. For easier recognition, the stake had a red strip of cloth tied to it and the artefact in its bag was attached to this stake.

Following the students with the metal detectors was a person responsible for recording the co-ordinates of each artefact. Using a hand-held Global Positioning System (GPS) unit, we recorded the co-ordinates of each find and collected the artefacts from the field. Given the scale of the battlefield and number of square kilometres associated with it, an accuracy of +5m

Taking a GPS reading for a recovered artifact.



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Another artifact comes to light.

provided by the GPS was considered to be acceptable. Following the cleaning of the finds, members of the project weighed, measured, drew and photographed each artefact. At the end of the field season, all the artefacts were presented to the local regional museum in Zboriv and Zbarazh.

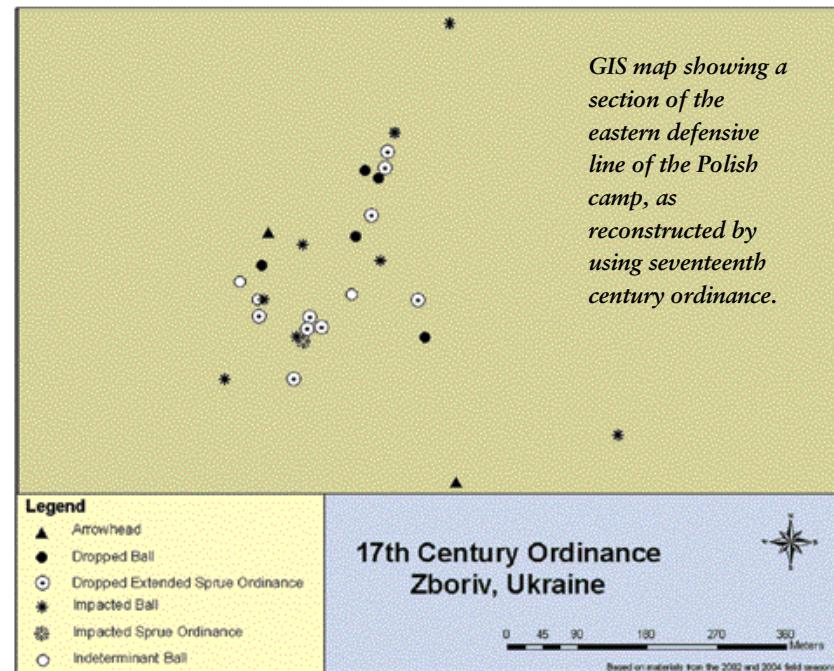
A wide variety of artefacts, many which date to the seventeenth century, were recovered during the course of the survey. However, since these areas have been in agriculture for centuries, our initial analysis was restricted to distinctly seventeenth century military artefacts. Unlike medieval battlefields where very little datable military material exists, by the seventeenth century firearms were widely used, which allows scholars to recover quantities of lead balls and iron shot. As expected, we recovered quantities of musket balls and iron shot during our survey. When we plotted out the distribution of the seventeenth century military ordinance along an X and Y grid, at both sites we identified a line of dropped and impacted balls. Based on this preliminary information, we believe that we have discovered the eastern

portion of a battle line at Zboriv in an area not yet subject to residential or industrial development. At Zbarazh, we have identified all three siege lines, but because of urban growth, only the most outward siege line has been preserved.

In both instances, when we take this distribution of military artefacts and compare them with the local topography, we see that all of these items are found along the military crest of small hills at both Zboriv and Zbarazh. Since the 'choice of ground on which to fight and the exact deployment of troops in battalia were based on sound military principles', it is clear that the topographic environment predetermined the establishment of the firing line in this particular location. If we add to our datasets the existing contemporary maps of the 1649 campaign, we clearly can identify component parts of the battle.

'If we add to our datasets the existing contemporary maps of the 1649 campaign, we clearly can identify component parts of the battle.'

In addition to the recovered ordinance, we also examined artefacts such as buttons, melted pieces of lead and quantities of hand wrought iron, which may relate to military wagons or weapons. Since it is unlikely that peasants could afford such items, there is a tendency to associate these items with the battle. As has previously been noted, unless



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it is possible to demonstrate a direct relationship between the military and non-military artefacts, no correlation may be postulated. However, since many of the objects were found along the same line as the dropped bullets, the likelihood of direct correlation between these artefacts is quite high.

According to a contemporary account of the battle, written shortly after the end of hostilities, the crown forces built earthen fortifications to strengthen their battle lines. Although the eastern line of these earthen fortifications witnessed no major military engagements, the documentary record is quite clear that Tatar troops demonstrated in this area to draw the attention of the enemy. The recovery of buttons and metal buckles among dropped musket balls, which we believe troops dropped when they prepared for battle, confirms the location of the eastern section of the Polish defensive earthworks at Zboriv.

The construction of the earthen walls on the night between the first and second day of the battle, while undertaken primarily by attached servants, required the assistance of combat troops. The dire situation in which the Crown army found itself, required haste and they would have used any item to build up a barricade. The Commonwealth commonly used heavy military wagons; similar to the fifteenth century wagenburg initially developed by Jan Ziska, the commander of the Hussite Armies of Bohemia, as mobile field defenses. The recovery of so many metal hardware wagon parts found alongside seventeenth century military ordinance suggests that the army added wagons to the defensive barriers.

To recognize the implications of the distribution patterns of the recovered military ordinance, it is essential to understand how military units functioned and the role that firearms played in particular regiments as any gaps between groups of lead balls may indicate the space between musketeers occupied by pikemen, rather than two separate units. In the 1640s, musketeers generally represented only 2/3 of a European infantry regiment, as the remaining 1/3 were pikemen. Among infantry regiments, the general military practice of the period placed pike armed troops in the centre with musketeers on each flank. Within each army this arrangement may have been slightly different. The Swedish armies of King Gustavus Adolphus maintained a theoretical proportion of 216 pikes to 192 musketeers, while slightly larger Dutch battalions strived to maintain a ratio of 250 to 240. In the 1630s, the Polish infantry was reorganized and followed both the Swedish and

Dutch models which divided regiments into six companies. As the Polish army at Zboriv also included various 'German' mercenary troops, the relationship between pike and shot may have varied even between regiments.

Throughout the seventeenth century, there was a growing tendency to reduce the depth of infantry units. Rather than have units of ten or eight ranks deep, these were continuously reduced until reaching a rank or three or four ranks deep by the early eighteenth century. During this evolution, regiments began increasingly to occupy a larger frontage but retained the same number of men. Thus, an infantry battle line from the 1630s may have occupied a much small area of frontage than an infantry battle line of the 1660s. Since most military units were rarely at full strength, the distribution of ordinance will not necessarily coincide with the theoretical dimensions of a combat unit.

'...an infantry battle line from the 1630s may have occupied a much small area of frontage than an infantry battle line of the 1660s.'

Trying to link this material with particular Cossack regiments is even more difficult since the relationship between pike and shot within the regiments present at Zboriv remains unclear. Contemporary descriptions of the Cossack regiments suggest that many of the peasant troops were inadequately armed, with a third of the troops lacking firearms. However, since Khmelnytsky brought only his best troops to Zboriv while the rest of the Cossack army, including the newly raised peasant armies remained at Zbarazh, the majority of these troops were believed to have been armed with projectile weapons.

Our work at Zbarazh focused on the territory immediately surrounding the sixteenth century castle and its earthworks, as well as trying to establish the area of the 1649 siege. A comparison of the recently uncovered 1649 military engineering map with more modern topographic maps indicated that the most intensely defended area was to the northeast of the castle. An examination of the territory directly adjacent to the castle produced few surface finds from the seventeenth century, but we did encounter a large calibre ball lying directly on top of an earthen bank. This ball, which had a diameter of almost 40mm, was mostly likely from a small cannon, a tarashnytsia, but it remains unclear if it relates to the 1649 siege.

While housing has destroyed the area of the last two siege lines, that of the first line has remained in crop. Recently the area belonged to a collective farm, but now small parcels of land have been given to individual residents to use as gardens. Conducting our survey along

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Iron arrowhead recovered from the Zboriv Battlefield.
ZBORIV REGIONAL MUSEUM.



An ancient engraving of a Tatar warrior holding their traditional style bow. The Cossacks were employed such weapons due to the fact they were quicker to fire and were not affected by cold and wet weather conditions.

public footpaths and on those parcels which were not in crop, we encountered a significant amount of varied military ordinance. Lead balls were the most common item encountered, but iron arrowheads, axe heads, gun-flints, and sword fragments were also encountered.

By correlating the area where the most significant finds were encountered with the military map, we realized that the material was coming directly from a siege line. To test our hypothesis, Bohdan Strotsen excavated a test trench. This 1 x 4 metre trench exposed the remains of a ditch. The lack of any datable materials from the ditch prevents us definitively linking this feature with the military events from the mid-seventeenth century, but the recovery of significant amounts of military ordinance from the immediate area clearly supports the idea that we had indeed encountered part of the initial siege line.

In the middle of the seventeenth century there was a great variation in the types of projectile weapons in use. In addition to firearms, Cossacks often made use of Tatar style bows, which, according to a seventeenth century French military engineer who had spent many years in the Commonwealth, had a faster rate of fire, could be used in adverse weather and did not give away the position of the Bowman. Although the recovery of seventeenth-century Tatar style arrowheads from the area of the siege of Zbarazh and at Berestechko confirms their continued use by the Cossacks, lead balls outnumber arrowheads on these battlefields at a ration of 16 balls for every one arrowhead (Figure XXX -

‘...lead balls outnumber arrowheads on these battlefields at a ration of 16 balls for every one arrowhead’.

Seventeenth century cannon balls recovered in the area around the modern town of Zboriv. ZBORIV REGIONAL MUSEUM.



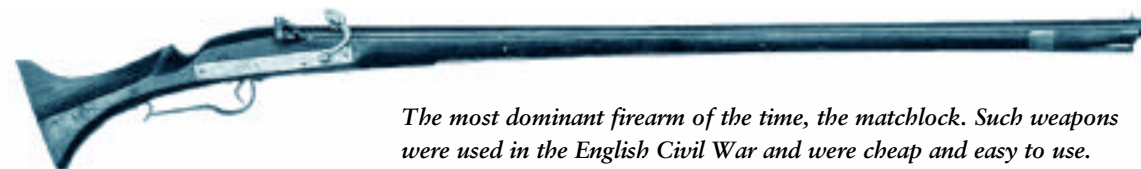
arrowhead from Zbarazh along side of arrows found in the L'viv History Museum). Clearly, firearms were the primary weapons in use.

In Ukraine, modern flintlocks had, for the most part, replaced hazardous matchlocks by the middle of the seventeenth century. Excavations at the 1651 Berestechko battlefield indicated the overall dominance of flintlock weapons, while the recovery of large quantities of iron spanners suggests the use of expensive wheel locks. The lack of matchlock weapons, however, is surprising. Cheap and somewhat reliable, matchlocks were

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Examples of balls recovered from Zboriv during the 2002 and 2004 survey. ZBORIV REGIONAL MUSEUM

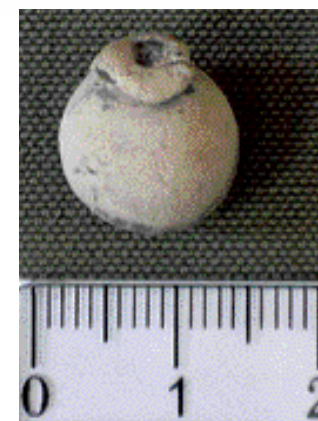


The most dominant firearm of the time, the matchlock. Such weapons were used in the English Civil War and were cheap and easy to use.

the dominant firearm during the English Civil War (1642-48) and remained in use by Austrian military units at least until the 1683 Siege of Vienna. French and English armies retained matchlocks until the turn of the century. Yet among the ‘poorly armed Cossacks,’ matchlocks were obsolete by the middle of the seventeenth century.

Another common assumption is the lack of firearm standardization. Rebel armies often have logistical nightmares and given the significant variations in the firearm calibres, one would expect to find a wide range of musket ball calibres. Since all seventeenth century gunpowder left a residue of unburned soot after only a few shots, the barrel quickly became clogged and increasingly difficult to load. Conventional wisdom is that soldiers usually carried a variety of smaller balls to use as the battle progressed. Yet the recovery of complete bullet pouches and cartridge cases from Berestechko indicates no significant variations of ammunition calibres carried by each combatant. From this information we can make a much stronger argument that the calibre of ball corresponds closely to the weapons used.

A study of collections of seventeenth century military arms in both the National Army Museum in Warsaw (Poland) and the Historical Arsenal Museum in L'viv (Ukraine) clearly illustrates that seventeenth century



Close view of extended sprue ordinance. ZBORIV REGIONAL MUSEUM

armies standardized their weapon systems. Muskets, usually of Western European design, were predominantly large calibre weapons with a bore diameter between 24 and 18 mm, with 20 mm being the most common. In 1649 and at the beginning of 1650 the arsenal in Warsaw acquired 1,300 muskets from Holland and 210 Dutch muskets. Most oriental ‘Turkish’ weapons in the museums of Poland and Ukraine have a much smaller bore, while mid-seventeenth century Dutch muskets have a barrel bore that approaches 21 mm. Given latitude for windage - that is, the difference between the actual barrel diameter and the size of the ball, the large

calibre musket balls recovered from Zboriv may have come from the Dutch guns imported by the Polish Crown. The battlefield museum at Berestechko identified similar large size musket balls as ‘bullets that killed Cossacks.’

Most musket balls recovered from this area of the battlefield of Zboriv are between 11 and 16 mm. Given the close proximity of these finds along a line of battle, it is possible that these rounds all belonged to a particular military unit. In the seventeenth century, dragoons carried a specific type of firearm, called a bandolet. This weapon was of a smaller calibre and preserved examples in the museums of Poland and Ukraine have a bore diameter of between 18 and 11 mm,

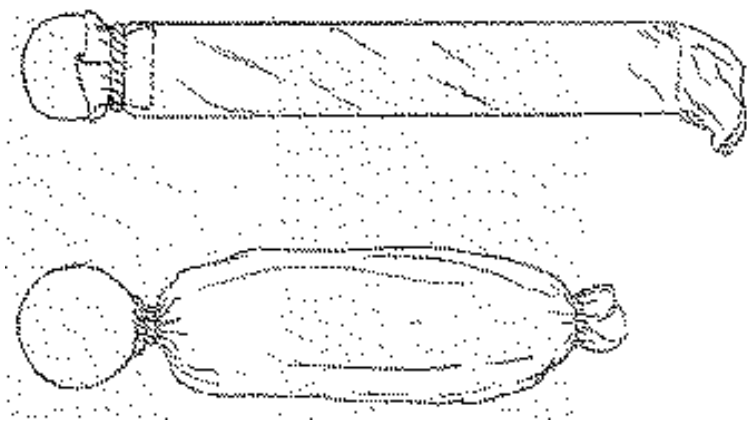
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with diameters of 15 to 16 mm most common. At the same time, however, other cavalry units used smaller calibre weapons. In addition, eastern firearms tended to be of a smaller calibre. While some have suggested that it may be possible in the future to identify certain types of units by the calibre of the shot, the use of small calibre weapons on both sides of the conflict precludes such an analysis. Nevertheless, the recovery of numerous large calibre balls may serve as an indicator for infantry in the service of the Polish crown.

During our survey we discovered a great variation in the actual musket balls. Unlike most projectiles that are round or exhibit uncut sprue from their casting, many of those recovered at Zboriv had an added or modified tail along the sprue, which is far more elaborate than a simple by-product of the casting process (Figure XXX - ordinance from 1649). Such additions are unusual, and besides being recovered at Berestechko and Zbarazh, have previously been rarely recognized as such in the archaeological record. A sprue is normally created as part of the casting process, but usually it is removed before the ball is fired. As such, unless a scholar is specifically looking for such sprues, they would most likely conclude that these were unfinished balls.

Yet these are not simply unfinished balls. As can be seen in this photograph, there exists a recess cavity on the top of the sprue (Figure XXX - ball with sprue). When compared with a regular ball that has not had its sprue trimmed off, one can clearly see that these sprue tails were intentionally created. Unlike eighteenth century cartridges, where both the ball and powder were inside a paper tube, makers of these earlier cartridges attached the paper tube to the sprue. Sometimes a special flange was added to the ball to help tie the paper cartridge. While such cartridges may have been in use by the mid-sixteenth century, in 1697, Saint Remy, a French scholar, 'illustrated a cartridge with a ball attached by its sprue as the latest type' (Figure XXX - St Remy).

It is more than likely that the musket balls recovered at Zboriv were modified in such a manner to allow for the production of semi-fixed ammunition. An examination of the Cossack bullet moulds recovered at Berestechko indicates that at least some of them were modified to create extended sprues ordinance (Figure



Seventeenth century paper cartridges with ball attached by the sprue. TAKEN FROM HAROLD L. PETERSON, ARMS AND ARMOR IN COLONIAL AMERICA.

'Lord Orrery, a seventeenth century military writer noted that 'bandeleers are often apt to take fire, especially if the matchlock musket be used'. The results of such accidents could be quite lethal.'

XXX - Berestechko mold).

The production of cartridges simplified the loading process. Previously, musketeers relied upon bandoliers of pre-measured powder charges. Lord Orrery, a seventeenth century military writer noted that 'bandeleers are often apt to take fire, especially if the matchlock musket be used'. The results of such accidents could be quite lethal. Although mounted units used small metal cartridge boxes as early as the second half of the sixteenth century, the overwhelming majority of European infantry continued to rely upon the dangerous bandoliers. The leather and wood cartridge boxes recovered at Berestechko are thought to be among the earliest known examples of infantry cartridge boxes used in Europe but it is more than likely that the Swedes first developed infantry cartridge boxes. Cartridge boxes quickly became popular and in 1656, for example, seventy-five cartridge boxes were included in an inventory list of munitions sent to the South River of New Netherlands.

A second advantage of the sprue, especially in small calibre bullets that are fired at a low muzzle velocity, is that the bullet tumbles - that is it does not fly symmetrically, but rather wobbles through the air. While such a weapon system may not have the range of a more powerful large calibre ball, the wounds inflicted in such a manner can be horrific. Such small calibre weapons, especially with tumbling munitions, use less gunpowder and are just as effective as large calibre weapons. The immediate benefit of such system is that it allows troops to carry more rounds on the battlefield. The advantage

of carrying more rounds over a reduced muzzle velocity had been recognized by military forces around the world for more than a century and the history of small arms development over the last hundred years reflects this tendency.

The recovery of glass beads from an ammunition pouch at Berestchko also suggests that glass bullets, commonly used in the Commonwealth at the end of the sixteenth and at the beginning of the seventeenth century, may have also been used during the time of the Cossack wars (Figure XXX - Berestechko glass beads found in an ammunition pouch). To date no such bullets have yet been recovered from either Zboriv or Zbarazh, but it is possible that such balls, like this one recovered from Putsk in northern Poland, were used (Figure XXX - Putsk glass balls).

The recovered military ordinance challenges many of the commonly held assumptions of the Cossack armies of the mid-seventeenth century. Most scholars agree that the Cossack rebels wanted to create a new political system that would replace the religious, economic and cultural elite in the southeastern territories of the Commonwealth, but few also note that the military innovations employed by Cossacks were just as revolutionary. Not only were the rebel armies under the direction of innovative leaders who had significant military talent and expertise in engineering but also the weapons systems used by the rebels were the most modern and technically developed in both Europe and Asia. Clearly, these armies may have looked rather ragged, especially when compared to the silver and gold encrusted troops of the Commonwealth, but the Cossack army was a professional force equal to any on two continents.

Without doubt, the Cossack army was a professional fighting force. The image of a rag-tag mob, although burned in the collective memory, is a stereotype of limited value. Rather, while often clothed in non-regulated clothing and perhaps intermittently fed, these rebels, including long-serving Cossacks, former serfs, nobles and Orthodox clergy adopted and adapted new military tactics and weapon systems. This may not be all that unusual, since these same revolutionaries were, by their very nature, vying to bring about a new social reality. Although existing military establishments are often among the most conservative segments of society, the results of the research from this programme suggests that this rebel army, much like earlier and later revolutionary armies, adapted and incorporated the most recent and successful of the new technologies.

The identified sections of the battle lines serve as a point of reference for further research. By taking into consideration any minute topographic features in the



Flag allegedly carried at the Battle of Zboriv by Crown forces. WARSAW MILITARY MUSEUM.

terrain that contemporary military commanders would have exploited to their advantage, it is possible to correlate the terrain with the features noted on the preserved 1649 maps. Using this information, it becomes much easier to see how the actual battle developed. As the 1649 siege map of Zboriv also shows the disposition of particular units in the Crown's camp, with further work it may be possible to link the discovered ordinance with a particular military unit. Additional analysis will not only allow us to identify sections of the battlefield where cultural resources may be present, but also it will allow us to reconstruct the location of the earthworks even in areas significantly impacted by modern development.

When compared with other battlefield survey projects, our results at Zboriv were not unusual. For ten years Dan Sivilich and his group of excavators have been returning to the same areas of the American Revolutionary War battlefield of Monmouth (New Jersey) and continue to flesh out the original model. After a decade's worth of research, they are now able to show how and why the battle developed in the way it did. Clearly, the results achieved at Zboriv and Zbarazh reflect the possibilities offered in studying battlefields and need to be continued. By using new technologies, coupling them with local topography and comparing this information with the available documentary evidence, it

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is possible to gain further insights into one of the most studied and important events in the history of Ukraine and East Central Europe. Perhaps, and most importantly, it allows us to give a voice to a people who previously have not had the opportunity to speak for themselves.

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Cossacks who chose to live in the Sich did so in stern simplicity without wives or families. The men were organized into military units and worked together for a common good.

Although most people think of Cossacks as horse mounted troops, their earliest renown was as sailors who raided the Ottoman settlements along the Black Sea coast. During the middle of the seventeenth century, most Cossacks fought on foot or served as artillerymen.

Originally from the German word Hauptmann. Among the Ukrainian Cossacks, the Hetman was the highest military, administrative and judicial office. This is not to be confused with the use of the title in the Commonwealth, where the term of hetman simple meant commander-in-chief and the highest military authority in the realm.

Although the text of the Treaty of Zboriv has survived and the register of Cossacks has been previously published, Ukrainian scholars such as the eminent historian Mykhailo Hrushevsky has interpreted the

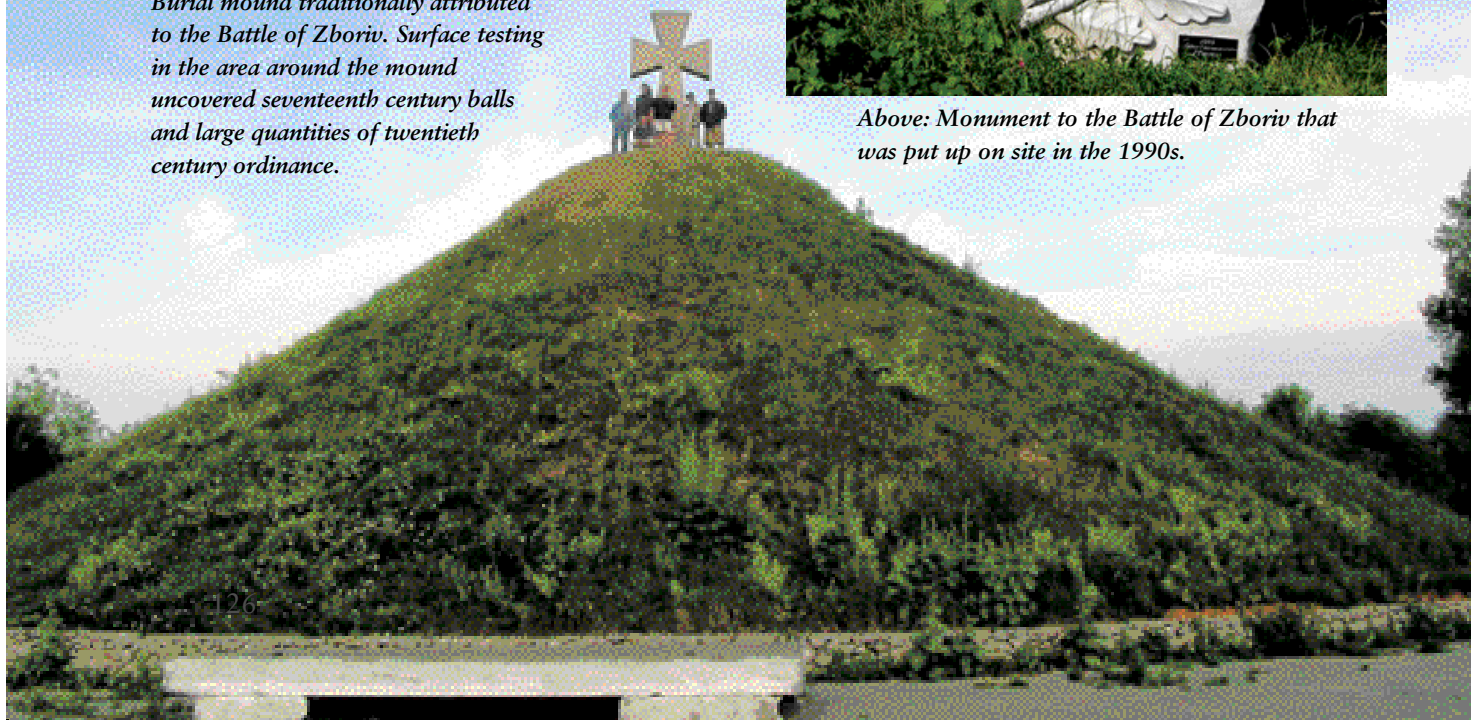
Zboriv Agreement as 'hopeless' (Mykhailo Hrushevsky, History of Ukraine-Rus', vol. 8, Canadian Institute of Ukrainian Studies Press, Toronto, 2002, pp 575-654) or 'compromised' (I. Krypiakievych, Bohdan Khmelnyts'kyj, Kiev, 1954, pp 165-172). More recently, the Canadian Ukrainian historian Frank Sysyn has indicated that 'the guarantee of a forty-thousand-man Cossack army ensured Hetman Khmel'nyts'kyj his place as an almost independent ruler of the Ukraine' (Frank Sysyn, Between Poland and Ukraine: The Dilemma of Adam Kysil 1600-1653, Cambridge, MA, 1985, p. 173).

While many scholars have devoted their attention to



Above: Monument to the Battle of Zboriv that was put up on site in the 1990s.

Burial mound traditionally attributed to the Battle of Zboriv. Surface testing in the area around the mound uncovered seventeenth century balls and large quantities of twentieth century ordinance.



the battle of Zboriv, among the earliest and most influential studies remain L. Kubala, Oblzenie Zbaraza i pokŹj pod Zborowem, Szkice historyczne, Krakow, 1896 and Ludwik Frs, Bitwa pod Zborowem w r. 1649, Kwartalnik Historyczny, XLVI, 1932.

I. Krypiakievych published five separate accounts of the battle of Zboriv, but the most detailed description appears in Zhyttia i Znannia, no. 10-11, L'viv, 1929. A later account published by the same author in the Litopys Chervonoi Kalyny, no. 10, L'viv, 1931, includes two maps, one which showed the disposition of forces at the time of the initial ambush, and second illustrated the attacks of the second day. These two maps were later reprinted (Ivan Tyktor, Istoriia Ukrain's'koho Vijs'ka, Winnipeg, 1953).

Teodir Matskiv, 'Zboriv's'kyj Dohovir u svitli nimets'koi j anhlis'koi presy z 1649 r', Zborivshchyna, Naukove Tovarystvo im Shevchenka, Ukrain's'kyj Arkhiv, vol. 38, Toronto, 1985.

Stanislaw Alexandrowicz, 'Plany Obronnych ObozŹw wojsk Polskich pod ZbaraŹem i Zborowem z Roku 1649', Fortyfikacja, vol. 1, 1995, pp 15-23.

I. K. Sveshnikov, Bytva pid Berestechkom, L'viv, 1993.

Aleksej Vasy'ev and Igor Dzys, 'Bytva pod Berestechkom', Zeughaus, Moscow, No. 8, (2/1988), pp 2-6.

Such a result is not unexpected, since archaeologists who have relied on traditional testing methods of digging in depth rarely have been successful in identifying resources related to military engagements. Using traditional archaeological field methods at the American Civil War First Manassas (Bull Run) battlefield, for example, 'only one artefact was found by shovel testing, while several hundred were found using metal detectors' (Lawrence E. Babits, 'Book Archaeology of the Cowpens battlefield', Fields of Conflict: Progress and Prospect in Battlefield Archaeology, P.W.M. Freeman and A. Pollard, eds., BAR International Series 958, 2001, p. 118).

Artefacts from these excavations are on display at the local museum in Zboriv.

Excavations of a burial pit from the Battle of Wisby, for example, provided a good indication of medieval warfare (Bengt Thordeman, Poul No'rlund and Bo E. Ingelmark, Armour from the Battle of Wisby, 1361, vol. 1, Kungl. Vitterhets Historie OCH Antikvitets Akademien, Stockholm, 1939).

Douglas D. Scott and Richard A. Fox, Jr., Archaeological insights into the Custer battle: an assessment of the 1984 field season, Norman, 1987; and D. D. Scott, R. A. Fox, Jr., M. A. Connor and D. Harmon, Archaeological perspectives on the Battle of the Little Bighorn, Norman, 1989.

For more information about the Commission and to view the results of the first years programme, please go to the following web site: www.lviv.ua/cossacks

At Zboriv, and to a lesser degree at Zbarazh, the most common artefacts recovered from the survey data are from later battles in this area. Shrapnel balls, rifle cartridges, bullets and artillery shell fragments from the First World War and the Polish-Ukrainian War of 1919 litter the areas of both 1649 battlefields, while other military equipment, such as the early nineteenth century Russian button found at Zbarazh, which may relate to the military events of 1809, were also periodically encountered.

Glenn Foard, 'The archaeology of attack: battles and sieges of the English Civil War', in Fields of Conflict: Progress and Prospect in Battlefield Archaeology, P.W.M. Freeman and A. Pollard, eds., BAR International Series 958, 2001, p. 89.

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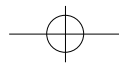
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Museum of the 'Cossack Mounds', National Historical Memorial Preserve 'Field of the Berestechko Battle', Pliasheva Village, Radyvyliv's'kyj Region, Rivnens'ka oblast, Ukraine.

Pierre Surirey de Saint Remy, Memoires d'Artillerie, second edition, 2 vol, Paris, 1707.

Harold L. Peterson, Arms and Armor in Colonial America 1526-1783, Harrisburg, Pennsylvania, 1956, p. 63.

Courtesy of Professor Jerzy KruppÈ, University of Warsaw, Poland.



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