Fields of Conflict

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Archaeology of Modern Conflict: The War after the War in Lithuania and Battle of Užpelkiai Forest, 1949

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INTRODUCTION

Modern conflict archaeology, investigating military conflicts of the 20th and early 21st centuries has diverged as a branch of archaeology at the turn of the millennium (Moshenska, 2013; Saunders, 2013). Since then, the main trends and schools of research, i.e. the First and the Second World Wars, the Spanish Civil War, the Cold War, Latin American military dictatorships, have become prominent (Robertshaw & Kenyon, 2008; Saunders, 2010; Zarankin & Salerno, 2011; González-Ruibal, 2012; Moshenska, 2012; Carr & Jasinski, 2013; Symonds & Vařeka, 2014). B

y focusing on landscape, collective and living memory, oral history, text sources, and cartography, modern conflict archaeology has expanded possibilities of investigating recent military conflicts, their analysis and interpretation.

In Lithuania, investigation of modern conflict sites began in the 1990s. Over the last three decades, archaeologists have explored mass graves of Nazi and Soviet soldiers, disposal sites of Lithuanian partisans, bunkers, underground quarters, battlefields, and partisan liaison homesteads (Jankauskas et al., 2005b; Petrauskas & Vaitkevičius, 2013; Vėlius & Žygelis, 2013; Petrauskienė & Petrauskas, 2014; Vaškevičiūtė & Zabiela, 2016; Petrauskienė et al., 2017). For a long time, however, Lithuanian researchers were interested in the prospect of forensic archaeology and forensic anthropology only, therefore, a comprehensive overview of modern conflict sites was not available (Jankauskas et al., 2005a, 2007, 2010, 2011; Jankauskas, 2009, 2012, 2015; Bird, 2013). During the last decade, the number of investigations of Lithuanian partisan war sites has increased significantly, a scientific approach has emerged, and, eventually, these sites have become an object of Lithuanian archaeology (Petrauskienė & Petrauskas, 2014; Petrauskienė et al., 2017; Petrauskas et al., forthcoming a).

The article examines data of the field research of the Užpelkiai Forest battle (Radviliškis District, Central Lithuania), conducted from 2014 to 2017 (Petrauskas et al., 2017, forthcoming b). The battle of 13 August 1949 between Lithuanian partisans and the Soviet Army had a major impact on the partisan leadership, leaving a deep trace in the history of the Lithuanian partisan war (1944–1953). By analysing archival data, the cartography, narratives of surviving witnesses, and archaeological data, a comprehensive analysis of the Užpelkiai Forest battle is presented. Based on the field research data, the analysis of armament and war strategy, the details of the battle, the deployment of Soviet soldiers and Lithuanian partisans, their battlefield scenes are reconstructed. The authors discuss the methodology of the battlefield study, argue the concept of modern conflict archaeology.

The War after the War in Lithuania

The 20th century is marked by countless military conflicts. Some of them, such as the First and the Second World Wars, were universal, embraced entire countries where millions of soldiers and civilians were

killed. However, some military conflicts were local and differed from the former ones not only in scale, but by reason and aspirations. Among the latter, partisan wars, defensive in nature and regardless of the country, were fought not against something, but for something (Gailius, 2011). In the 20th century, wars for liberating, protecting and defending the independence from more powerful enemies were common in many countries.

Prior to the Second World War, Stalin and Hitler divided the Europe into the Soviet Union and the Nazi Germany spheres of influence. In 1940, a young State of Lithuania was occupied by the Soviet Union (Lithuania declared its independence in 1918), one year later by the Nazi Germany, and in 1944, when the Second World War was close to its end the Soviet Union reoccupied Lithuania for another 50 years. A painful experience of the first Soviet occupation, when in June 1941 the Soviets exiled about 17,500 Lithuanian statesmen, teachers, military officers, clergymen, and farmers, was one of the main reasons why from the first days of the second Soviet occupation in 1944, large units of Lithuanian Freedom Army partisans, mostly called 'forest brothers' by locals, gathered in the woods.

The period of 1944 to 1946 was the most active in the Lithuanian partisan war (Gaškaitė-Žemaitienė, 2006; Kuodytė, 2015). Numerous battles took place during the first years of the Lithuanian war for independence resulting in deaths of a large number of partisans. Partisans gathered in large units up to several hundred, installed fortified camps in the woods, attacked Soviet headquarters in district centres, and liberated political prisoners. However, the painful experience of the first years necessitated changing the partisan war tactics. Freedom fighters split into sections of 3 to 4 and units of 7 to 8 partisans, who mostly lived in the woods or well-concealed underground bunkers in partisan supporter homesteads. Although partisans stayed in separate small units, they acted strictly under the command of the leadership, and any non-compliance resulted in punishment by the Military Court.

The establishment of the Lithuanian partisan leadership is what the Lithuanian partisan war is distinguished for. In February 1949, partisan representatives from all over Lithuania founded the Union of Lithuanian Freedom Fighters (Lietuvos laisvės kovos sąjūdis, hereinafter LLKS), and on 16 February 1949 a political declaration was signed (Gaškaitė-Žemaitienė, 2006; Gailius, 2011; Kuodytė, 2015). The declaration, stating that the partisan leadership was the only legitimate government in the occupied Lithuania was the main document for the succession and struggle for the restoration of an independent democratic state of Lithuania. In 1999, the Parliament of the Republic of Lithuania recognized the declaration as a legitimate document, and Jonas Žemaitis (codename Vytautas), the Chairman of the LLKS was announced as the fourth President of Lithuania.

In 1944–1953, Lithuania had a population of slightly more than 2 million, 50,000 of which were partisans, supported by a growing number of liaisons and partisan supporters. During this 'the war after the war' period, more than 20,000 freedom fighters were killed, about 140,000 people were arrested and imprisoned in forced labour camps, and 118,000 persons were exiled to Siberia (Anušauskas, 2015; Starkauskas, 2015). After the partisan war was physically suppressed, the Soviet government launched a propaganda company against Lithuanian partisans and their supporters. During the 50 years of the Soviet occupation, many books and movies were released, Lithuanian partisans were called 'bandits', 'traitors of the homeland', and 'bourgeois nationalists'. The only counterweight to the Soviet propaganda was publications of Lithuanian intellectuals who had fled West during the Second World War (Tauras, 1962; Vardys, 1965; Remeikis, 1980; Daumantas, 1988). Only after Lithuania restored its independence in 1990, the official attitude towards Lithuanian partisans has changed. The Lithuanian partisan war has been investigated on the basis of archival documents and recollections of survivors, and many partisan diaries and albums have been published (e.g. Ramanauskaitė-Skokauskienė, 2007; Baliukevičius, 2008). Isolated from the Soviet propaganda, the objective image of the Lithuanian partisan war has been an objective of current studies.

The Battle of UŽPELKIAI Forest

The Užpelkiai Forest battle of 13 August 1949 plays a key role in the narrative of Lithuanian Partisan Commanders (Figure 1). During the battle, 5 freedom fighters were killed, two of whom were signatories of the 1949 Declaration. The battle and the death of the partisans had a strong influence on the leadership of the

LLKS and the Prisikėlimas [Resurrection] District, and changed its course (Petrauskas et al., forthcoming a). Soviet operative security files, documents and recollections of partisans who participated in the combat provide important data about the battle. According to these data, a meeting of commanders and their guards from the Defence Forces Headquarters and the Public Division of the LLKS, as well as the Prisikėlimas District was planned in the Užpelkiai Forest. The meeting, marking the beginning of the internal partisan leadership reorganization, was not a regular meeting of Lithuanian partisan commanders. Moreover, during the meeting partisans commanders had to exchange offices, chancery and resources.

The beginning of the Užpelkiai Forest battle was a report of 9 August 1949 by a Soviet security agent Stasys Karanauskas (codename Zelenyj [Green]) on the discovery of a partisan camp in the woods. Not knowing that the Soviet security had information on the partisan camp existence, five partisans gathered in the Užpelkiai Forest on August 12, these were: Petras Bartkus (codename Žadgaila), Jonas Gedminas (codename Girėnas), Vytautas Kuzmickas (codename Sakalas [Falcon]), Jonas Lušas (codename Aitvaras [Kite]), and

Figure 1: The location of the Užpelkiai Forest battlefield. Drawing: Gediminas Petrauskas

Pranciškus Prūsaitis (codename Laputė [Foxy]). In the evening of the same day, 7 vehicles full of NKVD soldiers (according to witnesses, around 400 soldiers) arrived at the Užpelkiai Forest, although the attack of the partisan camp did not start then. In the early morning of August 13, another four partisans reached the camp: Bronius Liesis (codename Naktis [Night]), Laurynas Mingėlas (codename Džiugas), Viktoras Šniuolis (codename Vytvytis), and his brother Vytautas Šniuolis (codename Svajūnas). The other two partisans did not come to the meeting on time and thus avoided the battle. At the same time, 11 more NKVD vehicles arrived at the Užpelkiai Forest. However, Soviet soldiers did not fully understand the positions and roles of the partisan commanders gathered in the forest.

The Battle of Užpelkiai Forest took place in the morning of August 13. During the battle Bartkus and Liesis, the signatories of the 1949 Declaration, as well as the partisans Gedminas, Lušas, and Vytautas Šniuolis were killed (according to partisan documents, the battle ended with the death of 18 Soviet soldiers). The other partisans successfully withdrew with one seriously injured partisan Mingėlas, who was carried by Viktoras Šniuolis to the partisan bunker in Minaičiai village, 8 km away. The bodies of the murdered partisans were dumped in the market square of Grinkiškis (7 km away from the battlefield) and then in an hour taken to Radviliškis NKVD Headquarters, where bodies were laid in obscene poses for display and then secretly hidden in one of the Antaniškiai village wells (now Radviliškis city). Eventually, in 1991, the remains of the partisans were unearthed and buried in the Radviliškis city cemetery (Petrauskienė & Petrauskas, 2014, Figure 5).

The abundance of partisan documents testifying the Užpelkiai Forest battle is an exceptional case in the Lithuanian partisan war. Mingėlas and Viktoras Šniuolis, survivors of the battle, documented their recollections the same year. Also, the betrayal of the partisans was investigated, the secret service data on the Soviet soldiers before the battle and the defiled bodies of the partisans was collected, and documents for awarding the dead were prepared. Moreover, in December 1949, i.e., four months after the battle, Mingėlas prepared a comprehensive scheme of the battle. The archive with the mentioned documents was stored underground and found in 1993 in Antanas Bekeris' farmstead in Pivoraičiai village (Kelmė District). In 1999, relatives of the killed partisans, community representatives, and state authorities commemorated the Užpelkiai Forest battle. A monument was built in the Užpelkiai Forest, although the exact location of the battlefield was not known at that time.

Materials and Methods

While searching for the exact location of the Užpelkiai Forest battlefield, the main focus was the partisan Mingėlas' sketch (Figure 2). In the scheme, a forest quarter line is marked to the west of the battlefield and a forest path is marked to the farmstead in the north. The drawing of three fir trees at the battlefield place point to a coniferous forest, a water pit and a swampy area with deciduous trees in the east suggest that in the middle of the 20th century it was wet around the battlefield. This, of course, influenced the choice of the location of the partisan camp. A dotted line in the east and south of the battlefield reveal that the fatal events of 13 August 1949 took place on the very border of the Užpelkiai Forest.

In locating the Užpelkiai Forest battlefield an important role was played by Jonas Petrėtis and his son Bronius who had lived on the southern outskirts of the forest. Around February or March 1948, a liaison point was established at the Petrėtis' home. On 12 September 1949, a month after the Užpelkiai Forest battle, Jonas Petrėtis was interrogated by

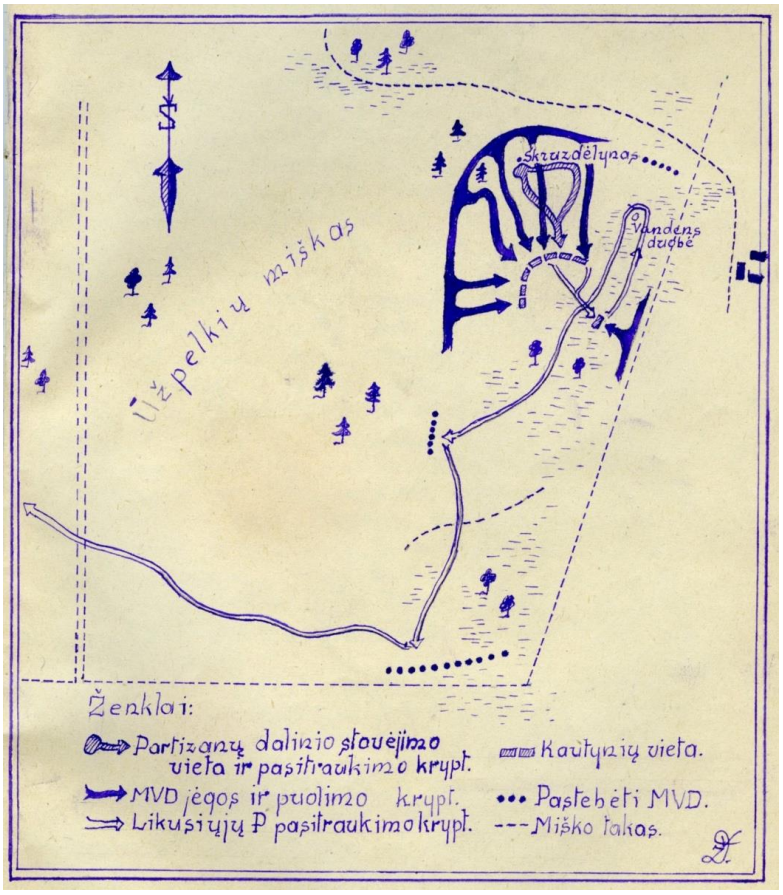

Figure 2: A sketch of the Užpelkiai Forest battle drawn by the partisan Mingėlas (December 1949). Courtesy of the Lithuanian Special Archives

the Soviet security in Vilnius about the Partisan Headquarters, one kilometre away from his farmstead where freedom fighters were 'constantly reading and writing'. Partisan groups of two to five visited Petrėtis at home or at work in the peat bog. In turn, Petrėtis reported to the partisans twice of thrice a month of the situation in the neighbourhood and whether it was safe for the partisans to organize a meeting. Moreover, the Petrėtis family supported partisans with food, collected information about local opinion and the process of collectivization.

The site of the Petrėtis' former farmstead was localized according to the 1928 parcel plan of the Šarkučiai farm. The comparison of the partisan Mingėlas' sketch with the topographic maps of the late 19th and 20th centuries, and the site inspection revealed that the forest path marked on the sketch to the Užpelkiai Forest, heading to and from the Petrėtis' farmstead, does not exist anymore. However, the melioration ditch dug out in the marshy alder-covered lowland, as well as the borderline of the forest and the forest quarter line heading north to south have shown, that the Mingėlas sketch's decoding is possible, and the search for the battlefield site should be started from the southern part of the Užpelkiai Forest.

In August 2016, the archaeological field survey was conducted in the potential battlefield site of the Užpelkiai Forest (Figure 3). Six groups of participants of the archaeological expedition, using metal detectors, began a thorough search of the remains of the battlefield in a mixed forest, north of the melioration ditch. As soon as the first cartridge cases were detected near the melioration ditch, the archaeological expedition thoroughly searched for cartridges, bullets, grenade fragments, and various items related to the partisan camp and the Užpelkiai Forest battle. The objective of the field survey was to restore a comprehensive outlook of the battlefield, i.e. the shooting of Soviet soldiers, the routes of the assault and retreat, and various details of the battle.

In 2016 and 2017, an irregular area of 60–110 m in length and 30–110 m in width of the partisan camp on a slight hillock and its foot was thoroughly surveyed in the Užpelkiai Forest (approximately 0.6 ha). The area was divided into parallel 2 to 3 m wide stripes,

Figure 3: The Užpelkiai Forest battlefield, as seen from the southeast. Photo: Gediminas Petrauskas, 2016

besides, more than 5 ha were surveyed in addition without observing a strict trajectory, paying more attention to find concentrations and less attention to empty spaces between them. The coordinates of the detected finds were measured and the distribution plans were drawn using a GNSS rover.

RESULTS

The archaeological field survey has revealed that the finds were distributed in the area of 190 to 275 m, and the battle of Užpelkiai Forest took place on the southern outskirts of the forest, 450 m northwest form the courier Petrėtis' farmstead. During the survey, a total of 221 finds were discovered. The majority of the finds were ammunition: 10 Soviet and 2 German unfired cartridges, 140 Soviet and 2 German cartridge cases, and 38 Soviet bullets. The Soviet ammunition includes 7.62x25mm and 7.62x54mmR unfired cartridges, cartridge cases and bullets of a PPSh submachine gun, an unidentified machine gun, a carbine Mosin, and a semi-automatic rifle SVT. One of the 7.62x25mm cartridges, found in the partisan camp, most probably was broken on purpose, so that the powder could be used to light the fire. Judging by markings on the bottom of cartridge cases, many of PPSh cartridges were manufactured in 1940, 1944, and 1945, while the 7.62x54mmR cartridges were made in 1939 and 1940.

The list of the German ammunition discovered in the battlefield of Užpelkiai Forest is significantly shorter. Only 2 9x19mm unfired cartridges, manufactured in 1940, and 2 carbine Mauser cartridge cases with dates of 1937 and 1939 were found during the field survey. Given the fact, that the Soviet Army used only Soviet ammunition, and Lithuanian partisans used both, Soviet and German weapons, it is considered that the German cartridges and cartridge cases discovered in the battlefield belonged to the partisans. However, four years after the Second World War, there was a shortage of German ammunition. In addition to German weaponry, a fragment of an exploded hand grenade was found.

Many other finds were also related to the partisan camp and the battle of Užpelkiai Forest: 4 ammunition buckles, 3 fragments of shoe-plates, 2 German uniform buttons, 2 syringe needles, a carabiner, a cigarette holder, and a cover of a voltaic cell. A silver ring (purity .800) with an engraved Vytis, an armoured knight, holding a sword and a shield, that has been a national Lithuanian symbol inherited from the 14th century of the Grand Duchy of Lithuania and the coat of arms of the Republic of Lithuania (Rimša, 2005; Galkus, 2009; Razauskas-Daukintas, 2018), has received a special attention (Figure 4). The FTIR spectroscopy has shown, that the front part of the ring is filled with chalk. The sides of the ring are decorated with plant motives, its edges have notch ornaments and an engraving of the goldsmith, as well as silver purity is marked on the back side – [Seal of Solomon] 800 L. Judging by the analogues, the ring was minted between 1922 and 1940 in Kaunas, the then capital of Lithuania by an unknown goldsmith L (cf. Šėma, 2014, Figure 118.1). However, the ring is not an original version, as the plate with the Vytis symbol was attached on it after its stone was removed. The ring is considered to have belonged to one of the signatories of the 1949 Declaration, killed in the battle of Užpelkiai Forest, Bartkus or Liesis.

Partisan uniform accessories make the last group of the finds. A button of an interwar uniform of the Lithuanian Ministry of Communications uniform button, a belt clip with a chain, and a segment of a binocular lens were discovered in the battlefield of Užpelkiai Forest (Figure 5). A particular attention is drawn to the fact that a piece of the same broken binocular related to the partisan Mingėlas, and an identical button, related to Vytautas Šniuolis who

Figure 4: The partisan ring discovered at the battlefield of Užpelkiai Forest. Photo: Gediminas Petrauskas

**Figure 5: Partisan uniform accessories discovered at the battlefield of Užpelkiai Forest:
1 – a button; 2 – a belt clip with a chain; 3 – a segment of a binocular lens. Photo: Gediminas Petrauskas**

worked as a translator at the Radviliškis Railway Board, were found during the excavation of the above mentioned partisan bunker in Minaičiai village (Vėlius & Žygelis, 2013).

After mapping the archaeological finds, discovered in the Užpelkiai Forest, and the analysis of their distribution, several clusters of findings have been defined (Figure 6). The first cluster, covering the territory of about 35 to 40 m in the middle of the surveyed area, includes most of the PPSh and 7.62x54mmR bullets, all German unfired cartridges and cartridge cases, also finds related to the partisans: the silver ring, the button from the Lithuanian Ministry of Communications uniform, the German uniform buckles, the ammunition buckle,

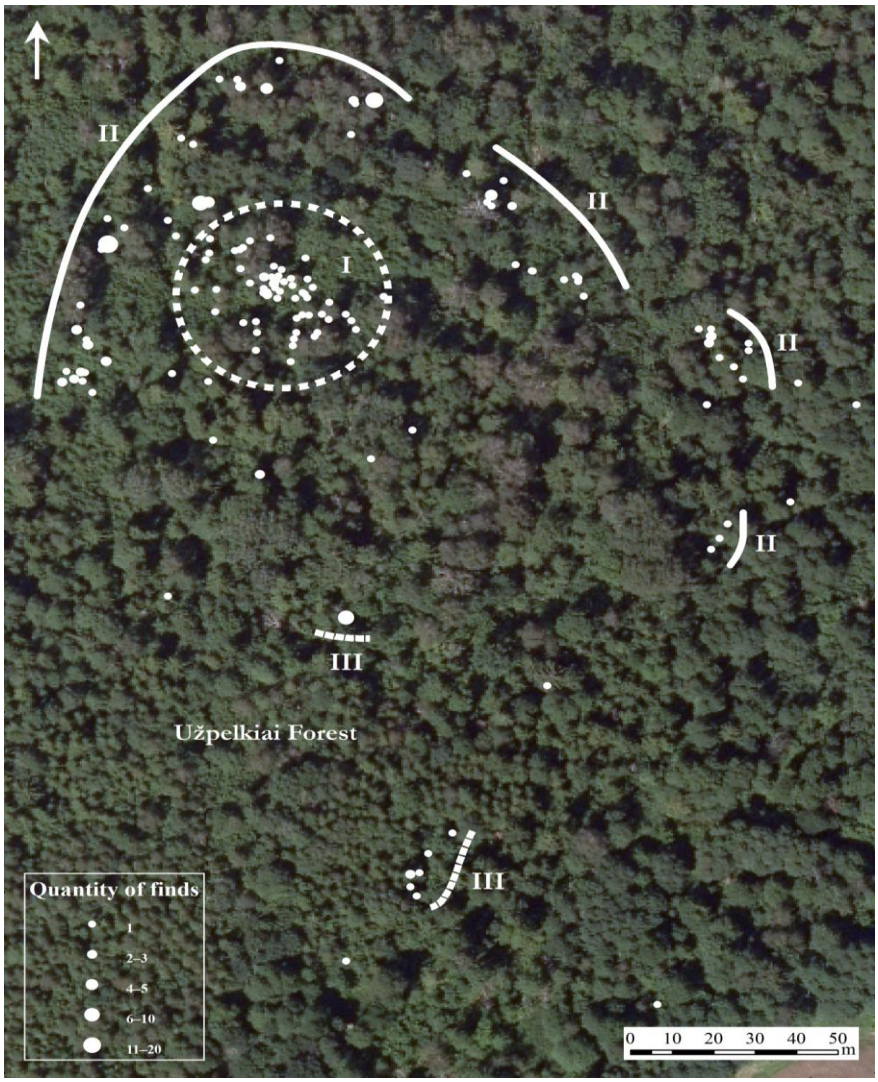

Figure 6: Situation plan of the Užpelkiai Forest battle: I – the partisan camp; II – the encirclement of the Soviet Army; III – the positions of individual Soviet soldiers. Drawing: Gediminas Petrauskas

the belt clip with the chain, the fragment of the binocular lens, the syringe needles, etc. These finds indicate the place having been the partisan camp. In addition, the distribution of the bullets reveals, that the place was the target of the Soviet soldiers (one of the PPSh bullets was found deep in a tree stump). Judging by the 17 PPSh, one Mosin, and one Mauser cartridge cases discovered in the concentration of the finds, the partisans fired at least 19 shots while withdrawing from the camp. At least three more Soviet 7.62x25mm cartridges, one 7.62x54mmR and two German 9x19mm unfired cartridges were ejected or unloaded by the Soviet soldiers after the battle. The question of whether the ring was accidentally lost during the battle or hidden on purpose, so it would have not ended up in the hands of the Soviet soldiers, remains unanswered.

The second cluster of the finds circles the first one from the southwest, north, and east. It consists of only PPSh and 7.62x54mmR (mostly Mosin) cartridge cases, 55 and 54 accordingly. Both types of weapons were widely used during the battle. The analysis of the ammunition distribution has revealed that at least 8 more apparent groups of cartridge cases, 15 to 30 m apart existed. Cartridge cases of both types were found in all clusters of the findings, with the exception of one farthest to east concentration, holding only PPSh cartridge cases. The Soviet soldiers fired up to 5 shots from each disposition using the PPSh, up to 6 shots using the Mosin or SVT, and up to 13 shots using the PPSh ammunition. The 20 7.62x54mmR cartridge cases, or two used cartridge clips, of a machine-gun, found on the north western side indicate the position of a Soviet

machine-gunner. Also, 4 unfired cartridges, some broken in parts and some defective, were found in the western part of the encirclement.

The distribution of the ammunition in a semicircle, showing the Soviet Army attack from the southwest, the west, and the north, confirm the same facts indicated in the Mingėlas' sketch. The archaeological field survey has shown that the partisan camp and the Soviet soldiers' encirclement were about 10 to 50 m apart, while Soviet positions in the east were 45 to 90 m away from the camp. It is worth to mention, that this particular part of the encirclement is also marked in the Mingėlas' sketch. Furthermore, 3 shoe-plate fragments, 2 ammunition buckles, a cigarette holder, and a cover of a voltaic cell were found next to the ammunition in the south eastern part of the encirclement. These items were supposedly lost by Soviet soldiers during the attack of the partisan camp.

The last two concentrations of the ammunition were recorded at 80 m and 140 m southeast from the partisan camp. In the first of these concentrations, 7.62x54mmR cartridge cases split into two parts, evidence 6 shots fired by the Soviet soldiers. In the second concentration of a 12-meter long row, 7 PPSh cartridge cases were found. According to the Mingėlas' sketch, at the beginning of the battle the partisans withdrew northeast, but after nearly colliding with the enemy they turned southwest, later south, and finally west. The sketch and the archaeological data of the two clusters of cartridge cases found at the unenclosed outskirts of the partisan camp evidence the withdrawal of the partisans southeast and south and the disposition of the Soviet soldiers, who were observing the partisans and later started gunfire at them.

To sum up, the Užpelkiai Forest battle began at the partisan camp, embraced the area of about 150 to 150 m, and ended up in the death of 5 freedom fighters. The fact, that the battle continued on the outskirts of the forest has been proved by a bullet, discovered just 25 m away from the cultivated field. Although the archaeological data provide no more specific data about the end of the battle (withdrawing partisans did not shoot), the Mingėlas' sketch indicates that an injured author of the sketch was taken away by Viktoras Šniuolis westward, towards Minaičiai village. Prūsaitis, another partisan who survived the battle, as seen by Aleksas Vaitkevičius from the stone barn in the Medeliukai farm, 750 m southwest of the Užpelkiai Forest, was escaping south crossing the Srautas stream. The longhair partisan was mistaken for a girl by the Soviet soldiers and was tried to be captured alive, but succeeded in escaping. The route of Kuzmickas' escaping has not been identified so far.

DISCUSSION

The study of the Užpelkiai Forest battle was complex in its origin as it incorporated numerous data. During the investigation of the battle, not only documents of Lithuanian partisans and the Soviet security, historical maps, recollections of surviving witnesses were examined, but also a comprehensive archaeological field survey was conducted, the discovered ammunition and the war strategy was analysed. The determined location of the battlefield, the reconstructed course of the battle, the identified disposition of partisans and Soviet soldiers, and the identification of the four previously unknown partisans have revealed numerous opportunities in researching modern conflicts.

Only a few sites of the Lithuanian partisan war have attracted the attention of researchers so far, the research methodology has just begun to be developed (Petrauskienė et al., 2017; Vėlius, 2017). Because of the sources used, their variety and the abundance of the methods applied, the investigation of the Užpelkiai Forest battle is the first study of Lithuanian partisan war battlefields of this type and extent. It is an example of the research of sites of modern conflicts that opens up new possibilities in examining more deeply and comprehensively the struggle for freedom of Lithuania in the middle of the 20th century.

The investigation of the battlefield of Užpelkiai Forest gives an opportunity to get a glimpse at the context of modern conflict archaeology. By researching military conflicts of the 20th and early 21st centuries, the relationship of people and the environment, also atrocities of war, modern conflict archaeology is similar to conflict archaeology, military archaeology, and battlefield archaeology (Sutherland & Holst, 2005; Scott & McFeaters, 2011; Homann, 2013). As it was shown by the analysis of the Užpelkiai Forest battle, modern conflict archaeology is an interdisciplinary one. The archaeological data are compared to text sources

(historical documents and inscriptions), oral history (narratives and recollections), the cartography, visual sources (aerial photography and orthophotography), etc. (cf. Cocroft, 2009; Valero Escandell, 2009). In modern conflict archaeology, closeness to anthropology, cultural geography, architecture, history of war and art, studies of museum, tourism, and heritage are of not less importance.

Oral history plays a special role in modern conflict archaeology. Living memories are characteristic of contemporary military conflicts and is one of the essential features distinguishing the research of the 20th and early 21st centuries from other periods without surviving witnesses (Moshenska, 2007). For this reason, modern conflict archaeology is the closest and most sensitive to the public, thus emotional experiences gained during archaeological excavations can bring back people's memories and they can be passed over to the future generations (Moshenska, 2009).

The best results in studying modern conflicts are achieved in cooperation with local people. Surviving witnesses and informants can indicate sites, unfold details, identify findings and link them to personalities (Moshenska, 2009). For example, inhabitants of the surrounding villages provided valuable information about the withdrawal of the partisans from the Užpelkiai Forest, the transportation of the dead by a horse carriage, and the identification of the local people who were forced to do so. These important details were neither mentioned in the documents of the partisans or the Soviets, nor were they obtained during the archaeological field survey. On the other hand, memory volatility and emotional factors can be misleading in research studies (Moshenska, 2008). In such cases, a critical study of data, its analysis, and comparison with other sources is crucial. It is noteworthy to mention, that after the restoration of the Lithuanian independence, informants, participants, and witnesses have indicated most of the Lithuanian partisan war sites: bunkers, underground quarters, shelters, battlefields, and death sites. While painful events of the 20th century are fading, the number of people able to provide information or indicate locations is constantly decreasing. In the future, the significance of the archaeology in researching modern conflicts will only increase, and the archaeological field survey will become the only way to discover unknown conflict sites.

Written documents are another important source in researching modern conflicts. The entire current history of the Lithuanian partisan war is based on written documents of Soviet security agencies, operative, criminal, and exile files, as well as interrogation protocols. The encrypted and hard to read partisan documents and letters have not received proper attention yet (Petrauskienė et al., 2017). On the other hand, Soviet security files, as well as historical Annals or the Medieval Chronicles, are subjective, the reality in those documents is often distorted and far from being true, containing many mistakes and discrepancies. This suggests that the written data should also be critically analysed and treated with due care.

Thus, the investigation of the Užpelkiai Forest battle has revealed that a comprehensive research on modern conflicts is possible only in the context of interdisciplinary studies. Close cooperation of different branches of science and the interpretation of data is necessary in a thorough research. Archaeological data must be compared to documents, narratives, visual and various other sources, they not only complement and illustrate the data, but also refine the picture of modern conflicts, give it credibility and completeness.

CONCLUSION

The Užpelkiai Forest battle occupies a significant place in the history of the Lithuanian partisan war. It made a huge impact on the leadership of Lithuanian partisans and changed the course of 'the war after the war'. After the restoration of the independence, Lithuanians were eager to immortalize the Užpelkiai Forest battle and the partisans who had been killed, the battle was repeatedly mentioned in historical literature, although it has not been given sufficient attention by researchers. A thorough investigation conducted in 2016 and 2017, the discovery of the battlefield and the reconstruction of its progression have given an opportunity to look back at the battle in detail. However, the greatest achievement of the study is presentation of potentialities of the complex research. The combination and analysis of archaeological data, written documents, oral history and the cartography, the application of armament and war tactics, and revealing the benefits of the complex research have opened up a new approach to the Lithuanian partisan war. The investigation of the Užpelkiai Forest battle is significant in disclosing and developing the concept of modern conflict archaeology.

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The Methodology Used to Identify the Battle Site of Fulford

Chas Jones

Methodology is a dry topic but I aim to show that it was only by following a formal research method that we are able to confidently locate the 1066 battle of Fulford. The alternative to a methodical search is 'treasure hunting' and this case study illustrates how an assessment based on random finds can be misleading. A formal methodology was also necessary at Fulford for two reasons. First, we expected to find nothing – Based on work elsewhere we expected to find no weapons, no earthworks, no human remains, indeed nothing 'archaeological'. Second, we really did not know where the battlefield was. We have an extensive primary and secondary literature, plus a stable landscape and notable, local geology. The downside of a formal method is that with hindsight some work appears pointless but that is the nature of systematic research. However, it allowed the battle areas to be compared with the surrounding land which contributed to the confident identification of the site. Systematic searching can also be slow. For example, it took me 11 years to decide where it was worth digging. But following the formal methodology has provided a structured and exciting journey and gives one confidence in the conclusions.

At previous conferences I have presented the physical evidence that suggested there was post-battle metal recycling and I am looking to publish a formal paper setting out the extensive evidence next year. One key principle of the method was iteration. Not only was the data formally reviewed but the question 'So What?' was always on my lips. In practice the data should have been reviewed more frequently as some important clues were missed so latterly formal team 'brain storms' were instituted.

- *1055 Earl Tostig Godwinson becomes Earl of Northumbria*
- *1065 Northumbria revolt – Tostig, Harold's brother, is exiled*
- *1066 January*
- *Edward 'The Confessor' unable to attend consecration of his West Minster then dies and buried*
    - *Next day Witan confirm Harold Godwinson as king at coronation*
- *1066 Easter: Harold marries the sister of the northern Earls, Edwin & Morcar*
- *Wednesday 20 Sept – Fulford*
- *Monday 25 Sept – Stamford Bridge*
- *14 October – The battle at Battle*

Figure 1 Tostig has spent 1066 organising the Norse, and possibly coordinating it with the Norman, invasion. The Northern earls, who ousted one Godwinson the previous year, are now allied by marriage to King Harold who has been guarding the south coast against the expected Norman invasion.

Literature

It was the literature that dictated where we searched. Regular seminars were held where physical findings and the literature were assessed. It was, above all else, the regular revisiting of the literature that gradually made sense of the physical evidence. Because we didn't know where the battle took place, the secondary sources of those historians who had studied the battle were all investigated. The accumulated evidence now tells us that the battle site was more extensive than originally anticipated. It emerged that, with a few exceptions, all those who had published speculations about the battle's location contained an element of truth. Conversely, by focusing on just one part of the evidence none of them accurately described the battle illustrating the risk of selecting evidence and vindicates the methodology which required each of the published theories to be tested.[1] Brand new data is important when testing ideas scientifically. The same principle holds true for archaeology: An ancient source translation was published in 2013 and provided a way to test our published interpretation. [Fig 2] We learn that King Harald offered battle, where other sources were ambiguous: We read about the still pool of deep water clarifying the words used in other sagas. We are told that the local forces are split from the Mercians by Harald's counter-attack, and then the retreat routes are explained. This information was not found in the sources available when the project was designed but all the landscape features had been identified and some of the actions described were anticipated in my published 2010 interpretation.

Scholarship in the last decade has also shown that we can rely on the historical sagas and the Skadic Poetry Project has identified at least one of the source poems about Fulford employed by those who assembled the sagas in the 13th century. The quality and quantity of translated material has also improved dramatically during the project. But, interestingly, at the Leeds Mediaeval Congress in July this year (2018) I was warned by medieval scholars not to take landscape descriptions too literally. I have invited them to visit Fulford so I can

> "King Haraldr elected to give battle. He landed and drew up his troops on the riverbank, with one wing toward the river and the other toward the still water of a deep pool. The jarls led their formation with all the rank and file down along the river. The king's standard was close to the river, where his battle array was densest, while it was thinnest by the pool. There too the troops were least reliable, and when the attack was made, that wing gave way.
> "The English launched their attack down along the river, then toward the pool, and they thought that the Norwegians would flee. King Haraldr led the attack with his troops and joined battle so fiercely that the enemy was split and the local army began to flee.
> "They retreated to a place where there was no armed opposition, in the swampy ground around the pool. Jarl Morkere had followed the standard closest to the pool, and Jarl Waltheof fought the king more toward the river. He fled up along the river, and the troops with him were the only ones to escape. Translated Alison Finlay 2013

Figure 2 Morkinskinna or 'Mouldy Parchment,' was written about 1220

show them that the skalds accurately described the setting; Evidence from Fulford suggests we should indeed take the landscape descriptions seriously.

Landscape

Landscape archaeology was the focus of much early work in order to understand surface change and re-create the land surface of 1066. Augering or test-pits formed a key part at all stages of the project. This has

[1] The important test applied to the literature was '..to see if any single aspect…cannot be sensibly reconciled with the literature' because '..it is possible to find many places where any battle can find a "good fit".. to the literature'. [Author 'Finding Fulford' 2010 report #125] 'Good' does not pass the test. Perhaps we have been lucky but I believe the fit is perfect.

necessarily evolved into a full understanding of the geology to explain the creation and silting of the beck (stream) at the heart of the action.

We also had to test that fighting a battle on this surface was feasible on what the literature suggests was waterlogged land. We confirmed that in1066 the surface of the peat ditch was covered by a clay/sand mix and proved surprisingly firm so would have supported soldiers battling on its surface.

We hoped a soft sub-surface might have trapped organic material but the firm surface we discovered would not have concealed items from the recyclers, discussed later. We also found the texture of the clays around the water's edge was too soft to preserve any footprints - The 'foot print' shapes we did find were almost certainly caused by mole nests, just above a layer rich in worms, and we found moles digging 2m below the surface.

Figure 3 By studying the geology over the full width of the battle, we now understand the height and nature of the surface on which the battle was fought, flood levels and match the 1066 surface to the literature. This research is vital since battles are fought over the landscape.

Finds

Finds are the normal focus of battlefield research. This methodology included searching not just those areas where people pre-conceived the battle to have taken place as well as the gaps between them. The Fulford methodology collected iron even though conventional wisdom at that time said we should expect to find nothing for the very good reason that no iron finds had emerged from any other battle of this era.

The early focus was however on the statistics rather than the artefacts to test the hypothesis that fragmentary iron might point to the location of the action. Number crunching indeed pointed to locations along Germany Beck with concentrations of iron hundreds of time the average density. What did the concentrations of fragmentary iron mean? The 'hot spots' suggested one location while the literature and landscape pointed elsewhere.

I hope it is axiomatic that when we find our theory does not fit the evidence we need to find a better theory.

A tour of six Scandinavian institutes in 2006 suggested that much of the recovered material was related to iron recycling. The interesting items were exclusively from these compact iron recycling sites matching the statistical hot spots.

In a double-blind trail[2], we re-checked all the collections. The benefit of searching a wide area provided good comparative samples and recycling debris was only found in the compact zones previously

[2] Those sorting the finds were unaware of either what they were looking for or the reason for the sort. They were just asked to sort the collection by size and shape.

identified. This led me to suggest the post-battle, metal recycling hypothesis for which we now had extensive and I believe overwhelming evidence.

The evidence suggests that when the metal workers had to abandon the site after news of their defeat at nearby Stamford Bridge, they grabbed all they could carry leaving only the incomplete items for us. Of course, normally the battle debris would have been recycled and removed which is why, I suggest, most sites of this era provide no finds.

The hasty abandonment of the recycling work might be best illustrated by samples where five thin plates of iron are apparently being forge-welded together.
Subsequent finds and conservation work has served to support the recycling hypothesis.

- One rather unimpressive piece of iron has been identified as a sword that was under construction. It had been spirally wrapped in sacking or leather to protect it when buried - it has never had a pommel or a guard fitted. One sensible conclusion is that the owner was hoping to return and complete this weapon.
- We have a set of seax blades without their tangs which they possibly planned to add later perhaps using a softer iron rather than the quality wrought iron of the blades.
- Many tools had been identified from xrays. With the concretion removed it is clear that the tools found were mostly unused and even unfinished.

Our methodology suggested that digging could only be justified if specific targets had been identified. Sadly my repeated requests over many years to excavate the recycling sites were refused and the surface material has now been stripped and removed from the site destroying this unique evidence. Deprived of our primary target for excavation, when testing an idea in 2013 that we might find an enhanced concentration of iron in the soil at a depth that we could date to the time of the battle. The Dutch style auger produced chunks of iron and I was encouraged to dig a test pit. The results were remarkable from this 1 sq m test pit.

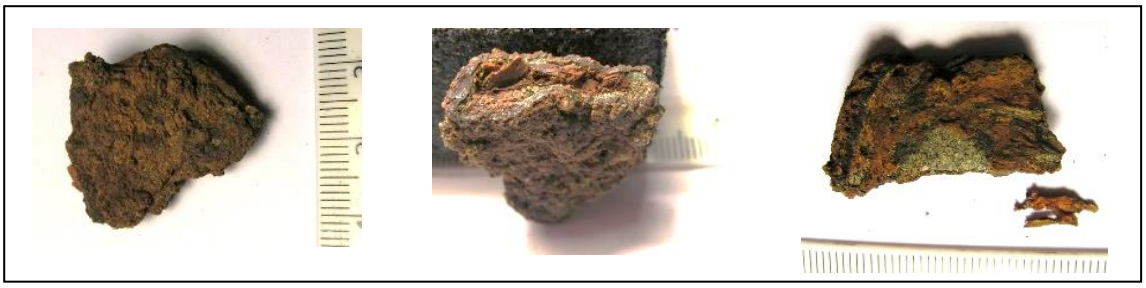

Figure 4 Among the finds from the test pit within the base of the beck were three pieces which have a wire-like structure inside an iron shell. It is suggested that these come from weapons. More samples are awaiting conservation.

Road to the Battle Site

This test pit encouraged further digging and over a number of seasons we found a road. It is hard to overstate its archaeological importance. Finding a road linking Fulford to the Riccall, base for most of the Norse fleet, was the first objective of the methodology since armies need roads to reach a so-called ‘pitched’ battle. Much effort at the start of the project was devoted to looking for this road. We have possibly found a unique road which we can trace from pre-history until the present.The few datable ceramic finds allowed an early date-model for the base layer to be estimated at 900-1200 and confirmed with C14 dating. Subsequent digs showed the base of the beck had been stable for at least 2000 years, probably >50,000 years, with liths, Roman tile, fishing weights and weapon-like iron artefacts within the beck stone base. This very ancient stream only began to silt up in the time after the battle which the geology could explain. Another conclusion

worth reporting is that the iron finds stopped at the bank. Surviving iron was all from within the water which I suggest is why it escaped collection after the battle.

Datable evidence

Figure 5 Above the Roman surface we found evidence of a repaired surface, datable to the late medieval era with the ruts made by carts. Below the Roman surface a large stepping stone, mounted on a tripod of vertical stone,

While the methodology called for scientific dating where possible, sadly, the environment does not always deliver what we want.

The samples of human-like bone were recovered in 2015 from just one context which was on the inside of a bend in the beck, while heavier iron was deposited on the outside of the sharp bends. Many Fulford bones were submitted for C14 dating. Sadly only bones from higher layers, which we know post-date the battle, were datable. The University of York used a super-sensitive technique known as ZOOMS which might even have identified isotopes. But this was also defeated by the failure of any collagen to survive in the base layer bones.

We cannot state that these bones are human however animal bones were typically found in assemblages, were more fragile and from higher contexts.

Between 2009 and 2015 a 3km section of the Tollense River in Germany was investigated by Greifswald University on the site of a Bronze Age battle. The fragmentation and translocation of bones along the direction of flow, matches the pattern of bone found at Fulford. The peat found in both locations, did not preserve soft tissue but conserved, indeed strengthened bones. At Fulford, the peat growth predates the battle.

More research is required but at Fulford, the evidence suggests the bone fragments were translocated and deposited during a flood event within 50 years of the battle in a pattern matching the recent German finds. The German findings match those at Fulford in another respect. The weapons they found came from within what they interpret as the ancient river where the battle was fought - The surrounding areas were clear of battle debris providing more evidence that battles have historically been systematically cleared.

Figure 6 One thin layer, dateable to about the time of the battle, contained human-like bone but which could not be dated. It is suggested that the bones have been flushed to this location.

Unidentified objects

Implicit in the methodology was that every bit of the evidence had to fit the model or a good reason had to be found to dismiss it. We cannot cherry-pick battlefield evidence.

Researching 7 large metal mushroom-shapes was a challenge. There are no similar objects in any collection so far traced. A cluster of professors at a conference in Oslo in December 2014 suggested I joined the gathering of medieval metal workers to discuss the images. So I made models, based on the CT scans, and took them to Borre in Norway.

Four of the five experts who work with Scandinavian museums thought these were tools used for knocking dents out of helmets and shield bosses, a useful tool to have after a battle. Experimentally, one of these has been successfully employed by the Vik re-enactors in England.

These tools had to be driven into a block of wood to be used – This is important because it would have prevented their easy removal when the metal workers escaped. On this flood plain, the wooden block would convey them downstream until the anvils, acting as a keel, grounded at one of the bends in the beck, explaining their concentration. The mineralised wood is visible on several of these 'planishing' anvil finds.

Figure 7 Several new classes of find were identified. Some can be explained as the stages of weapon manufacture or recycling. However the models led experts to suggest the items above were used for repairing dented iron plate in, for example, shield bosses or helmets. It is possible these were deployed on the site during the battle. CT scan copyright Dr R Hill and the Portman Hospital.

The Methodology Tested

There were other important components in the methodology.

- Old maps and air photos were part of the desktop study and helped guide the metal detecting and geology.
- The battle action also needed to make tactical military sense as per the Burne Inherent Military Probability hypothesis. Fulford is a fitting climax to the military career of King Harald 'hardrada'. It was a battle of exceptional tactical sophistication.
- We did not get a chance to do as much taphonomy as we had hoped because access to the land was denied.

Battles are complicated archaeology not just because of their size and ephemeral nature. They also have multiple strands of evidence where each strand has its own evolving narrative, which will of course be endless, and with each strand building towards the conclusion. However, modern media, and political decision makers, like binary answers – Either the evidence confidently locates the battle, village etc, or it doesn't. The

needs of the real world are in conflict with the way archaeological methodology works but the former must not prevent an open-ended debate for individual finds or strands. For example, at Fulford we had a causeway, which with successive digs became a trackway, a Roman road, a mediaeval cart crossing and probably an Iron Age ford. But from the moment it was found, the relevance of the road to the battlefield research was the identification of a route to bring combatants to the ford. Neither should disputing the precise nature of any one finding distract from a timely holistic interpretation of battlefield data which the outside world requires. 'Possibility' can evolve into 'probability' and hopefully on to 'near certainty'. Given enough time, and if we apply a systematic, open method we should eventually be able to state a clear conclusion. Meanwhile researchers must accept that archaeologists are quite rightly going to argue; but they need to be reminded of the damage they do when they publicly nit-pick some detail without first recognizing the big picture presented by the other evidence.

In conclusion, I would suggest that the alternative to pursuing a formal landscape method is to chase finds and rely on luck.I believe that using a formal methodology allows one to set a gold standard of proof because, rather than seeking to prove a theory, it assembles and then interprets the available evidence. A systematic survey of a site allows competing theories to be tested if the data-first approach is followed. In this spirit I am happy to state that we have, beyond any sensible doubt, located the 1066 battlesite at Fulford.

LIDAR with key locations

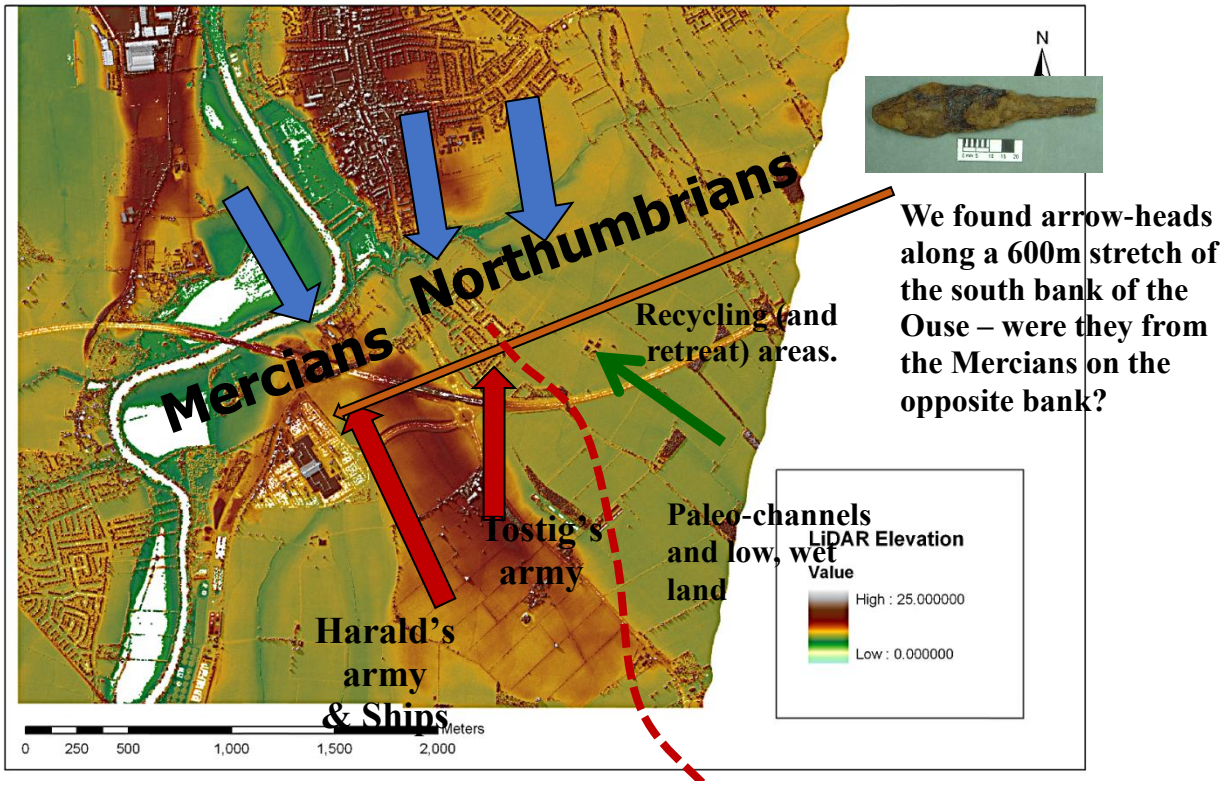

Figure 8 The slide shows the locations of the opening disposition of the armies, dictated by the tide and landscape as described in the literature.

The Battle of Alcalá La Vieja. Location and Understanding of a Medieval Battle.

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ABSTRACT

The research of this medieval battlefield was necessary to gain a deeper knowledge about this historical fact because studies never focused on it. The main information was located in secondary written sources, however it was not completely reliable or clear, for example when they talked about trebuchets and their location, or the situation of the temporary castle in Malvecino hill. In order to fill these gaps, we decided to use "traditional" methods in archaeology, like aerial photographs, and new techniques, like LiDAR or physical calculations.

Through the combination of physics and historical and archaeological data we could propose a new perspective about the battle and siege of Alcalá la Vieja, allowing us to establish a new theory about this place.

Keywords: aerial photography, archaeology, medieval, siege, trebuchet & physics.

1. INTRODUCTION

The battle and siege of Alcalá la Vieja took place in Alcalá de Henares (Madrid, Spain) in 1118 and this year it has been the 900th anniversary, being the ideal moment to present this work. We started this research project two years ago with the goal of investigating this historical fact to protect it and preserve it. At the beginning, the main purpose was to establish a delimitation area for the battlefield but while we studied the written sources a big lack of information appeared and the description in the texts presented problems and inconsistencies. In order to solve it, we decided to broaden increase our research using archaeological research and new technologies.

The use of Geographic Information Systems allowed us to fill several gaps in the written sources, like visibility from different positions, possible locations for trebuchets and the best attack route. All this data was published previously in a Congress in Spain about battlefield archaeology (Ramírez & Montalvo 2017). This military engagement had to be studied with other methods to get a complete understanding. In this paper, we wanted to share the progress in our investigation covering two specific topics: likely locations for trebuchets and the temporary castle.

Knowing the position of the medieval siege engine is very complicated because the historical sources are not very clear when they talk about this issue and the information is not complete. For this reason, we carried out physical calculations, using data from historical and archaeological sources, to establish the possible maximum shooting range and with that information creating the area with more chances. And regarding the location of the temporary castle, we used, probably, one of the most mainstream techniques in the archaeological investigation: LiDAR (Light Detection and Ranging). Thanks to this method, a lot of archaeological sites has been discovered in the last years and it was perfect for us to research Malvecino hill, which will be explained in detail afterward.

2. LOCATION AND CONTRIBUTIONS OF WRITTEN SOURCES

The defensive enclosure that makes up the Alcalá la Vieja site lies on the west bank of the Henares river (Fig. 1), at an altitude of 644 meters, within the so-called Parque de los Cerros, a publicly-owned protected natural space to the south-west of the town of Alcalá de Henares (Madrid), listed as Public Utility

Mount by the Department of the Environment, Autonomous Community of Madrid, in 2000. According to the General Urban Development Plan, the Parque de los Cerros is a Type-A Area of Archaeological Importance. The geological history of this place is linked to the shaping of the Tagus trench, and from a geo-morphological standpoint, the west bank displays steep slopes and hillsides of soft clays and Miocene sands.

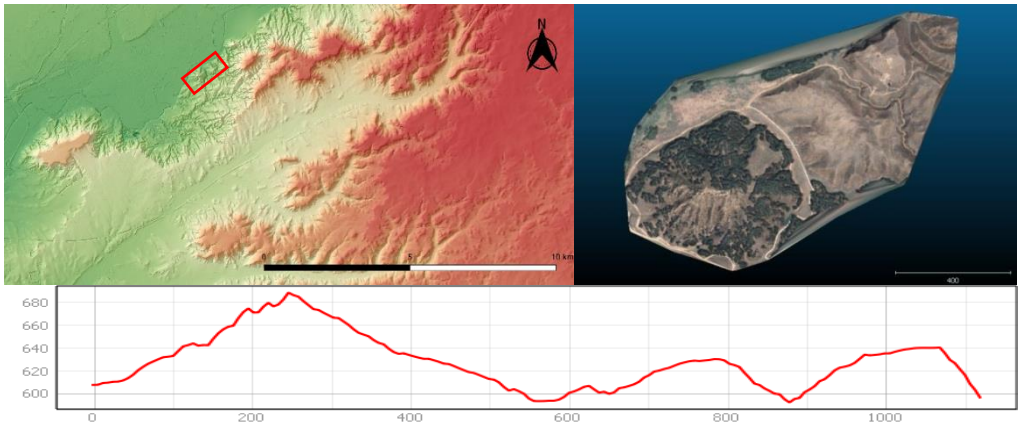

Fig. 1. Location of the battlefield of Alcalá la Vieja (Alcalá de Henares, Madrid, Spain) and topographical profile

This fortress is located at an enclave which overlooks the route between today's Toledo and Zaragoza, protected by complex terrain and the river Henares. The population would have settled in the outlying neighborhood that has never been studied in great detail: Previous research on Alcalá la Vieja mainly focused on studying the inside of the fortress, paying little attention to the outside. It has been argued that the outlying neighborhood was gradually depopulated until abandoned in the fourteenth century. The fortress was probably finally abandoned towards the sixteenth century, according to the documents of that period.

Only 472 meters away we find the base of the Malvecino hill, a cone-shaped elevation detached from the fortress by a cliff and a series of hillocks that rise gently until reaching an altitude of 698 meters. This elevation has different terraces, some of them natural, others resulting from recent replanting work at the Parque de los Cerros. Roman remains and structures were documented both at its base and in the surroundings, according to the archaeological map of the Autonomous Community of Madrid, which refers to the exploration conducted by K. Raddatz in 1957. The news was confirmed by the exploration conducted in 1976 by D. Fernández-Galiano, who could see wall structures and building remains that, however, were not located in the exploration undertaken in 1989-1990 by S. Rascón Marqués and A. Méndez Madariaga.

Ever since Juan Zozaya (1983: 411-529) started his archaeological explorations back in the 1960s, there have been different archaeological campaigns inside the Alcalá la Vieja fortress. These studies established a continuous occupation since the Al-Andalus period; however, the building date could never be specified. They were able to confirm the occupation of this elevated plateau in previous periods with structures belonging to recent pre-history and the Carpetian era. In addition, some Roman and late-Roman pottery was found on the surface. Araceli Turina (1985; 1990), who excavated this fortress in the 1980s, claimed that the fortress would have been built in the mid-ninth century. Other scholars contend that the *qal'at* place name refers to Arab-occupied places, which would have been created by the State in the first years of the Muslim conquest (Presas, Serrano & Torra, 2009[3]), this area being controlled by the BanūSālim Berber family.

The BanūSālims were the major regional power probably since the first decades of the ninth century A.D., when they started to expand towards the southeast from their control of Medinaceli, including the

[3] The excavation was sponsored by Dirección General de Patrimonio Cultural (Plan de Yacimientos Visitables)

founding of Guadalajara and the control of the old Complutum territory (Castro, 2011). The Alcalá la Vieja fortress was part of the defensive system of the middle frontier, erected for protection against attacks from the northern Christian-controlled territories. This defense, together with those of Guadalajara, Talamanca, Paracuellos, Maqueda and Madrid, was an essential point in the Al-Andalus protection system.

Following the Christian conquest in 1118, the fortress was transferred to the Christians and in 1129 King Alfonso VII and Doña Berenguela assigned this Alcalá territory to the archbishop of Toledo, Don Raimundo, thereby becoming part of the possessions of subsequent archbishops of Toledo (Fita, 1885).

The documentary research of the Alcalá la Vieja siege of 1118 A. D. is complex, as written sources are not very clear about the historical event, and the information provided is not enough to understand the course of the siege in detail. This is a problem for us, but also opens up a huge field of research to fill the gaps in the written documents with contributions from archaeologic interventions and studies. The gaps in written documents continue for more than a century; consequently, the rewritings undertaken in the sixteenth century shed doubts about their accuracy, which we intend to confirm with our research.

We will briefly list below some of those information gaps to take stock of the situation we had to face in these first stages of our work. Firstly, we lacked a detailed explanation of the Christian troops' maneuvers, which is absolutely essential to knowing the direction taken by different unit movements. Secondly, we have no data about the deployment of Christian units, except what secondary sources reveal as Christian establishments in the Malvecino and the Veracruz hills. Both information gaps obscure the initial boundaries for the Alcalá la Vieja battleground area; nevertheless, the descriptions of the landscape and of those topographical elements that played a decisive role in the course of the confrontation are well depicted.

Among the data located in written sources during our inquiries we should explain that we attempted to find every written source that somehow mentioned Alcalá la Vieja, the battleground and any item or reference that might help us know how and where the action would have taken place. Not only did we use explicit data for that purpose, but also deductions, interpretations and cross-referring data and information.

The most reliable and closer-in-time written source we know is the account by Archbishop Rodrigo Jiménez de Rada, in his work entitled De RebusHispaniae (HRH). He mentions the occupation of Alcalá several times, omits any explanation about the development of the siege, but leaves several useful references and data to become acquainted with this event lead by the archbishop of Toledo, Don Bernardo de Sedirac. The chapter about the occupation of Alcalá and Valencia describes that Don Bernardo organized the siege of the Alcalá castle achieving its custody, *"which was almost impregnable, and erected another castle on a hill which overlooked the first castle"* (…) *"and finally, victims of famine, the villagers fled through hidden trails"* (Jiménez de Rada, thirteenth century, Chapter XXVIII).

According to the sources consulted during the historic study of the Alcalá la Vieja battle (Azaña, 1882; Portilla and Esquivel, 1725; Torres Balbás, 1959), Don Bernardo de Sedirac's army built a provisional castle on the Malvecino hill. The hill should have been protected by constructing a defensive system to close access to the area and thus prevent potential harrying by the defenders of Alcalá la Vieja or by supporting troops sent to force the Christian army to lift the siege on the Qal'at 'Abd as-Salam fortress. Unfortunately, written sources neither provide nor specify the material typology of the wooden stronghold *(castillo padrastro)* located in Malvecino; however, if we confine ourselves to the different references to it, we may infer that they should have not used solely wood, as the sources mention the presence of walls in place, which leads us to

think of a combined building use of wood, rammed earth, stones and rocks. Nevertheless, the archaeological record that a wooden construction may leave is minimal, being solely reduced to terrain alterations, such as pole holes, trenches and/or ditches (Ramírez & Montalvo, 2017).

So far, we have no archaeological data about the materials with which the wooden fortress would have been erected in this space. An archaeological study of the site is absolutely essential in order to obtain complete information. In this section we will complete the information contributed by the aforementioned previous work, adding new possibilities provided by the progress of our research. Prominent historians such as Plácido Ballesteros San José, who has been studying Alcalá La Vieja and the less known period for decades, acknowledges the need for contributions to be made by archaeological research.

3. ARCHAEOLOGICAL WORKS AND FINDINGS IN THE BATTLE AREA.

Most of the archaeological works have been focused on the castle of Alcalá la Vieja. The area around it, Los Catalanes and Malvecino, were surveyed, with the purpose of gaining a better understanding of this area. The first excavation took place in the fortress in 1854, discovering the aljibe. This systematic archaeological work started with Juan Zozaya in 1969. His works consisted of digging two trenches, to know the Islamic occupation sequence in the stronghold. During the eighties, Araceli Turina started a new archaeological dig focused on the main gate. On their behalf, Ana Lucía Sánchez Montes and Jorge Vega de Miguel carried out a geophysical survey and after, they dug seven test excavations (Castro 2011: 273-274, 277-278). Last but not least, the most recent digs are being conducted by Miguel Ángel López Marcos, Manuel María Presas Vías, Elena Serrano Herrero and Mar Torra Pérez, studying several areas in the castle. (López, Presas, Serrano & Torra 2013: 2-3)

Regarding archaeological findings on the surface, we have to say that it is very common to find them in this area. The access to the castle through the thalweg is practically full of different types of pottery sherds. Additionally, it is very easy to locate this typology of materials as well as construction and wall remains (Fernández-Galiano & Garcés 1978: 24; López, Presas, Serrano & Torra 2011: 238) in the zone in front of Alcalá la Vieja called Los Catalanes, the place where the Muslim *arrabal* was situated. According to Fernández-Galiano, in one of the most important places during the siege, Malvecino hill, there were archaeological remains from Middle Ages, like habitation features and pottery remains. The information about the remains on this hill was confirmed after checking the archaeological register of the Autonomous Community of Madrid, however, we could read that the remains were not seen during the last archaeological survey there in the nineties.

We visited the battlefield several times since we started the project with the goal of getting a better knowledge about this area and during these work we could find several materials on the surface confirming the information from the previous investigations and also the written sources. These remains can be categorized into three different groups: construction, pottery, and weapon.

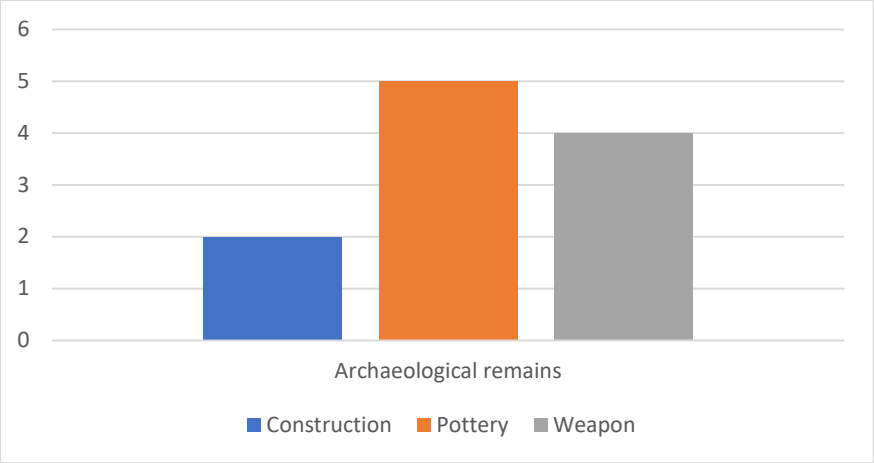

Fig. 2. Statistics of different archaeological findings located in the battle area.

During the first time we went there (July 2017), we visited two zones in the battlefield: Malvecino hill and Los Catalanes. In our opinion, both areas played an important role in this historical fact. As we have mentioned before, historical written sources agree on the first location: the place where Christians built a temporary castle. Nevertheless, we do not have data about the role played by Los Catalanes. In Malvecino (Fig. 2) we found two pottery sherds and one construction material very close to the area where we propose the location of the temporary castle. Apparently, the construction remain is an orange brick which has three black circular marks on the surface, probably made with fingers. The size of these marks is different, so it is indicating the use of different fingers. We are currently working to determine the chronological period of this object and the pottery sherds. We have also located several pottery pieces and one construction remain in Los Catalanes (Fig. 3), the plateau right in the middle between Qal'at 'Abd al-Salam and Malvecino. The first of these elements was a tile which has an orange tonality. The next object was a pottery fragment belonging to a storage pottery and it is easy to see the incised decoration made with their nails. On the internal surface, we can observe a black engobe. This ceramic material could be dated between the XI and XII centuries. Finally the last archaeological remain was situated very close to the tile and it is a pottery sherd. It has paint on the surface and it could be related to the first attempts of the technique called *cuerda seca*, also belonging to the XI and XII centuries.

Fig. 3. Materials found in the battle area. Photographs: Rafael Montalvo Laguna

The reason for this low number of remains is that we did not carry out an intensive surface survey, but we are certain that with an intensive prospection the result would be different.

Fortunately for us, archaeological remains directly related to the battle were found very close to the castle (Fig. 5), specifically four stone projectiles. Three of them were at the point that we called A in the photograph below (Fig. 4), and the fourth was at the point B. The location of these objects was very important for us because it allowed us having a beeter understanding about the medieval siege engines used during this conflict. The area where these materials were found is the thalweg between the fortress of Alcalá la Vieja and the zone where Muslims built the *arrabal.* Regarding the coordinates of these materials, we think that it is not the original location of the projectiles and they have been moved. The study of the shooting range regarding the positions will be extremely important for us to determine the best places to establish the trebuchets.

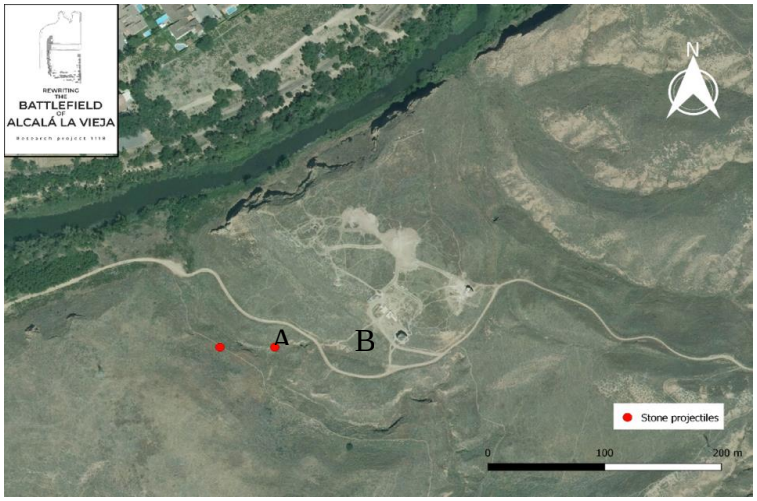

Fig. 4. Location of the stone projectiles. Projectiles MAR-CE2017/42-1, MAR-CE2017/42-2 & MAR-CE2017/42-3 were situated in the point A and MAR-CE2017/42-4 in the B.

To make the projectiles, Christians used the same material for all of them, in this case, limestone. The use of this type of rock seems to be very common during Middle Ages to build projectiles. We have seen stones projectiles from different archaeological sites in different countries, using also limestone. At this time, we are working on a new investigation line to determine the origin of these materials.

The four projectiles have marks of the quarry to create the spherical shape, which was necessary to get a better shot. After measuring them (Table 1), we could see that dimensions were very similar, except the

projectile MAR-CE2017/42-3, which is the smallest. Its measurements are 28 x 29.5 cm. The rest of them have a measuring range between 33-35 cm; however, the weights present different values, as you can see in the table below, which shows all the relevant information about them.

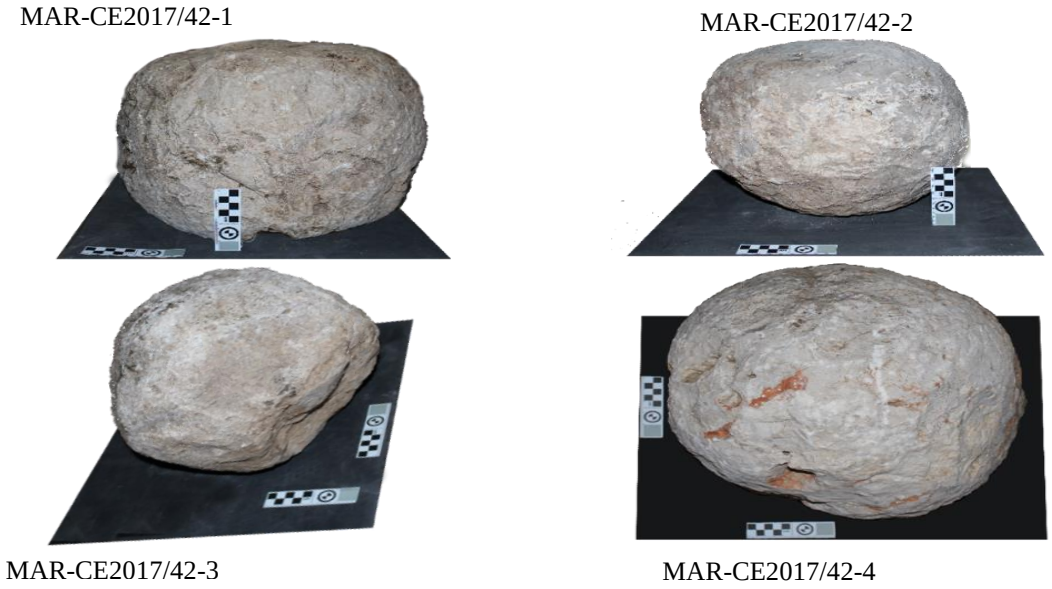

Fig. 5. Limestone projectiles located around the castle of Alcalá la Vieja (Alcalá de Henares, Madrid, Spain)

Table 1. Stone projectiles found in the battlefield.

ID Number	Material	Dimensions	Weight
MAR-CE2017/42-1	Limestone	33.5 x 30.5 cm.	50.8 kg.
MAR-CE2017/42-2	Limestone	34 x 29.5 cm.	47.6 kg.
MAR-CE2017/42-3	Limestone	28 x 29.5 cm.	32.8 kg.
MAR-CE2017/42-4	Limestone	35 x 29.5 cm.	58.6 kg.

Thanks to this information, we decided to calculate the maximum shooting range for this medieval siege engines. With this data, it is possible to establish the best positions for the location of trebuchets. One of the things that we disagree with the written sources, is the setting of trebuchets situated in Malvecino hill. In order to do that, we carried out physical calculations to be more accurate about the shooting range and locations of the trebuchets. We are going to explain this in the next section.

As we mentioned during the introduction, we used new methods to get a more holistic understanding about this archaeological site, like LiDAR. One of the first steps in our investigation was the use of aerial photographs (Fig. 6) to see archaeological remains related to this conflict, especially in Malvecino, where written sources and archaeological works and reports indicated the presence of medieval remains. Some of the remains were linked to the temporary castle built in 1118 by the Christian Army led by the Archbishop of Toledo Don Bernardo de Sedirac. In this specific case, all photographs were taken vertically which would have helped us determine the presence of archaeological features underneath the ground; however, we could not see any sign in that specific location. On the other hand, we located an oblique aerial photograph, very useful to see the differential growth patterns, and we saw a rectangular shape in the zone where we thought was ideal for the location of the Christian castle.

Fig. 6. Positive cropmarks in Malvecino hill (Alcalá de Henares, Madrid, Spain)

The next step was to corroborate that data with LiDAR files. The use of this technology allows archaeologists to carry out a quick aerial survey of the site. It is a noninvasive technique as well, which is very important in archaeology too. In Spain, we are lucky to have a governmental database (*Centro Nacional de Información Geográfica*) that has a total coverage of the Spanish territory. According to this institution's website, *"points clouds were captured with flights using LiDAR sensors with a density of 0.5 points/m^2 or higher."*[4] In order to process and visualize this data, we worked with three different softwares to see if it was possible to locate the same cropmarks. The first of them was Fugro Viewer, we could observe a similar shape in the same area but it was dim for our purposes. For this reason, we decided to compare this result with a different software: Cloud Compare, but after the processing, the hidden feature was not visible and for that reason, we decided to use the last tool called Global Mapper. This program showed us a better image with a high resolution to corroborate the presence of that cropmarks in that specific area. (Fig. 7.)

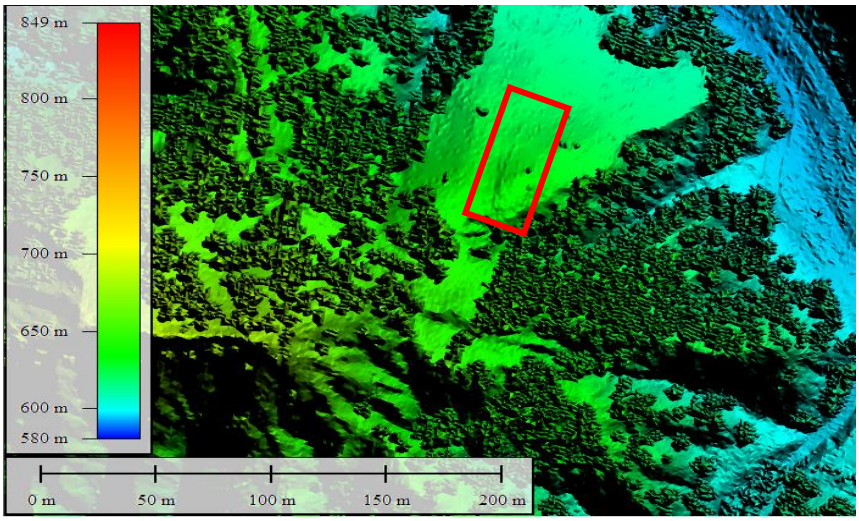

Fig. 7. LiDAR file showing the likely feature in Malvecino.

As we mentioned above, the cropmarks indicate negative features because they were positive, so, if it was an archaeological structure it could have probably been earthworks like ditches or trenches. Nevertheless, this data only confirms the presence of a feature we detected through aerial photographs. Without more information, we cannot determine the origin of it and it would be necessary to carry out a geophysical prospection with different devices and an archaeological excavation to date that structure and discard it as a modern earthwork.

4. PHYSICAL CALCULATIONS

The analysis of historical written sources, combined with the study of the landscape, allowed us to conclude that the trebuchets' location was not possible in Malvecino hill and the best way to propose a solid

[4] http://centrodedescargas.cnig.es/CentroDescargas/locale?request_locale=en

theory was carrying out physical calculations. However, we have encountered problems during the process because the texts did not provide all the necessary information.

According to several experts, the term trebuchet includes three different types of siege engines: traction, hybrid and counterweight trebuchet. All of them used the same working principle but the mechanism was slightly different. Information about trebuchets is explained in another article (Ramírez & Montalvo 2017). Based on those scholars' information and the data provided, the Christian army could have used the second one, the hybrid trebuchet.

In order to calculate the shooting range of this type of medieval siege engine, we recovered all the information from different previous researches. The data that we needed to know the maximum shooting range was the approximate number of soldiers, the projectile's weight, and the counterweight's weight. Through the study of these works we could know, approximately, how many men they needed to pull the ropes to launch the stone and thanks to the discovery of the four limestone projectiles, we knew the weight. Unfortunately, the information about the counterweights in the hybrid trebuchet was limited and we had to do estimations to calculate the shooting range.

5. THE PHYSICS OF THE HYBRID TREBUCHET

The trebuchet converts the potential energy of the counterweight and the work done by a group of men into kinetic energy. When men perform more strength and the counterweight is heavier, the projectile acquires more speed and the range will be greater.

Developing the equations to analyze the physics of the hybrid trebuchet is complex. This complex problem can be treated as a two-dimensional system, making the following assumptions:

- The trebuchet is rigid.
- There is no air resistance as the payload flies through the air.
- The trebuchet remains stationary on the ground during launch.

The difficulty of their study lies in the small amount of data (number of men, average strength of each man, length of beams, average weight of the counterweight ...) that there is on this type of machine and the physical description.

To avoid these difficulties, we will take as valid the physics that describes the trebuchet of counterweight for its simplicity and we will consider that the study machine is less effective. We will include that difference in the calculations. We can make this assumption since we will take as weight of the counterweight the sum of the weight of the counterbalance of the hybrid machine and the force made by men.

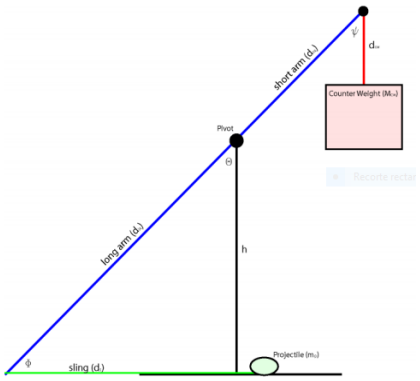

Fig. 8. Schematic of a trebuchet.

6. THEORETICAL APPROACH

To avoid these difficulties, we will take as valid the physics that describes the trebuchet of counterweight for its simplicity and we will consider that the study machine is less effective. We will include that difference in the calculations. We can make this assumption since we will take as weight of the counterweight the sum of the weight of the counterbalance of the hybrid machine and the force made by men.

As we said before the trebuchet is a device that converts potential energy and the men work in to kinetic energy. The amount of potential energy and the work done by a group of men are what define the power of a trebuchet. The potential energy can be obtained as

$$E_p = M_{CW} g h_{CW}$$

Where M the counterweight mass, g is the gravity's acceleration and hcw is the distance between the counterweight and the floor.

The work done by men is given by

$$W_M = F_M h_{CW} \cos\alpha = M_{CW} g h_{CW} \cos\alpha$$

Where F is the strength made by men, a is the acceleration and α is the angle with respect to the height of the counterweight.

The total initial mechanical energy is

$$E_{M_i} = E_p + W_M = M_{CW} g h_{CW} + M_{CW} g h_{CW} \cos\alpha = M_{CW} g h_{CW} (1 + \cos\alpha)$$

Summing up, we can approximate the operation of the machine as the conversion of potential energy into kinetic energy. Due to the conservation of mechanical energy

$$M_{CW} g h_{CW} (1 + \cos\alpha) = \frac{1}{2} m_p v_p^2$$

Where m_p is the projectile mass and $v_p$is the projectile velocity.

The height at which the counterweight is calculated from the length of the longest arm of the beam as follows

$$h_{CW} = d_p \text{sen}(\pi/4)$$

We calculate the maximum distance reached by the projectile from the velocity with which it is launched. We use the parabolic launch formulas.

The projectile reaches the distance that is given by

$$R = v_p \cos\theta \, t$$

Where θ is the launch angle and t is the time. To know the time, it will take the projectile to fall, we will calculate the time it takes to travel half of the trajectory, since at that point we will only have velocity on the horizontal axis.

$$v_y = v_p \sin\theta - g\frac{t}{2} = 0$$

$$t = 2\left(\frac{v_p \sin\theta}{g}\right)$$

7. RESULTS

The first step we take is to calculate the height of the counterweight. We do not know the exact value of the beam of the used trebuchet so we take several values.

Table 2 Height of the counterweight

LENGTH OF THE ARM (M)	HEIGHT OF THE CW (M)
8,5	6,01
9	6,36
9,5	6,72
10	7,07
10,5	7,42

The next step is to calculate the velocity of the projectile. The angle formed by the rope with which the group of men pulls with the vertical is unknown its exact value, we will take a set of values that goes 0º, 30º and 45º. In the calculations we have made we can see that the projectiles reach higher speeds for angles close to zero.

Because we do not have exact values of these two variables (angle and height) the value of the speed will depend on both.

In this study we used the mass of four projectiles (Table 2.) that were discovered in the area.

Table 3 Mass of projectiles

Projectile 1 (m)	50,8
Projectile 2 (m)	47,6
Projectile 3 (m)	32,8
Projectile 4 (m)	58,6

We will calculate the speed taking different lengths for the beam, since exact measurements are unknown. We will use two possibilities for the set of counterweight and the group of men, we will perform the calculations for a maximum and a minimum case. Now of choosing the mass of the counterweight we chose to be guided by historical data known from other similar studies due to the lack of data.

From these lengths, the mass of the projectiles, counterweight and the force made by men, we will calculate the velocity reached by the projectile. From the calculated speeds we will obtain the range that the four projectiles can reach.

For the first projectile for the maximum strength of the counterweight and the group of men (Fig. 9) we obtain minimum speeds of 35.9 m / s and maximums of 41.44 m / s. For these speeds the range of reached distances that we obtain is 22 m for launch angles near zero degrees and 176 m for launch angles near forty-five degrees.

For the minimum strength we obtain velocities between 29,37 m/s and 32,63 m/s. The projectile barely reaches 110 meters (Fig. 10)

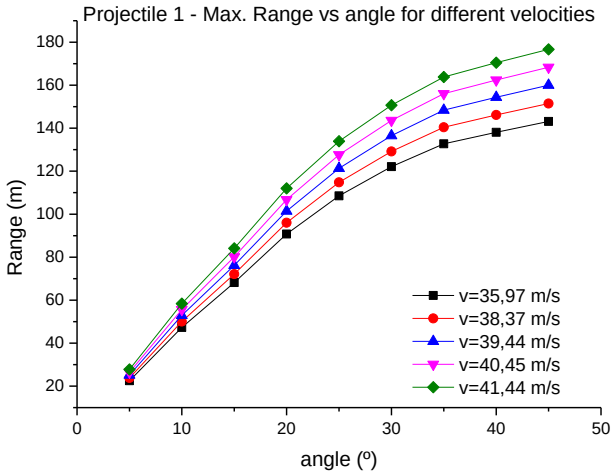

Fig. 9. Representation of the range vs angle for different velocities for the projectile 1, maximum strength of the counterweight and the group of men.

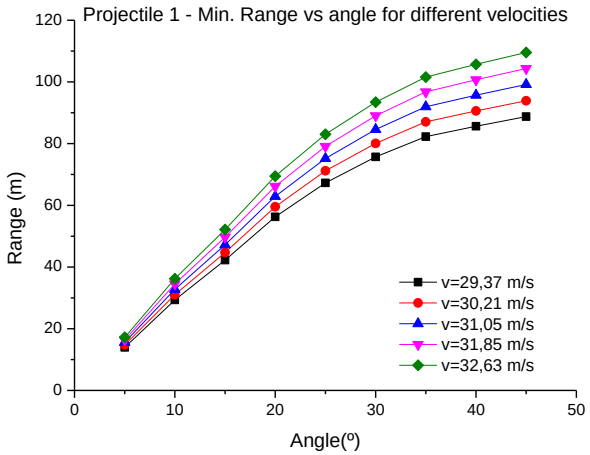

Fig. 10. Representation of the range vs angle for different velocities for the projectile 1, minimum strength of the counterweight and the group of men.

The velocities obtained for the second projectile range from 38.53 m/s to 42.81 m/s for the maximum case of counterweight and group of men. With these speeds the projectile can reach maximum distances between 150 meters and 190 meters (Fig. 11).

For the case of minimum force the range of speeds reached ranges from 31.46 m/s to 34.98 m/so that the maximum distances that the second projectile can reach are from 100 to 125 meters as you can see in the figure 12.

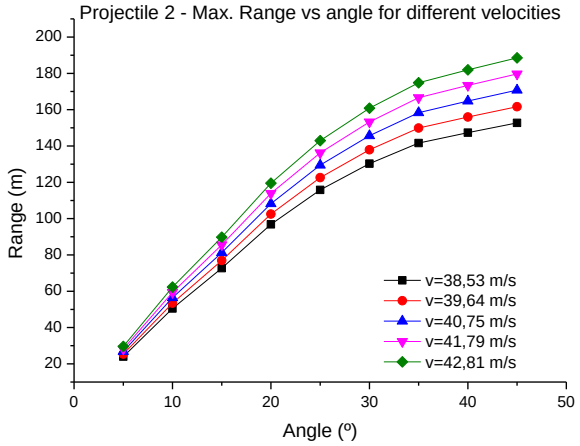

Fig. 11. Representation of the range vs angle for different velocities for the projectile 2, maximum strength of the counterweight and the group of men.

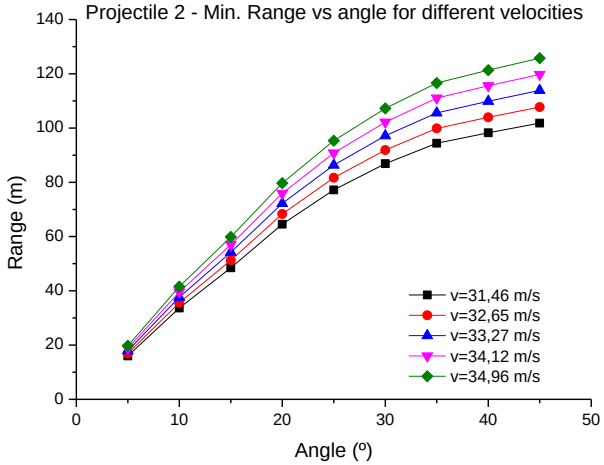

Fig. 12. Representation of the range vs angle for different velocities for the projectile 2, minimum strength of the counterweight and the group of men.

For the third projectile for the case of maximum strength (Fig. 13) the range of forces is 46 m/s at 52 m/s, it can reach maximum distances between 220 and 275 meters. On the other hand for the minimum case (Fig. 14.) the lower velocity reached is 37.90 m/s and the maximum velocity is 42.11 m/s can reach maximum distances between 147 and 185 meters.

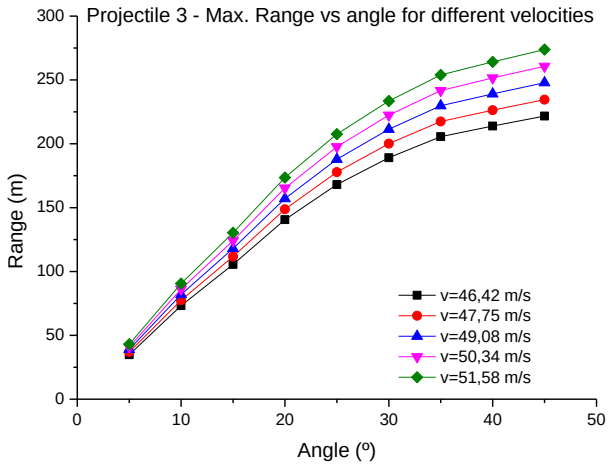

Fig. 13. Representation of the range vs angle for different velocities for the projectile 3, maximum strength of the counterweight and the group of men.

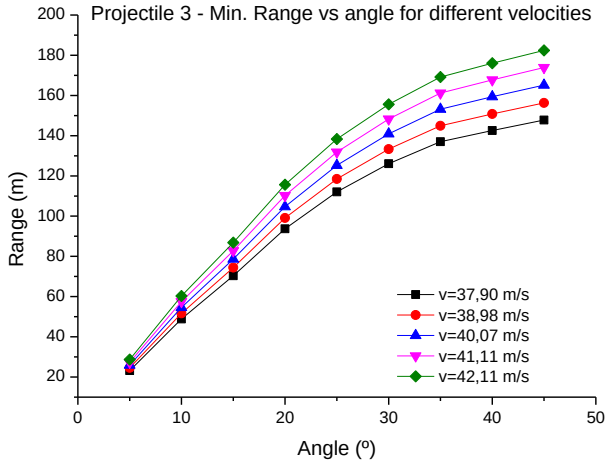

Fig. 14. Representation of the range vs angle for different velocities for the projectile 3, minimum strength of the counterweight and the group of men.

For the last projectile, the heaviest, reaches a maximum distance of between 125 and 145 meters. While for the minimum force the maximum distances reached are between 80 and 100 meters. (Fig. 15-16)

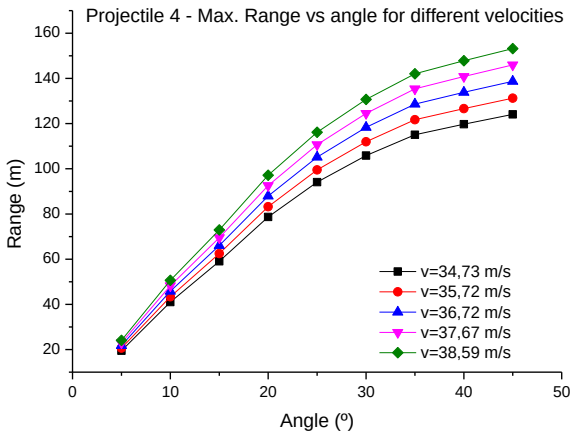

Fig. 15. Representation of the range vs angle for different velocities for the projectile 4, maximum strength of the counterweight and the group of men.

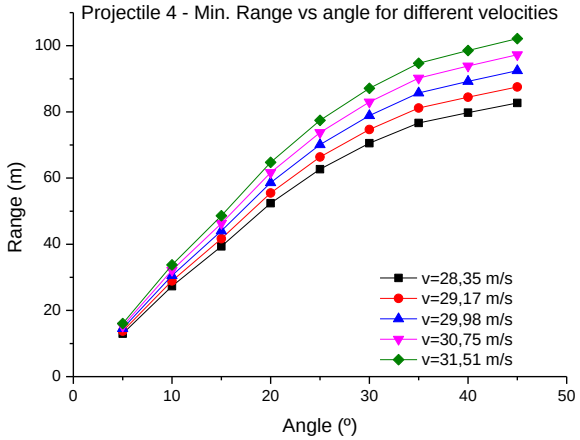

Fig. 16. Representation of the range vs angle for different velocities for the projectile 4, minimum strength of the counterweight and the group of men.

8. CONCLUSIONS

The conclusions that we obtain from the study of the operation of the hybrid trebuchet are the following:

- The angle with which men pulled the strings influences the calculations. We have observed that the more vertical, that is, the closest angle is zero, the projectile reaches a higher speed.
- The angle at which the projectile is launched also influences the calculations, the projectile reaches greater distances in angles close to forty-five degrees.
- The weight of the counterweight and the number of men can completely change the distance a projectile can reach. That is why we have used a maximum and a minimum case.
- We have verified that the smaller projectile mass is, the longer distance will be.
- From the results obtained, we can see how the projectiles with masses lower than 40 kg can reach distances of even 220 m.

Thanks to the data obtained through this study, it has been determined that the trebuchets' location in Malvecino hill was not possible. The shortest distance between Alcalá la Vieja and this elevation was 400

meters, approximately. This information allows us to reinforce our theory about being placed in Los Catalanes since that plateau has the best conditions for that purpose.

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Initial Discussions on Military Archaeology
Zhao Congcang

Proposing the topic of Military Archaeology

The military activities, in principle, the war, comes with the development of the human society. The wars in China can be dated to the mid-late period of primitive societies. Throughout thousands of years of the development of Chinese society and culture, a massive quantity of relics and remains related to military activities can be found.

The archaeology as a social science, studies all the cultural remains of the ancient civilizations. The relics and remains of ancient military activities are obviously one of the study objects. The modern archaeology were introduced to China about 80 years ago, as same as other disciplines, the archaeology research is evolving and deepening. As archaeology finding and research accumulates abundantly, and through international academic exchanges, the knowledge of archaeologists have much expanded, in a result, the theories and methodologies of archaeology have greatly advanced. The emerge of various branches of archaeology is also a proof of the development of archaeology. The branches such as Art Archaeology, Agricultural Archaeology, Environmental Archaeology, Ethnic Archaeology, Underwater Archaeology, Science and Technology Archaeology have been accepted by the archaeologists. Although some of them still need to be developed and improved, the development and achievements of research over the years have shown that branching disciplines with multiple perspectives can be used to conduct special research on various archaeological remains, and they are very useful for the whole development of archaeology studies.

In the past archaeology research, a rich quantity of relics and remains related to military were found, and scholars have studied in this field, some articles and books were published too, to discuss the ancient weapons and military systems. But the whole academic world have not yet considered it as a branch of discipline, as a result, the study is neither systematic nor scaled. Compared to the rich military remains and the need for related studies, the current academic focus is obviously insufficient. Thus, the writer proposes to establish the military archaeology as a new branch of archaeology, it will help us broaden the research field of archaeology, and deepen the research on the military of ancient people.

Basic research objects of Military Archaeology

The Military archaeology is very rich in content. Any relics or remains related to ancient military are the subject of military archaeology. There are three general categories.

Sites and Remains

Ancient border defense sites.

Including the Great Wall, and the Coast Defense sites, etc..The world-famous Great Wall is made up of a combination of the defensive walls and the passes, the watchtowers, the beacon towers, and the castles. From the Spring and Autumn period to the Ming Dynasty,throughout about 2000 years, there were 8 vassal states and more than 10 dynasties have added up to the construction of the Great Wall. It is unique and was considered the most tremendous military defense engineering system in the world. It has unique and important research value for ancient Chinese military strategic thinking, military geography, major war events, military defense allocation system and fortification technology. The increasing number of archaeological discoveries about the remains of the Great Wall have continually enriched people's understanding of the rich connotations of the Great Wall.

China's long frontiers have been evolving in history. The past generations have produced many border defense facilities for the frontier operations. They mainly play the military defense function of solid borders and defend the frontier positions and bases. Categorized by its different geographical environment, China's

frontiers can be divided into land and sea. The border defenses of the land are mainly in the border areas of northeast, northwest and southwest of China; the coastal defense sites are mainly in the southeastern coastal areas. The military archaeological studies frontier sites, through systematically sorting out the archaeological excavation of border defense, summarizing the structural characteristics and systems of the land and sea facilities in different periods, and the relationship between the them. We can further analyze the ancient Chinese military defense system, border defense management, etc. Basic issues, in-depth discussion of the central government's strategy and national policy toward the neighboring regime.

The costal defense sites are mainly constructed in the Ming Dynasty, it is also one of the huge military projects in Chinese history. It is a maritime defense facility built on the coast of China from Liaodong in the north to Hainan Island in the south, with the garrisons and headquarters as the cores, with a combination of fort, wall, pier, raft and barriers. It stretches eight provinces and has left various relics and remains.

Military transportation and communication sites

These mainly include various military roads and beacon towers and post sites. Military roads emerged along with the beginning of military activities. In ancient times, there were many military roads opened for military purposes. The Qin First Emperor, has ordered the construction of “Zhi Dao”road from the center of Shaanxi province to the center of Inner mongolia autonomous region, as in the history record, they “cut through mountains and leveled the valleys for a thousand of miles”; Another example is by the end of Qin dynasty, Liu Bang, the founder of Han dynasty, also created a military passage “Yong Dao” in Henan Province, for his military actions; The built mountain passages called “Zhan Dao,” in Tong Guan Pass, Meng Jin and San Menxia area, are also famous because of their use in the military actions since Han dynasty, especially the Bao river Dashi Mountain passage, has gained a lot of fame in the Three Kingdom period.

In ancient times, the existing roads were often used as military roads. For example, the "Da Dao" road built by the vassal states like Zhao, Wei, Qi, etc. during the Warring States period were used as military roads in the struggle between the states. The Qin First Emperor has ordered the construction of "Chi Dao" road for him to tour around the country, and it was later used in the military operations in the war with the nomadic Xiongnu people. Some military roads were later used as traffic roads too. For example, in the Tang Dynasty , Huangchao Uprising Army built a 700-mile military road between cliffs from Zhejiang province to Fujian province. It was still used as an important road between the two provinces for quite a long time. There are also water transportations for military use, such as the Ling Qu Canal which Qin First Emperor ordered to be built for the military activities in southeastern China. In short, all roads involved in ancient military activities can be regarded as the scope of military road sites..

Military communications also came about with the emergence of war. In the Shang and Zhou dynasty oracle records, there are some border military situation been reported to the capital city. During this period, beacon tower and postal system were established to make alarming and transmitting information more conveniently. Since then, the beacon tower and the postal station have always been an important means of ancient Chinese military communications. The sites and traces of ancient beacon towers and post stations that have been discovered and yet to be discovered are extremely rich.

Military bases and military towns, customs sites

In ancient times, there are various buildings with certain properties of military bases. In the Chu-Han War, Liubang the founder of Han Dynasty have ordered General Xiao He to establish a base in Guanzhong(the area near current Xi’an City), which played a huge role in winning the war. In addition, in Han Dynasty and later periods such as the Three Kingdoms Period, garrisons in the inland and frontier areas, as well as some garrisons with persistent battles, can be regarded as the remains of military bases.

Due to the need for resisting or attacking, in ancient times, in some military places and places where the terrain was steep, the troops would be stationed and guarded, in this case, cities and villages would also be built, that is, the military towns and pass fortresses. Generally, they will last for a reletively long time, so there are often remains of buildings, defensive facilities, and relics such as weapons and household appliances left to be discovered.

City defense sites

Mainly refers to the city with political importance. It is currently known that the earliest city in China was the late Yangshao culture ancient city (around 5,000 years ago) discovered in Zhengzhou, Henan Province. The Longshan period is the first highlight period in the history of China's city construction. The city sites in this period were widely found in the vast areas of the Yellow River and the Yangtze River. After entering the class society, every time the dynasty is established, a city will be built. In addition to the state capital, Provisional capital, and there are kingdom capitals, county and state cities and so on. In the Shang Dynasty, there are already planning for the area where the troops can be stationed and the avenues that lead to the outside of the city, there are also facilities such as barriers, battlements and pontoons required for military operations. In fact, the history of the city's defense facilities can be traced back much earlier. In the Jiangzhai site of the Yangshao culture period, the surrounding of the settlement is constructed with a defensive ditch that is commonly used in the Neolithic Age settlements. There are several outposts on the inside of the trench, which can be regarded as an early example of the defense facilities of the ancient city. Throughout the development of ancient Chinese cities, although its scale, pattern and performance have constantly changed, military defense has always been one of the main functions of ancient cities. The military factors it reflects are very prominent.

Weaponry manufacturing sites

In the Stone Age, weapons such as stone/bone/bamboo/wood spear, axe, arrow, etc., is generally manufactured together with the production tools, and its remains are scattered in the sites of the same cultural period. After entering the class society, in order to adapt to the needs of foreign wars and internal ruling maintenance, weapon manufacturing has always been highly valued by the ruling class as an official handicraft industry. In the Xia Dynasty Erlitou site, there are unearthed typical bronze weapons such as dagger-axes, axes and arrow-heads etc., which should be produced in a bronze workshops with an area of more than 10,000 square meters. The Shang Dynasty has created workshops specializing in the production of weapons from the bronze handicraft sector. Zhengzhou Shang Dynasty City site, Anyang Yinxu site and other sites have excavated such workshops. During the Western Zhou Dynasty to the Spring and Autumn Period and the Warring States Period, the capital Luoyang and various vassal states in their political centers all had handicraft workshops produceing bronze and ironware (mainly during the Warring States period), and the production quantity of weapons was considerable. In the Qin and Han dynasties and later dynasties, the production of weapons was further developed. In the capitals and counties, there were many copper and iron handicraft workshops, some of them also produces weapons. Also we can find ancient shipbuilding workshops too. The scale of production after the emergence of firearms has further expanded. In the Northern Song Dynasty, there was a siege-weapon workshops in the Kaifeng city, the number of artisans reached 5,000, and the gunpowder weapons were produced in batches. In the Southern Song Dynasty, there were firearms manufacturing workshops in some military towns, which had high production capacity. In the Ming Dynasty, the production of firearms was unprecedented, and there were 200 kinds of firearms. It can be seen that the number and scale of ancient weapons manufacturing workshops are very large.

Battlefield sites

There have been countless wars in ancient Chinese history. Many of the famous war events have been recorded in ancient books and passed down from generation to generation. Some battlefield relics have been

preserved to this day, and a large number of ancient documents are well known to the people, and their remains are subject to more archaeological discoveries.

War burial sites

This refers to all kinds of burials of military personnel for war reasons. It basically can be divided into three types of properties: The first type is the burial of the group's own soldiers who died on the battlefield. They are usually buried or collectively buried in the form of tombs; the second is the one-time burial of the enemy's bodies on the battlefield, the scale is generally large, and the bones are messy; The third is burial of captives as a ritual sacrifice for the war, or as funeral for those deceased who have great contributions in the war. Such cases have emerged in the Neolithic Age, and existed throughout the ancient history, which have certain value for understanding the ancient war situation and related research.

Weapons

Weapons are the most basic material conditions for the implementation of military actions. Archaeological findings prove that the earliest weapons were differentiated from the production tools with sharp edges in the mid-late stages of primitive society. With the development of productivity and the needs of war, weapons continue to evolve. The development of weapons in ancient China can be divided into two stages: the cold weapon era (from the 22nd century BC to the 10th century AD) and the combination era of firearms and cold weapons. The cold weapon era takes up more than three-quarters of all- time . Ancient cold weapons are divided by materials, such as stone, bone, enamel, bronze, steel, bamboo, wood, leather, etc., and can be divided into two categories: offensive weapons (such as axe, spear, sword, etc. for fighting, long-range weapons such as bows and arrows, Self-defense weapons like knife, dagger); and protective equipment (armor, helmet, shield, horse equipment). In addition, there are attack and defense equipment like siege ladder-towers, mobile watchtowers, spike traps chariots and warships (used till the era of firearms) etc. Ancient firearms mainly include firearms, artillery, rockets, and grenades. The large number and variety of weapons in ancient China makes it an important object of military archaeology research.

War life relics

This refers to the living utensils used in ancient marching and battles. For example, the cocoon-shaped pot that was used by the Qin army as a marching kettle; The bronze cauldrons, pots, heaters and their descendants since Warring States period and Qin, Han Dynasty, such utensils used in marching and battles are also indispensable for understanding the ancient war situation.

Statues and figurines of soldiers

A large number of statues and figurines of soldiers appeared in the Qin Dynasty, prevailing in the Qin and Han Dynasties, the majority of them are potteries, often appearing in the form of formations. The example is the Terracotta Warriors of the Qin First Emporer Mausoleum and the Han Dynasty Terracotta Warriors of Yangjiawan tomb in Xianyang. The Qin First Emporer Terracotta Warrior is equipped with wooden chariots and other weapons. The study of military formation, combat methods, and armored equipment has gained an important material evidence. After the Han Dynasty, the warrior formation relics were still visible, but the scale were reduced. The use of one or several warriors in the tombs was gradually common, and it was also a physical evidence for studying the military situation at that time.

Other relics related to the military

For example, the Hu Fu (tiger-shapped pair token) which grants the general the power of commanding;l the seal reprsenting each ranks of the ancient army; the bronze instruments: Zheng and Chun

Yu, to order the army forward and back; Bronzewares, portrait bricks, portrait stones, bronze mirrors, stone carvings, and enamel paintings that engraved patterns of war, such as the“Battle in water and land”copper pot.

Archaeological unearthed military literature and written materials

The unearthed texts on ancient military are quite rich. For example, the Shang and Zhou oracle bones, Bronzeware inscriptions in the Eastern Zhou dynasty; the silk manuscripts and bamboo slip books of Qin and Han Dynasties, as well as various stone carvings and brick carvings (including a large number of epitaphs), pottery inscriptions, etc., have recorded and reflected the ancient wars and military situations, many of which were not seen in ancient literature. Through these materials, we can directly understand the situation of the war and military activities at that time, it can complete the untold stories of the ancient books. At the same time, the unearthed military works can also play the role of "confirming the history." In ancient China, the military records can be traced back to very early period, for example, in the early historical documents such as *Shangshu* and *The Book of Songs*, there were descriptions of military theoretical fragments and war situations. The Bing Jia (war philosophers) was emerged in the Spring and Autumn Period and the Warring States Period, and a rich number of military books was written in the history, left us a vast collection of ancient military literature.

It is undoubtedly the precious material of ancient military research. However, in the long-term circulation process, there are some inevitable shortcomings and mistakes. Therefore, the proof and supplement of archaeological excavation data is very important. For example, there are two famous military litterature with very similar name: *Sun Tzu's Art of War* and *Sun Bin's Art of War*, their content, authors and the age of writing are always a confusing problem to distinguish even for the ancient people. In 1972, the bamboo slips found in Yinqueshan Han Dynastu Tombs in Linyi, Shandong Province have proved that there were actually two different military books of *Sun Tzu's Art of War* and *Sun Bin's Art of War* in the history, which made this historical mystery much clearer.

The characteristics of military archaeology and its meanings

The military archaeology is proposed from the perspective of archaeology and belongs to a branch of archaeology, so the methodology and research methods of archaeology cannot be replaced. In this sense, military archaeology has a special role in revealing and restoring the history of the occurrence and development of ancient Chinese military activities, and it can help us to understand and interpret ancient Chinese military thoughts.

Military archaeology has its own independence, but it is not isolated and closed. There are three reasons here. First, as a branch of archaeology, it is inseparable from many other aspects of archaeology. The study of military archaeology needs to integrate with other related archaeological branches to promote the understanding of ancient material remains.

Second, the contents of the military archaeology listed above should not be tied together. Some categories are relatively independent because of their broad connotations. For example, the Terracotta Warriors, their connotation is not limited in military. Therefore, some scholars suggest that setting up a "Terracotta Warriors Study" is more conducive to comprehensively deepening its research, and this does not harms its significance in archaeology study. Another example is the huge variety of ancient weapons, which can also be classified as a relatively independent subject. Military relics such as weapons can also be used as objects of scientific archaeology research. Ancient military documents can also be included in the study of philology etc.

Third, military archaeology is linked to other disciplines other than archaeology and military science. In military science part, the content of ancient military science is an indispensable component of the discipline, especially the emergence and development of weapons and armies, changes in military equipment and

strategy, military transportation and engineering achievements, and the collation and research of ancient military documents, etc., is also an important part of military archaeology. Military archaeology is based on the continuous discovery of the facts of the ancient military activities, on the one hand, to provide research results for related disciplines, and at the same time to finally reveal the process of the occurrence and development of ancient military activities and interpret its patterns. It complements the "military history" of the branch of military science and so on. Military archaeology also has a close relationship with history, ancient literature and other disciplines.Therefore, military archaeology has interdisciplinary attributes.

Military archaeology has a practical significance that cannot be ignored. First of all, the brilliant military achievements can stimulate the self-confidence of the Chinese people. Many aspects of the ancient Chinese military was in the world's leading position, and they have written a glorious chapter in the history of world military. When people face a group of exquisite military relics and a batch of military scientific and technological achievements, they can show us the wisdom and wisdom of the ancient Chinese people, and the tenacious spirit and invincible power of the Chinese nation, thus revitalizing China and its determination to strengthen its comprehensive national strength, including its national defense strength. Second, one of the purposes of archaeology is to inherit and learn from history and serve today's socialist construction. The world today has entered the high-tech era, the military level and means have greatly exceeded the ancient models and capabilities, but the unique military ideas and creativities expressed by the ancient intellectuals , the strategic and tactical principles, military and technical experience, as well as the general patterns embodied in the ancient war and military development process, will certainly have beneficial enlightenment and influence on today's people.

Modern China has shown unprecedented prosperity in many aspects such as economy, culture, science and technology. All fields of natural science and social science are realizing their own development and transcendence. The heavy responsibility of the times has made us obligated and confident to take the steps of scientific research to a broader and deeper level.

Military archaeology is a huge project, and its extensive content is not covered by an article. What we have proposed here is only a simple framework, and ultimately it is necessary to build a systematic project, which requires scholars to make hard and solid joint efforts. We will do our part for the early completion of this project.

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The Battle of Cheriton: The Archaeology of an English Civil War Battlefield

Kevin M. Claxton[1]

1. Battlefield's Trust's Yorkshire Region

INTRODUCION

On 29 March 1644, the Battle of Cheriton became a turning point in the English Civil War, marking a significant victory for the Parliamentarians and forcing the Royalists on the defensive for the rest of the war (Burne 1950, 395; Adair 1969, 150; Adair 1973, xiii; Spring 1997, 1; Bonsall 2007, 32; Wanklyn 2014, 83). The battle took place next to the village of Cheriton, approximately 10 km east of the city of Winchester (Figure 1). The battlefield itself lies relatively unchanged since the 17th century yet has not been studied in great detail from either a historical or archaeological perspective. However, between 1974 and the late 1990s, James McGovern and his son Michael metal-detected the fields around Cheriton, collecting various metal objects from different periods, including a large number of lead shot from the battlefield area. When James and Michael both passed away, their collection was donated to the Winchester Museum Services. Whilst a brief study has been carried out on some of the finds from the battlefield site, this accounts for less than 3% of the area of the battlefield (Bonsall 2007, 29). Since then the collection has remained in storage, along with the detectorists' notes, but until now has yet to be studied in detail (Foard 2012, 191; personal communication, April 9, 2016; Rees, personal communication, April 15, 2016).

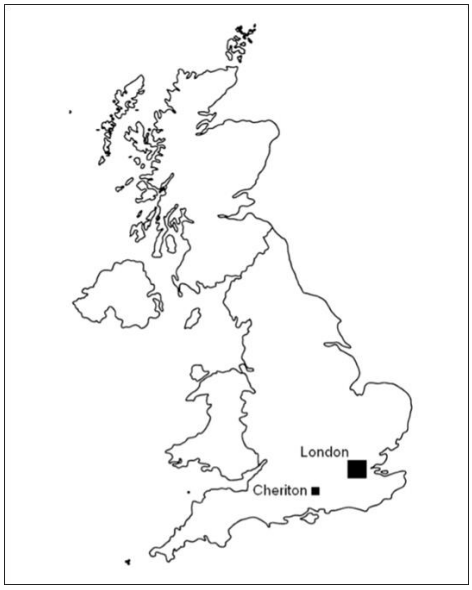

Figure 9. Location of the Cheriton battlefield (after Bonsall 2007, 30)

The Battle of Cheriton

Throughout most of the autumn of 1643 and the early months of 1644, Royalist and Parliamentarian forces struggled for control over southern England (Halsall 2002, 45). By the middle of March 1644, Lord Hopton, supported by the Earl of Forth, commanded a Royalist army of between 6,000 and 8,000 men (Burne 1950, 395; Rogers 1968, 120; Seymour 1975, 70; Wanklyn 2014, 83). Standing between the Royalists and the route to London was a Parliamentarian army of between 8,000 and 10,000 men (Burne 1950, 395; Kinross 1979, 111; Wanklyn 2014, 84), led by Hopton's former friend and comrade-in-arms, Sir William Waller (Adair 1973, 1-2). Accounts of the battle vary, but most follow the description of the action given by Adair (1969, 140-148; 1973, 125-136) (Figures 2 and 3). At the start of the day Hopton had taken up position on the North Ridge (or the Central Ridge in Adair's interpretation), and early in the battle his forces had successfully defended the strategic Cheriton Wood from the Parliamentarian attacks. Then followed a breakdown in communication and discipline in the Royalist army: a young cavalry officer broke ranks and led a cavalry charge against the Parliamentarian line. What spurred this sudden charge is not known, but it prompted several more Royalist cavalry charges to follow, all of which were defeated by the Parliamentarians. With the Royalist cavalry all but decimated, the Parliamentarians mounted a counter attack, breaking the Royalist line and forcing the King's army to retreat north to Alresford.

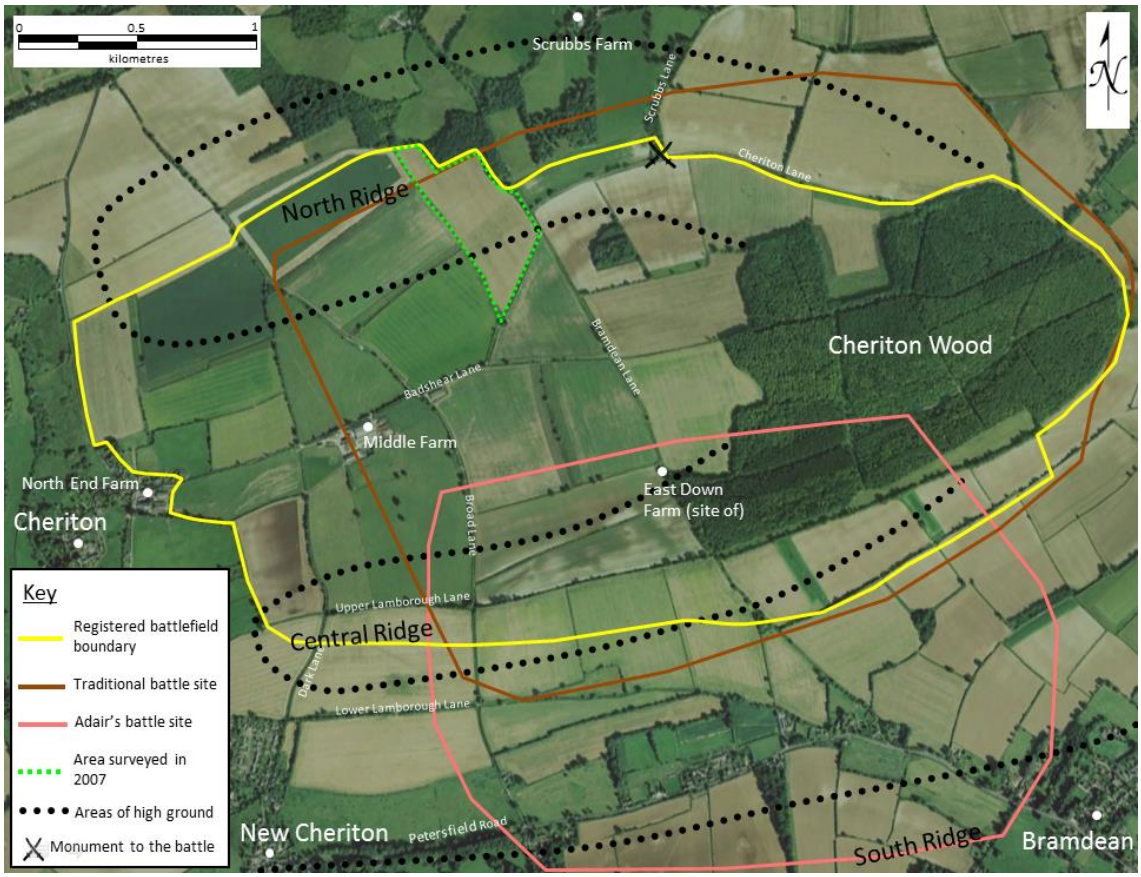

Figure 10. Aerial view of the battlefield today showing the current registered area (after Battlefields Trust 2016), the traditional area of the battle (after Burne 1050, 398; Battlefields Trust 2016), the alternative area proposed by Adair (after Adair 1973, plate 18), and the area surveyed in 2007 (after Bonsall 2007). The map also shows the areas of high ground and the battle monument (created by author).

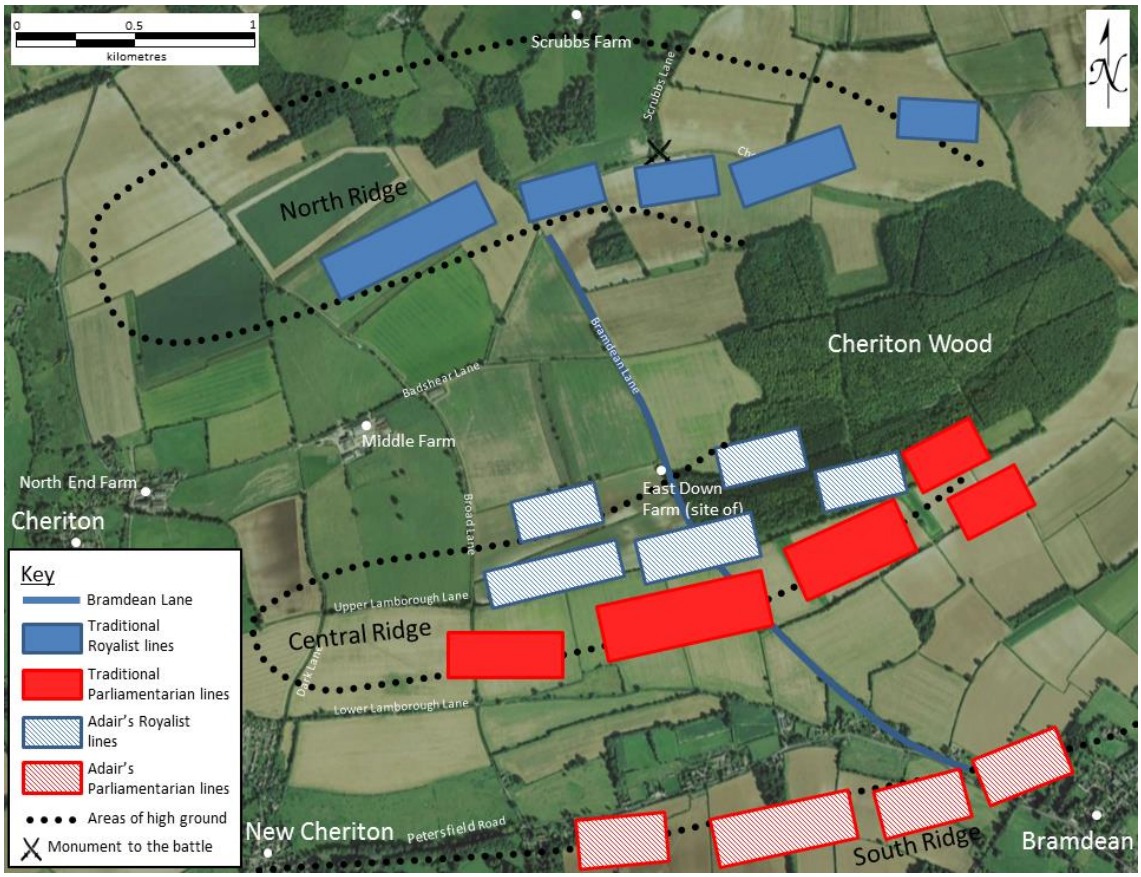

Figure 11. Map of the battlefield showing the traditional deployments of the Royalist and Parliamentarian armies (after Burne 1950, 398; Battlefields Trust 2016), and the alternative deployments suggested by Adair (after Adair 1973, plate 18). The map also highlights Bramdean Lane, commonly thought to be the route of the ill-fated Royalist cavalry charge (after Burne 1950, 398; Adair 1969, 140-148; 1973, 125-136; Battlefields Trust 2016) (created by author)

The battle was the first significant Parliamentarian victory during the war, forcing Charles I on the defensive for the rest of the Southern campaign (Burne 1950, 395; Adair 1969, 150; 1973, xiii; Spring 1997, 1; Rayner 2004, 93; Bonsall 2007, 32; Wanklyn 2014, 83). The King's secretary said of the battle, 'Cheriton was a very doleful beginning to into the year 1644 and broke all the measures, and altered the whole scheme of the King's Counsels' (quoted in Emberton 1995, 103). Emberton also describes the significance of the battle, stating that if the Royalists had been victorious and had appeared before the capital 'there was every reason that the peace party within the government would force the others to sue for terms' (1995, 102). The ideological result of the battle cannot be underestimated either; a victory for the Parliamentarians proved that God was no longer on the side of the King, lending greater support to the Parliamentarian cause. However, despite being one of the key conflicts of the Civil War, the Battle of Cheriton has not received the literary coverage one might expect. Much of the literature pertaining to the battles of the Civil War gives Cheriton only brief attention; in A. H. Burne's seminal guide The Battlefields of England acknowledges that 'this battle is unduly neglected and underrated' (1950, 395). Similar patterns can be found in other material relating to battlefields around Britain or the Civil War, all providing only brief descriptions of the battle and failing to recognise the significance of the Parliamentarian victory (Rogers 1968, 119-123; Seymour 1975, 68-82; Kinross 1979, 111-112; Smurthwaite 1984, 152-153; Bennett 1990, 100-101; 1997, 208; Ackroyd 2014, 269; Wanklyn 2014, 83-106).

Only three complete works dedicated to the study of the Battle of Cheriton have been written: two historical accounts by Adair (1973) and Spring (1997); and the archaeological report by Bonsall (2007) on the assemblage found in one small area of the battlefield (highlighted in Figure 2). Adair also provides a theory for the location of the battle site, proposing what was, at the time, a new site for the battle (1969, 141; 1973, 195-197) which conflicted with Burne, who claimed there to be 'no dispute as to the site of this battle' (Burne 1950, 397). Spring tentatively adopts Adair's new suggested location for the site, although he does highlight that there could be some sources Adair has overlooked that may call into question the interpretation of the site (1997, 1). The analysis carried out on a selection of finds from the Dark Copse Field at Cheriton by James Bonsall in 2007 is the first and, until now, the only archaeological research carried out on the battle. The results of the report call into question some of the historical analysis of the site: the analysis proved that some of the action took place further north than the previously accepted location of the battlefield provided by Adair. Bonsall's report is a prime example of how battlefield archaeology can influence the understanding of battles. However, the report only covers a very small percentage of the assemblage from the site, meaning that a full analysis of the assemblage could provide a much-needed interpretation of the details and precise location of the battle. Although the assemblage was collected by an amateur metal-detector over a long period and is unlikely to be systematic, the survey appears to have covered the entire area of the battlefield, unlike at Edgehill, and differs from Naseby and Marston Moor in that the complete assemblage is available for analysis.

Analysis of the Cheriton Collection

To gain detailed information about the Battle of Cheriton, an analysis of the small finds assemblage was carried out. This analysis followed similar studies carried out on battlefields in Britain and America, using a methodology appropriate to the assemblage. The aims and objectives of this study also contributed to the methodology used. In addition to the small find analysis a study was made of the collection of notes and maps made by the metal-detectorists who recovered the finds.

Methodology and Analysis of the Lead Artefacts

No.	Type of Find
2555	Round Ball
270	Impacted Shot
14	Rounded Slug
26	Squared Slug
3	Artillery Shot
47	Powder/Primer Cap
14	Quartered Shot
1	Conjoined Shot
10	Other
2940	TOTAL

Table 1: Breakdown of all lead artefacts from Cheriton assemblage

The methodology used in the analysis was taken from a variety of similar sources of lead shot study from Britain and America (Bonsall 2007; Foard 2009a; 2009b; 2012; Harding 2012; Sivilich 1996; 2005; 2016). The planned methodology was to incorporate the recording primarily of the type, weight and diameter of each lead shot for the purpose of the research aims but also for any additional information that could be recorded about each artefact, should the need arise for additional information in future studies. To mitigate the health and safety risks of working with lead objects, the analysis was carried out in a ventilated room and gloves, face mask, and a lab coat were worn at all times when working with the collection.

The first stage in the analysis was to identify and separate the Civil War finds from the rest of the McGovern collection and to organise them in such an order that could enable easy identification and storage, both during the analysis and in the future. Due to the size of the collection and the timescale in which to analysis it, the decision was taken to focus solely on the lead artefacts and disregard the non-lead finds which could relate to the Civil War that were found in the area, including iron and bone artefacts. Each individual shot was identified by type, weighed using digital scales accurate to 0.01g and studied for any distinguishing marks. Where a mould seam was visible on the shot, the diameter was measured at 90 degrees to the mould line using digital callipers accurate to 0.01mm. Each shot was examined for signs of a sprue cut or flashing, firing evidence, or impact damage. Additional characteristics were also recorded, such as the presence of ramrod marks or evidence of chewing by livestock. The lead shot was then bagged and labelled with an identifying number relating to the field it was recovered from and filed in a cardboard box, and each box shelved in alphabetical order by field name. All information on each lead artefact was recorded

No.	Weapon Type	Unit Type
418	Pistol	Cavalry (816 balls)
398	Carbine (& some pistols)	
1502	Bastard/middle bore musket	Infantry (1739 balls)
237	Full bore musket	

Table 2: Breakdown of the likely weapon types based on the size of the lead shot and therefore whether they are from cavalry or infantry

directly onto an Excel spread sheet. The ArcMap 10.4.1 GIS program was used alongside EDINA Digimaps and Google Earth for creating the various maps.

A total of 2,940 lead finds with a combined weight of nearly 74kg were analysed over the two-week period. Of the 2,940 lead finds, 2893 were some form projectile used in gunpowder weapons. The remaining 47 lead objects were powder box caps and priming flask caps. A breakdown of the number of lead finds is shown in Table 1. Using the examples provided by Foard (2009b; 2012), Harding (2012), and Sivilich (2005; 2016), a graph was produced to show the different calibre balls analysed in the survey (Figure 4) and the probable weapon types that those shot were produced for. As the graph clearly shows, there are four peaks for the four different weapon types. This reflects similar patterns found in the analysis of other Civil War collections, such as Edgehill (Foard 2012, 54-57; 69). These numbers are also able to determine the split between infantry and cavalry at the battle, as the muskets would have been used by infantry and the cavalry would use carbines and pistols. Table 2 shows the number of balls per weapon type and therefore whether the ball is likely to represent cavalry or infantry. Although it is impossible to determine whether the ball belonged to the Royalists or the Parliamentarians, these figures suggest that approximately one-third of the armies at the Battle of Cheriton were made up of cavalry. This again, is in keeping with the patterns found in similar assemblages (Foard 2012, 69) and with the military tactics of the period (Weller 1966, 50-56; Peachey 1992, 27; Turton and Peachey 1996, 3-10). Table 3 shows a summary of the total number and weight of all the lead finds in each of the 39 fields, plus the split between likely cavalry and infantry shot using the graph produced in Figure 4.

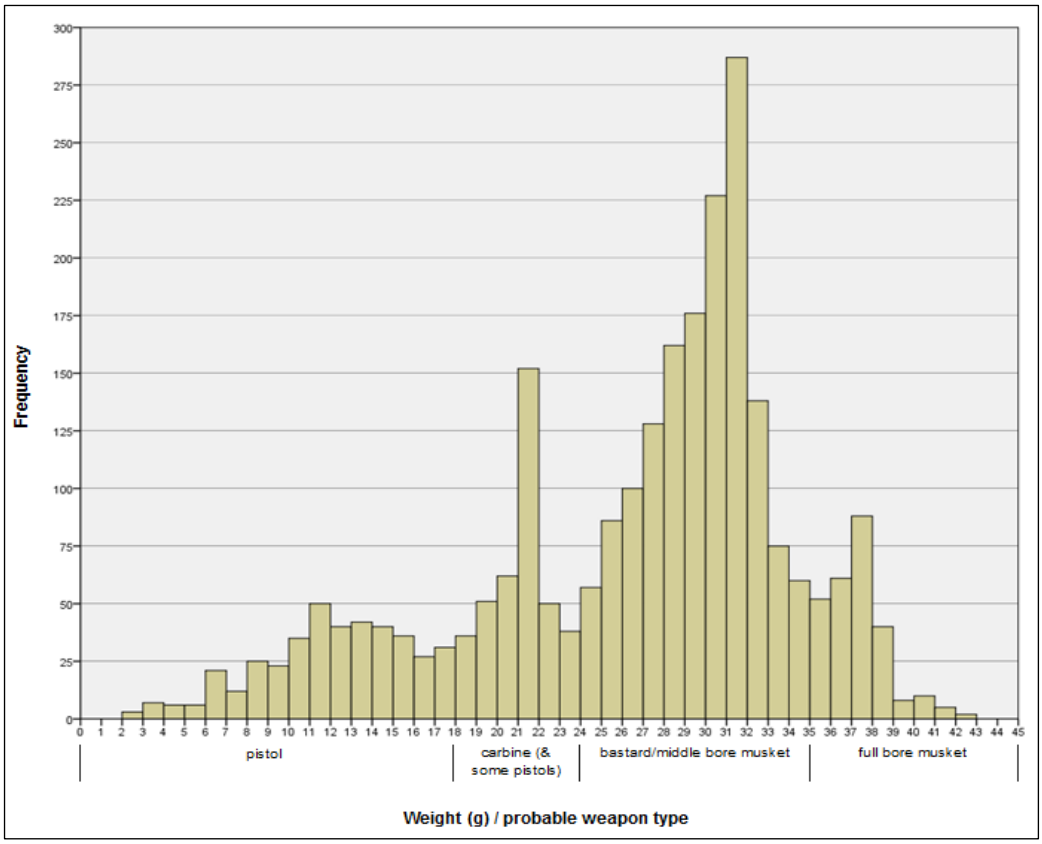

Figure 12. Graph of calibre of balls and probable weapon type, showing weight at 1 gram intervals (created by author)

Field Name	No. of Finds	Weight (g)	Round Balls			Other Shot	Impacted Shot	Powder/ Primer Cap	Other
			Cavalry	Infantry	Artillery				
Barns Field	3	61.92	1	1	0	0	1	0	0
Big Hazzard Field	23	600.00	5	16	0	0	2	0	0
Bishop Sutton Common	14	425.53	0	13	1	0	0	0	0
Bramdean Lane Field I	7	168.77	3	1	0	0	3	0	0
Broad Lane Field	32	600.21	18	9	0	0	4	1	0
Castle Field	34	853.88	12	19	0	0	3	0	0
Celtic Field	81	1499.06	42	29	0	0	5	3	2
Cheriton Wood Field	8	127.46	5	2	1	0	0	0	0
Cowdown Copse Field	14	387.01	5	9	0	0	0	0	0
Dark Copse Field	370	9663.00	69	240	1	2	54	4	0
Dark Copse Wood	11	153.41	11	0	0	0	0	0	0
Dowlings Field I	5	139.51	0	5	0	0	0	0	0
Dowlings Field II	2	33.68	2	0	0	0	0	0	0
Dowlings Field III	5	90.06	2	1	0	0	2	0	0
East Down Farm Fields	21	292.20	9	12	0	0	0	0	0
East Downwell Field	4	120.76	1	1	0	0	2	0	0
Flat Bottoms	439	10550.44	175	220	0	4	40	0	0
France/Britain Field	13	337.22	5	6	0	0	1	1	0
Hookhams Copse	4	134.50	0	4	0	0	0	0	0
Hookhams Copse Field	4	101.06	1	3	0	0	0	0	0
Lamborough Field	6	67.94	3	1	0	0	0	2	0
Long Barrow Field	766	20598.37	162	499	0	36	37	32	0
Lyes Field	36	867.13	12	17	0	3	2	0	2
Malthouse Field	2	54.01	1	1	0	0	0	0	0
Middle Farm I	28	788.72	5	22	0	0	1	0	0
Middle Farm II	78	2533.82	3	73	0	0	2	0	0
Middle Hazzard Field	436	10973.88	122	246	0	4	62	2	0
North End Farm I	38	692.24	19	10	0	2	0	1	6
North End Farm II	27	626.32	14	10	0	0	3	0	0
North End Farm III	37	871.04	15	16	0	1	5	0	0
North End Farm IV	45	1204.72	12	23	0	0	10	0	0
North End Farm V	3	75.21	1	2	0	0	0	0	0
North End Farm VI	9	269.54	1	6	0	2	0	0	0
North End Farm VII	6	128.31	3	3	0	0	0	0	0
North End Farm VIII	3	78.33	0	2	0	0	1	0	0
Pond Field	12	291.08	4	6	0	0	2	0	0
Scrubbs Copse	274	7434.44	53	191	0	1	28	1	0
Scrubbs Copse Field	39	983.26	20	19	0	0	0	0	0
South West Field	1	32.43	0	1	0	0	0	0	0
TOTAL	2940	73832.86	816	1739	3	55	270	47	10

Table 3: Summary of number and weight of all lead artefacts from each field

Methodology and Analysis of the Location Data

As previously mentioned, there has been some debate over the precise location of the battlefield. Although it was traditionally thought to have taken place in Cheriton Wood and between the North Ridge and Central Ridge, Adair places the battlefield further south, between the Central Ridge and South Ridge (1969, 141; 1973, 195-197). The report by Bonsall (2007) revealed that some of the battle must have taken place further north than Adair suggests, but as it only assesses the finds from a single field it cannot be used to accurately pinpoint a location for the battle. Until now, all theories about the site of the Battle of Cheriton have come from deductive reasoning based on the landscape and the written historical evidence.

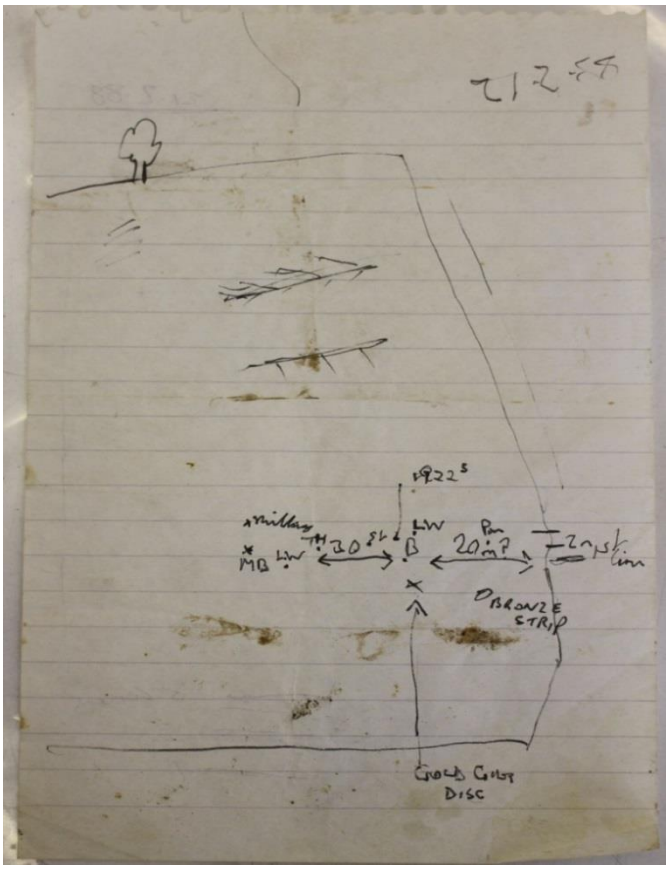

Figure 13: Example of a map from the McGovern notes collection, showing the individual finds spots but no labels to identify location or orientation (photograph by author)

As part of the analysis, the written notes and annotated maps made by James and Michael McGovern during their metal-detecting were also studied, with the hope that they might be able to provide details of the location of each find so that a spatial distribution map could be produced, similar to that created for the Battle of Edgehill. However, the collection of notes did not provide enough information to be able to accurately plot individual spatial distribution for the entire site. Only a handful of the maps and documentation showed individual finds locations, but as seen in the example in Figure 5 some of these were unusable as they provided no identifiable marks. Although the entire area appears to have been extensively covered over the 20 years of metal detecting, there does not appear to be a systematic method to the detecting, leaving the possibility that there may be areas that have not been surveyed or have been only partially surveyed. Amongst the notes were a series of letters and documents relating to other metallic finds recovered from the area, such as a hoard of gold staters. Whilst not directly relevant to the Civil War material, these documents were beneficial in helping to identify the relevant field names, along with historical and modern maps and aerial photographs which were also used to identify the field names. One of the letters penned by James McGovern also provided a valuable piece of information: James and Michael McGovern had an agreement with all the local landowners to exclude any other metal-detectors from their land.

Although it has not been possible to produce detailed spatial distribution maps showing the scatter of individual finds, such as those produced for Edgehill, the notes did offer details of the field names and the coverage of the area, and since all the finds were presented in boxes and bags labelled with the field they came from it is still possible to extract some location and spatial distribution data from the assemblage. Using the field names, the extent of the battlefield area can now be determined (Figure 6). Although this map may not show the full extent of the battle ground, since it is possible there are finds missing from the collection, the presence of Civil War artefacts in this area suggests that the battle extended at least as far as these field boundaries. As the new map shows, this area extends beyond the current registered battlefield boundary and some way beyond the limits of the traditional battle site. More significantly, the new battlefield area is considerably bigger than the area suggested by Adair and there are no Civil War artefacts in the collection found in the southern half of Adair's battlefield.

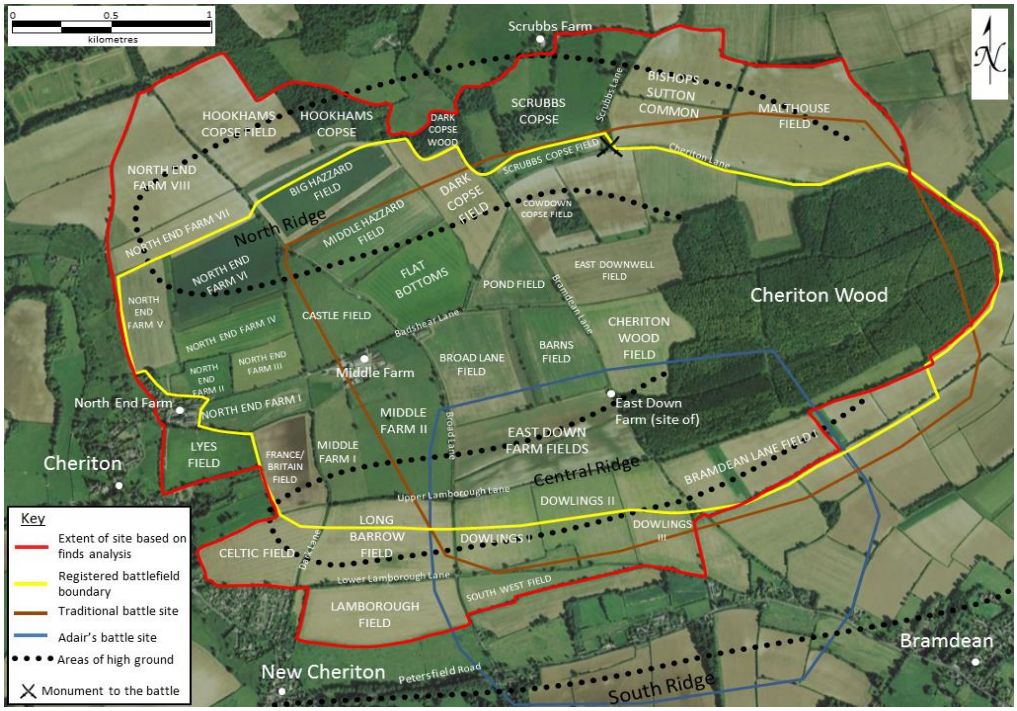

Figure 14. Map of the Cheriton battlefield showing the new extent of the site based on the finds analysis, including all the named fields containing Civil War artefacts (created by author)

Using both the historical evidence available and the results of the location analysis, it is finally possible to gain better insight into how the battle unfolded. Although not as accurate as the individual lead shot spatial distribution maps such as those produced from the Battle of Edgehill analysis, it is still possible to show distribution of finds across the battlefield. Figure 7 shows the distribution of all lead shot by field, with the darker colours showing a higher concentration of finds. This distribution map clearly shows the areas of concentrated fighting: Long Barrow Field on the Central Ridge; Middle Farm II in the valley between the two ridges; and Flat Bottoms, Middle Hazzard Field, Dark Copse Field, and Scrubbs Copse on the North Ridge. As this map and Table 3 show, Long Barrow Field has the highest concentration of lead finds at 766, significantly more compared to the next largest amount: Flat Bottoms with 439. This would suggest that Long Barrow Field was the site of some of the fiercest fighting during the battle, with a large part of the battle also taking part across the North Ridge. Additional maps show the distribution of musket balls (Figure 8) and pistol/carbine shot (Figure 9) and presents a similar pattern in terms of concentration of finds as the map in Figure 7, again suggesting that the areas around Long Barrow Field and the North Ridge were in the thick of the action.

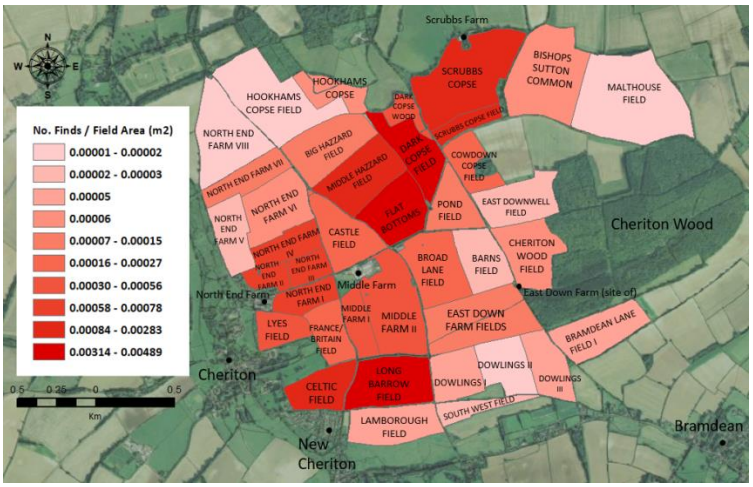

Figure 15. Map of the battlefield showing the distribution of all lead finds by number per field (created by author)

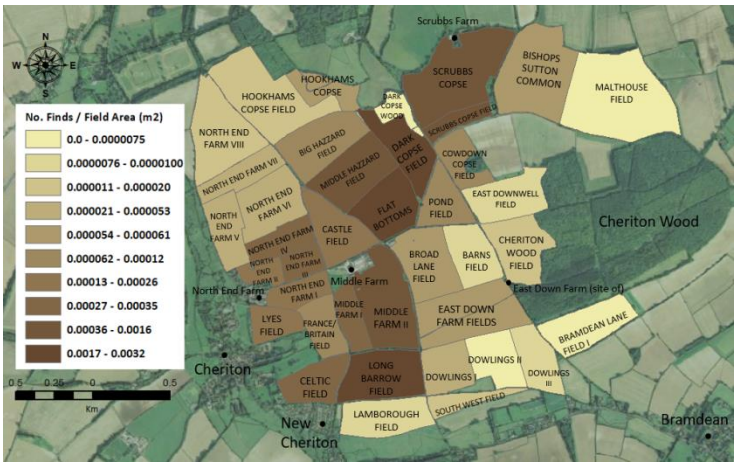

Figure 16. Map of the battlefield showing the distribution of musket balls per field and therefore the likely spread of infantry fire (created by author)

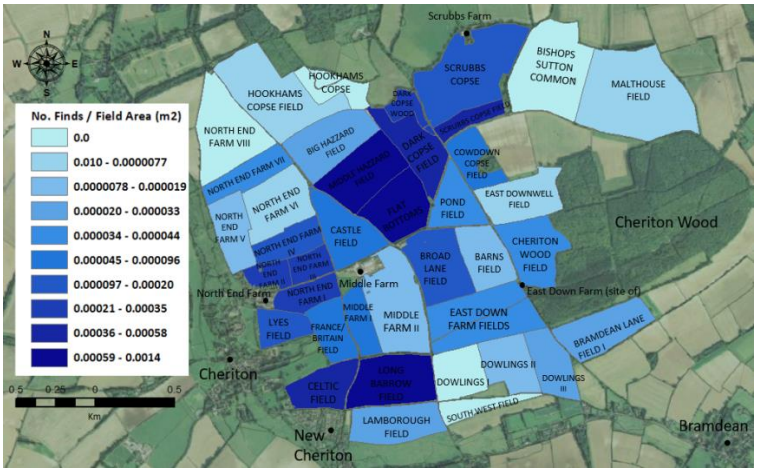

Figure 17. Map of the battlefield showing the distribution of pistol and carbine shot per field and therefore the likely spread of cavalry fire (created by author)

DISCUSSION

This analysis has provided a great deal of new information for the interpretation of the Battle of Cheriton. Of particular importance are the new maps showing the location and size of the battlefield. These maps may not show the full extent of the battleground, as it is possible there are finds missing from the collection, yet the presence of Civil War artefacts in this area suggests that the battle extended at least as far as these field boundaries: extending beyond the current registered battlefield boundary and some way beyond the limits of the traditional battle site. More notably, the new battlefield area is considerably bigger than the area suggested by Adair and there are no Civil War artefacts in the collection found in the southern half of Adair's battlefield. Based on the results of this analysis, supported by the work of Bonsall (2007), it is reasonable to conclude that Adair's theory of the battle taking place within the area between the South Ridge and Central Ridge can now be considered to be incorrect. In addition, as the area of the battle is now known, the potential for protection of the battlefield can be considered further. The fields of Cheriton are currently all agricultural land belonging to the three farms in the area: North End Farm, Middle Farm, and Scrubbs Copse Farm. Whilst these fields continue to be used for agricultural purposes it is unlikely that they will be built upon, but as Cheriton is one of just five Civil War battlefields that remain wholly undeveloped (Foard and Morris 2012, 182; Battlefields Trust 2016) some form of protection should be considered to prevent any future development.

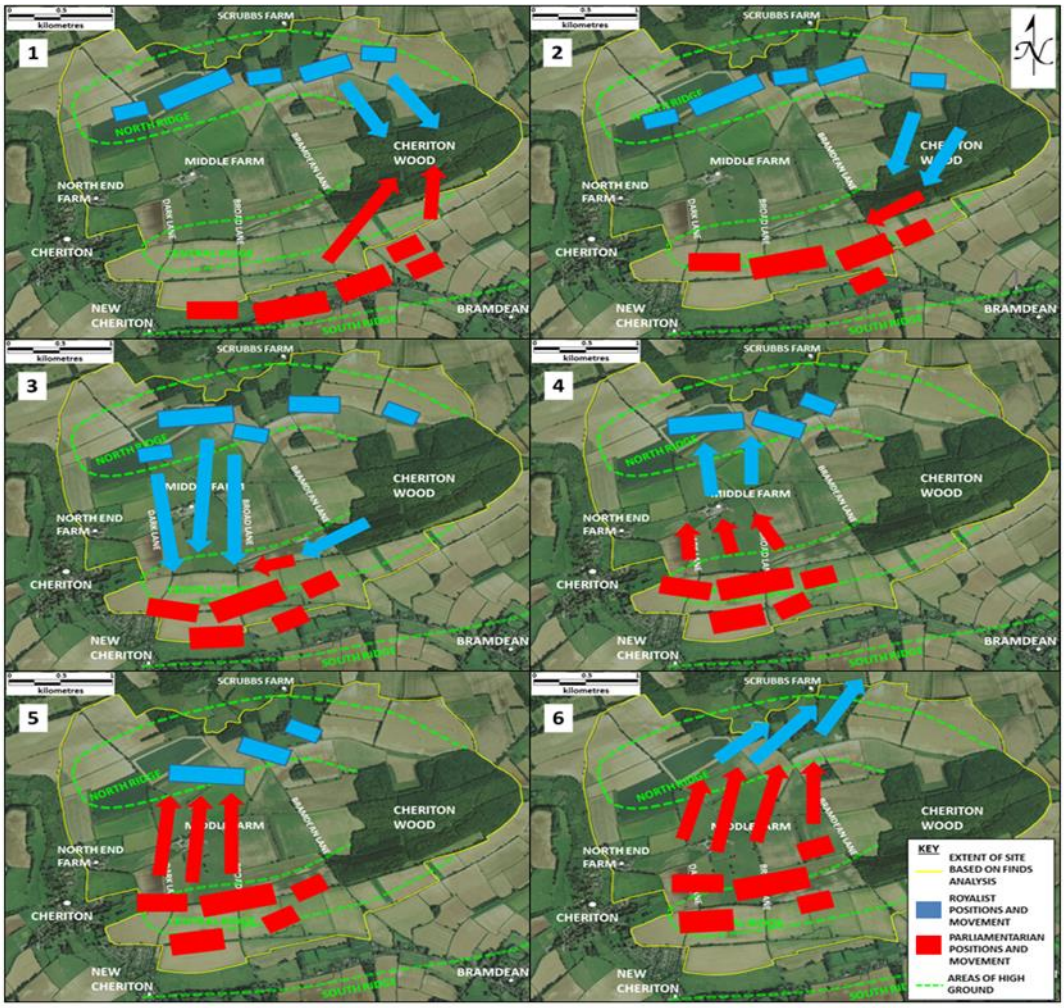

Figure 10. New interpretation of the events of the battle based on the finds: 1) The Parliamentarians arrayed on the South Ridge attempt to take Cheriton Wood but 2) are beaten back onto the Central Ridge by the Royalists positioned on the North Ridge, 3) the Royalists launch a cavalry attack on the Parliamentarians left

flank along either Dark Lane or Broad Lane, 4) fierce fighting takes place on the Central Ridge as the Parliamentarian infantry fight off repeated attacks, 5) having fended off the Royalist Cavalry the Parliamentarians launch a counter-attack on the Royalists forces, 6) the Royalist line collapses and the army, now in disarray, turn and retreat along Scrubbs Lane towards Alresford (created by author)

The analysis of the spread of the lead artefacts means that the action of the Battle of Cheriton can be examined for accuracy. The data and the historical documentary evidence suggest that the accepted description of the events of the battle is correct, but the location of these events can be called into question. Figure 10 presents a new interpretation of the events of the battle. Key to this new interpretation is the location of the ill-fated Royalist cavalry charge. Originally thought to have been along Bramdean Lane, next to Cheriton Wood, the evidence now suggests that this cavalry charge is more likely to have been further to the west, either using Dark Lane or Broad Lane. There are no dramatic differences in the amount of cavalry shot found in the fields around these three lanes (Figure 9), but the concentration of finds in Long Barrow Field suggests that Dark Lane or Broad Lane is a more likely route for the Royalist cavalry, the cavalry charge bringing about the fiercest fighting. It is also possible to suggest that, after being routed from Cheriton Wood early in the day, Waller moved his troops north-west from their starting position on the South Ridge onto the Central Ridge, thereby occupying a more commanding position of the battlefield. This supports the charge levelled at Hopton by some historians of failing to press home the advantage once Cheriton Wood had been taken by the Royalists, allowing Waller to reform (Burne 1950, 399; Adair 1973, 128; Spring 1997, 16; Halsall 2002, 46). It would also give partial support to Adair's interpretation of the battle which places the Parliamentarian army on the South Ridge (Adair 1973, 125).

There are, however, a few anomalies found in this analysis. The foremost of these is the absence of artillery evidence: only three artillery shot were recorded in the analysis. Artillery ammunition of this period would be lead balls similar in size to musket balls, which were packed into the cannon and fired in a shotgun effect, resulting in a hexagonal shape to each shot resulting from compression during firing. Both the historical evidence (Adair 1969, 144; 1973, 109; Kinross 1979, 111; Spring 1997, 13; Wanklyn 2014, 98) and tactics of the day (Peachey 1992, 20-21; Turton and Peachey 1993, 12; Foard 2012, 87) suggest that artillery was present at the Battle of Cheriton, yet there is very little archaeological evidence in this analysis to support their use. One theory for this is simply inexperience: the initial training received prior to the carrying out the study was more focused on the recording of musket balls and carbine and pistol shot. As such, the absence of artillery shot could be due to a failure to correctly identify them. However, the previous archaeological survey carried out on Dark Copse Field also failed to identify any artillery shot other than a single cannon ball (Bonsall 2007, 34). An alternative theory is that the shot were simply discarded during recovery by the detectorists. Again however, this scenario is unlikely as the McGoverns were diligent in their collection (if not their recording) and even the most disfigured lead pieces were recovered. The absence of artillery shot could be explained by the artillery being present but not used at the battle. Peachey (1992) states that the artillery presence was often low in number, and 'it seems they were often either too late to reach the field [or] became left behind on the field…as the army advanced or manoeuvred' (1992, 21). This may also apply to Cheriton. Many sources state that the day started off with a heavy mist (Adair 1969, 140; 1973, 126; Emberton 1995, 102; Spring 1997, 15; Wanklyn 2014, 96), making the use of artillery impractical. This would also apply to the first action of the day which took place in Cheriton Wood: any artillery that was fired to the wood would not have been recovered as part of the McGovern collection as Cheriton Wood does not appear to have been surveyed. The main action in the open fields started with the ill-fated cavalry charge on the Parliamentarians left flank, which may have happened too quickly for the artillery to be repositioned to deal with this attack. A further systematic survey of the battlefield and a more detailed statistical analysis on the shape of the balls in the collection may shed further light on this irregularity.

Another anomaly is in the potential inadequacy of the survey, highlighted especially by the three unnamed fields north of Cheriton Wood which appear to contain no Civil War finds (Figure 7). This, along with the incompleteness of the notes and maps, suggests that either there are more finds and notes belonging to the McGoverns that have yet to be revealed or that the area was not as extensively surveyed as thought. A further detailed methodical site survey could therefore be carried out. As mentioned previously, it appears the

McGoverns had exclusive access to metal-detect on these fields, implying that any areas that were not surveyed, or incompletely surveyed or recorded, are unlikely to have been disturbed by other metal-detectorists during the time of the investigations. There is also no evidence of re-enactments being carried out on the fields during this time, another factor which can impact data results. A comprehensive and systematic survey of the entire area would ensure that the battlefield site has been fully covered. If the finds are recorded correctly using GPS, this could also result in a further spatial analysis of the finds distribution, using any new finds recovered during the survey and using the examples where individual locations have been provided by the McGoverns' maps and notes. A detailed spatial analysis could provide a more detailed interpretation of the action and events of the battle.

This study of Cheriton is therefore by no means complete: there is certainly potential for further research that could be carried out on the collection. The assemblage itself could also be subject to further examination. With almost 3000 lead artefacts, the Cheriton collection is one of the largest complete collections recovered from a Civil War site and could therefore yield a great deal of information not just about the battle, but also about the characteristics of lead ammunition of this period. An analysis of the impact damage to the lead shot could be carried out: only 39% of the shot analysed showed impact damage of some kind. This supports the trend shown in Bonsall's study of the finds from Dark Copse Field (2007, 38) and a study of the impact damage could provide further insight into the effects of impact on lead shot. This could also be used to examine the reports of a frantic large-scale Royalist retreat: the lack of impact damage would suggest that a large number of shot was abandoned or misfired during the retreat (Bonsall 2007, 38). Three-dimensional laser scanning, piloted on the Bosworth collection, can also be used for the recording of the geometry and surface attributes of the lead shot to examine the finer detail of surface striations and smelting (Foard and Morris 2012, 69). This innovative new technique is still in the early stages of use in battlefield archaeology and so could be used to great effect with the amount of lead shot available in the Cheriton collection. Then there is the study of the construction of the lead shot. Although both armies would have carried plenty of supplies of ammunition, some of the musket balls and pistol shot would have been made on site, either the night before or possibly during the battle. Therefore, it may be possible to study the characteristics of each shot relating to its construction, to identify if the shot was made professionally or whether it was made on the eve of battle, and how the shot itself was created. This could have a wider impact on the study of warfare in general, highlighting the difference between the historical 'reactive' aspect of battle, where the site of conflict is chosen based on circumstance, and the modern orchestrated conflicts, such as the Battle of the Somme, where the battle was planned down to the hour of attack and so ammunition and supplies were prepared in advance (Keegan 1976, 196; 1993, 312-313).

There are also the non-lead artefacts that are available for study. As mentioned in the methodology, these were not included in this study to enable the focus to be on the lead finds, but the non-lead finds could have significance as well. Amongst these were a small number of badly corroded iron plates and horseshoes, which could potentially represent armour and cavalry. However, these also could just be agricultural depositions. A further analysis may be able to differentiate them. Also in the non-lead artefacts were five bone fragments, believed to be human finger bones and part of a shin bone. The shin bone appeared to present with cut marks. The bones were found in Long Barrow Field, so named for the long barrow that sits in the southern end of the field. As already shown by the artefacts, this field is also the site of the heaviest fighting in the battle, thus suggesting that the largest number of fatalities would have been in this field. It is not an improbable theory then to suggest that the long barrow was used as a makeshift mass grave for the dead, since previous research has shown that existing landscape features are often used when digging mass graves on battle sites (Sutherland and Holst 2005, 29; Foard and Morris 2012, 32-34). If these bones do indeed belong to a Civil War casualty and indicate the presence of a mass grave, this would be a major discovery for battlefield archaeology in this country: although burial sites have been suggested at Naseby, Edgehill and Newbury, to date no mass graves have been found and excavated at any English Civil War battlefield site (Foard and Morris 2012, 30).

The immediate step that should be taken next, however, is to ensure these results are shared with the public, in particular, the local populace of Cheriton itself. Archaeological research should be carried out for the

benefit of all, and 'it is the duty of the archaeologist, as of the scientist, to reach and impress the public' (Wheeler 1954, 196). This piece of research has brought about a better understanding of the Battle of Cheriton and a new interpretation for the events of the battle, and as such it is important that piece of local history is returned to the community, whether that be to update the information boards dotted around the site, or for the landowners to understand the need for cultural heritage protection. The Battle of Cheriton artefact collection, and the site itself, remain a wealth of information waiting for detailed analysis that one day may bring Cheriton the recognition that it deserves, both as an archaeological and historical example and as a pivotal battle in one of the bloodiest and most important conflicts this country has ever engaged in.

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"Running the Gauntlet: Locating the Battle of Parker's Ferry, South Carolina"

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INTRODUCTION

By the late summer of 1781, British fortunes in South Carolina had been radically reversed from their successful capture of a 5,000 man American army and the city of Charleston, South Carolina, in May of 1780. While securing Charleston, they had quickly ranged deep into the backcountry and captured the important villages of Augusta, Ninety Six, and Camden, and also coastal Georgetown. Perhaps the high tide of British occupation of South Carolina was the destruction of a second Continental army under General Horatio Gates outside of Camden in August 1780. It appeared to the British that their decision to change strategy and focus on the American Southern colonies rather than those in the north, would indeed win them the American Revolution. One year later, however, they had lost all those backcountry villages, and were confined mainly to Charleston and its immediate environs. The Americans were not strong enough to recapture the town or even confine the British within the city limits, but the backcountry was no longer in British hands.

To maintain their Charleston base, and attempt to regain the strategic offensive, the British sent out raids and foraging parties when opportunities presented. It was in this context that American General Francis Marion executed a classic ambush near Parker's Ferry against a foraging party in the lowcountry swamps southeast of the city. In 2007, a portion of the battlefield was located by the authors. With a 2015 American Battlefield Protection Program

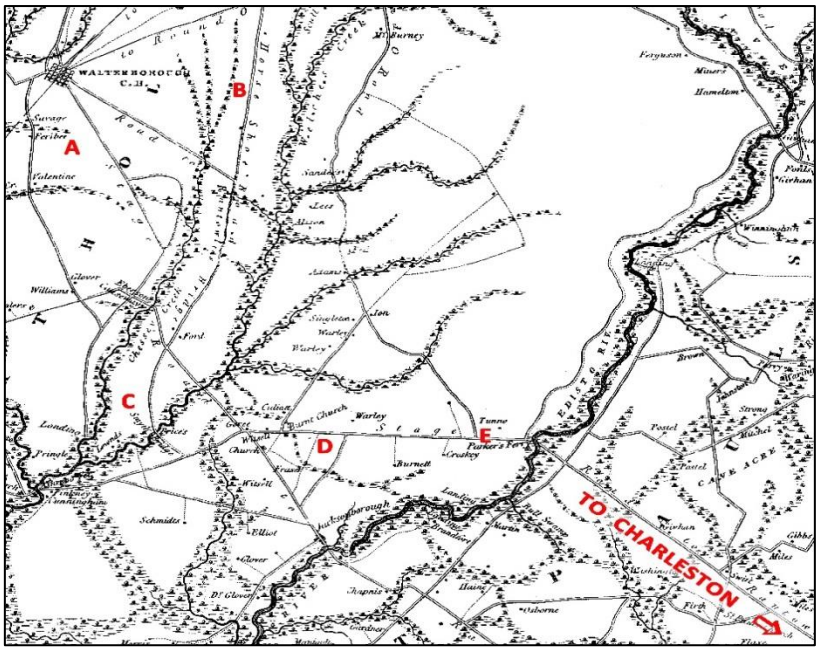

Figure 1 General Location of Parker's Ferry Battle. A & B= Alternate Locations for Round O, C= The Horseshoe, D= Hayne's Plantation, E= Parker's Ferry Battlefield (modified from Mills Atlas 1825).

grant, the authors returned to the site to define and map the battlefield's extent. This paper discusses the results of those efforts and our attempt to reconcile the limited historical documents with the archaeological remains recovered. The results are not completely satisfactory, but the archaeological data provides little room to speculate beyond the obvious. In this case, the battlefield data speaks for itself.

Historical Context

On August 10, 1781, American General Nathanael Greene, commander of the Continental forces in South Carolina suggested to Francis Marion that "If it is practical I wish you to give support to Colonel [William] Harden" (Greene, August 10, 1781, Greene Papers [GP]:158). Harden previously had written Marion directly for assistance in stopping the British from gathering rice in the Lowcountry south of Jacksonboro, South Carolina, but Harden's messenger could not find Marion and so he continued to Greene's camp. Marion was in the St. Stephens area of South Carolina at Peyre's Plantation along the Santee River, blocked from Harden by British maneuvers between the Santee and the village of Monck's Corner, and heavy rains (Marion, August 13, 1781, GP:179). But five days later, Marion asked Greene permission to rescue Harden personally. Since Greene had already suggested it, the request was to obtain permission for his 200 men to be accompanied by Colonel [Hezekiah] Maham's and [Peter] Horry's cavalry in hopes of destroying British cavalry (Marion, August 18, 1781, GP: 204).

Marion eventually set off on August 22. He arrived at Round O, somewhere south of present-day Walterboro, South Carolina, the next day (Figure 1). Early nineteenth century biographer William Dobein James indicates that Marion had traveled "at least a hundred miles" (James 1821:126) to avoid the British patrols. At Round O found Harden ill and his militia "not Collected" (Marion, Sept. 3, 1781, GP:289). The next day Marion moved to the Horseshoe, between Walterboro and Jacksonboro, South Carolina, where on August 26 he was joined by Colonel [William] Stafford and 150 men, and a Major Harden with 80 men, bringing Marion's command to over 400 men (Ibid.:289).

In the area gathering rice was a British foraging party consisting of 180 Hessians, 150 British regulars, 130 Loyalists and 80 men of the Queen's Ranger's horse (Ibid.:289), for a total of 540 men, plus two artillery pieces.[5]

From that point, the Americans and British maneuvered around each other, the British seemingly attempting to avoid a confrontation, while Marion looked for an opportunity to strike. Eventually, to return to British occupied Charleston, the British would have to cross the Edisto River, and Marion assumed that would be at Parker's Ferry. On August 30, Marion set up an ambush a mile down the Parker's Ferry road between Hayne's Plantation, where the British had camped and Parker's Ferry (Figure 2). Once there Marion learned that there was a party of around 100 Loyalists camped at the ferry. Marion had placed himself between two enemy forces, awaiting the larger force to come up the road. A coordinated British attack could have surrounded Marion. Instead, Marion defeated both in turn, but not without a close-call. Marion's report to General Greene is the most complete account, although, typical Marion's of writing, it is difficult to interpret.

> The 30th I went below them & formed an Ambuscade in a thick wood Within a mile of Parkers Ferry within forty yards[6] of the road which the Enemy must come, here I was Informed of upwards of one hundred toreys under a Col. Cuningham from Dorchester & Stono Laying on the banks of the river at Parkers Ferry waiting for Lt Col. De Benin who Comman[d]ed the Enemys force. My right Division of about Eighty men was Commanded by Maj. [Harden] who I orderd to retire one hundred yards from the Line, & to march up when the firing began on my left; my Swordsmen of Sixty horse I sent under Majr Cooper to fall in the rear of the Enemy to Draw their Attention that way & to follow them whenever they moved, & to keep in sight, with positive orders to Charge their Enemys rear at all hazards, as soon the firing became Generall. Here I waited untill sunett when part of the toreys from the ferry came on which I Intended should pass, but they discovered one of my men & Challenged, not Answering they fired, & I coud not restrain the men longer they returned it which made them immediately return back on the spur. I sent a few horse after them which rund them a Cross the river. The Enemy hearing the fire & and being on their way down Immediately sent their Cavalry to resque them & came on full speed, & received the fire of the whole Line Runing The Gauntlet through them. The infantry Immedia[tely] Appeared before us & a heavy fire Insued which Continued for Some time, but unluckily some Villians Cryed out they ware flankings on the right & penetrating the wood they immediately broke & while We ware rallying them & forming the secon Line in front of the horses, which was piquetted two hundred yards from the first line the Enemy took that Oppertunity, carry off their field ps & wounded & retreated on the trott, Leaving twenty men & twenty three horses Dead on the spott. We Immediately marched up to the road & took possession of the Ground & remained three hours, but my people having been without provisions for 24 hours I retired two miles to refresh them (Ibid:289-290).

The noise of the exchange of fire between the Loyalists and Marion's far left flank drew the British horse up the road and into the ambush. Charging up the narrow causeway, Marion's front line open fire, and according to Loyalist cavalryman Stephen Jarvis, "we received a most galling fire ever Troops experienced"

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[5] For such a simple affair, the names of the participants are horribly confused. Major Harden, for instance is recorded as William Harden Jr in the GP (Vol IX: 288), but is called Edward Harden, William's brother, in Daso (1992:54). Terry Liscomb lists him as Charles Harden (Liscomb 1979:38). Marion writes that the British commander was De Benin, probably he meant Frederick Ludwig von Benning, according to recent Biographer John Oller (Oller 2016:315). The *Royal Georgia Gazette* (Sept 13, 1781) and Daso (1992:56) believes it was Ernst Leopold DeBorck. However, Terry Liscomb, referencing the British HQ papers, indicates that it was von Borck (Liscomb 1979:38). The authors go with Oller. The Loyalist commander at the ferry is variously known as Patrick Cunningham (Liscomb 1979: 38; GP, Vol. IX: 289) or William Cunningham (Rankin 1973:237). John Oller believes it was Robert Cunningham, a cousin of Patrick and the most famous, William "Bloody Bill" (Oller 2016:182).

[6] William H. Mathers, on Marion's front line said they lined up "16 strides" from the road (Mathers S45846).

from Marion's front line (Jarvis 1907:728). The British cavalry was thrown into confusion, their situation exacerbated by their attempt to wheel and attack the American line. This was impossible on the narrow causeway, and even if they could have, Marion's militia had cut down trees on their front as an abatis and it would have been impossible for the horse to get at his line. British horse commander Fraser was forced to run straight through the ambush to the ferry. They were out of the fight, but almost immediately British infantry appeared, deployed, and a general engagement began. Unfortunately, according to Marion, "some Villains Cryed out they ware flankings [sic] on the right and penetrating the wood" and Marion's men fell back (Ibid.:290). He attempted to rally them and form a second line 200 yards in the rear, but in the meantime the British had decided to fall back on their own. William Dobein James believes Marion's retreat was prompted by a lack of ammunition (James 1821:127) and participant John Conyers says they were defeated "for want of ammunition having only two rounds apiece" (Conyers S311617). The British then returned and camped at the ferry overnight (Ibid:290; Jarvis 1907:728).[7]

Marion complained that he could have destroyed the entire British detachment but the cavalry had chased the Loyalists and were not available for the main battle. Furthermore, Major Harden's men never fired a shot. Luckily for Marion, the British artillery had been neutralized; all of their artillerymen being killed or wounded (Jarvis 1907:728). Marion attempted to return the next day to bury the dead, but the British were still in the area, and he began his march back to the Santee River on September 1. Marion would immediately be involved in the battle of Eutaw Springs, the last major engagement of the American Revolution in South Carolina, and the Parker's Ferry engagement was overshadowed in history.

Archeological Investigations

That is the traditional and short version of the battle of Parker's Ferry. As noted archaeological investigations to find the battlefield began in 2007, sponsored by South Carolina's Francis Marion Trail Commission (Smith et al. 2008), and continued, with an American Battlefield Protection Program grant beginning in 2015. These projects have resulted in locating the battlefield; of that we are certain, however, inferior field conditions and limited and contradictory historical accounts do not allow us to state that we have solved the entire riddle of how the battle unfolded.

Site conditions were a major part of the problem. In 1781, the battle took place along a road in a swamp. Suitably, the Americans were under the command of Francis Marion, known in legend as the 'Swamp Fox.' The site is still swampy, and the northeasterly running dirt causeway, or road, is in the same place as it was in 1781. Today, it divides two distinctly different landscapes. On the east side, the landscape consists of a heavy reforested woods, with thick understory, and twisted and downed trees (Figure 3). This landscape continues from the road east for 200 to 300 feet before becoming a young pine forest recently planted by the lumber

[7] Casualties are for once, fairly consistent among sources. Stephen Jarvis claimed as many as 125 men were killed while the Americans lost none (Jarvis 1907:728). Marion reports 20 British men and 23 horses dead "on the spot" (Marion to Green, Sep. 3, 1781, GP Vol IX: 290). Marion's orderly book claims "three privates wounded and one Killed, The Loss of the Enemy, 18 men Killed & one negro taken, 23 horse d and five wounded and Seven taken- Maj Frazer wounded & Cap Campbell, by the best Accounts they had Eighty men wounded" (O'Kelley 2006:544). A day or so later, a party following the British, found 40 more horses along the road, and an estimated 80 badly wounded men carried off. Nathaniel Pendleton's Orderly book states 20 killed and "above" 80 wounded (Orderly Book quoted in GP, volume IX: 298).

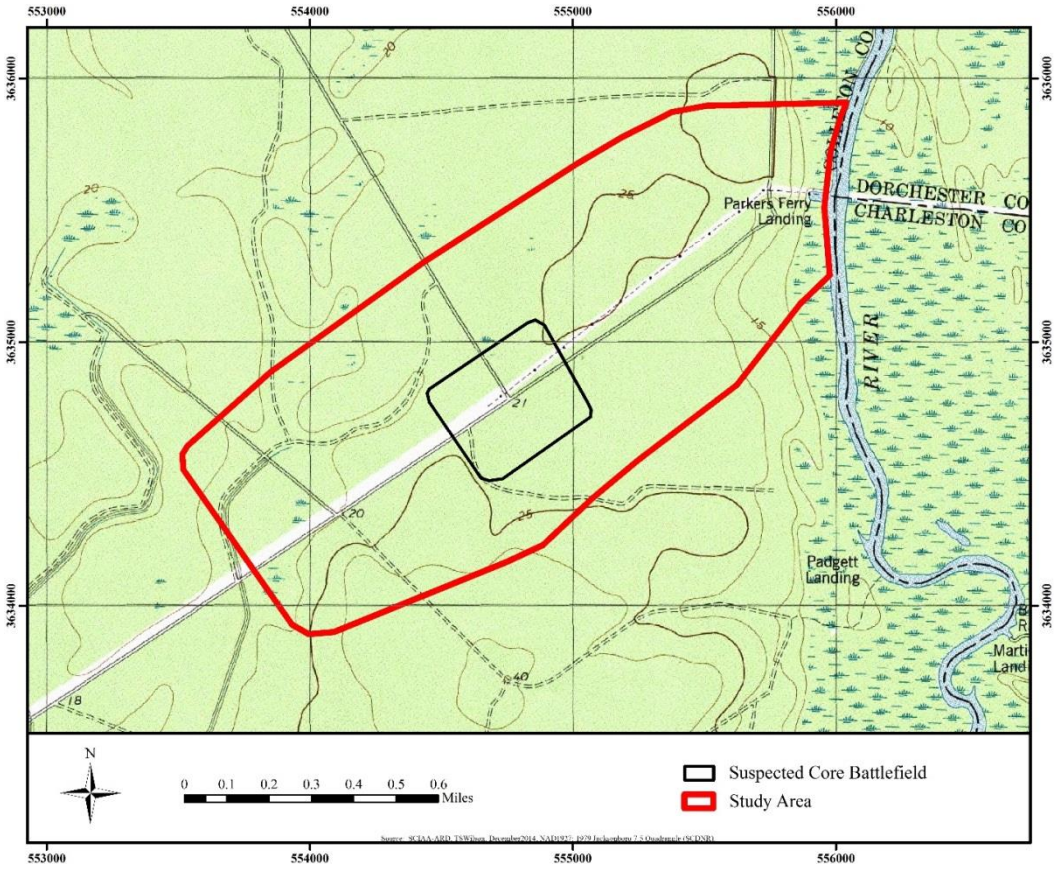

Figure 2: Study Area for Parker's Ferry Battlefield (modified from USGS Jacksonboro, SC Quad).

company that owns the property. These trees are only around ten years old today, maybe 15 feet high and have not been thinned. They stand about 2 to 3 feet apart and it is impossible to walk through let alone survey using a metal detector. The trees were planted after our initial discovery of the battle site in 2007, and due to that discovery, the timber company made the site a 'Special Use Area,' meaning they would not harvest the trees. This was both fortunate and unfortunate. The fortunate part is that the battle site was not logged when the other area was, or otherwise it would have all been replanted in pines by the time we returned from 2016 through 2018. The unfortunate part is that the timber company has not done regular forest management in the Special Use Area. So, trees hit by high winds and hurricanes (and rain, more on that in a moment), are left as they fell, and the forest floor has a thick layer of pine needles and leaves.

Further exacerbating our survey efforts was the recreational habits of the natives. The entire area for several miles in all directions is timber land leased by hunt clubs. The hunters have developed a tradition of throwing their empty beer cans into the forest as they drive by on their off road vehicles. Over the years, these cans have been covered with more pine needles, so they must be found with a metal detector before they can be removed. That side of the battlefield was the easy side.


Figure 3 Landscape East Side of Road (SCIAA). Figure 4 Landscape West Side of Road (SCIAA).

On the other, west, side of the road there was a thin line of trees twenty feet wide bordering an open field (Figure 4). This area was devoid of trees because a major power line ran parallel to the road. Thus, the powerline landscape's soggy ground surface mostly consisted of thick wire grass about three feet high. In that condition it was impossible to metal detect. We were able to partially solve that problem by arranging to have the timber company plow a portion of the battlefield. This left us with a bare dirt field and 100% visibility but still it was difficult to detect because they had rough plowed it, leaving large wet ruts and dirt chunks like a midwestern corn field. Meanwhile we discovered that most of our metal detectors were rendered inoperable under the power line.

The second environmental problem was rain. Two historic rain events occurred during the duration of the project, which made metal detecting impossible, even if we could have accessed the site. The first was October 3 to 5, 2015, when an unusual rain event brought between 16 to 22 inches of rain to the area over the period of about a week (Grum n.d.). The second was Hurricane Mathew in 2016. Because it was already a swamp, these areas did not dry out sufficiently until the Spring of 2018. Furthermore, the wet conditions made it impossible for the east side to be subjected to a controlled burn. In the end, we feel fortunate to have been able to get the landowner to plow the west side.

Despite these conditions, continual day trips throughout the project period from 2015 to 2018, with a concentration in the spring of 2018, allowed us to locate and delineate site boundaries.

The field method consisted of both systematic and reconnaissance metal detecting. Systematic detecting consisted of blocking out areas using pin flags and walking overlapping transects, sweeping the ground with the detector head, until the block was completely covered. Two detectorists worked within each block, so that they began on opposite sides of the block, walked parallel to each other, eventually overlapping their lanes and thereby covering each block twice. The detectors could be set at different frequencies so that the detectors did not interfere with each other. The block method was used on both sides of the road, within what became the core battlefield area.

Outside of the core battlefield area, detectorists conducted a reconnaissance level survey, in which they simply walk loose transects attempting to locate battle related artifacts. Had an area produced such artifacts, blocks would have been imposed around these artifacts and systematic survey conducted. This did not happen as the artifacts were well clustered in the core battlefield area.

A wide variety of detectors were used by a crew of experienced detectorists. The SCIAA uses Deus® XP wireless detectors, Tesoro® Cibolas, and Garrett® AT Pro and Gold detectors. Several volunteers used

Whites® machines. The Deus seemed to work best in the woods, while the Cibola was the only machine usable under the power line.

Analysis and Discussion

As recommended by the American Battlefield Protection Program, discovering the location of a battlefield should begin with the application of KOCOA (Key Terrain, Observation, Cover and Concealment, Obstacles, and Avenues of Approach), a method of systematic landscape analysis. By researching the historic documents associated with the battle, a series of "defining features" are identified. Defining features are landscape features mentioned in the text that are one or more of the five points of KOCOA. For example, a bridge crossing a river on the battlefield could be Key Terrain, and Avenue of Approach, and if blocked, an Obstacle to overcome in order to defeat an enemy. Defining features do not have to be mentioned in the texts. One could simply analyze the generally known location of the battlefield and hypothesize the features based on knowledge of the tactics and technology of the time. This is known as an "inherent military probability," or the probability that a landscape feature would have had an effect on the tactics used by the two combatants (Smith 2016: 5).

The only defining features for this poorly documented battle are the road or causeway and the ferry. A series of historic maps from colonial times to the present, confirms that the ferry and the old road system at the battle site are in the same place as they were in 1781 (Figure 1).[8]

The ferry site was a major crossing from the earliest colonial occupation of the area up to the twentieth century. John Parker died as early as 1735 and was known to operate flatboats at the ferry as early as 1733 (Krawczynski 1996:188, footnote 11). The power line has severely impacted the ferry site, but even today a scatter of 18th century artifacts can be seen on the ground surface after a rain.

A 1793 land plat is especially significant for our analysis of the battle site in that it strongly suggests that not only is the Parker's Ferry road in the same place, but, that the road intersecting the Parker's Ferry road at the battle site was also in existence at the time of the battle (Figure 5). This suggests that Marion intentionally set up his ambush at that intersection. The reason for this is further discussed below.

Locating the site proved to be the easiest task. Marion, in his report of the battle to General Greene, states that it was located "within a mile" of the ferry on the road to the ferry (Figures 1, 2, and 5). On day one of the first field season in 2007, we entered the woods on the east side of the road a mile down the road from the ferry site and across from the intersection with the secondary road, and immediately recovered buckshot and rifle balls. From this point on, the various field efforts consisted of attempting to find the boundaries of a slowly growing collection of lead shot and eighteenth century artifacts in the woods. Eventually

[8] The road is one of the earliest colonial roads, going back at least to 1725 (Bryan 1993:125).

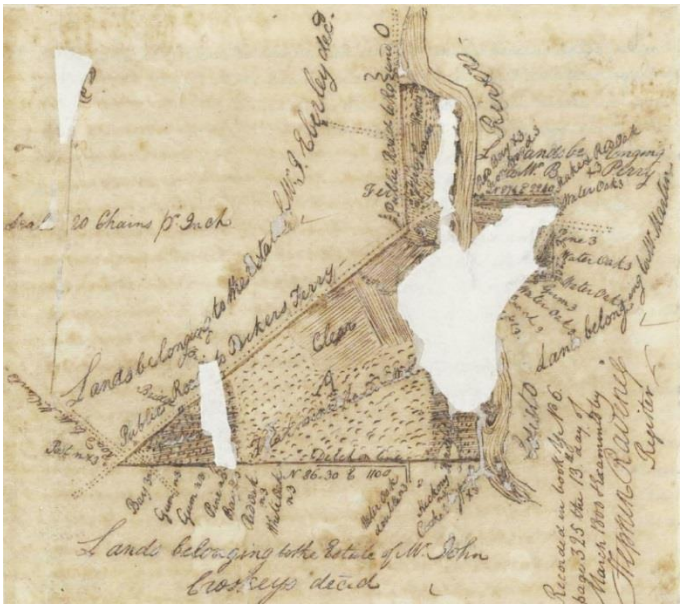

Figure 5 1793 Plat Survey of land South of Parker's Ferry. Note Intersection One Mile Southwest of Ferry (South Carolina Deed Book Y6:324).

the total would reach 20 large buckshot, 24 standard buckshot, five .75 caliber musket balls, three .69 caliber musket balls, three fusil or carbine balls, and eight probable rifle balls (Figure 6). Other artifacts probably associated with the battle included a frame buckle, shoe buckle, English half penny dated 1771, two colonial period horseshoes, and one brass 18th century button. Not a large collection, however, the overwhelming ratio of lead shot to other items strongly suggests a battlefield. There was no evidence of a domestic site, like ceramics or domestic materials (except modern logging metal), and the poorly drained soils make it a highly unlikely place for a homestead.

Note that there are only a few artifacts on the west side of the road and those are at the intersection with secondary road (Figure 6). We are confident that the absence of battle related artifacts on the west side is a battle phenomenon and not simply the result of poor detecting conditions. Reconnaissance beyond this core battlefield, found no evidence of the battle outside of the borders of this cluster of artifacts. Archaeologists ranged up and down both the Parker's Ferry road and the secondary road and found no other artifacts. The cluster of artifacts as noted seem to be all the evidence of the battle.

Marion's plan was for the British to march into and through the ambush before the Americans sprang the trap (Figure 7). When Marion's militia opened volley, Marion wanted the head of the British column to have been at Marion's extreme left flank or just beyond. The entire British column would have been on the road, two or four abreast, parallel to Marion's entire front line. As planned, the far left flank should have opened fire first, while Harden's command marched forward to join the first line and fire at the rear of the British column. The Cavalry, useless in the swamp, were deployed along the secondary road on the left flank of the British rear and would have been able to cut down any who retreated. Caught in column along a road, with an abatis between them and the enemy, the British would have sustained a brutal

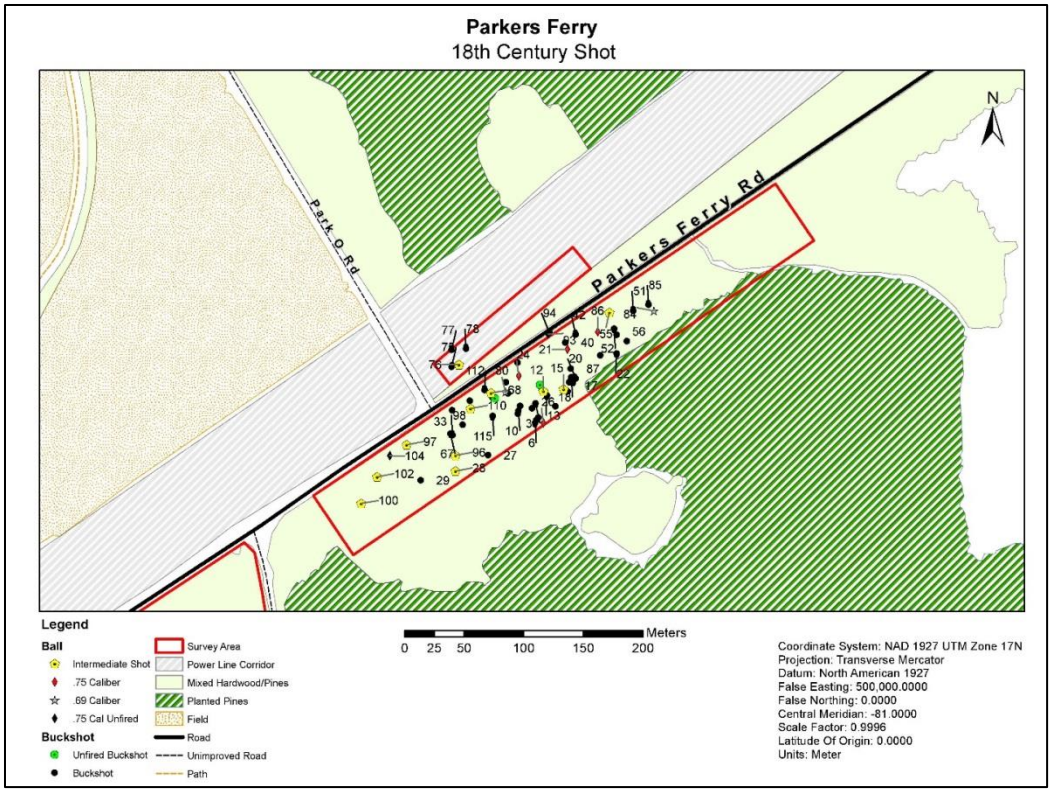

Figure 6 Lead Shot Recovered at Parker's Ferry Battleground (SCIAA).

defeat. Unfortunately for Marion, the Loyalist horse, coming down the road from Parker's Ferry sprang the trap too soon.

Based on the archaeological data and the historic record, then, the battle unfolded as follows. Marion lined up his men on the west side of the road awaiting the main British force (Figure 7). At dusk scouting party from the Loyalist camp came down the road and saw some of the men on the left flank of Marion's front line. Firing broke out, and the British marching up the road heard the firing. Marion ordered a few of his cavalry to attack the Loyalist detachment and they chased the Loyalist up the road and across the ferry. The Loyalists were out of the battle and Marion's attention quickly turned to the British horse, who arrived at the scene and rode into the trap. Marion's front line fired and horse and horsemen were decimated. William Dobein James wrote that Marion's men fired "with either a ball and buck shot, or heavy buck shot alone" (James 1821:128) and the artifact collection confirms that. There must have been a brief pause after the first fire while the remaining horsemen realized their situation, completely flanked by a nearly invisible enemy behind a maze of downed trees. As Marion's men reloaded and fired, the horsemen realized they must ride straight ahead beyond Marion's left flank out of the ambush zone.[9] One account accredited to Stephen Jarvis records that "We only saw the flash of the pieces the enemy was so completely hid from our view, and we only had to push forward,

[9] William Smith, who used a rifle lent to him by a Lieutenant Buckner states they fired "three brisk rounds as they passed in haste down to the ferry" (Smith R9875).

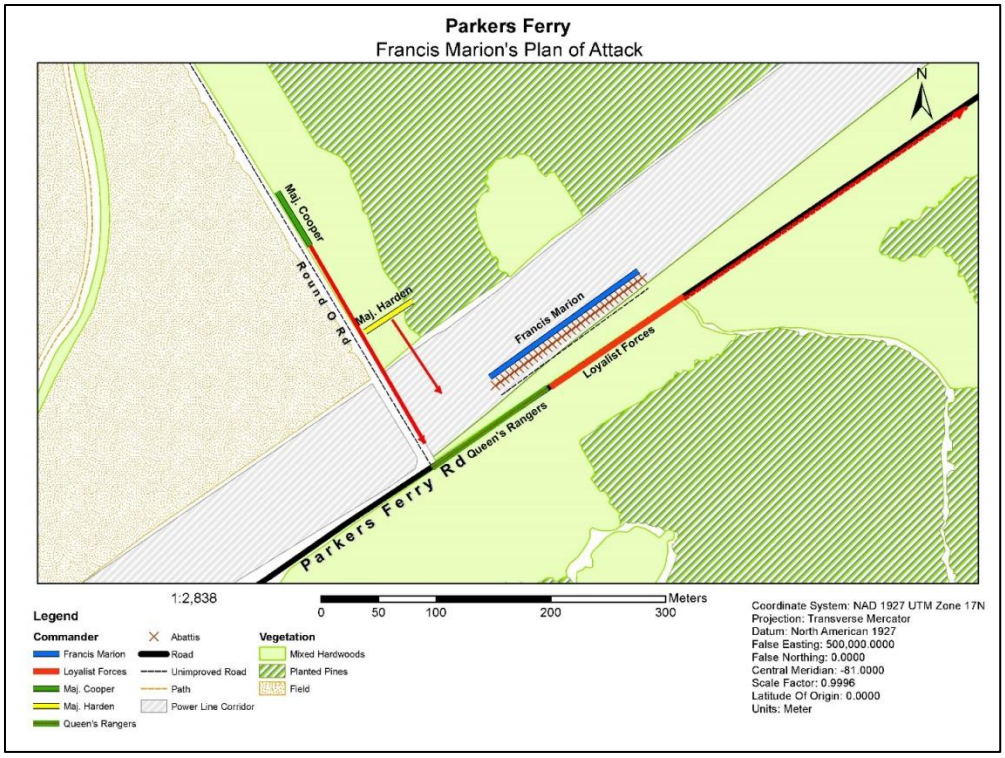

Figure 7. Marion's Plan of Attack. Line Lengths Based on Number of Men Believed to be Available Spaced At Two Feet Per Man (SCIAA).

men and horses falling before and behind" (Jarvis 1907:728). Neither the British nor the Americans record what happened to those horsemen who had not been hit and were able to run through the ambush. They must have galloped up the road to the ferry where they should have encountered the detachment of Marion's horse that had chased the Loyalists. Its possible there was a skirmish there also. A hint may be provided in a pension account by Ralph Cassel. Cassel records that in the battle he "received a wound in his head in said engagement & arms, and was cut severely with the sword, that the Enemy crossed the River and compelled us to retreat, that during the retreat his horse was shot under him & he [was] pursued by the enemy & was relieved by Sergeant McDonald & a man named Pierce, who shot the person that was cutting him" (Cassel R1791). This action seems to fit with what probably was happening at the ferry rather than at the ambush site.

Historians have noted that Marion's letter specifically state that the British horse ran a gauntlet (Rankin 1973:237). A second account by Jarvis records that "it was so well directed that we were obliged to run the Gauntlet for a mile" (Jarvis 1996:75). The common meaning of gauntlet is a form of punishment in which the offender must run between two rows of soldiers while they punch or strike them with switches. In this sense, it has been assumed that the British horse ran through two lines of militia on either side of the causeway. The archaeology, however, clearly indicates that all the fire came from the western side of the road and the overshots landed east of the road (Figure 6). Deploying two rows of militia forty yards from the road across from each other would have been suicidal. They would have been firing at each other less than 100 yards apart. It is also doubtful that Marion would have tried a more sophisticated 'Z' ambush in which the soldiers would have lined up one side for a distance and then changed to the other side. These were militia, not a SEAL Team. There is no archaeological evidence of that.

What happened after the British horse ran through the gauntlet and the British Infantry and artillery arrived at the intersection? The distribution of lead shot supports the ambush but there is little archaeological evidence of Marion's report of a "heavy fire" (Figure 8). There does not appear to be evidence that the British returned any fire. Nor does there appear to be much evidence of Marion firing perpendicular to the Parker's Ferry road, which would be logical if a heavy fire ensued. In order for Marion to engage the British coming up

the road and deploying, his left flank should have wheeled and crossed the road to face the British deployment, while Hardin's men advanced on the British left. Whatever Marion meant by a heavy fire, it was likely overwhelmingly American fire, and enough to kill or wound "every man in the Artillery" (Jarvis 1996:75). A German military record records that the Hessian detachment lost five wounded and two killed (Hartis 2014: 102).

The archaeology better supports William Dobein James version of the battle, in which he states that "A large body of infantry with a field piece, were now seen advancing, and Marion retreated without counting the dead" (James 1821:127). Likewise, Javis notes that the Americans "immediately retired without the least injury" (Jarvis 1996:75). This supports the idea that after the first volley's against the British horse, there was a light exchange of fire and a quick retreat by both sides.

Given the historical accounts and the archaeological data, it is possible that Marion's front line may have "refused" its right flank, in order to meet the British infantry while they were attempting to deploy and bring their artillery to bear on Marion's line (Figure 8). This deployment quite likely centered at the road intersection, against the British artillery, while the British infantry attempted to maneuver left and right into the swampy woods.

Marion was counting on Harden's detachment to come up to the front line. In the event, Harden did not appear, and Marion's front line fell back, to reform 200 yards to the rear where his horses had been piqueted. As he notes in his report, the British took that opportunity to retreat.

Marion notes that Hardin did not come forward, but that may not be completely true. Marion recorded that someone in the ranks called out that the line was being flanked on the right. We suggest that in fact, Hardin's detachment did start forward or at least moved, and that movement was misidentified in the growing dark as being the British by someone in the front line, who shouted, and created the panic. Its likely we are pushing the data too far, but, we suggest that in order for Marion and his men to hear someone shouting that they are being flanked, the gunfire was not so heavy or continuous to drown him out. The panic caused both the Marion's left and right (Hardin) to retreat back to where the horses had been piqueted.

There is no mention of what Marion's remaining mounted swordmen did. A pension account by a Marion swordman, Solomon Freer states they were to "charge and back forth" as the opportunity presented but they obviously did not. Perhaps in the flow of events, with Marion's men falling back and Harden's men hesitating, firing going on in the dark down the

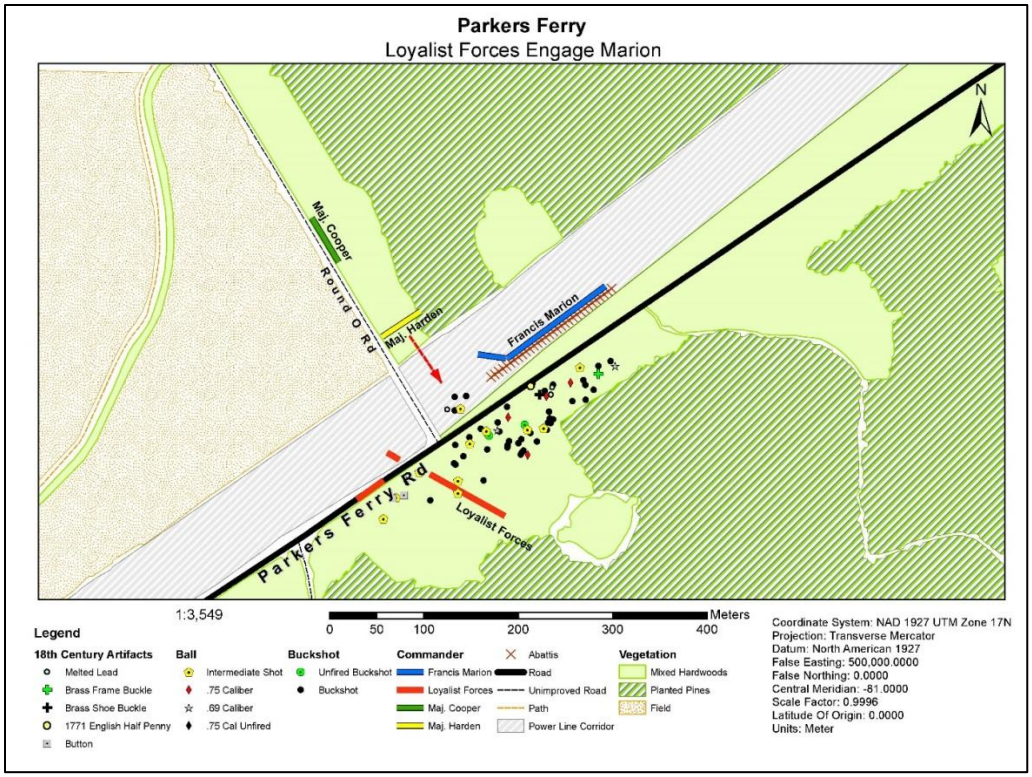

Figure 8. British Deployment Before Both Sides Withdraw. (SCIAA)

road, the horsemen saw no opportunity to advance. Indeed, if the British artillery were at the intersection, it would have been suicidal to do so. In any event, by locating the ambush at the intersection, Marion gave the cavalry its best opportunity for success, allowing it to operate along the road system rather than through the woods. This probably explains why Marion chose this location over other areas both north and south of the ambush site that were higher and dryer.

Solomon Freer's pension account adds more mystery to the unfolding of the battle. He notes that Marion, "gave strict orders of secrecy, and as soon as the enemy approached, the left were ordered to fire first, and then the right, after which the left should fall back and form a line below the right and continue the fire -- the horse (my Company) were ordered to charge back and forward as occasion required." Freer's account of Marion's left firing first, followed down the line by the right makes sense and supports the archaeological data. It is, however, difficult to interpret his statement that the "left should fall back and form a line below the right." Reading this literally, it seems to mean that Marion wanted the left to retreat and somehow form a line along the secondary road that intersects the Parkers Ferry road. That can't be though as it would have had the left run directly into Harden's men moving up on the right. Perhaps "the form a line below the right" means he wanted the left to wheel across the road to face the British. Whatever it means, it would have been a difficult order to follow as darkness grew. The words "form a line below the right" are simply impossible to reconcile with either Marion's plan, what actually happened according to the historical record, or the archaeological record. Since the American left did indeed fall back, perhaps Freer was remembering what happened and assuming that retreat was part of Marion's grand tactical plan.

CONCLUSIONS

Every battlefield site in South Carolina has been subjected to relic hunting through the years since the invention of the detector. Being in an unpopulated rural landscape, the Parker's Ferry battle site has very likely been a target of such activity. The fact that there was any battle related material remaining is probably due to

the poor conditions and that many people today still confuse the battlefield with the actual ferry site, and since there is a colonial site at the ferry, some detectorists may believe they are on the battlefield. Those collectors who do their research, though, no doubt have impacted the site.

Despite all the caveats of poor survey conditions, unusual weather, and previous collecting, we maintain that what is left archaeologically is a valid representation of battlefield behavior. Marion's attempt to destroy a British column was thwarted by the unfortunate arrival of a Loyalist detachment from the ferry, which prematurely sprang the trap. This drew the British horse into the ambush, but not the entire column. A heavy volley or two from Marion's front line decimated the British horse, drawing the British infantry and artillery to the battlefield. In the confused darkness, the British attempted to deploy and took further casualties at their artillery battery, which, no doubt was on the road. As the American front line fell back, however, the British took the opportunity to fall back also. With the element of surprise lost, the ever-cautious Marion chose not to press the point and left the scene. In the end, as James relates, it probably was a brief affair, the first volleys from the Americans being the most violent. Had Marion been able to catch the entire British column on road, the result would have been as devastating as history wants us to believe.

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"In the Morning We Began to Strip and Bury the Dead:" A Context for Burial Practices During the American War for Independence

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ABSTRACT

Following almost any military engagement, wounded soldiers in various stages of mutilation littered not only the battlefield site proper but could frequently be found for miles around. Interspersed with them lay the corpses of men who were killed in the battle or had died during the pursuit of the enemy. Yet methods of battlefield cleanup, such as taking care of the wounded and disposal of corpses, are topics rarely covered in written accounts of battles and their aftermath during the American War for Independence.

Treatment of the dead and wounded following battles of the American War for Independence varied according to a range of factors. The location of the battle, weather, time of year, who controlled the battlefield, how much time was available for battlefield cleanup, the character of the surrounding community, and the customs and attitudes regarding the dead of those responsible for burial all influenced the ways corpses were treated. Utilizing historical documentation and archaeological examples derived from several Revolutionary War battlefields in the northern and middle Atlantic regions, including Princeton, Bennington, Hubbardton, Brandywine, Paoli, and Red Bank, this paper offers an historical and archaeological context for eighteenth century battlefield burial practices.

On October 23, 1777, the day following the bloody battle of Red Bank (Fort Mercer), Sergeant John Smith of the 1st Rhode Island Regiment began the grisly task of cleaning up. He wrote: "…in the morning we began to strip & bury the Dead of our men & Hessians -- we buried 75 Hessians in one Grave in the intrenchment & Covered them over & 8 or 10 more below the bank by the River -- it took us all Day to bury the Dead" (Smith 1777). In the aftermath of battle, wounded soldiers in various stages of mutilation littered not only the battlefield proper but could frequently be found for miles around. Interspersed with them lay the corpses of men who were killed in the battle or had died during the pursuit of and by the enemy. These dead would soon be joined by those who died at makeshift field hospitals which sprang up surrounding battlefields. Methods of battlefield cleanup, such as taking care of the wounded and the disposal of corpses, are topics infrequently covered in written primary and secondary accounts of battles and their aftermath during the American War for Independence.

Historical documentation describing burial practices at battlefields of the American War of Independence provides a range of first-person accounts on how armies and battle survivors dealt with the corpses lying on their fields. Compiling the written record for the treatment of bodies is essential for understanding the potential archaeological evidence that may survive for battlefield burials. Given the number of historically reported battlefield dead, it is noteworthy that only a handful of battlefield burials have been excavated archaeologically. A similar lack of burial locations for the English and French dead on battlefields of the medieval period has also been reported (Curry and Foard 2017).

Archaeological investigations of prison and hospital locations have been completed and reported on, and many of these are marked with memorials (cf., Cotter et al. 1992a:205-210; Duell and Ragland 1930; Ragland 1930; Rutsch 1972; Santone and Irish 1997; Shaffer and Humpf 1996; Shaffer 1998; Starbuck 1990; Warfel 2000) (Table 1). In contrast, comparatively few archaeological examples of actual battlefield graves have been investigated that provide the physical burial evidence (Table 2).

In the guidance published by the National Register of Historic Places for evaluating and registering historic cemeteries, authors Elisabeth Walton Potter and Beth M. Boland state that "during the American Revolution, soldiers were buried in existing burial grounds near the place of battle" (Potter and Boland 1992:6). No documentary or archaeological evidence is offered to support this statement and our current research reveals it to be incorrect and overly simplistic. Focusing on American Revolutionary War battlefields located within the Middle Atlantic, locations of burials and treatment of corpses varied widely. The time of year of the battle, e.g., is the ground frozen or soft, the composition of the ground, e.g., does it contain many stones, how many dead required burying, whether the dead soldiers were friend or foe, officer or enlisted man, and who buried the dead all effected how, when, and where battle casualties were buried.

Where were the dead buried? The first answer that comes to mind is in a mass grave or graves on the battlefield, but that was not always the case. Mass burials are mentioned at Lexington and Concord, Brandywine, Germantown, and other large engagements, yet the locations of mass burials are essentially unknown. In the Middle Atlantic region, two are marked – the 52 dead Americans at Paoli (mentioned above), and the mass grave uncovered at Tappan, New York –

Table 1. Summary of Archaeological Examples of Hospital Burials

Hospital Site	Burial Type	Description	Method of Investigation or Reporting	Reference
Bethlehem, PA	individual	Hospital burial ground, buried by religious order (Moravians)	Historical record; archaeological survey	Shaffer 1998; Shaffer and Humpf 1996
Ephrata, PA	individual	Hospital burial ground, buried by religious order (Moravians)	Archaeological survey	Warfel 2000, 2001
Governors Island, NY	Mass grave	Hospital or prison burial ground. Remains likely	Archaeological Survey	Santone and Irish 1997

		represent British sailors		
Fishkill Supply Depot, NY	individual	Hospital burial ground	Historical record; archaeological survey	Goring 1975; Chadwick 2008
Governor's Palace, VA	individual	158 grave shafts uncovered in the garden of the Governors Palace	Archaeological survey	Ragland 1930; Duell and Ragland 1930
Langhorne, PA	shafts	Hospital burials associated with battles of Trenton (1 and 2) and Princeton. Shafts stacked 3 to 4 deep	Historical record; archaeological survey	Stewart 1992
Brandywine, PA	Mass grave	Common grave site at Birmingham Meetinghouse and at Old Kennett Meeting House, buried by civilians	Historical record	Smith 1865
Washington Square, Philadelphia, PA	Individuals in a burial ground	Burials associated with prison and hospitals of both Crown Forces and Americans, circa 1777-78	Archaeological Survey	Cotter et al. 1992a
Morristown, NJ	individual	Cemetery site at Morristown NHP	Historical record; archaeological survey	Rutsch 1972
Mount Independence, VT	Mass and individual	Hospital site at principal American fortification	Historical record; archaeological survey	Starbuck 1990, 1999

the site of Baylor's Massacre. The Paoli mass burial has not been the subject of professional archaeological investigation, but the grave's contents was reported in 1817 when the commemorative monument was erected. The Baylor's Massacre site was excavated by amateur archaeologist in 1968 and included six sets of human remains were recovered from a tanning vat. Based on the recovered artifacts – in particular, marked regimental buttons – several of the individuals were identified as young men of the 3rd Continental Light Dragoons, and subsequent research suggests that they may also be the remains of local militia (Daniels 1968; Maurer 2005:465-497).

Table 2. Summary of Archaeological examples of Battlefield Burials

Battlefield	Burial Type	Description	Method of Investigation or Reporting	Reference
Saratoga, 1777	Individuals	Isolated individuals within British lines, male and female	Archaeological	Snow 2016
Germantown, 1777	Individual	Isolated individual of the 52nd Regt of Foot; identified	Archaeological	Crane 1986; Cotter et al. 1992; Heyl 1908
Tappan (Baylor Massacre), 1778	Mass grave	Two mass graves containing multiple burials	Archaeological	Daniels 1968; Maurer 2005
Paoli, 1777	Mass grave	Large burial grave containing 52 corpses, buried by local population. Now marked by	Amateur	McGuire 2000

		obelisk		
Brandywine, 1777	Individual & reported mass grave(s)	Several isolated individual graves excavated by locals; reported burial trench	Amateur	Ashmead 1884; Anonymous 1893, 1900; Brinton [1895]
Hubbardton, 1777	Mass grave	Collection site of human remains, now marked by obelisk (1859)	Amateur	Catts and Selig 2017; Hemenway 1877; Williams 1988
Princeton, 1777	Mass grave	Reported to be in a gravel or stone pit, archaeological work identified the pit, but no human remains.	Archaeological	Bradley et al. 2017

Mass burials were also reported at Princeton Battlefield. The battle was fought in January 1777 and bodies of both American and British soldiers were reputedly moved by sled to a central location where they were placed in a stone quarry or "driftway" (defined as a common road or path for driving cattle) (Magee 1896:289; Barber and Howe 1844:272). Historical and topographic evidence, supported by strong local oral tradition located the quarry on a prominent rise on the battlefield. Recent geophysical survey identified a potential feature measuring thirty feet by about 8 feet, with regular sides. The feature was sampled and found to be a portion of a backfilled quarry pit. Unfortunately, within the sampled section, no human remains were discovered (Bradley et al. 2017).

Sometimes, individual corpses were buried where they were found. Indeed, it is the individual burial that is more often archaeologically reported and often these graves are discovered by accident. Individual burials reported include the British light infantryman of the 52nd Regiment excavated at Germantown. In this case, because of the marked regimental coat buttons, the individual was identified as Private John Waite (Crane 1986; Cotter et al. 1992b:351-353). Other isolated remains of soldiers have been found, generally by accident by farmers, on the Brandywine Battlefield (Anonymous 1893, 1900; Ashmead 1884:319). None of the Brandywine remains were archaeologically investigated. Individual burials have been reported by Dean Snow at Saratoga within the British fortification line of the Balcarres Redoubt (Snow 2016:87-91). Archaeological field work with the Redoubt in 1941 uncovered four graves of soldiers attributed to the British Royal Artillery, and in 1972 a fifth grave containing a female was identified within the foot trench inside the redoubt wall. None of the remains were stripped of clothing. The four artillerymen were likely casualties of the First Battle of Saratoga and had been carefully laid with respect (Valosin 2016: 211-2). In contrast, the remains of the female seem to have been more hastily buried, face down, facing northward, covered first with earth and then with logs. Snow estimates that, based on the number of recovered remains and the size of Balcarres Redoubt approximately 80 burials may be present within the redoubt (Snow 2016:90). A sixth burial located in 1972 in the Breymann Redoubt, was buried in a shallow, basin-shaped pit. The individual was male, in his thirties, and had no clothing or uniform parts to identify him. He is interpreted as a Loyalist or German killed in the fighting on October 7, 1777 (Snow 2016:94-95).

During the American Revolution, burial of battlefield dead in consecrated ground – church yards – does not seem to have been a concern, likely due to the practicality of finding a church cemetery convenient to the battlefields. There was obvious regional variation to this, with some battle dead buried in churchyards in more settled areas. At times when the dead could be transported to and buried in church cemeteries, they were, but in most cases this was not a deciding factor in where and how to bury the dead.

More often than enlisted men, officers may have been accorded the religious salvation afforded by consecrated ground. Mortally wounded at the battle of Monmouth, British Lt. Colonel Monckton was buried "at the north corner of the Meetinghouse [Old Tennent Church] …with all the honors of war" (Means 1833). Hessian Colonel Johann Gottlieb Rall, mortally wounded at the Battle of Trenton, was buried in in the First Presbyterian Church yard. In the case of Trenton, the historical record reports that 24 Hessian soldiers were

also buried in one pit at the Presbyterian Church (Barber and Howe 1844:298). Trenton was an unusual battle action of the War for Independence, since it took place in a somewhat "urbanized" space, so burial in a town churchyard was not unusual. Lexington, Concord, and Germantown also were fought in more settled village spaces, and battlefield dead at these sites were sometimes transported to and buried in church yards.

When disposing of the dead, any hole in the ground would do. The tanning vats at Tappan have already been mentioned, and the use of wells was reported at Brandywine (Brinton [1895]). At Bennington, Asa Fitch wrote that "previous to the battle [there had] been a log hut near the Tory's breastwork, and a small outdoor cellar formed of slabs covered with earth. The house was gone, and the slabs had rotted and let the dirt tumble down into the cellar hole. Into this cellar hole those [Tories] who were killed… were thrown in a promiscuous heap, & dirt thrown over them. Seventeen bodies were thus thrown in here this being the number of Tories left dead upon the hill
on the day of the battle" (Fitch 1777). In his pension application, New Jersey militiaman Jacob Sisco recalled many years after his service "…that a large hole or pit was dug in the earth, on the east side of the Rahway Creek, on a little eminence near the Elizabethtown road, into which the enemy threw the bodies of their dead soldiers. Many of them lay so near the surface, that the rains soon washed bare & exposed to view, the hands, feet & limbs of the dead…." (Sisco 1834).

Due to the pragmatic concerns such as stench and putrefaction of bodies, most battlefield casualties were buried as soon as possible after the action. Military formations took on this task if they occupied the battleground for any length of time. Burial details were created from the companies and battalions that were available. At Red Bank (Fort Mercer), the Rhode Island Continentals and local New Jersey militia buried the large number of Hessian casualties, in this case by throwing the corpses in the fort trenches and covering them. In 2016 geophysical testing at Fort Mercer was unable to locate human remains, likely because the Delaware River has eroded more than 120 feet of shoreline – it was reported that the last bones eroded out of the bluff about 1865 (Catts et al. 2017). British corporal Roger Lamb reported that the task of burying the dead after the First Battle of Saratoga (September 19, 1777) was daunting: "…the ground afforded on the day following a scene truly distressing – the bodies of the slain, thrown together into one receptacle, were scarcely covered with the clay, and the only tribute of respect to fallen officers was, to bury them by themselves, without throwing them into the common grave…." (Lamb 1811:192). We'll return to the issue of rank a little later.

In some battles specific soldiers, known as pioneers, were responsible assigned burial detail. British Lieutenant Gilbert Purdy, who served under Samuel Holland in the Corps of Guides and Pioneers in 1777-1778, wrote after the battles of Cooch's Bridge and Brandywine that his company was responsible for burial details. At Brandywine he reported that "In the time we Laid their Dead that was Buryed (sic) By Us on the Day After the Battle were 55 By our [Battalion] Besides What was Buryed (sic) By the rest of the Army" (Purdy 1777-78).

In most cases, the burial was carried out by the local population. Such a situation occurred if the number of casualties was particularly high, overwhelming the meager efforts of the military, or if the contenting armies had moved on without completing the task of burial. After the fight at Lexington and Concord, non-combatants buried the dead, moved by a sense of duty to honor the fallen. Mary Hartwell related that "…could not sleep that night, for I knew there were British soldiers lying dead by the roadside…." The next day, she recalled

> "…The men hitched the oxen to the cart, and went down below the house, and gathered up, the dead. As they returned with the team and the dead soldiers, my thoughts went out for the wives, parents, and children away across the Atlantic, who would never again see their loved ones; and I left the house, and taking my little children by the hand, I followed the rude hearse to the grave hastily made in the burial-ground. I remember how cruel it seemed to put them into one large trench without any coffins. There was one in a brilliant uniform, whom I supposed to have been an officer. His hair was tied up in a cue…." (Hartwell no date).

After the battles of Hubbardton, Bennington, Brandywine, Paoli, Germantown, and Tappan, civilians did much of the burying. At Brandywine, for example, Quaker Joseph Townsend recorded that after Howe's army had moved on "…the ground which they [the British army] had lately occupied at Birmingham, being now cleared and left in a desolate condition, exhibited a scene of destruction and waste. Some few of the inhabitants…found it necessary to call in the assistance of their neighbors to rebury many of the dead, who lay exposed to the open air and ravages of beasts and wild fowls, having, in consequence of the late heavy rains, been washed bare, and some few of them had never been interred" (Futhey and Cope 1881: 77). The burials Townsend referred to were located at the Birmingham Meetinghouse, where the location of the mass grave is marked by a commemorative stone.

At the battlefields of Princeton, Brandywine, and Paoli, the locals were members of the Society of Friends – Quakers – who strove to avoid involvement in the war and had little use for military-style clothing or accoutrements. Reports from Brandywine years after the battle identify burials that contained buckles, fragments of uniform coats, regimental buttons, and muskets. An isolated burial, identified as British, containing a musket was uncovered in 1900, and single graves were found in 1859 during railroad work and 1881 by a farmer. The former was identified as an American soldier and the later as British based on recovered buckles and buttons (Ashmead 1884:319; Anonymous 1893, 1900). Evidence from the Paoli battlefield shows that the Quakers buried the dead with honor and respect, and with all of their equipment of war. The 52 dead who were buried on 22 September 1777 were interred in a trench about 12 by 60 feet in two rows of twenty-six with heads facing east. The mass grave included the hats, shoes, clothing and accoutrements of the soldiers. The Paoli Monument Committee Report in 1817 stated that when they moved the bodies of four of the Paoli dead to build a foundation for the monument, they were still in their clothes, shoes, caps, and "armor" and that some bayonets were thrown in with them (McGuire 2000: 185-6).

Were the dead stripped of their clothes and buried naked or were they thrown into their graves as they were found? In the eighteenth century the term "naked" did not necessarily mean unclothed or bare, but instead that the body was indecently clothed, perhaps in undergarments of a shirt or shift. The examples of Brandywine and Paoli notwithstanding, the general rule seems to have been that if the burials were done by the army, the usable clothing and equipment, shoes, etc. were taken off the bodies and they would be buried in their shirts and possibly their trousers or breeches, but again the historical evidence is inconclusive. The practice of stripping the dead seems to have been something that each side accused the other of perpetrating and denied doing themselves; in reality, armies did it irrespective of side. Captain Jonathan Buel of the Connecticut militia articulated this dichotomy, remembering at Bemis Heights that

> "…as I passed over the battle-ground of the previous day, I saw the British dead lying scattered and mostly stripped of their clothes. This practice of stripping the dead of the enemy seems to have been considered proper at that time. The American dead were not stripped. They lay where they had fallen, and were buried with their clothes on near the place where they were found, two or three in the same hole…. The burial took place the day after the battle.... Two of our men were killed by a cannon ball. I was present when one of them was buried. A shallow grave was dug, a little grass thrown in, then the body, almost cut in two by a cannon ball, was laid in, all bloody as he fell, then a little grass and the earth thrown in to fill up the grave" (Hibbard 1897: 147).

Removal of clothing as something done by "the other" was also noted by American Ashbel Green as he traveled over the battlefield of Springfield, New Jersey. Seeing several corpses, he observed that "…If they had been Americans, I think their countrymen would not have stripped them; and, for the like reason, if they had once been British or Hessian soldiers, their comrades, in their hasty retreat, would probably not have denuded them." Stripping bodies could occur with frightening rapidity after a fight, sort of akin to the speed at which carrion birds and insects descend on a carcass. French officer Count Rechteren of the Royal Deux-Ponts Regiment reported the morning after the assault on Redoubt No. 9 at Yorktown that "…At daybreak, I saw the entrenchments which presented a shocking scene, for dead bodies stripped naked lay strewn all about…." (Baum et al. 2016:109). Stripping of usable clothing happened regardless of whether the corpse was victor or

vanquished. At Princeton one civilian recalled that the American and British dead, "frozen stiff" due to the winter weather, had "their clothing stripped off by the American soldiers…." (Barber and Howe 1844:272).

Scavenging by unauthorized people for clothing, money, and arms has long been an element of battlefield cleanup. Following the Battle of Bemis Heights, Private Ezra Tilden of Colonel Benjamin Gill's Massachusetts Militia Regiment wrote in his diary on 7 October 1777 that he "saw several dead and naked men, Regulars, or the Enemy lying Dead in the woods close by or even where the battle was fought" (MacKerron 2009: 50). On 24 June 1780, the day after the Battle of Springfield, Ashbel Green's "route homeward led me over the whole of this ground, and for the first, and I hope for the last time of my life, I saw the yet unburied corpses of the victims of war. Two or three of these corpses, stripped as naked as when they were born, lay at the bridge which the British attempted to force, and on the side adjoining the town…." (Jones 1849: 119).

Despite their seeming difference in social status conferred by rank and Lamb's statement at Saratoga above, the bodies of dead officers often received the same treatment as enlisted men. Colonel Donop was interred with military honors and received a headstone after he had been killed at Red Bank (Fort Mercer) in October 1777, and Americans buried British Captain William Leslie, mortally wounded at Princeton, with full honors in Pluckemin on 5 January 1777. However, Leslie's fellow officer Captain Francis Tew of the 17th Regiment, a Princeton veteran, was not so fortunate. Following the capture of Stony Point by General Anthony Wayne's forces on 16 July 1779, Ensign Frederick Philipse Robinson of the 17th Regiment of Foot, taken prisoner by American forces, recorded in his journal that "as soon as it was light, my attention was attracted by a Sight which I confess struck me dumb with horror. Near me I saw the naked body of my old friend Captain Tew of the 17th Regt. a man whom I loved and respected in the highest degree; I almost Sickened at the Sight and was rivetted to the Spot. An Officer who witnessed this, took me by the arm and led me amongst the Dead and Wounded in order, as he said afterwards, to familiarise me to Such Sights" (Robinson 1777).

American officers killed at Germantown were buried in mass graves with enlisted men, though some were later disinterred for burial elsewhere (Heyl 1908:55-58). At Bennington, Thomas Mellen recalled how "Not more than a rod from where I fought, we found Captain McClary dead, and stripped naked. We scraped a hole with sticks and just covered him with earth" (Butler and Houghton 1849: 29). Nahum Parker and his detachment "found two ded (sic) men on our road" on the march to Bennington on 17 August. Surely they did not leave them there but buried them probably by the side of the road (Parker 1777). Chauncey Rice in Captain Barnes' Company of Massachusetts Militia wrote that "the Lieutenat [sic] was killed and buried" where he had fallen: "at the foot of a tree" (Rice 1832).

Depending on their number the task of burying the dead could be overwhelming for the survivors, resulting in quick burials and predictable long-term results. Burials were often shallow, or the bodies barely covered. At Brandywine, one historian writing more than a century later noted that the large number of dead lay on the field for several days in hot weather. Bodies were buried in wells, in gullies along the roadside, later to be "washed or Ploughed up when the Road menders come and it was common for fifty years [about 1827] after the Battle to get Bones along the Road side…" (Brinton [1895]). Thomas Anburey at Saratoga noted that burial methods varied according to the burial party and he observed more decency than "…some parties had done, who left heads, legs and arms above ground…." (Anburey 1789:421). At one location at Monmouth battlefield, "…the British grenadiers lay in heaps like sheaves of wheat on a harvest-field. Our informant [Dr. Samuel Forman] states that they dragged the corpses by the heels to shallow pits dug for the purpose, and slightly covered them with earth; he saw thirteen buried in one hole. For many years after, their graves were indicated by the luxuriance of the vegetation…." (Barber and Howe 1844:341).

Treatment of the dead varied according to time, topography, weather conditions, and the vagaries of war. William Boutelle recorded that on 16 August 1777 following the Battle of Bennington "Night came on and [we] were forbidden to pursue the enemy. We continued to our quarters bringing with us the body of Thomas Joslin who was killed in the first onset; he was tied up in a sheet and swung on a pole, and two of us had to carry him at a time and changed often." A bit later on he recorded: "I went and helped to make a coffin

for Thomas Joslin, Dec's'd, and went to the funeral. […] The deceased was conveyed in a wagon to Bennington and decently buried in their burying ground, the minister of the town attended and went to pray at the grave; the whole company followed the corpse to the grave as mourners" (Gabriel 2016: 22-31,26-28).

Treatment of the dead sometimes depended on whose side they fought when they were alive. Often bodies were unceremoniously dumped. An anecdote told about Deacon Nathaniel Harmon following the Battle of Bennington gives an idea about the procedures: "It was a rude transaction, but the time was urgent. It was better that the dead bodies of the slain foe should be buried in any manner than left to breed pestilence upon the surface of the earth. There were two large excavations for wintering potatoes — left open in the summer time until another harvest — nearby; Mr. Harmon took his rope slip-noose halter from his horse's neck, and dragged the dead bodies of the slain enemy therewith into the excavations and covered them with earth. There were some sixty bodies thus buried in each of the two excavations (Jennings 1869: 273). In the center of the battlefield "were the remains of two potato holes, at the time of the battle. The dead bodies to the number of thirty, according to Austin Wells' statement were drawed together from this part of the ground and were thrown into these potato holes & covered, whilst a tory also found here was interred half way between the two holes" (Fitch 1777). These potato pits were reportedly near where the Barnet house now stands and recent geophysical survey in this area identified several anomalies that may be these pits (Selig et al. 2017).

Weather conditions and the time of year that the battle took place were important considerations. Battles fought in the summer and early fall when the weather is still warm necessitated a quick burial of corpses. The odor of death would have soon become apparent and may have been one reason that expedient burials were necessary. The stench or "stink" of the aftermath of battle was something that Nicholas Creswell wrote about while on Staten Island. Creswell, writing on a warm 22 June 1777 commented that he was "[a]lmost bit to death with Mosquitoes and poisoned with the stink of some Rebels, who have been buried about three weeks in such a slight manner that waggons have cut up parts of the half corrupted carcases and made them stink most horribly" (Creswell 1924: 240). Isolated battlefields, or fields that opposing forces had marched away from prior to cleaning up were places to be avoided. Fought in early July, the battlefield at Fort Ann was a dismal scene of rotting corpses left by both armies. British Lieutenant William Digby recorded the condition at Fort Ann two weeks after the battle, writing "We saw many of their [American] dead unburied…which caused a violent stench. One officer of the [British] 9th Regiment, Lieut. [Richard] Westropp, was then unburied, and from the smell we could only cover him with leaves" (Baxter 1887:234). Corporal Fox of the 47th Regiment of Foot echoed Digby's observation, writing on 26 July 1777 about the casualties of the Battle of Fort Ann that they exuded a "smell so offensive of the hill that a party of us were ordered to go and bury the dead bodies of the 9th regt and the rebels" (Houlding and Yates 1990: 158).

At some battlefields where neither British nor American dead had been buried, disposal of corpses could be extreme, including burning or tossing into a pond. Chaplain Dr. Timothy Dwight visited Forts Clinton and Montgomery with a group of officers in the spring of 1778, some six months after the battle and recorded what he witnessed (Dunwell 1991: 24-5):

> "[The] first object that met our eyes…was the remains of a fire kindled by the cottagers… for the purpose of consuming the bones of some of the Americans who had fallen at this place, and had been left unburied. Some of those bones were lying partially consumed round the spot where the fire had been kindled; and some had evidently been converted into ashes. As we went onward, we were distressed by the odor of decayed human bodies. To me this was a novelty, and more overwhelming and dispiriting than I am able to describe. As we were attempting to discover the source from which it proceeded, we found, at a small distance from Fort Montgomery, a pond of moderate size, in which we saw the bodies of several men, who had been killed in the assault upon the fort. They were thrown into this pond, the preceding autumn [1777], by the British, when probably the water was sufficiently deep to cover them. Some of them were covered at this time, but a depth so small, as to leave them distinctly visible. Others had an arm, a leg, and a part of the body above the surface. The clothes, which they wore when they were killed, were still on them; and proved that they were militia, being the ordinary dress of farmers. Their faces were bloated and monstrous; and their postures were uncouth, distorted, and in the highest degree afflictive."

Some of the deceased were still floating in the lake at least 15 years later.

Some remains were never buried. In 1778, two years after the battle of White Plains, Joseph Plum Martin found many of the dead unburied: "Here were Hessian skulls, thick as a bombshell. Poor fellows! They were left unburied in a foreign land" (Martin 2011: 89). Sometimes the dead could be left for decades, as when Anthony Wayne's forces camped around Fort Ticonderoga in December 1776 and came across the bones of French and Indian War dead. Wayne compared it to "The Ancient Golgotha a place of skulls – they are so plenty here that our people for want of Other Vessels drink out of them" (Ketchum 1997: 29). At Hubbardton the American corpses apparently were left to rot where they had fallen and no attempt made to bury the remains until years after the battle. A local historian reported that in 1784 "…the inhabitants turned out and made a general search over the battle-ground and woods adjoining, gathering up what bones they could find, which had lain bleaching in the sun, wind and rain for 7 years (amounting to many bushels) and buried them. Since that time there have not been many found. But, occasionally, when they have been discovered, they have been carefully taken care of and buried" (Catts and Selig 2017; Hemenway 1877: 751). Hubbardton Battlefield's obelisk monument, erected in 1859, is reported to mark the location of the collected remains.

Some graves were clearly known or remembered after the engagement, but their locations have been lost to time. Three years after the battle of Cooch's Bridge, grave locations were apparently still known to military commanders and to the locals. In the spring of 1780, General Samuel Patterson wrote to the Pennsylvania Executive Council to report that, in attempting to locate a New Castle County militiaman named McNabb, "…graves were opened by his wife to try and find him" (Patterson 1780). McNabb had served under Patterson at the battle. The results of his wife's burial search were fortunately unsuccessful; McNabb was found to be a prisoner with the British in New York City. Today, no burials are known at Cooch's Bridge, and geophysical survey work to locate possible graves is ongoing (Chadwick 2018).

For many participants, whether hardened veteran soldiers or raw militia, the sense of relief in surviving a battle was compounded by the difficult task of burying the dead and recovering the wounded. After the First Battle of Saratoga, British soldier Roger Lamb described the burial detail as "distressing," while Thomas Anburey mention the emotional effect of burying the dead. "You that are pleased to compliment me on my humanity," he wrote, "will think what I must have felt, on seeing fifteen, sixteen and twenty buried in one hole…." (Lamb 1811: 192; Anburey 1789:421). Following the Battle of Springfield in 1780, American Ashbel Green wrote that "…the whole scene was one of gloomy horror — a dead horse, a broken carriage of a fieldpiece, a town laid in ashes, the former' inhabitants standing over the ruins of their dwellings, and the unburied dead, covered with blood and with the flies that were devouring it, filled me with melancholy feelings, till I was ready to say – Is the contest worth all this? I was glad to get away from the affecting spectacle" (Jones 1849:121).

Summary

Treatment of the dead and wounded following American War for Independence battles in the Middle Atlantic and northeast varied according to a range of factors. Variables included 1) The location of the battle; 2) weather; 3) time of year; 4) who controlled the battlefield; 5) how much time was available for battlefield cleanup; 6) the character of the surrounding community; 7) the customs and attitudes regarding the dead of those responsible for burial; 8) whether a friend or foe; and 9) whether officer or other rank. As these eighteenth-century examples show, there existed no clear pattern regarding battlefield clean-up and the disposition of corpses. Many of the factors that influenced the treatment of the dead following a battle are similar to those reported for English and French battlefields of the fourteenth and fifteenth centuries, reflecting a remarkable continuity in methods of battlefield cleanup over the space of several centuries (Curry and Foard 2017). A further similarity between the medieval battlefield and the Revolutionary War battlefield is the remarkable lack of burials and graves found on the battlefields, despite the large numbers of reported dead and the burying of corpses on the field.

The War for Independence examples permit a general context of what most likely happened during the days after a battle:

a) Burials were carried out by the force who occupied the battlefield, or more commonly, by civilians.
b) Burial in consecrated ground, such as a church yard, was not the norm, but was sometimes done is a cemetery was convenient. Often such burials were associated with post-battle hospitals. Burial of officers in consecrated ground was more common than for enlisted men.
c) The bodies would likely have been stripped of clothing, weapons, and accoutrements, and would have been buried naked or in their small clothes. An exception to this seems to be burials by Quakers, as seen at Brandywine, Paoli, and Princeton. Stripped bodies may mean that burials are not readily identifiable through archaeological means.
d) A corollary to stripping bodies may be that the general location of mass burials could be identified by concentrations of uniform or clothing items, such as buttons, pins, and buckles.
e) Depending on the number of casualties, there were usually multiple burial sites on the battlefield.
f) The dead of both armies were often buried indiscriminately in the same grave.
g) Burials were often quick and expedient, with corpses placed in wells, pits, ponds, or other already existing holes in the ground.
h) Graves often were shallow with body parts unburied or protruding from the grave. Post-battle agricultural tillage means that archaeologically, incomplete skeletons may be the result.
i) As the war progressed, officers and enlisted men were often buried in a common grave or graves as pre-war societal norms were observed less and less among the professional soldiers.
j) The experience of battle dulled sensibilities. This "dulling" was occasionally induced intentionally in professional soldiers and influenced the approach to burying the dead. Militiamen who experience battle maybe only once in their life-times tended to act and react differently.
k) The emotional involvement of the adversaries in the cause, i.e. why the troops fought, greatly influenced the approach to enemy dead and their burial.
l) The definition of the enemy as fellow soldier, Rebel, Loyalist, African American or Native American greatly influenced the approach and treatment of the fallen enemy.
m) Treatment of enemy dead varied according to the composition of the burial party, particularly in comparing American militia and Continentals.

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Historical Narrative and Cultural Landscape Analysis: Revealing the American War of Independence Battle of Chelsea Creek

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ABSTRACT

Overshadowed by the iconic battles at Concord/Lexington and Bunker Hill, the Battle of Chelsea Creek is often overlooked as part of the siege of Boston. On May 27-28, 1775, American militia forces raided British forage and supplies on the northern shore of Boston Harbor. A running engagement with British marines and armed vessels ensued. The British forces were unsuccessful; a major result of the battle was the capture and destruction of the armed schooner HMS *Diana*. Today, the area is a heavily modified urban-industrial landscape. With funding from the National Park Service's American Battlefield Protection Program, a geospatial and temporal assessment of the location, extent, and preservation potential of the Chelsea Creek battlefield and its associated cultural resources was undertaken. By re-examining the documentary record and using GIS analysis, a digital elevation model, and a military terrain model (KOCOA), this investigation created a high resolution spatial and temporal dataset of Boston's historical landscape during the time of the American Revolution.

KEY WORDS: American Revolution, cultural landscape, battlefield, naval

INTRODUCTION

Sandwiched between the Battle at Concord and Lexington (April 19, 1775) and the Battle of Bunker Hill (June 17, 1775), the Battle of Chelsea Creek (Battle of Hog Island, Battle of Noddles Island) is often overlooked as part of the siege of Boston. On May 27, 1775, Provincial militia (American) were dispatched to the northern edge of Boston Harbor to capture, drive off, and/or destroy supplies, livestock, and other forage stockpiled by British forces on the nearby Boston Harbor islands. British marines and armed vessels from Vice Admiral Samuel Grave's fleet, later joined by troops under General Thomas Gage, attempted to stop them. The British forces were unsuccessful. A major result of the battle was the capture and destruction of the armed schooner HMS *Diana* as well as British casualties.

The Chelsea Creek Battlefield is located in the present-day municipalities of Boston (East Boston), Chelsea, Revere and Winthrop, Massachusetts. The central and unifying geographic feature is Chelsea Creek (Chelsea River), which flows into the Mystic River as it meets Boston's Inner Harbor. Today, the predominant use of the land area is industrial and commercial, with abutting high density single or multi-family residential housing and limited open space (including reclaimed brown fields). Chelsea Creek is the main waterway serving petroleum, parking facilities, and road salt depots along its shore. Portions of the study area are on original land, but segments have been filled from the eighteenth century through the present, all serving to obscure the battlefield.

HISTORICAL BACKGROUND

The Battle of Chelsea Creek is the name given to the military actions that occurred along Chelsea Creek in the area of Boston's Inner Harbor on May 27-28, 1775 (McKay 1925). Throughout May 1775, the Massachusetts Committee of Safety passed a number of resolutions calling for the removal and/or destruction

of all supplies on Noddles and Hog Islands. On May 25 or 26, General Artemas Ward convened a council of war to carry out this directive. The battle began as a large-scale livestock raid by Provincial militia on Hog and Noddles Islands (East Boston and Orient Heights). It quickly developed into what the military refers to as a meeting engagement when British marines landed on Noddles Island and pursued the militia north toward Hog Island. The marines were supported by *Diana*, Lieutenant Thomas Graves commanding, with ten or twelve longboats which moved up Chelsea Creek to intercept Provincial militia (Mastone et al. 2011; Tentindo and Jones 1976). The forward movement by British marines was stopped between the islands at Crooked Creek. With favorable winds and an incoming lunar tide, *Diana* continued up Chelsea Creek in pursuit of Provincial forces. Late in the evening, *Diana* went aground at the head of the creek (Revere) and came under heavy Provincial musket and cannon fire just as the tide started to fall and the winds died. The longboats were now used to tow *Diana* downstream. Provincial militia continued to pursue *Diana* downstream. This action culminated in a vicious encounter at Winnisimmet Ferry Ways (Chelsea), where the *Diana* was again attacked by hundreds of Provincial troops and artillery. The attack resulted in the grounding and abandonment of the *Diana*, where she was subsequently looted and burned by Provincials forces. Sporadic fighting between Provincial and British forces lasted through June 10 as raids on supplies continued (Brown et al. 2013).

This engagement gained local recognition for its manifestation of "firsts" in the American War of Independence (Bossom 1900; Brown et al. 2013; Mastone et al. 2011; Tentindo and Jones 1978):

1. First planned offensive operation by Provisional forces.
2. First instance of military cooperation among the colonies ("Army of the United Colonies").
3. First use of artillery by the Provincials.
4. First naval engagement.
5. First American battle victory.

Within the larger context of the entire war, the Battle of Chelsea Creek should be viewed as an integral component of the Siege of Boston. The siege is defined by three overlapping phases. The first phase was largely organizational, beginning with General Artemas Ward taking command of the provincial forces following Lexington and Concord and ending with appointment of George Washington as Commander in Chief of the newly created Continental Army in Cambridge on July 2, 1775 (Griffith 2002; Lancaster 1971). The second phase began when both armies realized that vital stores of livestock, fuel, and hay needed for the survival of the British garrison trapped in Boston lay unsecured on the islands ringing Boston Harbor (Frothingham 1849). The final phase was the actual military envelopment of the city of Boston marked by the Battle of Bunker Hill June 17, 1775, the American occupation of Dorchester Heights, and finally the evacuation of Boston by the British on March 17, 1776 (French 1911; Frothingham 1849; Ketchum 1974).

RECONSTRUCTING THE 1775 LANDSCAPE

Recreating landscape features of this little known event and integrating them with historical source documents was only possible through the utilization of geographic information system (GIS) technologies. A high resolution GIS dataset and Citation Data Model (CDM) of the temporal and spatial features associated with the battle and its 1775 landscape map were developed. Base-level and battlefield maps were produced within the GIS through the integration of multiple data sources including, primary and secondary historical accounts, maps, high resolution orthophotographs, and light detection and ranging (LIDAR) data (Maio et al. 2012; Mastone et al. 2011).

The CDM provided the framework to organize and integrate historical records and geospatial data within a GIS. This methodology organizes and relates the historical sources to the points, lines, and polygons that make up vector GIS data (Frye 2008). The CDM contains a variety of primary and secondary historical and cartographic sources. ESRI's online Mapping Center (Frye 2010) provided the template for the CDM. Each feature created on the map is linked to the source from which it was derived, and each source is assigned a unique identifier (Frye 2008). Physical landscape features, such as the shoreline and saltmarshes, are related to the historical map from which their spatial attributes were defined. The CDM also provides accountability in mapping (Maio et al. 2012).

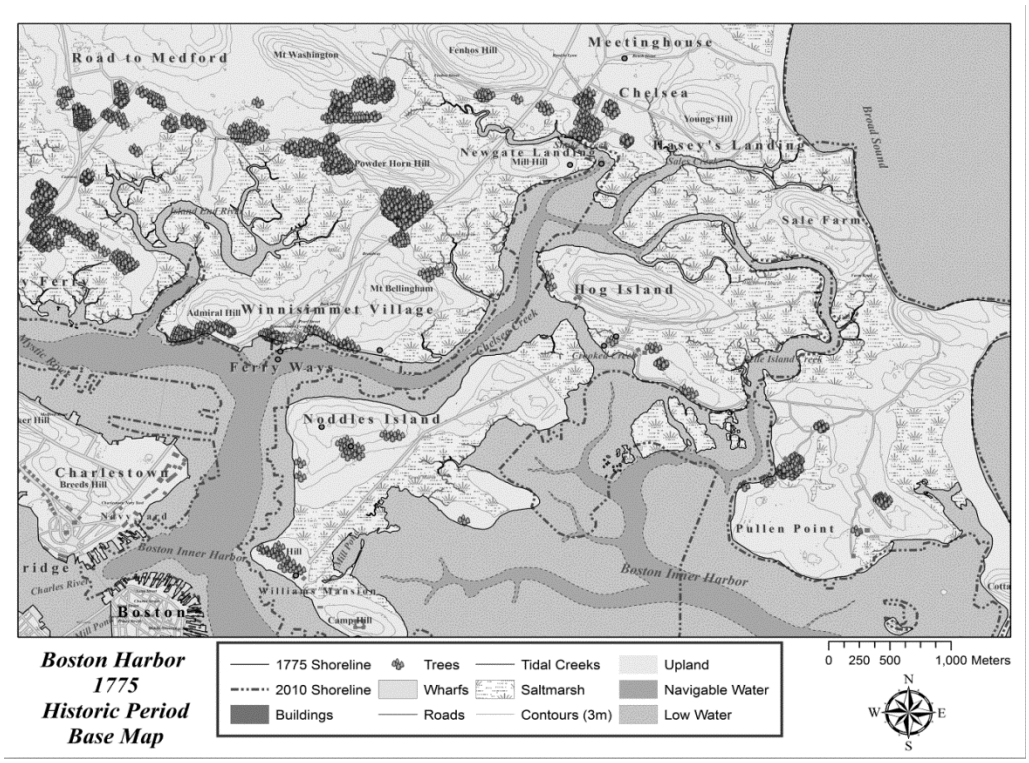
Creating the 1775 landscape base map was a critical component to our analysis. It serves as the foundation for the entire dataset and is crucial for the accuracy of the military terrain analysis and the mapping of defining features and potential archaeological resources. To achieve the desired accuracy, the 1817 and 1847 Coast Survey maps were used as the reference layer for all major landscape and topographic features. The most landward shoreline shown on 1847 Coast Survey maps is associated with the High Water Line (HWL) and was digitized to represent the 1775 shoreline within the GIS (BSC 2007; Mague 2008). In areas where 1847 shoreline was not representative of the 1775 shoreline, the 1817 Coast Survey maps were used as the secondary source. The resulting shoreline served as a guide for georeferencing non-registered historical maps. It was also the starting point for the digitization of spatial data shown on the Coast Survey maps representing aspects of the physical landscape (i.e., upland, rivers, and saltmarshes). The historic map from which each feature was digitized was cited within the CDM. In some cases, non-registered historical maps were used to identify places.

While the physical landscape changed very little between 1775 and the Coast Survey of 1847, there was extensive development with respect to buildings, roads, and wharfs. As a major hub of colonial American commerce, Boston's coastal landscape had already undergone over 100 years of extensive modifications in the form of tideland filling, wharfs, and roads. Roads and other anthropogenic landscape features from the 1847 maps were digitized when they could be identified on the earlier non-registered maps. Some features (wharfs, roads, buildings) shown on the base map likely post-date 1775 (Maio et al. 2012).

A digital elevation model (DEM) representing the 1775 topography was essential to carry out viewshed analysis and accurately depict contours on the base map. The DEM was produced through the integration of high resolution light detection and ranging (LIDAR) data for the uplands and constant value raster grids representing the intertidal and marine areas. The use of modern data to depict the 1775 upland topography was appropriate given these areas have not been modified to a degree which would affect our ability to accurately produce contours and carry out viewshed analysis. The existing "Upland" polygon feature class, digitized from the Coast Survey maps, was used to clip the 2002 LIDAR data (MassGIS 2003). The clipped LIDAR derived DEM covered only upland areas of the study site (Maio et al. 2012).

Extensive tidelands filling did not allow for the use of the LIDAR data in these areas. A single value DEM to represent the saltmarshes was therefore created with an elevation of 1.71 meters above sea level, obtained from the averaged elevation values from the LIDAR DEM in the area of the Belle Isle Saltmarsh Reserve (a protected relatively unmodified conservation area). This provides a proxy elevation for historical saltmarshes within the study area. Factoring in sea-level rise (approximately 0.63 meters), the resulting adjusted historical saltmarsh elevation value is 1.08 meters relative to the LIDAR dataset. Similar methods were used to create a raster layer for the local marine areas, setting its value to zero. The three separate DEM's (Upland, Saltmarshes, and Waterbodies) were then mosaicked together to represent the area's historical terrain. The DEM was used to create three meter contours and carry out viewshed analysis.

In addition, time series maps where produced to enhance the ability to understand and convey battlefield events. Each map portrays a temporal phase of the battle derived from the timeline of battle events. These series of events were divided into eight phases based on their spatial and temporal relationship and portrayed on an individual map displaying events occurring during each phase. This data was then overlaid on the historical base map (Mastone et al. 2011). The results of the geospatial assessment of the area provided the requisite baseline to successfully carryout a military terrain analysis and guide interpretation (Figure 1).



GROUNDING THE NARRATIVE

The primary accounts of this battle were often from non-locals unfamiliar with the local landscape and place names. These accounts were often vague with features unnamed making it difficult to identify them on a map. These terrain features are organized and cataloged under the appropriate KOCOA components. KOCOA is an acronym that stands for: **K**ey or Decisive Terrain; **O**bservation and Fields of Fire; **C**over and Concealment; **O**bstacles; **A**venues of Advance and Withdrawal (see Table 1).

The National Park Service (NPS) utilizes KOCOA, a standard method of military terrain analysis to define the limits of historical battlefields. The KOCOA approach correlates significant terrain features recorded in historical accounts with terrain features that can be identified on the modern landscape in order to establish the boundaries of the battlefield to reliably locate events on the battlefield.. Significant terrain features may be natural or cultural in origin. To facilitate interpretation of the Battle of Chelsea Creek, the map depictions utilized the reconstructed 1775 historic landscape for each of the various KOCOA components. Unfortunately, the detail of historical accounts does not allow us to further identify specific units (e.g., Massachusetts or New Hampshire militias).

KOCOA Component	Definition	Example
Key or Decisive Terrain	Any locality or area, the seizure of which conveys a military advantage to a combatant.	High ground, open fields, navigable water.
Observation and Fields of Fire	The ability to see over a particular area and acquire targets.	High ground, open fields.
Cover and Concealment	Cover is protection from the effects of fire. Concealment is protection from observation.	High ground, buildings, vegetation, fortifications, ditches, ravines, gullies, embankments.
Obstacles	An obstacle is any natural or	Bodies of water, marshes, ditches,

	manmade obstruction that disrupts movement.	ravines, walls, dense vegetation.
Avenues of Advance/ Withdrawal	The route a force can use to reach its objective or withdraw from an area.	Roads, railroads, paths, dry creek beds, navigable water.

Table 1: KOCOA Terrain Analysis Definitions (U.S. Army FM 5-33; 6-0; 34-130)

Key Terrain

The broken topography of the Chelsea Creek Battlefield accentuated the importance of high ground. While a majority of the terrestrial landscape provided advantage to Provincial forces, the navigable water sheet of Boston Harbor, principally Chelsea Creek, must be viewed as key terrain for British forces as it provided both the principle means of conveyance and the firing platform for any British vessels.

***Winnisimmet Village/Winnisimmet Ferry*:** In 1631, the General Court of Massachusetts granted to Thomas Williams the right to operate a ferry between Winnisimmet (Chelsea) and Boston. This ferry landing was near the base of Admiral's Hill at the foot of Broadway. In 1634, Richard Bellingham (future Governor) purchased land and the rights to the associated ferry. Bellingham moved the ferry landing east to the foot of Winnisimmet Street near the present Fitzgerald Shipyard in Chelsea (Chamberlain 1908). Winnisimmet Ferry continued to occupy this location until its closure in the early twentieth century.

Winnisimmet Village and Ferry became a strategic location with the closure of the Port of Boston. In April 1775, Graves records, "I have also hired a small Sloop of 25 Tons which I have placed between Noddles Island and the Main near Winnisimmet Ferry; through this passage I find much Smuggling has been carried as it is extremely convenient and near to the two Towns" (Clark 1964:59-60). This sloop is likely the *HMS Britannia* that was engaged at Winnisimmet Ferry coming to the aid of the *Diana* during the battle.

Winnisimmet Village and Ferry was key terrain for Provincial forces. The decisive engagement of the two day battle was fought here culminating in the grounding and burning of the *Diana* (ADM 1/5307; Anon 1775a; Anon 1775b; Barker 1774-1776; Graves 1775b). John Dawson, sailing master of the *Diana,* testified that "the Tide not withstanding set us on the ferry ways at Winnisimmet -The Rebels all this time keeping a very hot fire upon us from the Houses behind Walls and other Covers" (ADM 1/5307). Farnsworth (1775-1779:80-81) recorded in his journal: "At night March[d], to Winnisimit ferry whare thare was A Schooner and Sloop Afiring with grate fury on us thare But thanks be unto god that gave vs the Victry at this time for throu his Providence the Schooner that Pla[d] upon us the day before run Aground and we Sot fiar to hur And Consumed hurt hare And the Sloop receved much damage."

***Mount Bellingham*:** Mount Bellingham is a drumlin feature roughly encompassed within the triangle created by Broadway, Central Avenue, and Eastern Avenue in Chelsea. The role of this key terrain feature during the battle is unclear. If utilized by the Provincials, Mount Bellingham would have provided an excellent line of sight to observe the British position on Noddles Island Hill (See Observation below). Roads from Medford and Winnisimmet Ferry converge near Mount Bellingham's base allowing for the possibility that this is the knoll referred to in the account of James Stevens (below).

***Mill Hill*:** Mill Hill is a small drumlin feature lying easterly of Broadway in Chelsea and adjacent to the Slade Tide Mill in Revere, across Snake Creek from the rise of ground identified as "Chelsea Neck" by McKay (below). This feature provided the Provincial militia with a firing position that enabled them to catch the *Diana* in a crossfire with elements positioned on Chelsea Neck. Stevens related that his party arrived: "within a quarter of a mile of the fery & then halted & our ofisers went to louk out to place the canon thay went round by the water while thay come in sight of the sconer when as son as the regerlers saw our men thay fired on them then the firing Begun on boath sides & fired very worm there come a man & ordered us over a nol rit into the mouths of the canon we got on the top of the nol & the grap shot & canon bauls com so thik

that we retreted back to the rode & then marcht down to the fery (Stevens 1775-1776:45-46)." Mill Hill is a better fit than Mount Bellingham for the knoll described by Stevens and is likely the first position occupied by Putnam on his arrival in Chelsea (Stevens 1775-1776).

***Chelsea Neck*:** McKay (1925:13) relates that the "high ground, easterly of Powderhorn Hill and lying in Revere, north of Snake Creek, thence around into Winthrop was in the early days called Chelsea Neck, since the lay of swamps and creeks converted it into the semblance of a strip of land." It was on this key terrain feature that Stark and Nixon deployed their men in line of battle as described above (Anon 1775b). Chelsea Neck likely included the Newgate/Yeaman House where battle eyewitness Elizabeth Hasey reported seeing a Provincial cannon position (Chamberlain 1908). Chelsea Neck together with the Slade Tide Mill and Mill Hill formed a dangerous cul-de-sac that exposed the *Diana* to Provincial fire from three directions and threatened to trap her in upper Chelsea Creek.

***Hog Island (Orient Heights)*:** Hog Island occupied a strategic position between Noddles Island and the Chelsea Mainland. The dominate terrain feature characterizing Hog Island was a 152 foot drumlin (Orient Heights) that provides a nearly 360º view of the battlefield. In 1775, the island was owned by Oliver Wendell, a resident of Kingston, and Jonathan Jackson of Newburyport, who left the running of the farm to manager, William Harris (Anon 1775b). A letter from H. Prentiss to Oliver Wendell dated May 12, 1775 bears testimony to the position in which Harris found himself on Hog Island. Prentiss related that "Mr. Harris is very uneasy, the people from the Men of War frequently go to the Island to Buy fresh Provision, his own safety obliges him to sell to them, on the other Hand the Committee of Safety have threatened if he sells anything to the Army or Navy, that they will take all the Cattle from the Island, & our folks tell him they shall handle him very rufly (Prentiss 1775)." At 11 AM on May 27, Stark and Nixon crossed Belle Island Creek from the Sales Farm and began liberating the livestock on Hog Island (Anon 1775b; De Guines 1775). Estimates list 300 to 400 sheep together with horses and cows were taken from the Island. During mid-afternoon, a detachment of 30 men including Corporal Amos Farnsworth, crossed to Noddles Island. Their actions were observed by British Captain John Robinson aboard the *HMS Preston* touching off the Battle of Chelsea Creek (Robinson 1775a). Control of Hog Island allowed Provincial forces to maintain communications with the Chelsea Mainland during early phases of the battle.

***Hog Island Marsh*:** In 1775, Hog Island Marsh was a 50 acre area tideland separating Hog Island and Noddles Islands. Crooked Creek (Crooked Lane) was a tributary of Chelsea Creek that bisected this marsh. A road crossed this marsh linking Hog Island and Noddles Island to the Chelsea Mainland. Crooked Creek could only be forded at low tide making Hog Island Marsh a key terrain feature during the battle. Provincial control of this marsh allowed for communication between the main body of militia and Farnsworth's Detachment on Noddles Island. A sharp engagement (see below) took place here as British Marines advanced upon the detachment (McKay 1925; Sumner 1858; Tentindo and Jones 1978). Today, the boundaries of Hog Island Marsh can be delineated as an area of low lying filled tide lands lying southeast of the rise of Orient Heights (Hog Island) in East Boston.

***Noddles Island Hill/West Head*:** Noddles Island Hill appears in accounts of the battle as the location of the British artillery position. In "A Circumstantial Account Of The Late Battle At Chelsea, Hog Island, &c" the author records that during the burning of the *Diana* "a heavy cannonading was begun, at Noddles Island hill, with the 12 pounders upon the provincials" (Anon 1775b). Sumner (1858) identifies West Head as that hill. Possession of this key elevation conveyed two distinct advantages to the British. First, it provided an excellent view over much of the Chelsea shoreline and Chelsea Creek. Second, the British artillery position here commanded both a key segment of Chelsea Creek and Winnisimmet Ferry (see Observation and Fields of Fire below). This artillery position provided cover to British vessels as they ceased operations and withdrew from Chelsea Creek.

***Noddles Island/Smith Hill*:** The Smith Hill place name does not appear in any account of the battle. However, this was a key terrain feature for the British as the location of the British naval storehouses, wharf, and mansion house occupied by Henry Howell Williams (Sumner 1858; Tentindo and Jones 1978). Graves's

desire to protect the vital stores housed on Smith Hill prompted him to act once the Provincial threat was known. Smith Hill was an important British staging area throughout the battle. There is evidence that the *Britannia* tied up to the wharf with many casualties after being badly damaged during the battle (Clark 1964:606-607). Smith Hill became the Provincial objective during subsequent actions on Noddles Island from May 29-June 10. Williams's mansion and naval cooperage was burned on May 29-30 (Noddles Island Papers 1775-1814). The naval storehouse was burned on June 10 (Tentindo and Jones 1978).

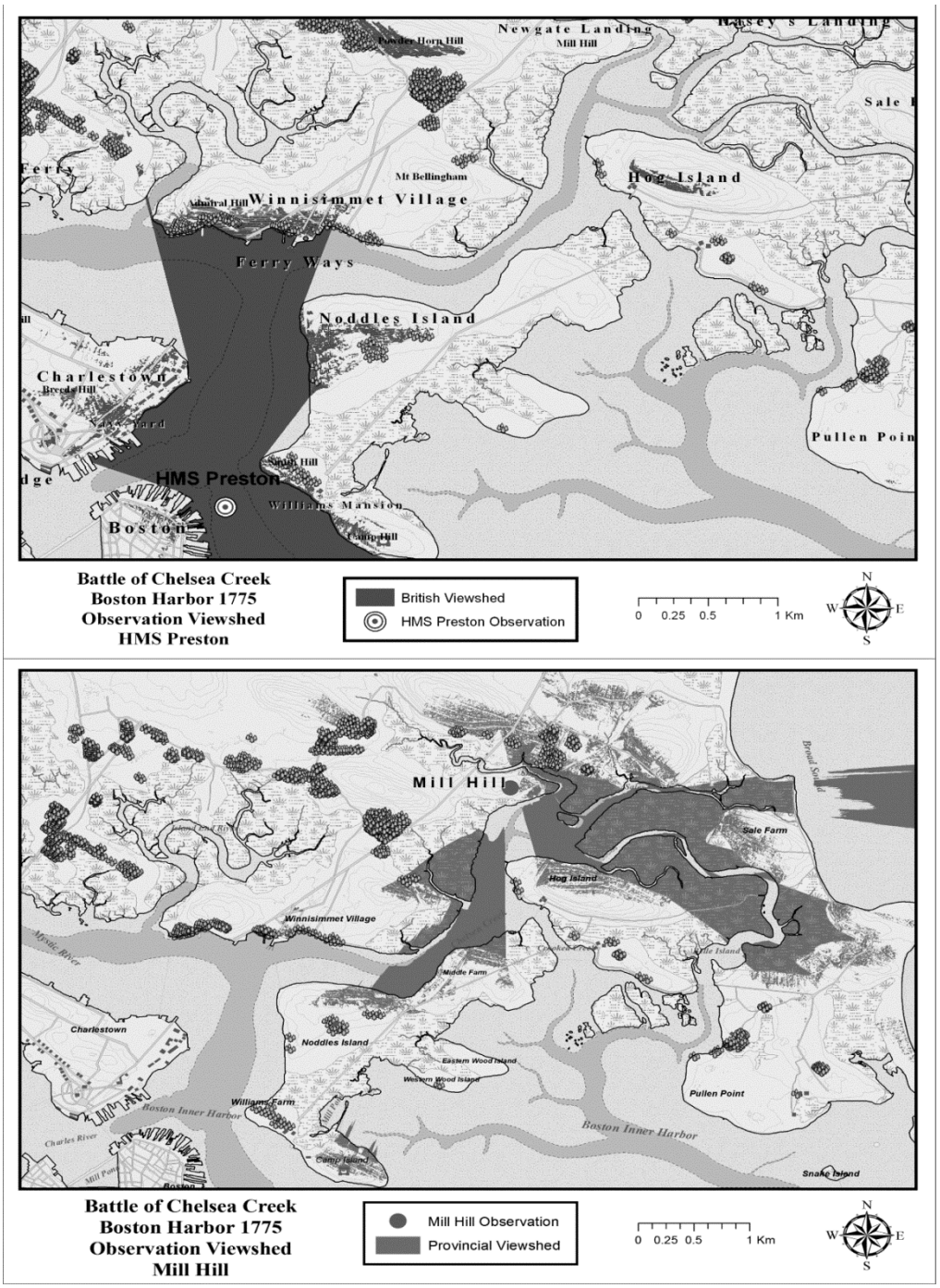
***Chelsea Creek (Chelsea River) Navigable Water*:** Chelsea Creek extends roughly two miles from its mouth near the Meridian Street Bridge east and north to Mill Hill where it becomes Snake Creek. This waterway served as an avenue of approach and withdrawal for the Royal Navy. Any vessels traversing the waterway could act as movable firing positions throughout the battle. Lack of Provincial control of this key terrain feature necessitated their long circuitous route in approaching and withdrawing from the battlefield. Conversely, British control of this feature dictated the course of British actions. Admiral Graves's orders for *Diana* were for that vessel to pursue and cut-off Provincial forces as they withdrew (Graves 1775b). Thus, the navigable channel of Chelsea Creek is included as a key terrain feature for the British.

Observation

Places from which critical observation took place and are recorded can best be explained by referencing the maps that follow (Figure 2). The view sheds or lines of sight from each point are illustrated and shaded areas denote what was visible to a person standing at that observation point.

British naval vessels are included here as individual movable observation points. Captain John Robinson of the *Preston* was the first to record seeing Provincials at approximately 2 o'clock in the afternoon "on Noddles Island destroying some hay" (Robinson 1775a). From the position of the *Preston*, Captain Robinson observed Provincial activity on West Head.

***Mount Bellingham*:** If utilized by the Provincials, Mount Bellingham would have provided an excellent line of sight to observe the British position on Noddles Island Hill. The convergence of roads near its base suggests the possibility this may be the knoll referred to in the account of James Stevens (above).



***Mill Hill*:** Mill Hill is a small drumlin feature lying easterly of Broadway in Chelsea and adjacent to the Slade Tide Mill in Revere. Mill Hill juts out into Chelsea Creek providing good lines of sight over upper Chelsea Creek. This position enabled Provincial troops to see up Sale Creek, Belle Island Creek, and down Chelsea Creek as far as Hog Island. This feature is most likely the knoll referred to in the account of James Stevens (above) (Figure 2).

***Noddles Island Hill (West Head)*:** Noddles Island Hill/West Head provided an excellent view over much of the Chelsea shoreline and Chelsea Creek. British marines positioned here could see northeast up Chelsea Creek as far as its bend at Mill Hill. During daylight, this viewshed allowed the British to observe Provincial movements along the key Provincial position at Winnisimmet. During the night of May 27-28, the

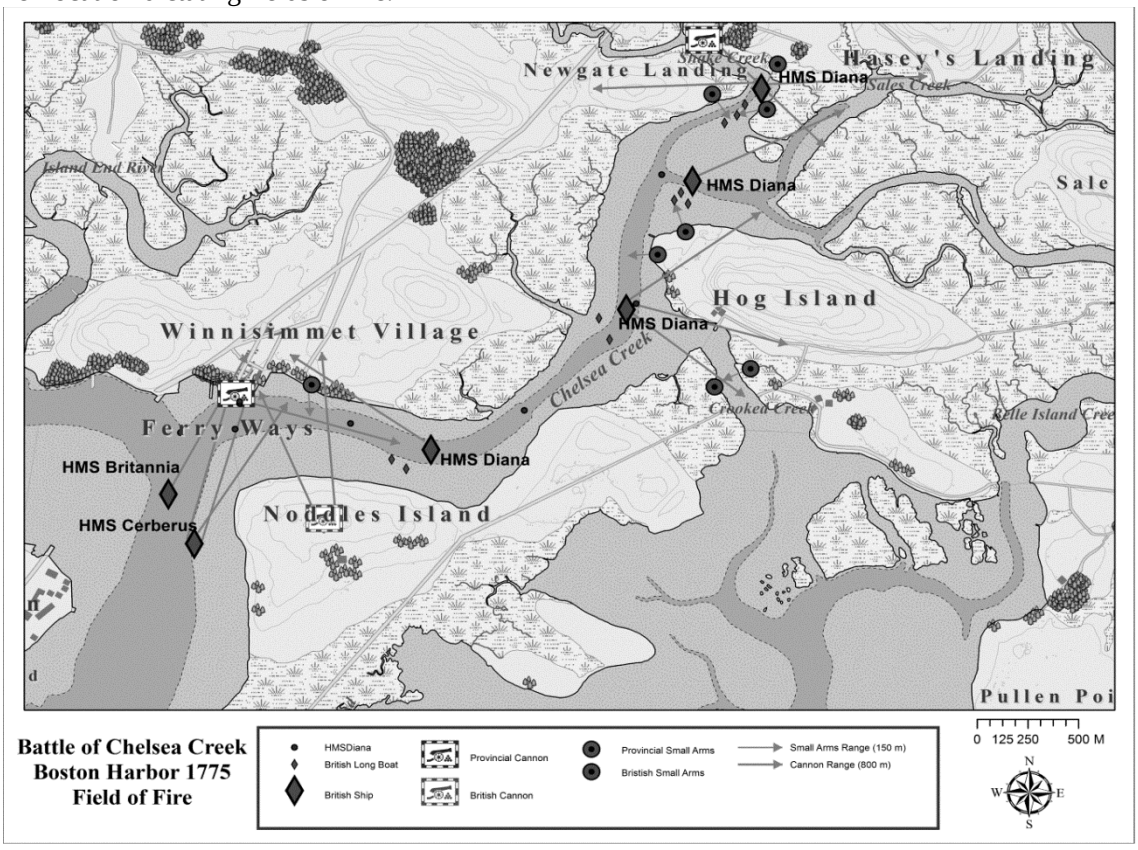
British used West Head to observe the progress of the *Diana* as she attempted to extricate herself from upper Chelsea Creek. The British placed an artillery battery at this position in an attempt to cover the *Diana's* withdrawal (see below).

***Hog Island Summit*:** While there is no record of Provincial forces occupying the summit of Hog Island (today, Orient Heights section of Boston), it offers a commanding view of the entire battlefield. These vistas enhanced our understanding of KOCOA derived features and aided in our understanding of battlefield events. Certain defining features now obstructed by filling and development activities still had a visible signature on the landscape. For example, the now filled course of Crooked Creek was clearly discernible as low topography coinciding with its predicted location.

Fields of Fire

The approximate firing positions for Provincial and British forces are depicted on Figure 3. The effective range of small arms was depicted as 100 yards and cannons averaged to 1,000 yards. The prevailing direction of fire is depicted in direction of opposing forces.

Provincial artillery positions at the Newgate/Yeaman House and at Winnisimmet Ferry were located to command the main channel of Chelsea Creek. These locations are mentioned in both Provincial and British accounts (ADM 1/5307; Stevens 1775-1776). The British artillery position is mentioned in several accounts as being on West Head (Anon 1775a; Anon 1775b; Graves 1775a; Sumner 1858); it was hoped that artillery position would provide cover to British vessels as they ceased operations and attempted to withdraw from Chelsea Creek. Provincial small arms fire came from several positions. The crew of the *Diana* reported coming under musket fire from "the Houses behind Walls and other Covers" as they made their way past Winnisimmet Village (ADM 1/5307). They also reported taking small arms fire from Noddle's Island, Hog Island, and the Main (ADM 1/5307). *Diana* could act as movable firing positions throughout the battle with her location dictating fields of fire.



Cover and Concealment

Provincial forces used key terrain features and Winnisimmet Village as cover (ADM 1/5307; Stevens 1775-1776). They also used the marshes along Chelsea Creek as cover. The small inlets and ditches made by feeder streams provided ready-made trenches that the Provincials used as cover. The engagement between Farnsworth's Detachment and Royal Marines at Crooked Creek (Hog Island Marsh) illustrates their use as trenches. Farnsworth wrote: "we Crost the river and about fiften of us Squated Down in a Ditch on the mash and Stood our ground. And thare Came A Company of Regulars on the marsh on the other side of the river And the Schooner: And we had A hot fiar until the Regulars retreeted (Farnsworth 1775-1779:81)."

British forces did not have the same terrain features available to them or failed to take advantage of them. British military doctrine required the use of linear formations with firing by platoon to make best use of their shoulder arms (Nardo 2003). There is no evidence that they acted contrary to this doctrine at Crooked Creek. *Diana*'s crew was fairly well protected from Provincial small arms fire. It was not until the *Diana* grounded and the Provincial artillery could rake their position that the ship became untenable. The sailors in the longboats trailing *Diana* were not well protected. At least two seamen from the *HMS Somerset* were killed as they tried to tow the *Diana* out of the upper reaches of Chelsea Creek (LeCras 1775).

The same terrain features concealed Provincial movements. The few roads tended to wind their way around the base of high terrain. Elevations like Mount Bellingham, Mill Hill, and Hog Island (Orient Heights) lay between the roads and British observation points. Provincial forces moving along these roads at night were invisible to British ships in the harbor. It was not until 2 PM on May 27th, when Provincial troops set fire to hay and houses on Noddle's Island, that the British became aware of what was happening (Robinson 1775a).

Obstacles

***Chelsea Creek*:** Chelsea Creek and its tributaries comprised the major obstacles confronting Provincial forces. British naval vessels controlled Boston Harbor making it impossible for the Provincials to utilize any vessels. Graves strategically positioned the *Britannia* in the mouth of Chelsea Creek for the express purpose of interdicting vessel traffic in and out of the creek (Clark 1964:59-60). British control of the waterways necessitated the long circuitous avenue of approach used by Provincial forces across the tributaries of Sale, Belle Island, and Crooked Creeks. Negotiation of these tributaries required close coordination with low tide (Bossom 1900; McKay 1925; Sumner 1858; Tentindo and Jones 1978). The British were not so limited; Lieutenant Graves was simply ordered to "sail as high as possible to prevent [the Provincials] Escape" (Graves 1775a).

While water bodies provided a clear natural obstacle to Provincial forces, the effects of a falling tide created tidal flats. Exposed tidal flats may have facilitated the movement of individuals by providing additional crossing points and uncovering marsh land that could provide cover and concealment. However, soldiers herding captured livestock would have experienced trouble negotiating the soft muddy terrain with animals in tow.

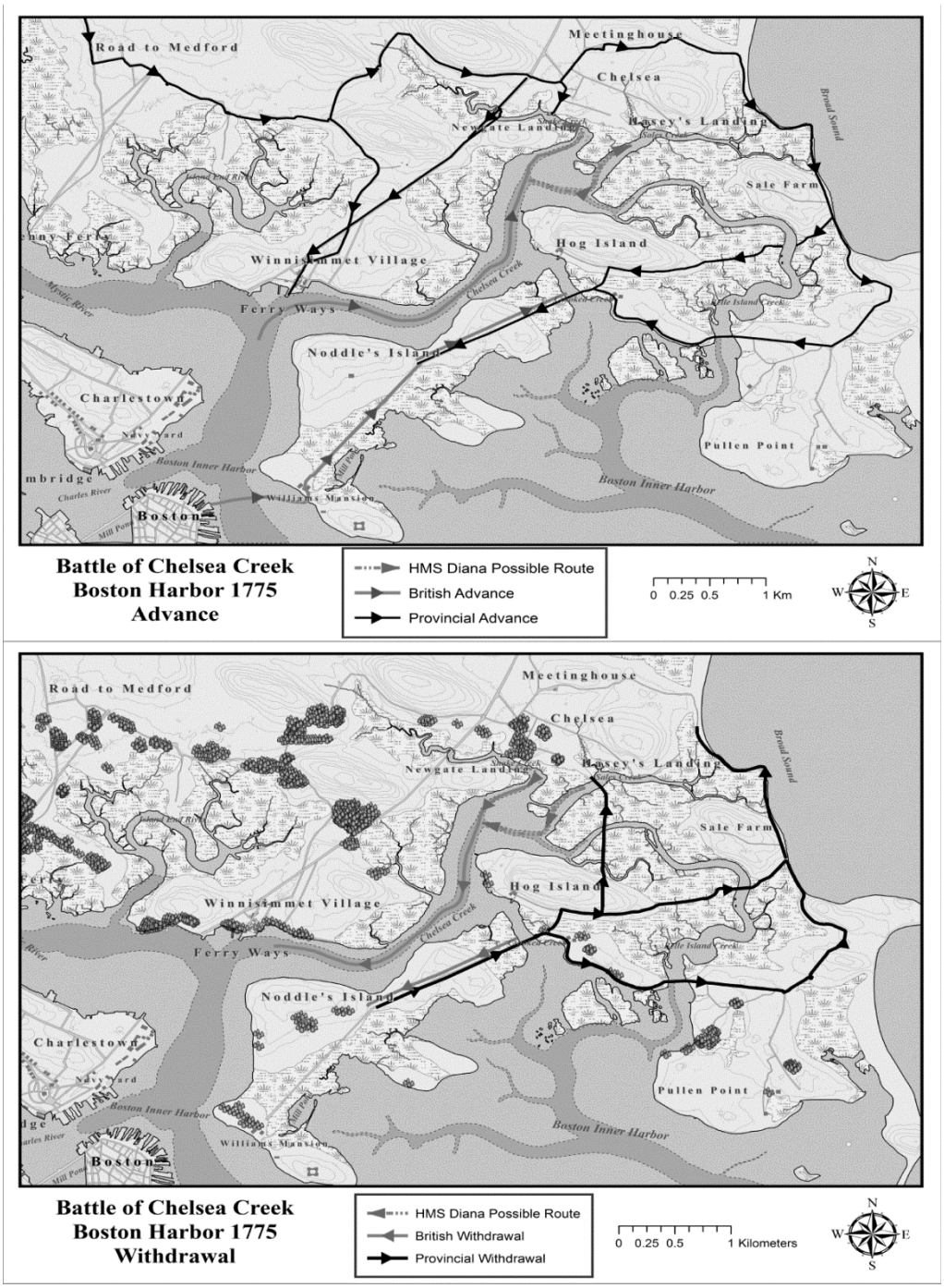
***Belle Island Creek*:** Belle Island (Isle) Creek was a meandering tributary of Chelsea Creek that separated Hog Island (Orient Heights) from the Chelsea Mainland. The extensive bordering marsh was used as pasture and for harvesting salt hay. The creek itself was easily fordable at low tide at crossing places below the Sale Farm and above Pullen Point. Between 10 AM and 11 AM on May 27, 1775, Colonels Stark and Nixon, with their men, made the crossing from Sale Farm while the tide was still high (Anon 1775b; De Guines 1775; Ehret 2011). Captured livestock, the raid's objective, could only cross at low water. This necessitated an earlier crossing and careful coordination with the low tide to remove the captured animals.

***Crooked Creek/Hog Island Marsh*:** Crooked Creek, a tributary of Chelsea Creek, separated Hog Island (Orient Heights) from Noddles Island (East Boston). It was wider and deeper than Belle Island Creek

and together with the bordering Hog Island Marsh presented formidable obstacle to Provincial movement. A rudimentary road connecting Noddles Island with Hog Island did provide a ford only traversable at low tide. Farnsworth's Detachment, crossed from Hog Island to Noddles Island during mid-afternoon on May 27th correlating well with the estimated low tide at 3:37 PM (Farnsworth 1775-1779). This detachment had to conform their movements with low tide or risk being stranded on Noddles Island. As this detachment negotiated Hog Island Marsh on their return from Noddles Island, they came under fire first from the *Diana* and then from the Royal Marines sent in pursuit. Once across Crooked Creek, Farnsworth with 14 men formed a rear guard using a ditch as a natural fortification. The short, sharp engagement that followed resulted in at least two British casualties (Farnsworth 1775-1779).

Avenues of Advance and Withdrawal

The route a force can use to reach its objective or withdraw from an area can have a major impact on the course of action and the capabilities of the opposing forces. Topographic and cyclical environmental conditions (e.g., tides) proved to be factors directly affecting the movement of both forces. The respective avenues of advance and withdrawal are indicated on the following map (Figure 4).



***Provincial Advance*:** The Provincial advance to Noddle's Island and Hog's Island conformed to the Old County Road or Road to Salem. Some Provincial forces may have taken a more direct farm road from the Chelsea Meetinghouse to the Sale Farm during the morning of May 27 (Bossom 1900; MacKay 1925; Tentindo and Jones 1978). The approach was concealed from British observation by darkness and terrain.

Tidal conditions affected the Provincial movement across the marsh surrounding Hog Island. There were no bridges on the road network linking Noddle's Island with Hog Island and the Chelsea Mainland in 1775. Crossings of Belle Isle Creek and Crooked Creek had to be coordinated with low tide at natural fording places. Their control was essential for Provincial troops. Individual soldiers could cross marshes, tidal flats, and shallow creeks with little difficulty, but it would have been impossible to negotiate this terrain with

livestock. Proper coordination with tidal fluctuations was a key factor in the Provincial success at Chelsea Creek.

***British Advance*:** British forces advanced along two paths. Marines were landed at the wharf/ferry landing associated with the Williams Mansion on Noddle's Island and moved overland in pursuit of the Provincials. This route roughly conforms to present-day Saratoga Street in East Boston. At the same time, the *Diana* with ten or twelve longboats proceeded up Chelsea Creek in an attempt to block Provincial withdrawal (Bossom 1900; MacKay 1925; Tentindo and Jones 1978).

An incoming spring or lunar tide which exceeded mean high water by 10 feet (Figure 3) and favorable winds greatly facilitated *Diana's* movement into the upper reaches of Chelsea Creek and allowed the possibility of the vessel entering Sales Creek (Hassey's Landing) and/or Snake Creek (tide mill). While Chelsea Creek is generally navigable, this advancing lunar tide provided a much wider channel and deeper channels for Sale and Snake Creeks.

***Provincial Withdrawal*:** The Provincials withdrew along the same route as they approached, except for one significant difference. While one party of Provincials withdrew with the captured livestock along the road back to the Chelsea Meetinghouse, another party moved through the marshes and engaged the *Diana*. This interpretation is based upon testimony from the *Diana's* crew and reports of spent munitions found around the tide mill at the head of Chelsea Creek (ADM 1/5307; Chamberlain 1908).

While *Diana* could move upstream taking advantage of tidal flow, the incoming tide would have hindered Provincial withdrawal through the marshes. The main body of these troops moved their captured livestock along the Beach Road and back to the farm path across the marsh after crossing Crooked Creek. Their destination was the Chelsea Meeting House. Given that *Diana* remained under small arms fire, some Provincial troops must have moved along the western edge of Hog Island.

***British Withdrawal*:** After the brief engagement at Crooked Creek, British land forces withdrew along their previous route of advance. These British Marines camped on Noddle's Island for a few days following the battle (Chads 1775; Robinson 1775b).

The rising tide and dissipating winds directly affected the movements of *Diana*. The *Diana*'s advance placed her above the head of Chelsea Creek, likely in Snake Creek or perhaps as high as the tide mill. The advantages of the extreme high tide were quickly lost once Lieutenant Graves made the decision to withdraw from Chelsea Creek. As the *Diana* came about in preparation for her return, the wind slackened. The incoming tide, which had previously facilitated *Diana's* advance, now threatened to ground her within easy reach of Provincial forces occupying both banks of the creek (Bossom 1900; McKay 1925; Tentindo and Jones 1978). The vessel's movements were now dependent upon the ability of the accompanying longboats to tow it down stream. Local tradition has the *Diana* grounding first at the head of Chelsea Creek, opposite Mill Hill, before grounding again for the final time at the Winnisimmet Ferry Ways. As the *Diana* reached a point opposite Winnisimmet Ferry, Provincial forces in buildings and behind stone walls concentrated their fire on the sailors manning the longboats. This fire compelled the longboats to cast off, leaving the *Diana* to drift westward (with the tide now falling) and ground on a sand bar near the ferry ways (ADM 1/5307).

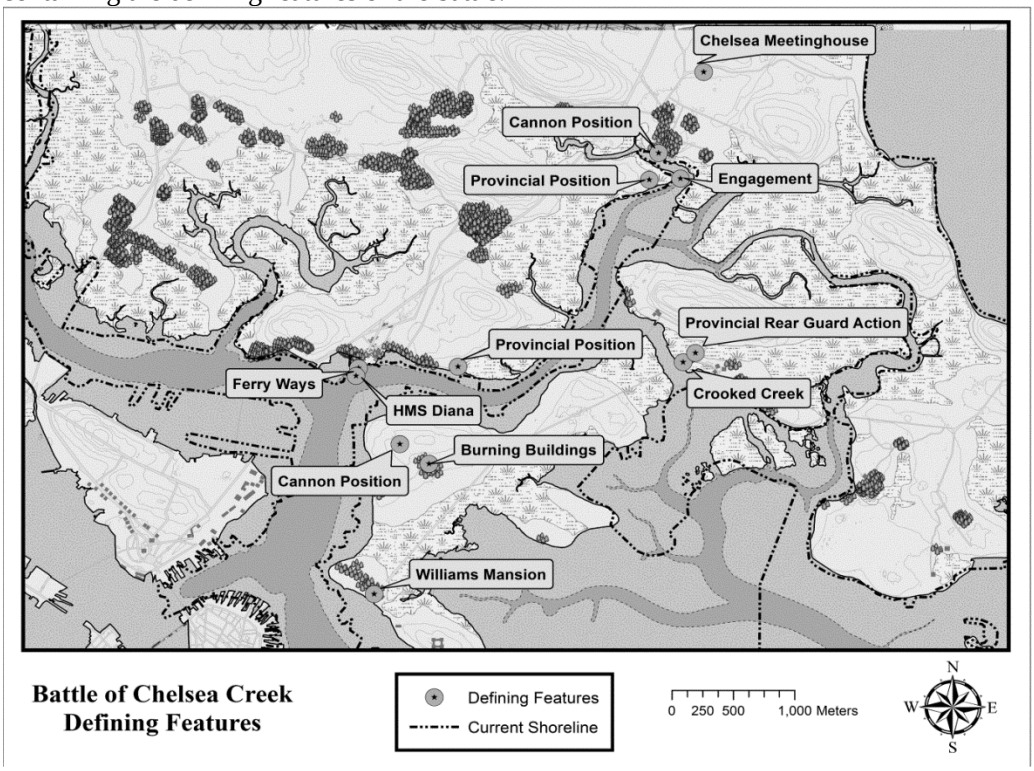
CONCLUSION

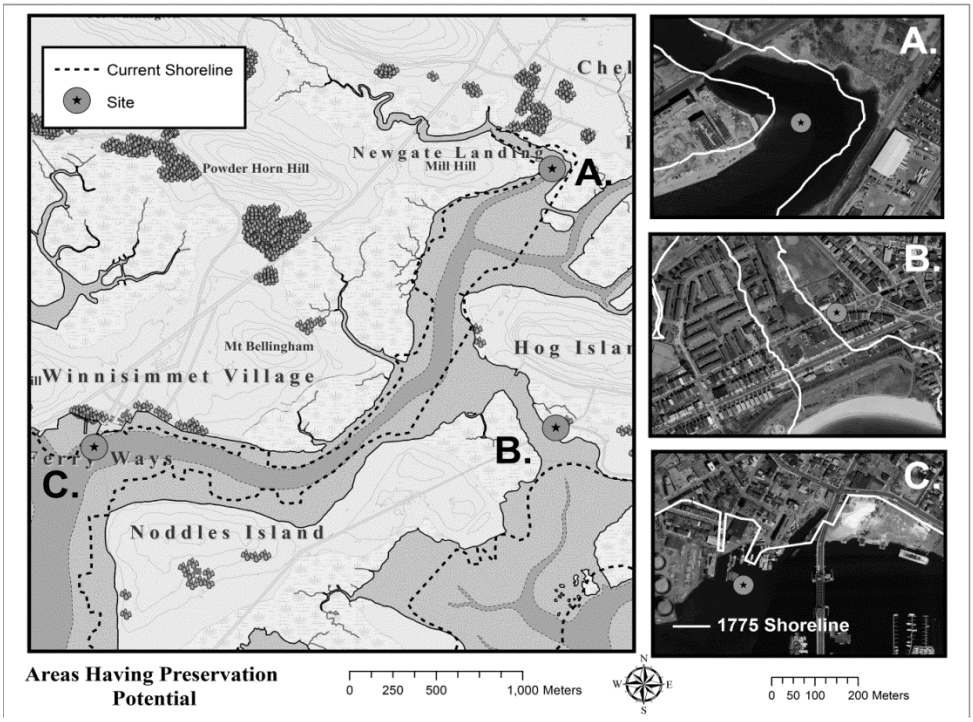
The lack of battlefield delineation and identification of its archaeological components is a major threat to the preservation of any battlefield. The absence of reliable location and condition data severely hinders the ability to identify potential adverse impacts. Ongoing and potential development activities obscure, damage, or destroy the major landscape features of the battlefield, archaeological resources associated with the battlefield, and any attempts to recovery the historic landscape and restore the view shed of the battlefield.

We were able to accurately relocate major landscape features such as shore lines, wetlands, and roads.

By filtering the battle narrative through KOCOA and tying it to the location of these historic features, we were able to define the physical limits of battle events and related movements. Much of our proposed boundaries for the Battle of Chelsea Creek follow the 1775 transportation network for that area. Movement of troops off these routes cannot be reliably discerned.

Six core areas (Figure 5) within the battlefield study area were visually inspected. Williams Wharf and Mansion, West Head of Noddles Island, and Chelsea Meeting House exhibit high levels of disturbance and extensive development since 1775. However, three core areas were identified as having potential for containing remnant archaeological features associated with the battle: Crooked Creek (East Boston), Mill Hill/Chelsea Neck (Chelsea and Revere), and Winnisimmet Ferry Ways/ *Diana* (Chelsea) (Figure 6). A more detailed topographic and land use analyses coupled with additional ground-truthing, intensive archaeological sampling and geophysical surveys within core areas would be necessary to conclusively identify preserved locations containing the defining features of the battle.





The primary historical sources described above contained a number of time cues and locational information that initially permitted only a general reconstruction of the battle. The majority of battle participants were not from the local area and the majority of the landmarks they describe are not actually named. However, when these same sources were examined using KOCOA, the results could be grounded on the landscape of 1775 and today. KOCOA proved to be a powerful interpretive tool when evaluating the historical record in concert with the reconstructed historical landscape. It provided a richer, more complete history of the Battle of Chelsea Creek, the establishment of study and core areas, and the identification of site locations.

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