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*Preserving Fields of Conflict: Papers from the 2014  
Fields of Conflict Conference and Preservation  
Workshop*

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**PRESERVING FIELDS OF CONFLICT: PAPERS FROM THE 2014**  
***FIELDS OF CONFLICT* CONFERENCE AND PRESERVATION**  
**WORKSHOP**



**STEVEN D. SMITH, EDITOR**

South Carolina Institute of Archaeology and Anthropology  
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**PRESERVING FIELDS OF CONFLICT: PAPERS FROM THE 2014 *FIELDS OF  
CONFLICT* CONFERENCE AND PRESERVATION WORKSHOP**

**STEVEN D. SMITH, EDITOR**

**South Carolina Institute of Archaeology and Anthropology  
Columbia, South Carolina  
1321 Pendleton St.  
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## MANAGEMENT SUMMARY

From 12 through 15 March 2014 conflict archeologists and preservationists met in Columbia, South Carolina, to present 54 papers and 14 posters at the 8<sup>th</sup> Biennial *Fields of Conflict* Conference. In conjunction with the conference, a workshop was held on the preservation of battlefields across the globe entitled “Call to Action: National Park Service American Battlefield Protection Program Battlefield Preservation Workshop.” The 33 papers in this volume are extended abstracts of those papers presented in a popular format. The goal of this volume is to make conflict archeology assessable to the public and raise the awareness of the critical importance of battlefield preservation.



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## FOREWORD

At the 2013 Society of Historical Archaeology annual meeting in Baltimore, Maryland, there seemed to be a whisper campaign being waged in all the sessions on warfare, conflict, and general mayhem: would the American Battlefield Protection Program (ABPP) sponsor or support the next *Fields of Conflict* conference in the US? My response to Doug Scott, Larry Babits, and Steve Smith was a measured: “Sure, but you only have a week or so to get in the grant request.” From that point on, the conference and our ABPP participation seemed to take on a life of its own.

The South Carolina Institute of Archaeology and Anthropology, University of South Carolina, won the grant award through a tight annual competition for funds with the ABPP Preservation Planning Grants. The 2014 conference was a smashing success of paper presentations from researchers hailing from all over the world. In fact the grant lead, Steve Smith did such a great job of organizing and economizing we actually had a smidge of funds left over. We agreed that the dialog and research should be further promoted to the field through a publication that could be widely distributed. This volume is the result of that effort to share resources.

The ABPP is likely to support works like this. It is not just that this collection of papers is a labor love by the principal organizers and the bright and earnest researchers that were invited to participate. It is not just the fact that there is excellent scholarship in these pages. The ABPP supports works like this because this effort reaches in concert with our core mission—to support the public in its quest to steward its local significant battlefield resources with best practices and passion. We look at this volume as a resource for all our local partners and grant applicants. I hope you view this resource as a contemporary text for inspiration and creativity in understanding the archeology of the past at battlefields.

Kristen McMasters  
Archeologist and Grants Manager  
American Battlefield Protection Program



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*Fields of Conflict* 2014 was Co-Chaired by the editor and Charles Cobb. The Conference Advisory Committee for *Fields of Conflict* included Douglas Scott, Lawrence Babits, and Tony Pollard. James B. Legg assisted with editing, commenting and numerous other tasks associated with the conference. The Palo Alto conference was organized by Rolando Garza, Douglas Scott, and Peter Bleed. All these individuals kept the editor from making many mistakes, but alas, the editor is responsible for those that remain.

*Fields of Conflict* 2014 and the “Call to Action” Workshop was sponsored by a grant (GA-2287-13-023) from the National Park Service, American Battlefield Protection Program, the University of South Carolina, the South Carolina Institute of Archaeology and Anthropology, the South Carolina Archaeological Research Trust, the South Carolina Arms Collectors Association, TRC, Inc., and The River Alliance. The Palo Alto conference was sponsored by NPS Palo Alto Battlefield Historic Park, NPS Southeast Archeological Center, and the Department of Anthropology, University of Nebraska-Lincoln.

The author graciously thanks ABPP personnel Paul Hawke, Kristen McMasters, Elizabeth Vehmeyer, Greg, Hindsley, and Patrick Jennings. Without ABPP leadership and funding, many battlefields across the United States would remain unexplored and most importantly unpreserved. Likewise, our knowledge and heritage would be lost.

Conference logistics were handled by USC’s Conference and Event Services. Two very special people, Kate Sheldon, Director, and Jim Twitty, Manager, of CES allowed the conference chair to get some sleep at night. I think all those who attended the conference were very pleased with the arrangements at the Columbia Marriott.

Special thanks to: the South Carolina Archaeological Research Trust Board, who supported the project with funding (especially Edward and Dorothy Fowles Kendall); Mike Dawson and John Jameson of The River Alliance for the workshop and Saturday afternoon Congaree Battlefield tour; Spencer Barker of the South Carolina Arms Collectors Association for funding transportation; Sean Norris of TRC., Inc., for funding of *Fields of Conflict* 2014 flashdrives; Tony Starling and the volunteer range officers at the Indigo Gun Club, who made our Saturday afternoon very special; Lawrence Babits and James Legg for the same reasons; Melisa Salzinger of Minelab, Inc., who donated two metal detectors for the raffle; and Dean Thomas for donating five volumes from Thomas Publications. The editor also thanks former Dean Mary Anne Fitzpatrick of the University of South Carolina, College of Arts and Sciences, for her welcoming words at the opening of the conference.

Other organizations that assisted *Fields of Conflict* include: The Palmetto Conservation Foundation, Columbia, SC; Warren Lasch Conservation Center, North Charleston, SC; York County Cultural and Heritage Museums, York, SC; the South Carolina State Historic Preservation Office, Columbia, SC; South Carolina Department of Parks, Recreation and Tourism, Columbia, SC; and, the South Carolina Battleground Trust, Charleston, SC. Finally, thanks to Heathley Johnson for a final technical edit before printing.

Steven D. Smith  
February 1, 2016



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# PRESERVING FIELDS OF CONFLICT: PAPERS FROM THE 2014 *FIELDS OF CONFLICT* CONFERENCE AND PRESERVATION WORKSHOP

Steven D. Smith, Editor

## INTRODUCTION TO THE VOLUME

From 12 through 15 March 2014, over 150 archeologists, historians, preservation specialists, and private citizens converged on the Marriott, in downtown Columbia, South Carolina, to share their research and findings in the study of conflict sites across the globe. Over the course of the four days, participants attended 54 presentations on battlefield archeology, military campsites, ritual warfare, archeological methodology, and artifact analysis. In addition, 14 posters were displayed for participant viewing and interaction. Discussions about the archeological investigation of battlefields spilled over into hotel rooms, local bars, and restaurants each evening. The conference was entitled *Fields of Conflict*, and was the eighth meeting in what has become an international biennial event. The articles in this volume are extended abstracts of these presentations and posters, summarizing the research in a popular format. The volume's goal is to present to the public excellent examples of the diversity and breadth of modern conflict archeology and to build awareness of the critical importance of battlefield preservation.

## FIELDS OF CONFLICT

As with all great ideas, the *Fields of Conflict* biennial conference was born in a pub in 1998 (Freeman in Freeman and Pollard 2001). Two *Fields of Conflict* founders, Phil W. M. Freeman and Anthony "Tony" Pollard, were discussing their work at battlefields and it came to them that it might be worthwhile to get together with other battlefield archeologists to share issues, problems, and methodologies. As Freeman noted, "What we wanted to emphasize was the unique contribution that archeology can make to explaining actions (individual and corporate) and reactions to a range of experiences which, for better or worse, define us as humans: that is our propensity to use violence to resolve situations" (2001:1). With that idea, a call for attendees went out and the diverse and global response "overwhelmed" them. The first conference was held in Glasgow, Scotland, in 2000. Since then the conference has grown, meeting in Aland, Sweden (2002), Nashville, Tennessee (2004), Leeds, England (2006), Ghent, Belgium (2008), Osnabruck and Kalkriese, Germany (2011), and Budapest, Hungary (2012). *Fields of Conflict* 2014 was the largest attended conference to date and the second one hosted in the United States.

The 2004 meeting in Nashville, Tennessee, was especially rewarding in that the United States National Park Service (NPS), American Battlefield Protection Program (ABPP), held a joint preservation workshop along with the third *Fields of Conflict* Conference (Scott et. al. 2007). The success of that conference prompted the editor to apply for a grant from NPS to bring the conference back to the United States and again include the ABPP workshop on battlefield preservation. Thus, *Fields of Conflict* 2014 began with a Wednesday morning "Call to Action" preservation workshop that discussed KOCO analysis (see below), battlefield landscape analysis, best practices in battlefield preservation, applied methods for battlefield research, working with local partners in preservation, and the ABPP program assistance. Later in the conference a local nonprofit conservation organization, The River Alliance, hosted an example of battlefield preservation in action. This symposium presented The River Alliance's current efforts to preserve and interpret earthen defensive fortifications that were key terrain in the American Civil War Battle of Congaree Creek. Pre and post conference field trips included tours of military sites in

Charleston, South Carolina, an American Civil War prison camp (Asylum) in Columbia, South Carolina, and the American Revolutionary War Camden battlefield outside of Camden, South Carolina.

## PALO ALTO SYMPOSIUM

A highlight of the *Fields of Conflict* 2014 conference was a Friday morning symposium focused on the Mexican War battles of Palo Alto and Resaca de la Palma, 8 and 9 May 1846. This special symposium was the result of a serendipitous partnership between *Fields of Conflict* and another battlefield conference entitled *Battlefield Archeology: Global Perspectives in Research and Preservation*. This battlefield conference had been scheduled for October 2013 at Brownsville, Texas, however, due to a temporary government shutdown, the conference was postponed. Clearly, the goals of the two conferences closely overlapped. Bringing the Palo Alto conference to *Fields of Conflict* as a special symposium seemed an ideal solution. This happy partnership between the two conferences drew to Columbia, South Carolina, much of the intellectual leadership in modern battlefield archeology. Summary papers in this symposium from Carl Drexler, John E. Cornelison, Roland Garza, Angélica María Medrano Enríquez, Glenn Foard, Charles Haecker, Nathan Ledbetter, Tony Pollard, Daniel Sivilich, Michael Seibert, Sara Kovolaskas, Bruce Kaiser, and Daniel Wescott appear in this volume.

## CONFLICT ARCHEOLOGY

Archeologists have been interested in military sites since the beginnings of the discipline of archeology. Forts, especially, have drawn the attention of early archeologists, not so much for their military aspects as for their association with other forms of cultural interaction. For many years though, battlefields posed a special problem. They were too large! (Freeman in Freeman and Pollard 2001:1). Normal field methods, excavation units for instance, failed to provide any sense of the entire battle landscape, or even locate battle events and camps (Espenshade et al. 2002). So for years, archeologists largely ignored battlefields, leaving them to military historians to wander and study.

There was another group of individuals who were quite interested in battlefields, however, and did not ignore them. These were metal detectorists, who after WWII began to comb battlefields across the United States and Europe, recovering the detritus of battle. With ever increasing sophistication, metal detectors became better able to find and discriminate metal objects and likewise became less expensive. The hobby grew, and the market in battle artifacts increased leading to public trade shows and eventually on-line trading. As metal detecting increased and detectorists competed to find battle artifacts, they became adept at researching military history and documents in search of the more obscure battlefields and camps. Regardless of motivation, whether it was a keen interest in military history, desire for militaria, or purely financial (these things are highly valued!), battle related artifacts were being removed from historically significant sites at an increasing rate. As artifacts were disappearing from the battlefields so was archeological information; critical data archeologists needed to gain understanding of violent conflicts. In other words, the pages of history were being torn away.

Although archeologists had not totally ignored this development, few had done much about it. The loss of data through metal detecting led many archeologists to blame the technology. While some archeologists used metal detectors as early as the 1970s, their use was widely abhorred by archeologists because metal detectorists used

them. Furthermore, locating an object with a detector tended to violate basic archeological methodology—dig slowly, carefully, while carefully keeping track of soil stratigraphy and artifact depth.

In America, two major events occurred to change all that, such that today, metal detector use by archeologists is not only acceptable but even strongly suggested as part of modern cultural resource management practices. First, in August 1983 a grass fire occurred at the Little Big Horn Battlefield in Montana. This allowed Richard Fox and Doug Scott the opportunity to use metal detectors to examine the flow of battle at Custer's Last Stand (Fox 1993; Scott and Fox 1987). The research, methodology, and knowledge that came out of that work proved that metal detectors could be used to gain new historical and anthropological knowledge about conflict events and even develop conflict theory. There was indeed a method whereby archeologists could study large landscape events like battlefields in a scientific manner. Not suddenly (a minority of archeologists still mistrust data from metal detecting), but gradually from the 1990s on, the basic methods at the Little Big Horn were applied to battlefields in the United States and Europe (see Freeman in Freeman and Pollard 2001, for a European perspective). Furthermore, archeologists now widely accept that nearly all battlefields have been visited by metal detectorists prior to archeological investigation, and that the knowledge and experience of detectorists can be harnessed to salvage valuable archeological data. Since Fox and Scott first used avocational metal detectorists at the Little Big Horn, most archeologists now include avocational detectorists on their projects or interview them as part of their own research. Today, battlefield archeology has become nearly democratized among the archeological profession (nearly everybody is doing it) and, as is demonstrated in this volume, forging trusting relationships with private detectorists.

It is important to note that while Fox, Scott, Freeman, Pollard and others were not the first archeologists to use metal detectors (eg. Dickens 1977; Legg and Watson 1979), their standing among the profession at the time was such that once they picked one up and demonstrated that it could be used to gain significant new archeological knowledge in a scientific manner, there was no longer an legitimate reason not to use them. It takes opportunity and authority to change paradigms--the right people at the right time.

It also takes funding and the arrival of steady funding was the second major event that changed the archeological approach to battlefield investigation. Recognizing the fact that many Civil War battlefields were being lost to development, the United States Congress passed the Civil War Studies Act in 1991. At the same time the Secretary of the Interior created the American Battlefield Protection Program within the National Park Service to assist in the study. In 1996, Congress passed the American Battlefield Protection Act authorizing the ABPP to protect battlefields and associated sites, assist in planning and management of interpretation of battlefields, and raise awareness of the need to preserve battlefields in the United States. Since 1996, the ABPP has conducted two major national studies identifying the status of Civil War and American Revolutionary War sites, is in the process of doing likewise for sites of the War of 1812, and has awarded over 500 grants to archeologists and preservationists to identify and preserve battlefields on American soil. As readers of this volume will notice, many of the studies reported in this volume were initially funded by the ABPP.

We have now come full circle. As battlefield archaeology grew, it expanded into a recognized sub-discipline that focused on all aspects of military sites archeology. Those archeologists with an interest in battlefields were naturally also interested in camps, fortifications, shipwrecks, and artifacts associated with battlefields. A broader term became necessary and battlefield archeologists have adopted the term "conflict archeology," originally used to define battlefield archeologists working on WWI sites, to encompass all aspects of military sites archeology.

The papers in this volume reflect the broad diversity of conflict archeology today. Chronologically, the battlefields range from conflict between Roman legions and Germans in 9 AD to the 1982 Falklands War between Argentina and Great Britain. Geographically, the studies range from Japan, to Europe, to the United States. Although KOCOA analysis is a common methodology, the articles also demonstrate a diversity of methodologies to understand conflict. What is exciting about these papers is that while the majority of the papers still deal with battlefield landscape analysis through KOCOA, the papers in this volume go well beyond mere “here is where this happened,” reflecting a growing maturity of conflict archeology.

This volume opens with Daniel Sivilich, and Christopher Espenshade and Severts, who demonstrate the value of professional-avocational partnerships. Archeologists can lament the loss of data by private metal detectorists, but the facts do not change. Much data (artifacts) have already been removed from virtually all major battlefields (Legg et al. 2009:116). Instead of cursing the dark, Sivilich and Espenshade and Severts light a candle by integrating the keen interest of private citizens in military history and militaria, and their detecting skills, into efforts that will preserve archeological data. Natasha Ferguson then describes the success of the Treasure Trove Unit, the Scottish solution to private collecting and the means by which archeological data can be salvaged from such activity.

From that point, the volume provides examples of conflict archeology at battlefields in chronological order according to the date of the battle. Besides multiple examples of the value of military planning, KOCOA, and landscape analysis (Balicki, Medrano Enríquez, Ledbetter, Scott, Simonds, Veninger, Wittig and Babits), there are several other common themes. Readers should note how many include successful partnerships between professional and private citizens and organizations (Espenshade, R. Elliott, Geier et al., McBride and McBride, Posey, Sivilich, Wittig and Babits). Other themes include the discovery of lost battlefields and campsites (Abel, Battle, D. Elliott, Scoggins and Smith), the expansion of known sites as the result of professional archeological investigation (Kirk and McQuinn), the special problems dealing with battlefields thought to be destroyed by urbanization (R. Elliott), and skeletal analysis of battle dead (Wescott). Both Pollard and Mandzy provide excellent examples of the proper use and analysis of oral testimony in the examination of modern battlefields. Foard and Drexler detail changes in artillery technology. Rost and Wilbers-Rost remind us that battlefields are subject to looting immediately after the battle and this activity affects archeological study. Bell brings the battle down to the personal level of a Civil War soldier under fire. Miller and Schürger demonstrate a point that cannot be repeated enough—mainly that multidisciplinary teams using the integrated use of historic documents, landscape analysis, archeological investigation, and knowledge of the tactics and technology of the time, is essential for correct battlefield analysis. Obviously most of the papers integrate several of these themes within their texts.

New analytical techniques described in this volume are especially inspiring and are obviously going to have a great impact on the sub-discipline in the future. A perfect example is Seibert et al. analysis of lead shot using pXRF spectrometry for lead sourcing. No doubt, this technique will soon be replicated across the globe. Drexler examines artillery shell microstructure using an electron microscope. Silliman and Batt, and Cornelison et al. model small arms projectiles on the 18<sup>th</sup> and 19<sup>th</sup> century battlefields through GIS. Schmader demonstrates the value of remote sensing. Clearly, the articles in this volume demonstrate that conflict archeology is a growing area of study and those battlefields can no longer be ignored. Finally, the articles demonstrate the importance of battlefield preservation around the globe.

## KOCCOA

As mentioned, many of the papers use KOCOCCOA as an analytical tool in the study of battlefields. KOCOCCOA is an acronym for Key Terrain, Observation and Fields of Fire, Cover and Concealment, Obstacles, and Avenues of Approach. It is a systematic method of looking at the battlefield landscape from the perspective of the soldier who is attempting to achieve a military objective. The U.S. Military version of this method is OCKOCCOA, and in this rearranged version it is the prescribed method for battlefield analysis by the ABPP. This form of battlefield analysis traces back to military historian Lieutenant Colonel A. H. Burne, who recognized in the 1950s that by walking the battlefield, he could determine the “solution of an obscurity by an estimate of what a trained soldier would have done in the circumstances,” which he called “Inherent Military Probability” (Keegan 1977:33-34). Key Terrain features are landscape features necessary to gain an advantage over the enemy. Observation and Fields of Fire features are often the same features as Key Terrain, allowing observation of the enemy and clear lanes for firing against an enemy. Cover and Concealment are landscape features that cover or conceal maneuvers from the opponent. Obstacles are landscape or man-constructed features that block or restrict movement, and Avenues of Approach are the likely features (roads) that allow or accelerate movement to and from the battlefield (Babits 2014:263-264). Obviously, these features change through time based on military technology. The top of a hill might be critical in 17<sup>th</sup> century warfare but dangerous in WWII. Still, with that understanding the method is extremely useful for archeologists attempting to determine and understand the flow of battle; especially when the landscape has changed significantly since the battle occurred. Step one in KOCOCCOA analysis is to reveal defining features by an analysis of any and all historical documents related to the battle. Eyewitnesses describing an attack might mention crossing a ravine, or climbing a hill. These landscape nodes become defining features to be discovered by an on-site survey of the battlefield. From there, the battle unfolds across the landscape for the archeologist, and can be confirmed through archeological investigation, often using metal detectors. The technique can be used in reverse also. Perhaps the main battlefield is known. From there, KOCOCCOA analysis allows the archeologist to determine likely avenues of approach, increasing our knowledge of events leading to the main combat location. Many, perhaps most, of the papers in this volume clearly demonstrate the power of this analytical technique.

## FINAL OBSERVATIONS

This volume is targeted at the public. Conflict archeologists can get excited discussing their findings among themselves and sometimes forget to bring the results of their work to the larger world. This volume represents an attempt to spread the word more widely. Each short article is only a brief summary of a larger, more thorough research effort and readers are encouraged to seek out the authors for more details or check the references provided at the end of each chapter. The editor hopes readers will take away a simple idea: much can be learned by the study of battlefields and therefore they are important to preserve.

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# FROM METAL DETECTING TO A NEW MUSEUM AT MONMOUTH BATTLEFIELD STATE PARK: THE STORY OF BRAVO

Dan Sivilich

## INTRODUCTION

This is one of the most unusual stories in the annals of battlefield archeology. It is about how a New Jersey metal detecting club discovered a major Revolutionary War conflict site and provided data for an extremely detailed and corrected interpretation of the site. It is a story of one of the earliest cooperative efforts between metal detectorists and professional archeologists. It led to the State of New Jersey constructing a new \$8.5 million museum at Monmouth Battlefield State Park with an entire section on archeological metal detecting (Figure 1). The park is located in Freehold and Manalapan Townships, New Jersey, and is now a significant interpretive site of the American Revolution.



**FIGURE 1 NEW MUSEUM AT MONMOUTH BATTLEFIELD STATE PARK  
IN FREEHOLD AND MANALAPAN TOWNSHIPS, NJ.**

The Battle of Monmouth was one of the most significant engagements of the American Revolution. This was the first battle after the 1777-1778 winter encampment of the Continental army at Valley Forge, Pennsylvania. Prior to this, the Americans lacked training and standardized weapons, which were significant disadvantages, and of which the British were well aware. The Americans typically would not hold their ground during a British bayonet charge, which led to many an American defeat. During the stay at Valley Forge, the French began shipping in large quantities of standardized muskets with bayonets and lead shot. At the same time, Baron Friedrich Wilhelm von Steuben trained the troops in the skills of proper fighting, including the proper use of bayonets. The Continental army had now truly become a competent force ready to challenge the Crown forces.

In the spring of 1778, General Sir Henry Clinton withdrew the British army from Philadelphia to New York City. General George Washington and the American army were still in Valley Forge when the news arrived. Washington decided to intercept the slow moving British army and force a battle. Along the way the British stopped and rested at Monmouth Courthouse, New Jersey, today known as Freehold Borough. Here on 28 June 1778, George Washington and the Continental army defeated the British army in one of the largest battles of the American Revolution. The British were proceeding to Middletown, New Jersey, when their rear guard was attacked by a Continental advanced force. The training by von Steuben was put to use. After heavy fighting, including hand to hand combat, the British pushed the Continentals back three miles until the British were stopped by Continental artillery. Out-manuevered, the British were forced to retreat leaving their dead and wounded on the field. Washington and the Continental Army claimed a significant victory that changed the outcome of the American Revolution.

In the 1960's the farms comprising the main conflict area were under threat of being destroyed by the construction of senior citizen high rise housing. A committee from the Sons of the American Revolution worked to save the battlefield. When they were turned down by the National Park Service, they appealed to the State. With taxpayer approved Green Acres bond money and the assistance of Joseph Truncer, Director of the Division of Parks and Forestry, the land was acquired and designated as Monmouth Battlefield State Park. Eventually a Visitor's Center was erected to interpret the battle, but had no artifacts available for display. The main attraction was an electronic map of the battle. Little did anyone know that it was inaccurate since it was based on early interpretations of where the battle took place without archeological evidence.

In 1987 I secured permission to metal detect a farm across the street from the state park. It was owned by Bell Labs and was going to be developed. I was looking for coins, but found musket balls. Being an engineer, I began to crudely map what I found and grouped musket balls in three sizes (small, medium, and large). The site was approximately 195 acres, so I asked for help from the Deep Search Metal Detecting Club (of which I was a member). The rules were that I must be present to map the artifacts, all of the artifacts got turned over to me for measuring and I would give them back when done. However, I did suggest that if anyone would like to donate them, we would turn them over to Freehold Township and/or the Monmouth County Historical Association. The township rewarded us with a very good topographical survey map of the site, which allowed us to significantly improve our mapping procedures. I was pleasantly surprised how many members were willing to donate their artifacts. The property adjoined park land, which we were mindful of not disturbing. However, two of the State Park Rangers became interested in our work and we became friends.

In 1990, I was approached by one of the Rangers who asked me if I would be interested in helping to start up a friends group in the park. I agreed and the Friends of Monmouth Battlefield began. Later that year, Dr. Garry Wheeler Stone, an archeologist for the state, was transferred to Monmouth. He reviewed our work and our map. We had discovered an area of major importance. It was the area where General Washington relieved his second-in-command, General Charles Lee, who was subsequently court martialled for his actions. The most intense fighting of the battle took place at this site. Troops under General Anthony Wayne clashed with the British Grenadiers, Guardsmen, and Dragoons in hand to hand combat.

Garry had the foresight to see the value of metal detecting as a tool that would be essential to locating artifacts on large tracts of land. In October 1990 we conducted our first successful metal detecting survey in Monmouth Battlefield State Park with Garry supervising. We experimented with different methods of mapping artifact locations, beginning with 100' x 100' squares. This evolved into setting up survey points around the perimeter of the fields and using a surveying compass and 300' tape measure to locate points. In 2000, we split the archeology from the Friends of Monmouth Battlefield as a new and separate entity --the Battlefield Restoration and Archaeological Volunteer Organization or BRAVO for short. We raised enough money to purchase a Trimble total station laser transit to map artifacts with speed and high precision. The ESRI, Inc. donated ArcView Geographic Information Software (GIS) to map the artifacts onto aerial photographs and period maps to interpret the data. The results were nothing short of astounding. We located battlefield events nearly a half mile from where they were previously thought to be located. Clear pictures of conflict areas, artillery bombardments, troop movements, and post battle field hospitals were identified. Thanks in part to the work of the members of BRAVO, the state was able to acquire the original 195 acres that we discovered in 1987 and incorporate it into the park. It was saved from total destruction.



**FIGURE 2 METAL DETECTING DISPLAY.**

an archeological resource as shown in Figure 2.

There are even two computer stations that have a touch screen video game. The participant's finger becomes a metal detector needed to locate 13 different artifact types on a period map to solve where Molly Pitcher's cannon was during the battle. Yours truly is the archeologist on the screen. Artifacts are displayed in professionally designed exhibits and under every artifact is a description and the name of the BRAVO member who excavated it. There are a number of very interesting artifacts such as muskets, swords, and canteens from other prominent Revolutionary War site museums as seen in Figure 3.

Actual period muskets are displayed with mannequins and are used to highlight the gun fragments excavated at Monmouth. There are also replica artillery ordnance, such as grape shot and canister shot, so that visitors can actually see how many of the artifacts were actually used. All of the data from the archeology and historical document research was used to create a new and accurate electronic map of the battle. The museum gives a new interpretation of how the battle unfolded right down to a panel display the casualty tolls.



**FIGURE 3 ARTIFACTS ON LOAN FROM VALLEY FORGE NATIONAL HISTORIC PARK.**

Monmouth Battlefield State Park has multiple histories. From 1862 - 1864 one of the farms that is now part of the park was Camp Vredenburg, a Civil War training camp for New Jersey troops. The exact location of the camp has been debated for years. It was originally a farm lot belonging to Jacob Herbert, but was leased by the state of New

Jersey as a training camp because of its easy access to the Freehold and Jamesburg Agricultural Railroad. Access to this railroad enabled movement of troops and supplies to the camp. Although the general location of the camp is known because of a property deed, the exact layout of the camp remained unknown. Following is a description of the property that appeared in the Monmouth *Democrat* on 17 July 1862:

The campground has been located on a fine field on the farm of Jacob Herbert, Esq., about two miles from the village on the line of the railroad. It has plenty of good water for drinking and bathing purposes, a fine grove of trees on the rear will afford shelter from the heat of the sun, it is convenient access from all parts of the district, and just the right distance from the town for the comfort of both soldiers and citizens.

The camp was named after local judge Peter Vredenburg. His son, Peter Jr., was elected Major of the first regiment to train there. The regiments mustered out of Camp Vredenburg were the 14th, 28th, 29th, and Company H of the 35th. BRAVO was instrumental in locating parts of the camp layout and excavated many period artifacts. There is a display of some of the Civil War artifacts recovered by BRAVO. Some of these artifacts are on display paired with a reproduction Civil War uniform donated by a local re-enactor.

## SUMMARY

What began as a simple metal detecting project by the Deep Search Metal Detecting Club in 1987 has led to the creation of BRAVO and the longest (and still running) cooperative effort between metal detectorists archeologists, and historians. More about BRAVO can be found at [www.bravodigs.org](http://www.bravodigs.org). The public can visit Monmouth Battlefield State Park 365 days of the year. It is located on Business Route 33 west in Manalapan, New Jersey. Further information and the new museum hours can be found at: <http://www.state.nj.us/dep/parksandforests/parks/monbat.html>.

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# BETTER TRAINING = BETTER BATTLEFIELD INTERPRETATION: THE AMDA AND APP CLASSES

Christopher T. Espenshade and Patrick Severts

## INTRODUCTION

Many battlefield studies rely heavily on metal detecting as an investigative method, and metal detecting can be labor intensive. The study of a battlefield can require many persondays of detecting; where will this expertise be found? The authors have been involved in the creation of two classes designed to provide metal detecting personnel who can apply best practices in metal detecting to professional research. Advanced Metal Detecting for the Archaeologist (AMDA) is a continuing education class aimed at professional archeologists. The class is certified by the Register of Professional Archaeologists (RPA). We are clear in our belief that improving best practices in metal detecting will improve the quality of battlefield studies.

The second course, Archaeological Partnership Program (APP), is designed for avocational detectorists who would like to work in tandem with professional archeologists. Avocational detectorists have great skills, local knowledge, a keen interest, a commitment to history, and a desire to help preserve battlefields and similar military sites. Through the training of a corps of avocational detectorists, APP is developing a resource that will help in the study and preservation of battlefields.

Taken together, AMDA and APP increase the skills of professional archeologists and avocational detectorists, and reinforce the bridge between these two groups. These training efforts will have positive results on the quality of battlefield studies, the level of public engagement, and the development of local advocacy for battlefield preservation (Table 1).

## AMDA CLASS

The AMDA class was born in 2011, when several archeologists recognized the need to teach best practices in metal detecting to professional archeologists. We saw that professional archeologists were finally accepting that metal detecting was a valuable tool, but there was no good source for instruction in metal detecting. AMDA began as a conference/class hybrid in October 2011 in Helen, Georgia.

Based on the response to the Helen event, and in conjunction with the new RPA program for certifying continuing professional education classes, the founders of AMDA chose to focus solely on instruction. The founders included Sheldon Skaggs, Garrett Silliman, Patrick Severts, Doug Scott, Terry Powis, and Chris Espenshade. After formalization of the instructor corps and course offerings, AMDA was certified by the Register of Professional Archaeologists. We were proud to be the first continuing education course to receive this important certification.

The AMDA class recognizes that the three main factors affecting the efficacy of a metal detector investigation are: 1) competency of the operators; 2) appropriateness of the device to the task at hand; and, 3) suitability of the research design. The class includes eight hours of classroom instruction, where we present best practices. The class notebooks also include a case study CD with examples of successful research efforts.

Table 1. AMDA and APP Working in Tandem.

	<b>AMDA</b>	<b>APP</b>
Site Preservation	The skills learned in AMDA help assure that military sites are properly discovered, evaluated, and interpreted. AMDA leads to better treatment of military sites.	Students are taught to properly document battlefields and other historic sites, to alert state officials when they observe battlefields under threat, and to work in partnership with professional archeologists. APP teaches students how to help preserve resources.
Public Benefit	Public sees less loss of battlefields and related sites. Public receives a better product from government-sponsored projects (e.g., ABPP grants) when archeologists are skilled in metal detecting.	APP teaches the public (avocational detectorists) how to engage in documenting their history. APP creates a corps of local advocates for battlefields.
Public Involvement	AMDA provides instruction in the engagement of avocational detectorists in professional research. Such involvement increases the work possible and creates public stewards for battlefield resources.	APP is all about active public involvement. Students are instructed on how they can be involved in providing background research, field labor, and interpretations to professional studies of battlefields. Students become extra eyes to monitor and stem site loss.
Innovation	AMDA is first formal course for teaching best practices in metal detecting to professional archeologists.	APP is the first nationwide program to teach avocational detectorists to work with professional archeologists.
Future Vision	All professional archeologists in areas of military activity will be skilled in applying metal detecting and in partnering with avocational detectorists.	To develop of corps of ethical, trained avocational detectorists who can work with professional archeologists in the study and monitoring of battlefields and other military sites.
Public in Battlefield Studies	Course includes guidance for professionals using avocational detectorists in battlefield studies. Course presents many positive example of public involvement in NPS/ABPP projects.	Many field studies of battlefields use metal detecting as a method, and APP trains avocational detectorists to partner with professional archeologists in such studies.

We also recognize that professional archeologists need an opportunity for instructor-monitored, hands-on, practical field experience with a variety of currently available devices. The AMDA has created a partnership with several manufacturers and retailers who provide trial models at various price points. Our fieldwork sessions are designed to contribute to the research needs of our local hosts, and we work on real problems on real sites.

We have presented the class seven times: August 2012 in Charleston, South Carolina; April 2013 in Lagrange, Georgia; November 2013 in Winchester, Virginia; and August 2014 in Stone Mountain, Georgia; February 2015 in Brownsville, Texas; March 2015 at Kennesaw State University, Georgia; and April 2015 in Harrisburg, Pennsylvania. To date, 143 archeologists have completed our training. The course has seen a broad mix of graduate students, CRM consultants, and state and federal agency personnel.

## APP CLASS

Avocational detectorists have long been a potential source of labor and expertise in battlefield studies. Unfortunately, many professional archeologists avoid engaging avocational detectorists. The reasons for this avoidance include: 1) certain professional archeologists are suspicious of the ethics of avocational detectorists; 2)

professional archeologists do not want to be seen as condoning relic hunting; and, 3) certain professional archeologists do not feel that avocational detectorists understand how and why professional archeologists do what we do. We found ourselves sort of stuck with a paradox. On the one hand, we (and the profession in general) long for avocational detectorists to embrace a preservation ethos and begin working closely with archeologists, but on the other hand few professionals have provided them any guidance or training toward that goal. Some exceptions include Matthew Reeves of the Montpelier Archeology Certification Program, and Daniel Sivilich's BRAVO Program in New Jersey (Sivilich, this volume). Our profession sacrifices our right to complain about relic hunters if we continue to ignore the training of avocational detectorists. In the context of the current professional angst over reality TV shows about metal detecting, we could not condone complaining about behaviors without trying to change said behaviors. We knew from a number of projects and other contacts with avocational detectorists that this community held many with a strong interest in history and a willingness or desire to work with professional archeologists.

In autumn of 2013, Chris Espenshade, Patrick Severts, Doug Scott, and Matthew Reeves began working with Minelab, a major manufacturer of detectors, to develop the APP course. From the onset, we were aware of the risk, mentioned above, that we might be perceived as offering a class to improve the skills of looters (again, not all professional archeologists appreciate the difference between relic hunters and avocational detectorists). Instead of focusing on actual metal-detecting skills, we designed the course to emphasize how and why professional archeologists do what they do. We hope to make avocational detectorists understand and buy into the professional approach to metal detector research.

The class is offered only to avocational detectorists willing to sign and abide by this ethics pledge:

*I will neither purchase nor sell artifacts. I will not detect on any property without written permission of the land owner. I will record all discovered sites within 30 days with the state site files. I will keep records on the location of all materials I recover. I will not excavate any targets below the topsoil/plowzone. I will not disturb any human remains. I will report sites threatened by development or other actions to the state archeologist or state historic preservation office. I will share data and knowledge with professional archeologists. I will partner, when feasible, with professional archeologists to assist in the preservation and study of archeological resources. I will strive to be a responsible avocational detectorist. I understand that violation of this pledge may result in my name and contact information being removed from the APP database of responsible avocational detectorists.*

The class teaches avocational detectorists how professional archeology differs from hobby collecting, and why professional archeologists do things as they do. We let students know how they might find opportunities to work with professionals. We stress that there is an over-riding concern among both the professional archeology community and the avocational detectorist community to stem the flow of site loss. We emphasize that avocational detectorists and professional archeologists can work together to study sites that would otherwise be lost.

We also recognized the risk that the APP class might be seen by certain skeptics as a pay-to-dig opportunity. When a real archeological site is used in training detectorists, the situation can be viewed as the participants paying for the opportunity to detect on a neat site. To avoid this, APP classes are held only on test gardens (site proxies created only for the class, using modern replicas of key artifact classes). None of the APP class work occurs on actual archeological sites.

We also wrestled with the question of policing the behavior of our graduates. These are not professional archeologists and cannot be held to RPA/SHA/SAA ethical standards. There is no threat that they will lose their registration or membership for ethical lapses. We instead created an ethical standard for avocational detectorists who wish to undergo APP training and become part of the APP program. Those graduates who take the pledge and abide by it will be placed on an internet data base of responsible avocational detectorists willing to work with professional archeologists. Many avocational detectorists are willing to spend a week or two of their vacation assisting on the study of an interesting battlefield. If we learn that a graduate has broken their pledge, they will be removed from the database.

In creating the pledge, we recognized the need for a compromise between our strict professional ethics and the desire of avocational detectorists to be able to pursue their hobby in the absence of a professional archeologist. We felt that this is a reasonable compromise.

Our goals with APP are: 1) to create a legion of responsible avocational detectorists with an understanding of how and why professional archeological projects are undertaken; 2) to provide a resource to professional archeologists who might need assistance on their projects; and, 3) to create partnerships between professional archeologists and avocational detectorists to help preserve archeological data. With the backing of Minelab, the first class was presented in Chicago in September of 2014. Registration filled quickly and the student feedback from the course was overwhelmingly very positive. APP will be working closely with Minelab to present the class many times a year in different parts of the country.

## SUMMARY

The discovery, delineation, interpretation, and preservation of former fields of conflict rely heavily on the proper application of metal detector methodologies. The authors have been involved in the creation of two classes to help assure best practices in metal detecting. The first class, AMDA, is a continuing education course for professional archaeologists. AMDA is designed to keep professional archeologists up to date on developments in research design and instruments. The second class, APP, is aimed at the avocational detectorist interested in helping in the documentation and preservation of historic sites. The APP course introduces the avocational detectorist to the approaches commonly used by professional archeologists. The course delineates the methodological and ethical expectations when avocational detectorists work with professional archeologists. The two courses represent complementary means of assuring the proper archeological treatment of battlefields and other historic sites.

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# CONSERVATION THROUGH RECOGNITION: MATERIAL CULTURE RESEARCH AS A HERITAGE MANAGEMENT TOOL FOR CONFLICT SITES

Natasha Ferguson

## INTRODUCTION

In Scotland (UK) Treasure Trove law requires all discoveries of archeological objects, regardless of age or composition, to be reported to the Treasure Trove Unit (TTU) based in the National Museum of Scotland, Edinburgh. This capacity to record and scrutinize a broad range of artifacts allows the Unit to build a significant body of comparable material, which reflects the diversity and unique character of Scotland's archeological record. This has become an important heritage management tool utilized to great effect in recognizing the presence of previously unknown conflict sites. This article provides an overview of the TTU's active role in the identification and heritage management of conflict sites in Scotland using outreach programs, educational tools, small-scale surveys, and most critically, recording of public finds reported to the Unit. Two case studies are provided as examples of the unit's success.

## TREASURE TROVE LAW IN SCOTLAND AND THE ROLE OF TTU

Treasure Trove law originated during the medieval period as a mechanism to gain revenue for the Crown under the legal premise 'bona vacantia' – property that no longer had a traceable owner (Curtis 2007:343; TTU 2014). Today, there is a reasonable assumption that archeological material fits within this category of property. Therefore if an object or assemblage is discovered by chance through agriculture, activities such as metal detecting, or professionally in the course of archeological investigation, the material becomes the ownership of the Crown. Here the Crown, or more accurately the Crown's property representative in Scotland, the Queen's and Lord Treasurer's Remembrancer (QLTR), acts for the benefit of the nation by 'claiming' objects considered to be of archeological significance. These objects are then allocated to museums across Scotland where they are made accessible for research and public display rather than languishing unseen in private collections; in short, Scotland's archeological past belongs to everyone.

The Treasure Trove Unit (TTU) operates on behalf of the QLTR providing the frontline archeological expertise when assessing material through the Treasure Trove system. The Unit liaises with members of the public reporting finds of archeological objects, 95% of which are metal detector-users, as well as archeologists, museum curators, and other heritage professionals. As specialists in material culture it is the responsibility of the TTU to assess and research material passing through the Treasure Trove system, ultimately identifying which objects or assemblages are appropriate for 'claiming'. As there is no restriction on the age or composition of the material there is great flexibility in what can be considered 'archeologically significant' and therefore 'claimable' as Treasure Trove.

This is particularly relevant in relation to battle-related material, the majority of which dates from the post-medieval period onwards and is primarily represented by base-metal objects like lead projectiles. The Unit is careful to focus on an artifact's research value and its contribution to our knowledge of Scotland's past rather than its intrinsic value. To illustrate this point, no distinction is made, for instance, between the archeological



FIGURE 1 FINGER RING FROM DUMPFRIES AND CANISTER SHOT FROM THE BATTLE OF CULLODEN. COPYRIGHT: TREASURE TROVE UNIT.

significance of a gold medieval finger ring found alone near Dumfries (Dumfries & Galloway), and a piece of lead canister shot recovered from the Battle of Culloden, 1746 (Figure 1). Indeed, arguably, the canister shot is archeologically more valuable due to its context and spatial relationship with other similar battle-related objects as part of a wider artifact distribution characterizing the battlefield. This example draws on another aspect of Treasure Trove that is of benefit to the study of conflict sites, which is the requirement of ‘finders’ to report all archeological objects. By adopting an assemblage-focused rather than object-focused approach, the Unit can identify potentially coherent assemblages of material, even if there are multiple finders as, for example, a collection of material recovered at a metal detecting rally. The importance of this inclusive approach is reflected in research from a material assemblage at Fort George, Highland, and in the identification of an unknown conflict site.

## BUILDING A COMPARANDA: THE MATERIAL CULTURE OF THE ‘VOLUNTEER MOVEMENT’ IN LATE 18<sup>TH</sup> CENTURY SCOTLAND, THE FORT GEORGE EXAMPLE

The raising of auxiliary forces in the late 18<sup>th</sup> century marks a distinct period in Scotland’s social history. With the threat of French invasion ever on the horizon and regular units stretched to capacity overseas in Europe and America, there was a pressing need for a stronger network of homeland defense (Steppler 1992:4). This saw the formation of non-regular units including regiments of Fencibles, Militia, and Volunteer Corps (Fairrie 1991:75). The Volunteer Corps (1793 – 1815) was primarily a home defense force with units raised locally by the landed gentry or other notable dignities in the community with enough influence and funds to equip and train a body of men (Morrison 2011:2). The Volunteer Corps not only had a distinctive local character, but also a strong political one with the raising of the corps often associated with the development of the middle classes and the growth of a civic-mindedness and patriotism (Campbell 2012; Cookson 1989:868).

Fort George was built in the wake of the Jacobite uprising of 1745 and was designed to hold approximately 1600 infantry, artillery, and ordnance, which ensured a consistent military presence in a region regarded as troublesome by the Hanoverian establishment (Tabraham and Grove 1995:94). The Fort’s role as a barracks and training ground

became increasingly important during years of sustained conflict as the fort's location provided a "convenient centre for embodying and inspecting the numerous corps raised at that period (1795) for the more northerly parts of the Highlands" (Mackay-Scobie 1914:57). Members of the various Volunteer Corps based in the Highlands were committed to attending a three week camp each year for training (Fairrie 1991:81).

Metal detecting by a local enthusiast over the last decade has uncovered approximately 16,000 military related artifacts spanning the fort's history, including military buttons, badges, accoutrements, ammunition, weaponry fragments, as well as domestic and other personal items (Campbell 2006). The range of material is impressive and provides a unique chronology of military equipment and its evolution from the late 18th century onwards. Not only does it reflect the scale of military activity at Fort George, it also provides a more detailed insight into military equipment and its use in training, as compared to its use in combat. This aspect was highlighted in the large volume of accoutrements such as bayonet scabbard finials, frog clips and pan brushes, which have simply fallen off during training. More acute is the broken weaponry such as ram-rod pipes and snapped trigger guards due to faults in their design, gradually phased out in the development of the Land Pattern muskets (De Witt Bailey 1997), and which have direct parallels in assemblages recovered from the battles of Prestonpans (1745) and Culloden (1746) (Pollard & Ferguson 2009; Ferguson 2007). This is particularly important when assessing patterns in breakage which may incorrectly be attributed to an act of violence in the context of a battlefield, rather than more mundane patterns of wear or design failures.

The Fort George assemblage not only provided a diverse range of comparable material covering all aspects of 18<sup>th</sup> – 19<sup>th</sup> century military activity, it also demonstrated that the training of units such as the Volunteer Corps can have a distinct and visible physical footprint in the archeological record. Across Scotland several previously unknown sites, although on a smaller scale, have been identified through the reporting of assemblages of military objects by hobbyist metal detectorists, as reflected in this short case study.

## RECOGNIZING AN UNKNOWN CONFLICT SITE: ROBERTON, SCOTTISH BORDERS

This significance of this particular site as a training area for a Volunteer Corps was only identified through a slow accumulation of material over several years. The area was metal detected by a local enthusiast, primarily in the search for Roman and medieval objects, who reported his finds in small batches on an inconsistent basis. This made it difficult to identify a coherent assemblage, however, in this case and with the agreement of the finder it was decided to retain individual military objects as they were reported in expectation of an assemblage developing. Over time the assemblage included a lion mount sword-belt clasp, a cap badge of the Berwickshire Yeomanry, and what appeared to be a pouch badge with Crown cypher and leather still retained in the fastening lugs (Turner 2006:52) (Figure 2). The deciding factor was the recovery of approximately 100 lead projectiles, all found within a close concentration. Unfortunately, the finder had not recorded individual findspots for the projectiles therefore determining the location of the artifacts was based on the memory of the finder. Interestingly, the finder had interpreted the projectiles as part of a 17<sup>th</sup> century skirmish site and not connected with the later 18<sup>th</sup> century military material; a misinterpretation potentially replicated by archeologists. Although small, the pattern of material was distinctive and compared closely to similar sites of this type. The location was also interesting, as although it was in a remote part of the Scottish Borders, it was close to a farmstead and small cluster of hamlets with a track leading directly to the main concentration of objects (Ferguson 2014).

This case study demonstrates the importance of reporting, however, it also highlights the fragility of the system and the reliance on finders to report objects in the first place, even if they look to be insignificant. At this point



FIGURE 2 ROBERTON ARTIFACT ASSEMBLAGE. COPYRIGHT: TREASURE TROVE UNIT

education and outreach becomes vital to help finders make informed decisions at the point of recovery. This not only includes what to report, but also the importance of accurate recording and recognizing potential patterns, especially important when identifying the presence of conflict sites. The Unit's outreach has included talks and interactive workshops for metal detecting clubs, together with the design of innovative 'Guide to reporting' posters, including one on the theme of military artifacts in Scotland, to help finders to identify significant objects and assemblages (Figure 3). This has resulted in a notable increase in reported finds and greater awareness of the presence of plowzone artifact assemblages. The Unit is also in the unique position to communicate directly with the metal detecting community through established links not available to other heritage managers in Scotland. This allows the Unit to monitor metal detecting activity on conflict sites, albeit when material is reported, especially battlefields designated within the Historic Scotland Inventory of Historic Battlefields (Historic Scotland 2014). It is also the policy of TTU, when appropriate, to claim any battle-related material recovered from designated sites to ensure this material is preserved and available for future research. In the past the Unit has also exercised some limited legal control when dealing with what can be described as negatively impacting metal



FIGURE 3 MILITARY POSTER. COPYRIGHT: TREASURE TROVE UNIT

detecting activity on battlefields. One recent example involved the reduction of ex-gratia awards (a monetary award given to 'chance finders' recognizing the responsible reporting of artifacts) to finders who did not adequately record important battle-related material from the battle of Prestonpans (1745). More details of this incident can be found in Ferguson 2013a and Ferguson 2013b.

## SUMMARY

The aim of this article has been to demonstrate the importance of material culture research in the identification and effective heritage management of known and unknown conflict sites. While the Treasure Trove system in Scotland does allow for a diverse range of archeological material to be considered significant, the success of this system is reliant on a maintaining a flexible and inclusive approach, together with rigorous research to ensure comparable material is relevant and that others in the academic community have access to it. Furthermore, it is necessary to emphasize the importance of focused outreach to encourage responsible and informed interaction with the archeological record, in particular conflict sites, which lie as faint and fragile footprints on the landscape.

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# THE EXTENSIVE BATTLEFIELD OF KALKRIESE (VARUS BATTLE 9 AD): A CHALLENGE FOR ARCHEOLOGICAL RESEARCH AND MONUMENT PRESERVATION

Achim Rost and Susanne Wilbers-Rost

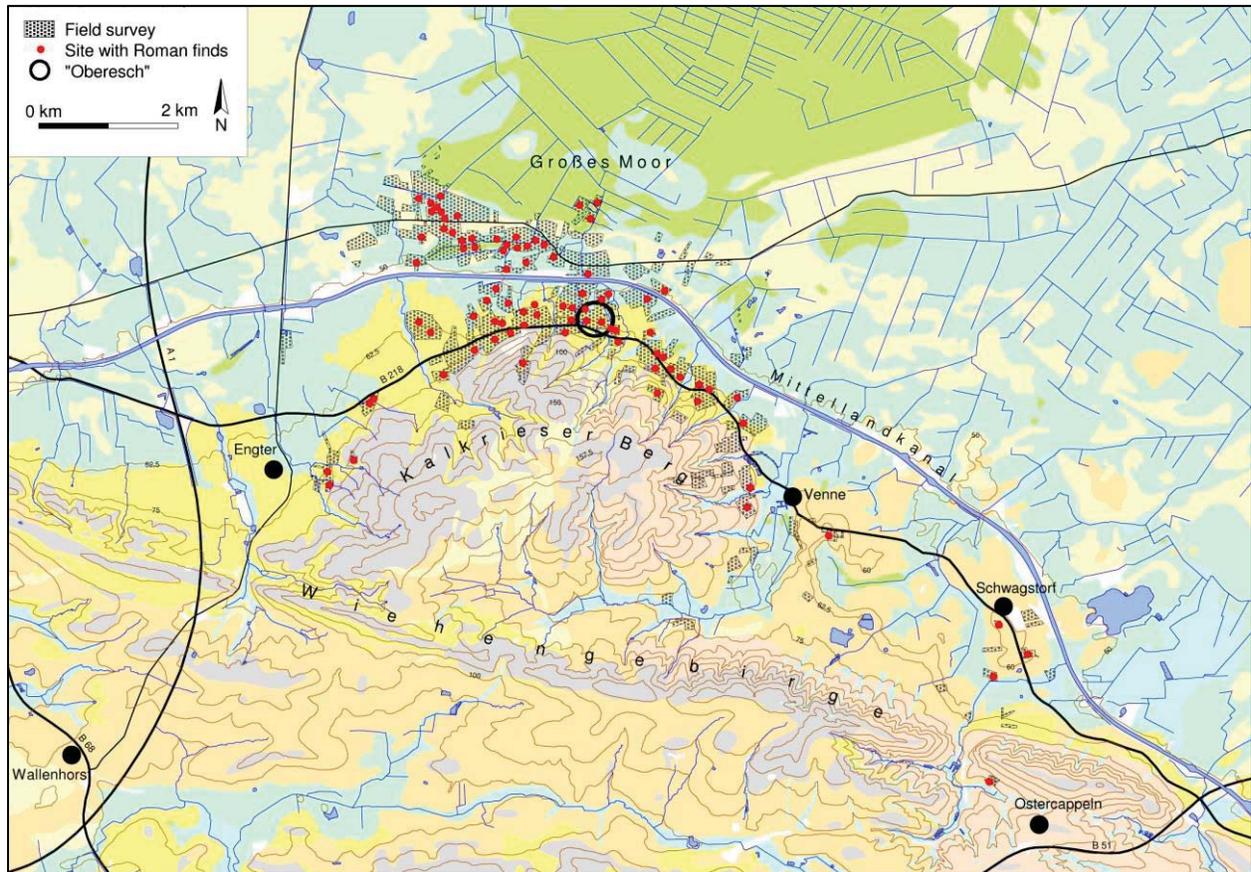


FIGURE 1 STUDY AREA OF KALKRIESE: GREEN-GREAT BOG, BLUE-WET SAND, YELLOW-DRY SAND, LIGHT BROWN AND PURPLE-HILLS.

## INTRODUCTION

About 25 years ago archeological investigation began in Kalkriese near Osnabrück in Northern Germany. We discovered the area of an ancient battlefield which appears to be the Varus battlefield or Battle in the Teutoburg Forest (9 AD). Today nearly 6,000 fragments of Roman military equipment and more than 1,500 coins have been found scattered over more than 30 square kilometers in the bottleneck between the Kalkriese Hill and the Great Bog (Figure 1). The topography and the distribution of the Roman finds suggest an extensive battle in a defile where marching Roman legions were repeatedly attacked on the flank by German tribes under the command of Arminius. The Oberesch site has proved to be the main battlefield of this large battle. We excavated a rampart

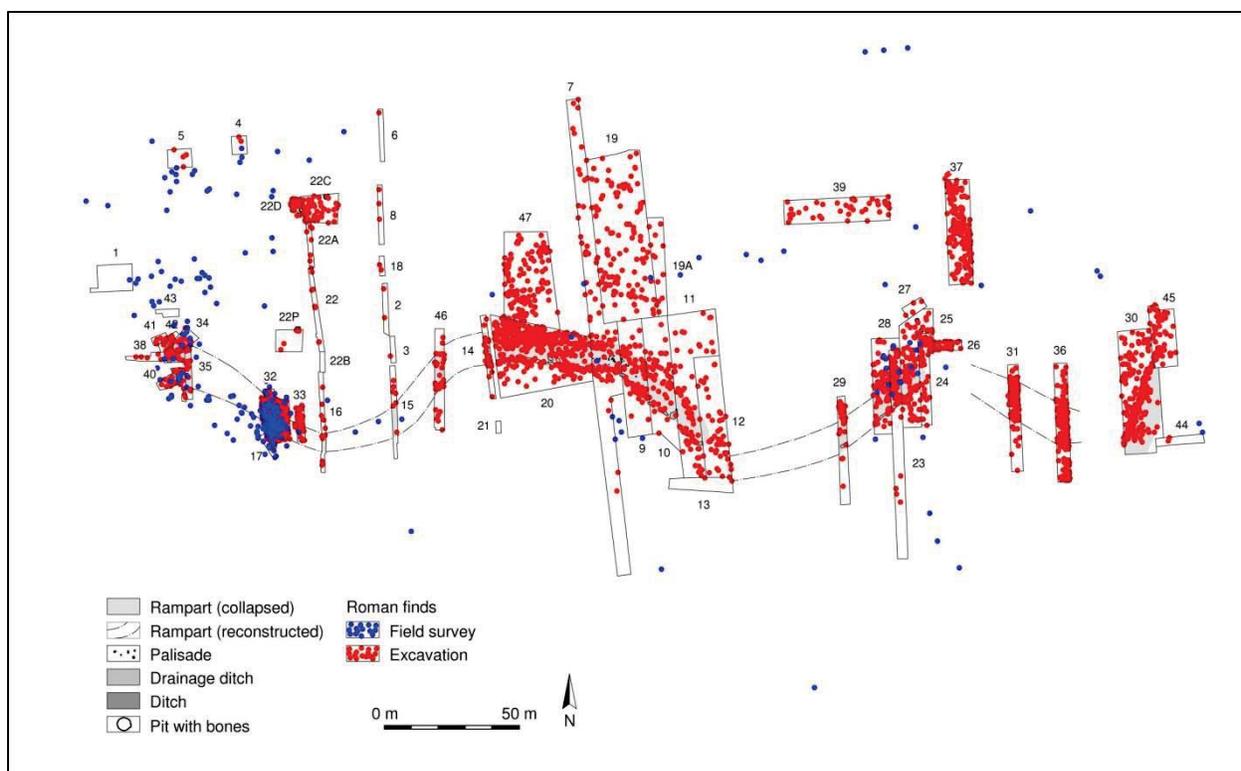


FIGURE 2 DISTRIBUTION OF ROMAN FINDS AT THE OBERESCH SITE.

built by the Germans and pits with bones of dead Roman soldiers. A concentration of Roman military equipment, i.e. more than 5,000 objects, were found there. Obviously the Germans had prepared this place as an ambush, and the Roman army, which had already been badly affected in earlier skirmishes, suffered a total defeat at the Oberesch site.

## FINDINGS

The Roman finds from the Oberesch reflect the presence of fighting troops as well as a large baggage train. While mapping all the artifacts (Figure 2) we realized that the Roman military objects are not distributed evenly across the site. The distribution pattern of military remains resulted not only from the course of the fighting but also from looting and other post-battle processes. Pieces of the legionaries' equipment fixed to the body - i.e. fragments of ring mail shirts and laminated armor (*lorica segmentata*) as well as fragments of belts and aprons - indicate places where legionaries were killed and brutally stripped by looters; they were found close to the wall, but also in its approaches. The broad distribution of large amounts of hobnails, brooches, and coins also mark the area of movements and combat of the Roman troops.

An unusual concentration of shield fittings near the wall, however, cannot be explained as a result of combat (Figure 3). The fittings represent shields that were collected by the Germans after the battle, and since the large Roman shields did not fit the Germanic warriors' weaponry they were dismantled to obtain the valuable metal parts. What we find today are only the last fragments of this dismantling. Furthermore, only one fragment of a sword blade was recovered suggesting that the Germans collected the Roman swords and reused them, perhaps during the ongoing clashes. The scabbards, separated from the blades, were not standardized and thus useless to

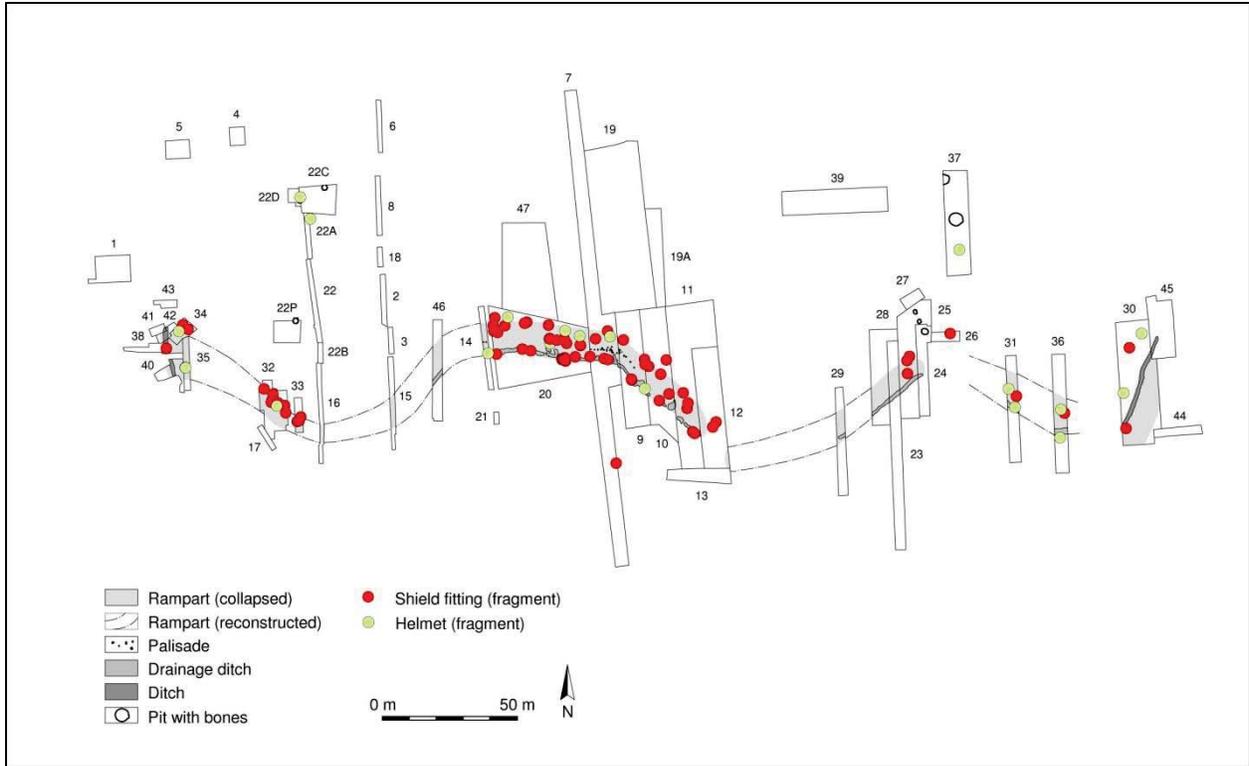


FIGURE 3 DISTRIBUTION OF FRAGMENTS OF ROMAN SHIELDS AND HELMETS AT THE OBERESCH SITE.

the Germans. Hence the looters processed them like the shield fittings to get the metal. Large amounts of small often unidentifiable fragments of bronze and silver sheets, which are concentrated next to the wall, show that the central zone near the rampart was used to organize the scrapping of the valuable metal and the distribution of booty.

The distribution of other Roman objects however, especially fragments of helmets (Figure 3), which consisted mainly of metal and were not necessarily dismantled like the other objects, indicates an additional reason for the collection of equipment in the wall area: the victorious Germans seem to have displayed the losers' equipment in the aftermath of the battle.

After a victorious battle the Romans used to present the weapons of the defeated enemy in a *tropaeum* as is known for instance from Trajan's Column (Roman triumphal column in Rome). Shields and helmets played an important part in such a presentation, which was usually erected at the place where the enemy had fled from the battlefield. It is highly probable that Arminius, a former leader of auxiliaries, was familiar with this Roman custom. Thus inspired, he may have taken opportunity to visualize to his allies their collective success in a victory celebration after the Varus battle.

These observations suggest that the Oberesch was the main site within the much wider battle area. Many other sites beyond this one have considerably fewer finds, a fact that caused some confusion at the beginning of our investigations. Meanwhile, methodological reflections concerning the impact of post-battle processes – like body stripping, looting, and scrapping - have produced explanations for the different amount of finds in different parts of the battle in a defile.

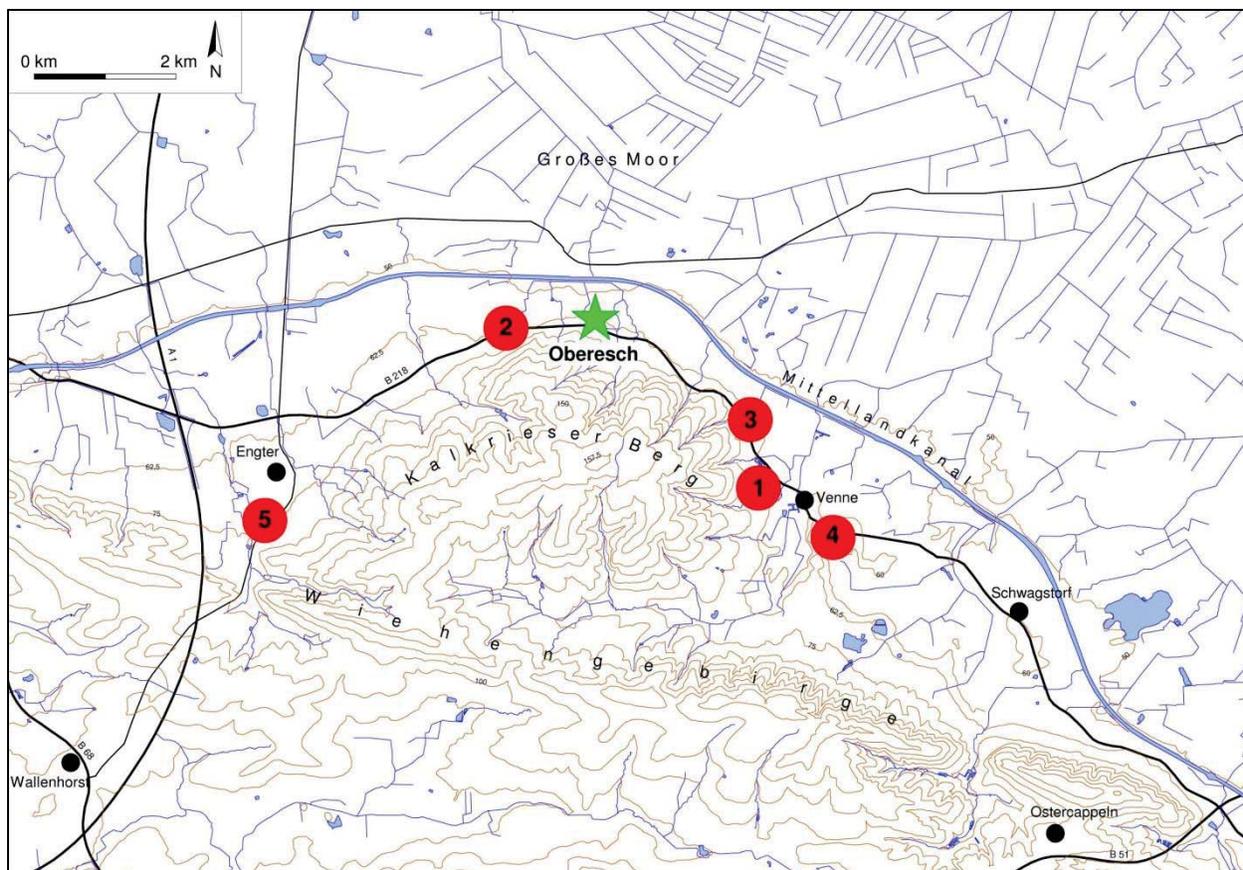


FIGURE 4 GERMANIC SETTLEMENTS IN THE BATTLE AREA OF KALKRIESE.

Fighting started east of Oberesch site, but in the beginning of the battle the Roman troops were probably still largely intact, and they were able to collect their dead and wounded soldiers together with their equipment to take them along in their baggage train. From skirmishes like these much less remained than from the main action at the Oberesch site. There, we may assume, not only intense combat took place, but also looting even of those Roman casualties who had not fought at this site. Northwest of Oberesch site we found less, but precious finds such as coin hoards or silver fittings of a scabbard. They suggest flight and pursuing skirmishes where the defeated tried to hide their valuable belongings to prevent them from falling into the Germans' hands.

Having gained insight into some of the main structures of the archeological record on the Kalkriese battlefield we are now researching, with three year's funding from the Deutsche Forschungsgemeinschaft (German Research Foundation), the greater cultural landscape surrounding the battle, the conflict landscape, and the German people who defeated the Roman army. Field surveys and excavations have identified settlements of the Late Pre Roman and the Early Roman Iron Age. Our work focuses the factors that have determined the combat operations. For example, the size and the density of the Germanic settlements, as well as the lines of communication that existed when the Roman troops reached that region. We hope to learn where the booty was left after the battle; was it transported to other distant tribal areas or brought to settlements nearby? The present studies show a concentration of Germanic settlements and infrastructure in the dry sandy area at the foot of the Kalkriese Hill. It seems that a dry zone at the edge of the bog was not settled at the time of the battle, and neither the hill nor the wet sand area was used for settlements or agriculture. The distribution of artifacts demonstrates that the Roman troops were guided by the settlements of the indigenous population when they were marching along the hill.

Two settlements which were inhabited around the time of Christ's birth could partly be excavated during the last years. They are situated in a distance of two and four kilometres east and west respectively of the Oberesch (Figure 4, sites No. 1 and 2). Probably the settlement density in the area at the hill was much higher than we know today, but a thick layer of turf on the fields is a hindrance for field surveys, and we always have to excavate a site to get detailed information.

The site west of the Oberesch (site No. 2) is of special interest to us. We unearthed a few farmhouses which indicate that the settlements were quite small. Besides, more than 100 Roman military objects were discovered at this site. Some show traces of chiselling, and together with drops of molten bronze they tell us that Roman equipment must have been processed by the Germans. We now have to discuss whether the Roman objects were collected at some other place in the battle area and were taken to this settlement as booty or if we can take them as evidence for fighting at this site. At the current stage of our analysis we may say that the distribution pattern argues for the latter interpretation since the finds are scattered over the whole site. If the Roman finds were to be interpreted as booty, one might expect a craftsman's hoard for example, since Roman coins, seal boxes, gaming pieces or brooches were not used by the Germans in daily life. We also found rather worthless items such as iron crest holders and nails. Altogether, the quality of finds is comparable to what we found at the Oberesch site. Perhaps some of the skirmishes took place in a small settlement which the inhabitants had temporarily left not long before the Roman troops arrived. This part of the battlefield was also plundered at the end of the conflict, but the inhabitants of this settlement may have found lost small remains by chance and used them as raw material for the production of their own metal objects.

## FUTURE INVESTIGATIONS

With such aspects in mind, a critical analysis of Roman military objects found beyond the Oberesch site will constitute the base for a complete interpretation of the vast distribution of finds in the battle area of Kalkriese as traces of an extensive battle in a defile between hill and bog.

The large extension of battlefields is quite a problem not only for research, but also for preservation. The analysis of finds and features in Kalkriese demonstrates that ancient battlefields show a very complex archeological record and that it is necessary to investigate not only sites with many finds, which appear to be the centers of the clashes, but, we also have to investigate areas of approach or flight as well as the indigenous infrastructure when we aim to understand the military conflict in its entirety.

Even the determination of the extension of an ancient battlefield can be difficult. It depends very much on the kind of weaponry used in the battle. The use of lead sling shots for example is quite helpful for investigations. Comparable to the ammunition of firearms, such small projectiles were seldom collected after a battle, and their resilience against decomposition results in a large amount of such finds still found on ancient battlefields today. With only small iron or bronze objects which decompose more easily left on a battlefield, a site is much harder to identify. After 2000 years of exposure to the impact of soil and environment many of the finds are in a bad condition. We must assume that such sites of military conflicts will suffer further loss of substance even when they are under the care of local and state monument protection. In order to save the information of such archeological sources it is therefore necessary to complete field surveys and geomagnetic prospections with archeological excavations at least in selected sections.

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# PRESERVING THE DACIAN LANDSCAPE: DOCUMENTING ROMAN AND DACIAN MILITARY FORTIFICATIONS IN ROMANIA

Jeremy C. Miller

## INTRODUCTION

In the past, researchers often excluded local communities and interest groups from research and excavations. This behavior led to an unnecessary divide between scholars working to document cultural heritage and the individuals whose past they sought to preserve. Today, public advocacy and site preservation are



placed at the forefront of **FIGURE 1 REFERENCE MAP OF ROMANIA WITH LANDMARKS.** archeological investigations

because public integration and preservation are synonymous. Public involvement and support has been successful throughout North America and parts of Western Europe but remains a challenging endeavor in regions where the population does not view cultural resources in the same manner. Archeological teams conducting research in Romania are negotiating processes to transform traditional methods of interpretation to a more communally integrated system. Members of Braşov Archaeological Projects (BAP) and Archaeological Techniques and Research Center (ArcheoTek-Canada) are collaborating with Romanian scholars and professionals in order to progress towards this long-term goal. By incorporating innovative technological methods, these archeological teams are working to get local Romanians more invested in their cultural heritage.

In this paper, I provide a brief summary of the research and fieldwork conducted by Braşov Archaeological Projects (BAP) in Romania (Figure 1). From 2010 to 2014 BAP's multi-disciplinary team spent several field seasons surveying Roman *castra* (military fortifications) throughout Transylvania (Figure 2). In the 2014 field season, BAP added five Dacian fortifications to the study as comparative data that provided a more holistic view of the complex martial landscape of Dacia before and during Roman occupation (106- 271 C.E.). Outlined in this document are the innovative techniques BAP employed to survey, investigate, and preserve the cultural landscape. The paper concludes with considerations for site preservation and the various methods of public access within the socio-cultural context of modern Romania.

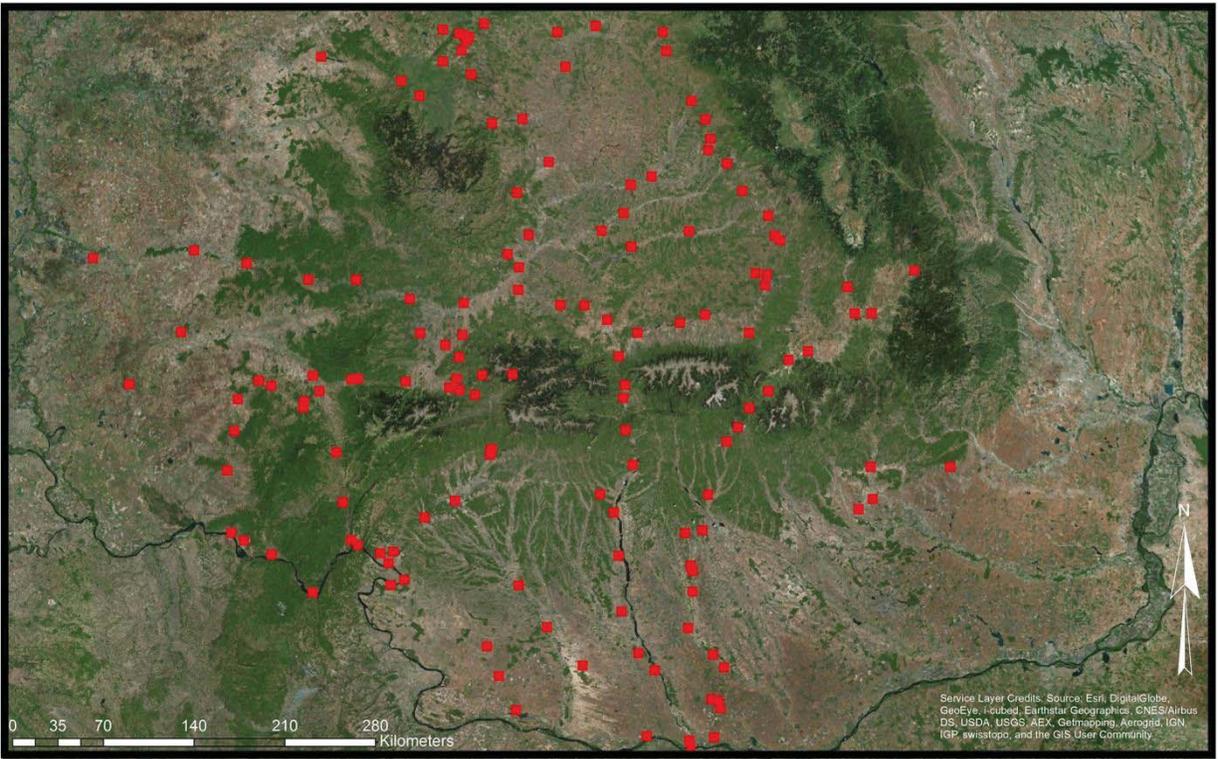


FIGURE 2 DISTRIBUTION MAP OF ROMAN CASTRA.

## HISTORICAL BACKGROUND

The nature of early Roman interactions with Dacia is widely debated. Few ancient sources elaborate on this relationship, and those that do are full of inconsistencies (Herodotus *Histories*; Strabo *Geographica*; Suetonius *De Vita Caesarum*; Cassius Dio *Roman History*). Primary sources referencing the Dacians are limited to a few sporadic texts. These documents only mention barbarian groups in the Balkans as a whole and often inaccurately label or identify tribal affiliations and allegiances (Grumeza 2009). The lack of historical records has forced scholars to make inferences from the few written accounts that are available.

Cited within the Roman civic record are only the significant events that occurred between the reigns of the emperors Domitian (r. 81-96 C.E.) and Aurelian (r. 270-275 C.E.). Though specific details regarding major battles and troop movements of the Dacian Wars do not exist in literature, some scholars have used the Column of Trajan in Rome as a means to supplement the paucity of textual documentation with visual imagery (Rossi 1971; Lepper and Frere 1988). According to Cassius Dio, the emperor Domitian responded to the growing threat of Dacia, then a unified kingdom under the rule of Decebalus, with a major military campaign between 85-88 C.E. (Dio *Roman History* Book *LXVII*). Domitian's campaigns can only be described as a humiliating defeat that weighed heavily on the economy of the Roman Empire and the morale of her legions. At the First Battle of Tapae (c. 86 C.E.), the entire *Legio V Alaudae*, under the command of Prefect Cornelius Fuscus, was annihilated (Parker 1971; Suetonius *Lives of the Caesars*). The destruction of an entire legion meant the deaths of thousands of Roman legionnaires. This defeat, and a Germanic incursion along the Rhine, led to Roman withdrawal from Dacia in 88

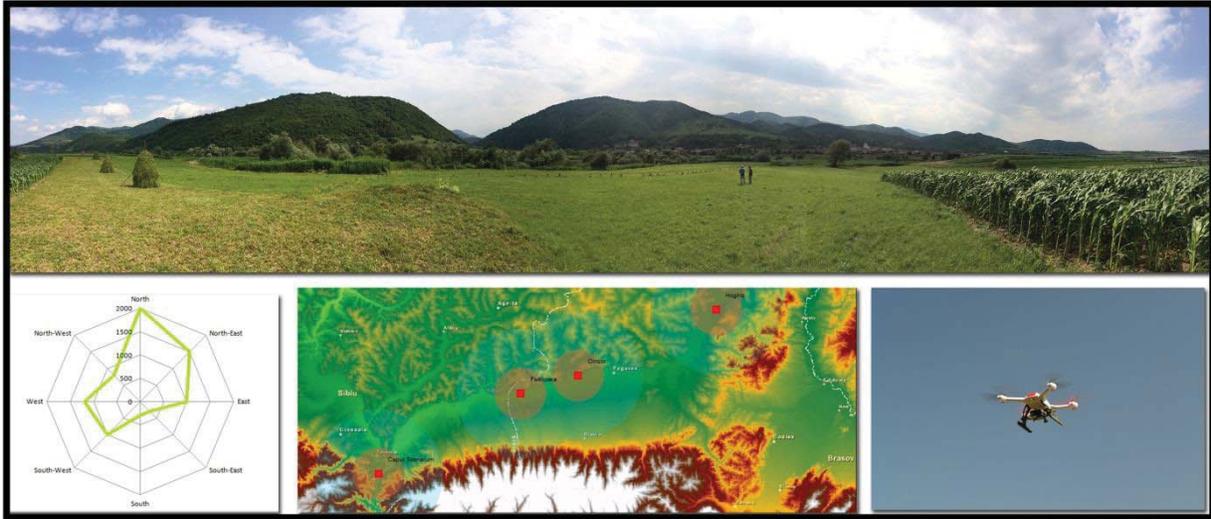


FIGURE 3 VIEWSHED DATA FROM CASTRA-CAPUT STENARUM.

C.E. Peace negotiations resulted in Decebalus receiving a considerable annual stipend from Rome, as well as access to Roman goods and technologies.

Subsequently, Trajan was named emperor of Rome in 98 C.E. Within three years, he set about accomplishing what Domitian had failed to do: acquiring gold, silver, and salt resources in the Carpathian Mountains and the duteousness of the Dacians. His exploits avenged Rome’s embarrassing defeat, subjugated the Dacian ruling class, and rescinded the payments to the Dacian kingdom. To accomplish this, Trajan entered into two major wars with the Dacians between 101-102 C.E. and 105-106 C.E. No textual first-hand accounts for the war stratagem exist, but this has not stopped modern historians from assembling an array of theories concerning the conflicts’ narrative (Cătănciu 1981; Gudea 1979; Oltean 2007; Wilkes 2005).

Most scholars agree that Trajan relied upon the failures of his predecessor to define his operational objectives. Domitian’s strategic blunders include misallocation of resources, misplaced trust in legates, and ordering Roman forces to invade through one access point into Transylvania. During Trajan’s First Dacian War, certain military achievements were accomplished, though they were never described in any detail. Ultimately, Trajan’s Second War led to a Roman victory with the complete decimation of the Dacian capital of Sarmizegetusa Regia. Rome subsequently occupied the newly acquired territory and exploited its resources until the drawdown of the 3<sup>rd</sup> century.

## METHODOLOGY

Research conducted by Braşov Archaeological Projects (BAP) members has provided compelling evidence that directly challenges previous scholarly notions concerning the Roman occupation and the ‘Romanization,’ or assimilation, of native indigenous groups. Archeological remains show the continued practice of Dacian traditions, active resistance, and evidence of Creolization, or complex cultural mixing, as manifested through material culture recovered from sites across all of Transylvania, especially in the central to eastern regions (Webster 2001; Ibarra 2014).

During the 2014 field season, BAP conducted a large-scale survey documenting over 20 Roman and Dacian fortifications across Transylvania. The BAP team consisted of archeologists, anthropologists, art historians, and combat veterans; providing a unique multi-disciplinary approach to the interpretation of landscape and terrain analysis. Data collection methods ranged from military terrain analysis to the use of Unmanned Aerial Systems (UAS/UAV). A modified method of the U.S. Army's battlefield and terrain evaluation tool known as OCOKA (*Observation, Cover and Concealment, Obstacles, Key Terrain, and Avenues of Approach*) was implemented in conjunction with 360° viewshed analysis (Figure 3). Viewshed data was collected by taking a series of photographs facing each of the four cardinal directions and four intercardinal and subsequently using a rangefinder to calculate distances to nearest visibility obstructions. Least-cost pathway (LCP) analysis was applied to each site to provide quantifiable data that was utilized to determine variables in site efficiency. A datum was established for each site (at rough center) and geospatial coordinates were recorded from this datum and all visible surface features. The data was further entered into the geospatial Esri® software ArcGIS®. Post-processed data—such as viewshed diagrams—were overlaid onto regional maps within the program, illustrating parameters of visibility and a means to identify certain characteristics that dictate site placement by Romans within the Dacian landscape.

## SITE PRESERVATION

Partnering with local communities has proven to be a key requirement in promoting effective site preservation. The majority of Roman and Dacian sites throughout Romania are in poor condition. This degradation is the result of many variables but is primarily due to site location (often in agricultural fields), geological factors, and urbanization. Seismographic activity has also led to the destruction of many Dacian sites, as they are regularly embedded in elevated terrain or on summits within the Carpathian Mountains. Locating the archeological footprint of Dacian sites is already a challenging pursuit for any researcher, and these additional obstacles are a significant hindrance to the preservation of indigenous heritage sites in the region.

Early preservation and data collection from the archeological sites within Romania increased during the period of the Romanian Communist Party (1946- 1965), reaching a peak during Nicolae Ceaușescu's position as head of the Socialist Republic of Romania (1965- 1989). It was during this latter period that nationalist agendas promoting cultural unification were imposed upon local archeologists and historians. This period saw Roman *castra* and larger Dacian citadels partially excavated to collect enough data to approximate dimensions and orientations. Programs at larger sites such as Ulpia Traiana Sarmizegetusa, Sarmizegetusa Regia, Apulum, and Porolissum were deemed more significant by the Romanian Socialist Party and received financial support for documentation, museum curation, and eventual preservation. In conjunction with reconstructive-restorations, interactive kiosks were integrated into the sites to provide visitors with interpretations and visual aids. These reconstructions were often completed within a short amount of time and their accuracy is the cause of considerable debate among modern scholars and professionals.

The preservation of Roman *castra* throughout Transylvania varies considerably based on their individual locale. The sites located in the western portion of Transylvania, such as the Roman capital of Ulpia Traiana Sarmizegetusa, Sarmizegetusa Regia, and Apulum are the best preserved because they were initially excavated with the intention of being tourist attractions. *Castra* in central Transylvania are often in a poor state of preservation due to the location of the forts in privately owned agricultural fields that were continually used throughout the centuries. As most often is the case, little to no visible evidence exists to identify the presence of these *castra* in the modern landscape other than small clusters of artifacts, brick debris, and tile fragments, which appear on the surface of plowed fields. In contrast, sites east of Dumbrăvița (Figure 1) are in remarkable condition, likely a testament to the

cultural shift in the area from subsistence and commercial farming to herding. In this region of Transylvania, almost anyone can walk onto the modern landscape and visibly distinguish ditch defenses, inner walls of the fortification, and the foundations of internal structures of a given *castrum*.

To date, all known Roman *castra* and Dacian citadels are documented in the Romanian National Archeological Record Database (RAN) which is maintained by the Ministry of Culture and National Heritage (URL: <http://ran.cimec.ro/>). The sites are accessible to professionals and the public and are organized according to historical period, county jurisdiction, and geospatial coordinates. Ambitious local scholars, such as Florin Fodorean, Ioan Fodorean, and Ciprian Moldovan are currently attempting to modernize preservation and site documentation in Romania by implementing digital cartography and constructing GIS databases that include geospatially referenced archeological site plans and geospatial coordinates. With these tools, a researcher is able to view site drawings, and computer-generated reconstructions of major excavated *castra* and settlements throughout Romania (Fodorean et al 2013). In addition to the work of these researchers, university professors, county archeologists, museum curators, and the Romanian Ministry of Culture are conducting continuous archeological investigations.

Recently, the public has been encouraged to directly engage and support archeological investigation. Romanian driven excavations often rely on local volunteers from the community and student groups to back their efforts. Tourists visiting noteworthy sites are invited to participate with researchers. At major sites, such as at Ulpia Traiana Sarmizegetusa, public history festivals and reenactments are regularly undertaken and provide entertainment, interactive stations, and programs taught by resident artists, historians, and archeologists. In the United States, similar “living history” demonstrations and “experimental archeology” have found success among visitors of state and national parks. Due to the lingering effects of the Communist and Socialist regimes, many middle-aged to elderly Romanians continue to view these actions by local and foreign archeologists with suspicion. Focusing on the education of younger generations remains essential to continuing preservation of sites and cultural heritage in the region.

Since 2001, ArchaeoTek-Canada has offered field schools and research opportunities throughout Romania for foreign amateurs and professionals. BAP researchers have now joined the diverse staff of ArchaeoTek-Canada as a means to collaboratively conduct archeological investigations in Romania using the advanced, multifaceted methods that ArchaeoTek-Canada has refined. The research being done by BAP on Roman occupation-era *castra* and settlements in Dacia is critical to further our understanding of the dynamic cultural situation in ancient Dacia among soldiers, veterans, colonists, and natives. Furthermore, the examination of the martial posturing of *castra* provides our only unbiased chronology for events during and after the Dacian Wars. The intensive survey and documentation of Roman and Dacian sites in Romania serves to illustrate an invaluable cultural heritage. With collaboration between Romanian institutions, scholars, and ArchaeoTek-Canada, the Braşov Archeological Project will continue documenting and preserving the unique frontier settlements, battlefields, and cultural landscape of the region.

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# LANDSCAPE OF CONFLICT IN 12<sup>TH</sup> CENTURY GWYNEDD

Jacqueline Veninger

## INTRODUCTION

The ephemeral nature of medieval conflicts in Great Britain and in particular, Wales, has generally discouraged archeological investigation. To date, the majority of battlefield surveys center on the recovery and interpretation of portable military material culture, acquired through traditional archeological survey methods and techniques. However, this type of investigation and survey is rarely practical or possible for these ephemeral medieval conflicts. These conflicts need to be approached and understood from a larger and holistic conflict landscape methodology. Currently no precedent exists in Great Britain for a methodological primer as a tool for deciphering medieval conflicts. Such a methodology would be particularly important to rescue archeology and cultural resource management archeologists.

My doctorate research involves spatially defining the archeological landscapes of conflict associated with the Welsh resistance to the Anglo-Norman conquest of Wales in the 12<sup>th</sup> century. The mid-12<sup>th</sup> century in Gwynedd (North Wales) was a period typified by intense conflict between the Native Welsh under the leadership of Prince Owain Gwynedd and the Anglo-Normans led by King Henry II. The 1157 Coastal Campaign and the 1165 Berwyn Mountain Campaign were the definitive campaigns of the era. It can be argued that their outcomes preserved Welsh independence for more than a century, up until the Edwardian conquest at the close of the thirteenth-century. The following is an outline of the project methodology, a brief overview of the 'Battle of Coleshill' engagement of the 1157 Coastal Campaign and the resulting preliminary conclusions from a military terrain analysis. A concluding remark will also be included on the implications of medieval battlefield archeology in the public sphere, particularly in terms of preservation and commemoration as it pertains to the 1165 Berwyn Mountain Campaign.

## THE METHOD

- 1) Analyze primary sources to construct a timeline of battlefield or conflict events with anticipated archeological signatures.
- 2) Conduct an archeological landscape survey to locate, define and evaluate the integrity of conflict sites.
- 3) Reconstruct the historic built landscape by conducting an archeological landscape survey to locate, define and evaluate the integrity of these sites.
- 4) Evaluate the military significance of the physical landscape by conducting a military terrain analysis survey using 'reverse' KOCOA, a significant part of which includes viewshed analysis.

Integrate the conflict terrain, as well as historical and archeological data into GIS to reconstruct conflict events across time and space.

Apart from the application of 'reverse' KOCOAs, which will be explained below, the methodology outlined above is not unique as it is used by many conflict archeologists working on battlefield sites (particularly American Battlefield Protection Program sites (ABPP)) in the USA. In fact much of this research methodology, including 'reverse' KOCOAs was adopted by the author from her previous work with Dr. Kevin McBride on an ABPP documenting the battlefields of the Pequot War (1637) (McBride *et al.* 2011). What makes this methodology unique is its application to a medieval conflict and the inclusion of an in-depth reconstruction of the contemporary historic landscape. This is a challenge for medieval conflicts and medieval Welsh archeology as the historic cultural landscape is poorly documented.

Generally KOCOAs are used to better delineate and define features of a known battlefield to assist in the analysis and reconstruction of discrete battlefield events. Reverse KOCOAs use the elements of KOCOAs to identify potential battlefield locations, in events where the site of the engagement is not precisely known. Once this is achieved, KOCOAs are then applied in the traditional mode. Essentially this is a landscape archeology approach to defining conflicts. This approach is unique in that it utilizes a military terrain analysis lens to reconstruct historic landscapes and historic landscapes of conflict. In the realm of medieval conflicts this methodology has promising implications, as it provides archeologists with a tangible way forward for better defining and understanding medieval conflicts that is not dependant on the recovery of portable military material culture.

## 1157 COASTAL CAMPAIGN OVERVIEW AND PRELIMINARY 'REVERSE' KOCOA RESULTS

And then, after Owain, prince of Gwynedd, had summoned to him his sons and his forces and his might, he encamped at Basingwerk, and a mighty host along with him. And there he made an appointment for battle with the king and had ditches raised with the intention of giving open battle to the king. And when the king had heard that, he divided his host and sent many knights and barons beyond number together with a strong multitude along the shore towards the place where Owain was. And the king himself unperturbed, and armed forces most ready to fight along with him, advanced through the wood that was between them and the place where Owain was. And Cynan and Dafydd, sons of Owain, encountered him in the wild wood and gave the king a severe battle. And after many of the king's men had been slain, it was with difficulty that he escaped back to the plain. (*Brut Y Tywysogyon* [Chronicle of Princes] Red Book of Hergest manuscript 1973:135).

The scope of this article is not such as to allow an overview of the comparison of manuscripts and the resulting KOCOA features highlighted. Suffice to say that other manuscripts contemporary to the one referenced above provide further clues as to the location of the battlefield, based on the description of the natural terrain and other built features. For example, the *Brenhinedd Y Saesson* indicates that Owain raised a castle in preparation of battle (159), and the *Journey Through Wales* states unequivocally that the battle transpired in a narrow wooded pass near Coleshill (189). The following is a brief overview of the military terrain analysis used to better define Henry's avenue of approach and in connection to this, the probable location of the ambush event described above.

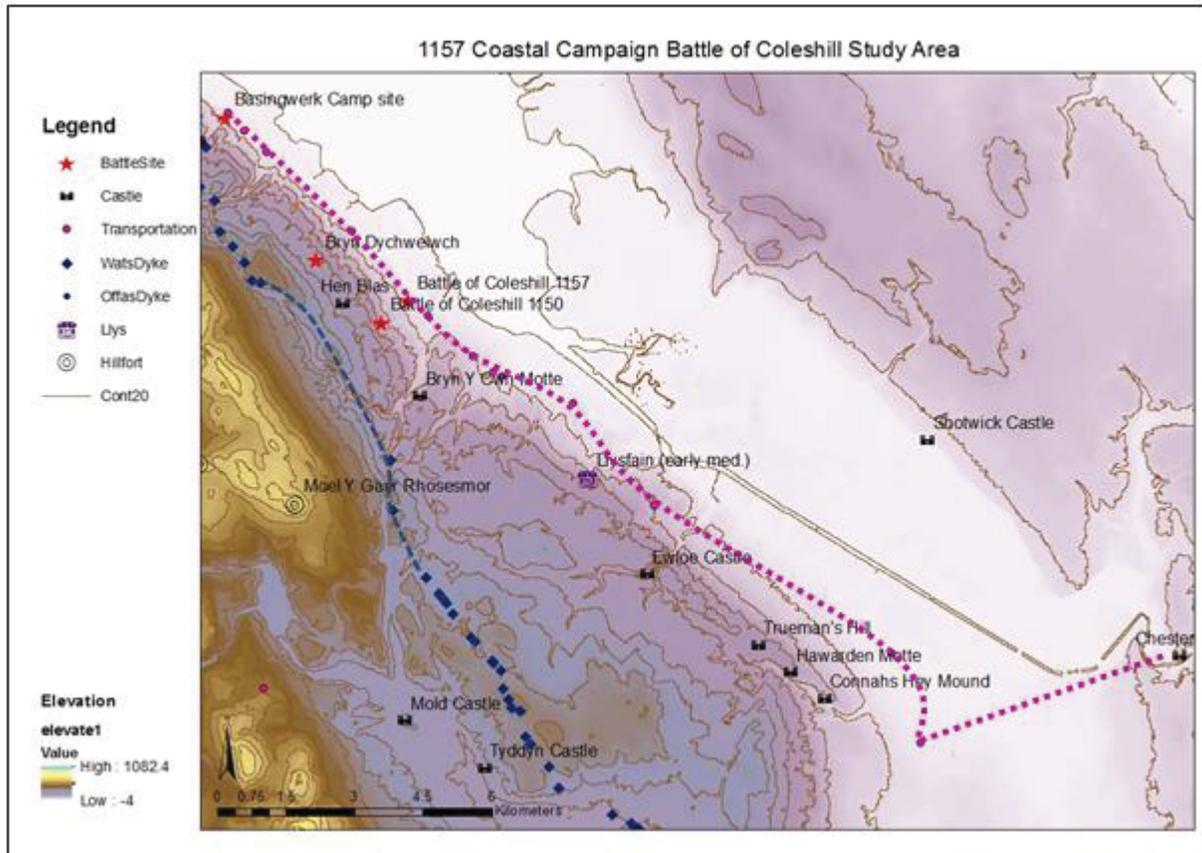


FIGURE 1 KEY FEATURES OF THE 1157 BATTLE OF COLESHILL. NOTE, BLUE LINE IS WAT'S DIKE, PINK LINE IS COASTAL ROMAN ROAD. BATTLE SITES APPROXIMATIONS.

According to medieval manuscript tradition, the battle took place in a wooded area at an undefined location somewhere between Chester and Basingwerk. This wood, as defined by the *Domesday Book* (c. 1086), stretched from the border near Chester to Basingwerk, a distance of approximately 11 kilometers (Williams and Martin 1992:728). Given the need for concealment from the Welsh (Henry intended to surprise the Welsh from their rear), and based on the description of the battle location in the *Journey Through Wales*, it is likely that the Anglo-Norman troops exploited the ravines that are prevalent in this region. Given the difficult nature of the densely wooded terrain, it was unlikely that Henry had intended to remain in the woods for the entirety of his march to the Welsh encampment at Basingwerk.

Wat's Dyke (an early medieval boundary) runs parallel to the coastal Roman road to Basingwerk where it terminates (Figure 1). At Hawarden it is located eight kilometers west of the road and at Hen Blas it is less than three kilometers to the west. It is possible that Henry intended to cut west through the forest – which the *Domesday Book* states was two leagues wide (approximately 5.5 kilometers) to Wat's Dyke. It is uncertain what condition the dyke would have been in nearly four hundred years after its construction, but as much of it is still extant today it is probable that it was better preserved in the 12<sup>th</sup> century. Regardless of the condition of the dyke, its steepness retarded large vegetation and thus would have provided Henry's forces a relatively unencumbered and defensible route of march. Viewshed analysis of this particular stretch of the dyke illuminated a unique visibility feature, due to the topography of the ridgeline on which the dyke is located, it affords forward visibility only. That is, on a south to north movement trajectory, the landscape towards the north is visible, whereas the

retreating landscape to the south affords no or extremely limited visibility. Had Henry's troops made it to the dyke this would have been an important feature, as his troops would have had visibility as they advanced north to Owain's encampment, but any Welsh scouts would not have been able to observe the advancing force (Figure 2). Unfortunately for Henry, what was a good strategy in theory was never to be tested, as his forces were ambushed before they reached the dyke.

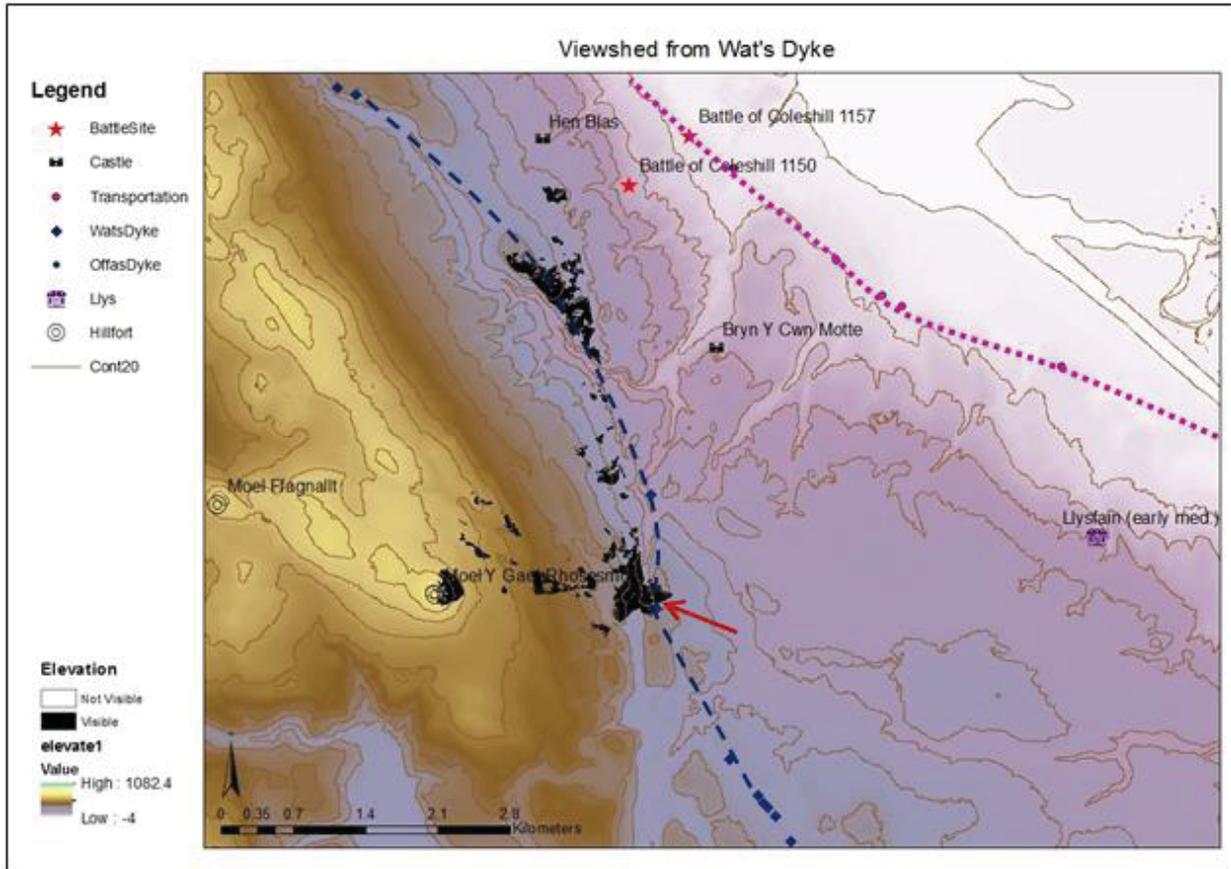


FIGURE 2 EXAMPLE FORWARD LOOKING VIEWSHED FROM A POINT ON WAT'S DIKE (RED ARROW).

Similar to Wat's Dyke, the invisibility aspect was an important quality in determining the possible location of the ambush, commonly referred to as the Battle of Coleshill. Much of the coastal Roman road was visible from the Welsh encampment at Basingwerk, particularly the stretch within five kilometers of the Welsh encampment. Areas of the road that would have been invisible to the Welsh position, and that were adjacent to ravines, were investigated as possible ambush locations. These are the ravines near: Hawarden Castle, Ewloe Castle, Bryn Y Cwn Motte and the castle of Hen Blas. Although the ravine near Ewloe Castle is the popular location of the battle, (local enthusiasts have even erected a plaque), this preference seems to be based primarily on antiquarian literature from the eighteenth and nineteenth centuries. Conversely, the results of the military terrain analysis point to Hen Blas as the probable location of the engagement. Archeology conducted at Hen Blas in the 1950s by G.B. Leach, indicated that the motte (castle mound) had been hastily constructed, possibly in preparation for the 1157 conflict (1957: 2). Additionally Hen Blas is located at a distance of less than three kilometers from Wat's Dyke, compared to the eight kilometers in the Ewloe region. Furthermore, the location of Wat's Dyke near Ewloe would have been

within view of Mold Castle, which at this moment in history was garrisoned by the Welsh of Gwynedd. There is also a tumulus of undetermined origin near Hen Blas that may be a mass grave containing the battle dead (see Figure 3). Hen Blas is also located within the municipal region of Coleshill, for which the battle was named. Incidentally Hen Blas was originally called Coleshill castle. Currently, additional research is being undertaken to further establish the probability of Hen Blas as the location of the Battle of Coleshill. This type of archeological inquiry and analysis would not have previously been possible without battlefield archeology methodology, adjusted to a medieval context.



FIGURE 3 VIEW TOWARDS POSSIBLE BURIAL MOUND ASSOCIATED WITH BATTLE. RAVINE LOCATED WEST (LEFT) OF PHOTO.

## THE 1165 BERWYN MOUNTAIN CAMPAIGN AS AN EXAMPLE OF PUBLIC OUTREACH, PRESERVATION AND COMMEMORATION

Currently the heritage communities in Britain define a battle as: “an action involving wholly or largely military forces, present on each side in numbers totalling c. 1000 or more, and normally deployed in formal battle array” (Foard and Morris 2012:6). This post-medieval definition of battle, has led to the dismissal by the heritage community of the skirmishes, ambushes and raids that define so much of medieval armed conflict. The result is that medieval battles are often ignored making it difficult to raise public awareness and promote preservation.

Despite this, there exists a localized tradition of commemoration for the 1165 Berwyn Mountain campaign. The tones of these commemorations vary greatly depending on which side of the border they are located. For example, commemorative plaques and informational placards in Wales (sponsored in part by the Wrexham and Denbighshire County Councils) describe the events with an undeniable tone of pro-Welsh sentiment. Whereas in England the campaign commemoration adopts an entirely different tone, one that is overtly pro-English, a plaque at Oswestry Castle states that “Henry II is said to have camped in Oswestry before defeating the Welsh Prince, Llewellyn”. This statement is rife with inaccuracies, as not only was it Owain not Llewellyn who was Henry’s opponent, but it was Henry, not Owain who was defeated. It is remarkable that such contention and bias exists to this day over events that transpired nearly 850 years ago. The ability of past conflict to contribute to the conceptualization and creation of modern identity is a powerful argument for the relevance and continuation of the study of the archeology of conflict. Future work on this project hopes to involve the members of the public in raising awareness on the importance of this conflict and hopefully working alongside the heritage community to develop a new set of criteria for defining and preserving medieval battlefields in Great Britain.

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# GUNS ON THE BATTLEFIELDS OF LATE MEDIEVAL EUROPE: ARCHEOLOGICAL EVIDENCE FOR THE ORIGINS OF FIREPOWER

Glenn Foard

## INTRODUCTION

Gunpowder weapons, introduced into Europe by 1326, were used in significant number on battlefields by the 1380s. Important technological developments in around 1470 seem to have transformed their battlefield use. After a further half century of technological change and tactical responses, the gun had taken on a battle winning role. The Battle of Pavia, fought in Italy in 1525, is often taken as the tipping point.

The guns seen at Pavia, however, were already in use on some battlefields of the 1470s. These included artillery of cast bronze of a wide range of calibers on efficient light carriages, which were easily moved and elevated, and shoulder firing matchlock handguns. These weapons were used in battles such as those between the Swiss Confederacy and the Burgundians at Grandson and Murten in Switzerland in 1476. However, alongside these there were the older style wrought iron composite artillery barrels.

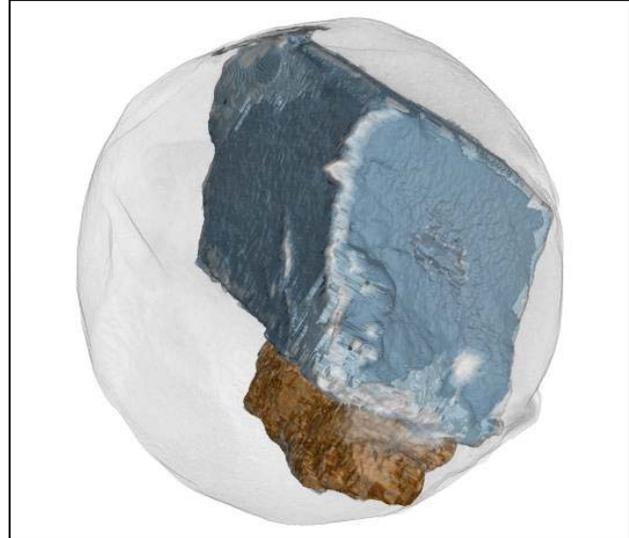
Unfortunately the documentary record is very limited for the apparently crucial developments in the second half of the 15<sup>th</sup> century. There are hundreds of surviving late medieval gun barrels, of both artillery and handguns, surviving in European collections. Analysis of these provides valuable data and further scientific analysis would add more, but most of the barrels are notoriously difficult to date. Wreck assemblages are closely dateable but field artillery had different requirements, of lightness and mobility, compared to naval or indeed siege artillery, so the type and chronology of tactically important developments in these may be very different.

## ANALYSIS OF BOSWORTH ARTIFACTS

Recent discoveries from the battlefield of Bosworth in England, fought in 1485, suggest that archeological evidence has the potential to complement the historical record in this key transitional period (Foard and Curry 2013). The artillery rounds from this and from other battlefields can be linked securely to a specific day and so might yield data on the size and types of guns used, perhaps even provide some guide as to the numbers of guns present. At Bosworth the resources did not allow for survey for ferrous artifacts and this may explain why no iron round shot were found, while an effective methodology for the recovery of stone round shot does not yet exist.

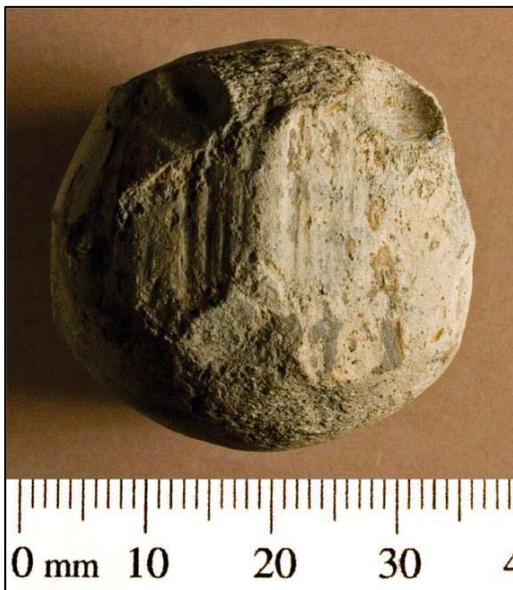
Data from the *Mary Rose*, a warship sunk in 1545, might suggest that stone rounds were less likely to have been used in field artillery, which will generally have had a bore of under about 100mm. Cast iron may have been more common for the higher calibers of field piece but lead seems to be the dominant material for late medieval field artillery, especially for the smaller bore guns.

Another problem is the uncertainty as to when hailshot, such as case and canister, first came into use and what materials were typically used for the projectiles. Iron fragments may be difficult to recognise from battlefield survey as they will be heavily corroded. Where stone pebbles or flint shards were used they may be



**FIGURE 1 LEFT: A 56MM ROUND SHOT FROM BOSWORTH BATTLEFIELD CONTAINING IRON DICE (BROWN CORROSION) WHERE CORNERS OF IRON DICE REACH SURFACE. RIGHT: NEUTRON TOMOGRAPHY 3D IMAGE REVEALING SHAPE OF IRON DIE (BLUE) AND PRESENCE OF STONE PEBBLE (BROWN). THESE INCLUSIONS WILL HAVE SAVED LEAD IN CASTING, BUT WAS IT ACTUALLY THE REDUCTION IN MASS THE GUNNERS REQUIRED TO CHANGE ITS BALLISTIC PROPERTIES? (COURTESY PAUL SCHERRER INSTITUTE, SWITZERLAND).**

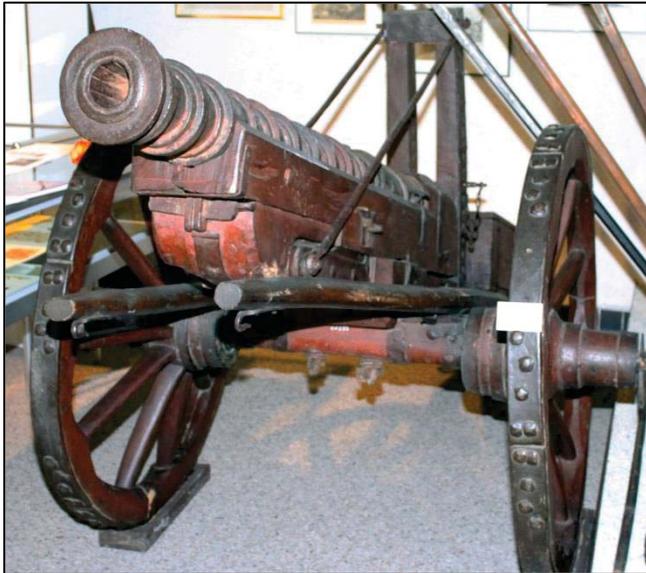
indistinguishable from natural stone found on many battlefields, though there may be exceptional sites in particular geological contexts where flint or certain types of pebbles are not otherwise present and may therefore be recoverable in fieldwalking surveys. The key development will be the introduction of lead bullets for hailshot, for these can be easily recovered and recognised in battlefield survey, but it is unclear when they were first used.



**FIGURE 2 A LEAD ROUND SHOT FROM BOSWORTH BATTLEFIELD SHOWING A DISTINCTIVE FIRING SIGNATURE IN THE FORM OF A FACETED BAND WITH STRIATIONS RUNNING IN THE DIRECTION OF TRAVEL DOWN THE BARREL.**

Many of the lead round shot of the period are of composite form, with stone pebble, flint shard, wrought iron cube die or even cast iron ball encased within the lead (Figure 1). Varied reasons have been suggested for these composite rounds, which went out of use by the end of the 16<sup>th</sup> century. It is possible that lead rounds were used because it was very forgiving of the massive irregularities of the wrought iron composite gun barrels. However, with the high mass of the larger calibers it may have resulted in too great a strain on the gun barrels, so the inclusions may have been intended to reduce the mass of the projectile and thus to reduce the pressures. That the mass of the lead projectiles was being carefully modified is suggested by analysis of the Bosworth rounds, with the addition of stone reducing the mass so it was close to that of iron rounds of the same diameter. This suggests the gunners also had a genuine concern for consistency of mass of round shot, which would be important both in calculating the appropriate gunpowder charge and for achieving consistency of range.

The evidence on the round shot from Bosworth suggests it is possible in some cases to identify the type as well as bore of gun barrel from which lead and lead composite rounds were fired. This has been confirmed by detailed studies of



**FIGURE 3 ONE OF A NUMBER OF ARTILLERY PIECES, THIS ONE OF WROUGHT IRON HOOP AND STAVE CONSTRUCTION CAPTURED FROM BURGUNDIANS BY THE SWISS AT THE BATTLE OF MURTEN IN 1476 AND PRESERVED IN THE TOWN MUSUEM, LA NEUVEVILLE, SWITZERLAND.**

surviving guns of the period, scientific analysis of the projectiles and a program of experimental firing. On firing the composite barrels create a distinctive faceted signature on the lead rounds (Figure 2). The signature, including the number and type of facets, varies according to whether the gun was gutter built (2 halves lengthwise) or hoop and stave built (with three or more staves of iron running the length of the barrel) (Figure 3). In contrast the new bronze guns have a far more consistent bore and will have normally produced a smooth firing band without facets. However, one problem is the existence of solid wrought iron guns, which have a more consistent bore than the composite wrought iron guns. What is not yet known is how consistent are these gun bores and thus whether they might produce a firing signature identical to that of the new bronze guns.

The guns also varied in loading mechanism, some being loaded from the muzzle and others with a removable gunpowder chamber at the breech. All breech loaders will have had a wooden or some other form of tampion closing the mouth of the chamber, creating a high pressure on the lower hemisphere of a lead ball on firing and so compressing it significantly, while reducing or completely removing the potential for hot gasses to melt the lower hemisphere of the ball. In contrast, if the muzzle loader was fired unwadded there would be lower compression but intense melting of the lower hemisphere of the lead ball. Thus the signature on some lead round shot will prove it has been fired from a composite gun, while muzzle loading can to some degree be distinguished from breech loading guns. But again, it is unclear whether a wadded firing from a muzzle loader will produce a similar compression and lack of melting as seen in a breech loader.

Thus there is the potential for lead round shot to provide an indication not only of the bore of guns present on a battlefield but also to identify the types of gun present, though the consistency and accuracy in such identification must be subject to further experimentation. Such experiments will also be needed to extend the data on the range of guns, which so far has shown modern 60mm breech and muzzle loading reproduction barrels achieving ranges of up to 1.2km after bounce and roll. But various other parameters need to be tackled. For example, all the experiments so far have been undertaken with modern gunpowder, which has a much higher peak pressure resulting in greater deformation of the ball for the same level of energy release compared to original powder. What are needed are experiments undertaken with reproduction powder more closely matched to that of the 15<sup>th</sup> century. This will assist in interpreting the distribution of round shot across the battlefield, which may offer clues as to where the guns were deployed and how they were used tactically. At Bosworth, there are also significant numbers of bullets of calibers compatible with early shoulder firing arquebus, however, these are not concentrated on the battlefield core but rather spread equally across the wider landscape and thus almost certainly represent sporting rounds deposited in later centuries. In contrast, there are three or four larger caliber balls, present only on the battlefield core, which are compatible with the large caliber early hand-cannon, though they may prove to have been fired from some form of mounted gun, such as the wagon mounted guns seen in the illustrations of the Swiss battles of 1476. Two small fragments and two round shot which may come from such guns have been found on Towton battlefield, fought in England in 1461. Thus, the Bosworth evidence seems to

confirm the traditional documentary analysis that, in contrast to continental armies, small arms were not in regular use in England and in the late 15<sup>th</sup> century. Indeed, it seems they were not introduced in large numbers until well into the 16<sup>th</sup> century, still being used in equal number with archers in the 1540s.

## CONCLUSION

Bosworth is exceptional only in the large scale, intensive and systematic nature of the survey undertaken. It is to be expected that other well preserved late medieval battlefields will have similar evidence. How the evidence differs on battlefields before and after circa 1470 is a crucial question. The Wars of the Roses in England, between 1455 and 1487 saw 15 substantial battles, including Bosworth. These battles span the transitional period and offer an important opportunity to test and to complement the documentary record using archeological evidence. Work at Towton already suggests very few guns may have been in use in 1461 compared to 1485. Comparison between the English experience and that in other countries across Europe may also add significantly to our understanding of the chronology and geographical focus of these important changes in the battlefield use of gunpowder weapons. However, one thing that is clear is that, with the exception of the one surviving English battlefield where mercenary handgunners were present, at Barnet in 1471, for the study of the first introduction of effective small arms to the battlefield we must look to continental battlefield sites.

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This article is based on the publication of the Bosworth project, where extensive referencing will be found on the various aspects discussed here.

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# THE SLINGSTONES AND ARROWS OF UNFORTUNATE OUTRAGE: VÁZQUEZ DE CORONADO IN THE RÍO GRANDE VALLEY, 1540 TO 1542

Matthew F. Schmader

## THE VÁZQUEZ DE CORONADO EXPEDITION OF 1540-1542

On 23 February 1540, nearly 2,000 people gathered before Antonio de Mendoza, the Viceroy of Nueva España (México), to present a muster roll (Aiton 1939). The place was Compostela, capital of the newly formed province of Nueva Galicia, in the west-central region of present-day México. The expedition's goal was to explore north of Nueva España, seeking new civilizations, riches, and a possible route to Asia (Flint 2008:17-19). The expedition was the largest land-based enterprise assembled by the Spanish crown in colonizing the "New World." It was led by the 29-year old governor of Nueva Galicia, captain general Francisco Vázquez de Coronado. By the time it ended, the Coronado expedition would cover 3,900 miles in a period of 28 months (Schmader 2014:116).

The contingent included 375 European men-at-arms, almost all Spanish, and at least 1,300 indigenous soldiers of mixed ethnic descent from central and western México (Flint 2008:58-60). The force was not well-outfitted: modern weaponry consisted of just 21 crossbows, 25 *arquebuses*, and 60 swords along with coats of mail and rudimentary shields and headgear (Flint and Flint 2005). The expedition's substandard outfitting was the result of being a private enterprise not underwritten by the Spanish crown. Since three-fourths of the force was Mexican indigenous soldiers, the most common weaponry was likely native in character (Schmader 2014). Over 1,000 horses and several thousand head of livestock were used to support the expedition.

Vázquez de Coronado led his party along the west coast of México before heading due north into the interior and towards the American southwest. It took four months to reach today's border between México and the United States; by early July 1540 the expedition reached the pueblo of Zuni, in present-day New Mexico. The Zunis were aware of the advance of such a large and slow-moving force, and had reason to be concerned. Vázquez de Coronado was anxious to reach Zuni, thought to be a wealthy settlement with exploitable riches. Neither side capitulated when they met, and a battle ensued on 7 July 1540 (Damp 2005). This was the first of numerous skirmishes Coronado would have with native peoples of the American southwest over the next two years (Flint and Flint 2005).

## THE TIGUEX PROVINCE

Realizing that Zuni was not the rich civilization he sought, Coronado had to choose whether to return or to press on. With much private funding invested-- about \$20,000,000 from the expeditionary members-- Coronado elected to send a scouting party eastward. That party found the Río Grande valley in central New Mexico by September 1540, and recommended relocating there to set up a long-term base of operations. They called the Río Grande valley near present-day Albuquerque, New Mexico the "Tiguex" (TEE-wish) province. The province was described as having twelve "towns," or villages consisting of many adobe rooms and buildings (Hammond and Rey 1940:183).

Once the entire expedition re-assembled in Tiguex, it was late fall of 1540 and the start of a very cold winter. Poorly provisioned and with many native Mexican soldiers who had never experienced such cold, Coronado took over an entire village for shelter. His men appropriated food and blankets and soon relations with the Tiguex peoples became strained. Other villages were forced to give up supplies, and an attempted rape of a pueblo woman went unpunished. The pueblos retaliated by killing several Mexican sentries and stealing horses, prompting Coronado to respond by attacking a village. The pueblo defenders were forced out by smoke and fire, and many men surrendered (Hammond and Rey 1940:226). When one of Coronado's captains tried to execute the men another bloody struggle ensued. By this time most of the Tiguex decided to leave their homeland; those who stayed retreated to one last stronghold called Moho, said to be three or four leagues (8 to 10 miles) away from Coronado's main encampment (Hammond and Rey 1940:358-359).

In early 1541, Vázquez de Coronado was determined to break the resistance of the Tiguex people. He moved a large contingent to Moho and demanded that the holdouts surrender. When they refused, he personally led the first assault on Moho but as the expedition's most cited chronicler, Pedro Castañeda de Nájera stated, "the enemy had been ready for many days and had so many stones to hurl upon us that they laid many of our men on the ground" (Hammond and Rey 1940:228). Coronado decided to lay siege to the village and eventually the puebloans began to suffer from thirst. "What troubled the people the most was their lack of water," Castañeda wrote. The siege lasted between 50 and 80 days according to differing accounts, including several more assaults, but was ended when the last survivors tried to escape one night. Many were killed and the rest were captured, but Coronado had ended the resistance and would leave Tiguex in haste for places further east (Flint 2008).

## PIEDRAS MARCADAS PUEBLO

The Tiguex province of 1540 occupies a stretch 15 miles long on both sides of the Río Grande north of present-day Albuquerque, New Mexico. The remnants of practically all the "twelve towns" of Tiguex have been found; the largest of these is known as Piedras Marcadas pueblo ("village of the marked stones"). This site contains an impressive settlement of well over 1,000 ground-floor adobe rooms built into apartment-like complex, parts of which were several stories high. Beginning in the 1990s, consultation with local tribal leaders resulted in a non-excavation management policy and research that emphasized remote sensing and low impact techniques (Schmader 2014:120; 2016).

Remote sensing studies carried out from 2005 to 2007 determined that electrical resistivity (ER) was the most productive method at the site (Markussen et al 2007). ER surveys of a 2.5 acre area in the site center revealed several hundred rooms arranged around an open courtyard or central plaza (see Figure 2), and areas of thick adobe melt indicating upper-story rooms. Vegetation removal to prepare the ER survey transects left several acres of bare soil, which also exposed the first indisputable artifact from the Coronado expedition (Schmader 2014:122). A single wrought iron nail with a faceted head was found on the site surface (Figure 1D) and metal detection surveys as suggested by Charles Haecker of the National Park Service soon followed.

In eight field seasons from 2007 through 2014, an area of 1.25 acres (5,000 square meters) has been intensively surveyed by metal detection. Within that space, more than 1,100 16<sup>th</sup> century metal artifacts have been mapped and retrieved-- the largest known assemblage of Coronado artifacts. Verifiable Coronado sites are quite rare, and although his was a large expedition, remains are found in very few places in the American southwest. The Piedras

Marcadas assemblage holds much interpretive potential in the quantity of items, the uniqueness and types of artifacts, and their distributions.

## ARTIFACT ASSEMBLAGE

About two-thirds of the 16<sup>th</sup> century metal artifacts, roughly 700, are iron or ferrous in composition. The remaining one-third, about 400 artifacts, are non-ferrous (that is, copper, copper alloy, or lead). These artifacts sort into several basic categories: ferrous items are nails and nail parts, chain or wire pieces, some utilitarian items including possible horseshoe fragments, and scraps of fragmentary sheet. Non-ferrous artifacts include personal items, munitions (crossbow points or lead balls), scraps of thin or thick copper alloy sheet, and unshaped lead blobs. The average artifact depth below modern ground surface is just 3 cm to 8 cm, indicating a stable and relatively undisturbed surface and lack of soil build-up on the site (Schmader 2011; 2014).

Fragments of non-diagnostic sheet iron are among the most common items. Exact causes of fragmentation are not known, but presumably relate to the intensity of actions that occurred at the site (Schmader 2011; 2014). Nails and nail fragments are the most abundant class of identifiable artifacts, constituting over 40% of all 16<sup>th</sup> century items. Nearly half of these are nail shaft fragments, and the diagnostic facet-headed nail type (Figure 1D) is represented by over 120 whole or partial nails and nail heads. Fragments of wire and chain, including whole or partial links of mail (Figure 1A), and the broken tip of a dagger (Figure 1L) round out the ferrous artifact types.

Non-ferrous artifacts include a variety of whole or broken personal items such as clothing lace tags or aglets (Figure 1B), clothing fasteners (Figure 1C), buckles (Figure 1E), strap loops (Figure 1F), strap ends, scabbard tips, horse tack (Figure 1G), and needles. Thick and thin copper alloy sheet (including bell fragments), and unshaped lead blobs are abundant. Whole or flattened lead balls (Figure 1H) and copper crossbow tips or "boltheads" (Figure 1I, 1J, 1K) constitute the metal ammunition found at the site.

There is no doubt that the assemblage found at Piedras Marcadas pueblo is attributable to the Vázquez de Coronado expedition. Certain items are diagnostic to a narrow time span, such as aglets which date to the first half of the 1500s based on size and lack of decoration (Schmader 2011). Characteristic facet-headed nails are similarly restricted to the 16<sup>th</sup> century. The most important diagnostic artifacts are copper boltheads. While boltheads were found on other Spanish expeditions of the 1500s, all other expeditions found in the United States used iron boltheads. Copper boltheads appear to have been unique to Coronado's venture, and lead isotope analyses of these artifacts traces back to the mining districts of Michoacán, which was part of the Nueva Galicia province (Thibodeau et al 2012).

Breakage patterns on many artifacts indicate one or more situations where extreme energy or force was used. Fragmentation of iron sheet and wrought iron nails is complemented by loss or breakage of numerous personal items worn by individuals. These patterns are augmented by the presence of ammunition, such as crossbow boltheads and lead musket balls; many boltheads were bent from impact and lead balls were flattened from impact. The evidence is very clear that Piedras Marcadas was not only a significant Vázquez de Coronado site, but it was also a significant field of conflict (Schmader 2011:315; 2014).



FIGURE 1 ARTIFACTS FROM VÁZQUEZ DE CORONADO EXPEDITION OF 1540-1542 RECOVERED FROM PIEDRAS MARCADAS PUEBLO, NEW MEXICO. SEE TEXT FOR DESCRIPTION OF ARTIFACTS.

It is worth reflecting that this battle site is one of the only known places on American soil where a medieval-style conflict took place in terms of weaponry, technology, tactics, and troop deployment.

Metal artifacts represent the first instance that such material appeared with initial European contact in areas like the Río Grande valley of New Mexico. Many European expeditionaries did not have modern weapons but were listed in the muster roll as having native weaponry, or *armas de la tierra*. More importantly, three-fourths of Coronado's forces were indigenous Méxican soldiers whose weapons were derived from their ethnic areas. One such weapon was the obsidian-edged wooden war club called *macahuitl* in native Méxican languages. A second weapon type would have been native bows-and-arrows. A third type of weapon would have been slings and slingstones, which were used with great effect by Aztec and other warriors in central Méxicó before and during the contact period there.

Remnants of all three types of native weaponry may be found at Piedras Marcadas pueblo. The site surface is littered with abundant obsidian debris, some of which may be breakage from *macahuitl* wooden war clubs. Trying to positively identify *macahuitl* debris will be a difficult analytical task but surface obsidian is common; breakage patterns and flake morphology seem to be consistent with expected *macahuitl* debris (Schmader 2011:327-328). Although not numerous, projectile points found at the site have several different sizes and styles. Some are surely native pueblan points while others do not resemble local point types. In fact, some projectile points bear a striking similarity to those found at the Méxican battle site of El Tuiche (see Enríquez Medrano, this volume), which dates to the same year--1540--as the Coronado expedition. Lastly, more than 25 slingstones have been found on the site surface, which is a remarkable occurrence (Schmader 2014:129). Some slingstones are formally prepared, exhibiting grinding around the midsections of the stones. Such implements have not been identified at sites in the American southwest until recently described at Piedras Marcadas.

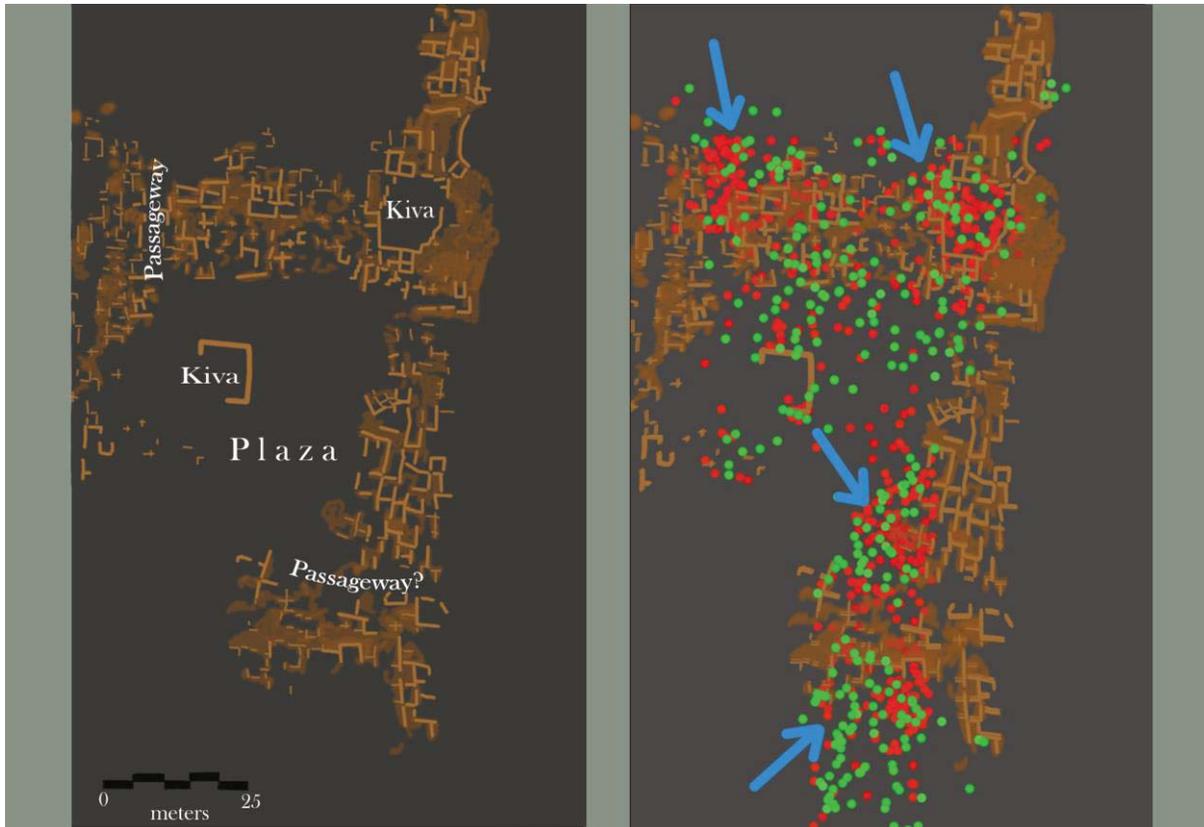


FIGURE 2 LEFT, ADOBE ARCHITECTURAL DETAILS DETECTED BY ELECTRICAL RESISTIVITY. NOTE MULTIPLE ROOMS SURROUNDING OPEN CENTRAL PLAZA, PASSAGEWAYS, AND RECTANGULAR COMMUNAL ROOMS (KIVAS). RIGHT, 16<sup>TH</sup> CENTURY ARTIFACTS FOUND BY METAL DETECTION. RED DOTS ARE FERROUS ARTIFACTS AND GREEN DOTS ARE NON-FERROUS. FOUR ARROWS INDICATE CONCENTRATIONS AND INFERRED LINES OF ATTACK: BOTTOM, DIRECTED TOWARD SOUTH EXTERIOR WALL. TOP LEFT, DIRECTED AT PASSAGEWAY. TOP RIGHT, DIRECTED AT KIVA. CENTER, DIRECTED AT SOUTHEAST CORNER OF PLAZA.

## CONCLUSIONS

The relatively intact condition of Piedras Marcadas pueblo allows for interpretation of artifact patterns (Schmader 2011). When the artifact distributions are combined with architectural information derived from ER surveys, several apparent clusters imply zones of heavier conflict or possible strategic lines of attack (Figure 2). One concentration outside the southern exterior walls of the central roomblock suggests that the pueblo was attacked from the south in an attempt to break into the plaza from the outside. A second cluster is at the northwest corner of the central roomblock, where an apparent passageway exists, and where abundant broken materials may indicate fighting in the passageway. A third concentration exists at the northeast corner of the roomblock, overlying a large communal room or kiva. There may have been another attempt to access the plaza by climbing onto or breaking into the kiva; this area also may have had possible post-battle activity such as forging, as inferred from pieces of molten slag. A fourth artifact concentration at the southeast corner of the plaza may indicate fighting that tactically drove defenders into a confined space. Analyses of artifact types, density, contents, and breakage will be needed to tease out the details of these hypothesized battle actions.

Current research at Piedras Marcadas is ongoing. The site is large, complex, and has many lines of potential investigation. It is significant as a major site of first European contact, and of fighting between indigenous groups from México against pueblo people defending their homelands (Schmader 2016). These characteristics are amplified when discussing the site with modern-day puebloan descendants, whose oral traditions still carry memories of past struggles. Those struggles began with the first contacts by outsiders in 1540, resonated through the 1600s and culminated with the Pueblo Revolts of 1680-1696, and are remembered even today in stories kept by community elders (Schmader 2016). In so many ways, research into past conflict may be seen as a way to heal the oldest of wounds among native peoples whose lives were most profoundly affected.

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# ROUGH PEOPLE IN A ROUGH SITUATION: MIXTÓN WAR (1541-1542) AND CAXCANES

Angélica María Medrano Enríquez

## WHO WERE THE CAXCANES?

This paper aims to illustrate research that is being done by Mexican archeologists into the history of armed combat in the New World. It does that by focusing on conflict between Spanish forces and native peoples of central Mexico particularly the Caxcans, or Caxcanes. When the Spaniards arrived in the south of the state of Zacatecas in 1530, they questioned the indigenous people—using translators who spoke both Nahuatl and Spanish— about precious metals, such as gold and silver. In answer to their question, the locals replied “caxcane, caxcane,” which in Nahuatl signifies “there is none.” (Acuña 1988: 300). To the Spanish, the people became known as the Caxcans.

Caxcan polities or “cacicazgos” were small states including Tlaltenango, Teúl, Jalpa, Juchipila, Nochistlán. Weigand and García (1996, Figure 1:149) proposed Tuitlán as one of those states, but research on this site shows a sporadic occupation by Zacatecos. Caxcan neighbors included other peoples: Guachichiles, Guamares (Powell 1984), Tecuexes and Tecos (Tecoles) (Baus de Czitrom 1982) with Zacatecos toward the north (Powell 1984).

During the Spanish *entrada* in the sixteenth century, the Caxcans were in a time of military expansion, maintaining continuous strife with their neighboring groups, the Tecuexes and the Tarascans (Figure 1) (Tello 1968, vol. I: 195-197). Since the Caxcans were highly warlike, battles were constant and included internecine conflicts. Ethnohistoric sources recount that Caxcans at Teocaltiche and Nochistlán initiated struggles with Caxcan settlements at Juchipila and Jalpa, essentially, their own people (Acuña 1988:169-170, 302).

The Caxcan settlement at El Teúl (Figure 1) has been recently investigated by archeologists. The presence of copper artifacts signals occupation during the late Postclassic Period (900-1530 AD). El Teúl features monumental architecture, and according to documentary sources, the site functioned as the ceremonial center for all of the Caxcan polities, or the “Gran Caxcana.”

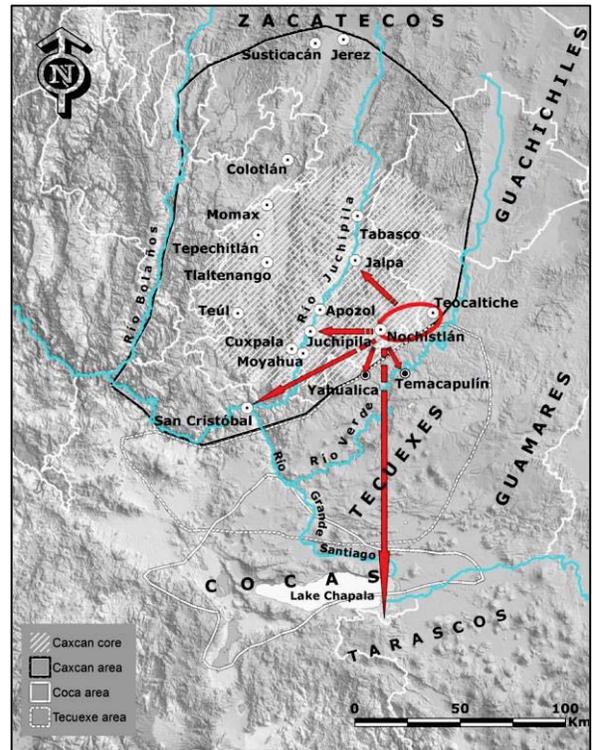


FIGURE 1 CONFRONTATION OF THE CAXCANES OF NOCHISTLÁN AND TEOCALTICHE AGAINST NEIGHBORING GROUPS.

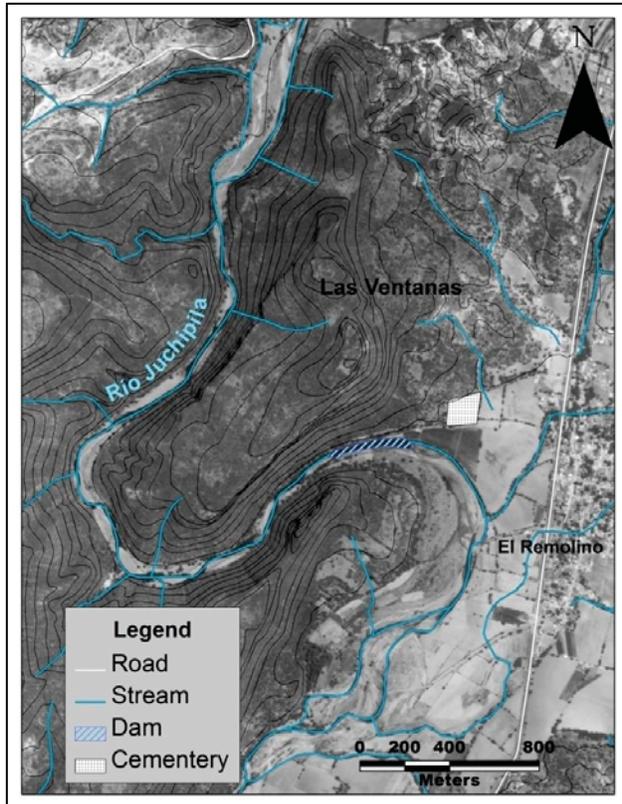


FIGURE 2 THE LAS VENTANAS SITE.

Other Caxcan towns are also being explored. Cerro de Las Ventanas, one of the largest Caxcan sites of Zacatecas, has been identified as the “Peñol de Juchipila” (Weigand and García 1996: 105). The Mixtón War account prepared by Acazitli (1971:21) describes one of the peculiarities of this peñol: “...y llegamos á Xuchipila ...y la forma del Cerro estaba rodeado de un Río...”. This is believed to refer to the physiographic setting of Cerro de Las Ventanas, which is surrounded by the entrenched Río Juchipila (Figure 2). Occupation of the site spans the Formative to Late Postclassic Periods of the Mesoamerican cultural sequence; the site was occupied when the Spanish arrived (Oster 2007: 497-518, 589).

No doubt as a pretext for the argument that their invasion was a “just war,” the Spanish reported that the Caxcans were a savage, uncivilized, and warlike group, a “gente belicosa.” In point of fact, even the modest archeological research that has been accomplished to date indicates that Caxcan society was internally sophisticated, highly stratified, and effectively organized. All of this is evidenced by their monumental architecture and other material culture,

their employment of the Mesoamerican calendar system tied to ritual observances, a complex cosmology, and complex burials. The burials certainly reflect the care and respect the Caxcan people gave to their honored dead.

## THE SPANISH CONQUEST OF THE CAXCAN PEOPLE

The first Spanish force to arrive in Caxcan territory was led by Nuño Beltrán de Guzman who penetrated the territory in 1530 (Figure 3). Before reaching Caxcan the territory, his force went through Michoacán, inhabited by the Tarascans. While there he fell on the community Caltzontzin. A Spanish settlement was formed at Nochistlán. This is where the Villa of the Holy Spirit, later called Guadalajara. Formal settlement was not established until 1532 due to constant attacks by the natives. Because of these attacks, the settlement of Guadalajara was moved three times: first to Tonalá (1533), then Tlacotán (1535), and finally to the Valley Atemajac (1542) (Tello 1968; 1985). These moves show the instability that was part of the first Hispanic occupation of Caxcan territory.

## MIXTÓN WAR

After 10 years of Spanish domination the Mixtón War exploded in 1541-1542. For this war, two battle sites played key roles, Cerro del Mixtón and Peñol de Nochistlán. The first formal confrontation occurred on April 9, 1541. It involved allied Indians led by Cristóbal de Oñate and Miguel de Ibarra. They presented demands for peace which were rejected. Taking advantage of an eclipse of the sun the next day, Palm Sunday, April 10, rebels attacked the Spanish camp, nestled in the foothills. Taking them by surprise, they killed thirteen of the Spanish soldiers and over



FIGURE 3 ENTRY NUÑO BELTRÁN DE GUZMÁN IN WESTERN MEXICO. (CODEX TELLERIANO-REMENSES, AMOXCALLI.ORG.MX/LAMINAS.PHP?ID=385&ACT=AN T&ORD\_LAMINA+385\_44V).

300 Indians. The Spanish force then fled. Following this defeat, Viceroy Mendoza asked Pedro Alvarado for aid from the town of Guadalajara. Alvarado responded but died during the June 24 battle. With this defeat, fear increased among the Spanish. The Caxcans continued their offensive by attacking Guadalajara on September 28 (Tello 1985: 159-321). That battle was won by the Spanish who had been reinforced by forces sent to the viceroy and the surviving soldiers of Alvarado. While that warfare was happening in Guadalajara, Viceroy Mendoza was heading to the rebel region with one of the largest army of the colonial history of New Spain. Ethnohistoric sources mention up to 50,000 combatants at this battle. Of these only 500 were Spanish, the rest being Native Americans, including the Indian allies or ‘indios amigos’ of the Spanish (Anónima Tercera 1963: 338).

## WHERE ARE THESE FORTRESSES?

The Viceroy’s force met the Caxcans at several places, including Nochistlán, Coina (Tototlán), and finally the Cerro Mixtón. The “Compostela Map” (created by an anonymous cartographer in approximately 1550) illustrates the locations of the various engagements between the rebel forces and the Spanish-led troops in this region, including Nochistlán, Juchipila, Mixtón and Teúl (Figure 4). Each site is distinctive.

### Peñol de Coina

The first military confrontation between the Spanish army and the rebels in this phase of the war occurred at Coina or Tototlán, according to descriptions of the documentary sources and physiological characteristics, I suggest as the Cerro Puruaño. Among the features of Puruaño is the natural protection afforded by its location on a mesa or *peñol*; it is not easy to access. The mesa reaches a height of 260 meters, and it is surrounded by several cliffs. Historical sources indicate that the top is “paired”: “Dicho pueblo estaba vn peñol muy fuerte... porque el peñol era encima de lo alto aparejado...” (Anónima Tercera 1963: 339). Documentary sources also point to the presence of barricades on the peñol: “...caminasen los peones por delante y se subiansen a la primera albarrada (Anónima Tercera 1963: 339). Ground-truthing by archeologists, including the use of metal detectors, has yet to take place at the Peñol de Coina.



FIGURE 4 MAP OF COMPOSTELA (1550), INDICATING PEÑALES OF MIXTÓN WAR, 1 TEÚL, 2 MIXTÓN, 3 JUCHIPILA, 4 NOCHISTLÁN, 5 COIMA (ARCHIVO GENERAL DE INDIAS, CODE ES.41091.AGI/27.17//MP-MEXICO,560. IN PARES.MCU.ES).

**Peñol de Nochistlán**

A major battle site was located at the Peñol de Nochistlán. Ethnohistoric descriptions and the Compostela Map and other graphic sources attest to the presence of distinct cliffs and embankments which match features at the site of El Tuiche. The cliffs are a significant reference, because various sources indicate that many of the Caxcan defenders committed mass suicide by leaping from a cliff 30 meters high. Both graphic representations and written records mention the presence of *albarradas* or stone barricades built to defend the site. Stone rings encircling the hill show up clearly on aerial photographs, and archeological survey has also revealed architectural elements and several stone alignments. Elements of the weapons used by the Spanish, including crossbows and matchlock firearms, can be identified through comparisons with various images from the codices. Using metal detectors, archeological survey crews located crossbow bolt heads and lead shot at El Tuiche (Medrano 2012). This offers further evidence that this is where the battle of Peñol de Nochistlán occurred.

**Peñol del Mixtón**

The final battle took place at the Peñol del Mixtón, which gave the name to the war event. The documentary sources described it as follows:

“Había en el Mixtón cien mill enemigos, sin niños y mujeres, aprestados para la defensa... (Tello 1985: 314).”

“...subimos una Sierra mui grande, y mui peñascosa...el segundo dia viernes se comenzo á hacer el Camino en que se ocuparon siete dias, y al octavo fueron ganados y destruidos los Enemigos...y tan derrepente que fue milagro de Dios... (Acazitli 1971: 23-24).”

After the defeat of the insurgent Indians, thousands were left dead, although a significant number were captured:

“Murieron en lo alto más de diez mill yndios y se despeñaron casi otros tantos... cautivaron mas de tres mill... (Tello 1985: 321).”

Identifying the precise location of Peñol del Mixtón is a daunting task given that it is nestled in the Sierra Morones, a remote location difficult to access, even now. According to historical sources, this place was only used as shelter at the time of the Mixtón War. It was not a settlement. Analyses of the landscape indicate that the remains of the Peñol battlefield are most likely located on a promontory known today as the Cerro La Viga. This interpretation is under evaluation and will require additional landscape analyses, followed by archeological survey and “ground-truthing” for confirmation. Archeological research is providing useful information about the history of an important aspect of Mexican colonial history, complementing (and in some cases, correcting) insights provided by other investigators.

## FINAL COMMENTS

The leading protagonists of the Mixtón War, the Caxcans, have become a people lost to history since their defeat by the Spanish. Contemporary archeological research efforts, such as the investigations reported here, have not only facilitated the identification of Mixtón War battle sites such as the Peñol de Nochistlán, but have also provided the opportunity to describe and understand the sophistication of sixteenth-century Caxcan culture, correcting the erroneous impression created by the ethnohistorical sources that designated them as mere “savages.”

The study of other battle sites of the Mixtón War will be crucial to furthering our knowledge of the Caxcan people, and their allies. Among the sites of greatest interest as research efforts continue are the Peñol de Coina and the Peñol del Mixtón, awaiting field investigations that integrate standard archeological field methodologies with metal detector surveys, landscape-level analyses, and informed perusal of ethnohistorical data.

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# CONTEMPORARY MILITARY CONCEPTS AS INTERPRETIVE FRAMEWORKS FOR UNDERSTANDING THE CONDUCT OF HISTORICAL WARFARE

Nathan H. Ledbetter

*“...everyone admits that the most spectacular demonstration of the power of Japanese musketry occurred on 21 May 1575\* at the battle of Nagashino. [Oda] Nobunaga deployed 3,000 musketeers in three ranks in this action, having trained them to fire in volleys so as to maintain a constant barrage. The opposing Takeda cavalry was annihilated. The battle-scene in Kurosawa’s film Kagemusha offers a credible reconstruction, for the action is intended to represent Nagashino.” (Parker 1996:140).*

## INTRODUCTION

The above quote from Geoffrey Parker, and the Akira Kurosawa film *Kagemusha*, to which it refers, encapsulate the popular perception of the Battle of Nagashino in 1575. And, that the 38,000 troops of Oda Nobunaga and Tokugawa Ieyasu utterly crushed the 15,000 troops of Takeda Katsuyori, there can be no doubt. However, in my research into the Nagashino campaign, there were too many contradictions in the various texts. Of course, each text tells the story as the author saw it, or wants it to be seen. But further examination showed that the majority of accounts appeared inconsistent with the terrain, or differed in how many soldiers and what weapons they carried, and so on.

The purpose of this article is to demonstrate how I have applied military doctrinal concepts to the analysis of commanders’ decisions at Nagashino, specifically my use of the Five Paragraph Operations Order, the product of the mission analysis process, as a framework to show how all of these different things are integrated together into a coherent picture of the overall battle or campaign (Department of Army, March 2010). The five paragraphs are: 1) Situation (what’s going on, or the “why”); 2) Mission (the “what”); 3) Execution (the “how”); 4) Sustainment (the “with what”); and, 5) Command & Signal (who’s in charge and how orders are communicated). Here I focus first on the Situation paragraph, and then the Execution paragraph, but all of these have value in assessing historical actions as components of successful planning and execution of tactical operations. My interest is in understanding the thought processes and decision making of historical commanders; I hope that this understanding can benefit the conflict archeology field as well by informing site investigation through a better understanding of commander intentions and actions.

## SITUATION

In order to understand how a daimyo (feudal lord) commanded, we must determine what he commanded. This falls under Task Organization in the situation paragraph, though to get there I use some Intelligence Preparation of the Battlespace concepts as well. This will answer three questions—were the accepted chronicle troop numbers possible? How many guns were present on the Oda/Tokugawa side? And did they conduct any “revolutionary” organized volley fire? Chronicles vary widely in reporting the numbers of troops at Nagashino, with 38,000 combined Oda and Tokugawa against 15,000 Takeda being the most accepted total. Owada Tetsuô challenges this

by claiming troop inflation in textual sources and that no more than 18,000 Oda and Tokugawa against 6,000 Takeda would have been possible at Nagashino (Owada 1995). Other scholars challenge the image of 3,000 guns used by the Oda at Nagashino by claiming the Shinchōkōki states there were only a total of 1,000 guns (see Fujimoto 1993; 2010). These are the first two issues to resolve.

A modern army outlines units along a standardized system, classifying them by type and grouping them together in functional combat elements that make up larger units. This allows the use of a doctrinal template: a standard unit arrangement that any military unit uses given ideal terrain conditions. The unit's position is later adjusted to fit the actual battlefield, but the theoretical doctrinal template demonstrates how much space a given unit would ideally occupy. This is a significant problem when confronting analysis of a premodern army. Samurai armies did not fight in units with standardized sizes. Samurai retainers brought with them what men their land holdings could support. Because of this, "unit" sizes varied considerably. A straightforward "plugging in" of standard units as when looking at a modern force is impossible. There is no "doctrinal template" that the Oda, Tokugawa, or Takeda used to plan their force emplacement.

This lack of any standardized unit representation was the most difficult analytical obstacle to overcome. However, Higuchi Takaharu's review of sixteenth-century manning rosters for various daimyō armies provided a clue. His analysis of the Takeda army, based on documents from 1561 to 1579, gave me a guide for how the Takeda army was broken down by weapons type (Higuchi 2010). I was able to confirm his analysis by comparing it to the depiction of Takeda forces on the Kawanakajima kassen byōbu, a set of screens that depict the 4th Battle of Kawanakajima. One screen depicts a Takeda unit of over 700 in formation. Counting the numbers of soldiers represented on the screen by weapon type reveals very similar percentages to Higuchi's analysis, confirming his percentages as a representative standard. More importantly, the screen gives a pattern for their tactical emplacement that a Takeda unit would plausibly employ on the battlefield—in other words, a doctrinal template. Using this, I was able to construct a usable doctrinal template for the Takeda forces at Nagashino. Using 700 personnel as the base number for Takeda unit size, I determined the total number of each type of warrior. Then, using the Kawanakajima kassen byōbu as a guide, I placed them in similar formation to create a template.

Matching up the spacing on the template with an actual measure of distance shows how much space a unit would take up on the ground. One pikeman requires six-tenths of a meter, so multiplying the 50 pikemen in the center formation by .6 meters, a line of 50 pikemen requires 30 meters of space from end to end. Importing the image into Google Earth matches the line of 50 pikemen up with a measured line of 30 meters on the map of Nagashino. Thus aligned, the template depicts how much space a unit of 700 Takeda soldiers would have taken up on the battlefield. Replicating the same unit fourteen times shows possible locations of 9,800 Takeda troops, with the remaining 5,000 left surrounding Nagashino Castle and as Katsuyori's personal force. Emplacing fourteen locations along the eastern side of the Rengogawa River, 9,800 troops would easily fit along the line in this "doctrinal" formation.

Calculating and applying the Oda and Tokugawa templates in the same manner to Google Earth, the positions around Danjōyama do accommodate 38,000 combined troops. I am not suggesting this is how the forces were arranged for combat; this does demonstrate, however, that formations of 30,000, 8,000, and 15,000 troops can fit within the area that combat took place.

With an understanding of what each commander had under their command at the battle, their intentions, and the view they had of their enemy through the template of the Situation paragraph, we can begin to understand what they intended to do (their "Mission") and how they would have applied their forces to accomplish that goal (the

“Execution” of the operation). A structured approach to these questions, made possible by the framework of the operations order, provides a workable hypothesis of how commanders used their units on the battlefield that can then be tested through site investigation by battlefield archeology. Material evidence collected can then determine the validity of the hypothesis and help disprove traditional recounting of the battle based in hyperbolic or hagiographic texts.

## EXECUTION

Takeda Katsuyori is portrayed as brash and foolish for ignoring the advice to withdraw in the face of the Oda and Tokugawa reinforcements. It does not take military experience to realize charging prepared defensive positions with an army half the size of the enemy's is not a plan for success. Characterizations that Katsuyori did not understand the power of the Oda guns, however, are incorrectly based on derogatory textual appraisals by disgruntled subordinates. The Takeda had been using guns themselves as early as the 1550's, and would be well acquainted with the weapons.

In reality, Katsuyori had a poor understanding of the tactical situation, which Oda Nobunaga did much to foster. Katsuyori's first mistake was to underestimate the Oda and Tokugawa. The Tokugawa had performed poorly against the Takeda in the previous few years. Additionally, Nobunaga's history of weak assistance was enough for Ieyasu to threaten joining the Takeda if support failed to materialize. Thus Katsuyori did not expect strong support to come from Nobunaga. Finally, Katsuyori received communication from one of Nobunaga's senior retainers, Sakuma Nobumori, promising to switch sides and attack the Oda during the battle. Katsuyori did not know that he was outnumbered by more than two to one, did not believe the main Oda/Tokugawa force had arrived, and the poor record of the Tokugawa and Oda against the Takeda lent him confidence.

Katsuyori sent a force against where he anticipated the Oda/Tokugawa lines would be, the ridgeline centered on Danjoyama, to fix, or hold the enemy in place, while the main attacks flanked to the north and south. He believed Sakuma Nobumori's force defection would cause disruption in the Oda lines, and his encirclement would destroy them completely. His father had used a similar tactical plan at Mikatagahara to great success, and Katsuyori expected the same result. This is an example of doctrinal patterning we see in most military organizations, regardless of time period or level of formalization. Armies tend to stick with what works.

Oda Nobunaga had a much clearer picture of his enemy and the tactical situation. Scouts and messengers from besieged Nagashino Castle had kept him and Tokugawa Ieyasu well informed about the size, location, and activity of the Takeda force. As this was Tokugawa territory, much of the force was intimately familiar with the terrain. Nobunaga also understood his enemy's preferred tactic was to use mobility to attack on the flank, and designed a plan to take advantage and destroy the Takeda attack.

Tokugawa forces initially took up a position forward of the Danjoyama ridgeline, conducting a screening operation to prevent Takeda observation of their movement and defensive preparations. Nobunaga moved his 30,000 men up gradually, concealing the bulk of them behind Danjoyama. On the 19th and 20th the combined force completed their defenses. In the center, a force would block Takeda movement against the Danjoyama ridgeline. However, the focus would be, as with the Takeda, on the flanks. To the north and south barricades were deployed in successive lines along the routes the Takeda would use to attack. With the Takeda advance slowed by the obstacles, the Oda and Tokugawa arquebusiers and archers could pick off targets at will, further disrupting the attack. Takeda troops that made it through the barricades and fire would be vulnerable to counterattacks by the Oda and Tokugawa pikemen and foot soldiers. Delay actions would also draw Takeda troops in only to be met by

more obstacles, gunfire, and counterattacks. The Sakuma offer to defect was a further ruse to entice Katsuyori to attack. A daring attack by Sakai Tadatsugu on Takeda positions surrounding Nagashino Castle succeeded in relieving the beleaguered garrison and placing allied troops behind the Takeda retreating from the main engagement. The end result was a perfectly executed plan of attack that lured the Takeda in, countered their tendencies, and destroyed two-thirds of the Takeda force.

## SUMMARY

Analyzing the Battle of Nagashino in this manner demonstrates that a battle between 38,000 Oda and Tokugawa and 15,000 Takeda could have taken place within the battlespace. The Oda and Tokugawa took advantage of their previous experience facing this enemy, superior force numbers, and advantageous terrain augmented with obstacles to develop a terrain-oriented defensive plan that anticipated and brilliantly countered standard Takeda tactics. Relevant to the study of battle sites, I hope my use of a systematic framework (the Operations Order) provides an example of how military historians and archeologists can sift through conflicting textual sources to determine where and what to search for in site exploitation.

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# BATTLEFIELD PROTECTION IN GERMANY AND THE LÜTZEN PROJECT

André Schürger

## INTRODUCTION

The Thirty Years War (1618-1648) began as a German religious civil war, but soon escalated into a European-wide struggle for dominance. After the defeat of the Danes, the war appeared to have been won by the Catholic League and the Austrian-Imperial army, but in 1630 Sweden entered the war and shifted the balance of the conflict. On 16 November 1632, the 18,000-strong Swedish-Protestant army, commanded by the Swedish King Gustav II Adolf, and the 14,000-strong Imperial-Leaguist army under Generalissimus Albrecht von Wallenstein met at Lützen, a small town 20km south of Leipzig in the Electorate of Saxony. In this engagement, Gustav II Adolf was killed and his death had a disastrous effect on the Protestant alliance.

When Gustav II Adolf landed in Germany, he took advantage of a German 16<sup>th</sup> century prophecy that “one day, a Lion from midnight would appear to rescue the Protestants from Catholic oppression,” and this phrase became legendary after his decisive victory at Breitenfeld on 17 September 1631. His death at Lützen corroborated the myth of “the Lion from the North” and he became an important religious figure in Germany. In Protestant churches, he is often portrayed beside Martin Luther. In the 19<sup>th</sup> century, a memorial was built on the battlefield and his death is still officially commemorated every year in Lützen on 6 November.

## ARCHEOLOGY AT THE LÜTZEN BATTLEFIELD

An archeological project to investigate the Lützen battlefield was launched in September 2006 as part of the preparations for the 375<sup>th</sup> anniversary of the battle. This six-month project was initialized by the Parliamentary Secretary of the Ministry of Culture of Saxony-Anhalt Ingo Mund, the Mayor of Lützen and MP Maik Reichel, and the head of the State Office of Heritage Management Archeology (LDA) Saxony-Anhalt Professor Harald Meller. In modern Germany there is no tradition of preserving or visiting battlefields, as such activities became very unpopular after World War II. Even though the first German archeological battlefield project began in the 1980s at Kalkriese on the 9 AD Roman Varus battlefield, some scepticism remained about conducting archeological surveys of modern battlefields. The Battle of Lützen was much closer to World War II than the Varus battle and modern archeology is just in the process of development in Germany. In addition, only few a German archeologists have experience with the ‘field walk.’ This first official metal detector survey on a modern battlefield in Germany could have been the last and it was necessary to enlist the public for support. Local interest in Lützen was high, and many Swedish visitors came to the Gustav-Adolf-memorial. To build a connection with the public, a number of outreach programs were initiated, including: tours of the battlefield, public lectures, the bringing in of school groups to visit the ongoing fieldwork, and the publication of our project in the local newspaper.



**FIGURE 1 THE 'STUDENT ACADEMY OF THE FRANCKE FOUNDATION' VISITING THE BATTLEFIELD. TO THE RIGHT IS THE TRIAL TRENCH, WHERE THE MASS GRAVE WAS FOUND (BY EVA SZABÓ).**

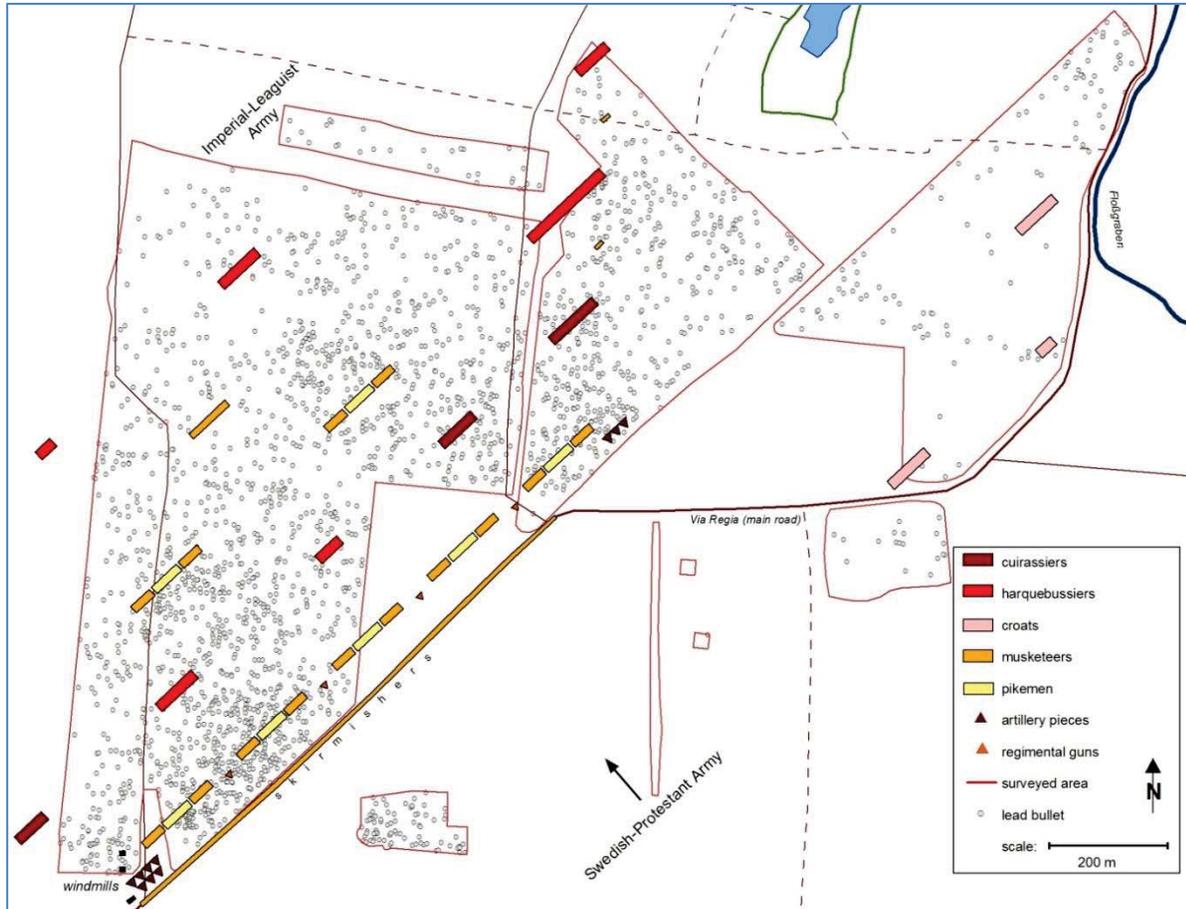
At the same time, a Gustav II Adolf exhibition was prepared in the castle of Lützen for the 375<sup>th</sup> anniversary of the king's death. In spite of the short research window, the results from the battlefield survey were incorporated into the exhibit. The exhibition had over 10,000 visitors, including many politicians and diplomats (Figure 1). Although the finds from the battlefield made up only a small percentage of the exhibit, public interest for battlefield archeology in Germany increased greatly. The Lützen project was extended by six months with support from the Ministry of Culture of Saxony-Anhalt and then the Brown Coal Mining Company (MIBRAG), who is planning a mining operation on parts of the battlefield, provided funding for another three years.

In 2008, the LDA organized a battlefield archeology conference in Halle. One of the results was an international workshop held annually on the Lützen battlefield with well-known Swedish and British battlefield archeologists. Bo Knarrström (Heritage Board Lund, Sweden), Glenn Foard (University of Huddersfield), Tim Sutherland (University of York) and Tony Pollard (University of Glasgow), were invited to discuss methods of metal detector surveys and small finds analysis (Figure 2). The workshop finally led to a PhD-thesis at the University of Glasgow, Centre for Battlefield Archeology. In 2009, Lützen became Germany's first protected battlefield and the process was even easier than protecting other archeological sites after all these public activities. However, Germany consists of sixteen states with different archeological protection laws in every state and only the future can tell if other battlefields will be preserved beyond the borders of Saxony-Anhalt.

Without explicit permission from the heritage board, metal detecting is illegal in Saxony-Anhalt. This law and negative experiences with grave robbers created some tension between private metal detectorists and archeologists, which caused problems assembling a professional team and prevented integrating volunteers into the project. Therefore, the main team from 2008 to 2011 consisted of locals who had no previous experience in archeology or metal detecting. All metal detectors in the project were used in the same low setting discriminate-mode, or, when using different metal detector models, the



**FIGURE 2 INTERNATIONAL WORKSHOP ON THE 15 NOVEMBER 1632 RIPPACH SKIRMISH. ALSO THE SITE OF A NAPOLEONIC SKIRMISH WHERE THE FRENCH MARSHAL BESSIÈRES WAS SHOT. FROM RIGHT TO LEFT: TIM SUTHERLAND, BO KNARRSTRÖM, TONY POLLARD, AND ANDRÉ SCHÜRGER (BY EVA SZABÓ).**



**FIGURE 3 DEPLOYMENT OF THE IMPERIAL ARMY AND LEAD BULLET DISTRIBUTION. BULLET CONCENTRATIONS ON THE RIGHT AND LEFT CENTER SHOW THE AREAS OF THE SWEDISH MAIN ATTACKS.**

discriminate-mode was synchronized to produce a similar small find recovery rate. The team members were told to collect every metal object they could find with this discriminate-mode setting and they were trained to walk with the same slow speed. This method was used stringently in order to prevent the selective recovery of particular types of artifacts. When the Lützen project started in 2006, there was no practical experience in metal detector surveys and so our first objective was to establish a methodology. The decision was made to make one systematic full coverage metal detector sweep, which means that every square meter was metal detected once without any spacing between the transects. By 2011, approximately one third of the battlefield (111.2ha or 1,329,940 square yards) was surveyed using this method. Over 11,000 small finds, not all of them are battle related or identified, were recovered from the battlefield. The locations of these finds were recorded using a Garmin 60 GPS (Figure 3).

The most numerous types of finds were the 2,756 lead bullets from muskets, pistols and carbines (light cavalry long guns). The bullets produce distribution patterns, which provide valuable information about the nature and intensity of shooting engagements. In order to archive this goal, the lead bullets' caliber needed to be established, which would then allow for the classification of the bullets into different types and then linking these types to particular classes of firearms. One setback of this method, however, was that no country was able to equip their armies with weapons from national production during the Thirty Years War, and huge amounts of firearms were imported. The result was that armies were equipped with a variety of firearms, which made the interpretation of

bullet distribution patterns difficult. Nevertheless, the distribution of bullets, specifically of impacted balls, allowed us to discover the location of a mass grave in the first trial trench dug specifically for this purpose. The results from the survey and the finding of the mass grave, finally, stirred plans for building a visitor center on the site.

The archeological finds and the historical accounts provided the framework for battle research. But there are two other issues, which are often overlooked by historians. The first issue concerns the opposing armies and their numbers, tactics, equipment and physical condition. Logical conclusions of a combat situation are often buried under decades of fruitless discussions by giving non-eyewitness accounts way too much priority over logic and first-hand-information. As an example, historians have often misplaced units in the Imperial battle array at Lützen by favoring accounts of non-battle participants, thus creating one very strong and one very weak wing. This, however, disregards military tactics in general and Wallenstein's battle tactics in particular. In addition, it is contradicted by an account of the Imperial second-in-command, Field Marshal-Lieutenant Heinrich Holk, who explicitly stated that both wings were equally strong.

The other issue concerns the terrain analysis. KOCOA is unknown in Germany and a field boundary map from 1710 helped reconstruct the historic landscape at Lützen at the time of the battle. The battlefield is flat without many visible obstacles, which led Gustav II Adolf, along with many modern authors, to underestimate the terrain. However, two small but deep canals ran across the battlefield, and can only be realized as obstacles by standing right in front of them. These canals slowed down the Swedish approach. On the other hand, the Via Regia, a German major road in front of the Imperial army, had little impact on the battle. Based on various contemporary copper plates and accounts, it has long been seen as a fact that the Imperial army dug trenches inside its road ditches and the Swedes suffered high casualties storming these fortifications. Archeological excavations, surveys and a detailed study of all battle accounts revealed that there was never a trench. A chain of misunderstandings, distributed by letters from non-eyewitnesses and printed as pamphlets, led to the myth of an Imperial trench system at Lützen.

## CONCLUSIONS

The history of 150 years of research on the Battle of Lützen is a good example of how research on a battle can go wrong. The limited number of historical sources has led historians to uncritically use first and second-hand accounts with the same priority, picking statements randomly without discussing their reliability. Most historians, except Brzezinski, did not visit the battlefield. All battles, even small engagements, are incredibly complex and we cannot hope to ultimately understand them. Only an integrated approach that makes use of eyewitness accounts, battlefield archeology, and an understanding of the military system and historic landscape analysis can lead to a better understanding of these fields of conflict.

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# HISTORICAL AND ARCHEOLOGICAL INVESTIGATIONS OF 1812-1813 CANTONMENT SARANAC, PLATTSBURGH, NEW YORK

Timothy Abel

## INTRODUCTION

Cantonment Saranac, Cantonment Plattsburgh, and Pike's Cantonment, are all names referring to the 1812-1813 winter encampment of the US Army 1st Brigade located at Plattsburgh, New York, during the War of 1812 (Herkalo 2001). The camp was commanded by Colonel Zebulon Pike, who earned fame as a western explorer before the war and gained legendary status as the highest-ranking casualty of the war (Brigadier General) when he was killed on 27 April 1813 at the Battle of York (see this volume). It was occupied beginning in late November 1812, following an unsuccessful invasion of Canada. Furloughs among senior officers lead to a lack of discipline, which combined with a lack of provisions, resulted in over 200 deaths during the first month alone.

In the spring of 1813, most of its 2,000 soldiers were relocated 175 miles to the west in Sackets Harbor, New York, to prepare for a spring offensive. Sick and wounded remained in the camp until May. In the summer of 1813, its location was discovered by a British raiding party under Lieutenant Colonel John Murray. Using pine pitch, Murray's raiders burned the camp and it was never rebuilt. Through time the exact location of the camp was lost to history.

## FINDING CANTONMENT SARANAC

The location of Cantonment Saranac has been the subject of intense debate for the better part of the last century. This is largely due to the vague accounts of the encampment that have survived (Harris 1987), and the fact that no contemporary map of the cantonment was ever produced. Based on first-hand accounts, early historians favored a location known locally as the "Indian Falls," near the runway of the now closed Plattsburgh Air Force Base but later historians shifted their focus to another location known as the "Main Mill" after an 1812 coin was found in the river there. The evidence favoring the Main Mill site also included General Alexander Macomb's 1814 map of the Battle of Plattsburgh depicting the British Army's crossing near that bend in the river at the Main Mill. In his written account, however, Macomb states that the British army crossed the Saranac River in front of the former cantonment three miles from the American forts, a location that favors the original site of Indian Falls (PESI 1998). Meanwhile, for decades, local collectors had shared knowledge of War of 1812-era artifacts being found around Indian Falls. They also reported piles of brick and shaped stone that they thought might be hut locations. Unfortunately, collectors and historians never connected, and the location of Cantonment Saranac remained unknown to all but a few collectors.



**FIGURE 1 DIAGNOSTIC ARTIFACTS FROM THE 2011 SURVEY. A: CUT NAILS, B: REGIMENTAL COATEE BUTTONS, C: BAYONET SCABBARD CHAPE, D: TAILOR'S THIMBLE, E: .69 CALIBER MUSKET BALL. (COURTESY: BATTLE OF PLATTSBURGH ASSOCIATION).**

Plans to close Plattsburgh Air Force Base required the Air Force to fully evaluate the impact of that closing on any significant archeological resources within the base and the hunt for Cantonment Saranac intensified. A 1993 archeological shovel-testing survey did find a site called the Zagreb site, but no diagnostic artifacts were found that would associate the site with Cantonment Saranac (ie. military buttons, musket balls, lead sprue, or other military objects indicating a military occupation). Instead, researchers suggested the site was a camp built to house workmen building the Dannemora Railroad in the mid-19<sup>th</sup> century. The Zagreb site was nonetheless recommended for more intensive assessment, which was completed in 1997. This assessment relied on systematic shovel and limited unit

excavations that again failed to recover diagnostic artifacts. It did, however, include the investigation of two of several brick and stone mounds and concluded they were structural in nature. This work and additional historical evidence led to a determination that the site was the probable location of Cantonment Saranac even though there was still no concrete artifact evidence. While the site was recommended eligible for listing on the National Register of Historic Places, its listing on the register was impossible. In order for the Zagreb site to be considered Pike's 1812-1813 Cantonment Saranac, military artifacts were essential.

In 2011, the Battle of Plattsburgh Association (BOPA) sponsored a new survey of the site, headed by the author and local historian Keith Herkalo (Abel in press). Using metal detectors to scan transects spaced 10 meters apart and conducting test excavations, diagnostic artifacts were finally found demonstrating once and for all that the site was the location of Cantonment Saranac (Figure 1). Following submission of the report to the NYS Office of Parks, Recreation and Historic Preservation, the site was nominated and listed on the National Register, just in time for its 200th anniversary.

## INTERPRETING CANTONMENT SARANAC

In 2012 and 2013, researchers returned to the site and conducted archeological field schools as part of an Immersion Experience course at Clinton Community College and sponsored by the Champlain Valley Teacher Center and BOPA (Abel 2014). Expanding on 2011 investigations, they uncovered a total of 24 square meters, exposing the entire floor of a soldier's cabin measuring 12 x 15 feet. It is believed to be the only excavated example of a War of 1812 winter structure to date (Figure 2).

The excavation of the cabin revealed it to be built of logs. The hut was heated by two fireplaces with brick facing on a stone platform, one of which provided faunal remains. The floor of the structure confirmed the 1813 burning of the camp by the British in form of charred beams, fire-hardened nails and melted window glass. Only small fragments of domestic artifacts were recovered, including small sherds of gilded porcelain that suggested a high-ranking occupant (Figure 3).

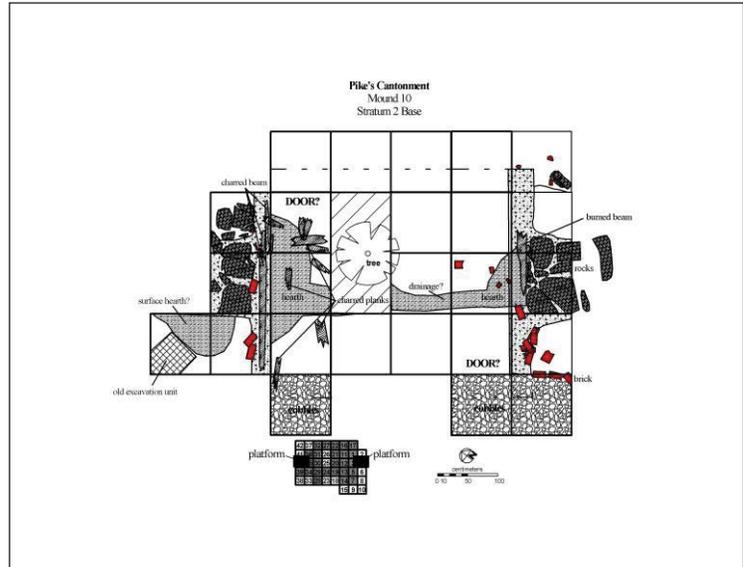


FIGURE 2 SOLDIER'S CABIN.

A site survey by the field school found evidence that the Zagreb site contains as many as six additional cabin sites in a pristine state of preservation. The cabins appear to form a row with one larger one off-line to the north. The arrangement is similar to the officer's row prescribed by Friedrich Wilhelm von Steuben in his *Regulations for the Order and Discipline of the Troops of the United States* written during the American Revolution. Furthermore, there is a rich midden nearby that contains abundant period artifacts, faunal, and floral remains. The site remains the only undisturbed piece of the cantonment site yet documented, encompassing just under 2 acres, though the search is now on for other undisturbed components nearby.

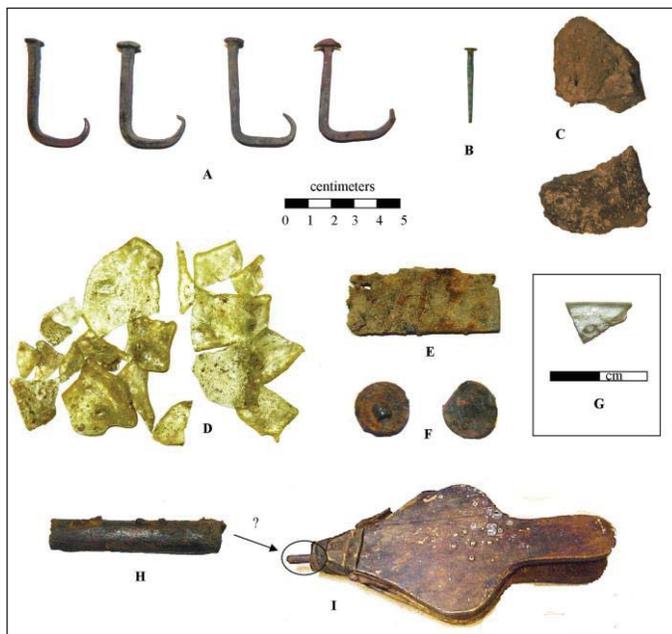


FIGURE 3 ARTIFACTS FROM STRUCTURE: A) WROUGHT NAILS, B) CUT NAILS, C) VITRIFIED CHINKING, D) MELTED GLASS, E) HINGE, F) OBLVERSE AND REVERSE, 2 PIECE BUTTON, G) EXPORT PORCELAIN, H) TIN TUBE, I) BELLOWS. (COURESTY BATTLE OF PLATTSBURGH ASSOCIATION).

The survey and subsequent investigation proving that the Zagreb site was part of Colonel Zebulon Pike's 1st Brigade winter encampment has catapulted it into the consciousness of the Plattsburgh community. Commemorations were made in November of 2012 at the bicentennial of the site, and an annual encampment is held every winter to educate visitors about the conditions soldiers faced. Now that the site is listed on the National Register, plans are being made to conduct long-term investigations aimed at studying all that the site has to offer. Plans are also being made for an interpretive area adjacent to the site that will educate the public about the significance of the place and the war in 1812.

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# ARCHEOLOGY AND THE SECOND BATTLE OF SACKETS HARBOR: WHY THE MILITIA DESERVES ITS DUE

Matthew Kirk and Corey D. McQuinn

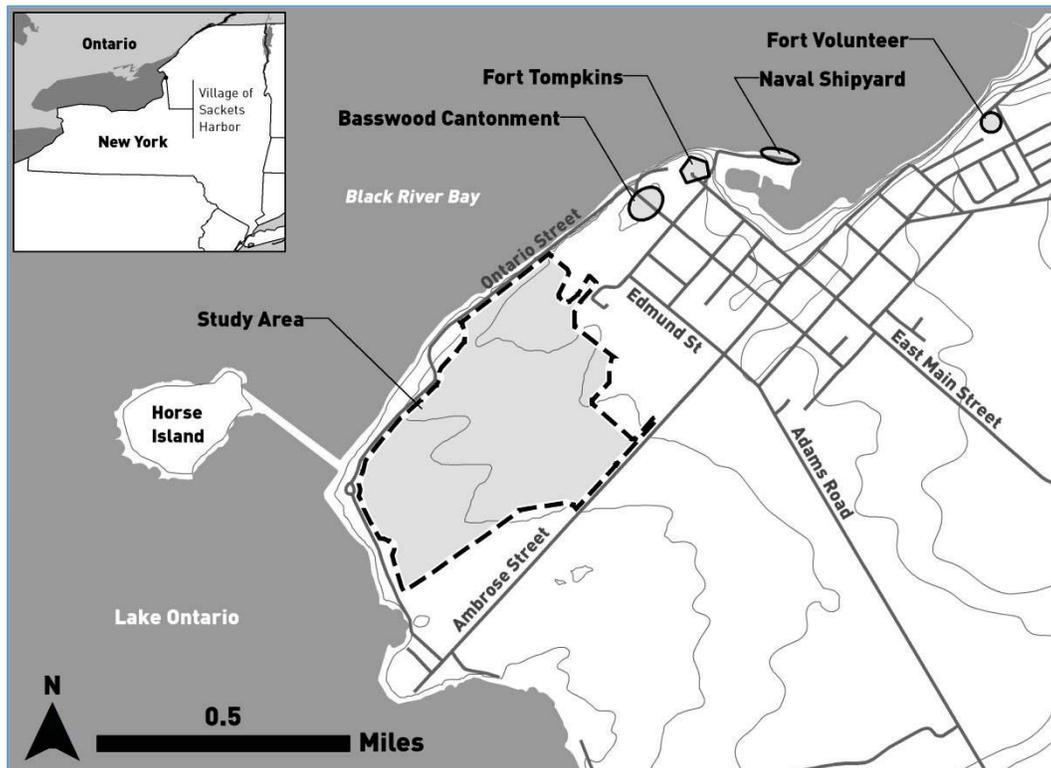


FIGURE 1 STUDY AREA FOR THE SECOND BATTLE OF SACKETS HARBOR.

## INTRODUCTION

The American Battlefield Protection Program of the National Park Service awarded a grant to the Friends of Sackets Harbor, a nonprofit group focused on preserving the history and archeology of Sackets Harbor's role in the War of 1812. The New York State Office of Parks, Recreation, and Historic Preservation operates a historic interpretive park at the Sackets Harbor Battlefield State Historic Site, but the park only encompasses a few of the known military installations built to construct naval vessels and protect the harbor and naval yards (Figure 1). The new grant focused on the study of a series of agricultural fields associated with the British invasion of the mainland on their way to routing the American forces at the harbor. This engagement, known as the Second Battle of Sackets Harbor, took place 28-29 May 1813.

## THE BATTLES OF SACKETS HARBOR

The First Battle of Sackets Harbor consisted of a brief naval engagement as the British attempted to retake a captured vessel in July 1812. The Americans drove the British from the harbor without causing any significant damage and retained the ship, which had been outfitted for battle and rechristened *Scourge*. This minor engagement set the stage for the second battle. The Second Battle of Sackets Harbor on 28-29 May 1813, consisted of an early morning naval assault and amphibious landing by British troops. At that point, Sackets Harbor was one of the most productive American naval facilities in the northern theater of war. Learning from their previous mistakes, the British navy and expeditionary forces changed their strategy and took advantage of a tactical mistake and poor planning on the part of the Americans. In an effort to draw British naval defenses away from their shipyards in Kingston, Ontario, the Americans sent a large naval force west to join the battle at York, Ontario, where Zebulon Pike and his men were fighting. With few officers and troops remaining behind, Sackets Harbor was vulnerable to attack. Command of the shipyard fell to General Jacob Brown, a militia leader with little practical experience.

The British landed about 900 troops on Horse Island, a small, stony island connected with the mainland by a narrow causeway sometimes submerged depending on the weather and season (Figure 2a). The British quickly overran the American defenses composed of an advanced guard of volunteers and militia, chased them across the narrow neck of land, and into the open fields and woods west of the shipyards and forts (Figure 2b). The reserved American regulars, mostly comprised of dismounted dragoons led by Colonel Backus, advanced to fully engage the British. The British advanced using a pincer movement with the main column focused on the regulars and a smaller contingent sent to the south and east to outflank the Americans. With backup from naval bombardment, the British overran the American cantonment and forced the remaining troops to seek shelter in Fort Tompkins (Figure 2c). The Americans within the shipyards feared capture of the facility and set fire to the port and stores, losing about half of their ships and supplies. The British had victory in their grasp when Sir George Prevost, commander of the expeditionary force, demanded the Americans surrender the fort. When the Americans declined to capitulate, Prevost ordered the British to retreat from the harbor back to Horse Island and onto their awaiting ships (Figure 2d).

## ARCHEOLOGICAL INVESTIGATIONS

Hartgen Archeological Associates, Inc. was hired to perform an archeological search for the battlefield beyond the state park. Archeologists developed a research design, completed a KOCOA analysis, and conducted a metal detecting survey focusing on a part of the site within a large agricultural field where the British engaged with the retreating American volunteers and militia and advancing regulars. KOCOA analysis provided crucial information on potential skirmish lines and defensive positions. The fortifications and village surrounding the harbor were considered key terrain for both forces, since these were the primary objectives of the British invasion and the American defensive works, but also as observation points, since the blockhouse and other structures were the highest points in the vicinity. While Horse Island was the primary avenue of approach for the British, the narrow causeway leading to the mainland also stood as a major obstacle and the Americans hoped to take advantage of this bottleneck when planning for a potential invasion. The study area where this initial engagement occurred had

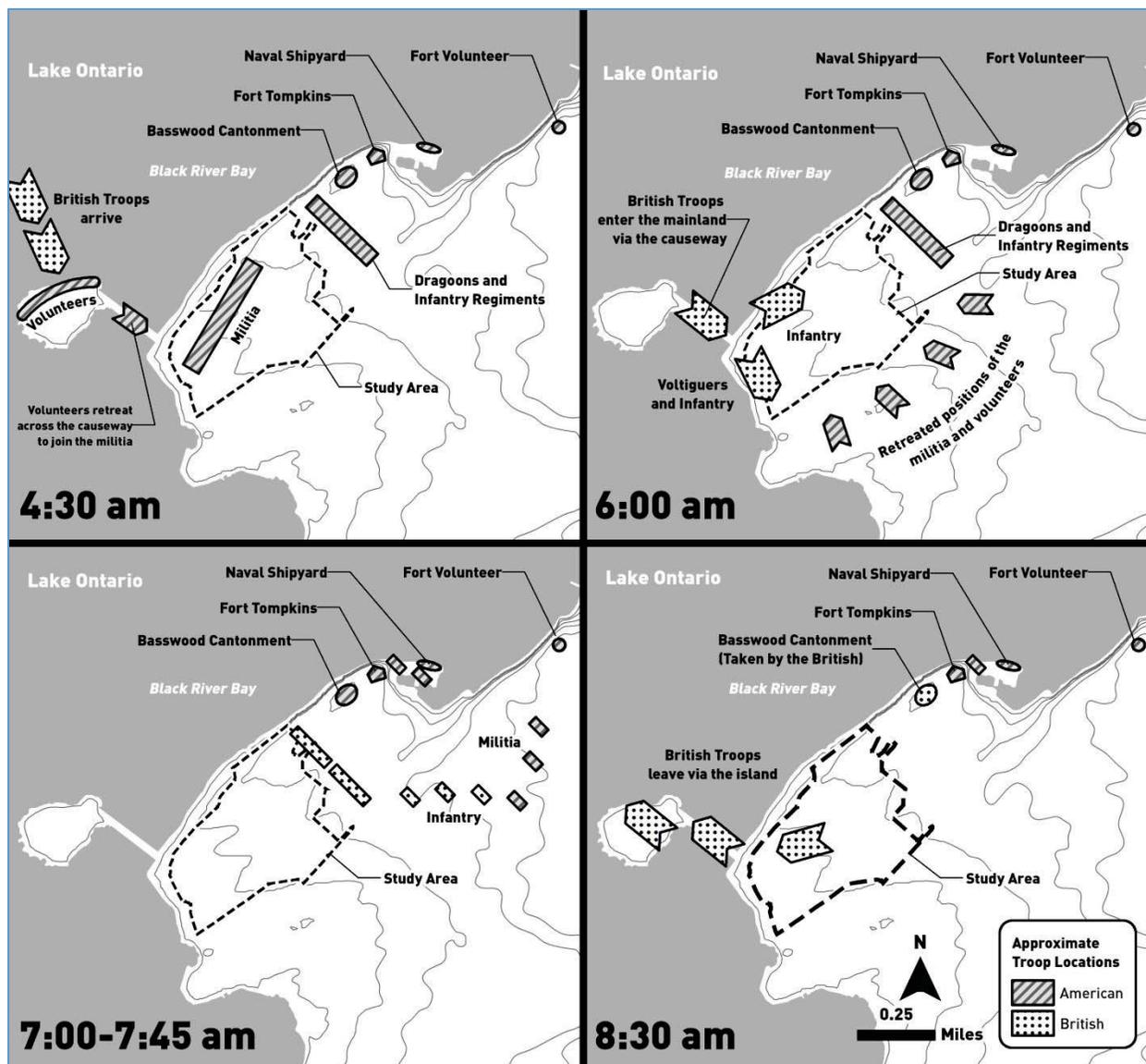


FIGURE 2 THE SECOND BATTLE OF SACKET'S HARBOR.

very little relief besides a few low-lying drainages and low knolls, offering little in the way of cover and concealment for the Americans.

The results of the battlefield metal detecting survey served to answer important research questions and provided archeological evidence that conflicted with historical accounts. For instance, one goal of the study was to determine if a defensive ditch manned by an American dragoon force was located in the study area. Metal detecting along the northern extent failed to find evidence of this fortification, suggesting that remnants of the ditch may lie within the state historic site, adjacent to the northeast of the study area.

Historical accounts of the battle differ, but the popularly accepted narrative is that the American militia and volunteers offered no significant challenge as they fled the British advance. The metal detecting survey, however, identified multiple skirmish lines likely formed by American troops as they regrouped in small bands and returned fire onto the British. Near the outlet of the causeway from Horse Island onto the mainland, archeologists found a concentration of ammunition likely used by local militia forces, rather than the American regulars. This suggests

the militia withstood a longer defense than implied in the historical record. Overlapping artillery ammunition in this area shows that the dragoons bombarded the British at this position, likely after the militia fled the scene. The British advanced from here to the northeast towards the fortifications.

Archeologists located a concentration of American buttons. This assemblage suggests that some American forces took cover ahead of the dragoons' position, likely lying on their fronts, firing from minimal concealment on the advancing British. The troops probably lost the buttons during this engagement, as some would have been lost while crawling over the ground. Eventually, the British were able to rout the remaining militia from the area, clearing their way to the forts and harbor. One of the groups responsible for this push may have been the Grenadiers of the 100<sup>th</sup> Regiment of Foot, a military unit organized in Northern Ireland around 1804 for the British war against Napoleon. Archeologists recovered a British half-penny coin minted in Ireland, likely in 1805, along one of these skirmish lines. This coin may have been dropped by a member of the 100<sup>th</sup> during their effort to extricate the militia from their position. The Grenadiers suffered heavy casualties early in the engagement, as one of their landing crafts was one of the only British vessels hit by American artillery. Many Grenadiers died in that incident, but some were able to swim ashore to Horse Island and join the battle.

The evidence of a disorganized, but forceful, American stand against the British army disputes previous accounts of the battle. It is possible that these small bands of harassing Americans may have figured into the final incidents of the battle. If the retreating Americans were able to regroup and flank the British, Prevost's forces would have been pinned inside the cantonment and defeated or captured. Popular sentiment holds that the first lines of American militia and volunteers ran away from the battle due to lack of experience. This new archeological evidence from an unexplored corner of the battlefield, however, demonstrates that the American defenders continued to regroup and fight back, perhaps giving Prevost reason to pause and beat an orderly retreat once certain objectives were met. The Americans seemed to have succeeded despite poor leadership from General Jacob Brown, who spent most of the battle off the field trying to regroup his fleeing militia. Ironically, General Brown would continue to have a successful military career and become one of the true American heroes of the War of 1812, despite the inauspicious beginning of his tour of duty.

Other evidence from the site testifies to the sacrifice made by soldiers on both sides of the fight that day. Archeologists recovered dozens of musket balls from both American and British guns. Some of those were dropped, never fired, but many bore the evidence of impact with a solid object, such as the ground, a tree, or a human being. Five musket balls were sent for blood protein residue analysis, four obviously fired and one dropped. Hartgen teamed with PaleoResearch Institute of Golden, Colorado, for the specialized analysis. Of the four fired balls, two were of the size of typical British munitions and two were the size of typical American lead shot (although both sides commonly utilized a variety of small arms with varying calibers). These artifacts were recovered from the ground with a handful of the surrounding soil and lightly washed just before analysis to minimize potential contamination. While the dropped musket ball came back clean, each of the four fired shots bore evidence of human blood protein, indicating that these projectiles struck a human target. This study and others like it bear further implications for the archeological study of battlefields and the threat of amateur collecting and illegal looting. The presence of human blood protein on these fired musket balls suggests that the artifacts collected from battlefields are more than just artifacts. Educating the public about the implications of this study may factor into the decisions avocational archeologists and looters make about collecting artifacts from battlefield sites.

## COMMEMORATION

Since the conclusion of the study, the archeology of the Second Battle has received more attention, especially as the bicentennial of the War of 1812 approached. Relatively few comparable studies of protein residue analysis have been completed using ABPP grant funding. Additional consideration of this fascinating and illuminating study can add to our interpretation of battlefields and more concretely demonstrate the human cost of war through material culture. The study of this site has made an impact in New York State's commemoration of the War of 1812's bicentennial and was featured in a documentary that aired on a local PBS television affiliate. The study's lead investigator, Matthew Kirk, RPA, also served as a New York State Council for the Humanities speaker during the bicentennial commemoration, providing public lectures on the Second Battle of Sackets Harbor and the archeology of the War of 1812. Currently, the Sackets Harbor Battlefield State Historic Site is pursuing National Historic Landmark status. A nomination form has been submitted and review is currently underway. The community and support groups are still working to preserve the battlefield, the majority of which is outside of the state historic site and currently threatened by residential and commercial development. Sackets Harbor is a bedroom community for nearby Fort Drum, home of the 10<sup>th</sup> Mountain Division-one of the most active US Army units during the recent Middle East operations-and a popular tourist area. As a result this small community is experiencing unprecedented growth and change. As one of the best preserved War of 1812 battlefield sites in the United States, it will take concerted effort by local, state, and national groups to ensure this rich archeological and historical resource remains intact.

Matthew Kirk, RPA Principal Investigator with Hartgen Archeological Associates, Inc., and Corey D. McQuinn archaeologist with New South Associates, Inc.



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# “I TREMBLE FOR THE FATE OF THE GREENBRIER PEOPLE”: BORDER CONFLICT IN REVOLUTIONARY ERA WEST VIRGINIA

W. Stephen McBride and Kim A. McBride

## INTRODUCTION

Conflict between white settlers and Native Americans over land in present West Virginia was ongoing from the 1750s until the 1790s. Settlement attempts in the Ohio River drainage area of the state during the 1750s and early 1760s were unsuccessful because of the French and Indian War and Pontiac's Uprising, but settlers returned in 1769-1770 following the 1768 Treaties of Fort Stanwix and Hard Labor with the Iroquois and Cherokee, respectively. One of the areas into which settlers returned is our study area, the Greenbrier Valley of present eastern West Virginia. While these settlers may have believed that these treaties guaranteed peace in this region, warfare soon returned with Lord Dunmore's War in 1774 when Shawnee and the Virginia government came into conflict, and then in the Revolutionary War, when most Ohio Valley Indians allied with the British. To counter Indian raids in this period, settlers created a local defensive system consisting of organized county militia, Indian spies (scouts), and neighborhood fortifications. The Virginia government assisted these efforts by building a chain of forts on the Ohio River, by providing some supplies, and by organizing the rare offensive campaigns into Indian country. Historical and archeological investigations of two fort battle sites, Arbuckle's and Donnally's Forts, within the Greenbrier Valley are examined here to gain a better understanding into the nature of frontier warfare and defense during the Revolutionary era.

## FRONTIER DEFENSIVE SYSTEM

When settlers returned to the Greenbrier Valley in 1769-1770 they primarily built log houses on family farmsteads that were somewhat clustered in neighborhoods. Although it is unclear if forts were built immediately, the county militia organization was quickly re-established. The county militia was led by the County Lieutenant whose staff and company officers commanded the men. All free white males aged 18 to 50, except those with vital occupations, were required to serve. Each county had at least one militia regiment that was divided into five to 15 companies of approximately 20 to 80 men and officers. During the Indian Wars, local militia duty usually consisted of garrisoning forts, pursuing Indian raiding parties, and spying between forts and along trails and gaps.

The activities of the militia spies were particularly crucial since many settlers would remain or return to their farms until an alarm was given. As militia spy Michael Swope (1833) stated, "...when [spies] saw signs of Indians they would fly from Fort to Fort and give the alarm so that preparations might be made for defensive operations by the people that were Forted and those who had ventured out to work their corn might betake themselves to the Fort before the Indians would attack them..." The spies generally went out from one fort in groups of two to three for four to eight days and with a circuit of thirty to seventy miles.

Documents suggest that forts were built in the Greenbrier Valley during Dunmore's War and the Revolution. These forts anchored the local defensive system by providing operational bases for militia and spies, and served as places

of refuge for settlers during times of danger. These forts were either privately built by farm owners or built by militia companies. Although descriptions of these forts are very limited, they seemed to have ranged from two-story log houses or blockhouses to wooden stockades with corner bastions. The forts were usually located in the center of a settlement cluster or neighborhood and ranged from three to ten miles apart. Each drainage area or community had one to three forts and a corresponding local militia company that usually garrisoned these forts. Research into county tithable and personal tax lists suggests that the number and location of forts was closely correlated with population density (Botetourt County 1775; Greenbrier County 1783).

## TWO BATTLE SITES

While there were numerous battles and skirmishes in the Greenbrier Valley during the Indian Wars, we focused on two battle sites, Arbuckle's Fort and Donnally's Fort in the Muddy Creek and Sinking Creek settlements of Greenbrier County, respectively, to examine both the nature of frontier warfare and the location and design of frontier forts. These two fort sites have received extensive archeological investigation, consisting of shovel test probe and larger unit excavation, metal detecting, and some backhoe trenching (McBride and McBride 1998; 2006; 2011; 2014).

Arbuckle's Fort was built in the spring of 1774 by Captain Matthew Arbuckle's militia company on John Keeney's farm and garrisoned throughout the Revolutionary War by the Muddy Creek militia company under Arbuckle and later Captain William Hamilton. The fort, also called Keeney's Fort, was located on a ridge at the confluence of Muddy and Mill Creeks and near a major trail. There are no period descriptions of Arbuckle's Fort, but the numerous references to this fort in period documents and militia pension applications suggest that it was the strongest fort in the Muddy Creek community, and hence, probably stockaded.

Arbuckle's Fort was the scene of two very poorly documented Indian attacks, one in August 1774, when it was reported by Major James Robertson that "I got flying news of the Indians shooting at one of Arbuckle's centery's on Muddy Creek" and one on 11 September 1777, when Captain John Stuart reported "a number of guns was heard by sundry persons in our neighborhood supposed to be at Muddy Creek fort about sundown last night" (Thwaites and Kellogg 1905: 103-104; Thwaites and Kellogg 1912: 81). In neither the 1774 nor 1777 attacks is there any indication of how many Indians or militiamen were involved, or how many casualties occurred, although William Kelly was killed in the 1774 attack. But, generally 15 to 20 militiamen manned these forts.

The site of Arbuckle's Fort is the most extensively excavated, and best understood, of any of the Greenbrier Valley forts (Figure 1). It has also been the focus of much public outreach archeology with professional archeologists being assisted by adult volunteers, college students (particularly Concord University, Marshall University, and University of Kentucky), elementary and middle school students, and Boy Scouts. Here we have found and exposed

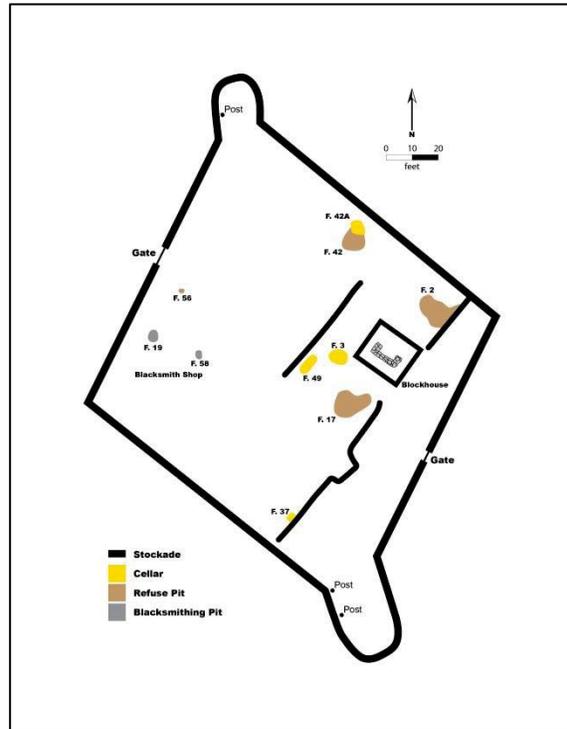


FIGURE 1 ARBUCKLE'S FORT.

the main two bastioned fort stockade (110 x 110 ft), two shorter interior stockade lines (one with a small redan), the stone foundation and chimney of a blockhouse, a blacksmithing area, four cellar pits, and a number of refuse pits and postmolds. One mystery of these excavations is the nature and function of the two shorter stockade lines: are they part of an earlier (1774) smaller fort or could they be secondary lines of defense within the larger fort? We believe the distribution of arms related artifacts, which were found in test units and by metal detecting, may help answer this question.

The distribution of fired lead balls indicate firing on both the northwestern and northeastern main walls of the fort (indicating that some of the Native Americans came up Muddy Creek), but also firing on the two shorter stockade walls and the blockhouse. While the blockhouse certainly rose over the main stockade, it would have been difficult to hit the short walls if the main stockade was present, unless the attackers breached the main walls- a scenario that would have likely created more documentation. The most likely explanation for this pattern was that the short walls were part of an earlier fort and that these balls probably represent the 1774 attack, which occurred from the southeast (Mill Creek) and northwest (Muddy Creek), while the balls from the main walls represent the 1777 attack, which came mostly from the north. Further evidence for this conclusion is found with the dropped balls and shot and the gunflints. The dropped balls (.40-.50 in) and shot (.28-.32 in) suggest militia positions at the blockhouse, northwestern short stockade, and northwestern and northeastern main stockades. The lack of dropped balls in the two bastions is surprising, but only limited excavations have occurred in these areas.

The French gunflints and local Greenbrier chert gun spalls are concentrated in both short stockades, the blockhouse, the northeastern structure (as defined by a cellar pit), and the northwestern main stockade, while the European gray gun spalls are all concentrated on the southeastern short stockade, particularly in the redan. The gunflints, particularly the European gray gun spalls, suggest that the short stockades were heavily utilized; a pattern unlikely if they were merely secondary lines of defense. These distribution of the above arms artifacts, therefore suggest that the two interior stockades were probably part of an earlier smaller fort.

The largest and best documented battle in the Greenbrier Valley occurred on 29 May 1778, when upwards of 100 to 300 Wyandot, Mingo, and Shawnee warriors attacked Lieutenant Colonel Andrew Donnally's Fort, a combination residence and militia fort located on a low ridge along Rader's Run in the Sinking Creek community. Donnally's house was constructed in ca. 1771 and fortified by 1774 or 1775. This fort was garrisoned by the Sinking Creek militia under Captain Andrew Donnally and later Captain William McCoy.

Documents indicate that following an unsuccessful siege of Fort Randolph on the Ohio River, these Indians traveled up the Kanawha River, moved eastward toward the Greenbrier Valley at Meadow River, and then attacked Donnally's Fort early on the morning of 29 May. Fortunately for the Sinking Creek settlers, they had been warned of this raid by scouts Philip Hammond and John Pryor from Fort Randolph.

The initial attack consisted of the Indians approaching the fort at dawn, silently killing John Prichet while he gathering wood at the run, and then rushing the kitchen door of the house/fort left open by Prichet. This initial attack was repulsed by militiamen and Dick Pointer, an enslaved man, followed by the Indians surrounding and laying siege to the fort, which was occupied by about 25 militiamen and 60 family members. At about 3 p.m. that day, the fort was reinforced by 66 militiamen from Fort Savannah (present Lewisburg), who helped successfully withstand the siege. During this attack the Indians lost 17 men in the door assault and the militia lost four – three killed outside the fort and one in a bastion.

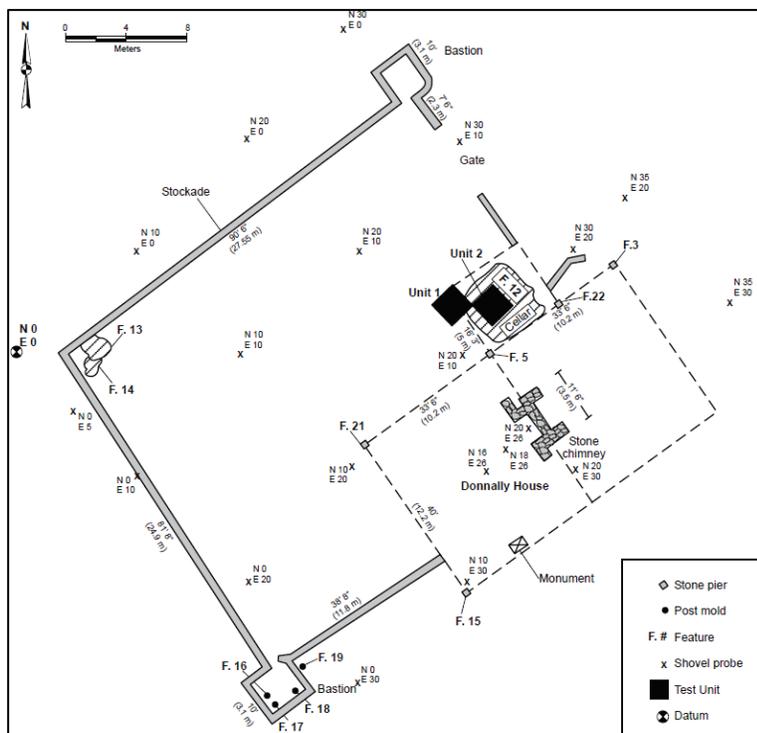


FIGURE 2 DONNALLY'S FORT.

Descriptions of this battle and fort, which are by far the best in this region, were critical in understanding this fort's layout. Especially critical were battle participant Captain John Stuart's quote "The house formed one part of the front of the fort and was double [with] the kitchen making one end of the house...", and Ann Royall's (1826) description, "Donnally's house made a part of the fort, the front of it forming a line with the same, the door of the house being the door of the fort" (Stuart 1833; Royall 1826). So, if we could find the house we should find the stockade intersecting it. This is exactly what happened. Once we uncovered a double stone chimney we began trenching for a stockade line and soon found and followed it. What we uncovered was a two bastioned stockade (90 x 82 ft), a 67 x 40 ft double pen house on stone piers with a central double chimney with the kitchen to

the northeast, one cellar to the rear of the house (excavated by a West Virginia University field school), and two pits/privies in one corner of the fort (Figure 2). Because of our limited excavations that were directed at understanding the fort's layout, we have not found any definite battle artifacts, but we did find two .50 in. dropped lead balls. A metal detector survey of this site is planned for the future.

## CONCLUSION

Archeology at Arbuckle's and Donnally's Forts has provided the first concrete evidence of the size and appearance of frontier forts in the Greenbrier Valley. Both of these forts were two bastioned stockades with internal buildings, cellars, and pit features. They differed in that Arbuckle's Fort had an internal blockhouse, rather than a residence as at Donnally's, and that it was likely built in two stages. The distribution of arms artifacts at Arbuckle's Fort reflect the militia men's positions and Indian firing during the 1774 and 1777 attacks, and strongly suggests that in 1774 the fort was smaller than in 1777. The lead balls also suggest that roughly .50 caliber muskets (likely rifled) were the main weapon of the militiamen.

Documents and archeology provide us with locational and tactical information on the Donnally's Fort battle. Native Americans first attempted to take the fort by surprise, but when this failed they resorted to surrounding and laying siege to the fort, which also failed when the fort was successfully reinforced by additional militiamen. The failure of the Indian attacks on these two forts, particularly when compared to successful attacks on farmsteads, demonstrates the successful defensive strategy of fortifying-up on this disputed frontier.

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# MODELING SMALL ARMS PROJECTILE DISTRIBUTION ON 18<sup>TH</sup> AND 19<sup>TH</sup> CENTURY BATTLEFIELDS

Garrett W. Silliman and Brandon Batt

## INTRODUCTION

The application of Geographic Information Systems (GIS) technologies to archeological investigations continues to provide new perspectives on historical events. Applied to battlefield archeology, GIS analysis affords an efficient means of predicting potential artifact distribution across a conflict landscape. The approach proposed in this article allows a user to test historical engagement scenarios within a desktop computing environment utilizing a customized GIS application. The purpose of the proposed method is to provide an approachable and packaged model for predicting the distribution of small arms-related artifacts in 18<sup>th</sup> and 19<sup>th</sup> century battlefield contexts.

As with any predictive model, these data provide an idealized picture; in this case, one of conflict site debris based on historical research, landscape analysis, and our inputs described below. This model is intended as a low-cost tool for planning and testing fieldwork efficacy. It is our belief that this study would have a particular application in cultural resource management contexts as well as use by local governments and historical societies interested in understanding and preserving battlefield areas located outside the protection of federal government lands (as was the case with the test study described below).

This study was originally conceptualized by the authors during 2008-2009 in response to the rampant destruction of battlefield properties in the Atlanta, Georgia, metropolitan area. The major issues the original study sought to address included:

1. A lack of understanding for the totality of archeological patterns in a battlefield setting;
2. the inability of historical research alone to account for these patterns; and
3. the improper application of field methods to identify these patterns.

The initial attempt proved to be too ambitious for the scope and budget of the original project. The major shortcoming we recognized was the lack of quantifiable inputs to generate an actual model in favor of the largely impressionistic picture we had created. As a result, the current study was intended to address these issues by developing a framework that allowed for the input of quantifiable parameters in order to illustrate potential artifact patterning. The framework consists of two components, the trajectory model and the methodology for implementing it. Using this coarse-grained approach, it is our contention that small-arms projectile distribution can be estimated for a single engagement. As an initial example to illustrate the efficacy of our model, this study uses data and parameters from the 1777 Battle of Ridgefield, Connecticut landscape as a test case (Silliman 2012).

## THE FRAMEWORK

Sophisticated battlefield scenario testing for the purposes of archeological investigation has been demonstrated in the past (Athanson 2009; Campillo et al. 2012). Building upon these efforts, the proposed approach is designed for a broader audience within the archeological community. While the underlying mechanics and mathematics are necessarily complex, by limiting model inputs and establishing certain assumptions the end-user can focus on archeological investigation, interpretation, and preservation.

The proposed model allows the end-user to digitize an engagement within a GIS and estimate ordinance distribution over a specified period of time. The tool was written for Python 2.6 (<https://www.python.org/>) and implemented as a script tool within Environmental Systems Research Institute's (ESRI's) ArcGIS 10 software. The model user first digitizes troop positions within the GIS, based on available research or presumed locations. Next, the user can attribute ordinance expenditures estimated from historical records or calculated based on a rate of fire. The user can then choose a weapon type from a simple menu that pre-populates several ballistics characteristics required to calculate trajectories to a given target. Finally, the archeologist can run the model for each set of troop positions to establish artifact dispersion across a battlefield.

The model is designed for the smooth-bore musket fire characteristic of 18<sup>th</sup> and early 19<sup>th</sup> century warfare. While the Newtonian formulas for calculating a trajectory path are well known, measuring the effects of wind resistance, or drag, requires several inputs. These inputs include a minimum and maximum range of initial muzzle velocities, the cross-sectional area of the projectile, and the mass of the projectile.

For our purposes, the British .75 caliber Long Land Pattern musket (Brown Bess) was used as the input basis due to its ubiquity on battlefields in 18th century North America. Estimates for the muzzle velocity of the Brown Bess musket vary from 700 feet per second (fps) (213.36 m) to as much as 1500 fps (457.2 m) (Willegal, 1999; Pollard et al. 2008a: 4), though the latter value was obtained from mid-19th century experiments. Modern experiments utilizing reproduction weapons and various powder types in a controlled environment demonstrated highly inconsistent velocity values, varying by as much as 650 fps with the same powder type and quantity (Pollard et al. 2008a: 13). Further, fouling of the barrel or over-priming the flash pan, might also affect the initial muzzle of velocity of the projectile, for these reasons the model assesses each shot from within a user-prescribed range.

A raster elevation surface is utilized in order to account for variations in targeting angles. The current function of the elevation surface is to establish direct line of sight from the origin to target based on a slope calculation. Given the close proximities of engaged troops as characteristic of 18<sup>th</sup> and 19<sup>th</sup> century warfare as well as the input's function in the model, variations in this elevation surface can produce varying results. While the elevation surface should reflect conditions at the time, it is understood that detailed information of this nature would likely be unavailable for 18<sup>th</sup> century engagements. If sufficient documentation exists regarding pertinent terrain features, including these into a readily obtainable elevation surface might produce the most reliable results, though the current implementation of the elevation surface within the model assumes a coarse-grained approach. This method has been employed in research of a similar vein (Lacey 2003).

## TARGETING

The targeting methodology is designed to accommodate both the inaccuracy of smooth bore weapons as well as the linear tactics employed in battle. Utilizing this strategy, lines of troops several ranks deep exchanged volleys of fire at close range using a prescribed set of commands from field officers. After each volley, ranks would rotate to allow reloading. This allowed for a high and consistent rate of fire, which was important due to the inaccuracy of the smooth bore musket (Lewis 1956:91; Hanger 1816:205). Even at less than 100 yards (91.44m), the likelihood of an individual landing a shot on a target individual was less likely than his shot landing somewhere else along the target formation, if at all. Even fired in a consistent fashion, other factors affecting the power and path of a given projectile include variations in musket barrel construction quality, projectile size, powder charge, and individual soldier behavior.

The horizontal targeting strategy rests on the assumption that an individual soldier, represented by a vertex on an input feature, would be aiming towards some point along the target formation, but not necessarily the same point along the target formation. As such, horizontal targeting is accomplished through a stochastic process of selecting a vertex from the target feature for each trajectory generated by the model. Once selected, an internal function determines the azimuth from the origin point to the target point and populates an internal table for later processing.

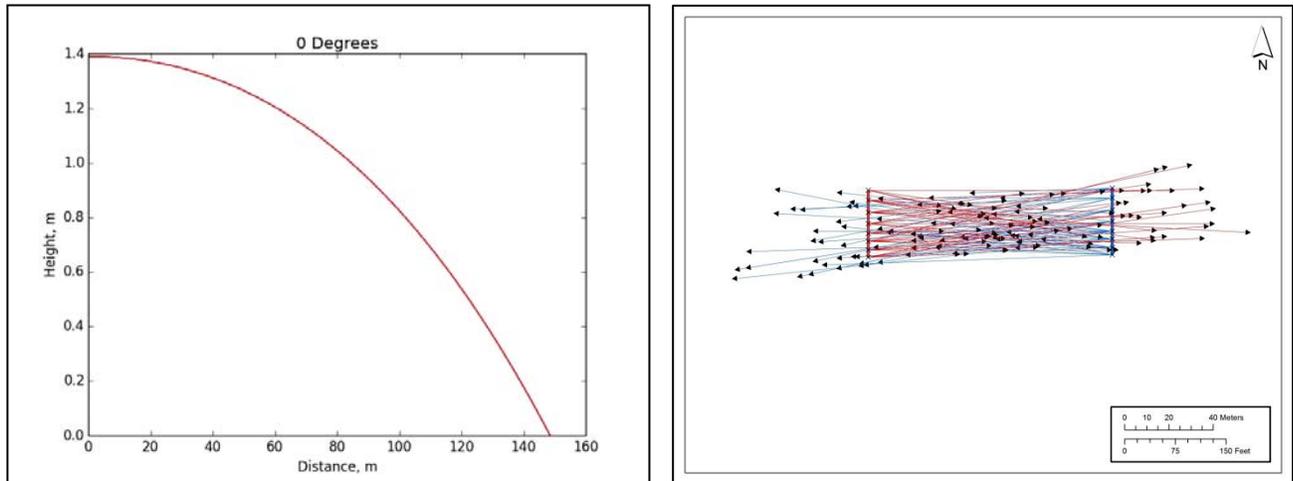
A similar process is employed to determine the vertical angle at which the firearm is held towards a target. The vertical angle at which a soldier would aim a weapon towards a given target would depend on several factors such as the relative elevations of origin and target, powder charge, and judgment of the soldier. To account for these variations, a direct bore line to the target is established by determining the slope angle between the origin and target based on the input elevation surface. With a direct path established, vertical aim is determined through the random selection of a value within a user-prescribed range of potential angles that represent an overshoot of the target.

## TRAJECTORY GENERATION

Much work has been done to calculate projectile trajectories and accommodate the multitude of variables required (Rowe et al 1985; Wade 2013; Weinacht et al. 2005). Our approach for estimating initial ground impacts borrows from these efforts, which incorporates a trajectory generating function within an accessible framework, and provides for future extensions to the approach. Accurately predicting the path of a projectile through an atmosphere requires knowledge of several characteristics of the projectile as well as its medium. The addition of atmospheric resistance increases the complexity and computational expense of calculating the projectile's trajectory. In the interest of usability, an effort was made to minimize the number of inputs required, enabling the user to focus on the modeled scenario and less on the internal calculations involved.

The model employs Euler's method, a stepped approach used to numerically solve differential equations, to predict a trajectory path as a function of time. This method is incorporated into a Python function that requires an angle of fire, an initial firing point ( $x$ ) and height ( $y$ ), an initial muzzle velocity, the projectile's cross-sectional area, an analysis time frame, and the step increment. Results predicted by this method are comparable to previous efforts using a .75 caliber musket ball, based on an assumed mass of 0.0379 kilograms (Miller 2010). The drag

coefficient varies with velocity and is determined programmatically through an internal Python function based on previous research (Pollard et al. 2008: 120). Connecting each point in the process produces a trajectory path for the projectile, and the calculated distance to impact is recorded and predicted (Figure 1a).



**FIGURE 1 A: PREDICTED TRAJECTORY (GENERATED WITH MATPLOTLIB, [HTTP://MATPLOTLIB.ORG](http://matplotlib.org), B: SAMPLE OUTPUT SHOWING TRAJECTORY DISTANCES AND IMPACT POINTS.**

This process is repeated for each shot emanating from the input origin feature class, ultimately populating a geodatabase table with every shot's origin point, horizontal firing angle, and distance to initial impact. With this information in place, the Bearing Distance to Line tool, a function native to ArcGIS, is invoked and the end points of this output are extracted as a point surface (Figure 1b).

## TEST CASE: BATTLE OF RIDGEFIELD

During May 2012, Terminus Archaeological Research (TAR) conducted the Phase I Archeological Survey of 593 Main Street in Ridgefield, Connecticut. This project was conducted in response to the Connecticut State Archeologist's and Town of Ridgefield's request for an archeological survey prior to the proposed construction of a multi-family housing unit on the property. Investigations in the study area, approximately 1.5 acres, identified one archeological site, which is likely associated with the 1777 Battle of Ridgefield as well as secondary domestic deposits from the 18<sup>th</sup> through 19<sup>th</sup> centuries.

The Battle of Ridgefield was a skirmish fought between British and American forces on the afternoon of 27 April 1777. A British force of approximately 2,000 men, commanded by British Major General William Tryon, engaged an American militia made up of approximately 500 men. Based on contemporary accounts and landscape observations, it is believed that the Connecticut militia established a defensive barricade in the vicinity of the study area, crossing Main Street north of downtown Ridgefield. This barricade extended across a low hillside from the former location of the Stebbins House on east side of Main Street to a ledge of rocks on the west side of Main Street (Figure 2).

Based on contemporary accounts, the engagement at the barricade lasted less than 20 minutes and involved an envelopment movement by British flankers as well as a frontal assault on the American militia position. Contemporary accounts indicate that a portion of the British flanker's advance was mired by thick brush around a wet, low-lying area at the base of the hill in and around the study area. Artifacts likely associated with this advance were recovered during the survey; additionally, identifying key terrain features such as the ledge of rocks (visible from the study area), the bend in the Danbury Road (Main Street), and the low-lying area allows us to interpret this portion of the modern landscape in the context of the original battlefield and was no less critical for providing key inputs for the model's spatial framework (see Figure 2).



**FIGURE 2 RECONSTRUCTED VIEW OF BATTLE OF RIDGEFIELD, SHOWING KEY TERRAIN FEATURES, CONJECTURAL TROOP MOVEMENTS AND MODERN DEVELOPMENT.**

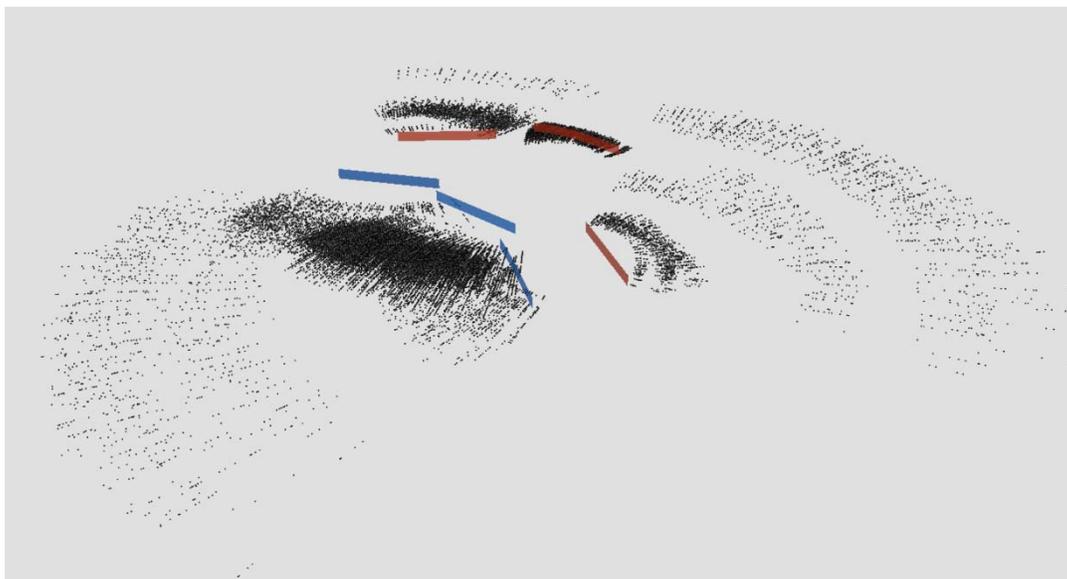
## MODELING

To initiate the model, a linear feature representing the main American force was placed at the barricade location, while supporting skirmish line features were placed to the east and west. Similarly, a linear feature representing the main British force was placed approximately 100 yards north of the barricade, with separate skirmish line features placed to the east and west representing the smaller detachment of flanking lines. These lines were placed approximately 50 yards from the Continental position based on assumptions regarding the surrounding terrain.

The number of soldiers assigned to each feature was assumed to be the number of men per line multiplied by the number of ranks engaged at each position while the firing rate was based on the efficiency and skill of each side.

An assumption of three rounds per minute was made for the main British column (Darling 1970: 11), while skirmish lines approaching from the east and west were assumed to be less effective as a result of the inhibitive terrain. The American forces, lacking training and experience, were assigned a firing rate of two rounds per minute. Firsthand accounts of the engagement suggest a length of approximately 15 minutes. As such, quantity of fire was assessed by multiplying the number of men represented by the feature by the rate of fire and the length of the battle.

Inputs to the trajectory function included a minimum muzzle velocity of 213 m/s ( $\approx 698.8$  fps) and a maximum muzzle velocity of 274 m/s ( $\approx 898.9$  fps), a relatively conservative range given available data. Elevation data was obtained from Connecticut Department of Energy and Environment Protection (DEEP) (<http://www.cteco.uconn.edu/>) and processed within ArcGIS. Utilizing the Spatial Analyst extension, an interpolated raster surface was created from point surfaces showing impact locations. The Kernel Density method was used with an output raster cell size of 0.5 meters. The model was run six times, once for each origin/target set, and the resulting point surfaces as well as raster surfaces were aggregated into a single datasets for comparison (Figure 3 and 4).



**FIGURE 3 THREE DIMENSIONAL RENDERING OF POINT SURFACES SHOWING IMPACT POINTS, FACING NORTHWEST.**

Utilizing the proposed approach above, a surface density of projectile impacts was produced based on aforementioned assumptions and troop placements. Figure 3 displays the point surface generated prior to interpolation, while Figure 4 denotes impact density as impacts per raster cell size (0.5 m), varying from negligible to approximately 7 impacts per cell ( $\sim 3.5$  impacts per  $m^2$ ).

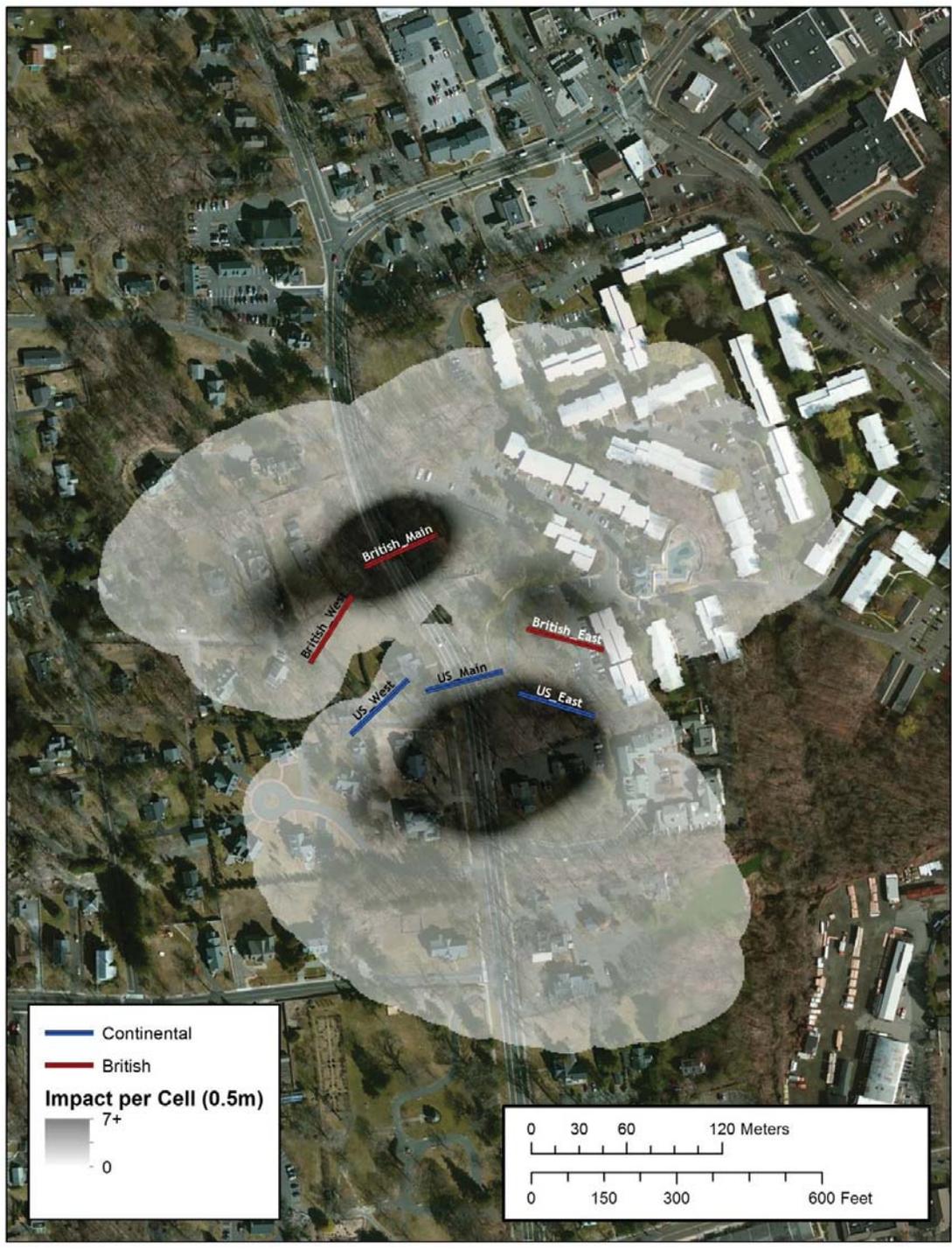


FIGURE 4 INTERPOLATED KERNEL DENSITY SURFACE SHOWING ORDINANCE IMPACTS FOR THE 1777 BATTLE OF RIDGEFIELD.

## DISCUSSION

While the Battle of Ridgefield serves as an example of the tool's application, it is our intent that this methodology be extended and applied to a wider range of engagements where a desktop survey might supplement or guide field investigations. The authors believe that the value of this approach as a supplement to the archeologist's toolkit lies in its scalable and adaptable nature. The approach offers its user base a freely-distributable tool specific to archeological research with the potential for widespread applicability to conflict sites. Future efforts will focus on providing additional projectile types as well as consideration of projectile behavior after initial ground impact, as the distance traveled after initial ground impact can often times be as much as twice the impact distance (Miller 2010). What's more, accurately predicting this projectile behavior after impact would require several additional terrain characteristics and empirical firing data that exceeded the scope of the project. Nevertheless, research is ongoing and future efforts will focus on bringing this functionality to the model.

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# A MNEMONIC ARTIFACT: A 1777 CHEVAL DE FRISE FROM THE DELAWARE RIVER BATTLEFIELD

NICOLE WITTIG AND LAWRENCE BABITS



FIGURE 1 THE CHEVAL DE FRISE AFTER RECOVERY FROM THE DELAWARE RIVER (THIS WEEK IN PENNSYLVANIA ARCHAEOLOGY BLOG, 2013).

## INTRODUCTION

When picturing a battlefield, often images of rugged terrain or grassy expanses come to mind. Battlefields are not just terrestrial landscapes, however, but also extend beneath the depths; that is, bodies of water present opportunities for defense and deterring an enemy's advance. This paper focuses on one particular artifact known as a cheval de frise, a defensive structure adapted for underwater fortification during the American War of Independence. Our paper details the application of these underwater defenses and how they altered British movements along the Delaware River. As only one facet of the American defense system, the cheval de frise serves to direct new research into better understanding how Americans utilized both passive and active defenses within a maritime landscape. This research, in turn, allows more complete understanding of the Delaware River as a battlefield.

On 10 November 2012, members of the Anchor Yacht Club in Bristol, Pennsylvania, removed a log obstructing the Delaware River (Figure 1). An observant member recognized the timber as a man-made artifact. Unsure of the piece's purpose or significance, they contacted Pennsylvania Museum and Historical Commission staff who

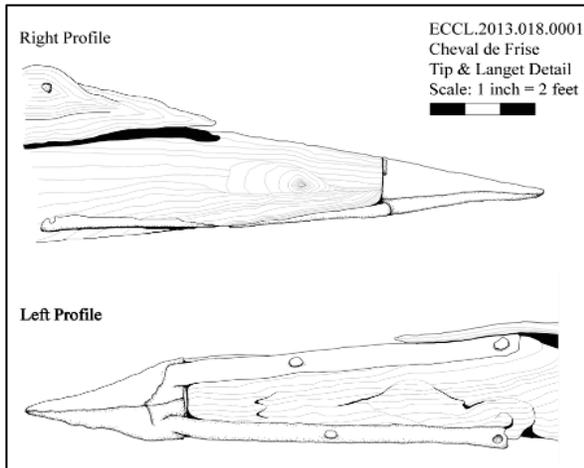


FIGURE 2 ILLUSTRATION SHOWING IRON TIPS AND LANGETS (NICOLE WITTIG 2013).

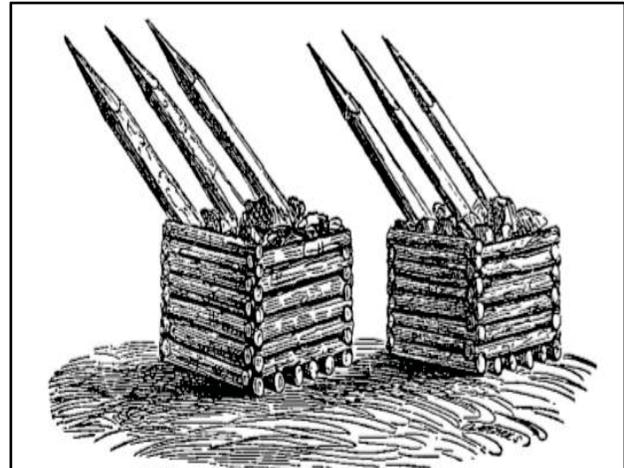


FIGURE 3 MARINE CHEVAUX DE FRISE WITH CRIB AND SPEAR CONFIGURATION (HARTE 1946).

identified the log as a spike for a cheval de frise (plural, chevaux de fries). This particular log was shaped as a large spike 28 feet, eight inches (8.7 meters) long and 13.6 inches (34 centimeters) in diameter at the widest point. The spear is a debarked tree trunk with an iron spike at the narrow end. The spike is a solid, triangular shaped iron point attached to the log's end by four iron langets (metal bands), three of which are still intact (Figure 2). Each langet is fastened by two iron nails. Along one side of the log partial iron nails and small, rust colored patches in the general shape of chain links indicate how the log was fastened to a supporting crib structure.

## CHEVAUX DE FRISE

The recovered spear represents an obstacle used during the American War of Independence. Typically, this obstruction is used on land. Originally used by the French, these devices consisted of a series of pointed logs mounted perpendicularly to a horizontal beam. The main brace, or beam, was between ten and twelve feet (3.3-4 meters) long and six to nine inches (15-22.8 centimeters) thick. Five to seven feet long (1.6-2.3 meters) wooden spears were inserted through the beam about eight inches (20.3 centimeters) apart. The lances were positioned at right angles to the beam and perpendicular to the next, creating a series of "X's". Chevaux de frise originally served as a portable anti-cavalry barrier but became a temporary obstruction to defend weak spots including: vulnerable parts of camps, entrenchments, ditches and roads. The term derives from the French phrase meaning "horse of Friesland." Such obstructions were used until World War I, when barbed wire attached to iron rods replaced wooden lances.

Chevaux de Frise could also be used as an underwater obstruction to block shipping channels. During the American War of Independence, rebelling Americans lacked a formal fleet to challenge British warships so inventive defensive measures were required. River obstruction became the more economical and manageable solution. Obstructions placed in rivers, including the Delaware, could potentially stop, damage, or sink British warships. They used sunken ships, cribbing and frames sunk onto the river bottom as obstructions.

The preferred design of underwater Chevaux de Frise incorporated a crib to which the lances were attached. This variety was favored over tetrahedrons because, "The Ground being soft in our Channel, we were oblig'd to fix our pointed Beams to a floor" (Franklin 1776). Workmen constructed the devices at Gloucester, New Jersey. The first

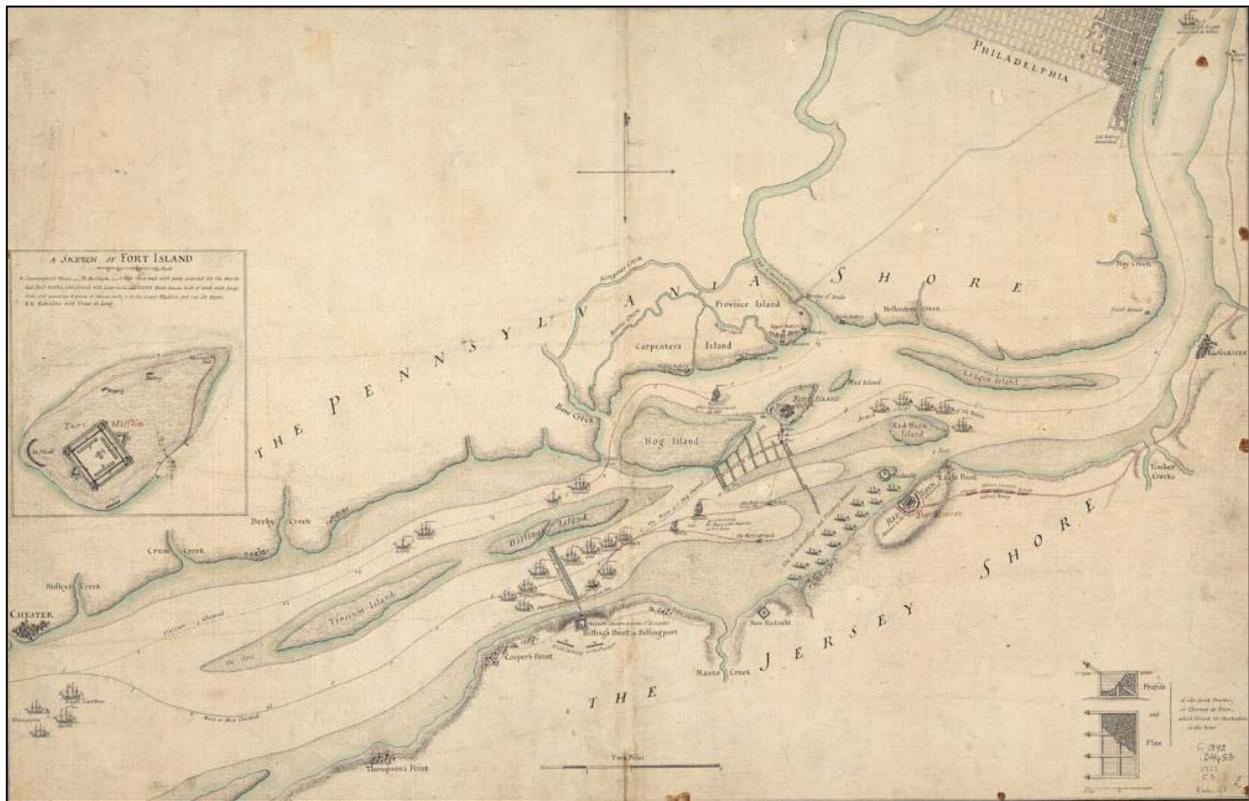


FIGURE 4 WILLIAM FADEN'S 1777 MAP OF THE AMERICAN TERRESTRIAL AND UNDERWATER DEFENSES SOUTH OF PHILADELPHIA (LIBRARY OF CONGRESS).

obstructions were placed opposite Fort Mifflin starting in September 1775. Deploying the chevaux de frise required anchors to temporarily hold them in place, while between 15 and 50 tons of ballast (depending on size) was lowered into crib. Chains connected chevaux de frise and secured them against tidal and river current shifting. Tree trunks with their iron tips were then attached to the cribbing (Figure 3).

The spears were more than adequate for penetrating a warship's hull; running against the spears could halt a vessel, several penetrations might sink it. A stopped ship was in danger because the ship was well within cannon range of nearby forts. Lines of chevaux de frise complemented other defensive measures on the Delaware River to protect Philadelphia (Figure 4). Even after the American forces were driven away, the river forts and obstructions continued to block British access to Philadelphia by water.

## BATTLEFIELD ANALYSIS

Understanding the various obstructions and their terrestrial and maritime use provided insights into how the Americans protected their capitol during 1777. Applying modern military analysis to this study included using METT-TC and KOCO. The acronym METT-TC embodies aspects of a particular military organizational scheme including Mission, Enemy forces, Terrain, Troops available, Time and weather, plus, more recently, the Civilian environment. The key element of METT-TC for this study is Terrain, which is further subdivided under the acronym KOCO, to better organize battlefield analysis. Terrain includes Key terrain, Observation and fields of fire, Cover and concealment, Obstacles and Avenues of approach and withdrawal. In the recovered Delaware River example the most important aspects are key terrain, obstacles, and avenues of approach.

Defending Philadelphia was the primary objective for obstructing the Delaware River. A single channel known only to ten local pilots remained free of obstructions to allow “friendly” shipping to pass. Two zones of chevaux de frise ran between Billings Island and Billingsport and from Fort Mifflin and the New Jersey shore. By July 1776, obstacles enhanced the defenses of chevaux de frise defense lines including, “...Gallies, fixed and floating Batteries, Chevaux de Frises, Ships of War, Fire Ships, and Fire Rafts...” (Adams 1776). Some forts, vessels and floating batteries explicitly defended the cheval de frise. Still, the passages not blocked by chevaux de frise were of great concern. Chains, piers, and scuttled ships presented a feasible solution but would not allow friendly forces to pass; floating booms failed to adequately block the channels (Harte 1946:140-141). Though the other obstructions were used, chevaux de frise covered by land based artillery represented the primary means for blocking the Delaware River.

British naval personnel were very aware of the barriers, but before they could remove them, they had to reduce the American forts that covered the obstructions with interlocking fields of fire. This British solution involved capturing the forts, generating a battlefield involving the land-water maritime environment. The Delaware River battlefield was centered on a defensive barrier denying British supply ships use of the river by blocking secondary passages and controlling movement in the primary channel. By the time British ships came upriver and encountered the obstructions, their army already had driven off the main American army. Once they learned they could not run past the obstructions, they moved to reduce the forts protecting the river barriers. After over six weeks of maneuvering, bombardment and assaults, the forts were taken. Without the forts protection, enough obstructions could be removed to allow access to Philadelphia, even if all were not removed. Despite repeated dredging in the 200 years since 1777, some remnants of the obstructions remained.

As can be seen from the map (Figure 4), the low lying river provided almost unlimited observation and outstanding fields of fire for anyone holding key terrain features. The American defenders heavily fortified the few high ground sites along the river as well as islands. The obstructions meant that a British surprise from the water was unlikely. The various water barriers not only denied the British ways around the defenses, but channeled attacking forces into kill zones covered by American artillery.

The American fortifications added cover and, to some extent, concealment from the British. Made of local materials, they blended well into the river banks and were often difficult to see from the water. The obstructions forced any British naval attack under concentrated fire, even if they avoid being impaled on the chevaux de frise. British warships could not effectively fire on the forts because their guns did not have sufficient elevation. A small boat attack was hardly possible without supporting naval gunfire so a river assault was most unlikely. Eventually, the British surrounded the forts, laid siege to each fort in turn, and finally carried most by assault although they allowed the last to surrender with the honors of war.

Americans had to keep their revolt going and to do that, they had to keep their army in the field. Consequently, the primary American mission was deny British supplies access to Philadelphia. While the Americans failed on land, they succeeded on the water, at least temporarily, by denying the British a supply route to their occupying garrison. As can be shown from other examples, notably Saratoga and Yorktown, the British Army could not survive without support from the Royal Navy. On the Delaware River battlefield, the key terrain was held by American troops who were more than willing to put up a very solid resistance. With the advantage conveyed by terrain, they were able to deny water access to Philadelphia for almost two months.

The American troops available were tied to their fortifications but were surprisingly resolute. They were well protected, well-armed and supplied for the long haul. Even in the absence of the main army, they held out in

extremis until their mission was meaningless. Ultimately, the repeated British assaults were successful but to save lives, the Americans were allowed to surrender the last, key fort.

The Americans used time well. Their defense delayed the British and, to some extent, prevented a rapid pursuit of the main army away from Philadelphia. It could be argued that, just as happened the year before, the British opted to go into winter camp in late November. The delayed pursuit after the battles of Brandywine and Germantown was, in part, due to a lack of supplies reaching the field army promptly because ships could not navigate upriver to deliver them until the obstructions were passed.

Referring to terrain is very useful here. The key terrain held by well supplied and protected American defenders were heavily fortified and provided outstanding observation and fields of fire, both over the water, and to a noticeable degree over potential land assault routes as well. The fortifications provided more than adequate protective cover for men and guns. The most important aspect of the American defensive network was the river obstruction system that blocked the only effective British supply route, including this particular cheval de fries discovered and recovered by the Anchor Yacht Club of Bristol, Pennsylvania. The Delaware River was the main highway into Philadelphia for British war material and subsistence supplies that had to last an entire winter. While the British Army eventually got their supplies, there were hard times in the city. The lack of promptly resupplying the army meant that it was hampered in eliminating Washington's Army and basically ending the revolt in 1777.

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# STIRRING THE HORNET'S NEST: RECENT CONFLICT ARCHEOLOGY IN WILKES COUNTY, GEORGIA

Daniel T. Elliott



FIGURE 1 THE BATTLE OF CARR'S FORT, 10 FEBRUARY 1779 (BY SHAUNA FANNIN).

## INTRODUCTION

This research effort established two key landmarks of Wilkes County, Georgia's Revolutionary War legacy—the Kettle Creek battlefield and the battlefield at Captain Robert Carr's patriot militia fort (Figure 1). This area of Wilkes County was in the newly "Ceded Lands" on the Creek and Cherokee frontier. Wilkes County, the Ceded Lands, was a hotbed of patriot sympathies in the American Revolution, so much so that it earned the moniker, "Hornet's Nest". Why was this so?

The Ceded Lands were disputed real estate claimed both by land-hungry Euro-American colonists and Native Americans. In this area the worlds of the Creek, Cherokee, Yuchi, English and Scots-Irish collided. The Ceded Lands were a buffer between hostile Native Americans and the Euro-civilized world. The colonists who settled in this backcountry were little served by the British government. They were left to defend themselves. The newcomers were ranchers, farmers and frontiersmen. Their goal was to keep their families alive in a hostile land. Farmsteads were targeted by coordinated raids and opportunistic raids of Loyalist Indians in 1778 and 1779. These raids were

manipulated by the British Indian agent David Taitt involving the Indians burdened with decades of debt obligations relating to the deerskin trade.

Military resources in the Ceded Lands included forts and fortified farms. Historians Robert Scott Davis, Jr. and Kenneth Thomas (Davis and Thomas 1975; Davis 1983) identified 23 forts in original Wilkes County that dated to the American Revolution era (1774-1783), including: Robert Carr's, Elijah Clarke's, John Dooly's, Benjamin Fulsam's, Heard's, John Hill's/Fort Martin, Hinton's, Kerr's, Robert McNabb's, Joseph Nail's, Solomon Newsome's, Joel Phillips', Zachariah Phillips', Powell's/Childer's, Sherrall's, Stewart's, William White's, Wells'/Drury Rogers' and other unspecified forts. The latter included an unidentified fort at the fork of Long Creek, Kiokee Fort at the mouth of Kiokee Creek, Fort Chatham, Fort James/Thomas Waters' fort (a Loyalist garrison) and a fort near the later site of Lisbon, Georgia (Log or Loggy Fort). Elliott (2009) identified 13 additional Revolutionary War forts in Wilkes County, including: Samuel Alexander's, John Autry's, George Barber's, Daniel Gunnell's, John Heard's, Stephen Heard's/Fort Washington, Knox's, James Little's, Leonard Marbury's, Potts', Williamson's, Cowan's Ferry and Fort Dement. Of the 36 forts, at least 10 experienced hostile action. White's [fortified] House was attacked and his entire family slaughtered in 1773. Sherrall's Fort was attacked by Indians in 1774. McNabb's Fort and Nail's Fort were attacked by Indians in 1778. Carr's Fort was the scene of battle on 10 February 1779 and again attacked in March 1779. It, along with Fulsam's and Wells'/Rogers' Forts, were destroyed by a Loyalist Creek Indian raid led by Taitt. Newsome's Fort also was attacked in that raid but there the Loyalist Creeks were repulsed. Zachariah Phillips' Fort was destroyed in 1780. Hill's Fort was attacked at an unknown date.

The Georgia backcountry was the object of Lieutenant Colonel Archibald Campbell's campaign in early 1779. This same area was again targeted in 1780 when British troops marched into the area and burned its forts and many family farms in retaliation for patriot actions against British-held Augusta. One example includes Carr's Fort. Loyalist occupation of Captain Robert Carr's patriot fort on Beaverdam Creek on 10 February 1779 resulted in a brief siege by Georgia and South Carolina militia. After learning of a larger body of approaching Loyalist recruits, Colonel Andrew Pickens broke off the siege, carried off the Loyalist's horses and supplies and began a chase after Colonel Boyd's forces. The actual casualty figures for the Carr's Fort engagement are quite low, although the importance of the engagement transcends that of a simple skirmish. Great Britain's loss at Carr's Fort helped to temper the flames of Loyalism in the Georgia backcountry.

Ironically, after a 150-mile journey, the patriots caught up with Colonel Boyd's Loyalist recruits at James Hammett's farm on Kettle Creek, barely four miles from the Carr's Fort battlefield. The outnumbered Georgia and South Carolina militia surprised Boyd's Loyalists in a decisive American victory. Colonel Boyd and many of his recruits were killed and the threat that they represented to the patriots largely diffused. The Kettle Creek engagement on 14 February 1779 was a rare patriot victory in Georgia. Colonel Andrew Pickens later wrote to Henry Lee that he considered it to be one of the most important patriot victories in the war.

## METHODS

National Park Service (ABPP) funded battlefield surveys by the LAMAR Institute offered the first tangible evidence of military events in Wilkes County. The Kettle Creek project was funded by a 2007 grant to the City of Washington, Georgia from the Preserve America program. The Carr's Fort project was funded by a 2012 Research Grant to the LAMAR Institute from the American Battlefield Protection Program (ABPP). Additional funding for Revolutionary War battlefield research in Wilkes County was provided by the Plum Creek Foundation, Kettle Creek Battlefield

Association, LAMAR Institute and private donations. The approximate location of the Kettle Creek battle was known but it was rigorously delineated through LAMAR Institute fieldwork in 2008. The location of Carr's Fort battlefield remained a mystery until its discovery in 2013. Both of these battlefield survey projects were fully documented in reports that are available online (Elliott 2007; 2009; 2013; 2014; Elliott and Davis 2014).

Historians reviewed histories of Revolutionary War-era Wilkes County. They identified and examined primary and secondary accounts, which included letters between participating officers and their superiors, both patriot and British, as well as official military records, United States pension application records, personal

recollections and contemporary newspaper accounts. Researchers also reviewed post-war histories for additional details about the battles. One medical text included examples of battle wounds suffered by soldiers at Carr's fort and Kettle Creek and their subsequent treatment by British military surgeons. Researchers also identified the military units, officers, and soldiers involved in battle. This allowed them to establish an "Order of Battle" for the two conflicts. Various archives in Great Britain and North America yielded contemporary maps of the battle environment and other pertinent early maps and aerial photographs. Researchers developed a GIS database for the historic cartographic data and archeological finds.

Field survey methods were patterned after the pioneering work of Doug Scott and his work at the Little Bighorn Battlefield. The Georgia battles were fought in the piedmont, which consists of ancient low hills with highly eroded surfaces. This erosion was exacerbated by more than a century of timber harvest and cotton cultivation. Since the mid-twentieth century this section of Wilkes County has reverted to pine forest, which is intensively managed using mechanized planting and site preparation. Silviculture has further altered the historical landscape in a negative way. Areas not in timber mostly serve as cattle pastures. Almost no acreage in the study area remains in cultivation.

## FINDINGS

Researchers identified eight loci at Kettle Creek that related to the 14 February battle. They used KOCO analysis to reconstruct events during the battle and related these to modern landmarks on the battlefield landscape. Researcher's pinpointed patriot and Loyalist firing positions and the areas of heaviest engagement, as well as avenues of approach and retreat (Figure 2). Three loci were particularly telling—Locus B displayed the heaviest battle evidence and is interpreted as the area where the Loyalist commander Boyd was killed. Locus F, which was

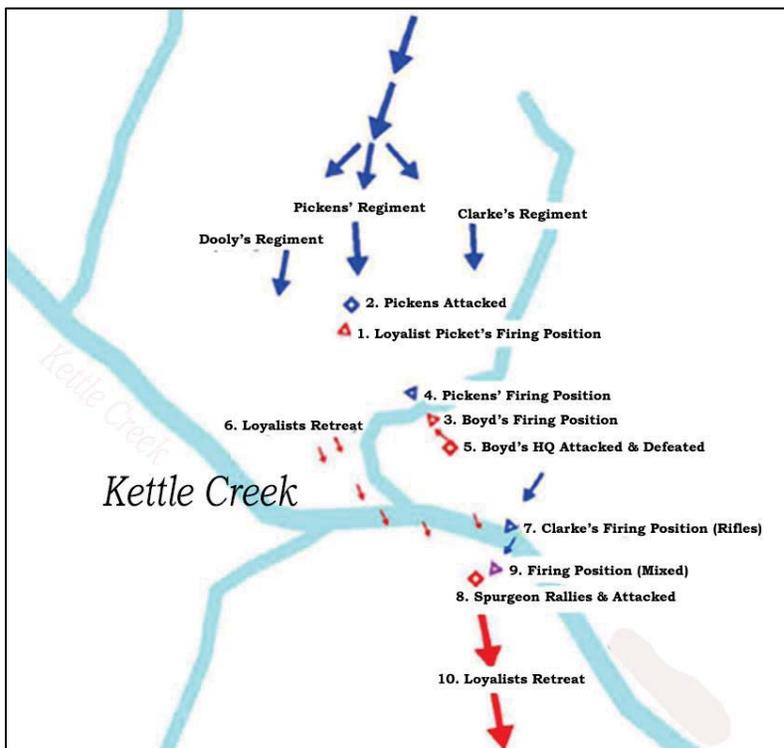


FIGURE 2 BATTLE OF KETTLE CREEK.

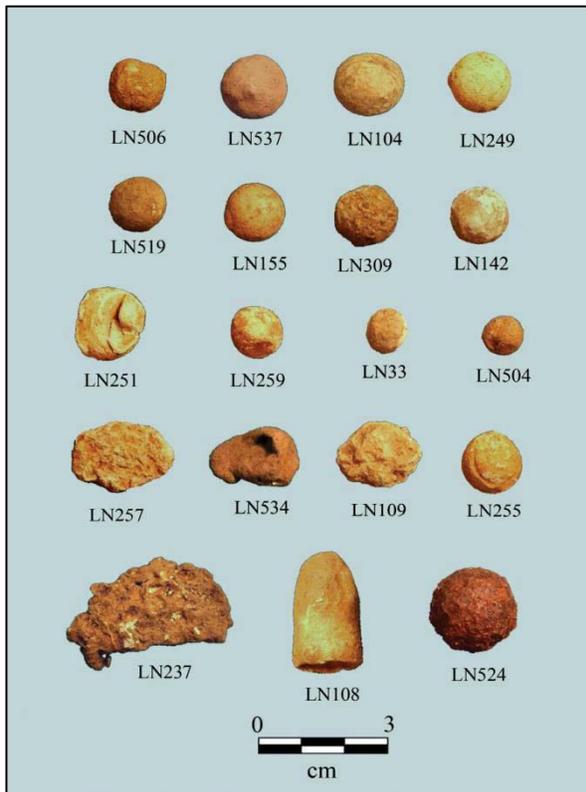


FIGURE 3 LEAD SHOT FROM KETTLE CREEK.

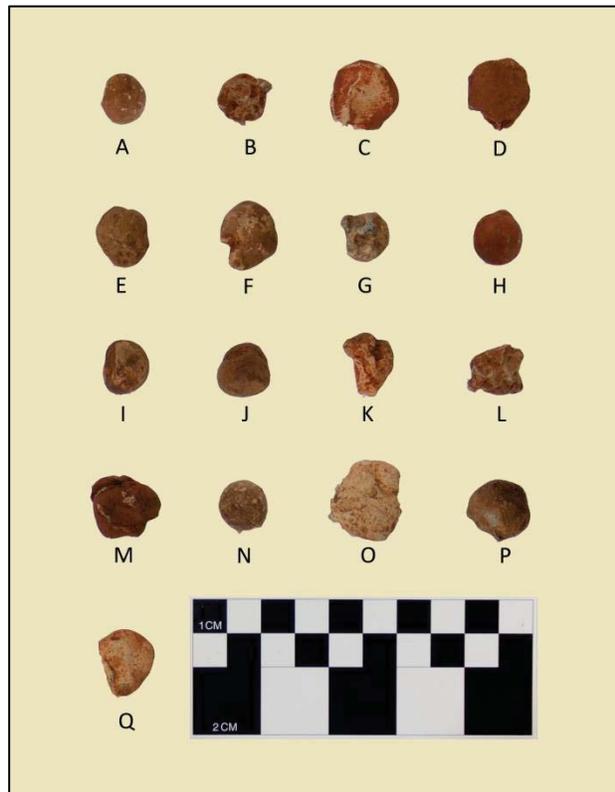


FIGURE 4 LEAD SHOT FROM CARR'S FORT.

on the opposite side of Kettle Creek from Locus B was interpreted as the area where the retreating Loyalists made their last stand. Locus D contained a concentration of rifle balls along an old road trace, which was interpreted as the location where Colonel Andrew Pickens and his South Carolina militia were fired upon by Colonel Boyd's men (Figure 2). The archeological footprint of the battlefield was compared with the various historical accounts of the event. Kettle Creek was largely a cavalry battle and both sides used rifled muskets and other small to medium caliber smoothbore guns (Figure 3). Despite the extreme erosion and intense relic collecting that the battlefield has experienced, the LAMAR Institute's team was able to reconstruct the battlefield. The end result was an improved understanding of the battlefield landscape and a more accurate interpretation of this important Revolutionary War battle.

The search for Carr's Fort was nearly a lost cause. After weeks of careful detective work using historical documents and relentless field survey of over four square miles in 2013, LAMAR Institute researchers achieved archeological delineation of both battlefields. The Carr's Fort battlefield study also resulted in the location of more than a dozen early farmsteads, a blacksmith shop and early road networks that were the cultural landscape surrounding the battlefield. Our survey team was able to locate these resources while searching for Carr's Fort. Typically for archeology, the fort and battle site was not discovered until the last two hours of the last day of our month-long survey project. Consequently, we covered many thousands of acres by metal detector, which allowed the identification of these dwellings sites, early industrial site and abandoned roads. The actual battle site at Carr's Fort was smaller than a football field. The diagnostic battle artifacts at Carr's Fort included dropped and impacted rifle balls and gun parts; and large iron spikes, wrought nails and other artifacts associated with buildings and occupation of Carr's Fort and a nearby dwelling (Figure 4).

## PROJECT SIGNIFICANCE

The tale of the American Revolution in the southern colonies and states remains hazy. This lack of clarity is particularly true for military events that transpired in the backcountry of Georgia and the Carolinas. Wilkes County, Georgia was a remarkably active patriot stronghold but very little primary historical documentation survives to explain the events there. Battle maps are entirely lacking. The number of contemporary maps that depict the cultural landscape is exceedingly rare and lacking in detail. Colonial plats of the Ceded Lands have not been located and post-war plats from the 1780s provide only a few clues about events and places from the war years.

The two battlefield studies done in Wilkes County, Georgia by the LAMAR Institute demonstrate that despite the dearth of primary records and the horrid erosion of the landscape, battlefield features and artifacts survive with relative integrity. With aggressive study, these types of early historic sites can be located and their internal characteristics retain archeological context suitable for their interpretation as early American battlegrounds. Six years ago there were no identified sites in this category known for Wilkes County and now we have two.

The archeological studies spawned additional historic preservation efforts. The Kettle Creek battlefield survey led to the formation of a non-profit organization, the Kettle Creek Battlefield Association (KCBA), whose mission included the acquisition and proper historical interpretation of the battlefield. The KCBA has been quite active in this endeavor. The organization, which is a grass-roots movement that includes many local citizens, provided a sizeable cash donation to the Carr's Fort battlefield survey. The Carr's Fort battlefield survey is in its final stages of completion and a short documentary film has been produced (Jordan 2014). The property owners on whose property the battlefield is located have been notified of their unique historical resources.

## THE FUTURE

These baseline data enable future studies of other early military sites in the Ceded Lands. At least 35 more Revolutionary War forts in Wilkes County remain to be discovered. Other fortifications in original Wilkes County met with violent ends. Attacks on many other forts by Loyalist Creeks and Cherokees resulted in their destruction by burning, although many of these were vacant at the time of the attacks. Other forts were spared destruction and several of these served as garrisons and bivouac sites for patriot troops throughout the period of the American Revolution. The conflict archeology studies of Kettle Creek and Carr's Fort can serve as a model for future studies in Wilkes County.

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# LOCATING THE LOST AMERICAN REVOLUTIONARY BATTLE OF BRIER CREEK, GEORGIA

Daniel Battle

## INTRODUCTION

The Revolutionary War Battle of Brier Creek took place on 3 March 1779, in a rural Georgia location along the banks of the Savannah River. This battle was the final engagement of the Southern Winter Campaign of 1778-79 and the only large open land battle of that campaign. It was an American defeat that resulted in the recapture of Georgia, making her the only Royal Colony officially returned to British Sovereignty during the war. Although the local community has been commemorating the battle for generations, the battle footprint has never been archeologically defined. Furthermore, these commemorations have placed great significance on the lost burial sites of 150 soldiers killed during the engagement. In 2012 Cypress Cultural Consultants was contracted by the City of Sylvania, Georgia, under a grant awarded to them by the Georgia Department of Transportation, to locate both the battleground and the grave sites.

## THE BATTLE OF BRIER CREEK

In December of 1778, Georgia suffered a multi-sided invasion by British forces. General Augustine Prevost invaded from Florida while Lieutenant Colonel Archibald Campbell made a simultaneous amphibious landing at Savannah, Georgia. Although the British also planned for a force of Native Americans to attack along the western borders of the colony, the plans stalled due to the preemptive efforts of patriots along the Georgia frontier. From the north, the British sought to rally backcountry Loyalists to help invade Georgia from South Carolina. The numbers of available Loyalists never rose to the level the British expected again due to preventive patriot activities. The pinnacle of these efforts was the defeat of Loyalists at Kettle Creek, Georgia.

By mid-January 1779, the British Army under the command of Lieutenant Colonel Archibald Campbell pushed into the interior of Georgia with hopes to finally end patriot resistance. Instead, the British found serious opposition mounting in the Georgia interior as well as across the Savannah River in South Carolina. Continental forces under the command of General Benjamin Lincoln were planning the first American military offensive of the Southern Winter Campaign of 1778-79 to recapture Georgia. American forces, consisting of approximately 1,200 to 1,500 men, crossed into Georgia at Augusta, Georgia, and marched south to the mouth of Brier Creek. Preparations were being made for engaging the British forces occupying an outpost at Hudson's Ferry along the Savannah River. Campbell, however, skillfully anticipated this maneuver and had already scouted and mapped the terrain along Brier Creek. Lieutenant Colonel Mark Prevost, replacing Campbell, then proceeded on a bold maneuver to entrap the Americans in a natural pocket of swamps and waterways at the confluence of the Savannah River and Brier Creek by expertly using a combination of intelligence and organizational skills. The strategy employed several small military elements to serve as distractions while simultaneously preventing all communications from entering and leaving the American camp. In order to delay American reinforcements from joining the American camp, demonstrations occurred at military posts well south along the Savannah River leading the Americans to believe that invasions were occurring at those locations. Meanwhile Prevost sent another diversionary force of about 500

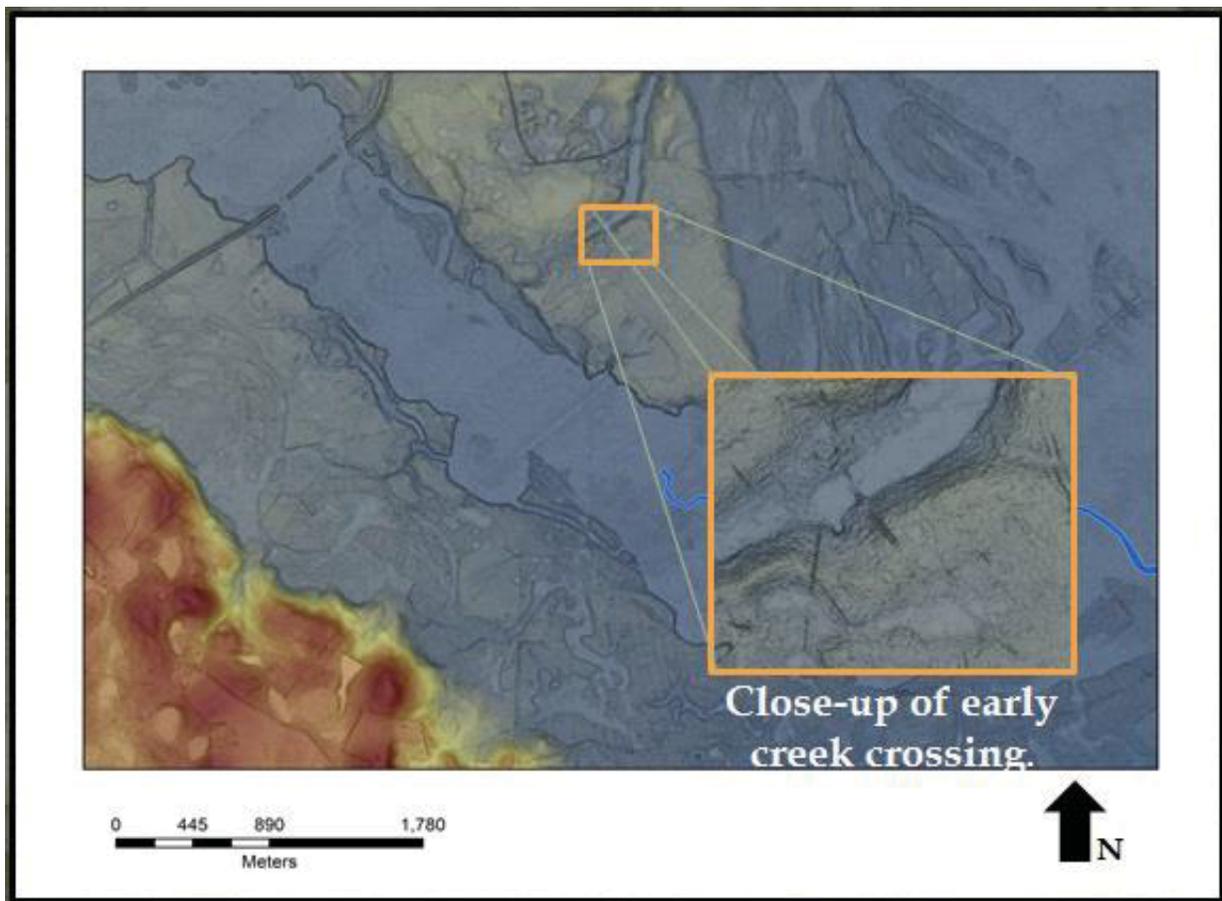
men and cannons to the south of the American camp with orders to attack at about 3:30 p.m. the afternoon of 3 March. The main British attack force of about 1,200 men then executed a forced march of 50 miles around and north of the camp. Within 48 hours he skillfully sealed off the American's rear. The maneuver was so skillfully executed that the Americans did not know of the attack until approximately 15 minutes before the battle commenced. American lines had to be hastily formed while ammunition was handed out to soldiers who had no means to hold their fragile cartridges safely since no cartridge boxes had been issued. Many soldiers stored the cartridges inside their uniforms. As the lines formed, British artillery created havoc in the uneasy American ranks. The Americans attempted to anchor their lines with about 100 Georgia Continental soldiers and militia, however, the British executed a double envelopment to turn the American lines at both flanks. This included a bayonet charge on the American left flank by troops of the British Light Infantry under Captain James "Bloody" Baird. The right flank was assaulted simultaneously by mounted forces, while the British center fixed the Continental forces. Almost all of the Americans, consisting mainly of North Carolina militia, threw down their weapons and ammunition and fled for the surrounding swamps, many without firing a shot. Americans that attempted to surrender were bayoneted by the dozens in one of the worst atrocities seen during the war. An estimated 500 American soldiers were either killed, wounded, or captured (Battle In press; Hutchins 1780; Campbell 1981).

The Battle of Brier Creek devastated the American Continental Army in Georgia. It represented a bitter end to any organized effort to halt the British invasion. The Georgia Continentals never fully recovered. Some historians argue that the revolution was extended by an additional year as a result of the decisive defeat (Moultrie 1802:324).

## POST WAR HISTORY AND STUDY METHODS

The battlefield lay virtually forgotten for many years. In 1938, efforts to create a historical corridor called the Oglethorpe Trail along the old path of the Savannah Augusta River Road were submitted to the National Park Service along with Natchez Trace. Included in the historic sites that would be recognized along the trail was the Brier Creek Battlefield. The Oglethorpe Trail was never implemented, however. In 1976, Georgia, like many other states, assessed the state of its Revolutionary War sites during the Revolutionary War Bicentennial. The success the British had conquering the state tempered the bicentennial fervor that was sweeping the rest of the country. Even though the bloodiest day of battle in the state occurred at the Siege of Savannah and perhaps the most defining battle occurred at Brier Creek, the state instead acquired the site of Fort Morris at Sunbury, Georgia, with hopes that it would serve as the center for interpretation of Georgia's role during the Revolutionary War. A resurgence of interest in the Brier Creek battlefield briefly occurred, however, when the DAR transferred ownership of the site of the Battle of Kettle Creek to Wilkes County in 1979, which resulted in additional consideration of the Brier Creek. Unfortunately, the Georgia Department of Natural Resources (DNR) ultimately concluded that Brier Creek had been such a disaster that little interest would exist for battlefield preservation. Furthermore, due to a decided lack of scholarly research on the battle, the battle was determined not significant.

Despite the DNR's determination, the tract came under their control in the 1970's with the establishment of the Tuckahoe Wildlife Management Area (WMA). Still, the state took no measures whatsoever to protect the area rumored to be the battlefield despite the likely presence of American soldier burials. Recreational and tree farming activities were allowed without any archeological testing or management that would give even minimal protection to the archeological resources. A power line corridor was allowed to be constructed along the edge of the tract in the area many believed to include the battlefield. Eventually an archeological survey was done, but traditional archeological survey techniques were employed and failed to identify any evidence of the battle; a failure similarly experienced at other battlefields. In addition, attempts by interested organizations to gain funding through the



**FIGURE 1 USE OF SLOPE-SHADED LIDAR ALLOWED CLOSE IDENTIFICATION OF TOPOGRAPHIC FEATURES THAT WERE IMPORTANT TO THE BATTLE OF BRIER CREEK.**

American Battlefield Protection Program failed in part due to state ownership, which was viewed as offering some level of protection to the battlefield.

Ultimately, funding was granted to the City of Sylvania to examine the suspected location of the battlefield. Goals included locating the battlefield boundaries and the graves of the 150 soldiers that died during the battle. Intensive archival research was conducted prior to the fieldwork in an effort to understand American and British battle tactics. This included research at British archives in Scotland and England, as well as American archives across the country, and the input of many prominent Revolutionary War historians. Cypress Cultural Consultant's field survey included a metal detector survey. The detecting was guided by aerial LiDAR maps as well as an analysis of primary and secondary accounts of the battle. Cypress Cultural Consultants was one of the first to employ LiDAR mapping on a Georgia battlefield in order to identify key landscape features that may have influenced where battle lines were drawn. The team theorized that natural swamp features and creek tributaries were utilized, which helped narrow the search area. The project represented the first real opportunity in 235 years for historians, archeologists, descendants, and local citizens to fully demonstrate the battle's significance and to push the state of Georgia for protection and preservation of the site and the soldier burials located there.

The field team represented a range of experiences and perspectives. The staff of Cypress Cultural Consultants was assisted by members of the Lamar Institute and the Brier Creek Committee (organized by the City of Sylvania), as well as graduate students from Georgia Southern University. Many of the crew were experienced metal detector users, however, the graduate student's experience was limited to the more traditional forms of archeological survey like shovel testing. The project provided an educational opportunity for the students to learn metal detector survey methods in a real world setting. For instance, the tight schedule required creative and fluid data collection that challenged individuals with little experience in these type situations.

Team members were equipped with identical model metal detectors, the Nautilus DMCIIB, which were set on identical settings determined best for recovering artifacts in the soils at the project site. This allowed for consistent results across the battlefield. Still, the variation in metal detector experience, especially with the students, did provide variation in the quality of coverage. To aid in protecting intact resources, a 'maximum retrieval depth' was established to limit artifact recovery within only the plowzone.

LiDAR proved very useful in revealing detailed surface features not visible on traditional topographic maps, but that probably played an important role in how the battle unfolded (Figure 1). LiDAR mapping information was exhibited in relief maps, showing changes in topography every one meter, color shading to show elevation changes at 1 meter intervals, aerial imaging with reliefs, and slope-shaded imaging maps. LiDAR allowed a well-defined view of key terrain features, one of the first approaches to KOCO analysis. The most successful of these variations, however, were the slope-shaded maps. These maps allowed the crew to identify abandoned road beds, old creek crossings, earthen berms, military trench works, and wet areas that would have been obstacles during the battle. The relative location of natural topographic features correlated to the military formations depicted on an early map of the battlefield and in historic battle accounts. Again the project time schedule precluded detailed analysis of fields of fire, however, the potential for such analysis in the future is high.



**FIGURE 2 FLAGS MARK LOCATION OF A MUSKET BALL CONCENTRATION REPRESENTING A AMMUNITION MANUFACTURING AREA AND POSSIBLY WHERE SOLDIERS WERE ISSUED AMMUNITION PRIOR TO BATTLE.**

The modern landscape posed problems for the surveyors. The project area has been repeatedly subjected to pine planting and cutting. The most recent pine plantings occurred in irregular rows to better mimic natural growth, however, this frustrated efforts to complete systematic survey transects. The undergrowth also was thick and difficult to maneuver. Following several weeks of light reconnaissance metal detector survey by experienced detector operators, the project area was narrowed to an area probably representing the core of the battlefield. Then WMA conducted a burn of part of this area. In addition, Cypress Cultural Consultants hired equipment operators to cut the undergrowth ahead of the detector crew. Despite the irregular pine rows, detectorists were able to identify concentrated target areas where more intensive methods could be used.

Closely spaced transects within small blocks were then searched mainly by the students in areas determined to hold significant military artifacts.

Complete elements of the battlefield were identified during the project including the recovery of nearly 700 artifacts. A fortified homesite surrounded by abatis with military camps was believed to be identified. Also located were the American picket posts that surrounded the American camp and were attacked just prior to the main battle.

These stations were located almost a mile from the battlefield. Despite the intrusion of modern camping, some of the battle lines were identified by lines of dropped musket balls found during metal detecting. In locating encampments, many fragments of cast iron kettles smashed by the British were found and may indicate where camp features are located. An area where the Americans manufactured ammunition was discovered also (Figure 2). In addition, a field of battlefield debris was discovered left by the fleeing Americans. With LiDAR in combination with recovery information, even sparsely tested areas were able to be profiled with other battlefield elements. The field crew also identified search areas where two trained cadaver dogs were employed. Although both dogs agreed on the location of five possible burials, the burials could not be verified due to DNR restrictions.

## FUTURE PRESERVATION OF THE BRIER CREEK BATTLEFIELD

This project will serve as the foundation for all future studies of the battle and will allow the State of Georgia to manage and protect it. Now, Georgia DNR can develop a management plan that will guide them in the protection of the archeological resources in addition to the other resources currently managed by the agency. The patriots that died during the battle can be given the respect due to American soldiers killed in the line of duty. Unlike many other Revolutionary War sites in the state, the Battle of Brier Creek remains relatively in-tact and untouched by development. The people living around the site and historians hope that a portion of the tract may one day become a park that will present Georgia's role in the Revolutionary War. While the battle was lost, the lessons learned by the patriots allowed them to ultimately defeat the British and gain independence (Figure 3). The project also gathered together a significant amount of primary and secondary documents pertaining to the battle that have never been previously examined by historians. The new information will reopen the discussion about the importance of this Georgia battlefield.



FIGURE 3 JEFF TREXLER PAINTING CONTRACTED BY CYPRESS CULTURAL CONSULTANTS BASED ON THEIR BATTLEFIELD RESEARCH. PLANS ARE UNDERWAY TO HANG THE PAINTING AT THE GEORGIA CAPITAL.

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# REVOLUTIONARY SAVANNAH OR JUST ANOTHER GHOST TOUR?

Rita Folse Elliott

## INTRODUCTION

Sunburned and catatonic tourists, hotels, aromas from local restaurants, a dispersed college campus, briskly walking tennis shoe-clad businesswomen, fleets of trolleys, bicyclists, behemoth motor coaches. . . welcome to Savannah, Georgia. Boasting the largest National Historic Landmark District in the United States, the historic area is quilted together by 22 public “squares” or parks. Virtually nothing is visible, however, of young Savannah born on the 1733 frontier and coming of age in a horrific siege and battle during the American Revolution. Not until the advent of the 21<sup>st</sup> century was Revolutionary Savannah found and limited efforts made to recognize its presence in the middle of what is now a very urban landscape.

Remove this urban landscape and shrink Savannah to its original footprint along the Savannah River bluff to envision the town on the dawn of 9 October 1779. The morning follows several weeks of French and American artillery bombardment of the small, but important Southern port city. During these weeks terrified civilians cowered and British forces under Major General Augustin Prevost garrisoned the town. This dawn explodes into a titanic battle across the landscape of fields and swamps surrounding the city. A polyglot of French, Polish, Haitian, African, Native American, Scottish, and Irish dialects among the 8-12,000 multi-national troops fills the air. This discord is punctuated by the deafening roar of cannon and musket fire, creating a blinding curtain of smoke and haze. In less than one hour, approximately 800 troops have been killed or wounded in some of the fiercest fighting in the American Revolution. The overwhelming British victory leaves Britain in control of Savannah and results in a disproportionate loss of 50 British contrasted to 750 American and allied casualties. This decisive allied Franco-American defeat reinvigorates Loyalists and allows Great Britain access to Charleston, straining the French and American alliance and ultimately changing the course of the southern theater of the American Revolution.

## HOW WAS SUCH A MONUMENTAL BATTLEFIELD LOST? HOW WAS IT FOUND?

In 2005, Coastal Heritage Society (CHS) was well underway in landscaping a city block known as Battlefield Park, purported location of the Spring Hill Redoubt, the focal point of the intensive battle. Archeologists convinced administrators to allow a three-week window of archeological investigation prior to construction of a redoubt replica (one of 14 earthen “mini-forts” that surrounded British-held Savannah). During the third and final week of fieldwork archeologists discovered an intact section of two Revolutionary War fortification ditches, which contained palisade post stains, lead musket balls, a brass gun barrel strap from a Charleville pistol, and a lead-wrapped gunflint from a large wall-mounted gun, all directly associated with the Battle of Savannah.

More than 50 years after the Battle of Savannah, the Central of Georgia Railroad leveled much of Spring Hill for its extensive complex. Many people were convinced that this massive ground disturbance destroyed all evidence of the battle, particularly the portion at the Spring Hill Redoubt. Archeological excavation revealed that remnants of

the battlefield survived; even in heavily impacted areas such as this. The logical conclusion was that if the Spring Hill Redoubt survived, what else has? Could archeologists use the Spring Hill Redoubt as the “Rosetta Stone” to align it using geographic information systems (GIS) on historic and modern maps in order to discover other parts of the battlefield?

This was an exciting premise and archeologists submitted a grant proposal to the National Park Service American Battlefield Protection Program (ABPP) in 2007 and a follow-up proposal in 2009 upon the successful completion of the first project. These two ABPP projects were done through CHS in partnership with The LAMAR Institute. Neither project, nor their far-reaching results, would have been conducted without the support of the ABPP. The limited local and private funds already raised were being applied towards making the Spring Hill site a public interpretive park.

Archeologists began the ABPP projects with the collection of thousands of pages of historical documents and maps. Then they used GIS and KOCO analysis to place the battlefield features on the modern landscape. Of the 65 maps examined, one-third provided useful GIS information. This included tentative locations of redoubts, defensive ditches, abatis, French saps, American Major General Benjamin Lincoln’s headquarters, and American and French camps when overlaid on modern maps. Archeologists used this information to target eight areas of downtown Savannah to investigate in 2007-2008 and an additional nine areas during 2009-2010 (Figure 1). One such area was the Spring Hill Redoubt. The redoubt location made no sense until one realized, through KOCO analysis, that there existed both a spring and a hill there in 1779, where it is now flat and dry. Why were the attacking French and American forces slaughtered to the south and west of Spring Hill Redoubt? Troops mired in swamps in this area were slow targets for artillery fire from the fortifications.

## WHAT DID ARCHEOLOGISTS DISCOVER?

Archeologists used a combination of shovel testing, controlled metal detector survey, ground penetrating radar, and test unit excavation at these 17 target areas to search for evidence of the battle (Figure 2). They discovered a major defensive ditch bordering the central redoubts, the scene of the other focal point of the battle. Archeologists uncovered a six-foot deep section of the defensive ditch in what is now Madison Square. Thousands of tourists and residents walk across this green-space daily, without realizing what is beneath their feet.

In September 1779, British troops, local Loyalist militia, free and enslaved African Americans all frantically dug this immense ditch connecting the two central redoubts to neighboring redoubts to the east and west. British troops occupied these defenses during the initial battle thrust on October 9, which was a feint on the Central Redoubts. The unsuccessful feint was an attempt to divert attention from the attack at Spring Hill Redoubt. The West Central Redoubt ditch contained gunflints, gun parts, and lead balls from the Battle of Savannah. Archeologists estimate that the ditch originally measured more than 13 feet wide and over 5.5 feet deep.

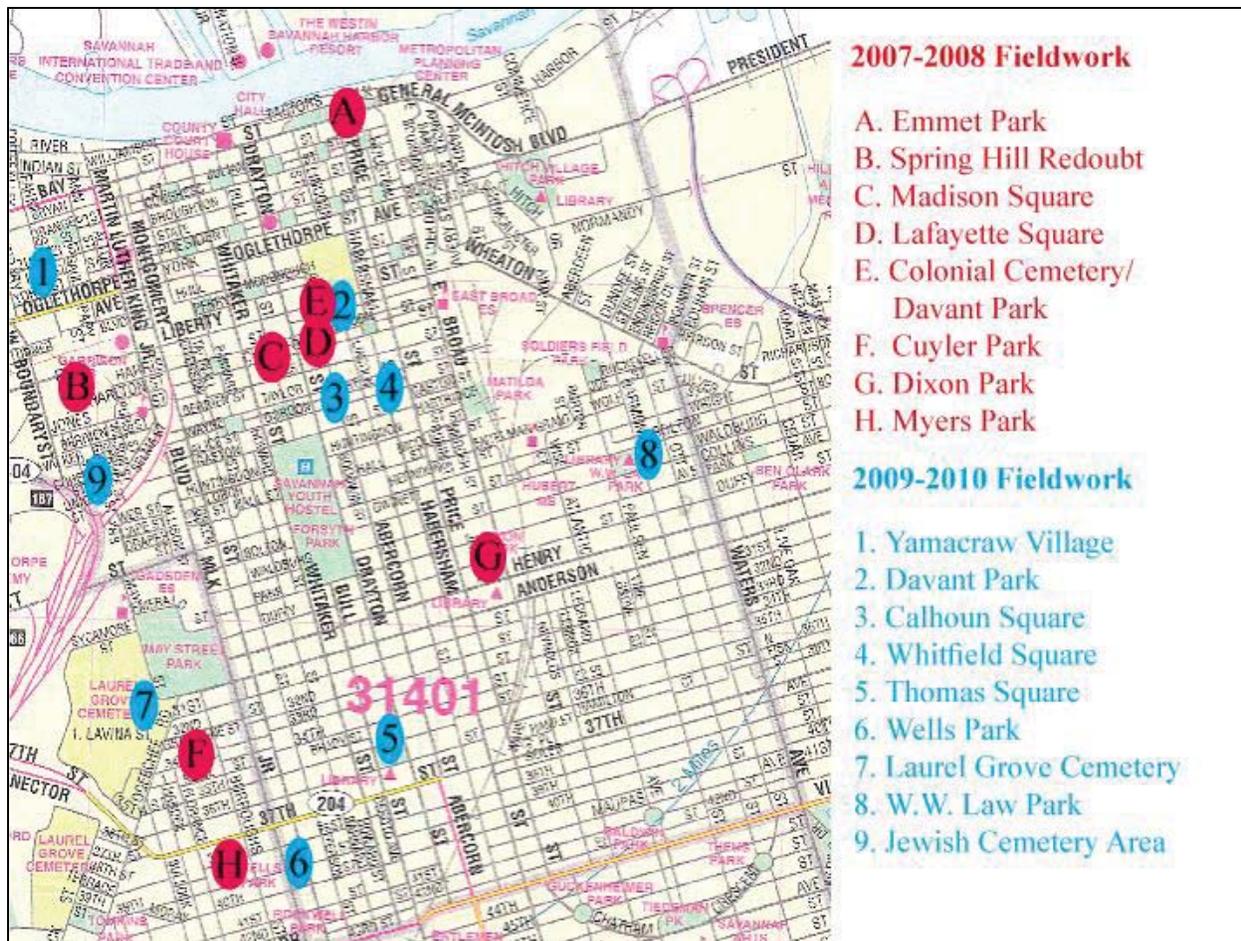


FIGURE 1 POTENTIAL LOCATIONS OF BATTLEFIELD FEATURES SUPERIMPOSED ON MODERN MAP OF SAVANNAH, GEORGIA.

Another fascinating part of the battlefield story came to light during the projects. The French and American battle plan of 9 October 1779 stationed Haitian troops at the Jewish Cemetery, 400 yards south of Spring Hill Redoubt. These reserve troops would cover an allied retreat if necessary. The cemetery offered relatively high ground and a view of the battle.

Archeologists examined this area and found damage from school construction. Additionally, the razing of a factory and neighborhood created thick deposits of modern debris masking anything below. Archeologists interviewed two local relic collectors who generously shared their information about the area. Their collections included Revolutionary War artifacts they found during construction of the school's playground. Unfortunately, the lack of archeological ordinances in historic Savannah allowed the school and playground to be constructed with no archeological investigation first. The construction destroyed an untold portion of this important part of the Battle of Savannah. The collector information, including a sketch map of the area was helpful in salvaging residual information from the battlefield.

The number of artifacts from the Jewish Cemetery area suggests that more intensive battle activity occurred here than indicated by historical documents. It illustrates that the Haitian forces likely provided intensive cover fire for retreating allies. This significant role of free black Haitians in the American Revolution is yet to be fully recognized. It also suggests archeological potential for undisturbed areas surrounding the school.



FIGURE 2 ARCHEOLOGISTS USING GROUND PENETRATING RADAR.

## WHY SHOULD ANYONE CARE?

Over 3,000 residents and tourists visited the Madison Square excavations in two weeks, but the attraction was not merely the allure of archeology. It was the appeal of connecting to the past in a real and tangible way; standing on the battlefield, seeing the fortifications uncovered, touching the weapons last used during the colossal struggle in the birth of a free nation. This authenticity is the engagement the public seeks (Figure 3). Most students are required to commit basic historic facts to memory. Such mindless generic facts such as George Washington led American troops to victory in the American Revolution; the war ended in 1783 with

the Treaty of Paris; and the French Revolution began in 1789 are staples of American education. These facts are not engaging. They are not even connected. Battlefield archeology connects the dots. Haitians in the Volunteer Chasseurs of San Domingo represented the first free black regiment in the French army. These Haitian troops fighting at the Battle of Savannah returned to Haiti and later revolted, creating the first Caribbean island to successfully free itself from European domination. Admiral Henri d'Estaing, armed with 22 war ships and leader of the French forces at Savannah returned to France, later losing his head to the guillotine in the French Revolution. Numbers of Hessian soldiers fighting for Britain in the Battle of Savannah left their German regiments for a new life in the Georgia countryside, finding refuge in German speaking villages such as New Ebenezer, Bethany, Abercorn, and Vernonburg. Polish General Count Casimir Pulaski, father of the American cavalry, was mortally wounded in the Battle of Savannah, putting the future of the cavalry in jeopardy. African Americans played a huge, yet relatively unacknowledged role on both sides of the American Revolution. Enslaved and free, they undertook manual labor in the construction of Savannah's earthworks and fortifications, in addition to handling horses, wagons, and troop supplies. They worked in the military's Volunteer Negroes and Black Pioneers units and also served as seamen. Many black Loyalists fled Georgia and other states for Canada and the Bahamas along with British troops at the close of the revolution. These are integrated facts brought to life through archeology. Clearly, battlefield archeology provides substance and context to formerly mundane trivia. Battlefield archeology connects the public to the past in a unique way.

## HOW DOES THE DISCOVERY OF THE BATTLE OF SAVANNAH CONTRIBUTE TO PRESERVING OUR HISTORY?

The Battle of Savannah projects uncovered and documented real locations on the ground of pivotal historical events and made this information available to the public. Coastal Heritage Society's work to establish Battlefield Park included construction of a berm marking the actual location of Spring Hill Redoubt – the impetus for the two ABPP projects. Archeologists found the locations of other important portions of the battlefield, including the West Central Redoubt in Madison Square and the Jewish Cemetery Reserve Troops site. The ABPP projects uncovered a rich level of detail about not only the battle, but about the context surrounding it and those involved. This fascinating information continues to be shared with the public through two project reports available free online,



FIGURE 3 THE PUBLIC VIEWING THE EXCAVATIONS AT MADISON SQUARE.

public presentations, interpretive signage at Battlefield Park, a curriculum, updates to exhibits in the Savannah History Museum, two mobile phone apps developed by Armstrong Atlantic State University Anthropology instructors and students, and periodic tours, such as a Field Studies tour for the National Trust for Historic Preservation 2014 Conference in Savannah. Battlefield archeology has been the catalyst for these connections to our shared past.

The Battle of Savannah continues, however, as there are still *no ordinances protecting the battlefield or any archeological sites in Savannah and Chatham County*. Hotels, condos, and other construction continue to take permanent bites out of the

battlefield and other archeological sites. This construction destroys forever our tangible connection to the past and our ability to uncover new information about it, reducing both the educational and economic/heritage tourism opportunities for us all. Will Savannah and America be relegated solely to fictitious “Any City U.S.A” ghost tours when there are no more surviving battlefields and other archeological sites providing a true connection to the past? Or do we choose preservation?

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# THE SEARCH FOR WILLIAMSON'S PLANTATION BATTLEFIELD

Michael C. Scoggins and Steven D. Smith

## INTRODUCTION

On 12 July 1780, a small but important battle was fought between American Whig or patriot militiamen and British Provincial troops at James Williamson's Plantation in York County, South Carolina. This battle was the first patriot victory over British regular troops after the British army and navy captured Charleston, South Carolina, two months earlier. It proved to be a tremendous morale booster for the American revolutionary cause in the Carolina upcountry or "backcountry" at a time when the war in the South seemed doomed to failure. Subsequently known as the Battle of Williamson's Plantation, or "Huck's Defeat" after the British commander killed in the battle, this incident was the first in a series of significant engagements fought and won by the Carolina backcountry militia during the summer and fall of 1780. Huck's Defeat is a classic example of the late Revolutionary War in the Carolinas, in that the battle pitted nonprofessional militiamen from the South Carolina backcountry, operating as irregular partisans with no government support, against professional uniformed troops of the British Provincial Corps, who were commanded by experienced British officers and were trained, equipped and paid to the same standards as regular British troops from the United Kingdom and Ireland. In fact, Huck's Defeat was the first of many such battles in the Carolina backcountry during late 1780 and early 1781, which pitted the local Whig partisan militia against professional troops of the British regular army, the British Provincial Corps, and Crown-supported Loyalist or "Tory" militia. Celebrated in the 19<sup>th</sup> century by local veterans, by the mid-twentieth century the exact location of this important and archetypal battle had been lost.

Historical records implied that the battle occurred in the vicinity of another plantation home, that of William Bratton (1740-1815), which is still standing at the modern site known as Historic Brattonsville in York County. Historic Brattonsville is an 825-acre living history center administered by the York County Culture and Heritage Museums (CHM). Besides the original Bratton log house, constructed circa 1766, this site includes numerous original and reconstructed buildings from the 19<sup>th</sup> and 20<sup>th</sup> centuries. CHM staff believed that the battlefield would be an invaluable contribution to Brattonsville's interpretive programs on backcountry history and culture if it could be conclusively identified. Between 2006 and 2012 the Culture & Heritage Museums and the South Carolina Institute for Archaeology and Anthropology conducted extensive historical research and archeological field surveys that successfully located the site of the Battle of Williamson's Plantation. The archeological and historical research was supported in part by two grants from the National Park Service's ABPP in 2009 and 2011. This article presents an overview of the original historical and archeological research that resulted in the discovery of this long-lost and significant turning point of the American Revolution.

## HUCK'S DEFEAT

After the fall of Charleston on 12 May 1780, British forces immediately marched into the Carolina backcountry, securing towns and villages in an effort to completely subdue the rebellion in the South. As part of this pacification

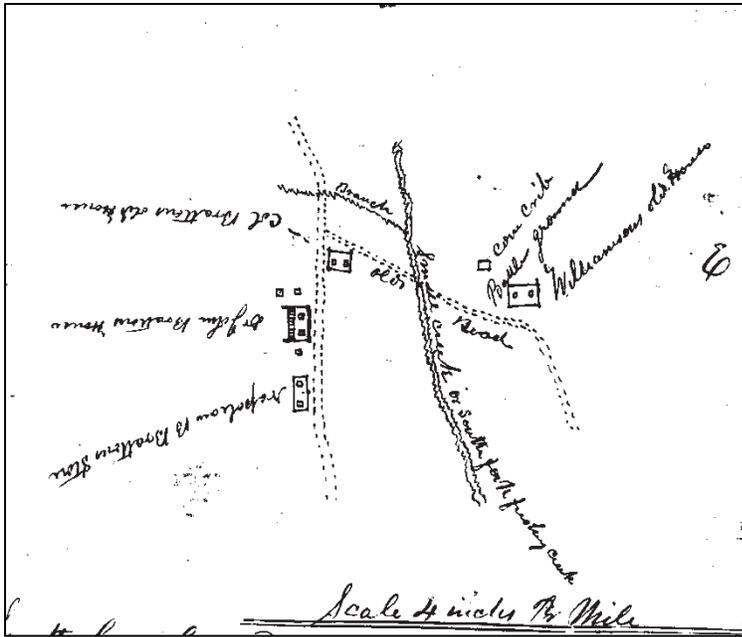
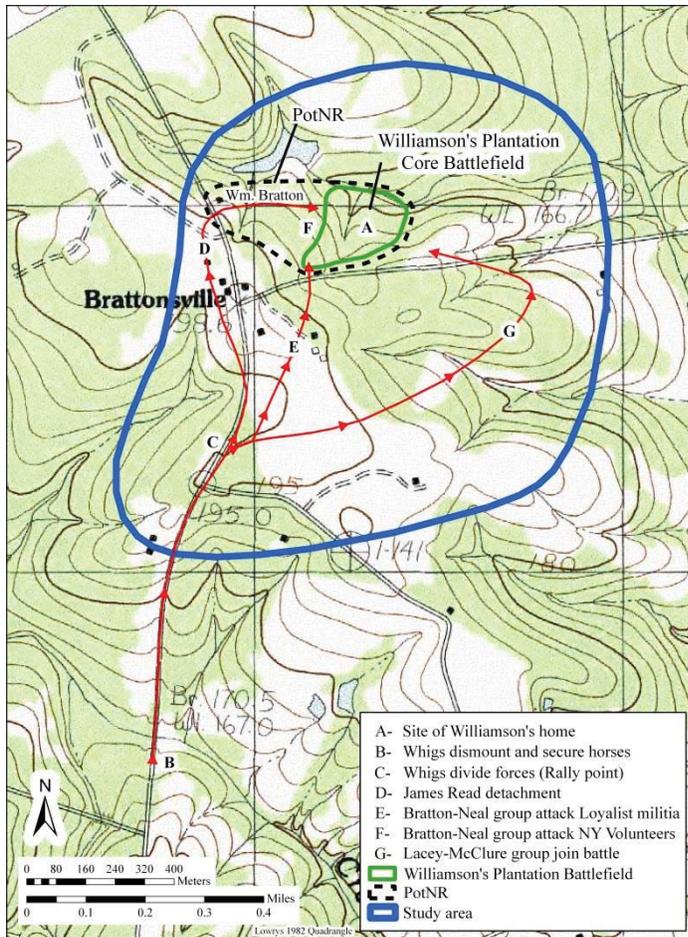


FIGURE 1 WILLIAMSON'S PLANTATION BATTLEFIELD DRAWN BY DANIEL G. STINSON, MARCH 1876, (COURTESY WISCONSIN HISTORICAL SOCIETY).

effort, detachments of British Provincial troops and Tory militia sought out known rebel leaders in the Broad and Catawba River valleys of the South Carolina Piedmont. This area had been heavily settled during the colonial period by Scotch-Irish Presbyterians from the north of Ireland who were openly hostile to the British Crown and Church. On 11 July 1780, Captain Christian Huck and his command of 35 British Legion dragoons or cavalry, 20 New York Volunteer infantry, and 50 Tory militia arrived at the plantation home of Colonel William Bratton, located along the South Fork of Fishing Creek in modern day York County, South Carolina. Bratton was a commander of local Whig militia and had been a leading supporter of the revolutionary cause since 1775. Huck's orders were to capture or kill Bratton and

other rebel leaders and put an end to the resistance in the upper districts between the Broad and Catawba Rivers. Huck arrived late in the day only to find that Bratton was not home. After unsuccessfully interrogating Bratton's wife Martha, Huck and his force moved to the nearby plantation of James Williamson and camped for the night. At dawn on the morning of 12 July, a battalion of approximately 140 Whig militiamen under the combined command of William Bratton, Andrew Neel, Edward Lacey and John McClure, surprised the British in a daring daybreak attack. A short, sharp battle ensued, during which the Whigs killed 30 Crown troops and captured another 50, many of whom were also wounded. Among the British officers killed in the action were Captain Christian Huck of the British Legion and Colonel James Ferguson of the Loyalist militia. The Whigs lost only one man.

Historical documents indicate that the James Williamson family settled 300 acres on the South Fork of Fishing Creek in 1766, about the same time as the Brattons. At the time of the Battle of Huck's Defeat in 1780, Williamson's plantation included a two-story log house, a corn crib, and a stable or barn, as well as several fruit tree orchards and several fields of oats and wheat, located on the southern end of the property. Accounts of the battle indicate that the action began several hundred yards south or southeast of the Williamson home and moved in a northwest direction, with the final phase of the battle taking place around the Williamson house as Whig militiamen engaged mounted troops of the British Legion cavalry. Casualties from the battle (including Captain Huck) were buried on site in an unknown number of graves, possibly on the southern end of the property. In 1787 James Williamson's son Samuel sold the lower 140 acres of the original Williamson tract, including the old home place and the battlefield, to his neighbor Colonel William Bratton, who commanded some of the troops in the battle. Bratton apparently dismantled or moved the buildings and used the materials to build structures near his own plantation house, following which the battlefield area was converted to agricultural uses. Despite local interest in the battle (including a celebration on 12 July 1839 that drew some 1,500 people to the site), years of intensive cotton farming in the nineteenth and twentieth centuries significantly altered the landscape, erasing many of the features that would help identify the battle. To find the battle site today, historical research, landscape analysis, and archeology were all necessary (Figure 1).



**FIGURE 2 AVENUES OF APPROACH OF AMERICANS AT WILLIAMSON'S PLANTATION BATTLEFIELD.**

located on the grid using a GPS instrument with antenna, providing a location within less than 50 centimeters of the exact location.

Once the battlefield was located, archeologists returned on several occasions at different seasons providing an intensive effort to recover artifacts related to the plantation and battle site. These efforts included resistivity, shovel testing, and 1 x 1 and 1 x 2 meter excavation units. Ultimately, we were able to precisely define the battlefield's core area, and through the recovery and plotting of 18<sup>th</sup> century nails, reveal the location of the plantation house. After defining the core area, historians and archeologists were able to step back to a broader picture of the region and conduct a KOCO analysis that determined the Americans' avenues of approach during the battle. Thus, KOCO analysis can work from a broad landscape perspective to narrow down the battlefield, but it can also work from the core battle location back out to the initial staging areas and avenues of approach.

Plantation maps, battle descriptions, and metal detecting ultimately revealed the unfolding of the battle (Figure 2). Early in the morning of 12 July, while the British Provincials were camped around Williamson's Plantation, mixed detachments of American militiamen rendezvoused about 1.5 miles south of the Williamson house. They detached a small number of men under militia captain James Read to swing wide to the west of the house, with the intent to cover the expected British retreat route toward the main local road. This maneuver would have these men pass by the Bratton house and down the lane eastward toward Williamson's. The rest of the Americans marched directly

The key to narrowing down the location of the battle was the still standing Bratton house in combination with a series of maps drawn by historians and descendants of William Bratton (Figure 1). These maps indicated that Williamson's home was some 300 yards east of the Bratton house at the end of "Williamson's Lane", a short road connecting the Williamson site to a heavily traveled colonial road west of the Brattons. A fresh-water spring was located nearby, emptying into a branch of the South Fork about 100 yards to the north. With this information, archeologists began their search for the battlefield using metal detectors. Because the original search area had experienced significant hardwood reforestation after the 1940s, systematic survey was problematic. Nevertheless, once battle related artifacts, primarily in the form of lead shot, were discovered, the woods were then cleared of underbrush and a block survey was implemented. This method consists of setting up blocks of landscape, within which metal detector operators sweep adjacent lanes until the entire block is covered. The operators then resweep the block walking perpendicular to the original lanes. Once discovered, each artifact is numbered with a unique location number, flagged, bagged, and

toward the Williamson house, until they got to a small hollow where they again divided into two groups, one marching straight toward Williamson's and another swinging far east to flank the British. The American detachment attacking directly north toward the British first encountered the Loyalist or Tory militia, who either surrendered or scattered to the surrounding woods after the Whigs fired several volleys. The Whigs then attacked the New York Volunteers, who were camped along Williamson's Lane between the lane fence and the Williamson log house. The fence hindered the New York infantry but also presented an obstacle to the Whigs. The Americans overpowered the Volunteers without much resistance and pushed on to the British Legion dragoons or cavalry, who were camped around the plantation house. Flanked on three sides, the Legion also quickly broke and some of the officers attempted to escape to the north and west. Captain Huck was killed as he tried to break out of the trap and reach the main road near Bratton's. The commander of the New York Volunteers, Lieutenant William Adamson, was mortally wounded as he also attempted to escape on horseback. After seeing their senior officers go down, the Provincial troops quickly surrendered.

## WILLIAMSON'S PLANTATION TODAY

After the discovery of the battlefield, the battle site has gone from a briar-filled hardwood forest outside the core Brattonsville interpretive area to an integral part of the site's interpretive history. Upon arrival at the historic site, visitors can now view an original video documentary on the Battle of Huck's Defeat, artifacts recovered by archeologists at Williamson's plantation, and original artwork depicting important scenes from the battle. A state-of-the-art gravel-paved interpretive trail leads down to the battlefield and loops around sites of the British military camps and the Williamson log house. Along the path are interpretive panels that incorporate the original artwork and explain the battle and its context within backcountry history. At the core battlefield a life-sized shadow structure outlines Williamson's plantation house against the forest landscape. The Battle of Williamson's Plantation, or Huck's Defeat, is no longer an undiscovered battlefield; it is now one of the premiere historical sites and restored Revolutionary War battlefields in the southeastern United States.

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# A CLOSER LOOK AT THE BATTLE OF PALO ALTO: HISTORIC BACKGROUND

Rolando L. Garza

## INTRODUCTION

On the afternoon of 8 May 1846 Mexican forces, under the command of General Mariano Arista, intercepted U.S. forces, under the command of General Zachary Taylor, at a place on the broad coastal prairie known as Palo Alto. Taylor, with about 2,300 troops and 270 wagons filled with supplies just secured from the coast, was headed to relieve the besieged earthen fortification his troops had recently constructed on the banks of the Rio Grande opposite the city of Matamoros, Mexico. Arista, intent on preventing the main body of U.S. forces from reaching the fort that had been under fire since 3 May, spread his 3,200 man force across the open prairie. The U.S. forces, with the newly developed corps of “Flying” artillery and the two 18 pound (pdr) cannons

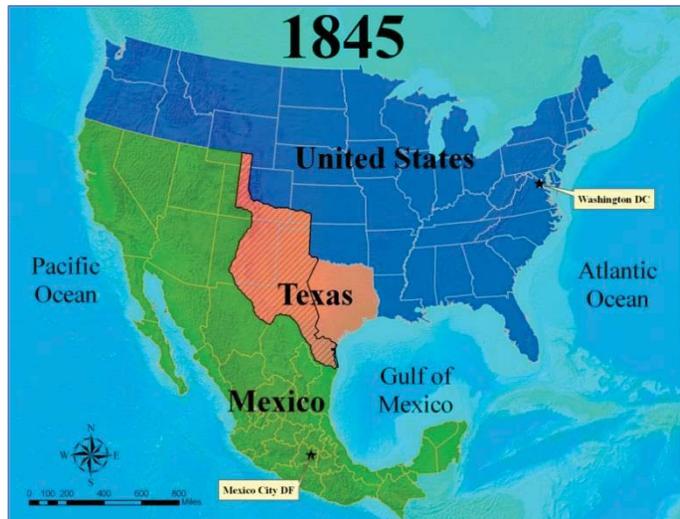


FIGURE 1 MAP DEPICTING TEXAS AND THE DISPUTED TERRITORY.

intended for the fort, carried the day by repulsing the Mexican cavalry flanking maneuvers and preventing a full out Mexican infantry charge. At dusk both armies ceased firing their weapons with neither side surrendering the field. While both sides suffered losses, the Mexican forces fared far worse.

The Battle of Palo Alto, which was the first battle of the U.S.-Mexican War, was essentially the result of the two young republics’ conflicting claims to the Texas territory. Both New Spain and the Republic of Mexico had drawn the southern boundary of the Texas province along the Rio Nueces (Figure 1). In 1836 the people of Texas, Mexican citizens mostly of American origin, rebelled against the central government of Mexico. On 21 April 1836 the Texas Army, under the command of General Samuel Houston, defeated the Mexican Army sent to squelch the rebellion at the Battle of San Jacinto, capturing the Mexican Commander and President, General Antonio Lopez de Santa Ana. In order to secure his release Santa Ana signed the Treaty of Velasco, establishing the Republic of Texas with the Rio Grande as its southern boundary (Eisenhower 1990:13-14).

Because the Treaty of Velasco was signed under duress and not ratified by the Mexican Congress, Mexico never acknowledged the sovereignty of Texas. However, Mexico could do little to force Texas back under the Mexican flag during the subsequent nine years. In the summer of 1845 the citizens of Texas voted to be annexed as a state of the United States of America, with President James K. Polk guaranteeing the Rio Grande as the new state’s southern boundary. The political climate in Mexico might have allowed Mexican President Jose Herrera to peacefully cede the territory that Mexico considered to be the province of Texas, but by no means would the

people of Mexico consider giving away the large expanse of Mexican territory that Texas had claimed (Singletary 1960:8-10).

President Polk ordered General Zachary Taylor to lead U.S. forces into the Texas territory with the intent of pressuring Mexico to the negotiating table. By October Taylor had amassed a force of about 4,000 troops, nearly half of the country's standing army, near the mouth of the Nueces River. This show of force, however, did not have the effect that Polk had intended. In December President Herrera, despite his refusal to receive a U.S. envoy, was overthrown by a political faction led by General Mariano Paredes, who vowed to keep the boundary between the United States and Mexico at the Sabine River, the current boundary between Texas and Louisiana (Bauer 1974:32; Singletary 1960:10-11).

In January 1846 President Polk ordered Taylor to advance his force and occupy positions on or near the east banks of the Rio Grande. Taylor chose to occupy the lands across the Rio Grande from the thriving international port of Matamoros where he could be supplied directly from New Orleans and have the protection of naval boats in the Gulf of Mexico. Taylor's army arrived at their destination by the end of March. Upon arrival, Taylor took a detachment of the 2<sup>nd</sup> Dragoons to set up a base camp, Fort Polk, on the coast at the small fishing village of El Fronton del Santa Isabela. Taylor then took the main body of his force to the banks of the Rio Grande opposite of Matamoros, where they designed and constructed a six-pointed, star-shaped earthen fortification. Throughout the month of April U.S. troops labored intensely on the construction of the fort (Eisenhower 1990:48-54).

Meanwhile Mexico had begun amassing troops in Matamoros under the command General Pedro de Ampudia to form the Army of the North. Mexican troops also worked vigorously to strengthen the fortifications of the city. This included constructing new artillery batteries along the river targeting the U.S. fort. On 24 April General Mariano Arista arrived in Matamoros to assume command of the Army of the North. Arista immediately informed Taylor that hostilities had officially commenced. Arista also ordered General Anastacio Torrejon and 1,600 lancers (cavalry) to cross the Rio Grande at a location about 15 miles upriver of Matamoros. On 25 April, Torrejon's force overtook a scouting party of U.S. dragoons under the command of Captain Seth Thornton at el Rancho de Carricitos, some 20 miles upriver from Matamoros. The U.S. suffered 11 killed, 6 wounded, and 46 captured, including Thornton. Hostilities had definitely commenced (Eisenhower 1990: 65; NPS 1980: 13-15).

On 1 May Taylor took the majority of his troops to Fort Polk to bring back supplies necessary to withstand a drawn-out siege. He left 500 men under the command of Major Jacob Brown to complete the construction of the fort and hold it until his return. At daybreak on 3 May Mexican artillery began shelling the fort from their positions in Matamoros. Taylor could hear the far off cannon fire from Fort Polk and knew he had to hasten his return. On the afternoon of 7 May, Taylor left for the besieged fort with his two brigades encumbered by a massive 270 wagon supply train and a pair of 18-pounder siege cannon drawn by oxen. Taylor's force only made it seven miles before they stopped for the night. They resumed their march before sunrise on 8 May 8 (Haecker 1994:22).

## The Battle of Palo Alto

On the morning of 8 May, General Arista learned that Taylor was already in route for the U.S. fort. Arista, who had removed his army from Palo Alto days before for a better water supply at los Tanques de Ramireno, was forced to rush his troops back to Palo Alto to intercept the American army on the open prairie. Arista also sent orders to Ampudia, whom he had sent in command of several units to join the siege effort when he moved his troops to the tanques, to rejoin him immediately at Palo Alto. By mid-morning, Torrejon's regiment of cavalry was the first to

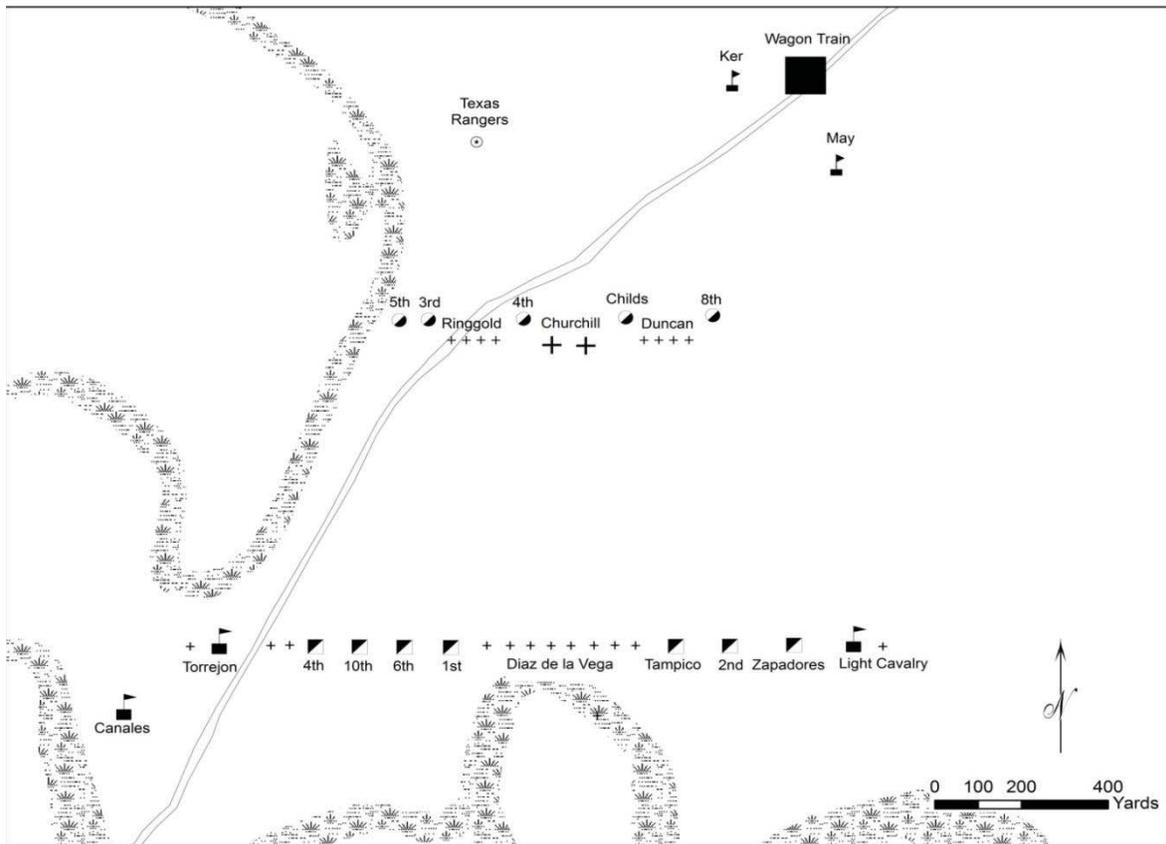


FIGURE 2 DEPLOYMENT OF MEXICAN AND AMERICAN TROOPS AT THE BEGINNING OF THE BATTLE OF PALO ALTO.

arrive at Palo Alto. Torrejon's regiment took position on the west side of the road (Figure 2). Arista directed the Mexican forces into their battle positions as they arrived on the prairie. Ampudia's forces began to arrive at Palo Alto over four hours after the initial Mexican forces had taken their positions. The Mexican line of battle, now complete, was comprised of the following units from west to east: Torrejon's regiment of cavalry holding the western flank; Ampudia's four artillery pieces and 4<sup>th</sup> Infantry; 10<sup>th</sup> Infantry; 6<sup>th</sup> Infantry; 1<sup>st</sup> Infantry; 12 pieces of field artillery; Tampico Coast Guard Battalion; 2<sup>nd</sup> Infantry; Zapadores; and a regiment of Light Cavalry with a 4 pdr cannon holding the eastern flank (NPS 1980: 19-22; Haecker 1994:24-26).

The first of the U.S. troops began to emerge onto the prairie of Palo Alto shortly after noon. Taylor halted the column near the pond at Palo Alto and ordered his men to drink and fill their canteens. General Arista allowed the U.S. forces to form their battle line without molestation. Taylor deployed his 2<sup>nd</sup> Brigade under the command of Colonel David E. Twiggs on the western portion of his line of battle. The 5<sup>th</sup> and 3<sup>rd</sup> Infantries held the extreme western flank, with Ringgold's 3<sup>rd</sup> Light Artillery and the 4<sup>th</sup> Infantry on the interior. Taylor ordered the two 18 pdr cannons under the command of Lieutenant William Churchill pulled forward and positioned on the road. Captain Ker's squadron of 2<sup>nd</sup> Dragoons was detailed to the wagon train, which was positioned north of the road next to the pond. Captain May's squadron of 2<sup>nd</sup> Dragoons was held in reserve. Taylor deployed his 1<sup>st</sup> Brigade under the command of Lieutenant Colonel William G. Belknap on the eastern portion of his line of battle. The 8<sup>th</sup> Infantry held the extreme eastern flank, with Captain James Duncan's 2<sup>nd</sup> Light Artillery and Child's Foot Artillery on the interior. The company of Texas Rangers under Walker was placed as pickets on the rear of the extreme western flank (NPS 1980: 19-21; Haecker 1994:24-26). About midafternoon the Mexican artillery opened fire on the U.S. positions. Ringgold and Duncan move their batteries approximately 200 yards forward, and with the assistance of

Churchill's 18 pdrs, returned fire on the Mexican artillery. After about a half hour of this exchange, Arista ordered Torrejon to charge around the American western flank. Torrejon's flanking maneuver was slow to get off the Mexican line, and then bogged down as it traversed two muddy low areas. This allowed the American 5<sup>th</sup> and 3<sup>rd</sup> Infantries to form squares and position themselves to repulse the Mexican cavalry charge. Accompanied by Ringgold's light artillery, the U.S. troops were able to turn back the Mexican cavalry charge. Ringgold then moved his battery forward and targeted the Mexican line. The 5<sup>th</sup> and 3<sup>rd</sup> Infantries fell in behind Ringgold. The prairie ignited from the wadding of the artillery wounds, within an hour and a half from the start of the battle. The flames and smoke brought a halt to the engagement (NPS 1980: 21-25; Haecker 1994:26-28).

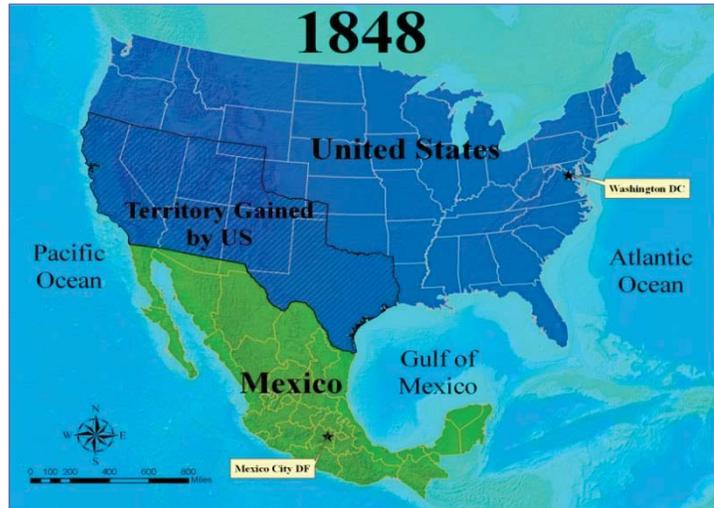


FIGURE 3 MAP DEPICTING LAND EXCHANGED AS A RESULT OF THE U.S.-MEXICAN WAR.

Both armies used this time to regroup. Taylor moved the two 18 pdrs further down the road and pulled his east wing back to maintain a continuous battle line. Arista responded by moving his west wing to the rear and pushing his units on his east wing forward. Essentially the two armies rotated their battle lines counter clockwise about 45 degrees. The two armies resumed the salvo, as the smoke began to dissipate. With the new formation, Arista perceived an opportunity for his light cavalry to swing pass the 8<sup>th</sup> Infantry and hit the U.S. wagon train. Duncan spotted the maneuver, repositioned his guns, and with the assistance of the 8<sup>th</sup> Infantry and Foot Artillery, turned back the Mexican attempt to reach the wagon train (NPS 1980:24-32; Haecker 1994:28-32).

Despite being pounded by the American artillery for hours, the Mexican battle line, with a few exceptions, maintained its integrity. As dusk fell on the field, Arista withdrew his battered troops to the rear of the field to set up camp for the night. Taylor acted in-kind and presumed the battle would resume in the morning. Mexican casualties at Palo Alto were 100 killed and 125 wounded, while U.S. casualties were 9 killed and 17 wounded (Bauer 1974:57-63; Eisenhower 1990:77-80; Haecker 1994:32-36).

That night Arista decided his army should not face the U.S. forces on the open prairie, and began to relocate his army to a place about six miles to the south; where the road to Matamoros crosses the Resaca de la Palma. Arista's plan was to use the ravine of the abandoned river channel and the dense brush to negate the effects of the American artillery. His plan worked, and the May 9<sup>th</sup> Battle of Resaca de la Palma was much more of an even contest. However, after two hours of fierce hand-to-hand combat, the U.S. troops were able to penetrate the western flank of the Mexican line and capture their camp, routing the Mexican forces from the field of battle. The siege of the fort was lifted as Mexican troops from Resaca de la Palma were seen scurrying back to Matamoros. Armed conflict continued until September 1847, when U.S. forces captured Mexico City. In February of 1848 the Treaty of Guadalupe Hidalgo was signed; ceding over half of the Mexican national territory to the United States. This would forever change the face of the North American Continent and forge the relationship between these two young republics (Figure 3).

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# THE ARCHEOLOGY OF THE 1846 MEXICAN-AMERICAN WAR BATTLE OF PALO ALTO

By John E. Cornelison, Jr., Rolando L. Garza, Guy L. Prentice, and Michael A.  
Seibert

## INTRODUCTION

The first battle of the Mexican/American War (1846-1848) was fought just north of the Rio Grande and was part of the siege and relief of Fort Brown. The first day's action is known as the Battle of Palo Alto and took place on 8 May 1846 (Bauer 1974; Taylor 1846; Thorpe 1846). This battle was largely an artillery duel with a few associated cavalry charges (Taylor 1846). The day's action ended with neither side being able to decisively defeat the other. After nightfall on 8 and 9 May, the Mexican Army moved to Resaca del la Palma where they were soundly defeated on 9 May. In many ways these two days of fighting set the pattern that would continue through the end of the war.

The Palo Alto Battlefield National Historic Site Act of 1991 (PL 102-304) effectively enabled the NPS to preserve and interpret the site of the first battle of the Mexican-American War (1846-1848). The first on-site NPS facility, Palo Alto Visitor Center, was opened in January of 2004. The lands where the park was proposed had already been subject to a large-scale metal detector survey under the direction of National Park Service archeologist Charles M. Haecker. The results of this survey were first presented in *A Thunder of Cannons* (Haecker 1994). Haecker's survey provided enough information to determine where the major actions had taken place. Once the NPS began to develop the unit it became clear that more detailed information concerning the battle would be needed prior to the construction of trails, waysides, exhibits, and facilities. From 2005-2007 and from 2010-2012 the core area of the battlefield was systematically surveyed using metal-detectors.

During the project over 650 acres of land were surveyed with metal detectors at both the Palo Alto and Resaca de la Palma battlefields. This resulted in the collection of 2,742 artifacts weighting over 218 kilograms (kg). Over 2,332 (85 percent) of these artifacts are military or military related items. It is on the basis of these collected artifacts that the geographic information systems (GIS) analysis was undertaken. Since both sides were firing similar weapons (smoothbore muskets and cannons) using similar battlefield tactics, systematic interpretations of the survey results were extremely difficult to obtain.

## METHODOLOGY

Following Douglas D. Scott's (Scott and Fox 1987) seminal work at the Little Bighorn Battlefield using ejector and pin-fire marks to determine the paths that various weapons followed, the use of metal detectors on archeological projects conducted by the NPS went from virtually unheard of to a must have on every battlefield project. It soon became clear, however, that battles fought in North America from the Revolutionary War through the Civil War,

produced an assemblage for each side that was virtually identical to its counterpart. In many cases, the opposing armies were buying or obtaining their weapons from the same sources. There are noted ammunition variations, such as the Americans using a cartridge containing a .69 caliber ball with three .32 buckshot and the British firing shot larger than .69 caliber at the Battle of New Orleans. There are also examples from the Civil War where units such as the Irish Brigade continued using smoothbore .69 caliber balls while most of the other units were using Minié balls. But in general most North American assemblages are very similar.

Without being able to use the forensic techniques of Little Bighorn Battlefield, analytical methods were needed that would help separate the masses of battlefield data into its respective components. Working with collections from various 18th-19th century battlefields in the southeastern United States has necessitated the development of three basic analytical methods employing Geographic Information Systems (GIS) to make sense of the observed artifact distributions (Cornelison 1997, 2000, 2005, 2006a, 2006b, 2007a, 2007b; Cornelison and Cooper 2002a, 2002b, 2002c, 2004; Cornelison et al. 2004; Cornelison and Smith 2008; Cornelison and Lowe 2014). The first involves plotting of individual artifacts (point data) using different symbols to allow visual identification of obvious patterns. The second approach employs isopleth mapping techniques for aggregating the point data into meaningful categories based on artifact density. The third method involves comparing the observed density values from the second approach versus those expected from a hypothetical evenly random distribution to show deviations from the expected norm. These GIS data sets can then be evaluated in terms of three basic confidence levels: what we think, what we know, and what we can prove.

The first category—think—is when distributions of certain artifacts are identified and linked to assumptions such as the "Mexicans moved from south to north so the material in the south must be Mexican." The second category—know—consists of taking knowledge such as "the Mexican generally fired larger than 0.69 caliber balls so the shot above that number must be of Mexican origin." The final category—prove—consists of using statistically based analytical techniques that compare what is observed versus expected to test the validity of what we think and know.

On most historic battlefields that predate the Civil War, the artifact density is often not sufficient to make meaningful projections of unit locations based on the distribution of individual artifacts (i.e., point data). To compensate for this lack of point density, another method is to use an isopleth mapping approach where artifacts are aggregated together according to where they were recovered from within a set of spatial units, in this case a grid of 20 m squares superimposed on the project area. The total number of artifacts actually recovered from each square is then summed to serve as a density value for that square (Step 1). This represents the "observed" set of isopleth data. The next step requires that the total number of artifacts be redistributed evenly across this same grid, producing a new set of values for each square (Step 2). This constitutes the "expected" set of isopleth data, or what one would expect from a hypothetical, completely random distribution of artifacts. These squares and grids of aggregated artifacts can then be compared and mapped using terrain "contour mapping" software, such as Surfer® by assigning the aggregated artifact count obtained for each square as the Z-value for the square's center point. Once the artifacts are assigned to their groups of observed versus expected, it is then possible to determine areas of high and low concentrations by subtracting the number of artifacts expected (Step 2) from the actual count of the artifacts recovered (Step 1) in each square. At this battle, since the Mexican shot contained silver, a portable x-ray fluorescence (pXRF) unit was used to evaluate the effectiveness of the above techniques (see Seibert et al., this volume).

## CATEGORY ONE - THINK



**FIGURE 1 DISPLAY OF ARTIFACTS RECOVERED IN THE AREA OF TORREJON CAVALRY ATTACK. AN EXAMPLE OF THINK.**

During the survey, three stirrups were recovered, however it was not possible to determine nationality of use. One stirrup (PAAL 3060) was located in the area surveyed west of the resaca, which is believed to be where the Torrejón attack took place (Bauer 1974; Taylor 1846; Thorpe 1846). This lone stirrup represents the best illustration of the “think” concept. It is clear from the historical records of the battle that Torrejón attempted a cavalry charge on the American right wing from a position west of the Resaca. This charge was driven back, inflicting severe casualties in the process, by American artillery and at least one volley of U.S. infantry fire.

While this single object does not make a compelling case by itself, when combined with other objects such as canister and cannonballs, the presentation becomes clearer (Figure 1). Numerous canister balls are clustered around the stirrup. There are also a number of cannonballs to the northeast, but these are likely the results of other battle bombardments and not the Torrejón attack. One thing that is striking about this image is the intensity of the canister fire to the east of the resaca when compared to the west. The west area has much less canister and would likely be created as the result of concentrated fire on a smaller target rather than the general battle spread seen to the east.

Figure 2 shows the estimated poundage of spherical case fragments based on wall thickness for spherical case fragments that were intact enough to be measured. When this data is displayed in ArcGIS (Figure 2) it provides important information about the battle, and bridges the gap between category one and two level analysis. Part of deciphering the puzzle is the fact that the Mexicans used only 4- and 8-pounders in the battle while the American’s had 6-, 12-, and, most importantly, 18-pounders. Fragments of 18-pounder ordnance are represented by blue dots in Figure 2; the overwhelming majority of these fragments are found along the Sanchez property fence line that demarcates the east boundary of the survey area. This is consistent with the final location of the Mexican army but is a little south when compared to some of the distributions that will be shown later.

Admittedly, there are some issues with the measurements as the case fragments are rusty and deteriorated and sizes for the Mexican shells can only be estimated. The American 6-pounder did not come as spherical case and it is assumed that this is true of the Mexican 4-pounders. There is a significant concentration of American 12-pounder fragments (gold dots) to the west by the resaca where the Americans ended the fight. Why fragments recorded in this range are not present in the Mexican area is not clear. This is likely the result of measurement error due to corrosion. The fragments represented by the red dots are in the size range for the American 6-pounder cannon; however, given that they are mostly concentrated to the west, this size no doubt represents the Mexican 8-pounder cannon.

## CATEGORY 2 – KNOW

Previous survey experience on North American battlefields has shown that the earlier in history that a battle takes place, generally speaking, the lower the number of artifacts that will be present (Cornelison 1997, 2000, 2005, 2006a, 2006b, 2007a, 2007b; Cornelison and Cooper 2002a, 2002b, 2002c, 2004; Cornelison et al. 2004; Cornelison and Smith 2008; Cornelison and Lowe 2014). In order to look for the larger trends, a 20 m grid was superimposed upon the entire survey area, and the artifacts recovered from within each 20 x 20 m square were aggregated as a measure of the artifact density for each square. Each square's density value was then plotted in three dimensions by assigning the number of recovered artifacts within each square as the Z value and the square's center point or centroid as the X,Y value.

The first goal of the analysis was to determine as precisely as possible where troops from each nation were located during the battle. Following Lees (1992, 1994) model, which states that the location where soldiers stood is marked by dropped unfired balls, the database was queried to total the number and weight of all unfired balls within each square that fell within the range of shot used by the American side. The query results were entered into Surfer® for 3-D terrain (contour map) modeling and an isopleth plan map and wireframe version was made for each set of values.

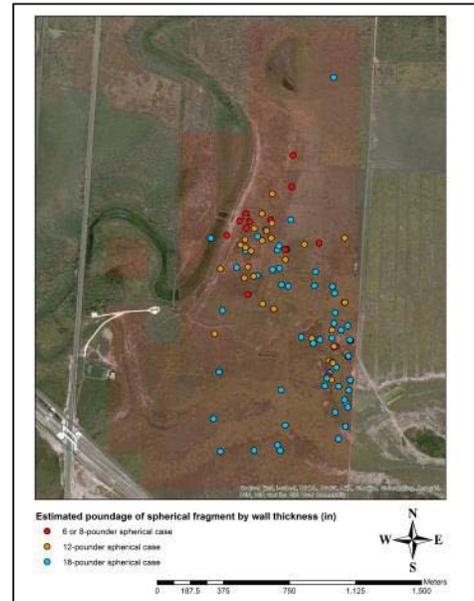
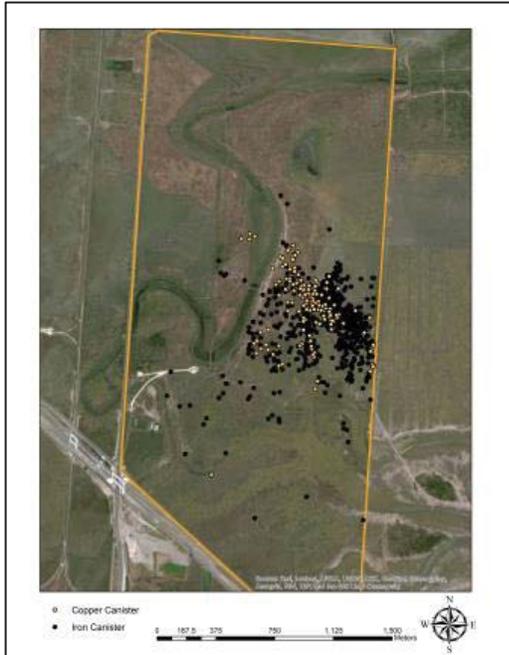


FIGURE 2 ARTILLERY SHELL FRAGMENT BY SIZE. AN EXAMPLE OF THINK/KNOW.

Figure 3 show copper canister shot by count and weight. Copper shot was one of the few categories of artifacts that can be attributed solely to the Mexican army. Copper shot was mostly distributed in the cone area from which most of the iron shot emanated. However, this shot pattern did not have the characteristic shape of the cone pattern; it was much more rectangular in shape while still maintaining the same orientation. Since this area is between the final positions of the Mexican and American armies, it is assumed that most of this fire took place later in the battle. However, in the weight version, the gray banding shows that copper shot was distributed across the battlefield with at least five major color bands present. In Figure 3, it is clear that the northwest end of the rectangular zone of fire where the Americans were present received a larger amount of copper canister fire. On the southeast end, where Mexicans were positioned, the pattern shows that much less canister is in this area. If this data were presented without the benefit of supporting data, it would be very hard to interpret the direction of fire with only this single map as a guide.

## CATEGORY 3 – PROVE



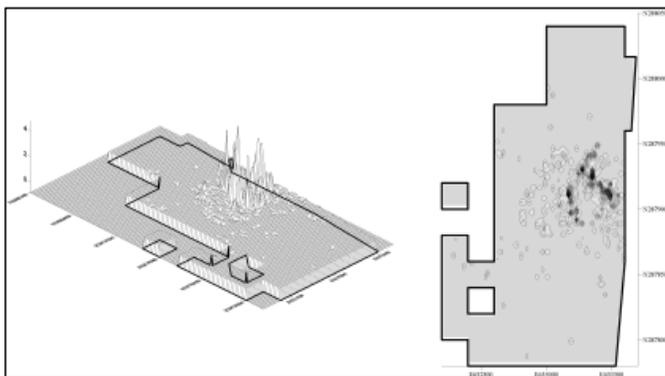
**FIGURE 3 COPPER AND IRON CANISTER SHOT. AN EXAMPLE OF KNOW.**

The final method for analysis uses the same data previously utilized but examines the results in terms of observed versus expected. To accomplish this goal, the total count of artifacts is divided evenly across the survey universe as if they were randomly found in each location. The expected count is then subtracted from the observed/actual count. This produces a new value that can be mapped using Surfer® mapping software to identify deviations from a hypothetical uniform random distribution and potentially evaluated from a statistical basis. It has the added benefits of wiping clean the areas where no artifacts are present.

This approach has been used before. During the investigation of the Sunken Road and the Hornet’s Nest at the Shiloh National Military Park (Cornelison 2007b), it was determined that the relative intensity of fire in the battle could be ascertained using these kinds of Surfer® distributions. At Shiloh, both sides were using virtually the same weaponry. While the combatants at Palo Alto used slightly dissimilar weaponry, they appear to be similar enough to make these methods useful.

Figure 4 shows the observed versus expected maps for all iron canister shot regardless of origin. Both the isopleth and wireframe maps show two parallel lines that appear to represent the American and Mexican lines in their final positions on the day of the battle. These lines trend northeast/southwest. The concentration that represents the American line is significantly less dense than the Mexican line. The Mexican line shows shot being distributed in a funnel pattern. It is possible that this graphic shows the Mexican line being pushed back.

## CONCLUSIONS



**FIGURE 4 OBSERVED VERSUS EXPECTED FOR ALL IRON CANISTER. AN EXAMPLE OF KNOW.**

observed density values versus those expected from a hypothetical evenly random distribution uses the power of the 3-D modeling software to generate isopleth maps that show deviations from the expected norm and are arguably easier to interpret than the two previous mapping methods.

In conclusion, three different methods for interpreting the data recovered from the battlefield have been used. The first views categories of artifacts plotted as points on maps produced by ArcGIS and permits interpretation based solely on the viewed patterns. The second method uses aggregated artifact data and Surfer® terrain modeling software to produce isopleth plan maps and 3-D wireframes of the recovered artifacts. This technique provides spatial models that can then be interpreted based on the derived density values. The final method of comparing

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# DETERMINING BATTLE LINES: A PXRF STUDY OF THE LEAD SHOT FROM THE BATTLE OF PALO ALTO

Michael Seibert, John Cornelison, Rolando Garza, Sarah Kovalaskas, and Bruce  
Kaiser

## INTRODUCTION

In the 19th century, the United States as a nation was growing rapidly and looking to expand further. The idea of Manifest Destiny, propagating the belief that America was destined to expand across the North American continent had taken hold of the fledgling nation. This expansionist zeal put the United States on a path that would lead to the opening salvos of the Mexican-American War, the Battle of Palo Alto.

The Battle of Palo Alto was one of only two battles fought on American soil. The American forces commanded by General Zachary Taylor consisted of two infantry brigades, a battalion of dragoons, two 18-pound siege cannons, one battery of light artillery and one battery of "Flying" artillery. The Mexican Army had three brigades of infantry, cavalry brigade, two regiments of irregular cavalry, a 12 piece battery, and a battalion of zapadores under the command of General Mariano Arista. The battle consisted primarily of an artillery duel with brief action on the flanks by mounted cavalry with the main infantry bodies never coming into contact.

In order to provide a more detailed interpretation of the battlefield for Palo Alto National Historical Park, the Southeast Archeological Center, National Park Service, undertook an archeological metal detector survey of the core battlefield. During the survey, numerous artifacts were recovered that were directly attributable to the specific occupants of the battle, such as the Mexican regimental uniform insignia from the Tenth Infantry. Other artifacts such as lead shot can be more difficult to designate cultural affiliation. George C. Furber, in writing about his experiences during the Mexican-American war made an observation regarding the Mexican army's munitions in the various regions and campaigns.

"...in the silver mining districts, there are many mines of this metal, and it is cheaper than iron; - and, besides the mines, much copper is worked out with the silver, and this is of but little value, while iron is difficult to be procured, and is of high price...this refuse metal, then, is worked up into balls, and cast into shells." (Furber 1848)

During the war, the north Mexican army was furnished with artillery munitions (canister and solid shot) made of copper as well as iron. This caused consternation among the American soldiers. Rumors spread through the American ranks that the primary reason behind the Mexican's use of copper, opposed to lead and iron, the primary metals used in the construction of American shot, was to poison the enemy. Simply put by Furber, copper was a more readily available and cheaper metal than iron in north Mexico, hence the use of copper cannonballs and canister in this region. This quote from George C. Furber, who served as a private during the war, led the investigators at Palo Alto to question the chemical composition of the shot recovered and what the implications of knowing the composition could be for the interpretation of the battlefield.

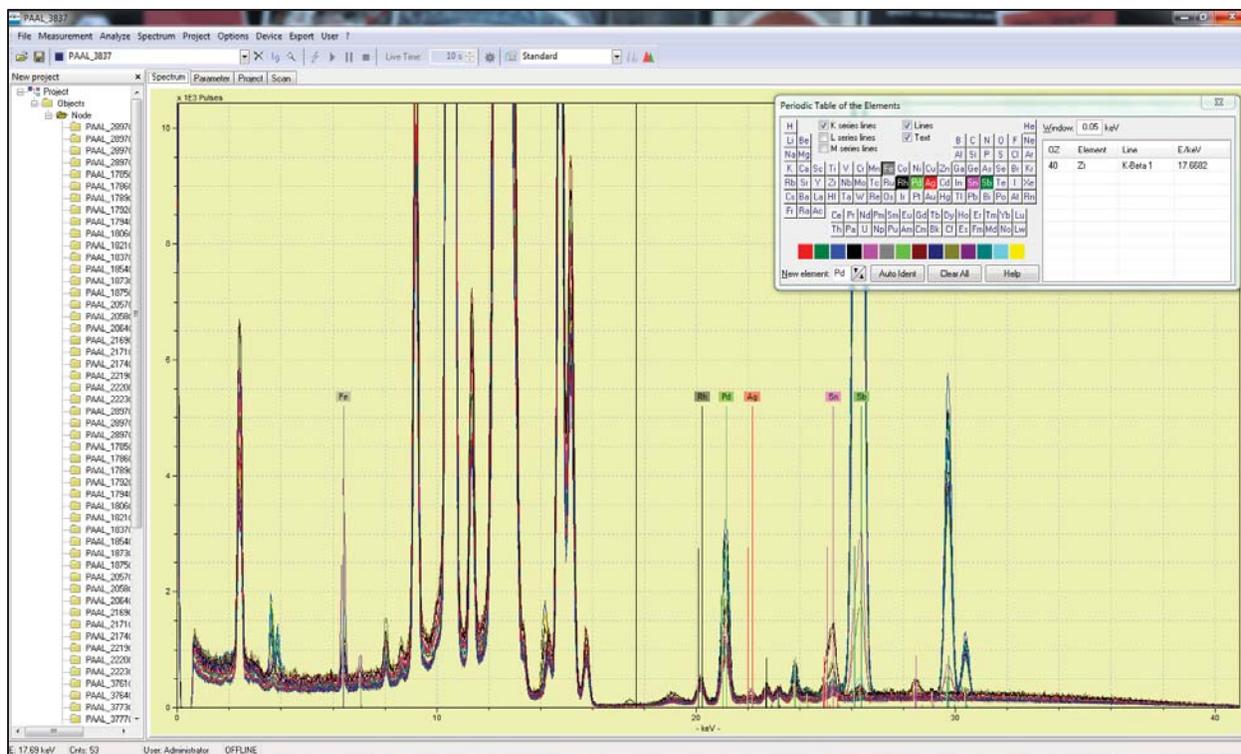


FIGURE 1 COMPUTER SCREEN SHOT OF A LEAD SHOT SPECTRUM.

The realization that copper was a by-product of the silver mining process led us to consider the sources of Mexican lead. If Mexican lead was a by-product of the silver mines or was contaminated during processing, would the lead contain trace amounts of silver? If so, would there be enough trace silver to differentiate between the supposed silver-lead of Mexico and the supposed silver free-lead of the United States? It was also proposed that the United States' higher quality of production, resulting from the industrialization of its arms and munitions manufacturing, would remove most of the trace elements inherently found in unprocessed lead, thereby creating a lead product with low trace amounts of non-lead material. The purpose of the following study was to determine if there is a chemical difference in the lead used by the American forces under General Zachary Taylor versus the lead used by the Mexican forces under General Mariana Arista and if so, how did the chemical analysis compare to our initial cultural identifications based on battlefield location and caliber. In order to test the hypothesis, non-destructive X-ray fluorescence spectrometry (XRF) was conducted on recovered lead shot in an effort to ascertain the chemical composition of the lead shot recovered from Palo Alto.

## METHODS

XRF is a process by which the analysis of major and trace elements in materials is made possible by detecting the behavior of atoms when they interact with X-radiation. When the instrument's X-ray beam illuminates a sample it becomes excited. The atoms in the sample absorb a portion of the X-ray energy causing electrons from one of the three orbital bands (K, L, and M) to be ejected and replaced by an electron from a higher energy band; the bands most often affected are K and L as they require the least amount of energy to dislodge an electron (Figure 1). The release of energy caused by the ejection of electrons creates X-ray photons that are then detected by the

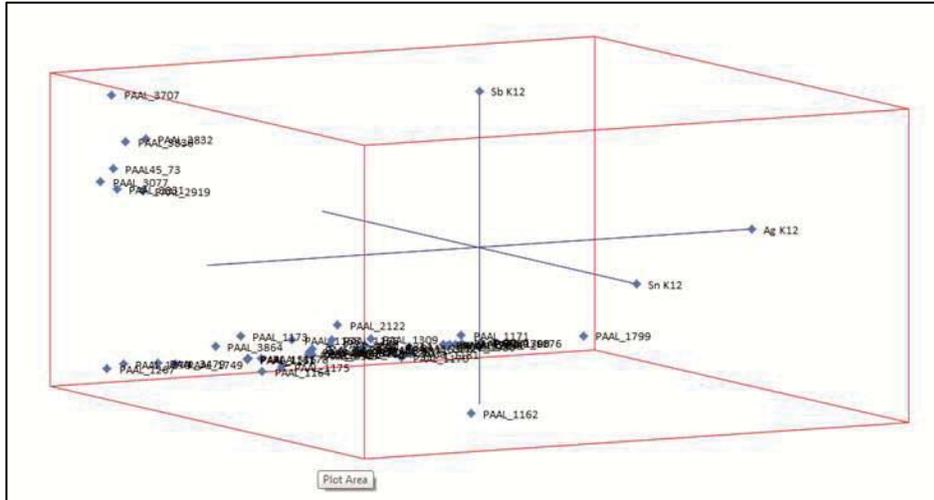


FIGURE 2 EXAMPLE OF A LEAD SHOT SCATTER PLOT.

instrument. The emitted X-rays are characteristic of the atoms present in the sample and so by examining all the wavelengths of the emitted X-rays we are able to determine the chemical properties of the sample (Fitton 1997).

Using a Bruker Tracer-III (a portable XRF), each lead shot was prepared by removing the dirt and patina from a small

portion of the artifact, 2x2 centimeters, by way of 320 grit sandpaper. The artifact was then placed atop the instrument, clean side facing the X-ray lamp. The following settings were applied: duration of 500 seconds, tube voltage of 45kv, tube current of 20 micro amps, green filter (12mil Al + 1mil Ti + 6mil Cu). S1PXRF software was used to record count rate, signal acquisition, and adjusting tube operating voltage and current settings; the spectrums were then uploaded into Artax®, a software program designed for qualitative analysis of XRF spectras.

Using Artax®, we were able to compare the peaks of each spectrum to discern potential patterns.

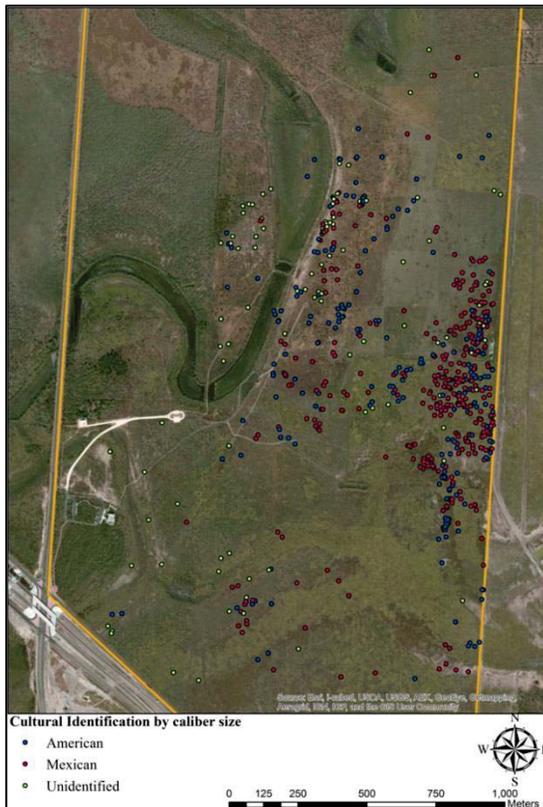
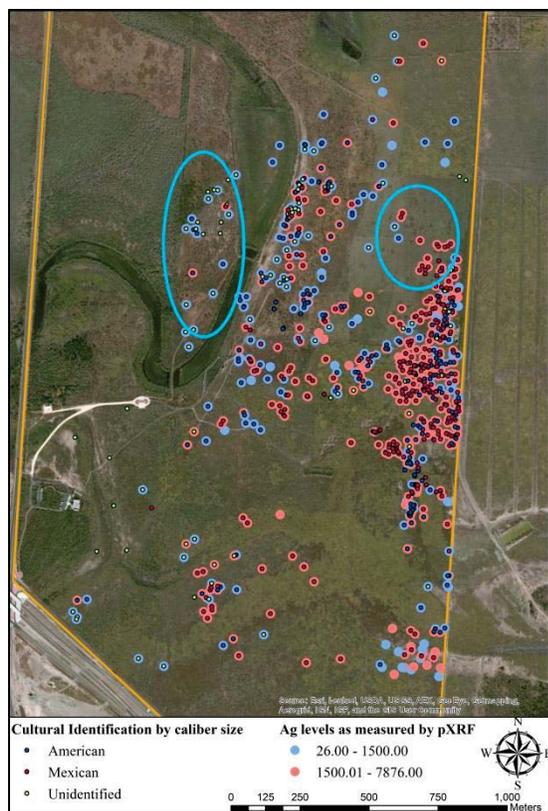


FIGURE 3 CULTURAL IDENTIFICATION OF LEAD SHOT BY CALIBER SIZE.

A total of 700 lead shot were sampled during the survey. The data from the spectra was then exported into Microsoft Excel®. Excel® was used to determine if there was a significant chemical variation in the amounts of Ag between samples and whether there were any additional elements that could provide significant statistical input. The data was grouped into 3D scatterplots to ascertain significant groupings using cluster analysis (Figure 2). Analysis of the spectra revealed three trace elements by which the lead shot could be differentiated: Silver (Ag), Tin (Sb), and Antimony (Sn). High Sn and Sb levels distinguished the later 1897 faceted shrapnel ball from the 1840's material, helping us establish a temporal cutoff as they belonged to the later 19th century occupation of Fort Brown, Brownsville, whose troops used Palo Alto as an artillery range. The 1897 faceted shrapnel ball also differed in patina, shape, and size setting them apart visibly as well as chemically from the 1840's material. With this data in hand we were able to eliminate those lead shot, 1897 faceted shrapnel ball, from the remainder of the study. Cluster analysis revealed a distinct break for Ag at the 2000 photon. Those above the 2000 mark were classified as having a significant amount of Ag, with



**FIGURE 4 LEAD SHOT CLUSTERING INDICATING BATTLE MANUEVERS.**

those below the 2000 mark as having trace amounts of Ag.

## RESULTS

In the lab three distinct clusters of lead shot were identified based upon their calculated calibers: those with calibers of .69 or greater, those with calibers between 0.63-0.68, and those with calibers .62 and lower. The calculated caliber was established using an algorithm developed by Daniel Sivilich, (Diameter in inches= .223204 x (Weight in grams) <sup>1/3</sup>) (Sivilich 1996). Those with calibers .69 and greater were identified as likely belonging to the Mexican army as they conformed to the caliber size of lead shot used by the India Pattern Brown Bess, the primary arm of the Mexican infantry. Those with calibers .63-.68 were identified as belonging to the American army as they conformed to the caliber size expected from the Model 1816/1822 and 1835 muskets, primary arm of the American infantry. The last cluster, calibers of .62 and less, could not be assigned a cultural affiliation based solely on caliber as both forces maintained an arsenal of small-caliber rifles, shotguns, and pistols, which fired lead shot of similar caliber to the enemies. The results were plotted in GIS, illustrating the location of lead shot based on caliber size and there for its cultural affiliation (Figure 3).

Of the 344 lead shot with a calculated caliber of .69 or greater, only 8% did not contain significant amount of Ag. 92% of the lead shot identified as Mexican based on caliber size contained significant amounts of Ag. Lead shot with a calculated caliber between .63 and .68 (n=238) contained a distribution with 82% containing trace amounts of Ag and 18% had significant amounts of Ag. Seven percent of those with calibers of .62 or less (n=118) had significant amounts of Ag, with 93% containing trace amounts of Ag. Both armies carried munitions within these caliber ranges (for pistols, rifles, carbines, shotguns, and escopetas) primarily for their mounted forces who were, other than the artillery, the main combatants during the battle. This being the case, providing a cultural affiliation for the shot in this category without chemical analysis is extremely difficult especially considering that during the battle the lines shifted so that the area once occupied by the American line was occupied by the Mexican line during the second phase of the battle and vice versa.

The Mexican army should have been the only force at Palo Alto armed with large caliber muskets (.69 and greater), in statistically significant quantities, and with 92% of the lead identified within this range containing significant amounts of Ag suggests that lead shot of other calibers was likely manufactured in Mexico as well. Identifying the smaller caliber shot is important as it can help identify the locations of the failed flanking maneuvers by Torrejón's cavalry on the American right and the failed flanking attempt by a joint cavalry-infantry force on the American left near the end of the battle (Figure 4). These two locations on the battle lines were the primary instances of concentrated small arms fire and by pinpointing these positions it has helped us to establish with greater accuracy the ebb and flow of the battle lines on 8 May 1846.

## CONCLUSIONS

The pXRF study on the lead shot from the Battle of Palo Alto was successful; both armies had elementally distinct munitions allowing us with confidence to compare the composition of the lead to the calculated caliber sizes. This comparison, though not 100%, solidified our interpretations of the events of 8 May 1846. We were able to confirm the location-specific actions that are known through the historic records. We were also able to confirm the shifts in the lines from afternoon to evening. The pXRF is a tool that added additional information to our survey that helped confirm our initial interpretations. Using the pXRF we were able to establish temporal cutoffs for a battle site that was continually used as a bomb range into the early 20th century. We were able to show that there was a difference in the chemical composition of the lead shot used in the battle, most likely resultant from the leads source and/or manufacturing techniques. We were then able to equate the distinction in chemical composition with the calculated calibers of which two groups had a strong cultural affiliation, one being Mexican at .69 and greater and the second being American at .63-.68. These groupings based on caliber matched the expected chemical composition at 92% and 88%, respectively. The high percentage rate allowed us the confidence to sort the third and final category of unknown affiliation, calibers .63 and less, using the chemical composition of those artifacts as a guide. The results helped identify the location of Torrejón's attempted flanking maneuver on the American right flank. Placing this specific action of the battle on the ground laid the framework for the final analysis, as we were able to assuredly determine the right flank of the American battle line.

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# SKELETAL ANALYSIS OF MEXICAN SOLDIERS FROM THE BATTLE OF RESACA DE LA PALMA

Daniel J. Wescott

## INTRODUCTION

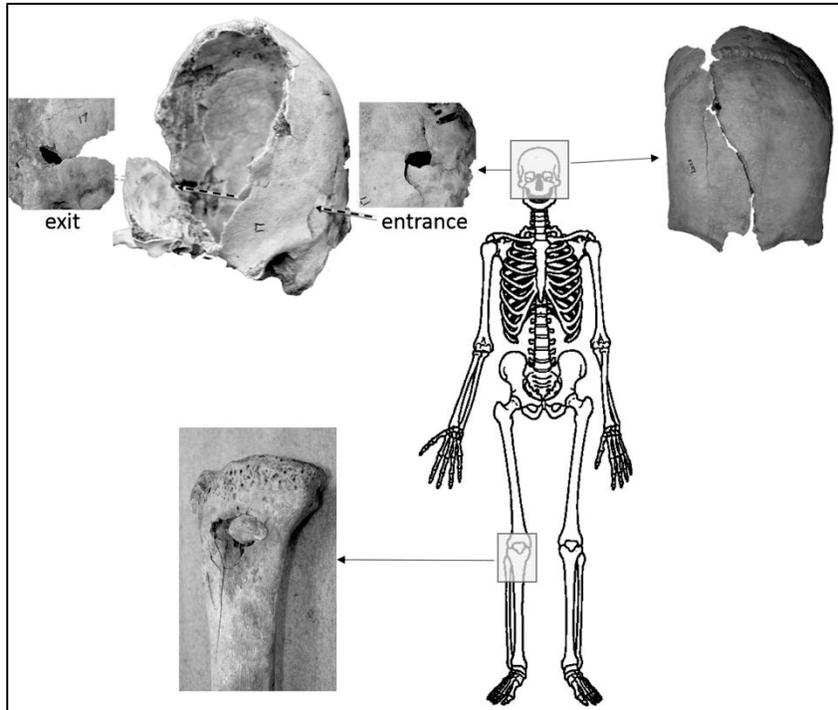
The Battle of Resaca de la Palma was the second major engagement of the Mexican-American War. The battle was fought on 9 May 1846 in an old meandering channel of the Rio Grande River approximately five miles south of the Palo Alto battle site. Hundreds of Mexican soldiers were killed during the battle that was decisively won by U.S. troops led by General Zachary Taylor. Following the battle, many of the deceased Mexican soldiers were buried in mass graves by U.S. soldiers. In 1967, one of the mass graves (41CF3) containing the skeletal remains of numerous Mexican soldiers was excavated by the Texas Archaeological Salvage Project after being exposed by earthmoving activities at a residential construction site in Brownsville, Texas. The deceased Mexican soldiers were primarily laid face up in three primary clusters. Insignia among the artifacts suggest that some of the soldiers were from the 7<sup>th</sup> and 10<sup>th</sup> Infantry Units.

The skeletal remains of Mexican soldiers from the Battle of Resaca de la Palma provide a rare view of the life of 19<sup>th</sup> century Mexican soldiers and this historic battle. Skeletal remains from the mass grave were inventoried and examined to determine the age, sex, and stature of the individuals and to document the presence of trauma, other bone lesions, and after death alterations. The minimum number of individuals was estimated using the most frequently occurring bone. The likely number of individuals present in the grave was then calculated using a pair-match method developed by Adams and Konigsberg (2004).

## SKELETAL ANALYSIS

A minimum of 27 individuals were buried in the mass grave, but the most likely number of individuals is 36 based on pair matches of the thigh bones. In general, the soldiers were in good health prior to the battle. All of the individuals were males and most were in their second or third decade of life, although a few were older. The average stature was 5'3  $\frac{3}{4}$ " (162 cm). The biological information (sex, age, and stature) is consistent with information known about 19<sup>th</sup> century Mexican soldiers.

The historical record indicates that the soldiers at Resaca de la Palma were buried on 10 May 1846 by U.S. troops (Haecker 1994). The mortuary data are consistent with this description. Most of the bones were still in anatomical position when excavated and there is little evidence of animal scavenging. The soldiers' skeletal remains were arranged in three primary clusters (north, central, and south) of pseudo-rows with the bodies laid in an extended position and face up. However, they were not neatly laid out and were buried with very few artifacts. It is highly likely that most of the objects in the soldiers' possession were removed by U.S. troops prior to burial.



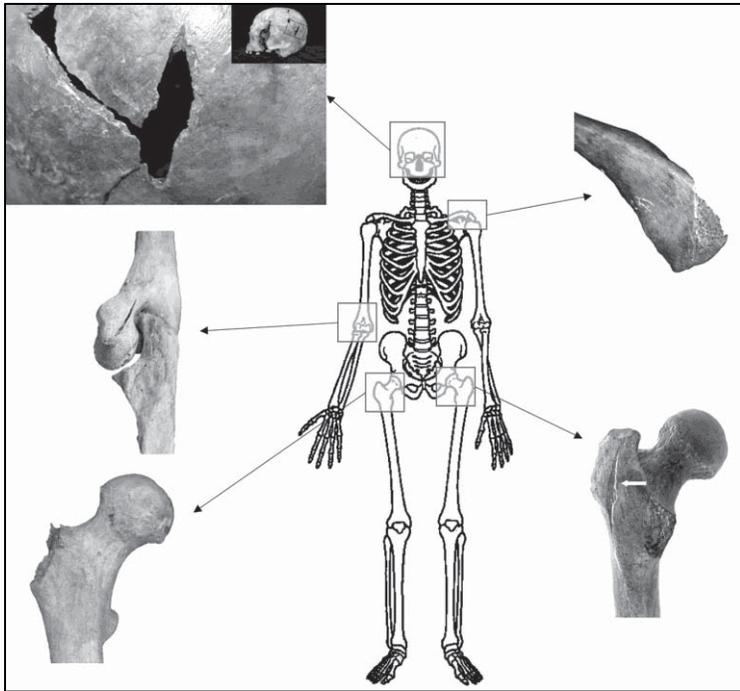
**FIGURE 1 EXAMPLES OF PROJECTILE TRAUMA.**

More than half of the individuals examined show evidence of battle-related trauma (Wescott et al. 2012). However, many of the injuries would not have been life threatening. This is consistent with other military samples from North American military cemeteries, but unlike many of the other cemeteries, it can be assumed that all of the soldiers buried in the pit at Resaca de la Palma died of combat-related injuries. Therefore, most of fatal injuries did not leave an observable indicator on the bones or have been obscured by post burial processes.

Projectile wounds (caused by bullets and shrapnel) were the

most common injury followed by sharp force (bladed instrument) trauma (Figures 1 and 2). Blunt force trauma may be under reported because it was difficult to differentiate from post burial fracturing. It is not surprising that projectiles inflicted the greatest number of observed battle-related injuries considering that both personal firearms and artillery were used during the battle. The relatively high prevalence of sharp force injuries is consistent with accounts of hand-to-hand combat that occurred during the battle. Surprisingly, none of the sharp force injuries observed can be linked specifically to the standard issue bayonet provided to U.S. troops. Most of the cut marks observed are nonspecific, but the more evident ones were most likely caused by swords or sabers.

One of the more interesting aspects of studying skeletal remains from battlefields is that they can provide some evidence about the behavior or occupational activities of common soldiers. Evidence of healed fractures was observed on several soldiers. The most stark is a fracture to the lower jaw of a young male, but healed fractures of the nasal bones, ribs, and bones of the hands, legs, and ankles were also observed among the soldiers. It is difficult to determine if the healed injuries observed are related to previous battlefield trauma or the result of previous farming and labor jobs held by soldiers. Indicators of physical stress observed among the skeletons from Resaca de la Palma include bone spurs, depressions in the bones of the spine (vertebrae) caused by herniated disks, arthritis of the spine and limb bones due to wear, stress fractures of the spine, and indicators of localized inflammation of the connective tissue surrounding the bone known as periostitis. With the exception of localized periostitis, very few individuals exhibited clear indicators of physical stress. Bone arthritis, for example, was observed in relatively few of the bones from 41CF3. Two or three individuals exhibited mild arthritis of the spine and bone spur development, which can result from physical labor or age. In the limb bones, arthritis was found mainly in the ankle joints, with approximately 13% of the individuals exhibiting mild arthritis in one or more of the ankle joints. In addition, one young male (Burial 21) exhibits mild arthritis on the joint surfaces of the right elbow. Depressions in the bones of the spine caused by herniated disks were present in the middle (thoracic) and lower (lumbar) vertebrae of at least four individuals, occurring most frequently in the 8<sup>th</sup> thoracic vertebra.



**FIGURE 2 EXAMPLES OF BLADE TRAUMA.**

Among the soldiers from Resaca de la Palma, there are two interesting patterns of bone reaction. One is the combination of mild periosteal bone formation on the inside surface of the shaft of the major lower limb bone (tibia), localized periostitis on the end of tibia and the other leg bone (fibula) near the ankle joint, and minor ankle arthritis. The other pattern is an elongated area of mild periosteal bone formation (thin layer of new bone) on the front and outside surface of the thigh bone shaft below the hip. Periostitis was observed primarily on the right thigh bone (eight individuals) but was observed on the left thigh bone of two individuals, and on both sides in two other soldiers. Altogether, 60% of the soldiers with thigh bones present exhibit this long narrow strip of periostitis on at least one thigh bone.

The first pattern may be an indicator of an overuse condition known as medial tibial stress syndrome (MTSS), more commonly known as shin splints, although other causes of localized inflammation cannot be ruled out. Clinical data demonstrate that MTSS is common among athletes and military recruits (Beck 1998). Running on hard or uneven surfaces and wearing improper shoes are often reported as major sources of MTSS. These activities result in chronic abnormal bending of the tibia shaft and over pronation (inward rotation) of the foot (Beck 1998; Fredericson et al. 1995). Chronic bone fatigue caused by biomechanical stress during foot-to-ground activities can result in swelling of the connective tissue around the leg bone and may eventually progress to bone breakdown and fatigue fracturing of the tibia (Anderson et al. 1997; Beck 1998; Fredericson et al. 1995). Clinical radiographic findings of athletes and military recruits with pain on the inside of the leg often show new periosteal bone formation on the inside surface of the leg bone, especially where bending strength is weakest (Beck 1998; Fredericson et al. 1995).

Historical evidence suggests that Mexican soldiers frequently marched and ran long distances. Furthermore, while the Mexican soldiers at Resaca de la Palma were issued boots, they generally preferred to march barefoot or wearing sandals (Young 1994). Consequently, it is likely that many of the Mexican soldiers suffered from MTSS. Approximately 50% of the soldiers from Resaca de la Palma have mild periosteal reaction restricted to the medial surface of the tibia. Over pronation of the foot could easily explain the relatively high incidence of localized distal tibia and fibula periostitis (30%) and ankle injuries (13%). As the foot rotates inward, it could cause excess stress on ligaments connecting the bones around the ankle.

The cause of the localized periosteal reaction observed on the thigh bone of 60% of the soldiers is not easy to evaluate, but is probably caused by an activity commonly conducted by the soldiers. One possible explanation for this pattern of pathological change could be related to historic reports of Mexican soldiers firing their weapons with the butt against their hip rather than their shoulder. Accounts of U.S. soldiers and Texas volunteers document that Mexican soldiers often fired their muskets with the butt plate held against the hip to reduce the discomfort

associated with discharging their weapon (Deas 1870; Young 1994). Mexican soldiers apparently would overload their muskets. As a result, when the musket was fired there was considerable recoil against the shoulder and burning of the cheeks and eyes as half-burnt powder and flint particles flew up into face (Bloom 1956; Haecker and Mauck 1997; Young 1994). Localized blunt trauma to the bone and overlying muscle would have occurred from shooting a musket with the butt plate mounted against the thigh bone, resulting in bruising of the underlying bone. After time, a slip-like cover of new periosteal bone would form on the external surface of the bone shaft in the vicinity of the bruise (Ortner 2003). Based on the historical accounts that Mexican soldiers often shot their muskets from the hip, the known reaction of bone to traumatic injuries, and the high incidence of periosteal bone formation restricted to the front surface of the thigh bone (especially the right bone) among the Mexican soldiers, it is possible that shooting from the thigh may be responsible for this unique pattern of pathology. The observation that most of the thigh bone periostitis was healed or healing is consistent with the fact that the Battle of Resaca de la Palma occurred early in the Mexican-American War. Historians argue that most of the soldiers at Resaca de la Palma were battle experienced. Therefore, it is expected that these soldiers may show signs of healed periostitis from previous battles. However, there are disputes about how frequently shooting from the hip occurred and the location of the bruising is slightly lower than expected. Therefore, this pattern may be the result of some other activity commonly carried out by infantry men.

## SUMMARY AND CONCLUSIONS

The skeletal remains of 27 to 36 Mexican soldiers that died during the Battle of Resaca de la Palma were examined for battle-related and occupational stress-related lesions. Over half of the identifiable individuals observed exhibit unhealed battle-related trauma caused primarily by projectiles and bladed instruments. However, most of the lethal wounds appear to have only caused soft tissue damage.

Two interesting patterns of injuries were observed that may provide some insight into the Mexican soldiers at Resaca de la Palma. The first is mild periostitis on the inside surface of the tibia and around the ankle joint that is indicative of medial tibial stress syndrome, which is a common condition in military recruits. The second is that most of the individuals with thigh bones present exhibit an elongated area of localized periostitis on the front surface of the thigh bone shaft near the hip. The high frequency of periostitis on the thigh bone, especially the right side, suggests that the chronic periosteal inflammation may have been due to the soldiers firing their overloaded muskets from the hip instead of the shoulder.

This study provides a rare glimpse into the life and death of Mexican soldiers during the 19<sup>th</sup> century, and important insight into the Battle of Resaca de la Palma. The results show that the Mexican Army was composed of resilient soldiers that lived a physically demanding life. This study also provides physical evidence that the Battle of Resaca de la Palma involved not only traditional battle tactics but also numerous hand-to-hand battles as indicated in the historic record.

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# “ALL QUIET ALONG THE POTOMAC TO-NIGHT”: ARCHEOLOGICAL SITES ASSOCIATED WITH THE CONTROL OF THE POTOMAC RIVER DURING THE FIRST YEAR OF THE AMERICAN CIVIL WAR

Joseph F. Balicki



FIGURE 1 BATTLE OF AQUIA CREEK.

## INTRODUCTION

John Milner Associates, Inc., in partnership with the Maryland Maritime Archeology Program and the Institute of Maritime History, undertook investigations of the American Civil War Aquia Creek Battlefield (Figure 1) in close coordination with the Virginia Department of Conservation and Recreation, and the Stafford County Department of Economic Development. The project was funded by an American Battlefield Protection Program (ABPP) grant. Research and fieldwork were conducted in four phases: 1) background research and KOCOIA documentation; 2) terrestrial archeology; 3) underwater remote sensing; and, 4) diver-led transitional zone underwater archeology.

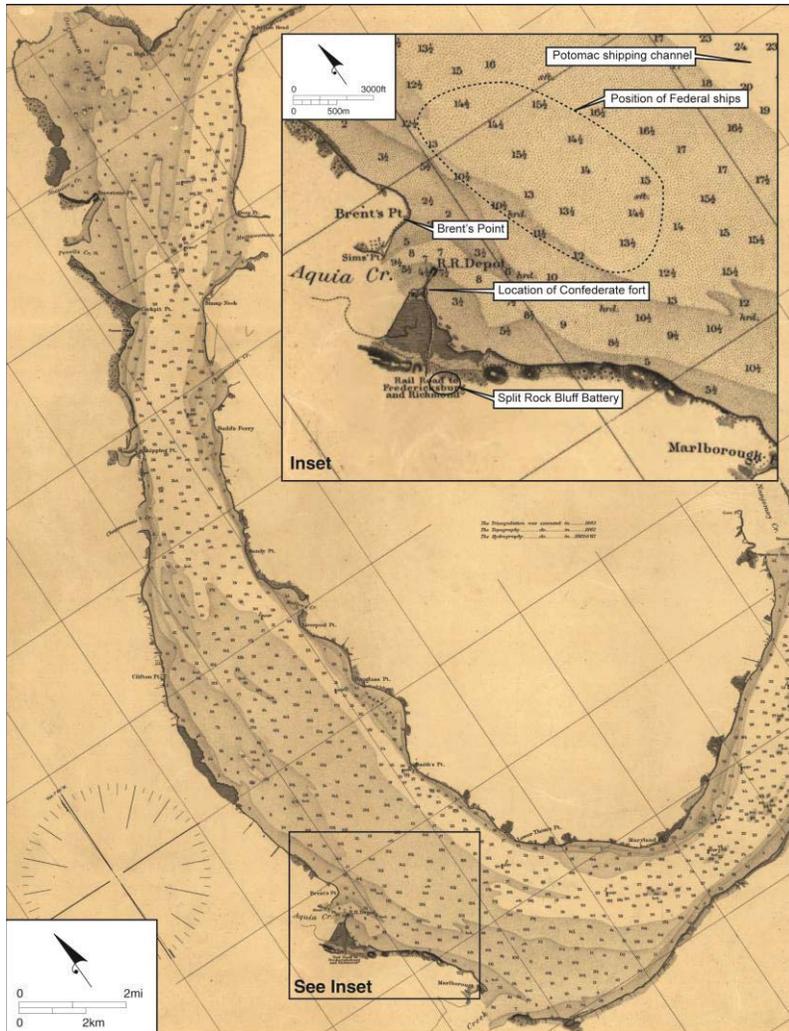


FIGURE 2 THE AQUIA CREEK BATTLEFIELD SEASCAPE.

This work is presented in a comprehensive report (Balicki et al. 2012), which presents results and recommendations for both immediate long-term protection and management of the Aquia battlefield.

## THE BATTLE OF AQUIA CREEK

Beginning in 1842, Aquia Landing was a transfer point, for both passengers and freight, between the Richmond, Fredericksburg, and Potomac Railroad (RF&P) and the Potomac Steamboat Company. On the eve of the Civil War there still was no direct railroad route between Richmond and Washington, D.C., making the rail terminus at Aquia Landing strategically important. Between May 1861 and March 1862, the Potomac River and the Virginia shore were at the forefront of the conflict in the Eastern Theater of the war. Afterward Aquia Landing would remain of strategic importance as a Federal supply depot for the rest of the war.

To understand the events of the 29 May and 1 June battle, one must be aware of the strategic thinking that led to the tactical decisions of the combatants. Strategically the Federal goal was to keep the Potomac open for navigation, minimize cross-river traffic, and deter the establishment of offensive batteries. Confederate thinking was twofold, defend Aquia Creek landing and then establish offensive batteries to disrupt Federal use of the Potomac River.

In May 1861, Aquia Landing became a landscape of conflict (Figure 2). On orders from General Robert E. Lee, Virginia State troops under General Daniel Ruggles constructed defensive positions guarding the avenues of approach. General Ruggles determined that the best way to defend the terminus of the railroad was to construct an earthwork at the tip of land, just behind the wharf on Aquia Creek. The forces the Confederates who had to defend this position were relatively new untrained Stafford County volunteer troops and the 2nd Regiment, Tennessee Infantry commanded by both Infantry and Naval officers.

On the evening of 29 May 1861, the *USS Thomas Freeborn* fired several times at the earthwork. The tide was out and the ship could not come within effective range (Wills 1975:25). The next day the Federals focused on Mathias Point, 18 miles downriver from Aquia. On 31 May 1861, the *USS Thomas Freeborn*, joined by the *USS Anacostia*

and *USS Resolute*, renewed the bombardment. The ships withdrew after two to three hours having fired all of their long range ammunition (Wills 1975:25). During the exchange the Confederates established a second battery of 3-inch rifled field guns on Split Rock Bluff, a high point behind the landing. The Federal ships could not elevate their guns high enough to fire on this position. Federal reports indicate the Confederate earthwork was put out of action, a claim disputed by the Confederates (Scharf 1877:96). The battle was resumed on 1 June when the *USS Pawnee*, *USS Thomas Freeborn*, and *USS Anacostia* engaged the Aquia defenses at 2,000 to 2,500 yards. The Confederates set the wharf buildings on fire as, on the 31<sup>st</sup>, the Federals had used them to range their guns.

The Confederate guns were mounted in embrasures. Consequently, their lateral field-of-fire was hindered and they could not keep Federal ships under constant fire. The Confederates counted the number of Federal rounds; during the battle 499 shots were fired at the Confederate defenses, causing little damage. The earthen fort, buildings at the landing, and portions of the railroad track were hit (ORN Series I Volume 4: 495). Confederate fire damaged both the *USS Pawnee* and *USS Thomas Freeborn*, but no one was injured. The *USS Pawnee* was hit nine times with the hull, main topsail, and mizzenmast damaged (Wills 1969).

The battle of Aquia Creek between 29 May and 1 June 1861 constituted a series of minor artillery exchanges between mostly static Confederate positions and the mobile ships of the Federal Potomac flotilla. The forces engaged were small, artillery rounds exchanged were few, casualties slight, and there was no decisive victor. The impetus for the battle was the Federal Commanders desire to attack the enemy where he could and test the Confederate forces at Aquia Creek and vicinity. Although a minor affair, the battle was one of the first engagements along the Potomac River. As such it had an effect on the strategic thinking of both sides. In the aftermath, Confederates solidified their positions and for a time blockaded a section of the river. The Federals struggled with keeping the river open to commerce. In early March 1862, the Confederates retreated from their positions along the river.

## ARCHEOLOGY AND KOCOA ANALYSIS

The Potomac River opposite the Brent's Point sandbar was examined for evidence of the battle. The results of the survey were inconclusive. No ships were sunk during the battle; thus, the only evidence would have been fired shot and shell. Although numerous metallic targets were found, none could be conclusively associated with the battle.

The documentary research led to the conclusion that Aquia Landing has lost a significant amount of land through erosion. The location of the Confederate battery was at the end of the landing, east of the railroad tracks and south of the wharf. This location is now submerged. A 1980s shoreline restoration destroyed virtually all of the landing's archeological potential. GPR investigations confirmed that almost all of the remaining landform is disturbed (Figure 3).

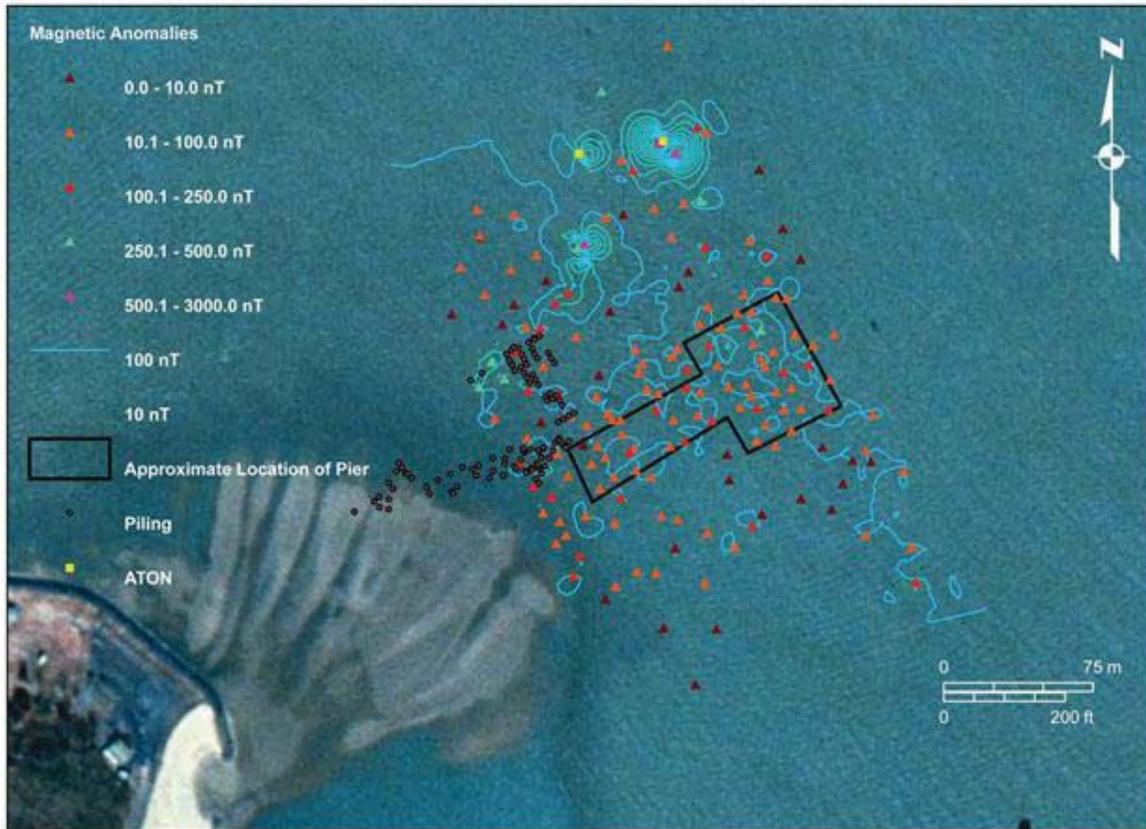


FIGURE 3 MAGNETIC ANOMALIES, AQUIA CREEK.

The most enduring archeological resources are the piers associated with Aquia Landing. The submerged wharf was found by geophysical survey and wading in the shallow waters adjacent to Aquia Landing Park. Periodically, these pilings have been exposed and will continue to be a link to the Civil War.

The battle involved both infantry and naval forces; consequently, KOCO analysis examined both terrestrial and aquatic features. Recently researchers have begun to use KOCO principles to assess and interpret naval conflicts. The added elements of tides, water system (channels, shoals, mud flats, etc.), and weather also have to be factored into the assessment of the battle. For example, the Potomac River was considered as a Key Terrain and Avenue of Approach; tides and configuration of the river channels were examined as obstacles. Additionally, one force, the Confederates fought from relatively static positions while the Federal forces presented moving targets.

The KOCO analysis shows that key elements of the battlefield have survived. Even with the extensive erosion and modification to the end of Aquia Landing, the battle and the tactical decision-making of the combatants can be discerned and understood based on the modern landscape. The Federal ships were 2,000 to 2,500 yards off the landing, just past the Brent's Point sandbar. The Confederates held the landing and on 31 May had a battery on Split Rock Bluff. Terrestrial investigations examined Brent's Point, Split Rock Bluff, and Aquia Landing. Underwater investigations were conducted where Federal ships cruised and in Aquia Creek where Civil War period wharf are present.

For the Confederates, the battle was fought by land forces defending a stationary target at an elevation of the river. Their fortification mounted four guns within embrasures, thus they had a limited field-of-fire. Supplementing this position was, for a brief time, an artillery battery located on an 80 foot high bluff, approximately 2,500 feet to

the rear of Aquia Landing. The forces the Confederates had to defend this position were relatively new untrained volunteers commanded by both Infantry and Naval officers.

A Confederate reported that the guns were of poor quality.

Some of the guns had been sent here for a battery about to be erected near the steamboat landing at Aquia. This was considered an important point, being the railroad terminus and on the direct road to Richmond. The armament for this "important point" was two old eight-inch navy shell guns, on ship's carriages; and with them there had been sent a few solid shot that could not be used, some unfilled shell, and no powder (Anonymous 1866:709).

In contrast the Federal forces included five Potomac Flotilla gunboats; *USS Pawnee*, *USS Thomas Freeborn*, *USS Anacostia*, *USS Reliance* and *USS Resolute*. The *USS Pawnee* was a regular sloop-of-war that mounted eight 9-inch guns and two 12-pound guns in broadside. The *USS Thomas Freeborn* was a converted side-wheel steam ferryboat armed with two 32-pound guns. The *USS Anacostia* was a sloop with two 9-inch Dahlgren guns. Both the *USS Reliance* and *USS Resolute* were small screw steamers each armed with one 24-pound gun and a 12-pound howitzer (Hanson 1953:42-43).

The Federals had an advantage because of the maneuverability the river afforded to bring forces to the conflict and how they could arrange and rearrange their attacking forces, but the river also limited their field-of-fire. Although the creek mouth is over 1.5 miles wide, the entrance for deep draft ships was only a 1,200-foot-wide channel that hugs the south shore of the creek. Local pilots indicated that "the channel at Aquia was very narrow, with but 10 to 12 feet of water--not room enough to turn the vessel in" (ORN Series I Volume 4:462). In order to enter the channel, ships approaching from upstream would have to sail directly in front of the Confederate guns and then execute a turn, which would take them directly toward the Confederate fort. The Confederates used their knowledge of the waterway in designing their defense, and only covered the channel entrance.

The north side of Aquia Creek is navigable to only shallow draft boats due to the presence of a large sandbar. In 1862, the depth of the water over this bar varied from 2-3.5-feet. The sandbar extends south-southeast for approximately 7,400 feet. The presence of this bar had a profound impact on the strategic thinking of the combatants. The Confederates defended the water approach to Aquia Landing, aiming their weapons to the east and southeast. Although they could move field pieces to protect against a crossing of the sandbar, these guns would have to have been placed in exposed positions on Brent's Point or on the Aquia Landing wharf. The Federal ships could not cross the bar but, took up positions just northeast of the bar in a "dead zone" protected from Confederate fire. The guns in the Confederate fort could not fire through or over the wharf, and the Split Rock Bluff Battery was too far away to bring effective fire to bear. The Federals, on the other hand, could fire upon the wharf and Confederate earthwork with near impunity.

## SUMMARY

The 29 May and 1 June 1861 battle of Aquia Creek has traditionally been viewed as one of the first between the Federal Navy and Confederate ground forces. The project enhanced Stafford County's commitment to preserving the battlefield landscape and highlighting their citizens' heritage. Much of the battlefield is owned by the County and the State. Public involvement included public presentations and stakeholder meetings. Unfortunately, due to lack of archeological deposits the public could not participate in on site excavations.

Archeological deposits associated with the Civil War wharf are present in Aquia Creek just off Aquia Landing Park. Continued investigation of the submerged pilings could yield important information on the terminus of the RF&P railroad at the time of the battle. Further, additional insight may be gained on the Federal rebuilding and use of the landing during the remainder of the war. The earthworks at Brent's Point and Split Rock Bluff are archeological features that will be sustained and preserved in public parks.

The KOCO analysis contributed to a growing body of research that employs the key principals of Military Terrain Analysis to assess and interpret naval conflicts. The extension of KOCO principals to water provides a method for organizing and integrating elements such as tides, water system (channels, shoals, mud flats, etc.), and weather into the assessment of the battle.

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# ANSWERING THE QUESTION “WHY?” IN THE STUDY OF BATTLEFIELDS: THE EXAMPLE OF THE BATTLE OF ROANOKE ISLAND

Lucas Simonds

## INTRODUCTION

The study of historic battlefields is often focused on determining the boundaries and major features of a battlefield based on historic accounts of the battle and archeological research. However, battlefield archeology also presents the opportunity to reexamine historic accounts, and to better understand the events of the battle itself. The naval action at the Battle of Roanoke Island, North Carolina, serves as a case study for how archeological, geographical, and historical data can be combined and interpreted in order to better understand the events of the battle. In particular, this study was focused on trying to answer questions about the motivations behind the decisions that the combatants made during the battle. In other words, the main question of the study was not what the combatants did, how they did it, or where they did it. Rather, this study focused on answering the question of why they did what they did during the battle. In order to get at this question, the study was based on some modern-day military decision-making frameworks that have become common in battlefield archeology (KOCOA and METT-T). Through the use of these frameworks, the study has led to a better understanding of the events of the battle, and can perhaps justify the most criticized decision made by the Confederate commander.

## BATTLE OF ROANOKE ISLAND



FIGURE 1 LOCATION OF THE ROANOKE ISLAND BATTLEFIELD.

The Battle of Roanoke Island took place on 7 and 8 February 1862 at Roanoke Island. Roanoke Island lies between the Outer Banks of North Carolina and the mainland, and served as a strategic choke point on the route to the Albemarle-Chesapeake and Dismal Swamp Canals, which led to Norfolk (Figure 1). The battle was the first blow struck against the Confederacy during the Burnside Expedition; a Union invasion of eastern North Carolina that lasted from February to June 1862. The battle began on the morning of 7 February, when a makeshift squadron of Union gunboats and troop transports made their way northwards through the narrow channel at the southern end of Croatan Sound. The Union squadron was a ragtag collection of converted ferryboats, passenger steamers, and commercial vessels that had been hastily

converted for military service in the months leading up to the invasion. Waiting for them, near the northern end of the sound, was the Confederate “Mosquito Fleet,” so called for the small size and weak firepower of the vessels. The Confederate squadron was a group of seven passenger steamers and canal boats, all but one of which only

mounted a single cannon. This squadron was supported by three forts constructed along the western shore of the island, one on the opposite side of the sound, and a series of sunken schooners and pilings that formed a barricade across the majority of the width of the sound.

After passing into Croatan Sound, the Union gunboats quickly moved north and began bombarding the southernmost Confederate fort, Fort Bartow; importantly, the Union firing position was out of the range of all of the other forts, as well as all but three of the cannon in Fort Bartow. The Confederate gunboats made a number of attempts to draw the union vessels north into the fire of the other forts, but they were unsuccessful. These attempts eventually led to the loss of the only boat that sank during the battle, *CSS Curlew*. In the afternoon, as the Union bombardment raged on, the Union troop transports moved in and began their landing operations at Ashby's Harbor, two miles south of Fort Bartow, and well out of the range of any Confederate cannon. By nightfall, both sides had expended most or all of their ammunition; the Union fleet retired to Ashby's harbor to wait, while the Confederate gunboats steamed north to Elizabeth City to resupply. The remaining troops were landed on the island during the night. On 8 February there were some desultory exchanges between the Union gunboats and Fort Bartow, but the majority of the action took place on the island as the Union force marched north, capturing the Confederate forts and forcing the surrender of the remaining defenders.

## BATTLE ANALYSIS

Although the fight on the island itself was key to the Union victory, this study focused particularly on the actions of the Union and Confederate squadrons on 7 February. The focus of the study was to better understand how factors such as terrain, the ships and cannon that were used, or the prevailing naval tactics of the time would have affected the decisions made by the Union and Confederate commanders during the battle. To do this, the study was based primarily on two frameworks from military decision making: METT-T (Mission, Enemy, Terrain, Troops Available, Time) and KOCOA (Key Terrain, Obstacles, Cover and Concealment, Observation and Fields of Fire, Avenues of Approach). These frameworks are shorthand methods for summarizing the important factors that must be considered when making tactical decisions. KOCOA focuses specifically on the aspects of terrain, and has been used frequently in battlefield archeology as a framework to define the features of a battlefield's landscape. METT-T, which includes KOCOA as the element of Terrain, encompasses a wider range of other factors that can be equally important when making decisions. In addition to these frameworks, the study involved a review of tactical manuals from the time of the battle, in order to understand the prevailing suggestions at the time for how to react to the factors embodied by METT-T and KOCOA.

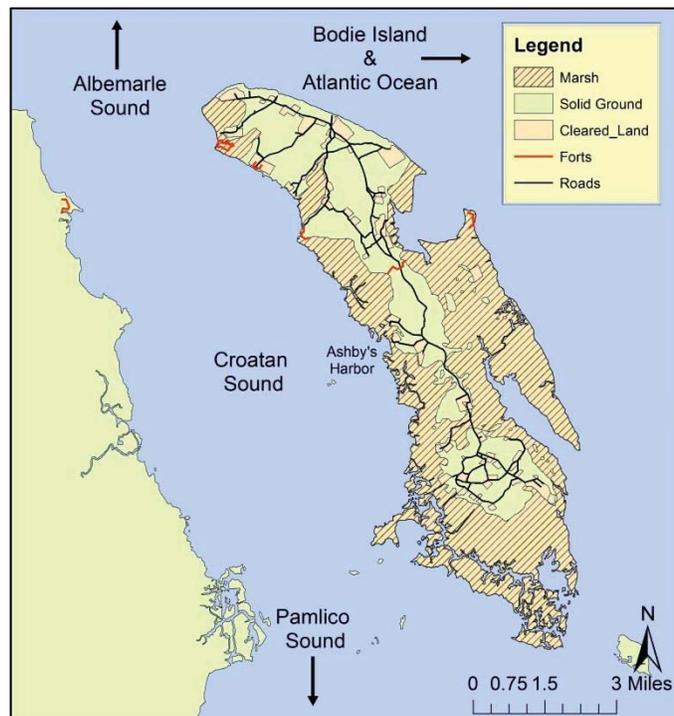


FIGURE 2 DIGITAL LANDSCAPE RECONSTRUCTION WITHIN GIS.

With these foundations in mind, the study began with the collection and analysis of data from a wide range of sources. In order to understand the terrain of the battlefield in 1862, data from US Coast Survey charts from the 1850s, 60s, and 70s were integrated into a geographic information system (GIS). This made it possible to create a digital reconstruction of the area in 1862, including shorelines and the depth of the water. On top of this base layer, other features such as the forts, fields of fire, and the barricade of sunken vessels were added (Figure 2). Next, first-hand accounts of the battle served as a source to compile data about the ships that were involved, where they were during the battle, what they were armed with, who was commanding them, and any other relevant data that was available. Tactical manuals from the period were then used to create a list of the tactical principles of the day that would have been relevant to amphibious landings and bombardments. Finally, the research team went into the field with a side-scan sonar and GPS to gather data about the location of the barricade of sunken ships and CSS *Curlew*, as well as to search for other undiscovered remains from the battle. Although nothing new was uncovered during the survey, the precise locations of two of the sunken schooners and CSS *Curlew* were added to the GIS, which greatly improved the accuracy of the reconstruction of the battlefield.

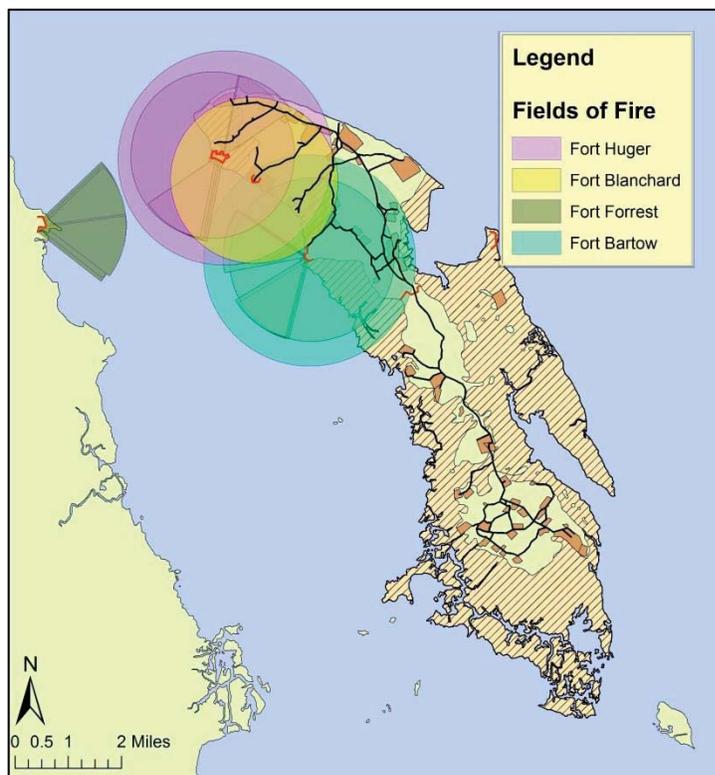


FIGURE 3 FIELDS OF FIRE OF THE CONFEDERATE FORTS.

Having collected all of this data, the next step was to return to the first-hand account of the battle and attempt to interpret the decisions of the commanders. This analysis was based first on the available data about the situation in which those decisions were made (categorized through METT-T and KOCOA), and second on the prevailing thoughts about how to act in certain situations (gained through the study of tactical manuals). Some decisions were not difficult to interpret. The location of the Confederate forts on the island allowed the Union gunboats to focus on Fort Bartow while remaining out of the range of the other three forts. Naturally, the elements of terrain, the guns in use, and prevailing tactical principals all played a role in motivating the decision, and this was revealed by the analysis. The decision to exploit this obvious weakness would also seem to be common sense though, and it did not necessarily require such in-depth analysis. Other decisions, however, are not so clear-cut at first glance. In the past, a

major criticism of the Confederate defensive strategy was that the Mosquito Fleet waited near the northern end of the sound for the Union attack, rather than meeting them as they passed through the narrow entrance of the southern end of the sound. Commentators have speculated that, if the Confederates had met the Union fleet at this natural choke point, they may have been able to prevent the landing operations that led to the capture of the island. When analyzing the decision to wait for the attack though, it becomes clear that the Confederate commander actually made the best decision available considering his circumstances. An analysis of the distribution of guns among the forces shows that, while the entirety of the Union firepower would have been present at the choke point, less than a quarter of the Confederate guns were mounted on their gunboats, with the rest being in the forts. The tactical principal of mass, elaborated in multiple treatises from the time, dictates that a commander

should always try to meet a smaller portion of the enemy force with the majority of his own force. By attacking at the choke point, the Confederates would have been completely ignoring this principle. Furthermore, the tactics of a defensive engagement dictated that a commander should wait in a secure location with artillery support in order to plan a counterattack rather than rushing ahead at the attackers. The Confederate position within the range of the forts and behind the barrier of sunken ships and pilings certainly fits the bill for this principle (Figure 3). Considering these facts, the Confederate decision to mass the firepower of the gunboats with that of the forts was tactically sound considering the situation. Although it failed, it was the best decision given the circumstances.

## CONCLUSIONS

The situation described above is only one example of how the in-depth analysis of archeological, geographical, and historical data can lead to a deeper understanding of a battle. The collection and analysis of this data—even in cases where the analysis simply provides an explanation for seemingly common sense decisions – ultimately allows for a richer narrative of the battle to be constructed, which places the events more solidly within their historical context. The work of battlefield archeologists to define, preserve, and manage historic battlefields is invaluable to our collective efforts to preserve our nation's history. It should not be forgotten though, that the land of a battlefield is not inherently valuable, it is only because of the events that took place and the sacrifices that were made there. In order to truly preserve the memory of a battle, we must not only work to protect the ground on which it took place, but also strive to understand, in as complete a way as possible, the events that took place there. The questions of what and where are often addressed in battlefield archeology, but the question of why is too often left behind as researchers move on to their next project. The methods employed in this study are one way to tackle the question of why, but they are certainly not the only way to do so. Hopefully, as the study of battlefields continues to develop, other methods will be conceived and tested so that our knowledge of the stories and motivations behind these momentous events can continue to deepen.

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# THE BATTLE OF MOORE'S MILL, MISSOURI: EMPLOYING VOLUNTEERS AND KOCOA TO ACHIEVE SUCCESS

Douglas Scott

## INTRODUCTION

The Battle of Moore's Mill is one of several engagements associated with Confederate Colonel Joseph C. Porter's recruiting operations in northeast Missouri in 1862. The Union victory at the 28 July 1862 Moore's Mill engagement in Callaway County, Missouri, stopped Porter's march south and kept the recruits with him from crossing the Missouri River and joining the Confederate army in Arkansas (Hance 1915; Mudd 1992; Williamson 1972).

The Battle of Moore's Mill began when a Confederate force ambushed a Union cavalry column near present-day Calwood in Callaway County, Missouri. For about four hours on that hot July afternoon, hundreds of men fought a desperate battle not far from Auxvasse Creek, a tributary of the Missouri River. The Union force was commanded by Colonel (later Brigadier General) Odon Guitar, commander of the federal forces at Jefferson City. The Confederates commanded by Colonel Porter were composed of a mixed force of local guerrillas and men he recently recruited.

It might be said the historical record is accurate in recording the events, but perhaps not precise in its description or detail of where actions occurred on the ground. Regardless of the depositional disturbances that have occurred due to farming, road construction and maintenance, and relic collecting on the Moore's Mill battlefield, the archeological data recovered there today is patterned and is the physical evidence of those events on 28 July 1862. The archeological data and its distribution record the fight in clear detail and provide a new and independent means of assessing and evaluating the disparate historical record of the event. It certainly does not alter the outcome, but it does provide a physical link, and an interpretable body of data, to an episode in the history of the American Civil War. This article describes an archeological analysis of the battle, based on KOCOA analysis and metal detector survey. The question to be answered was, "exactly where were the combatants?"

## ARCHEOLOGICAL METHODS AT MOORE'S MILL BATTLEFIELD

Research conducted on battlefields since 1987 has proven that metal detector surveys conducted by knowledgeable operators under the direction of a professional archeologist are the best method to locate evidence of fighting (Scott et al. 1989; Fox and Scott 1987; Connor and Scott 1998). Prior to the metal detector survey, the archeological team employed information in the written accounts of the battle to inform the choice of the survey area by employing the KOCOA technique to evaluate historic records and accounts of the battle (Scott et al. 2014). The team first investigated the land near the road and along the ridge where the Union forces were believed to be positioned, and slopes above the drainages where the Confederate forces were believed to have set their ambush. The accounts also indicated that the fighting took place on both sides of the road and one period map indicates that the road is in roughly the same place that it was in 1862.

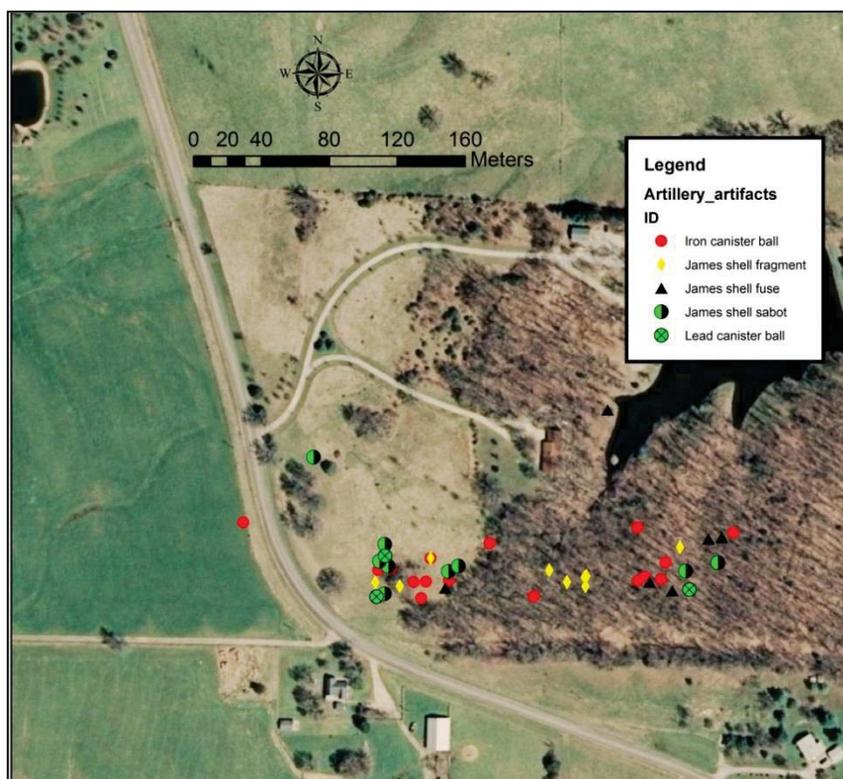


FIGURE 1 JAMES SHELLS AND CANISTER DISTRIBUTIONS ON THE MOORE'S MILL BATTLEFIELD.

It is clear from the historic record that Porter's command prepared and executed an ambush near the road running south from what is now Calwood. The written record clearly establishes that Federal troops riding south were ambushed by Confederates concealed in dense brush and woods on the east side of the road. The gun types represented in the archeological record and the distribution of those artifacts support the historic record and participant accounts that state that during the battle the Confederates were armed for the most part with shotguns but that some carried common rifles.

Artillery played a significant role at Moore's Mill. The written accounts indicate that Union

forces deployed two guns, one section of the Third Indiana Battery. One gun was placed on the road not far from the Confederate ambush line and Colonel Oden Guitar reported that it fired shell and canister at the hidden Confederates. The second gun was unlimbered and was placed in action at an unknown distance north of the first gun. This gun was ordered to shell the Confederate positions but no mention is made of the type of ammunition.

The archeological survey was undertaken in March 2013 using metal detectors operated by volunteers. The survey covered approximately twenty acres (Scott et al. 2014). The survey was a three-part process that included metal detector operators, excavators, and recorders who were largely students from Lindenwood University and Missouri Valley College. The metal detector operators walked transects until a property line was reached or until the density of Civil War era artifacts reached zero. When the operators located an artifact; the excavators removed the artifact from the ground and marked its location with a pin flag; and the recorders assigned the artifact a number, collected it and recorded its provenience using a handheld GPS unit.

## AMMUNITION DISTRIBUTION

During the battle several rounds of James artillery shell, case shot, and canister were fired at the Confederates (Figure 1). These are all exploding shells and thus no solid shot was fired. The systematic archeological investigations were constrained by a variety of later land alteration activities and episodes of relic collection. However, analysis of the shell fragments, fuse artifacts, sabot fragments, and canister distribution identify the Union artillery as 3.8 inch James Type I rifled cannon. Analysis of the shell, fuse, and canister distribution patterns suggests one gun, likely firing canister and probably shell, was on or near the current JJ Highway on the higher ground overlooking the densely wooded gullies and erosional ridges used to conceal the Confederates. This

forward gun fired to the east southeast and south. The second gun was likely located further north, perhaps 100 to 200 meters north of the canister firing gun and likely on or near the road. It fired James Type I shell and possibly case shot. The rounds were fired to the east southeast toward the erosional ridges in the gully system.

The small arms bullets recovered allowed us to identify, using firearms identification procedures, at least eleven types of shoulder arms and minimally three types of pistols used by both sides during the battle. The archeological evidence confirms the presence of shotguns and country or common rifles in the hands of the southern forces. The Confederates may have had a few .54 caliber rifled muskets and perhaps a small number of .69 or .72 rifled muskets in the command. Porter's "shotgun men" appear to have been largely concealed below the military crest, on the south side of the erosional ridges in the gully system which appears to have been covered by very dense trees and brush in 1862. The areas of concealment would likely have ranged from 30 to 100 meters from the road depending on the actual historic road alignment. The men with .54 caliber rifled muskets were likely posted in the midst of the shotgunners but within 50 meters of the road. The large caliber rifled muskets were likely posted among the shotgunners. The few common or squirrel rifles present cannot be accurately placed in the Confederate line due to the small number of bullets recovered. Tactically the intermixture of small arms, likely men deployed with shotguns intermixed with muskets, was sound as it provided a maximum amount of fire for the short-range shotguns to begin the ambush. As the element of surprise passed the intermingled longer-range rifled muskets provided fire support for the shotgunners as they reloaded.

Union ordnance reports of troop armament are consistent with the archeological evidence. The 9<sup>th</sup> MSM cavalry is clearly seen in the distribution of the pinfire cartridges. Given that modern road construction destroyed some evidence of the fight the 9<sup>th</sup> MSM can still be placed along the east side of the road and just north of the gully area. Based on the distribution of dropped or lost bullet finds that are associated with weapons issued to the Tenth MSM they were likely positioned to the right or west of the 9<sup>th</sup> MSM. The bullets that may be from the 10<sup>th</sup> MSM appear to have been fired from the west to the east southeast into the gully area. The 3<sup>rd</sup> Iowa Volunteer Cavalry had one company placed in the line to support the 9<sup>th</sup> MSM.

After Shaffer's column arrived there is some question as to which units and companies did or did not fight. The distribution of French .58 caliber minie balls suggests that the Third Iowa companies with Shaffer's column may have been deployed to support the line's center right, likely to fill gaps in the 9<sup>th</sup> MSM line created by the Confederate ambush shotgun blasts. The Second Missouri Volunteer Cavalry and perhaps the other companies of the 3<sup>rd</sup> Iowa and 10<sup>th</sup> MSM are reported to have been deployed west and east of the Union line. It is likely the statement of being deployed to the west may refer to the two companies of the 10<sup>th</sup> MSM with Shaffer.

The distinctive bullets representing the arms of eight companies of Merrill's Horse and possibly Rice's Red Rovers including the Sharps and Hall carbines are clearly present archeologically. They are on the far eastern edge of the Union line. This area is on gently sloping land between the gravel driveways leading to the two houses currently on the property. The landform slopes gently toward the south and southeast gully area. This slightly higher ground affords an excellent field of fire to the south and east southeast. The gully ridges that concealed the Confederates are about 100 to 150 meters distant from the higher ground. These are the ranges at which the Sharps and Hall carbines were sighted for combat purposes. Whether the independent company of Rice's Red Rovers actually participated in the battle or were held in reserve is an open question. However, the Hance (1915:8; Mudd 1992:192, 214) accounts of Rice asking to have captured weapons returned does suggest that somehow two or three of the Sharps carbines were lost during the engagement.

## BATTLEFIELD LANDSCAPE ANALYSIS



**FIGURE 2 KOCOA ANALYSIS ALLOWS FOR A RELATIVELY ACCURATE PLACEMENT OF BATTLELINES AND MANUEVER.**

Analysis of the archeological collection and artifact distribution through computerized modeling of the landscape and terrain employing the KOCOA approach provides us with relatively specific locations where troops and artillery batteries were positioned on the field (Figure 2). That evidence occurs in the form of impacted bullets and artillery shells, as well as lost equipment items and unfired bullets dropped or lost in the heat of battle. The archeological evidence provides the tangible link with the historic accounts of where actions occurred.

Regardless of the accuracy of the historic maps, or lack thereof, the road network that existed at the time of the battle is nearly the same as the modern road alignment. What is abundantly obvious from the reconstruction of artillery positions based on the archeological artillery artifact distribution is the clear correlation of the road network and the location of artillery pieces. Guns could not be easily moved through wooded or brushy areas without a trace or a road. They could maneuver on open ground, if it was not muddy, but roads were the key to moving these heavy pieces

of ordnance, and they were key to where the guns went into action as well. Placing the cannon on the landscape based on the archeological evidence puts them on or immediately adjacent to roads or traces shown on the various maps.

KOCOA analysis, archeological artifact distributions, and the GIS-based viewshed analysis demonstrate the fields of fire for both sides were constrained by the landscape geography of the area. The battle's core area is limited to the dissected gully areas for the concealed Confederate force and the ridgetops for the Union forces. The battle area is relatively small. Viewshed or weapons fan analysis based on the limits of shotgun ranges and the ranges of human visibility on this terrain confirm the artifact distribution data and aid in limiting the battle space boundaries.

## CONCLUSIONS

The archeological data tells us what types of arms and accouterments were used by the combatants at the Battle of Moore's Mill. This data augments the historical record, which was largely silent on the types of weapons employed on the battlefield. Moreover, the artifacts located by the archeological survey clearly show the location of battle lines—where Union troops and Confederate troops were located during the fighting. As there are no contemporary battle maps, this information is invaluable. The data derived from the archeological survey of the Moore's Mill battlefield will be used in conjunction with data from other Missouri battlefields to determine if more information can be gleaned from the artifacts discovered. With more intensive testing it might be possible to determine if trace elements in lead artifacts can be used to determine if rounds were Union or Confederate. At

Moore's Mill, X-Ray Fluorescence (pXRF testing) was used but the sample proved to be too small to be valid. However, this data could be verified if tested with a larger sample from another battlefield.

The use of volunteers, many of who are local residents has helped to build a cadre of supports for preservation of the battlefield. Those who worked on the site have a higher understanding of what the loss of artifacts and their context means, and they have become a strong local voice for protection. The use of modern analytical tools like KOCHOA coupled with GIS mapping of artifact distributions provides a clearly defined core battlefield area that can be preserved and protected with no change in current land use. Analysis of the archeological and historic data sets has led to the drafting of a nomination form to place the site on National Register of Historic Places.

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# EXCAVATING THE KING OF BATTLE: STUDYING ARTILLERY AMMUNITION IN CONFLICT ARCHEOLOGY

Carl G. Drexler

## INTRODUCTION

Battlefield archeologists typically work with large collections of artifacts, everything from bullets to sling stones; gun parts to buttons. By examining them closely and studying patterns in the places we find them on a battlefield, we can often reconstruct the battle, showing where different units, sometimes individual soldiers, were and how they moved across the battlefield.

We also study different kinds of battlefield artifacts to see what we can do to better understand how they were made and what kinds of things happen to them during their use. Other archeologists have worked on things such as round balls from the American Revolution. This chapter shows a bit about what a team of archeologists have been able to do with the ammunition used by the artillery, known as the “King of Battle.”

## ARTILLERY TYPES

Many different kinds of artillery ammunition have been used throughout the course of history; everything from stone balls to nuclear warheads. This article focuses on the main kinds of ammunition used during the American Civil War (1861-1865). During that conflict, five main kinds of ammunition were used by both sides, solid shot, common shell, case shot, canister, and grapeshot. Of these, the first three were long-range ammunition, the other two were used at shorter range, generally under 400 yards.

Solid shot rounds, as their name implies, were solid iron. These were used for battering fortification walls, or against approaching lines of infantry, either on a flat trajectory (for rifled ammunition) or skipped across the ground (for spherical smoothbore ammunition). For spherical ammunition, solid shot were used to name the caliber of the weapon. The most popular cannon of the war, the Model 1857 “Napoleon” gun-howitzer, was of 12-pounder caliber (4.52” bore diameter), meaning it fired solid shot that weighed twelve pounds. Smaller 6-pounders (3.43” bore diameter) were also used, as were some 14, 24, and 32-pounders; the latter being used mostly in forts. Cannons designed for rifled ammunition, and very large seacoast and naval cannons, commonly used the inch-based system, with three-inch guns being common in the field, and seacoast and naval guns running around 11-inch to 13-inch varieties, though they might range as large as 20-inch. These calibers were used for the other kinds of ammunition discussed here.

Common shell were shaped just like solid shot, but had a hollow chamber inside them that would be filled with gunpowder and fitted with a fuse. The fuse would either be timed to burst in the air above enemy troops, showering them with many fragments of lethal iron, or on impact. These were long-range anti-personnel rounds, and worked with devastating effect on many battlefields.

Case shot rounds were similar to common shell, but had a slightly shorter range and greater killing power. Like common shell, they also had a chamber inside, though slightly larger than the common shell. Into this were poured

iron or lead balls and a small bursting charge. When these rounds exploded, they threw many more fragments, or shrapnel, killing more people.

Canister rounds were short-range ammunition, and were highly effective against the massed infantry formations used during the war. They were little more than a large shotgun round for the cannon, consisting of a tinned iron can filled with round iron or lead slugs. When fired, the slugs tore great gaps in enemy lines.

Finally, grapeshot rounds were also used at short range, but more commonly by the navy than the army. These had larger slugs than the canister rounds, and were specifically designed to tear away the rigging on an enemy ship. Some stands of grapeshot were used during the war in land battles, but they were a comparative rarity.

## ARTILLERY ARTIFACTS FROM WEST OF THE RIVER

All of these kinds of ammunition, except for grapeshot, were used at two of the biggest battles fought west of the Mississippi River during the Civil War, Wilson's Creek (10 August 1861) and Pea Ridge (7-8 March 1862). Wilson's Creek (Piston and Hatcher 2000) was the first major battle, and Pea Ridge (Shea and Hess 1992) was the most strategically significant, as it secured Missouri in U.S. hands.

Both battlefields are now national parks, and both were studied archeologically in the 2000s by a team consisting of archeologists from the National Park Service, Midwest Archeological Center, park staff, and a large number of volunteers, headed by Douglas Scott (Scott, Roeker, and Drexler 2008). I was fortunate to be one of those archeologists, and what follows are the products of this collaboration. Together, the team recovered over 1,400 battle-related artifacts from Wilson's Creek, and 2,700 from Pea Ridge. Artillery ammunition constituted a large portion of each set of artifacts.

Each one of these artifacts was collected individually, and its location mapped with a high-precision global positioning system (GPS). By plotting the artifacts and comparing those plots to the historical documents associated with each battle, we were able to identify groups of ammunition that we could reliably associate with either Confederate or Federal artillery units. This allowed us to then make comparisons between the two sides in terms of the characteristics of their ammunition.

When archeologists have tried to study battlefield finds, they usually look for ways in which they can link the finds to the documented kinds of ammunition, weapons, etc., known to have been used during the battle. This kind of work has been very beneficial in terms of helping us orient ourselves to the landscape and figure out where different units were. Using the Pea Ridge and Wilson's Creek artifacts, however, we decided to take a slightly different approach, and see if the artifacts could tell us anything for which there is little documentation, and which pertain more to off-battlefield aspects of the conflict. To see if this was possible, we turned to a suite of metallurgical and morphological studies.

## METALLURGICAL ANALYSES

Starting with the metallurgical studies, I assisted two colleagues (Caporaso, Drexler and Masters 2008) in looking at common shell and case shot fragments from both battlefields. These were all made of iron (indeed, few other substances were used in artillery ammunition during the war), and we know from period ordnance manuals how

they were supposed to be produced. Great detail was offered in the manuals on the method of production and the quality-control standards specified to produce reliable, uniform ammunition. Reliable ammunition would behave predictably, not exploded prematurely and endangering friendly troops, and would have flown reasonable true to the target. Uniform ammunition helped with reliability, and ensured that problems, such as a round being too large to be loaded and fired, were not discovered on the battlefield.

To explore these issues, archeologists and engineers from the University of Nebraska, in collaboration with the Midwest Archeological Center, conducted a series of tests, looking at the structure and composition of the iron used in each side's cannonballs.

We looked at the microstructure of the iron using a scanning electron microscope, noting that small flakes of a substance called ferrite looked different in both sides' ammunition at Wilson's Creek and Pea Ridge. Ferrite flakes order themselves into star-shaped patterns when the metal cools slowly (Figure 1). When they cool more rapidly, the star patterns don't have time to form. Noting this difference was important in that it tells us that both sides used freshly-made ammunition at Pea Ridge. The winter of 1861-1862 was particularly cold, and would have driven down the ambient temperatures in the arsenals where the ammunition was being produced. This made the cannonballs cool faster, resulting in more erratic ferrite flake patterns.

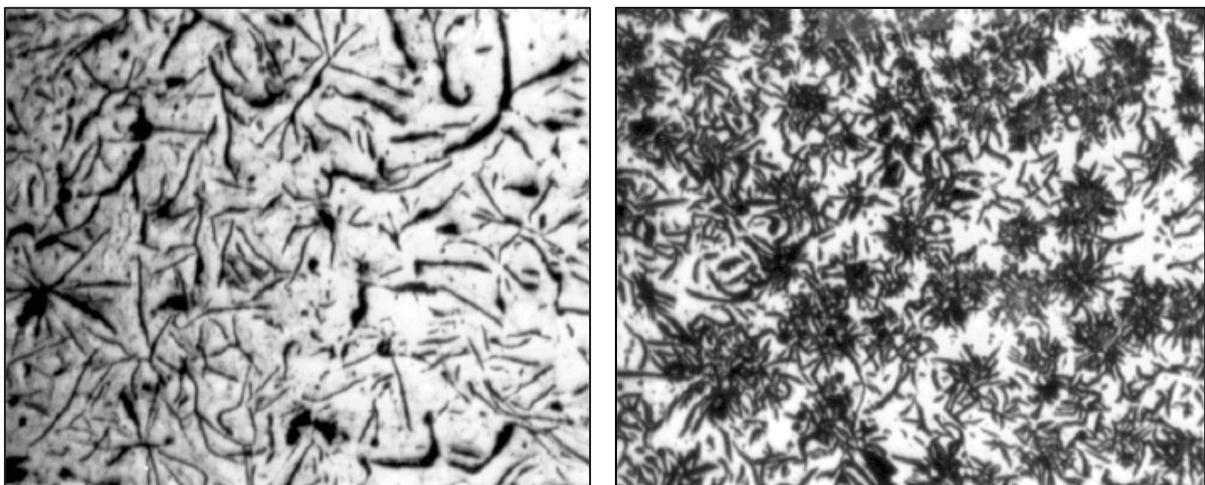


FIGURE 1 JUMBLED FERRITE FLAKES CAUSED BY QUICK COOLING (L) AND STAR-SHAPED FERRITE CLUSTERS CAUSED BY SLOW COOLING (R).

We followed this up with an examination of the chemical composition of the iron used in both sides' ammunition at both battles. We found that the Federal ammunition was more regular in composition than the Confederate, at that between Wilson's Creek and Pea Ridge, federal ammunition became more regular, and Confederate ammunition became less regular. This tells us that Federal ammunition was being produced in better-run, and perhaps fewer (likely, larger) facilities than the Confederates, and that quality control was being maintained and improved with time as the Federal side mobilized its industry for the war. The Confederates, on the other hand, were producing ammunition in more varied circumstances, due either to using more facilities with unique setups, or using personnel who were not as specialized in the production of the munitions. Let's not forget that these differences appeared within the first seven months of the war.

These show that we could find some interesting patterns when we look very closely, and that we have only scratched the surface of what we can do with battlefield finds. They were particularly valuable to us in that the armies that fought west of the Mississippi River did not keep the best records. Any line of evidence that tells us

something about how both sides, but particularly the Confederates, organized for war and how effective they were at doing so, tells us a needed story about the conflict, one that we don't really have the documents for. Still, these required a lot of expertise and some advanced equipment. I was able to do some other analyses that were much more low-tech, but nonetheless yielded some interesting results.

## METRIC ANALYSIS AT PEA RIDGE

I tried one kind of metric analysis on cannonball fragments from Pea Ridge. Again, this was based on our ability to associate some groups of finds with one side or the other (Carlson-Drexler, Scott, and Roeker 2008). Once more, I was interested in the question of uniformity as an indicator of the quality and sophistication of a production practice. Well-tooled facilities operated by well-trained staff should produce more uniform and consistent ammunition than cruder facilities worked by people who were still learning the craft.

To look for uniformity, I borrowed techniques developed to study pottery. Archeologists see, in prehistoric contexts, that when people go from a situation where everyone makes their own pottery to one where a few specialists churn out pottery for the group, the pots become very uniform. Each pot tends to start looking like the other, and the pots have a very nice, uniform thickness throughout; a testimony of the skill of the potter. Other archeologists have documented this shift in broken pottery fragments, so I decided to try it out on broken bits of cannonball.

Taking explosive shells (common shell and case shot) to be something akin to an iron pot, I used this same technique on 382 shell fragments recovered from Pea Ridge. I found a documentable difference between Union and Confederate ammunition. Union ammunition was slightly more uniform than Confederate ammunition, suggesting a difference in the quality of the production facility, echoing what we found in the metallurgical analyses. It is quite possible that this difference would play out on the battlefield. An uneven shot would be weighted oddly, causing it to fly wide of the target when fired, unlike a round with more uniform thickness and better balance. I also took a look at short-range ammunition at Pea Ridge. Canister balls were measured three times to get an average diameter, which, when plotted against weight gives us groupings shown in Figure 2.

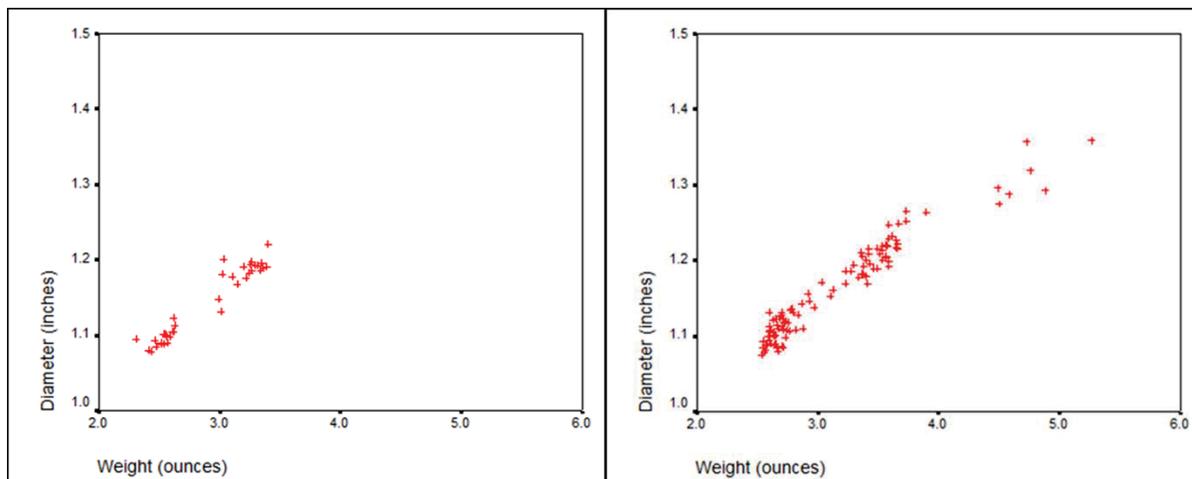


FIGURE 2: CANISTER SLUGS FROM PEA RIDGE ASSOCIATED WITH UNION (L) AND CONFEDERATE (R) ARTILLERY BATTERIES.

Notice how the federal ammunition clusters around two points. These correspond to the prescribed diameters and weights for 12-pounder and 6-pounder ammunition. The Confederate ammunition shows no comparable

clustering, indicating their ammunition was much less uniform. As seen with the long-range ammunition, Union ammunition conforms much more to regulation than the Confederate did, indicating that there was, even at this early part in the war, differences in the quality of ammunition each side's war industries were producing.

Beyond the measured difference in canister slugs lies the recovery of several fragments of "bar shot." These were hastily-produced rounds of canister made in camp by Southern forces before Wilson's Creek. They are little more than square iron bar stock cut with chisels or large shears. The field team recovered these at both Wilson's Creek and Pea Ridge, and they represent the degree to which standards can evaporate in moments of urgency when there is no production facility available.

## CONCLUSION

Conflict archeologists have made great strides in figuring out how to read the patterns of battlefield artifacts to reconstruct the movement of troops across a battlefield. This is a significant advancement, and has brought much to our understanding of many past conflicts. However, there is more written in the artifacts than simply that which was originally designed. Through innovative studies using advanced technology, conflict archeologists can see evidence of the successes and failures nations experienced in their attempts to arm their soldiers and keep up the fight.

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# WESLEY MERRITT AT CEDAR CREEK: THE ARCHEOLOGICAL DELINEATION OF THE 1ST DIVISION CAVALRY CAMP, ARMY OF THE SHENANDOAH, OCTOBER 1864

Clarence Geier, Joseph W. A. Whitehorne, and Alyson L. Wood

## INTRODUCTION

The focus of this study is a large military encampment that was part of the far more extensive Union Army of the Shenandoah. The encamped army was attacked by the Confederates in the historically significant Civil War Battle of Cedar Creek in October of 1864. Most of the site will be ultimately be lost, but the archeological information it contained will contribute to the interpretation of the camp, soldier behavior, and the battle that are at the heart of the recently established Cedar Creek and Belle Grove National Historical Park. Relying on volunteers affiliated with the Northern Shenandoah Valley Chapter of the Archaeological Society of Virginia, systematic programs of metal detecting were used to reveal the plan of encampment. While the techniques employed have been used elsewhere, this project is certainly one of the largest in scope carried out in Virginia and the Middle Atlantic.

## STRATEGIC CONTEXT

The Federal plan to gain control of the Shenandoah Valley in 1864 began poorly. The failed efforts of Major Generals Franz Sigel and “Black” Dave Hunter, led to the embarrassing March on Washington by Lieutenant General Jubal A. Early’s Confederate Army of the Valley in July. The Confederate advance caused Federal General in Chief, Ulysses S. Grant, to spur the War Department to reorganize Federal forces in the Shenandoah Valley. The result was the Middle Military Division under the command of Major General Philip F. Sheridan. Grant ordered Sheridan to accomplish two objectives; remove Early’s Confederate Army of the Valley and strip the valley of everything that could be used to supply the Confederacy (Lewis 1987:101; Wert 1987; Wood et al. 2013).

As Sheridan’s new command came together in late August, 1864, his numbers approached 40,000 men, consisting of three infantry corps; the VIII, VI, and XIX. In October, his army was enhanced by three cavalry divisions under the overall command of Brigadier Gen. Alfred T. A. Torbert. The 1<sup>st</sup> Division was commanded by Brigadier General Wesley Merritt, the 2<sup>nd</sup> by Colonel William H. Powell, and the 3<sup>rd</sup> by Brigadier General George Armstrong Custer (Mahr 1992; Wert 1987; Wood et al. 2013).

The 30 days between 19 September and 19 October 1864 saw almost continuous action for Sheridan’s army (Battle of 3d Winchester, Fisher’s Hill, “burning” of the Valley, Toms Brook) taking it well up the valley and away from its main headquarters at Winchester, Virginia. As Sheridan withdrew back towards his base in early October, he moved into bivouac on the heights north of Cedar Creek to allow his victorious army an opportunity to rest, reorganize, and resupply before going into winter camp. Initial elements were encamped by 11 October, with the 37,000+ man force draped across roughly six miles along the north side of Cedar Creek beginning at its mouth at the North Fork of the Shenandoah. On 19 October the encamped army was surprised by the Confederate Army of

General Jubal Early and driven from their camp. That afternoon the Union counterattacked and regained the camp; most of the army re-occupying the same positions they had held that morning (Mahr 1992; Wert 1987).

## THE PROJECT

In 2008, James Madison University researchers began a program of survey and site identification on a 520 acre parcel of land on Middle Marsh Run, a principle tributary of Cedar Creek west of Middletown, Virginia. The combination of archival research, visual reconnaissance, systematic shovel test pitting, and an extensive program of systematic metal detecting, resulted in the identification of the 154 acre encampment of the 1st Division U. S. Cavalry of Brigadier Gen. Wesley Merritt. Rigorous reconnaissance aided by excellent military maps of the battlefield revealed that the modern natural agricultural landscape was very similar to that in 1864 (Geier et al 2011; Wood et al 2013).

Shovel test pitting at maximum 50 foot intervals proved useless for identifying the encampment, while the systematic metal detecting revealed the military occupation. Using the same grid established for the test pitting, metal detectorists, affiliated with the Northern Shenandoah Valley Chapter of the ASV, walked defined transects separated by 50 foot intervals. Teams of students worked alongside the detectorist and as metal hits were identified each was excavated, recovered, bagged, and given a unique code number. A flag was placed at the findspot marked with the same coded number. The depth of the artifact below grade was recorded and the exposed soil was searched for evidence of charcoal, burned clay or other evidence that might suggest the presence of buried features. Upon completion of each transect, the survey team would return along the opposite side documenting additional items as found. This process produced a linear transect, roughly 10 feet wide. The location of all identified artifacts was mapped using a Nikon Total Station. With the use of ArcGIS, maps were then produced which revealed the spatial patterning of artifacts. Using these procedures the site evaluation has gone through two phases. In 2010 the outer margins of the site were defined and placed within a model of the 1864 cultural landscape (Geier et al 2011). In 2012, systematic testing continued in order to find evidence of internal site patterning (Wood et al 2013).

## SITE HISTORY

While existing military maps were useful in interpreting the natural and cultural landscapes where the Army of the Shenandoah camped and the 19 October battle was fought, they proved to be of remarkably little use in defining the precise location of the 1<sup>st</sup> Division camp. General descriptions do exist, and the harvesting of bits and pieces of information from military guidelines, diverse journals, diaries, letters, etc. provided some glimpses into camp activities.

Brigadier General Wesley Merritt's 1<sup>st</sup> Cavalry Division encamped along Middle Marsh Run for six days prior to the Battle of Cedar Creek, the camp being broken down and removed as the battle commenced. As part of the larger Union camp, the 1<sup>st</sup> Division held the ground between the Union VI Corps commanded by General Horatio G. Wright and the 3<sup>rd</sup> Cavalry Division of Brigadier General Custer which held the right flank. Unfortunately, but not uncommonly, specific historic documents describing the plan of Merritt's Camp do not exist, though it is known that the 2<sup>nd</sup> Brigade of Colonel Thomas Casimer Devin and the Reserve Brigade of Colonel Charles Russell Lowell, were encamped at the site. This included roughly eight cavalry regiments or approximately 1,700 men and a similar number of horses. The Division headquarters staff was present, with the 5th U. S. Cavalry from Brigadier

Gen. Thomas Devin's 2<sup>nd</sup> Brigade in support. The 1st Brigade commanded by Colonel James Kidd was on picket duty west of the main camp (Geier et al 2011).

As the Battle of Cedar Creek unfolded, Merritt's Cavalry, along that of Custer's, played an active role in the action. In the afternoon and through the next day, the 1<sup>st</sup> Division pursued the retreating Confederate Army. Upon its return to Cedar Creek it was moved to the left of the Union line and did not return to its original camp site. There is no record of either an earlier or later military encampment at the site, a fact that enhances its interpretive significance as a single component site (US War Department; 1893, OR, Series I, Vol. 43, Part 1).

Since 19 September Merritt's cavalry unit had seen almost continuous action. Consistent with the protocols for troops in the field, the wagons containing the unit's personal items as well as some of the basic supply functions of the division had been left in Winchester. After 30 days of often severe action, the encampment at Middle Marsh provided the first opportunity for the troops to rest and resupply. Primary activities would have included the care, repair and replacement of clothes, weapons, saddles, bridles and other horse gear including the re-shoeing mounts of their mounts by the company farrier. The lack of personal items recovered at the camp suggests that the wagons carrying personal supplies never reached the troopers at this camp. Available accounts indicate that in spite of the temporary nature of the camp, many of Sheridan's soldiers who returned to their original camp sites began to make their tents as comfortable as possible adding wooden floors, small hearths, etc. There is no such evidence for that taking place at Middle Marsh Run.

Some insight into probable features of the cavalry camp is provided in the *Revised U.S. Army Regulations* manual of 1863. Those guidelines, which served as a standard for the Army of the Potomac, include a specific plan for an encamped regiment of cavalry that was to be followed as terrain conditions allowed. Given the open nature of the moderately sloping and open terrace landscapes enclosing the Middle Marsh Run, it is quite possible that this camp plan or a close equivalent was used to guide the layout of the 1<sup>st</sup> Division camp complex. The dissected nature of the terrace terrain, however, would have prevented a simplistic pattern of immediately contiguous companies or squadrons.

## THE CAMP

Site archeology revealed the 1<sup>st</sup> Division camp to lay across a 260+ acre farm owned by Abraham Stickley. At the time, the family of his son, Benjamin Franklin Stickley, and a small community of enslaved African Americans was residing on the farm which had the historic name of Nieswander's Fort (Figure 1). A network of primary and secondary roads joined the camp to that of Custer's 3<sup>rd</sup> Division to the west, to Sheridan's Headquarters at Belle Grove, to the camps of the Union VI and XIX Corps, to the Valley Turnpike at Middletown, Virginia, and to key fords of Cedar Creek. An abandoned, road trace identified as Nieswander's Road ran parallel to the Old Forge Road that bounds the site on the north and effectively divided the farm into two halves. The prestigious two story tall stone Stickley residence (Figure 2) and associated farm structures lay almost center within the defined farm boundaries. A single slave cabin lay south of Nieswander's road, on the east side of the Run, approximately one quarter mile east of the house site.

Distributions of artifacts (Figure 3) revealed by metal detecting identified three contemporary areas of encampment and an outlying picket area lying across 154 acres of the farm (Wood et al 2013). The northernmost or North Camp lay east of the Run, north of the farm access lane on the faces of a series of low, heavily weathered

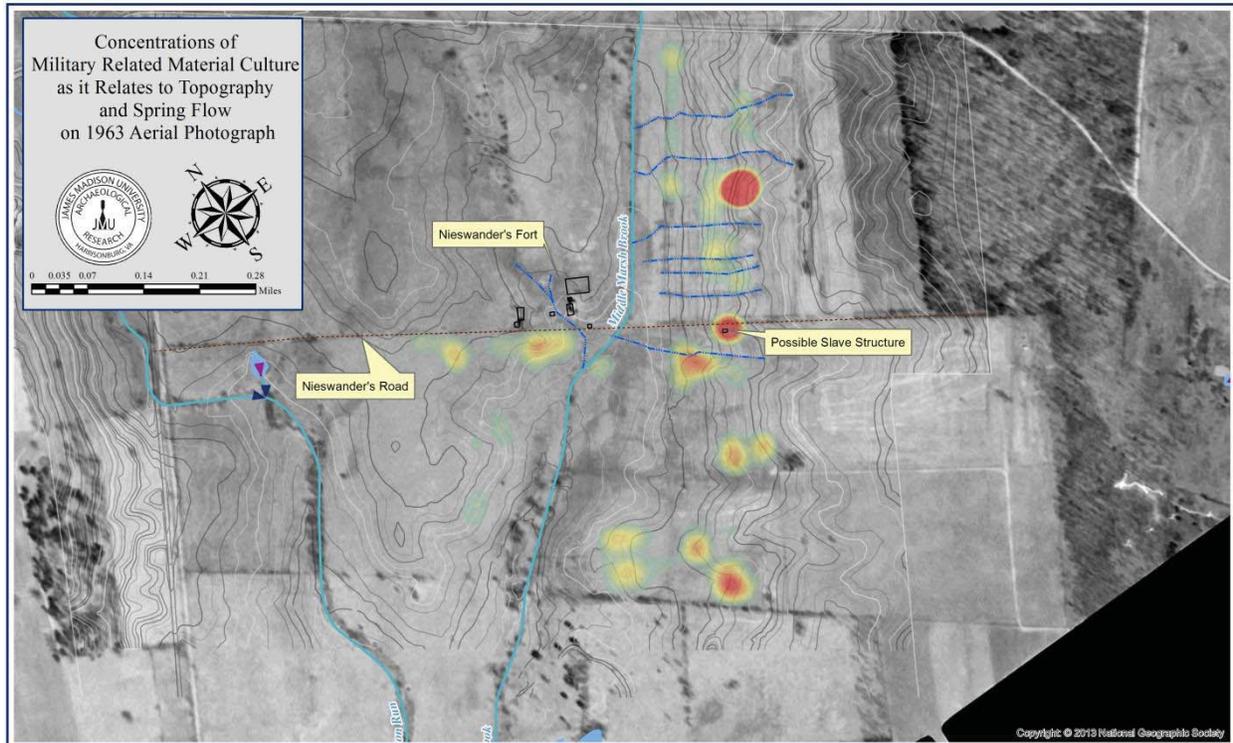


FIGURE 1 BENJAMIN FRANKLIN STICKLEY FARM (NIEWANDERS'S FORT) SHOWING AREAS OF ENCAMPMENT ARTIFACT DENSITY.

and dissected first terraces and the more developed second terraces. South Camp lay east of the Run and south of the road to the Stickley house. The terrain placement continues a pattern of weathered, terraces and valley slopes that are dissected by seasonally flowing springs that drain into the marshy floodplain. The Stickley slave quarter lies at the north end of the camp and was occupied by cavalry troops either as a brigade headquarters or a vedette regulating movement into the camp area from the east.

The third or West Camp lies on the east facing slope of a weathered upland ridge west of the Run. Only one of the two ravines crossing the camp landform shows evidence of sub-grade seasonal stream flow, however, this ravine divides the camp into two smaller camp areas. The Stickley Farm Complex lies immediately to the north and could have contributed to the support of the division headquarters staff. The slightly more substantial pattern of encampment debris to the south of the ravine and could identify the position held by the 5<sup>th</sup> New York Regiment, who served as Merritt's military escort.

Camp size, artifact types and comparable terrain placements are believed to attribute North and South Camp to the two resident brigades. In these areas encampment debris is consistently found on faces and intermediary slopes of first and second terraces east of Middle Marsh Run and within the drainage ravines that separate them. Perhaps coincidentally the location of the seasonal springheads are placed at a height approximating the east end of the observed encampment scatters and it is possible that at least some could have been dug out and used as a source of water for troopers and livestock.

Many of the artifacts at the camps show evidence of burning or heat alteration from discard in fire hearths (melted lead, burned nails). Machine cut nails of various lengths are the largest category of artifacts found, many suggesting debris from storage boxes. Dropped, unfired bullets are common finds. Not only do these items act to define encampment presence and patterning but differences in types aid in identifying the resident brigades. In



FIGURE 2 STICKLEY HOME (NIESWANDER'S FORT) (HABS FOLIO 210).

the North Camp Spencer bullets and cartridge casings represent 74% of the dropped bullets found. Regiments commanded by Charles Russell Lowell in the Reserve Brigade were armed with Spencer repeating carbines, suggesting their occupation of this camp. In contrast, Sharps carbine bullets represent 65% of those found in South Camp. This camp probably was occupied by the 2nd Brigade of Thomas Devin, who were armed with Sharps carbines.

Clothing, equipment and gun parts discarded from the process of repair and replacement occur in the camp debris, though for the amount of area archeologically tested and the number of troops encamped, the quantity is relatively small. Certainly the number of items of personal property and use (tags, rings, coins,

gaming pieces, smoking materials, pocket knives, kitchen items etc.) is quite small. While some of this may reflect previous metal detecting at the site, it is more probable that this represents the state of troops on active duty whose personal gear is in storage on regimental wagons at the army headquarters supply depot.

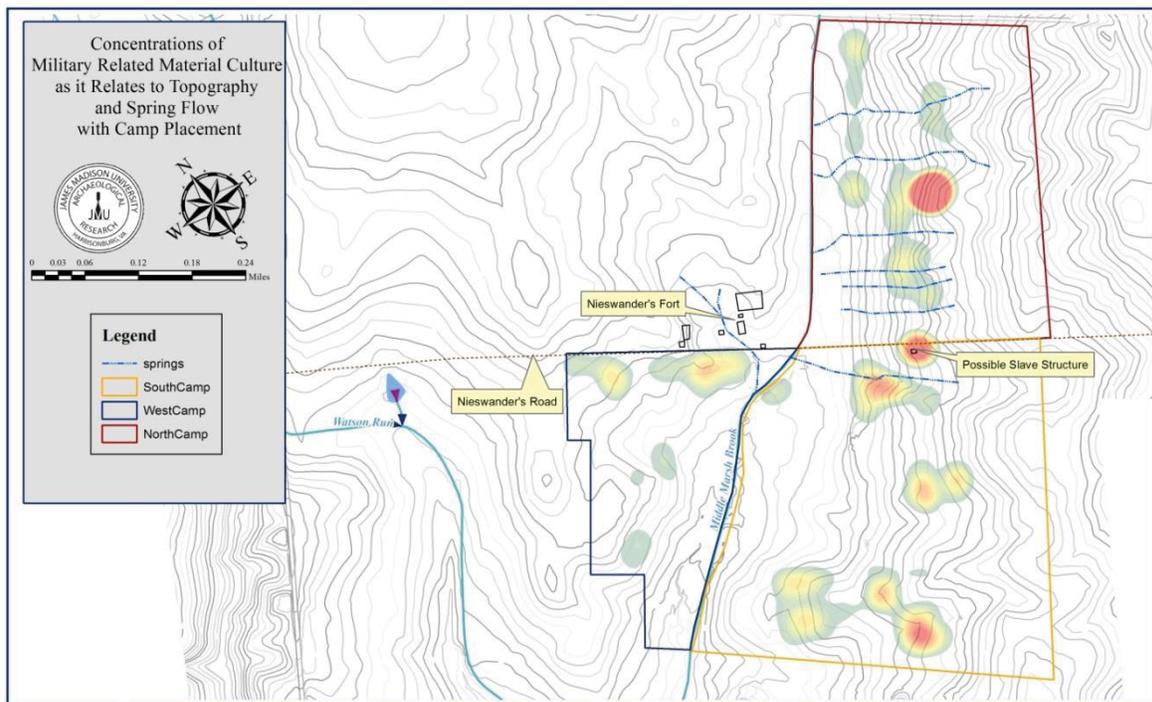


FIGURE 3 ARTIFACT DISTRIBUTION DEFINING THREE CAMPS: NORTH CAMP (COLONEL LOWELL'S RESERVE), SOUTH CAMP (BRIG. GEN. DEVIN'S 2ND BRIGADE), AND WEST CAMP (POSSIBLY DIVISION HQ WITH 5TH N.Y.).

Consistent with the presence of mounted cavalry, evidence of horse related debris is widespread across all three camps. Most of the items reflect the activities of regimental farriers (horse shoes, horseshoe nails) and the efforts to repair horse tack and saddles.

One last point of interest lies in the absence of site features. Hearths appear to have been lost to post-Civil War agricultural plowing, and trash pits, latrines or trash middens were not identified at any of the camps. Particularly in North Camp, however, large numbers of Spencer cartridge casing and other waste items were found in the ravine floors and marshy bottoms along Meadow Run. In South Camp, farrier and troop waste was commonly found in the area of the marshy floodplain. These patterns suggest that these low areas were used as trash dumps.

## SUMMARY

The analyses of existing history, terrain and remaining material culture attribute the encampment discovered by the metal detecting to be the 1<sup>st</sup> Union Cavalry Division commanded by Brig. Gen. Wesley Merritt established in October of 1864. This complex was one part of the massive Union encampment Gen. Philip Sheridan established on the high ground north of Cedar Creek that was attacked by the Confederate army commanded by Gen. Jubal Early on 19 October 1864. While there is no evidence that the camp archeologically investigated was directly attacked during the Battle of Cedar Creek, it is, nonetheless part of the military community attacked by Early's troops, and the research to date provides important new insights into the natural and cultural features that shaped the community. As the site is scheduled to be lost to development, additional testing is planned that will hopefully more clearly define the internal camp plan. Knowledge of site boundaries might also allow certain areas to be preserved.

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# THE FACE OF BATTLE: INTERPRETING THE CASUALTIES OF THE BATTLE OF RIVERS BRIDGE

Dan Bell

## INTRODUCTION

Rivers Bridge was not a large battle. It was fought over a relatively small area by a relatively small number of troops. The battle did not result in a large number of casualties and, compared to other battles, was not considered to be terribly significant. A little-known engagement from the American Civil War, Rivers Bridge was fought on 2-3 February 1865, during the Carolinas Campaign at the beginning of General William Tecumseh Sherman's march through South Carolina. Some 5,000 Union soldiers faced about 1,200 Confederates who held a fortified crossing of the Salkehatchie River, the Southerners' first line of defense in the state. The Confederates held a series of fortified crossings along some 45 miles of the river, but almost all the combat took place at only one of them, Rivers Bridge. Both sides suffered relatively light casualties. The Confederates lost fewer than one hundred men killed, wounded, captured or missing, and the Federals reported about 124 total casualties. The Union victory at Rivers Bridge broke the Confederates' line on the Salkehatchie River. After Rivers Bridge the Confederates retreated to another line of fortified crossings along the next major river system.

## INTERPRETING RIVERS BRIDGE

Since 1945 the battlefield has been preserved and interpreted as a historic site by the South Carolina State Park Service. The site is small and uncomplicated. Visitors walking the ¾-mile interpretive trail can quickly comprehend the action that occurred there in 1865. The terrain and the strength of the Confederate position are almost self-explanatory. The remains of the Southerners' earthen field fortifications are still visible on the high ground overlooking the thickly wooded swamp of the Salkehatchie River, as formidable a natural obstacle today as it was in 1865. The narrow earthen causeway across the swamp – the obvious avenue of approach for the attacking Union soldiers – is still visible at the site. Visitors can readily grasp how Confederate cannon fire swept Union soldiers off the causeway, and they can just as easily understand how Union soldiers moved off the causeway into the swamp and used its thick cover to advance on the Confederate position and successfully attack it on its flanks. Given that the site tells such a simple story, why does the battle of Rivers Bridge matter?

Rivers Bridge shows how veteran soldiers from both sides had learned to fight after several years of war, using fortifications, flanking, and cover to increase their chances of survival. It shows how Union troops maneuvered in the face of strong Confederate positions, relying on pioneers with axes to build corduroy roads that would take them around fortifications instead of attacking them head-on. Most importantly, though, Rivers Bridge tells the story of the war's casualties. The limited number of losses has made it possible to identify through archival research nearly all the men killed, wounded, captured, or missing. Just as the small scale of the action makes Rivers Bridge readily understandable, the relatively low casualties make the cost of the fighting comprehensible on a personal scale. The casualties of the battle of Rivers Bridge – and by extension, the casualties of the entire Civil War – are no longer overwhelming numbers recited to summarize who won and who lost. They're individuals with names, families, stories, and sometimes photographs. They tell us of lives cut short or forever altered in two days at a cold, wet, obscure spot in South Carolina.



**FIGURE 1 ONE OF TWO DRAFT BATTLEFIELD MAPS DRAWN BY UNION ARMY ENGINEERS AFTER THE BATTLE OF RIVER'S BRIDGE. THE SALKEHATCHIE RIVER AND ITS SWAMP IS IN THE CENTER OF THE MAP, THE FORTIFIED CONFEDERATE POSITION IN THE UPPER RIGHT (NATIONAL ARCHIVES).**

Research on the casualties, in combination with a study of the terrain and the maps produced after the battle by Union Army engineers, has also shed new light on the battle to alter previous interpretations of the action and point to areas for future research and preservation. A study of the battlefield funded by a grant from the American Battlefield Protection Program in 2003 revealed that these maps were extremely accurate (Figure 1). They provide a wider-angle view of the battlefield and illuminate aspects of the terrain and action that can't be easily perceived on the ground. One artillery emplacement was placed in the Confederate works to shoot down the length of the causeway in the middle of the swamp. Fire from the two guns in this emplacement stopped the attack made by the 25<sup>th</sup>

Wisconsin Infantry on 2 February when the unit was about half-way up the road. The 25<sup>th</sup> suffered only eight casualties, but they were memorable enough to be recalled by the former commander of the 25<sup>th</sup> at a regimental reunion twenty-two years later:

*You will all recall the terrible swamp through which we charged on that occasion. It was in that charge that Sergeants Tomlinson and Church fell, and Bugler Knudson had his head blown off by a cannon ball.*

A Union stretcher bearer retrieved one of the men from the 25<sup>th</sup> Wisconsin on the night of 2 February. "I helped to carry a man out of the swamp that had one side of his head shot off," he wrote in his diary. "It looked dreadful." These few casualties of the 25<sup>th</sup> Wisconsin are individuals with names and stories – William Tomlinson, John W. Church, and the Norwegian immigrant Peter Knudson – and their fates tell of the awful effects of accurate artillery fire. Where they met their deaths is outside the present-day historic site and in need of preservation.

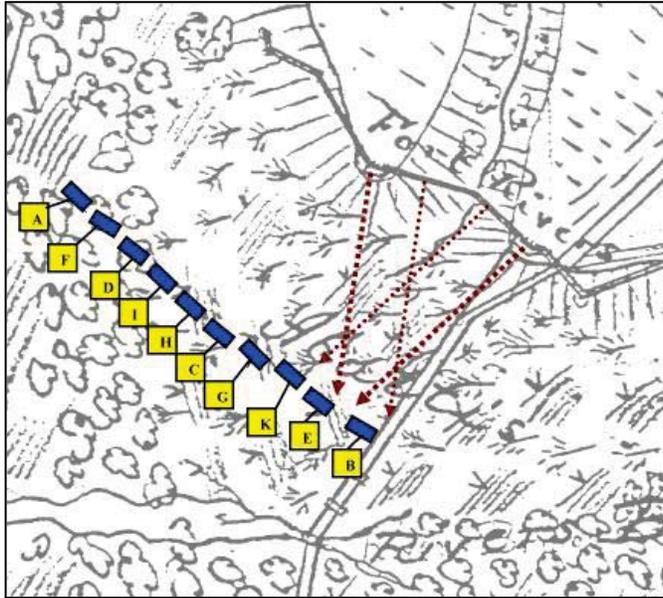


FIGURE 2 ALIGNMENT OF THE 32ND WISCONSIN INFANTRY AT RIVERS BRIDGE ON 3 FEBRUARY 1865, AS REMEMBERED BY SERGEANT RUEL P. RUSSELL SUPERIMPOSED ON A BATTLEFIELD MAP. COMPANIES B, E, K, AND G SUFFERED 34 OF THE REGIMENT'S 52 CASUALTIES (*NATIONAL TRIBUNE*, 17 JUNE 1915).

The battlefield maps and the ground in front of the Confederate earthworks reveal how and where other men fell to the close-range fire of rifle-muskets (Figure 2). On the second day of the battle, soldiers of the 32<sup>nd</sup> Wisconsin Infantry waded through icy water and scrambled over fallen trees to establish a bridgehead on the far side of the river. Their breakthrough prompted an all-out attack on the Confederate right that forced the Southerners to withdraw. The men of the 32<sup>nd</sup> Wisconsin paid a high price for their action at Rivers Bridge. The regiment suffered its heaviest combat casualties of the war, losing more than fifty killed and wounded.

The 32<sup>nd</sup> Wisconsin's brigade commander reported after the battle that the regiment's breakthrough was made "800 yards above." This single comment led to a long-held interpretation that the 32<sup>nd</sup> Wisconsin had crossed the river 800 yards upstream of the Confederate earthworks. But a crossing point there would have put the 32<sup>nd</sup> Wisconsin well beyond the Confederate fortifications and into a position where they should not have suffered such heavy casualties. First-hand accounts from the 32<sup>nd</sup> Wisconsin all agree that the unit was under heavy fire. They also agree that the regiment was posted just to the left of the causeway road. Fifteen picked marksmen from the outfit were even in the road, firing on the Confederate artillery emplacements from the cover of a low rifle pit. The old interpretation of where the 32<sup>nd</sup> Wisconsin crossed is clearly incorrect. When the brigade commander reported that the unit had established a toehold on the far side of the river "800 yards above," he most likely meant that the crossing was 800 yards forward of the where the rest of the brigade was posted at the time in the middle of the swamp. Scaled measurements on the battlefield maps support this reinterpretation. The 32<sup>nd</sup> Wisconsin Infantry emerged from the swamp directly in front of the center of the Confederate line. The ground there is a low swale covered by an inward-angled line of Confederate rifle trenches. Southern infantrymen posted there poured a deadly crossfire into the Wisconsin men from a distance of probably less than 100 yards. Little wonder that the losses of the 32<sup>nd</sup> Wisconsin amounted to about 41% of the total Union casualties in the battle.

The losses in the 32<sup>nd</sup> Wisconsin were not evenly distributed throughout the regiment's companies, though. A recently discovered soldier account seems to explain why. The *National Tribune*, a postwar newspaper for Union veterans, printed stories written by former soldiers about different actions in the war. One man's reminiscence would prompt another vet to submit his own recollections describing his or his unit's part in the same action. From late 1914 through early 1916, the *National Tribune* printed a number of Union soldier recollections of the battle of Rivers Bridge. Some contradicted other accounts, some were clear and apparently accurate, and a few were clearly confused, as might be expected of fifty-year-old memories. One story about Rivers Bridge was provided by a former sergeant in the 32<sup>nd</sup> Wisconsin. Remarkably, the man claimed to recall his regiment's company alignment during the fighting on 3 February. When the companies of the 32<sup>nd</sup> Wisconsin are superimposed on the battlefield maps in the order in which this veteran recalled them, the four companies that

suffered the majority of the outfit's losses are put on the field in an area where they would have been subject to overlapping fields of close-range Confederate rifle and artillery fire.

Our research on the casualties may make it possible to one day locate the positions where individual soldiers fell. Many Union accounts describe how Federal soldiers used the cover of trees and fallen logs to advance and fire into the Confederate fortifications. One of those Union soldiers was responsible for all the casualties in Earle's Battery, the Confederate artillery unit at Rivers Bridge. One of those casualties was Lieutenant Simeon S. Kirby, probably one of the last Southerners killed in the battle. William Larke, an artilleryman in Earle's Battery, described Kirby's death in a letter he wrote in 1899 to Kirby's sister. According to Larke, a Union soldier had taken cover behind a log some twenty to thirty steps away from the gun emplacement and from there wounded two gunners in the battery. Just before the Confederate retreat Kirby was shot in the chest by the Union soldier. Kirby's last words were, "Oh Lordy," uttered as he fell into Larke's arms. Larke borrowed a musket from an infantryman in the trench next to him to shoot back at the Union marksman. "I took aim at the fellow and hollered at him," Larke wrote. "[W]hen he looked up I shot him clear through just about the same spot where he shot our Liutenant [sic]."

We don't know exactly where Lieutenant Kirby fell. There were two artillery emplacements in the Confederate works at Rivers Bridge. Both could have easily come under fire from Union infantrymen, and Kirby might have been in either one of them. Some day we may know.

## THE FACE OF BATTLE

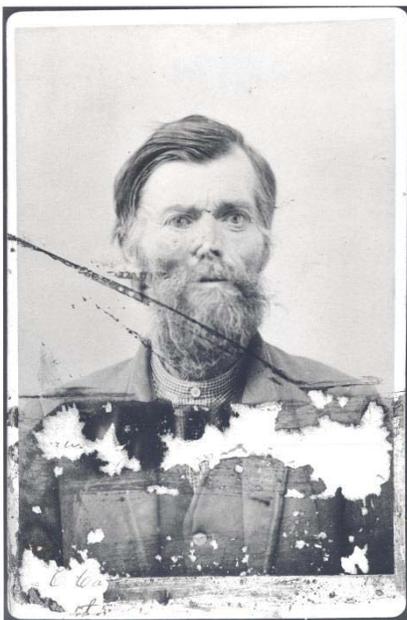


FIGURE 3 EDGAR W. CHERRY, (US SENATE).

In 1876 the remains of the Confederate dead from the battle were gathered by local men and reburied in a single grave. That act prompted annual commemorations of the battle that continue to this day and led to the eventual preservation of the battlefield. When they were reinterred most of the Confederate dead were unknown. Now we know the names of more than 150 men from North and South who were killed, wounded, or captured in the battle, with some information on these casualties coming from their descendants. Edgar W. Cherry of the 32<sup>nd</sup> Wisconsin is one of them (Figure 3). On 3 February a Confederate minie ball slammed into Cherry's face below his right eye and tore out near the tip of his nose. He lived for another thirty years with the effects of his wound: blind in one eye, partially blind in the other, and unable to breathe through his nose. His story, and the stories of the other casualties from Rivers Bridge, remind us of the terrible significance of combat in the Civil War, or what one Northern participant called "the horrid results of every battle."

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# THE LOST BATTALION PROJECT 2009 – 2015

Brad Posey

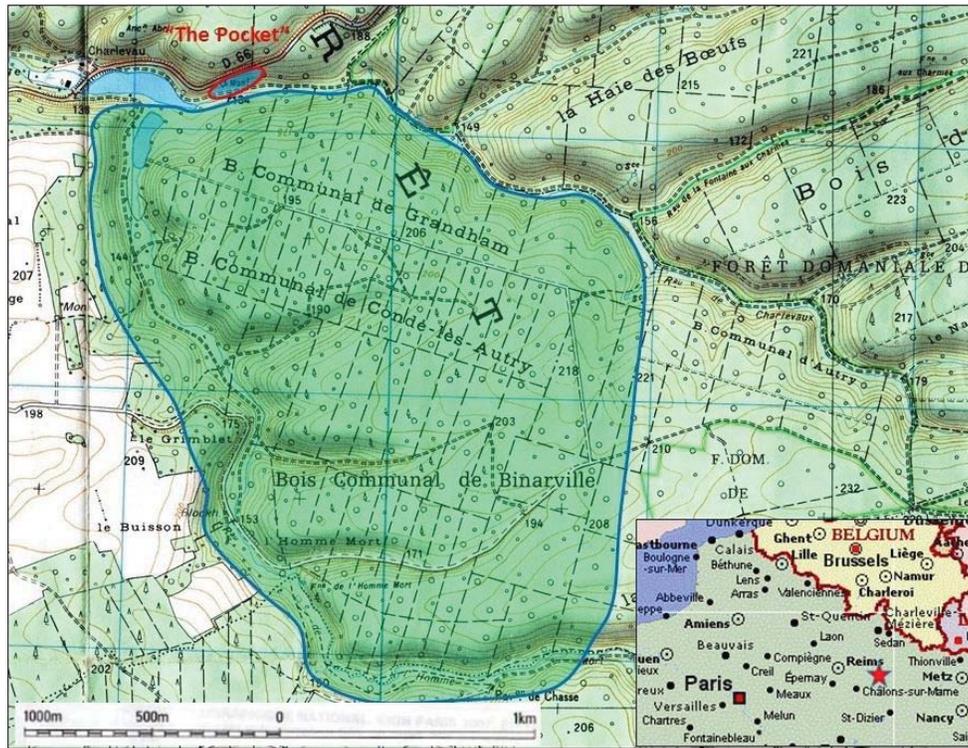


FIGURE 1 THE 200 HECTARE TRACT SOUTH OF THE LOST BATTALION SIEGE POCKET APPROVED BY REGIONAL ARCHEOLOGICAL, FORESTRY, AND MUNICIPAL AUTHORITIES.

## INTRODUCTION

The Lost Battalion Project is a large scale metal detecting effort in the Argonne Forest of northern France, on the site of the legendary American battle in 1918 (Figure 1). This project is a non-funded, all-volunteer project led by Brad Posey, a retired US Army field artilleryman who lived in Germany until recently. The project has been underway since the summer of 2009, and is conducted under the oversight of Yves Desfossés, the regional director of archeology for the French department of the Champagne-Ardennes.

## HISTORY

The Lost Battalion research involves perhaps the most well known epic of the American Expeditionary Force (AEF) during the Meuse-Argonne Offensive in the Fall of 1918 (Lengel 2008; Johnson and Pratt 2000; Laplander 2007). On 2 October 1918, Major Charles Whittlesey of the American 77<sup>th</sup> Division led two battalions from the 308<sup>th</sup>

Infantry Regiment, and two machine gun companies in an advance near the western edge of the dense, hilly Argonne Forest towards the Allied objective, the Apremont-Binarville Road. The Meuse Argonne Offensive began on 26 September and by 2 October both the Allies and the Germans were in disarray and neither side had a very clear picture of their own dispositions, much less those of the enemy. Whittlesey's advance was supposedly in conjunction with a French division on his left, and with the US 307<sup>th</sup> Infantry Regiment on his right.

Most of Whittlesey's command skirmished and infiltrated through a gap in the main German line located along the crest of Hill 198, and dug in on their objective, a steep slope on the north bank of an east-west ravine well behind the enemy front. The 307<sup>th</sup> Infantry on their right, and French forces on their left failed to penetrate the German line, and the Germans soon brought up reinforcements and re-established a continuous front. Whittlesey's command was cut off. The Germans laid siege to Whittlesey's position and for five days the Americans endured enemy artillery and machine gun fire, showers of grenades, flamethrower attacks and a misplaced Allied artillery bombardment. On 7 October 1918 Whittlesey and his men were finally relieved as the Germans withdrew to the north. Of the approximately 600 men who went into the isolated "pocket" on 2 October less than 200 walked out on their own on 7 October. The remainder was killed, wounded, captured or missing. Major Whittlesey and six other men were awarded the Medal of Honor for their bravery and heroism during the siege and the relief effort. In 1921, Whittlesey attended the dedication ceremony at the Tomb of the Unknown Soldier, at Arlington, and he committed suicide shortly thereafter.

## PROJECT BACKGROUND

The Lost Battalion siege site or "pocket" is well preserved, but it has been the target of illicit relic collecting for several decades. Artifacts purportedly removed from the site have been seen in internet auctions. This project was initially envisioned as a salvage operation, essentially an effort to recover and document the residual artifacts that had not been looted by relic hunters and to map the numerous surface features of the siege including fighting positions and artillery impact craters.

In the spring of 2009, Brad Posey worked in the Argonne Forest with Thomas Nolan's Sergeant York Project (Nolan 2007, 2012; Posey 2012; Legg 2010), and later that summer he worked with Yves Desfossés on a German camp excavation in the Argonne. He then submitted his research proposal for a Lost Battalion project to Desfossés (Posey 2009a). Although the proposal was approved, Desfossés and Posey were unable to secure access to the site from the owner of the siege pocket itself. While this was initially a disappointment, it resulted in a much more ambitious project in a tract of some 200 hectares of communal forest located south of the pocket (Figure 1) (Posey 2009b). This included the area that Whittlesey and his men traversed to reach the pocket, as well as the sites of several small unit actions during the American efforts to break the siege. Unlike the siege pocket, the project area appears to be virtually untouched by relic hunters.

In late summer 2009, the first week-long field work expedition took place. Since 2009 the project averages 10 days annually in the field, with an average of 6 volunteer metal detector operators coming from Germany, the United Kingdom, and the United States. To date, about 60% of the research area has been systematically covered by metal detecting, and the project has mapped over 2,000 provenience points and catalogued over 30,000 artifacts. Curation of the artifacts is at the Champagne-Ardenne archeological storage facility in Châlons-en-Champagne. Concurrent with the field work, the project has compiled the official primary records and maps of the battle from both US and German archives, together with all of the known unit histories and other unofficial sources from both sides.



FIGURE 2 LEFT: EXPENDED 8 MM CARTRIDGES AND MAGAZINES FROM AN FRENCH CHAUCHAT LIGHT MACHINE GUN FOUND CLUSTERED WITHIN A THREE SQUARE METER AREA, INDICATING AN AMERICAN GUN CREW. RIGHT: AMERICAN M1910 CARTRIDGE BELT HARDWARE, M1910 HAVERSACK HARDWARE AND CONTENTS, INDICATING A PROBABLE AMERICAN CASUALTY LOCATION. INSET: IN MANY CASES AMERICAN CASUALTY LOCATIONS INCLUDE OPENED SHEET BRASS BANDAGE CANS.

## RESULTS

Before field work began there was some question regarding the level of clarity that might emerge from what was sure to be a large mass of data dating to the First World War. The Argonne Forest was the scene of very heavy trench warfare in 1914 -1916, and in that part of the Forest any sort of coherent metal detecting data would be a practical impossibility. Fortunately, by October 1918 that front lay several kilometers to the south of the 77<sup>th</sup> Division's area of operations. The Sergeant York site, located in the Argonne Forest approximately 5 kilometers northeast of the Lost Battalion site, displayed a very high degree of clarity, including several artifact clusters indicating both individual firing positions and casualties that correlated remarkably well with participant testimony and unit historical records (Posey 2012; Legg 2010). In the case of the brief York firefight, which took place in an isolated ravine outside of his division's area of operation, it was the only action in the immediate vicinity. In contrast, the Lost Battalion project area was traversed and fought over by a number of different American and German elements before and during the Lost Battalion siege. The participants often had no clear idea of their own locations, and the official historical record on both sides is confusing and incomplete. Would the project data yield a clearer picture of the various actions related to the Lost Battalion, or would it present a generalized, incoherent scatter of ammunition and other material?

As the research began in the summer of 2009, it was soon apparent that there was a substantial definition and clarity in the artifact distributions being recorded. Two significant archeological patterns emerged, both of which were familiar from the Sergeant York research. The first was that of the *individual firing position* (Figures 2, 3). Distributions of these discrete artifact clusters indicated where fighting occurred and where it did not, as well as the nature and intensity of the combat. There is actually very little general, chaotic scatter between these discrete clusters, and there are large swaths of the project area that are nearly void of any evidence of weapons use. American positions are indicated primarily by clusters of .30'06 cartridge cases and clips, from the US M1917 Enfield rifle, and 8 mm cartridge cases and magazines from the French Chauchat light machine gun. German positions are marked by 7.92 mm cartridge cases, from G98 rifles or MG 08 and MG 08/15 machine guns. The Germans also left behind quantities of screw-off caps from M17 stick grenades. The firing positions generally do

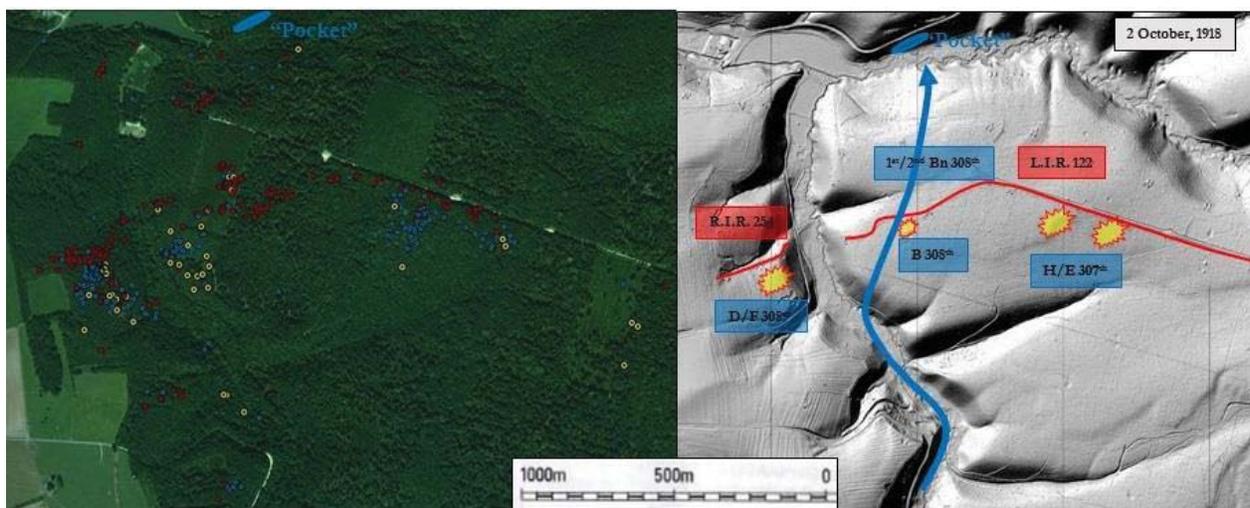


FIGURE 3 LEFT: ARTIFACT DISTRIBUTION MAP DEPICTING INDIVIDUAL FIRING POSITIONS, AMERICAN (BLUE), GERMAN (RED), CASUALTIES (WHITE). RIGHT: LIDAR MAP SHOWING WHITTLESEY'S APPROACH 2 OCTOBER 1918. GERMAN FRONT LINE IN RED, SMALL UNIT ACTIONS IN YELLOW.

not include much material other than ammunition, unless the location also includes the second significant artifact pattern, the *casualty location*.

A *casualty location* is typically seen as a very tight concentration of personal equipment and uniform artifacts that would not normally be discarded (Figures 2, 3). These objects mark the locations of individuals who were killed or wounded, for whom the normal retention of equipment was no longer a factor. Casualty locations yield a variety of items such as unfired rifle ammunition, grenades, mess gear, entrenching tools, bayonets, metal hardware from web and leather equipment, personal possessions, uniform buttons, and insignia. American casualty locations are often accompanied by opened, sheet brass bandage cans (Figure 2). Casualty locations sometimes include particularly useful diagnostic artifacts that are unit-marked. Here again, there is relatively little general scatter between discrete clusters representing individuals, and artifacts of the sort normally found with *casualty location* groups are uncommon finds outside of those groups. Unfired ammunition is an exception—complete bandoliers and handfuls of cartridges are sometimes found in isolation, unrelated to either of the normal artifact patterns.

In some cases casualty artifact groups are associated with shallow, temporary burials that were exhumed by the American Graves Registration Service (GRS) in the several years after the war. Their detailed records and large-scale maps of the grave removal process are preserved in the National Archives. Those records have allowed the correlation of removed-grave features and artifact groups with individuals from particular units, which, of course, is of considerable value in interpreting the events at that location.

The coverage of the project area is by no means complete, but the locations of several discrete, identifiable events are already clear, and others are suggested (Figure 3). One of the best defined loci is where Whittlesey left behind a blocking force on his left flank as he maneuvered through the German front (Legg 2013). This detachment, including elements of “D” and “F” Companies of the 308<sup>th</sup>, eventually withdrew, leaving behind a reduced platoon under the command of 1<sup>st</sup> Lt. Charles Turner in front of the German trench on the western side of the north-south ravine. Turner’s force was annihilated in heavy fighting that followed, and Turner himself has never been accounted for. A dense artifact distribution in front of the German trench suggests a “last stand” perimeter. In the midst of clusters of expended American cartridges, numerous fragments of exploded German hand grenades were

recovered. American casualty groups include items with unit markings for both “D” and “F” Company, 308<sup>th</sup> Infantry.

Another location that can be readily interpreted is where Whittlesey’s command actually crossed the intermittent German front line on 2 October. There “B” Company, 308<sup>th</sup> Infantry captured a group of 28 Germans from the 3<sup>rd</sup> Company, Reserve Infantry Regiment 254, and disabled their machine guns by destroying the firing mechanisms. Among the artifacts recovered there were two German G98 rifles, both deliberately disabled, the firing mechanism for a German MG 08 machine gun, three German bayonets, and other German equipment and ammunition.

In another area, the artifact distributions indicated the unsuccessful attempt of the 307<sup>th</sup> Infantry to penetrate the German front and establish contact with Whittlesey’s right flank during the initial advance on the morning of 2 October. They encountered a deep barbed wire belt and determined German resistance in a trench beyond. The 307<sup>th</sup> made little progress, and in any case were completely out of communication with Whittlesey. A number of American firing positions have been identified along the German trench, and among the artifacts recovered was a canteen cap marked for “E” Company, 307<sup>th</sup> Infantry.

On the crest of Hill 198 an American collar disk belonging to a soldier from “A” Company, 308<sup>th</sup> Infantry was recovered amid an isolated cluster of artifacts indicating an American casualty. By 2 October “A” Company had suffered so many casualties that it was no longer an effective unit, so Whittlesey employed the survivors as runners. These men were posted at intervals along Whittlesey’s route of advance, back to the American lines to the south. On the night of October 2<sup>nd</sup> German reinforcements sealed the gap in their front and eliminated the runner line.

In addition to American unit-marked artifacts, German identity tags have been recovered belonging to soldiers from the 10<sup>th</sup> Company, Landwehr Infantry Regiment 122, and the 3<sup>rd</sup> Company Reserve Infantry Regiment 254. The German War Graves Commission has confirmed that the 122<sup>nd</sup> soldier was killed on 5 October 1918. The location where his tag was recovered agrees remarkably well with the location of the 10<sup>th</sup> Company as recorded in the 122<sup>nd</sup> regimental history. This tag is also associated with a tight, isolated cluster of German artifacts including a bayonet, leather fragments and brass hardware from rifle ammunition pouches, uniform buttons with fragments of cloth attached, and a German leather M17 gas mask. The 254<sup>th</sup> Reserve identity tag belonged to a soldier from the 3<sup>rd</sup> Company who was killed on 2 October, 1918. It is known from both American and German sources that the 3<sup>rd</sup> Company was captured by Whittlesey’s “B” Company, 308<sup>th</sup> Infantry as they crossed over Hill 198 on 2 October. This tag was recovered in close proximity to the distribution of German artifacts that indicate a surrender and the disabling of a German machine gun (above).

## CONCLUSIONS

The Lost Battalion Project, in common with some other recent research (e.g. Nolan 2007, 2012; Posey 2012; Mandzy, this volume), begins to demonstrate the great potential of large scale metal detector collection to shed light on complex 20<sup>th</sup> century battlefields. It is very likely that the two strong artifact patterns identified by this project, the *individual firing position* and the *casualty location*, will appear on other 20<sup>th</sup> century battlefields where open warfare occurred. Real clarity in the metal detecting data is dependent on two important preconditions, however. The first is a single historical component with a practical level of artifact deposition. For example, metal detector research on a 1918 component on the 1916 Verdun battlefield would be impossible. Second, the battlefield should have suffered no more than a moderate level of relic collecting. Had the Lost Battalion project

area been subjected to the same level of collecting as the siege pocket itself, the results would be meager and inconclusive.

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# ORAL TESTIMONY AND BATTLEFIELD ARCHEOLOGY: A MULTI-DISCIPLINARY STUDY OF A UKRAINIAN AMBUSH FROM 1945

Adrian Mandzy

## INTRODUCTION

Against the backdrop of the Second World War, a small action took place in January 1945 in the Carpathian Mountains of Ukraine between a company of the Ukrainian Partisan Army (UPA) and a battalion of Soviet security NKVD troops. According to the acting commander of the Ukrainian Partisans, Myroslav Symchych, a division of NKVD troops was sent to eliminate the village of Kosmach, which served as a local nerve center for the partisans operating in the area (Figure 1). The initial attack stalled and the Soviet forces wired for reinforcements. The partisans intercepted the transmission. Symchych, along with two other companies, were ordered to set up ambushes on the approaches to the town.

## THE AMBUSH

According to the now almost ninety-year old Symchych, he set up his ambush a few kilometers outside of town on two ridges overlooking the mountain pass just before a stream (Figure 2). As his forces had arrived a few hours before the NKVD, the UPA took apart the small wooden bridge that crossed the stream. When the twelve “Studebaker” troop trucks and one automobile came upon the missing bridge, the trucks stopped and the troops formed into two columns so as to advance on foot to the village. At this point Symchych gave the command to fire and his company destroyed the battalion and killed the commanding officer. Later it was discovered that the commander was Major General Sergei Dergachov, best known for his punitive actions against Chechian and Tatar civilians. Wounded in the arm, Symchych later collapsed from the loss of blood and never was able to give the command to come off of the ridges and collect weapons from the destroyed convoy.

Imprisoned, released, imprisoned for a second time and finally released after the collapse of the USSR, the former combatant has told his story many times since Ukraine achieved independence in 1991 and has become a local celebrity. A small earthen commemorative mound was erected on the spot where he commanded the troops and by 2013, two television documentaries have been made about his story. A second 3-meter high monument was raised in the neighboring town of Kolomyia.



**FIGURE 1 UPA COMMANDER AT THE SITE  
OF THE 1945 AMBUSH.**

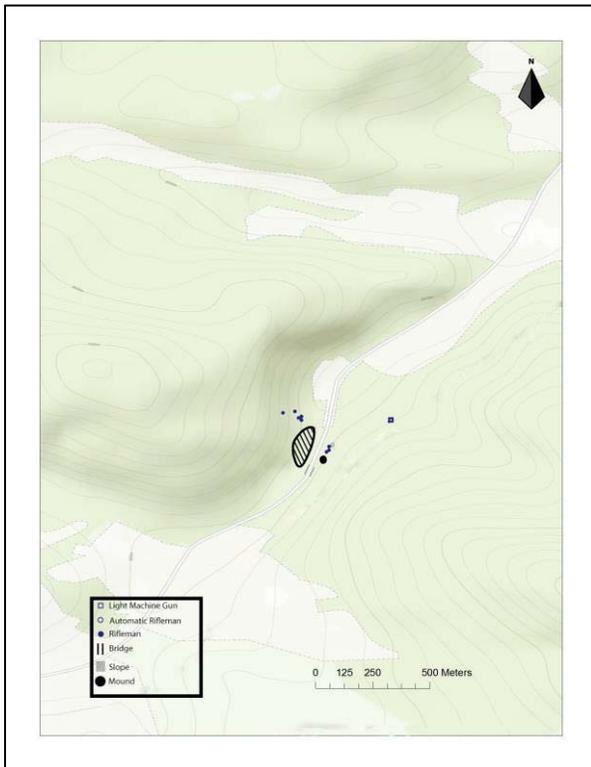


FIGURE 2 UKRAINE AMBUSH MAP. (COURTESY OF BRAD MILLER).

Yet the story of the ambush was not common knowledge, even among specialists of the UPA. Tys-Krokhmaluk's work, for example, on *UPA Warfare in Ukraine* does not mention this encounter. The twenty some odd volumes of the *Litopys of the UPA* are also rather silent on the engagement. Soviet sources mention the death of the general, but downplay its significance. Accounts given by the ninety-year old Symchych 70 years after the event also may not be accurate.

## THE ARCHEOLOGY

The developing field of battlefield archeology, however, provides the tools to critically analyze this memory. Mid-twentieth century firearms expended a large number of metal cartridges. Made of brass, copper, steel, or copper cased-steel, these artifacts provide a significant amount of information (Figure 3). The cartridges themselves make it possible not only to determine the caliber of a weapon, but information stamped onto the heel of the cartridge often provides a date and place of manufacture. Imprints from extractors and firing pins can also be compared and

it is possible to determine if one or two different weapons fired similar cartridges. Deeply indented primers suggest that the weapon fired from an open bolt, such as a fully automatic machinegun.

In the last twenty years, developments in battlefield archeology have demonstrated that cartridges provide solid evidence of how individuals behaved on a battlefield. There are, however, some problems. In a mountain environment, spring run offs can significantly change a landscape. As the ambush took place in the middle of winter, the troops were not dug in and any expended ordinance would have dropped into the snow. In the spring, many of these cartridges would have been simply washed away into the valley below.

Other factors would have also limited the effectiveness of a metal detecting survey. The construction of an earthen mound on the battlefield shifted any physical evidence of the encounter in that particular location. The construction of a new road at the bottom of the hill and its periodic springtime flooding would remove evidence of the engagement. Nevertheless, surveys of other significantly impacted battlefields have successfully been conducted in the past by the author and a two-day survey of the ambush site was conducted in 2012 where we recovered more than two hundred artifacts. As each artifact was recovered, it was given a unique number and its coordinates were taken by using a hand held GPS. These coordinates were later transferred to a map in ArcView. The National Park Services employs KOCOIA in conducting battlefield analysis and establishing park boundaries. KOCOIA makes use of defining characteristics of a battlefield and attempts to link historically defined features, both natural and cultural, with the existing landscape. Understandably, the specific location of the ambush was chosen by the confluence of two ridgelines that dominated the valley river road below. Although the modern bridge and road was slightly relocated over the course of the last sixty years, their presence played a critical role in the events of January 1945.

When we look at the map of the ambush site, we are able to substantiate that sometime in the mid-1940s a group of people had set up a series of firing position that dominated the area below. Taking into account the oral history of the engagement, as laid out by its architect, we are presented with a textbook case of how to set up an ambush. In spite of the road construction, the building of a monument, and the movement of ground brought on by spring run offs, our survey found definite evidence of the ambush so vividly described by a ninety year old veteran.



**FIGURE 3 RECOVERED CARTRIDGES FROM THE AMBUSH SITE.**

Moreover, in one of the interviews given by the UPA commander, he stated that he anchored the edges of his ambush with two machinegun positions. When we look at the location of the MG position identified during the course of our survey, its location appears to be at the edge of the ambush site. More than likely, it is perhaps one of the two guns that the 22-year old junior officer Symchych set up to seal off any escape from the ambush.

Although new surveys of the area may uncover more cartridges, the nature of the mountainside terrain make it unlikely that all the positions used in January 1945 will ever be identified. However, given the recovered material culture, the actions of Symchych and the Berezova Company he commanded can now be substantiated by physical evidence. As a result of our survey, in 2013 the battlefield area was recorded as an archeological site in the regional historical preservation office and is protected as such.

Interest in the 90-year old commander and his ambush has already seeped into local legend and lore. During the course of our survey, three families travelling along the road stopped by the battlefield monument as we were working, and wanted to have their picture taken with the veteran, who was wearing his uniform as he walked us around the bottom of the valley. In the rural area, the activities of visitors are often the center of local gossip and our presence did not go unnoticed. On our second day, we were approached by the administration of a local summer sports camp for children from the eastern industrial city of Donbas for a tour of the battlefield. A local elementary teacher who had spent time with the project served as a tour guide, pointing out places we had identified during our survey and described by the veteran commander. As it is only a matter of time before the architect of the ambush passes on and the telling of the tale falls to a younger generation, our survey project serves as an important link, providing a scientific body of evidence concerning the events of January 1945.

Since Ukrainian independence in 1991, various archeological programs have looked at the recovery of human remains, including those of massacre sites, but this project was the first to specifically target a partisan field of conflict. The success of the project was highlighted at the Xth International Academic Conference “Archeology of Western Ukraine”, which took place in L’viv, Ukraine in May 2013 and plans were made for an active field program which would explore various battlefields connected with the Ukrainian independence movement. Unfortunately, the Russian invasion of the Crimea in March 2014 and the Ukrainian-Russian War in Eastern Ukraine have temporarily put this research program on hold.

## REAPPRAISAL AND COMMEMORATION

As a result of the ongoing Russian military advances into Ukraine, there is a growing reappraisal of the role of the partisans in combating Soviet aggression. For Ukrainians, the initial shock of the Russian invasion of the Crimea resulted in uncertainty and defeatism. In the current struggle within the Luhansk and Donetsk provinces, the under-equipped and outnumbered Ukrainian military continues to fight against foreign troops who are armed with modern state of the art weapons. Various volunteer Ukrainian National Guard units use the symbols of the UPA, while the Russian back forces continuously refer to the Ukrainian troops as Banderites, a Soviet-era derogatory term for those who followed Stefan Bandera, the political leader that headed the UPA. Social media from both sides of the conflict is filled with references of the UPA's military operations and how the grandsons of the veterans who fought in 1945 are engaged in the same struggle. In such an environment, it is understandable how Myroslav Symchych's successful ambush of a much larger and better-equipped Soviet force provides both inspiration and a pattern to follow for those Ukrainian troops fighting on the front lines.

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# MAPPING THE CULTURAL HERITAGE OF THE FALKLANDS WAR

Tony Pollard



FIGURE 1 FALKLAND ISLANDS. MOUNTAINS MENTIONED IN TEXT ARE WEST OF STANLEY AND EAST OF MOUNT CHALLENGER (SEE ENDNOTE REGARDING LICENSE).

## INTRODUCTION

The archipelago of the Falkland Islands is a British Overseas Territory situated in the South Atlantic, some 600 kilometers directly east of southern Argentina. It consists of East and West Falkland and over 700 smaller islands (Figure 1), with an overall landmass of around 4700 square miles (c. 12000 square km—slightly smaller than Northern Ireland). The capital, Port Stanley (known locally as Stanley), is located in a sheltered bay on the eastern side of East Falkland. In 1982 the population was 1,820; in 2012 it was 2,932. The economy is traditionally based on sheep farming and fishing. In recent years, tourism has gained in importance, with cruise ships regularly berthing in Stanley during the summer months. In part because of this, battlefield tourism has also begun to make an impact on the islands' economy, though not all battlefield tourists originate on cruise ships as regular flights from the UK

and South America bring in other visitors. The prospect of oil in the surrounding seas may see a further dramatic change, and this has also heightened tensions once again between the UK and Argentina.

## The Falklands War

The invasion of the islands by Argentina in April 1982 was an attempt by a fascist military junta in Buenos Aires to distract the populace from a free-falling economy and the inevitable backlash of having 'disappeared' thousands of Argentines with left-wing sympathies. For as long as there had been an Argentina (since 1816), the Malvinas (as the islands are known to Argentines) has been a place close to the average citizen's heart. As was hoped by the Junta, the 1982 invasion fostered nationalist fervour, bringing Argentines of all political persuasions together for at least as long as their country's blue and white flag was flying over the islands.

The British response to the invasion, which took the Argentines as much by surprise as their actions had the British, was to send a maritime task force 8000 miles to retake the islands, with some of the 127 ships of the task force departing within just a few days of the Argentine landings. Ascension Island, situated at the halfway mark, was used as a way station and for a while accommodated a very busy military airport. The British established a 250-mile exclusion zone around the islands, which, as the task force approached, became a total exclusion zone (TEZ), and threatened to attack any Argentine ship or aircraft within it. The first casualties were suffered by the Argentines when, controversially, the Argentine cruiser ARA *Belgrano* was sunk with the loss of 323 lives by a torpedo launched by the British submarine HMS *Conqueror*, while she was outside the TEZ on 2 May. The first British casualties came when HMS *Sheffield* was badly damaged on 4 May (sinking on 10 May), with 20 men killed, by an Exocet missile fired from an Argentine aircraft.

British special forces were the first members of the task force to step foot on the islands. Prior to the main landings at San Carlos on 21 May, the Special Air Service (SAS) carried out a successful raid on an Argentine airbase on Pebble Island, from which aircraft could pose a serious danger. The landings were a relatively but not entirely bloodless affair for the British, and a beachhead was secured without much in the way of combat. However, ships anchored in San Carlos Water, which became known as Bomb Alley, were exposed to attack from Argentine aircraft (among them, the HMS *Ardent* and HMS *Antelope* were sunk, on 22 and 24 May, respectively). The first major land engagement took place on 28–9 May, when men of the 2<sup>nd</sup> Parachute Regiment captured the airfield and settlement of Goose Green, from where the garrison could have threatened the right flank of a British overland advance on Stanley to the east, where the main body of the occupying force was stationed.

An overland advance on foot was unavoidable as most of the British heavy lifting helicopter fleet had been destroyed in an Exocet attack on the MV *Atlantic Conveyor*, which had been transporting them to the islands. After taking just three days to negotiate over 50 miles of rough terrain carrying heavy packs, the men of 3 Commando Brigade prepared for attacks on the main Argentine defensive positions on the mountains to the west of Stanley. Meanwhile, British reinforcements in the form of 5 Infantry Brigade had arrived at San Carlos. Rather than have these men march across the islands, they were put on troop carriers and sailed to Bluff Cove, to the southwest of Stanley, where they could be disembarked to take part in the final push on the islands' capital. On 8 June, while the ships were at anchor with many men still on board, they were attacked by Argentine aircraft and suffered hits from bombs dropped at low altitude. The result was the worst single loss suffered by the British, with forty-eight men killed on RFA *Sir Galahad* and two on RFA *Sir Tristram*.

Despite these losses British troops made their final approaches on the mountains. One by one the craggy peaks were assaulted and the Argentine defenders thrown back on Stanley, with the heaviest fighting taking place on Mount Longdon (11–12 June) and Mount Tumbledown (13–14 June). The final assault on Wireless Ridge (13–14 June) saw the bulk of the Argentine army stream back into the town, and the British braced themselves for a potentially costly assault. Fortunately, the Argentines chose to surrender rather than to fight, and on 14 June British forces entered the town.

The Falklands War was a swift but costly conflict, with 258 British and 649 Argentine servicemen killed and many more wounded on both sides in the 74 days between the Argentine landings on 2 April and the surrender in Stanley on 14 June. British success secured another term in office for Margaret Thatcher's Conservative government but doomed the Junta in Argentina, with a return to democracy ushered in by elections in 1983.

## The Scoping Project

In December 2012, the author undertook a two week visit to the Falkland Islands in order to carry out a scoping visit in advance of an effort to develop a cultural heritage mapping project, which has at its heart an archeological survey of remains related to the 1982 Falklands War (Pollard 2014).

The main aims of the reconnaissance were to: 1) Verify the character and condition of the remains at a variety of locations; 2) Assess the potential for a mapping/archeological survey project; and, 3) If the remains merited, seek sanction to pursue a project from the Falklands Legislative Assembly. The field reconnaissance included visits to the following areas: 1) Pebble Island, Airfield and tour of major conflict sites - e.g. Dagger crash site and Coventry memorial; 2) San Carlos, Ridge of Sussex Mountains; 3) Darwin, Goose Green battlefield; 4) Stanley, Mount Tumbledown, Mount Longdon, Mount Harriet and Mount William; 5) foot of Mount Kent, helicopter wrecks; and, 6) Wireless Ridge and Stanley airfield.

War remains are extensive throughout the former conflict zone, but many of the sites have been subject to salvage as well as souveniring. Nevertheless, military artifacts litter each of the areas visited, as do the scars inflicted on the landscape by heavy bombardment—shell holes and ordnance-fractured rocks. Combat operations in the Falklands War combined modern technologies, such as the use of the Harrier vertical take-off aircraft and the first combat use of a laser sighted bomb, with more tried and trusted techniques such as night reconnaissance missions by ground troops. Even the bayonet would see use in a number of the mountain-top battles. Throughout the ground war the Argentines adopted a defensive strategy, creating make-shift fortified positions, while the British fought offensively, with ground troops supported by naval gunfire, Harrier ground attack aircraft, and in some cases, light tanks.



**FIGURE 2 ARGENTINE STONE BUILT BUNKER. NOTE FRONT EMBRASURES. THIS IS A PARTICULARLY WELL PRESERVED EXAMPLE.**

Alongside numerous remains of rifle pits, dugouts, trenches and rock-built bunkers (Figure 2) are debris fields created by aircraft wrecks, such as the Argentine Dagger crash site on Pebble Island and helicopter wrecks at the foot of Mount Kent. More widely distributed are the various reminders of ground combat, including spent shell cases, ammunition boxes, water bottles, radio batteries, army blankets, machine gun mounts, and in some cases even largely intact pieces of light ordnance such as mortars and recoilless rifles (Figure 3). These are obvious as one walks the battleground, and as previously noted battlefield tourism is thriving. As far as material culture and the human experience of existence in an extreme environment is

concerned, perhaps the most interesting items are those of a more mundane nature, which relate to the soldiers' daily lives. Throughout the conflict zones food ration cans, remains of field kitchens, field expedient heating and cooking hearths, related improvised cooking utensils, and stretcher frames attest to the less glamorous elements of warfare.

## Adaptation and Improvisation

It is clear that the Argentine troops made every effort to adapt to the harsh surroundings of the mountains to the west of Stanley. Some places give the impression that almost every available nook and cranny within the rocks has been adapted for either shelter or defense. Today only partial remains survive, some having been destroyed during combat, while others have been dismantled or have decayed since the end of the war. Fragments of ponchos, tents and blankets litter the landscape still, and these give some idea of the most basic levels of protection against the elements, and certainly those provided by the military for the use of the occupying troops. There is little doubt however that these were used in conjunction with ad-hoc structures, stone sangars, rock shelters or bunkers, in order to make more bearable what must have been for the Argentines a very uncomfortable six weeks exposed to the elements. Much effort seems to have been put into sourcing construction materials, which range from sheets of corrugated iron, lengths of timber, wooden pallets, iron rails (in some cases from quarry railways), plastic sheeting, etc.

Many of these structures were not constructed according to a manual on field fortifications, though clearly rifle pits and to a degree sangars are recognized fieldworks, but were improvised adaptations to local conditions, providing protection from wind, rain, snow, enemy bullets, bombs and shell fire. This improvisation was not limited to defenses and shelters, as it is also evidenced by some of the artifacts still present on the battlefields, again most particularly on the mountains.

It is clear from accounts of the Argentine occupation that troops based outside of Stanley suffered from a lack of supplies, while these were plentiful in the town (e.g. Clapp and Southby-Tailyour 1996:224; van der Bijl 1999:266-268). Food was among those vital commodities that suffered from limited distribution. Although the field kitchens present on Tumbledown and Longdon provide evidence for the provision of some hot food, troops were also responsible for procuring and preparing their own rations. Various food wrappers, including pasta, and fragments of storage jars were encountered on the mountains but it remains unclear whether these came from army supplies or were procured from other sources, including local people. Parcels were sent by families, but again it would appear that many of these never reached their intended recipients.



**FIGURE 3 ARGENTINE RECOILLESS RIFLE ON MOUNT LONGDON. STANLEY IS VISIBLE IN THE FAR DISTANCE TO THE LEFT.**

Perhaps the most striking examples of improvisation are the various objects created from lengths of wire and bits of scrap metal, which like the building materials had been locally scavenged by hard pressed troops. The function of some of these remains unclear, though wire frames found in several locations may relate to cooking, providing grills to place over fires etc., and again indicate a rather haphazard approach to food and eating. A very obvious example of this was encountered in the mouth of a rock shelter with lean-to on Sapper Hill (see note). Here, a tin lid, possibly from a tin of paint, had been used to stand in for a frying pan or griddle after the addition of a handle formed from bent fencing wire. It would appear that these items have survived the scavenging activities of the trophy and souvenir hunters because of their 'mundane' and in some cases enigmatic character. These made objects provide insight into the experience of the Argentine troops beyond that presented by what at first view may appear to be more interesting military objects.

## Observations

Despite our brief reconnaissance, it is clear that extensive physical remains of the 1982 Falklands War, both structural and artifactual, survive within the island landscape. It is equally clear, however, that the remains have been subject to serious attrition and so represent only a fraction of what once existed. This is especially true of the artifacts which have been subject to various forms of removal, including:

- Immediate post battle clean up - including ordnance disposal (this has left its own traces on the landscape), removal of weapons, and other re-usable hardware.
- Later clean up by both civilians and the military (the removal of material from the summit of Mount Longdon is evidenced by a 'scrapyard' on its southern flank - which has itself been subject to souvenir collection).

- Souvenir hunting. This can be broken down into three main categories: 1) removal of artifacts by military personnel in the immediate aftermath of the war and continuously since then by the garrison based at Mount Pleasant; 2) removal of artifacts by civilians, the majority of whom could be classified as battlefield tourists but also by locals, at times in an attempt to preserve the remains; and 3) removal of artifacts by Argentine veterans revisiting their old battlefields (the same could be said of British veterans but the Argentines in particular seem to have been eager to take mementoes home with them, in some cases from their own positions).
- Civilian and military development - including the construction of communications masts on the summit of Sapper Hill, the military base on the summit of Mount Kent and the various improvements and expansions to settlements, farms and communications, including roads.
- Artifact decay. Iron will naturally rust and decay with the passage of time, especially if exposed. Wooden objects such as ammunition boxes and structural elements likewise degrade. This process varies from object to object and place to place - a good example of this variability was demonstrated by the magazine from an FN rifle on Mount Tumbledown, which had almost entirely rusted away, while a wooden ammunition box on the southern flank of the mountain had survived surprisingly well.
- Natural geomorphological processes such as erosion and silting. In part this includes the process of the landscape healing itself as scars such as shell holes gradually silt up and slowly disappear.

Finally, a more recent weeklong visit was made to the islands in April 2015, in the company of a British veteran of the 1982 war. Some of the sites mentioned above were revisited and one observation made then is worth noting here. Although the author was gratified to see that the previously mentioned tin-lid skillet, in the rock shelter on Sapper Hill, was still there, a considerable amount of degradation was evident since the object was first recorded in late 2012. It is obvious that if such rapid decay (in this case rust) can impact an artifact in a sheltered location such as this, then objects in more exposed contexts are likely to degrade at even more accelerated rates, with the implication that if not recorded by survey in the near future some objects will be lost entirely.

## Management and Conservation

Despite the above, it is clear that the general levels of preservation, including artifacts in or near their original context, are impressive. Given the increasing interest in the history of the Falklands War specifically, and in historic battlefields in general, it can be suggested that these remains represent a vital component of the islands' cultural heritage, and one that is benefiting the island economy, especially battlefield tourism, which in the Falklands exists in a sometimes surprisingly comfortable relationship with the more obvious attractions offered by natural history. Where else, for instance, is it possible to see five species of penguins while visiting the scene of one of the most daring special forces raids in British military history and examining aircraft wrecks than on Pebble Island?

Local battlefield guides play a key role in preserving these remains and presenting them to a wide audience, military and civilian, and their role as 'gate-keepers' should not be overlooked in any future mapping project, the results of which would hopefully assist them in their role as interface between the landscape, military remains and interested visitors. On the basis of this scoping exercise it seems clear that the remains associated with the 1982 war should, where possible, be preserved. This scoping visit, despite its limited extent, achieved its aims of

assessing the condition and extent of the remains in certain parts of the islands but it falls well short of any form of formal survey, which is essential if further steps are to be taken to preserve this heritage. Based on these findings, and other motivations (discussed elsewhere in Pollard 2015) a thorough survey of the battlefield is recommended for preservation and management of this important battlefield.

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Notes: Figure 1 is an Open Source image from Wikipedia by Eric Gaba (Sting-fr:Sting) [GFDL (<http://www.gnu.org/copyleft/fdl.html>)], accessed June 26, 2015.

Sapper Hill was mistakenly identified as Mount William by the author in a previous paper – Pollard, T. (2015). *Materiality, Memory and the Falklands War*. This was in part due to a dearth of good maps combined with the author's geographical clumsiness, but also a reflection of the important service that experienced battlefield guides on the islands provide.

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