

Historic Structures Report

The Redoubts of West Point

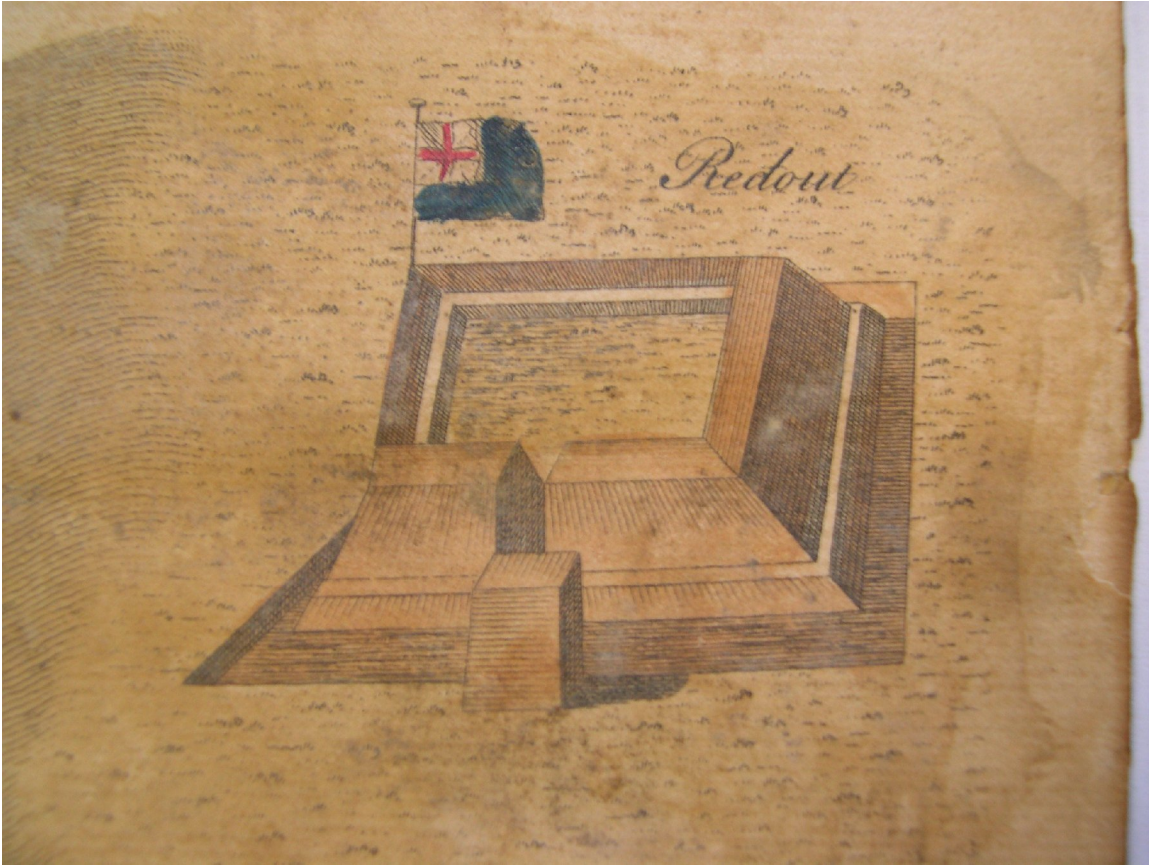
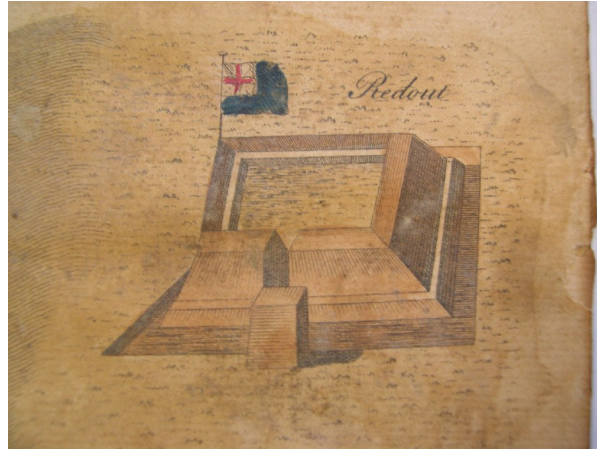


Illustration from Sir James Young, *An Essay on the Command of Small Detachments* (London: 1766), Figure 1.

Douglas R. Cubbison
Directorate of Housing and Public Works
U.S. Military Academy
West Point, New York

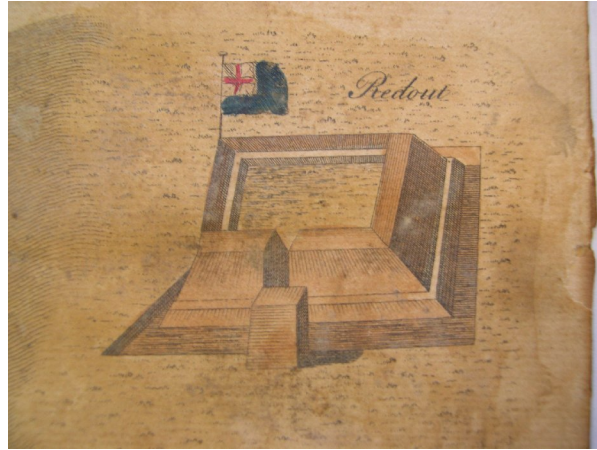
January 2004



- 1.0 Introduction
 - 1.1 Background
 - 1.2 Eighteenth Century Redoubts
- 2.0 Seven Years War in North America
 - 2.1 French Experience
 - 2.2 British and Provincial Experience
- 3.0 Revolutionary War Background
- 4.0 The Redoubts of West Point
- 5.0 Conclusions

- | | |
|---------------|--|
| Figure One | Components of Redoubts, from Lochee, <i>Elements of Field Fortification</i> , Plate I. |
| Figure Two | Standardized Design for a “Star” Redoubt |
| Figure Three | Revolutionary War Resources at West Point
On Modern Topographical Map |
| Figure Four | Plan of West Point by Engineer Major Villefranche, 1780 |
| Figure Five | Standardized Design for a “Pentagonal” Redoubt |
| Figure Six | Plan of Redoubt Wyllis by Captain Ephraim Sergeant, 1782 |
| Figure Seven | Standardized Design for a “Hexagonal” Redoubt |
| Figure Eight | Plan of Redoubt #1 by Captain Ephraim Sergeant, 1782 |
| Figure Nine | Plan of Redoubt #2 by Captain Ephraim Sergeant, 1782 |
| Figure Ten | Kosciusko’s Original Design for Redoubt 4 |
| Figure Eleven | Plan of Redoubt #4 as actually constructed |

###



Historic Structures Report

The Redoubts of West Point

“The Redoubt is a work generally enclosed on all sides. It serves to secure a post, a grand guard, or communications; to defend a defile, a bridge, a ford, etc., and is of various dimensions, that is, of different plans and profiles.”

Lewis Lochlee

Master of the Royal Military Academy, Little Chelsea, England, 1783¹

1.0 Introduction

1.1 Background

By the middle part of the Eighteenth Century, military art and science was an advanced field of study. Military engineering and architecture, in particular, was the subject of numerous professional treatises; and massive stone fortifications had been constructed throughout the nations of Europe and their colonial possessions. In North America, where military fortifications were frequently constructed in relatively remote and inaccessible locations, works built from readily available materials (typically brick, lumber and earth) tended to be more common than the ornate masonry edifices of Europe. Because of the nature of these building materials, most of these works were transitory, and have not survived to the present.

One of the finest extant collections of Eighteenth Century military architecture in North America is located within the boundaries of the U.S. Military Academy, West Point, New York. At Constitution Island on the east bank of the Hudson River, the Continental Army began constructing a defensive position to obstruct passage of the river as early as August 1775. These works would be occupied and destroyed by a British Army under General Henry Clinton advancing up the Hudson in late October 1777. West Point was re-occupied by American forces in February 1778, who constructed a series of extensive fortifications at this location. Since that time, the U.S. Army has continuously occupied West Point. Most of these fortifications survive today. West Point's collection of relatively intact Eighteenth Century military works include a

¹ Lewis Lochlee, *Elements of Field Fortification* (London: T. Cadell and T. Egerton, 1783), 36. Lochlee is the standard historic engineering manual used for this study.

portion of one bastioned fort (Fort Arnold, hastily renamed Fort Clinton in September 1780), one large redoubt (Fort Putnam), eight other redoubts (three with detached batteries, one with a detached battery and breastwork), one section of connecting defensive works, one unfinished redoubt, one powder magazine, and six river batteries. Surviving archaeological resources include three military encampments, a military burial ground, one redoubt, and one guard post/small encampment. This Historic Structures Report will explore the Eighteenth Century military utilization of the redoubt, and then examine how West Point's collection of surviving redoubts demonstrates American field application of the Eighteenth Century art of military fortification.

1.2 Eighteenth Century Redoubts

The "redoubt" was a well-established type of military fortification. Nearly every contemporary engineering manual described their construction and defensive utilization. Lewis Lochee of the British Royal Military Academy compiled one of the most succinct descriptions of a redoubt:

The Redoubt is a work generally enclosed on all sides. It serves to secure a post, a grand guard, or communications; to defend a defile, a bridge, a ford, etc., and is of various dimensions, that is, of different plans and profiles. The extent of it is proportioned to the number of men who are to defend it, and the parapet is generally of sufficient height to cover them. The redoubt has no precise or common form...the form, indeed, is determined by the spot of ground on which it is raised, and the purposes for which it is constructed.... By redoubt...is understood a work enclosed on all sides, and formed wholly of salient angles.²

When used in conjunction with the extensive masonry military fortifications designed and constructed in Europe, redoubts were placed within the outer-works to command critical angles, or to support other portions of the outer-works.³ During sieges, the great French Military Engineer and Field Marshall Vauban noted that redoubts could be used to secure the siege lines against attack from the besieged garrison, or a relieving force.⁴ More typically in America, redoubts were built as the stand-alone fortifications described by Lochee.

In order to understand the military application and utility of redoubts, an evaluation of their design, configurations, and materials is necessary. For this purpose, Lochee and three other military engineering manuals from the period of the American Revolution were consulted.⁵ As

² Ibid., 36-37.

³ For examples of this refer to Guillaume LeBlond, *The Elements of Fortification, Translated from the French* (Philadelphia: Printed for the War Office by C.P. Wayne, 1801), 27, 29-30, 32, 42; and Sebastien LePrestre de Vauban, translated by George A. Rothrock, *A Manual of Siegecraft and Fortification* (1740; reprint edition Ann Arbor: University of Michigan Press, 1968), 155.

⁴ Marchel Sebastien le Prestre de Vauban. *The New Method of Fortification, published in English by Abel Swall, London, 1691* (Ann Arbor, Michigan: University Microfilms, Inc, 1963), 18.

⁵ Jean Louis LeCointe, *The Science of Military Posts; For the use of Regimental Officers, who Frequently Command Detached Parties, In which is Shown the Manner of Attacking and Defending Posts, With Cuts, Explaining the Construction of Field-Forts and Intrenchments* (London: Printed for T. Payne, at the Mews Gate, 1761); and Lieutenant J.C. Pleydell, *An Essay on Field Fortification: Intended Principally for the use of Officers of Infantry, showing how to trace out on the ground and construct in the easiest manner, all sorts of Redoubts and other field works, translated from the original manuscript of an officer of experience in the Prussian Service* (London: Printed for J. Nourse, Bookseller to His Majesty; 1768; New Edition, London: Printed for F. Wingrave, 1790). Pleydell was a British Engineer Officer who served in Western

designed and constructed in the middle of the 18th Century, redoubts were designed with certain common features, which will be defined and described as appropriate [Figure One]:

- Parapet;
- Banquette;
- Embrasures;
- Ditch (with Berm, Scarp and Counterscarp);
- Palisades;
- Fraizes;
- Abbatis; and
- Entrance.

Parapet – According to Lochee, “the parapet is the bank of earth surrounding the post to be defended, and serves to cover the troops and artillery employed for its defense.” As regards its thickness, this was based upon the size of weapons that it was anticipated to defend against: “When 2 feet broad at the top, it is capable only of resisting musket shot. When the parapet is 3 or 4 feet broad at the top, it can resist a three-pounder, when 4 or 5 feet a six-pounder; and when 7 feet, a twelve-pounder. When 18 feet, it is capable of resisting the shot of the larger cannon.”⁶ British Engineer Lieutenant J.C. Pleydell provided similar recommendations: “It should therefore be known, that a ball from three to six pounds weight, will enter three or four feet into earth newly cast up; and a twelve-pounder eight feet. This, at once, determines the thickness of the breastwork. The height of the parapet within, to form a complete covering for the men, should at least be 6 feet.”⁷

Regarding the size of the redoubt, this was based upon the strength of the detachment assigned for its defense. According to Pleydell: “Allowing an ordinary pace, or two feet, to each file [of soldiers], two deep. When cannon are intended to be placed in a field work, six paces are allowed to a field-piece, and eight paces to a twelve-pounder.”⁸ However, Pleydell also noted: “The least interior circumference that can be allowed to a square redoubt is eighty paces.”

Banquette⁹ – Again, according to Lochee: “the design of the banquette is to elevate the men, that they may see over the parapet to fire upon the enemy. As the design of the banquette is to elevate the men, it necessarily follows, that the banquette must be raised within 4 ½ feet of the summit of the parapet. The space of 4 ½ feet allowed for the breadth of the banquette is absolutely necessary for forming upon it the men who are to defend the parapet. This space allows the parapet to be lined two deep.”¹⁰ French Military Engineer LeCointe suggested a somewhat higher banquette: “You must make the parapet four feet higher than the banquette.”¹¹ Pleydell recommended a slightly narrower banquette of four feet.¹²

Pennsylvania during the Seven Years War. Another book that provides nearly identical guidance is Sir James Young, *An Essay on the Command of Small Detachments* (London: 1766). Because this is a small treatise (only 29 pages and figures), the three more expansive works will be used most frequently in this study.

⁶ Lochlee, *Elements of Field Fortification*, 10-11.

⁷ Pleydell, *An Essay on Field Fortification*, 16.

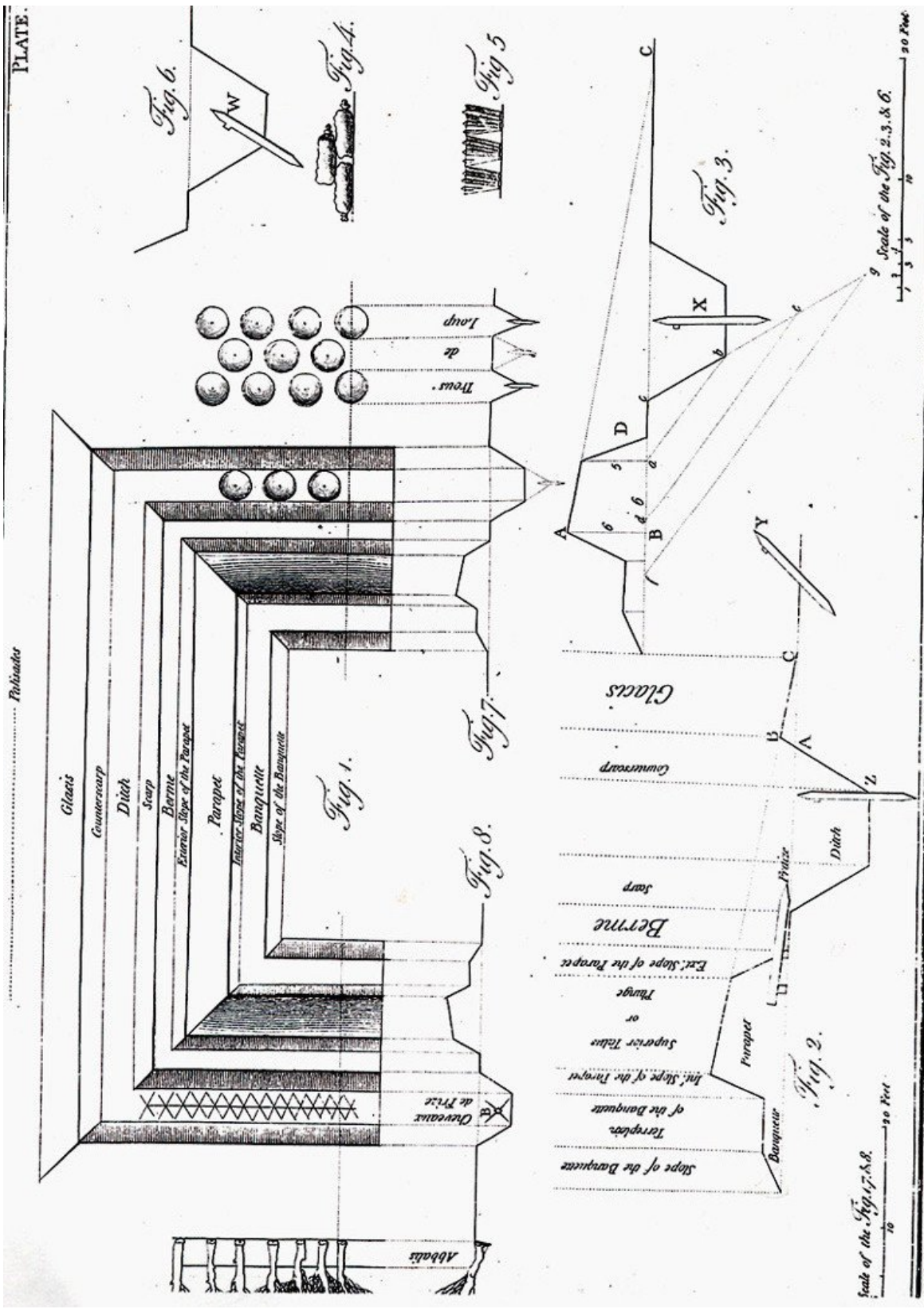
⁸ Pleydell, *An Essay on Field Fortification*, 7.

⁹ Also often referred to as the English “firing step.”

¹⁰ Lochee, *Elements of Field Fortification*, 10-11.

¹¹ LeCointe, *The Science of Military Posts*, 44-45.

¹² Pleydell, *An Essay on Field Fortification*, 16.



Components of Redoubts
from Lochee, *Elements of Field Fortification*, Plate I.

Embrasures - Embasures were openings incorporated into a work when it was equipped with artillery pieces. Rarely, artillery pieces were installed to fire directly over the top of the parapet, this circumstance being referred to as “en barbette.” Most commonly, embrasures were cut through the parapet to enable the artillery to fire from behind the protection of the parapet. “The dimensions of the embrasure depend not only upon the nature of the soil, and the height and thickness of the parapet, but also on the caliber of the piece, the height of the wheels, and the construction of the carriage.”¹³

Ditch- Because the height of a redoubt’s parapet was specified as a minimum of six feet, this could theoretically be climbed by determined troops. Accordingly, a ditch was incorporated to raise the vertical face of the parapet, making it more difficult to be scaled. Again, from Lochee: “The trench dug up at the exterior foot of the parapet, is called ditch. At the same time that it serves to furnish the earth necessary for raising the parapet and banquette, it contributes to increase the difficulty of approach. The dimensions of it depend on the dimensions of the parapet and banquette; its depth should, if possible never be less than 6 feet. The slope nearest to the parapet is called scarp, and that opposite to the parapet, is called counterscarp.”¹⁴ A small level space between the ditch and the parapet, which served to keep the parapet from sliding into the ditch, was referred to as the berm. Pleydell noted, “two feet are sufficient for the breadth of the berm.”¹⁵

Palisades – Lochee suggested the use of vertical poles to add an additional defense to a redoubt: “Palisades are stakes of strong split wood, of about 7 or 8 inches broad, 3 or 4 inches thick, and 8 or 9 feet long, of which 3 or 4 feet are sunk into the earth. They are pointed both at the top and bottom, and that they may be of greater strength, they are fastened to a horizontal rail within two feet from the top, and are generally placed so close to each other, as only to admit the muzzle of a piece between them. Their greatest distance from each other is never so great as to afford room enough to creep through them.”¹⁶ Palisades could be erected around a post for protection from surprise, or installed at the bottom of the ditch. LeCointe succinctly added regarding their positioning: “...fix pickets quite round his post.”¹⁷ Pleydell added: “Palisades, used in fortifying the ditches, are nine or ten feet long, and six inches broad, pointed at one end, but if a sufficient number of these dimensions cannot be had, smaller may be made use of, provided they are properly intermixed with the large.”¹⁸

Fraizes – These were often referred to in historic documents as “fraizing.” Lochee recorded: “Palisades fixed in the parapet are called fraizes. When the stakes are 9 feet long, 4 feet lie within the body of the parapet, and the remainder leans over, inclining a little towards the ditch. The stakes are sufficiently close to each other; they do not afford room enough to creep through them. To strengthen the fraize, the stakes are fastened to two sleepers, one of which lies upon the level ground, and the other lies within the body of the parapet.”¹⁹ This inclination was to permit hand grenades thrown from within the redoubt to bounce off them into the ditch, and to make it more difficult to throw hand grenades from the ditch into the redoubt’s interior. Pleydell

¹³ Lochee, *Elements of Field Fortification*, 14.

¹⁴ Lochee, *Elements of Field Fortification*, 17. Pleydell provided almost identical recommendations regarding the ditch. Pleydell, *An Essay on Field Fortification*, 16-17.

¹⁵ Pleydell, *An Essay on Field Fortification*, 11.

¹⁶ Lochee, *Elements of Field Fortification*, 21.

¹⁷ LeCointe, *The Science of Military Posts*, 51.

¹⁸ Pleydell, *An Essay on Field Fortification*, 56.

¹⁹ Lochee, *Elements of Field Fortification*, 24- 25.

provided some elaborating information: “Fraises are made eight feet long, and five inches broad, sharp at one end. The beams, or sleepers of wood, laid along the parapet, are twelve feet long, and six inches thick, to which the fraises are fastened with nails seven inches thick.”²⁰

Abbatis- Essentially, an abbatis was constructed as an obstacle to an attacking force, to delay it while exposed to fire from the redoubt. Lochee recommended: “It consists of hewn trees with the points of their branches turned towards the enemy, and to increase the danger and difficulty of forcing it, the trees are not only placed close to each other, but the branches are stripped of their leaves and twigs, sharpened at their extremities, and interwoven one in another. The trunks of the trees are generally sunk 3 or 4 feet into the earth, and the principal branches that lie on the ground are fastened down by stakes.”²¹ LeCointe added: “Surround your post with a breast work of trees, with their trunks buried about three or four feet in a ditch made on purpose. You may sharpen their points, and take off all the leaves, place the trees as near each other as you can, so that the branches may twist into one another, and see that they point a little towards the enemy.”²²

Entrance - Discussing the entrance, Lochee noted: “the entrance, which is made in the side or face least exposed, has no greater breadth than is absolutely necessary for passing and re-passing, and is commonly defended from within by a traverse.”²³ Pleydell echoed Lochee: “The entrance should always be made in the face least exposed to an attack. It is five paces wide to give room for the cannon to pass, but if none are to be put into it, three or four paces are sufficient.”²⁴ The renowned French Engineer Vauban gave nearly identical measurements for a redoubt entrance: “The bridge for entrance into the redoubt ought to be ten or twelve feet broad, when you would bring the cannon into it; otherwise five or six feet of breadth will suffice.”²⁵ Pleydell provided some distinctive commentary regarding defense of the entrance to a redoubt: “The entrance of the redoubt ought likewise to be secured with a good barrier, a kind of open gate, made of cross-bars about seven feet long, and six inches thick, which troops may fire through with small arms, or with two or three chevaux-de-friese.”²⁶

Although a redoubt could be constructed of masonry, in North America they were almost always constructed of earth. Frequently, the earth would be placed within a framework of wood. The wood could consist of interlocked hewn trees (similar to a log cabin), fascines (tightly bound bundles of sticks about six feet in length staked into position), gabions (essentially small woven baskets typically 3-4 feet in diameter, staked into position and filled with dirt), or hurdles (essentially woven vertical mats). Once the framework of wood was in place, it would be filled with earth from the ditch, and other available rubble, which was pounded firmly into position. Sometimes, earth was simply used, then covered with cut squares of sod spiked into place to hold the dirt. In cases of extremity, the dirt was simply piled up and tamped down.²⁷ Lochee noted, “In a stony or gravelly soil, the banquette and lower part of the parapet are to be raised with

²⁰ Pleydell, *An Essay on Field Fortification*, 55.

²¹ Lochee, *Elements of Field Fortification*, 28-30.

²² LeCointe, *The Science of Military Posts*, 52-53, 127.

²³ Lochee, *Elements of Field Fortification*, 36-37.

²⁴ Pleydell, *An Essay on Field Fortification*, 14.

²⁵ Vauban, *The New Method of Fortification*, 90.

²⁶ Pleydell, *An Essay on Field Fortification*, 75. Chevaux-de-Friese were portable obstructions, constructed of a long piece of timber pierced by a number of perpendicular sharpened stakes [See Photographs Appendix].

²⁷ Lochee, *Elements of Field Fortification*, 138-153; and Pleydell, *An Essay on Field Fortification*, 53-58;

whatever earth can be got, but the upper part of the parapet is to be raised with fine mould, that the troops may not suffer more from the stones flying about, than from the bullets of the enemy.”²⁸

One of the most important aspects of a redoubt is that although the classic configuration was square; they were specifically intended to be adapted to the terrain that they were defending. Lochee, who exhaustively addressed how different redoubt shapes could be laid-out and utilized, specified: “The redoubt has no precise or common form, but may be a square, a rhombus, a trapezium, a trapezoid, a pentagon either regular or irregular, a circle, or any other form. The form, indeed, is determined by the spot of ground on which it is raised, and the purposes for which it is constructed. When there is no essential reason to the contrary, the form is commonly a square.”²⁹ Pleydell, who devoted nearly his entire work to an examination of how the shape of a redoubt was adapted to the terrain, dictated: “It is not at all necessary redoubts should be traced exactly square, they are full as serviceable made in the figure of a rhomb, or with one side longer than another. This method, so far from being defective, becomes absolutely necessary when the ground neither allows, nor indeed requires, works to be exactly regular. Generally speaking, it is the spot redoubts are to be constructed on, as well as the lying of the ground near them, which should determine their figure.”³⁰ Both Lochee and Pleydell discussed at great length how redoubts were integrated with each other, and with other types of field works such as fleches, batteries and breastworks, to command important ground.

2.0 Seven Years War in North America

2.1 French Experience

The redoubt was extensively utilized in North America by both French and British forces prior to the start of the American Revolution. To defend high ground that commanded Fort Saint Frederick at Crown Point on Lake Champlain, the French military constructed two redoubts in 1754. The British constructed Fort Crown Point directly atop at the location of one of these redoubts in 1759-1760, destroying all vestiges of the work. The other work was southwest of Fort Saint Frederick, and the parapet, berm and some stone parapet walls from this redoubt are visible today [See Photographs Appendix].³¹ This work appears to have been a simple square design. At Fort Carillon, constructed by the French at Ticonderoga Narrows on Lake Champlain in 1755, the fort design originally contained two redoubts.³² One was constructed to protect the lower town or “French Village.” This redoubt is no longer extant.³³ The second redoubt, apparently

²⁸ Lochee, *Elements of Field Fortification*, 148.

²⁹ Lochee, *Elements of Field Fortification*, 36-37.

³⁰ Pleydell, *An Essay on Field Fortification*, 20-21.

³¹ This redoubt was evaluated during a site visit to Crown Point State Historic Site by the author in September 2002. The author wishes to acknowledge the contributions of Mr. Tom Nesbitt of Crown Point for information on this little studied and documented redoubt.

³² Albert C. Elmer, “A Glimpse Into the Past at Fort Carillon.” *The Bulletin of the Fort Ticonderoga Museum* IX, No. 2 (Winter 1953), 115-136; and Edward P. Hamilton, *Fort Ticonderoga, Key to a Continent* (1964; reprint edition Fort Ticonderoga, New York: 1995), 48-49. The French redoubts were evaluated during a site visit to Fort Ticonderoga Museum by the author in October 2002. The author wishes to acknowledge the assistance of Mr. Chris Fox, Curator of Fort Ticonderoga, for his assistance.

³³ J. Duncan Campbell. “Investigations at the French Village, Fort Ticonderoga, New York, 13 June – 15 July 1957.” *The Bulletin of the Fort Ticonderoga Museum* X, no. 2 (1958), 143-155.

built in 1756, is known as the “Grenadier Battery.” This redoubt was a five-faced work constructed on the rock point to the east of the main fort, and was connected to the main fort by a covered way. This redoubt survives in good condition, although partially obscured by vegetation [See Photographs Appendix]. It appears to have been constructed of cut limestone laid with mortar, then filled with earth and rock rubble. The Grenadier Battery served a traditional fortifications role, as it secured the eastern end of the outer-works of Fort Carillon. The third redoubt at Fort Carillon was constructed in 1758, following the repulse of the British assault of that summer. This redoubt was intended to cover a potential avenue of approach to the northwest of the main fort that outflanked the defensive breastworks hastily constructed west of Fort Carillon by French General Montcalm in 1758. Known as the Germain Redoubt, this appears to have been constructed more hastily using “dry-stacked” fieldstone. The Germain Redoubt was a detached work, used to defend a potential avenue of enemy approach. Both the Germain Redoubt and Grenadier Battery were employed in classic roles as redoubts, although the Grenadier Battery employed more traditional European construction techniques. When American Provincial forces serving with British General Jeffery Amherst occupied Fort Carillon and Saint Frederick in 1759 they encountered these redoubts.

2.2 British and Provincial Experience

The British also made extensive use of redoubts during the Seven Years War in North America. At Fort William Henry at the southern terminus of Lake George, when the main fort proved to be too small for the proposed garrison, a large irregularly shaped redoubt was constructed on high ground due east of the main fort. This large redoubt was occupied principally by Provincial soldiers during the famous siege in 1757.³⁴ Although little is known of this large redoubt, it appears to have been a classic earth and timber construction, and contained artillery. During the Siege of Louisburg in 1758, the British forces under the command of Amherst constructed a number of redoubts to secure their siege works, a classic use as defined by Vauban.³⁵ During the movement of General John Forbes and Colonel Henry Bouquet on Fort Duquesne in 1758, their route of advance was secured by a series of strategically placed redoubts.³⁶ Following his capture of Fort Saint Frederick in 1759, Amherst constructed Fort Crown Point, a massive pentagonal bastioned earth and timber fort to secure the strategic narrows of Lake Champlain at Crown Point and Chimney Point. As a component of Fort Crown Point, Amherst constructed three redoubts as outer works on strategic ground to extend the control of the larger fort: Gage’s Redoubt, the Light Infantry Redoubt, and the Grenadier Redoubt. Of these three, the Grenadier Redoubt was largely destroyed by the modern construction of a lighthouse and the Champlain

³⁴ Ian K. Steele, *Fort William Henry & The Massacre* (New York and Oxford: Oxford University Press, 1990), 99.

³⁵ Noel Saint John Williams, *Redcoats Along the Hudson, The Struggle for North America, 1754-1763*. (London and Washington: Brassey’s, 1997), 134.

³⁶ Harold A. Thomas, “The Last Two Campsites of Forbes’ Army” *Western Pennsylvania Historical Magazine* 46 (1963), 45-56 ; Thomas, “Site of Forbes Last Three Breastworks.” *Western Pennsylvania Historical Magazine* 47 (1964), 55-66; and Charles Morse Stotz, “Forbes Conquers the Wilderness: A Modern Odyssey” *Western Pennsylvania Historical Magazine* 67 (October 1984), 309-322. Provincial forces from Delaware, Maryland, North Carolina, Virginia and Pennsylvania comprised Forbes’ Army. Among the Virginian Officers was Colonel George Washington.

Monument.³⁷ The center Light Infantry Redoubt was a simple pentagon with a formal dry ditch faced with cut, mortared limestone scarp and counterscarp walls. It contained a well-defined banquette (firing step), small barracks and artillery within its confines [See Photographs Appendix]. The parapet was earth and timber, constructed on mortared, cut limestone walls. The western redoubt was constructed by Colonel Thomas Gage's 80th Foot (Light Infantry), and is a simple square redoubt with a dug dry ditch, and was constructed principally of lumber and earth. It contained a well-defined infantry banquette (firing step), small barracks and artillery within its confines.³⁸ Fort Crown Point was in large part constructed by Provisional forces serving with the British Army.³⁹ To secure their line of communications running from Fort Edward on the Hudson River, across a carrying place to the southern end of Lake George, and then to Forts Ticonderoga and Crown Point, the British constructed a series of redoubts. A particularly prominent work, Fort Gage, was only recently destroyed at Lake George Village. However, salvage archaeology hurriedly performed at this redoubt provided valuable information on how such redoubts were designed and constructed. Fort Gage was a triangular earth redoubt with small half-bastions, and a dug dry ditch. Its exterior was palisaded, and the redoubt was protected by fraising. A "blockhouse" constructed of mortared stone appears to have occupied the center of the work. Connecticut Provincials from Colonel Whiting's Regiment constructed the redoubt. Collectively, the Seven Years experience provided Americans with exposure to the construction and utilization of redoubts, as used by both the English and French military.⁴⁰

3.0 Revolutionary War Background

By the start of the War of American Independence, a healthy interest in military art and science was well founded in the fourteen colonies, and a large number of military treatises were readily available for purchase.⁴¹ At the early Battle of Bunker Hill, the cornerstone of the American defenses on Breed's Hill was a large, square earth redoubt that the American had constructed in a single night of prodigious labor. This redoubt was approximately 136 feet square, contained a redan (salient angle) facing to the south (in the presumed direction of British attack), and an entrance to the north (reverse). The devastating casualties inflicted upon the British Army when it attacked this redoubt served as a demonstration of how effectively such works could be defended.⁴² Given this early success, the Americans almost immediately began to utilize

³⁷ Paul R. Huey, *A Preliminary Report on Rescue Excavations Near the Champlain Memorial Lighthouse and Site of the Grenadiers' Redoubt at Crown Point, 1978* (Waterford, New York: Bureau of Historic Sites, New York State Office of Parks, Recreation and Historic Preservation, Revised March 1995).

³⁸ Paul R. Huey, "The History and Archaeology of Crown Point." *Fortress* Issue No. 5 (May 1990), 44-54.

³⁹ Ibid., 45; and Charles L. Fisher, "Obliged to live...on the outside of the Fort": *A Report on the Soldier's Huts Found During Archaeological Survey of the Proposed Maintenance Building Site, Crown Point State Historic Site, Essex County, New York* (Waterford, New York: Bureau of Historic Sites, New York State Office of Parks, Recreation and Historic Preservation, February 1993).

⁴⁰ Paul R. Huey, "A Brief Overview and Interpretation of the Fort Gage Excavations at Lake George, 1975" (Paper presented at a meeting of the New York State Archaeological Association, May 1997); and Louis M. Feister and Paul R. Huey, "Archaeological Testing at Fort Gage, A Provincial Redoubt of 1758 at Lake George, New York." *The Bulletin & Journal of Archaeology for New York State* 90 (1985), 40- 59.

⁴¹ One of the few studies of this topic was performed by John Henry Stanley, *Preliminary Investigation of Military Manuals of American Imprint Prior to 1800* (M.A. Thesis: Brown University, 1964).

⁴² Richard M. Ketchum, *Decisive Day, The Battle for Bunker Hill* (Garden City, New York: Doubleday & Company, 1974), 111; and Christopher Ward, *The War of the Revolution* (New York: The Macmillan Company, 1952), 1:78-79.

fortifications as an integral component of their military plans. Redoubts were incorporated with great regularity into American defensive positions constructed between 1776 and 1777. Literally miles of fortifications were constructed under the supervision of General George Washington to defend New York City during 1776. As an example of the extent of this massive fortification effort, eighteen redoubts have been documented in association with the defense of Fort Washington on Manhattan Island alone.⁴³ Unfortunately, nearly all of these redoubts have been destroyed by the expansion of New York City in the ensuing decades.

With the onset of armed hostilities, American political and military leaders recognized the need to fortify the Hudson River to deny British naval and land forces unconstrained access to this crucial river corridor. Early evaluations of the Hudson River identified Martelaer's Rock and West Point, along with Anthony's Nose to the south, as preferred locations for fortifications to impede the river. The Martelaer's Rock and West Point location was particularly well suited, for here the river is at its narrowest, and makes two right angle turns. Sail-driven boats must slow and make numerous changes of tack to negotiate these turns, a job exacerbated by shifting winds in the narrow river gorge. In September 1775 Bernard Romans, a self-styled military engineer, arrived at Martelaer's Rock to supervise construction of "Fort Constitution." Work progressed slowly, obstructed by chronic shortages of money, men and materials; poor engineering design on Romans' part; and jurisdictional arguments between various revolutionary leaders.

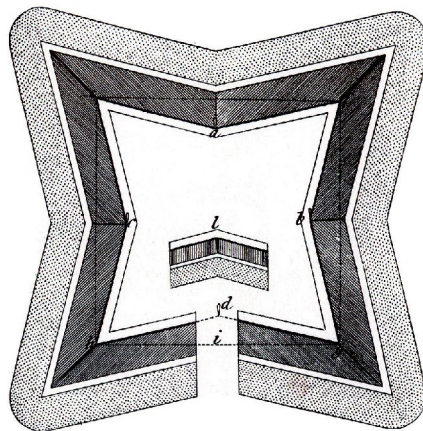
For these reasons the Americans transferred the major defensive effort in the Hudson Highlands from Fort Constitution to Fort Montgomery, located on the west bank of the Hudson River immediately north of Popolopen Creek, where Anthony's Nose constrains the river. Work began at Fort Montgomery in March 1776. Initially, a single battery was sited to fire across the Hudson; supporting facilities such as barracks, storehouses, a guardhouse and a powder magazine were constructed to its rear; the whole enclosed by three redoubts connected by a lengthy breastworks. One of these redoubts survives as a part of the Fort Montgomery State Historic Site and is available for inspection. This redoubt was the northernmost of the three, and contained a redan extending to the north. Two reentrant angles were constructed to the south (or interior of the works). This redoubt appears to have been constructed of dry laid fieldstone, with presumably earth and timber parapets, and contained a banquette (firing step). Archaeological excavations at this redoubt suggested that it contained at least one artillery-firing platform.⁴⁴ [See Photographs Appendix]

It soon became obvious that the site of Fort Montgomery was commanded by high ground immediately to the south, across Popolopen Creek. Fort Clinton was therefore constructed on this site beginning in August 1776. Communications were maintained between Forts Montgomery and Clinton by a pontoon bridge across Popolopen Creek. Fort Clinton also consisted of a series of breastworks with one large integrated redoubt serving as the heart of the fortification. One additional redoubt was constructed to the southwest of Fort Clinton, to control an avenue of approach from this direction (considered to be the rear of the fort, that is, the face of the fort

⁴³ Reginald P. Bolton, *Fort Washington, An Account of the Identification of the Site...with a History of the Defense and Reduction of Mount Washington* (New York: Empire State Society of The Sons of the American Revolution, 1902), 41-65.

⁴⁴ William H. Carr and Richard J. Koke, "Twin Forts of the Popolopen," *Fort Clinton and Montgomery, New York, 1775-1777* (Bear Mountain, New York: Bear Mountain Trailside Museums, Historical Bulletin No. 1, July 1937). The other two Fort Montgomery redoubts survive, but are located on private property, and were not accessible for survey. The author wishes to acknowledge the assistance of Mr. Jack Volk, Park Manager, Bear Mountain State Park, for providing unconstrained access to the Fort Clinton West Redoubt.

away from the Hudson River). Although Fort Clinton no longer exists, this redoubt still survives in relatively good condition as a component of Bear Mountain State Park.⁴⁵ This “West Redoubt” of Fort Clinton is usually described as being star shaped with four faces, properly described as a square redoubt with each face having a reentrant angle.⁴⁶ A small detached battery was sited immediately to the east of the redoubt, to provide artillery fire along the western face of Fort Clinton, and to provide a protected entrance to the redoubt as specified by Lochee, except that it was defended by an outer work rather than an interior traverse. Thus, this redoubt was designed as a detached work to control a specific piece of ground. This redoubt contained a prominent banquette (firing step) with embrasures, a dry ditch, and was constructed of earth and timber upper parapet on a dry laid field stone lower parapet wall [See Photographs Appendix]. The American defensive position contained a number of fatal flaws, one of which was that both forts were served by a single powder magazine located at Fort Montgomery, and that the sole line of communications between the two forts (the pontoon bridge across Popolopen Creek) was not protected by fortifications.



**Standardized Design for a “Star” Redoubt
Similar to Fort Clinton West Redoubt
Pleydell, *Essay on Field Fortification*, Plate 15**

Although a well-considered position, both Fort Montgomery and Fort Clinton were too extensive. When actually attacked by the British, the available American force was only one tenth of the force necessary to adequately defend the two forts. The Americans retreated into the redoubts, and these subsequently bore the brunt of the fighting. Fort Clinton fell in part when ammunition ran out after the Popolopen Creek pontoon bridge was interdicted by British forces.⁴⁷ Fort Montgomery was eventually over-run by superior numbers. Still, the redoubts at the two forts had enabled the small and heavily out-numbered American defenders to present a credible defense.

⁴⁵ A short portion of the Fort Clinton breastworks also survive, but are not germane to this study.

⁴⁶ It is interesting to note that the Fort Clinton West Redoubt is nearly identical to a “star” redoubt depicted on Plate 15 of Pleydell, *An Essay on Field Fortification*; and Young, *Small Detachments*, Figure 2.

⁴⁷ Dave R. Palmer, *The River and the Rock* (New York: Greenwood Publishing Corporation, 1969), 113-114.

During the early years of the War, the American forces displayed an alarming tendency to construct fortifications that were too extensive, and could not be held by the number of forces reasonably anticipated to be present for their defense.⁴⁸ Additionally, the rambling nature of these works effectively tied down the American forces, rather than permitting them to maneuver. As the American Army prepared defensive positions across the Delaware River, they constructed a series of fortifications at Fort Billingsport on the New Jersey (east) side of the river, at Fort Mercer at Red Bank on the Pennsylvania (west) side of the river, and Fort Mifflin on Mud Island in the Delaware. All three forts were poorly designed. Fort Billingsport was originally designed as an earth fort with four bastions, 700 feet per side, which would have required approximately 2,000 men to defend. Washington recognized this, and had it reduced in size. Still, the French Engineer DuCoudray again reduced the fort, essentially to a single redoubt. This fort was never assaulted, as an adequate force could not be mustered for its defense, and it was abandoned upon British approach. Fort Mercer had also been designed to be too large, and under the supervision of French Engineer Chevalier Thomas Antoine Mauduit du Plessis, it was substantially reduced in size, essentially to a large redoubt that could be defended by 500 men. The success of this redesign was made apparent when a large Hessian force assaulted the work on October 25, 1776 and was repulsed with crushing losses. The attacking force lost 151 killed, 263 wounded and 20 captured. Eighty of the attackers were so demoralized by the experience that they deserted to the Americans the next day. American casualties were light, being 14 killed and 23 wounded. Fort Mifflin was similarly too large, being designed for 1,500 men instead of the 500 that were actually available. Still, its location in the middle of the Delaware River enabled it to put up a stout defense in the fall of 1777. The American experience along the Delaware River proved that military fortifications could be used with great success, when correctly sized and defended.⁴⁹

Washington's Army spent that winter at the infamous encampment at Valley Forge. Although other elements of this camp have received considerable discussion, the fact that Washington had French Engineer Louis L. Duportail design a series of fortifications to protect the camp is frequently ignored. Duportail designed two lines of fortifications. The "outer line" consisted of a large square redoubt flanked by artillery redans, and a series of breastworks and lunettes. Behind this was a strong "inner line" consisting of a number of redoubts connected by breastworks.⁵⁰ When British commander William Howe sent spies to the Valley Forge, he learned that it was indeed "a strong point" and "having good information...that the enemy had strengthened his

⁴⁸ Pleydell specifically cautioned: "If [a work] is too large, it cannot be manned properly, and the enemy will make themselves master of it with very little trouble, or loss. Indeed, it is not of so bad consequence to make it too small, as a reserve may be formed of those who have not room to act." Pleydell, *Essay on Field Fortification*, 8-9. LeCointe also noted: "Good sense and various examples show that too large intrenchments, such as are frequently made, cannot be well defended but by a considerable number of men. An excess of this kind seems to me a great fault. I think it better to fall into the opposite, in making them smaller." LeCointe, *The Science of Military Posts*, 38.

⁴⁹ DuCoudray, "Du Coudray's Observations on the Forts Intended for the Defense of the Two Passages of the River Delaware, July 1777" *Pennsylvania Magazine of History and Biography* XXIV, No. 3 (1900), 343-347; Hugh M. Brackendridge, "The Siege of Fort Mifflin" *Pennsylvania Magazine of History and Biography* XI, No. 1 (1887), 82-88; Samuel S. Smith, *Fight for the Delaware, 1777* (Monmouth Beach, New Jersey: Philip Freneau Press, 1970); and Ward, *The War of the Revolution*, 1: 372-383.

⁵⁰ It should be noted that this is a classic use of redoubts, as specifically addressed by Lochee, *Elements of Field Fortification*, 123-124.

camp by additional works, I dropped all thoughts of attack.”⁵¹ By the sheer strength of a fortified camp, a British advance had been deterred.

In the Northern Theater, the American army used redoubts and military fortifications to great advantage at Fort Ticonderoga in 1776 and at Saratoga in 1777. Americans under Benedict Arnold and Ethan Allen had occupied the fortifications at Ticonderoga in May 1775, and Ticonderoga had served as the logistical base for American operations in Canada throughout 1775 and the first half of 1776. When the American invasion of Canada ended in defeat, the American army was removed to Fort Ticonderoga, where they established their main defensive position. Although American forces had been stationed at Ticonderoga for over a full year, they had apparently taken few (if any) steps to strengthen or repair the position there. When Major General Horatio Gates arrived at Ticonderoga to assume command of the American field army and main defensive position there, he immediately initiated the construction of a series of redoubts and batteries around the old French fort. The works at Ticonderoga were constructed under the supervision of Colonel Jeduthan Baldwin, the Chief Engineer of the American Northern Theater. Although Baldwin had never received any formal military engineering training, he had served under renowned British Engineer Captain William Eyre at the construction of Fort William Henry in 1755-1756.⁵² Almost immediately upon the arrival of Gates and Baldwin at Ticonderoga on July 8, 1776 they began laying out the fortifications.⁵³

Baldwin and Gates occupied a strong position on the eastern side of Lake Champlain which they christened “Mount Independence,” and established river batteries there to command the isthmus of Lake Champlain. They then laid out a series of redoubts to control the high ground around Fort Ticonderoga, and an entrenched line with integrated batteries to defend the rear of the Mount Independence batteries.⁵⁴ At the same time, the old French breastworks on the commanding ridge to the west of the French fort were re-constructed. Strengthening the American defensive position at Ticonderoga were seven new redoubts, and the two old French redoubts (the Germain Redoubt and Grenadier Battery).⁵⁵ The two French redoubts were re-constructed, and were noted as being defended by 200 men apiece. Lieutenant Ebenezer Elmer of Colonel Dayton’s Third New Jersey Regiment recorded on November 20, 1776 that the “stone

⁵¹ Ward, *The War of the Revolution*, 2: 544; and Gilbert S. Jones, *Valley Forge Park, An Historical Record and Guide Book* (Valley Forge Park Commission: 1947), 8-11. Although some of these defensive positions are visible at Valley Forge National Historical Park, the park’s cultural resources staff does not believe that any of them (with the exception of some of the breastworks of the inner line) are original. Accordingly, although these works were visited in the conduct of this study, they were not surveyed or documented. The author acknowledges the assistance of Ms. Julie Steele and Mr. Doug Campanello from Valley Forge National Historic Park.

⁵² Colonel John H. Calef, Editor, “Extracts from the Diary of a Revolutionary Patriot.” *Journal of the Military Service Institution of the United States* 39 (July-August 1906), 123-130.

⁵³ Thomas Williams Baldwin, Editor. *The Revolutionary Journal of Colonel Jeduthan Baldwin, 1775-1778* (Bangor: Printed for the DeBurians, 1906), 58-59.

⁵⁴ The similarities between the American defensive positions at Ticonderoga and West Point should be obvious. Because Mount Independence did not contain any redoubts proper, it is not evaluated by this study.

⁵⁵ Baldwin recorded visiting “the redoubt east of the garrison in the point of rocks” on July 30, 1776. “Diary of Colonel Jeduthan Baldwin” *The Bulletin of the Fort Ticonderoga Museum (BFTM)* IV, No. 6 (January 1938), 13.

redoubt” (the old French “Grenadier Battery”) mounted one 24-pounder, one 9-pounder, two 6-pounder, three 4-pounder, and one 3-pounder cannon.⁵⁶

The largest redoubt was the farthest north, located on the shores of Lake Champlain. Constructed by the 1st New Jersey Regiment under the command of Colonel William Winds, this was an irregularly shaped redoubt constructed principally of earth (actually sand) and presumably timber, and surrounded by a ditch.⁵⁷ Sergeant Timothy Tuttle of this regiment first recorded “our party is at work at the Ridout [redoubt] down by the side of Lake” on August 8, 1776.⁵⁸ Two days later he first noted its name: “Same day on fatigue at the Jersey Redoubt, 3 hours on & 3 off fatigue.” On September 12th Sergeant Tuttle stated: “...Our battalion has now don [done] the Jersey Redoubt” although his diary records work continuing through late October. Regrettably, Tuttle only provides one account of the actual construction of the Jersey Redoubt, on October 22nd: “Pa. Battalion at work [on] the blind [on] the inside of Jersey redoubt.” By “blind,” Tuttle probably means a traverse, a heavy parapet constructed perpendicular to the main work to protect it from enfilading fire. A map from the Collections of the New York Historical Society noted that the Jersey Redoubt was designed for 300 men, and Lieutenant Ebenezer Elmer of Colonel Dayton’s Third New Jersey Regiment recorded on November 20, 1776 that the Jersey Redoubt mounted one 32-pounder, two 18-pounder, one 9-pounder, and one 6-pounder cannon.⁵⁹

Immediately to the east of the Jersey Redoubt another irregularly shaped redoubt was similarly constructed of earth (sand) and presumably timber. Apparently known as the “Oblong Redoubt” it was laid out by Colonel Baldwin on August 16th, and designed to be defended by 250 men, and mounted three 4-pounder cannon.⁶⁰ To the south of the Jersey Redoubt, two new redoubts covered the ground between Lake Champlain and the Jersey Redoubt to the re-constructed French lines. The closest to the Jersey Redoubt was known as the “Circular Redoubt,” although actually it was semi-circular, with the curved face to the west (or direction of anticipated British advance). Why Baldwin designed this redoubt in this distinctive shape when he laid it out on August 20th is unknown.⁶¹ The Circular Redoubt was to be defended by one hundred men, and contained one 9-pounder and three 4-pounder cannon. To the south of the Circular Redoubt was a more traditional square redoubt, designed for one hundred men. Although the evidence is sketchy, apparently this redoubt was referred to as the “Sandy Redoubt” and mounted one 12-pounder, one 9-pounder, and two 4-pounder cannon. Both the Circular Redoubt and this square

⁵⁶ “Journal Kept During An Expedition to Canada in 1776 by Ebenezer Elmer.” *Proceedings of the New Jersey Historical Society* II, No. 4 (1847), 43-44.

⁵⁷ The soil at this location is extremely sandy, and stone would have to be carried down from the vicinity of the fort itself. The American redoubts were evaluated during a site visit to Fort Ticonderoga Museum by the author in October 2002. The author wishes to acknowledge the assistance of Mr. Chris Fox, Curator of Fort Ticonderoga, for his contributions to this study.

⁵⁸ “Journal of Sergeant Timothy Tuttle, 1st New Jersey Regiment, 1775-1776.” New Jersey Historical Society, Newark, New Jersey. Baldwin also noted on August 8, 1776: “I laid out a redoubt on the North end of the French Lines by the Lake.” “Baldwin Diary” *BFTM*, 15.

⁵⁹ “Proceedings of a General Court Martial for the Trial of Major General St. Clair, August 25, 1778” (Philadelphia: Hall and Sellers, 1778); in *Collections of the New York Historical Society for the Year 1880* (New York: 1881).

⁶⁰ “Baldwin Diary” *BFTM*, 17.

⁶¹ *Ibid.*, 18. Colonel Baldwin described it as “a half circular redoubt.” The only historic discussion of the utility of a half-circular redoubt is provided by Young, *Small Detachments*, 20 and Figure 5. Young suggests the use of such a redoubt when defending the point of a hill, which does not apply to this redoubt at Ticonderoga.

redoubt were constructed similarly to the Jersey Redoubt, of earth (again, actually sand) presumably faced with sod or timber to stabilize the parapet, and were surrounded by ditches.

To secure the vulnerable north (or right) flank of the old French Lines, the Americans constructed two redoubts, which were laid out by Colonel Baldwin on August 15th.⁶² To safeguard the rear of the French lines, the Americans constructed one additional redoubt, which was surveyed by Colonel Baldwin on August 24th.⁶³ All of these redoubts were traditional square designs, and were constructed of soil and presumably timber, and surrounded by ditches. These redoubts were to be defended by one hundred men. Lieutenant Elmer makes no mention of any artillery being mounted in these three redoubts.

When combined with the works at Mount Independence, additional outer defensive works at Mount Hope, the reconstruction of the old French defensive breastworks, and the old French fort itself, Ticonderoga was an imposing fortification. Colonel John Trumbull, Adjutant to General Gates, describes the impression that Ticonderoga made upon the British Army when it advanced in late October 1776:

Ticonderoga must have had a very imposing aspect that day, when viewed from the lake. The whole summit of cleared land, on both sides of the lake, was crowned with redoubts and batteries, all manned, with a splendid show of artillery and flags.... Our appearance was indeed so formidable, and the season so far advanced, that the enemy withdrew without making any attack....⁶⁴

Again, an American position had resisted attack merely through the presence of its fortifications, of which redoubts had played a prominent role. The use of redoubts at Ticonderoga had permitted the Americans to effectively control all of the militarily significant terrain around the old French fort with their available forces.

The British Army returned down Lake Champlain in 1777, and drove the Continental Army in retreat almost to Albany. Major General Horatio Gates returned to the Northern Theater to resume command of the army, and working in conjunction with a young Polish Engineer named Thaddeus Kosciuszko, they laid out a strongly fortified position on a bluff immediately west of the Hudson River, near a local landmark “Bemis’ Tavern.” Although these works have received scant study or appreciation, in large part because they never figured in the heavy fighting that occurred at Saratoga in September and October 1777, they constituted an extensive and formidable position. Kosciuszko, a professionally trained military engineer, may well have drawn upon a strong Polish military tradition of utilizing field fortifications and entrenched camps.⁶⁵ Constructed across the high ground of “Bemis’ Heights” were a series of artillery batteries and infantry redoubts, connected by lineal breastworks. Kosciuszko cleverly designed these works to “refuse” the American right (eastern) flank, such that any British force moving south on the River Road would suddenly discover its advance blocked by heavy entrenchments, and

⁶² Ibid., 17.

⁶³ Ibid., 18.

⁶⁴ Theodore Sizer, Editor. *The Autobiography of Colonel John Trumbull, Patriot-Artist, 1756-1843* (1841: reprint edition New Haven: Yale University Press, 1953), 34.

⁶⁵ Robert I. Frost, *The Northern Wars, 1558-1721* (Essex, England: Pearson Education Limited, 2000), 106, 110, 244-245, 247. The most current, and well-prepared, biography is Francis Casimir Kajencki, *Thaddeus Kosciuszko, Military Engineer of the American Revolution* (El Paso, Texas: Southwest Polonia Press, 1998).

outflanked to the west by strong artillery batteries guarded by redoubts.⁶⁶ The American works extended nearly 1¼ miles east to west (with a double line of fortifications guarding the west flank), and ¾ miles from north to south. Although the British Army never directly assaulted these works, their presence heavily influenced the British maneuvers and field tactics during September and October 1777. In large part, the strength of the field works at Saratoga enabled the American Army to re-establish a successful defense of the Hudson River, and contributed their full share to the British surrender at Saratoga.⁶⁷

4.0 The Redoubts of West Point

As American military commanders and their various supporting Engineering officers evaluated the terrain around the bend of the Hudson River at West Point, it became immediately obvious that West Point was controlled by ground that continually ascended nearly twenty miles to the west (essentially to Schunnemunk Mountain immediately west of Woodbury Creek). Thus, any successful defensive scenario at West Point would have to consist of two integrated elements:

- Obstructions and artillery batteries at the Hudson River; and
- Supporting fortifications to prevent the river batteries from being taken from ascending ground to their rear.⁶⁸

To achieve this, a large, formal bastioned fortification, named Fort Arnold in honor of Major General Benedict Arnold, was designed immediately above the river batteries. A single large hill overlooked Fort Arnold, and a large redoubt christened “Fort Putnam” was constructed to secure this ground.⁶⁹ Fort Arnold and Fort Putnam were both large works possessing considerable strength, and were designed to require a formal siege for their reduction. To control ascending ground above and around Fort Putnam, a series of four redoubts were constructed. These redoubts were intended to be strong enough to be able to withstand a simple infantry assault, and to require a deliberate attack before they could be captured. They were intended to provide perimeter security for Fort Putnam in particular.

An evaluation of the ground around Fort Putnam revealed two avenues of potential British approach, directly from the south along a ridgeline, and to the north-northeast. The approach from the north-northeast would not be a preferred engineering approach, because it could be easily enfiladed by artillery fire from Fort Arnold. To secure the more likely avenue of approach from the south, two strong redoubts and a battery defended the ridgeline. A detached artillery battery farthest south known as Battery Miegs was the first work. Immediately to its north (in the direction of Fort Putnam), a series of outer-works connected this Battery to a strong redoubt. This redoubt, Redoubt Wyllis, contained both a detached battery, and an attached breastwork

⁶⁶ Kosciusko may well have been emulating the successful use of redoubts by the Russian Army in canalizing and subsequently crushing a Swedish Army at the Battle of Poltava on June 27, 1709 along the Vorskla River. Frost, *The Northern Wars*, 289-294.

⁶⁷ Unfortunately, none of the American works designed by Kosciuszko at Saratoga survive. The author expresses his appreciation to Mr. Chris Martin and Ms. Christine Robinson of Saratoga National Historical Park for their assistance with this study.

⁶⁸ The well-known West Point Chain across the Hudson River has been exhaustively documented in a large number of histories. The West Point river batteries, and the American defensive position on Constitution Island, will be the subject of future Historic Structures Reports to be prepared by the Cultural Resources Manager, U.S. Military Academy, West Point, New York.

⁶⁹ Fort Putnam was not evaluated by this survey, because the surviving fort is predominantly a 1793 casemated masonry fortification rather than the large redoubt from the American Revolution. Again, a future Historic Structures Report is intended to evaluate both Fort Putnam’s Revolutionary War and post-Revolutionary War history and military architecture.

(infantry trench). Finally, Redoubt Webb to the north and closest to Fort Putnam secured the ridgeline. Any British approach utilizing this ridge would have to reduce these outer-works before any siege could progress against Fort Putnam.

Finally, three redoubts protected the river batteries and eastern terminus of the Hudson River obstructions at Constitution Island. These redoubts were intended to defend the rear of the river batteries against a possible British amphibious operation using what is now known as “Constitution Marsh.”⁷⁰

The centerpiece of West Point’s land defenses was Fort Arnold. Initially, French Engineer Louis LaRadiere designed a massive European type fortification that would have occupied nearly the entire area of what is today’s Plain. American commander Brigadier General Samuel H. Parsons rapidly scaled LaRadiere’s plans down when he initiated construction in March 1778.⁷¹ Today, only the east parapet of Fort Arnold survives. This parapet wall is approximately eighteen feet thick, meaning that it would have been proof against the heaviest cannon. Fort Arnold’s eastern face contains an interesting square protrusion (approximately 30’ x 80’, See Photographs Appendix), which consistently appears in early drawings of the fort. The military purpose of this square protrusion is unknown, and it is not in conformance with any feature depicted in any 18th century military engineering manual or treatise. The introduction of this salient feature protruding beyond the main parapet created a point on the parapet extremely vulnerable to being breached by enfilading artillery fire. The assumption is that Parsons re-designed Fort Arnold without any professional engineering assistance, and this feature is compelling physical evidence that such was the case.⁷²

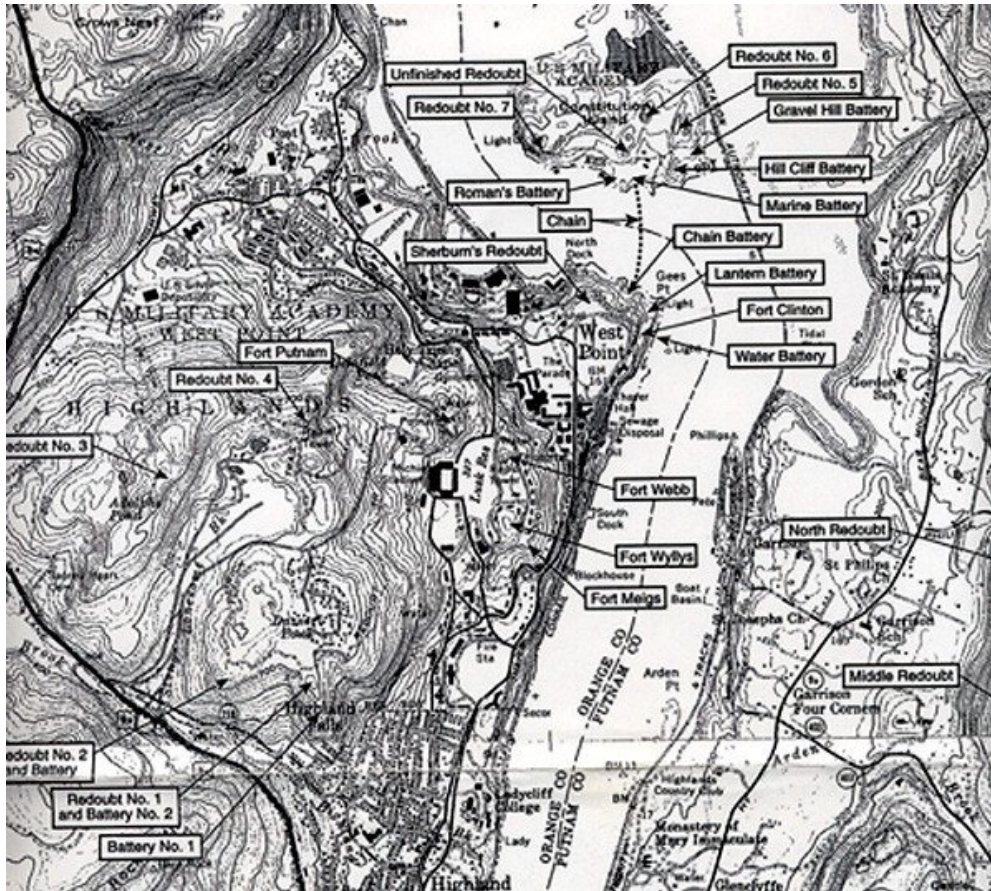
General Parsons expressed concerns that he had no professional engineer to guide his work, as LaRadiere had departed precipitously. In response, Washington sent the personable young Kosciusko, whose abilities had made such a difference at Saratoga, to the succor of Parsons.

The first redoubts designed by Kosciusko, and constructed in the spring of 1778, appear to have been Fort Putnam and the series of outer works defending the prominent ridge running south from Fort Putnam (Redoubt Webb, Redoubt Wyllis with its detached battery, Battery Miegs, and the connecting works between Redoubt Wyllis and Battery Miegs).

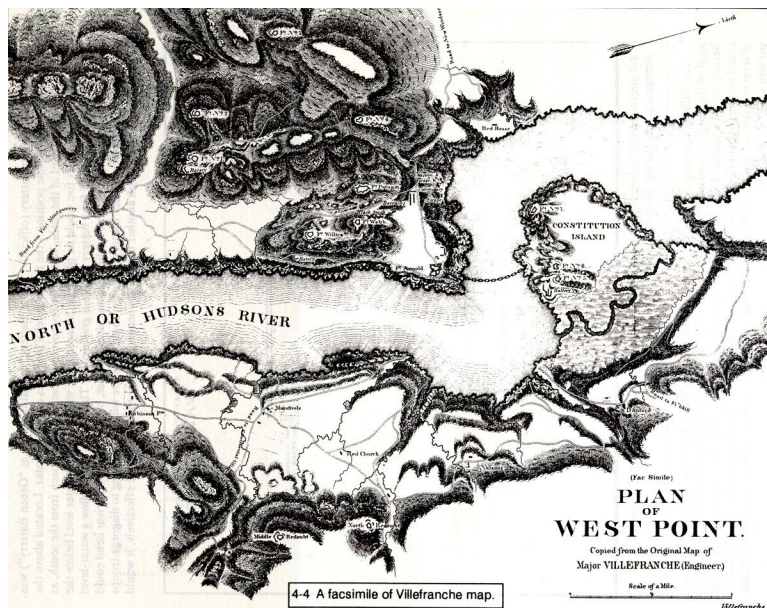
⁷⁰ The British capability to execute complex, successful amphibious attacks was well proven. For this, see David Syrett, “The British Landing at Havana: An Example of an Eighteenth-Century Combined Operation” *The Mariner’s Mirror* 55 (1969), 325-331; Syrett, “The Methodology of British Amphibious Operations During the Seven Years and American Wars” *The Mariner’s Mirror* 58 (1972), 269-280; and J. Mackay Hitsman and C.C. J. Bond, “The Assault Landing at Louisburg, 1758” *The Canadian Historical Review* XXXV, No. 4 (December 1954), 314-330.

⁷¹ Parsons was an Attorney. Charles S. Hall, *Life and Letters of Samuel Holdon Parsons* (Binghamton, New York: Otsego Publishing Company, 1905), 143, 149, 153-157.

⁷² Charles E. Miller, Jr., Donald V. Lockey and Joseph Visconti, Jr. *Highland Fortress, The Fortification of West Point During the American Revolution, 1775-1783* (West Point, New York: Department of History, U.S. Military Academy, 1979), 79.



**Revolutionary War Resources at West Point
On Modern Topographical Map**



Plan of West Point by Engineer Major Villefranche, 1780⁷³

⁷³ Reproduced from Miller, et. al., *Highland Fortress*, 68.

The furthest north redoubt on this ridge; Redoubt Webb was filled by the construction of an Observatory in 1883, which was in turn demolished in the 1950s.⁷⁴ Although previous studies have stated: “Today there are no visible traces of Fort Webb” this is in error.⁷⁵ In fact, the entire redoubt is believed to exist underneath the fill for the observatory. A well-defined dry-laid fieldstone parapet wall extends along the northern face of the redoubt. During a field visit to the site in September 2003 a 6-pounder grapeshot was recovered from a groundhog hole at the site, indicating that archaeological resources remain at this redoubt [See Photographs Appendix].⁷⁶ Only one plan of this redoubt has been located in the West Point Library. It depicts Redoubt Webb as a roughly “L” shaped redoubt, with the refused left facing the Hudson River to the east. This redoubt was shown with four artillery embrasures and a banquette (firing step). This agrees with an inventory of artillery for West Point dated September 5, 1780 that listed Redoubt Webb as having one 12-pounder, two 6-pounders, and one 4-pounder cannon. The circumference of the Redoubt was 402 feet, indicating that the redoubt required a garrison of 375 soldiers to defend it, making this a considerably larger redoubt than other redoubts at West Point. The entrance appears to be on the western face, which would not be in conformance with proper redoubt design as previously discussed, suggesting that these plans may not be entirely accurate.⁷⁷ The only written description located to date was prepared by Major General Benedict Arnold for transmission to British General Henry Clinton in September 1780: “Fort Webb, built of fascines and wood, a slight work, very dry, and liable to set on fire, as the approaches are very easy, without defenses, save a slight abbatis.”⁷⁸ It is hoped that financial resources will become available in the near future to permit additional archaeological investigations of Redoubt Webb.

Redoubt Wyllis was a pentagonal redoubt, constructed of dry-laid fieldstone walls at the base filled with earth, and presumably with timber ramparts and a banquette given the height of the work [See Photographs Appendix].⁷⁹ The parapet walls are twelve feet thick, which would have been adequate to resist all but the heaviest siege cannon. Wyllis had a perimeter of 258 feet, thus requiring a garrison of 250 men to defend it (allotting eight feet for a cannon). Arnold described Redoubt Wyllis as: “Built of stone, 5 feet high, the work above plank filled with earth, the stone work 15 feet, the earth 9 feet thick, no bomb proofs, the batteries without the fort.” A contemporary sketch depicts one embrasure on the south side, presumably to cover the detached battery. The redoubt definitely contained a powder magazine, and probably a guard house (described by Mead as a “bomb proof”). The redoubt did not contain a ditch, probably due to the rocky nature of its location. The redoubt is located on high ground, and its elevation provides the redoubt with a commanding presence. The choice of a pentagonal shape appears appropriate to the terrain. A well-defined set of stairs provides the entrance to the redoubt from the west side, and the entrance is protected by a traverse as discussed by Lochee, although the positioning of the entrance should be to the south rather than the west. The entrance is ten feet wide, precisely the entrance width for a redoubt with artillery as specified by Lochee and Vauban. A strong

⁷⁴ *Historic Structures Inventory United States Military Academy West Point New York* (Washington DC: Historic American Building Survey Historic American Engineering Record, U.S. Department of the Interior, National Park Service, 1984), 2:67-68.

⁷⁵ Miller, et. al., *Highland Fortress*, 95.

⁷⁶ Adrian B. Caruana, *British Artillery Ammunition, 1780* (Bloomfield, Ontario, Canada: Museum Restoration Service, 1979), 18.

⁷⁷ Edward C. Boynton, *History of West Point and Its Military Importance During the American Revolution* (New York: D. Van Nostrand, 1863), 114.

⁷⁸ Boynton, *History of West Point*, 115.

⁷⁹ As with the West Redoubt at Fort Clinton, Redoubt Wyllis’s shape is nearly identical to a pentagonal redoubt presented as Plate II, Figure 4 by Lochlee, *Elements of Field Fortification*.

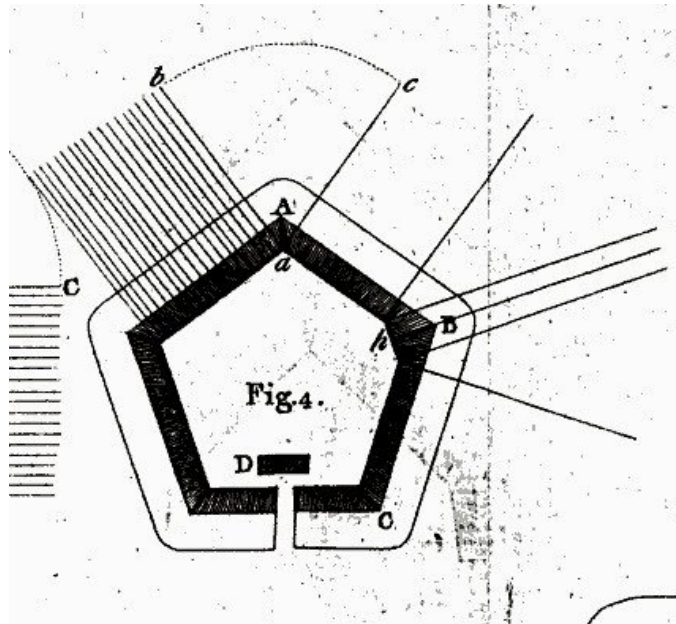
detached battery with four embrasures is located immediately south of Redoubt Wyllis. This was a massive battery with eleven foot thick parapets to the south and southeast, and a heavier parapet to the west of nineteen feet, which would have been adequate to defend the face of the battery against any but the heaviest siege guns, and rendering the western parapet proof even against them. To protect the southwestern corner, presumably the most vulnerable to attack, an epaulment was constructed to strengthen this point on the battery. This massive epaulment added approximately six feet to the thickness of the parapets, making it proof against even the largest siege artillery. The September 1780 artillery report noted that Redoubt Wyllis mounted two 18-pounders and three 3-pounders. Presumably one of the smaller 3-pounders was located inside the redoubt.⁸⁰ Extending from the epaulment to a rock outcropping, generally to the south-southeast to close off a ravine running in front of the battery, a well-defined eighty-foot long attached breastwork (infantry trench) was constructed. This trench contained a six-foot parapet, was approximately four feet deep and six feet wide, and the interior face of the trench was lined with dry-stacked fieldstone. The parapet of this breastwork would have been stout enough to resist field artillery.⁸¹ Redoubt Wyllis is a well-designed, strongly constructed, well-positioned work that is generally in complete conformance with contemporary redoubt designs.

An important point is that none of the redoubts at West Point are perfect geometric figures, and accordingly are frequently described as being “irregular.” Given the surveying equipment available at West Point, the extremely rocky and difficult nature of the ground, and the fact that these redoubts were built using natural materials by hand laborers under adverse circumstances such as having insufficient tools and materials, these redoubts should be considered to be regular in shape. It must be remembered that these redoubts are considered to be “field works” adjusted to the terrain. As Young specifically noted: “Upon measuring from [one point of a redoubt to another point] he may find it either under or over 50 feet; but this Inaccuracy must not discourage him, for his Redoubt will still be good though not laid down mathematically just.”⁸²

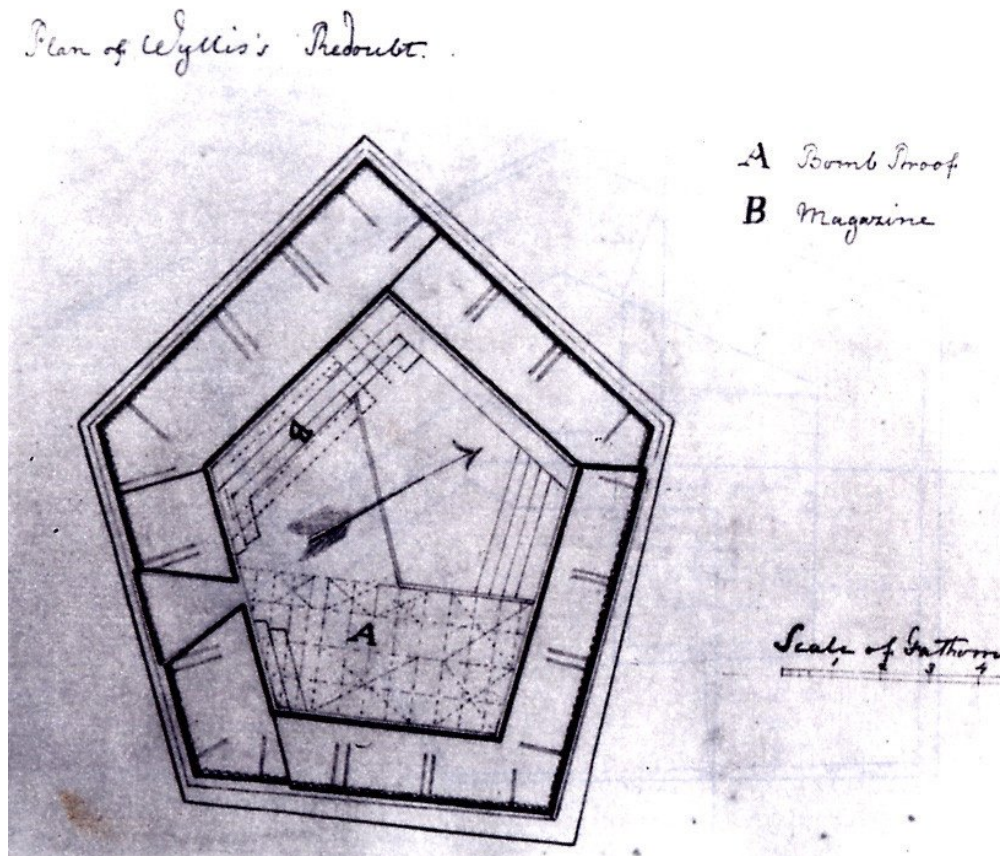
⁸⁰ Miller, et. al., *Highland Fortress*, 96-100; Boynton, *History of West Point*, 114-115; and Jack Mead, *Archaeological Survey of Fort Putnam and Other Revolutionary War Fortifications at West Point, New York, 1967-1968* (West Point, New York; West Point Museum Fund, 1968), 25-33.

⁸¹ This short breastwork had not been previously surveyed or evaluated. This infantry trench was first located during a site visit by the West Point Cultural Resources Manager in April 2003, and initial measurements and photographs were taken in December 2003.

⁸² Young, *Small Detachments*, 11.



Standardized Design for a "Pentagonal" Redoubt
Similar to Redoubt Wyllis and Redoubts No. 2 and No. 3
from Lochee, *Elements of Field Fortification*, Plate 1II, Figure 4



Plan of Redoubt Wyllis by Captain Ephraim Sergeant, 1782⁸³

⁸³ Reproduced from Miller, et. al., *Highland Fortress*, 97.

Although identified by Archaeologist Jack Mead as “Battery Miegs,” the extant earthworks on a small plateau southeast of Redoubt Webb are more likely a line of outer works that connected Battery Miegs with Redoubt Webb.⁸⁴ The surviving trace of earthworks at this location agree extremely well with a map drawn by Major Villefranche, another of the ubiquitous French Engineers, in 1780; and in the Papers of Moses Greenleaf, who commanded Fort Putnam in 1779-1780.⁸⁵ This line of works is generally “U” shaped, with the open end facing to the north (or in the direction of the American defensive interior). The parapet terminates at its northwest corner in a well-defined perpendicular traverse, continues due south approximately 140 feet, and then briefly follows the natural topography and turns east for the river. It appears that an artillery platform and embrasure was located at the southwestern corner. The works then turn north, again following the natural topography, and a well-defined breastwork (infantry trench) provides the eastern face of these works. This trench seems to terminate at a large rock outcropping. Construction techniques appear to be the typical dry-laid fieldstone at the bottom of the parapet, filled with earth or rock rubble, which is all that remains today. The parapet walls survive in height up to five feet, and are from five feet to eight feet in width, sufficient to withstand up to a 12-pounder shell. This in itself is a strong indication that this work is not an artillery battery, as thicker parapets would be required to provide protection against return artillery fire from heavier guns, as constructed at Redoubt Wyllis. These outer works made excellent use of the available terrain. These works are in a good state of preservation although exposed to considerable foot traffic because of their location within a family housing area, suggesting that they were extremely well constructed.

Battery Miegs proper was destroyed during the construction of Officer’s Family Housing Quarters #21 at the U.S. Military Academy in 1910. No remnants of this battery have been identified or located. The destruction of this battery apparently caused earlier researchers some confusion, resulting in the misidentification of Battery Miegs.

This assemblage of small field works controlled this prominent ridge that could serve as the preferred avenue of approach to Fort Putnam, and then Fort Arnold. The use of this ridge for British siege works was denied so long as this series of layered works survived. This was a classic use of redoubts and associated works, as described by Lochlee, Pleydell and Le Cointe.

To defend the high ground surrounding Fort Putnam to the west and south as previously discussed, Kosciusko designed and constructed a series of four redoubts. As formally designated on July 27, 1779 the redoubts from east (closest to the river) to west (terminating at “Rocky Hill” above Fort Putnam) are numbered Redoubt No. 1, 2, 3 and 4.⁸⁶ Two professional cultural resources surveys of Redoubts No. 1 and No. 2 have been previously prepared, which provide excellent documentation of these redoubts.⁸⁷ Construction on these redoubts and detached batteries started in July 1779.

⁸⁴ Miller, et. al., *Highland Fortress*, 99-100; Meade, *Archaeological Survey of Fort Putnam*, 22-23.

⁸⁵ Special Collections and Archives, U.S. Military Academy Library, U.S. Military Academy, West Point, New York.

⁸⁶ “Orderly Book, West Point Garrison, July-August 1779 and August- December 1779” (WPA Transcript, Special Collections and Archives, U.S. Military Academy Library, West Point, New York), 31.

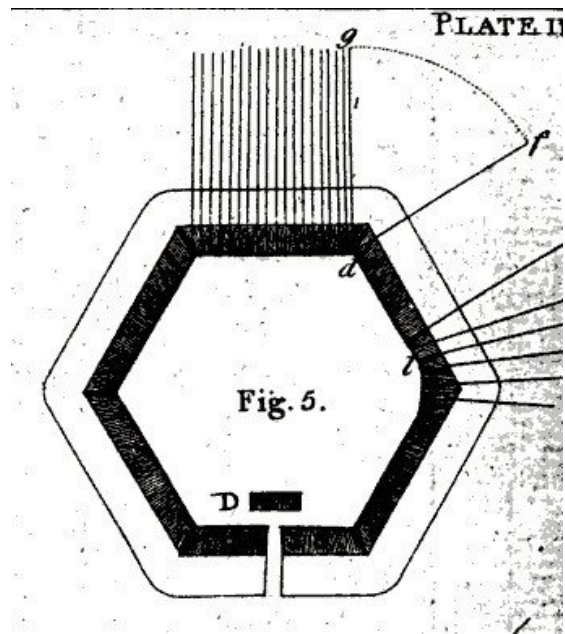
⁸⁷ John Milner Associates, Inc., *Preservation Plan, Redoubts No. 1 and 2 at the Stony Lonesome II Housing Facility, United States Military Academy, West Point, Orange County, New York* (U.S. Army Corps of Engineers, New York District: 1996); and Panamerican Consultants, Inc., *Maintenance Plan for Redoubts Nos. 1 and 2 and their Associated Batteries, U.S. Military Academy at West Point, Orange County, New York*. (West Point, New York: U.S. Military Academy, May 2003).

Redoubt No. 1 was a hexagonal work constructed of dry-laid fieldstone parapet walls, and presumably with timber ramparts and a banquette given the height of the work.⁸⁸ As inventoried by Milner and Associates in 1996: “The interior walls...are vertical with sharp angled corners. They vary in height from 19 to 32 inches.” The parapet walls, still well defined inside, have entirely collapsed to the outside. Thus, although the parapet is today twelve to twenty feet in thickness, it was described by Arnold as being nine feet thick on the south side, and four feet thick on the north and east sides. Given these dimensions, the south parapet would have been proof against guns up to 12-pounders, while the remainder of the parapet would have been sufficient only against 6-pounders. Mead noted what he believed to be the remnants of banquettes inside this redoubt, but recent field surveys have not revealed such features. The location of the entrance can no longer be discerned, although a contemporary sketch depicted a simple straight cut through the northern parapet, not in conformance with Lochee or Vauban. The interior circumference of this redoubt was probably originally 180 feet (six faces of thirty feet each). Thus, 180 men would have been required for its defense. No indications of any embrasures survive, which is consistent with Arnold’s description: “No cannon in the works, a slight and single abbatis, no ditch or picket. Cannon on two batteries, No bomb proofs.” The redoubt does not have a ditch, presumably because of the stony nature of the ground. The redoubt is located on a prominent elevation, and its configuration appears to be appropriate to the topography. The redoubt has survived until today in remarkably good condition, which suggests that it was an exceptionally well-constructed work.⁸⁹ Immediately to the southwest of the redoubt is a lineal detached battery, consisting of three parapet faces pierced by four embrasures. The parapets are constructed of dry-stacked fieldstone, approximately three feet in height except at the embrasures, where the present height is reduced to eighteen inches. The thickness of the surviving parapets vary from seven to ten feet in width, which would have made the battery proof against 12-pounders.

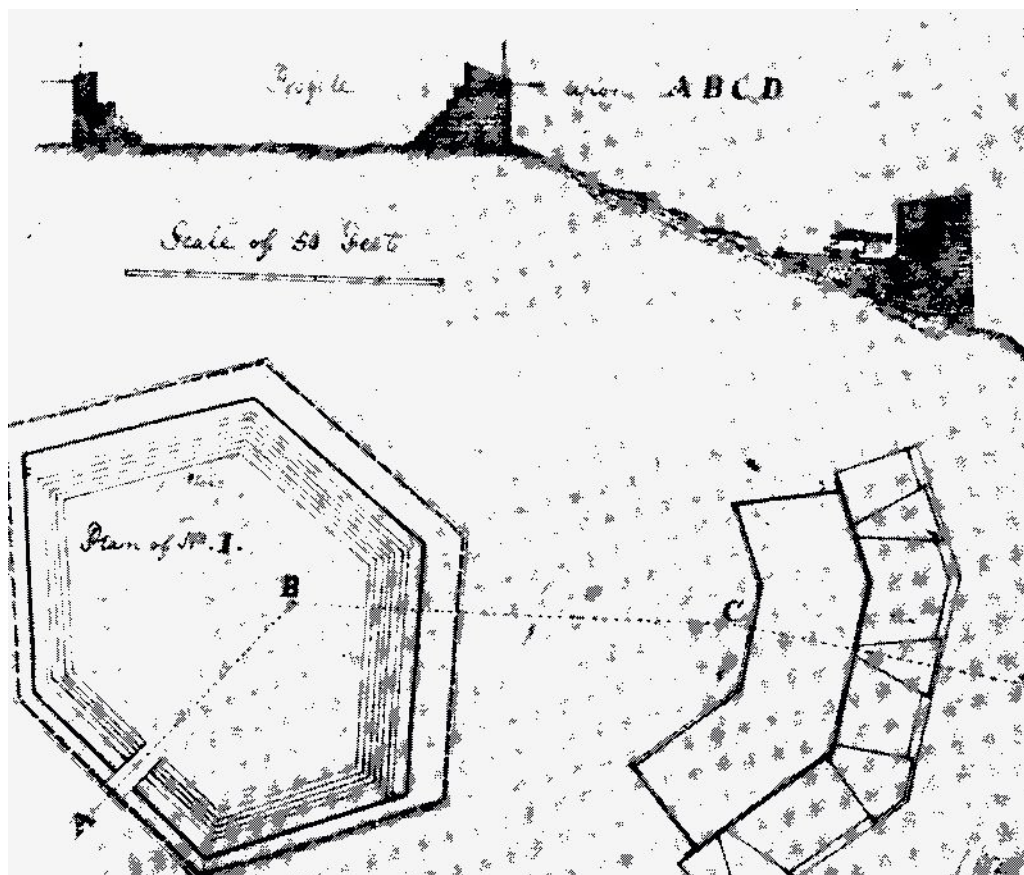
Approximately 600 feet southeast of Redoubt No. 1 is the second detached battery, located on a prominent flat, rocky knoll offering excellent observation of the Hudson River to the southeast (this will be designated as Battery #1 for the purposes of this study). Battery #1 appears to have originally been “C” shaped, with the open face being to the north (in the direction of Redoubt No. 1). The battery consisted of dry-stacked fieldstone, filled with earth and rock rubble. Unfortunately, this battery is in a poor preservation condition, and it cannot now be determined if the battery had embrasures, or if the guns fired en barbette. The heaviest parapet thickness is to the west, where the original parapet appears to have been approximately fourteen feet, protection against all but the heaviest siege guns. The parapet becomes progressively thinner on the other faces (south and east), where presumably a lesser artillery threat was anticipated. According to Arnold’s September 1780 report, the two detached batteries at Redoubt No. 1 mounted one 12-pounder and four 9-pounder cannon. This suggests that these batteries were under-gunned, at least in 1780.

⁸⁸ As with Redoubt Wyllis, Redoubt No. 1’s shape is nearly identical to a hexagonal redoubt presented as Plate II, Figure 5 by Lochlee, *Elements of Field Fortification*.

⁸⁹ Miller, et. al., *Highland Fortress*, 145-147; Boynton, *History of West Point*, 114-115; and Mead, *Archaeological Survey of Fort Putnam*, 35-44.



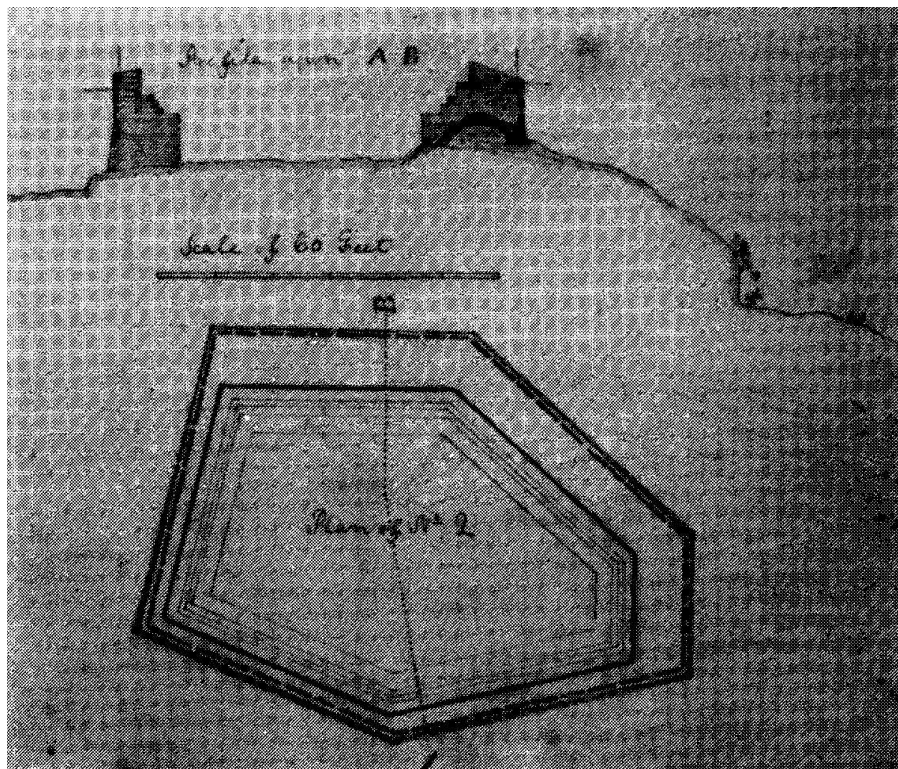
Standardized Design for a “Hexagonal” Redoubt
Similar to Redoubt No. 1, West Point
Lochee, *Elements of Field Fortification*, Plate III, Figure 5



Plan of Redoubt #1 by Captain Ephraim Sergeant, 1782⁹⁰

⁹⁰ Reproduced from Miller, et. al., *Highland Fortress*, 145.

Redoubt No. 2 is located on a prominent piece of high ground approximately 1,500 feet west of Redoubt No. 1.⁹¹ This redoubt is located on higher ground that commands Redoubt No. 1. This redoubt is a pentagonal redoubt adapted with the incorporation of a sixth short face cutting across the principal salient angle. This appears to have been necessitated by the terrain, an adaptation that would have been completely in agreement with Lochee and Pleydell.⁹² Redoubt No. 2 is constructed of dry-laid fieldstone parapet walls at the base, and the remainder of the redoubt is well-packed earth only (which may have originally been faced with sod or timber). As with Redoubt No. 1, there is no ditch. The interior circumference of this redoubt was probably originally 160 feet (five faces of thirty feet each, plus a short face of approximately 7-8 feet). Thus, 160 men would have been required for its defense. Because of severe erosion problems caused by previous improper clearance of protective vegetation from this redoubt, the original thickness of the parapet walls, the possible presence of any banquette or embrasures, and the location of the entrance can no longer be discerned. Arnold succinctly noted of Redoubt No. 2: "The same as No. 1, No bomb proofs." The redoubt is located on high ground, and its elevation provides the redoubt with a commanding presence. The choice of a modified pentagonal shape appears appropriate to the terrain. Redoubt No. 2 has been under extreme erosion pressure for a number of years, but its continued survival under these adverse conditions suggests that it was an extremely well constructed fortification.⁹³



Plan of Redoubt #2, by Captain Ephraim Sergeant, 1782⁹⁴

⁹¹ Miller, et. al., *Highland Fortress*, 147; Boynton, *History of West Point*, 114-115; and Mead, *Archaeological Survey of Fort Putnam*, 44-52.

⁹² As with Redoubt Wyllis, Redoubt No. 2's shape is nearly identical to a pentagonal redoubt presented as Plate II, Figure 4 by Lochlee, *Elements of Field Fortification*. In this case, however, the redoubt was adapted by adding a short side cutting across the most prominent salient angle, as described.

⁹³ Stabilization efforts at this redoubt are planned for the fall of 2004.

⁹⁴ Reproduced from Miller, et. al., *Highland Fortress*, 148.

Immediately southwest of Redoubt No. 2 is a detached battery. As inventoried by Milner, “This battery is roughly U-shaped, and is constructed on the crest of a rock outcropping. The southeast and southwest sides of the “U” are relatively low, with embrasures for six cannon. The northwest side of the battery was a high epaulment, intended to provide protection from possible fire from Redoubt No. 3.”⁹⁵ As with the redoubt itself, severe erosion problems preclude an assessment of parapet thickness of this battery. Arnold’s report noted that Redoubt No. 2 contained two 9-pounders, which also suggests that this battery was under-gunned, at least in 1780.

The detached batteries at Redoubt Webb, and No. 1 and No. 2, are positioned so that even if they were over-run by an infantry assault, their interiors could still be controlled from the redoubts. This is not the case with Battery #1, which is located in defilade from the redoubt. It appears extremely vulnerable to being assaulted, and from this standpoint its siting appears extremely questionable. However, when prominent terrain to the south is evaluated, it becomes readily apparent why Battery #1 was so placed. American commanders, and presumably Kosciusko, were particularly concerned with Bare Rock Mountain, an extremely prominent promontory located nearly due southwest from this detached battery [See Photographs Appendix].⁹⁶ A careful terrain study suggests that the location of this battery, when combined with the fire from the detached batteries at Redoubts No. 1 and No. 2, would have enable effective flanking fire to be placed upon any British artillery position on Bare Rock Mountain. To achieve this enfilading fire, the second detached battery at Redoubt No. 1 was necessitated. And it should be noted that even if British forces overran Battery #1, its position was beyond effective musket range from Redoubt No. 1, and thus would not have constituted a threat to that redoubt.

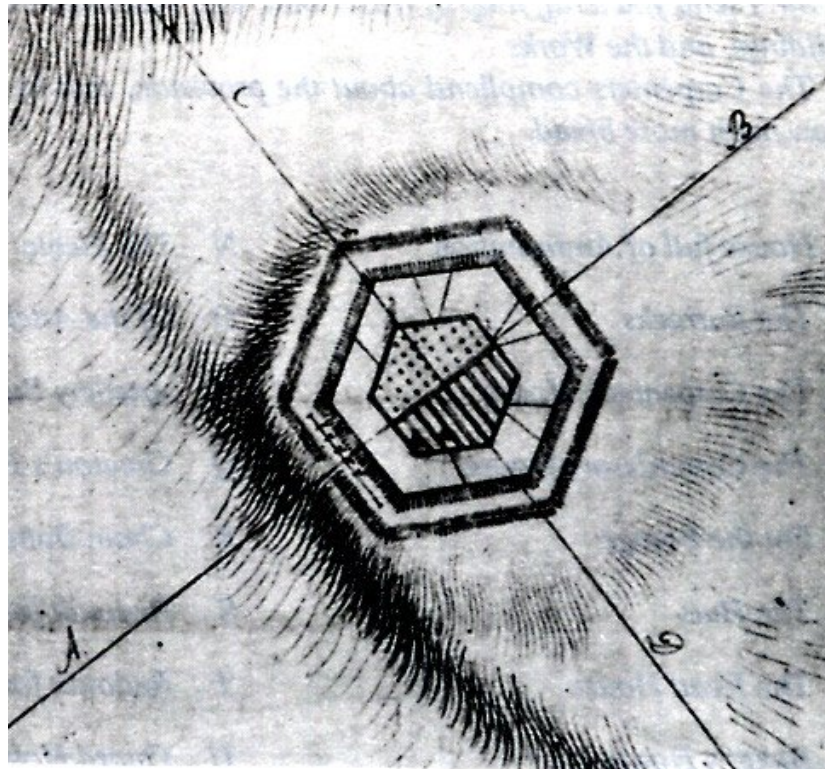
Redoubt No. 3 is the most difficult of the West Point redoubts to adequately assess. It is currently located in a heavily wooded site that contains considerable underbrush, making a viable survey quite problematic. Redoubt No. 3 is a pentagonal redoubt with five interior parapet faces of thirty feet, thus requiring 150 men for its defense. Only a low dry-stacked fieldstone wall approximately two feet in height remains aboveground to mark its trace. The presence of any embrasures or entrance can no longer be noted through a pedestrian survey. The original thickness of the parapet cannot be ascertained. The redoubt apparently contained an adjacent encampment and numerous support structures, along with a detached battery. However, Arnold’s 1780 report did not indicate any artillery at this redoubt. He noted of it: “A slight wood work 3 feet thick, very dry, no bomb proofs, a single abbatis, the work easily set on fire. No cannon.” No presence of a ditch can be ascertained, although a barely discernable footpath appears north of the redoubt.⁹⁷ The layout of the redoubt is precisely in conformance with Lochee, and it is emplaced on a prominent rock knoll that commands the surrounding vicinity as well as can be determined given the extant conditions at the redoubt. The design of the redoubt appears appropriate to the terrain. This redoubt does not appear to have been as well constructed as the other West Point redoubts.

⁹⁵ Although this is simply a thicker section of parapet, rather than an actual epaulment. The only redoubt or battery at West Point with a proper “epaulment” is the Detached Battery at Redoubt Wyllis.

⁹⁶ Bare Rock Mountain’s topographical prominence is extremely similar to that of “Mount Defiance” at Ticonderoga, whose occupation by British artillery in early July 1777 necessitated hasty abandonment of that defensive position.

⁹⁷ Miller, et. al., *Highland Fortress*, 147-151; Boynton, *History of West Point*, 114-115; and Mead, *Archaeological Survey of Fort Putnam*, 53-57.

Redoubt No. 4 was the last of the four outlying redoubts at West Point [See Photographs Appendix]. Redoubt No. 4 was sited on “Rocky Hill” an extremely prominent rocky knoll overlooking Fort Putnam. American officers, and presumably Kosciusko, were quite concerned that a British artillery position on this Rocky Hill could place effective fire into Fort Putnam. Members of the New York Historical Society performed limited early archaeological excavations at Redoubt No. 4 in 1921.⁹⁸ The amount of damage caused to Redoubt No. 4 by these excavations is unknown. Unfortunately, Redoubt No. 4 was heavily damaged by the installation of a communications tower and ancillary structure in 1945. Renowned archaeologist Dr. Daniel Crozier of Temple University performed a comprehensive archaeological investigation of Redoubt No. 4 in 1975, followed by limited reconstruction and complete stabilization of the redoubt.⁹⁹ Although originally designed by Kosciusko to be a standard pentagonal redoubt (similar to Redoubt Wyllis), a completely different configuration was instead adopted.

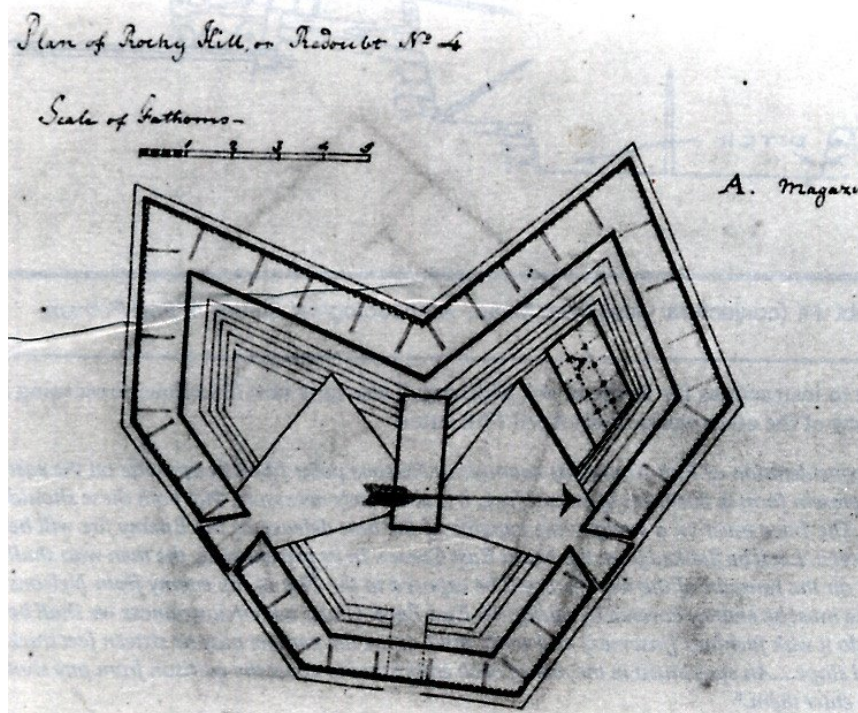


**Kosciusko's Original Design for Redoubt 4
A Classic Hexagonal Redoubt¹⁰⁰**

⁹⁸ W. L. Calver and R. P. Bolton, *History Written with Pick and Shovel* (New York: New York Historical Society, 1950), 86.

⁹⁹ Dr. Daniel G. Crozier, et. al., *Revolutionary War Fortifications, West Point, New York: The Archaeological Investigation and Stabilization of Redoubt No. 4* (Philadelphia, Pennsylvania: Department of Anthropology, Temple University, 1976).

¹⁰⁰ Reproduced from Miller, et. al., *Highland Fortress*, 140.



Plan of Redoubt #4 as actually constructed, by Captain Ephraim Sergeant, 1782¹⁰¹

Redoubt No. 4 as constructed contained a prominent reentrant angle to the west (in the direction of any anticipated British attack) that completely dictated the configuration of the work. This reentrant angle is approximately 120 degrees (or a degree or two less), which although being the maximum allowable reentrant angle according to Lochee is still acceptable.¹⁰² The two faces of this reentrant angle were 35 and 40' in interior length, and the remainder of the work consisted of five additional interior faces dictated by this central angle, resulting in a total interior circumference of 235'. The northeastern and southeastern faces (essentially, pointing towards the interior of the American defensive position at West Point) were pierced by embrasures. Arnold's 1780 report indicated that Redoubt No. 4 contained two 6-pounders, which appears consistent.¹⁰³ Thus, Redoubt No. 4 required a force of 223 soldiers for its defense. Continuing the rather odd configuration of this redoubt, a powder magazine was located at the northern angle of the redoubt, that is, in the direction of the greatest threat, thus increasing its vulnerability. Only the entrance to the redoubt was correctly positioned according to Lochee and Pleydell, being located in the extreme eastern face according to a historic sketch. However, Crozier found no evidence of this entrance, and the historical plan indicates no provisions for defense as specified by Lochee and Pleydell. In variance with the other redoubts at West Point, a ditch was constructed to the west and north of Redoubt No. 4, to provide additional defense against the only two feasible directions of British advance. Because of rock ledges and cliffs, Redoubt No. 4's southern and eastern approaches were totally inaccessible to assault. The width of the ditch varies and was not completely excavated by Crozier, but is generally twelve feet wide. The parapets of Redoubt No. 4 were constructed of dry-laid fieldstone filled with earth and rubble,

¹⁰¹ Reproduced from Miller, et. al., *Highland Fortress*, 97.

¹⁰² Lochee, *Elements of Field Fortification*, 6-7.

¹⁰³ Interestingly, an iron grapeshot recovered by Crozier was too small for a 6-pounder, its size more accurately reflects a 3-pounder. Crozier, *Archaeological Investigation*, 51; and Caruana, *British Artillery Ammunition*, 18.

which were stabilized by Crozier to a width of approximately ten feet. This parapet width would have been adequate to defend against any field guns, and would have necessitated the use of heavy siege guns to breach it. Both Crozier and Mead surmised that the redoubt had earthen ramparts atop the approximately 5 ½' stone base. Crozier found some evidence that the earth ramparts were faced with timber. The scarp and counterscarp walls of the ditch are dry-laid fieldstones. A berm of approximately two feet width extends around the redoubt's north and west ditch, which is appropriate according to Pleydell's specifications. Redoubt No. 4 did not have an associated battery. Given the fact that the redoubt has survived at least two relatively modern and fairly detrimental incursions, the redoubt appears to have been quite sturdily constructed.

Clearly, the Americans expended considerable efforts on this redoubt, as suggested by Arnold's 1780 assessment: "Redoubt No. 4, a wooden work about ten feet high and four or five feet thick, the west side faced with a stone wall 8 feet high and four thick. No bomb proof, two six pounders, a slight abbatis, a commanding piece of ground 500 yards west."¹⁰⁴ Redoubt No. 4, although well designed to withstand an attack from the west, is extremely poorly designed to defend against an attack from the north, which offers an alternate approach route for a possible British assault. The redoubt is designed so that no enfilading or flanking fire could be placed upon a northern attack. The two embrasures are not sited to provide any defense against an attacking force, rather, if captured, they are sited to place fire upon the interior of the American defensive position. The powder magazine is poorly sited, in the most vulnerable salient angle (the northwestern angle, most exposed to British attack). The entrance appears to be undefended. Why this redoubt is so faulty in design and configuration is unknown. Historians from the West Point History Department surmised: "Perhaps the British advance up the river at the end of May to Stony Point caused construction at the redoubt to enter a 'crash' phase with an attendant revision of the design to allow early completion."¹⁰⁵ Quite obviously, Redoubt No. 4 was not designed or sited to the same standards as the other West Point Redoubts.

Redoubt No. 4 was the site of a masonry stabilization demonstration project performed by the U.S. Military Academy in the fall of 2003, which repaired damage caused by normal wear and tear, some inappropriate usage, and isolated cases of vandalism that had occurred since the stabilization of this redoubt by Dr. Crozier in 1975. This stabilization effort served as a pilot project to validate additional preservation efforts planned to occur over the next several years at West Point's Revolutionary War redoubts.

A number of features at the West Point redoubts remain uncertain. Orderly Books from the West Point garrison contain a number of interesting entries:

"October 11, 1780 – Guards at Redoubts 1, 2, 3, 4 as well as Wyllis Redoubt are to be constantly within the works night and day. Engineers will have small constructed magazines of planks for Redoubts 1,2,3,4. The temporary guard houses ordered by Genl St. Claire are also to be completed as soon as may be."¹⁰⁶

¹⁰⁴ Miller, et. al., *Highland Fortress*, 137-142; Boynton, *History of West Point*, 114-115; and Mead, *Archaeological Survey of Fort Putnam*, 58-65. This "commanding piece of ground" is located at the top of West Point's ski slope.

¹⁰⁵ Miller, et. al., *Highland Fortress*, 141.

¹⁰⁶ "Orderly Book, West Point Garrison, October-November 1780" WPA Transcript, Special Collections and Archives, U.S. Military Academy Library, West Point, New York, 12-13.

October 19, 1780 – All guards posted at works are to be within them at retreat beating and the gates to be shut and secured till sunrise.¹⁰⁷

October 7, 1780 – “The officers of the advanced redoubts are constantly to shut those gates on the beating of retreat and never suffer them to be opened after the tattoo until it is fare day light.

It has been represented that the troops are burning the...abates [abbatis] about the fort area.”¹⁰⁸

As noted, powder magazines have been located at Redoubt Wyllis, and Redoubt No. 4. Redoubt Wyllis also contains a guardhouse (noted as a “bombproof” by Mead). Surviving historic elevations of some of the other redoubts suggest that they may have contained similar guardhouses. The other redoubts may also have had their specified powder magazines constructed. The October 1780 order suggests that small sentry boxes (similar to reproduction sentry boxes that can be seen today at Fort Ligonier, Pennsylvania or Fort Stanwix, New York) may have been constructed at the redoubts. Lochee recommended that guardhouses and powder magazines be a component of redoubts:

When the work is intended to remain for some time, to shelter the men against the inclemencies of the weather, it is usual to erect a guard-house, built with large beams and plans. That it may be more secure, it is commonly sunk 3 or 4 feet below the surface; and to prevent its being pierced by the enemy’s grenades, joist are laid along the top, and covered with about 2 feet of earth. When destitute of time, materials or situation, huts or tents are used instead of them. To preserve the powder and cartridges from contracting damp, as well as from being set on fire, holes, serving as magazines, are dug within the work, the sides of which are lined with planks to keep the earth from tumbling in, and it is also covered over with planks.¹⁰⁹

This suggests that the feature in Redoubt Wyllis identified as a “bomb proof” is rather a guardhouse, quite similar to that described by Lochee. Clearly, the entrances to the redoubts were defended by some type of gate, possibly as specified by Pleydell, although no further record has been located.¹¹⁰

West Point historians and other researchers have located a number of sources that recommend various improvements and expansions to the various redoubts. Whether or not any of these recommendations were ever completed is uncertain, and clearly deserving of future study. The location of the abbatis and pickets mentioned for selected redoubts is also indefinite.¹¹¹ If constructed according to Lochee, Pleydell and LeCointe, archeological evidence of both pickets and abbatis might reasonably be expected to survive. It is hoped that future archaeological work, particularly at Redoubt Webb, may yield some clues to these ancillary structures.

¹⁰⁷ Ibid., 22

¹⁰⁸ “Benjamin Peabody Orderly Book” WPA Transcript, Special Collections and Archives, U.S. Military Academy Library, West Point, New York, 75-76.

¹⁰⁹ Lochee, *Elements of Field Fortification*, 71-72.

¹¹⁰ Op. Cit.

¹¹¹ Miller, et. al., *Highland Fortress*, contains considerable information on this topic.

5.0 Conclusions

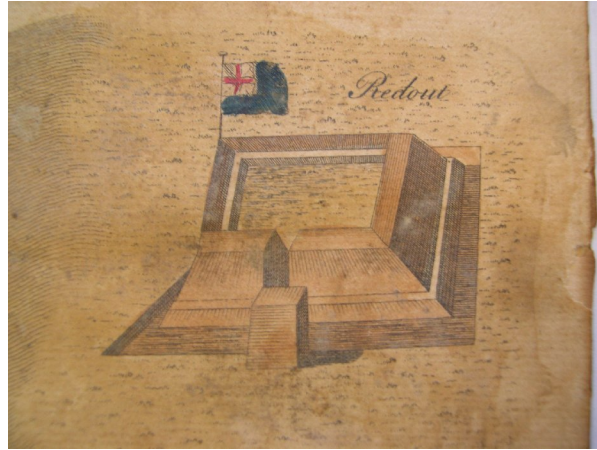
In 1976, Lieutenant Colonel John H. Bradley, Director of Bicentennial Activities at the U.S. Military Academy, advanced this assessment of the works at West Point:

As a fortress, West Point was much ahead of its time, because as 19th and 20th century soldiers discovered, a fortified area consisting of mutually supporting strong points is the heart of modern defensive positions and is considerably stronger than a single position built in the 18th century tradition.¹¹²

This interpretation has become the standard evaluation of the works at West Point. As this monograph has presented, there is no historic evidence to support Colonel Bradley's findings. Rather, the use of redoubts was a well-established element of military fortifications as practiced in the middle of the 18th century. The redoubts at West Point were positioned, utilized, designed and constructed precisely in accordance with military treatises of the period. Redoubts had been used to provide mutually supporting positions extensively in North America prior to the construction of the West Point fortification, particularly by the French at Fort Saint Frederick and Fort Carillon, by the British Army at Fort Crown Point, and by the American Army at Ticonderoga, Saratoga, and Valley Forge. The redoubts at West Point were constructed nearly identically to those constructed by the French and British armies during the Seven Years War at Lake Champlain, and by the American army at Fort Montgomery, Fort Clinton, and Ticonderoga. There is compelling evidence that Kosciusko designed the works at Saratoga and West Point in the well-established tradition of the Polish 17th and 18th century military.

The redoubts at West Point, however, clearly represented the culmination of the use of military fortifications by the fledgling Continental Army. The redoubts were well-designed, relatively well-constructed and well-positioned; provided the American Hudson River defenses at West Point with effective security; enabled the Continental Army to defend West Point with the numbers of men realistically expected to be available; and freed Washington's field army for aggressive offensive operations. In large part, the Yorktown campaign that effectively won the War of American Independence was made possible because the strength of the West Point position ensured that the Hudson River could be secured with a minimum expenditure of force. This, indeed, is the true significance of the redoubts of West Point.

¹¹² Lieutenant Colonel John H. Bradley, *West Point and the Hudson Highlands in the American Revolution* (West Point, New York: U.S. Military Academy, 1976), 16.



Historic Structures Report
The Redoubts of West Point

Appendix
Photographs

Appendix A
Chain Battery Collapse
Tropical Storm Jeanne
Monday, September 27, 2004
and Tuesday, September 28, 2004



Collapse from Northeast



Collapse from North



Collapse, Parapet Wall Perspective



Collapse from Top of Parapet Wall



Detail
Collapse from Top of Parapet Wall



Collapse from South



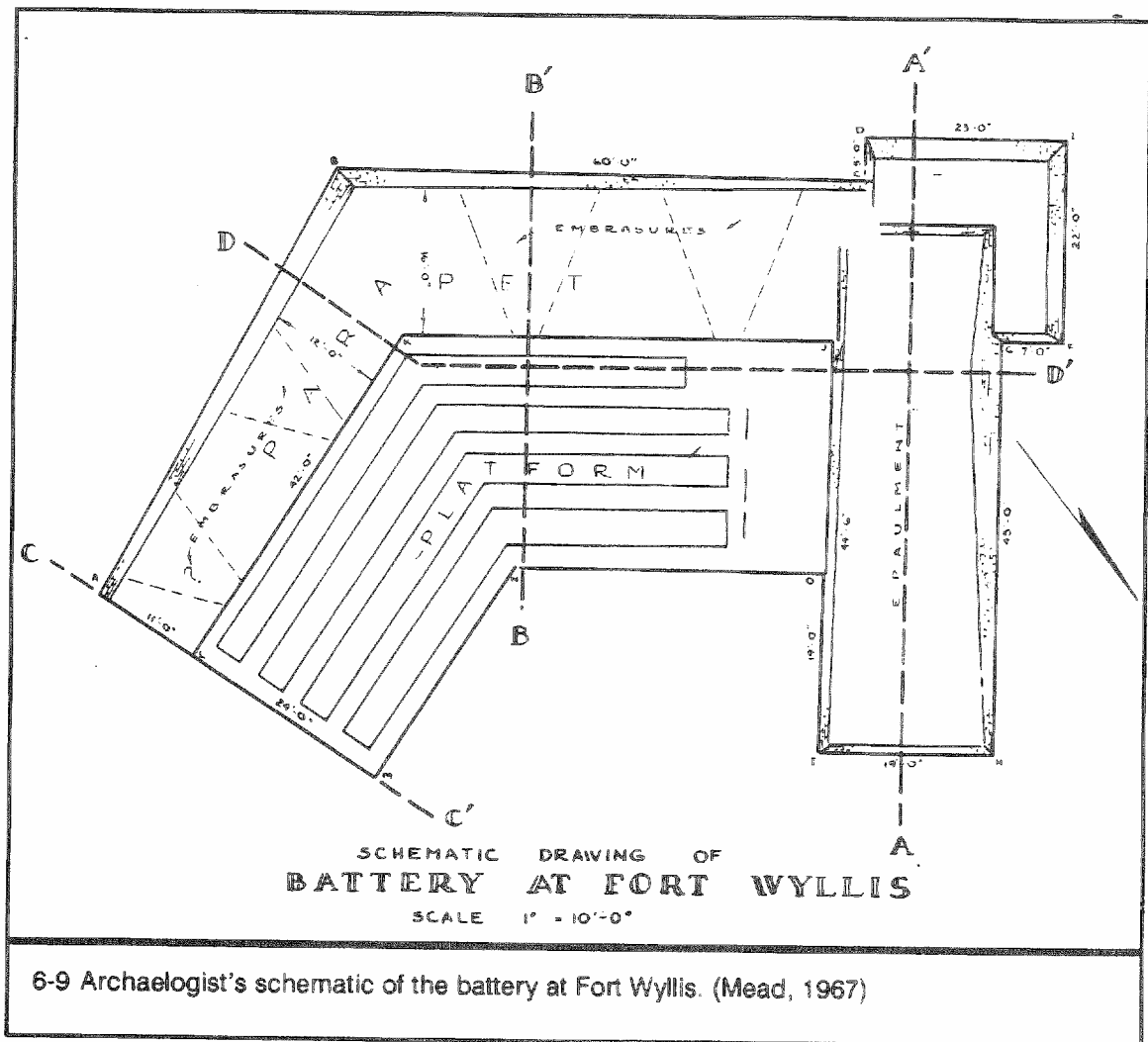
Collapse from South (Different Perspective)



Collapse from Southeast

Appendix B

Detached Battery, Wyllis Redoubt



Source: Jack Mead, *Archaeological Survey of Fort Putnam and Other Revolutionary War Fortifications at West Point, New York, 1967-1968* (West Point, New York; West Point Museum Fund, 1968), 31.



Interior of Battery, looking south



Interior of Battery, Looking Southeast



Battery- Left (Eastern) Terminus



Battery- Right (Western) Terminus



Battery- Interior



Detail- Supports for Firing Platforms



Epaulment
(from west, looking southeast)



Epaulment (Detail)



Epaulment (Detail)