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THE EVOLUTION OF FIELD ARTILLERY ORGANIZATION AND EMPLOYMENT DURING THE AMERICAN CIVIL WAR

BY

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THE EVOLUTION OF FIELD ARTILLERY ORGANIZATION AND EMPLOYMENT DURING THE AMERICAN CIVIL WAR

AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

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INTRODUCTION

The organization and employment of field artillery continually evolved throughout the course of the American Civil War. As each side was building up its forces, technology was changing the way war was to be fought. This paper examines the evolution in field artillery organization and employment during major battles as the Civil War progressed. The structure and performance of both the Army of the Potomac and the Army of Northern Virginia in the eastern theater are discussed. These units were chosen since they were the heart of the Union and Confederate military and eventually the same concepts used in the campaigns in Virginia were adopted in the western theater.

This study examines six major battles - First Bull Run, Malvern Hill, Antietam, Fredericksburg, Chancellorsville, and Gettysburg. These battles were chosen because they were significant artillery actions or provided milestones in artillery development. Appendices are included which outline the artillery organization for each battle. The minute details of each battle will not be described. Instead, each battle will be analyzed for artillery lessons learned and examined to ascertain how these concepts were used to shape future conflicts of the war.

PERIOD OF CHANGE

There were several key areas that affected the overall artillery organization and employment throughout the Civil War and were instrumental in the evolution of better techniques and

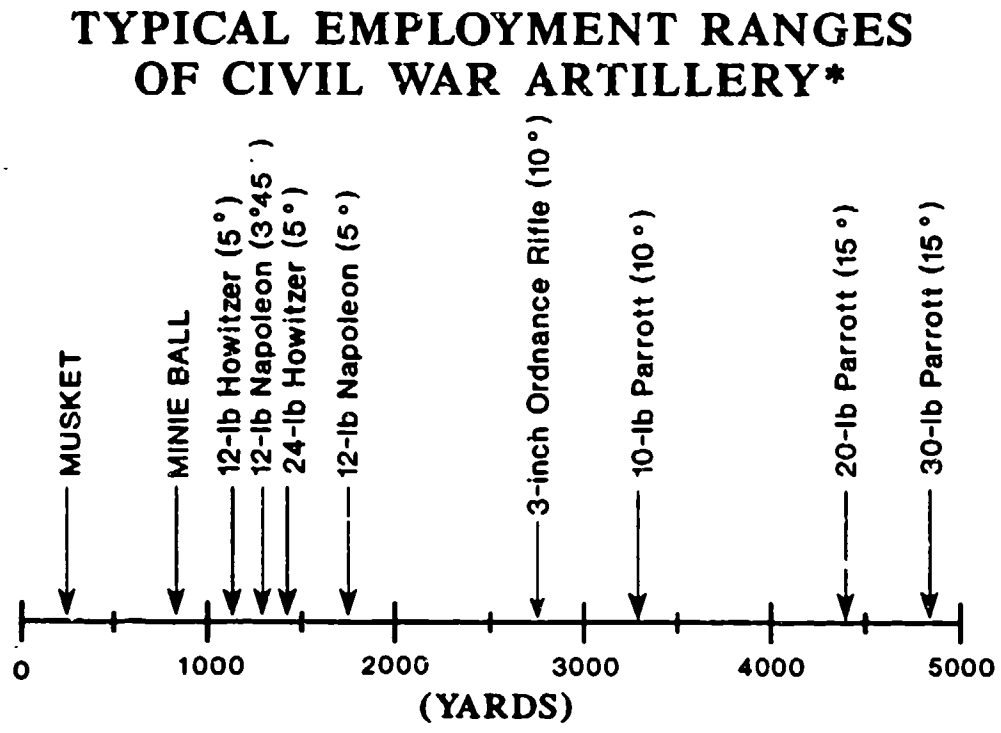

Figure 1. Typical employment ranges of Civil War artillery and small arms.

of warfare required a new line of thought in the artillery community. The advent of the Minie ball meant artillery could no longer provide direct fire support without sustaining tremendous losses, as illustrated in Figure 1. Greater ranges and rifled barrels also meant increased lethality and changes in doctrine.

Second, the tactics and doctrine used during the Napoleonic era and Mexican War proven unsuitable for the large armies operating on the varied American theaters. However, the experience of most commanders was from the Mexican War and the tactics of the last war would again be used to fight the first

battles of the Civil War. The process of attaching artillery batteries to infantry brigades was accepted doctrine in both armies. It had been followed since the Revolutionary War when two field guns were attached to each infantry battalion, the rest being kept in general reserve.[1] Later, even though the Mexican War brought the artillery to the forefront as a combat arm, it taught the wrong lessons of artillery employment and failed to illustrate the proper relationships for a major campaign. In General Zachery Taylor's northern line of operations field batteries were attached to infantry brigades. In General Winfield Scott's southern line, artillery was attached to divisions. Additionally, units of the Mexican War were much smaller than the ones that took the field during the Civil War. At the beginning of the Civil War artillery was considered a relatively short-ranged weapon, utilized mainly for direct fire. The era of long-range indirect fire was about to begin. Both sides were slow to recognize the futility in the piecemeal application of their artillery.

Third, the massive buildup of both armies required several iterations before the optimum command structure was devised. Neither side had experience in controlling large elements of artillery, nor did they have any training in staff procedures necessary to control and coordinate artillery units. Chiefs of Artillery positions were created but appropriate command authority was slow in developing. Finding the proper command and staff relationships would prove difficult for both sides.

PRELUDE TO WAR

The beginning of the Civil War found both sides struggling to prepare for the battles they knew would soon occur. The resources of the North gave them substantial advantages in artillery. It has been said that "a battery carries with it all that goes to make up civilization."[2] Production of cannons required the skills of mechanics, carpenters, shopsmiths, and foundries. The agricultural base of the South did not lend itself to the production of cannons.

At the beginning of the Civil War the Union field artillery was composed of sixty batteries of regulars, all mounted and equipped as light artillery. As men were mustered to fill the swelling ranks of the Army the greatest portion was soon composed of volunteers, generally organized into regiments or independent batteries.

Union artillery fell into two categories, heavy and field artillery. Heavy artillery was formed almost entirely from volunteers from several states. While most were stationed around forts and sea coasts, a number of regiments would be called to the front during the war to replenish depleted ranks after heavy losses. Assignments with the heavy artillery was generally considered good duty so units of this type had little trouble keeping their ranks filled.

The type of weapons these early units fielded was a hodgepodge collection at best. Even though the Napoleon 12-pounder was the cannon of choice, units used whatever they could

get their hands on. Other commonly found weapons were the smoothbore 6- and 12-pounders, and 12-, 24-, and 32-pound howitzers.[3] Arsenals were often ransacked to fill the newly formed units. One battery might contain two and even three different types of calibers. Compounding the standardization problem was the simultaneous development of the Parrott rifled guns and 3-inch ordnance guns, both of which were eagerly adopted into the field armies, but with little thought of how these weapons would be integrated with other short range systems. The heavy artillery had a variety of siege guns, 30-pounder Parrotts, 20-pounder Parrots, and 4.5-inch ordnance guns. It would be a year after the war started before the Union forces organized their artillery into units of the same caliber.

A review of the doctrinal manuals available at the beginning of the war reveals the accepted principles for artillery employment. The U.S. Army's Instruction For Field Artillery prepared by Majors William French, William Barry, and Henry Hunt in March 1860 described the purpose of the field artillery as:

> attack and defend the works of temporary fortifications; to destroy or demolish material obstacles and means of cover, and thus prepare the way for success of other arms; to act upon the field of battle; to break an enemy's line or prevent him from forming; to crush his masses, to dismount his batteries; to follow and support in a pursuit, and to cover and protect a retreat.[4]

While the authors failed to provide exact details on how artillery was to be employed, they did say that a "combined and concentrated fire"[5] should be used, indicating an understanding

of the massing of artillery. Two of the authors of this manual ultimately became Chief of Artillery for the Union army. They may have understood the principle of massing, but the infantry leaders who controlled the artillery in battle chose to distribute their artillery assets to all parts of the battlefield making massing impossible.

The Confederate publication Manual of Instruction for the Volunteers and Militia describes general characteristics of all branches of the service and, after discussing the infantry and cavalry, indicated that:

> artillery is placed third in rank among the arms. Its duties are to support and cover the other arms; keep the enemy from approaching too near; hold him in check as he advances; and prevent his *debouching* at particular points.[6]

The war soon taught everyone that all combat arms were essentially equal and had to fight as a combined arm team if they were to be successful. The manual went on to say that one piece per thousand men was adequate for well trained soldiers, but an increase would be necessary for poor troops, as artillery tended to inspire confidence. On positioning artillery the manual stated that:

> When a battery is brought into action it is usually thrown forward some sixty paces in front of the main line.[7]

Both sides quickly learned that positioning artillery well forward resulted in the loss of that unit. The Napoleonic era was over.

FIRST BULL RUN

The first major land battle of the war at Manassas, Virginia, found both sides essentially lacking in artillery organization and plans for employment. Relying on their Mexican War experience, Union and Confederate commanders chose to commit their field artillery batteries in an independent piecemeal fashion. Nearly all of the commanders failed to recognize the significance of the size of the armies, change in technology, and difficult Virginia terrain. A measure of their unpreparedness is illustrated by Union forces borrowing Navy guns and hauling the guns to the battlefield by drag-ropes, exactly the way it was done at Bunker Hill in 1775.[8]

The strength of the Union Army rested with the artillery, distributed down to brigades and comprised mostly of regulars as shown in Appendix A. On tne surface they appeared to have the advantage in both organization and type of equipment. Even though there was general parity in the total number of guns, the Union artillery was clearly superior in caliber of weapons, having a much heavier set of guns and howitzers than the confederates, as illustrated in Figure 2. When Brigadier General Irvin McDowell led his forces into battle on 21 July 1861, his 55 guns gave him almost two guns per thousand men. More than half of his pieces were rifled ten-pounders or larger, while smaller 6-pounder smoothbore howitzers made up most of the Confederate artillery.

However, the organization structure of the Union artillery was flawed. Batteries were haphazardly distributed to brigades with little thought of a coordinated fire support effort. Changes in mission were frequent, often occurring on the march and in the middle of a battle. Batteries were routinely split apart sending guns to various parts of the battlefield, destroying unit cohesion.

ARTILLERY AT FIRST BULL RUN

WEAPON TYPE	UNION		CONFEDERATE	
	Rifled	Smooth-Bore	Rifled	Smooth-Bore
30-Pounder	1			
20-Pounder	2			
13-Pounder	10			
12-Pounder		10		4
10-Pounder	16			
6-Pounder		14*	7	38
Small Howitzers		2		
Total	29	26	7	42

* Six 6-pounders were left unmanned by the 8th NY who departed when their enlistment expired on 20 July, 1861.

Figure 2. Comparison of Union and Confederate artillery at the Battle of First Bull Run.

John C. Tidball, one of the Union battery commanders, summed up the lack of organization in the early stages of the war by saying:

> with proper organization and administration our artillery in the Civil War, good as it was, might have been more serviceable and produced greater results.[9]

Lack of centralization and senior leadership were critical shortcomings. A Chief of Artillery was desperately needed but none existed. Major Barry had the title but he did not join McDowell until 17 July and had little chance to influence the battle. Because of the flawed command and control structure battery commanders found themselves receiving orders from many sources. In fact, commands for the use of artillery were given by brigade commanders, division commanders, and Brigadier General McDowell himself. A coordinated effort was not possible under these circumstances.

The organization and use of artillery of the Confederacy varied greatly between armies, or actually divisions. Brigadier General Joseph Johnston's forces were much better organized than Beauregard's. As Johnston's Chief of Artillery, Colonel William Pendleton had centralized command of five batteries. Four were distributed to brigades while the fifth was kept in reserve under Pendleton's control. Pendleton's expertise in artillery combined with Colonel J.E.B. Stuart's command of cavalry operations provided Johnston's corps with a formidable combined arms team.[10]

Conditions were much different with Brigadier General P.G.T. Beauregards's forces. His seven infantry brigades were uneven in number and quality of soldiers. His artillery was badly organized with almost one half belonging to the Washington Artillery composed of three different types of weapons. There

was no centralized command of the artillery with batteries broken up and distributed to brigades in an unorganized fashion. While Beauregard gave the appearance of creating an artillery reserve, his piecemeal distribution rendered it an ineffective unit.[11] The following distribution of Major J. B. Walton's Washington Artillery illustrates the level to which his forces were parcelled out.

> Second Brigade, General Ewell, in advance of Union Mills Ford, two 12-pounder howitzers, two rifled guns; Third Brigade, General Jones at McLean's Ford, one 6-pounder, one 12-pounder howitzer; Fourth Brigade, General Longstreet, at Blackburn's Ford, two 6-pounders; Firth Brigade, Colonel Early, at or near Union Mills Ford, one 12-pounder howitzer, one rifled gun; position of Union Mills Ford, one 6-pounder; total number of pieces, 11.[12]

There were many explanations for the fiasco at Bull Run including Colonel W. B. Franklin's argument that the superior firing of the rebels won the day.[13] Author R. M. Johnston is more accurate when he states that "the configuration of the ground, superior tactics of the Confederates, the general lack of ability of McDowell's subordinates, the lack of a proper system of command, and the general ignorance of staff work" all combined to produce the southern victory.[14]

Bull Run taught both sides that the Civil War would be costly, involve tremendous resources, and require substantial changes in the way they were to fight. It also taught both armies that organizational changes, including the artillery, were badly needed.

REORGANIZATION FOLLOWING FIRST BULL RUN

Following Bull Run both armies began the task of reorganization to meet the changes of the rapidly expanding structure and increased lethality of the battlefield. Major General George McClellan, the new commander of the Army of the Potomac, selected Major William Barry as chief of artillery and Major Henry Hunt as chief of artillery reserve. The reorganization initiated by Barry produced the most comprehensive changes in artillery structure during the war. The major tenets were as follows:

> 1st. The proportion of artillery should be in the ratio of at least two and one-half pieces to 1000 men, to be expanded if possible to three pieces to 1000 men.
>
> 2d. That the proportion of rifled guns should be restricted to the system of the U.S. Ordnance Department, and of Parrott and the smooth bores (with the exception of a few howitzers for special service) to be exclusively the 12-pounder gun, of the model of 1857, variously called the gun howitzer, the light 12-pounder, or the Napoleon.
>
> 3d. That each field battery should, if practicable, be composed of six guns, and none to have less than four guns, and in all cases the guns of each battery should be of uniform caliber.
>
> 4th. That the field batteries were to be assigned to divisions and not to brigades, and in the proportion of four to each division, of which one should be a battery of regulars, the remainder of volunteers; the captain of the regular battery to be the commander of artillery of the division. In the event of several divisions constituting an army corps, at least one-half of the

> divisional artillery was to constitute the reserve artillery of the corps.
>
> 5th. That the artillery reserve of the whole army should consist of one hundred guns, and should comprise, besides a sufficient number of light mounted batteries, all the guns of position, and until the cavalry be massed all the horse artillery.
>
> 6th. That the amount of ammunition to accompany the field batteries was not to be less than four hundred rounds per gun.
>
> 7th. A siege train of fifty pieces. This was subsequently expanded (for special service at the siege of Yorktown) to very nearly 100 pieces, and comprised the unusual calibers, and enormously heavy weight of metal of two 200-pounders; five 100-pounders; and ten 13-inch sea coast mortars.[15]

Even though the new organization still attached batteries to divisions, it did address many of the shortcomings discovered during the First Battle of Bull Run.

Majors Barry and Hunt transformed the Union artillery into a robust, cohesive combat arm. By March 1862 their Union ranks consisted of 92 batteries of 520 guns, 12,500 men, and 11,000 horses. Major Barry also worked hard to standardize the caliber of the majority of his batteries. In order to simplify logistical problems he wanted to limit the calibers to the 12-pounder Napoleon, rifled Parrott weapons, and the 3-inch ordnance gun. Both Barry and Hunt knew that the Napoleon would have to be the workhorse of the artillery due to the wooded terrain of the eastern theater. Even though rifled guns had twice the range of the smoothbore, the rifled guns had proven to be somewhat unreliable due to a high dud rate of defective fuzes.[16] However,

production shortfalls limited the fielding of 12-pounders so that McClellan ultimately fielded his batteries with Parrott rifles, James rifles, 6- and 12- pounder howitzers, Napoleons, and a few 12-pounder mountain howitzers.

The Confederate reorganization effort was not as extensive as that of the Union army. Colonel Pendleton's main problem was increasing the number of weapons and was dispatched to Richmond to expedite the process. In his absence Captain E. P. Alexander trained and organized the artillery for three months following Bull Run. Alexander was a strong advocate of creating a light battalion consisting of three batteries under a central commander. Even though his newly created Richmond Howitzer Battalion was soon disbanded, he managed to plant the seeds for the battalion formation. Ultimately, Brigadier General Joe Johnston continued to attach batteries to brigades. However, he did create a formal artillery reserve of 13 battalions. While Pendleton and Alexander were eager to standardize the caliber of their artillery, they were realistic and recognized that shortages would make it impossible. They gladly accepted any weapons they could get their hands on.

MALVERN HILL

The Peninsula Campaign gave both sides the opportunity to test their new organizations. The dense woods, swamps, and varied terrain of the Virginia peninsula provided numerous unforeseen problems for the Union and Confederate redlegs.

McClellan's plan to take Richmond by landing near Fort Monroe and moving inland resulting in a series of often confusing battles climaxing with one of the greatest artillery actions of the war at Malvern Hill.

As shown by Appendix B, when McClellan embarked for the Peninsula Campaign he had a total of 299 guns organized into 49 batteries, 20 of which were regulars. Of the total, 100 guns were organized into 18 batteries constituting his artillery reserve.[17] McClellan had made tremendous progress in equipping and organizing the Army of the Potomac; however, he would soon learn that his generals were inexperienced in using the artillery given them. Some commanders like Major General Joe Hooker would admit their inexperience and assume all responsibility for the improper employment of his artillery.[18] On the other hand, some such as Brigadier General George Sykes thought he had fulfilled his responsibilities when he had simply divided Edward's Battery, sending two guns to each of his brigades and thinking nothing more of it.[19] Compounding the inexperience of the leaders was a shortage of artillery field grade officers. For all his artillery McClellan had only one brigadier general, four colonels, three lieutenant colonels, and three majors to accomplish the multitude of staff actions required of his artillery forces.[20] He needed at least three times that number, especially in the difficult terrain of the Peninsula.

The Confederate artillery that opposed McClellan's invasion also suffered from organizational problems. Although recently

reorganized, General Johnston's army had units of vastly different strength and weapons, resulting in a force that was "very poorly hung together."[21] At this stage of the war Confederate generals, as a group, were arguably better leaders and tacticians than their adversaries. However, their employment of artillery during the Peninsula Campaign was as ineffective as the Union forces. Like their counterparts the rebels also suffered from a shortage of field officers and grossly inadequate staff work, particularly reconnaissance in the swampy terrain of the Peninsula.

The early part of the campaign found the Confederate forces fighting a series of delaying actions up the peninsula. The first significant action occurred 31 May, 1862 at Seven Pines in which Johnston was wounded and General Robert E. Lee took command. The Confederate artillery played a limited role in this action. Afterwards, Lee immediately reorganized the artillery, strengthening the chief of artillery positions under Brigadier General Pendleton, created division reserves while retaining a general reserve, and put all reserve units into battalions.[22] Later in the month Lee gave the division chiefs of artillery administrative control of the divisional batteries with the division commander retaining tactical control. Lee also recognized the terrain limited the numbers of guns he could effectively employ and therefore sent some heavy guns back to Richmond and disbanded some light units.[23] This still left him with about 71 batteries.

However, the changes made during the campaign did not immediately improve artillery performance. Modifications by Lee had little or no impact on confederate performance during the Seven Days' Battle.[24] Union forces were generally more effective since they were on the defensive. Both sides still suffered from poor reconnaissance, poor staff work, and very difficult terrain for artillery operations. Malvern Hill was different.

Despite heavy losses Lee had managed to drive McClellan away from Richmond and toward the Malvern Hill area. A 150 foot elevated plateau provided a tremendous advantage for the defending Union forces. Even though their backs were at the James River, the gently sloping ground allowed McClellan to get all his artillery out of the woods and emplaced with excellent fields of fire. Colonel Henry Hunt's skillful distribution of divisional and reserve units allowed him to continuously support the defense with at least 60 guns. As one unit ran out of ammunition or needed replacements it was pulled back and another was put in its place. As described by Tidball

> it was the most marked instance during the war of the power and effect of artillery when brought in mass against the enemy at the crisis of a battle.[25]

The number of artillery pieces was approximately equal for each side at Malvern Hill. McClellan had lost about 40 pieces in the campaign thus far and Major General Theophilus Holmes had joined Lee from the Department of North Carolina, adding to the Confederate forces. The problem for Lee was not numbers of cannon but rather development and execution of his plan for the

offense. Even though the attack was dependent upon a successful artillery effort the Chief of Artillery was not even consulted. The 1 July 1862 order by Lee was one of the worst of his career:

> Batteries have been established to rake the enemy's lines. If it is broken, as is probable, Armistead, who can witness the effect of the fire, has been ordered to charge with a yell. Do the same.[26]

But as the Confederate troops would soon discover, batteries had not been established and the Union line was not broken. A lack of coordination between divisions, limited narrow roadways, and wooden terrain prevented the rebel guns from even threatening the Union forces. Instead, most of the Confederate batteries were destroyed or forced to retire as they were emplaced. The result was an uncoordinated attack where Lee's forces were committed piecemeal and destroyed in turn. At least one half of the casualties were as a result of artillery fire causing Major General D. H. Hill to comment in his usual caustic manner that "it was not war -- it was murder."[27] Confederate losses during this battle would total 5965 while McClellan lost less than half that amount.[28]

Several conclusions can be drawn from the Peninsula Campaign. First, the Confederate Army was poorly organized in the initial stages. Units varied greatly in size and capabilities and there existed a lack of cohesion between divisions. Second, the artillery of both sides failed to perform to its ability due to inexperience of infantry leaders in employing artillery and the difficulties of the terrain. Third,

the defensive positioning of the Union forces, especially at Malvern Hill, clearly illustrated the need to be able to mass fire. Finally, both sides struggled with proper utilization of the Artillery Reserve. They were often out of position or distributed out to the infantry so they were unable to influence the action at the decisive moment. Also, the reserve guns were often in the rear of very long columns, making it almost impossible to get into the action in the heavily wooden regions of the Peninsula.

REORGANIZATION FOLLOWING THE PENINSULA CAMPAIGN

Following the Peninsula Campaign both sides made changes in their artillery organization, the Confederate changes being the more substantial.

One of the major changes McClellan made was the 5 September 1862 appointment of Colonel Henry Hunt as Chief of Artillery, Army of the Potomac, replacing General Barry who moved to Washington as Inspector of the Artillery. In this capacity Hunt would have a tremendous impact on the organization and performance of the Union artillery for years to come. McClellan continued to attach his artillery to infantry units, although it was to both brigades and divisions. The artillery of Hooker's First Army Corps was attached to brigades while that of Brigadier General Joseph Mansfield's Twelfth Army Corps was attached to both brigades and divisions.[29] There was no uniformity, with tactical control of the guns left to the infantry commander.[30]

To the Confederate leadership, Malvern Hill and Second Manassas clearly illustrated a need for substantial organizational revisions. In particular, Lee saw a need to eliminate the piecemeal commitment and contribution of individual batteries and get more of the Artillery Reserve into the fight.[31] Therefore, he formed his artillery into battalions of four to seven batteries each and attached them to each of Major General James Longstreet's five and Major General Thomas Jackson's four divisions. Additionally, Lee created a reserve battalion for each wing (corps) and a general reserve for the entire army. To improve the command and control, each battalion, whether divisional or reserve artillery, was authorized a field grade officer. A battalion assigned to a division was to be under the command of the Division Chief of Artillery, as shown by Figure 3.[32] When fully implemented this organization would give Lee a decided advantage in employment of artillery. However, he would not have this plan completed by the Battle of Antietam. Appendix C illustrates these changes and shows the organization of both armies for the battle.

Therefore, as both armies marched for the next battle at Antietam they now had substantially different artillery organizations. Lee had centralized control of his 73 batteries of 288 guns while McClellan had centralized control of only a small portion of his 55 batteries of 322 cannons.[33] The benefit of the Confederate centralization would become clear on the rolling terrain near Sharpsburg.

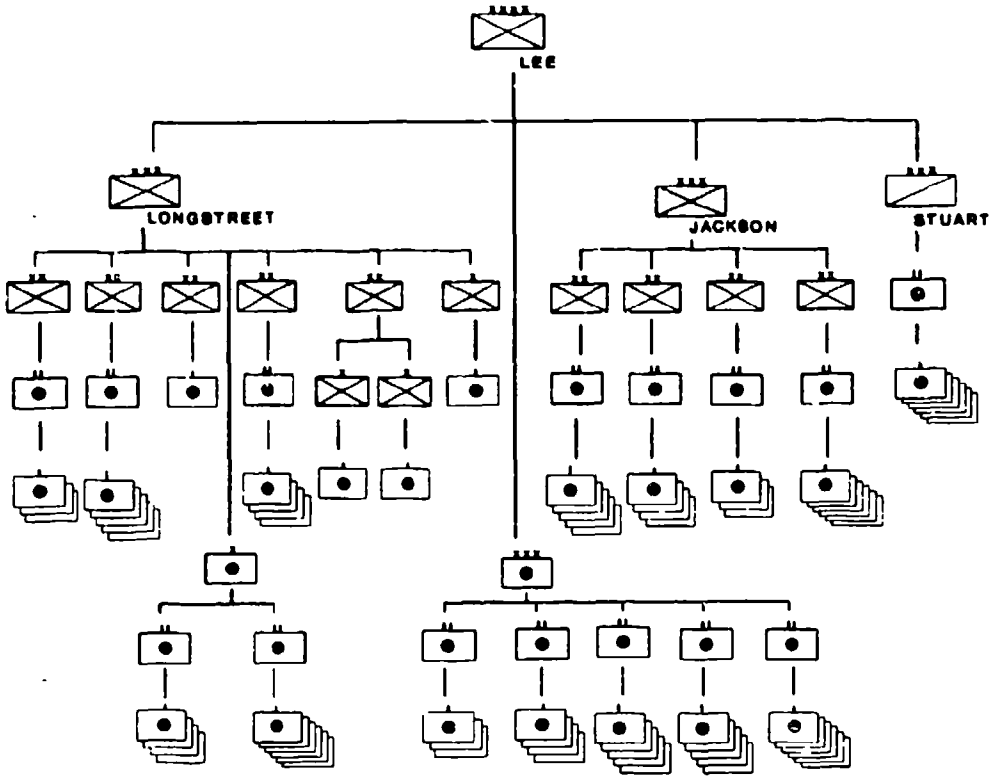

Figure 3. Confederate artillery organization for the Battle of Antietam.

ANTIETAM

Lee set the stage for the battle of Antietam on 14 September 1862 by retiring from the passes of South Mountain and placing Longstreet's soldiers in defensive positions just north of the town of Sharpsburg. Jackson's troops were emplaced on Longstreet's left while Stuart's cavalry occupied positions on Jackson's left. The artillery for each wing was emplaced on 16 September, 1862. Even though these were generally good positions with good fields of fire and gently sloping terrain, the

Confederate gun line paralleled a ridge upon which Hunt would place most of his long range Artillery Reserve.

As the Union forces marched to battle their entire command was reorganized when President Lincoln directed that the three corps of the Army of Virginia be absorbed into the Army of the Potomac. At Antietam McClellan commanded the II, V, and VI Corps of the Army of the Potomac, and I and XII Corps of the Army of Virginia.[34]

Henry Hunt faced tremendous problems in simply getting the artillery to battle. Some artillery had to be immediately off-loaded from boats returning from the Peninsula Campaign and hastily dispatched toward Antietam, with no logical basis for attachment. Hunt had to literally ride up and down the column to determine what artillery would be available for the fight.[35] As shown by Appendix C, Lieutenant Colonel William Hays' Artillery Reserve battalion had to assigned under Major General Fitz John Porter's Fifth Corps. Considering the circumstances Hunt did an admirable job of organizing the Union artillery forces for combat. Figure 4 shows the approximate number of pieces each side had access to during the battle.

McClellan's plan for the battle was as follows:

> The design was to make the main attack upon the enemy's left - at least to create a diversion in favor of the main attack, with the hope of something more by assailing the enemy's right -- and, as soon as one or both of the flank movements were fully successful, to attack their center with any reserve I might then have on hand.[36]

ARTILLERY AT ANTIETAM		
TYPE OF ARTILLERY	UNION	CONFED
20-Pound Parrott Guns (Rifled)	30	4
10-Pound Parrott (Rifled)	42	36
3-Inch Ordnance Rifles	94	40
12-Pounder Napoleons	108	27
12-Pounder Howitzers	14	34
12-Pounder Dalgren Boat Howitzers	5	0
24-Pounder Howitzers	0	4
2.71-Inch Whitworths (Rifled)	0	2
3.5-Inch Blakelys	0	2
6-Pounder Smoothbore Guns	0	45
Guns of Unknown Calibers in 13 Batteries (Assuming 4 Guns Per Battery)	0	52
TOTAL	293	246

Figure 4. Comparison of Union and Confederate Artillery at the Battle of Antietam.

This confusing order was ambiguous, ill-coordinated, and totally without focus. As was the case in so many battles of this war, the actual attack was nothing more than a sequence of smaller individual efforts rather than an all-out offensive. Instead of a simultaneous assault, the approximate time of engagement by McClellan's corps was I Corps at 0600, XII Corps at 0730, II Corps at 0900, and IX Corps at 1500.[37] This uncoordinated effort allowed Lee to shift his forces, particularly his artillery, to meet each element in turn. Despite the ineptness of the divisional attacks, Hunt's Artillery

Reserve, augmented by Parrott and 3-inch Ordnance guns from V and VI Corps, had an enfilading fire on the Confederate line. His counterbattery fire was superb throughout the day. These 68 Union guns inflicted tremendous losses on the Confederates, prompting S. D. Lee in a letter to Colonel E. P. Alexander to remark,

> Pray that you never see another Sharpsburg. Sharpsburg was artillery Hell.[38]

Despite the extensive counterbattery fire, Confederate gunners provided superb support by 1) dispersing their guns when possible, 2) concealing batteries in defilades and springing into action when the hostile fire had shifted, and 3) simply ignoring the Union fire and sustaining heavy losses. They ultimately used a combination of all three techniques.[39] Figure 5 provides a line of sight analysis for Union artillery emplaced on East Ridge near the Middle Bridge, looking westward. The exposed nature of Longstreet's right flank is clearly portrayed. The shaded area of this figure also illustrates the "dead space" or area that the Reserve Artillery could not observe, and therefore could not engage.

Even though McClellan had more artillery on the field than Lee, the superior Confederate organization allowed Lee to shift forces to various parts of the battlefield giving him localized superiority at critical times. Lee's decision to group batteries into battalions and have them commanded by field officers was the main reason for the responsiveness of his artillery. When Hooker's I Corps attacked Jackson's wing its 48 guns potentially

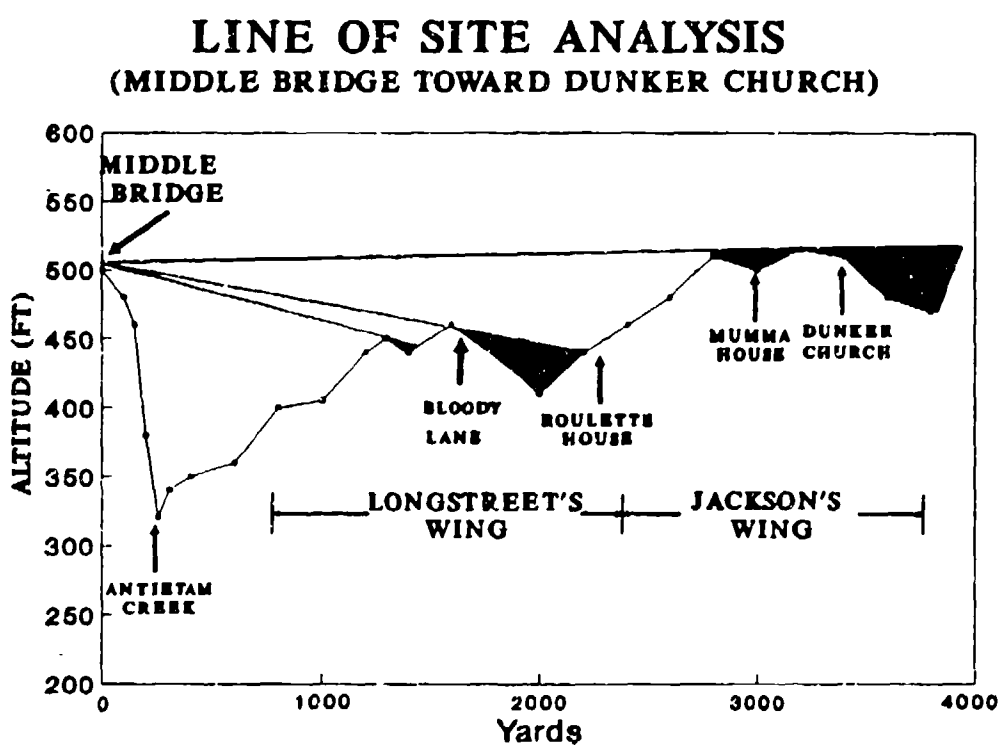

Figure 5. Line of Sight Analysis for Union Artillery at Middle Bridge Looking Westward.

available were ultimately met by 68 Confederate cannons. Mansfield's XII Corps would bring 20 more to the fight but a major portion of Hooker's and Mansfield's forces did not participate due to poor leadership, poor terrain, and poor placement in the order of march. Hooker's decision to leave six batteries guarding his right flank near the Potomac River must also be seriously questioned as these units contributed little or nothing to the fight. Hooker had no Chief of Artillery to help with the terrain reconnaissance or artillery placement. Mansfield had a Chief of Artillery in the rank of captain, but

XII Corps command and control procedures called for the artillery batteries to receive instructions from Mansfield, through his Chief of Artillery. In reality, the batteries did not receive guidance or orders from anyone.[40]

Jackson, on the other hand, had ample artillery, allowing him to move batteries and reinforce as necessary. Additionally, Major John Pelham, Stuart's Chief of Artillery, established 13 guns atop Hauser's Ridge near the Nicodemus House, out of the range of Hunt's counterbattery fire. The historian, Jennings Cropper Wise, describes Pelham's actions as:

> one of those masterstrokes by a subordinate of highly developed initiative...a move on the chess board, though perhaps by a pawn, which baffled the most powerful pieces of the enemy.[41]

From this position Pelham was able to control almost the entire left wing of Lee's position. Needless to say Jackson had adequate artillery support throughout the day.

The artillery ratios were much the same in Longstreet's wing where 40 guns of II Corps ended up facing about 72 Confederate cannons. The task for the rebel gunners was not as easy here due to the deadly fire of the Union Artillery Reserve. The Confederate ability to rapidly shift and reinforce artillery in Longstreet's wing also proved to be the deciding factor during some of the most intense fighting of the war. Along the Sunken Road the Confederates were down to a single battery at one point before increasing to 20 guns.

The attack of Union Major General Israel B. Richardson on Bloody Lane clearly illustrated the futility of operating under the system of infantry commanders retaining absolute control over artillery employment. After Richardson was wounded Brigadier General Winfield Scott Hancock assumed command and reported,

> Up to this time the division was without artillery...Application was made for two batteries of artillery to the different commanders within reach, and to the Chief of Artillery, but none could be spared at that time.[42]

Hunt could not meet Hancock's original request but ultimately sent a battery of light 12-pounders.[43]

Brigadier General Alfred Pleasonton, to Hancock's left, reported that,

> Hancock requested some guns to assist him. None could be spared at this moment, but I directed the fire of some eighteen guns upon the enemy's line in front of him for twenty minutes.[44]

Clearly if Pleasonton could devote this much artillery for this period of time he could have provided Hancock with cannons. This case underscored the possessive nature of infantry commanders in handling their artillery, rather than a cooperative spirit toward mission accomplishment.

Several conclusions can be drawn from the artillery action at Antietam:

1. Centralized Confederate command and control compensated for superior Federal quality and quantity of artillery.

2. Exposed rebel artillery sustained heavy losses from Hunt's reserve artillery. It would later be Longstreet who

ordered extensive field fortifications constructed at Fredericksburg.

3. Neither side had a formalized fire support plan. Both developed one for Fredericksburg.

4. Lateral interior lines of communication allowed Lee to rapidly shift artillery. At Fredericksburg he had trenches dug for this purpose.

5. Confederate field grade officers acting as Chiefs of Artillery made a significant difference in the employment of artillery.

REORGANIZATION FOLLOWING ANTIETAM

Following Antietam Colonel Hunt knew he still did not have the appropriate artillery organization to properly support the infantry. Recognizing the need for more centralized system he proposed consolidating the Union artillery into one corps making it immediately responsive to the commander.[45] However, neither McClellan nor his replacements, Major General Hooker and Major General Ambrose Burnside, adopted Colonel Hunt's ideas. Once again they would enter battle with an inadequate artillery command and control system.

As Lee ended his Maryland Campaign he knew his artillery would have to be reorganized. Not only had he lost valuable men and cannon, but his horses and harnesses were also in short supply. Some units were so depleted that they could muster only 29 men for duty.[46] With Colonel Pendleton as the architect, Lee

sought to eliminate his most ineffective units and leaders by writing Jefferson Davis and asking permission to consolidate batteries and "dispose" of surplus officers according to their merit.[47] Davis wisely acted on Lee's request rather than submitting it to Congress for approval as Confederate states probably would not have given universal approval of eliminated the respective batteries of their home states. Lee ultimately received approval for the majority of his recommendations and by 20 November 1862 had 252 guns configured into 63 batteries.

FREDERICKSBURG

The Battle of Fredericksburg is especially noteworthy from an artillery point of view in that both sides developed a well-defined plan for fire support. Rather than simply moving guns around in various direct fire roles, plans were developed in this battle that would utilize the technological advances and evolution of warfare to that point.

By 10 December 1862, Lee had one of the largest concentrations of the war thus far - 78,513 men and 250 guns. Procrastination by Major General Burnside allowed Lee to more than adequately prepare his position and forces overlooking the town of Fredericksburg. The Confederate army had learned a valuable lesson in cover and concealment at Antietam where much of its artillery was exposed to the long range fire of the Union artillery on East Ridge. Therefore, at Fredericksburg not only was the infantry well dug in, but most of the long range

artillery as well. Short range artillery was concealed until the last moment, then moved forward into position. Also following the slaughter at Bloody Lane some infantry constructed innovative ziz-zag trenches at Fredericksburg preventing enfilading fire.

The Confederate fire support plan was well defined with three distinct phases. In Phase I the long-range pieces, protected by fortifications, would first engage Union units as they crossed the river or formed for the attack. They were not expected to provide effective counterbattery nor become decisively engaged with the Union long-range artillery during this period. In Phase II as the Union infantry columns got within range, the short-range artillery was moved from concealed positions into firing points and engaged them. Finally, in Phase III as Federal shifted to engage the Confederate short-range artillery, the rebel long-range pieces would conduct counter battery operations.[48]

Confederate artillery command and control was further enhanced by forming groups of battalions and batteries that could easily mass fire on enemy approaches. As the historian Wise explains:

> The batteries under Alexander and Walton and those of R. H. Anderson's division thus commanded the entire plain from Hazel Run northward to the westward bend of the river, as well as the opposite bank, at a range of 1 1/2 miles, while Cabel's group of nearly 50 pieces could sweep the flats from Fredericksburg southward, crossing fire with Frobel's guns beyond Deep Run.[49]

The Army of the Potomac brought 373 guns to the Battle of Fredericksburg, including 24 of the horse artillery and eight siege pieces. The Artillery Reserve had 88 pieces leaving 51 batteries of 285 guns still attached to divisions.

Brigadier General Hunt also had a good plan for the Union artillery, especially during the river crossing operations. He positioned the bulk of the artillery on Stafford Heights to

> control the enemy's movement on the plain; to reply to and silence his batteries along the crest of his ridge; to command the town; to cover and protect the throwing of the bridges and crossing of troops, and to protect the left flank of the Army from attacks in the direction of Massaponax Creek.[50]

To build the base of fire Hunt needed all the firepower he could muster. Therefore, much to the displeasure of the commanders, all the batteries except one were withdrawn from each division. These batteries were reunited as the divisions crossed the bridges. Using a concept much like that of the Confederates Hunt formed four "divisions" of artillery totaling about 149 pieces. This left about 100 guns, mostly Napoleons, with the divisions plus the horse artillery. Hunt also used divisional and reserve artillery in a direct support role to assist in the bridging operations.

Even though both sides had well developed plans, events did not go as expected. Tough resistance by Brigadier General William Barksdale's Mississippi Brigade persisted despite repeated shelling by Hunt's artillery "divisions." Even after leveling much of the town, Burnside still needed tough house-to-

house fighting to eventually clear the town and position his forces to assault the heights overlooking the city. Once his forces were in place Burnside planned to seize Prospect Hill with Major General William Franklin's Grand Left Division and Marye's Heights with Major General Edwin Sumner's Grand Right Division. Franklin was to sweep to the right along Lee's lines of communication and link up with Sumner. Hooker held four divisions in support of Sumner and sent two to Franklin.[51] However, his execution order was ambiguous making timing and support relationships between units unclear.[52]

The Confederate artillery had trouble attacking Union infantry as they crossed the river (Phase I) due to dense ground fog and smoke in the cold December air. Sumner and Franklin's forces crossed virtually unopposed by Confederate artillery. However, the remainder of the battle was well supported by Phase II and III of the Confederate plan. Continued assaults of the Union divisions failed to dislodge rebel infantry and were continually driven back in the face of canister of the Confederate guns. Approximately one half of the Union losses while attempting to take Marye's Heights were due to artillery fire. Prepared positions kept Confederate losses relatively low.

Union long-range artillery failed to silence the rebel artillery due mainly to the fortifications and prepared positions. Federal problems were further compounded when infantry units masking their artillery support, preventing them from firing without causing fratricide. Much of Sumner's

artillery was unused while Franklin's desperately needed additional support. A more centralized artillery command and control system would have allowed shifting of assets to needed areas.

A discussion of artillery at Fredericksburg would be incomplete without mention of Major Pelham's action on the Confederate right. Here Stuart's Chief of Artillery took two Napoleons and broke the shock of Meade's column by neutralizing Brigadier General Abner Doubleday's entire division during the critical hours of the battle. As described by Wise, Pelham was

> like a gnat in the eye of a great beast, he was never driven from the field, but, retiring to a more secure position from which at any time he was free to return to the immediate flank of his opponent, he brought more and heavier guns into action.[53]

As at Antietam he showed what initiative, properly placed artillery, and courage could accomplish. This would be Pelham's last major action, for he was killed several months later.

Both sides left Fredericksburg having learned valuable lessons on artillery employment. The value of grouping in a centralized artillery command and control was immediately apparent to those charged with that responsibility. However, the Union leadership would fail to capitalize on this experience and continue with a decentralized system without a senior Chief of Artillery at each level. The value of prepared positions was clearly illustrated, especially by the Confederate artillery. Finally, the ability to develop a comprehensive fire support plan was demonstrated by both sides. Hunt's unique support of

bridging operations and formation of artillery "divisions" showed vision and initiative, while the Confederate three phase fire support plan and battalion grouping also proved to be highly effective.

REORGANIZATION FOLLOWING FREDERICKSBURG

Despite the demonstrated advantages of centralized artillery command and control during the battle of Fredericksburg, the Union leadership chose not to change the basic artillery organizational structure. Batteries remained assigned to divisions with no chief of artillery other than the senior battery commander. The Artillery Reserve was reduced to 12 batteries and commanded by a captain rather than a colonel. The major changes in the Federal Army occurred at the corps level where Burnside's Grand Divisions were dissolved.[54]

As was the case following other major campaigns, the Confederate leadership further refined their command and control systems. Brigadier General Pendleton proposed aligning the few remaining independent batteries into a battalion system and increasing the number of field grade officers accordingly. Under his plan First Corps would have four divisional artillery battalions and two corps artillery reserve battalions totaling 26 batteries and 112 guns. Second Corps would have the same structure with 27 batteries and 116 guns. The General Reserve would be composed of two battalions of three batteries each, totaling 36 guns. Lee adopted all of Pendleton's recommendations

except the increase in field grade officers.[55] Confederate law authorized one colonel for every 40 guns, one lieutenant colonel for every 24, and one major for every 16 guns.[56]

CHANCELLORSVILLE

Throughout the winter months the Rappahannock River separated the two armies in their winter camps. By the spring of 1863 the Army of the Potomac had grown to 130,000 men and Major General Hooker knew he must attack. He realized the center of gravity was the Confederate army, not Richmond. He also knew that further attempts against Lee's strong positions overlooking Fredericksburg were futile. Therefore, Hooker developed a plan whereby at least three corps would cross the Rappahannock twenty-five miles northeast of Fredericksburg, then cross the Rapidan River and move south to threaten Lee's left flank and rear. This main force would be preceded by Brigadier General George Stoneman's cavalry. Much like Fredericksburg, artillery support was planned for the river crossings, 34 pieces being allocated to 5th Corps and 46 guns to 6th Corps.[57] Two corps would remain in front of Fredericksburg as a deception effort and an economy of force role.[58] On paper it was a good plan and if properly executed it might have succeeded.

As the Union forces marched to battle the artillery command and control was essentially non-existent. Hooker had, for whatever reason, decided that Hunt should serve as a simple staff advisor rather than Chief of Artillery. This meant there would

be no one coordinating the overall artillery battle for the Union army.[59] As the Union army conducted its reconnaissance in force moving south, it did so without any artillery.

Lee fought the battle of Chancellorsville without Lieutenant General Longstreet and the divisions of Major Generals John B. Hood and George Pickett which had been sent to defend Richmond.[60] Eight batteries had gone with this force. Lee had to use artillery to substitute for the shortage of infantry formations, particularly near Fredericksburg, and distribute the Artillery Reserve to replace artillery sent with Longstreet.[61]

Lee easily identified Hooker's intent and positioned his forces to meet the Union attack. As Lee slowed Hooker's advance, Brigadier General Fitzhugh Lee reported the Union right flank open. In one of his most daring moves of the war Lee divided his forces and sent Jackson with about 80 guns on a flanking movement. Colonel John Brown used his artillery battalion to protect Jackson as he withdrew. A total of 42 regiments moved forward to ascertain Jackson's movement, but again unbelievably no artillery went with them. The forces had to halt and wait for artillery to be sent forward once contact was made.[62] Union forces ultimately believed Jackson to be moving off the battlefield to the south. Jackson caught the Union right unprepared despite the repeated efforts of Union artilleryman Captain Hubert Dilger to warn Hooker of advancing rebel forces. The 11th Corps occupied a two-mile front but had only 16 guns in position. Three batteries were in a battery park in the rear and

never saw action.[63] Dilger's battery was essentially the only forces of the 11th Corps ready for the Confederates, but they were quickly overwhelmed despite their valiant efforts. Jackson's forces rapidly advanced until they were forced to stop, to dress their lines, and organize units after moving through the dense terrain.

Although the terrain was similar to that of the Peninsula Campaign, the performance of the Confederate artillery differed greatly. The Confederate artillery command and control ensured that adequate guns were in position to support the infantry whenever needed. This required tremendous efforts in many cases, particularly during Jackson's advance. The batteries of Captains Beckham, Breathed and McGregor were continually pushed forward to support the attack. The centralized command system also allowed Colonel E. P. Alexander, taking over for the wounded Crutchfield, to eventually mass over 50 guns atop Hazel Grove. This advantageous position soon caused Hooker's forces to finally withdraw in the face of intense shelling and spirited infantry assaults.

The final action of the Chancellorsville battle occurred near Salem Church where Major General John Sedgwick's forces were able to cross the fords north of Fredericksburg and advance towards Lee. Again Lee was able to shift Major General Lafayette McLaw's division and several artillery battalions to augment Brigadier General Cadmus Wilcox defending along the Orange Plank Road. The lack of a Confederate Artillery Reserve placed a heavy

demand on the rebel gunners but they were equal to the task, traveling many miles with Jackson and then hurrying back to Fredericksburg to fight once more.

The artillery action at Salem Church is significant for two reasons. First, it was the first instance of indirect fire by the Confederates. Anticipating Sedgwick's retreat at Bank's Ford, E. P. Alexander had established predetermined deflection settings for night firing.[64] The effect of the fire as Union forces moved back across the river is not known. Second, the inferiority of some of the Confederate weaponry was becoming apparent. Captain Robert Hardaway noted that only one out of 15 Confederate shells burst due to defective fuzes.[65]

In general, the Confederate artillery performed very well. However, southern success was tempered by the loss of Stonewall Jackson. Despite the heroic efforts of individual units the Union artillery performed poorly. Four reasons can be cited for these differences in performance. First, superior command and control allowed the Confederate guns to be ready to capitalize on any gains. Battalion organization, Chiefs of Artillery positions, cooperative spirit between units, and initiative by individual battery commanders all combined to exploit Confederate success.[66] The friction and discord found in the Union army was not present in Lee's forces. Second, mobility and forward positioning allowed the maximum number of Confederate guns to influence the action.[67] Third, the absence of Brigadier General Hunt as Chief of Artillery placed Union artillery at a distinct

disadvantage. Even though Hooker reinstated Hunt it was not done until the last day of the battle. There was no one to take a comprehensive look at the battlefield from a Union artillery perspective.[68] Fourth, Union infantry commanders again failed to properly use their assigned artillery. Many Union guns remained in gun parks in the rear throughout the battle.[69]

REORGANIZATION FOLLOWING CHANCELLORSVILLE

After the debacle at Chancellorsville Major General Hooker was more than willing to listen to his Chief of Artillery, Brigadier General Hunt. Based on Hunt's recommendations the artillery of the Army of the Potomac was finally organized into brigades (actually battalions) of batteries. One brigade was allocated for each army corps, two for the cavalry, and four for the reserve artillery.[70] While these organizational changes were a dramatic step forward the Union artillery was still drastically short field grade officers and staff officers of all rank.

By this time the Confederate leadership had fully accepted the practice whereby the Chiefs of Artillery, not the infantry division commanders, commanded the artillery.[71] Further refinement of artillery was addressed when on 8 June 1863 the South established an artillery board to review policies and procedures.[72] The most significant action of the board was implementation of the artillery reorganization in response to the Army of Northern Virginia being formed into three corps and the abolishment of the reserve artillery. The distribution of the

reserve artillery to the corps was a recognition that no guns could remain idle on the southern side. Three divisional and two reserve artillery battalions were formed for each of the three corps.[73] Confederate command and control structure was still superior to that of the Union army in terms of organization, command relationships, and field grade officers. Figure 6 illustrates the revised Confederate structure.

GETTYSBURG

The Battle of Gettysburg, 1-3 July 1863, was the first battle where both sides had a mature, centralized artillery command and control system. Events throughout the three days verified the advantages of this structure.

The stage was set for Gettysburg when, on 7 June 1863, Lee left Lieutenant General A.P. Hill in an economy of force role at Fredericksburg and quietly sent Longstreet's and Ewell's corps toward Pennsylvania. Lee intended his campaign to be "offensive in strategy and defensive in tactics."[74] Hooker detected this movement and on 13 June sent his army northward.[75] However, Hooker's disagreement with Henry Halleck on the disposition of forces at Harper's Ferry and a general lack of trust by the Lincoln administration led to his replacement with Meade on 28 June while the Union army was marching to battle.

The centralized command system allowed both sides to adequately support the infantry as the battle progressed. Superior Confederate numbers initially drove Federal troops back

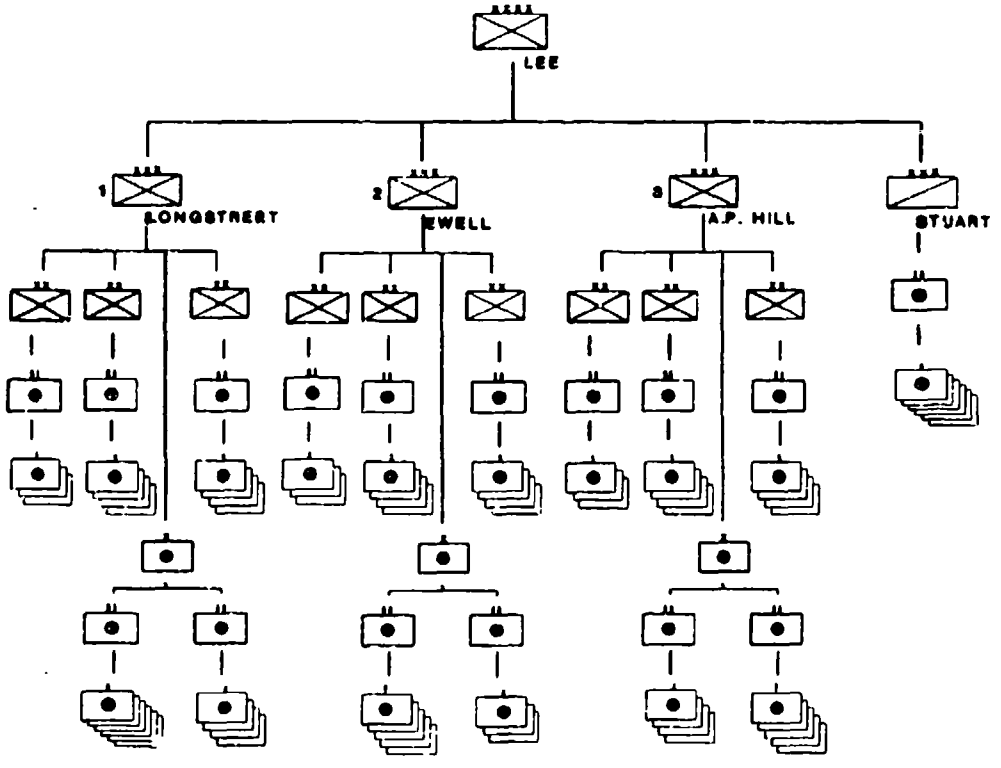

Figure 6. Confederate Artillery Organization for the Battle of Gettysburg.

to Cemetery Ridge, but timidity on Lieutenant General Richard Ewell's part prevented further gain. Colonel Charles Wainwright and Major Thomas Osborn of the 1st and 11th Corps, respectively, made good use of their new control of artillery.

Figure 7 presents the approximate number of artillery pieces each side had during the battle.

At the beginning of this battle Hunt was not sure of his status as Chief of Artillery. Although Hooker had reinstated him following Chancellorsville, he had not received guidance from Meade as to his specific responsibilities. That role was

ARTILLERY AT GETTYSBURG*		
TYPE OF ARTILLERY	UNION	CONFED
20-Pound Parrott Guns (Rifled)	6	12
10-Pound Parrott (Rifled)	60	40
3-Inch Ordnance Rifles	103	66
12-Pounder Napoleons	142	101
12-Pounder Howitzers	2	25
24-Pounder Howitzers	0	5
2.71-Inch Whitworths (Rifled)	0	2
James Rifles	4	0
TOTAL	320	251

* Does not include horse artillery. Union had 44 3-inch guns serving with the cavalry. Confederate unknown.

Figure 7. Comparison of Union and Confederate Artillery at the Battle of Gettysburg.

clarified in Hunt's mind on 2 July when according to Hunt,

> The General Commanding then gave me directions to make the necessary arrangements to meet the emergency. I considered this, in connection with the order previously given me, as a recognition, for the present, at least, of the position I had held at Antietam and Fredericksburg, as commander of the artillery of the Army, and proceeded to make the necessary dispositions and to give all directions I considered necessary during the rest of the battle.[76]

The new Union artillery organization Hunt commanded is shown in Figure 8.

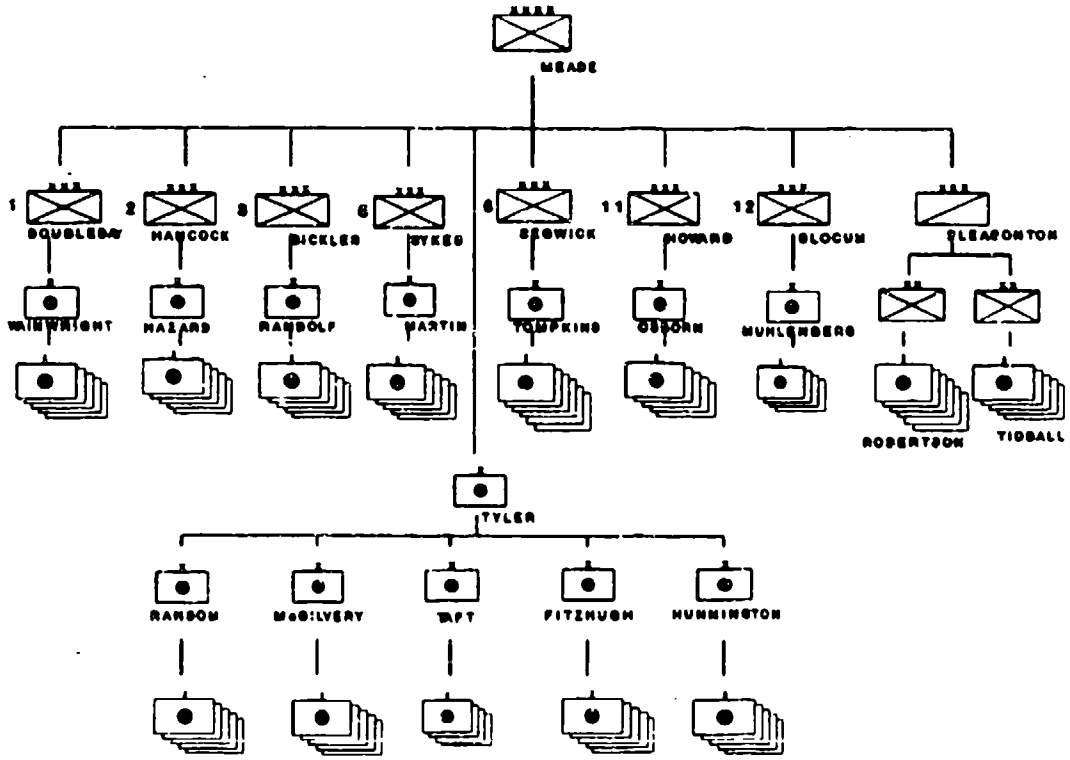

Figure 8. Union Artillery Organization for the Battle of Gettysburg.

The key in comparing Figures 7 and 8 is that each battery belonged to a parent artillery unit, commanded by an artillery officer. Gone were the days of infantry commanding the artillery.

The Confederate army was quite comfortable with this relationship and, in fact, had been using it for over a year. The main difference in this structure and those of previous battles was that the Artillery Reserve had been distributed down to each corps giving them a "reserve" capability.

For the Union forces it was a completely new concept. Brigadier General Hunt was extremely pleased for he had been fighting for this very structure for over two years. As noted by Figure 8, the Union forces retained the Artillery Reserve, which Hunt put to excellent use during the battle. Shortages of field grade officers led to shortages in the command positions of the artillery brigades (actually battalions). The ranks of officers in these jobs ranged from colonel to captain, but each accounted for himself very well during the fight.

The terrain of Gettysburg worked in favor of the Union army as it afforded Meade good interior lines of communication. Hunt used this to his advantage, rapidly shifting batteries where needed. The Confederate army had a much more difficult problem with more than five miles separating the flank units at times.

During the 2 July attack by Longstreet on Little Roundtop he had 62 guns supporting his effort but almost 140 Union pieces were emplaced to meet his advance. Hunt had moved over 60 cannon from the reserve to augment the defense on the Union left flank.[77] Uncoordinated attacks by Ewell failed to fix Federal forces and prevent their shifting on the battlefield.

Apparently, Hunt had no specific fire support plan such as that found at Fredericksburg. Events developed so rapidly that the main emphasis was simply on providing enough artillery to shore up weaknesses in the Union perimeter. On the third day Hunt issued his most definitive guidance of the battle by ordering his artillery commanders

> not to fire at small bodies, nor to allow their fire to be drawn without promise of adequate results; to watch the enemy closely, and when he opened to concentrate the fire of their guns on one battery at a time until it was silenced; under all circumstances to fire deliberately, and to husband their ammunition as much as possible.[78]

Lee's limited success on the Union left and center encouraged him to make a final attack on 3 July. Even though Brigadier General Pendleton emplaced almost 160 cannon along Seminary Ridge to support his advance, he still left 41 pieces unused. The 25 rifles and 16 Napoleons of Ewell's 2d Corps were desperately needed to prepare for Pickett's assault.[79] Pendleton explained the Confederate fire support plan for the 3 July attack as follows:

> By direction of the commanding general, the artillery along our entire line was to be prepared for opening, as early as possible on the morning of the 3d, a concentrated and destructive fire, consequent upon which a general advance was to be made. The right, especially, was, if practicable, to sweep the enemy from his stronghold on that flank.[80]

On the Union side Hunt was able to site 166 pieces along Cemetery Ridge and hold 54 in reserve.[81] He knew that ammunition would be a critical factor in the battle and directed batteries to withhold their fire for 15-20 minutes after the cannonade started, then engage the most effective of the Confederate batteries. He had also, unknown to Meade, created a special reserve ammunition train which he put to excellent use.[82] Additionally, Hunt took the initiative and imposed firing restrictions to conserve ammunition, leading the Confederates to

believe their preparation had been effective. Confederate fire, on the other hand, diminished at the critical stages due to shortages of ammunition.

Superior numbers of artillery and well-emplaced infantry ultimately defeated determined Confederate attacks. The southern historian Wise lists six errors that spelled defeat for Lee.

1. Absence of Stuart and the associated lack of reconnaissance.[83]

2. Advance elements becoming decisively engaged against Lee's orders.[84]

3. Ewell's failure to take Culp's Hill and Cemetery Hill on 1 July. [85]

4. Late attack on Federal left by Longstreet.[86]

5. Failure of Ewell's supporting attack on 2 July.[87]

6. Failure of 2d Corps and 3rd Corps to attack simultaneously on 3 July.[88]

While there were obviously errors on the part of the Confederate forces, careful consideration must also be given to the success of the Union troops under Major General George Meade's leadership. Given the short time to prepare for the role, Meade's performance was especially noteworthy. Seemingly, he was able to anticipate Lee's moves and get the Union forces to work well together. The spirit of cooperation, new command authority, and interior lines of communication allowed Hunt to support every aspect of Meade's plan. Hunt's special ammunition train and ammunition conservation measures were also instrumental

in the success of the Union effort. Things certainly would have turned out differently if the Federal guns had been silent during Pickett's charge. Like Lee at Antietam, Meade's ability to use interior lines of communication to move infantry and artillery to critical points on the battlefield allowed him to counter each attack. Hunt's placement of his Artillery Reserve at Powell's Hill in the center of the Union line let him quickly influence the action at any point. While the tactics and decisions used by each both sides may be argued, it was clear that each adversary had finally developed a viable artillery command and control system to support their forces.

REORGANIZATION FOLLOWING GETTYSBURG

The artillery architecture used at Gettysburg was the basic structure each side used until the end of the war. While there were some minor modifications, both sides had finally developed a robust, responsive command structure.

The Union army under General Ulysses S. Grant's leadership would reach the same conclusion as Lee concerning the Artillery Reserve. When the heavy artillery became a burden in the heavily wooded terrain of the Wilderness, Grant sent some of the reserve back to Washington and absorbed the rest into his existing corps artillery organizations.

SUMMARY

The organization and employment of field artillery of both the Union and Confederate armies evolved throughout the first three years of the Civil War. Both sides used lessons learned from each battle to improve various aspects of their artillery structure. McClellan gave the Union artillery an excellent basis for organization early in the war but later failed to improve upon it when he had the chance. Continual turnover in the commanding general position hampered Union refinement of McClellan's initial plan. The Napoleonic model of attaching artillery to brigades was a hard one to break, requiring almost two years of fighting to convince the leadership that a change was needed.

The more stable leadership of the Confederate army incrementally improved their artillery posture after each battle. Continuity and experience allowed Lee to make changes well before the Union army. Less than a year after the war started he had begun to organize his artillery into battalions, a year ahead of the Union forces. The centralized command and control system of the Confederate artillery compensated for superior Union quantity and quality of artillery in many battles leading up to Gettysburg. At Gettysburg, and afterwards, the Union and Confederate artillery command and control systems were essentially equal.

Both armies also learned valuable lessons on how to employ their artillery. At the early stages each side struggled with

the integration of the short-range guns with the new long-range rifled pieces. While both were quick to ascertain they could no longer push artillery beyond the front lines due to the extended range of the Minie Ball, neither side routinely developed a concept of fire support to support the commander's intent. Early battles involved the infantry leaders simply directing artillery preparations to soften points of attack for infantry forces. Occasionally, artillery duels of counterbattery fire would be conducted. It was not until Fredericksburg that a coordinated fire support plan was developed. Here both sides utilized a phased plan of execution whereby the long and short-range systems would complement each other.

Both sides quickly understood the need for mobility and massing of artillery. Initially, massing was usually done through a hub-to-hub arrangement of the guns, but later the concept of massing by fire from various firing points was recognized to be advantageous, particularly when considering counterbattery fire. Mobility and the importance of interior lines was clearly demonstrated by Lee at Antietam and again one year later by Meade at Gettysburg.

Many of the developments such as the creation of brigades or battalions were not authorized by legislature nor were to be found in field manuals of the era. Rather they "sprang out of the necessities of war."[89] The lessons learned by both sides were hard ones, often bought with the blood of thousands of brave soldiers. Reflecting on remembering past experiences, Lieutenant

William Birkheimer wrote that:

> fortunate will it be for us if the results of practical knowledge then acquired does not pass beyond recall forever with the lives of those who then learned the proper use and management of the artillery arm in campaign and in battle.[90]

Ultimately, both the Union and Confederate cannoneers supported their infantry comrades with the same vigor and enthusiasm of the artillerymen that had come before them, and those who would follow in their footsteps.

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APPENDIX A

ARTILLERY FORCES
FIRST BULL RUN
(21 JULY, 1861)

UNION FORCES
(BG IRWIN McDOWELL)

1st Division
- 2d Bde
  - Btry E, Second U.S. Arty
- 3d Bde
  - Btry E, Third U.S. Arty
- 4th Bde
  - Btry G, First U.S. Arty
  - Btry M, Second U.S. Arty

3d Division
- 1st Bde
  - Btry I, First U.S. Arty
- 2d Bde
  - Btry D, Second U.S. Arty

2nd Division
- 1st Bde
  - Btry D, Fifth U.S. Arty
- 2d Bde
  - Second Rhode Island(w/organic light Arty)
  - Seventy-First New York (w/two howitzers)

5th Division
- 1st Bde
  - Btry A, Second U.S. Arty
- 2d Bde
  - Btry G, Second U.S. Arty

CONFEDERATE FORCES
(BG JOSEPH JOHNSTON)

Army of the Potomac
(Afterwards 1st Corps)
- Artillery
  - Kemper's Battery
  - Latham's Battery
  - Loudon's Battery
  - Shield's Battery

Artillery Not Brigaded
- Washington (Lousiana) Battalion Artillery

Army of the Shenandoah
(Johnston Division)
- 1st Bde
  - Pendleton's Battery
- 2d Bde
  - Alburtis' Battery
- 3d Bde
  - Imboden's Battery
- 4th Bde
  - Grove's Battery
- Reserve
  - Beckham's Battery

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APPENDIX B

ARTILLERY FORCES
MALVERN HILL
(1 JULY, 1862)

ARMY OF THE POTOMAC
(MG GEORGE B. McCLELLAN)

Second Army Corps (BG Edwin Sumner)

First Division (BG I. Richardson)
Artillery (CPT G. Hazard)
- Btry B, 1st NY Light Arty
- Btrys A & C, 4th U.S. Arty

Second Division (BG John Segwick)
Artillery (COL C. Tompkins)
- Btry A, 1st RI Light Arty
- Btry I, 1st U.S. Arty

Corps Arty Reserve
- Btry G, 1st NY Light Arty
- Btrys B & G, 1st Rhode Island Light Arty

Third Army Corps(BG S. Heintzelman)

Second Division (BG J. Hooker)
Artillery
- Btry D, 1st NY Light Arty
- 4th Btry, NY Light Arty
- Btry H, 1st U.S. Arty

Third Division (BG P. Kearney)
Artillery
- Btry E, 1st RI Light Arty
- Btry G, 2d U.S. Arty

Corps Arty Reserve (CPT Gustavus DeRussy)
- 6th Btry, NY Light Arty
- 2d Btry, NJ Light Arty
- Btry K, 4th U.S. Arty

Fourth Army Corps (BG Erasmus Keyes)

First Division (BG Daruis Couch)
Artillery
- Btry C, 1st PA Light Arty
- Btry D, 1st PA Light Arty

Second Division (BG J. Peck)
Artillery
- Btry H, 1st NY Light Arty
- 7th Btry, NY Light Arty

Corps Arty Reserve (MAJ Robert West)
- 8th Btry, NY Light Arty
- Btrys E & H, 1st PA Light Arty
- Btry M, 5th U.S. Arty

Fifth Corps (BG Fitz John Porter)

First Division (BG George Morrell)
Artillery (CPT W. Weeden)
- Btrys C & E, MA Light Arty
- Btry C, 1st RI Light Arty
- Btry D, 5th U.S. Arty

Second Division (BG G. Sykes)
Artillery (CPT S Weed)
- Btrys L & M, 3d U.S. Arty
- Btry I, 5th U.S. Arty

Third Division (BG George McCall)
(BG Truman Seymour)
Artillery
- Btrys A, B, & G, 1st PA Light Arty
- Btry C, 5th U.S. Arty

Sixth Army Corps (BG William Franklin)

First Division (BG Henry Slocum)
Artillery (CPT Edward Platt)
- Btry A, MA Light Arty
- 1st Btry, NJ Light Arty
- Btry D, 2d U.S. Arty

Second Division (BG W. Smith)
Artillery (CPT R. Ayers)
- Btry E, 1st NY Light Arty
- 1st Btry, NY Light Arty
- 3d Btry, NY Light Arty
- Btry F, 5th U.S. Arty

Artillery Reserve (COL Henry Hunt)

First Brigade (LTC W. Hays)
- Btrys A,B,L, & M, 2d U.S. Arty
- Btrys C & G, 3d U.S. Arty

Second Brigade (LTC G. Getty)
- Btrys E,G,& K, 1st U.S. Arty
- Btry G, 4th U.S. Arty
- Btrys K & A, 5th U.S. Arty

Third Brigade (MAJ Albert Arndt)
- Btrys A,B,C,&D, 1st Bn NY Light Arty

Fourth Brigade (MAJ Petherbridge)
- Btrys A & B, MD Light Arty

Fifth Brigade (CPT Howard Carlisle)
- Btry E, 2d U.S. Arty
- Btry F, 3d U.S. Arty

Siege Train (COL R. Tyler)
- 1st Connecticut Heavy Arty

Unattached
- Btry G, 1st NY Light Arty
- 5th Btry, NY Light Arty

CONFEDERATE ARTILLERY FORCES
(GEN ROBERT E. LEE)

Jackson's Forces

Whiting's Division (BG W. Whiting)
- Balthis' Btry, Stauton (VA) Arty
- Reilly's Btry, Rowan (NC) Arty

Hill's Division (MG D. H. Hill)
- Bondurant's Btry, Jeff Davis Arty
- Carter's Btry, William (VA) Arty
- Clark's (VA) Btry
- Hardaway's (AL) Btry
- Nelson's Btry, Hanover (VA) Arty
- Peyton's Btry, Orange (VA) Arty
- Rhett's (SC) Btry

Jackson's Division (MG T. Jackson)
- 1st Brigade
  - Carpenter's (VA) Btry
  - Poague's Btry, Rockbridge Arty
- 2d Brigade
  - Caskie's Btry, Hampden (VA) Arty
- 3d Brigade
  - Wooding's Btry, Danville Arty

Ewell's Division (MG Richard Ewell)
- 8th Brigade
  - Carrington's Btry, Charlottesville (VA) Arty
- 7th Brigade
  - Courtney's (VA) Btry
- Maryland Line
  - Brockenbrough's Btry, Baltimore (MD) Arty

Magruder's Forces (MG John Magruder

First Division (BG David Jones)
- Brown's Btry, Wise (VA) Arty
- Hart's Btry, Washington (SC) Arty
- Lane's (GA) Btry
- Moody's (LA) Btry
- Woolfolk's Btry, Ashland (VA) Arty

McLaw's Division (MG L. McLaws)
- 1st Brigade
  - Manly's (NC) Btry
- 4th Brigade
  - Kemper's Btry, Alexandria Arty
- 2d Brigade
  - Thorp (GA) Btry
- 3rd Brigade
  - McCarthy's (VA) Btry

Artillery (COL S. D. Lee)
- Kirkpatrick's Btry, Amherst (VA) Arty
- Page's Btry, Magruder (VA) Arty
- Read's Btry, Pulaski (GA) Arty
- Richardson's Btry

Longstreet's Division (MG J. Longstreet)
- 1st Brigade
  - Roger's (VA) Btry
- 4th Brigade
  - Anderson's Btry, Thomas (VA) Arty
- 5th Brigade
  - Maurin's Btry, Donaldson (LA) Arty
- 6th Brigade
  - Smith's Btry, 3d Richmond Howitzers
- Division Artillery
  - Washington (LA) Battalion

Huger's Division (MB B. Huger)
- 2d Brigade
  - Grimes's (VA) Btry
  - Mcorman's (VA) Btry
- 3d Brigade
  - Huger's (VA) Btry
  - Ross' (GA) Btry
- 4th Brigade
  - Stribling's Btry, Fauquier Arty
  - Turner's (VA) Btry

Hill's Light Division (MG A.P. Hill)
- Andrew's (MD Btry
- Bachman's (SC) Btry
- Braxton's Btry,Fredricksburg Arty
- Crenshaw's (VA) Btry
- Davidson's Btry, Letcher Arty
- Johnson's (VA) Btry
- Muster's (VA) Btry
- McIntosh's Btry, PeeDee Arty
- Pegram's (VA) Btry

Department of North Carolina
Wise's Command
- 4th VA Heavy Arty
- Andrew's (VA) Btry
- Armistead's (VA) Btry
- Rives' (VA) Btry

Artillery (COL J. Deshler)
- Branch's (VA) Btry
- Brem's (NC) Btry
- French's (VA) Btry
- Graham's (VA) Btry
- Grandy's (VA) Btry
- Lloyd's (NC) Btry

Reserve Artillery (BG William Pendleton)

1st VA Artillery (COL J. T. Brown)
- Coke's Btry
- Macon's Btry
- Richardson's Btry
- Smith's Btry
- Watson's Btry

Richardson's Battalion (MAJ Richardson)
- Ancell's (VA) Btry
- Milledge's (GA) Btry
- Woolfolk's Btry, Ashland Arty

Jones' Battalion (MAJ H. P. Jones)
- Clark's (VA) Btry
- Peyton's (VA) Btry
- R.C.M. Page's Btry

Sumter (GA) Battalion (LTC A. Cutts)
- Blackshear's Btry
- Lane's Btry
- Price's Btry
- Ross' Btry

Miscellaneous
- Chapman's Btry, Dixie (VA) Arty
- Dabney's (VA) Btry
- Dearing's Btry
- Grimes'(VA) Btry
- Hamilton's Btry

Nelson's Bn (MAJ William Nelson)
- Huckstep's (VA) Btry
- Kirkpatrick's (VA) Btry
- R.C.M. Page's Btry

APPENDIX C
ARTILLERY FORCES
BATTLE OF ANTIETAM
(17 SEPTEMBER 1862)

ARMY OF THE POTOMAC
(MG GEORGE B. McCLELLAN)

FIRST ARMY CORPS (MG Joseph Hooker)
(MG George G. Meade)

1st Division (BG Rufus King)
(BG John P. Hatch)
(BG Abner Doubleday)
Artillery (CPT J. Albert Monroe)
First Btry, New Hampshire Light
Btry D, 1st Rhode Island Light
Btry L, 1st New York Light
Btry B, 4th U.S. Artillery

2nd Division (BG J. B. Ricketts)
Artillery
Btry F, 1st PA Light
Btry C, Pennsylvania Light

3rd Division (BG George G. Meade)
(BG Truman Seymour)
Artillery
Btry A & B, 1st PA Light
Btry C, 5th U.S. Artillery

SECOND ARMY CORPS (MG Edwin Sumner)

1st Division (MG Israel Richardson)
(BG John C. Caldwell)
(BG Winfield S. Hancock)
Artillery
Btry B, 1st New York Light
Btrys A & C, 4th U.S. Artillery

2d Division (MG John Sedgwick)
(BG Oliver O. Howard)
Artillery
Btry A, 1st Rhode Island Light
Btry I, 1st U.S. Artillery

3rd Division (BG William H. French)
Unattached Artillery
Btry G, 1st New York Light
Btry B, 1st Rhode Island Light
Btry G, 1st Rhode Island Light

FOURTH ARMY CORPS

1st Division (MG Darius N. Couch)
Artillery
Third Btry, New York Light
Btry C & D, 1st PA Light
Btry G, 2d U.S. Artillery

FIFTH ARMY CORPS (MG Fitz John Porter)

1st Division (MG George Morrell)
Artillery
Btry C, Massachusetts Light
Btry C, 1st Rhode Island Light
Btry D, 5th U.S. Artillery

Artillery Reserve (LTC William Hays)
Btrys A, B, C, & D, 1st Battalion
New York Light
Fifth Btry, New York Light
Btry K, 1st U.S. Artillery
Btry G, 4th U.S. Artillery

2d Division (BG George Sykes)
Artillery
Btry E & G, 1st U.S. Artillery
Btry I, 5th U.S. Artillery
Btry K, 5th U.S. Artillery

3d Division (BG A. Humphreys)
Artillery
Btry C, 1st New York Light
Btry L, 1st Ohio Light

SIXTH ARMY CORPS (MG William B, Franklin)

1st Division (MG William Franklin)
Artillery (CPT Upton)
- Btry A, Maryland Light
- Btry A, Massachusetts Light
- Btry A, New Jersey Light
- Btry D, 2d U.S. Artillery

2d Division (MG William Smith)
Artillery (CPT Romeyn Ayres)
- Btry B, Maryland Light
- 1st Btry, New York Light
- Btry F, 5th U.S. Artillery

NINTH ARMY CORPS (MG Ambrose Burnside)
(MG Jesse L. Reno)
(BG Jacob D. Cox)

1st Division (BG Orlando Willcox)
Artillery
- Eighth Btry, Massachusetts Light
- Btry E, 2d U.S. Artillery

3rd Division (BG Isaac Rodman)
Artillery
- Btry A, 5th U.S. Artillery

Unattached Artillery
- Btry L & M, 3d U.S. Artillery

2d Division (BG Samuel Sturgis)
Artillery
- Btry D, Pennsylvania Light
- Btry E, 4th U.S. Artillery

Kanawha Division (BG Jacob Cox)
(COL E. Scammon)
1st Bde
- First Btry, Ohio Light Arty

2nd Bde
- Simmonds' Btry, Kentucky Arty

TWELFTH ARMY CORPS (MG Joseph Mansfield)
(BG Alpheus Williams)

Artillery (CPT Clermont Best)
- 4th & 6th Btrys, Maine Light
- Btry M, 1st New York Light
- 10th Btry, New York Light
- Btrys E & F, Pennsylvania Light
- Brty F, 4th U.S. Artillery

Cavalry Division (BG Alfred Pleasonton)
Artillery
- Btrys A, B, L & M, 2d U.S. Artillery
- Btrys, C & G, 3d U.S. Artillery

ARMY OF NORTHERN VIRGINIA (GENERAL R. E. LEE)

LONGSTREET'S WING (MG James Longstreet)
Chief of Artillery - COL Cabell

McLaw's Division (MG L. McLaws)
Artillery (MAJ S. P. Hamilton)
(COL H. C. Cabell)
- Manly's (NC) Battery
- Pulaski (GA) Artillery
- Richmond (Fayette) Artillery
- Richmond Howitzers (1st Company)
- Troup (GA) Artillery

Anderson's Division (MG R.Anderson)
Artillery (MAJ John Saunders)
- Donaldsonville (LA) Arty
- Huger's (VA) Battery
- Moorman's (VA) Battery
- Thompson's (Grimes) (VA) Battery

Jones' Division (BG David R. Jones)
Artillery
- Wise (VA) Arty (J.S. Brown's Btry)

Walker's Division (BG John Walker)
Walker Bde
- French's (VA) Battery

Ransom's Bde
- Branch's Field Artillery (VA)

Hood's Division (BG John B. Hood)
Artillery (MAJ B. W. Frobel)
- German Artillery (SC)
- Palmetto Artillery (SC)
- Rowan Artillery (NC)

Evan's Bde (BG Nathan Evans)
- Macbeth (SC) Artillery

ARTILLERY

Washington (LA) Arty (COL Walton)
- 1st Company
- 2nd Company
- 3rd Company
- 4th Company

Lee's Bn (COL S. D. Lee)
- Ashland (VA) Artillery
- Bedford (VA) Artillery
- Brooks (SC) Artillery
- Eubank's (VA) Artillery
- Madison (LA) Light Artillery
- Parker's (VA) Battery

JACKSON'S WING (MG Thomas J. Jackson)
Chief of Artillery - COL Crutchfield

Ewell's Division (BG A. R. Langston)
(BG Jubal Early)
Artillery (MAJ A. R. Courtney)
- Chesapeake (MD) Artillery*
- Courtney (VA) Artillery *
- Louisiana Guard Artillery
- First Maryland Battery*
- Staunton (VA) Artillery

Hill's Division (MG D. H. Hill)
Artillery (MAJ Pierson)
- Hardway's (AL) Battery
- Jeff Davis (AL) Artillery
- Jones' (VA) Battery
- King William (VA) Battery

Hill's Light Division(MG A.P. Hill)
Artillery (MAJ R. L. Walker)
- Crenshaw's (VA) Battery
- Fredericksburg (VA) Battery
- PeeDee (SC) Artillery

Jackson's Division (SG John Jones)
(BG W. Starke)
(COL A. J. Grisby)
Artillery (MAJ L. M. Shumaker)
- Alleghany (VA) Battery
- Brockenbrough's (MD) Battery
- Danville (VA) Battery
- Hampden (VA) Artillery
- Lee (VA) Battery
- Rockbridge (VA) Battery

* Left at Harper's Ferry

RESERVE ARTILLERY (BG William N. Pendleton)

Brown's Battalion (COL J. Brown)
- Powhatan Artillery
- Richmond Howitzers, 2d & 3rd Company
- Salem Artillery
- Williamsburg Artillery

Cutt's Battalion (LTC A. S. Cutts)
- Blackshear's (GA) Battery
- Irwin (GA) Artillery
- Lloyd's (NC) Battery
- Patterson's (GA) Battery
- Ross's (GA) Battery

Miscellaneous
- Cutshaw's (VA) Battery
- Dixie (VA) Battery
- Magruder (VA) Artillery
- Rice's (VA) Battery

Jones' Battalion (MAJ H. P. Jones)
- Morris (VA) Artillery
- Orange (VA) Artillery
- Turner's (VA) Artillery
- Wimbish's (VA) Artillery

Nelson's Battalion (MAJ W. Nelson)
- Amherst (VA) BAttery
- Fluvanna (VA) Artillery
- Huckstep's (VA) Battery
- Johnson's (VA) Battery
- Milledge (GA) Artillery

Horse Artillery (CPT J. Pelham)
- Chew's Battery
- Hart's (SC) Battery
- Pelham's (VA) Battery

APPENDIX D

ARTILLERY FORCES
BATTLE OF FREDRICKSBURG
(11-15 DECEMBER 1862)

ARMY OF THE POTOMAC
(MG AMBROSE E. BURNSIDE)

Chief of Artillery (BG Henry J. Hunt)

Artillery Reserve (LTC William H [illegible]s)
- 5th Btry, New York Light Artillery
- Btrys A, B, C, & D, 1st Battalion New York Light
- Btry K, 1st U.S. Artillery
- Btry A, 2d U.S. Artillery
- Btry G, 4th U.S. Artillery
- Btry K, 5th U.S. Artillery

Unattached Artillery (MAJ Thomas Trumbull)
- Btrys B & M, 1st Connecticut Heavy Artillery

RIGHT GRAND DIVISION (MG EDWIN SUMNER)

SECOND ARMY CORPS (MG Darius Couch)

1st Division (BG Winfield Hancock)
Artillery
- Btry B, 1st New York Light
- Btry C, 4th U.S. Arty

3d Division (BG William French)
Artillery
- Btry G, 1st New York Light
- Btry G, 1st Rhode Island Light

2d Division (BG Oliver Howard)
Artillery
- Btrys A & B, 1st Rhode Island Light Artillery

Artillery Reserve (CPT Morgan)
- Btry I, 1st U.S. Arty
- Btry A, 4th U.S. Arty

NINTH ARMY CORPS (BG Orlando Willcox)
Chief of Artillery (CPT John Edwards)

1st Division (BG William Burns)
Artillery
- Btry D, 1st New York Light
- Btrys L & M, 3d U.S. Artillery

3d Division (BG George Getty)
Artillery
- Btry E, 2d U. S. Artillery
- Btry A, 5th U.S. Artillery

2d Division (BG Samuel Sturgis)
Artillery
- Btry L, 2d New York Light
- Btry D, Pennsylvania Light
- Btry D, 1st Rhode Island Light
- Btry E, 4th U.S. Artillery

Cavalry Division (BG Pleasonton)
Artillery
- Btry M, 2d U.S. Artillery

CENTRAL GRAND DIVISION (MG JOSEPH HOOKER)

THIRD ARMY CORPS (BG George Stoneman)
Chief of Artillery (CPT Lee Rhett Livingston)

1st Division (BG David Birney)
Artillery (CPT G. E. Randolph)
Btry E, 1st Rhode Island Light
Btrys F & K, 3d U.S. Artillery

3d Division (BG Amiel Whipple)
Artillery
10th & 11th Btrys, New York Light
Btry H, 1st Ohio Light

2d Division (BG Daniel Sickles)
Artillery (CPT James Smith)
2d Btry, New Jersey Light
4th Btry, New Jersey Light
Btry H, 1st U. S. Artillery
Btry K, 4th U.S. Artillery

FIFTH ARMY CORPS (BG Daniel Butterfield)
Chief of Artillery (CPT Stephen Weed)

1st Division (BG Charles Griffin)
Artillery
3d & 5th Btrys, MA Light
Btry C, 1st Rhode Island Light
Btry D, 5th U.S. Artillery

3d Division (BG Andrew Humphreus)
Artillery
Btry C, 1st New York Light

2d Division (BG George Sykes)
Artillery
Btry L. 1st Ohio Light
Btry I, 5th U.S. Artillery

Cavalry Division (BG W. Averell)
Artillery
Btrys B & L, 2d U.S. Artillery

LEFT GRAND DIVISION (MG WILLIAM FRANKLIN)

FIRST ARMY CORPS (MG John Reyonlds)
Chief of Artillery (COL Charles Wainwright)

1st Division (BG Abner Doubleday)
Artillery (CPT George Gerrish)
(CPT John Reynolds)
1st Btry, New Hampshire Light
Btry L, 1st New York Light
Btry B, 4th U.S. Artillery

3d Division (MG George Meade)
Artillery
Btrys A, B, & G, 1st Pennsylvania Light
Btry C, 5th U.S. Artillery

2d Division (BG John Gibbon)
(BG Nelson Taylor)
Artillery (CPT George Leppien)
2d Btry, Maine Light
5th Btry, Maine Light
Btry C, Pennsylvania Light
Btry F, 1st Pennsylvania Light

SIXTH ARMY CORPS (MG William Smith)
Chief of Artillery (CPT Romeyn Ayres)

1st Division (BG William Brooks)
Artillery
Btry A, Maryland Light
Btry A, MAssachusetts Light
1st Btry, New Jersey Light
Btry D, 2d U.S. Artillery

3d Division (BG John Newton)
Artillery
Btry C & D, 1st Pennslyvania Light
Btry G, 2d U.S. Artillery

2d Division (BG Albion Howe)
Artillery
Btry B, Maryland Light
1st Btry, New York Light
3d Btry, New York Light
Btry F, 5th U.S. Artillery

Cavalry Brigade (BG George Bayard)
(COL David Gregg)
Artillery
Btry C, 3d U.S. Artillery

ARMY OF NORTHERN VIRGINIA (GEN ROBERT E. LEE)

Chief of Artillery - BG W. N. Pendleton

FIRST CORPS (LTG James Longstreet)

Chief of Artillery - COL Cabel

McLaw's Division (MG L. McLaws)
Artillery (COL H. C. Cabell)
- Manly's (NC) Battery
- Read's (GA) Battery
- McCarthy's Btry, 1st Richmond Howitzers
- Troup (GA) Arty (Carlton's Btry)

Anderson's Division (MG R. Anderson)
Artillery
- Donaldsonville (LA) Arty
- Huger's (VA) Battery
- Lewis' (VA) Battery
- Norfolk (VA) Light Artillery Blues

Pickett's Division (MG G. Pickett)
Artillery
- Dearing's (VA) Battery
- Stribling's Btry, Fauquier(VA) Arty
- Macon's Btry, Richmond Arty

Hood's Division (MG J. B. Hood)
Artillery
- Bachman's Btry, German Arty
- Garden's Btry, Palmetto Arty
- Reilly's Btry, Rowan (NC) Arty

Ransom's Division (BG Robert Ransom)
Ransom's Brigade (BG Robert Ransom)
- Branch's (VA) BAttery

Cooke's Bde (BG J. R. Cooke)
(COL E. D. Hall)
- Cooper's (VA) Battery

1st Corps Artillery

Washington (LA) Arty (COL Walton)
- 1st Company
- 2d Company
- 3d Company
- 4th Company

Alexander's Bn (LTC E. P. Alexander)
- Bedford (VA) Artillery
- Eubank's (VA) Battery
- Madison Light Artillery
- Parker's (VA) Battery
- Rhett's (SC) Battery
- Woolfolk's (VA) Battery

SECOND ARMY CORPS (LTG Thomas Jackson)

Chief of Artillery - COL Crutchfield

D.H. Hill's Division (MG D.H. Hill)
Artillery (MAJ H. P. Jones)
- Hardaway's (AL) Battery
- Bondurant's Btry, Jeff Davis Arty
- Carter's Btry, King William Arty
- Page's Btry, Morris' (VA) Arty
- Fry's Btry, Orange (VA) Arty

A.P. Hill's Division (MG A.P. Hill)
Artillery (LTC R. L. Walker)
- Branch (NC) Artillery
- Crenshaw's (VA) Battery
- Fredericksburg (VA) Battery
- Johnson's (VA) Battery
- Letcher (VA) Artillery
- Pee Dee (SC) Artillery
- Purcell (VA) Artillery

Ewell's Division (BG Jubal Early)
Artillery (CPT J. W. Latimer)
- Charlottesville (VA) Artillery
- Chesapeake (MD) Artillery
- Courtney (VA) Artillery
- First Maryland Battery
- Louisiana Guard Artillery
- Staunton (VA) Artillery

Jackson's Division (BG Taliaferro)
Artillery (CPT Brockenbrough)
- Carpenter's (VA) Battery
- Dansville (VA) Artillery
- Hampden (VA) Artillery
- Lee (VA) Artillery
- Lusk's (VA) Battery

RESERVE ARTILLERY (BG W. N. Pendleton)

Brown's Battalion (COL J. T. Brown)
- Brooke's (VA) Battery
- Dance's Battery, Powhatan Arty
- Hupp's Battery, Salem Artillery
- Poague's (VA) Btry, Rockbridge Arty
- Smith's Btry, Third Howitzers
- Watson's Btry, Second Howitzers

Nelson's Bn (MAJ William Nelson)
- Kirkpatrick's (VA) Battery, Amherst Artillery
- Massie's (VA) Battery, Fluvanna Artillery
- Milledge's (GA) Battery

Cutt's (GA) Battalion
- Lane's Battery
- Patterson's Battery
- Ross' Battery

Misc Batteries
- Ells' (GA) Dattery
- Nelson's (VA) Btry, Hanover Artillery

Cavalry (MG J.E.B. Stuart)
Artillery (MAJ John Pelham)
- Breathed's (VA) Battery
- Chew's (VA) Battery
- Hart's (SC) Battery
- Henry's (VA) Battery
- Moorman's (VA) Battery

APPENDIX E

ARTILLERY FORCES
BATTLE OF CHANCELLORSVILLE
(1-6 MAY 1863)

ARMY OF THE POTOMAC (MG JOSEPH HOOKER)
*Chief of Artillery (BG Henry Hunt)**

FIRST ARMY CORPS (MG John Reynolds)

1st Division (BG James Wadsworth)
Artillery (CPT John Reynolds)
1st Btry, New Hampshire Light
Btry L, 1st New York Light
Btry B, 4th U.S. Artillery

2d Division (BG John Robinson)
Artillery (CPT D. Ransom)
Btrys B & E, Maine Light
Btry C, Pennsylvania Light
Btry C, 5th U.S. Artillery

3d Division (MG Abner Doubleday)
Artillery (MAJ Ezra Matthews)
Btrys B, F, & G, 1st Pennsylvania Light

SECOND ARMY CORPS (MG Darius Couch)

1st Division (MG Winfield Hancock)
Artillery (CPT Rufus Pettit)
Btry B, 1st New York Light
Btry C, 4th U.S. Artillery

2d Division (BG John Gibbon)
Artillery
Btry A & B, 1st Rhode Island Light

3d Division (MG William French)
Artillery
Btry G, 1st New York Light
Btry G, 1st Rhode Island Light

Reserve Artillery
Btry I, 1st U.S. Artilery
Btry A, 4th U.S. Artillery

THIRD ARMY CORPS (MG Daniel Sickles)

1st Division (BG David Birney)
Artillery (CPT A. Clark)
Btry B, New Jersey Light
Btry E, 1st Rhode Island Light
Btrys F & K, 3d U.S. Artillery

2d Division (MG Hiram Berry)
(BG Joseph Carr)
Artillery (CPT Thomas Olson)
Btry D, 1st New York Light
Btry H, 1st U. S. Artillery
Btry K, 4th U.S. Artillery

3d Division (MG Amiel Whipple)
(BG Charles Graham)
Artillery (CPT Albert von Puttkammer)
10th & 11th Btrys, New York Light
Btry H, 1st Ohio Light

FIFTH ARMY CORPS (MG George Meade)

1st Division (BG Griffin)
Artillery (CPT Augustus Martin)
Btrys C & E, Massachusetts Light
Btry C, 1st Rhode Island Light
Btry D, 5th U.S. Artillery

2d Division (MG George Sykes)
Artillery (CPT Stephen Weed)
Btry L, 1st Ohio Light
Btry I, 5th U.S. Artillery

3d Division (BG Humphreys)
Artillery (CPT Alansom Randol)
Btry C, 1st New York Light
Btry E & G, 1st U.S. Artillery

SIXTH ARMY CORPS (MG John Sedgwick)

1st Division (BG William Brooks)
Artillery (MAJ John Tompkins)
Btry A, Massachusetts Light
Btry A, New Jersey Light
Btry A, Maryland Light
Btry D, 2d U.S. Artillery

2d Division (BG Albion Howe)
Artillery (MAJ de Peyster)
1st Btry, New York Light
Btry F, 5th U.S. Artillery

3d Division (MG John Newton)
Artillery (CPT J. McCarthy)
Btrys C & C, 1st Pennsylvania Light
Btry G, @d U.S. Artillery

Light Division (COL Hiram Burnham)
Artillery
3d Btry, New York Light

ELEVENTH ARMY CORPS (MG Oliver Howard)

1st Division (BG Charles Devens)
(BG Nathaniel McLean)
Artillery
13th Btry, New York Light

2d Division (BG A. Steinwehr)
Artillery
Btry I, 1st New York Light

3d Division (MG Carl Schurz)
Artillery
Btry I, 1st Ohio Light

Reserve Artillery (COL Schirmer)
2d Btry, New York Light
Btry K, 1st Ohio Light
Btry C, 1st West Virginia Light

TWELFTH ARMY CORPS (MG Henry Slocum)

1st Division (BG Alpheus Williams)
Artillery (CPT Robert Fitzhugh)
Btrys K & M, 1st New York Light
Btry F, 4th U.S. Artillery

2d Division (BG John Geary)
Artillery (CPT Joseph Knap)
Btry E, Pennsylvania Light
Btry F, Pennsylvania Light

CAVALRY CORPS (BG George Stoneman)

1st Division (BG A. Pleasonton)
Artillery
6th Btry, New York Light

2d Division (BG W. Averrell)
Artillery
Btry A, 2d U.S. Artillery

Artillery (CPT James Robertson)
Btrys B, L, & M, 2d U.S. Artillery
Btry E, 4th U.S. Artillery

* Advisor only, no command responsibility

ARMY OF NORTHERN VIRGINIA (GEN ROBERT E. LEE)
Chief of Artillery (BG William N. Pendleton)

FIRST CORPS (LTG James Longstreet)**

McLaw's Division (MG L. McLaws)
Artillery (COL H. C. Cabell)
Carlton's (GA) Btry (Troup Arty)
Fraser's (GA) Btry
McCarthy's (VA) Btry(1st Howitzers)
Manly's (NC) Btry

Anderson's Division (MG R. Anderson)
Artillery (LTC J. Garnett)
Grandy's (VA) Btry
Lew's (VA) Btry
Maurin's (LA) Btry
Moore's (VA) Btry

Artillery Reserve

Alexander's Bn (COL E. P. ALexander)
Eubank's (VA) Btry
Jordan's (VA) Btry
Moody's (LA)Btry
Parker's (VA) Btry
Rhett's (SC)Btry
Woolfolk's (VA) Btry

Washington (LA) Arty (COL Walton)
Eshleman's 4th Company
Miller's 3d Company
Richardson's 2d Company
Squire's 1st Company

SECOND CORPS (LTG Thomas Jackson)
(MG A. P. Hill)
(BG R. E. Jones)
(MG J. E. B. Stuart)

Hill's Division (MG A.P. Hill)
(BG Henry Heth)
(BG W. D. Pender)
(BG J. J. Archer)
Artillery (COL R. L. Walker)
Brunson's (SC) Btry
Crenshaw's (VA)Btry
Davidson's (VA) Btry
McGraw's (VA) Btry
Maryе's (VA) Btry

D.H. Hill's Division (BG Rhodes)
(BG Ramseur)
Artillery (LTC T. Carter
Reese's Btry
Carter's (VA) Btry
Fry's (VA) Btry
Page's (VA) Btry

Early's Division (MG Jubla Early)
Artillery (LTC R. Andrews)
Brown's (MD) Btry (Chesapeake Arty)
Carpenter's (VA) Btry
Dement's (MD) Btry
Raine's (VA) Btry

Trimble's Division (BG R. Colston)
Artillery (LTC H. Jones)
Carrington's (VA) Btry
GArber's (VA) Btry
Latimer's (VA) Btry
Thompson's Btry

Artillery Reserve (COL S. Crutchfield)

Brown's Bn (COL J. Brown)
Brooke's (VA) Btry
Dance's (VA) Btry
Graham's (VA) Btry
Hupp's (VA) Btry
Smith's Btry
Watson's Btry

McIntosh's Bn (MAJ D. McIntosh)
Hurt's (AL) Btry
Johnson's (VA) Btry
Lusk's (VA) Btry
Wooding's (VA) Btry

RESERVE ARTILLERY (BG William N. Pendleton)

Sumter (GA) Bn (LTC A. S. Cutts)
- Patterson's Btry (A)
- Ross' Btry (B)
- Wingfield's Btry (C)

Nelson's Bn (LTC W. Nelson)
- Kirkpatrick's (VA) Btry
- Massie's (VA) Btry
- Milledge's (GA) Btry

CAVALRY (MG J. E. B. Stuart)

Horse Artillery (MAJ R. F. Beckham)
- Lynchberg Beaugards
- Stuart Horse Artillery
- Virginia Btry
- Washington's (SC) Artillery

** LTG Longstreet, with Hood's and Pickett's division, and Dearing's and Henry's artillery battalions, was in southeastern Virginia.

APPENDIX F

ARTILLERY FORCES
BATTLE OF GETTYSBURG
(1-4 JULY 1863)

ARMY OF THE POTOMAC (MG GEORGE G. MEADE)
Chief of Artillery (BG Hnery J. Hunt)

FIRST ARMY CORPS (MG Abner Doubleday)
(MG John Newton)

Artillery Brigade (COL Charles S. Wainwright)
- Btry B, Maine Light
- Btry E, Maine Light
- Btry L, 1st New York Light (Btry E, 1st New York Light attached)
- Btry B, 1st Pennsylvania Light
- Btry B, 4th U. S. Artillery

SECOND ARMY CORPS (MG Winfield S. Hancock)
(BG John Gibbon)

Artillery Brigade (CPT John Hazard)
- Btry B, 1st New York Light (14th New York Battery attached)
- Btrys A & D, 1st Rhode Island Light
- Btry I, 1st U. S. Artillery
- Btry A, 4th U. S. Artillery

THIRD ARMY CORPS (MG Daniel Sickles)
(MG David Birney)

Artillery Brigade (CPT Georpe Randolph)
(CPT A. Jackson Clark)
- 2d Btry, New Jersey Light
- Btry D, 1st New York Light
- 4th Btry, New York Light
- Btry E, 1st Rnode Island Light
- Btry K, 4th U. S. Artillery

FIFTH ARMY CORPS (MG George Sykes)

Artillery Brigade (CPT Augustus Martin)
- Btry C, Massachusetts Light
- Btry C, 1st New York Light
- Btry L, 1st Ohio Light
- Btrys D & I, 5th U. S. Artillery

SIXTH ARMY CORPS (MG John Segwick)

Artillery Brigade (COL Charles Thompkins)
- Btry A, Massachusetts Light
- 1st & 3d Btrys, New York Light
- Btrys C & G, 1st Rhode Island Light
- Btrys D & G, 2d U. S. Artillery
- Btry F, 5th U. S. Artillery

ELEVENTH ARMY CORPS (MG Oliver O. Howard)

Artillery Brigade (MAJ Thomas W. Osborn)
- Btry I, 1st New York Light
- 13th Btry, New York Light
- Btrys I & K, 1st Ohio Light
- Btry G, 4th U. S. Artillery

TWELFTH ARMY CORPS (MG Henry W. Slocum)
(BG Alpheus S. Williams)

Artillery Brigade (LT Edward D. Muhlenberg)
- Btry M, 1st New York Light
- Btry E, Pennsylvania Light
- Btry F, 4th U. S. Artillery
- Btry K, 5th U. S. Artillery

CAVALRY CORPS (MG Alfred Pleasonton)
Horse Artillery

1st Brigade (CPT Dunbar Ransom)
- 9th Michigan Battery
- 6th New York Battery
- Btrys B, L, & M, 2d U.S. Arty
- Btry E, 4th U.S. Artillery

2d Brigade (CPT John Tidball)
- Btrys E, G, 1st U.S. Artillery
- Btry K, 1st U.S. Artillery
- Btry A, 2d U.S. Artillery
- Btry C, 2d U.S. Artillery

ARTILLERY RESERVE (BG Robert O. Tyler)
(CPT James M. Robertson)

1st Regular Bde (CPT D. Ransom)
- Btry H, 1st U.S. Artillery
- Btrys F & K, 3d U.S. Artillery
- Btry C, 4th U.S. Artillery
- Btry C, 5th U.S. Artillery

1st Vol Bde (LTC F. McGilvery)
- Btry E, Massachusetts Light
- 9th Btry, Massachusetts Light
- 15th Btry, New York Light
- Btrys C & F, Pennsylvania Light

2d Vol Bde (CPT E. Taft)
- Btrys B&M, 1st Connecticut Light
- 2d Btry, Connecticut Light
- 5th Btry, New York Light

3d Vol Bde (CPT J. Huntington)
- 1st Btry, New Hampshire Light
- Btry H, 1st Ohio Light
- Btrys F & G, 1st Pennsylvania Light
- Btry C, West Virginia Light

4th Vol Bde (CPT Robert Fitzhugh)
- Btry F, Maine Light
- Btry A, Maryland Light
- 1st Btry, New Jersey Light
- Btrys G & K, 1st New York Light

ARMY OF NORTHERN VIRGINIA (GEN ROBERT E. LEE)
Chief of Artillery (BG William N. Pendleton)

FIRST ARMY CORPS (LTG James Longstreet)

McLaw's Division (MG L. McLaws)
Artillery (COL H. C. Cabell)
- Btry A, 1st North Carolina Arty
- 1st Richmond Howitzers
- Troup (GA) Artillery

Hood's Division (MG John B. Hood)
(BG E. M. Law)
Artillery (MAJ M. W. Henry)
- Branch (NC) Artillery
- German (SC) Artillery
- Palmetto (SC) Light Artillery
- Rowan (NC) Artillery

Pickett's Division (MG G. Pickett)
Artillery (MAJ J. Dearing)
- Fauquier (VA) Artillery
- Hampden (VA) Artillery
- Richmond Fayette Artillery
- Virginia Btry (CPT Blount)

First Corps Artillery Reserve (COL J. B. Walton)

Alexander's Bn (COL E. P. Alexander)
- Ashland (VA) Artillery
- Bedford (VA) Artillery
- Brook's (SC) Artillery
- Madison (LA) Light Artillery
- Virginia Btry (CPT Parker)
- Virginia Btry (CPT Taylor)

Washington Arty (MAJ Eschleman)
- First Company
- Second Company
- Third Company
- Fourth Company

SECOND ARMY CORPS (LTG Richard Ewell)

Early's Division (MG Jubal Early)
Artillery (LTC H. P. Jones)
- Charlottesville (VA) Artillery
- Courtney (VA) Artillery
- Louisiana Guard Artillery
- Staunton (VA) Artillery

Rodes' Division (MG R. E. Jones)
Artillery (LTC Thomas Carter)
- Jeff Davis (AL) Artillery
- King William (VA) Artillery
- Morris (VA) Artillery
- Orange (VA) Artillery

Johnson's Division (MG E. Johnson)
Artillery (MAJ J. Latimer)
(CPT C. I. Raine)
- 1st Maryland Battery
- Alleghany (VA) Artillery
- Chesapeake (MD) Artillery
- Lee (VA) Battery

Second Corps Artillery Reserve (COL J. Thompson Brown)

First VA Artillery (CPT W. Dance)
- 2d Richmond (VA) Howitzers
- 3d Richmond (VA) Howitzers
- Powhatan (VA) Artillery
- Rockbridge (VA) Artillery
- Salem (VA) Artillery

Nelson's Bn (LTC William Nelson)
- Amherst (VA) Artillery
- Fluvanna (VA) Artillery
- Georgia Battery

THIRD ARMY CORPS (LTG A. P. Hill)

Anderson's Division (MG R. Anderson)
Artillery (Sumter Bn) (MAJ Lane)
- Company A
- Company B
- Company C

Pender's Division (MG William Pender)
(BG James Lane)
(MG I. R. Trimble)
Artillery (MAJ William Poague)
- Albemarle (VA) Artillery
- Charlotte (NC) Artillery
- Madison (MS) Light Artillery
- Virginia Battery (CPT Brooke)

Heth's Division (MG Henry Heth)
(BG J. Pettigrew)
Artillery (LTC J. Garnett)
- Donaldsonville (LA) Artillery
- Huger (VA) Artillery
- Lewis (VA) Artillery
- Norfolk Light Arty Blues

Third Corps Artillery Reserve (COL R. Lindsay Walker)

McIntosh's Bn (MAJ D. McIntosh)
- Danville (VA) Artillery
- Hardway (AL) Artillery
- 2d Rockbridge (VA) Artillery
- Virginia Battery (CPT Johnson)

Pegram's Bn (MAJ W. Pegram)
(CPT E. Brunson)
- Crenshaw (VA) Battery
- Fredericksburg (VA) Artillery
- Letcher (VA) Artillery
- Pee Dee (SC) Artillery
- Purcell (VA) Artiliery

CAVALRY (MG J. E. B. Stuart)

Stuart's Horse Arty (MAJ R. Beckham)
- Breathed's (VA) Battery
- Chew's (VA) Battery
- Griffin's (MD) Battery
- Hart's (SC) Bactery
- McGregor's (VA) Battery
- Moorman's (VA) Battery

Imboden's Cmd (BG J. Imboden)
- Virginia Btry (CPT McClanahan)

ENDNOTES

[1] William E. Birkheimer, Historical Sketch of the Organization, Administration, Materiel, and Tactics of the Artillery, United States Army (Washington, D.C.: J. Chapman, 1884), 76. (Hereafter referred to as Historical Sketch)

[2] Henry J. Hunt, "Our Experience in Artillery Administration" Journal of the Military Service Institution 12 (March, 1891): 214.

[3] Boyd L. Dastrup, King of Battle: A Branch History of the U.S. Army's Field Artillery (Ft. Monroe, Va: Office of the Command Historian, 1992), 89.

[4] Instruction for Field Artillery (Philadelphia: J. B. Lippincott & Co.,1861): 2.

[5] Ibid., 2.

[6] Gilham, William. Manual of Instruction for the Volunteers and Militia of the Confederate States (Richmond, Va: West & Johnston, 1862): 27.

[7] Ibid., 43.

[8] Dastrup, King of Battle, 79.

[9] Hunt, "Artillery Administration", 223.

[10] R. M. Johnston, Bull Run: Its Strategy and Tactics (Boston: Houghton Mifflin Co., 1913), 111.

[11] Ibid., 112.

[12] War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies Series 1, Vol 2 (Washington, D.C.: 1880-91), 466. (Hereafter referred to as Official Records).

[13] Ibid., 407.

[14] Johnston, Bull Run, 270.

[15] Official Records, Series 1, Vol 5 (Washington, D.C: 1880-91), 67.

[16] Dastrup, King of Battle, 93.

[17] William E. Birkheimer, Historical Sketch (Washington, D.C: J. Chapman, 1884), 81.

[18] John C. Tidball, "The Artillery Service in the War of the Rebellion, 1861-65." Journal of the Military Service Institution 12 (July 1891): 711.

[19] Ibid., 725.

[20] Ibid., 707.

[21] Jennings Cropper Wise, The Long Arm of Lee (Lynchberg, VA: J. P. Bell Co., 1915; repr., Lincoln, Nebraska: University of Nebraska Press, 1988), 187.

[22] Official Records, Series 1, Vol XI, Part III (Washington, D.C.:1880-91), 612.

[23] Wise, Long Arm of Lee, 200.

[24] The Seven Days' Battle consisted of the battles of Oak Grove (day one), Mechanicsville (day two), Gaines's Mill (day three), Garnett's Farm (day four), Allen's Farm/Savage Station (day five), Glendale (day six), and Malvern Hill (day seven).

[25] Tidball, "Artillery Service in Rebellion", 731.

[26] E. P. Alexander, Military Memoirs of a Confederate (New York: Charles Scribner's Sons, 1907), 157.

[27] Battles and Leaders of the Civil War Vol 2 (Secaucus, New Jersey: Castle, 1887), 394.

[28] Alexander, Military Memoirs, 167.

[29] John C. Tidball, "The Artillery Service in the War of the Rebellion, 1861-65." Journal of the Military Service Institution 12 (September 1891): 955.

[30] Dastrup, King of Battle, 98 .

[31] Wise, Long Arm of Lee, 278.

[32] Ibid., 279.

[33] Dastrup, King of Battle, 98.

[34] Jay Luvaas, U.S. Army War College Guide to the Battle of Gettysburg (New York: Harper & Row Publishers, 1986), xii.

[35] Edward G. Longacre, The Man Behind the Guns (UK: A. S. Barnes & Co., 1977), 119.

[36] Official Records, Series 1, Vol XIX, Part 1, 29-30.

[37] Albert A. Mrozek, "The Battle of Antietam: The Creation of Artillery Hell." Field Artillery (August 1992): 32.

[38] Ibid., 33.

[39] Wise, Long Arm of Lee, 324.

[40] John C. Tidball, "The Artillery Service in the War of the Rebellion, 1861-65." Journal of the Military Service Institution 12 (March, 1891): 964.

[41] Wise, Long Arm of Lee, 301.

[42] Official Records, Series 1, Vol XIX, Part 1, 279.

[43] Hunt says he received a request for a rifled battery, not two batteries as Hancock reports. This might explain Hunt's reluctance at first since it was true that all rifled guns of the artillery reserve were heavily engaged. However, many other guns from other units were idle.

[44] Official Records, Series 1, Vol XIX, Part 1, 211.

[45] Allan Nevins, A Diary of Battle: The Personal Journals of Colonel Charles S. Wainwright, 1861-1865 (New York: Hancourt, Brace & World Inc., 1962), 114, 129.

[46] Wise, Long Arm of Lee, 336.

[47] Official Records, Series 1, Vol XIX, Part II (Washington, D.C.: 1880-91), 629, 632.

[48] Wise, Long Arm of Lee, 372.

[49] Ibid., 372.

[50] John C. Tidball, "The Artillery Service in the War of the Rebellion, 1861-65." Journal of the Military Service Institution 12 (November, 1891): 1215.

[51] Wise, Long Arm of Lee, 385.

[52] Tidball, "Artillery Service in the Rebellion", 1219.

[53] Wise, Long Arm of Lee, 404.

[54] John C. Tidball, "The Artillery Service in the War of the Rebellion. 1861-65." Journal of the Military Service Institution 13 (March 1892): 277.

[55] Lee's directive was published as Special Order No. 106, Army of Northern Virginia, April 16, 1863; Official Records, Series 1, Vol XXV, Part II, p. 651 & 728.

[56] Wise, Long Arm of Lee, 423.

[57] Tidball, "Artillery Service in the Rebellion", 281.

[58] Cullen, Joseph P. The Battle of Chancellorsville (Harrisburg, PA: Historical Times Inc., 1968), 7.

[59] Tidball, "Artillery Service in the Rebellion", 285.

[60] Wise, Long Arm of Lee, 445.

[61] Ibid., 445.

[62] Tidball, "Artillery Service in the Rebellion", 287.

[63] Ibid., 268.

[64] Wise, Long Arm of Lee, 539.

[65] Ibid., 538.

[66] Ibid., 548.

[67] Ibid., 548.

[68] Tidball, "Artillery Service in the Rebellion", 285.

[69] Ibid., 298.

[70] John C. Tidball, "The Artillery Service in the War of the Rebellion, 1861-65." Journal of the Military Service Institution 14 (May 1892), 466.

[71] Wise, Long Arm of Lee, 556.

[72] Official Records, Series 1, Part III, Vol 27, 873,895.

[73] Wise, Long Arm of Lee, 565.

[74] Ibid., 598.

[75] Tidball, "Artillery Service in the Rebellion", 469.

[76] Official Records, Series 1, Vol 27, Part 1, 232.

[77] Tidball, "Artillery Service in the Rebellion", 656.

[78] Ibid., 238.

[79] Wise, Long Arm of Lee, 665.

[80] Official Records, Series I, Vol 27, Part II, 351.

[81] Dastrup, King of Battle, 111.

[82] Longacre, Man Behind the Guns, 159.

[83] Wise, Long Arm of Lee, 611.

[84] Ibid., 615.

[85] Ibid., 627.

[86] Ibid., 632.

[87] Ibid., 634.

[88] Ibid., 660.

[89] Birkheimer, Historical Sketch, 86.

[90] Ibid., 92.

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BIBLIOGRAPHY

Alexander, E. P. Military Memoirs of a Confederate. New York: Charles Scribner's Sons, 1907.

Anderson, Robert. Evolutions of Field Batteries of Artillery. New York: D. Van Nostrand, 1860.

Battles and Leaders of the Civil War. 4 vols. Secaucus, New Jersey: Castle, 1887.

Birkheimer, William E. Historical Sketch of the Organization, Administration, Materiel, and Tactics of the Artillery, United States Army. Washington, D.C.: James Chapman, 1884.

Buell, Augustus. The Cannoneer: Recollections of Service in the Army of the Potomac. Washington, D.C.: The National Tribune, 1890.

Cockrell, Monroe F. Gunner With Stonewall: Reminiscences of William Thomas Poague. Wilmington, North Carolina: Broadfoot Publishing Co., 1987.

Coddington, Edwin B. The Gettysburg Campaign: A Study in Command. New York: Charles Scribner's Sons, 1968.

Cullen, Joseph P. The Battle of Chancellorsville. Harrisburg, PA: Historical Times Inc., 1968.

Dastrup, Boyd L. King of Battle: A Branch History of the U.S. Army's Field Artillery. Ft. Monroe, Virginia: Office of the Command Historian, 1992.

Davis, William C. Battle at Bull Run. Baton Rouge: Louisiana State University Press, 1977.

Dowdey, Clifford. The Wartime Papers of R. L. Lee. Boston: Little, Brown and Company, 1961.

Downey, Fairfax. Cannonade: Great Artillery Actions of History. New York: Doubleday and Company, Inc., 1966.

Freeman, Douglas Southall. Lee's Lieutenants. 3 vols. New York: Charles Scribner's Sons, 1942.

Gilham, William. Manual of Instruction for the Volunteers and Militia of the Confederate States. Richmond: West and Johnston, 1862.

Gallagher, Gary W. Antietam: Essays on the 1862 Maryland Campaign. Kent, Ohio: Kent State University Press, 1989.

_____. Fighting For the Confederacy: The Personal Recollections of General Edward Porter Alexander. Chapel Hill, North Carolina: The University of North Carolina Press, 1989.

Hanson, Joseph M. A Report on the Employment of the Artillery at the Battle of Antietam, MD. Petersburg, VA: U.S. National Park Service, 1940.

Hogg, Ian V. A History of Artillery. London: Hamlyn Publishing Co., 1974.

Heller, Charles E. and William A. Stofft. America's First Battles, 1776-1965. Lawrence, Kansas: University Press of Kansas, 1986.

Instruction for Field Artillery. Philadelphia: J.B. Lippincott & Co., 1861.

Johnson, Curt. Artillery. London: Octopus Books Limited, 1975.

Johnston, R. M. Bull Run: Its Strategy and Tactics. Boston: Houghton Mifflin & Co., 1913.

Longacre, Edward G. The Man Behind the Guns: A Bibliography of Henry Jackson Hunt. South Brunswick, UK: A.S. Barnes & Co., 1977.

Luvaas, Jay. The Military Legacy of the Civil War. Lawrence, Kansas:University Press of Kansas, 1988.

_____. The U. S. Army War College Guide to the Battle of Antietam: The Maryland Campaign of 1862. New York: Harper Collins Publishers, 1987.

_____. The U.S. Army War College Guide to the Battle of Gettysburg. New York: Harper & Row Publishers, 1986.

Manucy, Albert. Artillery Through the Ages. Washington, D.C.: U.S. Park Service, 1985.

McClellan, George B. Report on the Organization and Campaigns of the Army of the Potomac. New York: Sheldon & Co., 1864.

McWhiney, Grady and Perry D. Jamieson. Attack and Die: Civil War Military Tactics and the Southern Heritage. University of Alabama: University of Alabama Press, 1982.

Murfin, James V. The Gleam of Bayonets: The Battle of Antietam and Robert E. Lee's Maryland Campaign, September 1862. Baton Rouge: Louisiana State University Press, 1965.

Naisawald, L. Van Loan. Grape and Cannister: The Story of the Field Artillery of the Army of the Potomac, 1861-1865. New York: Oxford University Press, 1960.

Nesmith, Vardell Edwards. The Quiet Paradigm of Change: The Evolution of the Field Artillery Doctrine of the United States Army, 1861-1905. Doctoral Dissertation, Department of History, Duke University, 1977.

Nevins, Allan. A Diary of Battle: The Personal Journals of Colonel Charles S. Wainwright, 1861-1865. New York: Hancourt, Brace & World, Inc., 1962.

Owen, Wm. Miller. In Camp and Battle With the Washington Artillery of New Orleans. Boston: Tichnor and Co., 1885.

Ripley, Warren. Artillery and Ammunition of the Civil War. New York: Promontory Press, 1970.

Sears, Stephen W. To the Gates of Richmond: The Peninsula Campaign. New York: Tichnor and Fields, 1992.

_____. Landscape Turned Red: The Battle of Antietam. New York: Warner Books, 1985.

Smith, James E. A Famous Battery and Its Campaigns, 1861-64. Washington, D.C.: W. H. Lowdermilk & Co., 1892.

Thomas, Dean S. Cannons. Arendtsville, Pa: Thomas Publications, 1985.

War of the Rebellion: A Compilation of the Records of the Union and Confederate Armies. Washington, D.C.: Government Printing Office, 1880-91.

Ward, Geoffery C. The Civil War: An Illustrated History. New York: Alfred A. Knopf, 1991.

Wise, Jennings Cropper. The Long Arm of Lee. 2 vols. Lincoln, Nebraska: University of Nebraska Press, 1988.

JOURNALS

Austerman, Wayne. "Case Shot and Cannister: Field Artillery in the Civil War." Civil War Illustrated (September 1967): 16-48.

Downey, Fairfax. "Artillery Forward!" Ordnance 45 (September-October 1960): 212-214.

Hazlett, James C. "The Napoleon Gun: Its Origin and Introduction into American Service." Military Collector and Historian (Spring 1963): 1-5.

Greer, Allen J. "The Roaring Guns From the Seven Days to Cold Harbor." Field Artillery Journal 26 (Jan-Feb 1936): 5-26.

Hunt, Henry J. "Our Experience in Artillery Administration." Journal of the Military Service Institution 12 (March 1891): 197-224.

Morelock, Jerry D. "Wait For the Wagon! Combat Service Support for the Civil War Battery." Field Artillery Journal (March-April 1986): 14-19.

Mrozek, Albert A. "The Battle of Antietam: The Creation of Artillery Hell." Field Artillery (August 1992): 30-34.

Tidball, John C. "The Artillery Service in the War of the Rebellion, 1861-65." Journal of the Military Service Institution 12 (July 1891): 697-733.

_____. 12 (September 1891): 952-979.

_____. 12 (November 1891): 1211-1223.

_____. 13 (March 1892): 276-305.

_____. 14 (May 1892): 466-490.

_____. 14 (July 1892): 677-704.

Voltz, Karl W. "Redlegs In Blue and Gray." Field Artillery 46 (Jan-Feb 1978): 34-38.

Weller, Jac. "The Field Artillery of the Civil War, Part I." Military Collector and Historian 5 (June 1953): .

_____. Part II 5 (September 1953): 65-70.

_____. Part III 5 (December 1953): 95-97.

Wise, Jennings C. "The Artillery Mechanics of Gettysburg." Field Artillery Journal 13 (Nov-Dec 1923): 493-497.

Willmarth, Philip R. "Field Artillery, Model 1861." Field Artillery Journal Vol 39 (Sep-Oct 1949): 206-207.

Wilson, Jerre W. "The Guns of Malvern Hill." Field Artillery (February 1989): 28-31.