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United States Tactical Doctrine, 1855 to 1861: The Mismeasure of Technology

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This thesis illuminates the state of United States Army tactical doctrine at the beginning of the Civil War. In 1855, the weapons available to the United States Army left much to be desired in terms of firepower. Their limited range and lack of accuracy meant that they could not be relied upon to render the final decision in battle. The tactical system of 1855, however, blended this firepower with the shock action effect of bayonets and sabres, permitting the capabilities of the weaponry to be maximized on the battlefield while at the same time minimizing the deficiencies.

This harmony between weapons and tactics was not to be long lived. In June 1855, the United States Army adopted the rifled musket which greatly increased the firepower capability of the infantry. However, the effect that this new firepower would have on the conduct of battle was not understood. Military manuals and literature published between 1855 and 1861 failed to adequately prepare the officer corps of 1861 for the carnage this weapon would produce on the battlefields of 1861 to 1865.
TABLE OF CONTENTS

LIST OF FIGURES .............................................. iv

Chapter

1. TACTICS, 1855 .......................................... 1

2. GRAND TACTICS, 1855 ............................... 28

3. THE IMPROVEMENTS OF TECHNOLOGY, 1855-1861 75

4. TACTICS, 1855-1861 ................................. 89

5. GRAND TACTICS, 1855-1861 .......................... 109

6. CONCLUSION ..........................................145

BIBLIOGRAPHY ................................................ 152

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LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The Orders of Battle</td>
<td>46</td>
</tr>
<tr>
<td>2.</td>
<td>Twelve Battalions in Two Deployed Lines</td>
<td>51</td>
</tr>
<tr>
<td>3.</td>
<td>Twelve Battalions in Column by Division in Two Lines</td>
<td>55</td>
</tr>
<tr>
<td>4.</td>
<td>Twelve Battalions in Squares in Two Lines</td>
<td>56</td>
</tr>
<tr>
<td>5.</td>
<td>Twelve Battalions in Mixed Order</td>
<td>60</td>
</tr>
<tr>
<td>6.</td>
<td>Twelve Battalions in Heavy Column</td>
<td>62</td>
</tr>
</tbody>
</table>
CHAPTER 1
TACTICS, 1855

On 10 April 1835, Lewis Cass, Secretary of War under President Andrew Jackson for the majority of that stalwart's time in office, endorsed for publication a manual of tactics written to standardize the manner in which American infantry were to drill and fight. Cass's words of endorsement were both strong and delimiting: "With a view to ensure uniformity throughout the Army, all infantry exercises and manoeuvres not embraced in this system are prohibited, and those herein prescribed will, . . . be strictly observed."¹

The author of this manual was Brigadier General Winfield Scott. Scott had been one of America's top soldiers since the War of 1812 when he trained and led a brigade on the Canadian frontier and contributed significantly to the all too few American victories in that theater. Throughout his career following the War of 1812, Scott maintained a keen, scholarly interest in the art and science of managing armies and controlling men in battle. By 1834 he twice toured Europe, meeting with every noted military personage that he could, while keeping detailed notebooks of what he learned from them as well as from his own

observations. He avidly collected every manual and work on military service amassing a large collection.

In 1815 and 1824, and again in 1826, Scott was appointed to head boards of tactics assembled to review and revise the tactical manuals used by the United States Army and by the state militias. In 1834, largely on his own initiative, he undertook to translate the latest French manual of infantry tactics and to adapt it for the use of United States infantry. His objective was to establish a tactical system for the infantry which would be uniform throughout the Army and the militia. The result of Scott's effort was titled *Infantry Tactics; or, Rules for the Exercise and Manoeuvres of United States' Infantry*. It was proclaimed by Secretary Cass as the official tactical manual for infantry, and remained so without significant revision until 1862.

At the beginning of his manual, Scott offered his readers a definition of tactics taken from *Spirit of the System of Modern War* first published in 1799 by the noted European military theorist Friherr Heinrich Dietrich von Bülow. "Tactics," Bülow had written, "I call, the science of movements which are made in the presence of the enemy, that is, within his view, and within reach of his artillery." In selecting this definition, Scott established that his tactical system, for the most part, was concerned with the movement of troops in battle. More specifically, the true essence of Scott's and every other mid-nineteenth century system of infantry tactics lay in the capability it gave to unit commanders to control the conduct of their body of troops on the battlefield. The state of the military art at that time, the methods of movement and communication in particular, meant that control could only be exercised through a system of personal supervision,
wherein the commander could be both seen and heard by those who were to receive his orders. So it was that *Scott's Tactics* was in reality, and of necessity, a system of close order drill by which a commander issued verbally, specific and definite orders to his troops which they in turn were to carry out with precision and uniformity of movement.²

Scott's *Infantry Tactics* was printed in three small volumes, each measuring only four-by-six inches, to make them convenient for officers to carry in the field. The first volume was divided into three sections called titles. Title One consisted of general instructions which included describing the infantry regiment—the basic combat unit—as consisting of ten companies, eight battalion companies, a grenadier company, and a light infantry or rifle company, depending on how this latter company was armed. It also specified the positions of all officers and noncommissioned officers when the regiment formed in line of battle. Though not specified or discussed in the manual, the strength of an infantry company in 1834 was approximately 100 men, officers and noncommissioned officers included. A regiment, then, could number up to 1000 men, if it were recruited and maintained at full strength. Captains commanded the companies, while the regiment was commanded by a colonel, assisted by a lieutenant colonel, a major, and a small staff that included an adjutant and a quartermaster officer.

In Title Two, "The School of the Soldier," Scott designated the stance and movements of each soldier in a formation and the manner in which the soldier would handle his weapon. This particular set of

procedures and the section that contained them would be known as the manual of arms. Because in formation the soldiers would be elbow to elbow with the ranks only 13 inches apart, the author admonished instructors of his drill to continually take great care to rectify the position of each soldier so that he would never occupy too much space in his rank.3

Also in "The School of the Soldier" were the procedures for loading and firing the soldier's musket. The manual divided the loading process into 12 steps. For the new recruit these were to be carried out at the order of separate commands with the same precision and measured cadence expected in other movements. As the soldier became more experienced, the number of commands was reduced to four with each soldier performing the intervening steps at an individual but rapid pace. When the soldier mastered loading the musket, the manual allowed for accomplishing the procedure with but one command. In this final phase of instruction which mimicked the desired behavior of battle, Scott stipulated that the soldier should "load with the greatest possible promptitude, each without regulating himself by his neighbor, and above all without waiting for him."4

Firing the musket was hardly less simple and no less carefully controlled than its loading. On command, the soldier readied the weapon by bringing it from the left shoulder to hold it diagonally across the front of his body as he pulled back the hammer with the right thumb to the full cock position. In taking aim--the next command--the soldier

3Scott, 1:39.
was to "shut the left eye, direct the right along the barrel, drop the head upon the butt to catch the object, and place the fore-finger on the trigger."\textsuperscript{5} Officers controlled the direction of fire by specifying the aim to be directly to the front or at an angle to the right or left. On the command to fire, the soldier pulled the trigger and immediately brought the weapon to the ready position in preparation for executing the next command.

Lastly in "The School of the Soldier," the basic rules for marching were laid down. The length of the step was to be exactly 28 inches. For training, the pace would be "common time," a rate of 90 steps per minute. Experienced soldiers would march at "quick time," 110 steps per minute. The direction of march could be changed in three ways. A march to the oblique caused the soldiers to step off at a 45 degree angle to the right or left while still facing forward. Marching "by the flank" required the soldiers to face to the right or left and move off in the new direction. Wheeling caused a rank of soldiers to change direction by pivoting on the soldier on the right or left end of the rank.

The final title of Volume I provided the methods for controlling the company. In the six subdivisions of "The School of the Company," called "lessons," the company commander was told how to conduct the manual of arms, control the loading and firing sequence in his unit, maneuver the company in line of battle, move it--still in line of battle--by either flank, form and march the company in column, and change the configuration of the column in order to pass obstacles. Once

\textsuperscript{5}Ibid., 1:64.
an officer mastered this complex drill, he would be able to smoothly adjust the position of his company to meet any battlefield situation provided, of course, that his soldiers were well practiced and could respond to the commands with the proper movement and required precision.

In Volume II of the tactics, Scott addressed control of the battalion, the next larger tactical unit above the company. In 1834, the battalion was not an organization of standard size, but any grouping of two or more companies exercised or maneuvered as a unit. A full regiment of ten companies controlled as a unit by the regimental commander was called a battalion as were two, three, or more companies detached from the regiment but exercised under the command of one officer. Thus, Volume II of the tactics, titled, in part, "The School of the Battalion," provided direction for any officer responsible for two or more companies operating in the field together. "The School of the Battalion" followed approximately the form of "The School of the Company." In five parts it told commanders of battalions how to conduct the manual of arms and control battalion firings, pass from line of battle into column, march in column, pass from column into line of battle, and maneuver in line of battle. Like "The School of the Company," "The School of the Battalion" provided a complete system of control. An officer who was the master of this drill would have little trouble moving his battalion in the field.

As a supplement to "The School of the Battalion," Scott included in Volume II "Instruction for Light Infantry and Rifle, or Skirmishers." Although he had specified previously that each regiment would have one company of light infantry or rifles, he did not limit the drill in this section to that company alone. "By the general term skirmishers, will
herein be understood any company or body of infantry, whether denominated grenadiers, light infantry, rifle, or battalion companies, thrown out and actually deployed into open files or loose order." The purpose of having skirmishers was "to clear the way for, and to cover the movements of the main corps." Because skirmishers operated in extended order, the standard company and battalion drill would not suffice for their control. Controlling a body of skirmishers required a drill that considered intervals between files governed by the extent of the ground to be covered, provided for using terrain as cover when possible, and allowed the two soldiers in each file to arrange the timing of their fire so that one of them would always be loaded. Scott felt that it was necessary that skirmishers always be backed up by a reserve force, so instructions for selecting, positioning, and controlling a reserve, as well as a system for reforming skirmishers in line of battle, was included.®

In the final volume, Scott turned his attention to control of the largest infantry units on the mid-nineteenth century field of battle: the brigade, the division, and the corps d' armee. The brigade was to be composed of two battalions, the division of two brigades, and the corps d' armee of two divisions. Titled "Evolutions of the Line," Volume III paralleled in organization and content "The School of the Battalion." Scott reasoned that control of several battalions was not essentially different from the control of one, and that since the principles of control were already set down in "The School of the Battalion," it remained only "to apply those principles to a line of

®Ibid., 2:187-88.
many battalions." The system of control at the brigade and division level as envisioned by Scott was as follows:

When the general shall wish to cause a movement to be executed, he will give the general commands relative thereto. Each colonel [commander of a battalion] will always successively repeat, with the greatest rapidity, . . . those general commands, unless the general has given, or sent to him, an order to the contrary.

The colonels having repeated the general commands, . . . will immediately command, and cause to be executed, without waiting for each other, the preparatory movements which, in their battalions, ought to precede the execution of the general movement.

The brigadier and major generals will look to the prompt execution of these preparatory movements in their brigades and divisions, and rectify any error that may be committed by the colonels.

The final command, or that which determines the execution of the general movement, will always be given by the general.

With Volume III, the principle of tactical control through close order drill was extended to every infantry unit. In theory, to control his army on the battlefield, a general simply had to know the proper commands as did a captain to control a company or a colonel to control a battalion. The drill was a system of tactics, because the drill facilitated, as Bülow had specified, the execution of movements in the presence of the enemy.

While Scott's manual was a landmark in the history of American military development, it was an adaptive and innovative work rather than one of originality and invention. It was based on a recent French tactical manual that incorporated the latest in tactical thought and which was adapted by Scott to the particular organization of United

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7Ibid., 3:8.

8Ibid., 3:9-10.
States infantry. It provided a system of tactics that Scott felt was the best, considering the needs of the men who would use it. Like all infantry tactical systems of the mid-nineteenth Century, Scott's system was one of close order drill because drill was the only method through which infantry units could be employed effectively on the battlefield.

Two particulars of nineteenth century warfare account for this singular characteristic. The first was the ability of commanders to communicate orders to their subordinates on the battlefield, especially at the regimental and company levels. In an age when wire and radio communications did not exist, all control of units had to be exercised through verbal commands that could be heard by the officers and soldiers who would carry them out. Although regimental and company commanders had officers, drummers, and buglers to assist them in relaying orders to their subordinates, the area over which commanders at these levels exercised effective tactical control was limited to the area they could observe and over which they could be heard. Necessarily, all of the soldiers in these units had to be formed up and capable of operating effectively within this limited area. Such a feat could only be accomplished with a tactical system that allowed for the close concentration and operation of large numbers of soldiers and the communication of orders and directions to those soldiers which would be clearly and instantly understood. In consequence, extending and maintaining control over a regiment or company meant having the

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organization and discipline that only a uniform system of tactical close order drill could provide.¹⁰

The second particular was the need to develop and apply the combat power of the infantry. Effective application of combat power meant effective use of the weapons carried by the soldiers. When Scott was writing his infantry tactics in 1834, the weapons of the infantry were the bayonet and the smoothbore flintlock musket. The bayonet was the more traditional weapon, a direct descendant of the pikes that main line infantrymen carried in the days when firearms were little more than a novelty.¹¹ It was a weapon of shock action. In order to use it, the soldier had to be brought into physical contact with the enemy. Necessarily, the bayonet would be least effective if the soldiers fought individually, with commanders trusting that the individual soldier's skill, fitness, and fortitude was at that point superior to that of the enemy's soldiers. Battle, in such a case, would be reduced to a mere gladitorial contest of the best champions put up by each side. However, if an entire unit with bayonets leveled and dressed could be brought in close formation against an enemy force, then the bayonet was a weapon of great power and terror, effective against even well trained opposing troops.

The musket was the soldiers' firearm, but, because of the state of firearms technology at that time, it too was little more than a shock action weapon requiring close proximity to the opposing force in order


to be used with effect. The characteristics of the musket that recommended its use by the infantry were two: it could be loaded and fired rapidly—up to three rounds a minute—and it could be fired again and again without extensive cleaning. To load the musket, the soldier took from his cartridge box a cartridge, which was a paper tube, sealed at both ends, containing the powder charge and the projectile that the musket would fire, a lead ball. The soldier tore open one end of the paper cartridge with his teeth and used a small portion of the gun powder from it to prime the lock of the musket. The remaining powder was dumped down the barrel of the musket followed by insertion of the ball into the barrel. The ball was then rammed down the barrel to the breech through the use of a ramrod which the soldier drew from a channel in the stock of the musket under the barrel. After replacing the ramrod, all that remained was for the soldier to draw the hammer to the full cocked position, aim, and fire. This capability to load the musket rapidly, and to be able to continue doing so even after repeated firings, resulted from the fact that the musket ball was considerably smaller in diameter than the bore of the barrel. Therefore, it was easily pushed into the barrel and seated at the breech through the use of the ramrod, even after the barrel became fouled from repeated firings. Because of fouling buildup in the barrel after firing, a tight fitting projectile could not have been loaded even after just one shot without stopping to clean the barrel.

But, even though the musket, because of its capability to produce a rapid and sustained fire, was the best firearm of the day for the infantry, it had two major disadvantages which greatly limited its effectiveness in battle: the musket had a very limited range and was
highly inaccurate. Just as with the weapon's positive capabilities, the undersized projectile was responsible for the deficiencies. In firing the musket, what actually propelled the ball down the barrel was a rush of hot gas produced by the burning of the gun powder. Because the ball did not tightly fit the barrel, much of this gas would escape around the ball and proceed it down the barrel without having a propelling effect upon the ball. This limited the speed that the ball achieved while traveling down the barrel—muzzle velocity—and thus the distance it was capable of traveling once it left the barrel. Another problem with the undersized ball was that it would bounce from side to side and top to bottom as it moved down the barrel. So, like a billiard ball rebounding from the rail, the projectile's direction on leaving the barrel was determined by which face of the barrel it glanced off last. This made the musket so inaccurate that, on the average, a soldier armed with this weapon could not repeatedly hit a target the size of a man at a distance of only 100 yards. Because of its inherent inaccuracy, the musket had no need of a rear sight and only a single blade front sight was provided for the soldier to use in aiming.

Tactical systems based on close order drill facilitated the use of both the bayonet and the musket because their effective and efficient employment required concentrating the largest number of soldiers into the smallest linear distance. In using the bayonet closely packed ranks could apply the awful power of a disciplined, controlled phalanx of leveled and dressed bayonets against the enemy line at the point of decision. Correspondingly, the ability to control and to concentrate the fire of the soldiers' muskets would enhance that weapon's effectiveness. Because of the musket's lack of accuracy, individual
fire by dispersed soldiers would have only limited effect. But, if the soldiers were compressed as much as possible in their ranks, and release of their fire was controlled and directed toward targets designated by the officers, the effect of the fire would be exponentially increased. And not only would effectiveness be increased, but the range to which that effectiveness could be projected would be increased also. Soldiers firing together could be effective against enemy formations at up to 200 yards, whereas soldiers firing individually were usually not effective beyond 100 yards. For soldiers to load, fire, and otherwise handle their weapons in tightly packed ranks, and to move those ranks to and on the battlefield with speed and agility, dictated a need for uniform and precision movements on the part of each individual; in other words, soldiers well practiced in a system of tactical close order drill.

The particular requirements for communicating and for using the bayonet and the musket effectively determined other important characteristics of infantry tactical systems of the 1850s. Chief among these were the basic formations to be used by the infantry unit. In Scott's *Infantry Tactics*, as in all other infantry tactical systems of that time, there were two basic formations: the line of battle and the column. The line of battle consisted of either two or three ranks only 13 inches apart with an equal number of soldiers in each, all facing in the same direction. The most basic subdivision of the line of battle was the file, a cross section of the line made up of one soldier from each rank. The major advantage of the line of battle was that in this formation all of the soldiers could fire their muskets or use their
bayonets to the front. The flanks, though, were a problem as only a very limited number of soldiers could use their weapons to cover the area perpendicular to the right or left of the line. Scott took this into account when he specified that when formed in line of battle there would be no break between companies, and battalions would be separated by only 22 paces.12

In the line of battle no special controls were required for the soldiers to use their bayonets. The musket and bayonet combination was of sufficient length that even the men in the rear ranks could present their bayonets to the front of the formation through the right side of their file. Controlling the fire of the line of battle required specification. For the company, Scott stipulated two methods of firing: fire by company, and fire by file. In the fire by company, all of the soldiers, regardless of the rank they stood in, were to fire together on command. In the military lexicon of the day, this was known as volley fire. Once the soldiers had fired, they remained in the firing position until the next order was given. 13

In fire by file, or fire by two ranks as it was also called, the firing commenced on command on the right of the line with the front two men of each file firing together. Once they had fired, the front two men of the next file to the left would fire, and so it would continue down the line. The effect was to create a running fire along the entire length of the company line of battle. Unlike the fire by company, in the fire by file the soldiers were not required to await orders to

12Scott, Infantry Tactics, 1:7.

13Ibid., 1:117.
reload. Once each had fired he was to "reload and fire without regulating himself by others." This insured a continuous fire from the company because by the time the last file fired, the men in the first file would be loaded and in the process of firing again. To maintain this tempo and distribution of fire, the men in the third rank, if there were such, did not fire. Rather they waited until the middle rank fired and then passed their loaded muskets forward for the middle rank men to fire, accepting the fired muskets of the middle rank men to be reloaded.

At the battalion level the commander had additional options in controlling the fire of his unit, if only because of the number of sub-units into which the battalion could be divided. He could conduct a battalion volley, wherein all the companies and all the soldiers in those companies fired together, or he could volley fire by wing, a wing being the right or left half of the battalion. He could direct the battalion to fire by company, in which case the company commanders conducted volley fire in their companies, but alternated their volleys with the other company in their division--each two companies, as counted from the right, forming a division. Lastly, he could direct the battalion to fire by file, and that procedure would be carried out in each of the companies individually.

The commander of a line of battle composed of many battalions controlled the fire of that line by directing the battalion commanders concerning the method of their fire. If the firing was to be by battalion volley, the odd battalions (as counted from the right of the

14Ibid., 1:118.
line) would fire first, the even battalions withholding their fire until
the soldiers in the odd battalion to the right were almost reloaded.
However, an order to fire by wing, by company, or by file was to be
executed by the battalions individually without regard for the progress
or sequence of fire in any other battalion.

The line of battle was not necessarily a static formation. It
could be maneuvered either directly or obliquely to the front or the
rear, and there were a number of methods for executing a "change of
front." Changing front meant turning the entire line, or a portion of
it, some degree and distance to the right or left of its original
position. If only a company were involved, changing front was most
often a simple procedure of wheeling, but the process increased very
much in difficulty and complexity at the battalion and higher levels.

The second basic formation, the column, was used to move a unit
from one place to another as rapidly and efficiently as possible while
maintaining the maximum level of control and order within the unit. The
basic characteristic of the column formation was its depth of many ranks
of soldiers. Its disadvantages were two: its dimensions usually made it
an excellent target for artillery; and, while in column, few soldiers
could use their weapons to good effect.

Unlike the line of battle, the column formation had many
variations. At the company level the simplest column was formed by
having the soldiers, while in line, face "by the flank" to the right or
the left. This resulted in a column with a front of either two or three
soldiers depending on whether the original line of battle had been of
two or three ranks. The standard column of maneuver for the company,
though, was the column by platoon, platoons being formed by dividing the
company in half at the center. The methods of forming a column by platoon consisted of forming the company in line of battle and then having the platoons "wheel" to the right or left, or having the right platoon move forward with the left platoon marching obliquely into position behind it. Scott cautioned strongly that in this formation the rear platoon was always to maintain a distance from the front platoon equal to the length of the platoon front so that the line of battle could be instantly reformed to the right or left through the process of wheeling. For a march "in route," the company commander could reduce the front of this column by forming a column by section—half platoons—using the same methods as had been used to form the column by platoon. Never though was the front of a column by section to be fewer than seven men as this would cause an unacceptable lengthening of the column.

Going from the column by platoon or the column by section back to the line of battle required special consideration and procedures. In each, the primary consideration was that the new line of battle should be exactly the same as the original one with each officer, noncommissioned officer, and soldier in the same position as he had been originally. The manual contained enough of these procedures that the company could reform its line of battle quickly to the front, right, or left of the column.

For the battalion, the standard columns of maneuver were the column by company and the column by division. The basic methods of forming these columns were the same as for forming the column by platoon at the company level. However, due to the number of companies involved, the procedures were much more complex and more numerous. One of the key differences was that at the battalion level the columns could be either
open or closed in mass. An open column was one in which the distance between the companies or divisions was sufficient to allow them to wheel to the right or left to reform the line of battle. In a column closed in mass, the distance between the companies or divisions was reduced to only three paces. Reforming the line of battle at the battalion level from either an open or closed column involved very complex procedures. Suffice it to say, however, that Scott carefully worked out these procedures to permit the line of battle to be reformed quickly and precisely in any direction from any column.\textsuperscript{15}

In units of several battalions, the standard columns for maneuver remained the battalion columns. Building on the School of the Battalion, Scott's instructions for a column of many battalions involved moving them into position relative to a base battalion selected by the overall commander. Only in this way could a column of several battalions be formed. All of the battalions in this formation would be in column by company or division, and would maintain a normal distance from each other. The preferred formation when the maneuver required the battalions to be closed in mass was the column by division.\textsuperscript{16}

The procedures for going from column to line of battle, changing front while in line of battle, and going back to column were the heart of every infantry tactical system of the 1850s, Scott's included. The more quickly and efficiently these movements could be accomplished, the more maneuverability and agility the units would have on the

\textsuperscript{15}Ibid., 2:19, 28-29.

\textsuperscript{16}This is evident by the fact that the instructions in Volume III for maneuvering either a column or line of battalions in mass specifies that the battalion be in a column of divisions.
battlefield. Maneuverability and agility, in turn, gave commanders the ability to develop a maximum of combat power at the right time and at the right place, whether it was shock action through the use of the bayonet, or firepower through the use of the musket. Either way, the precise and skillful execution of the movements—the drill—as specified in the infantry tactical manual meant a greater chance of survival and success in battle.17

Infantry, of course, was not the only combat arm of the armies of the 1850s. Two other branches of the service directly participated in the conduct of battle, the cavalry and the field artillery. To the officers of that day, the most important branch after the infantry was the cavalry. In European armies, cavalry was classified as either heavy or light according to its particular armament and corresponding battlefield mission. Counted as heavy cavalry were carabiniers and cuirassiers, so called for the defensive armor that they wore. Light cavalry included hussars and chasseurs. Lancers were a type of cavalry which could be considered either heavy or light depending on the particular mission they were to perform. In the United States the distinction between heavy and light cavalry was not preserved as markedly as it was in Europe. In fact, the United States Army did not even have mounted units between 1815 and 1832. In 1833, Congress began returning regular mounted units to the Army, styling them as dragoons.

17Halleck, 125.
Intended strictly for service on the frontier, these units were decidedly light cavalry to the European way of thinking.\(^{18}\)

As with the infantry, the basic unit of the cavalry was the regiment. While the cavalry regiment was approximately the same size as the infantry regiment, its internal structure was very much different. The cavalry regiment was composed of five squadrons, each of which consisted of two companies, sometimes called troops. Each company could be further subdivided into two platoons. Lieutenants lead the platoons, captains commanded the companies, the senior captains the squadrons in addition to their own companies, and a colonel the regiment. The regimental staff included a lieutenant colonel, three majors, lieutenants as adjutant, quartermaster, and commissary officer, and a surgeon and assistant surgeon.\(^{19}\)

For armament, each cavalry trooper carried a heavy saber, two pistols, and a carbine. The saber was the traditional weapon of the cavalry. It was the shock action weapon of the cavalry in much the same way that the bayonet was the shock action weapon of the infantry, except that a greater level of individual skill was required to engage in combat with the saber than with the bayonet. The firearms of the cavalry were like the infantry musket in that they were single shot, loaded through the muzzle with a paper cartridge, were smoothbored and, thus, were extremely limited in range and accuracy. These


\(^{19}\)Steffen, 126, 177; Halleck, 127.
characteristics were further complicated by the fact that the cavalry trooper was often required to load his firearms while mounted, which was no easy task. To help in the loading process, the ramrods of the weapons were usually attached to the barrel by a chain or swivel, but, even so, the loading process while mounted took much more time, greatly reducing the firepower capability of the cavalry. The pistols were the second most important weapon in mounted close combat, but being single shot, limited in range, and impossible to reload during mounted combat, they were considered only as an adjunct to the saber. The carbine, the effective range of which was less than the musket because of its shorter barrel, was used primarily for mounted and dismounted skirmishing. The trooper's horse could also be considered a weapon of shock action, for, if the circumstances were right, the trooper could ride down his enemy. 

During the conduct of a campaign, the role of the cavalry, particularly the light cavalry, was to screen and protect the movements of the army, front, flank, and rear, and to conduct reconnaissance of the enemy. The cavalry was literally the eyes and ears of the commander. In this capacity, the cavalry relied on its speed and mobility, and on its limited firepower when skirmishing with enemy forces. In battle, however, although the individual trooper carried three firearms, the value of the cavalry lay entirely in the shock action it was capable of producing through a massed, mounted charge with the saber or lance as the principal weapon. As with the infantry in battle, the cavalry was required to act in mass to be effective, because the cavalry trooper had little more capability for individual action with his weapons than the individual infantryman had with his. Like the infantry, cavalry on the battlefield was maneuvered and would charge in
either a close order line or column formation. The cavalry formation in line was of two ranks while the columns were generally formed by platoon or by squadron. Control of cavalry on the battlefield, the ability to maneuver and to apply its shock action combat power, was essentially the same as with the infantry, a matter of drill. Like Scott's Infantry Tactics, the basic tactical manual of the cavalry, the Cavalry Tactics of 1841 by a board of officers, was a translation and adaptation of the system of tactics used by the French. This manual was in three volumes: Volume 1, School of the Trooper, of the Platoon, and of the Squadron, Dismounted; Volume 2, School of the Trooper, of the Platoon, and of the Squadron, Mounted; and Volume 3, Evolutions of a Regiment.

Field artillery, like cavalry, was divided into classes of heavy and light. The distinction was contingent on the size of the guns as described by their weight and caliber, and the weight of their projectiles. Generally, light artillery included the guns that fired projectiles with a weight of six pounds and the heavy artillery the guns that fired 12 pound projectiles. However, by the mid-1850s, due to improvements that made the gun itself lighter and gun carriages and limbers lighter and more efficient, the real distinction in the classification of artillery as either heavy or light was in the mobility of the guns. Those guns that could be maneuvered on the battlefield with great speed and agility were counted as light artillery, while those guns less mobile in character were considered to be heavy artillery.21

20 Steffen, 177.
21 Mahan, 45.
The basic field piece of the artillery was operated by a crew of seven soldiers. It was loaded through the muzzle in much the same way as the infantryman's musket was loaded, with the powder charge and projectile being rammed to the breech. Also like the musket, the field piece was a direct fire weapon, aimed by the gunner through the use of a front sight permanently affixed to the muzzle of the gun, and a detachable rear sight which was set in place by the gunner for aiming and removed before the gun was fired. The gun was fired through the use of a friction primer that was set in a vent at the breech of the gun leading to the main powder charge. The gun had no recoil mechanism so it had to be repositioned and reaimed after each firing. A well drilled gun crew working rapidly was capable, when the situation required, of loading and firing up to four rounds per minute. The normal sustained rate of fire, though, was two rounds per minute.

Following the convention of the other two arms of the service, the artillery was formed into regiments of ten batteries each. In reality regiments of artillery were rarely, if ever, seen on the battlefield or in garrison because the basic combat unit of the artillery was the battery. A battery was commanded by a captain and had six guns and the men and equipment necessary to operate and support those guns in the field, including a limber and caisson team for each gun.\(^{22}\) Generally, individual batteries were assigned in direct support of infantry and cavalry brigades and divisions. The organization of several batteries into an artillery battalion was a common practice, if the field army was large enough to include several divisions of infantry or cavalry. In

\(^{22}\)War Department, A Board of Officers, *Instruction for Field Artillery, Horse and Foot* (Baltimore: Joseph Robinson, 1845), 73–74.
that case, the artillery battalion would be in addition to the batteries
directly supporting the brigades and divisions, and would be under the
control of the field commander.

Unlike the infantry and cavalry, the combat power of the artillery
lay entirely in its firepower. The standard field pieces used by the
armies of the 1850s were smoothbored and fired three basic types of
ammunition. Solid shot, which was the most accurate round, could be
effective to a maximum range of a little over 1600 yards. It was used
to batter down fortifications and against masses of troops. Shell and
spherical case shot, which were exploding rounds, were less accurate
than solid shot and effective to a range of only about 1500 yards.
These rounds were to be used against troop formations. The exploding
charge in them, however, was very small, so their effect was often more
moral than physical. Another problem with shell and spherical case shot
was fusing. These rounds were exploded through the use of a time fuse
which had to be cut by the gunners based on the expected time of flight
of the projectile to the target. The fuse was ignited by the action of
firing the gun, and, if everything worked as it was supposed to, the
round would explode as it reached the target. If the target were large
enough and stationary, this system could work fairly well, but if the
target were small, particularly in its lateral dimension, or it was
moving, getting the round to explode at exactly the right time was more
than a little difficult. The most effective artillery ammunition, in
terms of its capability to produce casualties, was the canister round.
Canister was nothing more than a tin can filled with shot a little
larger than a musket ball. When the gun was fired the tin container
disintegrated, spreading the shot as if it came from a giant shotgun.
The effective range of canister, however, was limited to just 350 yards.\textsuperscript{23}

As with the infantry and cavalry, drill was also the instrument of control for the artillery. The \textit{Instruction for Field Artillery Horse and Foot} of 1845 described three basic formations for a battery: the order in line, the order in battery, and the order in column. The order in line placed all six guns side by side while still limbered, either followed or preceded by their caissons. From this formation, the battery was prepared to move forward, to the right or left, or into battery. In battery, the guns were also side by side, only in this case they were unlimbered and prepared to fire. From the order in battery, the guns could be moved forward or in retreat by half battery, three guns moving and three guns remaining in position to cover the movement by their fire. As in the infantry line of battle, there were also a number of procedures for changing the front of the battery to the right or left. The basic column formation had two guns side by side followed by their respective caissons, which were in turn followed by the remaining four guns and their caissons in the same order.\textsuperscript{24}

In the interest of being complete, there was one other type of soldier on the battlefield of the 1850s whose primary mission involved combat; this was the rifleman. Although Scott accepted the rifle company as a substitute for the regimental light infantry company, there were many officers who felt that riflemen did not form a proper part of the infantry, and that they were no more than marginally useful on the


\textsuperscript{24}\textit{Instruction for Field Artillery}, 133-34.
The primary distinction between infantrymen and riflemen was that riflemen were armed with a rifled firearm rather than a musket. As will be seen, the firing characteristics of the rifle, as opposed to those of the musket, made for significant differences in how riflemen were employed on the battlefield.

There were three major differences between the rifle and the musket. First, the rifle had greater range and was far and away more accurate than the musket. With it, even an average marksman was capable of hitting an individual at 300 yards, and an expert could be effective at ranges of up to 500 yards. The second difference was that to properly load the rifle required from one to two minutes. With the rifle, the powder had to be precisely measured, the ball had to be patched so that it would engage the rifling in the bore of the barrel, and then it had to be carefully rammed to seat it properly in the barrel at the breach. All of this was time consuming, but absolutely necessary to ensure the weapon's greater range and accuracy. Lastly, the rifle did not always have the staying power of the musket. As fouling built up with each firing, the tightly patched ball became harder and harder to ram down the barrel. Not only did this increase loading time, but after as few as 25 rounds, the rifleman might have to retire from the field to perform a major cleaning of his weapon to be able to reload it. These last two differences were major disadvantages on the battlefield of the 1850s that made the musket the weapon of choice for the infantry.

Another problem was that the rifleman did not fit conveniently into the scheme of battlefield control. In an age of warfare when

25Scott, Infantry Tactics, 1:7; Mahan, 42; Halleck, 260.
soldiers were effective only as a part of the mass, the rifleman was an individual who had to be exempted in activity in order to be effective. A rifle could not be fired instantly on the order of command as could a musket, if maximum results were to be achieved. A marksman needed a free hand to position himself, acquire his target, take careful aim, and squeeze off his shot only when the target was properly aligned in his sights. The principles of control through drill, therefore, did not adapt themselves well for control of a body of riflemen. Other than the instruction that Scott included in his manual for light infantry and riflemen on skirmish duty, there was no manual directed at the control of riflemen in battle.26

In summary, the rifleman was a soldier who fought through the use of fire. But while his fire was long and accurate, in the 1850s it was yet deficient in volume, protraction, and compliance to the established control measures of the day.

26Halleck, 260; Mahan, 42.
While Scott's *Infantry Tactics* and other tactical manuals laid out the procedures for controlling infantry, cavalry, and artillery in battle, it was left to other scholars and writers on the subject of military art and science to provide instruction as to how wars should be conducted and battles fought.

In the decades after the Napoleonic Wars, the European nations enjoyed a cornucopia of writings concerning the theory and practice of the conduct of war and large scale military operations. The wars of the French Revolution and those of Napoleon had significantly changed the established concepts of strategy and tactics, and now military scholars and professional soldiers sought to identify and set down the new principles and rules for the successful combination of infantry, cavalry, and artillery in the conduct of campaigns and battles. Although every European nation had its eminent military theorist, the majority of these works were written in French or German with only a few being translated into English and published in the United States.

Among those published in America, however, was *Summary of the Art of War* by Antoine-Henri Jomini. First appearing in Europe in 1838, it was the last of more than twenty-five books, essays, and articles on military history and operational theory written by Jomini, and by the mid-1850s was probably the most influential volume in Europe, and the
United States as well, on the subject of strategy and the conduct of battles. The Swiss born Jomini was a keen observer of military operations and interrupter of European military history. He had served as an officer on the staff of Napoleon's General Ney from 1805, and later, on the staff of the Emperor himself. In 1813, Jomini split with Napoleon and joined the Russian army in which he served until his death in 1869, ultimately reaching the rank of general. Jomini's first work on military theory was published in 1803 when he was only twenty-four, but it established him as an authority on military operations, a reputation which continued to flourish as Jomini continued to write. His *Summary of the Art of War*, which recapped his theories on military art and science, was first translated and published in the United States in 1854.

Although not to the extent of the Europeans, a few Americans were also thinking and writing on the subject of war and military operations, drawing their ideas largely from the Europeans and applying them to uniquely American circumstances. Foremost among these American theorists were Dennis Hart Mahan and Henry Wager Halleck. These two men studied carefully the writings of the Europeans, especially the French and Germans, and included their ideas in works on military art, science, and engineering that were directed not only at American military professionals but at the larger body of militia in particular.¹

¹T. Harry Williams, *The History of American Wars from 1745 to 1918* (New York: Alfred A. Knopf, 1981), 195-97. Halleck addressed his work, *Elements of Military Art and Science*, to "volunteers and militia" as a part of its title. Mahan frequently did the same, and often addressed his introduction "To the Officers of Militia" or mentioned the applicability of the work to the militia in his preface.
Dennis Hart Mahan graduated first in the United States Military Academy Class of 1824. His performance while at the Academy was such that immediately after graduation he was made assistant professor of mathematics and engineering. In 1826, he was sent to Europe by the Army to study and report on public works and military institutions. He remained in Europe for four years, some time of which was spent as a student at the French School of Application for Engineers and Artillery, reputed to be one of the finest of its kind in the world. Its faculty included many officers who had served under Napoleon. Returning to the United States, he resumed teaching at the Military Academy where he was appointed a full professor of civil and military engineering in 1832. He continued at the Academy in this capacity until his death in 1871. Mahan was a prolific writer and frequent contributor to periodicals on a variety of subjects. He was best known, however, as the author of numerous text books on military engineering and science.

Henry Wager Halleck was a student of Mahan, who graduated third in the West Point Class of 1839. He taught there as assistant professor of chemistry and engineering even while still a student and for some time after graduation. In 1844, he was sent on a tour of Europe receiving permission to visit and study French fortifications. On returning, his "Report on the Means of National Defense" was published by Congress and formed the basis for a series of twelve lectures given at Lowell Institute of Boston, as well as for his most notable military work, *Elements of Military Art and Science*, first published in 1846. Assigned to California during the war with Mexico, he translated Jomini's *Vie Politique et Militaire de Napoleon* during the seven month voyage around South America. Halleck left the Army in 1854 to pursue a career in law.
and business in California, but returned as a Major General in 1861 to put his considerable organizational talents to work as commander of the Department of Missouri. He was appointed General-in-Chief of the Armies by President Lincoln in 1862, but was relegated to the position of Chief of Staff when Grant became General-in-Chief in 1864. Unfortunately, Halleck is most often remembered for his failings as a wartime leader, rather than for his scholarly contributions to the fields of law and military science.

In the 1850s, the prevailing military theories on the conduct of war and large scale military operations centered on opposing armies engaging in decisive battle: "the actual conflicts of armies contending about great questions of national policy and of strategy," as Jomini defined it. The military experience of the Europeans throughout the seventeenth, eighteenth, and early nineteenth centuries led them to believe that it was the large scale set piece battle fought between the principal armies of the contending nations that would finally decide the outcome in war. Napoleon himself had written, "It is upon the field of battle that the fate of fortresses and empires is decided." The importance of battle then, as the center focus of all military operations, was paramount. Furthermore, it was requisite that the battle be conducted at the right time, in the right place, and under the right conditions. Accordingly, the definition of strategy which Halleck adopted largely from Jomini underscored the importance of decisive battle in that the strategic movements of armies must be directed almost entirely toward that end. "Strategy," Halleck wrote, "is defined to be
the art of directing masses on decisive points, or the hostile movements of armies beyond the range of each other's cannon."2

Once achieved, battle was to be conducted according to an exhaustive set of principles, rules, and procedures collectively known as grand tactics. As defined by Jomini, grand tactics was "the art of posting troops upon the battle-field according to the accidents of the ground, of bringing them into action, and the art of fighting upon the ground." Mahan's definition was similar in that he specifically related grand tactics to the skill and knowledge required by a commander to fight a battle, defining grand tactics simply as "the art of combining, disposing, and handling troops on the field of battle." Because grand tactics was concerned with the overall conduct of battle, specifically the employment of all arms--infantry, cavalry, and artillery--together, it did not deal with the internal control of individual units as tactics and tactical manuals like Scott's did. Both Mahan and Halleck made a clear distinction between grand tactics and what they called minor or elementary tactics. To them, elementary tactics referred to the drill and other instruction of a body of troops which enabled their officers to control them in battle. Grand tactics, on the other hand, was concerned with the larger concept of control of the battlefield, the totality of events during the battle. It was the process of selecting

the field of battle, of combining and positioning the available forces, and of determining how a battle would be fought.³

The system of grand tactics in use during the 1850s was one that sought to combine the basic elements of combat power—shock action and fire—in particular and unique ways to attack or defend a battlefield position. The bedrock of the system of grand tactics was the infantry. The infantry was the most numerous arm of the armies of the 1850s because it was clearly the most powerful. It could be easily maneuvered over most types of terrain and its bayonet and musket could be used in unique combinations of shock action and fire to produce a tremendous amount of combat power. The cavalry was next in importance, its combat power during battle resulting almost entirely from the shock produced by the momentum of its great charging formations. The artillery contributed additional firepower to the battle. The heavy batteries could be massed and positioned to make the best use of their long range fires, while the light and mobile batteries were capable of moving in support of the maneuver of the infantry and cavalry.⁴

Grand tactics recognized three types of battle: the offensive, the defensive, and the unexpected. For the most part, the military theorists of the 1850s saw the offensive and defensive battles as being mutually inclusive; that is, in a single battle one side almost always electing to fight on the offensive while the other side would choose to fight on the defensive. Halleck counseled that it was the "strategic

³Jomini, 69-70; Mahan, 32; Halleck, 114.

⁴Jomini, 290, 304, 315; Dennis Hart Mahan, Lithographic Notes on the Composition of Armies and Strategy (West Point: n.p., n.d.), 1; Mahan, Out-post, 38-40; Halleck, 121, 125, 128-29.
relationships of the contending forces in a campaign" which "determined whether we are to await the enemy, or to seek him out and attack him wherever he may be found." The common essence of the offensive and defensive types of battle lay in the fact that one army would take up a defensive position in which it could receive the attack of the opposing army. The concept of position was of the utmost importance because, as will be seen, it was the focus of the system of grand tactics. The principles and precepts that made up the body of grand tactics were concerned, for the most part, with the establishment of a defensive position and the conduct of an offensive or a defensive battle waged around that position.

If there was a choice, the preferred mode of fighting the decisive battle was on the offensive. Jomini's fundamental principle of war, which involved the continual throwing of the mass of one's force upon the decisive points in the theater of war or on the battlefield, implied the compellingness of the offensive. It was only on the offensive that any decisive results could be achieved. Indeed, Jomini pointed out to his readers that if his fundamental principle of war was correct, "it will be necessary to take the initiative." Jomini went on to mention several times the principal advantage of the offensive as being "that the assailant has a moral advantage over the assailed, and almost always acts more understandingly than the latter, who must be more or less in a state of uncertainty." Halleck agreed, writing that, "As a general rule the attacking force has a moral superiority over the defensive." Both, however, readily admitted that the advantage of fighting the battle on

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5Halleck, 114-16; Jomini, 179, 186; Mahan, Composition of Armies, 10.
The offensive was slight at best, and could frequently be "more than counterbalanced by other conditions." One of those conditions was the requirement that the attacker approach the established position of the defender under disadvantageous conditions "arising from the obstacles to be crossed before reaching the enemy's line."6

The key to victory for the army fighting the offensive battle lay in breaking the defensive position of the enemy by either piercing or turning his line of battle. As Mahan put it, "An enemy may be made to abandon a defensive position, either by driving him from it; or by manoeuvring to turn it, and so force him to fall back to secure his line of communications." The process to accomplish this involved first determining the decisive point of the field, defined by Jomini to be that point "the possession of which, more, than any other, helps to secure the victory, by enabling its holder to make a proper application of the principles of war." Mahan's approach to the subject of decisive points was decidedly more practical. He said, "In planning the attack of a position, attention must, in the first place, be directed to those points in which its main-strength resides, and for this reason termed the key-points." Both Jomini and Halleck believed that the decisive or key-point was "determined by the configuration of the ground, the position of the contending forces, the strategic object of the battle; or, by a combination of these."7 Notwithstanding what or where the decisive point might be, it was hoped that once this key to the defensive position was taken by assault or made untenable by a flanking

6Jomini, 72-73, 186; Halleck, 116.

7 Halleck, 116, 121; Jomini, 186-87; Mahan, Out-post, 70-71.
maneuver, the enemy would have either been used up and broken in the process or would be required to attempt a withdrawal which would present an opportunity for his final destruction.

Although fighting a battle on the defensive was somewhat less attractive to the mid-nineteenth century commander than fighting it on the offensive, it was still recognized that there were times and conditions in war which would render it necessary and even advisable to do so. Jomini counseled that "an army may often find it proper to await the enemy at a favorable point, strong by nature and selected beforehand for the purpose of there fighting a defensive battle." Mahan was even more emphatic in his support of the defensive battle saying that, "When the ground presents natural or artificial obstacles to the enemy's progress, and our troops are well disciplined and steady, it will perhaps be best to select our position, and sustain the enemy's attack."8

But the counsel of the military theorists in favor of the defensive battle was not without qualification. They were quick to point out that, for an army fighting a defensive battle, victory would not result merely by preventing the attacking army from piercing or turning the defensive position. Jomini called attention to the fact that no matter how strong a position or the army defending it might be, a way could always be found to attack it successfully. He said, "A general who stands motionless to receive his enemy, keeping strictly on the defensive, may fight ever so bravely, but he must give way when properly attacked." But Jomini did not stop there. He went on to say

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8Jomini, 180; Mahan, Composition of Armies, 11.
that an army fighting a defensive battle might first profit "by all the advantages of the defensive system, and holding itself ready to take the offensive when occasion offers, ... may hope for the greatest success." This hope, and therefore, the real objective of the defensive battle, was that the strength of the defensive position and the action of the army occupying it would so disrupt and weaken the attacking army during its assault that the defending army could then move forward in an attack of its own. Mahan pointed out that in the course of a normal assault, the enemy would arrive at a "certain point, when, exhausted by his first efforts, he will be unable to repel our attack, which should be vigorously made." In grand tactics, then, the defensive battle was seen as a prelude to the defensive army taking the offensive for itself. It was only in this way that any decisive results could be achieved while on the defensive. In summing up the essentials of fighting the defensive battle, Jomini went so far as to say that "the best thing for an army standing on the defensive is to know how to take the offensive at a proper time, and to take it." 9

The third type of battle, the unexpected battle, was a special case in which the contending armies met abruptly while on the march, neither having a particular position initially. But other than recognizing that battles could occur in this manner, the theorists of grand tactics did not treat the unexpected battle as a separate type. No specific set of rules was developed in grand tactics for fighting the unexpected battle as were developed for fighting the offensive and defensive battles, since after the initial meeting one side would

9Jomini, 183, 185; Mahan, Composition of Armies, 11.
quickly take the offensive because of some chance advantage, while the other side would just as quickly take the defensive. Jomini noted that, "In every battle one party must be the assailant and the other assailed. Every battle is hence offensive for one party and defensive for the other."10

Regardless of whether the decisive battle was to be fought as an offensive or defensive action, the first order of business in grand tactics was the selection of a position. Mahan wrote that the tactical systems that grew out of the French Revolution gave great prominence to topography and that the term position would be applied "to any ground taken up by a body of troops either to make, or to receive an attack." The requirement for selecting a good position on the ground was especially important when the army was to fight the battle on the defensive, for it meant selecting the actual ground on which at least the initial stages of the battle would be fought. The basic requirements of a good position included a limited number of avenues for the enemy's approach, without greatly limiting the possibilities for moving friendly troops forward against the enemy's position; good observation and fields of fire for artillery forward of the position and to its flanks so that the enemy might not approach unseen or unassailed; sufficient room for maneuver of the army out of view of the enemy; flanks well protected by natural or artificial obstacles; and, in case of disaster, avenues of retreat that would aid the army in its escape.

10 Jomini, 179, 186; Halleck, 115.
while not exposing it to destruction. The military theorists realized and readily admitted that it would be a rare case when all of these requirements could be satisfied at one time, so Jomini summed up the rules for selecting a position by saying that it, "should offer as many advantages as possible for the kind of troops forming the principal strength of the army, and, finally, the obstacles presented by its features should be more disadvantageous for the enemy than for the assailed."\(^{11}\)

The next consideration was the plan for the placement of the troops on the position. The prevailing concept of battle was that at the beginning the opposing armies would be arrayed opposite each other in either a line of battle or an order of battle. The line of battle and the order of battle both referred to the specific manner in which the various units of an army were posted on the ground, relative to one another, as determined by the battle plan of the army commander. Both Jomini and Halleck, however, made a point of differentiating between the line of battle and the order of battle by saying that generally the line of battle was the position taken up by an army intending to await the attack of the enemy or when the commander was as yet undetermined as to his specific course of action, while the order of battle was the arrangement of an army made with the intention of conducting a specific maneuver. Thus, in grand tactics the term line of battle usually implied a defensive arrangement of troops, while order of battle implied that the army would be fighting the battle offensively. However, as Jomini pointed out the differentiation of the terms "line of battle" and

\(^{11}\)Mahan, Out-post, 63-65; Jomini, 181-82; Halleck, 115; Mahan, Composition of Armies, 14-15.
"order of battle" was not always so particular, but seemed to him "necessary to keeping up a proper distinction between two things which should by no means be confounded."\(^{12}\)

In both the line of battle and the order of battle three echelons of troops were required; the advanced-guard or line of skirmishers, the main body, and the reserve. The advanced-guard, the first echelon, was posted closest to the enemy and, traditionally, was to be composed of the regimental flank companies, that is the grenadier and the light infantry or rifle companies. The reality of the 1850s, though, was that all infantry companies were trained in the skirmish drill and could be assigned this duty. The mission of the advanced-guard or skirmishers was to hold the enemy in check, preventing the near approach of his skirmishers and, thus, the enemy's close observation of the army's position. Skirmishers could also be posted to fill intervals in the main line and to help in protecting the flanks of a position. According to Mahan, the distance of the advanced guard from the main body would depend upon the nature of the ground. Under normal circumstances the distance would be from 150 to 300 paces, but if the ground was such that the troops of the main body were masked from the enemy's fire, the distance could be reduced to 80 to 100 paces.\(^{13}\)

The second echelon, the main body, was established along the trace of the main position of the army and was, therefore, for all practical purposes synonymous with it. The main body was to consist of "an unbroken line of troops, from which a close and well-sustained fire can

\(^{12}\)Jomini, 179-80; Halleck, 117.

\(^{13}\)Halleck, 259; Mahan, Out-post, 40, 48-49; Jomini, 292.
be brought upon all points by which these can be approached." For the most part, this meant a double line of infantry battalions, with the battalions of the second line positioned so as to cover the normal intervals between the battalions on the front line. Heavy batteries of artillery would support the infantry from positions which would cover the main avenues of enemy approach and strengthen the weak points in the infantry line through fire. Halleck believed that, "The most favorable position for this arm in ordinary ground, is in the intervals between the regiments or brigades of the line, and far enough in advance of this line not to draw upon the other troops the fire of the enemy's artillery." Mahan reiterated Halleck's advice pointing out that "cannon will always attract the fire of cannon to it."14 As a last consideration, the main line was initially to be positioned, as much as possible, out of sight of the enemy so as not to expose the troops unnecessarily to hostile fire.

The reserve, the last echelon, was to be made up of the most reliable troops, for their role in the battle might well determine the difference between victory and defeat. According to Mahan, "The object of the reserve is to supply the want of strength in our line of battle, and this it does by coming to the aid of the troops first brought into action, when they are weakened, exhausted, and in a partial state of disorganization from a murderous struggle." The reserve was to be made up of units from all three of the combat arms. The infantry of the reserve could be formed as a third line, or centrally positioned as a body ready to move rapidly to any part of the main line which might

14Mahan, Out-post, 46, 49-50, 64, 66; Mahan, Composition of Armies, 12, 15; Jomini, 181, 287; Halleck, 115, 294.
become threatened. The cavalry was considered a part of the reserve because it required momentum to fully develop its combat power and was, therefore, unsuitable for holding positions on the main line. The cavalry's proper position in support of the army was in the vicinity of the flanks of the main line to help defend against the enemy's cavalry, although large bodies of cavalry were often positioned in the center for general support. The light batteries of the artillery were also considered part of the reserve, and were positioned behind the main line so that they might move quickly to the support of any threatened point, or to exploit any advantage. As with the advanced guard, the distance from the main body to the reserve could vary according to the terrain and, because the reserve was made up of units from the three combat arms, the distance would also vary according to the type of unit. The cardinal principle in positioning the reserve was its availability when needed. As Mahan put it, "A reserve for the support of a strong position should not be farther off than to arrive in time to succour it; in the contrary case it would be desirable to yield the position without fighting, and fall back on the reserve; otherwise we should expose ourselves to the worst of disasters by being beaten in detail." \(^{15}\)

Once the terrain was chosen and the army positioned, the army commander could properly turn his attention to the conduct of the battle. If his plan were to take the offensive, the enemy's position would be examined to determine the location of those decisive points where his line might be penetrated, or those where an attack would succeed by seizing a key terrain feature necessary to the cohesion of

\(^{15}\text{Mahan, Composition of Armies, 13-14; Halleck, 125-27, 131, 263, 271; Mahan, Out-post, 47, 49-50, 56-57; Jomini, 287, 289, 304.}\)
the enemy's defensive line. In determining what the decisive points of the battlefield were, the commander would consider not only the terrain which constituted the enemy's position, but the relative placement of his troops also. According to the theorists, if the enemy's line of battle was at all extended beyond the norm, the center would necessarily be weak because the troops on the flanks would be too distant from it to contribute their combat power to any fighting there either through their fire or by shock action. On the other hand, if the troops were disposed with the normal intervals between units, the line would be strong along its entire length. In this case, the weak points would most likely be on the flanks because the flanks could only be defended by a portion of the enemy's troops and because once past a flank the enemy's line of communications would usually be exposed. Thus, according to the doctrine of grand tactics, the flanks usually offered a greater possibility for successful assault than the center.\footnote{Jomini, 187; Mahan, Composition of Armies, 6,15-16; Mahan, Outpost, 65, 71.}

Based on his examination of the terrain and the disposition of the enemy's forces, and considering the rationale offered by the theorists, a single point would be selected by the army commander to be the objective of the main attack. A single point of attack was selected because, lacking overwhelmingly superior forces, piercing or turning the enemy's linear position would require the assaulting army to develop superior strength at the decisive point by a massing of assault forces at that point. Otherwise, the battle would be fought equally along the whole of the line leaving to chance the point at which the line might be broken, if at all. Jomini was quick to point out that an attack which
was made in equal strength along the whole of the enemy's line "without having very superior forces, would be entirely in opposition to the rules of the art." But while the main attack was almost always to be directed at this single key-point, it was also always to be combined with secondary attacks or demonstrations upon other points of the enemy's line. This was to prevent the enemy from withdrawing his troops from those parts of the line of battle not under assault to reinforce the point threatened by the main attack. Jomini's formula for the arrangement of the attacking forces was that an army commander should use "a third of his force to keep the enemy in check or watch his movements, while throwing the other two-thirds upon the point the possession of which will insure him the victory."17

With the objective of the main attack determined, the army commander would next decide upon and array his army in the order of battle most suitable to his plan of attack. As defined by Halleck, "An order of battle is the particular disposition given to the troops for a determined manoeuvre on the field of battle." Arranging the army in an order of battle was the method by which the army commander translated into reality the principles of attacking the enemy position at the decisive point with overwhelmingly superior forces, while holding the majority of the enemy's line of battle in place with the remainder of the army. Developing the order of battle meant determining the initial formation of the main body in the movement to the assault, as well as that of the reserve and the advanced guard relative to it. In an era when the control of units in battle was accomplished by word of command

17 Jomini, 186, 199-200; Halleck, 116, 121, 132; Mahan, Out-post, 71; Mahan, Composition of Armies, 6, 14.
or message delivered by a mounted staff officer, it was a matter of necessity that unit commanders understand their mission and the movement of their units in the assault in terms of the unit placement in the army order of battle. Its importance to the conduct of a successful assault could not have been understated by the theorists. Jomini saw selection of the proper order of battle as the means to a successful attack, and went to great lengths to demonstrate that his classifying of all the different possible offensive formations as orders of battle was "neither fanciful nor useless."\(^{18}\)

Both Jomini and Halleck listed twelve standard orders of battle (figure 1), beginning with the simple parallel order and advancing to more complex oblique, concave, and convex orders before concluding with various orders by echelons and column. Mahan opted for a simpler approach to the question of orders of battle by classifying only two: the parallel order and the oblique order. The number of standard orders of battle notwithstanding, the common essence of each, except for the parallel order, was that they provided a formation for the main body to approach the enemy line of battle with units massed in depth at some point, providing a superiority of forces at that point, together with other forces formed relative to them to threaten or demonstrate against the remainder of the enemy's line, holding it in position. The parallel order differed only in that there was no point in the formation where the assaulting forces were massed, and thus no point along the enemy's line of battle where superiority of force would be achieved, the situation which Jomini cautioned against as being "entirely in

\(^{18}\)Halleck, 117; Jomini, 188, 197.
<table>
<thead>
<tr>
<th><strong>THE PARALLEL ORDER</strong></th>
<th><strong>THE PARALLEL ORDER WITH A CROTCHET</strong></th>
<th><strong>THE PARALLEL ORDER REINFORCED UPON ONE WING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THE PARALLEL ORDER</strong></td>
<td><strong>THE OBLIQUE ORDER</strong></td>
<td><strong>THE PERPENDICULAR ORDER ON ONE WING</strong></td>
</tr>
<tr>
<td>REINFORCED UPON THE CENTER</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>THE PERPENDICULAR ORDER</strong></td>
<td><strong>THE CONCAVE ORDER</strong></td>
<td><strong>THE CONVEX ORDER</strong></td>
</tr>
<tr>
<td>ON BOTH WINGS</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>THE ORDER BY ECHELON</strong></td>
<td><strong>THE ORDER BY ECHELON</strong></td>
<td><strong>THE ORDER IN COLUMNS</strong></td>
</tr>
<tr>
<td>ON THE CENTER</td>
<td>ON TWO WINGS</td>
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**ARMY IN ORDER OF BATTLE**

**THE ORDERS OF BATTLE**

**FIGURE 1**
opposition to the rules of the art." Jomini also cautioned "that these
different orders are not to be understood precisely as the geometrical
figures indicate them."\(^{19}\) Rather they were to be taken in the sense of
indicating the approximate line along which the units of the attacking
army would be arranged and maneuvered during the battle.

Although the order of battle was critical to the conduct of a
successful offensive battle, selection of the correct order was not a
panacea which would guarantee a successful attack. Regardless of the
order of battle, when the army was sent forward to the attack, other
factors would have to be attended to by the commander. In particular,
grand tactics and the state of the military art in the 1850s demanded
that infantry, cavalry, and artillery be used in a proper sequence and
combination to develop and apply the combat power which would make for a
successful attack. Mahan taught that, "To concentrate our masses is not
alone sufficient for success; we must also know how to bring them into
action with effect." According to Jomini, the chief difficulty in
arranging and conducting a successful attack was "to cause these
fractions to unite in the execution of the decisive maneuver which, in
accordance with the original plan of the battle, is to result in
victory." Moreover, in the doctrine of grand tactics, the conduct of an
offensive battle with regard to the use of the infantry, cavalry, and
artillery followed a relatively predictable sequence of actions,
although Halleck was quick to point out that, "The order of succession

\(^{19}\)Jomini, 188-96, 200; Halleck, 117-20; Mahan, Composition of
Armies, 11-12.
in which the different arms are engaged in a battle, depends upon the nature of the ground and other accidental circumstances, and cannot be determined by any fixed rules.²⁰

With this in mind, the military theorists stated that the heavy batteries of artillery would most often open the offensive battle. The fire of these batteries was to be concentrated on the intended point of attack "with a view of shattering the enemy's line to such a degree that he will be unable to withstand an attack upon which the fate of the battle is to turn." Some of the fire of the heavy batteries, however, was to be directed toward silencing those artillery batteries of the enemy which might interfere with the advance of the formations of the main attack.²¹

Next, the light infantry or skirmishers were to move forward to prepare the way for the assault forces by engaging the enemy's skirmishers and causing them to fall back onto their own main line. When this was accomplished, the light infantry would continue to move forward taking up positions from whence they could harass the enemy's main line, especially by trying to pick off the gunners of the enemy's artillery batteries.²²

At this point, Mahan believed that the light artillery batteries could be sent rapidly forward, taking up positions within as little as two hundred yards of the enemy's main line, but not so close as to be

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²⁰Mahan, Composition of Armies, 6; Jomini, 196; Halleck, 131.

²¹Jomini, 202, 290, 316-17; Halleck, 128, 131, 290; Mahan, Composition of Armies, 14; Mahan, Out-post, 61-62, 72.

²²Jomini, 292; Halleck, 131, 259; Mahan, Composition of Armies, 14; Mahan, Out-post, 51, 72, 191.
within effective range of the muskets of the enemy's infantry battalions. These batteries would concentrate upon the point of assault with canister in an effort to create a gap in the enemy's line into which the infantry could successfully assault. In this effort, the light batteries had to be closely supported by the light infantry and the main infantry assault columns so as to prevent destruction or capture of the batteries by a quick sortie of the enemy's infantry or cavalry.²³

As soon as a gap or any wavering appeared in the enemy's line, the main attack force would be called to the assault. As was stipulated for a main body, this attack force would be made up of two lines or echelons of infantry battalions, supported by the reserve. These battalions would move forward from the main line closely behind and in support of the light infantry and the light artillery, and, as much as possible, would move forward by covered routes avoiding exposure to the enemy's artillery fire and remaining just far enough behind the light infantry and artillery so as to be out of effective range of the infantry battalions of the enemy's main line. As the assault began, the light infantry would fall back on the battalions of the assault force, taking up positions on the flanks or in the intervals between them. The light artillery also would move to the flanks taking up new positions from where the batteries could continue to support the assault by fire and

from where they would be in position to cover the withdrawal of the infantry should the assault fail.24

One of the major military questions of the 1850s involved the manner in which the final assault should be conducted. Unlike cavalry, which fought by shock action alone, or artillery, which fought by fire alone, the infantry was capable of producing combat power through either fire or shock action, giving commanders a choice as to which should be employed in attempting to drive the enemy from his position. If the infantry assault force came forward in deployed lines, it would be able to best employ the fire of its muskets in the assault. However, if the assault battalions remained in a column formation, then an assault with the bayonet would be most effective. Jomini wrote that "the real question now is, shall the line of battle consist of deployed battalions depending chiefly upon their fire, or of columns of attack, each battalion . . . depending on its force and impetuosity?" In this context, both Jomini and Halleck suggested and discussed four methods of making the final infantry assault: in a shallow order of deployed lines, by battalions in columns by division or squares, in a mixed order of deployed lines and small columns, or in a deep order of heavy columns composed of several battalions.25

An assault made in the shallow order of two deployed lines meant that the battalions of both echelons of the assault force would come forward with their companies on line, each company in the line of battle formation of two or three ranks (figure 2). In this formation, every

24Jomini, 188, 303; Halleck, 132; Mahan, Out-post, 51, 72-73.
TWELVE BATTALIONS IN TWO DEPLOYED LINES

FIGURE 2
soldier of the battalions of the first line would be able to fire his musket at the enemy line of battle when the command was given, thus employing to the maximum the firepower capability of the assault battalions.

Although in the past, the deployed line had been the principal formation in the conduct of battle, the military theorists of the 1850s had serious reservations regarding its use in the assault. To begin with, they did not believe that the battalions could move any distance in a long line of battle without causing confusion. Halleck wrote that "reason and experience have demonstrated that infantry in this thin or light order can move only very slowly; that in attempting rapid movements it breaks and exhibits great and dangerous undulations." Jomini backed him up by discussing the likely results of a movement to the assault made in the shallow order. He wrote, "Suppose the attempt [be] made to bring up twenty or thirty battalions in line, . . . to the assault of a well defended position: it is not very probable they would ever reach the desired point, or, if they did, it would be in about as good order as a flock of sheep."^26

Their second objection to an assault made with battalions in deployed order concerned the ability of the soldiers to fire while on the move. Jomini pointed out that "when a position is to be carried it can be accomplished only by moving upon it, and marching and firing at the same time can be done only by troops as skirmishers, being an impossibility for the principal masses." Jomini posed the question to his readers: "Can an immense deployed line be moved into action while

^26Halleck, 122; Jomini, 292, 298.
firing?" and settled the issue himself by saying, "I think no one will answer affirmatively." The problem, of course, was the meticulous procedure and number of steps required in the loading and firing of the musket. To load and fire in an efficient and timely manner required that the soldier be stationary, and, as Jomini pointed out, the process of assault could only be accomplished by moving forward. But neither did the theorists care to consider allowing the deployed battalions to take up a stationary position before the enemy line of battle and attempt to break it by fire alone. Jomini told his readers that an assault "depending on the superiority of fire alone, until one or the other party takes to its heels" was "a case not likely to happen."27

The last objection of the theorists to an assault in the shallow order was that the formation lacked strength. Halleck and Mahan each pointed out that the principal strength of the infantry of the line was that it acted in masses. But in the line of battle formation, much of the strength of the mass was lost. Consequently, in using the shallow order in the assault of the enemy's position, there was great risk that as the battalions arrived within effective musket range of the enemy's line, their thin line of battle would be vulnerable to a charge by the enemy's infantry in battalion column or by his cavalry.28

The second method of assault, that made with the battalions either in columns by division or squares, was the one overwhelmingly preferred by all of the theorists because these column formations offered the characteristics of solidity, mobility, momentum, and mass which were

27Jomini, 203, 298, 302; Halleck, 124.

28Halleck, 122, 260; Mahan, Out-post, 41; Jomini, 298.
absolutely required if the bayonet was to be used effectively in the assault. In a battalion column by division (figure 3), two line companies, forming a division, would be drawn up side by side, each company in the line of battle formation. The remaining six line companies, forming three more divisions in the same way, would be arranged in column behind the first division with the normal intervals between the divisions, front to rear, reduced to three paces. The resulting battalion column by division, closed in mass, was a compact but easily controlled and highly maneuverable formation offering the solidity, mobility, momentum, and mass which the theorists required for the assault. The other column formation, the battalion square, could be formed in two ways (figure 4): as a true square with two companies on each of the four sides, or in an elongated square with three companies on the front and rear sides and one company each on the outward facing sides. The square was also a compact, controllable and maneuverable formation, but offered a slightly reduced measure of solidity, mobility, momentum, and mass.

Unlike the battalion deployed in line of battle, the battalion in column by division or square could be moved rapidly to the point of the assault without breaking or causing confusion within the mass. Unlike the larger columns, yet to be discussed, these column formations did not present an unacceptably large target for artillery, which in combination with their mobility offered the possibility of successfully crossing a zone of artillery fire that could not otherwise be avoided. These formations also did not preclude the use of fire in the assault.

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29 Jomini, 297; Halleck, 124, 260; Mahan, Composition of Armies, 12; Mahan, Out-post, 41.
ONE COMPANY IN LINE OF BATTLE
(TWO OR THREE RANKS)

TWELVE BATTALIONS IN COLUMN BY DIVISION IN TWO LINES

FIGURE 3
TYPICAL ARRANGEMENT OF REGULAR AND ELONGATED SQUARES

REGULAR SQUARES

ELONGATED SQUARES

ONE COMPANY IN LINE OF BATTLE
(TWO OR THREE RANKS)

TWELVE BATTALIONS IN SQUARES IN TWO LINES

FIGURE 4
The column by division and the true square kept two companies forward which were capable of delivering a volley as they approached the enemy's line of battle, while the elongated square had three companies in the forward position. In considering the firing capability of battalions assaulting in the column or square formation, it should be kept in mind that a battalion would not approach the enemy line of battle individually, but rather as part of a line of battalions in column or square which would have an equal capability of delivering their fire. In addition, the two skirmishing companies of each of the battalions would return at this point to fill the gaps between the battalions and would also be capable of delivering their fire along with the rest of their battalion making a total of either four or five companies capable of firing in each of the assaulting battalions. Jomini counseled, however, that, "While searching after methods of obtaining more fire when necessary, we must not forget that a column of attack is not intended to fire, and that its fire should be reserved until the last; for if it begins to fire while marching, the whole impulsive effect of its forward movement is lost."30

That impulsive effect of forward movement was the principal advantage of the battalion column and square because an assault in these formations was intended to end in a charge with the bayonet against the enemy's line of battle. In the military terminology of the day, a charge meant advancing with the bayonet to drive the enemy from his position. According to Scott in his memoirs, "An actual crossing of bayonets, therefore, is not indispensable to the idea of a charge." The

30Jomini, 294.

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charge itself was not a free-for-all forward rush, but a carefully controlled rapid forward movement of the full battalion acting as one mass and delivering with its collective full force a front of leveled and dressed bayonets upon the now weakened formations of the enemy's main line. The theorists felt that such a charge by a properly formed and directed column of infantry was nearly irresistible. Mahan went so far as to write, "A charge by a column, when the enemy is within 50 paces, will prove effective, if resolutely made." Halleck wrote that the moral effect produced by the charge of an infantry column was such "that they frequently carry positions without ever employing their fire." Jomini cited the example that, "In the later wars in Europe, positions have often been carried by Russian, French, and Prussian columns with their arms at a shoulder and without firing a shot." 31

Of the two formations, the column by division and the square, the theorists were decidedly in favor of the column as the formation of the assault. Mahan instructed his West Point cadets that, "in the attack of the decisive point the formation should be entirely in columns of battalions by divisions, as this formation has more solidity, and can receive a greater impulsion than a displayed line." Jomini was willing to go so far as to say, "These small columns have succeeded wherever I have seen them tried." And Halleck wrote, "That the attack by battalions in columns by division is the best for carrying a position." The battalion square formation was deemed by the theorists to be an acceptable assault formation under certain conditions; for example, if the battle took place on a plain and the enemy was strong in cavalry.

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31 Scott, Memoirs, 132; Mahan, Out-post, 50; Halleck, 124; Jomini, 297.
But Jomini and Halleck ultimately concluded that for the assault the square was not "so good as the column." 32

In outlining the possible methods for the infantry in the final assault, Jomini stated that, "An order of battle would be perfect which united the double advantages of the fire of the arms and the moral effect produced by an onset." So it was that the third method of assault that the theorists considered, a mixed order of the deployed line and the column by division (figure 5), was an attempt at combining both firepower and shock action in the final assault. In this method, the battalions of the first line would come forward in a column formation, deploying into line of battle just before coming into musket range of the enemy's main line. The battalions of the second line would remain in column by division and would closely follow and support the first line as it deployed. As the final assault began, the battalions of the first line would attempt to weaken the enemy line of battle with their fire. When this fire was developed to its fullest, the battalions of the second line would move forward, through the intervals of the first line, to make the final assault with the bayonet. A variation on this concept brought the two assault lines together in formations of three battalions where one deployed battalion was in the center with two other battalions in column by division on its flanks and on line with it, adding the firepower of four companies to the front of each three battalion assaulting formation. The intent was that the battalions in column by division would cease firing and go forward at the proper time to make the bayonet assault. Jomini cautioned, however, that with this

32Mahan, Composition of Armies, 12; Jomini, 296-98; Halleck, 123, 125.
STANDARD METHOD IN TWO LINES

ALTERNATED METHOD WITH ALL BATTALIONS ON LINE

ONE COMPANY IN LINE OF BATTLE (TWO OR THREE RANKS)

TWELVE BATTALIONS IN MIXED ORDER

FIGURE 5
variation, "There may be reason to fear that, these divisions becoming actively engaged in firing, their battalions which are formed in column to be readily launched against the enemy may not be easily disengaged for that purpose."33

Although in the assault, the mixed order seemed to effectively combine the firepower of the deployed line with the imperative shock action of the small column, it was not necessarily more favored by the theorists for the final assault than the order made up entirely of small columns. Jomini commented favorably on this method of assault by saying that although he had only seen it executed in practice, "it seems to me an irresistible combination of the advantages of firing and of the column." Halleck was more reserved in his appraisal of this method saying that it "has sometimes been employed with success" and that it "has many advocates, and in certain situations may be employed with great advantage."34

The final method of assault considered by the theorists was the deep order or heavy column composed of up to twelve battalions. This method had been extensively used for assaults during the later battles of the Napoleonic Wars and was still popular among many military professionals in the 1850s. There were at least two methods of forming this heavy column (figure 6). In the first, the battalions formed a column of battalions with each battalion in the line of battle formation and the distance between the battalions front to rear reduced, resulting in a mass one battalion wide and twelve battalions or up to thirty-six

33Jomini, 201, 295; Halleck, 123.
34Jomini, 301; Halleck, 123.
FIRST METHOD

FIRST METHOD WITH FLANK VARIATION

SECOND METHOD

TWELVE BATTALIONS IN HEAVY COLUMN

FIGURE 6
ranks deep. Jomini recommended a variation on this formation where two of the battalions were to march by files on the flanks of the formation to guard it from attack by the enemy's infantry or cavalry. The second method was to form two smaller columns of six battalions each in the same manner and then to place them side by side, making a formation two battalions wide and six battalions or eighteen ranks deep.35

There was no question among the theorists that this last method of assault was generally unacceptable. Because of its great mass, the deep order was slower in movement than the battalion column, and almost unmaneuverable except for its forward motion. Both Jomini and Halleck agreed that the heavy column "is objectionable as an habitual formation for battle, inasmuch as it exposes large masses of men to the ravages of artillery, and diminishes the mobility and impulsion of an attack without adding greatly to its force." Mahan believed that, "In a very deep order, the troops readily become huddled by any inequality of motion; the head alone fights; disorder easily creeps into the mass; and a fire of artillery on it causes the most frightful ravages." Jomini added the final note when he said that, "The order in very deep masses is certainly the most injudicious."36

Given whatever formation had been chosen by the commander, if the assault on the enemy's forward line of battle were successful, one more obstacle remained to be dealt with. This was the second line of the enemy's main body and his reserve. The second line of battle would be dealt with in much the same manner as the first had been in the final

36 Halleck, 123-24; Mahan, Composition of Armies, 12; Jomini, 295.
assault. The theorists, however, did not think it likely that the troops who had made the final assault upon the enemy's first line would be in condition to make a strong assault upon his second. Therefore, Jomini cautioned and recommended to the commander conducting the offensive battle, "that the most difficult as well as the most certain of all the means the assailant may use to gain the victory consists in strongly supporting the first line with the troops of the second line, and these with the reserve, and in a proper employment of masses of cavalry and of batteries, to assist in striking the decisive blow at the second line of the enemy; for here is presented the greatest of all problems of the tactics of battles." Jomini went on to point out that in this attack upon the second line, "theory becomes an uncertain guide; for it then is unequal to the emergency, and can never compare in value with a natural talent for war, nor be a sufficient substitute for that intuitive coup-d'oeil imparted by experience in battles to a general of tried bravery and coolness."37

Once the infantry assault had successfully pierced the enemy's main line or wrested from him his key terrain, it was time for the cavalry to go to work. The heavy cavalry, massed in a column formation, would at once charge the disordered enemy infantry before they had sufficient time to reestablish the full solidarity of their formations. It was in such situations that the massive, mobile shock action of the cavalry was most useful and most effective. Although the theorists hinted at the use of cavalry during the assault on the enemy's main line to help weaken it and to increase confusion, it was specifically agreed

37Jomini, 202-3.
upon among them that cavalry could have little or no effect upon infantry unless the infantry were drawn up in the shallow order or was otherwise in a state of disorganization and confusion. Jomini wrote that "a general attack of cavalry against a line in good order cannot be attempted with much hope of success," and Halleck was convinced that "good infantry can always sustain itself against the charges of cavalry." Accordingly, it was important that the cavalry be close at hand at this point during the offensive battle to take full advantage of the success wrought by the infantry assault. With the enemy formations now hopelessly broken, the light cavalry would be sent in against the fleeing survivors of the enemy's army to destroy any possibility of a rally. To complete the victory, it was only necessary that the commander direct his army in a vigorous and boldly conducted pursuit of the enemy army to insure its complete dispersal.38

In the properly conducted offensive battle the use of infantry, cavalry and artillery in combination was critical to success. The essence of the offensive battle was the selection of the decisive point of the enemy's main line and the conduct of an assault against that point so as to pierce or turn it. In this assault, the infantry was the principal instrument because of its ability to develop superior combat power through the fire of its muskets and the shock action of its columns with the bayonet. In the offensive battle, though, the musket proved to be of limited value because the effects of musketry fire were often limited or slow in realization, especially for formations on the move. In order to use the musket, assault formations would have to come

38 Jomini, 202, 242, 304-5; Halleck 125, 132, 264, 270-72; Mahan, Composition of Armies, 1; Mahan, Out-post, 45, 58, 73.
to a complete halt, sacrificing their momentum. Consequently, the professional officers of the 1850s were very much wed to the use of the bayonet over the musket in the assault, and the final assault was to be an infantry charge made with the bayonet.

A battle fought on the defensive was also a matter of the use of infantry, cavalry, and artillery in proper combination, with the infantry again playing the main role. In the defensive battle, the army would be deployed on the battlefield in a line of battle of three echelons as has already been explained. As with the offensive battle, the defensive battle would be opened by the light infantry, acting as the skirmishers of the first echelon. These light troops would attempt to hold back the enemy's assault force and to protect the forward artillery positions as long as possible before withdrawing to take up positions on the flanks and in the intervals between the battalions of the main line.39

The next phase of the defensive battle belonged to the artillery. Artillery batteries were to be positioned in the defense so as to cover every possible enemy avenue of approach in such a manner that they would be mutually supportive of one another and capable of concentrating their fire upon the assault columns of the enemy as they advanced. The heavy batteries would be in position closest to the main line but, in many cases, would be well forward of it to "obtain a good sweep of the avenue of approach," and to avoid drawing the fire of the enemy's artillery

39Halleck, 259; Mahan, Out-post, 49-50.
onto the infantry formations of the main line. The lighter batteries, due to their greater mobility, could be placed even farther forward of the main line. A reserve of light batteries—horse artillery, if possible—was withheld and positioned "to be thrown upon any point where the enemy's progress threatens danger; or to be used in covering the retreat." As the columns of the enemy's assault force started their move forward, they were to be subjected to the concentrated fire of all the batteries within range. As these columns continued their advance, the light batteries could be thrown forward to direct their fire into the flanks of these columns.40

If the concentration of artillery fire did not stop the advance of the enemy's columns of assault, the forward artillery batteries would be withdrawn and the responsibility for stopping the assault would pass to the infantry of the main line. In the defensive battle, the questions of fire versus shock action and column versus line which had been raised relative to the method of assault in the offensive battle were also to be considered in choosing a method of forming the infantry of the defensive main line. According to the theorists, a defensive line of battle required depth, so the infantry of the main line was always to be formed in two lines. The four methods that had been considered for forming infantry in the assault were also to be considered for forming infantry on the main line in the defensive battle as well: that is, in deployed lines, by battalions in small columns or squares, in the mixed

40 Mahan, Out-post, 46, 60-61, 68; Jomini, 289-90, 316-17; Halleck, 115, 128-29; Mahan, Composition of Armies, 12; Mahan, Treatise on Field Fortification, xxii.
order of deployed lines and small columns, or in heavy columns of several battalions.

Jomini correctly pointed out that because the infantry of the defensive main line were generally stationary, "the fire of musketry can be much more effectively used than in the offensive." Accordingly, the formation of two deployed lines was more attractive as a method of defense than it had been as a method of assault. Deployed lines allowed for producing the greatest possible volume of fire, and, since they would be stationary, the question of them breaking and causing confusion during movement did not have to be considered. The deployed line was also the formation that would be least susceptible to the effects of artillery fire. But the theorists did not necessarily believe that fire alone would be able to stop an assault. Accordingly, the deployed line as the defensive formation presented a problem in that it was easily pierced through by a column of charging infantry or cavalry and, thus, was not recommended for the defense.41

A defensive main line made up of small battalion columns or squares was considered a good method of defense, especially if the enemy were strong in cavalry. Halleck wrote that, "The formation of squares is exceedingly effective in an open country, and against an enemy who is superior in cavalry."42 If small columns were used, a balance of fire and solidarity of formation through depth could be achieved, especially if the second line battalions were positioned to cover the intervals between the battalions of the first line. But in small columns, the

41 Jomini, 203, 302; Mahan, Out-post, 49; Halleck, 122, 126.

42 Halleck, 123; Mahan, Composition of Armies, 13.
battalions of the first line at least would be vulnerable to the effects of artillery fire, more so than if battalion squares were used.

The mixed order of first line deployed and second line in small columns was the method most favored by the theorists for the defense. Jomini believed that,

The object of the defense being to break and throw into confusion the troops advancing to the attack, the fire of artillery and musketry will be the natural defensive means of the first line, and when the enemy presses too closely the columns of the second line and part of the cavalry must be launched against him. There will then be a strong probability of his repulse.43

The mixed order best fit this formula of defense because as the enemy's assault columns approached, the muskets of the deployed battalions of the front line could be used to the maximum extent possible to stop the assault, or, at the very least, to reduce the strength of the attacking formations before they were close enough to make a bayonet assault. Up to the point where the enemy assault columns were ready to begin their charge, the deployed front line would have the advantage because it was stationary and could produce a greater volume of fire than the attacking columns, which, because they were moving forward, would be unable to effectively return the fire without halting and sacrificing the momentum of the assault. However, once the assaulting columns were close enough to execute a charge with the bayonet, the forward deployed line of battalions would be at a serious disadvantage because their thin line of battle could not hope to withstand the mass and momentum of the charging enemy columns. This was the reason for forming the second line of battalions in column by

43Jomini, 203.
division. As the enemy columns were about to charge—or, for that matter if they showed any wavering while under fire—the battalions of the second line would quickly move through the intervals of the forward line and assault the oncoming enemy columns with the bayonet. If successful, this countercharge would break up the enemy's assault formations and force him to retire back across the field in disorder. Mahan felt that such a countercharge resolutely made would surely prove effective.44

The last method of formation, the heavy column of multiple battalions, was no more favored by the theorists for use in the defensive battle than it had been in the offensive, and perhaps even less so. The chief objection remained the vulnerability of this massive column to the fire of artillery. If used in the defensive, this formation would be stationary and, therefore, present an even better target for the enemy's gunners. Additionally, only one battalion in twelve would be able to effectively use its firepower while in this formation; a poor ratio considering that the theorists recognized firepower as of significant value in the defense.

If the main defensive line failed to stop the enemy's assaulting columns, then the cavalry and the reserve could be used to save the day. The major role of the reserve in the defensive battle was to guard against the disaster of an enemy penetration of the main line of battle. Mahan believed that in the case of a penetration, the reserve, formed in column by division, could and should use its bayonets "to strike a last and decisive blow." But timing was critical, "If engaged too soon, the

44Ibid., 298-99; Halleck, 125; Mahan, Out-post, 50, 68.
resistance offered to the reserve may prevent its making a decisive blow; if not engaged in time, the main-body may be too far exhausted and disorganized to rally." The cavalry would also prove to be most useful in blocking or turning back enemy troops which had broken through the main line. Jomini counseled that the cavalry by its great power of shock action "may regain the advantages lost, change the face of affairs, and cause the destruction of an enemy flushed and disordered by his own success."45

The success of the troops of the main line in turning back the enemy's assault columns did not mean victory, nor even the end of the battle. As has already been discussed, in grand tactics the repulse of the enemy's assault formations signaled the moment for the defensive army to take the offensive for itself. In this effort, the cavalry and the reserve would play the key role. Mahan taught that, "The cavalry must be in readiness, from its position, to act promptly, either against any attempt upon the flanks of the infantry; or to profit by any faults, or disorder of the enemy."46 With the enemy's assault columns retiring in disorder, the charge of a column of cavalry could be used to further crush them and insure that they did not rally to establish a defensive position of their own. The reserve was to be sent immediately forward also to press the retiring enemy army while the forces of the main line were being rallied and reordered so that they might move forward as soon as possible.


Before ending this discussion of the defensive battle, a word must be added concerning the role of entrenchments in the field. Many works were written by military engineers of the mid-nineteenth century on the science and construction of fortifications. For the most part, fortifications were to be used for the protection and security of permanent installations and major centers of population and civil government. They were locations upon which the field army could fall back on in the case of defeat on the field of battle during a campaign. But the attitude of the professional soldier toward the use of fortifications and even entrenchments by an army in the field was something quite apart from his attitude toward permanent fortifications.

Of the three military theorists considered in this chapter, Halleck spoke most positively concerning field fortifications when he said that they "are properly confined to the operations of a single campaign, and are used to strengthen positions which are to be occupied only for a short period." He went on to say that although entrenchments were merely inert objects, they should "be regarded as most valuable and important accessories in the defense of a position." Mahan, the author of numerous works on fortification, was much less positive concerning the use of field fortifications by troops engaged in a campaign in the field. He wrote, "When a position is weak, from the nature of the ground, it may be strengthened by intrenchments, abattis, inundations etc; or else a partial remedy may be found in the choice of the order of battle; but, in general, it will be safest not to trust to such whatever other advantages they may present." In speaking of entrenched positions in the field, Jomini was even more negative than Mahan and more correctly conveyed the attitude of the professional officer of the
1850s when he wrote, "A general and soldiers who seek refuge behind lines are already half conquered, and the idea of taking the offensive does not occur to them when their intrenchments are attacked." So it was that entrenched positions found little place in the doctrine of grand tactics. The honor of the officers, the soldiers, the army demanded that the enemy be faced and fought in the open field according to the rules and procedures laid down in the manuals of tactics and grand tactics.

On the theoretical battlefields of the 1850s, as envisioned by Scott and as described and taught by Jomini, Mahan, and Halleck, the chief ingredient of victory was the proper application of shock action; in practical terms, the effective use of the bayonet by a properly formed and directed infantry battalion. The role of firepower, to be sure, was increasing, but was professionally recognized as being subordinate, at best a necessary preparative, to the results that could be achieved through shock action. In the offensive battle, the application of firepower to break the enemy's line was difficult in the extreme. To fire on the enemy's line, artillery batteries had to be moved forward and established on ground already covered by the fire of the enemy's positioned batteries. The infantry also had to perform evolutions of drill under the enemy's fire before it could begin to return effective fire. Thus it was that the easiest, swiftest, most effective, and the final assault on the enemy's line was the one made

47Halleck, 343-44; Mahan, Composition of Armies, 15; Jomini, 215.
with the bayonet. In the defensive battle, firepower played a more significant role in achieving victory largely because the firepower of both the artillery and the infantry could be more effectively developed and applied with the units placed in preselected, stationary positions. But even during the defensive battle, the critical blows that determined the difference between victory and defeat were the blows of shock action delivered by properly massed and controlled infantry formations using the bayonet.
In 1855, the art and science of warfare was at a high point. While the limited range and the lack of accuracy of the firearms of the day meant that firepower could not be relied upon to render the final decision in battle, the systems of minor and grand tactics that had evolved over the years blended firepower with shock action in a complementary fashion that permitted the capabilities of infantry, cavalry, and artillery to be maximized on the battlefield. But this harmony between weapons, units, and tactics was not to be long lived. Advances in small arms technology were already beginning to upset the balance.

In the first of these advances, the U.S. Army Ordnance Board adopted in 1841 for use with the Army's small arms, the percussion system of ignition to replace the flintlock system which had been the military and civilian standard far longer than the United States had been a nation. The first U.S. Army weapons to use percussion ignition were the Model 1841 Rifle\(^1\) and the Model 1842 Musket.

\(^1\)After 1847, this weapon would be known as the "Mississippi" rifle because of its use during the War with Mexico by a regiment of Mississippi riflemen under the command of Colonel Jefferson Davis.
The percussion ignition system was a great improvement over the flintlock. In loading a flintlock musket or rifle, the soldier primed the lock of the weapon by shaking some of the powder from his cartridge into the pan and closing the frizzen over it before he proceeded with loading the barrel. During this process, the open pan and the powder were fully exposed to the elements. Wet powder, of course, would not ignite, so successfully priming a flintlock during wet weather was all but impossible. Even if the weather were ideal, other factors in the operation of the flintlock could cause it to misfire. The flintlock used a sharpened flint clamped in the jaws of the lock's hammer to produce sparks which would ignite the charge of priming power. When released by the trigger, the hammer fell forward forcing the sharp edge of the harder-than-steel flint against the vertical face of the steel frizzen. As the flint struck the frizzen, it produced sparks by striping off small pieces of steel from the face of the frizzen, and at the same time caused the frizzen to fall back, opening the pan and exposing the priming powder. The sparks would then fall into the pan, igniting the priming powder which, in turn, would ignite the main powder charge in the barrel through a small hole located next to the pan. If the flint were not sharp or were improperly positioned, the steel of the frizzen too smooth or too dirty, or the touch hole blocked by the residue of previous firings, the flintlock would misfire. Constant attention by the soldier to the condition of his lock was the only way to insure that it would fire, and even then, misfires were a common occurrence.

The percussion ignition system used fulminate of mercury in place of flint, steel frizzen, and priming powder. A small amount of this
very volatile explosive was sealed inside a copper cap which looked very much like a small top hat. To prime the lock, the percussion cap was pressed onto the end of a tube which projected from the barrel of the weapon and led to the main powder charge inside. As the hammer of the lock fell forward, it would strike the cap, compressing the fulminate of mercury inside against the tube, causing it to explode. The resulting fire would travel down the tube to ignite the main powder charge in the barrel.

The major advantage of the percussion system was that it was far more reliable than the flintlock. Percussion caps were weatherproof and the only other factor to be considered in the operation of the percussion lock was the fall of the hammer. In tests done by the British Army at Woolwich Arsenal in 1834, 6,000 rounds were fired by the percussion system with only 36 misfires. In the same test, the flintlock system produced nearly 1,000 misfires in 6,000 tries.  

Even though the reliability of the infantry musket was increased by the adoption of the percussion system, there was no need for changing infantry tactics. To be sure, fewer misfires with the percussion system meant a slight increase in the amount of firepower an infantry unit could produce, but that increase was not significant enough to warrant a greater reliability on firepower. The introduction of the percussion system did not increase the range of the musket nor did it increase its accuracy, and these were the characteristics of the weapon that determined the tactics. By the early 1850s, however, most of the major

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European powers were very close to satisfactorily solving these problems.

It had long been recognized that the effective use of rifling made a firearm inherently more accurate and gave it considerably greater range. But in order to effectively use rifling, the projectile had to fit tightly enough into the barrel that it would be in contact with and fill the grooves of the rifling. As has already been pointed out, this meant a patched ball and a toilsome loading process that took from one to two minutes. The longer loading time made rifled weapons unacceptable for the infantry of the line which relied upon an ability to load and fire rapidly to produce ample firepower. Throughout the 1830s and the 1840s, numerous innovations which permitted the effective use of rifling in the infantry musket without increasing loading time were proposed and tested by the European armies. The result of these experiments was a number of different types of rifled small arms which were more or less effective in improving the range and accuracy of the infantry musket.

In 1853, Secretary of War Jefferson Davis directed that the U.S. Army Ordnance Department undertake experiments on the various European systems of rifled small arms to determine their effectiveness and their suitability for adoption by the United States Army. The experiments were carried out at the Army's Harper's Ferry Armory during 1853 and 1854 by Colonel Benjamin Huger and Lieutenant J.B. Benton of the Ordnance Department with the assistance of the armory's master armorer, James H. Burton. Secretary Davis was so impressed by the results of these

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3Congress, Senate, Senate Executive Document No. 1, 33rd Cong., 2nd sess., 1855, 19; R.E.C. 7.
initial experiments, as well as by reports coming from Europe, that in
his report to the Congress in December 1854 he stated, "results render
it almost certain that smoothbored arms will be superseded as a military
weapon."4

Experiments with rifled firearms continued at the Springfield
Armory in Springfield, Massachusetts during the spring of 1855 under the
supervision of Lieutenant Benton with the objective of "applying the
principles of the rifle, . . . to all the small arms of our military
service." As a result of these experiments, the Ordnance Board
recommended to Secretary Davis on 26 June 1855 the adoption of a series
of rifled small arms of an entirely new model.5

The system of rifling that was recommended by the Ordnance Board
for the new arms was based on one developed over a period of years
separately by Captains Delvigne and Minie of the French Army, although
Minie, rightly or wrongly, is generally given the greater share of the
credit.6 This system involved the use of a soft lead, cylindro-ogee
projectile the base of which was hollowed out in the shape of a cone
into which was inserted an iron cup. As with the standard musket ball,
this projectile loaded easily into the barrel because its diameter was
smaller than the calibre of the barrel. On firing, however, the iron
cup in the base of the projectile was driven further into the cone by

4Senate, 20; War Department, Reports of Experiments with Small
Arms for the Military Service (Washington: A.O.P. Nicholson, Public
Printer, 1856), 5.

5Experiments with Small Arms, 39, 85-86.

6J. Schon, Rifled Infantry Arms, A Brief Description of the Modern
System of Small Arms as Adopted in the Various European Armies, trans.
J. Gorgas (Dresden: n.p., 1855; reprint, Yorktown, Va.: William E.
Meuse, 1965), 208; Senate, 19-20.
the force of the propellant gas. This caused the lead sides of the projectile to expand to the limits of the barrel, creating a gas seal and filling the grooves of the rifling. Because of the seal, none of the propellant gas could escape as it did with the musket ball, so the full force of the gas was made to act upon the projectile, greatly increasing muzzle velocity and, consequently, range. Additionally, with the projectile filling the rifle grooves in the barrel, a spin was imparted to it causing it to travel in a true direction once it left the barrel. This new type of expanding projectile would come to be known in the United States as the Minie ball.

The experiments conducted by the Ordnance Department between 1853 and 1855 had considered and tested every component of a rifled firearm. The tests determined the proper calibre, the ideal length of the barrel, the optimum number, depth, and twist of the rifle grooves, the best shape, size, and weight for the projectile, and the proper charge of powder. During the experiments, master armorer Burton discovered that the iron cup used by the French was dangerous as it tended to separate from the projectile after leaving the barrel and could cause casualties among friendly troops if the soldiers attempted to fire over the heads of their comrades. He went on to discover that if the cone in the base of the projectile was widened making its walls thinner, sufficient expansion of the round was achieved without the iron cup. Therefore, the iron cup was eliminated.7

The centerpiece of the new series of rifled small arms was the Model 1855 Rifled Musket. This weapon was intended to replace the Model 1842 Musket.

7Experiments with Small Arms, 14-15.
1842 smoothbored musket as the standard arm of the infantry. The Model 1855 Rifled Musket was smaller than the Model 1842 Musket with a total length of 55.85 inches compared to 57.80 inches for the musket, and a calibre of .58 inches vice the muskets' calibre of .69 inches. The new rifled musket was provided with a triangular socket bayonet identical in style but slightly smaller than the one used on the musket, although the length of the blade remained the same. A unique feature of the Model 1855 was that it incorporated a Maynard tape priming lock, a percussion system of ignition that used a roll of paper caps rather than the standard copper caps, although the copper caps could still be used.

The real difference between the Model 1855 Rifled Musket and the Model 1842 Musket, however, was to tell in its performance. Where the maximum range of the musket was only a few hundred yards, the range of the new rifled musket was well over 1000 yards; and where the accuracy of the musket was less than 200 yards, the accuracy of the rifled musket extended to 500 yards, and even then was more limited by the skill of the soldier than the capabilities of the weapon.8

Also included in the Model 1855 series of small arms, as recommended by the Ordnance Board, were a pistol carbine, a muzzle loading pistol with detachable shoulder stock designed for use by the cavalry and light artillery, and a musketoon, a carbine length weapon intended for engineer troops. Like the rifled musket, these weapons were to have Maynard tape priming locks and rifled barrels, and would fire the .58 calibre expanding projectile. While the board recommended reboring the existing .54 calibre Model 1841 rifles to fire the .58

8Ibid., 102.
calibre round, it did not recommend the continued production of this weapon, submitting that the musketoon would serve adequately in its place. With this recommendation, the Colonel of Ordnance, Henry K. Craig, could not agree, however. In his endorsement to Secretary Davis of the board's recommendations, Colonel Craig pointed out that the Model 1841 Rifle needed only to be manufactured with a .58 calibre bore and the new lock in order to correspond with the new series of small arms. He also pointed out, "For such an arm we have a factory and extensive machinery capable of turning out at least 3,000 per annum."

Consequently, Craig recommended continued production of the rifle with the necessary alterations. Secretary Davis accepted most of the board's recommendations and concurred with Craig on the continued production of the rifle. Davis, however, did not see a need for both the rifle and the musketoon, directing the discontinuance of the musketoon and the issuance of the rifle to the engineer troops in place of it. Production of the Model 1855 series of small arms began at the Harper's Ferry and Springfield Armories in 1857.

In addition to production of the Model 1855 weapons, the War Department determined to convert many of its older model muskets to rifled muskets. It was a simple matter for even the old smoothbored flintlocks to be fitted with new percussion locks and their barrels rifled, enabling them to fire expanding balls made for their particular

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9H.K. Craig to Jefferson Davis, 26 June 1855, quoted in Claude E. Fuller, The Rifled Musket (New York: Bonanza Books, 1958), 5. The factory that Colonel Craig was referring to was the rifle factory on the left bank of the Shenandoah River at Harper's Ferry. Although a part of the Harper's Ferry Armory complex, this factory was a different facility from the main armory factory located on the right bank of the Potomac River.
calibre. To be sure, these converted smoothbores would not perform quite as well as the Model 1855 Rifled Musket, but their performance would far outstrip any unconverted smoothbored musket.

It was clearly understood in the early 1850s that the problems of range and accuracy in the musket could be overcome by using a weapon that loaded through the breech rather than through the muzzle. But, at that time, no satisfactory breech-loading military weapon had been invented, and many felt that one never would be. Indeed, there was a great deal of prejudice among the line officers of the Army against breech-loading arms. Still, the Army was willing to test any that might be brought forward. In his initial series of tests of expanding projectiles in the fall and winter of 1853 to 1854, Colonel Huger tested the breech-loading Sharps carbine, invented by Christian Sharps in 1848, but for what seem to be a number of valid technical reasons, found it unsatisfactory for military use. In August 1854, Congress made a special appropriation of funds to enable the Army to purchase and test those breech-loaders that the Army considered to be the best available. Testing of these arms continued until early 1857 when a special board of officers was convened to complete the tests and make a final recommendation. In that recommendation, the board found that none of the breech-loading weapons tested were suitable for general military use. With that recommendation, Chief of Ordnance Craig suspended all ongoing testing and for the time being would not consider further testing of breech-loading firearms.¹⁰

¹⁰Senate, 19-20; R.E.C., 7; Experiments with Small Arms, 25; Carl L. Davis, "Small Arms in the Union Army, 1861-1865" (Ph.D. diss., Oklahoma State University, 1971), 138, 140-41.
Cavalry also benefited from the same advance in technology that gave the infantry the rifled musket. The rifled pistol carbine of the Model 1855 series of small arms brought the cavalry trooper some increase in firepower through greater range and accuracy than he had previously known with his smoothbore pistols and carbine. But the Model 1855 pistol carbine also cut down on the number of firearms that the cavalryman would carry. In place of two pistols and a carbine, he was now to be issued just two of the Model 1855 pistols with one detachable shoulder stock. Attaching the shoulder stock to one of the pistols created a weapon that was supposed to replace the smoothbore carbine. The United States Army also manufactured at this time a rifled carbine which was intended for use by mounted troops. Known as the United States Rifled Carbine, Model 1855, it was not developed as part of the Model 1855 series of small arms, but in production it was bored at .58 caliber so that it would fire the same expanding ball as the Model 1855 rifled musket and rifle. Only about 1000 of these rifled carbines were manufactured in 1855 and 1856, probably because they were to be replaced by the Model 1855 pistol carbine, the manufacture of which began in 1856.11

An equally significant technological development for the cavalry was the perfection of the percussion revolver by Sam Colt of Hartford, Connecticut in the mid-1840s.12 This weapon had a rifled barrel, and was capable of firing six rounds before it had to be reloaded, thus, it


12 Butler, 201.
had the potential to replace the saber under some circumstances of mounted close combat. Despite the rifling, however, the revolver's effective range was very limited, and the fact that it could not be readily reloaded under conditions of mounted close combat meant that the saber would still be very much be a primary weapon of the cavalry.

The introduction of the pistol carbine, the rifled carbine, and the revolver did not effectively increase the overall firepower capability of the cavalry in battle. While some increase in range and accuracy were to be realized, these weapons were still very difficult, if not impossible, to reload while engaged in mounted combat, and so did not give the cavalry the firepower it would need to stand against infantry or to assault positions held by infantry through other than the shock action of massed columns in a charge.

Artillery also benefited from new technology in the late 1850s. In 1857, the United States Army adopted the Model 1857 12-Pounder Gun-Howitzer as its standard field piece. This weapon, which would be known as the "Napoleon," was developed in France at the direction of Louis Napoleon in the early 1850s. Its chief recommendation was that it weighed only 1,227 pounds, 530 pounds lighter than the Model 1841 12-Pounder Gun which it replaced. This significant reduction in weight so increased mobility that it virtually eliminated the distinction between light and heavy artillery as the terms were then applied to field batteries. Henceforth, the term heavy artillery would only be applied to the guns found in a siege train, or those permanently mounted in fortifications, while light artillery would generally be applied to all of the field batteries that accompanied an army on campaign. The Napoleon, however, was still a smoothbored field piece and fired the
same types of ammunition to the same ranges as earlier guns. Consequently, no actual increase in artillery firepower was realized through its introduction.

Experiments on applying rifling to the artillery field gun were also being carried out in the late 1850s. As with the application of rifling to small arms, the artillery experiments revolved around achieving an expansion of a portion of the projectile to engage the grooves of the rifling in the bore as the gun was fired. Field artillery projectiles, however, because of the effects they were expected to have on a target upon impact, were made of hard cast iron. This meant that an expansion of the whole base of the round, as was the case with the soft lead Minie ball, was quite out of the question. So the effect in the field piece was most commonly achieved through an expansion of a lead or other soft metal sleeve placed around the projectile or through a soft metal ring embedded in it.

The chief benefits of applying rifling to the field piece were the same as for small arms, an increase in the range and accuracy of fire over what could be achieved with the smoothbored guns, although the increase in range would not be nearly so dramatic as realized with the rifled musket over the musket. Two other benefits which would result from the successful rifling of field guns were a reduction of the amount of gun powder it would take to fire a round, while at the same time achieving an increase in the weight of metal thrown at each firing. Like the smoothbores, the rifled guns would fire three types of projectiles, solid shot, shell, and canister. The effective range of the solid shot and shell promised to be approximately 2000 yards. The shell, which would be an exploding round, was to be fitted with a
percussion fuse that would set off the main charge as a result of impact. The canister round would have basically the same characteristics as the canister round fired from the smoothbores.

The benefits of rifled artillery were all very promising in the late 1850s, but would not be realized in the form of workable field pieces until after 1860.

The great technological advance of the late 1850s for the military, then, was the introduction of the infantry rifled musket. This weapon, with its greatly increased range and its huge increase in accuracy over the smoothbored musket, was destined to have a profound effect on the conduct of battle. When armed with the musket, the infantryman was required to act as part of the mass, because, in order to be effective, his fire had to be released in mass, in volleys by company or battalion. In the same way, the shock action of the infantry bayonet was effective only when the soldiers acted in mass, forming compact battalion columns to be directed against the enemy line. On the battlefield of the 1850s, the individual infantryman was not an entity, not a force that needed to be considered or dealt with. The infantry was the entity. It was the infantry unit, the company or battalion, trained and directed according to the tactics that was the force that had to be dealt with. But, with the introduction of the rifled musket, all of that changed. The individual infantryman become a force on the battlefield, a force that had to be considered and dealt with. Armed with the rifled musket, the infantryman could take careful aim and bring down his enemy hundreds of yards beyond the effective range of a company
or battalion of infantry armed with the musket. The soldier armed with
the rifled musket, then, was more than a soldier with a weapon of
increased range and accuracy, he was a soldier with a weapon that gave
him a firepower capability as an individual. The introduction of the
rifled musket meant a transition from the tactics of shock action to the
tactics of firepower. The transition began immediately, but its pace
was painfully slow, and its realities were witnessed on the battlefield
years before they were understood or compensated for in the tactical
manuals.
One of the first to understand that the arming of the infantry with rifled firearms would, in some way, require a change in tactics was the enlightened and forward thinking Secretary of War, Jefferson Davis. In the autumn of 1853, as he directed the Ordnance Department to undertake experiments with systems of rifling, Davis also directed the development of a new manual of tactics for infantry when armed with the rifle. He told Congress in his annual report for 1854, that, anticipating the almost exclusive use of rifled firearms, a new manual of light infantry and rifle tactics was being prepared that would introduce to the service such tactical improvements "as the experience of other armies has shown to be valuable."\(^1\)

To write this new manual, the War Department selected Lieutenant Colonel William J. Hardee of the cavalry. Born in October 1815 on his father's Georgia plantation, Hardee graduated from the Military Academy at West Point in 1838, 26th in a class of 45. His initial active duty involved participation in the Second Seminole War as a member of the Second Dragoons. In 1840, Lieutenant Hardee was selected by Secretary of War Joel R. Poinsett to be one of three officers from that regiment to study for 12 months at the French Royal Cavalry School at Saumur, Paris.\(^2\)

\(^1\)Congress, Senate, \textit{Senate Executive Document No. 1}, 33rd Cong., 2nd sess., 1855, 21.
thereafter to return to the Second Dragoons and instruct the regiment in
the latest French cavalry tactics and practices. Returning in 1842,
Hardee continued his service with the Second Dragoons, now in Louisiana,
and marched with the regiment to Texas in 1845 as relations between the
United States and Mexico worsened. During the War with Mexico, Captain
Hardee saw action with the Second Dragoons at the sieges of Monterrey
and Vera Cruz, and at the battles of Cerro Gordo, Churubusco, and Molino
del Rey. On 14 September 1847, he was with the Second as it escorted
General Winfield Scott on his triumphant entry into Mexico City. For
his gallant work during this war, Hardee was breveted lieutenant colonel
by the War Department and presented a handsome sword by the State of
Georgia. After the war, he remained with the Second Dragoons on
frontier duty in Texas, but in February 1853 was granted a leave of
absence to attend his terminally ill wife in St. Augustine, Florida. It
was after her death that Hardee was instructed to report to the War
Department in Washington to begin the task of writing a new infantry
tactical manual.

Hardee's initial undertakings on the new manual carried him in
December 1853 to the armory at Harper's Ferry where he observed
firsthand the tests of rifled firearms being conducted by Colonel Huger
and Lieutenant Benton. Much impressed with what he had seen, Hardee
repaired to Washington where, throughout the spring of 1854, he
supervised a board of officers in translating and adapting the French
manual of light infantry tactics, *Ordonnance du Roi sur l'Exercice et
les Manoeuvres des Bataillons de Cesseurs a'Pied*. By 28 July, the
manuscript of the new manual was complete and Hardee submitted it to
Secretary of War Davis for approval. At the urging of the Adjutant
General, Davis directed an evaluation of the new tactics be made by a board of officers at the Military Academy utilizing the Corps of Cadets as a test unit. Hardee went to West Point to lend his expertise, advice, and assistance to the board, and at the end of October 1854, Secretary Davis himself went there to review the results. Davis was most pleased and Hardee spent the winter of 1854 to 1855 making final preparations for publication of the manual. A contract for printing the manual was given to Lippincott, Grambo, and Company of Philadelphia during March 1855 and the first copies were distributed in June. The title of this new manual was *Rifle and Light Infantry Tactics for the Exercise and Manoeuvres of Troops when Acting as Light Infantry or Riflemen.*

Like Scott's manual, *Hardee's Tactics,* as the new manual would be commonly called, was a translation of the latest French system adapted to the particular needs and circumstances of the United States Army and militia. In organization, Hardee's manual was identical to Scott's beginning with the School of the Soldier and proceeding through company and battalion drill using virtually the same paragraph structure and titles as was used in Scott's manual. Throughout the new manual, whole paragraphs and even entire sections were practically word for word the same as found in *Scott's Tactics.*

Differences, of course, could be observed. Hardee's manual of arms deviated in several respects from Scott's because Scott's manual

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was written for men armed with full length flintlock muskets, while Hardee considered that the soldiers would be carrying the much shorter percussion rifle. Another change involved the formation in line of battle. The line of battle in Hardee's Tactics was of two ranks where in Scott's it was of three. This would have been a significant change except for the fact that the War Department had in 1835 suspended those injunctions of Scott's tactical system which called for the three rank line of battle.3

The differences between Scott's and Hardee's tactical systems that at least presumed to recognize the greater firepower of infantry carrying rifled firearms were two. The first, and most significant, was the standard length of step and pace of the marching soldier. With Scott, this was called quick time and was a step of 28 inches at a pace of 110 steps per minute. Scott provided for swifter movement by making provisions for a double quick time pace measured at 140 steps per minute and an even swifter pace he called, "the run." But Scott believed that, as ranks of men cannot march any length of time at so swift a rate, without breaking or confusion, this measure of acceleration will not be considered as a prescribed exercise, except in turning, forming line by successive files, and at the close of a charge. Accordingly, companies or battalions will only be habitually exercised in the quick time of one hundred and ten steps in a minute.4

In his system of tactics, Hardee kept the quick time cadence of Scott's manual, but reserved it for general uses such as the training of recruits and new units, extended marches at the route step, and for all exercises when the unit was part of a brigade or larger formation. As

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3Scott, Infantry Tactics, 1:5.
the habitual pace for battle, Hardee introduced the double quick time pace of 33 inch steps at the rate of 165 steps per minute. He went on to point out,

the double quick step may be executed with different degrees of swiftness. Under urgent circumstances the cadence of this step may be increased to one hundred and eighty per minute. At this rate a distance of four thousand yards would be passed over in about twenty-five minutes.\(^5\)

Hardee also included provisions for the run, a pace he considered to be the same as double quick time except that it would be executed at a much greater rate of steps per minute. Like Scott, Hardee believed that the soldiers could not march for any length of time at the increased double quick time rate of 180 steps per minute or the run without breaking ranks and causing confusion, so he cautioned against the use of those cadences except under the most urgent circumstances.\(^6\)

The increased rate of movement in battle from Scott's to Hardee's tactical system cannot be considered insignificant. A unit marching precisely at Scott's quick time pace would cover 85.56 yards in one minute. A unit using Hardee's double quick time would cover 151.25 yards during the same period of time; an increase in distance of 77 percent. To be sure, this would reduce the amount of time troops might be required to spend under fire while maneuvering from one place to another on the battlefield, but merely quickening the pace did not consider the greater accuracy of fire that would be encountered when fighting against infantry armed with rifled muskets.


\(^6\)Ibid., 1:115.
The second notable difference between Scott and Hardee was found in the procedures for the formation of columns. In Scott's Tactics, the principal column formations were the column by platoon, the column by company, and the column by division. The procedures for forming these columns were cumbersome at best, frequently requiring the unit to halt and, in some cases, even dress ranks during their execution. In his tactical system, Hardee retained these formations as the principal columns as well as Scott's procedures for forming them, but made the movements somewhat less complicated and more efficient by eliminating some of the halts.

With Scott's simplest column formation, the march by the flank, Hardee made more significant improvement. In Scott's system, this column was formed by having all the soldiers in the line of battle face to the right or left before marching off. Marching any distance in this narrow and extended column, however, caused considerable spreading out, making it unsuitable for all but short movements. Hardee's march by the flank, however, was based on the French concept of "comrades in battle," a grouping of the four soldiers from two adjacent files in the line of battle. To form Hardee's column by the flank, the unit faced to the right as in Scott's system, but with the added measure of having the soldiers in the even numbered or rear files step up beside the soldiers of the odd numbered or forward files. The result was a compact column with a front of four soldiers that could be used for movements over long distances without becoming spread out.7

Additionally, from this column by the flank, the line of battle could be quickly reformed to the left by simply reversing the procedure with the odd numbered file soldiers stepping back into their proper place as the facing movement was executed.\(^8\) Procedures were also included so that the line of battle could be reformed to the front of the column or to its right with the original order preserved, as well as for forming this type of column to the left from the original line of battle.

There was no indication in the manual that Hardee intended his column by the flank to become the standard marching column, but those who used Hardee's system would come to recognize that for marching a unit from one place to another, in battle or otherwise, this column offered advantages of simplicity, speed, and flexibility that no other column formation did. This column, however, would not in any respect suffice as a column of assault. Its front was much too narrow, its length much too extended, and the officers and non-commissioned officers were not positioned so as to properly direct their men in an assault. For this reason, if for no other, the column by company and the column by division remained the columns that would be required for the conduct of battle. In his closing remarks on instructing a regiment in the School of the Battalion, Hardee recommended that in training, "Great attention ought, . . . to be given to the . . . march in column by division."\(^9\)

\(^8\)Hardee, 1:119, 121.

\(^9\)Ibid., 2:223.
Lastly, in comparing Scott's and Hardee's tactical manuals, it must be pointed out that Hardee did not include a system of tactics for units larger than the battalion. *Scott's Tactics* was written in three volumes, the final volume, *Evolutions of the Line*, being devoted to the tactics of brigade and larger units. *Hardee's Tactics*, however, had no corresponding third volume. When tactics for brigade or larger units were called for, Hardee referred the user to Scott's manual: "When a battalion, instructed in this drill, shall be required to manoeuvre in the evolutions of the line, its movements will be regulated by the instructions contained in the third volume of the Tactics for heavy Infantry, approved by the War Department, April 10th, 1835."\(^{10}\)

The reason for the lack of a third volume may well have been simply that the French manual from which Hardee was working did not include tactics for units larger than the battalion. But, apparently, neither the War Department nor Hardee considered that the introduction of the rifled musket would require any change in the manner in which upper echelon units were deployed or used in battle.

*Hardee's Tactics* was written as a direct result of the pending introduction of rifled firearms to the infantry of the line. Yet, despite the fact that Davis anticipated the almost exclusive use of these rifled firearms by the army and the militia of the United States, and that he told Congress the new manual would incorporate the latest tactical improvements shown necessary by the experience of other nations, *Hardee's Tactics* was, in reality, little different from Scott's. Moreover, considering that the problem to be overcome by the

\(^{10}\)Ibid., 2:224.
introduction of rifled firearms to the infantry was one of increased range and accuracy, the new manual did very little to change the system of infantry tactics introduced by Scott, and nothing to change the doctrine according to which battles would be conducted. Still, Davis considered the introduction of Hardee's Tactics to be one of the accomplishments of his term of office as Secretary of War, at least co-equal with the introduction of the rifled musket.\textsuperscript{11}

Considering the often embedded, if not actually backward attitude of many senior officers of this period, it is not surprising that the publication of Hardee's Tactics initially created more problems within the military establishment than it solved. To begin with, there were questions about the manual of arms. In January 1855, a full five months before the final publication of Hardee's manual, Ethan Allen Hitchcock, Brevet Brigadier General and Colonel of the 2nd U.S. Infantry Regiment at Carlisle Barracks, wrote the Adjutant General of the Army, Colonel Samuel Cooper, concerning the need for a revised manual of arms to be used with the new rifle. Not content to await even an acknowledgement of his letter by Cooper, Hitchcock on 14 January 1855 appointed a board of officers from his own regiment to decide upon a system "for local use until otherwise directed." The board reported back to Hitchcock in mid-February that the best course of action was to adopt, as a "basis of

elementary instruction," the manual for rifles contained in General Orders Number 38 of 19 August 1846.\textsuperscript{12}

On 2 April, Hitchcock again wrote the Adjutant General to air his opinions, which this time were directed toward the manual of arms to be included in Hardee’s Tactics. His concerns specifically addressed the method of fixing and unfixing the bayonet, the possibility of breaking the rear sight as the soldier proceeded through the motions of the manual, whether or not the weapon would be stacked or grounded during an inspection of knapsacks, and the need for special directions in loading with the new Minie Ball cartridge. But more generally, Hitchcock's concern was that the manual of arms must be written specifically for the new rifle and tested with that weapon in hand.\textsuperscript{13}

The Adjutant General referred Hitchcock's April letter directly to Hardee, then in Philadelphia working with the publisher on the final version of the new manual. Responding to both the Adjutant General and to Colonel Hitchcock directly, Hardee addressed each of Hitchcock's concerns individually and then assured his addressees that both he and the West Point Board which examined his manual had carefully considered and tested each motion in the manual of arms against what they believed would be the final configuration of the new rifle. In closing, Hardee

\textsuperscript{12}Ethan Allen Hitchcock to Samuel Cooper, 12 and 14 January 1855, F26-28, R517, M567, Record Group 94; Headquaters, Carlisle Barracks, Pa., Orders No. 98, 14 January 1855, F159-60, R517, M567, Record Group 94. It is most curious that Colonel Hitchcock was concerned about the manual of arms for "the new rifle" at this date since no Model 1855 rifled muskets or rifles had yet been produced, except for possibly a few prototype pieces for use by the Ordnance Department in testing. As has already been pointed out, the Ordnance Board did not submit the new weapons for the approval of the Secretary of War until June 1855.

\textsuperscript{13}Hitchcock to Cooper, 2 April 1855, F420-22, R517, M567, Record Group 94.
aggressively defended his work pointing out that the manual of arms "gave me great labor, greater labor, perhaps, than the balance of the book all put together, and I do not wish it supposed that my time and labor have been so uselessly spent, as in making a system which is inapplicable to the new rifle, for which, & for which alone, it was intended."14

Apparently, concerns with the manual of arms in Hardee's Tactics not being applicable to arms other than the new rifle continued for some time, and may never have been completely laid aside. Testifying before a Congressional committee sent to examine the course of instruction at the Military Academy in 1860, Superintendent Hardee admitted that while the cadets were trained in infantry tactics according to his system, they used a different manual of arms because they were not armed with the rifle for which the manual had been written. They were in fact armed with a slightly smaller version of the full sized rifled musket called a cadet rifled musket. Hardee further acknowledged that he believed a new manual of arms was needed for use with the rifled musket, and that, "A single manual cannot be devised that is suitable for all arms."15

Another, and perhaps more serious, concern for the hierarchy of the Army, was the question of which troops would train using Hardee's Tactics and which would train according to Scott's. It was clear from Davis's statements to Congress that his intent was to have Hardee produce a revised tactical system that would, in effect, be used by all

14Hardee to Cooper, 11 April 1855, F412-18, R517, M567, Record Group 94.

15Senate, Misc. Doc. No. 3, 94.
of the infantry forces of the United States. In his report as Secretary of War for the year 1854, Davis pointed out, "with the recent improvements in small arms, it is probable that the distinction in the armament of heavy and light infantry, and rifleman, will nearly cease, especially in our service, where the whole force is liable to be employed as light troops."\(^{16}\)

Davis went on to point out to Congress that in setting Lieutenant Colonel Hardee to work on a new system of light infantry tactics, he (Davis) was anticipating the exclusive use of rifled firearms by the infantry of the regular army, and that such a system of instruction was the best for the militia also. To set the stage, Davis recommended that henceforth all foot troops be designated as infantry regardless of how they were armed, rather than the existing practice of calling them infantry, light infantry, or rifle regiments according to their armament and purpose.\(^{17}\)

But Davis's intent was not understood by a military establishment which was wed to a system that drew a clear and absolute distinction between heavy and light infantry, and which saw riflemen as special troops of limited use in the winning of battles. Consequently, officers began to debate the intention of the War Department, and argue among themselves concerning which regiments and companies should train with Hardee's manual and which with Scott's. Perhaps Davis by his own hand was the perpetrator of the problem for his endorsement of Hardee's manual specified that it was "adopted for the instruction of the troops

\(^{16}\)Davis, 2:407.

\(^{17}\)Ibid.
when acting as Light Infantry or Riflemen, and, . . . for the observance of the Militia when so employed," implying that the distinction between heavy and light infantry, and riflemen was to remain. The same tone was present in Davis' forwarding of copies of Hardee's Tactics to the governors of the individual states and territories. He told them that Hardee's manual was a "system of tactics recently adopted for Light Infantry and Riflemen," and left it to their discretion as to how the manual would be distributed and used by their militia.\textsuperscript{18}

In the regular army, matters were finally brought to a head in September 1856 when Lieutenant Colonel C.H. Waite, commanding the 5th U.S. Infantry Regiment at Ringgold Barracks, Texas, wrote the adjutant of the Department of Texas requesting to be told if all infantry regiments were to be drilled according to Hardee's Tactics. Waite wrote,

Several officers hold the opinion that it is the intention of those in authority, to have only those Regiments of Infantry which are armed with the Minie Rifle instructed in the Light Infantry and Rifle tactics recently prepared by Col. Hardee. The manual does not appear to be in every respect adapted to the musket.\textsuperscript{19}

Waite's letter was forwarded by the officer commanding the Department of Texas to the Headquarters of the Army in Washington, where it was referred to several ranking officers including Adjutant General Cooper and General-in-Chief Winfield Scott. Cooper offered the opinion

\hspace{1cm}18\textsuperscript{18}Hardee, 1:4; Jefferson Davis to State and Territorial Governors, 24 December 1855, F298-99, R37, M6, Letters Sent by the Secretary of War Relating to Military Affairs, 1800-1889, Record Group 107, Records of the Office of the Secretary of War, National Archives, Washington, D.C.

\hspace{1cm}19\textsuperscript{19}C.H. Waite to D.C. Buell, 4 September 1856, F509, R552, M567, Record Group 94.
that because the infantry regiments serving on the frontier against the indians were acting in the capacity of light infantry, they should be using Hardee's system. But Cooper was also of the opinion that Davis's endorsement of the manual was sufficient guidance for the officers commanding troops in the field and that no additional clarification was required. General-in-Chief Scott, who was not by any means on good terms with Secretary Davis and was probably unhappy that there was a system of tactics other than his own, refused comment and merely had the letter forwarded. Eventually, it was referred directly to Davis who on 3 November 1856 penned a confusing note which read, "'Rifle and Light Infantry Tactics' as circumstances will permit to this end they will be habitually exercised according to this system." Davis's note must have been accompanied by clearer instructions to the Adjutant General for on 28 February 1857 the matter of which regiments would drill according to Hardee's *Rifle and Light Infantry Tactics* was finally resolved with the publication of General Orders Number 2. This directive read: "The regiments serving on foot, being usually employed as light troops, will be habitually exercised in the system of tactics for light infantry and riflemen adopted by the War Department, March 29, 1855."20

With the publication of this order, Davis achieved the goal that he had envisioned three years earlier when he accepted the position of Secretary of War. Henceforth, all infantry regiments of the U.S. Army, no matter how they were armed or how they were being employed, would be

20 Record Entries and Notes, F507-9, R552, M567, Record Group 94; War Department, Adjutant General's Office, General Orders No. 2, 28 February 1857, F808, R7, M1094, General Orders and Circulars of the War Department and Headquarters of the Army, 1809-1860, Record Group 94.
drilled according to a tactical system that was supposed to be the latest and best available.

Another important question, and a very logical one considering that all of the infantry of the regular army was to be trained using Hardee’s Tactics, was whether or not Hardee’s Tactics should supersede the first two volumes of Scott’s. A recommendation to do just that was made by Brevet Lieutenant Colonel Silas Casey in a letter to Secretary Davis in October 1854. Casey had been a member of the board of officers which assembled at West Point in the late summer of 1854 to test Hardee’s Tactics using the Corps of Cadets. In his letter, Casey told Davis that he had a few thoughts on Hardee’s Tactics which could not be properly included in the final report submitted by the board. Casey praised Scott’s Tactics as an excellent system for heavy infantry and one which had stood the test of time. But he also pointed out that Hardee’s system contained all of the principles found in the first two volumes of the heavy infantry drill, and that a unit trained according to Hardee’s system could perform all of the movements required by Scott’s third volume, Evolutions of the Line, and thus could participate in battle with units trained totally according to Scott’s system.21

Given this, Casey saw four reasons why Hardee’s Tactics should replace Scott’s. First, Scott’s Tactics was written for a line of battle of three ranks, and even though the three rank formation had never been officially adopted or used, Casey saw no need for the continuation of a system of tactics that called for it. Secondly, the manual of arms in Scott’s Tactics was written for the flintlock musket

21Silas Casey to Davis, 28 October 1854, F120-25, R495, M567, Record Group 94.
which was no longer in use, and thirdly, some of the movements in Scott's had long since been found to be deficient and required correction. Lastly, Casey believed that there was some efficiency of movement in Hardee's Tactics which would be of benefit to the service.22

The details as to why Davis did not accept Casey's recommendation outright are not apparent from Davis's correspondence. But whatever his thoughts were on replacing Scott's Tactics with Hardee's, this action was in fact not taken by Davis, the War Department, or the army upon the publication of the new manual. Scott's Tactics remained the official infantry tactical manual of the Army, even though after 28 February 1857 it was not being used by the regular army infantry regiments.

Perhaps one reason for not superseding Scott's manual immediately was the feud then ongoing between Davis and Scott concerning the authority of the Secretary of War over the General-in-Chief of the Army. Davis' issuing of a directive suspending Scott's Tactics would have meant adding more fuel to an already very large fire.23 It is not likely, however, that the fiery and combative Davis would have shrunk from taking an action he thought in the best interest of the service merely because it would have meant another confrontation with Scott.

A more plausible reason for not superseding Scott's Tactics was the fact that this manual and its system of tactics had been enforce within the army and the militia since 1835, and an entire generation of infantry officers and soldiers had known no drill other than Scott's. For a variety of reasons, such established precepts were not all that

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22Ibid.

readily changed in the national military establishment of the 1850s, as has been demonstrated here by the controversy on the manual of arms and the debate over which units should use Hardee's manual. Resistance to change was to be anticipated and practically dealt with. Hardee himself realized this and urged the War Department to prepare to deal with it. In June 1855, as the first copies of his manual were being released by the publisher, Hardee wrote Adjutant General Cooper recommending that the report of the board of officers who had examined the new manual be published in an order for the benefit of those who would have to use it. Hardee suggested that "it would be satisfactory to the army to be advised that the drill was thoroughly examined in all its details, and practically tested, before it was adopted by the department." This knowledge, Hardee thought, together with an admission that the manual was mostly a translation from the French, would "render the book more generally acceptable."24

Hardee's concerns about the acceptability of the manual were not to be taken lightly. Four years after the introduction of his manual, Hardee still found it necessary to deal with those who were opposed to its use. To a militia officer in 1859, he offered advice concerning the introduction of the new system and, in doing so, admitted there was not much difference between his manual and Scott's. Hardee wrote,

I think under the circumstances, you have acted wisely in not attempting to force the new tactics on the Militia. It is with many of them as with many old officers in our services. They don't wish after learning one system to be compelled to learn another. In time they will be brought to see the advantages of the new drill and will also discover

24 Hardee to Cooper, 23 June 1855, F774-76, R517, M567, Record Group 94.
that after all there is not much new to learn & that it is
easy to pass from one system to the other.25

While much attention was given by the War Department and others to
providing the infantry a new system of light infantry and rifle tactics
to help deal with the introduction of the rifled musket, no attention at
all was given to the tactics of the cavalry or artillery which would
also be fighting against infantry armed with the new weapon.

At the same time that Hardee was preparing the new light infantry
tactical manual, he was also updating the current cavalry tactical
manual, the Cavalry Tactics of 1841. This update, though, included only
very minor changes to the first two volumes of the three volume set;
School of the Trooper, of the Platoon, and of the Squadron, Dismounted,
and School of the Trooper, of the Platoon, and of the Squadron, Mounted.
The most significant change that Hardee made was the addition to volume
two of a supplement titled, "A Manual for Colt's Revolver." The two
revised volumes were published in June 1855 by Lippincott, Grambo, and
Company at the same time that that firm was publishing Hardee's Infantry
Tactics. Hardee, however, was not identified as the author of these
volumes, probably because the revisions were so minor that it did not
warrent appending his name to them. The third volume of the Cavalry
Tactics, Evolutions of a Regiment, was not updated by Hardee and was not
republished along with the first two volumes.

For the artillery, the basic tactical manual, Instruction for Field
Artillery, Horse and Foot, remained until 1860 unchanged from its first

\[25\] Hardee to F. Townsend, 1 December 1859, quoted in Hughes, 46.
publication in 1845. A new edition of this manual did appear in 1850, but it was simply a reprint without revision of any kind. In 1860, a new manual, with the slightly shorter title *Instruction for Field Artillery*, was published. This work was a major revision of the manual of 1845, which, like its predecessor, was prepared by a board of officers, although this time they specified themselves to be a board of light artillery officers.

The field artillery manual of 1860 was considerably different, especially in its internal organization, from the manual of 1845. It contained much new and some updated information, particularly with regard to the organizational and technical aspects of field artillery. A section on "Organization, Material, and Service" was added which discussed the purpose of field artillery, the organization of the battery for the different requirements of active service, and the equipment of the battery to include a survey of projectiles and fuses. The actual tactics, the drill for handling a battery in combat, however, was entirely unchanged from the manual of 1845. No mention of the arming of the infantry with the rifled musket was made, nor was any adjustment of the tactics of the field battery made to compensate for the greater firepower that artillerymen would henceforth face on the battlefield. The board of light artillery officers who composed the manual did not consider the matter within the purview of their manual, and stated, "The employment of field artillery, according to the various conditions of service, is a subject of such extent and importance as
precludes any attempt to treat of it in this work." Its importance notwithstanding, no other manual was published during this period which attempted to comprehensively treat the employment of field artillery on the modern battlefield.

CHAPTER 5
GRAND TACTICS
1855-1861

As Secretary of War between 1853 and 1857, Jefferson Davis was dedicated to the modernization of the U.S. Army through the introduction of new weapons, equipment, and doctrine of the latest and best available from the armies of the major European powers. His introduction of the rifled musket and of a new system of infantry tactics to make the most of the new weapon's greater capabilities have already been discussed. However, considering Davis' penchant for military improvement and the considerable advance in infantry firepower that the rifled musket represented, it is surprising that no significant official effort was made to reevaluate or to revise the existing doctrine of grand tactics, the doctrine governing how battles would be fought.

The Regulations for the Army of the United States, which laid out the basic operating procedures of the Army in both peace and war, and which were approved by Secretary Davis and published in 1857, did contain a section which addressed the conduct of battles. In 27 relatively short paragraphs, covering less than four pages in a book of almost 500, this section attempted to outline the basic dispositions and rules for the use of troops in battle. For the most part, though, this brief treatment of the conduct of battle only reiterated and confirmed the doctrinal concepts of grand tactics as espoused by Jomini, Halleck,
and Professor Mahan. It advocated the offensive over the defensive battle, and specified, "The attack should be made with a superior force on the decisive point of the enemy's position." In that attack, the troops were to be drawn up in several lines, and false attacks and demonstrations were to be made to conceal the true objective of the main assault. Artillery was to be employed in silencing the enemy's batteries, and cavalry, drawn up on the wings or behind the center, was to be "ready for the pursuit." In the defensive battle, the artillery was to concentrate its fire on the advancing enemy columns while the infantry could sometimes be formed with advantage "in rear of the ground on which we are to fight, and advancing at the moment of action." Most importantly, "if the attack of the enemy is repulsed, the offensive must at once be taken, to inspire the troops, to disconcert the enemy, and often to decide the action." The formation recommended by the regulation for this movement was the close column.¹

All in all, the Army Regulations of 1857 mentioned nothing concerning the increase in infantry firepower resulting from the introduction of the rifled musket and did nothing to challenge the professional preception that battles would be more a matter of infantry shock action than firepower.

All other official publications and reports were also devoid of any discussion or indication as to how infantry armed with the new rifled muskets would effect the conduct of battle. Chief among the publications which might have addressed this issue were the reports of three officers who were selected by Davis in April of 1855 to "form a

commission to visit Europe for the purpose of obtaining useful information with regard to the military service in general" and the "practical advantages and disadvantages attending the use of the various kinds of rifled arms, which have been lately introduced in European warfare." The officers selected for this commission were Major Richard Delafield of the Corps of Engineers, Major Alfred Mordecai of the Artillery, and Captain George B. McClellan only recently promoted and transferred from the Corps of Engineers to the Cavalry. These officers traveled in Europe from April 1855 until April 1856 visiting and observing the armies of all the major European powers. Their travels included a period of 25 days on the Crimean Peninsula observing the war then ongoing between the Russian army and the allied British, French, Turk, and Sardinian forces. Upon their return to the United States, each of these officers wrote and published for the War Department lengthy and detailed reports of what they observed.²

Although Davis' instructions specifically directed the officers to study the employment of rifled firearms, none of the final reports included comments relative to the effect of these arms in battle, even though they were being readily adopted by the major European armies and were used by many of the units in the Crimean fighting. Majors Delafield and Mordecai can probably be forgiven for this oversight for their reports concentrated almost exclusively on their specialties of fortifications and heavy ordnance respectively. But not so with McClellan's report which dealt more generally with matters of military art and science and included detailed observations on the organization, ²

administration, and equipping of the European armies and on their tactics. In his report, McClellan carefully documented the increasing number of rifled firearms being issued to the troops in Europe. In the French army, he noted that although the "smooth bore musket is still in general use for the infantry of the line; the light infantry and elite corps have rifled arms." Of the Austrian army he wrote that, "Under the new system all small arms are rifled." The Sardinian army, he reported, was organized so that, "Twenty men in each company of infantry have the bersaglierie rifle, the rest have the ordinary percussion musket, using the Nessler ball," a particular type of expanding round similar to the Minie ball. McClellan also was aware of and described in detail the Prussian needle gun, a bolt action, breech loading rifled infantry arm which could be fired at a rate of up to seven rounds per minute to a range of 1000 paces.3

Of the infantry tactical systems of the European armies that he reviewed, McClellan seemed most impressed "that the Prussian Infantry Tactics, from the school of the recruit to that of the brigade, inclusive, form only one small volume of 228 pages." But even though the Prussians were arming their infantrymen with the most advanced firearm of the day, McClellan unconcernedly reported that their infantry firing "is usually by vollies, of one rank at a time; no rank fires without the special order of the commander." He also noted, "The tactics of the French infantry have not been changed since they were adopted in our service." Nowhere in his review of any of the infantry tactical systems of the European armies does McClellan mention or

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describe adjustments being made to conform tactics or grand tactics with the superior capabilities of rifled small arms.4

The section of McClellan's report dealing with his observations of the fighting on the Crimean Peninsula was largely an analysis of strategy and a discussion of the field fortifications used by both the Russians and the allies. Here again, McClellan did not specifically note the use or effect of rifled firearms in battle. In his three references to the tactical conduct of infantry, his analysis seemed predisposed by the doctrine of the day. In the first, reviewing costly assaults made by the Russians at Inkermann and Traktir, McClellan attributed their failure more to improper formation than to the effects of firepower. He wrote, "the Russians moved in two heavy and unwieldy masses; this system of tactics, which would on many fields, no doubt, carry all before it, . . . in these cases exposed them to terrible losses, and rendered impossible that effective development of numerical force and individual exertion which was necessary to carry the day." In the second reference, he noted that a French assault on Russian works on 8 September 1855, failed when the French were "rapidly and hopelessly driven out at the point of the bayonet." In the last, the failure of a British assault, also on 8 September 1855, was attributed "chiefly to that total absence of conduct and skill in the arrangements for the assault which left the storming party entirely without support."5

But perhaps McClellan should not be criticized too heavily for not noting the "practical advantages and disadvantages attending the use of

4McClellan, 42, 55.
5Ibid., 10, 21.
the various kinds of rifled arms" as Davis requested. McClellan's report seemed to be a thorough treatment of his subject and most carefully provided the details of arms, equipment, administration, and tactics of the infantry and cavalry of the European armies. Surely, given his thoroughness and attention to detail, if the Europeans were thinking in terms of the affects of rifled firearms on the battlefield and were developing new tactical and grand tactical doctrine, McClellan would have discovered the fact and included it in his report. The most probable explanation for McClellan's failure is that he found no evidence of any change in tactical or grand tactical doctrine and so did not report any. Nearly the same can be said of McClellan's observations of the fighting in the Crimea. He and his fellow officers did not arrive on the Crimean Peninsula until 8 October 1855, a full month after the fall of Savastopol, which was the last major action of the war. Therefore, McClellan did not have the opportunity to witness firsthand any real infantry fighting, and most likely relied upon interviews with those who had been witnesses in order to make his analysis. Here again, it is most probable that the Europeans failed to notice the effects of the use of rifled firearms and so they escaped McClellan also.6

Given the documentation that remains with us today, it is impossible to tell if Davis was satisfied with the results of his efforts as Secretary of War to have the War Department or the Army determine the affect that rifled small arms would have on the conduct of battle. Certainly, he considered that some change in doctrine might be

6Davis, 2:446; McClellan, 46. It is interesting to note that McClellan did not mention in his report the new French light infantry manual that was the basis for Hardee's Tactics.
required and took steps to cause an official determination of what that effect might be. But, when all of the official publications of the period immediately following the introduction of the rifled musket and even those down to the beginning of the Civil War are considered, the fact remains that no official publication of the War Department or the Army established any change or attempted to deal with any potential change to the doctrine of how infantry, cavalry, or artillery would be employed on a battlefield where the majority of the infantry would be armed with rifles.

In somewhat the same way as McClellan can be excused for his oversights, the War Department and the Army perhaps can also not be seriously taken to task for failing to comprehend the effects that the rifled musket would have on the conduct of battle when the major theorists of grand tactics themselves failed to perceive the need for any change.

Henry Wagner Halleck had resigned his Army commission in 1854 in favor of a career before the California bar, but apparently still maintained some interest in military affairs and developments. Although he produced no new military works, he did publish a revised edition of his *Elements of Military Art and Science* in 1859 which was word for word the same as the original edition published in 1846, except for the addition of an appendix of "Critical notes on the Mexican and Crimean Wars." This new appendix, though, did not even mention, let alone discuss the introduction of the rifled musket or its possible effects on the conduct of battle. When it came to considering the tactics and
experience of the Mexican and Crimean Wars, Halleck saw these as ratifying the system of grand tactics outlined in the body of his original work, particularly the infantry assault made in column formation. He largely dismissed the Mexican War, however, because "the small number of troops engaged, and the peculiar character of the ground in most cases, afforded but few opportunities for the display of that skill in the tactics of battle which has so often determined the victory upon the great fields of Europe." Still, Halleck did note that at Resaca de la Palma "the charge of a heavy column of infantry decided the victory" and at the Battle of Contreras "the charge by Riley's columns of infantry" was a movement "well planned and admirably executed."\(^7\)

Of the Crimean War, Halleck concluded that only the Battle of Alma was "subject to the tactical criticism of ordinary battles." Of this action Halleck believed, "The heavy column of Bosquet probably decided the victory, although the battle was general throughout the whole line." He noted also that the English advanced in columns of brigades, their left protected "by a line of skirmishers, of cavalry and horse artillery." This was a tactical disposition he had advocated in his basic treatise on tactics. The other major actions of theCrimean War—Balaklava, Inkerman, and Tchernaya—Halleck saw only as "sorties made to prevent an assault of the unfinished works of defense, and to prolong the operations of the siege." Of Inkerman and Tchernaya, though, Halleck made the same criticism of the Russians as McClellan had; that

\(^7\)Halleck, 3rd ed., 1862, 1, 414-15.
their infantry columns were heavy and unwieldy masses which caused them large losses and prevented an effective assault. 8

Throughout this period, the Baron de Jomini remained Europe's preeminent authority on strategy and grand tactics. He continued writing, producing new works of military history and military art and science. There is no doubt from these writings that Jomini was keenly aware of the technological developments which were taking place throughout the 1850s, especially the introduction of expanding projectiles and rifled small arms for the infantry. But, although Jomini was aware of these developments and aware of the questions concerning their effect on the conduct of battle, he reasoned that this affect would not change the tactical doctrine then being used by the armies of Europe and the United States.

Like Halleck, Jomini published new editions of his *Summary of the Art of War* without changing the original text, but adding appendices to discuss recent military developments and innovations. One of these appendices, written sometime just after the conclusion of the Crimean War, specifically addressed the influence which the rifled musket would have on the tactics of battle. In it, Jomini asked the question, "Will the adoption of the rifled small-arms and improved balls bring about any important changes in the formation for battle and the now recognized principles of tactics?" 9

Jomini began his analysis of this question by pointing out that the potential influence of infantry firepower in battle was not a new

8Ibid., 415-16.

9Jomini, 355.
question, but one that extended at least to the reign of Frederick the Great. Frederick, he pointed out, had fought a few of his battles with his troops formed primarily in deployed lines, where the use of their firepower played a significant role in the winning of the battle. But the armies of the French Revolution, though they had initially imitated Frederick by adopting the deployed line as their order of battle, had been forced by necessity to the use of columns of attack and infantry shock action in winning their battles. The column of attack, no less, had been the system of Napoleon, who fought nearly all of his battles on the offensive.  

The one recent example of the use of deployed lines, which Jomini admitted, was in the tactics of the Duke of Wellington, whose successes on the peninsula of Spain and the field of Waterloo "with troops deployed in lines of two ranks were generally attributed to the murderous effect of the infantry-fire." But Jomini did not see the linear tactics of Wellington as a definitive statement of the virtues of infantry firepower over shock action and berated "the fatal tendency of the clearest minds to reduce every system of war to absolute forms, and to cast in the same mold all the tactical combinations a general may arrange, without taking into consideration" all of the circumstances.  

Jomini had personally discussed the matter with Wellington at the Congress of Verona in 1823 and reported that the Duke admitted the tactical ascendancy of the English over the French at Waterloo was due largely to the French use of excessively heavy columns which were "very

\[\text{10}^{\text{Ibid.}, 348-50.}\]

\[\text{11}^{\text{Ibid.}, 349-50.}\]
dangerous against a solid, well-armed infantry having confidence in its fire and well supported by artillery and cavalry." According to Jomini, he modestly pointed out to Wellington that these heavy columns were not the small and mobile battalion columns which he (Jomini) advocated. The battalion column by division, Jomini told Wellington, was "a formation which insures in the attack steadiness, force, and mobility, while deep masses afford no greater mobility and force than a deployed line, and are very much more exposed to the ravages of artillery." Jomini then pointed out that this was precisely the formation in which Wellington had placed his Hanoverian, Brunswick, and Belgian infantry at Waterloo. Wellington replied that this was because he "could not depend upon them so well as upon the English." This statement Jomini took to be an admission by the Duke that the battalion column formation was superior to the deployed line. Wellington replied that the battalion column was certainly good, but that rating depended upon the discipline of the troops and the circumstances of the battle and ended by saying, "A general cannot act in the same manner under all circumstances."\(^\text{12}\)

Given the discussion with Wellington, Jomini concluded, as he had in his original text, that while the line of battle formation could, under the proper circumstances, be used effectively on the defense, it was entirely unsuitable in the attack. Jomini stated emphatically, "That the most skillful tactician would experience great difficulty in marching forty or fifty deployed battalions in two or three ranks over an interval of twelve or fifteen hundred yards, preserving sufficient

\(^{12}\)Ibid., 350-51.
order to attack an enemy in position with any chance of success." For Jomini, the preferred method of attack was with the assault battalions formed in column by division, a formation which emphasized shock action over firepower.

Having reviewed and reestablished the primacy of the battalion column, and, by implication, shock action in the attack, Jomini returned to the question of what affect the new rifled infantry arms would have on tactics. He quickly dismissed the notion that because of the increased range and accuracy of these weapons, battles would henceforth be a matter of two armies standing and firing at each other until one side or the other gave way. Battles, he said, would continue to be decided through maneuver, and victory "will fall to the general who maneuvers most skillfully." And as he had pointed out so many times before, maneuver was best accomplished with battalions in the column by division formation which necessarily relied on shock action and not firepower to achieve results. Although Jomini discussed and admitted that the deployed line relying almost exclusively on firepower was an option, he dismissed it by saying, "I would never accept the command of an army under this condition."14

He did state, however, that the battalion column should be modified somewhat by limiting the company line of battle to two ranks and including only six companies in each battalion. A battalion column, then, would have a slightly lengthened front with the companies in two rather than three ranks, and a depth of just six ranks. Jomini reasoned

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13 Ibid., 353.
14 Ibid., 355-56.
that battalion columns formed in this manner "would not be so much exposed to the fire of artillery, but would still have the mobility necessary to take the troops up in good order and launch them upon the enemy with great force."\textsuperscript{15} Nowhere in his discussion did Jomini consider or relate the increase in firepower that the rifled musket would bring to the battlefield to the use of the battalion column in future battles.

In his conclusions, Jomini stated unequivocally, "That the improvements in fire-arms will not introduce any important change in the manner of taking troops into battle."\textsuperscript{16} He did, however, recommend that the number of good riflemen and skirmishers be increased and dispersed throughout the line of battle, and that the troops on the whole be exercised in firing. His conclusions also reiterated that he believed a defense made with battalions in line of battle, relying upon firepower, at least initially, would be excellent, but that an attack upon an enemy position made in the line of battle formation would be difficult at best.

The last of the major theorists, Dennis Hart Mahan, had the least to say of the three concerning the effects which rifled firepower in the hands of the infantry would have on the conduct of battle. Mahan's major published work that despite its title, \textit{An Elementary Treatise on Advanced-Guard, Out-Post, and Detachment Service of Troops}, dealt with the conduct of battle, was first published in 1847 and continued in print until 1862. But unlike Jomini and Halleck, Mahan never attempted

\footnotesize{$^{15}$Ibid., 356.}\footnotesize{$^{16}$Ibid., 359.}
to revise or update this manual as new technologies emerged. Throughout the period between the introduction of the rifled musket and the beginning of the Civil War, he continued as the leading lecturer on military art and science at the Military Academy at West Point, and no doubt was aware of and carefully noted all of the latest military developments. But there is no evidence to show that he particularly noted the increased firepower potential that the rifled musket represented, or that he made any revision to his teachings on grand tactics to accommodate the potential of the new weapon. During this period, West Point was still largely a school of engineering, and Mahan was a professor of engineering before he was a professor of tactics.

If the Army and the established military theorists of the day did not recognize the effect that rifled firearms in the hands of the infantry would have on the conduct of battle, there were those younger students of military art and science who were at least intrigued by the new weapon and curious concerning its potential effects on the established systems of tactics.

Among the first of these to publish was Captain Henry Heth of the 10th Infantry. Heth was a West Point graduate, last in the class of 1847, who had earned his captaincy ahead of his classmates and others through long, rigorous, and exemplary service on the frontier.17 His interest in the new rifled musket and its potential for firepower,

though, may have been less of an interest in tactics than it was simply
an interest in firearms and marksmanship.

Heth had earned a reputation on the frontier as a marksman which
led him to use his own troops to experiment with a system of target
practice for soldiers that had been devised by Sir Henry Hardinge of the
British Army. At about the same time, March 1856, General-in-Chief
Scott issued a circular calling on officers to express their views as to
the best methods of improving accuracy within the Army. Heth responded
to the circular by forwarding to Washington a pamphlet he had written
describing a system of target practice which resulted from his own
experiments with Hardinge's system. Returning from the West on leave in
early 1857, Heth stopped by Washington to lobby with newly appointed
Secretary of War John B. Floyd for the opportunity to formally publish
the system of target practice for the betterment of the Army. Floyd,
somewhat of a marksman himself, was impressed enough that, upon the
completion of Heth's leave in October 1857, he was placed on special
duty in Washington to do just that. The result was the publication by
Heth and the War Department in March 1858 of A System of Target Practice
for the Use of Troops When Armed with the Musket, Rifle-Musket, Rifle,
or Carbine.\textsuperscript{18}

Like most of the works published on military subjects in the
United States during this period, Heth's A System of Target Practice was
not entirely his own work. Heth stated it was "prepared principally
from the French" and he acknowledged using the reports of other officers

\textsuperscript{18}Ibid., 135,138. Heth was aware of Hardinge's system because
Heth's friend, Oliver O. Howard, had sent him a copy of the London
Illustrated News with a description the system.
who had responded to the March 1856 circular from the General-in-
Chief. According to Heth, his principal reason for preparing the book
was:

The inaccuracy of the soldiers of our army in firing has
been a matter of surprise and regret to many officers. This
has been especially remarked upon since the introduction of
the expanding ball into our service.

Heth's book was exactly what its title indicated, a system of
target practice for the Army to use in the training of its infantry
soldiers. It discussed how soldiers should be taught to aim, the proper
positions for them to take in firing, trigger pull and simulated firing
exercises, how ranges and targets should be set up, and, of course, how
to conduct live firing exercises. The book was oriented on the tactics
of the day in that all of the exercises conformed to the methods of
firing that would be conducted by an infantry unit on the battlefield,
that is, fire by volley and file while in ranks, and firing as
skirmishers. Heth even went so far as to instruct officers in the
proper delivery of the firing commands cautioning them that being too
quick between the preparatory command of "aim" and the execution command
of "fire" would throw off the aim of their soldiers by allowing them too
little time for aiming properly, while taking too much time between
these commands would cause the soldiers to lose their aim in the fatigue
of having to hold their weapons in the firing position for too long.

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19 Henry Heth, A System of Target Practice (New York: D. Van
Nostrand, 1862), 1, 3.

20 Ibid., 9.

21 Ibid., 52-54.
While Heth's system, if adopted and followed by the Army, would certainly significantly raise the effectiveness of infantry fire and insure fuller development of the firepower capabilities of the rifled musket, it contained nothing to change or adapt the precepts of minor or grand tactics to the conduct of battle between armies possessing this greatly perfected firepower. While Heth apparently recognized and desired to see the Army capitalize upon the advantages that would result from arming soldiers with a weapon of greatly increased range and accuracy, he did not recognize how this weapon would affect the conduct of battle. Perhaps his long experience on the frontier did not influence his thinking enough. There soldiers habitually fought more as skirmishers, and long and accurate fire could decide almost any of the engagements with the Indians. Heth's book, however, was written in the terms of Scott's and Hardee's tactics, tactics that Heth studied and understood, but with which he had no experience in battle. Despite the fact that he was writing about marksmanship, Heth still believed that much of the effectiveness of infantry fire in battle would depend on the soldiers all firing on the given order of command. In this regard, then, A System of Target Practice made only a minor contribution to the battle doctrine of the day, because it dealt only with the improved capabilities of the rifled musket and did not recognize the tactical problems which would be brought about by improved firepower.

Some of the fresh interest in weapons and tactics caused by the introduction of the rifled musket came from the civilian side. In a long article titled "Modern Tactics," in the January 1858 issue of The

22Ibid., 53.
Southern Literary Messenger, an author who identified himself only as R.E.C., expounded upon the changes he believed that the introduction of the rifled musket would have on the conduct of war. Although the article endeavored to review the entire history of technical developments in warfare and, in many cases, was overly opinionated, it contained some well researched and knowledgeable insights as to the capabilities of the rifled musket and its effect on the conduct of battle that were being overlooked in print by other writers.

R.E.C. was most impressed with the capabilities of the new weapon and saw it not only as "the best fire-arm that has ever been put into the hands of troops" but also as a weapon which "has reached the limit of possible improvement in its principal features." Its principal features he saw as range, accuracy, and the rapidity with which the weapon could be loaded. The range of the rifled musket R.E.C. judged to be greater than the human capability of the soldier using the weapon. He pointed out that the penetrating power of the rifled musket projectile was sufficient to make the weapon lethal at a range of 1500 yards, even though the soldier was incapable of engaging a target or observing the effects of his fire beyond 1000 yards. Therefore, in this feature, there was no room for possible improvement. The same was true for the accuracy of the weapon. R.E.C. believed that in battle, the target of the infantry would not be single soldiers, but groups of soldiers. He cited the results of experiments conducted at the Springfield armory in 1855 which showed that at a range of 1000 yards, 

David K. Jackson, The Contributors and Contributions to the Southern Literary Messenger (Charlottesville, Virginia: The Historical Publishing Co., 1936), 139. Jackson states the author might have been R.E. Cochrane.
the average deviation of the rifled musket projectile from the vertical and horizontal was only 47-1/2 and 29 inches respectively. He concluded that this level of accuracy was more than sufficient to enable the average infantry formation to be effective to a range of 600 to 800 yards against another infantry formation or a crew working an artillery field piece. With regard to the rapidity of fire, R.E.C. declared that the slowest soldier would be able to fire three rounds a minute with the rifled musket and the best soldiers five. "Any thing beyond," he said, "would be a positive disadvantage; for troops fire too much at all times, and what is wanting is, that they should fire more deliberately, and not more rapidly."24

R.E.C. was quick to recognize that the introduction of the rifled musket would have a profound effect upon how the infantry would be required to fight. He pointed out that in the past, tactics had substituted "the action of masses in the place of the action of the individual soldier." Under such a system, R.E.C. believed, soldiers were trained only to the extent that they were capable of acting as part of the mass. They were not trained in the use of the musket and bayonet as individuals. The future, though, would require soldiers who were more capable of independent action, better trained to use both the rifled musket and the bayonet. "Above all," he said, "as the whole power of infantry is in its fire and the bayonet, let the soldier be perfected in the use of both."25

24R.E.C., 9-11.
25Ibid., 12, 18.
The ideal of this new infantry system, according to R.E.C., was to be found in the training and drill of the "Foot Chasseurs" of France. Members of these units, he wrote, were required to complete courses in gymnastics and fencing with the bayonet to perfect themselves as individual soldiers. Their drill much simplified and quickened the evolutions required of the company and battalion in battle to an average savings of one-third of the time required for the same movements under the old system. "What an advantage!" R.E.C. wrote, "For we must remember that under such a tremendous fire as that of modern artillery and the Minie-rifle, time is life." He went on to point out that just such a system as that of the "Foot Chasseurs" had been prepared for the use of the United States Army and the militia by Lieutenant Colonel Hardee at the direction of Secretary of War Jefferson Davis. R.E.C. concluded:

The new system is especially suited to the genius of the American people. It is in fact the bush-fighting of the American rifleman, rendered ten times more effective by the regularity of action which discipline produces, by the improved weapon and its bayonet, and by the capability of the men to perform the battalion evolutions when necessary.

As to the conduct of battle, R.E.C. believed that the use of skirmishers would be greater than ever before. In the infantry assault, he agreed with Jomini that the day of massive columns was over and that future assaults by the infantry would be made using converging small columns of single battalions in the column by division formation. The cavalry, he wrote, needed to increase the speed of its formations in

26 Ibid., 16.
27 Ibid., 18.
order to deliver its powerful shock in a charge against infantry. The artillery, in order to maintain its place in the tactics of battle, was to replace its six pounder guns with the greater range of the twelve pounder field piece. "This would enable field artillery to act from a distance, which would render the fire of the Minie rifle much less dangerous." And lastly, R.E.C. believed that the use of field fortifications on the battlefield would be increased significantly "in order to shelter all troops from the tremendous effects of the new arms, until the decisive moment of immediate action." 

Overall, R.E.C.'s article was remarkable in many respects for its perception of the reality of the rifled musket. With regard to the capabilities of the weapon, R.E.C. was correct in most of his assertions. It is particularly noteworthy that he recognized that the potential of the rifled musket was limited more by the human factor than anything else. So too, it is noteworthy that R.E.C. recognized that the introduction of the rifled musket would advance the worth of the individual soldier in battle, and thus required a greater emphasis on training the soldier as an individual. R.E.C.'s ideas on changes in the conduct of battle were particularly perceptive concerning the increased use of skirmishers, the need to increase the range of artillery, and the benefits to be derived from a greater use of field fortifications. But throughout the article, R.E.C. displayed the same impediment of foresight that inflicted other military thinkers of his time—that battles would be won by shock action and not by firepower. He did not see a benefit to increasing the soldier's rate of fire, indicating that

28 Ibid., 19.
he was not willing to accept that firepower alone would be the decisive element of battle. The same was indicated by his endorsement of Hardee's tactics. For R.E.C., Hardee's tactics were a sufficient complement to the rifled musket because the new tactics revised the skirmish drill and increased the tempo of infantry maneuver to allow columns of assault to close with an enemy line armed with the rifled musket. As with others, R.E.C. failed to note that Hardee's tactics offered no innovations to overcome the problems of increased firepower. R.E.C. endorsed the use of small columns for the infantry assault citing Jomini's statement "that in his long experience he never saw an attack fail which was made in this manner."\(^{29}\) Clearly, R.E.C. believed that despite the introduction of the rifled musket with all of its firepower capability, the decisive element of battle would remain the shock action that only the infantry was capable of delivering with the bayonet.

Another of the minor theorists of this period was First Lieutenant Cadmus Marcellus Wilcox. Wilcox was an 1842 graduate of the United States Military Academy who served with distinction as an infantry officer in the War with Mexico and continued his military career through the 1850s. In 1859, Wilcox published a book called *Rifles and Rifle Practice*. Although largely a technical and mathematical explanation of the physical science of rifles and rifle fire, accompanied by a survey of the rifled firearms developed by the European powers for their infantry, Wilcox's book did contain some observations on the probable effects of rifle armed infantry on the conduct of battle. Like Heth, Wilcox admitted in the preface of his book that he claimed little of it

\(^{29}\) *Ibid.*
as his original work, the majority being translations from what he considered to be the best French publications of the day on the subject of military rifles. Wilcox did not further identify the works or the authors he translated, so it is impossible to determine which, if any, of the tactical observations in Wilcox's book are his own.

Much of what Wilcox had to say about rifles concerned the capabilities of the new weapon in the hands of the individual marksman. In Chapter Five, however, he turned his attention to the weapon in the hands of an infantry unit, "for," he wrote, "it is of higher importance to know what effects are produced when it [the rifle] is employed by a number of men united in one body." Wilcox limited himself to investigating the relative effectiveness of the rifled musket when used in the standard tactical methods of firing, that is in the company volley, the fire by file, and the fire of skirmishers. Wilcox termed effectiveness of fire the "efficacy of fire," and defined it as a mathematical relationship resulting from the measurement of the accuracy, range, penetration, and rapidity of fire as observed during the execution of any of the tactical methods of firing. More simply stated, Wilcox was interested in measuring the casualty producing capability of a body of infantry using the various different infantry firearms, at various ranges, given the three different methods of firing tactically.

Using data from experiments made at Vincennes, France in 1851, Wilcox stated that at ranges under 164 yards the rifle had little, if any, superiority over the musket, at 218 yards the rifle was one and a

half times as effective as the musket, and at 437 yards it was six times as effective. Beyond 437 yards, Wilcox continued, the musket was completely ineffective while the rifled musket could still be considerably effective. Of the different methods of firing, Wilcox concluded, "These experiments proved that the fire of skirmishers was more effective than that of the file, and that the latter was more so than that of company." The exact ratio of effectiveness among the three methods Wilcox gave as 2 : 3 : 4. That is, two soldiers firing as skirmishers were as effective as three soldiers firing by file and four soldiers firing in a company volley. The reason, according to Wilcox, was that the soldiers firing as skirmishers were more deliberate in aiming and firing being less distracted than their comrades in the close order formation by the activity of others, and, in the case of the company volley, the necessity of firing precisely on the order of an officer.31

In a later chapter of his book, Wilcox turned his attention from the capabilities of the rifled musket to a consideration of the effects that the weapon would have on the conduct of battle. In this chapter, many of Wilcox's observations were farseeing and correctly predicted the influence that greater infantry firepower would have on the future battlefield. Summing up his ideas Wilcox wrote:

Fields of battle will be more extended than formerly; there will be more difficulty in estimating the variety and number of the adversary; more difficulty in properly placing troops on the field, and directing their movements. Keeping them together, holding them well in hand so as mutually to protect and sustain each other, will, in future, require the greatest care. As fields of battle will cover more ground

31Ibid., 173-74.
than formerly, new tactical means to obviate the disadvantages resulting from this will be required; that continuity of lines required by tactics will no longer be necessary.\textsuperscript{32}

Wilcox's greatest concerns about battle in the future seem to have resulted from the great range at which the rifled musket could be effective. He saw infantry rifled musket fire as being destructive at 1200 yards and absolutely irresistible at 600 yards. The infantry line with the smoothbored musket had not been effective beyond 300 yards. For Wilcox, this meant that the greatest care must be taken when bringing troops into battle. He feared that if care were not exercised, whole armies would suddenly find themselves under the most destructive fire. This concern particularly applied to the positioning of units which were not immediately to engage the enemy, such as the units of the main assault force or the main defensive line, and the reserve units. Ever so slightly, Wilcox hinted that a new concept of the order of battle might be required when he said, "The distances between lines in battle are fixed by tactics, and much importance seems to be attached to this feature: this will probably give way to a different order."\textsuperscript{33}

Turning his attention to infantry units in particular, Wilcox predicted that the importance of the individual infantry battalion on the battlefield would be much increased and the latitude given to battalion commanders to take independent action would have to be much broadened. This would mean that the organization of the infantry battalion and the precepts of infantry tactics would have to be changed to permit greater and more rapid mobility, particularly in deploying and

\textsuperscript{32}Ibid., 242.

\textsuperscript{33}Ibid., 242-43.
in the development of fire power. Toward this end, Wilcox's recommendations were the same as had been made by Jomini before him; that henceforth, the infantry line of battle formation should be in two ranks, and that the battalion should be composed of just six companies of 100 men each. Also like Jomini, Wilcox was not quite ready to believe that battles would be fought and won through the use of fire alone. Therefore, he recommended that the habitual formation of the infantry battalion on the battlefield should be the column by division. With only six companies to a battalion, this formation would not offer as lucrative a target as a battalion of ten companies, would be more readily deployable into the line of battle formation for firing, and would still be capable of forming a strong square to resist the assault of cavalry. Should a column formation of greater depth be required, Wilcox suggested that one battalion be placed behind another.34

Wilcox went on to recommend that a regiment of infantry should consist of four of these six company battalions and that each company should be thoroughly instructed in both target practice and skirmish drill. The best marksmen in the regiment, he believed, should be assigned to the fourth battalion. But this battalion should not be limited to skirmish duty alone, "but to be organized at times into special corps, to be launched at critical periods of battle in mass, moving with the accelerated pace against the almost victorious adversary."35

34Ibid., 244-45.
35Ibid., 246.
Turning to the cavalry, Wilcox pointed out that even when the infantry was armed with the smoothbore musket, a cavalry charge against it stood little chance of success unless the infantry were demoralized or poorly handled. Against infantry armed with the rifled musket, a cavalry charge "will be made with more danger and loss to itself, and with less probabilities of success." As before, Wilcox saw the problem as the extended range at which infantry fire would become destructive. Formerly, the cavalry could approach to within 400 yards of the infantry to begin a charge without suffering loss. Now, at 1200 yards the cavalry would be within the destructive range of the infantry, and the probability of loss would increase as the cavalry formation drew closer to the infantry line and the range grew shorter. But, Wilcox could not completely dismiss from the battlefield the cavalry and its powerful capability for shock action stating, "Cavalry, in the hands of a skillful general, must ever be a formidable arm."^36

Wilcox's comments concerning artillery on the rifled musket battlefield were perhaps the most perceptive of all. He noted that the destructive range of the infantry line was now at least equal to, in most cases superior to, the range of the most destructive fire that a battery of artillery could deliver against an infantry formation. Experiments at Hythe, England in 1856 showed that an infantry line of only 30 files, less than half a company, could disable a battery at a range of 810 yards in only three minutes. Therefore, Wilcox thought, artillery would no longer be able to open battles or prepare the way for the main assault by going forward to establish a firing position in

^36Ibid., 246-47.
close range of the enemy infantry line. "It is clear," Wilcox wrote, "that field artillery, with its present range, cannot with any chance of success remain in action in front of infantry." Nor did Wilcox believe that extending the range of artillery, even to several miles, would restore its former position on the battlefield because, "The infantry rifle has now a range equal, or greater, than the limit of distinct vision, and greater even than the extent offered by fields of battle in general." Still, he ended his statement on artillery optimistically by saying, "in its legitimate sphere of action in removing obstacles, in the attack and defense of forts and fortresses, artillery remains intact, as well as in the grand tactics of battles."37

With regard to field fortifications, Wilcox saw the introduction of the rifled musket as overcoming the problems that had been experienced when they were used in conjunction with the smoothbore musket. "With the improved rifle," he wrote, "the principle of the works will not be changed, but the inconveniences may be diminished."38 Those inconveniences were the areas in front of field works which could not be adequately covered given the limited effective range of the smoothbore musket. The introduction of the rifled musket, therefore, would serve to strengthen the use of field fortifications.

In Rifles and Rifle Practice, Wilcox's assessment of the power of the rifled musket was more penetrating than that of any other writer of the period. He decidedly demonstrated that the most effective fire would come from infantry in open order, skirmishers, and not from

37Ibid., 247-48.
38Ibid., 249.
infantry in the standard close order line of battle. His ideas concerning the conduct of battle correctly predicted the expanded breadth of the battlefield, as well as the more important and independent role that would be played by the infantry battalion and its commander. And Wilcox's ideas on the use of artillery predict the much changed capability for engagement that that arm would face on the rifled musket battlefield. But in all of this, Wilcox offered no practical suggestions as to how minor or grand tactical doctrine should be changed. Other than establishing that skirmishers were more effective in their firing than soldiers in the close order formations, Wilcox did not elaborate or attempt to suggest new tactical procedures which would capitalize on the greater firepower of infantry armed with the new rifled musket. His prediction of the extended battlefield and the more important and independent role of infantry battalions did not cause him to suggest or introduce any new concepts for the order of battle or the sequences of engagement, or to depart from the traditional infantry formations in battle. And lastly, even though Wilcox predicted significant changes in the battlefield capabilities of the infantry, cavalry, and artillery because of increased firepower, he could not set aside the time honored concept that shock action and not firepower would win battles.

Another West Point graduate who published at least some of his thoughts on the implications of the introduction of the rifled musket for the future conduct of battle was First Lieutenant John Gibbon. Gibbon shared with Heth membership in the class of 1847, and he had seen active service in Mexico during the final stages of Scott's campaign against Mexico City and in campaigns against the Seminole Indians in
Florida. Between 1855 and 1860, he was assigned as an artillery and quartermaster instructor at the Military Academy. Toward the close of this assignment, Gibbon published *The Artillerist's Manual*, which he had originally prepared as a book of instruction for cadets, but which he decided to extend "beyond the limits at first proposed, with a view of spreading information not popularly accessible, upon a subject of the first importance to our national defense."39

Gibbon's objective, as the title of the manual implies, was a book for the instruction and reference of artillery officers, especially those artillery officers who would man the large coastal fortifications during war. Gibbon believed these fortifications to be the nation's principle defense against invasion.40 For its time, Gibbon's manual was remarkably comprehensive in its instruction and scope of subject matter, covering almost all aspects of the study of artillery including the theory and science of its firing, types of guns, projectiles, carriages, and related equipment, the problems of logistics, and even the selection and care of horses. Sections were also included on the function, maneuver, and tactics of field artillery which offered Gibbon the opportunity to comment on the effects that the rifled musket would have on field artillery as well as on the general conduct of battle.

At the first of these opportunities, Gibbon addressed directly the subject of the rifled musket and field artillery, and took bold exception to the assertions of Wilcox and others "that the use of the


40 Ibid.
rifle will supersede entirely the use of field-pieces in war." Gibbon pointed out that because of the small signature effect of the strike of a single bullet, the rifleman during the confusion of battle would be entirely unable to adjust the sights of his weapon so as to be able to effectively fire at targets at the extended range of the rifle. Artillerymen, on the other hand, could easily follow and observe the strike of the much larger artillery projectile and more quickly make the necessary adjustments in range to place effective fire on their target. Gibbon went on to point out that even if the rifleman did succeed in adjusting his sights to effectively engage a gun crew, it was a small matter for the artillerymen to increase or decrease the range by some maneuver of the gun, forcing the rifleman to again go through the laborious and time consuming process of getting his sights adjusted to the proper range. "These facts," Gibbon wrote, "to say nothing of the great physical, as well as moral effect of a rapid and well-directed fire of half a dozen guns upon a body of infantry, seem to demonstrate that the importance of artillery upon the field of battle is rather increased than diminished, and should rather urge to improvement in its range and efficiency, than to its abandonment and under-rating." To punctuate his argument, Gibbon went on to assert that the French were discarding entirely the use of long range sights on their rifled muskets, and reemphasizing the importance of the bayonet.41

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41Ibid., 161-62. Gibbon did not directly name Wilcox or any other author in the text, but he so closely follows the structure of the argument concerning the superiority of rifled muskets over field pieces that Wilcox used in Rifles and Rifle Practice that it is obvious Gibbon is attempting to refute it.
In his second reference to the rifled musket, however, Gibbon allowed that, despite the great importance of the role of the bayonet in the winning of battles, it was "now incontestible that the efficiency of a body of infantry resides essentially in its accuracy of fire." And he went on to say that a well directed fire from infantry armed with the new rifled musket was "sufficient to stop the advance of almost any kind of troops." But Gibbon refused to credit the infantry of the day with the ability to deliver such effective fire, stating that in battle even the best disciplined of them would waste their new found firepower by firing too much and at too great a range. The point that Gibbon was attempting to make did not concern the capability of infantry firepower in battle as much as it did the need for the establishment of a regular system of schools and training within the Army. He wrote, "To attain efficiency in the use of any arm, diligent and systematic practice is absolutely necessary."42

In the particular case of the rifled musket, Gibbon advocated, as had Heth before him, a thorough system of target practice. Gibbon did not discuss the details of such a system in his book, possibly feeling that Heth had already adequately accomplished that, but he did point out that a system of target practice should include instruction in the theory of marksmanship, something that Heth had omitted. For Gibbon, this meant instruction in the physical science involved in the firing of the rifled musket, how gun powder acted upon a projectile, the implications of velocity, and a knowledge of trajectory, all of which he discussed at some length. Gibbon then concluded this section of his

42Ibid., 221.
book with a short discussion of the system of rifle firing practice then
in use in France. 43

In the section of his manual dedicated to field artillery, Gibbon
undertook to discuss the importance, use, and tactics of this arm in
battle. Field artillery, he said, "has now become an indispensable arm
in all armies; and brought to such perfection that no troops, however
brave and well-disciplined, can do without it." 44

Gibbon's concept of battle and of the use of artillery in battle
was most conventional. In all cases, artillery was to be posted along
the front of the main line of battle at a distance of at least 60 yards.
In the defensive battle, the proper role of the artillery was the
repulse of the enemy's columns of attack by throwing them into disorder
through the well directed, converging fire of the field batteries. In
the offensive battle, artillery was to be used to prepare the way for
the main attack and to support the maneuver of the infantry and cavalry.
While Gibbon counseled that artillery fire must always be delivered with
calmness and intelligence, and at a proper range of 800 to 900 yards, he
went so far as to assert that artillery was capable of going ahead of
the main assault force to prepare the way for the grand charge, even to
the point of advancing the guns to within 300 yards of the enemy main
line to overcome it with grape and canister. He cautioned, however,
that the cases when this tactic would prove to be successful "are very
rare, and require much tact and resolution to know how to profit by
them." In this discussion of field artillery in battle, Gibbon did not

43 Ibid., 221-47.
44 Ibid., 385.
address infantry armed with the rifled musket, or for that matter even mention rifles except to again point out the advantage possessed by artillery because "the striking of the shot gives a means of correcting the fire, not possessed by small arms."\textsuperscript{45}

Even though Gibbon enthusiastically espoused the capabilities of artillery, he readily admitted that the moral effect of artillery fire was very often greater and more important than the physical. Toward this end, he instructed that solid shot was preferred against infantry in line of battle and was to be fired low to strike in front of and ricochet through the line so as to produce "a greater moral effect than one which passes directly through it." Shell and schrapnell were to be used as much as possible against infantry or cavalry in a column of attack because these rounds "produce a greater moral effect, generally, than grape or canister."\textsuperscript{46}

Gibbon's manual was a book written by an artilleryman for artillerymen. As such, it was not intended to be a comprehensive analysis of the capabilities of the rifled musket or a treatment as to how its firepower would effect the future conduct of battle. The points that Gibbon made concerning the new weapon and its use on the battlefield, though, differed markedly from those made by many of his contemporaries. Gibbon fully recognized the firepower potential of the rifled musket because of its long range and great accuracy, but denied that the full firepower potential of the weapon could be realized in the smoke and confusion of battle. In particular, the difficulties that

\textsuperscript{45}\textit{Ibid.}, 386-87, 389, 402.

\textsuperscript{46}\textit{Ibid.}, 404-5.
Gibbon believed the infantryman would have during battle in estimating range and adjusting the rear sights of the rifled musket led him to conclude that the effectiveness of infantry would not be that much extended beyond its traditional effectiveness with the musket. While Gibbon conceded that infantry firepower might now be sufficient in the defensive battle, with the help of artillery, to stop the advance of the infantry assault columns, he wrote nothing to refute the belief that battles would be won by those same columns of assault with the bayonet as the principal weapon. If anything, infantry and cavalry required the firepower of the artillery more than ever before to help them break the enemy's infantry line at the point of the assault. To this end, Gibbon recommended no change in artillery tactics because of the introduction of the rifled musket. The ability of the artillery to maneuver and its overwhelming firepower, Gibbon believed, would be sufficient to maintain its role in the winning of battles.

At Charleston, South Carolina on 12 April 1861, the matter of how battles would be fought in the age of rifled small arms ceased to be a matter theoretical and academic and became one of terrible practicality. Yet, at that point in 1861, despite all the interest and effort that had been put forth by the nation's senior military leadership, its top military theorists, and its best young military minds, the superiority that the firepower of rifled infantry arms would possess over shock action in the coming battles was not recognized or understood. The warring factions of the nation, therefore, prepared for war in
accordance with doctrine, both tactical and grand tactical, that was yet far behind the technology with which the war would be fought.
CHAPTER 6
CONCLUSION

The battles of 1861, 1862, and 1863 reflect very clearly the leadership and tactics of soldiers raised and trained to fight battles in which shock action was the key element of victory. Regiments of infantry were trained according to the tactics of Hardee or Scott, cavalry and artillery with the manuals of 1841 and 1855, and 1845 and 1860 respectively. On the fields of battle, the armies of the North and the South were arrayed and maneuvered according to the precepts of Jomini, Halleck, and Mahan. This is not to say that the battles themselves were battles of shock action because they were not. It is evident in even the most elementary study of the battles of this period that firepower had become the dominant element of warfare. But officers educated in the doctrine of shock action could not at first see this.

By 1864, however, the terrible destructive power of the rifled musket was evident to every soldier in the field. On both sides, soldiers would not halt in the presence of their enemies without digging entrenchments to protect themselves from the fire of the rifled musket. Assaults on these field works were successful only with overwhelming superiority of force, and only if made over very short distances with minimum exposure to the rifle fire of the defenders. But even in these cases, the cost in terms of units and of life was extreme.

145

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Although dozens of manuals on both tactics and grand tactics were published during the war, little effort was made to correct the doctrine of 1861 in light of the reality of the battles. There was no staff and no system in either army dedicated to studying the battles and producing a revised doctrine which could be published for the benefit of the men who would fight the battles yet to come. Officers and soldiers in the field, as a matter of necessity, adapted the doctrine of 1861 based on their battlefield experience and communicated that experience directly to new units and replacements. The opportunity for doctrine, in its carefully thought-out written form, to predict and influence the manner of conducting battle had passed in 1861 and would not come again until after 1865.

The dominance of firepower on the Civil War battlefield in the form of the infantry's rifled musket and the inadequacy of the tactical and grand tactical doctrine with which the war was fought are facts that influenced the conduct and outcome of Civil War battles. That influence, however, has very often not been understood or considered by military critics and historians who have written about the battles and the military conduct of the war in general.

The participants themselves wrote extensively concerning their experiences in battle, and reviewed the campaigns and battles seeking to find reason for every defeat and victory. Many of these works are rich in tactical detail, providing today's historian with the material necessary for an in-depth analysis of the tactics used in battle. Rufus Dawes, for example, in his classic Service with the Sixth Wisconsin
Volunteers describes the formations, commands, and movements he employed as a regimental commander from 1862 through 1864. But, while the participants often described the details of the tactics they used and commented on the extraordinary effects of rifled musket fire, they did not produce a work which dealt directly with the inadequacy of shock action tactics on battlefields dominated by firepower.

In the years immediately following the war, even military theorists who were developing new doctrine based on the experience of the war failed to recognize how fully firepower dominated the tactics of shock action on the modern battlefield. In his new system of infantry tactics, published in 1867 and revised in 1873, Brevet Major General Emory Upton, a young officer with a brilliant record of combat service during the war, could not disassociate his new tactical system from the tactical system of lines and columns that had existed prior to the war. Recognizing, though, the even greater potential for firepower that the infantry would possess with the new breech loading rifle, Upton introduced a single rank formation which could be used in conjunction with the standard double rank formation, revised the instructions for skirmishers so that their deployment would be easier and their role in battle emphasized, and eliminated the square as being no longer necessary because he believed infantrymen armed with the breech loader could adequately defend themselves against cavalry by firepower alone. Still he wrote, "The introduction of the breech-loader has changed none of the principles of grand tactics; ... experience will prove that the safety of an army cannot be intrusted to men in open order with whom it is difficult to communicate; but that, to insure victory, a line or lines of battle must be ever be at hand to support or receive the
It should be noted that Upton's new system of infantry tactics was reviewed and approved by a board of officers which included no less personages than General U.S. Grant and Major General George G. Meade.

By 1894, however, the tactical and grand tactical lessons to be learned from an in-depth analysis of combat during the Civil War was beginning to show in doctrinal literature. In *Organizations and Tactics*, a work written chiefly for military professionals, Major Arthur L. Wagner carefully studied the tactics used during the war and concluded that the use of battalion close columns in the assault had generally not been successful during the war and lead only to very high numbers of casualties. Wagner also noted the extensive use of hasty entrenchments during the later stages of the Civil War and described it as "the most marked tactical feature of the War of Secession." But, even though he recognized the supremacy of firepower and believed it to be a key element in the conduct of an infantry assault, Wagner also believed that the infantry must "be able to deliver a heavy shock at the end of the fire action." To that end, he recommended that the infantry assault be conducted in a formation that amounted to little more than a variation on the columns of assault advocated by the pre-war theorists.

Historians of the Civil War, at least those who are interested in the purely military aspects of the war, have tended to concern

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themselves with producing campaign studies that illuminate the move
countermove that is the wealth of military historical writing. In just
the last decade, however, works such as Herman Hattaway's and Archer
Jones's How the North Won (1983) and Richard E. Beringer's, Herman
Hattaway's, Archer Jones's, and William N. Still's Why the South Lost
(1986) have analyzed the military operations of both the North and
South, seeking to explain the reason for the triumph of one side over
the other. In doing so, they adequately discuss the capabilities of the
rifled musket and the role of infantry firepower in winning or losing
Civil War battles. In Attack and Die (1982), Grady McWhiney and Perry
D. Jamieson reviewed Civil War tactical doctrine and attempted to
establish that the Southern penchant for assaults against positions held
by Federal infantrymen armed with the rifled musket was the chief reason
for the South losing the war.

But even in the campaign studies and analytical works cited above,
each of which in their own way directly treat the role of strategy and
tactics in the Civil War, historians have tended to view the tactics of
Civil War battles from the perspective of knowledge gained from an
analysis of those battles after the fact. While this approach is
certainly adequate and accurate in explaining why battles were won or
lost, the problem with it is perspective. As has been argued in this
thesis, the Civil War soldier did not enter the conflict with any
precise knowledge, indeed almost no knowledge at all concerning how the
rifled musket would affect the conduct of battle. Yet many historians
treat the knowledge of the effects of firepower in battle as a fact
known to those soldiers at the time of the war. In How the North Won,
the authors state, "we believe that the dominant culture in both Union
and Confederate armies was a faith in the defense aided by field fortifications and a belief that the offensive must rely on the turning movement." The reality of the war, however, was that this belief in field fortifications and turning movements resulted from experience gained during the war and not from tactical doctrine that existed prior to the war. Throughout the war, officers and soldiers continued to train according to the tactics of Scott and Hardee and to conduct battles according to the principles and rules of grand tactics as established by Jomini, Halleck, and Mahan. Their tempering of those rules and principles, the extensive use of field fortifications, came only after the reality of battle had shown them that some change was required.

Even in those cases where historians have considered that the tactical conduct of Civil War battles was subject to a process of development during the war, they do not fully treat the tactical and grand tactical doctrine that was the common base for that development. The authors of Attack and Die do an excellent job of describing tactical theory as it existed at the beginning of the war, but stop short of providing a full template for the conduct of battle as it was understood by the soldier of 1861.

A fully detailed and precise understanding of tactical and grand tactical doctrine as it existed in 1861 is not necessarily a requirement for an historian writing a campaign or battle history or a work on some other military aspect of the war. Even Douglas Southhall Freeman occasionally used the terms "musket" and "rifle" interchangably as if

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they described exactly the same entity. Many other historians have described the details of campaigns and battles in terms that relay the picture of battle but which are not precise with regard to the military terminology of the day. And many successful campaign and battle studies have been written that rely on an analysis of movements and countermovements without considering the doctrine that might, in the mind of the commander, have dictated those movements.

Officers and soldiers, however, fight battles and conduct campaigns according to the doctrine that they were trained in prior to their entry into a conflict. An understanding of that tactical doctrine in the way that it was understood at the time, therefore, can add a measure of detail and exactness to an historical narrative and can help to explain, in some cases, why a commander may have acted as he did.
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