Title: The American Rifled Musket: Technical Revolution or Tactical Redundancy?

Author: Alexandre F. Caillot

Colby College

Follow this and additional works at: https://digitalcommons.colby.edu/honorstheses

Part of the Military History Commons, and the United States History Commons

Colby College theses are protected by copyright. They may be viewed or downloaded from this site for the purposes of research and scholarship. Reproduction or distribution for commercial purposes is prohibited without written permission of the author.

Recommended Citation
https://digitalcommons.colby.edu/honorstheses/680

This Honors Thesis (Open Access) is brought to you for free and open access by the Student Research at Digital Commons @ Colby. It has been accepted for inclusion in Honors Theses by an authorized administrator of Digital Commons @ Colby.
The American Rifled Musket:
Technical Revolution or Tactical Redundancy?

Alexandre F. Caillot

Prepared for: HI483
April 26, 2013
# Table of Contents

- **Introduction** .................................................................................................................. 1
- **The Development of the Rifled Musket** ...................................................................... 4
- **Military Thinkers and the Rifled Musket** .................................................................... 11
- **Pre Civil War Use** ......................................................................................................... 21
- **European Adoption of the Weapon** ............................................................................. 26
- **American Perceptions** .................................................................................................. 28
- **Arming Troops for Combat in the Civil War** ............................................................... 45
- **The Battlefield Impact of the Rifled Musket in the Civil War** .................................. 49
- **The Day of Glory: First Bull Run** ................................................................................ 50
- **Confederate Entrenchment** .......................................................................................... 54
- **Union Entrenchment** .................................................................................................... 57
- **Reasons for Entrenchment** ............................................................................................ 60
- **A Change of Heart** ........................................................................................................ 62
- **The Risk of Exposure** ................................................................................................... 63
- **The Terror of Combat** ................................................................................................... 69
- **First Bull Run - Template of Modern Combat or Relic of the Past?** ....................... 78
- **The Depths of Despair: Cold Harbor** ......................................................................... 79
- **Seeing the Elephant** ...................................................................................................... 85
- **The Field of Blood** .......................................................................................................... 90
- **The Cold Face of Battle** ................................................................................................ 97
- **The Cost of Failure** ....................................................................................................... 101
- **Conclusion** .................................................................................................................... 102
- **Bibliography** ................................................................................................................ 105
List of Figures

Figure 1: The Mayberry Cartridge ....................................................................................... 10
Figure 2: The arcing path of the bullet ................................................................................ 13
Figure 3: The 1861 Springfield rifled musket ...................................................................... 48
Figure 4: The First Battle of Bull Run .................................................................................. 50
Figure 5: The Battle of Cold Harbor .................................................................................... 79
Figure 6: The Federal trenches at Cold Harbor ................................................................. 85
Introduction

Give me the Springfield rifled musket...An inferior arm will not answer the purpose, for our citizens will not enroll themselves unless they can be supplied with the best arms.\(^1\)

~ J.A. Gilmore, Governor, New Hampshire, 1863

The German soldier and military writer Freiherr von Bülow (1755-1816) once said that tactics were “the science of movements which are made in the presence of the enemy, that is, within his view, and within reach of his artillery.” This viewpoint, which he espoused in his seminal text *Spirit of the System of Modern War* (published in German in 1799), was representative of principles that would hold dominion over much of 19\(^{th}\)-century-military thought. However, the 1850s was hardly a time of intellectual stagnation in which innovation lacked amongst the military theorists of Europe. Indeed, it was a period of discovery and intense debate, spurred onwards by the potential implications of new weapons designs. The interest in improved arms extended across the Atlantic, too, as American leaders recognized the importance of keeping up with progress on the Old Continent.\(^2\)

If one had to denote a single technological advance as the most significant, it would certainly be the rifled musket. More than any other contemporary improvement, this new firearm arguably rendered von Bülow’s statement outdated. Boasting impressive range and greater accuracy than its forebears, the rifled musket represented a distinct challenge to traditional combat tactics dating back to the early 1700s. Nowhere was this demonstrated more broadly than in the American Civil War (1861-1865), when the weapon reached a zenith of popularity.

---


\(^2\) Winfield Scott, *Infantry Tactics: School of the Battalion and Instruction for Light Infantry or Rifle* (New York: George Dearborn Publisher, 1835), 1.
The rifled musket was the culmination of six centuries of firearms development. At first glance, it closely resembled its technological predecessor, the flintlock musket. In spite of its new components, it still operated on the principle of muzzle loading, and such firearms had existed for hundreds of years. Indeed, the first true musket was designed in 1521, and was employed in the armies of French King Charles V. In general, muzzle-loading firearms began their integration into European military practice in the 16th century.

The rifled musket was widely employed on both sides of the Atlantic, a testament to its crucial role in mid-19th-century western warfare. There were numerous models in circulation, but it was the 1861 Springfield rifled musket that proved to be the most influential. Over the course of the Civil War, over 30 companies produced about 1.5 million pieces. However, statistics only provide the reader with part of the story. It is not sufficient to acknowledge the weapon’s numerical significance, for that alone does not indicate whether the weapon in any way altered the way war was fought.

Popular belief suggests that with its improved capabilities, this firearm would render infantry combat more lethal than ever before. In the broad scope of military history, this would be an unsurprising development. Since the late Middle Ages, infantry had grown increasingly capable of challenging the domination of cavalry on the battlefield. The creation of field artillery had complicated this rivalry, but despite the devastating potential of the cannon, infantry consistently grew in numerical as well as tactical relevance.

---

4 Thomas Thackeray, *Three Lectures...on the Practice of Rifle Firing at Various Distances* (London: Parker, Furnivall, & Parker, 1853), 5.
This aside illustrates how the discussion of arms technology can never be conducted in a vacuum. To properly evaluate the qualities of the rifled musket, it is necessary to maintain a broad perspective. Considering its widespread use in the Civil War, it is easy to focus exclusively on that most bloody of American wars. Still, to do so would deny the scholar background information crucial to understanding the context of this weapons debate. The soldiers who fought in the “War Between the States,” armed with this and many other weapons, were not participating in a uniquely American experience. Europe had been ablaze with curiosity over the rifled musket for years prior to the Civil War, and so in this sense the United States was a latecomer to the new technology.

By considering both European and American perspectives on the firearm, the reader can develop a much more well rounded understanding of its significance in military circles. Nevertheless, this is only part of the analysis needed to judge its long-term importance. Ultimately, it is essential to evaluate its capabilities on the field of battle. Amongst the 7,000 actions of the Civil War, First Bull Run (1861) and Cold Harbor (1864) offer an ideal contrast for this discussion: the former was the first major field battle of the war, while the latter provided an unfortunate close to Ulysses S. Grant’s bloody Overland Campaign in the war’s final year.

These engagements illustrate the evolution of combat on a scale hitherto unimaginable in the young nation. The soldiers who witnessed this transformation firsthand would be forever changed psychologically, and for this reason one must consider the rifled musket not only from a technological standpoint, but also from a psychological one. In this way, it is possible to place the rifled musket in context as both a major development in firearms design and a deciding factor in the nature of mid-19th-century warfare.
The Development of the Rifled Musket

The rifled musket integrated several technologies into a system that many mid-19th-century experts suggested would herald a new era in the history of weaponry. It was a hybrid that combined the close-range utility of the musket with the long-range accuracy of the rifle. The latter was so-named because of a manufacturing process called rifling, a long-known but under-appreciated practice dating back to the 15th century.\(^7\) The first rifling grooves (1498) “were perfectly straight, the metal being cut out to receive the dirt accumulated in firing a gun, as well as to allow the escape of the air in forcing down the ball.”\(^8\) Later designs involved “spiral grooves...[that]...impress upon a tight-fitting bullet, a rotaty [sic] motion round its axis of progress and thus keep it in a straight line as it spins forward.”\(^9\) In his *The Artillerist’s Manual* of 1860, American artillerist John Gibbon credited the gunsmith Koller of Nuremberg with the invention of spiral grooves at the start of the 16th century,\(^10\) and stated that the first use of rifling was in breech-loading firearms.\(^11\) However, it was not until 1635 that gunsmith Arnold Rotsipen patented the concept in England.\(^12\) The potential contributions of rifling to the world of firearms manufacture were not fully realized before the general adoption of the rifled musket amongst Europeans in the 1850s.\(^13\)

Gunsmiths of the mid-19th century struggled to perfect the rifling technique, as it was “not yet a scientific art, because there [was] such a variety and contrariety of opinion and practice respecting the twist, the length of barrel, and other essential features belonging to rifled

---

7 Willis, *Illustrated History*, 71.
fire-arms.”

Historically, rifling had been used to create like-named weapons (rifles). In sharp contrast with the musket - the traditional weapon of line infantry - rifles were the sole province of skirmishers and other elite units. Their marksman training allowed them to take advantage of the rifle’s impressive long-range capability.

Nevertheless, rifling was not without its problems. Although it increased the weapon’s accuracy, it also made fouling more likely. Fouling was a phenomenon wherein the grooves would become clogged with burnt powder. As a result, loading the weapon necessitated “a considerable amount of force, and with a particular state of the atmosphere, the weapon became so foul after a few rounds that it was almost impossible to force the ball to its proper position.” Rapid firing was thus unfeasible, which also greatly reduced the rifle’s utility at closer ranges. For this reason, the smoothbore musket had remained the choice arm for front-line troops, who often found themselves engaged in point-blank exchanges of lead with the enemy. This status quo only changed in the mid-19th century, when several improvements to the weapon made possible the first army-wide adoption of the rifle by the French under King Louis-Philippe in 1849.

The percussion lock firing system was integral to ensuring the reliability of the rifled musket. Designed by Scottish Reverend Alexander John Forsyth in 1807, it was a substantial improvement over the flintlock design that had held a virtual hegemony over European firearms since the start of the 18th century. Unfortunately, the percussion lock was too unreliable for widespread implementation, and gunsmiths debated the optimal way to ignite the powder charge contained in the barrel. Forsyth attempted to address the question through the use of a scent-
bottle lock, which he patented in 1807.\textsuperscript{19} This small container was fitted to the weapon and filled with fulminate of mercury, a compound discovered in 1799 by British chemist Edward Charles Howard.\textsuperscript{20} Seeking a safe method of loading the compound into the weapon, other designs were tested in lieu of the scent-bottle lock, but more than a decade would pass before gunsmiths decided on the most reliable solution, the percussion cap. Although scholars today still debate the identity of the inventor, credit is most likely due to Joshua Shaw (1776-1860), who obtained a patent in America for his efforts in 1822;\textsuperscript{21} he would even receive $18,000 from Congress in 1847 for the creation.\textsuperscript{22}

The fundamental improvements of this design included its ease of use and speed of operation. The user had only to fit a cap to the nipple of the firing mechanism. When struck by the hammer, the fulminate of mercury contained within the cap would generate sparks that traveled down the hollow nipple to the main charge in the barrel.\textsuperscript{23} The result was a simple, fast-firing mechanism shielded from surrounding humidity. This significantly improved the practicality of firearms in combat, for it required little manipulation and few actions to operate. Indeed, the new percussion system closely approximated modern firearms in its focus on gross mechanical hand movements.

In comparison, the user of a flintlock had to pour gunpowder into a priming pan in addition to the main charge.\textsuperscript{24} This extra step lengthened the process of reloading, simultaneously

\textsuperscript{19} The Repertory of Arts, Manufactures, and Agriculture, No. LXVI, Second Series, Nov 1807 (London: Repertory-Office, Hatton-Garden, 1807), 401.
\textsuperscript{20} Edward Howard, “On a New Fulminating Mercury,” Philosophical Transactions of the Royal Society of London, 90 (1800), 204-238.
\textsuperscript{23} Willis, Illustrated History, 36.
\textsuperscript{24} Robert Bruce et al., Fighting Techniques of the Napoleonic Age: 1792-1815 (London: Amber Books Ltd., 2008), 25.
exposing the powder to humidity. Since wet powder would not ignite properly, this increased the risk of a misfire. Importantly, the firing of a flintlock involved two sequential explosions - upon firing, the priming charge would explode first, releasing a telltale puff of smoke. The second, larger plume of smoke arose from the ignition of the main charge. This two-stage ignition system meant that the weapon could not be fired instantaneously. As a result, it was less effective in close quarters combat, where reaction time was essential to survival. In addition, the user was put at greater risk when using a flintlock, for the inconvenient reloading process exposed him to enemy fire.

The creation of new ammunition was essential to the rise of rifled weaponry as the new standard in firearms design. In keeping with 300 years of tradition, flintlock muskets had used round, lead balls that deformed on impact, leaving human targets with terrible wounds. According to Union Colonel Charles F. Johnson, Civil War soldiers shot in the head and abdomen by these bullets almost never recovered. Furthermore, any bones in the path of the bullet would be shattered, and “it was rarely that only a round perforation, the size of the bullet, resulted.”

Spherical ammunition generally fit snugly to the sides of the barrel to prevent rattling during firing. This approach helped ensure some degree of accuracy in smoothbores, but it also contributed to the aforementioned friction that caused so many problems. Riflemen adapted to their temperamental weapons by using hammers or mallets to force the ramrod down the barrel.

---

26 To allow for faster reloading, some balls were made smaller than the caliber in question so that the user could simply drop the ammunition into the barrel. This decreased the musket’s already mediocre accuracy further. Marion V. Armstrong Jr., *Unfurl Those Colors! McClellan, Sumner, & the Second Army Corps in the Antietam Campaign* (Tuscaloosa, AL: The University of Alabama Press, 2008), 33.
This was not an effective solution, however, for it made the process of reloading even more time-consuming. 27

Indeed, the difficulty of reloading had long been the principal obstacle to the widespread adoption of rifled weapons. The solution to this dilemma was the elongated bullet, first designed by British Captain John Norton in 1824. His contribution to ammunition design was described in detail in an 1863 submission to Mechanics’ Magazine. In the article, the author complained that Norton had not been recognized for his accomplishment, while in France such inventiveness was well rewarded. 28 The author was probably referring to the success of the so-called Minié ball, a cylindro-conoidal bullet created by French Captain Claude-Étienne Minié in 1847. 29 This bullet was smaller in diameter than the barrel, and could be easily dropped into the gun. To ensure that it left the barrel smoothly, this bullet would expand on ignition to fit into the rifling. The invention carried tremendous implications, for riflemen could now load as quickly as musket-users, and yet - thanks to the rifling - deliver a more accurate fire. Still, the Minié was but one of many new bullet designs that followed Norton’s original design. Most were of similar shape and function, differing largely in terms of how they achieved a tight fit in the barrel, and in their dimensions. 30

Accuracy was not the only advantage of the new bullet, as it was also more efficient in its delivery of energy to the target. According to British General Francis Rawdon Chesney (1789-1872), the elongated bullet had “the advantage of encountering less resistance with an equal mass; consequently any piece in which it may be used, whether a musket or a great gun [cannon], will produce a shock equal to one of a considerably larger calibre, but having a

29 Willis, *Illustrated History*, 139.
spherical projectile.” Considering the already formidable damage potential of the round lead ball, the new bullet seemed to portend the rise of immensely powerful firearms.31

For the American military establishment, adopting the new bullet was not a foregone conclusion. The Minié ball, despite its advantages, was expensive, and actually broke apart in the barrel of the smaller caliber (.54) U.S. rifled musket. Such a dilemma could have forestalled progress in the improvement of the nation’s small arms. Fortunately, James H. Burton, Acting Master Armorer of the Harpers Ferry armory, resolved this problem by designing a cheaper, improved expanding round in 1854.32

The paper cartridge was hardly a new concept, but it too helped ensure the viability of the rifled musket as a standard issue combat weapon. It had been a mainstay of ammunition design since the first firearms, and the 19th century saw a continued interest in its improvement. For example, Englishman John Dickenson produced a design in 1807 that combined wool and linen fibers; this version was intended to “prevent sparks of fire being retained in the gun after the discharge.”33

The encasing of powder and bullet in a compact package represented a drastic improvement over the manual approach to reloading. Instead of measuring out the needed powder and inserting it along with ball and wad, the soldier simply had to open a paper cylinder and pour the contents into the barrel.34 This reduced the potential for human error in firearms operation, and also facilitated the transportation of ammunition. As Confederate Reverend

33 “Cartridges-Their History,” Scientific American, 6 (March 1, 1862), 139.
Wayland Fuller Dunway explained in his *Reminiscences of a Rebel*, troops carried “small leather boxes for percussion caps, and larger ones for cartridges.”

Nevertheless, the paper cartridge had a number of problems. It could be an unpleasant experience for the user, who - in the interest of efficiency - was instructed in military manuals to tear off the cartridge end with his teeth. The niter present in the gunpowder could create mouth sores, and the dry paper exacerbated the soldier’s thirst in battle. Furthermore, the tearing open of the cartridge was wasteful, since some powder inevitably fell to the ground instead of going into the rifle barrel. Although this represented an insignificant quantity of lost material, over 136 million rifle cartridges were produced in 1862 America alone. With so many cartridges in circulation, the gradual loss of powder with each rifle shot would represent a significant amount over time.

To avoid these inherent flaws with the paper design, American inventors developed alternative systems that closely resembled the metal cartridge (used only in breech-loaders) in their shape and function. For example, American inventor J.C. Mayberry patented a cartridge in 1862 that released the powder by means of a pin, ensuring that the explosive mixture could not exit the cartridge until it was seated in the barrel.

With this design, the user would no longer have to tear open the cartridge, and no powder would fall to the ground as waste.

---

38 “Mayberry’s Cartridge,” 277.
In sum, the rifled musket was a clear improvement over its predecessors. The combination of rifling with a bullet design that addressed the smoothbore’s limitations resulted in a long-range small arm accessible to, and practical for, the front-line infantryman. Furthermore, a more reliable firing system, and cartridges that facilitated rapid reloading, increased the weapon’s appeal for those concerned about its close-range capability. Nevertheless, the rifled musket experienced a surprising degree of approbation, as Europeans and Americans alike debated its merits both in terms of military theory and application.

**Military Thinkers and the Rifled Musket**

During the 1850s, military leaders on the Old Continent struggled to develop a unified verdict on the rifled musket. They were unaccustomed to such dramatic changes in armament, for the preceding flintlock had been the weapon of choice for over a century. To address the lack of numerical data regarding the weapon’s performance, firearms experts initiated a series of tests, evaluating its applicability in both close- and long-range combat.

In terms of accuracy, the data was very encouraging. On average, the rifled musket was about four times more accurate than the smoothbore musket, at nearly twice the range (~250 yards).\(^{40}\) This information was complicated, however, by the fact that the various models of the rifled musket did not perform in a like manner. The type of rifling used in each design was the major reason for the great disparity between the 500-yard range of most standard issue models (for use by line infantry) and the stunning 1,000-yard range of marksmen’s rifles.\(^{41}\)

From the perspective of firearms experts, this was not the only important consideration. Another major factor was the man-stopping potential of the new rifled musket. In keeping with

\(^{40}\)“Army Rifles,” *Scientific American*, 5 (July 20, 1861), 41.

\(^{41}\)“The Whitworth, Enfield, and American Rifles” and “Select Riflemen,” *Scientific American*, 5 (August 17, 1861), 99.
previous firearm standards, the rifled musket was produced exclusively in large calibers so that the slow-moving bullets could still deliver sufficient force. The result was an extremely potent weapon: in the 1857 British tests at the town of Hythe, the Whitworth rifle was able to penetrate 33 planks of wood. Based on these statistics, the rifled musket would seem unquestionably superior to the smoothbore alternative.

Nevertheless, the supposedly better performance of the rifled musket was somewhat deceiving. While it was clearly a more versatile weapon than the smoothbore alternative, it also had a notable flaw: lower muzzle velocity. Gunsmiths of the mid-19th century had learned to address friction through the use of the new ammunition, but while reloading was much easier, there remained significant friction during firing (because of the rifling). Consequently, the new weapon reached a muzzle velocity at least 500 feet per second slower than its predecessor. From a ballistics standpoint, this had implications for the weapon’s usefulness at all ranges.

The operation of the rifled musket was also much more complicated than that of the smoothbore. With the latter, the soldier was instructed to level his barrel and simply fire without aiming. This was due to the weapon’s limited accuracy; by firing in volleys, musket-equipped infantry would unleash a veritable wall of lead balls at the enemy line. This technique was easy to perform under the stresses of battle, and since the smoothbore fired rounds in a straight line (with an eventual drop-off), the practice was reasonably effective at closer distances.

---

43 During the Civil War, firearms trials did not abate. In 1863, Confederate Captain T.B. Brooks described a testing of the Sharps, Enfield, and Spencer rifles to evaluate their ability to penetrate various materials at 10-15 yards. They were able to pierce dry yellow pine, achieving a depth of 2.5-3.5 inches. *The War of the Rebellion*, Ser. 1, 28, No. 1, 324.
The rifled musket was a more complex firearm, since it launched bullets in a broad arc known as a parabolic trajectory.\textsuperscript{45} When presented with a nearby target, the user of the rifled musket could not simply level his sights. Instead, he had to have “long practice in [the] judging of distances by the eye,”\textsuperscript{46} and adjust his back (or rear) sight accordingly. Many rifled muskets lacked this accessory for the sake of simplicity, however, and in this case the soldier would use “his thumb nail for a back sight, by placing it across the barrel.”\textsuperscript{47} Since effective use of the rifled musket necessitated actual aiming, the soldier had to be trained in marksmanship. Without such preparation, experts feared that the troops would lack the confidence to use their new arms properly.

To address this need, Great Britain and France created schools for so-called scientific firing. The School of Musketry at the aforementioned Hythe (est. 1854) was the British answer to the need for greater instruction in the use of the rifled musket.\textsuperscript{48} Participants from each army corps went to the academy, and then transmitted the newly gained knowledge to their corps

\textsuperscript{45} “Sight Rifles,” \textit{Scientific American}, 5 (October 19, 1861), 246.
\textsuperscript{46} “The Enfield and Minie Rifles,” \textit{Scientific American}, 4 (May 18, 1861), 309.
\textsuperscript{47} \textit{Ibid.}, 309.
members. In France, the main school was located at Vincennes (est. 1842), with additional training centers in each regiment.

Still, critics did not view these institutions as a viable solution for a weapon that required so much training for effective use. While they acknowledged the superior performance of the rifled musket, they countered with the claim that its influence on battlefield tactics would be moderate at best. Skeptics asserted that in general, battles would still be decided at close range, with shooting as the inevitable precursor to a frontal assault with the bayonet.

This position was well encapsulated by French tactician Baron Antoine-Henri Jomini (1779-1869). The famous writer declared that the rifled musket “might...exert a certain influence on the details of tactics, but in the great strategical operations of war, and the grand combinations of battle, victory will always be secured by the same principles which gave it to the great captains of all ages.” Jomini asserted that the rifled musket’s advantages were unimportant, and pointed to long-standing “principles” as the driving factors behind victory. This reference was vague, supposedly referring to such standard tactical concepts as attacking boldly, standing firm in defense, and using terrain to the advantage of one’s army.

Jomini’s beliefs were clearly colored by his own experience in combat. As a participant in the Napoleonic Wars, he would have been directly exposed to the close-range, offensive-based fighting methods that typified early 19th-century combat. Later on, he found his niche as a writer of military thought, although many of his ideas were anything but original. In fact, much of his early work was based on Welsh soldier and writer Henry Lloyd’s translation of Prussian King

---

49 “The Volunteer Course At Hythe School of Musketry,” Fraser’s Magazine, 62 (July 1860), 34.
51 “The Formation for Battle,” Army and Navy Journal (October 8, 1864), 102.
52 Nosworthy, Bloody Crucible, 394, 397.
Frederick the Great’s own writings.\textsuperscript{53} Therefore, it is important to interpret Jomini’s ideas with the understanding that they were steeped in a long-standing tradition of military treatises, rather than the work of an independent theorist.

Given his dismissive opinion of the rifled musket, it would be easy to assume that Jomini categorized defensive tactics as unviable. This was certainly not the trend amongst other military thinkers, for a brief survey of period literature reveals that these approaches to combat gained in relevance alongside the rifled musket. Realizing the impressive range of the weapon, writers emphasized a more cautious approach to fighting in lieu of exposing troops in the open. Jomini had not ignored these developments, but rather insisted on a careful balance between traditional offensive tactics and a progressive, defensive mindset. A brief analysis of his \textit{A Summary of the Art of War} (1862) reveals the author’s interest in the latter:

\begin{quote}
Every army which maintains a strictly defensive attitude must, if attacked, be at last driven from its position; whilst by profiting by all the advantages of the defensive system, and holding itself ready to take the offensive when occasion offers, it may hope for the greatest success.\textsuperscript{54}
\end{quote}

It would be easy to assume that Jomini’s support for defensive tactics was based on the potential of the rifled musket. This impression would be mistaken, however, for he gave no indication in the above quote that he appreciated the lethality of the new weaponry. On the contrary, he wrote in general terms about various ways to approach combat. Any general from ancient times to the present day would find this recommendation applicable to the military leadership. Accordingly, this writer cannot be associated too closely with the movement to transform tactics in response to new technology.


\textsuperscript{54} Antoine Henri Jomini, \textit{The Art of War} (Westport, CT: Greenwood Press, 1971), 185.
A Summary of the Art of War was Jomini’s most influential work, but its impact was felt most powerfully by military leaders in Europe. For American thinkers, the major foreign influence was the earlier François Gay de Vernon (1760-1822), a professor of fortifications at the French École Polytechnique. His seminal text, the Treatise on the Science of War and Fortification, was not only the standard issue text of French military schools, but was also translated and remained in use at the United States Military Academy at West Point until 1830.\textsuperscript{55}

Significantly, Vernon asserted that:

\begin{quote}
fortification is divided into two kinds; the first, comprising all the daily or momentary works executed in the progress of an army to favour its operations, and constituting field or temporary fortification; the second comprehends all kinds of solid and permanent works used in the construction of strong places, forts, and permanent posts, and constitutes the permanent or fortification of fortresses.\textsuperscript{56}
\end{quote}

While large-scale fortification had been a well-established practice for centuries, the widespread use of field defenses constituted a more recent practice. Vernon’s separation of the topic into two categories demonstrated the changing definition of defensive tactics. No longer did this term only denote reinforced buildings; now, it encompassed various defenses that could be rapidly constructed in the midst of battle. For the purpose of firearms discussion, Vernon’s views on fortification bear consideration. He did not suggest that, given the new technology, an increased reliance on the defensive was inevitable. Instead, he alluded to a wide-ranging set of possible reasons for fortification, emphasizing the proper use of terrain in response to enemy attacks, and the protection of the army’s weakest points.

Other military thinkers promoted different schools of thought on the rifle. The British General Francis Rawdon Chesney was admittedly best known for his contributions to the Suez

\textsuperscript{55} Hagerman, Origins of Modern Warfare, 6.
Canal, but nevertheless produced a sizable text on the rifled musket, *Observations on the Past and Present State of Fire-Arms* (1852). In this work, Chesney acknowledged the superior range and accuracy of the rifled musket, and even cited the example of the French siege of Rome (1849), during which the chasseurs of Vincennes (a sharpshooting unit) unleashed a “terrible execution...picking off the Roman gunners.” Regardless, Chesney did not view this example as proof of the rifled musket’s superiority on the battlefield. He suggested that troops equipped with the older smoothbore musket could also produce impressive results if only they received the proper training.58

Chesney evaluated the probable importance of the rifled musket in terms of the entire army, and he rejected French artillery officer Henri-Joseph Paixhan’s (1783-1854) view that artillery crews would be rapidly devastated by incessant, long-range rifle fire up to 650 yards. Paixhan had asserted that “the new musket has an equal range and greater precision than field artillery, and that a company of marksmen can produce an equal effect at less cost than a battery of artillery, which would be soon rendered quite inefficient.”59 In contrast, Chesney’s reaction to the rifled musket was one of moderated criticism. He pointed out that, once the rifled musket became the primary infantry arm, it would “no longer be possible for one army to throw out clouds either of mounted or light infantry, much less of single companies of these, as has been imagined by the preceding authorities, without being opposed by similar means.” The general asserted that if one army had a superior number of marksmen, the other army would bring about

---

a close-range encounter to negate this advantage. Evidently, he did not believe that shooting alone would decide the battle.  

In an article entitled “The Rifle and the Spade, or the Future of Field Fortifications” (1859), British Captain R.E. Tyler offered a detailed commentary on the role of the rifled musket. He began by highlighting the tremendous attention military leaders gave the weapon, declaring that “there is no question more interesting to military men, or more important to the world in general, at the present day, than that of the effect which the modern rifle may be expected to produce.”

Tyler believed that infantry armed with the rifled musket would have a decided advantage over the other branches of the military, a position he supported with evidence from the Hythe experiments. In the opinion of the testers, “neither cavalry, nor the field artillery...will be able to stand against them [the new weapons].” Direct cavalry charges would be an impossibility, as horsemen would experience a withering fire from rifled weapons at distances unreachable to infantry armed with smoothbores. Tyler did not deal solely in generalities about the rifled musket, but also provided detail on several models. He pointed to the Whitworth firearm as an exemplar of the rifled musket’s potential, as it was superior in accuracy to two other British models, the Lancaster and Enfield.

Other contemporary sources, basing their support on mathematical calculations, supported this vision of devastating long-range infantry fire. British Field Marshal Colin Campbell (1782-1863) claimed that a regiment of 1,000 troops with rifled muskets would be able to unleash 10,000 rounds against a charging cavalry force. Generally, mounted units required

---

60 Ibid., 302.
62 Ibid., 171.
63 Ibid., 170.
seven minutes to close the typical charging distance of 1,000 yards. To put this statistic in context, British troops equipped with the “Brown Bess” (flintlock musket) had only six seconds of effective fire due to their limited range. Still, as Campbell was quick to point out, “the British squares [anti-cavalry formation] were never broken.” Therefore, the field marshal felt confident in supporting the rifled musket, since cavalry could not even scatter smoothbore-armed troops in proper formation.

Considering the vastly superior firepower of the rifled musket, to many thinkers the frontal assault appeared no longer relevant, and the role of the artillery seemed to be in jeopardy. Previously, cannon had boasted a far greater range than the musket-bearing infantry, but with rifled muskets, infantry would presumably be able to fire back at batteries with ease, inflicting heavy casualties on their crews. Tyler’s interpretation of the future battlefield, where carnage replaced disciplined shooting, was not simply apocalyptic fear mongering. Rather, it was an opinion shared by military author James Dalziel Dougall, who, in his The Rifle Simplified (1859) suggested that war would “become needless massacre.” He predicted that individual shooting would become much more efficient at downing foes, making the idea of shooting en masse decidedly antiquated.

Despite this enthusiasm over marksmanship, Tyler presented the views of both sides on the issue. The skeptical position on the new technology was well summarized by an anonymous officer who declared that “no good or decisive results can be anticipated on land or at sea by playing at ‘long bowls [firing at significant range].’” Tyler’s reaction was to make a historical comparison; he stated that the trend towards increasingly long-range combat had been a

---

64 James Dalziel Dougall, The Rifle Simplified (Glasgow: Thomas Murray and Son, 1859), 40.
65 Ibid., 40.
66 Ibid., 42-3.
phenomenon since the beginning of warfare. In his view, “the only difference is...that, as our weapons improve, we must inevitably...play at ‘longer bowls’ than we did before.”

Tyler was clearly well versed in the evolution of combat, avoiding the narrow-minded analysis of contemporary critics and instead evaluating the weapon from a broader perspective. He also demonstrated remarkable foresight, emphasizing the stark difference between the rifled musket’s test results and its battlefield performance. He considered factors that could hamper the weapon’s use, suggesting that “dust, turmoil, smoke, and excitement of the battle-field will detract from the accurate aim of the men.” In an important distinction, Tyler did not believe that the new weaponry would have a negative impact on the soldiers’ performance in battle. Countering the assertion that soldiers would waste ammunition in misplaced, long-range shots, or fear enemy shooting at such great distances, he claimed that with greater preparation for combat, the soldier would “retain his wonted self-possession, and...employ his ammunition in a useful manner.” Indeed, the captain considered that the challenging conditions of the battlefield would favor skirmishers in lieu of troops marching in formation. Assuming that soldiers equipped with the new weapons fired from broken, elevated terrain - where they would have an advantage over enemy forces standing in the open field - he concluded that “no bodies of cavalry, artillery, or infantry, will in future be safe when they are exposed.”

Tyler was also notably progressive in his views on field fortifications. He asserted that the destructive capabilities of infantry “and artillery fire have now acquired a fearful increase of power, and it seems probable, that entrenchments, will eventually become a main feature, even of operations conducted in the open field.” Tyler recommended the use of natural defenses,

68 Ibid., 177.
69 Ibid., 172.
70 Ibid., 173.
71 Ibid., 184.
such as forests, as well as the construction of artificial defenses, including trenches and earthen embankments.72

Pre Civil War Use

Without actual combat testing, of course, any discussion of tactics was speculative. In two wars that predated the American Civil War, European armies were able to evaluate the capability of the rifled musket, but steeply entrenched conservatism hindered proper analysis of these conflicts. The weapon was broadly employed by the British and French in the Crimean War (1853-56), and by the Austrians and French in the Italian War of 1859. These two conflicts furnished Europeans with hard evidence that the new arms were indeed effective; the resulting inference was that defensive tactics would be decidedly advantageous vis-à-vis the assault-based methods of the Napoleonic Era.

The British army began adopting the rifled musket in 1851. The following year, Arthur Wellesley, the first Duke of Wellington (1769-1852), recommended the weapon for standard issue, and by 1855, it would be employed “with destructive effect upon the Russians in the Crimea, who...were still armed with the old smooth-bored musket.”73 In comparison, the rifled musket was not standard amongst French line infantry until 1857. Until that time, it remained the domain of another element in the French army, the Zouaves. Equipped with rifled arms after 1852, these light infantrymen trained with a focus on rigorous physical conditioning and modern skirmishing tactics.74

The Battle of Alma (1854) offered the Allies the chance to test the viability of skirmish order (a scattered formation in which the men would actively seek out cover) with the new

72 Ibid., 179, 182.
weapon. It proved a stunning success, as the Russians retreated towards Sebastopol with almost double the casualties (~5,000 losses) of the victors. In a commentary on Alma, Prussian Field Marshal Helmuth von Moltke (1800-1891) listed three reasons for the Russian defeat, including “their neglect of intrenchments and reliance on bayonet attacks by massive columns,” as well as the fact that few Russian troops had the rifled musket.\textsuperscript{75}

The Siege of Sebastopol (1854-1855) featured massive entrenchment networks on both sides, but the Russians’ heavy reliance on a defensive strategy had more to do with their inferior numbers than with technology. Indeed, only one-twentieth of the Russian infantry was equipped with rifles.\textsuperscript{76} Nevertheless, the events at Sebastopol foretold the way in which the Civil War would be fought. Russian General Todleben made significant use of rifle-pits for his sharpshooters; these “offensive counter-works” then developed into lodgments. Whereas rifle-pits were constructed by soldiers at will - without specific advantages for shooting and no protection from artillery - lodgments were the work of engineers, designed to facilitate small arms fire and protect the occupants from bombardment.\textsuperscript{77}

These developments call to mind the fortifications of World War I, where substantial protective structures were necessary to shield the troops from the constant rain of artillery and small arms fire. However, this wide scale fortification of the battlefield was still more than half a century away, and the 1850s was not solely a period of rapid advancements. Indeed, French Emperor Napoleon III returned to military conservatism at this time, emphasizing the importance of closing with the enemy in hand-to-hand combat rather than relying on extensive, long-range

\textsuperscript{75} Ibid., 238-239.


\textsuperscript{77} Ibid., 189-191.
shooting. Historians sought to explain this reversal in doctrine by pointing to the Battle of Inkermann (1854). French Zouaves gained the victory that day by charging the enemy at full speed, supposedly demonstrating the continued effectiveness of traditional tactics. Napoleon III could justifiably claim that, based on the Inkermann experience, rifled arms fire could not stop a determined assault. This assertion proved to be overly simplistic, however, as other examples from the Crimean War were amply demonstrative to the contrary.

One such instance involved Allied troops unleashing a deadly fire on Russian artillery crews at the then-incredible distance of half a mile. The British troops responsible for this murderous fire employed a loose skirmish formation that contrasted sharply with the traditional, densely packed masses typical of Napoleon Bonaparte’s armies. Russian General Todleben reported the following:

A perfect cloud of riflemen, hid in thick brushwood, opened a very violent and very accurate fire against our artillery at the distance of 800 paces...it was more the fire of rifled small arms than that of the artillery of the enemy which reached our artillerymen, of whom the greater part were killed or wounded.

The verdict on this Allied victory was well summarized by Colonel Ernest Marsh Lloyd, who cited the “increased effect of fire-arms” as a factor that hindered shock tactics. In his opinion, the frontal assault had lost its overwhelming effectiveness due to improved firearms technology. This interpretation contrasted sharply with that of the French Emperor, indicating that there remained numerous questions regarding the real importance of the new technology. It would have to be tested on many more battlefields before a consensus could be reached.

---

78 Nosworthy, *Bloody Crucible*, 646.
80 Lloyd, *History of Infantry*, 239.
81 Russell, *General Todleben’s History*, 159.
The Battle of Bomarsund (1854) supplied additional evidence from the Crimean War with which to challenge contemporary skeptics. Once again, the use of the rifled musket decided the battle in the favor of the Allies – Great Britain, France, the Ottoman Empire, and Sardinia. During the siege, sharpshooters unleashed a rifle fire so deadly that “whenever a Russian showed himself at the embrasures, half a dozen balls were fired at him, with such deadly certainty, that he rarely escaped.” After only a few days, this devastating rain of lead had left most the Russian troops dead or injured.\(^83\) Here, the rifled musket proved itself to be an excellent sharpshooter weapon that demonstrated the need for new maneuvers. Troops could no longer march about the field with impunity, but instead would have to place a greater focus on fast-paced movement and the use of cover.

The Italian War of 1859 offered another chance to test the weapon outside the stringent confines of the firing range. This conflict was unlike the Crimean War, for the French were not facing an enemy equipped with antiquated weaponry. The Austrians used the Lorenz rifled musket, which according to British Lieutenant-Colonel E.M. Lloyd “was better than the French weapons.”\(^84\) Officers debating the rifled musket focused in particular on its applicability against cavalry and artillery. It was in these discussions that skepticism over the new arm arose once again. French officers debated the actual likelihood of infantry stopping a cavalry charge by shooting with the rifled musket. Theoretically, the greater range of the weapon would allow the user to hit a galloping target before it came too close. This belief would be in keeping with the above-mentioned views of Field Marshal Campbell, but some officers doubted the reliability of this prediction.

---


\(^84\) Lloyd, *History of Infantry*, 241.
General Louis Jules Trochu (1815-1896) pointed out that “at forty paces the old smoothbore was better than the rifle, because...the initial velocity of the ball was greater.” Whereas the old weapon was capable of launching a ball at 500 yards per minute, the Enfield and its French equivalent - the Minié - were considerably slower at 350 yards per minute. Even the Whitworth, so celebrated for its great accuracy, was only marginally better at 400 yards. This translated into less power at close ranges. With regard to penetrative capability, Trochu highlighted the disappointing test results of the rifled musket before the war. Despite its ability to penetrate vast quantities of wood, the weapon’s elongated round was only able to dent a cuirass (metal chest armor) at 38 yards, while the smoothbore alternative could pierce the material.

The practicality of relying solely on shooting to decide a battle was also still in doubt, and some officers in the field remained conservative in their stance regarding general combat principles. At the Battle of Solferino (1859), Marshal Adolphe Niel (1802-1869) suggested that the bayonet was still better suited to deciding a clash of arms. On the plain of Medole, he stated that:

...so long as it was a musketry fight I lost ground, owing to the enemy’s advantage in number. Then I formed a column of attack with one of the battalions of my reserve, and we won back with the bayonet more than we had lost with the fusilade [sic].

At first glance, this appears to count strongly against the supposed superiority of firearms at the time. However, a closer examination reveals that the French were almost entirely armed with smoothbore muskets that day, so this evidence was, if anything, a testament to the ineffectiveness of the older firearms.

European vacillation over the rifled musket’s qualities is surprising. Prior to actual usage, such theoretical contentions would be expected, but they are all the more remarkable because the

---

86 Ibid., 392
87 Lloyd, History of Infantry, 242-243.
interested parties had had years of fighting on which to draw a conclusion. Therefore, one can only conclude that the rifled musket’s advantages must have depended greatly on the specific battlefield situation. It was anything but a panacea for all tactical scenarios, and still needed improvement.

Lieutenant Andrew Steinmetz, who presented the opinions of these officers in his submission to the Royal United Service Institute, drew a similar conclusion. First, he pointed out that based on such first-hand accounts, an army equipped only with smoothbores would clearly suffer greatly against one armed with rifled muskets. Acknowledging the latter’s imperfections, however, he reminded his audience that while the rifle is “a very old invention, it is still in its infancy.” Second, Steinmetz viewed the initial excitement and subsequent disappointment over the weapon’s ability at long range as irrelevant, as this focus had overshadowed the rifled musket’s excellent performance at 200-240 meters. Despite its capability up to 800 meters, it was at closer ranges that he felt the rifle would prove most telling in battle.88

**European Adoption of the Weapon**

The Crimean War and the Austrian War of 1859 supplied the participants with valuable eyewitness information on the viability and overall lethality of the rifled musket. This hard data was critical, for it allowed military theorists to adapt their teachings to a battlefield that was itself undergoing transformation. Simultaneously, skeptics remained stolidly conservative in their adherence to old-fashioned fighting methods. With hindsight, it is easy to dismiss this group as merely the vestige of a bygone era, but the available data suggest a different interpretation. Generally speaking, weaponry needs to be extensively tested in all possible fighting conditions before it can be not only adopted, but regarded with confidence. By 1860, the rifled musket had

---

not yet been used en masse in the sort of large-scale context that the American Civil War would provide. Moreover, the sheer diversity of conditions that would characterize Civil War combat was arguably the conflict’s greatest asset as a proverbial testing ground. The sweeping range of field battles, sieges, guerrilla fighting, and more was essential to generate a fully educated opinion on the weapon’s value.

It would thus fall to the most catastrophic of American experiences to finally settle this military debate. That said, in spite of lingering opposition to the new technology in the pre-Civil War period, the majority of European nations adopted the rifled musket in the 1850s. The following chart illustrates Europe’s rapid integration of the new technology into the various national armies. It lists the general weapon type and its date of broad implementation in each European country. This list is not complete, but rather provides an overview of the trend in European military thought. The information is derived from Rifles and Rifle Practice (1859), a volume produced by future Confederate General Cadmus Wilcox.89

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Weapon Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1855</td>
<td>Lorenz rifled musket</td>
</tr>
<tr>
<td>Belgium</td>
<td>1846</td>
<td>rifled musket</td>
</tr>
<tr>
<td>England</td>
<td>1854</td>
<td>Enfield rifled musket</td>
</tr>
<tr>
<td>France</td>
<td>1854</td>
<td>Minié rifled musket</td>
</tr>
<tr>
<td>Norway*</td>
<td>?</td>
<td>breechloader</td>
</tr>
<tr>
<td>Prussia</td>
<td>1848</td>
<td>needle rifle (breechloader)</td>
</tr>
<tr>
<td>Russia</td>
<td>?</td>
<td>rifled musket</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Weapon Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sardinia</td>
<td>1854</td>
<td>rifled musket</td>
</tr>
<tr>
<td>Saxony</td>
<td>?</td>
<td>rifled musket</td>
</tr>
<tr>
<td>Spain</td>
<td>1858</td>
<td>rifled musket</td>
</tr>
<tr>
<td>Sweden**</td>
<td>1851</td>
<td>breechloader</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1856</td>
<td>rifled musket</td>
</tr>
</tbody>
</table>

* Norway had adopted a breech-loading rifle years previously.
** Sweden adopted a breech-loading rifle in 1851.
? Indicates that Wilcox did not list a date, but stated that the weapon was then in use - presumably said weapon was adopted in a timeframe similar to that of the other nations.

The military leaders of Europe were determined to learn everything about the new design. In pursuit of this goal, they continued to test it by means of elaborate and exhaustive firing range procedures. It is perhaps unsurprising that Americans were heavily influenced by their European counterparts. U.S. authorities looked to Old World monarchs, especially Napoleon III, for leadership on all things military, and tended to follow trends as they developed abroad. They praised the French emperor’s generally progressive beliefs on warfare as the way forward for the fledgling nation, and given France’s military hegemony over much of the 19th century, this viewpoint was warranted.\(^9\)

**American Perceptions**

While the nations of Europe were busily contesting the new technology and upgrading their arsenals, the United States had fallen behind. American military leaders recognized the

need to assess developments across the Atlantic; otherwise, the young nation would be at a major
disadvantage in battle against professional armies. Therefore, several military officers traveled to
Europe in 1854 on an investigative commission. This effort resulted in several reports of
tremendous detail on the Old World armies. The initial findings of Major of Engineers Richard
Delafield (1798-1873), published in 1860, were not encouraging. He pointed out that the United
States had a “comparative want of preparation and military knowledge,” and lamented that
despite tremendous resources, the nation’s “preparation, equipment, knowledge of the art of war,
and other means of defense, is...limited and inefficient.”

Still, there was hope in the form of foreign expertise. Delafield confirmed the authority of
Europe’s leading monarchs on military matters, as they were “professionally educated soldiers,
with ability to judge understandingly of the merits of any improvements proposed in the art of
war.” Delafield referred to three emperors: Napoleon III of France, Franz Joseph I of Austria,
and an unspecified Russian czar. In his opinion, the U.S. should carefully observe the military
advancements these leaders advocated, and make corresponding changes.

While in Europe, Delafield closely examined the prevailing views on the new weaponry.
In his report, he explained that while the rifled musket was clearly favored by all major European
powers, substantial experimentation continued in order to determine which type of ammunition
suited the new weapon best. Although the Austrians had adopted a single design for all of their
standard issue firearms, he wrote that none “of the other powers seem to have definitively
adopted the best or [most] satisfactory shape of the ball.” To exemplify this multiplicity of bullet
designs, he cited the Battles of Inkermann and Sebastol (1854-1855), where a wide variety of

---

93 The report was written between 1854-1856, during which time Russia was successively ruled by Nicholas I and
Alexander II. Delafield leaves unclear to whom he is referring in this section of the report. *Ibid.*, 2.
ammunition littered the battlefields. Delafield also pointed to the school at Vincennes, where French testers fired thousands of rounds a day in the search for the ideal bullet.\textsuperscript{94}

However, Delafield did not focus exclusively on the rifled musket, but rather noted that some European nations were already looking ahead to yet another technology: the breechloader. In a set of observations that mirrored those of Wilcox, he listed both Prussia and Norway as adopters of the breech-loading design. He also concurred with the prevailing European opinion that the current breechloader was only suitable for the cavalry.\textsuperscript{95} According to Delafield, infantry already wasted a tremendous quantity of ammunition; therefore, a faster-firing weapon was not required. Instead, these troops had to learn to aim properly at their targets, a task that would be made more difficult with the introduction of such rapid-firing arms. In contrast, cavalry struggled to use muzzle-loaders, which proved too cumbersome on horseback. Breech-loaders were thus the logical choice for mounted troops, who would benefit from their ease of operation.

Major Alfred Mordecai (1804-1887) of the U.S. Ordnance Department also traveled to Europe as part of the 1854 investigative commission. Upon his return, he pointed out that despite the ubiquity of the rifled musket, Sardinian line infantry were mostly equipped with smoothbores,\textsuperscript{96} and Delafield concurred that they still used this weapon in the Crimean War.\textsuperscript{97} The U.S. commission to Europe also included George B. McClellan (1826-1885), the most commonly cited among the three men.\textsuperscript{98} McClellan would forge a historical reputation as a highly divisive Union general who, despite a dubious field record, inspired tremendous enthusiasm amongst his troops.

\textsuperscript{94}Ibid., 6-7.
\textsuperscript{95}Ibid., 8-9.
\textsuperscript{96}Alfred Mordecai, \textit{Military Commission to Europe in 1855 and 1856…}, (Washington: G. Bowman, 1861), 165.
\textsuperscript{97}Delafield, \textit{Report on the Art of War}, 7.
\textsuperscript{98}Nosworthy, \textit{Bloody Crucible}, 82.
The commission was an effective means of gathering information on the latest military developments. The resulting three reports were remarkable in both breadth and depth, covering a vast number of details concerning several major European armies. This effort was spearheaded by Secretary of War Jefferson Davis (in office 1853-1857). The man who would later lead the Confederacy was also looking ahead militarily. He asserted that, with the rifled musket, armies would feature a higher percentage of skirmish troops, and would consist exclusively of light troops (rather than having both regular and light units).\textsuperscript{99}

Under Davis’s instruction, the U.S. Army’s Ordnance Department began a series of intensive tests on the rifled musket to evaluate its merits. This project was organized by Colonel H.K. Craig, who stated that due to the superior performance of elongated bullets launched from rifled guns, the testers had begun “investigations in relation both to the most advantageous shape of the ball, and the best mode of grooving the arm.” Colonel Benjamin Huger (1805-1877), who authored the first part of the \textit{Reports of Experiments with Small Arms for the Military Services, by Officers of the Ordnance} (1856), explained that tests performed at Harpers Ferry produced results similar to those of the British (1852) and French tests (1851).\textsuperscript{100} Tests on both sides of the Atlantic focused on determining the optimal bore diameter, rifling technique, method of expanding the bullet, and even powder type.

The second part of the report was written by Lieutenant J.G. Benton, who investigated the performance qualities of four ammunition types: the traditional round musket ball, the Pritchett round (a British expanding conical round), the Minié round, and the Burton round. The accompanying results chart did not list the Minié’s statistics, but the available data was conclusive regarding the potency of the other bullets. At 200 yards, the differences in

\textsuperscript{99} Ibid., 78.
\textsuperscript{100} \textit{Reports of Experiments}, 9, 21, 132.
performance between the traditional, Prichett, and Burton were not very significant, but at the
greater distance of 400 yards, they became quite marked. With various rifling groove depths, the
traditional musket round never achieved over 45 percent accuracy, whereas the Burton
consistently performed at 90 percent or above. The Prichett was the middling performer, ranging
from 30 to 80 percent depending on the depth of rifling grooves. At the extreme range of 700
yards, the round ball was actually unable to strike the target, while the other rounds simply
performed less impressively. Still, the Burton bullet was the best overall in this category, ranging
from 5 to 65 percent.\footnote{Ibid., 35.}

Admittedly, this last test did not reflect favorably on the efficiency of the new rounds, but
considering that the round ball was completely ineffectual in this area, the new ammunition still
constituted an improvement. As with the French evaluations at Vincennes, these American tests
were exhaustive, with the participants firing three weapons over a thousand times. Despite the
rigorous and highly scientific nature of the study, however, it had a notable flaw. All shooting
was conducted from a fixed position, with the gun supported by a rest.\footnote{Ibid., 33, 31.} Therefore, the above
data was not necessarily reflective of results under battlefield conditions.

The report also included several appendices with information on European testing. These
sections provided further evidence of an American interest in foreign weapons research. The first
appendix discussed the results of French experiments. L. Panot, chief of testing at Vincennes,
admitted that the rear sight was a great aid in firing the rifled musket, but that since “it has...the
inconvenience of obliging [the user] to move it whenever the distance varies...consequently his
line of sight is not adjusted for firing instantly.” For the purposes of massed infantry fire, the
need to constantly adjust gun sights was a time-consuming process that would prevent infantry
from responding quickly to an advancing enemy. It also demanded a great deal of marksmanship training to estimate distance and fine-tune the gun sights accordingly. Skeptics maintained that with such a feature, the rifled musket had once again proven too intricate for general use.\footnote{Ibid., 145.}

Another appendix offered information from the earlier testing at Hythe in England. Amongst the evaluations Lieutenant Colonel A. Gordon (1833-1885) had performed, one presented a telling comparison of the 1842 smoothbore musket and the 1851 rifled Minié. At 400 yards, the former could only achieve a dismal 4.5 percent accuracy rating, while the latter was able to maintain 52.5 percent accuracy. The Hythe examinations also involved a more realistic test in 1853; participants advanced to their targets, knelt, fired, and continued advancing. This simulated the advance of infantry upon an enemy force, and their ability to fire accurately at distances ranging from 200-700 yards. These tests were performed exclusively with the Minié rifle, with the participants achieving 70 percent accuracy. The Hythe test was of particular use in demonstrating the impact of the firing position on performance statistics. On average, bullets fired from a position of rest were 74 percent accurate, with those from the shoulder only 54 percent accurate. The final appendix listed results from a contemporary testing of Austrian rifle muskets, conducted at the Washington arsenal. At 300 yards, these arms achieved 74 percent accuracy.\footnote{Ibid., 164, 165, 166.}

Discussion of firearms testing extended beyond the confines of American military literature, and into the pages of popular media. One major avenue of discussion for these topics was \textit{Scientific American}. Established in 1845, it focused on academic discussions of scientific topics, including firearms.\footnote{“Press Room,” \url{http://www.scientificamerican.com/pressroom/aboutus.cfm}, accessed April 23, 2013.} By 1860, circulation hovered at 30,000 issues a week.\footnote{“Prospectus,” \textit{Scientific American}, 2 (June 16, 1860), 400.} One topic
of great interest in the publication was weapons testing. *Scientific American* described an 1861 shooting test that compared several firearms models. Taking place in Cincinnati, Ohio, it provided telling evidence in favor of the Springfield versus its contemporaries, which in this contest included the Colt revolving rifle (a repeating weapon), the Enfield rifle, the Minié rifle (French model), and several other similar arms. The penetrative power of the weapons at 90 feet was estimated by firing at an iron sheet; only the Springfield was able to pierce it. At a later, private test, the Springfield was able to penetrate an iron target at over 2,400 yards.\(^{107}\) The Enfield was a popular choice, but it suffered from quality control problems that affected its reliability and long-range performance. In the opinion of the Ohio testers, the Enfield was thus decidedly inferior to the Springfield.

The British agreed that the Enfield was far from exemplary. In an annual 1861 contest sponsored by the National Rifle Association of Great Britain, participants confirmed the rather mediocre performance of the standard issue army firearm. *Scientific American* featured an article reporting the results of the competition, and declared that the Enfield was not effective beyond 600 yards. For the long-range portion of the contest, participants used the Whitworth rifle,\(^{108}\) a weapon known for its superior accuracy amongst the British military elite. In a special committee meeting of the British House of Commons, Lord Elcho explained that the “mean deviation of the best Enfield was 12 inches, while the mean deviation of the best Whitworth was only 3 1/2 inches.”\(^{109}\) This meant that in repeated firing at a target, the Whitworth was much more accurate than the Enfield. Nevertheless, it had some flaws, namely a great propensity for fouling and a high manufacturing cost.

\(^{107}\) “Rifled Muskets in Ohio,” *Scientific American*, 5 (July 6, 1861), 11.


This survey of foreign as well as domestic firearms testing illustrates the international mindset that dominated American culture at this time. Firearms experts in the U.S. were not operating in a vacuum, devoid of knowledge regarding progress on the Old Continent. Similarly, the American public was continually made aware of developments across the Atlantic. Both recognized the need to keep up with their European counterparts, and responded by studying the subject with great energy. Still, American thought on the new weaponry was not confined to the firing range. Military leaders sought to bridge the gap between abstract discussions of combat and the manuals that instilled key concepts in the troops.

Military literature experienced a tremendous leap in growth on the eve of the Civil War. General Winfield Scott (1786-1866) - the esteemed career officer and commander of the U.S. Army in 1860, best known for his leading role in the Mexican-American War - contributed to the burgeoning field of military writing with his *Infantry Tactics*, adopted by the army in 1852. William J. Hardee’s *Rifle and Light Infantry Tactics* followed closely in 1855. Despite an English title, it was actually “an excellent translation of the Regulation for the Instruction of the Foot Chasseurs.” Unfortunately, Hardee’s work was not up to date with the presumed battlefield implications of the rifled musket, and General Thomas Morris (1811-1904) had to modify the volume accordingly. Scott, having seen Hardee’s work prior to its publication, acknowledged its influence on his own writings. Both would be superseded in 1862 by Silas Casey’s *Infantry Tactics*. These volumes, highly technical in their explanation of formations, drill, and unit movements, all drew upon each other’s work to some extent.

Awareness of the need to stay up-to-date extended to the press. In spring 1861, *Scientific American* featured a full-page article confidently asserting the importance of the rifled musket,

---

110 Southern Literary Messenger, 26: 17.
claiming that a “complete revolution has been effected in the army exercises in Europe within ten years, and few of our citizen soldiery seem to be aware of the fact.” It continued with information on the proper target shooting procedure, suggesting that in addition to being instructed in the use of the bayonet and sword, a proficient soldier should be able to hit a target at 1,200 yards.\textsuperscript{113}

However, this expectation of long-range shooting capability described in the \textit{Scientific American} article was not consistent with the performance of soldiers in past wars. Indeed, there was a bizarre disparity between the number of shots fired and the number of soldiers who were hit. In \textit{The Rifle Simplified} (1859), James Dalziel Dougall indicated that at the Battle of Waterloo (1815), “only one man was struck for every 480 shots fired.”\textsuperscript{114} \textit{Scientific American} offered data leading to similar results, albeit at later dates. It chided its readers by stating that the mediocre accuracy of the past was no longer acceptable. For example, it referred to the Battle of Cherubusco (1847), one of the last clashes of arms in the Mexican-American War, where “125 American [musket] balls were fired for every Mexican killed.” According to another study, which drew its calculations from the Crimean War and several other European conflicts, an army had to fire 270 pounds of lead to kill one soldier in the opposing army.\textsuperscript{115} Based on this information, the above expectations of \textit{Scientific American} do seem overoptimistic. Still, there remained hope for a significant improvement in performance. The editors indicated that in 1861 in England, “a party of 30 skirmishers...[could]...destroy a battery of light artillery, at 800 yards distance, in one minute.”\textsuperscript{116}

\textsuperscript{113} “Practical Warfare - Rifles and Shooting,” \textit{Scientific American}, 4 (May 11, 1861), 292.
\textsuperscript{114} Dougall, \textit{The Rifle Simplified}, 37.
\textsuperscript{115} “The Amount of Lead Required to Kill a Soldier,” \textit{Scientific American}, 4 (May 18, 1861), 314.
\textsuperscript{116} “Practical Warfare - Rifles and Shooting,” 292.
Perhaps the most intriguing aspect of the *Scientific American* texts was the discussion of new tactics. While the magazine conceded that massed troops fighting at close quarters had once decided many a battle, the editors now insisted that well-trained troops equipped with rifled muskets would “slaughter the best drilled columns...armed with smooth-bored muskets and handled in the old-fashioned pasteboard [massed formations] style.” Whereas troops could once march to within 300 yards - the smoothbore musket being unable to reach them - generals would now have to exercise caution within 1,000 yards. This awareness of range was not new. American officers had been well aware of the smoothbore musket’s poor performance long before the rifled musket had become the standard issue weapon of line infantry. Years after the Civil War, speaking of General Zachary Taylor’s troops in the Mexican-American War, General Ulysses S. Grant (1822-1885) disdainfully claimed that flintlock-armed men “a few hundred yards [away]...might fire away at you all day without your finding it out.”

The American response to the new technology extended to detailed tactical manuals. Stateside military thinkers, aware of the latest developments abroad, reflected this knowledge in their views on fighting techniques. Without question, the single most important military thinker in pre-Civil War America was Dennis Hart Mahan (1802-1871). A professor at West Point (1831-1871), his texts would replace Gay de Vernon’s work by 1836, and even in the years following the Civil War, Mahan’s volumes continued to be published. He exerted a significant influence on American military thought, vehemently rejecting the massed offensives that had been central to tactics for decades. Mahan did not look favorably on early-19th-century fighting methods, and accused Napoleon Bonaparte of demonstrating “a culpable disregard of the

---

117 Ibid, 292.
soldier’s blood.’’ He declared that instead, the goal of military thinking should be to “do the greatest damage to our enemy with the least exposure to ourselves.”\textsuperscript{120} However, Mahan did not claim that his conclusions were influenced by the rifled musket. In fact, the very omission of this important detail suggests that Mahan considered the new technology irrelevant to the discussion at hand.

Mahan was interested in defensive tactics, and this focus was largely based on his awareness of the U.S. army’s limitations. With only a small regular force, most troops were volunteers, and Mahan was certain that they would crumble if faced with a professional army in the field. He did not believe this was due to a lack of courage or discipline, but rather to the need for combat experience. As volunteers, these participants would not have the same confidence in each other and in their leader that was a hallmark of veteran units. To compensate for this deficiency, he suggested that field fortifications could raise the morale of the troops. Mahan substantiated this claim by alluding to the Battles of Bunker Hill (1775) and New Orleans (1815), where defensive techniques had helped ensure American victory despite the soldiers’ greenness. Mahan also reminded the reader that volunteers were “filled with all that is most valuable in society,” and that it would be senseless to waste the lives of otherwise productive citizens by instructing them to march, vulnerable, in the open field.\textsuperscript{121}

Mahan’s recommendations included more than general concepts, however, for he also went into considerable detail regarding viable defensive methods. For example, he proposed that advancing troops take advantage of naturally defensive terrain, and avoid exposing themselves needlessly to enemy fire.\textsuperscript{122} Based on the content of his \textit{Field Fortifications}, he was familiar with

\begin{footnotes}
\item[121] \textit{Ibid.}, viii.
\item[122] \textit{Ibid.}, 50.
\end{footnotes}
a vast repertoire of defensive options that soldiers could prepare in the field, ranging from abattis to mines.\textsuperscript{123} Still, Mahan did not take into consideration the rifled musket’s impact on these designs. Indeed, he pointed out that the “proper disposition of obstacles, is in advance of the ditch within short musket range.” He also stated out that the rifle took longer to reload.\textsuperscript{124} Clearly, he had not updated his text to reflect the changes wrought by the rifled musket.

In a discussion separate from that on defenses, Mahan provided a commentary on the state of American marksmanship, and bemoaned the traditional inaccuracy of infantry. He looked to a foreign example to strengthen his claim, highlighting the 1830 French expedition to Algiers in which the troops consumed over three million cartridges in a mere 15 days. He considered potential reasons for this waste, and listed the soldier’s tendency to be negligent with his ammunition supplies, a lack of proper training, an emphasis on rapid shooting that hindered concentration and, most importantly, “the over estimation of distance caused by fear, smoke, and the moveable character of the mark [target].”\textsuperscript{125}

Mahan also evaluated the relative effectiveness of shooting in different types of terrain, and it is here that he began to evaluate the differing performance of smoothbore and rifled weapons. He determined that smoothbore muskets fired on broken ground were consistently less accurate than those used on even ground. At 85 yards, the disparity in the number of hits was relatively low (75 to 67), but at 340 yards, the disparity was quite significant (20 to 6). Citing the Prussian General Decker, he also discussed the performance of riflemen; at 300 paces, the participants could only achieve one percent accuracy. This improved markedly at 100 paces, where they reached 40 percent accuracy. In general, Mahan found that when “the distance is under 170 yards and the mark large, the effects of the two arms are nearly equal. But for

\textsuperscript{124} \textit{Ibid.}, 33, xviii.
\textsuperscript{125} Mahan, \textit{An Elementary Treatise}, xvi.
distances of 220 yards, and beyond, the balance is greatly in favor of the rifle.” He pointed out that skirmish order, in which the troops took their time to aim and fire individually, yielded much better results at long range than massed volleys. As he reminded the reader, the real value of volley fire was the shock it induced in the ranks of the enemy, an effect only possible at closer distances where high accuracy was much easier to achieve. Accordingly, Mahan recommended that rifle-equipped troops shoot in skirmish order, and only fire volleys at 200 paces or less.  

Other authors recognized that the rifled musket would radically transform the battlefield, but differed on the specifics. In *Rifles and Rifle Practice*, Wilcox pointed out that prior to the rifled musket, armies had been able to remain within 300 yards of each other without significant risk. Now, however, advancing troops could suffer casualties up to 1200 yards away, and at 600 yards, would experience catastrophic losses. Referring to both the theoretical testing at Hythe (1855) and the experience of Russians in the Crimean War, he concluded that with “the improved rifle, the infantry fire is fourfold more destructive than formerly.”

Wilcox also explored the implications of such fearsome capabilities against cavalry. He reminded the reader that, even against infantry armed with smoothbores, a mounted charge was usually “preceded by the fire of artillery; or the infantry must have been already exhausted or demoralized from its contests with others arms.” Now, facing effective infantry fire at 1200 yards, cavalry charges would “be made with more danger and loss...and with less probabilities of success.” In Wilcox’s opinion, artillery too would be at great risk in the field. Basing this assertion on testing at Hythe against artillery targets, he declared that “field artillery...cannot

---

126 Mahan, *Field Fortification*, xviii-xix.
127 Wilcox, *Rifles and Rifle Practice*, 243-244.
128 Ibid., 246.
129 Ibid., 246-247.
with any chances of success remain in action in front of infantry...[and]...its comparative efficacy is lessened.”

In contrast, Wilcox had mixed opinions regarding the impact of the rifled musket on fortifications. While he did not predict any fundamental changes to the design of defensive structures, he believed that the rifled musket’s improved performance would make possible a simplification of fortification design. He explained that:

the precision and range of the new rifle permits a reduction by one half of the number of salients; renders the attack of those salients extremely difficult, and quadruples the space reserved between the works for the quartering and manoeuvring [sic] of troops, a great gain for the defense.131

Throughout his discussion of defensive works, Wilcox alluded to the challenges attackers would face against troops equipped with the rifled musket. He thus hinted at the nearly impregnable nature of well-entrenched infantry, a scenario that would be repeated time and again in the Civil War. For example, he described the difficulties an advancing force would face in assaulting crémaillère lines (fortifications in a sawtooth pattern). When positioning artillery batteries, the attackers would have to contend with an unbearable fire sustained by the defenders’ own small arms and artillery. Even in the event of a successful assault, only a single face of the fortifications would be captured, allowing the occupants to continue their resistance unimpeded.132

Wilcox commented on the long-standing inaccuracy of infantry armed with smoothbore musket, drawing on the French Revolution (1789-1799) for source material. He cited Major-Generals Jean Gassendi (1748-1828) and Guillaume Piobert (1793-1871) who, in commentaries on the armies of Revolutionary France, decried the wasting of some 3,000 rounds for each

130 Ibid., 247.
131 Ibid., 252.
132 Ibid., 250.
enemy casualty. Wilcox also referenced Decker, who outrageously claimed that a single casualty required 10,000 cartridges.\textsuperscript{133}

The future Confederate general even offered information from specific battles, such as the English at Vittoria (800 bullets per hit).\textsuperscript{134} He did not accept these statements at face value, but rather interpreted them as signs of the overall inefficiency of infantry fire when the smoothbore was in play. Although its limited range was largely to blame, Wilcox also considered the impact of psychological and technical factors in battle, such as:

- the rapidity of fire, the excitement incident to the strife, difficulty of aiming properly in consequence of the dust or smoke, necessity of firing by command, unsteadiness resulting from the pressure of files to the right or left, or in front or rear, and in general, one of the opposing forces being protected by fortifications, field or permanent.\textsuperscript{135}

Wilcox reminded the reader that cannoneers were known for a certain sang-froid (calmness in battle), and believed that if infantry could develop the same mindset, they could demonstrate greater effectiveness in the field. Knowing that the rifled musket was a notable improvement over its smoothbore predecessor, he believed that soldiers would gain confidence and take care while aiming. This in turn would lead to more consistent small arms fire. In conclusion, Wilcox asserted that infantry armed with the new weapon would prove far more capable than troops in past wars.\textsuperscript{136}

Contrasting with this positive take on the rifled musket, Gibbon offered mixed opinions on the new technology. He was quick to point out that the bayonet was no longer the chief weapon of infantry, and that instead, “the efficiency of a body of infantry resides essentially in its accuracy of fire.” Indeed, he felt that the disciplined fire of infantry armed with the rifled musket could stop any assault, including a cavalry charge. Regardless, he expressed doubts that

\textsuperscript{133} Ibid., 236.
\textsuperscript{134} Ibid., 236.
\textsuperscript{135} Ibid., 237.
\textsuperscript{136} Ibid., 238.
this full potential could ever be realized, because of the tendency amongst infantrymen to waste ammunition and engage in disorganized shooting. In Gibbon’s view, the chief hindrance to good results with the rifled musket lay in the fact that the U.S. military:

is perfectly devoid of any means of attaining proficiency in the use of arms of any kind, and the time will yet come, if some corrective is not applied, when this deficiency will result in a disaster vastly greater than the defeat of a handful of men in a distant territory.¹³⁷

Gibbon went on to recommend the establishment of training schools on the European model, referring to the French academies as examples. To justify his bold claim about the lack of preparation, he described a skirmish with Native Americans in which soldiers armed “with the old musketoon (a most indifferent arm)” failed to leave any impression on their enemy. The troops were then instructed in the use of the rifled musket and standard rifle, and in a later encounter, performed admirably.¹³⁸

Nevertheless, Gibbon should not be categorized as fully in support of the rifled musket. Even taking into consideration his concern over training, he was decidedly conservative regarding the impact of the weapon on tactics in general. Despite the long-range capabilities of the rifle, Gibbon believed that battles would still be dominated by close-range firefights. To support this assertion, he drew on the example of Napoleon III’s conservative retrenchment in the 1850s. Given the stresses of combat, Gibbon viewed the back sight as impractical. He once again referred to the French emperor, alluding to his increased support of the bayonet in lieu of the back-sight.¹³⁹ In the artillerist’s opinion, long-range shooting should be left to marksmen, while the line infantry focused on closer targets with simplified sights.

In an aside that unwittingly constituted a stunning prediction of the Civil War, Gibbon compared the performance of volunteer soldiers from different parts of the U.S. He reminded the reader that those from urban areas lacked a working knowledge of firearms, while those born in rural areas had long used guns in their everyday lives.\textsuperscript{140} Considering later comparisons of Union and Confederate volunteers, this statement was remarkably insightful. An 1861 \textit{Scientific American} article carried the same theme, pointing out that “any western youth can beat nine out of ten of them [eastern youths] in off-hand rifle practice.” The danger was clear: troops with such poor marksmanship were “as likely to send their balls flying over the heads of the foes or into the ground not twenty rods off, as into the ranks of the enemy.”\textsuperscript{141}

One of the most influential volumes of the pre-Civil War time period was not actually an official West Point text: Henry Halleck’s \textit{Elements of Military Art and Science}. An unabashed compilation of other authors’ opinions, this volume had an enormous readership. Halleck reflected a progressive stance with regard to the new weapon. Exploring the topic of how soldiers should be trained in the future, he cited a Major Barnard, who stated that the focus should be on proper aiming, not parade drill. Halleck judged traditional tactics to be hopelessly anachronistic. He likened the undisciplined shooting of the past to the hopeless Charge of the Light Brigade at the Battle of Balaklava (1854), where British cavalry charged in the open, only to suffer terrible casualties. By means of this famous example, Halleck indicated that traditional tactics were simply outdated.\textsuperscript{142}

Halleck was enthusiastic about the possibilities represented by the rifled musket. He viewed it as “almost invaluable for defending the approaches to a permanent work.” In an important distinction, he did not believe that the use of more capable small arms would change

\begin{footnotesize}
\textsuperscript{140} \textit{Ibid.}, 202.
\end{footnotesize}
the nature of fortifications. Instead, he claimed that defenses had long been too large for the arms then in use (e.g. smoothbore muskets),\(^\text{143}\) and that with the new weaponry, it would be possible to adequately defend them. Therefore, while defensive methods might not change greatly in substance, their efficiency would increase markedly. He also offered a sizable list of fortification options, reminding the reader that defensive structures “must...be regarded as most valuable and important accessories [sic] in the defense of a position.”\(^\text{144}\)

**Arming Troops for Combat in the Civil War**

Participants in the Civil War wielded revolvers, carbines, shotguns, target rifles with telescopic scopes, and even grenades. Without question, however, the rifled musket was numerically the most important weapon. Considering the nature of pre-war opinion, one might assume that it would have also been the most critical tactically. In the analysis of battlefield accounts that follow, the second half of this thesis will seek to determine the veracity of that prediction, and also to consider how the rifled musket functioned as an agent of change in Civil War-era military thought and practice.

The Civil War was not a conflict characterized by industrially produced uniformity in terms of weaponry. Despite the heavy reliance on factories to produce arms and equipment for both sides, there remained remarkable diversity in design. This was nowhere more clearly illustrated than in the juxtaposition of smoothbore flintlocks and rifled muskets amongst the combatants on both sides. This inconsistent approach to armament might strike the reader as unusual for the so-called “first modern war,”\(^\text{145}\) for indeed, it was not until the latter half of the

---

\(^{143}\) *Ibid.*, 436.

\(^{144}\) *Ibid.*, 344.

Civil War that some level of consistency was achieved. Troops going into the first campaigns of 1861 were armed in an eclectic manner, reflecting the variety in the holdings in American arsenals on the eve of the war. In 1859, all American arsenals held a total of 503,664 smoothbore muskets (with various firing mechanisms), in comparison with 106,598 rifles and rifled muskets.\textsuperscript{146}

Many firearms were sent southward in preparation for the impending conflict. Indeed, historians have criticized Secretary of War (1857-60) John B. Floyd for arming southern states, yet in any case, his assistance to southern states proved of questionable value. Of the 159,000 stockpiled small arms in the South,\textsuperscript{147} most were converted flintlocks “so much weakened in the process of alteration, as to become almost as dangerous when discharged to the person at the breech as the one in front of the muzzle.”\textsuperscript{148}

The continued issuing of smoothbores to troops once the war began proved to be a cause for complaint. Union troops equipped with smoothbores often claimed that they were helpless against Confederates armed with rifled muskets.\textsuperscript{149} In a \textit{New York Times} article from June 1861, the author explained that the 5\textsuperscript{th} New York Volunteer Infantry - also called Duryee’s Zouaves - were stationed near Fort Monroe, and carried traditional muskets. He declared that they were unable to fight effectively because their “range [was] very limited, and their aim by no means accurate.” The article emphasized that the New Yorkers would need the assistance of skirmishers

\textsuperscript{146} \textit{The War of the Rebellion}, Ser. 3, 2: 1.
\textsuperscript{148} “Stolen Arms,” \textit{Scientific American}, Vol. 5, 2 (July 13, 1861), 22.
\textsuperscript{149} Importantly, a mere 10\% of Confederates carried rifled muskets at this early stage of the war. Those so equipped used both Austrian Lorenz and Mississippi models. Nosworthy, \textit{Bloody Crucible}, 185.
to fight off entrenched enemies and sharpshooters, for in such cases their smoothbores were “comparatively useless.” 150

Indeed, early in the war the American media was quick to categorize smoothbore muskets as “curious relics of a more unenlightened age,” suitable for museums. 151 Scientific American similarly viewed this older firearm as outdated, pointing to the efficiency of the rifled musket against smoothbore-armed Russians in the Crimean War. 152 The New York Times concurred in an 1861 letter to the editor that included a vivid account of combat at Big Bethel in June, where the Union troops suffered “horrible slaughter.” The soldier who wrote the letter urgently requested better weaponry, saying that the Union muskets were completely ineffective against Confederates equipped with rifled firearms. Furthermore, he believed that to send Union troops so-armed into the field was “perfect butchery...against rifles that carry 400 yards with perfect accuracy. We shall be shot down like sheep.” 153

Another 1861 New York Times article aptly summarized the stark difference in performance between the two firearms, contrasting “the clumsy musket and rough ordnance of Revolutionary times [with]...the rifle of 1,000 yards to a mile range.” Nevertheless, the publication was not unilateral in its praise of the rifled musket. The editor was quick to point out that combat had not fundamentally changed, for despite increasingly accurate firearms, users were still only able to hit their targets once in 40-60 shots. 154

Based on the above, it rapidly becomes clear that the tragic consequences of the Civil War also served as an opportunity. While the war cost the nation dearly in lives and property, it provided military leaders the chance to consider their positions on weapons technology. Despite

151 “Army Rifles,” 41.
the great interest in the rifled musket, at the outbreak of the conflict an abundance of smoothbores remained in circulation, and it would not be until 1863 that the newer weapon became ubiquitous on both sides.\textsuperscript{155}

As is well known, when the war began, the Union had superior production capabilities due to the existence of several large industrial manufacturers on Northern soil, most notably the Springfield armory in western Massachusetts. The Union was thus able to supply the vast majority of its own arms, though, it did purchase some foreign weapons to supplement domestic production. In contrast, the Confederacy lacked a comparable domestic arms industry, as its only major production center was the Tredegar Iron Works at Richmond, Virginia. Moreover, the vast majority of weapons produced there proved inferior to their Northern counterparts, and hence the South had to rely far more on European imports.

![Figure 3: The 1861 Springfield rifled musket. Courtesy of the Smithsonian.](image)

There were three models of rifled musket present in large numbers on Civil War battlefields. The dominant arm in terms of overall quality and numbers was the Union-produced Model 1861 Springfield rifled musket. Considering that approximately three million men on both sides participated as soldiers in the war,\textsuperscript{156} the production of some 1.5 million Springfields constituted a definite plurality. Popular competitors included the 1853 Enfield, an English variant produced at the Royal Arms Factory at Enfield (and, like the Springfield, at other locations as

\textsuperscript{155} McPherson, \textit{Battle Cry of Freedom}, 475.

well), of which some 428,292 were purchased by the Union. The third most common foreign
model was the Austrian 1854 Lorenz; Northern orders totaled 226,294.\textsuperscript{157}

**The Battlefield Impact of the Rifled Musket in the Civil War**

The scientific evaluation of the rifled musket’s potential carries significant limitations for
the scholar. Period testing does provide ample numerical data, but this seemingly revelatory
information has one inevitable weakness: it lacks the authenticity of observations made in the
field. Regardless of time period, there has always been a profound difference between the
prepared conditions of the firing range, and the stressful, unpredictable nature of actual combat.
As a result, the scholar seeking to understand the full impact of a particular weapon’s
development on warfare cannot base a hypothesis on testing alone, but must rather supplement
such research with an in-depth evaluation of combat records.

The work of military theorists is also insufficient. Even with only a brief look at
battlefield material, it is quickly apparent that there was a sizable gulf between the orderly
clashes of arms depicted in theoretical texts, and the grim, chaotic reality experienced by the
Civil War’s participants. To gain a general idea of Civil War tactics, a survey of such writings
can be beneficial. Still, this content is ultimately more deceptive than illustrative. The scholar
cannot assume that these stratagems were carried out consistently in the field, for as Moltke once
said, “no plan survives contact with the enemy.”\textsuperscript{158} Generals on both sides would reaffirm the
veracity of this maxim time and again throughout the four years of bloodshed.

More simply put, it is impossible to study Civil War combat without taking the human
factor into consideration. Indeed, scholarly discussion of the war’s psychological impact on those

\textsuperscript{157} Katcher, *Source Book*, 57-58.
\textsuperscript{158} Quoted in Daniel J. Hughes, ed., *Moltke on the Art of War: Selected Writings* (New York: Presidio Press, 1993).
who engaged in combat is a well-established area of Civil War research. Some academics have already produced sizable volumes on the subject, including Gerald Linderman’s *Embattled Courage* and Drew Faust’s *This Republic of Suffering*. These tomes concentrate on the ideals the soldiers carried with them into battle and their perception of death, respectively. As an addition to that literature, the following close examination of two particular battles will be used to first explore the impact of the rifled musket on battlefield tactics. It is with such information that the experiences of the soldiers can be put in a new, more exegetical light.

The Day of Glory: First Bull Run

![The First Battle of Bull Run](image.png)

Figure 4: The First Battle of Bull Run. The open nature of the fighting is emphasized, while the defensive aspects are seemingly nonexistent. Kurz & Allison, 1890. Courtesy of Library of Congress.
The First Battle of Bull Run (July 21, 1861), alternatively known as First Manassas in the South, shattered expectations on both sides of a splintered mid-19th-century America. In a matter of hours, civilians and soldiers alike grasped the actual magnitude of a conflict that forever transformed the nation’s cultural fabric. In many ways, Bull Run represented the first step towards the maturation of a generation buoyed by dreams of bloodless glory. Once hopeful for a decisive victory - an attitude William Tecumseh Sherman later entitled “Bull Run mania”\(^{159}\) - both North and South soon found themselves disabused of the notion that the Civil War could be settled in a single clash of arms. In place of this delusion, they realized that the war would be a much longer affair with unprecedented costs in lives, material, and even the country’s very landscape.

The battle consisted primarily of a Union assault that at first succeeded, only to shatter in the face of stiff Confederate resistance. Brigadier General Irvin McDowell, with the kind of planning only suitable for a professional army very unlike his own, had envisioned a three-pronged attack on the enemy position. While this approach was tactically sound, it did not take into consideration both the capabilities of McDowell’s 18,500 (mostly green) troops, and the challenges presented by the battlefield terrain. As a result, what was intended to be an intricate assault devolved into confusion as the Union columns progressed at an agonizingly slow pace. Still, it was initially successful in pushing back the main Confederate position on Henry House Hill. This was only temporary, however, for the Southern army of some 21,900 men\(^{160}\) soon rallied, thanks to the efforts of Brigadier General Thomas Jackson. It was that day that he famously earned his surname “Stonewall,” the meaning of which has been the subject of debate.


However, it is generally accepted that it was in reference to his stolid behavior in the face of intense shooting and impending defeat. With the assistance of Colonel “Jeb” Stuart’s cavalry, the Confederates were able to drive back the Northern surge. McDowell did not just have to contend with a counterattack, though, for additional Confederate units under Brigadier General Joseph E. Johnston began to arrive. The odds now decidedly in the South’s favor, the Union troops lost their nerve and left the field in a complete rout.\textsuperscript{161} Casualties were - in the context of the war - low, with about 2,500 Union casualties,\textsuperscript{162} and some 2,000 Confederate casualties.\textsuperscript{163}

Officers looking back would suggest two major reasons for the Confederate victory that fateful day. The participating troops were largely composed of volunteers, and their lack of extensive training had been made painfully evident. Primary among these issues was a lack of proficiency with firearms. Union Colonel William B. Franklin confirmed this, claiming that “a great deal of the misfortune of the day at Bull Run is due to the fact that the troops knew very little of the principles and practice of firing. In every case I believe that the firing of the rebels was better than ours.”\textsuperscript{164}

This “firing” did not necessarily refer to the use of rifled weapons. Troops at Bull Run were equipped with an array of different firearms, of which the rifled musket constituted a distinct minority. By far, the older smoothbore was the dominant arm on the field, and as previously indicated, held this title until 1863. Indeed, at this early stage in the war, soldiers frequently obtained armament from their homes, including shotguns and older flintlocks. Therefore, a discussion of weaponry at Bull Run does not provide conclusive evidence on the

\textsuperscript{162} \textit{Ibid.}, 26.
\textsuperscript{163} Johnson and Buel, ed., \textit{Battles and Leaders}, Vol. 1, 195.
\textsuperscript{164} Kevin J. Dougherty, \textit{Great Commanders Head-to-Head: The Battles of the U.S. Civil War} (London: Amber Books, 2009), 19.
capability of rifled weaponry. Instead, it facilitates a more thorough comparison with later Civil War engagements, where the rifled musket was the primary small arm.

Importantly, the Confederate advantage extended beyond skill with weaponry. In his post-battle report on Bull Run, Union Captain D.P. Woodbury suggested that the Southern troops, having “acted on the defensive,” employed tactics better suited to the situation at hand. Nevertheless, they “were equally exposed to disorganization.” This latter point is noteworthy, for it highlights that soldiers on both sides were not nearly as reliable as the grizzled veterans of later years. Woodbury declared that the three-month volunteer, when exposed to danger or even mild battlefield stresses, “flies away from his ranks, and looks for safety in dispersion.” In his view, both armies were filled with men untried in combat, whose reliability under fire was highly suspect.165

There are several ways to learn about the fighting experience at Bull Run, not least of which is the examination of soldiers’ accounts. Still, much can also be inferred by examining the tactics employed that day. While such information might appear - on the surface - to be solely applicable from a technical perspective, it also helps reveal the thought processes of the troops. Enthusiastic yet apprehensive, these largely volunteer units required defensive preparations in order to perform consistently under fire. This illustrates why the rifled musket cannot be blindly associated with the growing emphasis on defensive tactics.

Post-battle reports help unveil the reasons for this evolution in fighting techniques. Officers explained that they would order their troops into cover, yet notably, mention of the rifled musket is conspicuously lacking. Instead, the available material suggests that the motivation for these tactics was the logical - and timeless - concern over bolstering soldier

morale. Both sides sought an edge by means of such combat methods, albeit to varying degrees. By exploring the accounts, one can ascertain the extent of these defensive actions, and how they changed battlefield conditions. The analysis helps clarify the rifled musket’s impact on later Civil War engagements.

**Confederate Entrenchment**

From the outset, the Confederate intention to employ a defensive mindset was abundantly clear. Far from impulsive decision-making, it was a deliberate plan to give Southern troops - who were arguably just as fickle as their Northern foes - an advantage both psychological and physical. There was clear evidence of Southern preparations for entrenchment in the days prior to the engagement, and the advancing Union forces made note of these developments. McDowell, describing the flight of Southern forces from Fairfax Court-House, listed “intrenching tools” as amongst the items seized. He also provided a detailed description of Confederate fortifications on the road to Fairfax Station. His troops had to clear out not only “trees felled across the road” but also “extra-sized breastworks...some of them with embrasures revetted with sand bags.” Evidently, the Confederate occupants had used both natural resources and man-made alternatives to make their position as defensible as possible.

The Confederate forces around Bull Run produced far more elaborate defenses at the Fairfax Railroad Station. First Lieutenant James Curtis, Acting Commissary of Subsistence, described a “deep cut...[filled] with trees and earth at least ten or twelve feet in depth and for a

---

166 As James McPherson points out, Southerners may have been more reliable. Although training amongst both armies was roughly equivalent, Confederates had longer enlistments. Whereas some Northern troops actually left the field just prior to the battle, Confederates had no such motivation to avoid combat. As a result, their so-called “will to fight” would be higher. McPherson, *Battle Cry of Freedom*, 339.

167 *The War of the Rebellion*, Ser. 1, 2: 305.

space of about two hundred feet.” Southern troops did not always rely on sizable defenses, instead utilizing light cover such as houses and woods. Colonel Israel B. Richardson, who faced Brigadier General James Longstreet’s troops at Blackburn’s Ford in the days before Bull Run, alluded to such Confederate positions as well as similar defenses at Centreville less than ten miles away.170

Defenses included the creation of obstacles, most notably the mining of a stone bridge. McDowell made mention of this development at the Warrenton Road crossing over Bull Run.171 The Confederates had not focused their attention exclusively on the bridge itself, for it “was defended by a battery in position, and the road...impeded by a heavy abattis.”172 According to Major J.G. Barnard of the Engineer Corps, the abattis was extensive, measuring some 200 yards long; on the day of battle, Captain Alexander ordered his engineers to cut it away so that Union troops could pass over the bridge. Anticipating that the Confederates would destroy it, the captain had had a trestle bridge made, but this proved unnecessary as the bridge remained intact.173

Another familiar Confederate tactic was the masked battery, wherein an artillery unit was concealed so that it could wreak havoc on advancing enemies, unimpeded. Unable to clearly see the enemy cannon, Union troops would be unable to respond effectively. Lieutenant Edward B. Hill of the 1st Artillery experienced this firsthand, stating that his unit’s position was “untenable on account of masked batteries of the enemy, the precise situation of which we could not ascertain.” Other Union officers took note of hidden Southern positions. Colonel O.B. Willcox of

169 Ibid., 341.
170 Ibid., 313-314.
171 Ibid., 308.
173 The War of the Rebellion, Ser. 1, 2: 332.
the 1st Michigan Infantry, in his report on the fighting at Fairfax Court-House, explained that the Confederate defenses included “a masked earthwork in the woods.” Colonel A. Porter of the 16th U.S. Infantry also alluded to a masked battery, indicating that it was protected by a grove.\(^{174}\)

Confederate troops extended the use of defensive tactics at Bull Run beyond protective structures; they also utilized these techniques to prepare traps for unwary enemies. Major I.N. Palmer of the 2nd U.S. Cavalry experienced this kind of surprise attack, claiming that his unit was unable to rally faltering Union troops when they experienced “a galling fire, opened suddenly from the woods in front.” Major J.J. Bartlett shared a similar story, writing that his unit was flanked by Confederates “who approached by a ravine under cover of a thick growth of bushes.”\(^{175}\)

Brigadier General Robert C. Schenck provided some telling information about Confederate preparations. To provide cover for his troops, the Union commander had taken advantage of natural terrain that included woods and a ridge. After several hours, during which skirmishers on both sides exchanged shots among the trees, he noted the movement of Colonel Alexander M. McCook through a wooded path with positions for ambush set up on both sides. While empty, these were signs that the Confederates had planned to use guerrilla tactics against advancing Union columns. McCook also encountered a “strong earthwork...with at least four heavy guns,” and most importantly, rifle-pits.\(^{176}\) These shallow indentations in the ground allowed infantry to offer a punishing fire while maintaining a low profile, making them difficult targets. Colonel I.B. Richardson of the 2nd Michigan Infantry also made mention of Confederate rifle pits, saying that enemy “skirmishers...covered themselves with trees and rifle-pits.”\(^{177}\)

\(^{174}\) Ibid., 365, 309, 384.

\(^{175}\) Ibid., 393, 389.

\(^{176}\) Ibid., 358.

\(^{177}\) Ibid., 375.
This information is telling from several perspectives. First, it substantiates Woodbury’s claim regarding the importance of defensive tactics to the Confederate victory. Second, these observations about preparation and fortification stand in sharp contrast with the image of naïve armies. While the participants at Bull Run may have been inexperienced in warfare both practically and psychologically, there can be no doubt that they were well versed in the techniques espoused by the pre-war literature. Still, this should not be taken to mean that the battlefield of Bull Run resembled the trench-ridden wastelands of the Western Front in World War I. At this early stage, Confederate troops did not engage in large-scale fortification. Instead, they took advantage of naturally defensible areas, presenting the Union forces with an environment especially challenging for raw recruits.

It is evident from the available material that Confederates employed a broad range of defensive options at Bull Run. Critically, they did this without the impetus of the rifled musket, for most troops were not so equipped at this earliest stage in the war. The use of sand bags and rifle-pits was not a reaction to murderous long-range fire from the new weapon, but rather part of an effort to conceal and deceive the enemy. Instead of a response to new technology, these tactics were simply consistent with good battlefield thinking.

**Union Entrenchment**

All of this should not be taken to imply that the Northern army was unprepared for such defensive tactics. Indeed, Union positions at Bull Run were hardly devoid of entrenchments or the equipment with which to construct them. Once again, there was no indication that these fortifications were prepared in response to rifled musket fire. Instead, they were simply part of the Union approach to field battles. Amongst McDowell’s instructions on the eve of battle, he stated that the soldiers were:
provided with intrenching tools and axes, and if the country affords facilities for obstructing our march, it also gives equal facilities for sustaining ourselves in any position we obtain...Troops will march without their tents, and wagons will only be taken with them for ammunition, the medical department, and for intrenching tools.178

The Union commander was not the only officer to discuss this topic in detail. The day before the battle, Assistant Adjutant-General James B. Fry assigned Lieutenant Prime of the Engineer Corps the task of constructing “defensive works, abatis, earthworks, &c.”179 The presence of engineers, whose primary tasks included fortifying and the building of bridges, is indicative of McDowell’s overall tactical mindset. Despite popular euphoria over the prospect of battle, the Northern general focused on the proper disposition of his troops, and this meant the full exploitation of advantages granted by the terrain. Other officers also took note of engineers amongst the troops, such as Woodbury. He referred to a Lieutenant Cross, who led a team of engineers (or “sappers”) and miners who facilitated the army’s movement by removing obstacles.180 Considering the Confederate use of impediments - such as abatis - to slow down the Northern advance, the engineers proved doubly crucial as not only fortifiers, but as facilitators of army movement.

As with their Confederate counterparts, Union defenses could vary greatly both in design and scale. Some were simple barriers, such as the felled trees that Johnston mentioned in a discussion of the Union position.181 In contrast, Prime described a Northern artillery position at Blackburn’s Ford, which was reinforced by means of an abattis, log revetment (wood-covered slope), and about 12 feet of dirt in front.182 These wood-and-earth designs, once limited in

178 Ibid., 305.
179 Ibid., 326.
180 Ibid., 334.
182 The War of the Rebellion, Ser. 1, 2: 335.
application to siege craft, were now being implemented on the battlefield to render vulnerable positions more secure.

Importantly, fortifications were not used simply to protect stationary units, but were also an integral part of fast moving field tactics. McDowell himself described how, in order to secure the Centreville ridge, he “sent an engineer to extemporize some field works.”\textsuperscript{183} It was here that the Union general demonstrated an impressive knowledge of modern tactical awareness. Recognizing the importance of the ridge as a position overlooking the battlefield, he ordered the construction of defenses to ensure that it would remain in Union hands. In certain cases, there was not sufficient time for engineers to arrive and reinforce the position. In such cases, the troops had to improvise. Colonel Richardson of the 2\textsuperscript{nd} Michigan Infantry demonstrated how Union troops could entrench on demand. In preparation for an impending Confederate attack, his men threw up defenses in the form of “an earthen parapet, with embrasures...and commenced an abatis of timber, by felling trees, pointing outwards.”\textsuperscript{184} These actions are reminiscent of modern infantry squads, which are trained to fortify their surroundings in response to impending threats.

Guerrilla tactics were not the sole province of the Confederates, either, for the Union troops set ambushes as well. Brevet Major Henry J. Hunt of the 2\textsuperscript{nd} U.S. Artillery, in anticipation of a Confederate assault, prepared the cannons to unleash a devastating volley of antipersonnel rounds. Meanwhile, the nearby Union infantry were “ordered to lie down and await the approach of the enemy.” Incidentally, the artillery proved so effective at driving off the advancing Confederates that the infantry did not participate. Once again, the Northern troops had

\textsuperscript{183} McDowell, “The Bull Run Battle…”
\textsuperscript{184} The War of the Rebellion, Ser. 1, 2: 374.
demonstrated a surprising degree of tactical awareness unconnected to the use of the rifled musket.\textsuperscript{185}

Looking at the records left by both sides, there is a curious lack of commentary on the reasons for, or observations regarding the effect of, these various entrenchments. Neither general hinted that the consistent use of defensive tactics might be innovative or at all inconsistent with older practices. Based on the concern over unseasoned troops, it is logical to assume that defenses were a precautionary measure. Still, McDowell extended the use of such structures beyond the preparatory and into the realm of modern infantry tactics. Rather than moving the army as an unwieldy bloc, he dispatched units to specific areas to “dig in,” a command usually associated with the defensive-minded combat of modern times. P.G.T. Beauregard’s consistent reinforcement of outer positions (e.g. Fairfax Station) exemplified this mentality as well.

Perhaps most importantly, neither side associated the need for defensive tactics with the rifled musket. While comfortable with fairly extensive fortification practices, they also betrayed a complete lack of concern regarding the new technology. Before exploring the impact of the rifled musket at this early stage of the war, it is critical to investigate the justification for fortification at Bull Run. With this information, it will be possible to determine whether the rifled musket truly transformed the battlefield, or if the changes so often attributed to it had already taken hold amongst the American military leadership.

**Reasons for Entrenchment**

The reasons for entrenchment at Bull Run were several. As already indicated, fear of the rifled musket’s capability was not a major factor in leading both army leaders to their respective strategies. Therefore, it is necessary to evaluate the motivations of the two generals, and consider

\textsuperscript{185} \textit{Ibid.}, 379.
how their planning affected the tactics employed that day. For McDowell, the numerous instances of defensive preparations were simply means to a goal: that is, an offensive that would result in Union victory. The general did not betray any substantial concerns about the battle that inspired this defensive approach; it was simply part of normal military proceedings. Beauregard, however, judged these developments as indicative of the Northern army’s strength. In his book-length commentary on the battle, the general made an intriguing comment about McDowell’s army and its defensive posture, stating that it could only be interpreted “as an indication of weakness.”

Ironically, a defensive approach was at one point the linchpin of Beauregard’s entire tactical outlook. Prior to the arrival of General Joseph Johnston’s reinforcements, the Confederate troops had been outnumbered. In Beauregard’s view, the natural reaction was to assume the defensive. On July 11th, he had expressed the hope that the Union army would collapse against his position, where its “numerical superiority would be materially counterbalanced by the difficulties of the ground, and my previous preparations there for the event.” His instructions to the troops are valuable for two reasons: not only do they illustrate his reliance on the defensive, they also reveal what tactics were viable with such inexperienced soldiers. Anticipating that the Northern troops would attempt to storm “his intrenched line,” he enjoined his men, firmly ensconced behind their defensive structures, to drive off the attackers with the bayonet. This command sounds archaic in light of the pre-war rejection of traditional combat methods. Regardless, the general also emphasized the need for controlled shooting,

---

188 Considering the abundance of defensive positions noted throughout the battle, one might assume that the Confederate troops were quite comfortable entrenching their own positions. However, the reality was that the soldiers did not agree entirely with their general’s vision. In particular, they despised the idea that as soldiers, they would have to dig trenches, and declared “that they had not enlisted to do the work of Negroes.” As a result, Beauregard had to obtain slaves to complete the task of fortifying the Southern position. Hagerman, *Origins of Modern Warfare*, 106.
wherein the troops would only begin firing once they had a clear view of their target. These commands are telling. Not only do they endorse the use of cold steel, but they also imply that the soldiers were apt to fire wildly unless they made a concerted effort to aim. If anything, these orders are synonymous with the pattern of earlier fighting, wherein close-range shooting and melee combat were the dominant means of coming to grips with the enemy. Beauregard’s focus on defensive tactics was not to be permanent, however. While the Southern troops still employed fortifications on a large scale in the battle, they did so within the context of a new, more offensively minded strategy.

**A Change of Heart**

Beauregard’s cautious plans changed dramatically on July 19th, a development described in detail by Lieutenant General Jubal Early. In Early’s account, Beauregard felt encouraged by the prospect of reinforcement from Johnston. With his army no longer at a numerical disadvantage, the general declared that when the incoming fresh Southern troops attacked “the enemy’s right flank...the next morning...we were to fall upon his left flank.” This switch in Beauregard’s strategy is significant for several reasons. First, it shows that the general’s reliance on defensive methods was due to concern over numerical inferiority, not necessarily the army’s lack of training. Second, Beauregard was apparently nonplussed about the risk of exposing his men to enemy fire in large-scale assaults.

Although this might appear to be a rather drastic change in mindset, it was actually in keeping with Beauregard’s general line of thought regarding offensive combat. Following Bull Run, the general would continue to advocate for decisive field battles, in which victory was

---

generally achieved most rapidly by means of frontal assaults. In an 1862 letter to Brigadier General C.G. Dahlgren, Beauregard proclaimed that victory lay “in throwing all our forces into large armies, with which to meet and successfully overthrow our adversary. The result of one such victory would be worth more to us than the occupation of all our important cities to our enemies.”

The Risk of Exposure

In the aftermath to Bull Run, McDowell sought a means of explaining the stunning Union defeat. He believed his army had been outnumbered, and while this was true, the difference was not marked. The Northern general’s excuse is all the more odd considering Beauregard’s own views. The Southern leader claimed prior to the battle that “On the Federal or hostile side were all material advantages, including superior numbers, largely drawn from the old militia organizations of the great cities of the North, decidedly better armed and equipped than the troops under me...” McDowell’s impression of events is plausible given the sudden arrival of Johnston’s troops, but Beauregard’s statement about “superior numbers” is inexplicable. This disagreement over army size suggests that the two leaders were not aware precisely how many troops were in the field.

In any case, McDowell did not believe the fate of the battle had been decided solely by numbers. He was quick to contrast the Confederates’ entrenched position versus his own, which he oddly described as exposed. He claimed that the battle had been fought against “an enemy...on the defensive, and always under cover, whilst our men were of necessity on the open

191 War of the Rebellion, Ser. 1, 15: 744-745.
fields.” This statement, reminiscent of Woodbury’s own observations, is also significant because McDowell acknowledged the impregnability of a strong defensive position. William Tecumseh Sherman, at that time a colonel, shared the opinion of the Union commander. In his *Home Letters*, he wrote the following:

> We must be the assailant and our enemy is more united in feeling, and can always choose their ground. It was not entrenchments but the natural ground and woods of which they took good advantage, while we in pursuit had to cross open fields and cross the crests of hills which obstructed a view of their forces.

Sherman thus not only acknowledged the Confederate use of defensive structures, but pointed out that they were largely natural rather than manmade. This distinction is noteworthy as well, for it shows that the Confederates were not yet utilizing the kind of elaborate fortifications that would be a common sight later in the Civil War, such as at Petersburg and Cold Harbor. Soldiers at Bull Run might have been using tactics synonymous with later wars, but - generally speaking - they did so without the benefit of advanced field fortification.

Ultimately, Sherman blamed the defeat on the mindset of the troops rather than any disadvantage in position or terrain. According to the redheaded colonel, the Union soldiers - unprepared for combat - had nevertheless been convinced that a show of force would suffice to win the day. He did not judge Bull Run a complete failure, however, for it was “one of the best-planned battles of the war...[even if it was]...one of the worst-fought.”

The Union Brigadier General Daniel Tyler was also well aware of the futility of assaulting entrenched positions. He discouraged Sherman from needlessly exposing his men, stating “that the enemy were in large force and strongly fortified, and a further attack was

---

193 McDowell clearly did not view his own defensive efforts as significant enough to warrant mention. Although the Union certainly was in the offensive position at Bull Run, there is simply too much evidence of fortification among the Northern troops to accept the general’s excuse wholeheartedly. McDowell, “The Bull Run Battle...”
194 Sherman, *Home Letters*, 211.
unnecessary.” By fortification, he meant breastworks and entrenchments. This wariness of fortified positions was common among Union officers, and demonstrates that knowledge of defensive tactics was not the sole province of the commander-in-chief; it filtered down through the ranks. Admittedly, Sherman and Tyler were high-level officers, but the multitude of instances involving low-level officers in defensive maneuvers is a testament to how common this mindset was at the time. The universal interest in fortification suggests that the pre-war focus on such tactics had permeated all ranks of the American military. If the soldiers were generally aware of defensive tactics, and employed them consistently that day, then the large-scale use of fortification in later battles cannot be singularly tied to the rifled musket and the dangerous new battlefield environment it supposedly fostered.

Admittedly, the subject of armament is a mysterious one, for the records are curiously silent on details of weaponry. For example, while the officers readily conceded the danger of the frontal assault, they failed to explain precisely why such efforts would fail. Conspicuously absent from The War of the Rebellion is a statement regarding even the power of the largely antiquated weaponry employed that day. Fortunately, Sherman’s commentary helps the scholar develop a hypothesis on the impact of arms, both old and new, on this first of many Civil War battlefields. His account extended beyond a general analysis of the battle results, as he also offered plentiful details with respect to his own role on the field. It is here that Sherman shed light on the experience of troops facing intense small arms fire for the first time.

The future general described his unit’s action at Bull Run, starting with the challenge they faced in actually locating their enemy. The Confederates sheltered themselves behind numerous obstructions, making them decidedly elusive targets. Of course, while thus shielded

---

196 The War of the Rebellion, Series 1, 2: 313-314.
from Union retaliation, the Southern infantry and artillery were able to fire at will. Indeed, Sherman’s “batteries, exposed, had been severely cut up by theirs [Confederate artillery], partially covered.” Sherman explained that the Confederates eschewed the bayonet in favor of their firearms, a fact that suggests confidence in firearms in lieu of cold steel. His men “were exposed to a very heavy fire,” resulting in terrible losses. With 111 soldiers killed and another 250 wounded, his command descended into chaos.

Still, his unit’s action only lasted an hour, and given the intensity of fire he described, one might expect heavier casualties. The results of this action seem to corroborate the complaints of pre-war writers, who bemoaned the fact that soldiers wasted hundreds of bullets to strike a single target. Sherman was quick to dismiss the “short exposure [of his troops] to an intense fire of small-arms at close range,” instead asserting that the Union troops had been gaining ground. In his view, his command would have emerged successful save for a break in morale. This statement is doubly important. Not only does it highlight the unreliability of the raw recruits, it also confirms the close-range nature of the fighting. Sherman’s casualties did not accrue from long-distance skirmishing, but were rather the direct result of close-range exposure to enemy fire.

The above example also demonstrates the potential of disciplined shooting. Southern troops, well ensconced in a defensive position and firing steadily, could drive back enemies with ease. At this stage in the war, when the vast majority of troops were far from professional, such performance was not terribly impressive. After all, repelling battle-hardened veterans would be a much more noteworthy feat, and indicative of a potential revolution in warfare. Such skilled

---

197 The War of the Rebellion, Ser. 1, 2: 370.
198 Sherman, Home Letters, 208.
soldiers were lacking at Bull Run, however, and this factor must be taken into consideration in the ensuing analysis.

The firearm did not completely overtake older forms of combat at Bull Run. The bayonet, a seeming anachronism on the battlefields of the first modern war, was the weapon of choice on multiple occasions that day. “Stonewall” Jackson himself demonstrated this willingness to rely on cold steel. Famously, he instructed his troops to prepare both a short-range volley and a charge by holding their “fire until they come within fifty yards! Then fire and give them the bayonet! And when you charge, yell like furies!” Historians often supply this quote as evidence for the early use of the so-called Rebel Yell. Nevertheless, it carries still more significance, for it suggests that the soldiers were not capable of accurate fire at long range. Instead, they had to focus their energies on closer exchanges of bullets and steel in order to be effective. Considering their inexperience, the lack of rifled muskets, and poor visibility due to the smoke-filled air, this conclusion was quite logical. Still, it carries other implications. If soldiers were not reliable shots outside of close range, then enemies could probably march about in safety as long as they were several hundred feet away. The reliance on defensive tactics, however, suggests that despite this lack of danger at range, fortification was still a dominant component of the battle experience. Once again, defensive tactics were brought about by more than just new weapon technology.

This Southern response, in which cold steel was used in lieu of flying lead, confirmed that seemingly outdated fighting techniques still had a place in a war that could be at once both modern and old-fashioned. Jackson’s spirited quote did more than shed light on the nature of combat at Bull Run; it also spurred the 4th and 27th Virginia to success as they drove the

---

Northerners off the field. Regardless, this was not the only instance of a bayonet charge that day. Jackson also called attention to Colonel Arthur C. Cummings, who led his regiment in a headlong assault on a Union artillery unit. The Confederates had to retreat in the face of intense fire, yet the successful use of a charge is noteworthy. Charging could even be employed by concealed infantry to great effect against unprepared enemy units. Captain Charles Griffin of the 5th U.S. Artillery witnessed such an attack, explaining how his unit was “charged by...infantry from the woods.” The rushing Confederates were mistaken for Union reinforcements, with catastrophic results. The artillery unit was decimated. Jackson did not provide specifics on Cummings’s advance, but the troops were only driven back after they reached the battery. This confirms that small arms fire was most devastating at closer ranges, with significantly less impact at longer distances. This conclusion is in keeping not only with Jackson’s own oft-quoted order, but also with Sherman’s comment on close-range fire, which he blamed for the high casualties suffered by his own command.

These were not the only seemingly outdated aspects of the fighting at Bull Run. Cavalry too made an appearance on the field. Jackson, ever the proponent of a headlong charge, credited cavalry commander “Jeb” Stuart with “timely charging the enemy and driving him back.” This claim must be treated with caution, for it did not imply that cavalry could lead consistently successful frontal assaults. Stuart’s unit, far from taking center stage, performed a counterattack to secure the Confederate left flank.

Therefore, while mounted units could still be effective, they were more limited in scope. Rather than leading the advance, they were restricted to supporting the infantry by protecting the vulnerable flanks while the latter bore the brunt of the fight with musket and bayonet. Cavalry

---

200 *The War of the Rebellion*, Ser. 1, 2: 481-482.
202 *Ibid.*, 481
used hit-and-run tactics to avoid unnecessary exposure to musketry. Union Brevet Second Lieutenant William D. Fuller of the 3rd Artillery experienced this first hand, claiming that his unit was “unexpectedly charged by cavalry...[and]...Our cannoneers and drivers were shot or sabered.”203

As these examples illustrate, the fighting at Bull Run is difficult to classify. While troops readily adopted the defensive, they also focused most of their energies on close-range exchanges. The rifled musket, still in the minority of Civil War armaments, had not exerted its full influence on tactics or the soldiers’ battlefield experience. The continued success of older fighting techniques was supposedly possible because the rifled musket was not yet the dominant arm. This hypothesis can be tested in light of the events at Cold Harbor, and is a major reason for this comparative study of the two battles. While Bull Run disproves the notion that fortification was uniquely tied to the rise of the new weaponry, it remains to be seen - without the evidence supplied by Cold Harbor - whether older methods could withstand the rifled musket.

The Terror of Combat

Bull Run was a battle that juxtaposed traditional frontal assaults and close-range fire with fortification and ambush. Even at this early point in the war, when the two sides had not tested each other’s strength, they did not hesitate to conceal their units in anticipation of enemy assaults. The idea that troops only assumed the defensive when defeat seemed certain, as Beauregard implied, is plainly inaccurate in light of this data; instead, soldiers simply used the terrain to their advantage. Ironically, it was the Confederates who arguably used defensive tactics to the utmost that day, and yet, far from demonstrating weakness, they emerged victorious.

203 Ibid., 367-368.
As a scholar, it is crucial to go beyond the sheer mechanics of battlefield tactics. The available source material leaves no doubt that Bull Run was the site of notable, if not large-scale fortification. Regardless of exact size or style, this evolution in fighting methods had an impact on the soldiers’ psychological experience. By considering their views as individuals - rather than as emotionless units - it is possible to learn much more about the nature of Civil War combat. With such information, it will then be feasible to make a comparison with the traumatic Union defeat at Cold Harbor.

Some accounts support the view of Bull Run participants as eager and unaware recruits desperate to reach the battlefield before it was all over. The Confederate artillery officer, William Thomas Poague, provided an extensive account of his thoughts on the climactic day. Describing the first firing of a friendly cannon, he proclaimed that:

The impression made was wonderful, exciting various emotions and creating an intense desire to see and take part in the fight. A solemn apprehension arose that here at last was the reality, about which we had been thinking, talking and speculating. An almost uncontrollable impulse urged us to dash down that stone pick to the help of our comrades. A curious mental exaltation seized us; an inward questioning as to whether it was all a dream.  

Poague described a kind of “wild and joyous exhilaration” as he approached a battlefield filled with bullets and shells. This surreal experience changed completely when he came upon a friend dead in the field. The young artillerist conceded that it was difficult to reconcile this sight with his other emotions. And yet, Poague was neither afraid nor exhilarated. As a Christian, he took comfort in God, and claimed to feel “a most novel sensation...with an effect something like entrancing music in a dream.” In no way did he believe his faculties were affected by the experience of battle.  

205 Ibid., 9-11.
Soldiers marching to this battlefield before the firing started may have been hopeful for an easy victory, but their writings following the engagement depict a radically changed mentality. Troops unprepared for such a savage contest were caught in the crossfire and strewn across the battlefield. The resulting grisly vision of fire and blood clearly left a strong impression on the survivors. Sherman perfectly encapsulated this difficult environment in an oft-quoted account filled with riveting yet grim imagery of his unit in action:

the carnage of battle, [with] men lying in every conceivable shape, and mangled in a horrible way...horses running about riderless with blood streaming from their nostrils, lying on the ground hitched to guns, gnawing their sides in death.\textsuperscript{206}

Sherman also encountered a Union artillery unit ravaged by Confederate cavalry, and recorded the horrific results in his report. He viewed “a complete scene of destruction...[with] wheels, limber-boxes, guns, caissons, dead and wounded men and horses...scattered all along the road.”\textsuperscript{207} This was, of course, only Sherman’s introduction to the horrors of warfare. Nevertheless, it must have been quite shocking to the many Americans who had expected Bull Run to be something more akin to a military parade than a true clash of arms.

Other soldiers offered similar commentaries on the disturbing sights they beheld. According to Charles Cheney of the 2\textsuperscript{nd} Wisconsin Infantry, there “were hundreds shot down in my sight; some had their heads shot off from their shoulders by cannon balls; others were shot in two in the middle, and others shot through the legs and arms...Cannon balls were flying like hail.” The troops already seemed full cognizant of the reality they faced, in which lives could be easily wasted in pointless assaults. Responding to a Confederate boast that a single Southerner

\textsuperscript{206} Sherman, \textit{Home Letters}, 208.
\textsuperscript{207} \textit{The War of the Rebellion}, Ser. 1, 2: 365.
could take on five Northerners, Charles E. Davis of the 13th Massachusetts Infantry admitted that it “was not so very comforting to feel that we were to be killed off in blocks of five.”

This was indicative of the soldiers’ pessimistic attitude regarding combat. One Virginian, decrying an absurd recognition ritual that demanded the soldiers stand upright in the open field, pointed out “They [the officers] failed to tell us that, while we were going through this...performance, we thus gave the other fellow an opportunity to blow our brains out.” As the men struggled to process these images and thoughts, they sought to rationalize such developments against the background of traditional warfare symbology. Rather than participating in a glorious, almost painless fight, they instead found themselves in a terrifying environment. One soldier declared: “I was in the presence of death. My first thought was, ‘This is unfair; somebody is to blame for getting us all killed. I didn’t come out here to fight this way; I wish the earth would crack open and let me drop in.”

Some soldiers offered more specific accounts, filled with vivid detail on advances against positions bristling with gunfire. One Confederate soldier of the 8th Georgia claimed that the “balls just poured on us, struck our muskets and hats and bodies.” Even at this early time in the war, when such horrific clashes as Antietam (1862) and Shiloh (1862) had yet to occur, one might hear soldiers refer to an assault position as “the place of slaughter.” Another survivor of a murderous offensive painted a scene of chaos wherein constant shooting created “a whirlwind of bullets...[as]...deadly missives rained like hail among the boughs and trees.” This kind of imagery was a far cry from the image of hesitant soldiers who fought halfheartedly, lacking the

---

208 Eicher, The Longest Night, 100.
210 Ibid., 178.
211 Ibid., 179.
experience to pursue the fight with vigor. Instead, these accounts suggest a battlefield experience in which attacking troops faced a literal wall of lead.²¹²

Nevertheless, this image of combat wherein the air reverberated with deadly missiles could be deceiving. As has already been made clear, small arms fire was anything but unerringly accurate at this time. Those present at Bull Run admitted that the troops’ accuracy could vary widely, as illustrated during an exchange between the New York Zouaves and Jackson’s command. The latter first aimed their weapons much too high, missing the Union force completely. It still surprised the Northerners, however, who immediately dropped to the ground.²¹³ Realizing their mistake, the Confederates readjusted for the second volley, and in the words of one Southerner, “we literally mowed them down.”²¹⁴

Although many troops aimed their weapons with little success, the presence of sharpshooters greatly increased the danger of troops exposed in the field. Captain James B. Ricketts, in what would become commonplace later in the war, complained of devastatingly accurate small arms fire, this time originating from a nearby house.²¹⁵ To silence this protected enemy position, he directed his artillery battery to bombard the building. Little did Ricketts know that he would encounter such a threat again that day. This second time, however, the firing was so devastating that he had no means of responding. When the 33rd Virginia advanced on the batteries of Captains Griffin and Ricketts, they fired a volley that killed around fifty horses in each artillery unit. In an instant, the artillery pieces were paralyzed.²¹⁶ Clearly, some infantry at

²¹² Soldiers were often quite willing to describe the horrors they witnessed, but civilians did not yet fully appreciate the distressing nature of 19th-century combat. The journalist Henry Brooks Adams (1838-1918) exemplified this ignorant mindset when he callously remarked that “barring as few lives and legs and arms lost, they’ll [the soldiers] all like it and be the better for it.” Eicher, The Longest Night, 100.
²¹³ This was, of course, consistent with Zouave training. A modern practice, it stood in sharp contrast with the use of outmoded fighting techniques that day, such as the bayonet charge. Nosworthy, Bloody Crucible, 55.
²¹⁴ Davis, Battle at Bull Run, 206-207.
²¹⁵ Ibid., 204.
²¹⁶ Ibid., 212.
Bull Run were capable of impressive accuracy, leaving unprepared units in shambles. It is unclear whether these Virginians were using rifled muskets; if they actually carried smoothbores, then this was a remarkable, if deadly performance indeed.

Even allowing for some exaggeration on the part of the participants, this material still counters the claim that Bull Run was only a preliminary clash of arms. While the resulting casualties may have paled in comparison with later actions in the war (2,896 Union, 1,982 Confederate), there can be no doubt that the soldiers present considered it a damaging experience.\(^\text{217}\) Perhaps no other Union source encapsulated this feeling of morbid desperation so well as a boy serving in the 11\(^{th}\) New York. Writing about the advance of the regiment to the frontline, he announced that with the order of the officers, “the pet lambs were led to the slaughter."\(^\text{218}\)

This mindset, which bordered on the macabre, was oddly juxtaposed against the official report of Brigadier General Tyler. He described the charge of the 2\(^{nd}\) Maine and 3\(^{rd}\) Connecticut up a hill into the face of Confederate artillery and infantry emplacements, and showered praise upon Colonel Alfred Terry - amongst other involved officers - for “his gallantry and excellent conduct.”\(^\text{219}\) Lieutenant John M. Wilson of the 2\(^{nd}\) Artillery offered a report exemplifying the way in which participants bizarrely juxtaposed old-fashioned ideals with brutality. He claimed that the unit’s artillery crews fired their pieces “in the most gallant style,” yet reported that as a result of this fire, the enemy “had been literally cut to pieces.”\(^\text{220}\)

Colonel C.D. Jameson of the 2\(^{nd}\) Maine Infantry highlighted the heroic achievements of men in battle, citing Captain E.N. Jones, who “fell mortally wounded while exhibiting great

\(^{218}\) Davis, Battle at Bull Run, 184.
\(^{219}\) The War of the Rebellion, Ser. 1, 2: 350.
\(^{220}\) Ibid., 362.
courage in rallying his men to the charge.” He also called attention to Sergeant William J. Dean, who “fell severely wounded while nobly bearing the beautiful California stand of colors presented to the regiment the day before by the ladies of San Francisco formerly residents of Maine.”221 The idea that gallantry and other related ideals could coexist alongside the traumatic sights of the battlefield strikes the reader as a dichotomy. This makes rendering an opinion on the source material uniquely difficult. The sources do not consist entirely of romanticized accounts, for they also include frank language that attests to the brutality of war. And yet, this material is not consistent with modern reporting, for it includes far too much idealized rhetoric. As a result, the only logical conclusion is that the material combines elements of both writing styles. Ostensibly, contemporaries felt comfortable using candid vocabulary in certain contexts, but favored more idyllic wording to describe the heroic feats of their peers. In this sense, Bull Run straddled a linguistic barrier. Thus, as with tactics, so with language: Bull Run was a battle caught in the transitional period between the traditional and the modern.

The noble veneer to be found in certain officer reports was at odds with the soldiers’ desperate effort to survive. Rather than fretting over their reputations as proper soldiers, they readily adapted tactics to suit the situation at hand. Colonel E.D. Keyes described this phenomenon, writing that his men were to seize a Confederate position filled with infantry and artillery. Those defending the spot benefited from the cover of “a building, a fence, and a hedge.” Advancing up the hill, Keyes ordered the troops to lie down while they reloaded.222 Once they reached the top of the hill, however, Keyes realized that their position was untenable, and conceded that “the fire became so hot that an exposure to it of five minutes would have annihilated my whole line.” Recognizing the need for cover, he led the troops in a flanking

221 Ibid., 357.
222 Again, a tactic associated with the Zouaves and indicative of modern tactics. Nosworthy, Bloody Crucible, 55.
movement to shelter in a nearby wooded area, only to move out once more. This behavior was hardly in keeping with the concept of the fearless soldier, who would, in the manner of “Stonewall” Jackson, stand out in the open regardless of danger. Recognizing that the uneven terrain could serve as cover, he led the troops through this area so that they could approach the enemy position without unduly exposing themselves. Importantly, although Keyes admitted the unfeasibility of the frontal assault in this context, he still praised the troops for their “gallantry” in originally charging up the hill within plain sight of the enemy.223

Brigadier General Barnard Elliot Bee Jr., too, had to adjust his plans quickly in the face of superior numbers. His command came to grips with a Union force too large to resist head on, and in response, he “ordered his men to halt and lie down. Instantly the firing along the line became brisk...[the] men having to rise to fire, then lying down once again to load.”224 Once again, the men readily obeyed the command, disregarding any potential impact these actions might have on their reputations.

The practice of lying down to avoid enemy fire was well accepted, even amongst offensive-minded leaders such as Jackson.225 Importantly, this did not mean that Jackson shunned offensives universally, as the fiery Southerner’s preference for traditional and modern tactics alternated unpredictably. Despite a willingness to use cover, he also avoided placing too much emphasis on shooting to decide a skirmish. Recognizing the impending Union assault, he declared: “when their heads [Union troops] are seen above the hill, let the whole line rise, move forward with a shout, and trust to the bayonet. I am tired of this long range work.”226

---

This use of forests and even the ground as cover were clear signs that soldiers would turn to any available natural advantages to avoid incoming fire. Union reports are filled with examples of such behavior. Captain James Kelly of the 69th New York moved his unit into the woods in anticipation of a presumed assault by Confederate skirmishers.\textsuperscript{227} Similarly, Colonel George Lyons of the 8th New York describes how after a brief exchange in the open, he ordered the troops to move into the forest for shelter.\textsuperscript{228} In his description, he left no hint that this might be considered a cowardly action.

During the retreat, Union officers continued this trend of cautious movement in lieu of risky maneuvers. As the tide turned against the North at Bull Run, Major George Sykes led the 14th Infantry as the last Union unit to retreat from their area of the battlefield. His troops suffered no casualties because they took “advantage of woods and broken ground.”\textsuperscript{229} Taken as a whole, this defensive approach to fighting is at odds with the concept of soldiers unprepared for combat. Although they expected an easier fight, they were sufficiently familiar with defensive tactics to employ them effectively that day. It is quite possible that fear also played a role in driving these men to defensive measures. However, they clearly benefited from their training, for otherwise they would have been unable to perform defensive maneuvers with any degree of effectiveness. Woodbury complained after the battle that these men were unreliable; regardless, they would have been nearly impossible to command without the instruction - however rudimentary - they had already received.

\textsuperscript{227} \textit{The War of the Rebellion}, Ser. 1, 2: 372.
\textsuperscript{228} \textit{Ibid.}, 388.
\textsuperscript{229} \textit{Ibid.}, Ser. 1, 2: 390.
First Bull Run - Template of Modern Combat or Relic of the Past?

The First Battle of Bull Run cannot be universally categorized as a modern engagement with respect to tactics and technology. This is significant in the current evaluation of the rifled musket’s long-term impact. In popular belief, the new weapon is frequently associated with the rise of a harsher battlefield, where idyllic standards of bravery ceded importance to the brutal realities of trench warfare. Based on the above analysis, Bull Run certainly did not fit clearly into this category. It was a battle caught in transition, with language, fighting techniques, and equipment all undergoing change to varying degrees. Nevertheless, it provides critical information for the weapons discussion. It is not possible to evaluate later battles - such as Cold Harbor - in an effective manner without earlier, contextual data. It is this role that Bull Run fulfills, allowing one to contrast conditions before and after the rifled musket’s introduction. Both tactics and the accounts of soldiers can be examined in a meaningful, comparative fashion.

On the surface, Bull Run appears unsuitable for the dubious honorific of “modern battle”. After all, the troops were largely inexperienced in combat and the weaponry still mostly analogous to that in use over a century and a half ago. It is only when one delves into the primary material that a more accurate impression emerges, one that makes drawing a conclusion more difficult. Taking the pre-war military discourse into account, the evolution in tactics was not due to concern over the rifled musket. Quite simply, the two generals sought to bolster the morale of their unsteady armies, and also recognized the necessity of seizing - and reinforcing - tactically relevant areas on the battlefield. To accomplish these two goals, an increased reliance on defensive tactics was the answer. In this sense, the rifled musket was not the driving force behind the progression to increasingly modern combat methods.
From a psychological perspective, a similar finding emerges. Soldiers at Bull Run were clearly affected by the violence they witnessed, even if it paled in comparison to later scenes of carnage. The majority of soldier accounts are dominated by disillusionment and horror at the merciless nature of the fighting. The instant annihilation of an entire artillery unit, for example, hardly fit with the image of a bloodless quest for glory. Once again, however, this was all the case prior to the large-scale adoption of the new weapon. Accordingly, the notion that the rifled musket’s greater accuracy would render the battlefield horrific is to disregard the already-terrifying experiences of soldiers in prior engagements.

With this research in mind, it is now feasible to closely examine the Battle of Cold Harbor. By juxtaposing these battles against one another, the rifled musket’s true importance can be ascertained. Naturally, these are only two battles in what was a war involving many theaters and types of engagements. Still, the selected battles stand out as large-scale, set-piece field battles where the impact of weaponry can be clearly ascertained.

The Depths of Despair: Cold Harbor

The Battle of Cold Harbor was the grisly culmination of the Overland Campaign. In comparison with First Bull Run, this latter engagement could not be more different. Whereas both North and South eagerly anticipated the former, they dreaded the latter. The reasons for this morose attitude were several. The first battle of the war had been a festive occasion, and the mood was only shattered once the fighting began to take its toll on the novice armies on that fateful day.
In sharp contrast, troops preparing for Cold Harbor had been exposed to incessant violence on a massive scale for several months. The Union army, commanded by General Ulysses S. Grant, suffered terrible casualties at the Battles of the Wilderness (1864) and Spotsylvania (1864); it did not envision a different result in this last push. Indeed, Cold Harbor was destined to be a bitter fight to the finish. As the culminating stroke in Grant’s Campaign, most of the Union army felt that the battle would decide the war. In the words of Lieutenant Colonel Martin T. McMahon, “Every one felt that this was to be the final struggle.” Unfortunately, this resigned attitude led to poor battle preparation. Confident of success, the leadership failed to order the kind of reconnaissance essential to any large-scale battle. General George Meade, who delayed the offensive from June 2nd to 3rd, apathetically ordered “corps commanders...[to]...employ the interim in making examinations of the ground on their front and
perfecting the arrangements for the assault.” This degree of preparation fell short of what one might envision on the eve of a large-scale battle.\textsuperscript{230}

It is intriguing that Meade allowed such a delay, considering his unease over facing a thoroughly entrenched Confederate force. He had predicted that if Lee’s army had additional time “they...[would]...dig in so as to prevent any advance on our part.”\textsuperscript{231} Union Brigadier General John Gibbon expressed a similar opinion. Pointing out that previous attempts to assault defensive lines had failed on both sides, he declared that a “few hours were all that was necessary to render any position so strong by breastworks that the opposite party was unable to carry it and it became a recognized fact amongst the men that when the enemy had occupied a position six or eight hours ahead of us, it was useless to attempt to take it.”\textsuperscript{232} Union Colonel Theodore Lyman provided substantial detail on the Confederate approach to fortification, explaining that it “is a rule that, when the Rebels halt, the first day gives them a good rifle-pit; the second, a regular infantry parapet with artillery in position; and the third a parapet with an abattis in front and entrenched batteries behind. Sometimes they put this three days’ work into the first twenty-four hours.”\textsuperscript{233} Of course, these predictions proved correct, and the error in timing, combined with the profound lack of intelligence gathering prior to the actual battle, cost the Northern army dearly.

The Battle of Cold Harbor consisted of two parts: the assault on June 3\textsuperscript{rd}, and the ensuing twelve-day stalemate. This latest in a series of clashes between Grant and Lee was simply the result of the Union commander’s desperate advance on Richmond. The Confederate leader, in an effort to safeguard the Southern capital, blocked Grant at every opportunity, and it was at these

\textsuperscript{231} \textit{Ibid.}, 156
\textsuperscript{233} \textit{Ibid.}, 86.
impasses that battles arose during the Overland Campaign. This latest engagement took on epic proportions, as the enormous Union force of 109,000 prepared to vie against the ragged Confederate army of only 59,000.\textsuperscript{234} Originally, Grant had planned to break Lee’s army on June 2\textsuperscript{nd}, but a combination of delays and troop fatigue made this goal impossible. Consequently, Grant had to delay the offensive until the following day, a seemingly minor setback that transformed the nature of the entire battle. With this extra time, Lee’s army was able to construct a truly astounding set of defenses along a seven-mile line. By the time Grant ordered the attack to begin, the Confederates were thoroughly prepared to resist just such an assault.

Perhaps what is most astounding about what ensued was its brevity. In a shocking display of efficiency, the Confederates inflicted some 7,000 casualties in a half-hour. The 40,000 Union troops involved in the frontal assault, moving against six miles of defensive line, had been brutalized in a matter of minutes.\textsuperscript{235} In the wake of this tragic event, both armies entrenched and remained immobile for days. This extended confrontation, punctuated by bursts of violence, highlighted the grim nature of trench warfare. No longer advancing in the open, the soldiers experienced a form of combat in which a second’s carelessness could result in death. Although the major assault took place over a single day, the ensuing period of suffering demonstrated that battles could now last much longer in contrast with the previous short exchanges. Warfare was clearly evolving, and in a way that rendered fighting conditions ever more inhospitable to the combatants.

Cold Harbor is an excellent resource for investigation, inasmuch as it abounds in revelatory primary material. It was a time of immense human loss, yet through this tragedy, much can be learned about the battlefield experience. Furthermore, it is possible to ascertain the

\textsuperscript{234} McPherson, \textit{Battle Cry of Freedom}, 733.
relevance of the rifled musket in a battle that, through its emphasis on defensive structures, appears decidedly modern. Juxtaposed against the analysis of Bull Run, a comparison can be made to see how the rifled musket influenced tactics, and whether it was chiefly responsible for the grisly results that day.

It certainly did not seem so ominous for the Union on the eve of the battle. Major General Phillip Sheridan, attacking the town of Old Cold Harbor on the 31st of May, noted that it was “intrenched and occupied by [enemy] cavalry and infantry.” Regardless, he was able to seize it and later employed the defenses against another wave of Confederates. At this point in the pre-battle hostilities, the results were clearly in favor of the Union, with the enemy suffering many casualties. This setback did not go unnoticed by the Confederates, who in response established a strong position to the west.

The Union’s initial good fortune continued with a small-scale assault led by Major Generals Horatio Wright and William F. “Baldy” Smith. Significantly, this advance took place across open ground and into a wooded area, where the Northern troops encountered enemy rifle-pits. These small but advantageous defenses were among the numerous fortifications seen over the fateful next few days. The sight of such preparations was indicative of the Southern defensive mindset, and it was unfortunate for the Union soldiers that they were so successful in capturing this small position. Had this action been more difficult for them, perhaps the leadership would have exercised greater caution. As things stood, however, there was a certain willingness to assault Confederate fortifications at this time; this trend was indicative of how the ensuing battle would develop.

---

236 Grant, Personal Memoirs, 366.
237 Ibid., 367.
238 Ibid., 368-369.
The pre-battle victories only told half the story, however. While the Union troops, now battle-hardened veterans, seized these fortified positions, they failed to respond effectively in the wake of Confederate counterattacks. Grant bemoaned their poor performance in this regard, explaining that the point of “all of our manoeuvres [sic]...[was]...for the purpose of getting the enemy out of his cover.”239 This suggests that, despite ordering frontal assaults, Grant realized these offensives were hardly the best approach. Ultimately, regardless of apparent evidence to the contrary, the Union army was actually failing, as it did not strike the Southern troops when they were at their most vulnerable.

Grant was clearly aware of how resilient a fortified position could be, but his complaints were wishful thinking. The general himself conceded that, after the Battle of the Wilderness, Lee had committed himself to a decidedly defensive approach in battle, avoiding risky assaults.240 Therefore, the odds of catching the Confederates in an exposed position were very low. Perhaps realizing the improbability of coming to grips with Lee in the open field, Grant ordered the fateful assault that left the Union army thoroughly mauled. Looking back on the battle’s catastrophic results, the future president admitted his mistake in a short but powerful commentary. Grant stated that he “always regretted that the last assault at Cold Harbor was ever made...[for] no advantage whatever was gained to compensate for the loss we sustained.”241 This was far from the harshest critique of Union performance. Adjutant Joseph Muffly of the 148th Pennsylvania bluntly declared that the “assault at Cold Harbor was an attempt, by sheer and furious fighting, to force the advantage which march and maneuver had missed. It failed at a cost of life matched by no other fifteen minutes of four years war.”242

239 Ibid., 368.
240 Ibid., 369.
241 Ibid., 372.
Much has been made of the supposedly massive entrenchments that permitted Lee to defeat Grant so completely. This image should not be readily accepted, for there was significant debate at the time regarding the actual extent of these defenses. Confederate soldier Robert Stiles emphasized that the preparations were far less elaborate than Union accounts implied. He quoted a friend, who explained that in the opinion of many Northerners, the Confederate positions at Cold Harbor were “formidable earthworks,” “powerful fortifications,” and “impregnable lines.” According to Stiles’ source, the reality was far less awe-inspiring; the preparations consisted solely of “a single line of earth about four feet high and three to five feet thick. It had no ditch or obstruction in front. It was nothing more than a little heavier line of ‘rifle pits.’” As further evidence of its manageable size, Dame claimed that Confederates easily walked over the

Figure 6: The Federal trenches at Cold Harbor. From a contemporary sketch. 
Courtesy of the National Park Service.

Seeing the Elephant

Much has been made of the supposedly massive entrenchments that permitted Lee to defeat Grant so completely. This image should not be readily accepted, for there was significant debate at the time regarding the actual extent of these defenses. Confederate soldier Robert Stiles emphasized that the preparations were far less elaborate than Union accounts implied. He quoted a friend, who explained that in the opinion of many Northerners, the Confederate positions at Cold Harbor were “formidable earthworks,” “powerful fortifications,” and “impregnable lines.” According to Stiles’ source, the reality was far less awe-inspiring; the preparations consisted solely of “a single line of earth about four feet high and three to five feet thick. It had no ditch or obstruction in front. It was nothing more than a little heavier line of ‘rifle pits.’” As further evidence of its manageable size, Dame claimed that Confederates easily walked over the
earthworks. To explain their impregnable nature to attackers, the friend suggested that the combination of fortification and stolid defenders made the position difficult to assault.

In contrast with Dame’s rather lackluster portrayal of the Southern defenses, others regarded them with greater admiration. One newspaper correspondent wrote that the position consisted of “Intricate, zig-zagged [sic] lines within lines, lines protecting flanks of lines, lines built to enfilade an opposing line, lines within which lies a battery...a maze and labyrinth of works within works.” Confederate President Jefferson Davis offered a similar opinion during his visit to the battlefield. Noting a triple line of breastworks, he declared that the troops “have acquired quite a respect for this sort of entrenchment, and work like beavers when they take up a new position. They began the war with a contempt for the spade, but now thoroughly believe in it.”

This statement suggests a reversal in opinions regarding the construction of fortifications. Some troops at Bull Run had refused to prepare defenses, but were quite willing to take shelter behind them. Now, they were eager to fortify as much as possible. In this way, there emerges a distinction between the building of defenses, and their actual use. According to Stiles’ friend, South Carolinian troops believed that “the chief duty of a soldier was...to get as much earth between [him] and the enemy as possible.”

Union troops, as intimated by Stiles, indeed described the Confederate position as impenetrable. Upon reaching the enemy earthworks, they “asserted that behind the line...was another and another line, and all the enlisted men insisted that they could not have taken the

---

243 Frank Wilkeson was also quick to point out that the Confederates could climb over their works with ease, confirming Stiles’ claim. Frank Wilkeson, Recollections of a Private Soldier in the Army of the Potomac (New York: G.P. Putnam’s Sons, 1886), 132.
245 Jaynes, Killing Ground, 156.
246 Furguson, Not War But Murder, 172.
247 Ibid., 109.
second line even if their supporters had followed them.”\textsuperscript{248} This brief excerpt hints at the very clear sense of resignation at Cold Harbor, which clashed sharply with the youthful enthusiasm characteristic at First Bull Run. Captain W.S. Hubbell of the 21\textsuperscript{st} Connecticut had noted this development amongst the Union troops; he admitted that the “hopeless look which many of the soldiers wore was quite noticeable. They did not expect to succeed.”\textsuperscript{249}

Endlessly quoted, perhaps nothing encapsulates this feeling of desperate resolution more than a scene movingly told by Union staff officer Horace Porter. The night prior to the battle, following an intense bout of rain, hail, and drizzle, the miserable men in the front line started to remove their coats. Intrigued, Porter realized upon further inspection that “the men were calmly writing their names and home addresses on slips of paper and pinning them on the backs of their coats, so that their bodies might be recognized and their fate made known to their families at home.”\textsuperscript{250} No act could more clearly demonstrate the decided shift in mentality between Bull Run and this scene of impending massacre.

Ultimately, this apprehension extended to the battle itself. Troops fought with varying levels of conviction, resulting in confusion as they crumbled under pressure. One Confederate claimed that in response to the initial Southern volleys, the “first [Union] line reeled and attempted to fly the field, but were met by the next column, which halted the retreating troops with the bayonet, butts of guns, and officers’ sword, until the greater number were turned to the second assault.”\textsuperscript{251} Union officers concurred that morale was a key issue that day. One artillery officer claimed that that he had:

\ldots never seen any body of troops in such a condition of utter demoralization; they actually groveled upon the ground and attempted to burrow under each other in holes and

\begin{flushleft}
\textsuperscript{248} Wilkeson, \textit{Recollections}, 133. \\
\textsuperscript{249} Jaynes, \textit{The Killing Ground}, 157. \\
\textsuperscript{250} \textit{Ibid.}, 156. \\
\textsuperscript{251} \textit{Ibid.}, 158.
\end{flushleft}
depressions...We spurred our horses upon them and seemed to hear their very bones crack, but it did no good; if compelled to wriggle out of one hole they wriggled into another.252

This quote has significance on multiple levels. It corroborates the belief that the morale of the Union troops was shattered, but it also highlights the actual relevance of the rifled musket. Nowhere in the source material is the new weapon singled out as responsible for the lethality of the small arms fire. Allusions to shooting are vague, omitting details on the specific armament; instead, accounts emphasize the positioning and personal experiences of the troops. Therefore, the intensity of fire was apparently less reliant upon the type of firearm, and far more on the field conditions.

In many ways, despite the different setting, the results of combat were much the same as at Bull Run. Confederate artillery officer Poague described a series of events remarkably similar to those experienced by Captains Griffin and Ricketts at that earlier battle. His artillery unit was forced to deploy in broad daylight on the early morning of June 3rd (unlike the other batteries, which had done so at night). As a result, his contingent was highly visible to enemy skirmishers and his misgivings about the timing of this endeavor proved accurate:

for the enemy’s skirmishers, apparently within a hundred yards, opened fire on Heth and myself...and just as the guns were unlimbered the enemy’s infantry opened on us, not a scattering fire of skirmishers, but with a perfect hail of bullets from their line of battle, just as I had feared. In less time than I can write it, both batteries were disabled. Not an officer escaped. Two were mortally struck and the rest more or less badly wounded. Only a few men were untouched...They kept up all day long a fusillade of small arms and shots from a battery on the extreme right...Neither Cooke’s men nor our guns replied except when notified of their attempts at a charge. So incessant was their fire that all the trees and bushes along the little embankment behind which our men sheltered themselves were entirely denuded of leaves and twigs and the ground covered with clippings...I never anywhere saw such a needless expenditure of ammunition.253

252 Ferguson, Not War But Murder, 92.
253 Poague, Gunner, 96.
Poague blamed this catastrophe on bad timing. With adequate sunlight, the enemy had been able to easily spot and pick off his men. If only he had been able to move his unit into place before sunrise, he declared, the result would have been very different. Poague’s statement, revelatory in numerous respects, clarified important details about the shooting that day. He highlighted the close-range nature of the encounter, the rapidity with which his unit accrued casualties, the use of charging even at this late stage in the war, the employment of cover by his men, and the endless consumption of ammunition. With this information, it is feasible to make a comparison with Bull Run. Barring the much higher losses, fighting at Cold Harbor does have much in common with the first exchanges of fire in 1861. The adoption of the rifled musket on a large scale had apparently done little to change the fundamental nature of 19th-century American field battles.

Indeed, Poague’s experience was not an anomaly. Despite the merits of the rifled musket as a long-range weapon, the troops continued to engage in point-blank fighting that belied the supposedly modern character of the battle. This was exemplified by the few Union troops who managed to reach the defensive line and engage the enemy face-to-face. One brigade commander, Colonel Guy V. Henry, managed to bound over the fortifications and fire his revolver “into the very faces of the awestruck foe.” Such brutal close-quarters combat was also indicative of the Union mindset at the time. While they had been morose before the battle, it was only after the first catastrophic day that they completely lost their enthusiasm for the attack.

The close-range mindset was pervasive, and went hand in hand with the attempt to bolster morale. Brigadier General Emory Upton made a remark suggestive of this approach. In response to an officer expressing fear that his troops could not resist a Confederate counterattack,

---

254 Ibid., 96.
the impatient Emory declared “Catch them on your bayonets and pitch them over your heads!”256 A Confederate officer’s report on artillery fire reflected the potentially horrific results of such encounters. He recounted how the Northern Brigadier General Francis C. Barlow’s forces were obliterated by “case-shot and double-shotted cannister [sic] fired at very short range, into a mass of men 28 deep, who could neither advance nor retreat, and most of whom could not even discharge their muskets.”257 Whether in the form of cannon, small arms fire, or melee with the bayonet, Union troops experienced combat at distances so close that long-range accuracy was simply not relevant.

The Field of Blood

General Robert E. Lee offered a set of troubling comments on Cold Harbor, which aptly frame the discussion of the battle as a psychologically damaging experience. He reported that on June 3rd, the entire Union line advanced simultaneously in a full-scale assault. However, this impressive display ended in tragedy as rank “after rank was swept away until the column of assault was almost annihilated...Attack after attack was made, and men fell in myriads before the murderous fire from the Confederate line.” The results were grisly, with some 13,000 Union casualties for just over 1,000 Confederate. The Northern troops, unable to endure the slaughter any longer, simply refused to renew the offensive.258

Considering what Union troops had witnessed over the previous hour of combat, this reaction is unsurprising. Following the unsuccessful Northern attack, Confederate Lieutenant-Colonel Charles S. Venable offered a chilling image of the results: “The dead and dying lay in

256 Ibid., 153.
257 Ibid., 159.
front of the Confederate lines in triangles, of which the apexes were the bravest men who came nearest to the breastworks under the withering, deadly fire.” The Union troops had only succeeded in gaining control over part of Major General Breckinridge’s line, where a fierce melee ensued.259 Still, this was a notable exception to the rule, wherein troops were mowed down before they come to grips with the foe. During that fateful hour, Union Brevet Major-General Martin T. McMahon explained, “more men fell bleeding as they advanced than in any other like period of time throughout the war.”260

The primary reason for these extreme losses was not simply the resilience of the Confederate fortifications. Further investigation reveals that the Union troops at Cold Harbor faced a very different defensive arrangement from that at Bull Run. Whereas the latter had consisted of strong points of varying size and quality, Lee had prepared a trap for the Union soldiers that, in modern military strategy, would be nothing short of textbook. Recognizing the need to preserve as many of his troops as possible against a much larger foe, the Southern general established both a strong front line, and two projecting “wings” that provided enfilading (flanking) fire. The result was a tactical “funnel” that forced Union troops to advance while being exposed on three sides.261 This is noteworthy for the analysis of the rifled musket at Cold Harbor. With such a position, Lee could defeat a much larger force simply because his army was able to produce an extremely concentrated volume of fire. The fact that the Confederates were using rifled muskets was simply beside the point; any capable weapon would have sufficed in this context to produce the proverbial storm of lead. After all, troops at Bull Run had reported that certain exchanges were very intense, and such fighting had been performed without the

259 Battles and Leaders, Vol. 4, 244-245.
260 Ibid., 217.
261 Ibid., 225.
benefit of the new weapon. Here at Cold Harbor, the soldiers arguably experienced a similar phenomenon, albeit on a much larger scale.

Reaching the barriers situated close to the Confederate fortifications, the Union troops found no respite. They lay down to gain a degree of protection, but were unable to make progress. Unlike at Bull Run, where dropping to the ground in Zouave fashion had helped the soldiers survive firefights, here the men were at a standstill. Having advanced steadily in the face of formidable enemy fire, now they could not breach the defenses. In addition, many soldiers could not even find cover and had to pull back in search of shelter.\textsuperscript{262} The result was simple, yet tragic: obliteration. With the adoption of an ancient strategy honed by prior generals,\textsuperscript{263} Lee had turned Cold Harbor into a field for the dead.

The experience of this assault left a deep impression on its participants. Accounts are unanimous in their portrayal of the Confederate defense as terrifying to behold. The design of these preparations was such that attackers were rendered hopelessly vulnerable to small arms fire. Some first had to contend with a robust abattis 70 feet deep, but this obstacle was only the precursor to the devastating gunfire that awaited them beyond. The Union troops, noting two openings to permit movement through the structure, unwittingly stumbling into the trap.\textsuperscript{264} As a New York heavy artilleryman explained, upon entering the gaps the Union troops experienced shooting akin to “a sheet of flame, sudden as lightning, red as blood, and so near that it seemed to singe the men’s faces.”\textsuperscript{265} The primary characteristic of the fighting was, in the opinion of many, the unfathomable quantity of lead - from both firearms and artillery - Confederates

\textsuperscript{262} Ibid., 217.
\textsuperscript{263} Other examples of the “funnel” strategy, whether by means of infantry wings or constricted terrain, included Trebia (218 B.C.) and Agincourt (1415). Kelly DeVries et al., Battles of the Ancient World 1285 BC-AD 451: From Kadesh to Catalaunian Field (New York: Barnes & Noble, 2007), 104-105. Kelly DeVries et al., Battles of the Medieval World 1000-1500: From Hastings to Constantinople (New York: Barnes & Noble, 2006), 180-181.
\textsuperscript{264} Furguson, Not War But Murder, 101.
\textsuperscript{265} Jaynes, Killing Ground, 153.
launched across the battlefield. Captain Asa Bartlett of the 12th New Hampshire described the “dreadful storm of lead and iron...[as]...more like a volcanic blast than a battle.” Projectiles were not the only thing filling the air on that most ghastly of battlefields. One Southern soldier claimed that with each successive Confederate volley, “heads, arms, legs, guns were seen flying high in the air.”

The fire these Union troops faced was so intense that they began to lean forward, as if shouldering against the bitterly cold winds of a blizzard. William Derby of the 27th Massachusetts claimed that the ground resembled “a boiling cauldron from the incessant pattering of shot which raised the dirt in geysers and spitting sands.” Quite simply, it seemed impossible to avoid being hit by any of the sheer number of bullets in flight. Colonel William C. Oates of the 15th Alabama claimed to have seen “dust fog out of a man’s clothing in two or three places at once where as many balls would strike him at the same moment.” This incredible rate of fire was possible because, at least among some Confederate units, the front line passed their weapons along to those behind them for reloading. The rear lines simply kept passing forward reloaded weapons, allowing for constant fire. The intensity of the shooting was matched by the deafening roar of exploding gunpowder, which was considerably louder than in prior battles. One Union gunner, by means of analogy, suggested that it was similar to “the fury of the Wilderness musketry with the thunders of the Gettysburg artillery super-added.” These sounds were but the mechanical roar of combat, however. The human factor also contributed greatly to the cacophony; as one unit advanced, the “air...filled with sulphurous smoke, and the shrieks and

266 Ibid., 158.
267 Ibid., 161.
268 Ibid., 164.
269 Ibid., 165; this advance of infantry into a storm of lead is reminiscent of the furious Nazi gunfire during the D-Day landings of 1944. The Second World War: A World in Flames (Oxford, Osprey Publishing, 2004), 385.
270 Jaynes, Killing Ground, 159.
howls of more than two hundred and fifty mangled men rose above the yells of triumphant rebels and the roar of musketry.”

Contemporaries painted a seemingly hopeless picture. According to George T. Stevens, surgeon of the 77th New York, “Hundreds of our brave fellows were falling on every side.” This was not the hyperbole of a single panic-stricken observer; others confirmed the extent of this lethal fire, including Captain Charles Currier of the 40th Massachusetts. He offered an even harsher image of the losses, proclaiming that the murderous Confederate fire “piled up our men like cordwood.” The repeated discussion of Union casualties is notable, especially because similar remarks on Confederate losses are lacking. Ultimately, this is unsurprising given that the Southern army suffered, comparatively speaking, to a lesser extent at Cold Harbor.

The extreme concentration of fire literally transformed the battlefield, as thousands of discharging rifled muskets rendered it a smoke-filled hell. As Private George Place of the 12th New Hampshire explained, the closest Union troops were only able to see “the flash of their [Confederate] musketry quivering through the bank of smoke like lightning through a cloud.” Indeed, the smoke was so extensive that the Confederate line became a fiery maelstrom of powder and lead otherwise inscrutable to advancing Northerners. This development was not the unique byproduct of the rifled musket, for smoothbores also released significant quantities of smoke upon firing. While the battlefield environment was greatly affected by small arms fire, it had little to do with the rifled musket.

From their perspective, Confederates were equally shocked by the destruction of the Union columns. One sergeant offered a metaphor, explaining that the sight of Northern troops

---

271 Furguson, Not War But Murder, 102.
272 Jaynes, Killing Ground, 164.
273 Ibid., 165.
274 Ibid., 161.
being mowed down was akin to “rows of blocks or bricks pushed over by striking against one another.” The extraordinarily high casualty rates left Southerners unsure of how they should interpret their own success. One Confederate officer, speaking with a New Hampshire soldier later on, admitted that “It seemed almost like murder to fire upon you.” General Evander Law concurred with this powerful sentiment, declaring that:

I had seen the dreadful carnage in front of Marye’s Hill at Fredericksburg, and on the “old railroad cut” which Jackson’s men held at the Second Manassas; but I had seen nothing to exceed this. It was not war; it was murder.

Cold Harbor was also the site of some disturbing psychological developments. Soldiers on both sides were clearly horrified, as no one had envisioned death on such a massive scale, and accrued with such rapidity. However, not everyone coped in the same manner. Visiting the Southern defensive lines, Law remarked that he saw “men in fine spirits, laughing and talking as they fired.” It was only as he turned towards the front line, that he beheld the sights they apparently found so amusing.\footnote{Ibid., 158.} The general was not alone in remarking on the soldiers’ odd reaction to violence. Confederate Captain Charles Sanders explained that in the process of supplying ammunition, he observed that they were “laughing how many they had killed.”\footnote{Furguson, \textit{Not War But Murder}, 106.}

This kind of behavior suggests a degree of emotional hardening among the men. It is unclear from the source material why exactly they behaved in this fashion. Potentially, it was a coping mechanism to deal with the disturbing sights they had witnessed that terrible day. This transformation was not unique to Confederates, however, as highlighted by the actions of a Union regimental commander during the assault. With his prior flag-bearer killed, he suddenly had need of someone else to fill this critical position. He asked a corporal to accept the role, but the man was reluctant on account of the flag-bearer’s high visibility (vis-à-vis the enemy). The
commander then promoted the soldier to sergeant in order to motivate him. With such encouragement, the new sergeant embraced his flag-bearer position with the declaration, “That’s business.” 277 Far from bravado, this carefree response arguably indicated the extent of psychological trauma suffered by the soldiers.

The analysis of the soldiers’ attitudes in combat is relevant to the evaluation of the rifled musket. Commonly, trauma and emotional hardening are associated with the large-scale, industrialized brutality of modern warfare. As the new weapon is frequently viewed under this temporal lens, it is easy to assume that the soldiers’ troubling mental states were the result of a new brand of deadlier combat urged onward by the rifled musket. To do so would be – in the context of the current discussion – a largely unsubstantiated generalization. The soldiers at Cold Harbor were struggling to contend with the cheapening of human life, as they looked over a field strewn with thousands of lost comrades and foes. The primary reasons for the elevated casualties lay in painfully effective tactics, not a revolution brought about by the rifled musket.

The psychological damage suffered by the troops on June 3rd illustrated the inapplicability of the frontal assault against a well-prepared opponent such as Lee. The Union army’s response was to embrace the defensive mindset so well exemplified at Bull Run, albeit on a much larger scale. Thus, while it was originally the Confederates who favored the trenches at Cold Harbor, this situation began to evolve. These developments harkened back to the roots of strategy that, drawing on pre-war thought and practical experience alike, had informed the earliest Civil War participants.

The Cold Face of Battle

Cold Harbor was more than a single day of unimaginable bloodshed. The initial assault was followed by eight days of misery in the trenches. Soldiers on both sides experienced a form of combat that was novel and terrifying, and in which the rifled musket played a key role. This engagement was no longer the realm of the Napoleonic assault, worn down to oblivion against Lee’s well-designed trap. Instead, it now foretold the realities of modern warfare. Sharpshooters, no longer relegated to isolated positions on the field, could now bear heavily on both the morale and casualty rates of the opposing force. Whereas line infantry once vied in the open, or in sundry defensive positions, marksmen, armed with highly accurate rifled muskets, were finally able to render the exposed army obsolete. With the introduction of extensive entrenchment, the predictions of pre-war theorists had finally come true: the new weapon, in the right context, could have a decisive impact on the nature of warfare.

There were several major factors that set apart the ensuing days from that of the assault. Primary amongst these was the length of time. Outside of a siege context, soldiers were as yet unaccustomed to the interminable nature of trench warfare. Day and night, a moment’s inattention could bring death, and this made it almost impossible to bring about a decisive engagement between the massed forces of both sides.

Sharpshooters were a necessary evil, inasmuch as they scouted for enemies while the infantry went about the tiring yet critical task of fortifying. To minimize the risk of casualties, the work had to be performed at night. The impact of marksmen on the battlefield cannot be overstated. McMahon claimed that they had such extensive control of the field, that “no man upon all that line could stand erect and live an instant.” Soldiers whose enlistments had expired
had to crawl “on hands and knees through the trenches to the rear.”\textsuperscript{278} This was hardly synonymous with the fighting at Bull Run, where defensive tactics had not become the exclusive means of approaching combat.

Many soldiers wrote about their experience in the trenches, suggesting that this was indeed a novel, if horrendous, episode in their lives as soldiers. Stiles is one such source on the topic, focusing on “the supreme discomfort and even suffering of ‘the lines’”:

Thousands of men cramped up in a narrow trench, unable to go out, or to get up, or to stretch or to stand, without danger to life and limb; unable to lie down, or to sleep, for lack of room and pressure of peril; night alarms, day attacks, hunger, thirst, supreme weariness, squalor, vermin, filth, disgusting odors everywhere; the weary night succeeded by the yet more weary day; the first glance over the way, at day dawn, bringing the sharpshooter’s bullet singing past your ear or smashing through your skull, a man’s life often exacted as the price of a cup of water from the spring.\textsuperscript{279}

Stiles supplied several examples as support for his dreary portrait of Cold Harbor. He pointed out that men could not even obtain water or operate artillery pieces for fear of being sniped by the enemy.\textsuperscript{280} Despite the risk, some soldiers lost their focus for just a moment, resulting in death. The atmosphere on the field changed with the passing of the day; as Georgia artilleryman Allen Moore pointed out, the setting sun brought with it greater confidence amongst the troops that they would be safe from enemy fire. Once, as daylight faded, the artillery crews stood up in the trenches, having observed that the rate of sharpshooting had greatly diminished. This was deceiving, however, and the unit captain was quick to denounce their false sense of security. After this short period of negligence, Moore himself received a fatal rifle shot to the head.\textsuperscript{281} Stiles also told the story of a soldier on furlough who was visiting the trenches before he left for home. After remaining in the trench for a while, he stood up to look at the Union lines,

\begin{footnotesize}
\begin{itemize}
\item[280] \textit{Ibid.}, 292-296.
\item[281] \textit{Ibid.}, 297-298.
\end{itemize}
\end{footnotesize}
saying that “it will be a long time before I get another chance.” In fact, this was his last chance, for within seconds he was fatally shot in the head.282

This kind of instantaneous death, taking place outside the confines of actual battle, left soldiers confused and angry. They described the much-hated sharpshooters as “snakes in the grass,” and decried their willingness to mercilessly shoot even those in the process of defecating.283 Stiles had sharp words too for the marksman who had such a tremendous impact on the field. Asserting that the defensive lines were most suitable for this kind of elite soldier, he bitterly described the man as “little better than a human tiger lying in wait for blood.” Arguably the major reason for such animosity towards the snipers was their tendency to shoot at any given moment. The tiger analogy was surprisingly accurate; marksmen would closely observe the enemy lines for hours, and fire with stunning accuracy at the very glimpse of an enemy movement. Furthermore, the sharpshooters displayed little respect for the precepts of human dignity. One Union artilleryman mentioned “an unwritten code of honor that forbade the shooting of men,” and pointed out bitterly that “these sharpshooting brutes were constantly violating that rule. I hated sharpshooters, both Confederate and Union...and I was always glad to see them killed.”284

While some men regarded sharpshooters in a solely negative manner, others attempted to put matters in a more positive light. Perhaps reflecting morose humor born of constant exposure to death, David L. Geer of the 5th Florida suggested that “If you held up your hand you could get a furlough.”285 This was no exaggeration; Confederate T.C. Morton claimed that “A hat put on a ramrod and raised a little would be perforated in a jiffy.” Morton himself received a minor head.

282 Ibid., 299-300.  
283 Drew Gilpin Faust, This Republic of Suffering: Death and the American Civil War (New York: Alfred A. Knopf, 2008), 42.  
284 Stiles, Under Marse Robert, 290.  
wound from a sharpshooter round after exposing himself for only a instant.\textsuperscript{286} This brand of non-stop violence indicated that Civil War combat had expanded beyond the confines of set piece fighting to include a degree of violence unforeseen at the time.

The personal letters of soldiers to loved ones back home revealed the experience of combat as no high-level report could. One such message, from Union private David Coon to his daughter, captured the sense of despair and horror these men felt for days on end. A soldier in the 36\textsuperscript{th} Wisconsin, he wrote:

\begin{quote}
...How would you feel to see your father lying in a ditch behind a bank of earth all day, with rebel bullets flying over his head, so that his life was in danger if he should raise on his feet, without a chance to get anything to eat...[then] running across an open field towards a rebel battery with rebel bullets, grape and canister, flying like hail, and men falling killed and wounded all around him, and finally...ordered to fall on our faces so that the storm could pass over us, and then be obliged to lie in that position until covered by the darkness of night so that we could get away, and then start on a forced march in the night without any chance to get any supper, and so weak that he could scarcely walk...to see him lie down in the dirt, and if allowed to stop for a few minutes, so exhausted as to fall asleep...My dear daughter, your father may be lying dead on the field of battle and you may not know it...
\end{quote}

In a letter to his son, Coon discussed the concept of exhaustion, and how it acquired an entirely new meaning in the context of attrition-based warfare. The ubiquitous threat of sharpshooting drained the men, leaving them with barely enough energy to endure:

\begin{quote}
You complained of being tired, and no doubt do get so. I used to, but find that after all I knew but little about what the word meant until lately...We now lie right in the hot sun behind our works, with bullets whistling over us. This morning one of our company was wounded and a man of another killed by the same shot from a sharp-shooter while attending a call of nature.\textsuperscript{287}
\end{quote}

Such vivid texts shed light on the nature of combat in a highly personal manner. These sources did not explicitly discuss the capabilities of the rifled musket, but in decrying the sharpshooter, they simultaneously emphasized the new weapon’s impact on warfare. Without

\textsuperscript{286} Ibid., 126.
\textsuperscript{287} Ibid., 195.
this highly accurate firearm, marksmen would have been unable to maintain suppression over the enemy in the days following the major assault. The terrifying atmosphere fostered by the marksmen could have existed without the rifled musket. The long-range qualities of the weapon made it uniquely suitable for this murderous task.

The Cost of Failure

Cold Harbor has been the subject of intense scholarly discussion. Historians have sought to explain how Grant could allow his army to be so brutally handled in a battle that did little to further the Union cause, and at an extreme cost. The general himself admitted his mistake, but for many this simply was not enough. Given his opinion on casualties, Winfield Scott would have judged Grant most harshly. Prior to First Bull Run, the aging leader declared that “No Christian nation can be justified in waging war in such a way as shall destroy five hundred and one lives, when the object of the war can be attained at the cost of five hundred. Every man killed beyond the number absolutely required is murdered.”

Thus, Grant might be considered a heartless waster of human life, in much the same way Mahan judged Napoleon Bonaparte. Such is the message of some modern volumes, including Ernest B. Furgurson’s Not War But Murder. However, other volumes tell a different story, namely Edward H. Bonekemper III’s A Victor, Not A Butcher. The dispute over Grant’s decisions that day is a relevant topic for Civil War historians, but in the rush to analyze this singular figure, other details are neglected. For example, the unfortunate focus on the front assault was hardly unique to Cold Harbor. In the assaults on Petersburg (1864), for example, several units failed to breach the defenses, yet continued to assault them in the traditional.

288 Faust, This Republic of Suffering, 34.
headlong manner. This phenomenon was described as “Cold War fever,”\textsuperscript{289} and demonstrates that troops under the command of other generals would employ the same, flawed fighting techniques. Therefore, the wholehearted association of Grant with brute force tactics is to some extent a generalization. Although many soldiers realized the dangers of such risky offensives, it was in the trenches at Cold Harbor that the rifled musket finally had a decisive impact. In the massed shooting of the 3\textsuperscript{rd}, it made little apparent difference, but in the following days it completely changed the nature of the fighting. The men who survived Cold Harbor had lived through a true precedent of combat on the Western Front.

**Conclusion**

The American Civil War has provided scholars with a wealth of information in many areas, and this is just one of the reasons for its enduring popularity as a topic of serious academic research. As a military phenomenon, it still presents unique challenges to the scholar. From a modern perspective, it would appear logical that tactical, technical, and psychological information is crucial to understanding period combat. However, as this thesis has shown, the technical data tends to bear relatively little on actual events. The soldiers at Bull Run and Cold Harbor did not fill their reports with comments on the merits of the new weapon. Instead, they focused on what was most important to them at the time – the tactics they employed, and what they felt on the battlefield. Therefore, while learning about the technical aspects of weaponry can be of great interest in the right context, this type of information can never replace that most constant of scholarly resources: eyewitness accounts.

This thesis has admittedly taken a rather unorthodox approach to the study of Civil War combat. Rather than focusing exclusively on the battles and those who fought them, it first explored – in significant detail – the pre-war atmosphere with regard to both military thought and weapon testing. This was done to foster a symbiotic study of the topic. Rather than evaluating a Civil War topic in a solely North American, temporarily-focused manner, the goal was first to consider how the years preceding – both in the United States and abroad – bore on the ensuing period. By opening the evaluation to both European and American sources, a topic once the sole province of Civil War study can be viewed with a broader lens. This is an essential part of the historical process. In order to determine whether the rifled musket was truly revolutionary, and if soldiers were undergoing an experience not akin to other wars at the time, it is important to look - albeit briefly - at European conflicts preceding the “War Between the States.”

The American Civil War has long been categorized as the first modern war, a title commonly accepted in the historical establishment. While its innovative character is undeniable, this label cannot be universally applied, especially with regard to the fighting itself. The rifled musket was a design born of ideas both old and new, but its ability to change warfare was decidedly limited. Contrary to the opinion of pre-war theorists, it did not bring about an entirely new emphasis on defensive tactics. The trend towards greater field fortification was – in the United States – instigated in order to bolster the morale of armies that were largely unreliable.

It was in the evolution of the battlefield from decisive clash to a brutal contest of attrition, however, that the rifled musket left its mark on mid-19th century warfare and beyond. It gave the marksman the ability to strike fear into the hearts of his enemies from the very closest ranges to distances previously unimaginable. In other words, the greatest change wrought by the rifled musket was the new and vastly increased empowerment of the soldier. No longer a faceless
component of a mass army, he instead pointed the way forward to the highly individualistic armies of the 21st century. Importantly, the rifled musket enjoyed only a brief period of popularity. Within half a century of adoption, it faced competition, and by the 1870s, it was practically outdated in the eyes of an American military that now preferred repeating weapons.\textsuperscript{290}

A rising star that quickly lost its luster, the rifled musket nevertheless accelerated the evolution of warfare to its modern apotheosis.

Bibliography

Primary Sources


Scott, Winfield. *Infantry Tactics: School of the Battalion and Instruction for Light Infantry or Rifle*. New York: George Dearborn Publisher, 1835.


**Periodicals**


**Secondary Sources**


**Internet Resources**


