TECHNOLOGY AND LOGISTICS: LINCHPINS OF THE CIVIL WAR

BY

CAPTAIN JASON D. GROSE
NPS, MONTEREY CA
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How did technological advances in weapons and the ability to logically support large forces over extended distances affect strategic decision-making? Did the North or South benefit the most from these developments?

Introduction

During the four-year American Civil War, several key innovations in weaponry required the leaders from both sides to adapt their war strategies. Additionally, innovations in logistics enabled the North to successfully supply men and material over long distances thus taking the fight to the Southern enemy. As a result, Northern forces prevailed in a war whose outcome many modern historians believe could have easily ended in Southern victory.

At the beginning of the war, both leaders and soldiers from both sides had a simplistic and amateur view of the war to come. Flush from the recent victory in the Mexican War in 1848, each side foresaw easy victory and a chance to win glory in battle. What they did not predict was a protracted war with grisly death tolls and the need to supply large armies across great distances.

Ushering in this new generation of war was the great expansion of industry and American financial success. The North, with its expanding industry and innovative manufacturing processes, made the conditions ripe for large scale production of war material. Although the South enjoyed similar success on a smaller scale, cotton was king and the sales of it made the South very rich.

Technology Changes the Rules

Two integrated technological developments changed the way each side waged war. First, the advent of the rifled barrel extended the battlefield, giving more range and accuracy to the soldier than had ever been provided by smooth-bore weapons. Second was a new bullet that prevented the new rifled muskets from clogging with powder residue.

In 1861, neither the North or the South had very many rifles. The average soldier used a smooth-bore musket and only the snipers of each side employed the rifle because of the problems inherent in the slow-loading weapon. As the advantages of a rifled firearm became apparent, the North, with its large industrial ability, became the first to mass produce the rifles for use in the war. With its much smaller industrial base, the South was slow to follow but by 1863, nearly all infantrymen on both sides carried rifles. (McPherson, 475)

What hastened the transition was the introduction Minié bullet which solved the problem of slow reloading. What seems like painfully slow by today's standards, the improved reloading time to three shots per minute in addition to the better accuracy and long range of the new weapon made the Minié bullet revolutionary. The old problem of clogging the rifling and requiring the soldier to use valuable time cleaning the barrel was solved by making the round smaller and providing a wooden plug at the base of the bullet that would expand upon firing, thus "grabbing" the grooves of the barrel and cleaning them on the way out. (McPherson, 474)

The transition to rifled rounds had a profound effect on tactics and strategy. During the Mexican War, both sides used smooth-bore weapons and with the shorter range of the weapon, Napoleonic tactics proved very effective. The Americans would mass together and march forward in "gentlemanly style" while the artillery flew overhead to meet the enemy just prior to the assault. The muskets were only effective as a precursor to a bayonet charge because of the close proximity necessary to shoot the enemy.

Rifled muskets changed that tactic during the Civil War by expanding the battlefield. No longer was it wise to march forward very deliberately into the teeth of the enemy because they could pick the advancing soldiers off from great distances of up to 400 yards. "In the first few months of the Civil War, troops disdained cover, since they were accustomed to tactics best suited for the smooth-bore musket. They considered cowering behind cover during combat to be less than manly." (Koenig) While some thought that taking cover behind logs and hunkering down for safety showed weakness, it did not take long for both sides to realize the way war was waged had changed

Another result of the greater range of these weapons was that the artillery could no longer advance with the infantry. The enemy could shoot the cannoneers as well as

those on horses from up to a half mile away and the old fashioned cavalry charge became a thing of the past. Horses were soon relegated to mere transportation rather than a weapon. (McPherson, 475).

What had started off as a perceived limited war quickly turned into a bloody stalemate. The increased distance and improved accuracy of the rifle produced horrendous casualties on both sides. During 1862 and 1863, the number of killed or wounded numbered 89,000 for the South and 69,000 for the North. The result was that the defense became stronger by enabling the defender to engage the encroaching enemy from much farther away. The defender, usually the South, adopted the tactic of digging trenches and thus ushered in the era of trench warfare seen most dominantly in the proceeding war. Therefore, McPhereson writes, "the rifle and trench ruled Civil War battlefields as thoroughly as the machine-gun and trench ruled those of World War I." (McPherson, 477)

Ironclad Innovations

Innovations appeared for the first time in warfare at an astonishing rate and were not limited to land warfare. The Merrimac and the Monitor, the two famous ironclads, made their debut and in one day, revolutionized sea warfare by rendering wooden navies of the entire world obsolete. (Fuller, 107)

In 1862, the Confederate ironclad, the Merrimac made its debut by destroying the Union's blockade at Hampton Roads. Quick to realize the utility of such a revolutionary design, the North had concurrently built its own version in a mere 101 days and sent it to battle the Southern ironclad. Having already destroyed two Union ships, the Congress and the Cumberland, the Merrimac was ready to destroy the Minnesota the next morning. But when the Monitor showed up to intervene, naval history was forever changed. For 3 ½ hours, the battle raged. After turning on the Minnesota and running aground, the Merrimac retreated, inflicting only one casualty; the captain of the Monitor.

The fate of the two ships that ushered in the modern steel Navy was grim. The Confederates destroyed the Merrimac soon after to prevent its capture by Union forces. The Monitor, victorious in its first battle, sank in a storm off Cape Hatters, North Carolina. Forty-nine Monitor crewmen survived. (Safir)

Logistics and Railroads

The main strategic-level factor with respect to logistics during the Civil War was the first large scale use of the railroad to drive deep into the South to support the eventual defeat of Southern forces. In fact, the American Civil War was the first large scale war in history to be supplied over a long distance and over a long period of time using the railroad. (Weigley, 131) The railroad was such a key factor that Weigley goes on to write, "… without the invention of the railroad, Union

operations over the extensive territory of the South might well have been impossible." (Weigley, 131)

Since the North needed the long supply tail to support their engagements in the South, the logistical evolution was more predominant and factored more in the Union strategy. Not only did the immense logistical apparatus necessary to keep the North fighting require soldiers from the infantry to fill the billets of quartermaster, but the vulnerability of the rail system in enemy territory siphoned off fighting men to guard the valuable metal arteries. More so, Northern troops found themselves repairing the sabotaged railways that the retreating South wisely destroyed along the way. Unfortunately for the Confederacy, the Unions Army's Construction Corps performed extraordinary feats of bridge reconstruction and keeping supply lines open.

A prime example of railroad dependence is General Sherman's march to the sea which began by his seizing the vital railhead at Chattanooga in 1863. His next step was to take Atlanta and secure that railway in preparation to continue to the Atlantic Ocean. Out-numbering his opponent by 60,000 men, Sherman had to keep the railway clear in order to supply his army of 100,000 troops. But to accomplish this he had to detach guards for the 250 mile link between Nashville and Atlanta which cost him more manpower than actual battle losses and reduced his strength to only 68,000. (Macksey, 19-20)

The South, conversely, enjoyed a close proximity to their own bases and were more accustomed to living off the land. This is not to say that they were without their own logistical problems. The disproportionate size of Southern industry and agriculture, mainly cotton, coupled with threats to and losses of logistically critical areas such as Richmond, Atlanta, and Petersburg meant that the rebel armies had to be more frugal with their supplies. Poor management of their limited resources, the systematic loss of their own transportation system, and the Union blockade all made the Southern logistical effort weaker than the industrialized North. But despite these setbacks, the Confederates did not lose a single battle or campaign due to logistical failures until the very end of the war. (Weigley, 132)

Attrition

McPherson claims that General Grant did not fight a war of attrition but it was General Lee who employed this destructive strategy. On page 734 of his book Battle Cry of Freedom, McPherson writes:

> ***Grant's purpose was not a war of attrition — though numerous historians have mislabeled it as such. From the outset he tried to maneuver Lee into open field combat, where Union superiority in numbers and firepower could cripple the enemy. It was Lee who turned in into a war of attrition by skillfully matching Grant's moves and***

confronting him with an entrenched defense at every turn. (McPherson, 734)

Attrition implies that one side uses its superior manpower, finances, and industrial advantages to wear down the enemy until it surrenders. Not only did Grant fight a war of attrition but with an attrition mentality mixed with a "total war" attitude. For the very reason the Lee confronted him with entrenchments caused Grant to resort to attrition. Furthermore, it was the rifled muskets discussed earlier that led Lee to assume trench defense and thus dragging out the war in bloody carnage.

What made possible this increased use of an old concept? Prior to the Civil War, entrenchment tools were expensive and hard to mass produce. Blacksmiths forged out spades independently making their availability very limited and therefore digging trenches was not an easy endeavor for an army. By the time a trench system was accomplished, the army would pick up and move, leaving their hard work behind them. With the introduction of mass-produced spades, armies were now able to quickly entrench themselves and require a higher ratio of attackers to dislodge them from their earthwork. (Fuller, 104-105)

Grant had no choice but to engage in the attrition strategy when faced with Lee's persistence to dig in and repel wave after wave of assault. Because the defense is stronger that the offense (fueled by the increased lethality of the rifle), no less that a 3 to 1 advantage to Grant could guarantee victory. Benefiting from the perfected supply system over conquered territory, Grant could continue to feed his war machine with men and supplies until Lee's forces simply wore out. Therefore the innovation of the rifle discussed above resulted in Lee's perseverance while the logistical advantages of railroads enabled Grant to overcome and emerge victorious.

Conclusion

Many factors leading up to and during the American Civil War converged to create fertile conditions for innovations. These innovations, in turn, changed the strategies and policies of each side through out the entire conflict.

One of thee most dramatic and far-reaching innovations was the rifle and the new bullets it used. By increasing the range and lethality of each shot, the physical dimensions of the battlefield were expanded. Artillery's role had to be remodeled. The centuries-old reign of cavalry on the battlefield abruptly ended, and the huddled formations of advancing infantry were replaced by trench warfare.

Naval inventions also changed the landscape of warfare during the Civil War. With a single battle between the Merrimac and the Monitor, the wooden fleets across the world became instantly obsolete.

The widespread use of railroads made the Southern battles possible by enabling the

North to supply logistics quickly. While the railroad provided a logistical lifeline never before seen in its success, it turned the war into a series of battles based on control of logistical lines.

Because Grant enjoyed this continued supply, he was able to partake in a war of attrition. If the South could have succeeded in cutting of the Northern supply trains, the Union would have had no choice but to go home. Instead, the Union continued to enjoy railroad shipment after railroad shipment that fed their destruction of Confederate armies. Consequently, the Confederates resorted to trench warfare in order to take advantage of the defensive advantage but only succeeded in protracting an already costly and bloody war.

Lee could not survive a war of attrition and it is questionable to insinuate that his plan was to attrit Grant's army. With the overwhelming superiority in men, weapons, and supplies, Grant could have withstood many more losses than Lee could and Lee resorting to trench warfare showed that he had to find ways to make up the uneven match between armies. It was Grant who all but defined the concept of attrition warfare by seeking open battle. He knew he could decimate the Confederate line even at the cost of equal or increased Union losses. When Lee wisely insisted on refusing battle, he only succeeded in delaying the inevitable. The Confederates had lost the war and the Union had used the innovations of the day in weapons and logistics to overcome a tenacious enemy.

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