

Technological innovations of the civil war



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The American Civil War is known for being the most ruthless battle ever fought in American History. The outcome of the war continues to review the disturbing nature that many individuals endure for the unity of our nation. Despite its downside, the Civil War is also regarded as the “ first modern war.”[1]During the Civil War, the improvement of weapons and technologies shaped the way Union and Confederate soldiers approached the front line. The technological innovations also triggered the surge in death tolls and casualties of many soldiers, which justifies the reason as to why the Civil War currently leads the number of deaths in all American wars. Weapons, communication, transportation, and documentation were all challenging for both the Union Army and Confederate States Army prior to the advancement of technologies. This ultimately made the battles extremely tough and the hardship that soldiers faced is something that would be impossible to imagine in wars that are fought today. Therefore, the innovations of the repeating rifle, hot air balloon, telegraph, submarine, railroad, and camera all had an immediate impact on how the Civil War was fought.

One of the most outstanding technological innovations of the Civil War was the repeating rifle. At the beginning of the Civil War, soldiers were forced to cope with various type of rifles until it eventually progressed to the repeaters. Soldiers from both the north and south were first given the smooth-bore muskets. The smooth-bore musket had a long barrel that was ineffective because it “ had a maximum range of about 300 feet.”[2]Accuracy was not the only issue, but the amount of time required to reload the muskets caused frustration. Only the most well-trained soldiers

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will be able to “ load, aim and fire their weapons three times in one minute.”[3]In addition, the smooth-bore muskets could only take in round shaped bullets that were nearly the same size as the diameter of the barrel, making the accuracy of the shot less effective. For soldiers to hit their target successfully, they would have to run closer to their enemies. To improve the accuracy, soldiers turned their interest to rifled muskets or rifling. Rifled muskets are like the smooth-bore muskets, but the only difference were the design of their barrels. The rifled muskets were designed with a barrel that had “ grooves”[4]that would allow the bullet to spin, which will result in the bullet spiraling its way to the enemy. It did not only cause intense damage to an enemy, it also extended its accuracy up to “ 500 yards when firing with a conical Miniè ball bullet.”[5]Although, both types of musket were still considered ineffective because it could only fire one bullet at a time. Thanks to Benjamin Tyler Henry, the first repeating rifle to be used in the Civil War was invented. Around 1863, Benjamin Tyler Henry invented the Henry Rifle that was capable of firing twelve shots in the span of one minute.[6]The emergence of the repeating rifles was only made available for the Union Army because the Confederates did not have the equipment nor did they have the knowledge on how to produce the rifles. This weapon made it possible for Union soldiers to fire rounds repeatedly, making it a convenient tactic when approaching enemy at a close distance. The only downside to the Henry Rifle was the time-consuming process to reload. Following the invention of the Henry Rifle was another type of repeating rifle called the Spencer Rifle. Christopher Spencer developed another version of the repeating rifle, but his invention could only fire seven rounds.[7]The Union soldiers admired the Spencer Rifle because it was much easier to reload and

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“ it could fire seven shots in 30 second.”[8]One of the most famous quotes that was written by a Union Soldier in response to the development of the Spencer Rifle is, “ we have guns that we load up on Sunday and shoot all the rest of the week.”[9]Both repeating rifles played an important role during the war, but it was the Henry Rifle that garnered most of the interest of the Union soldiers because of its higher ammunition capacity. The improvements from the rifled musket to the Spencer Rifle changed the way soldiers fought the war. Union soldiers were much more capable of causing immediate death to their enemy, making it possible for them to keep pressing forward. The innovation of the repeating rifles is just the beginning for the Union Army.

The Union Army continued to improve their military tactics with the aid of the hot air balloon. Professor Thaddeus Lowe innovated the first ever hot air balloon that was used in the Civil War. Despite seeing success in his work, he must first demonstrate his balloon to President Abraham Lincoln.[10]On June 17, 1861, Lowe “ lofted upward to a height of 500 feet in his balloon- the *Enterprise*- from the Washington Mall in the vicinity of where the National Air & Space Museum now stands.”[11]After a successful demonstration, President Lincoln established a Balloon Corp in which Lowe was appointed as commander. Lowe received funds on August 2, 1861 to construct the *Union* , which was the first hot air balloon to be used in a military combat.[12]The purpose of incorporating the hot air balloon during the Civil War was to provide “ aerial reconnaissance”[13]for the Union Army. The intended strategy that Lowe suggested is to ascend into the air while carrying a telegraph, another technological advancement for the Union Army, throughout the trip. By being 1000 feet high in the air, Lowe will be able to

examine every movement the Confederate soldiers made. He would then use the telegraph to send back information to the Balloon Corp, stating the locations of the Confederate Soldiers. Easily, the Union soldiers would be able to fire accurately at the locations of the Confederates, without actually seeing them.[14]The hot air balloon provided aerial advantage for the Union Army.

Technological innovations continue to be outpouring for the Union Army, following the invention of the telegraph. During the Civil War, “ the telegraph proved its value as a tactical, operational, and strategic communication medium and an important contributor to Union victory.”[15]Samuel Morse invented the telegraph in 1844 and continued to progress until he “ sent the world’s first telegraph message from Washington D. C. to Baltimore, Maryland.”[16]The telegraph is a machine that made long distance communication possible by sending electric signals over a wire. Prior to Civil War, telegraph lines were seen scattered throughout the East Coast. The Western Union Telegraph Company managed to spread around 15, 000 miles of telegraph cable, which was used primarily for military communication. [17]Similar to the innovation of the hot air balloon, the telegraph had to be demonstrated in order to get the approval to be utilize in war. In 1843, Morse made his first demonstration by sending the message, “ What hath God Wrought!”, from Washington D. C. to Baltimore.[18]The original document that hold these historic message is located in the Library of Congress. The telegraph played a major role in the Civil War because it made communication much easier. It was used to transmit and receive important messages about the war. It was a necessary device for the Balloon Corp

because in order for Professor Thaddeus Lowe to send messages to Union soldiers from the air, he must use the telegraph. The telegraph was also responsible for keeping the media up to date. Without the telegraph, the Union Army would not have that much advantage over the Confederate States Army.

The Union Army had greater advantage over the Confederate States Army, but with the innovation of the submarine, the Confederate soldiers found themselves in the process of retaliating. At the beginning of the Civil War, the Union Army already had “ naval advantage” by incorporating the ironclad warships. The ironclad warships were remarkable because it was equipped with “ armor-cladding”[19]and for its ability to destroy while staying afloat on water. The primary purpose of the ironclad warships was to create a barrier to prevent the Confederates sailors from leaving their ports. The innovation of the submarine gave the Confederates the ability to sneak up on the ironclad ships while underwater, which was considered “ one of the most celebrated tactical innovations of the war.”[20]There were many submarines that were developed by the Confederacy, but the most significant creation was done by William Cheeney and Horace Hunley. [21]Hunley created many submarines throughout the Civil War, but he felt the urge to continue improving the features of his submarines. The most outstanding submarine he created was called *CSS H. L. Hunley*. On February 1864, Hunley was ready to make the first attack with the *CSS H. L. Hunley*. Lieutenant George Dixon, along with his crew, set out and found the Union’s *USS Housatonic* , an ironclad warship. At this point, Dixon and his crew submerged away from the enemy and “ rammed the *Housatonic* with a spar

torpedo protruding from the front of the sub.”[22]The torpedo managed to hit the side of the enemy’s ship and was sunk within five minutes. Hence, the *CSS H. L. Hunley* secured a spot in history as being the first submarine to destroy an enemy ship.[23]Unfortunately, hours after the successful attack, the *CSS H. L. Hunley* sunk and was never seen again. The submarine played a major role in the Civil War for the Confederates because it gave them the greater advantage in naval warfare. Despite the Union Army’s aggression on land, the Confederate States Army were establishing their dominance underwater.

Technological innovations seem to be a competition, but the innovation of the railroad was impactful for both the Union and Confederates. Prior to the innovation of the railroad, it was difficult to transport reinforcement troops, weapons, and other military resources. “ Railroads dramatically increased strategic (and often operational) mobility and armies due to their ability to carry large amount of troops and supplies rapidly.”[24]The innovation of the railroad differs between the north and south. The Union Army still had the greater advantage because it constructed “ 20, 000” miles of track, compare to the Confederate’s “ 9, 000” miles of track.[25]This resulted in the Union Army scattering equipped troops throughout the northern region rapidly. Since the railroad was seen as an advantage for both sides, it made sense that they will try to destroy each other’s railroad operation. The Union Army created a strategy to “ attack and divide the Confederacy into non-supporting and isolated zones by cutting water and existing rail transportation line.”[26]The Confederate Army wanted to play equal by destroying “ fixed rail facilities”[27]in which the Union Army needed in order

to transport troops and supplies. Although, the Confederates did not have that much advantage with the railroads, but they were the first to “ use trains to their advantage.”[28]Since the production of military equipment were increasing during the Civil War, it would be considered useless without a large system to transport and distribute. In addition, without the railroads, animals would be the only option for the means of transportation.

The technological innovation that made the Civil War “ the first war to be documented,”[29]was the innovation of the camera. The camera differs from other technological innovations of the Civil War, only because it was not used for military purposes. The camera played a major role during the Civil War because it “ allowed the horrors and glory of war to be seen by the public for the first time.”[30] One of the most famous photographers during the Civil War was Mathew Brady. Brady did not capture most of the images himself, but he did hire Alexander Gardner and Timothy O’Sullivan to work in his studio.[31]Capturing photographs during the Civil War was a difficult process because the equipment was heavy and it was time-consuming. Hence, there were no action captured images of the war. It was also a dangerous process because the chemicals that were necessary involved “ sulfuric acid”[32]and it had to be mixed by hand. Wet-plate photography and stereo views photography were two types of method used to capture gruesome images of dead soldiers, as well as the locations where battles had taken place.[33]The stereo views photography was the most popular because it created three-dimensional images. The innovation of the camera made it possible for the memory of the Civil War to live on forever. Without the camera, primary sources of the Civil War would be limited to written

documents and artifacts. The photographs captured from the Civil War reveals the technologies that were used and it also give a glimpse of the life soldiers endure. This advancement did not only affect how the war was viewed, but it “ also inspired future combat photographer”[34]to take their camera and venture out to other battlefields such as the Vietnam War and WWII.

[1]“ The US Civil War, the First Modern War,” *Aeragon* , accessed March 5, 2017, <http://www.aeragon.com/03/>, Par. 1.

[2]“ Civil War Innovations,” *PBS*, accessed March 3, 2017, <http://www.pbs.org/opb/historydetectives/feature/civil-war-innovations/>, Par. 6.

[3]“ The US Civil War, the First Modern War,” *Aeragon* , accessed March 5, 2017, <http://www.aeragon.com/03/>, par. 19.

[4]“ Civil War Innovations,” *PBS*, accessed March 3, 2017, <http://www.pbs.org/opb/historydetectives/feature/civil-war-innovations/>, par. 6.

[5]Richard Moorehead, “ Technology and the American Civil War,” *Military Review*, vol. 84, no. 3 (2004), last modified June 2004, <https://www.questia.com/library/journal/1P3-665061951/technology-and-the-american-civil-war>, par. 2.

[6]“ The US Civil War, the First Modern War,” *Aeragon* , accessed March 5, 2017, <http://www.aeragon.com/03/>, par. 20.

[7]Ibid., par. 21.

[8]“ Civil War Technology,” *A+E Networks*, accessed March 9, 2017, <http://www.history.com/topics/american-civil-war/civil-war-technology>, par. 5.

[9]Ibid., par. 6.

[10]“ Army Balloon Corps,” Genesee Country Village and Museum, accessed March 3, 2017, <https://www.gcv.org/Historic-Village/The-Intrepid/Army-Balloon-Corps>, par. 2.

[11]Ibid.

[12]Ibid., par. 4.

[13]Ibid., par. 1.

[14]Ibid., par. 5.

[15]David Hochfelder, “ The Telegraph,” *Essential Civil War Curriculum*, accessed March 3, 2017, <http://www.essentialcivilwarcurriculum.com/the-telegraph.html>, par. 1.

[16]“ The US Civil War, the First Modern War,” *Aeragon* , accessed March 5, 2017, <http://www.aeragon.com/03/>, par. 36.

[17]“ Civil War Innovations,” *PBS*, accessed March 3, 2017, <http://www.pbs.org/opb/historydetectives/feature/civil-war-innovations/>, par. 1.

[18]“ Morse Code & the Telegraph,” *A+E Network*, accessed March 11, 2017, <http://www.history.com/topics/inventions/telegraph>, par. 6.

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[19]“ Civil War Innovations,” *PBS*, accessed March 3, 2017, <http://www.pbs.org/opb/historydetectives/feature/civil-war-innovations/>, par. 8.

[20]David Stauffer and Lewis West, “ The Civil and early submarine warfare,” The Gilder Lehrman: Institute of American History, accessed March 3, 2017, <https://www.gilderlehrman.org/history-by-era/american-civil-war/resources/civil-war-and-early-submarine-warfare-1863>, par. 1.

[21]“ Civil War Submarines,” American Civil War Story, accessed March 12, 2017, <http://www.americancivilwarstory.com/civil-war-submarine.html>, par. 19.

[22]Ibid., par. 31.

[23]Ibid.

[24]David Hollis, “ The Impact of Railroads on Warfare During the American Civil War,” *Tocwoc*, last modified February 16, 2010, <http://www.brettschulte.net/CWBlog/2010/02/16/the-impact-of-railroads-on-warfare-during-the-american-civil-war/>, par. 4.

[25]“ Civil War Innovations,” *PBS*, accessed March 3, 2017, <http://www.pbs.org/opb/historydetectives/feature/civil-war-innovations/>, par. 3.

[26]David Hollis, “ The Impact of Railroads on Warfare During the American Civil War,” *Tocwoc*, last modified February 16, 2010, <http://www.brettschulte.net/CWBlog/2010/02/16/the-impact-of-railroads-on-warfare-during-the-american-civil-war/>, par. 6.

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[27]Ibid., par. 7.

[28]“ Civil War Innovations,” *PBS*, accessed March 3, 2017, <http://www.pbs.org/opb/historydetectives/feature/civil-war-innovations/>, par. 4.

[29]Rebecca Brooks, “ Civil War Photography,” *Civil War Saga*, Last modified August 9, 2011, <http://civilwarsaga.com/civil-war-photography/>, par. 1.

[30]Ibid.

[31]Ibid., par. 4.

[32]Ibid., par. 7.

[33]Ibid., par. 6.

[34]“ Photography and the Civil War,” *Civil War Trust*, accessed March 3, 2017, <http://www.civilwar.org/photos/3d-photography-special/photography-and-the-civil-war.html>, par. 12.