The US Civil War, the First Modern War

The beginnings of modern military technology and the sources of design

Historians consider The American Civil War to be the first modern war. They regard it to be the first modern war because it was the first war where widespread use of mechanized and electrified devices like railroad trains, aerial observation, telegraph, photography, torpedoes, mines, ironclad ships and rifles occurred.

Although these recent innovations were used for military purposes during the engagements, the armed forces were sometimes reluctant to embrace new technologies. On occasion, the inventors and entrepreneurs of these new technologies visualized military applications for them and had to persuade the War Department to use them in the military efforts. The military men of the nineteenth century were not trained to see new gadgets as solutions to the problems of warfare. They had been schooled in techniques that were more-or-less classical and the product of long traditions. Experimenting with new devices can jeopardize an entire operation so it took a bold new approach to try any of the many newfangled contraptions that were proposed at the beginning of the conflict.

Apart from the new devices that are outlined here, there were hundreds of other proposals to the US War Department for machines intended to bring a swift end to the war. The Confederate States also received hundreds of proposals and tended to try more of them than the Northern States did. Perhaps it was because the Confederacy had the best officers or perhaps it was because of their strategic disadvantage in materials and personnel.

The records from the period are full of novel ideas and it is intriguing to consider what difference they might have made had they been tried. Some of the more plausible concepts include a double barreled cannon that fired chain shot, breech loading repeating rifles, ironclad batteries on wheels and various improved artillery shell designs. Some of the inventions were tried and put into use in combat with successful results. Many new weapons were incorporated into the equipment of the armies and changed warfare forever. Despite the interesting aspect of all of this new technology, it is impossible to forget that the new weapons made warfare far more deadly than ever before. The American Civil War was one of the bloodiest wars in history.
Mathew Brady

Mathew Brady, famous for photographing most US Presidents during that period, enjoyed great success in the photography field before the Civil War. He was certain that photography could be useful and valuable during wartime. At the beginning of the war, he decided to make a complete photographic record of the entire conflict. He hired twenty assistants, some of whom later became famous in their own rights, to help him record all of the events of the Civil War.

Brady invested US$100,000 (about 2 million of today’s US dollars) in this project and was certain that the US government would buy the photos and provide a nice profit for them when the war was over. Unfortunately, the US government showed no interest in the pictures for some time, and Brady went bankrupt during the financial panic of 1873. He was then forced to sell his studios and galleries and could not even pay the storage fees for the negatives of the Civil War photos. The government later purchased the negatives at auction for about $2800. Some of Brady’s friends in the government eventually convinced Congress to pay Brady an additional $25,000 for the images, but he was still insolvent and eventually died a pauper in a New York City hospital charity ward. Nevertheless, Mathew Brady did succeed at creating a comprehensive photographic record of the Civil War and the value of his collection is incalculable today.

Changes in Naval Warfare

There were many naval warfare experiments conducted during the American Civil War, such as the use of ironclad ships. Other navies had tried various configurations of ironclad ships a few years earlier in the 19th century, particularly during the Crimean War. The Union and Confederate navies began to cover their gun-ships with armor plate so that they could better withstand engagements. The
practice showed great promise and the ironclad ships were formidable adversaries for traditional wooden ships in use at that time.

One of the most famous naval battles of all time is the engagement between the CSS Virginia and the USS Monitor at Hampton Roads Virginia in 1862. The first Confederate ironclad ship, the CSS Virginia, was built from a scuttled Union ship, the USS Merrimac. Confederate forces salvaged the USS Merrimac after they obtained the Norfolk, Virginia Navy Yard that Union forces abandoned on retreat. Upon advancing into Norfolk, the Confederates raised the Merrimac and outfitted it with armor plate. When it became operational, it easily destroyed many of the Union’s wooden ships until it the USS Monitor, the Union’s first commissioned ironclad ship, engaged it. This first battle in history between two ironclad ships ended in an unusual draw.

The naval warfare experiences in America during the Civil War, and especially the battle between the CSS Virginia and the USS Monitor, clearly demonstrated that the wooden ship-of-the-line was now obsolete. Other nations took note of the American Civil War naval experiences and accelerated the retirement of wooden ships in navies worldwide. The powerful British Navy rapidly converted to all-metal ships and eventually, nearly all ships for any purpose would be constructed of metal.

Because one of the main tactics of the Union offensive was to blockade Southern ports, the Southern States developed a fleet of very fast ships to run the blockades. These ships were known as blockade-runners and they had steam power in addition to traditional sails. The blockade-runners had a low profile above the waterline and have inspired the designers of most professional smuggling ships ever since.

As a countermeasure to the Union's blockades, the Confederate States developed the first naval mines. When a ship contacted a mine it would explode and sink the hapless ship. The mines were promising and sank at least forty Union
ships. The success with the naval mines led to the development of torpedoes and land mines as well as other similar explosive devices. There is a bit of confusion surrounding the word torpedo from this time period. Generally, the word torpedo was applied to nearly any device with an explosive charge that could be used to destroy something. In current usage, one thinks more of a propelled naval weapon when using the word torpedo, but the other uses are still valid.

**Ordnance**

There were several notable advances in *ordnance* during the Civil War period. For one thing, this was the first war where widespread use of rifles by infantrymen occurred. Rifled muzzle-loading muskets gradually replaced the smooth bore muzzle-loading muskets that were issued at the beginning of the war. Finally, near the end of the war, breech-loading rifles became available. Before this, rifles had been in limited use and were not generally available for use by infantrymen. Improved manufacturing methods made rifling the bore easier and rifles replaced muskets by the end of the war. Rifling increased the range and accuracy of firearms substantially and may have had a significant effect on the high number of fatalities in the war. Later in the conflict, repeating rifles became common.

At the beginning of the war, most infantrymen were equipped with muskets that had to be muzzle-loaded. It was expected that with good training most infantrymen could load, aim and fire their weapons three times in one minute. Musket ammunition consisted of paper cartridges that contained a pre-measured amount of powder and the projectile. The infantrymen would bite the end off the cartridge, pour the powder in and stuff in the paper as wadding. Then they put the shot in and tamped it down. After the revolutionary metal cartridge and new rifle designs became available, infantrymen could fire as many as nine times more shots in one minute.
B. Tyler Henry was granted a patent for a lever-action-repeating rifle on 16 October, 1860. The design was an improvement on the earlier volcanic rifle. It used newfangled mass-produced metallic rim-fire cartridges for ammunition. The Henry rifle held twelve shots in its magazine and another round could be loaded into the chamber. The Henry rifle was the first magazine equipped weapon ever used by the army and it could fire twenty-five shots per minute. The Henry rifle was the direct ancestor of the Winchester rifles that would be widely used after the Civil War, particularly in the American Indian Wars.

Christopher Spencer patented another improved rifle design that came along during the same year. He obtained a patent on 06 March, 1860. The Spencer rifle was accepted more readily by the US Army and came into wider use during the Civil War although some firearms aficionados feel that the Henry was actually a better weapon.

Spencer and Henry rifles revolutionized firearms design by using manufactured metal cartridges for ammunition. Both the Spencer and the Henry could be loaded in a fraction of the time required to load a musket. However, the Henry rifle took a little longer to load than the Spencer rifle, but it had a twelve-shot magazine. The Henry rifle used more powerful ammunition than the Spencer rifle did.

Tyler Henry never really profited much from his invention and the enterprise was taken over by his employer, Oliver Winchester, a Connecticut shirt-maker. Winchester, however, profited greatly from Henry's invention and became very rich operating the Winchester Repeating Arms Company.

After the Civil War, the Spencer rifle lost out to the advantages of the Henry and the Spencer Company went bankrupt in 1869. The New Haven Arms Company of New Haven, Connecticut manufactured the Henry rifle. The New Haven Arms company dissolved in 1866 and was reformed into the Winchester Repeating Arms Company that same year. A few Henry .44 caliber rifles, Model 1860, were made during the Civil War.
The Henry Model 1860 was later improved and became the Winchester Model 1866, a widespread consumer product in the American frontier after the war.

**Cannon**

The incredible advances in manufacturing capabilities that had occurred up to the time of the Civil War made the widespread manufacturing of rifled cannon possible and there were several models of rifled cannon used during the American Civil War. Rifling large guns requires very large machine shop equipment because the entire gun barrel must be mounted in a lathe. Before this time, nearly all cannon were smooth bore guns. The rifling of cannon substantially increased the range and accuracy of this weapon.

**Rapid-fire Guns**

Experimentation occurred with new types of guns that are predecessors of the modern machine gun. None of them were actually machine guns in the strict sense of the term. Most of these newly devised guns were operated by a hand-crank, a feature that prevents them from being classed as machine guns. One of these devices was the Coffee Mill Gun, a design with a single barrel that had a hopper to feed shells into the chamber. It was not especially successful. Another of the new designs for rapid-fire guns was the Gatling Gun. There were also several other types of rapid-fire guns designed for the Civil War.

**Gatling Gun**

One important invention that became operational during the Civil War was the Gatling gun. It was one of the first rapid-fire guns and a predecessor of the modern machine gun. It was probably the most successful of the several rapid-fire guns that were developed at about this time. The Gatling Gun has an interesting developmental tale. Its inventor, Richard J. Gatling, set out to create a weapon so devastating that it would make the idea of war so horrible that war would become unthinkable thus ending all wars. He did succeed in creating a weapon that was very
devastating for its day, but the effect was that it made killing much more efficient, thereby making his invention a complete failure when considered in light of his intended purpose. Nevertheless, it seems that Gatling profited from his work and continued to improve his invention until it fell into disuse.

Gatling guns were large and heavy, weighing about a ton (900 kg), hence, they were usually mounted on wheels. Some models were designed to be mounted on a tripod. Gatling guns were used more frequently as short-range artillery pieces than as infantry weapons due to their cumbersome size and mounting. A drawback with the earliest Gatling guns was that they had problems with the ammunition jamming up causing long delays during which they could not be fired.

The Gatling gun was not used extensively during the Civil War. However, it was used widely in the Spanish-American war a few years later. Most ordnance experts considered Gatling guns obsolete until recently. Now, an updated Gatling design has found new use in large-caliber onboard rapid-fire weapons for the A-10 attack airplane and other new pieces of military hardware. Some of the modern artillery pieces that use the Gatling design can fire more than 10,000 rounds per minute.

**Railroads**

Railroads were newfangled technology at the beginning of the Civil War and they had not been used much in military applications. American forces had used trains to transport troops to the front during the Mexican War about fifteen years earlier. The railroads had grown substantially since then and at the beginning of the Civil War the Northern territory had about 21,000 miles (34,000 km) of track while the Southern States had about 9,000 miles (14,484 km) of track.

Almost from the beginning the armed forces of both sides of the conflict began to use the railroads to transport troops, ammunition and supplies to the front. With this newfound mobility troops and supplies could be relocated more rapidly
and in greater quantities than ever before. As the battle wore on operations that would not have been possible without the railroads were conducted. Frequently, as the troops secured new territory the rail system would fill in from the rear to supply the advancing troops.

Rapid transportation resulting from the railroad emerged as an increasingly important factor in the outcome of the war. With their profound effect upon logistics, railroads influenced all military calculations including the timing of engagements and the magnitude of mobilizations. Consequently, as the war progressed military campaigns were directed against centers of rail transportation such as Chattanooga, Atlanta and Manassas Junction.

Because the railroads emerged as such an important strategic military factor opposing forces began to try to sabotage the rail operations of their adversaries. There were many new inventions for sabotaging railroads such as rail twisters and devices to blow up railroad bridges and other infrastructure. Some troops specialized in destroying railroad equipment as their sole-role in the war.

Militaries operated the whole of their respective railroad systems in both the North and the South during the Civil War. They did so with typical military precision thereby making improvements to methods and service that continued beyond the war. As part of this role, the militaries did a lot of construction and repair to railroad properties. There were many additions to the rail system such as permanent and temporary spurs of rail, bridges and other infrastructure during the war thereby vastly increasing the areas served by railroads in the Eastern United States. Many important innovations such as railroad signals were created while the militaries operated the railroads. Later, the railroad signal would be applied to motor vehicle traffic in the form of the stoplight. Brigadier General Herman Haupt supervised all railroad operations by Union forces. After the war, Haupt managed similar operations for civilian railroads including the Shenandoah Valley, Richmond and Danville, Northern Pacific, and served as president of the Dakota and Great Southern Railroad.

The plan to complete a transcontinental railroad was instituted by President Abraham Lincoln during the war. Consequently, congress passed the Pacific Railroad Act in 1862 authorizing the Central Pacific and Union Pacific Railroads to build the transcontinental railroad along the 42nd parallel, but at the end of the US Civil War the railroad system
still stopped at the Missouri River. Construction began in earnest in 1865, but due to
great natural difficulties it was not completed until 1869.

**Telegraph**

At the beginning of the Civil War, telegraph was a recent innovation. Samuel F. B. Morse, its inventor, sent the world's first telegraph message from Washington D.C. to Baltimore, Maryland in 1844. In the succeeding years before the Civil War began, telegraph lines sprouted up over most of the Eastern United States. The only state east of the Mississippi River that did not have telegraph coverage was Florida. Because of the war and a big demand for the latest news, the Western Union Telegraph Company completed construction of a telegraph line through the Rocky Mountains connecting the West Coast to the network in October of 1861. This soon brought an end to the pony express messenger service that had been in operation for less than two years.

When the Civil War began, the telegraph was quickly used to report battle information and soon became the most important form of military communication. It was used to report intelligence information very rapidly and soon became a prime target for military counter-operations. There were some instances where messages were intercepted and replaced with disinformation. One Union commander captured at least two Confederate supply trains in this way.

Telegraph lines were quickly erected everywhere the armies traveled and by the end of the war, more than 15,000 miles (24,000 km) of telegraph lines had been built that served military purposes only. They also made use of semaphore messaging and built hundreds of signal towers. The armies developed mobile telegraph units that could travel along with the forces. As a part of the proliferation of new technologies that occurred during the war, the Civil War was the first instance where a telegraph message from a hot-air balloon was sent. The War
Department opened its own telegraph office and President Abraham Lincoln frequently visited to get information of the war. The White House did not have a telegraph office at that time.

The telegraph became an increasingly important military tool and began to affect the outcome of battles. This was nowhere more pronounced than it was in an operation at Fort Sanders near Knoxville, Tennessee. Southern forces, commanded by General James Longstreet, got tangled up in Union telegraph lines strung from tree stump to tree stump while attacking Union forces commanded by General Ambrose Burnside. Ordinarily the effect of the telegraph on military operations was more closely related to communication functions.

The Civil War was the first war where news media played a major role. Because the American press had grown to a very large size before the Civil War began, there were many news organizations vying for the latest scoop on the war. The telegraph with its nearly instant communication ability added considerably to the scope of this phenomenon. It suddenly was necessary for the military to manage the media exposure and this caused many problems at the beginning of the war. Most of the military leaders were not pleased with spending time on media functions and were concerned about jeopardizing their operations through indiscriminate releases of information. General Ulysses S. Grant was one of few Generals that felt that a good relationship with the press was worth cultivating. Even President Abraham Lincoln seemed unable to deal with the press effectively. Nevertheless, the press played a key role in maintaining public support and was the primary source of information for the troops in the field.