

# The Generals and the Gatlings

Lessons Learned from the U.S. Army 1862-1918

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## *Introduction*

The Gatling gun was the first functional machine gun,<sup>2</sup> able to reliably spew hundreds of rounds per minute with the cranking of a handle. Although early models were heavy and cumbersome, requiring in a horse- or mule-drawn carriage and a team of soldiers needed for optimum firepower, from this vantage point in history the Gatling, and follow-on machine guns, offered a clear military advantage. Given that its development occurred in the early days of the Civil War, when the infantry charge was often the decisive factor, why did the United States<sup>3</sup> not seize upon the Gatling as a way to change *how* to maximize an advantage in war?

The vast majority of widely-adopted machine guns—the Gatling, Maxim, Browning, and Colt—were designed by Americans, but it was not just the United States militaries which failed to fully capitalize upon the Gatling and its subsequent competitors, but also many other world powers such as Britain and France. Despite skirmishes in African countries by the British (late 1800s), the Franco-Prussian War (1870-71), and even the Spanish-American War (1898-1899), the U.S. Army generals by and large still did not comprehend the change in warfare brought about by the machine gun until World War I.

Even then, it took tens of thousands of casualties before the various generals decided machine guns had changed the established patterns of warfare. The Battle of the Somme alone resulted in over 50,000 British casualties in 24 hours due to the German machine gun defensive positions and inability of French and British leadership to react to the new paradigm.<sup>4</sup>

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<sup>2</sup> Note that it was not an “automatic” machine gun, as continual manual effort (the cranking of the handle) was involved. Maxim later invented the first automatic machine gun, which reloaded the chamber using the gas pressure from the round just fired, enabling continuous fire by simply holding down the trigger.

<sup>3</sup> The Gatling was predominantly marketed to the North. There is no evidence to suggest that Gatling, or someone pushing an inferior machine gun, sold or tried to sell to the South. Even after the Civil War, the Generals did not realize the fundamental change in warfare made possible by the Gatling.

<sup>4</sup> Over 50,000 casualties are equivalent to “men passing a fixed point in eight hours if marching four abreast in an unbroken column.” (Smith 2002, 208).

This paper will review the period from 1862-1918 from the vantage of the United States Army, as a representational example of the underlying problems of the world's militaries in machine gun adoption. The intent is to learn *why* the U.S. Army was slow to recognize the potential power of the Gatling, develop appropriate battlefield tactics, and properly equip the units. The lessons learned will be examined and remedies suggested that will provide the U.S. maximum advantage in future conflicts.

On September 11, 2001 a terrorist attack shattered the relatively stable peace of the United States. Shortly after, war was declared against the Taliban and the concerted military power of the U.S. struck. In a fairly short time, bases in-country were established and operations continued at full speed, mostly during hours of darkness to maximize the advantage of night vision goggle (NVG) technology.

NVGs had been around for over a decade, being used by Air Force Special Operations Command (AFSOC)<sup>5</sup> aircrew routinely since the late 1980s. The technology was well-established, training programs were in place, maintenance procedures published and tactics were defined. So why were Air Mobility Command (AMC) C-130 crews not ready for night operations?

Most AMC crews had never before used or received training for NVGs. Many crewmembers were handed a set of NVGs prior to stepping for a mission and told “fly with these tonight” (Neal 2006). While in some respects NVGs are intuitively designed and easy to use, for aviation there are a number of caveats to successful use due to the limited depth perception, narrow field of view, hidden obstacles, lack of compatible aircraft instrument lighting systems, and so on.

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<sup>5</sup> AFSOC is the smallest, and some would say most nimble, major command in the U.S. Air Force.

In general, the crews performed admirably and succeeded despite the training and aircraft lighting limitations, a tribute to the dedication and professionalism of U.S. Air Force crewmembers and the operations support personnel who used or maintained the equipment on the ground. There is little doubt the U.S. is a safer place due to our ability to operate at night and rout the Taliban.

The old saw in the military is that you always prepare for the last war, not the war you're about to fight. Even so, the ability to dominate the night time is surely recognizable as a serious edge for military operations. Was it funding, perceived lack of need, bureaucratic pushback or simply the ennui of a relatively stable U.S. peace?

Even four years after 9/11, the Air National Guard (ANG) and AMC C-130 crews still had insufficient numbers of NVGs due to the slow Program Objective Memorandum (POM) funding process and lack of current-year fiscal reallocation. NVGs were shipped around the country in a just-in-time manner so units about to deploy had a brief opportunity to train; meanwhile, other units' readiness suffered

The Gatling gun was another piece of revolutionary military technology slow to gain acceptance until a large-scale crisis precipitated its embrace. The machine gun, like NVGs, changed how armies fight. By reviewing the lessons learned from the Gatling, perhaps U.S. military forces—or other large organizations struggling to adopt new technologies—can better capitalize on future revolutionary technologies.

#### *State of War-making in the Late 19th Century*

In *The Pursuit of Power* William H. McNeill discusses the changes in warfare and the tremendous revolution in military technology and tactics that started in the late 1800s. These changes included the Minie bullet, Gatling gun, coincident improvement in national industrial

bases, and even changes in the required qualities for soldiers. As the rate of manufacture increased to the point at which “an entire army could be re-equipped about as quickly as soldiers could be familiarized with the new weapon,” the need for smarter soldiers better able to handle the technological changes became more pressing (McNeill 1982, 235 and 232).

McNeill argues that the U.S. Civil War was the first full-fledged example of an industrialized war, citing the important role of the railroads in supporting the war effort (1982, 242). The new railway system coupled with increasing demand for supplies for troops and equipment continued to drive the improvement of the newborn industrial capability of both the North and South. This new capability meant that mobilization was no longer the limiting factor for the conduct of war, but rather the employment of weapons and personnel on the battlefield—that is, tactics.

Despite the large time span covered by his book, van Creveld in *Technology and War* substantiates that war-making was fairly static until the 1800s when technology started driving changes in how war was conducted. Care is taken to provide the reader with a strategic view, such as when discussing on page 173 the density of combatants on the battlefield, or the problems of ammunition supply chains with the rapid firepower of the Gatling on page 175. Van Creveld takes a deliberate look at technology and how it impacted war making, which he sums up as

Technology does not just represent an assemblage of hardware but a philosophical system. As such, technology affects not only the way war is conducted and victory is sought, but the very framework that we use for thinking about it (van Creveld 1991, 232).

It is in the way we think about war-making technology and how best to employ it that we develop tactics. As Jamieson notes, the Gatling is an excellent example of “technology outrunning tactical theory” (1994, 79). Throughout his book, he asks many questions which

seemed unanswered by the U.S. Army prior to World War I: is the Gatling gun artillery or ordnance? How/where do they fit into the Army? What about tactics? What new logistical issues should be addressed organizationally?

### *The Civil War*

Dr. Richard Gatling developed his namesake gun when he observed the many wounded returning from Civil War engagements. His comment—one hopes made without cynicism—was that the possession of a gun capable of continuously firing hundreds of rounds per minute would reduce the number of men required to fight due to the killing power (Wahl and Toppel 1966, 18). A clever inventor—he made his original fortune with the development of the seed drill—he set to work and by 1862 had a working model of the first reliable, functioning machine gun.

The crank handle rotated the firing action around six fixed barrels, and a hopper on top of the weapon kept it fed with fresh cartridges. It was easy enough to use that a well-dressed man in coat and top hat could operate it, although on the battlefield it generally required a team to move, aim, reload and fire. In 1862, Gatling sent a letter to the Army Ordnance Department in hopes of encouraging tests of his gun and eventual adoption.

Brigadier General James Wolfe Ripley, the Army Chief of Ordnance (1861-1863), was by all accounts a careful and methodical career soldier. By 1861, he had nearly a half-century of experience as an ordnance officer, much of it based on dealing with tight budgets and expansive regulatory guidance. During this period, inventors were expected to petition directly to the military for test and evaluation of their inventions, and most of these solicitations were to the Ordnance Department.

Apparently due to his small staff, coupled with the high-volume of snake oil salesmen mixed in with the well-meaning inventors, General Ripley's written intent was to ignore

correspondence and instead focus on maintaining the procurement and fielding of weapons already in the system (United States War Department 1899 [hereafter cited as USWD], Ripley to Secretary of War Cameron, June 11, 1861, Series 3, Volume I, 264-65 and 292). While reducing workload and preventing a plethora of mismatched weaponry, it also resulted in very few opportunities to capitalize on new technological developments. General Ripley's office did respond to Dr. Gatling's solicitation, but simply to point out that the Ordnance Department had no direct knowledge of the weapon and therefore was unable to express an opinion relating to its value (National Archives, Record Group 156 [hereafter cited as NA, RG 156], Letters Endorsements and Reports to the Secretary of War 1812-89, Vol 14, 31).<sup>6</sup>

Unable to stir much initial interest from the U.S. Army, Dr. Gatling tried some novel approaches such as putting on a demonstration for the town of Indianapolis, which amazed the general population and the governor of Indiana with its ability to expend munitions. However, the limited reach of the governor afforded no help to Gatling in obtaining official interest in the weapon.

At one point in early 1864 after the retirement of General Ripley, Dr Gatling wrote President Lincoln and requested an opportunity to demonstrate the Gatling gun. However, with the stresses of the war and a re-election, it appears Lincoln took no direct action on the request. Gatling remained determined but at this point unsuccessful in finding a patron for the Gatling gun. By the end of the Civil War, only a few Gatlings had been purchased and no one had yet noticed this harbinger of change.<sup>7</sup>

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<sup>6</sup> Of course, since the Army Ordnance office had to test and evaluate all proposed new weapons, how would the Army *or* the Ordnance office have knowledge of the weapon unless they were to test it? A chicken-egg conundrum which effectively slow-rolled adoption of the Gatling.

<sup>7</sup> For example, General Benjamin F. "Beast" Butler of the Army of the James had bypassed the Army Ordnance office and bought 12 Gatlings on his own. They were used at Petersburg but generally were considered ineffectual due to a lack of tactics and training.

Why the lackluster response to a potentially decisive weapon? Regarding Dr. Gatling, there were rumors about his membership in the Order of American Knights, a group of Southern sympathizers, although the references are only in passing and no substantiation has been found (USWD, Series 2, Volume 7, 298 and 342).<sup>8</sup> Further, Gatling was a novice in the machinations of Federal bureaucracy, and the lack of modern lobbyists was no doubt a serious hindrance to obtaining even a chance to prove the weapon's worth.

The Army itself was already in a state of disarray, with multiple calibers, types of weapons and dissimilar equipment to the point where it was very difficult to uniformly equip units. The budget crunch was also a sore spot, with the huge expenses of fighting a war, and then the costs of Reconstruction immediately following the cessation of hostilities—and who wants to pay for new Army equipment when an expensive war was just won? This prevalent mindset explains much of the period between the end of the Civil War and the Spanish-American War (1865-1898).

### *Reconstruction*

With the arrival of a new Chief of Army Ordnance, General Alexander B. Dyer,<sup>9</sup> Gatling finally got approval for formal testing of his invention, and by January 1865 the latest model of the Gatling gun was tested at the Washington Arsenal. With four barrels this .58 caliber Gatling weighed 224 pounds, the carriage another 202 pounds and the limber yet another 200 pounds.<sup>10</sup> The overall test went very well, with some 300 rounds fired and very good accuracy noted out to 500 yards. Lieutenant Maclay, in charge of the testing, was overall impressed with the weapon

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<sup>8</sup> After all, if he were really that much of a Southern sympathizer, why weren't any Gatlings sold (or attempted to be sold) to the South? Instead, much effort was expended by Gatling to sell to the North.

<sup>9</sup> Dyer was Ordnance Chief from 1864-74.

<sup>10</sup> "Limber" is "a two-wheeled vehicle to which a gun or caisson may be attached" per Webster's Universal Encyclopedic Dictionary (New York: Barnes & Noble Books, 2002). The Gatling was fitted to its carriage, which allowed vertical and horizontal movement of the weapon, and the carriage then set into the limber. The limber also carried, depending on model, about 10,000 rounds of ammunition.

although noted several areas for improvement in order for the weapon to be fully battle effective (NA, RG 156, Reports of Experiments 1826-71, Vol 98, Entry 70).

Several weeks later, after an official demonstration attended by Generals Hancock<sup>11</sup> and Dyer, an order for twelve Gatlings was made by the Ordnance Department for the First Corps, along with two experimental one-inch Gatlings for flank defense (NA, RG 156, Letters, Endorsements and Reports to the Secretary of War 1812-89, Vol 15, 268). Flank defense is the protection of forts from ground assault, a new potential role for the Gatling advocated by General Dyer after seeing the demonstrations.

In the summer of 1866, additional tests of the Gatlings were ordered. Captain Baylor was placed in charge, and tasked with comparing a rifled one-inch Gatling against a smooth-bore 24-pound howitzer. Baylor went above and beyond, conducting tests on the durability of the Gatling by removing all oil and leaving out in the rain for two days, then taking directly to the range and firing. He also gave some minor consideration to machine gun tactics, noting the continuous barrage nature allowed no time for the enemy to advance between discharges (NA, RG 156, Reports of Experiments 1826-71, Vol 98, Entry 78).

The Ordnance Department—despite the abrupt and continuing reduction in funding—ordered 100 Gatlings in two models based in part upon Baylor's tests. By April of 1865, the Ordnance Department funding was so restricted that further purchases were out of the question, and by 1870 the budget was roughly five percent of the war-time amount (Armstrong 1982, 43).<sup>12</sup>

In the 1870s, the downsized and fiscally constrained U.S. Army still had not found a home or a battlefield role for Gatlings. As Armstrong puts it, there was “an absence of an

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<sup>11</sup> General Hancock was building the First Army Corps of Veteran Volunteers and was very influential.

<sup>12</sup> From \$43.1M in 1865, to \$16.5M in 1866 and then to \$2.4M in 1870.

intellectual and bureaucratic apparatus within the military that could make an *organized response to change*” [emphasis added] (Armstrong 1982, 51). This concept also explains the lack of solid tactical employment doctrine for the Gatlings. During this period, there were no credible tactics schools or other formal organizations composed of operational thinkers looking to integrate divergent weaponry into a cohesive synergistic effort. Reviews of available documentation, writings in military journals and other sources provide scant information on employment methodologies for the Gatling.

There were little new tactics developed for the Gatling, or other machine guns, throughout the remainder of the century. Aside from an occasional bright spot, such as the U.S. Army 1874 artillery manual which included some Gatling gun defensive drills, there was little organizational recognition of the Gatling or its capabilities. Even the artillery manual lumped the Gatling in with other artillery pieces and limited its role to defensive emplacements. Custer refused to take Gatlings as they might’ve slowed the horses down,<sup>13</sup> the machine gun massacres of African natives weren’t considered ‘real’ warfare<sup>14</sup> and the fantastic French failure with the *mitrailleuses*<sup>15</sup> (Armstrong 1982, 60-61) all underscore an almost worldwide blind spot regarding machine guns.

There were advances in the hardware itself. Hiram Maxim’s truly automatic machine gun was designed in 1884 in England.<sup>16</sup> Continuing improvements to the reliability, mobility and design of the Gatling resulted in an excellent weapon and it remained the U.S. Army’s

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<sup>13</sup> Note that historians and tacticians are uncertain whether Gatlings would’ve made a difference at the Last Stand due to the undisciplined manner in which the Indians fought (i.e., no infantry charge but rather guerilla-style tactics).

<sup>14</sup> Rather than learning from these engagements and developing tactics for future warfighting, the British (and other imperial nations) simply ignored the lessons.

<sup>15</sup> Ramping up to the Franco-Prussian War, the new French machine gun was kept in such utter secrecy that the troops generally had no training, and therefore no tactics were developed. It resulted in the war-winning secret weapon being a hideous failure and readily relegated to “bad idea” status—but due to decisions by the generals, not due to failure of the weapon itself.

<sup>16</sup> Note that Mr. Maxim was an American residing in England. Ellis (1975) posits some explanations for why Americans were the ones developing these weapons.

primary machine gun until 1903.<sup>17</sup> Other machine guns were developed and fielded sporadically by the U.S. Army, although the Gatling remained the standard to which all others were compared.

### *The Spanish-American War*

In 1898 the Spanish-American War broke out, and the ambitious Army Lieutenant John Henry Parker became the leading advocate of machine guns in general and Gatlings in particular. While the U.S. Army at large still disregarded Gatlings as a viable infantry weapon or artillery, Parker went to great lengths during the Santiago campaign to demonstrate the value of the Gatlings.<sup>18</sup>

John Henry Parker was one of the very first “believers” in the capability of the Gatling. He is credited with being the first to develop tactics specifically for the Gatling, and devise methods of employment on the battlefield.<sup>19</sup> In his book *The Gatlings at Santiago (With a Few Unvarnished Truths about that Expedition)* he discusses his first methodical use of the Gatlings on the battlefield and their successes. The text starts off with a rousing tribute by Theodore Roosevelt of the Rough Riders, describing the clear advantage the Gatlings provided to the front lines of battle. This battle-forged friendship of Lieutenant Parker with the soon-to-be President enabled Parker to push machine gun tactics farther than he may’ve otherwise been able to, although he was still limited in his ability to effect change.

There also appears to be a bit of careerism involved in his crusade, as he continuously pushed for a separate machine gun arm within the Army, commanded by someone with vision,

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<sup>17</sup> The Gatling was officially retired from U.S. Army service in 1911.

<sup>18</sup> Substantiated by the exceeding difficulties Parker faced in convincing the commanding Generals to authorize his experimental Gatling Gun Detachment.

<sup>19</sup> For example, designing methods of linking up dynamite guns with the Gatlings for better effect.

foresight and the courage to get the job done.<sup>20</sup> Many of his ideas were ahead of their time, for example, his underlying tactical strategy for the employment of the Gatling was independent rapid mobility—a concept the present-day U.S. Army is trying to embrace.

Parker did manage to get a small (28-man) detachment authorized, along with four Gatlings, mules and ammunition.<sup>21</sup> Parker had to go through or around General Wade, General Wheeler, General Lee, General Sumner and General Chaffee in order to prove the value of the Gatling (Parker, 1898).<sup>22</sup> Only General Shafter supported the experiment, and in one case had to be physically present to direct the requisitioning of mules and equipment. The Gatling Gun Detachment as reported by Parker contributed substantially to the Santiago campaign and to the body of knowledge on machine gun tactics.<sup>23</sup> Still, between the end of the Spanish-American War and the start of the Great War, Army leadership still ignored the Gatling.

### *World War I*

The Great War saw a number of “firsts” such as the use of chemical weapons on a battlefield, the invention of tanks,<sup>24</sup> machine guns creating defensive lines resulting in trench warfare and nearly 9,000,000 soldiers killed. Germany was better prepared for trench warfare and quicker at deploying and using machine guns to stake out and hold territory (Armstrong 1982, 173-175).

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<sup>20</sup> The additional requirement of having the initials “JHP” was barely left as an exercise for the reader.

<sup>21</sup> Major-General Shafter, 5th Corps Commander, authorized the establishment of the Gatling Gun Detachment. Lieutenant Parker reported directly to General Shafter.

<sup>22</sup> This list only includes general officers. The list of lesser officers would consume too much space.

<sup>23</sup> He also managed to impress Teddy Roosevelt of the Rough Riders, and John T. Thompson an ordnance officer and later the inventor of the Thompson submachine gun known as the Tommy gun.

<sup>24</sup> Tanks were developed late in the war, primarily as a response to the trench warfare stalemate brought about by the machine gun.

Due to limited U.S. participation in the Great War, American data on machine gun manufacture and use is lacking.<sup>25</sup> However, the British machine gun manufacturer production numbers are as follows (Smith 2002, 196):

	1914	1915	1916	1917	1918
Vickers	266	2,405	7,429	21,782	39,473
Lewis	8	3,650	21,615	45,528	62,303
Hotchkiss		9	4,156	12,128	19,088
<b>TOTAL</b>	<b>274</b>	<b>6,064</b>	<b>33,200</b>	<b>79,438</b>	<b>120,864</b>

Clearly, it did not take long into the war for the British generals to figure out that machine guns had changed *how* wars were fought, and to frantically ramp up production to meet the need.<sup>26</sup>

Many casualties were caused by machine guns—Lloyd George, the British War Secretary during WWI, estimated that 80% of their casualties were caused by machine guns (Ellis 1975, 142). Finally, after decades and tens of thousands dead, the generals recognized the technological revolution brought about by the Gatling.

### *Lessons Learned*

U.S. Army generals—and others worldwide—clearly failed to comprehend the sea change marked by the arrival of the Gatling. While occasionally individuals at the operational level—such as John Henry Parker—did their best to convince higher headquarters, the message was either never heard or disregarded. Below are some lessons from the history of the Gatling which perhaps will help large organizations better recognize and react to significant technologies in the future.

<sup>25</sup> U.S. Congress declared war in 1917, the war ended in 1918.

<sup>26</sup> Note that in 1918 more machine guns were produced than in all the previous years combined.

*Failure to recognize a paradigm shift and subsequently failing to quickly capitalize on the possibilities.*

Armstrong posits the reason so few military leaders recognized the potential of the machine gun prior to 1900—despite their successes against primitive peoples—was due to the conclusion from the Franco-Prussian War: that machine guns were not practical as an offensive weapon except when enemy artillery was inferior (1982, 65 and Note 44). This conclusion failed to properly analyze the shortcomings of the French *mitrailleuses* and the underlying reasons for their failure. In addition, machine guns were not considered proper civilized arms in the day of cavalry charges and the heroism of the infantry soldier.<sup>27</sup> Even by the Battle of the Somme in July 1916—two years after the war started—the generals had still not learned that machine guns had changed the nature of war, and hence sent waves of troops across the deadly ground toward the German machine gun emplacements.

*Bureaucratic decision making by generals far from the front lines rather than in concert with the war-fighters—exacerbated by the fiscal constraints preventing the adoption of critical new technology.*

By and large in the U.S. Army of the late 19th century, bureaucrats were allowed free rein in their departments, and were seldom accountable for their decisions and actions. Clearly, General Ripley was responsible for a three year delay in the adoption of machine guns (and the Gatling in particular) into the U.S. Army. Even into the Reconstruction period, dwindling funding levels and an inability to readily procure Gatlings and ammunition for practice resulted

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<sup>27</sup> “It must be accepted as a principle that the rifle, as effective as it is, cannot replace the effect produced by the speed of the horse, the magnetism of the charge, and the terror of cold steel.” From the 1907 British Cavalry Training Manual, as quoted by Ellis (1975, 55).

in poorly trained troops and a lack of tactics (NA, RG 156, document #3397, Major H. C. Cook to Assistant Adjutant General, Department of the Missouri, November 13, 1889). During the Spanish-American War, Parker lists many of his difficulties in cutting through red tape to even get the Gatling Detachment the equipment and supplies necessary.

*No dedicated organization with the ability to affect policy, influence funding priorities, and develop tactics for new technologies.*

No single organization within the U.S. Army had the right level of support and capability to actively mediate between the operational and strategic levels. Thus, policy development was ad hoc, funding was not integrated across the Army, and tactics were invented during battle if at all. Lieutenant Parker even brags “the American Regular makes tactics as he needs them” (1898, Chapter 1, paragraph 5) and demonstrated such, but preparing for battle in advance often results in fewer casualties and a better chance of victory. The operational units seemed to have little impact on the headquarters organizations, which resulted in significant shortcomings in strategic thought. If a small, separate unit had been set up which actively advocated for the front-line warfighters, that may have resulted in earlier realization of the Gatling’s potential.

*Military requirements should drive technological development, and the development of new war-making technology should have full military involvement.*

The 1866 Gatling would’ve been a much better weapon if Lieutenant Maclay had been involved in its design and manufacture from the beginning, rather than listing caveats to the utility of the final product. When requirements work in close concert with development, and the processes for adoption and integration of new technology are properly in place, there is much

greater opportunity for a successful development and fielding—with appropriate tactics and training. The Gatling is, at the very least, a counter-example for procuring without appropriate planning.

*Train for the next war, not the war just past.*

While it's an old cliché, history continues to underscore its validity: militaries prepare themselves to win the last big engagement, not the engagement about to come. The Civil War did not prepare the U.S. Army for the Spanish-American War, and the Spanish-American War did not prepare the U.S. for World War I.<sup>28</sup> The case can be made that Operation Enduring Freedom in Afghanistan succeeded only because of the professionalism and capability of the U.S. warfighters—not because they already had the training and knowledge to operate fully at night. The NVGs were readily integrated into operations, and there were few mishaps caused by the manner of adoption, but arguably this was a case of luck and shouldn't be a template for future implementation of new technologies.

### *Conclusion*

A review of the lessons from the Gatling gun indicates most remain unlearned. While in 1997 AMC established the Air Mobility Warfare Center (AMWC) as a center of excellence for tactical development, until 2003 they were relegated to back-of-the-closet status.<sup>29</sup> AMC's generals were finally able to recognize the paradigm shift to night operations collectively ignored

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<sup>28</sup> The Civil War was an all-out internal struggle across the U.S.; the Spanish-American War was essentially the invasion of a small island, with the defenders cut off from their supply chains. It can be easily argued that no country was well-prepared for World War I.

<sup>29</sup> The AMC Director of Operations released a message in 2003 stating that tactics, rather than standardization/evaluation, would thenceforth drive AMC operations.

for over a decade, and capitalize on the advantage, but only because the enemy was slow and lacked the U.S.' resources and professional warriors.

Bureaucrats far from recent unit-level experience still make the decisions, often marginalizing requirements of the personnel on the front lines, and the all-important budgets are ponderous, thundering beasts seldom put to immediate use. Finally, the long lead times and deadening bureaucracy has led to commercial-derivatives fiascos<sup>30</sup> in an attempt to circumvent the organization itself.

While certainly the U.S. military does it better than anyone, and has demonstrated that ability for many years, it could also do so much better if only the lessons of the Gatling could be learned—and stay learned.

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<sup>30</sup> The KC-767 tanker lease and the C-130J leap to mind as topics for future papers.

## Bibliography

- Armstrong, David A. 1982. *Bullets and Bureaucrats: The Machine Gun and the United States Army, 1861-1916*. Westport: Greenwood Press.
- Ellis, John. 1975. *The Social History of the Machine Gun*. Baltimore: The Johns Hopkins University Press.
- Jamieson, Perry D. 1994. *Crossing the Deadly Ground: United States Army Tactics, 1865-1899*. Tuscaloosa: The University of Alabama Press.
- McNeill, William H. 1982. *The Pursuit of Power*. Chicago: The University of Chicago Press.
- National Archives, Record Group 156.
- Parker, John Henry. 1898. *The Gatlings at Santiago (With a Few Unvarnished Truths about that Expedition)*. Kansas City, MO. Also available as an eBook at <http://www.authorama.com/gatlings-at-santiago-1.html>.
- Smith, Anthony. 2002. *Machine Gun: The Story of the Men and the Weapon that Changed the Face of War*. New York: St Martin's Press.
- United States War Department. 1899. *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*. Washington, DC: Government Printing Office. Also available digitally at <https://www.ehistory.com> or at Cornell University Library's *Making of America* website <http://cdl.library.cornell.edu/moa/>.
- Van Creveld, Martin. 1991. *Technology and War: From 2000 B.C. to the Present*. New York: The Free Press.
- Wahl, P. and D. R. Toppel. 1966. *The Gatling Gun*. London: Herbert Jenkins.