

“THANKS TO GOD AND
LIEUTENANT GENERAL SHERMAN’:
THE UNITED STATES ARMY
IN THE BREECHLOADER ERA, 1864-1892”

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CHAPTER I

INTRODUCTION: THE BREECHLOADER AND CONSERVATISM, 1841-1892

The decades following the American Civil War were a time of change for the United States Army, as it attempted to reequip itself and readjust to peacetime after four years of bloody conflict. During this time, the nations of Europe, inspired by Prussia's success with its famous Dreyse *Zundnadelgewehr* or "needle-gun," the world's first standard issue breech-loading infantry rifle, in the Second Schleswig War of 1864, also struggled to retool their militaries. David A. Armstrong, in *Bullets and Bureaucrats: The Machine Gun and the United States Army, 1861-1916*, attributes what he labels as conservatism in the United States Army to budgetary restrictions imposed by Congress. Certainly, lack of funds inhibited the army's progress and restricted its ability to test and procure new weapons, but the army itself attempted to do just that. Rather than create requirements based primarily on economics, the army always was concerned about battlefield reliability and ease of manufacture, as well as giving its numerically weak force the greatest amount of firepower. Armstrong argues that the army's money woes made the Ordnance Department "conservative" and "cost-conscious," but also notes that the army ordered one hundred experimental Gatling guns at a time when "No major European power had yet evinced more than a passing interest in machine guns, "

demonstrating that ordnance officers were concerned with equipping the army with modern weaponry.¹ The United States Army when viewed as a contemporary of European powers from 1865-1884 was not conservative, as it examined rifles, machine-guns, and new types of artillery for the entire time period, and attempted to create new tactical doctrines to employ them. In addition, the army paid close attention to the wars fought in Europe and the ideas created by other powers. Congress hampered its ability to rearm and conduct extensive testing, but in reality, the army was on par with Britain, Prussia/Germany, France, Russia, Austria, and Italy. It only lagged behind in magazine rifles at a time when many of the European powers adopted ad hoc, temporary designs.

As nations tested new equipment, their generals reflected on the experience in the military conflicts of the era, namely the Schleswig War, American Civil War, Austro-Prussian War, Franco-Prussian War, and Russo-Turkish War, in an attempt to adopt the best equipment available. Due to its failure to adopt a magazine rifle before 1892, its inability to create a workable doctrine embracing the machine-gun, and its usage of a single style of breech-loading rifle for almost thirty years many historians describe the United States Army during this time as a conservative military power. It spent comparatively little, settled on a breechloader converted from a musket and fabricated new examples of the “trapdoor” Springfield as its primary infantry rifle. Meanwhile, the Ordnance Department refused to adopt new magazine weapons – all the while having access to civilian-issue patterns or designs used during the Civil War.

Historians have generally concentrated their scholarship on the American Army in the period 1865-1892 on the three main conflicts fought during this time. The first

¹ David A. Armstrong, *Bullets and Bureaucrats: The Machine Gun and the United States Army, 1861-1916* (Westport, CT: Greenwood Press, 1982), 46.

examines the United States Army as a constabulary force fighting Indians on the frontier. The second examines the aspect of the imperialistic wars fought in Cuba and the Philippines at the dawn of the twentieth century. Finally, new works examine the preparedness of the army in both of these conflicts in comparison with its performance in the Punitive Expedition and the First World War. Collectively, these works, while insightful and generally authoritative on the specialized subjects they cover, fail to compare the supposed “conservatism” of the United States Army to that of other military powers during the era. The United States used breech-loading and magazine rifles in combat, although not as standard issue, before most European powers adopted such weapons. The army procured and deployed workable machine-guns well before European nations.

When examined as a contemporary of Europe, the evidence demonstrates that while the breechloader was the preferred weapon for a continental-style army, between the years 1864 and 1884, the American Army was not conservative and remained on a competitive plane, at least technologically, with the armies of Europe. After the Russo-Turkish War of 1877-1878 gave an impetus to militaries to rearm with magazine guns and after Europe began to do so in 1884, the American Army adopted a conservative stance and sought to cling to an outdated weapon. The United States Army’s Ordnance Department understood the revolutionary nature of the breech-loading rifle and carbine and despite indecisiveness in choosing a rifle system fabricated thousands of test examples to train and equip the army with a new weapon. Due to a lack of doctrine and worldwide slowness in immediately rearming with the new weapons, the department failed to realize the changed nature of warfare the necessity to rearm with a weapon that

took advantage of the new capabilities of a fast-firing repeater.

Conservatism, as defined in this work, is a term that denotes a reluctance to adopt or implement technologies or doctrines already proven and adopted by major military powers. While the traditional definition of the word usually involves a preoccupation with economic interests, cost consciousness, as explained by David Armstrong, is not synonymous with conservatism. The United States Army in the decades after the Civil War had a limited budget. Even with severely reduced funds, it nevertheless sought to develop and adopt a rifle that was the equal of those used in Europe. It requisitioned funds to procure and test service rifles against those used in foreign armies. Even before Europe gave thought to their adoption, the cash-strapped American Army purchased machine-guns and began testing them. After adopting the .45-caliber Springfield rifle in 1873, the army continually tried to improve it, while testing magazine rifles.

The army's continued reliance on items produced during the Civil War does not constitute conservatism. Robert M. Utley in *Frontier Regulars: The United States Army and the Indian, 1866-1891*, advances such an argument, in part, because it took fifteen years to sell off or use the items, and because new adoptions generally started out as improvements of Civil-War era equipment.² The War Department sold off many of the goods, and sought only to make the best use of what was already available. Using equipment and not wasting it is not conservatism. The army had a large number of muskets left in arsenals after the war and it was not until the 1870s before the government

² Robert M. Utley, *Frontier Regulars: The United States Army and the Indian, 1866-1891* (Lincoln: University of Nebraska Press, 1973), 69.

disposed of all of the rifle muskets.³ The army needed to make use of these muskets to gain a breech-loading rifle quickly. The army initially wanted to have a system to convert muzzle-loading muskets into breechloaders, but by 1868, five years before the army made its final decision on a weapons system, the breech-loading rifles fabricated at Springfield Armory, while based on conversions, featured new-made barrels, breeches, and stocks, indicating that the army no longer required a conversion of older weapons.⁴ Thus, the argument that because the United States adopted the “trapdoor” rifle designed by Erskine S. Allin to convert most of the old muskets, and save money, is incorrect, as only about 57,000 muskets were so converted at a time when the Ordnance Department sold off 1,340,000 muskets of all types.⁵ While many stocks of Civil War-era gear, as Utley notes, took time to issue, this fact is not necessarily an indicator of conservatism. An army may adopt new types of haversacks or canteens, but they do the same job as older patterns, only marginally better. Certainly new patterns *could* be adopted, but in a cash-strapped post-war army, the nation and the soldiers were better served by that money going into new arms, machine-guns, artillery, and other improvements, as opposed to adopting new items of secondary importance.

Historian Earl J. Hess in *The Rifle Musket in Civil War Combat: Reality and Myth* is quite harsh in his assessment of the post-war army. He argues that the army became conservative, and fell behind European powers during the international arms race

³ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1870* (Washington, DC: Government Printing Office, 1870), 8.

⁴ Richard A. Hosmer, *The .58- and .50-caliber Rifles and Carbines of the Springfield Armory, 1865-1872* (Tustin, CA: North Cape Publications, 2006), 54.

⁵ Hosmer, *The .58- and .50-Caliber Rifles and Carbines of the Springfield Armory, 1865-1872*, 6, 27; Ordnance Department, *Report of the Chief of Ordnance 1870*, 8.

following the Danish War and the American Civil War.⁶ True, the army did fall behind with the adoption of magazine rifles and smokeless weapons during the 1880s and 1890s; that argument is not in dispute. The army did not fall behind during the era of the breechloader, as ordnance officials regularly tested the Springfield against its European competitors. During the period of the breechloader, the Springfield served adequately and was not inferior to the weapons then in use in Europe. While some of the rifle designs in use in Europe, specifically the Mauser and the Beaumont, utilized bolt actions similar to what would endure well after the period, armies discarded those rifles about the same time as the United States did the Springfield.

Chapter Two, “*Zundnadelgewehr* and *Mitrailleuse*: Europe in the Breechloader Era, 1841-1877,” examines the armies of Britain, France, Prussia, Italy, Austria, Switzerland, and Russia and their attempts to incorporate machine-guns, breechloaders, and magazine weapons in their armies between the adoption of the Prussian *Zundnadelgewehr* or needle-gun in 1841 and the beginning of the Russo-Turkish War in 1877. Some, like Austria or Italy, acted slower than the United States, others about as quickly, while Switzerland in 1869 became the first power to adopt as standard issue a magazine rifle, the Vetterli. This section examines the role of the needle-gun, its combat performance in the Austro-Prussian and Franco-Prussian Wars, and its impact on breechloader development. The work also examines French machine-guns or *mitrailleuses* in combat and how they failed to cause a significant shift in military tactics. Against this backdrop, the actions of the United States may seem indecisive or slow, but certainly not conservative.

⁶ Earl J. Hess, *The Rifle Musket in Civil War Combat: Reality and Myth* (Lawrence: University Press of Kansas, 2008), 218.

Chapter Three, “‘Better Than the Much-Vaunted Prussian Needle-Gun’: The American Army’s Search For a Rifle, 1864-1869” analyzes the United States Army and its attempts to standardize on a rifle from 1864 when the United States Patent Office demanded a breechloader through Springfield Armory’s production of a rifle that was no longer a conversion of a rifle musket. This section explores the army’s use of a breech-loading rifle during the Civil War, its goals in the immediate post-war period, and the steps that General Alexander B. Dyer took to help refine the rifle designed by master armorer Erskine S. Allin of Springfield Armory. This chapter details the 1866 Hancock Arms Board, the Paris Universal Exposition of 1867, and the effects of the Austro-Prussian War on American policy. The focus on this chapter will be the army’s attempts to evaluate, test, and equip itself with a breechloader, without merely accepting what the national armory produced and rejecting weapons that did not meet the needs of its infantry and cavalry.

Chapter Four, “The Icon of Conservatism: The Adoption of the Model 1873 Springfield, 1869-1875” examines the effects of the arms boards of 1870 and 1872-1873, and the events leading up to the adoption of a reduced cartridge, a new rifle, and the effects of the Franco-Prussian War on American military policy. Against these European events, improvements continued within the army, as the army was unwilling to use the exact same pattern of weapon without improvement. While the United States Army standardized on the rifle produced at the national armory, events later demonstrated that the design was sound and competitive with European weapons. These tests pitted the rifle systems long favored by army officers since the Civil War against those used in Europe at the time. While not all American systems fared as well as others, the United States

Army had specific complaints of defects with European arms, which, as opposed to conservatism, demonstrated forward thinking as within five years of the 1870 board most of the European nations replaced the patterns of arms they were using. This chapter also demonstrates that the commanding generals saw the American Army as a traditional European style force and events in the Franco-Prussian War showed that they were keen to see how their troops, guns, and equipment would perform in a traditional battle and against a European army.

Chapter Five, “As Effective as Forty Springfields: Machine-Guns and Magazine Rifles, 1865-1878” examines the development of machine-guns and the testing of magazine-fed weapons in the United States Army from the adoption of the first Gatling Guns in 1865 to the close of the Russo-Turkish War of 1878. While the United States Army, like Europe, did not understand how to employ the weapons effectively, the fact remains that the supposedly conservative Americans adopted these new weapons before their European counterparts. This chapter also discusses the problems of ammunition supply, which figured prominently in European resistance to machine-gun technology during the 1870s.

Chapter Six, “‘Considered a More Serviceable Gun’: The Springfield and European Arms, 1875-1885” investigates comparisons of the .45-caliber Springfield with European arms, American improvements to the rifle, and the performance of European weapons from the general issue of the Springfield in 1875 to the British battle of Abu Klea in the Sudan in 1885. The Springfield, despite having an older-looking design, was just as good as the British Martini-Henry, and according to at least one British observer was better than the European rifle because it was simple and of stronger construction. In

the comparison between the Springfield and the Martini-Henry, evidence reveals that faulty ammunition was to blame for most of the weapons' deficiencies. The chapter also deals with the attempts by the American Army to create a Springfield with a permanently attached integral bayonet, which met mostly with failure but the Ordnance Department produced it anyway, signaling the beginning of a conservative trend and a refusal to abandon poor concepts.

Chapter Seven, "Conclusion: End of an Era and the Beginning of Conservatism, 1885-1892" examines the army's transformation towards a conservative power from the period following the general adoption of magazine rifles in Europe, beginning with the German 1871/84 Mauser in 1884, until the United States's adoption of a magazine rifle in 1892. The army loved its Springfield, and the new Chief of Ordnance, General Stephen V. Benét, did not want to expend a large amount of resources on new types of rifles, and these sentiments caused the army to be slow in adopting new technologies after European armies had done so in the 1880s. As these weapons did not have a rate of fire significantly higher than the breechloader, many in the American Army wanted to create a smokeless version of the venerable rifle. Finally, the army designed the smokeless magazine rifle finally adopted in 1892 so carefully around army doctrine of the 1870s and 1880s that it, in effect, was no more than a single-loader with a magazine. This section endeavors to understand why the army that had demonstrated such foresight and a lack of conservatism for twenty-eight years regarding new rifles was unable to grasp the new improvements of the late 1880s.

The genesis of this project lay in the reading of Isabel V. Hull's *Absolute Destruction: Military Culture and the Practices of War in Imperial Germany*, and it is

perhaps ironic that a study of the United States Army and its attempt to acquire an effective rifle began with a book about European military history. In discussing how European armies shared more similarities than differences, Hull noticed that they studied each other, observed each other's wars, and officers published in foreign military journals and that officers in one army read another force's work.⁷ Similarly, although not mentioned in her work, European armies also expressed interest, to varying degrees, in the United States Army, and sent observers to report on the American Civil War. If Europe expressed interest in the United States, and examination of militaries was a common practice, then it only makes sense that the United States, during the period of rapid modernization of the latter quarter of the nineteenth century, would do the same and study the developments of Europe. Following the American Civil War, the United States Army regularly examined military developments in Europe, especially the Austro-Prussian, Franco-Prussian, and Russo-Turkish Wars. During this period, the army sought to adopt technologies that were superior to those in Europe, and abandon the previous notions of adopting European technologies and tactics for the sake of them being European. At this time, the United States Army strove to be a European-style army, while incorporating American-made improvements and forging its own style of fighting force.

The United States Army was not a conservative power at the beginning of the breechloader era. It embraced change, and began breech-loading testing before many European nations, and the weapon adopted was equal to the rifles of Europe. When under a new Chief of Ordnance, instead of issuing masses of prototypes for field trials, the Ordnance Department lagged behind and refused to adopt a magazine rifle speedily. The

⁷ Isabel V. Hull, *Absolute Destruction: Military Culture and the Practices of War in Imperial Germany* (Ithaca: Cornell University Press, 2005), 98-99.

department was not as sluggish in the pushing of a Springfield rifle with an integral bayonet. While the United States was conservative with magazine arms after 1884, from 1865 until 1884 it demonstrated a lack of conservatism with regard to the breechloader.

CHAPTER II

ZUNDNADELGEWEHR AND MITRAILLEUSE: EUROPE IN THE BREECHLOADER ERA, 1841-1877

Though the smell of gunpowder, the loud rapping of rifles and muskets firing, and the glint of bayonets remained the same, the Second Schleswig War of 1864, the Austro-Prussian War of 1866, and the Franco-Prussian War that followed four years later ushered in two new devices of military warfare. The success of the Dreyse Needle Gun, or as the Prussians named it *Zundnadelgewehr*, in the 1864 and 1866 wars demonstrated conclusively the superiority of breech-loading firearms, while the French conflict allowed generals to continue to refine the tactics of their employment, and demonstrated the effect of the new machine-gun, which armies did not adopt as rapidly as the breechloader. About the time of the close of the American Civil War, most of the world's major militaries began adopting breech-loading firearms and experimenting with machine-guns. In Germany, the military loved the success of the *Zundnadelgewehr*, and the rapid defeat of the French caused the major armies to abandon Napoleonic infantry tactics. The adoption and standard issue of the rifle musket did not dramatically affect infantry tactics,

as the American Civil War demonstrated, but a quick firing breechloader and rapid-fire machine-guns caused all of the major militaries in the 1870s to create new doctrines and examine the lessons of the Wars of German Unification.¹

Prussia adopted the breech-loading rifle as standard issue in the 1840s, but because soldiers did not carry the weapon in combat until 1864, the majority of the world's militaries, including the United States, ignored the concept, although they experimented with some breechloaders of their own. Once the weapon allowed the Prussians to win a quick, decisive campaign against the Danes, and later the Austrians, many armies quickly sought breech-loading rifles of their own. The three wars launched by Otto von Bismarck, and the *Zundnadelgewehr* that his Prussian troops carried into battle ushered in a transformation of military thinking, tactics, and technology in Europe and overseas.

The Prussian army adopted the breech-loading Dreyse *Zundnadelgewehr* in 1840, and the weapon went into production the following year at a time when most militaries were still in the process of changing over from the flintlock muzzleloader to the percussion muzzle-loading musket.² This weapon offered a greater rapidity of fire over a muzzle-loading musket. While the Prussians and others praised its effect in battle, the weapon initially did not cause a change in military tactics. Infantrymen in the American Civil War of 1861-1865, which occurred concurrently with Bismarck's wars, fought with

¹ Charles Chesney, *Observations on the Past and Present State of Firearms and on the Probable Effects in War of the New Musket* (London: Longman, Brown, Green, and Longmans, 1852), 270. This work will attempt to preserve the naming patterns given to weapons by their respective armies. For example, the French Chassepot rifle will be called *Modèle 1866 Chassepot*, not *Modèle 1866*; likewise, the Dreyse *Zundnadelgewehr* will more often than not be referred to as the Prussian *Zundnadelgewehr*, although it and needle-gun are used interchangeably; also European style machine-guns are called *mitrailleuses*, as they were named after the French pattern Reyffe and Montigny *mitrailleuses*.

² G. L. M. Strauss, *Men Who Have Made the New German Empire: A Series of Brief Biographical Sketches Volume II* (London: Tinsley Brothers, 1875), 326.

muzzle-loading rifle muskets made in the United States, Britain, Austria, as well as antiquated smoothbore muskets, all the while using old Napoleonic infantry tactics.

The case of the Dreyse rifle highlights the two key items of resistance in improvements in weapons and tactics among militaries of the era. First, the Dreyse system did not actually see large-scale combat until the Austro-Prussian War, and because it was such a radical departure from conventional military weaponry, it was difficult even for the Prussians to accept such a radical design when Dreyse first showed the weapon to the army in 1835.³ Second, during this period most of the larger powers hated the idea of adopting foreign weaponry, preferring to wait until a native-born subject developed a suitable counterpart. In 1827, Dreyse had perfected the *Zundnadelgewehr* concept, and, although the weapon was still a muzzleloader, it was well ahead of the flintlocks then in use. Prussia refused to consider the weapon, and when Dreyse appealed to the Austrian government, they informed him “there was no lack of clever men in Austria!”⁴ Due to the Austrians failure to procure the weapon, and the Prussian government’s adoption of the rifle in 1840, the Austrians were at the same severe disadvantage in 1866 as the Danes were in 1864. The importance of the *Zundnadelgewehr* in the wars that created the modern German state, as well as its demonstration of the breech-loading rifle, cannot be underestimated. G. L. M. Strauss stated in his biography of men who shaped Germany “had he [the minister who refused Dreyse] accordingly tried his hardest to secure the ingenious inventor for Austria!... many things might be different... the new German empire might still remain a bright dream in

³ Strauss, *New German Empire*, 325.

⁴ *Ibid.*, 324.

the pondering brains of German patriots!”⁵ In addition to the *Zundnadelgewehr*'s effect in Germany, its performance in the Wars of German Unification proved to be the catalyst that caused industrial powers to cast off the old muzzle-loading musket.⁶

Prussia's army was the most revolutionary of the era, and other nations failed to adopt the novel firearm and slowly began changing to percussion muskets in the 1840s.⁷ Despite the fact that something new was available, the failure to follow the path of Prussia in 1840 does not make these nations conservative. The Dreyse *Zundnadelgewehr* was untested in combat, and, even in peacetime, the primary arsenal delivered only 300,000 weapons by 1863, a rate of only 12,500 per year, insufficient to reequip an army rapidly. Because the weapons continued to use paper cartridges, there was no way to seal off the breech of the rifle when the needle-shaped firing pin detonated the primer contained in the middle of the cartridge. The result was that some of the gas produced by the exploding gunpowder vented back into the shooter's face, often injuring them.⁸ This flaw led W. C. Dodge, examiner at the United States Patent Office, in a treatise examining various breech-loading designs, to proclaim that the revolutionary *Zundnadelgewehr* was “confessedly the most imperfect of all breechloaders.”⁹ Certainly, the weapon was not without flaws, and the Franco-Prussian War demonstrated its weaknesses, but its initial advantages were its rate of fire, accuracy, and the ability of a

⁵ Ibid.

⁶ “The Military Armaments of the Five Great Powers,” *The Eclectic Magazine of Foreign Literature, Science, and Art* 12 (January 1868), 73.

⁷ Louis Panot, “A Treatise on Small Arms, Part One,” *The United Service Magazine* 69 (June 1852), 262.

⁸ Henry Smith Williams and Edward Hunting Williams, *Modern Warfare* (New York: Hearst's International Library Company, 1915), 80.

⁹ W. C. Dodge, *Breech-Loaders Versus Muzzle-Loaders, or How to Strengthen Our Army and Crush the Rebellion With a Saving of Life and Treasure* (Washington, DC: Ed. A. Stephens, 1864), 10.

soldier to load and fire while prone, an advantage not shared by enemies with muskets.¹⁰

The Austrians were perhaps the most resistant to the *Zundnadelgewehr* concept. They complained that the needle was weak and likely to break, the gas problems made the weapon unsafe, and that the rifle had poor accuracy. They also argued that a high rate of fire encouraged soldiers to waste ammunition, a complaint echoed even more fervently once militaries began to debate the validity of the magazine-rifle concept in the late 1870s. Further, while innovative, Austria claimed that many of the *Zundnadelgewehre* were of poor manufacture, and used these excuses to justify the continued use of muzzle-loading weapons.¹¹

In 1864, a Prussian army soundly beat a Danish force armed with muzzleloaders, but except for one nation, this development caused no radical change in firearms design in Europe. Only the British, keen as ever to give its army an advantage in the field, understood the lesson: that a breech-loading-rifle armed army would best an enemy equipped with a muzzleloader. In 1866, disregarding the patriotic-inspired closed-mindedness displayed by, Britain adopted a breech-loading system devised by the American inventor Jacob Snider to its trusty Pattern 1853 Enfield rifle musket (See Figures One and Two). This rifle musket served the British Empire through the Crimean War, equipped Union and Confederate troops in the American Civil War, and proved readily adaptable for conversion.¹² This conversion added a receiver and breechblock for use with a metallic cartridge, while utilizing the original lock, stock, barrel, and bands of

¹⁰ Geoffrey Wawro, *The Austro-Prussian War: Austria's War With Prussia and Italy in 1866* (New York: Cambridge University Press, 1996), 21.

¹¹ Strauss, *New German Empire*, 324.

¹² Margaret E. Wagner, Garry W. Gallagher, and Paul Finkelman ed., *The Library of Congress Civil War Desk Reference* (New York: Simon and Schuster, 2002), 515.

the musket.¹³

The British experience with their new Snider-Enfields was characteristic of Europe and demonstrated both the reluctance to adopt newer and better rifles and commitment to weapon systems that worked, and worked well. The author of an 1867 article discussed how prior to successful testing of the rifle many in the army believed it would fail, explode, or somehow prove unsatisfactory. But, by 1867, the author noted that the Snider rifle was a “complete success,” with many rifles firing well over thirty thousand rounds without incident, and without any serious accident.¹⁴ This revised statement was after the army adopted new cartridges for the weapon, as the original Boxer cartridge caused numerous catastrophic explosions in the weapons. While the design of the rifle was critical, ammunition design and a successful cartridge were just as important, and while this author saw the rifle as successful, many continued to view the Snider with skepticism.¹⁵

The author discussed that in 1867 the British army reevaluated the Snider system, to see if it was a decent breech-loading system or if a better one existed. He argued the Snider was the best system, but still needed improvement, and hoped that a better rifle would supersede the Snider eventually.¹⁶ By the late 1860s, regarding the breech-loading rifle, Britain showed a remarkable lack of conservatism in adopting the Snider so quickly after the 1864 conflict and replacing it with the iconic Martini-Henry in 1871 (See Figures Three and Four).

¹³ George Smith, ed., “Breech-Loading Rifles,” *The Cornhill Magazine* 16 (July 1867), 177.

¹⁴ *Ibid.*, 177-179.

¹⁵ Charles B. Norton and William J. Valentine, “Report on the Munitions of War,” *Paris Universal Exposition, 1867. Report of the United States Commissioners* (Washington, DC: Government Printing Office, 1868), 10.

¹⁶ Smith, “Breech-Loading Rifles,” 179.

The Dreyse *Zundnadelgewehr*'s combat debut demonstrated that breech-loading rifles were the weapons of the future, and concurrently with the Austro-Prussian War, the armies of Europe and North America sought similar weapons. Just like in Denmark, infantrymen armed with muzzleloaders stood no chance against trained troops with faster-firing repeaters. Britain and the United States began experimenting with the new style rifles before the war, but after the war, most nations conducted similar trials. Of the many experimental rifle designs, few became standard issue. The Prussians and their new rifle soundly beat the Austrians with their Lorenz rifle muskets with the result every major nation adopted a breech-loading rifle of some sort by 1870. Many, like the British Snider, the American Springfield, and the Austrian Werndl, were conversions of muzzle-loading muskets. Others, like the French *Modèle 1866 Chassepot* were improved versions of the *Zundnadelgewehr*. Some, like the Swiss Vetterli, were entirely new designs.¹⁷

The *Zundnadelgewehr* was not the first breechloader used in combat. The Sharps and Spencer rifles and carbines, along with a handful of other designs, all saw service in the American Civil War, mainly in the form of cavalry carbines where muzzle loading was too unwieldy. The Austro-Prussian War was significant in that it was the first large scale – and European – conflict that involved a breech-loading infantry rifle. Other nations had already begun to create breech-loading rifles, but the conflict provided the impetus for nations to adopt workable, reliable, and militarily adequate systems.¹⁸

The French understood the shock of the defeat of the Austrians the most, and their army rushed to perfect the Chassepot rifle. Austria was a major military power, which made its rapid defeat more surprising and made the other powers willing to examine the

¹⁷ John Walter, *The Rifle Story: An Illustrated History from 1776 to the Present Day* (London: Greenhill Books, 2006), 53-56.

¹⁸ Utley, *Frontier Regulars*, 70; Walter, *The Rifle Story*, 49.

lessons of that war. By the beginning of the war in 1870, the French had over one million Chassepot Rifles and close to two million muskets, while the Prussians had more *Zundnadelgewehre* (almost 1,097,000) but no muskets to supplement their arsenal. More importantly, the French had machine-guns, the deadly *mitrailleuse*, patterned after the American Gatling gun.¹⁹ The Franco-Prussian War showed that the breech-loading rifle was a permanent fixture of military doctrine, and that the machine-gun was a deadly weapon that still needed a solid tactic of employment.

The French lost the war, in part because of their Chassepots. They were rush developments to counter the new Prussian threats, and had not been tested in strenuous circumstances. In an effort to seal the breech end of the weapon, they employed a rubber washer that expanded on firing. These washers quickly lost their seal after firing several rounds, rendering the weapon unusable without hazard to the soldier. The Dreyse was still not completely safe for the soldier carrying it, but it was at least reliable compared to the Chassepot.²⁰ When properly cared for, however, the rubber rings kept the Chassepot from venting gas into the shooter's face like the *Zundnadelgewehr*.²¹

Historian Geoffrey Wawro has a different opinion on the Chassepot, exalting its successes and abilities over its disadvantageous. The Chassepot had a greater range than the *Zundnadelgewehr*, allowing French soldiers to fire into Prussian lines well before the latter could respond with their weapons. Certainly, as he argues, a soldier with a Chassepot "could" hit a target at twelve hundred yards, but post-war examinations, especially from Britain, cast doubt on the actually real effect of such shooting, instead

¹⁹ Walter, *The Rifle Story*, 50.

²⁰ *Ibid.*, 55.

²¹ Geoffrey Wawro, *The Franco-Prussian War: The German Conquest of France, 1870-71* (New York: Cambridge University Press, 2003), 52-53.

suggesting such firing had an effect solely on morale.²²

The British, during and after the Franco-Prussian War, were dismissive of the capabilities of the Chassepot. W. W. Greener, a British gun maker and firearms expert, wrote a treatise on breech-loading weapons during the nineteenth century.²³ He argued that the Chassepot was a horribly inaccurate weapon, with far worse accuracy than the British Snider and the early Martini-Henry, describing the French adoption of the Chassepot as “a mistake.”²⁴ Indeed, three years after the war the French abandoned the Chassepot and its paper cartridge and adopted the Gras conversion that converted the rifle into a metallic-cartridge weapon. The firearm featured new production models, the *Modèle* 1874 rifle as well as the *Modèle* 1866-74 conversion of the Chassepot.²⁵

Franco-Prussian War was also the last action for the weapon that changed military tactics in the mid-nineteenth century. The fragile needle firing pin of the *Zundnadelgewehr* tended to break after firing just one hundred rounds, making the weapon accurate but not durable. The Prussians liked the concept of a stronger, more durable firing mechanism, as displayed by the Chassepot, and two new gun inventors, Peter and Wilhelm Mauser, designed a rifle that featured a self-cocking bolt with a more reliable firing pin. The new German army adopted this weapon as the *Infanterie Gewehr* 1871 Mauser, which also featured a smaller caliber and longer range compared to the old needle gun.²⁶

²² Wawro, *The Franco-Prussian War*, 55-56.

²³ G. T. Teasdale-Buckell, *Experts on Guns and Shooting* (London: Sampson Low, Marston, and Company, 1900), 375.

²⁴ W. W. Greener, *Modern Breech-Loaders: Sporting and Military* (London: Cassel, Petter, and Galpin, 1871), 225-226.

²⁵ Cecil James East, *The Armed Strength of France* (London: Her Majesty's Stationary Office, 1877), 145-147.

²⁶ Byron Farwell, *The Illustrated Encyclopedia of Nineteenth-Century Land Warfare: An Illustrated World View* (New York: W. W. Norton, 2001), 264. To avoid confusion, it should be noted that while the

While it took two decades for major armies to not only adopt machine-guns but also to create workable doctrines for them, the Franco-Prussian War demonstrated that a modern army had to have a breech-loading rifle. Beyond a simple breechloader, the rifle had to be accurate, safe, and have a decent rate of fire; the equipment was not the only result of the war, however. The French continued to use their famous massed column attack, a leftover from the days of Napoleon Bonaparte. The result was that Prussian soldiers, taking quick but steady aim inflicted horrendous casualties on the close-ordered French soldiers. Of all of the many attacks French troops launched on Prussian formations, none succeeded due to the effect of Prussian fire.²⁷ Such a lesson demonstrated that because the weapons had changed, infantry, artillery, and cavalry tactics all reexamination and updating.

In the decade that followed the Franco-Prussian War, all of the major militaries, including the United States, began to reorganize their army and examine the lessons of the conflict. Armies still credited the Germans as being the catalyst for reforms, and every power, to some degree, began to change and adopt new technologies based on the Prussian system. Charles Vincent's 1875 lecture focused on the European armies in peacetime, and as a survey of their reforms, he also clearly indicated that the German army and its performance in France in 1870 enthralled all of Europe.²⁸

While the lessons of the war of 1870 were the foundations for military reform in the following decade, nations closely watched each other, seeing how they incorporated

inventors were the same, this weapon had few similarities with the now iconic *Infanterie Gewehr* 1898 or *Karabiner* 98k Mausers that Germany used during the World Wars, as it still fired black-powder cartridges and possessed no magazine, being a single-shot rifle with a split bridge receiver. The latter two weapons were smokeless repeaters with five-round magazines. Stephen Bull, *Encyclopedia of Military Technology and Innovation* (Westport, CT: Greenwood Press, 2004), 166-167.

²⁷ Joseph C. Arnold, "French Tactical Doctrine 1870-1914," *Military Affairs* 42 (April 1978), 61.

²⁸ Charles E. Howard Vincent, "The Armed Strength of Europe: Special Lecture, Friday, June 18th, 1875," *Bristol Selected Pamphlets*, 1875, 555.

the lessons of the conflict or if some new invention became paramount. Gone was the reluctance and timidity as expressed by Austria over the *Zundnadelgewehr*. Russia, whose army was among the largest of Europe was “eagerly watched by ourselves, by all of Europe” according to Vincent.²⁹ His lecture focused primarily on the strengths of European armies, how they gained recruits or conscripts, as well as how quickly they mobilized reserves and marched against a power, as well as technological developments and acquisitions of new weaponry. The top of his list was Germany, followed by Austria, Russia, France, and Italy. He classified England as having a “2nd Class” army.³⁰ In addition, he noted that of the fifteen European armies he examined, most had adopted a breechloader by 1875, only five years after it proved its effectiveness.³¹

In the 1870s, Prince Friedrich Karl of Prussia, who commanded the Prussian Second Army in the Franco-Prussian War, wrote a treatise entitled *The Influence of Firearms Upon Tactics*, a critique of the *Zundnadelgewehr*, the Chassepot, the *mitrailleuse*, the lessons of the Franco-Prussian War, and how tactics changed because of the weapons. While much of the work was a simple history tracing the use of firearms from the flintlock musket, through the rifle, and then the breechloader, the last part focused on the lessons of the war and as tactics necessary to employ the new rifles successfully, as well as how to minimize casualties. The work also showed the optimism of the Germans, as its author coolly claimed that, with regard to the Austro-Prussian War, “The campaign of 1866 dazzled nobody in the Prussian army.” Prince Karl gave the impression that the Prussians planned for the war to last only seven weeks, and that the

²⁹ Ibid., 557.

³⁰ Ibid., 565.

³¹ Ibid., 551-554.

victory was certain.³²

Prior to the mass standardization of the rifled weapon in 1855, opposing infantry formations engaged each other at relatively close range. After the American Civil War, which had seen Napoleonic tactics, armies reevaluated the linear, close-range volley tactics. In 1870, French troops fired their Chassepots at long range, hoping to take advantage of the flatter trajectory of its bullet to not only help accuracy but also drive away enemy formations. Prince Karl noted that occasionally they did make an impact, but French riflemen largely wasted their fire, and by firing at extreme range squandered any benefits they might have gained from a quick-firing rifle.³³

Among the tactics that quickly proved unsuitable in the face of the breechloader was that of massed infantry formations. Both the Prussians and the French changed their doctrine to rely more heavily on skirmishers, as loose-formations of individual soldiers made difficult targets for quick-firing, accurate rifles and artillery.³⁴ Cavalry tactics also changed. While the introduction of the rifled weapon severely hampered any chance of success, a quick-firing breechloader made the success of a cavalry charge extremely unlikely.³⁵

Many theorists advocated the abolishment of linear tactics altogether in the aftermath of the French conflict, an idea that met with fierce resistance in Britain. Most tacticians did not deny that skirmishers became more vital with the breechloader, but conservative strategists objected fiercely to the calls that armies would be giant masses of

³² E. H. Wickham trans., *The Influence of Firearms Upon Tactics* (London: Henry S. King and Co., 1876), 127.

³³ *Ibid.*, 130.

³⁴ Wickham, *The Influence of Firearms Upon Tactics*, 132; Joseph Arnold, "French Tactical Doctrine," 61-62.

³⁵ Wickham, *The influence of Firearms Upon Tactics*, 134.

loose, difficult-to-control infantry formations. British army Lieutenant Colonel W. J. Williams decried the use of what he called “swarms of skirmishers,” arguing that “in their impatience of our old steady drill, and of our regulation of withdrawing skirmishers that we may have a steady line in front, some of our reformers are carried too far.”³⁶ Rather than accept that German skirmishers carried the day, Williams argued that it was “German regulation” that won the battle, noting that the Prussians had not attempted more skirmish-based tactics except against second-rate French units, as they beat the French regulars with more conservative tactics.³⁷

Historian Geoffrey Wawro, whose writings on the Austro-Prussian and Franco-Prussian conflicts contain negative assessments of the *Zundnadelgewehr* argues that the Prussian needle-gun was not a decisive factor in either conflict, arguing instead it was the tactics, inadequate supplies, and poor leadership of the Austrian and French armies that led to the Prussian victory. Against the Chassepot, which was a superior weapon, he argued that the German rifle could only reliably hit targets up to six hundred yards distant, while the French weapon was accurate to twelve hundred yards.³⁸ Wawro ignores the fact that the French army trained to open fire at only 875 yards, meaning that while the Chassepot did have an advantage on German weapon, it was only by 275 yards as opposed to 600. He argues the effect of the new French breechloader was so much that Prussian soldiers had an “erotic admiration” for the weapon.³⁹ The French regular troops had better equipment than the Prussians, and the famed weapon that revolutionized tactics and won the 1866 war was obsolete by 1871. Wawro concludes artillery, that is

³⁶ W. J. Williams, “On Infantry Tactics,” *Journal of the Royal United Service Institution* 16, no. 69 (1872), 768.

³⁷ *Ibid.*

³⁸ Wawro, *The Franco-Prussian War*, 56.

³⁹ *Ibid.*, 53.

quick-firing, breech-loading artillery, decided the conflict, not the Dreyse or the Chassepot.⁴⁰

After the Franco-Prussian War, tactical observers in France and abroad began to interpret the lessons of the conflict and recommend reforms. Williams argued that the infantry tactics had to be changed. He noted that the British officer received training in how to focus the fire of his men to maximum effect, but that no doctrine existed for minimizing casualties because of the withering fire of an enemy armed with breech-loading rifles. While Prince Karl argued that breechloaders allowed the infantry to open fire at longer ranges, he never commented on what the optimum range was. In 1872, the British considered “musketry range”, the range at where rifle fire could be commenced with some degree of accuracy, to be seven hundred yards.⁴¹ The French in 1869 maneuvers, firing at stationary targets, engaged in rifle training at ranges from 100 to 500 yards individually, with battalion firing at 800 meters, or almost 875 yards.⁴² While Wawro argues that the French fired at a range of twelve hundred meters in the conflict, citing the testimony of a Bavarian Lieutenant.⁴³ The rifle may have been capable of effective fire at that distance, but it is highly unlikely that the French infantry battalion drilled to fire at one range and then began a new series of tactics as soon as war began.

As the breechloader had become an accepted part of land warfare – and proved that older weapons and tactics were now obsolete, officers in European armies struggled to create reforms to address these new developments. Major Jones, who served in the

⁴⁰ Ibid., 307.

⁴¹ Williams, “On Infantry Tactics,” 771.

⁴² William G. Cordington, “Autumn Maneuvres Abroad and At Home,” *Journal of the Royal United Service Institution* 16, no. 68 (1872), 502.

⁴³ British military journals cite a range of twelve hundred yards for the Chassepot, but Geoffrey Wawro prefers the metric system, and cites the Lieutenant as claiming twelve hundred meters. Wawro, *The Franco Prussian War*, 99.

Prussian Guard, gave a paper in 1872 about changes in the Prussian drill manual. His findings were particularly surprising. He claimed that the new manual was an updated version of the 1847 manual, but the additions were small considering the perfection of breechloaders, the mass issue of rifled weapons, and the stunning defeat over Austria. The Prussians adopted the work just prior to the French war, but Major Jones noted that it contained barely anything related to recent experience over Austria in 1866.⁴⁴ The importance of Jones's work is clear, that the breechloader gave an attacking army an advantage, but armies did not need to adjust their tactics until the enemy possessed a breechloader. It also demonstrates that conservatism, at least in its classical form applied to military terminology, was endemic in all military powers of the era.

In the wake of the three European conflicts that occurred between 1864 and 1871, most countries began a rearmament program. Many adopted conversions of muskets out of economic expediency, while others began to experiment with machineguns as the French had employed them to deadly effect in the Franco-Prussian War. Among those powers, Charles Vincent noted that every power eyed Russia to see what that country would do in terms of reform; before his lecture in June of 1875, he spent time in Russia understanding their military structure and, in particular, their army and the improvement programs it began.

The Russian army needed reform in the 1870s because it, too, suffered from the conservatism that befell most of the armies of the era, but also because it still had not reorganized after the defeat in the Crimean War of the 1850s. In that war, where France primarily used the *Minié* rifle and the British the Pattern 1853 Enfield Rifle Musket,

⁴⁴ E. M. Jones, "On the Latest Changes Made by the Prussians in Their Infantry Drill-Book," *Journal of the Royal United Service Institution* 16, no. 68 (1872), 527-528.

eighty-percent of all Russian troops carried percussion smoothbore muskets, and only thirteen-percent had rifled weapons of any kind. Some even carried flintlocks into battle.⁴⁵ In the years that followed Russian officers “made exhaustive studies of native and foreign systems,” attempting to determine on a rifle system to standardize on, as the Russian army tried to rearm to be an equal of other European powers. As a defeated force, the Russian Army sought to modernize itself, adopting new, breech-loading, rifles and Gatling guns, revolvers, and modern ammunition, all by the outbreak of the Russo-Turkish War in 1877.⁴⁶

One of the reforms that Vincent noted the Russians took from the Franco-Prussian War was the issue of rifle sights and distances of firing. He noted that an infantry battalion in the Russian army included both rifle and infantry companies, although they used the same weapon. The Krinck-converted musket was the standard weapon while he was there, although the army had accepted the Berdan rifle, designed by American Hiram Berdan, for use.⁴⁷ The lesson of firepower that the Russian army learned was the same one that Strauss wrote of in 1875: that the French, by firing at long range, had wasted ammunition without achieving any significant result. Thus, the eight sharpshooters per company and the rifle companies had firearms with adjustable sights up to twelve hundred yards, while the sights of the regular infantry’s Berdans and Krnkas were limited to six hundred yards, one hundred yards less than what the British considered “musketry

⁴⁵ Guy Arnold, *Historical Dictionary of the Crimean War* (Lanham, MD: Scarecrow Press, 2002), 11; Joseph Bradley, *Guns For the Tsar: American Technology and the Small Arms Industry in Nineteenth-Century Russia* (Dekalb, IL: Northern Illinois University Press, 1990), 49-50.

⁴⁶ Bradley, *Guns For the Tsar*, 9.

⁴⁷ Charles E. Howard Vincent, “The Russian Army,” *Journal of the Royal United Service Institution* 16, no. 67 (1872), 298; *Appleton’s Annual Cyclopaedia And Register Important Events of the Year 1877 Volume XVII* (New York: D. Appleton and Company, 1878), 623.

range.”⁴⁸ Clearly, the Russians wanted their troops to save their fire until it was most effective.

While the Europeans watched the Russians to see how they reformed, no one was envious of their cavalry. Certainly, Vincent praised the Russian cavalry’s speed at mobilizing, but in armament, something that the 1870 war showed dramatically changed tactics and strategy, was deficient. He noted that, for instance, the cavalry pistol the Russian trooper carried was a model dating from 1839 – obsolescent, and one “no one would dare fire.”⁴⁹ Such a statement suggests less that the firearm design was unsafe, and more that the arms, being so old, were in a state of disrepair and that faulty maintenance, was responsible for the arm being dangerous. This anecdote demonstrated that while the Russian army was in the process of reform, much of its military equipment was horrendously outdated – each European army wanted up-to-date weapons, but in this case, the Russian cavalry carried an old, worn-out, obsolete, and possibly unsafe sidearm.

The Russians were also notable for reform because they purchased a large amount of machine-guns. The problem remained that neither they, nor any other European power, knew precisely how to classify them or how to employ them effectively. Vincent noted that Russia possessed four hundred of these *mitrailleuses*, disposed of in fifty batteries of eight each.⁵⁰ Much like Dreyse’s weapon in 1835, the machine-gun had not become an accepted weapon. Vincent argued that the Russians ordered the guns out of fear when Prussia invaded France in 1870, but by 1872, many of the older officers refused to accept them as tactically valid pieces of equipment. Such an argument occurred almost internationally, especially the United States, once again calling in to question the

⁴⁸ Vincent, “The Russian Army,” 298.

⁴⁹ *Ibid.*, 302.

⁵⁰ *Ibid.*, 306.

perceived idea of “conservatism” in many of the militaries of the world. In addition, no one in the Russian army was sure how to employ the weapons, some wanted to use them as artillery pieces while others wanted batteries scattered out to different infantry regiments or brigades. The Russians decided not to employ these guns at the company level, as having them close to the front exposed them to capture by cavalry. Despite whatever benefits having them at the point of action would have brought, keeping them safe was of prime importance.⁵¹

Much of the skepticism of machine-guns came from their actual usage in both the Franco-Prussian War and later the American Indian Wars. The Reyffe *mitrailleuse* and American Gatling Gun were both revolving guns, and both were not particularly successful. The American Army did not like the Gatling gun in Indian fighting, mainly because it, like most other nations’ machine-guns, was used as artillery. The weapon used a rifle-caliber round similar to that used in the Springfield, and because officers employed them as artillery, they had difficulty spotting the fall of shot. While use against a tightly-packed Napoleonic-style European line might have produced results, as a gunner just needed to see the line crumble, use against a dispersed and concealed enemy like Indians made observing the effects of fire difficult. The weapons had rates of fire of about 350 rounds per minute, but the weapons easily jammed, as the fouling generated by black powder was not entirely suitable for automatic weapons.⁵²

The Reyffe *mitrailleuse* was not much better. It had a limited range, only about four hundred yards, and the French used it as light artillery, and because of the short

⁵¹ John H. Parker, *Tactical Organization and Uses of Machine-guns in the Field* (Kansas City: Hudson and Kimberly Publishing Company, 1899), 15; Vincent, “The Russian Army,” 306.

⁵² Uteley, *Frontier Regulars*, 72-73.

range, it had to get in close to the action.⁵³ Such a short range is in extreme juxtaposition with the French tactic of having their infantry open fire at 875 yards, well over 475 yards past the effective range of the *Reyffe*. Such a limitation of the *mitrailleuse* meant that it was not an effective weapon and, while its usage caused modernizing nations like Russia to adopt them, once European armies began to reexamine the weapons after the Franco-Prussian War, many did not see them nearly as advantageous as previously thought. United States Army Captain John H. Parker, who commanded the Gatling Gun Detachment at San Juan Hill during the Spanish-American War, wrote a treatise on machine-gun usage and argued that when brought into action, especially at the Battle of Gravelotte, the *Reyffes* were effective in halting Prussian advances. He noted that in hindsight, commentators saw such lessons, but most military theorists argued in the 1870s that the Franco-Prussian War demonstrated the futility of machine-guns.⁵⁴ He also argued that the defeat of France by Prussia soured most of Europe on the machine-gun, because the nation that lost the war was the only one to employ them.⁵⁵ The *Zundnadelgewehr* spurred development of the breechloader because the troops carrying them won, but those gunners with *mitrailleuses* lost the war, and in doing so delayed global adoption of the weapon. The machine-guns were effective in some battles, but failed in the larger, strategic sense. Part of their failure stems from the gunners, who rather than firing against a body of men, instead aimed at a single soldier, firing upwards of thirty rounds on the solitary target, leaving little of the man behind.⁵⁶ The weapons had an impact on the morale of enemy troops, but because of their limited tactical uses, a lack

⁵³ Parker, *Tactical Organization and Uses of Machine-guns in the Field*, 14.

⁵⁴ *Ibid.*, 14-16.

⁵⁵ *Ibid.*, 22.

⁵⁶ Wawro, *The Franco-Prussian War*, 99.

of fixed doctrine, and ammunition expenditure failed to achieve a defined place in military circles.

One of the most oft-repeated arguments by European powers against breechloaders, long-range firing, and machine-guns was the difficulty of ammunition supply. Such an argument was important, as ammunition was not contained in clips or detachable magazines for rifles, and the ammunition was large, bulky, and heavy. Army transport was always a concern as was getting the ammunition to the front. For the individual soldier, he only carried a limited number of rounds, and most of them were inaccessible during a firefight. In maneuvers in 1869, a British officer observed that French infantrymen carrying *Modèle* 1866 Chassepots carried only forty rounds easily accessible in pouches, the rest resided in the soldiers' knapsacks.⁵⁷ Wawro claims that the total ammunition load out for a Russian troops in 1872 carried ninety rounds, with only thirty being accessible pouches, with sixty in the knapsack.⁵⁸ In a heavy firefight, assuming a steady fire of five-rounds per minute, the soldier would be rummaging in his knapsack within ten minutes of entering combat, leaving the front open to a steady advance by the enemy. Moreover, carrying extra rounds in the transport train was no easy matter; for example in the Russian army, the company transport wagon held forty additional rounds per man, the artillery reserves another sixty.⁵⁹ Thus, while on paper for an engagement an army might allot upwards of two-hundred rounds per man, actually supplying the soldier with more than what he carried was problematic at best.

For the new *mitrailleuses*, the problem of ammunition supply was even worse. The four hundred pieces that Russia acquired in 1872 arrived with 6,290 rounds of

⁵⁷ Cordington, "Autumn Maneuvres Abroad and At Home, 1869-1871," 498.

⁵⁸ Vincent, "The Russian Army," 298.

⁵⁹ *Ibid.*

ammunition in cases of about 24 rounds each, and a single ammo cart carrying the entire allotment served each gun. The Russian *mitrailleuse* was a ten-barrel Gatling design, and was of the same .42-caliber as the Berdan rifle. These weapons could produce a massive amount of firepower quickly, but assuming a rate of fire of twenty rounds per minute per barrel, a rate of which the British Snider-Enfield managed easily in 1867, a single day's engagement would exhaust the entire compliment of .42-caliber cartridges given to the Russian *mitrailleuse* batteries.⁶⁰ If the guns achieved the rate of fire of an American Gatling gun, or 350 rounds per minute, a Russian *mitrailleuse* would deplete the entire ammunition allotted to it in 1872 in less than twenty minutes of sustained firing.

This supposed wasteful expenditure of ammunition supply was at the heart of concern against machine-guns or magazine rifles, but commanders even scrutinized breech-loading rifles as well. Wawro reported that frenzied Prussian troops tended to “blaze away recklessly,” as only one out of every 250 *Zundnadelgewehr* rounds struck its mark.⁶¹ Such an accuracy rate was similar to that of a rifle musket, including the type then in use by the Austrians, many of which Union and Confederate troops had used in the American Civil War.⁶² American commentators, defending the adoption of breechloaders during the American Civil War, argued that because the breechloader had a rapid rate of fire, rather than wasting ammunition, the weapon gave a soldier confidence and kept him from panicking and wasting ammunition.⁶³ Whether or not soldiers panicked, the fact the weapons did fire faster than a rifle musket caused increased expenditure of ammunition. In action at Spicheren on August 6, 1870, the infantry of

⁶⁰ Ibid., 306; “Breech-loading Rifles,” 179.

⁶¹ Wawro, *The Franco-Prussian War*, 51.

⁶² Hess, *The Rifle Musket*, 116.

⁶³ Dodge, *Breech-Loaders Versus Muzzle-Loaders*, 5.

General Charles Vergé's division fired their Chassepots feverishly, firing 146,000 cartridges, which represented one-third of French daily ammunition production. If the other two divisions of the French corps at Spicheren fired amounts even close to that number on the same day, then one corps-sized battle would consume an entire day's production of ammunition.⁶⁴ French employment of a second type of rifle, the *fusil à tabatière*, a breech-loading conversion, for the *Gardes Mobile*, which utilized different ammunition, and *mitrailleuses*, meant that larger infantry battles would, by their nature, consume more ammunition than Spicheren all made French ammunition supply precarious.⁶⁵

The concern of ammunition supply, while most vocally expressed in the early 1870s as regarding French tactics with the Chassepot, were at the heart of military concern of new, modern quick firing weaponry. A breech-loading rifle let a soldier fire more quickly, even when using self-contained paper cartridges, than a soldier who had to pour powder, ram a ball, and then prime his weapon. All militaries desired a weapon with a quicker rate of fire, but until suitable methods of carrying more cartridges on the soldier's body and until transport trains could adequately handle the demand, generals within those armies remained skeptical, or at least wary of the rapid expenditure of ammunition for little gain. Further, large battles would consume ammunition at the rate seen in the Franco-Prussian War; increased use of machine-guns or magazine-fed weapons would exacerbate these problems.

For defenders of these tactics, the benefits of firing at long range and rapid fire were not to inflict casualties but "to do damage and to shake morale," which was about

⁶⁴ Wawro, *The Franco-Prussian War*, 113-115.

⁶⁵ *Ibid.*, 148.

the only effect achieved when the French executed battalion firing at a distance of eight hundred meters during maneuvers in August 1869.⁶⁶ General Sir William Cordington observed a French instructor who achieved a rate of seventeen rounds per minute with a Chassepot, which while it could damage morale when employed at a real enemy would quickly exhaust a man's ready compliment of forty rounds. Cordington quickly commented though that for the instructor to achieve the rate of fire was wholly unrealistic, the cartridges were carried in the soldier's hand and arm, a process that probably would have resulted in their loss should the method be tried in combat.⁶⁷ The greatest immediate effect of the Franco-Prussian War was to show that breech-loading rifles were from then on the standard arm of the infantry, but acceptable and effective doctrines for their employment took many years to devise.

Another lesson that the European nations took from the Franco-Prussian War was that of discipline. F. N. Maude, writing in the 1880s, noted that a company of two hundred Prussian infantry, armed with *zundnadelgewehre* broke up a charge of three thousand French cavalry. He argued that discipline and the control of fire counted for more than simply rapid fire and the stereotypical "wall of lead" against an enemy.⁶⁸ These arguments not only reinforced the breech-loading concept, but also served as a detriment to the theory of magazine rifles. It also demonstrated that cavalry became increasingly outmoded on a battlefield dominated by accurate, repeating weapons.

Though as late as 1872 armies considered long-range firing of rifles wasteful, by the end of the decade the value of such a tactic had become apparent. Later tacticians,

⁶⁶ Cordington, "Autumn Maneuvres Abroad and At Home, 1869-1871," 502.

⁶⁷ Ibid.

⁶⁸ F. N. Maude, *On Tactics and Organization: or, English Military Institutions and the Continental Systems* (London: W. Thaker and Co., 1888), 154-155.

perhaps the “younger” group of officers of which Colonel Vincent spoke of, that existed in every army, claimed by 1881 that of the lessons “taken deeply to heart by all European military powers,” the first was “the value of long-range infantry fire, by which alone the true advantages of the modern rifle are gained.”⁶⁹ So wrote Captain Walter H. James of the Royal Engineers. James was certainly an optimist, but apparently gathered different conclusions from the Franco-Prussian War than others. Rather than being of the opinion that long range fire, considered by the French to be about 800 meters or about 875 yards, was wasteful, he wrote in 1880 that armies would commence firing with infantry at ranges of two thousand yards, just over one mile, against “suitable targets,” though he did not denote what a suitable target was.⁷⁰ James is best classed as one of the younger, “radical” officers as such a tactic was clearly wishful thinking, as a man-sized target would be impossible to hit, and, by the time an enemy closed to a practical range, soldiers would expend most of their ammunition. If a soldier had forty rounds accessible, assuming a soldier fired two rounds every one hundred yards on the advance, then at a range of five hundred yards they would have only ten rounds remaining when the action was fiercest.

James was too mesmerized by the fierce sound of rifles chattering away and the terrible power they, and new breech-loading artillery, projected. He argued that instead of dislodging an enemy from his entrenched position, as armies had done for centuries, the object was to weaken their morale by firing at long ranges and with such rapidity as to increase the effect of rounds landing on target. He argued that magazine rifles, as used by Turkish forces at the battle of Plevna in 1877, demonstrated that volume of fire, not

⁶⁹ Walter H. James, “Modern Fire, Its Influence of Armament, Training, and Tactics,” *Journal of the Royal United Service Institution* 24, no. 106 (1881), 378.

⁷⁰ *Ibid.*

individual accuracy or rapidity, determined who won or lost a battle. Rather than expose men to the withering barrage of magazine fire, James argued that infantry should engage at longer ranges where the mass volume of fire was bound to do damage.⁷¹

The discussion of magazine rifles during the period of the Franco-Prussian War and the decade that followed is significant because, except for a few officers, line officers of the major military powers typically did not discuss or advocate the need for repeating arms in Europe. None of the officers seemed concerned by the fact that as their nations finally began to adopt second-generation breechloaders, that is to say, rifles that were not converted muskets, Switzerland adopted as standard issue, a magazine-fed repeating rifle for its army. The Swiss Vetterli rifle carried eleven cartridges in a tubular magazine, not unlike the American Winchester of Western fame. It was a bolt action, much like the Chassepot or *Zundnadelgewehr*, suitable as a single loader or a repeater, and used metallic cartridges.⁷² Three years later, in 1872, the Austrians adopted the Frühwirth rifle, a magazine fed repeater, but only for its *gendarme* while its regular army troops soldiered on with a breechloader.⁷³ A European army possessed a magazine rifle, while another's police force used a similar weapon, and the United States used Henry, Winchester, and Spencer magazine rifles and carbines but not primarily as standard issue. The other nations, including the United States ignored this development and discussed ways to improve the single-shot rifle.

The Swiss Vetterli in 1869 was exactly what the Prussian *Zundnadelgewehr* had

⁷¹ Ibid., 379-380.

⁷² *Appleton's Annual Cyclopaedia And Register Important Events of the Year 1889 Volume XVI* (New York: D. Appleton and Company, 1890), 746-747; "Vetterli Series," *Swiss Rifles.com*, <www.swissrifles.com/vetterli/index.html> Accessed 5 December 2009.

⁷³ "The Frühwirth Repeating Rifle," *Colburn's United Service Magazine and Naval and Military Journal* 129, (June 1872), 185.

been in 1841 – too early to cause a shift in tactics, and occurring at a time when nations were in the process of changing over outdated firearms. The armies of Europe chose to continue testing the new breechloaders they experimented with at the end of the 1860s, and ignored the Swiss rifle. Only the Italians liked the rifle as well and in 1871 adopted the Vetterli for the own use, on the condition that it *not* have a magazine (See Figures Nine, Ten, and Twelve). The Italians did not regret such an omission, until the shift towards new arms caused them to install a magazine system some sixteen years later, as they considered their version of the arm equal of all of Europe.⁷⁴ Such an adoption proves that it was not that the rifle was of a bad design. Instead, the Italian army's adoption of the Vetterli rifle, without a magazine, shows that European armies wanted a good breech-loading, single-shot rifle that had a high rate of fire, but they did not want it to have a magazine. Certainly, tubular magazine rifles were not safe as there was always the danger of the nose of a bullet striking the primer of the cartridge in front of it, causing a premature detonation. The fact remains that, during or just following the Franco-Prussian War, two nations had access to a common rifle with a magazine that was standard infantry issue and, for all of the reforms the war inspired, the war moved no army to adopt a magazine-fed rifle. That lesson had to wait until the Russo-Turkish War of 1877, when Ottoman soldiers inflicted massive casualties with a weapon the United States already decided should not be standard issue and was inferior.

Much of the hesitation towards magazine arms, and, indeed, the lack of interest in them, stemmed from their rates of fire. Commentators after the Russo-Turkish War noted

⁷⁴ "Vetterli Series," *Swiss Rifles.com*; Charles Martel, *Military Italy* (London: Macmillan and Company, 1884), 107.

that single loaders fired as fast as a magazine-fed weapon.⁷⁵ Even in the 1890s, as changing over to magazine rifles became inevitable, American Army officers noted that magazine fire did not increase rate of fire significantly.⁷⁶ The magazine rifle in the 1870s shared a role with the machine-gun as it was too new, wasteful of ammunition, and did not offer any then-discernable benefit over weaponry already in service. In addition, by 1878, these nations had just adopted new breechloaders in the wake of the Franco-Prussian War and changing over to yet another new rifle would have cost even more. As technology improved, nations were hesitant to purchase more firearms beyond current requirements.⁷⁷ This reluctance was similar to the timidity that kept Europe from adopting a breechloader in the 1850s after it had just recently adopted percussion muskets.

The Wars of German Unification prompted rearmament in Europe because the technology was readily available and demonstrated its usefulness. The Prussians had used the *Zundnadelgewehr* since 1841 and triumphed over three European powers. The French, meanwhile, with machine-guns lost their war in 1871 and in doing so failed to cause widespread, rapid adoption of machine-guns.

The German Wars of Unification caused all nations to adopt breech-loading rifles, but in the decade following each nation attempted to devise how to use them the most effectively. The majority of the debates, which affected machine-guns and magazine weapons as well, revolved around the expenditure of ammunition. During the decade, each nation accepted a breech-loading firearm as standard issue, but because of

⁷⁵ "Springfield Muskets," *Science News* 1 (April, 1879), 181.

⁷⁶ *Description and Rules for the Management of the U.S. Magazine Rifle Model of 1898 and Magazine Carbine Model of 1899, caliber .30* (Washington, DC: Government Printing Office, 1898), 43, 63.

⁷⁷ "Springfield Muskets," 181.

uncertainty on how to employ them, concerns about ammunition, and the costs involved for the most part did not adopt magazine rifles and treated machine-guns only as experimental weapons, unsure of their exact usage on the battlefield. The French, by employing the *mitrailleuse* and losing the war in 1871 delayed the mass adoption of machine-guns simply because a victorious nation rarely adopts the methods of those they have beaten on the field of battle. European-style militaries were willing to adapt and change their tactics and weapons, so long as something new was available, proven in combat, and used by a European victor in war. If a weapon, no matter how remarkable, failed that criteria, the generals disregarded it in favor of equipment they knew and loved.

CHAPTER III

“BETTER THAN THE MUCH-VAUNTED PRUSSIAN NEEDLE-GUN:”

THE AMERICAN ARMY’S SEARCH FOR A RIFLE, 1864-1869

Most soldiers who clashed in the American Civil War generally carried some type of muzzle-loading weapon, but the conflict was unique in that, while most troops carried smoothbore muskets or new, accurate, rifle muskets, many Union cavalymen and some infantrymen carried breech-loading rifles. These new rifles, as Prussia saw with the adoption of its *Zundnadelgewehr*, offered troops increased rates of fire, range, accuracy, and reliability over muzzle-loading weapons. Experiences in the Civil War caused the United States Army to become interested in breech-loading rifles as standard issue, and between 1864 and the Austro-Prussian War of 1866, the United States Army developed and examined breechloaders of its own, as well as those in use in European armies. While the Dreyse needle-gun failed to cause a change in global firearms technology in 1841, use of breechloaders in combat in the American Civil War, the Danish War of 1864, and the Austro-Prussian War of 1866 motivated armies of the world to adopt the new weapons. The United States, because of the Civil War and examination of European firearms, began the process of selecting a breech-loading firearm as standard issue well before the wars of German unification caused European militaries to do so.

The desire for breech-loading rifles was nothing new to the United States Army. In 1819, the army adopted in limited numbers a flintlock breechloader, the Model 1819 Hall rifle. First adopted in 1819, armories updated the rifle in 1832, and Harpers Ferry, one of the two national armories of the United States, produced almost twenty thousand examples between the adoption of the weapon and 1840.¹ While not standard issue like the Prussian *Zundnadelgewehr*, it demonstrates that the United States expressed interest in the breechloader before the Prussians adopted one as standard issue, and experimented with new, potentially useful, designs.

In 1854, fourteen years after armories ceased production of the Hall rifle, Congress appropriated ninety-thousand dollars for the procurement of breech-loading small arms, and the Ordnance Department tested examples later used during the Civil War: The Maynard, Burnside, Sharp's, Green, Gibb, and Merrill rifle and carbine, among others. In 1857, the army convened one of many future boards to determine the feasibility of adopting a breechloader as standard issue, and to decide on which one. Like many of the boards that followed, the 1857 panel did not recommend any specific arm, although in this instance the board gave preference to the Burnside carbine.² Later, the army adopted a magazine weapon, the Spencer, which caused supply problems due to its metallic cartridge but "proved a potent factor in the triumph of Union forces on more than one occasion."³

The army was not conservative because it did not adopt a breech-loading rifle as standard issue in 1857. Only two years previously, in 1855, the army adopted the Model

¹ Robert M. Reilly, *United States Martial Flintlocks*, 136-138.

² W. A. Campbell, "The Magazine Rifle: Its Development and Use," *The United Service: A Monthly Review of Military and Naval Affairs* 12 (November, 1894), 406.

³ *Ibid.*

1855 Springfield Rifle Musket. Regular troops had not all received the new weapon when the board convened. Trial and experience with these new weapons influenced decisions, but even at such a stage when only Prussia had a standard issue breechloader, the American Army began considering their merits. At this time, other nations followed the example of the Crimean War and began adopting rifle muskets. The United States simply acted as every other major power did at this stage.

In the Civil War, breech-loading and magazine-fed, repeating firearms were not standard issue, and used mostly by cavalry. Western troops were the primary employers of these weapons, and most Eastern units continued to carry rifle muskets. But, between 1863 and 1865, enough troops used these new weapons in combat for the army to begin to gauge their effectiveness.⁴ Soldiers loved them, especially the Henry and Spencer rifles, and one soldier of Colonel John T. Wilder's "Lightning Brigade" commented that, with their Spencers, they felt "well night invincible."⁵

The American Army first used breechloaders in combat a year before the Prussians used their *Zundnadelgewehre* in combat. At the battle of Hoover's Gap on June 24, 1863, two regiments of the Wilder Brigade, the Seventeenth Indiana and Ninety-eighth Illinois stopped a Confederate brigade with withering fire from their Spencer repeating rifles.⁶ These were magazine-fed repeating rifles, but overall the effect was the same: troops who could fire faster could do more damage to an enemy. In effect, a breechloader or a magazine rifle was a force multiplier.

As in Europe, there was much debate over wasting ammunition. Historian Geoffrey Wawro commented that Prussian infantrymen would "blaze away recklessly"

⁴ Earl J. Hess, *The Rifle Musket in Civil War Combat: Reality and Myth*, 53.

⁵ Hess, *The Rifle Musket in Civil War Combat*, 53; quoted in *Ibid.*, 54.

⁶ *Ibid.*, 54-55.

with their needle-guns, with an accuracy of 1 out of 250 rounds striking a French soldier.⁷ While scared Prussian troops may have fired more than their Austrian counterparts, their accuracy was no worse than American troops with Springfield rifle muskets in the Civil War, who inflicted as many hits at the Battle of Stones River in December 1862.⁸ Accuracy of firearms and the training given to soldiers were the causes of poor accuracy, not rapidity of fire. Alternatively, the Springfield might have been an excellent rifle musket at a time when the head of the United States Patent Office in 1864 declared that the needle-gun, the weapon that had yet to cause Austria and Denmark to surrender and which would face a tougher opponent in the Franco-Prussian War was “the most imperfect of all breechloaders.”⁹

W. C. Dodge, of the United States Patent Office, wrote in 1864 pleading for the Union army to adopt breechloaders as standard issue. His critique is a valuable commentary on early breechloaders, but also demonstrates that while the United States fought a bitter and bloody Civil War, it still kept abreast of European military developments and sought to incorporate those into the army. Dodge argued that rather than getting excited and wasting ammunition, as Wawro claimed Prussian infantry did, by 1864 no American regiment armed with breechloaders had reported instances of soldiers firing so fast as to waste ammunition – at least no more often than did soldiers armed with muskets.¹⁰ Dodge argued that rather than causing soldiers to waste ammunition, they had a weapon that could fire faster than a musket made them less prone to panic, and thus conserve ammunition. He asserted that opponents armed with a

⁷ Wawro, *The Franco-Prussian War*, 55.

⁸ Hess, *The Rifle Musket in Civil War Combat*, 73, 116.

⁹ W. C. Dodge, *Breech-Loaders Versus Muzzle-Loaders*, 10.

¹⁰ *Ibid.*, 4.

muzzleloader, knowing their enemy to possess a more rapid-fire weapon, would in fact panic and be the ones to expend ammunition frivolously.¹¹

As a trooper's state of being prone to excitement was at the forefront of military concern during this time, Dodge carefully pointed out that soldiers armed with muskets were the victims of panic and excitement. He argued that it was difficult to jam a repeater in a frenzied rush, but it was incredibly common for soldiers to load muskets improperly. Often soldiers accidentally rammed the minie ball or the round ball down before the powder, effectively putting the musket out of combat until cleared. Nervous hands dropped priming caps, rendering the musket unable to fire, and some nervous soldiers even loaded multiple rounds into the weapon, unable to fire any of them.¹² At the Battle of Gettysburg, some recovered muskets had ten rounds loaded into the barrel. Presumably, these extremes represented weapons picked up and loaded by multiple soldiers during the fighting.¹³ With a breechloader, soldiers could still jam weapons, but not as easily as a muzzleloader. Breechloaders offered the American soldier the ability to fire faster, have more faith in his weapon, and have a rifle that was safer and not a danger to him or his comrades.

By the end of the Civil War, the United States Army found the breech-loading rifle to be superior to the muzzle-loader in every respect. They had longer ranges, fired faster, and had superior penetration and stopping power. Stephen V. Benét, a Captain of the Ordnance Department and later commander of the Ordnance Department for much of the period after the Civil War, argued for breech-loading rifles during the Civil War,

¹¹ Ibid., 4-5.

¹² Ibid., 5; Hess, *The Rifle Musket in Civil War Combat*, 89-90.

¹³ Hess, *The Rifle Musket in Civil War Combat*, 90.

stating that they were superior to the trusted and reliable Springfield musket.¹⁴ The war had not ended, yet those in control of arms procurement in the United States Army had decided on a breechloader, over two years before the majority of European armies came to a similar conclusion.

The United States Army expressed more than a passing interest in breech-loading weapons. Between 1861 and June 1866, the army procured about 396,856 breech-loading or repeating rifles, including 3,520 of the old Hall breech-loading rifles, adopted by the army experimentally in 1819.¹⁵ While the Prussian army was the first force to issue breechloaders as standard issue, the acquisition of so many breech-loading rifles by the American army indicated that the army was not conservative. In fact, the United States military expressed interest in, and procured and issued such rifles well before the British did so in haste following the Danish War of 1864. The United States Cavalry received most of these rifles and carbines, but their performance was so satisfactory that the Ordnance Department recommended in 1872 “so far as our limited experience goes, it indicates the advisability of extending this armament to our infantry also.”¹⁶ The army desired an excellent breechloader and did not want to settle for something that would not do the job, but also admitted that a system that could convert the thousands of muskets produced during the war was “very desirable.”¹⁷ The decision to adopt a system that was adaptable to the Springfield rifle muskets placed a handicap on the arms board, but it also demonstrates that, in 1864, concurrently with the Britain’s decision to rearm, the United States Ordnance Department made a similar conclusion, two years before Austria and

¹⁴ Dodge, *Breech-Loaders Versus Muzzle-Loaders*, 8.

¹⁵ Charles B. Norton, *American Breech-Loading Small Arms*, 14; Reilly, *American Martial Flintlocks*, 136-137.

¹⁶ Quoted in Norton, *American Breech-Loading Small Arms*, 14.

¹⁷ *Ibid.*

France.

Historians often describe the adoption of such a weapon as conservative, supposedly because it restricted the Ordnance Department's ability to choose the best breech-loading system available. Certainly, budgetary concerns forced such decisions, but after building so many rifle muskets over the course of five years of war, using any part of them made economic sense. In addition, during the years between the end of the Civil War and the close of the Franco-Prussian War, armies adopted several variations of breech-loading rifles in an attempt to discover the best type.¹⁸ If the Ordnance Department spent much of its precious funds on a new breechloader, only to adopt a completely different model soon after, the new weapons would create ammunition supply nightmares.¹⁹ To adopt a stopgap rifle as an interim was common sense.

The adoption of a mere conversion to the venerable rifle musket was not a foregone conclusion. The Ordnance Department suggested that such a system was preferable, but by no means limited itself to only those systems designed to convert muskets easily. In January 1865, the United States Army began tests to select a breech-loading rifle design. At the first ordnance tests that month, the army examined sixty-five different types of breech-loading rifles, including ones in service during the Civil War.²⁰ This board did not agree on any one type of arm, and adjourned for the next year. The army hoped that in adopting a new rifle, it would select the best available.²¹

The Ordnance Department did not make a decision about firearm adoption in 1865, but the national armory at Springfield, Massachusetts, began work anyway. Erskine

¹⁸ Ibid.

¹⁹ Wawro, *The Franco-Prussian War*, 46, 52.

²⁰ Ibid., 21.

²¹ Ibid.

S. Allin, master armorer, developed a mechanism for loading metallic cartridges into the breech of a converted rifle musket. The armorers chose the Model 1861 rifle musket for conversion. The national armory made some five thousand of these conversions, and issued them to troops in the Washington, D.C. area, but the weapon did not see any Civil War combat, as most entered service late in the year and in early 1866.²²

The Allin conversion is perhaps the most well known of the prototype breechloaders produced at Springfield armory, but it was, in fact, not the first. Early in 1865, before the Civil War ended, the national armory fabricated 3,007 Springfield-Joslyn rifles. These were not conversions of Springfield Rifle muskets, but a .50-caliber rimfire design that used most of the components of the Model 1864 rifle musket, including the stock, bands, barrel, and lock. This weapon was a failure and the Arms Board of 1865 declined to give it their consideration. In 1871, at a cost of thirty-five cents each, the armory modified them to accept the .50-70 caliber centerfire cartridge for export.²³ The army wanted a breechloader, but was not complacent enough to accept whatever design the national armory created. The Union Army had employed rifles of the Joslyn system during the Civil War, accumulating over eleven thousand of them before the national armory manufactured some.²⁴ The Joslyn represented a counterpart to bolt-action rifles, such as the Needle Gun, and trapdoor-style rifles, such as the Allin system, but the 1865 Board did not see it as competitive with those designs.²⁵

The national armory only made a few of the Springfield-Joslyn rifles and until 1868 primarily converted older rifles to breech-loading designs or to the use metallic

²² Hosmer, *The .58- and .50- Caliber Rifles & Carbines of the Springfield Armory 1865-1872*, 5-8.

²³ *Ibid.*, 98-99.

²⁴ Norton, *American Breech-Loading Small Arms*, 14.

²⁵ *Ibid.*, 159; Hosmer, *The .58- and .50- Caliber Rifles & Carbines of the Springfield Armory 1865-1872*, 98-99.

casings. General Alexander B. Dyer, Chief of the Ordnance Department from 1864-1874, presided over this period of modernization.²⁶ He preferred to act slowly in this critical phase, not wanting to adopt something that would be a detriment to the army, or a waste of money, as inventors patented new rifles every year.²⁷ Dyer authorized Allin's conversion, claiming in his 1865 report to the Secretary of War that in his view, it "appears superior to any other that I have seen."²⁸ The Chief of Ordnance liked the trapdoor conversion, but was not about to force it on the army without testing, or without examining other designs.

These musket conversions were basic, and with many competing designs, the American Army was not satisfied with whatever the national army happened to turn out. Numerous defects in the original "First Allin" system caused the army to desire something better, and the army was critical of the design and stopped production after issuing five thousand rifles. The action was poor, the parts fragile, and the original .58-caliber cartridge weak and insufficient. Springfield Armory set on to do better.²⁹

Erskine S. Allin, designer of the national armory's submission for breech-loading rifles, knew exactly how his rifle stood up to European competitors. A magazine article from August 1865 noted that the War Department dispatched Allin to Europe to examine the breech-loading designs of Switzerland, Britain, and France.³⁰ While records are scarce on his opinions, Allin's trip demonstrates that the Ordnance Department expressed interest in foreign designs, and was able to compare the Springfield to weapons produced abroad.

²⁶ Hosmer, *The .58- and .50- Caliber Rifles & Carbines of the Springfield Armory 1865-1872*, xi.

²⁷ Norton, *American Breech-Loading Small Arms*, 14, 19.

²⁸ *Ibid.*, 14.

²⁹ Hosmer, *The .58- and .50- Caliber Rifles & Carbines of the Springfield Armory 1865-1872*, 26.

³⁰ "A Firearms Commission," *Scientific American* 13, no. 7 (1865), 101.

On March 10, 1866, a new board under General Winfield Scott Hancock met in Washington, D.C. to reconsider the question of new rifles and carbines, to allow designers to adjust their submissions, and to incorporate the lessons of breechloaders learned during the past year. The officers convening were General Hancock, Colonel T. V. Hagner of the Ordnance Department, Colonel J. G. Benton of the Ordnance Department, Lieutenant Colonel Horace Porter, and Lieutenant Colonel Wesley Owens of the Fifth United States Cavalry.³¹ The arms board had three objectives to consider with breech-loading arms. First, it had to determine what type of arm was best suited for the infantry. Second, it had to examine what type was better for the cavalry. Finally, the board had to consider what system was suited for converting the large stockpile of arms owned by the United States government at the close of the Civil War.³² In the hopes of attracting the widest range of inventors, and thus not simply reevaluate designs in use in Europe, or those used in the Civil War, the government ran columns in the *New York Times*.³³ This arms board, like those that followed until the adoption of the Krag-Jorgensen rifle in 1892, was a serious affair, one that honestly attempted to procure the best weapons for the United States Army

That the officers of the army asked the board these three questions is significant. It demonstrates that the United States Army, as early as 1866, wanted arms best suited to individual branches of the army. The board had to decide if an infantry arm's breech system was useful for cavalry, or if a completely new breechloader was conservative. Instead of adopting patterns of rifles already in existence, the board extensively tested

³¹ "A Board to Investigate the Merit of Breech-Loading Arms," *New York Times*, February 11, 1866, 6.

³² *The American Annual Cyclopedia and Register of Important Events of the Year 1866* 6 (New York: D. Appleton and Company, 1867), 38

³³ "Washington News," *New York Times*, February 9, 1866, 1; "A Board to Investigate the Merit of Breech-Loading Arms," *New York Times*, February 11, 1866, 6.

new patterns and requested foreign and civilian participation.

Government arsenals had large stockpiles of muskets, and the board decided to begin conversions of those arms while the army and other boards studied new types of breech-loading arms. As new developments occurred often in this period, the Hancock Board did not want to recommend adoption of a completely new system hastily. The board also suggested that future army rifles and carbines be .45-caliber, and demonstrated a further lack of conservatism by declaring that cavalry units should be equipped with magazine carbines. Magazine weapons were under a period of change and continual improvement as well, and the members of the board suggested that the army wait until a perfect system existed. In the interim, the officers suggested that the army issue Civil-War era Spencer magazine carbines to cavalry troopers, demonstrating that at this time, the army embraced magazine weapons and did not cling to single-loading designs.³⁴

General Dyer, the Chief of Ordnance, agreed with most of the board's recommendations. He argued that a .45-caliber round, as of 1866, showed no better performance over the .50-caliber round, which arsenals had already fabricated large amounts. To that end, he had day-and-night shifts working at Springfield Armory converting muskets to the 1865 pattern Allin system. Dyer wanted to try these arms, a decision that General Ulysses S. Grant did not share and did not endorse.³⁵

This committee also had no definite result, as the Secretary of War did not endorse a single rifle. The board suggested that the national armory produce both new-pattern and conversion weapons of eight different rifle systems, in the hope that one of them might be selected. If anything, the army was indecisive, not conservative, as it

³⁴ *The American Annual Cyclopaedia and Register of Important Events of the Year 1866* 6 (New York: D. Appleton and Company, 1867), 38.

³⁵ *Ibid.*

wanted a breechloader, and attempted to standardize on one. The Allin rifles made by the national armory were an interim solution, and the army was not complacent enough to accept that design in its present form.³⁶

In 1866, Allin redesigned the Springfield rifle to correct deficiencies in the previous design. The Model 1866 had a stronger action, and was of a smaller .50-caliber as the older caliber was too large to suit army needs.³⁷ This new weapon did not satisfy army requirements completely either, but in an attempt to supply the army with some kind of breechloader while the rifle boards deliberated, the national armory fabricated approximately fifty thousand of them. Unlike the previous musket conversion, the Model 1866 utilized the newer Model 1863 rifle musket, instead of the older Model 1861.³⁸

In April 1866, while the Hancock Arms Board convened, Prussia, Austria, Italy, and many of the smaller German states began mobilizing for war in the conflict known as the Austro-Prussian War or Seven Weeks' War.³⁹ As previously demonstrated, this conflict had a profound effect on European firearms technology, causing a quick adoption of breech-loading rifles and demonstrating the power of the Prussian needle-gun. Europe was enamored with the German firearm, and only after the Franco-Prussian war did continental armies begin to view the weapon in a more critical light.

On August 2, 1867, troops of Company C, Twenty-Seventh United States Infantry used this new rifle, the Model 1866 Springfield, also known as the "Second Allin Conversion," at what was later known as the Wagon Box Fight against Native Americans

³⁶ Norton, *American Breech-Loading Small Arms*, 21-22; Hosmer, *The .58- and .50-Caliber Rifles and Carbines of the Springfield Armory 1865-1872*, 26.

³⁷ National Park Service, U.S. Department of the Interior, "Fact Sheet #2: The "Trap Door" Rifle," *Springfield Armory Historic Site*, Accessed March 8, 2010, <<http://www.nps.gov/spar/historyculture/upload/fact%20sheet%20%20Trapdoor%201206.doc>>.

³⁸ Norton, *American Breech-Loading Small Arms*, 151; Hosmer, *The .58- and .50-Caliber Rifles and Carbines of the Springfield Armory 1865-1872*, 53.

³⁹ Wawro, *The Austro-Prussian War*, 52.

under Red Cloud.⁴⁰ These weapons represented a massive improvement in infantry firepower, as thirty-two men held off a large force of Native Americans.⁴¹ The previous year, Indians massacred the troops of Captain William Fetterman's small command, numbering two officers and thirty enlisted men, killing all of the small detachment.⁴² These infantrymen still carried the .58-caliber Springfield rifle musket, as did most of the infantry at Fort Phil Kearny. In July 1867, an army supply train delivered seven hundred of the new Model 1866 Springfield breechloaders to the fort, and these weapons enabled the men at the Wagon Box Fight to defend their position successfully.⁴³

Many of the infantry received limited or no training in the use of the breechloader, but the Allin system proved easy to learn. Private Frederick Claus reported that he and the rest of his company had received the Model 1866 Springfield only two weeks before using them in combat, hardly time to become fully acquainted with the weapon.⁴⁴ Even without much practice of the weapon, the troops were able to use it effectively. At a range of seven hundred yards, the range which the British Army later in 1872 considered the farthest distance of reasonable accuracy, one soldier only barely missed a warrior, and his round ricocheted into the brave's mount, throwing him off the horse.⁴⁵

The soldiers at the Wagon Box Fight loved their Allin Springfields, and such optimism made an impression on the army. Samuel Gibson of the Twenty-Seventh Infantry recalled being "tickled" about receiving the .50-caliber Model 1866 Second-

⁴⁰ Jerry Keenan, *The Wagon Box Fight: An Episode of Red Cloud's War* (Conshohocken, PA: Savas Publishing, 2000), 19-20, 23, 31.

⁴¹ *Ibid.*, 60.

⁴² *Ibid.*, 10-11.

⁴³ *Ibid.*, 19.

⁴⁴ *Ibid.*, 88.

⁴⁵ *Ibid.*, 67.

Allin rifles, as he had previously used a muzzle-loading Springfield musket.⁴⁶ His weapon performed wonderfully, though through the lengthy engagement many of the men fired so rapidly that the heat from the gun barrels burned their hands, and they “were obliged to open the breech-blocks during... [a] lull to allow the barrels to cool off.”⁴⁷ At close range, the accuracy of the weapon and the rapidity of fire possible, even when unfamiliar with the Allin “trapdoor” style breech-block system, were such that, according to Gibson “we had a steady rest for our rifles... and we simply mowed them down by scores.”⁴⁸ Gibson fondly remembered the weapon that had saved his life. He argued that the Indians expected them to carry the old rifle musket, as had the troops under Colonel Fetterman. “But thanks to God and Lieutenant General Sherman,” he recalled, “we had just been armed with the new weapon.... We simply threw open the breech-blocks of our new rifles to eject the empty,[sic] shell and slapped in fresh ones.”⁴⁹ The early Springfield Allin system was successful in combat, performed adequately and soldiers liked the weapon.⁵⁰

The Springfield, in combat, demonstrated the qualities that make an excellent battle rifle: reliability, ease of use, accuracy, and rapidity of fire. Frederic Claus noted that they did not receive training with breechloaders before the fight, but that did not stop the men of the Twenty-Seventh Infantry from using them to good effect.⁵¹ It was this excellent service of the Model 1866 Second-Allin rifle caused Dyer to support the Allin system wholeheartedly. It was not because it was the in-house design; it was because of

⁴⁶ Ibid., 65.

⁴⁷ Ibid., 74.

⁴⁸ Ibid., 72.

⁴⁹ Ibid., 72.

⁵⁰ Ibid., 82.

⁵¹ Ibid., 88.

the rifles issued to the troops this weapon received praise during actual combat.

The army continued to rearm with breechloaders, but always saw the Allin-system in its present state as an interim solution. Work on the converted Springfields moved rapidly, and the armory finished the fifty thousand Model 1866s by August 1867, modifying 23,083 that year alone.⁵² The machinery at the armory was sufficient that, with the day and night shifts, workers converted four hundred muskets a day to the breech-loading system.⁵³ Dyer acted slowly, as he did not want to erect facilities to mass-produce a weapon that the army might not adopt; in comparison, facilities at Enfield Lock in Great Britain converted an average of eleven hundred Enfield rifle muskets daily to the Snider system.⁵⁴ While the army, including both troops and the Springfield's biggest proponent, Dyer, liked the Springfield, the language in the Secretary of War's report in 1867 illustrates that the army knew the limitations of the weapon.⁵⁵ General Dyer reported, "It is confidently believed that no musket has been converted into a breechloader in this country, or in Europe, which is superior for military purposes to that which has been produced at Springfield armory, and none equal to it in serviceable qualities can be produced at less cost."⁵⁶

The language of Dyer's Ordnance Report shows that the Springfield's merits were its service qualities and cost, and its superiority to other converted breechloaders. Dyer acknowledged that the Springfield was better than other converted rifles such as the British Snider, the Austrian Wanzl, or the other conversions that European armies

⁵² United States Congress, House, *Message of the President of the United States and Accompanying Documents To the Two Houses of Congress at the Commencement of the Second Session of the Fortieth Congress, Annual Report of the Secretary of War Part I*. 40th Cong., 2nd Sess., 1867. Executive Document 1, 18.

⁵³ *Ibid.*, 18.

⁵⁴ Charles B. Norton and William J. Valentine, "Report on the Munitions of War," 1868, 25.

⁵⁵ United States Congress, *Report of the Secretary of War Part I*, 1867, 18.

⁵⁶ *Ibid.*, 609.

undertook in the wake of the Austro-Prussian War. Dyer, at least, reporting to the Secretary of War, was not prepared to state that the Allin-Springfield was superior to a breechloader that was not a conversion, the main one then in existence being the Dreyse *Zundnadelgewehr* of Prussia. Some observers considered the Springfield superior, among them the author of *The American Annual Cyclopedia and Register of Important Events of the Year 1866*, which discussed both the Austro-Prussian War and the 1866 Hancock Arms Board. He argued that the Springfield was “much better in all respects than the much-vaunted Prussian needle-gun.”⁵⁷ The Springfield was quickly becoming a successful weapon, but even General Dyer argued that a new breech-loading rifle probably possessed better qualities.

The early Allin rifle was functional, but not representative of a finalized piece ready for acceptance on a large scale. Dyer, the main proponent of the system, acknowledged that the system was not perfect and needed improvement. Although the arm needed work, he noted that those issued, nearly all of them, to the Departments of the Missouri and the Platte gave excellent service and proved both accurate and reliable.⁵⁸ Springfield armory filled the order for the 1866 Allin rifles, and incorporated changes into a new model, the 1868, which Dyer wanted to begin producing the next year.⁵⁹

The primary advantages the mass issue of the Model 1866 Second Allin conversion rifles gave to the United States Army were experience with a breechloader and the adoption of a standardized cartridge. The fifty thousand rifles issued to army troops saw excellent service, as best epitomized by the Wagon Box Fight, and allowed the national armory a chance to make combat-tested improvements in its design,

⁵⁷ *The American Annual Cyclopedia and Register of Important Events of the Year 1866*, 38, 317.

⁵⁸ United States Congress, *Report of the Secretary of War Part I*, 1867, 609.

⁵⁹ *Ibid.*

something many other firearms submitted to the 1866 Arms Board did not possess.⁶⁰ The primary ammunition facility at Frankford Arsenal had machinery capable of fabricating fifty-thousand cartridges daily, and in the Fiscal Year ending in June 1867 made seven million .50-caliber center-fire cartridges. Of those, workers at Springfield Armory and troops fired 367,943 rounds, with only 1,317 not detonating. Such performance indicated that the government ammunition had a failure rate of one-third of 1 percent.⁶¹ The effect of having a standardized cartridge meant that the army could now create specifications for new breechloaders to test, and gauge their qualities with a common ammunition type acting as a control test.

The year after the Austro-Prussian War, in 1867, the United States sent a group of commissioners to the Paris Universal Exposition. Among all of the various exhibits, which included examples of cereals, foodstuffs, medicine, and musical instruments, was a demonstration of the latest weapons from all over the world. Lieutenant Colonel Charles B. Norton and Commissioner William J. Valentine were the American delegates to the munitions of war exhibition, and reported both the latest European developments and how American weapons compared. The commissioners, referencing a British report, noted that the British Boxer cartridge, used in the Snider-Enfield, Britain's contemporary of the Allin rifle, was a "very faulty cartridge."⁶² The commissioners also reported that a Snider using a Boxer cartridge exploded at the breech, breaking the shooter's nose, because of a faulty cartridge.⁶³ As previously demonstrated, the British eventually accepted the Snider as a decent weapon, but initially it was prone to failure. While such

⁶⁰ Ibid.

⁶¹ Ibid., 610.

⁶² Norton and Valentine, "Report on the Munitions of War," 10.

⁶³ Ibid.

an occurrence might not have been unheard of with an American-made Springfield, General Dyer argued that most failures with Springfields were due to carelessness and the ammunition was comparatively safe, with a low failure rate.⁶⁴ Of the breech-loading cartridges examined in Paris, including French, Prussian, and British, a British observer described the American cartridge, though he did not indicate whether referred to the .58- or .50-caliber cartridge, as having “first place among the many cartridges that have come under our observation.”⁶⁵

The American commissioners commented on many of the various types of arms at the exhibit, including the famed needle-gun. The Prussian weapon did not impress Norton and Valentine. They argued the weapon was delicate and prone to failure; the paper cartridges needed careful transportation and allowed escape of gas at the breech, and even argued that the breech-loading rifle itself might not have been quite as decisive against Austria in 1866 as military theorists originally claimed.⁶⁶ The needle-gun was also victim to the elements, as the commissioners noted that it was prone to rust, dust, saltwater, elements which a then Captain Alexander B. Dyer noted could not put a Spencer or a Remington rifle out of action.⁶⁷ In describing the Snider rifle, the commissioners placed any faults of the rifle on the cartridge, which they described as unsafe, as the breech-action of the weapon was similar in many respects to those in the United States such as the Allin-system, which, as Dyer argued, possessed excellent safety records. Norton and Valentine contended that any ill repute of the rifle was because “the gun... has been

⁶⁴ United States Congress, *Report of the Secretary of War Part I*, 1867, 609-610.

⁶⁵ Norton and Valentine, “Report on the Munitions of War,” 14.

⁶⁶ *Ibid.*, 19.

⁶⁷ *Ibid.*, 20.

made to bear the sins of the cartridge.”⁶⁸ The Snider rifle was a decent breechloader, but the original ammunition faulty. Eventually, starting in 1870, the British adopted the Snider-Enfield Mark III, which embodied a new catch on the receiver, to prevent it from blowing open should a cartridge fail.⁶⁹ The Springfields in the hands of United States infantry and the ammunition it used were comparatively better than the systems then in use in Europe.

All of the major militaries during the critical years between the Danish War and the Franco-Prussian War examined, scrutinized, and criticized their breech-loading designs. Britain, according to the United States commissioners at the Paris exposition, adopted the Snider merely out of convenience and adaptability to the Enfield musket, not because of its serviceable qualities. The French Chassepot was, at least in 1867, an excellent weapon, while the Prussian *Zundnadelgewehr* began to show its age. The Russians adopted the Berdan Rifle, an American invention described as clumsy by the United States Army.⁷⁰ Other nations adopted breechloaders of varying quality, most of which the larger powers gave scarce attention to. Much of the problem, pointed out by Norton and Valentine, revolved around manufacturing standardized cartridges that were both safe and reliable.⁷¹

Although the Allin rifle was far from perfect, not standard issue, and in a process of constant upgrade, it was an excellent, serviceable, and safe rifle and the .50-caliber cartridge was superior to ammunition used in Europe. The United States Army in 1867 was handicapped not because of conservatism, but because its entire regular army was

⁶⁸ Ibid., 22.

⁶⁹ Walter, *Rifles of the World*, 456-457.

⁷⁰ Oliver Byrne ed., *Spon's Dictionary of Engineering, Civil, Mechanical, Military, and Naval, Division IV* (London: E. and F. N. Spon, 1871), 1485.

⁷¹ Norton and Valentine, "Report on the Munitions of War," 50-51.

not yet equipped with the breechloader, of which the army already had one equal to those in Europe. Regular officers were fond of American-made weapons, but they were not alone. “We may venture to say that our countrymen,” wrote Norton and Valentine at the conclusion of their report, “have little to learn, and nothing to fear, from European makers in the matter of small-arms.”⁷² General Philip J. Sheridan echoed a similar sentiment in 1870 after observing Prussian actions at Gravelotte and Sedan during the Franco-Prussian War, claiming, “There is nothing to be learned here professionally... [and] there is much, however, which Europeans could learn from us.”⁷³ Clearly, American officers thought that the lessons and equipment of the Civil War taught them what they needed to know about warfare.

Norton and Valentine’s quote demonstrated the period of transition in the American Army during the entire latter-half of the nineteenth century; some officers desired to pursue American achievements, tactics, and technologies, while others wanted European concepts for the sake of them being European.⁷⁴ Many in the United States read European military journals and tried to apply European military concepts. During the period following the Civil War, the United States Army modeled itself as a traditional European-style fighting force and sought to learn the lessons of European conflicts.⁷⁵ Although the commissioners to Paris argued that the United States had nothing to fear from European arms, throughout the rest of this period, rather than blindly adopt American made inventions, the United States continued to examine, critique, and where

⁷² Ibid., 207.

⁷³ Quoted in Paul Andrew Hutton, *Phil Sheridan and His Army* (Norman: Oklahoma University Press, 2003), 206.

⁷⁴ Arthur L. Wagner, *The Campaign of Koniggratz: A Study of the Austro-Prussian Conflict in the Light of the American Civil War* (Westport, CT: Greenwood Press, 1889), 3-4.

⁷⁵ United States War Department, *Annual Report of the Chief of Ordnance to the Secretary of War For the Fiscal Year Ending June 30, 1880* (Washington: Government Printing Office, 1880), 425.

possible incorporate the developments of European militaries.

While the Hancock Arms Board deliberated in the United States over a breech-loading rifle, Austrian and Prussian armies mobilized for war; however, the Austro-Prussian War caused no major scare or realignment in American military thinking. The use of many breechloaders in the Civil War already gave the United States army the experience that Europe gained after 1866. Lieutenant Arthur Wagner, writing in 1889 as an instructor at the Infantry and Cavalry School at Fort Leavenworth, Kansas, noted that the cartridges fired by the Prussians during the Battle of Koniggratz on July 3, 1866, amounted to about one round per man.⁷⁶ While the Prussians might have shot fast once they began the process of *schnellfeuer*, a constant fast-firing repetition of firing with their needle-guns, their entire army either did not engage or did not keep a sustained fire.⁷⁷ In terms of numbers engaged, Lieutenant Wagner compared Koniggratz to the Battle of Gettysburg and noted that while the numbers engaged were similar, the Austro-Prussian clash produced six-thousand fewer.⁷⁸

In fighting during the Civil War ammunition expenditure varied between battle, unit, and side, but Earl Hess noted that among several units at several selected battles over the course of the war, some units reported as few as six rounds-per-man fired, and as many as eighty.⁷⁹ Certainly, the Prussian rifle demonstrated the effect of breechloaders in combat, but so did the Sharps, Spencers, and various other types used by American troops. Further, the Austro-Prussian War and the Battle of Koniggratz did not demonstrate for the United States the effects of ammunition supply to the troops or the

⁷⁶ Wagner, *The Campaign of Koniggratz*, 82.

⁷⁷ Wawro, *The Austro-Prussian War*, 130.

⁷⁸ Wagner, *The Campaign of Koniggratz*, 72.

⁷⁹ Hess, *The Rifle Musket in Civil War Combat*, 98-100.

effect of rapidity of fire, because Union and Confederate infantry with their myriad of rifled and smoothbore muskets fired more ammunition. The United States was ahead of European powers by employing breech-loading rifles by 1863 and starting the process of adopting them in 1865. While it examined the lessons and technologies of Europe, the fact that the United States found nothing to change or supplant its own designs does not mark the Ordnance Department or the Army as conservative.

If there were conservative military powers during the years between 1861 and 1871, they were the continental European powers. While the United States was keen to learn and study European developments and wars, although not to the point of adopting things continental because they were foreign, the European nations largely ignored small arms lessons of the American Civil War because the Danish and Austrian wars yielded many of the same results. To this end, historian Jay Luvaas argues that, despite having observers in the American conflict, no aspect of the war penetrated official European doctrine. The Prussians did not attempt to use the Civil War to understand how their needle-gun might perform in actual combat, and, instead, ignored the use of other types of breechloaders to correct any deficiencies. Even Britain, who studied the war, failed to appreciate its military lessons until European battlefields in 1866 and 1870 duplicated the results.⁸⁰

When compared with European powers, the United States examined European technologies and tactics and incorporated those that worked, while Europe examined the United States and seemed uninterested in the results. In hindsight, the United States may have been slow to adopt certain technologies, such as smokeless powder in 1886 but

⁸⁰ Jay Luvaas, *The Military Legacy of the Civil War: The European Inheritance* New ed.(Lawrence: University Press of Kansas, 1988), 115, 124, 150.

between 1864 and 1870, the United States Army maintained itself with similar equipment to the forces in Europe, in terms of technological and doctrinal improvement, if not military size and deployment.

While the Allin system represented the in-house design of the national armory, the United States Army had not settled on its design. The army continued experimenting with weapons, as well as updating those breechloaders that demonstrated their usefulness during the Civil War. In 1865, the army retained fifty thousand Sharps rifles and carbines, and following the adoption of the .50-70 cartridge used in the Second Allin Conversion, the army requested a conversion of the Sharps breechloader to the new round. The Sharps Rifle Manufacturing Company did not deliver the prototype conversions until 1868, but by 1869, the army received over thirty thousand conversions.⁸¹ The army so liked the weapons that Springfield Armory converted another thousand in 1870, and produced three hundred weapons with completely new receivers made by the Sharps Company. While many of the soldiers who fought at the Wagon Box Fight liked the Springfield, others in army circles preferred the Sharps system.⁸²

While debate continued on the Springfield and the Sharps, still other army officials wanted a magazine weapon and preferred the Spencer repeating rifle. Despite their lack of replacement parts and having unique parts not shared by other rifles, in 1870 the United States Army authorized conversion of 1,109 Spencer Model 1865 rifles. The converted rifles went unused and the army placed them in storage, preferring the Spencer carbine to the rifle.⁸³ Army troops generally liked the Spencer, and while most of the men at the Wagon Box Fight carried the Springfield, a small number used these repeaters as

⁸¹ Hosmer, *The .58- and .50-caliber Rifles and Carbines of the Springfield Armory, 1865-1872*, 173.

⁸² *Ibid.*, 173-174.

⁸³ *Ibid.*, 157-158.

well.⁸⁴ By 1869, the entire United States Cavalry received either Spencers or modified, .50-caliber Sharp's carbines, the former being "regarded as a superior arm by the cavalry," while Springfield Armory finished thirty thousand conversions of the latter, which General Dyer considered "decidedly superior" to the Spencer for cavalry use.⁸⁵ Clearly, the Ordnance Department did not agree with all of the recommendations of the troops.

By the end of the 1860s, it was apparent that the army needed to standardize on a rifle. Congress ordered no new rifles produced by the national armory until an ordnance board selected a single rifle. Rather than have a separate style of carbine for cavalry troopers, as was currently done, Congress wanted one type of weapon with a long barrel length for the infantry, and a shorter, more manageable one for mounted troops. As a result, the army prepared for trials in 1869 to adopt a new rifle, with the hope that this board would be more successful than the 1866 Hancock Board.⁸⁶ Springfield Armory tried to fabricate more Model 1868 rifles before the board convened, and as a result, Congress slashed appropriations. The armory needed something to do, but as the Model 1868 was technically a new rifle, and not a musket conversion, it violated Congress's directive to the army to form an arms board to adopt a new rifle. The government wanted a new rifle, but only one recommended by the army. The Allin system saw satisfactory service and officials recommended it, but no army board had officially approved the weapon.⁸⁷

⁸⁴ Keenan, *The Wagon Box Fight: An Episode of Red Cloud's War*, 68.

⁸⁵ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1869* (Washington, DC: Government Printing Office, 1869), 6.

⁸⁶ Hosmer, *The .58- and .50-caliber Rifles and Carbines of the Springfield Armory, 1865-1872*, 73, 86.

⁸⁷ *Ibid.*, 73.

The army had not decided on which system of rifle to adopt, but it was not conservative because the Ordnance Department continued to experiment with varying kinds of rifles, not limited to a single nationality or a single style. The conversions of Springfield rifle muskets in the 1860s were purely stopgap measures provided by the national armory, an attempt to experiment with breechloaders in the cheapest, and most financially secure, way. The conversions of muskets by the national armory were a way for the Army to gain more breech-loading weapons, gain experience with them, and give Erskine S. Allin a chance to perfect his design's effectiveness under actual service conditions – something that the majority of the designs submitted to the boards in 1865 and 1866 did not. In addition, the army produced no new rifles during this time for general service, converting only muskets as the army wanted to adopt the best system available. Of the eight rifles the Hancock Board gave tacit approval to, only two of them, the Sharp's and the Allin-system, had seen combat, making any kind of judgment as to which system was "most perfect" difficult at best.⁸⁸ The army demonstrated slowness and indecisiveness in selecting a breech-loading, standard-issue rifle, but seized on the concept of a breech-loading rifle and experimented with different designs, while not "rubber-stamping" the first prototype system proposed by the national armory, demonstrating that with regards to weaponry the American Army was not conservative during this period.

⁸⁸ Norton, *American Breech-Loading Small Arms*, 14, 22; Keenan, *The Wagon Box Fight: An Episode of Red Cloud's War*, 19.

CHAPTER IV

THE ICON OF CONSERVATISM:

THE ADOPTION OF THE .45-CALIBER MODEL 1873 SPRINGFIELD, 1869-1875

For four years beginning in 1865, the United States Army examined various rifles, without making a decision. Arms boards identified patterns of arms of interest, but could not agree on one type. General Alexander B. Dyer wanted to ensure that whatever system the army adopted would be best suited to its military needs, although he showed a particular preference for the Allin Springfield rifle. Congress, especially after Dyer's attempts to produce new-production Model 1868 Springfields, wanted the army to arrive at a decision for a single system for both the infantry and the cavalry. On August 6, 1869, General William Tecumseh Sherman directed General John M. Schofield to convene a board at St. Louis, Missouri, rather than a more-often used eastern location, for the purposes of selecting an arms system for issue to the army. General Order Seventy from the army charged the board with examining both the arms then in service in the United States and those that might be submitted from civilians and if possible adopt an arm that suited the purposes of both the army and navy with an eye towards interchangeable parts. Not only was the army still, as had been its goal all along, attempting to adopt a suitable arm, but rather than conservatively focus on inter-service rivalry the army was desirous

of the cooperation of the Navy.¹

The board was not a radical departure from previous arms tests. General Sherman instructed the officers to take various factors of arms construction into account. They were to examine based on merits, interchangeability of parts, cost, ease of manufacture, the ammunition type, and how many pieces the government already had. Like any good military arm, they needed to be easy to repair and cheap to produce, especially in a time when the size of the regular army, and the money appropriated to it, were shrinking. Amazingly, the army removed restrictions on ammunition, allowing inventors to submit arms of any caliber, even ones the army previously determined insufficient, rather than mandate the use of the .50-70 cartridge, which Frankford Arsenal was able to produce at an amazing rate. The American cartridge was successful in service, even European nations admired its abilities, and the army demonstrated a willingness to change it if an arms board found a better rifle that used a different round.²

The board examined forty-one different rifles of twenty different systems, and many of the inventors submitted several rifles, of different calibers, with slight improvements, or with different bayonet mounting systems, as well as eight carbines and eleven pistols. The officers abused, field stripped, examined, rusted, and subjected the weapons to extreme firing tests, generally firing over five hundred rounds before cleaning. The most active company present was Remington, who presented eight rifles, two carbines, and four pistols to the army board. The Remington plant made the majority of the weapons, but the national army also fabricated one rifle, one pistol, and one of the

¹ United States War Department, Ordnance Department, *Ordnance Memoranda 11: Board of Officers at St. Louis, MO., June 10, 1870* (Washington, Government Printing Office, 1870), 3.

² *Ibid.*, 3-4.

carbines to Remington's design.³

The result of these tests was that the arms board recommended the Remington, Springfield, and Sharp's rifle, in that order, for trial and possible adoption. Three other rifles, the Morgenstern, Ward-Burton magazine gun, and Martini-Henry, soon to be adopted by the British Army, were selected as better examples than most of those arms submitted but did not have the "superior excellence" required for adoption.⁴ The Martini-Henry, like the Prussian *Zundnadelgewehr*, was an example of a European firearm that the American Army found did not suit its needs. Even the British were initially skeptical of the Martini-Henry rifle, noting that its ammunition was so defective that the copper rim-fire cartridges "burst repeatedly near the rim," thus casting the arm in "a negative light."⁵ Just because the United States did not adopt them, and because they were "European," did not make the American Army conservative any more than the European nations who did not adopt American firearms despite heaving praise upon them. Many of the firearms demonstrated to armies during this period showed potential, but potential did not translate into effective performance at the time of testing and adoption, when the rifle needed to be as close to perfection as possible.

General Dyer, always a critic of the Remington and favoring the Springfield, openly disagreed with the commission. He pointed to defects in the Remington system, particularly its troubles in detonating cartridges, and argued that the Sharps and Springfield rifles were the better choice.⁶ The .50-caliber Remington modified to load at half cock, approved as having the most merit by the board, failed to fire eighteen rounds

³ Ibid., 5-8.

⁴ Ibid., 15.

⁵ Vivian Dering Majendie, "The Martini Henry Rifle," *Journal of the Royal United Service Institution* 13, 367.

⁶ Ordnance Department, *Ordnance Memoranda 11*, 18-19.

out of five hundred and extracted the majority with difficulty after sustained firing, and as the barrel fouled accuracy became horrible.⁷ Eight cartridges from another Remington rifle, with a barrel made at Springfield failed to detonate when the testers fired five hundred rounds.⁸ In both cases, the Remingtons used the .50-caliber service cartridge. By comparison, the Springfield, with the same cartridge, had only one round fail to detonate and had a comparable rate of fire, and much better accuracy.⁹ The Remington was only superior in rate of fire, and only the rifle made with a Springfield barrel performed so well. The Sharps rifle, also favored by Dyer, had similar accuracy but had twelve cartridge failings during the test.¹⁰

The board, in recommending the trials of the Remington, noted that the army had to modify any of the weapons for loading at half cock, a complaint Dyer acknowledged stemmed from every infantry company using the weapon. The original could only be loaded at full cock, meaning that any jar of the weapon or stout rap on the receiver might cause it to discharge. He suggested purchasing one thousand rifles of each of the Remington, Springfield, and Sharps systems for trials, noting that the national armory not only made the Springfield but was in the process of making Remingtons for the Navy, and had stocks of Sharps weapons convertible to the .50-caliber cartridge.¹¹

Edward Spon's *Dictionary of Engineering* published the entire report of the St. Louis Arms Board, as well as accompanying material on breechloaders then in service. Beyond the report, the author of the firearms section of the 1871 edition included comparisons with the arms presented at the board as well as those then in use in Europe

⁷ Ibid., 8.

⁸ Ibid., 9.

⁹ Ibid., 8-10.

¹⁰ Ibid., 10.

¹¹ Ibid., 19.

or under consideration for adoption. The author had harsh criticism for the needle-gun, which by the close of the French War in 1871 ceased to be the standard that armies measured their breechloaders. Specifically, the article criticized the paper cartridge as being susceptible to the elements and that the rifle did not have an effective gas seal, similar to the ones issued for trials to the United States Army.¹² For the Martini-Henry rifle, recently adopted by Britain to replace the Snider, the author had harsh comments, calling it deficient, costly, and prone to accidents and failures.¹³ In hindsight, the Martini system stayed in British service until the 1890s, well after the adoption of the Pattern 1888 Magazine Lee Metford, but in 1870, it was fraught with defects that prevented the United States Army, which was in no rush to act quickly, from adopting what its generals considered a dangerous and unsuitable arm.¹⁴

The author of the engineering manual was not simply anti-British or against small, unknown inventors, but his article demonstrates how requirements varied between armies. Historians need to judge the requirements of each army individually before making their argument. The work described the Berdan rifle, well liked and recently adopted by the Russian Army, as “a clumsy attempt to evade.... patents.”¹⁵ He further asserted that it was a deficient arm, and an example to inventors on how not to make a breech-loading arm; it was representative of the many poor rifles often submitted to arms boards at this time.¹⁶ Mixed opinions prevailed in Russia on the Model 1868 Berdan I, but the Model 1870 Berdan II, adopted in 1869, was a success, described that year by V.

¹² Byrne, *Spon's Dictionary of Engineering, Civil, Mechanical, Military, and Naval, Division IV*, 1482.

¹³ *Ibid.*, 1484.

¹⁴ John Walter, *Rifles of the World* (Iola, WI: Krause Publications, 2006), 291-293.

¹⁵ Byrne, *Spon's Dictionary of Engineering*, 1485.

¹⁶ *Ibid.*, 1486.

Shkliarevich, author of a Russian firearms book, as “an excellent military arm.”¹⁷

Observers in the United States did not like the Berdan Rifle or the Martini-Henry, and yet both proved to be serviceable arms in foreign service. The United States’s rejection of these pieces is not conservatism.

As a response to the 1870 Arms Board, Dyer had rifles and carbines of each system fabricated at Springfield Armory for issue to the troops, and pushed for another arms board in 1872 to standardize on a system for mass issue, in part because the arsenals were short of arms.¹⁸ The Schofield Board liked the Remington, but the troops and General Dyer liked the Springfield.¹⁹ Congress and the army wanted the troops to have a new arm, and on June 6, 1872 appropriated \$150,000 for the manufacture of rifles at the national armory after the adoption of a single system for infantry and cavalry arms.²⁰

Three months later, on September 4, 1872, an arms board under General Alfred H. Terry convened in Springfield, Massachusetts, to select a breech-loading rifle, and this time, unlike the previous boards, the tone of this meeting was to standardize an arm.²¹ While the board examined rifles as its most important duty, the board also busily occupied itself with investigating a trowel bayonet devised by Lieutenant Edmund Rice. The board divided on the usefulness of the implement, but more importantly divided on the utility of the bayonet, long a hallmark of modern infantry. Bayonet had long been a favored infantry weapon, but General Alfred Terry, President of the Board, wrote in his report that, with the breech-loading rifle, “I think the day of the bayonet has passed

¹⁷ Bradley, *Guns For the Tsar*, 110.

¹⁸ United States War Department, Ordnance Department, *Report of the Chief of Ordnance to the Secretary of War For the Fiscal Year Ending June 30, 1871* (Washington: Government Printing Office, 1871), 4-5.

¹⁹ Hosmer, *The .58- and .50-caliber Rifles and Carbines of the Springfield Armory, 1865-1872*, 139.

²⁰ United States War Department, Ordnance Department, *Report of the Chief of Ordnance to the Secretary of War For the Fiscal Year Ending June 30, 1873* (Washington: Government Printing Office, 1873), 4.

²¹ *Ibid.*, 53.

away.”²² Others like Colonel H. B. Clitz worried that adopting the trowel would “spoil the bayonet.”²³ The board recommended the implement’s adoption, but the fact that the army was considering dispensing with the bayonet, long considered a necessary military weapon, demonstrates that within the cost-consciousness of the post-war years, army commanders demonstrated a willingness to abandon tradition for new technologies.

Like the 1870 arms board, the Terry board subjected weapons to vigorous testing, and also tested models then in use in Europe for their suitability for adoption or, more appropriately, as examples to measure the new models to. In all, the board examined ten European-issue weapons, representing the latest patterns available, as well as those that had received much fame in the recent conflicts in Austria and France. The rifles were the French Chassepot, the Prussian needle-gun in three incarnations: a rifle, carbine, and improved form, the German 1871 Mauser, which replaced them, the Austrian Werndl and Wanzl, the Bavarian Werder, the Swiss Vetterli, and the British Martini-Henry and Snider-Enfield.²⁴ Before even commenting on a final rifle design, the arms board had at least seen how the various pieces they tested would perform against the weapons then in use in Europe. The board took special interest primarily in the Martini and the Werndl rifle. Rusting, which the board inflicted on every rifle, disabled the Austrian standard-issue arm during the tests and the board removed the weapon from further tests.²⁵

The board dragged on, testing new arms and directing Springfield Armory to fabricate new trial patterns of submitted arms in a new .45-caliber chambering. After eight months, General Terry called for a vote among the board, which showed many

²² Ibid., 56.

²³ Ibid., 57.

²⁴ Ibid., 45, 67; Wawro, *The Franco-Prussian War*, 100.

²⁵ Ordnance Department, *Report of the Chief of Ordnance 1873*, 86.

different opinions. He telegraphed the Adjutant General of the Army, asking if the board could select a few rifles for trials and then adoption, much like the previous boards. No one in the army wanted to make a decision, for fear of selecting a rifle that would soon be outdated. E. D. Townsend telegraphed back asking the board to select a rifle, as Congress dictated that the armory could only produce a new type of rifle, no more trials weapons, and no more conversions. He sent, “If it is hard for this board to agree, much harder would it be to get a decision from various reports of different officers in the field.”²⁶ The army tasked this board with selecting a final rifle design for standard issue.

Eventually, the arms board came to a decision. They wanted a magazine gun for limited trials, and selected the Ward-Burton for further development. The board further went on to express the value of magazine weapons, noting that they were inherently better than breechloaders, claiming that when it was a good breechloader and had possessed a safe and easily workable magazine, then “every consideration of public policy will require its adoption.”²⁷ The Ward-Burton was not completely ready for service, so the board selected the Springfield system, loved by the troops, tested in combat, and now with a newer, improved cartridge, as the new army rifle, officially adopted as the Model 1873 Springfield rifle (see Figures Five, Six, and Twelve).²⁸ The army, in May 1873, believed this rifle to be the best suited to its needs and superior to the various rifles then in use in Europe.

For financial reasons, and to make use of the wealth of surplus parts left over from the Civil War, the army initially wanted a system that would allow the conversions

²⁶ Ibid., 92.

²⁷ Ibid., 48.

²⁸ Ibid., 47-48; Joe Poyer and Craig Reisch, *The .45-70 Springfield* 4th Ed., Tustin, CA: North Cape Publications, 2006), 5.

of old rifle muskets or at least make use of their parts. While this limitation did limit the choices the army pursued in the 1860s, financial concerns and the ability to rearm quickly were the prime motivators of that decision. By 1872, they did not dictate which rifle system was ultimately adopted. The Remington system, favored by many in the army but strongly opposed by General Dyer, was actually cheaper to produce than the Springfield. The cost of a Remington, depending upon the royalty charged by E. Remington and Sons, was between fourteen and sixteen dollars for the twelve thousand rifles purchased and accepted by the navy and the ten thousand additional rifles rejected by that service.²⁹ In 1877, the Springfield system in its adopted form cost eighteen dollars.³⁰ The Austrian Werndl, another converted system, cost even less in 1885, reported at twelve dollars and twelve cents, while the Mannlicher repeating rifle cost only a few dollars more, and both prices included bayonets.³¹ Even though Erskine Allin was a government employee, and thus might not have required a royalty, the cost without a royalty was still more than the Remington.³²

Despite its origins as a musket conversion, the Springfield rifle did not represent a conservative decision on the army's part. Army officers argued that, based on field trials, combat reports, and overwhelming praise, it was the better rifle. Aside from ammunition difficulties later encountered by the new .45-caliber cartridge, the new system was relatively trouble free. Many of the rifles adopted in this period by various armies were

²⁹ United States Congress, Senate, Committee on Investigation and Sale of Ordnance. *Report on Sale of Arms By Ordnance Department*. 42nd Cong., 2nd Sess., 1872. Report Number 183, 418.

³⁰ United States Congress, House, Committee on Military Affairs. *Report of a Sub-committee of the Committee on Military Affairs on the Reorganization of the Army*. Washington: Government Printing Office, 1878, 246.

³¹ United States State Department, *Reports From the Consuls of the United States on the Commerce, Manufactures, Etc., of the Consular Districts* 17 Number 57 (Washington, Government Printing Office, 1885), 146.

³² Poyer and Reisch, *The .45-70 Springfield* 4th Ed., 11.

problematic when they first entered service, and thus historians must not apply the benefits of hindsight. The weapon was cheap to produce, which undoubtedly was a factor in its selection. Cheap does not translate to inefficient or ineffective, though, and it was not the prime concern during the arms test. An article in the *Journal of the Royal United Service Institution* cited the British Martini-Henry's cost of 2 pounds, 18 shillings, and 9 pence to produce, or for the 1870 currency conversion approximately 16.42 United States Dollars, actually making it a cheaper alternative to the Springfield.³³ As previously seen, the United States Army rejected this rifle as unsuitable to its military needs, even though it was a cheaper and more cost-effective weapon.³⁴ The army was cost-conscious, but not conservative and still desired the best weaponry for its soldiers and did not see cost as a primary limiting factor. As opposed to being a simple, cheap, stopgap design, the Springfield was actually more expensive than some European and non-government American rifle designs, but the Ordnance Department believed it to be the most suitable.

Following the death of General Alexander B. Dyer on May 20, 1874, Brigadier General Stephen V. Benét became the new Chief of the Ordnance Department of the United States War Department.³⁵ Like Dyer, Benét liked the Springfield rifle, but noted that in its first year of production, Congress only appropriated one hundred thousand dollars for retooling and construction, and slowness in developing the new .45-caliber ammunition hampered the production of this new rifle. In his annual report of 1874, he pleaded for at least half a million dollars for the immediate rearming of the army. While

³³ Vivian Dering Majendie, "The Martini Henry Rifle," *Journal of the Royal United Service Institution* 13, no. 105 (1870), 376; "The Dollar-Pound Exchange Rate From 1791," *Measuring Worth*, Accessed March 7, 2010, <<http://www.measuringworth.org/datasets/exchangepond/result.php>>

³⁴ Ordnance Department, *Report of the Chief of Ordnance 1873*, 45, 67.

³⁵ United States Army, *Official Army Register for January, 1875* (Washington, DC: Adjutant General's Office), 237.

not attacking the small size of the regular army, he wanted half a million rifles manufactured and stored, ready to arm a militia should an emergency develop.³⁶ The appropriations did not increase “to any significant amount” for 1875, although the national army fabricated enough weapons to equip the regular army by the middle of the year, and create a reserve of twenty-six thousand rifles and carbines.³⁷ The Ordnance Department was not conservative, only cash-strapped as it begged for more money. For 1876, Congress only appropriated one hundred thousand dollars for the manufacture of new arms, an amount that would not rise until fiscal year 1879, and even then only to two hundred thousand dollars, at a time when General Benét requested between nine-hundred thousand and one million dollars for small arms.³⁸

Many of the rifles during the period of transition after the Franco-Prussian War were problematic, including rifles usually exhibited as superior to the Springfield. The German *Infanterie Gewehr* 1871 Mauser, ancestor of the rifle that Germany used in two World Wars, suffered from many handicaps when it was adopted, shortcomings that the United States Army saw at the Terry Arms Board in 1872-1873. Like the problematic British Snider, the German rifle had no ejector, meaning that after firing the soldier had to remove the cartridge case manually either with his hands or by tipping the rifle over. The bayonet, mounted on the side of the rifle, affected accuracy, as did the bolt’s locking mechanism, which caused recoil to be absorbed primarily on the right side of the action,

³⁶ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1874* (Washington, DC: Government Printing Office, 1874), 4.

³⁷ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1875* (Washington, DC: Government Printing Office, 1875), 8-9.

³⁸ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1879* (Washington, DC: Government Printing Office, 1879), 12; United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1878* (Washington, DC, 1878), iv.

throwing off the rifle's balance as the bullet left the muzzle. German armorers corrected some of these deficiencies, but others, like the bolt problems and the bayonet mounting, were endemic to the rifle.³⁹

The Springfield suffered from none of these problems, its major drawback being the copper case of the .45-70 Government Round. Until 1886, American metallic ammunition utilized copper cases, primarily because the means of creating and tempering brass cartridges was not available to the United States. The copper appears to have worked adequately enough in the .58 and .50-caliber ammunition, as arms tests and Frankford Arsenal reported comparatively few failures. Armorers and soldiers fired 367,943 .50-caliber cartridges during 1867 and only 1,317 failed to explode. This number is a failure rate of one-third of 1 percent, although the Secretary of War's 1867 report does not mention if any stuck hard and jammed in rifles or Gatling guns.⁴⁰ Problems of jamming, as the copper expanded and stuck in the breech of the rifle, were endemic to the new Model 1873 Springfield and other rifles and carbines that used the new cartridge until a brass case replaced it.⁴¹

The most high-profile failure of the new weapon, and perhaps part of the reason that historians have called its adoption "conservative," was the fight at Little Big Horn on June 26, 1876, when a force of Sioux warriors annihilated General George Armstrong Custer's detachment of the Seventh United States Cavalry.⁴² In an article entitled "The Little Big Horn, or Why Custer Lost," A. F. Wallace argued in 1920 that the single-shot weapon they carried was the contributing factor. He argued that the Spencer, a repeater,

³⁹ Paul S. Scarlata, *A Collector's Guide to the German Gew. 88 "Commission" Rifle* (Woonsocket, RI: Mowbray Publishers, 2007), 26, 30.

⁴⁰ United States Congress, *Report of the Secretary of War Part I*, 1867, 610.

⁴¹ Poyer and Riesch, *The .45-70 Springfield* 4th Ed., 10.

⁴² Uteley, *Frontier Regulars*, 258, 261.

could have changed the outcome of the battle. The Springfield, he argued in hindsight, “was no better than a club after a few shots were fired.” and noted how soldiers used pocketknives to pry stuck copper cases out of their jammed carbines.⁴³ The author’s argument is significant because it demonstrates the prejudice that colored many writers’ view of the weapon, and the army at the time. Wallace used the Wagon Box Fight of 1867 as evidence of the Spencer’s capabilities, apparently not realizing most of the infantry in that action carried 1866 Allin Springfields, which shared much of the design of the Model 1873 carbines the Seventh Cavalry used.⁴⁴

Many argue the United States Army was conservative in adopting a single-shot rifle because it already possessed a repeater, many Indians used magazine weapons, and, just over ten years after the army standardized on a rifle, Europe began to switch to repeating rifles. European armies began the shift towards magazine fed rifles after the Battle of Plevna in the Russo-Turkish War of 1877-1878, when a force of Turks carrying American-made Winchester repeaters badly bloodied Russian infantry carrying American-designed Berdan rifles.⁴⁵ For the Germans, the battle demonstrated that “The new and complicated small-arms have proven efficient.... nor was there any difficulty encountered in the handling of magazine rifles formerly condemned as a weapon of war.”⁴⁶ Even so, while the French navy adopted a magazine rifle in 1878, the European armies did not begin to adopt magazine rifles as standard issue, with the exception of

⁴³ A. F. Wallace, “The Little Big Horn, or Why Custer Lost, Part II,” *Fur News and Outdoor World* 32, (October, 1920), 4.

⁴⁴ Wallace actually places the battle in the latter part of July, and claims that the soldiers used Spencer repeaters. The fact he claims there were thirty two American troops confirms his battle as the Wagon Box Fight, where Jerry Keenan places the troops as using Model 1866 “Second Allin” conversion Springfields. Wallace, “The Little Big Horn,” 4; Keenan, *The Wagon Box Fight: An Episode of Red Cloud’s War*, 20.

⁴⁵ Scarlata, *The German Gew. 88 “Commission” Rifle*, 26; F. Maurice, *The Russo-Turkish War 1877 – A Strategic Sketch* (London: Swan Sonnenschein and Company, 1905), 11-12.

⁴⁶ Thilo von Throtha and Carl Reichmann, trans., *Tactical Studies on the Battles Around Plevna* (Kansas City, MO: Hudson-Kimberly, 1896), 207.

Switzerland, until 1884. Two years later, the French adopted the *Modèle* 1886 Lebel rifle, the world's first smokeless, magazine rifle, which changed military tactics and weaponry as much as the Prussian *Zundnadelgewehr* had twenty years earlier.⁴⁷

In 1872, when General Alfred Terry and the rest of the arms board that convened in Massachusetts proclaimed that the Springfield rifle best suited army needs, the weapon did. Besides Switzerland, no European nation carried magazine rifles as standard issue, though some like Turkey and the United States used them to a limited extent. While the Hancock Board of 1866 liked the Spencer repeating rifle, it used a small cartridge unsuitable for infantry, which is why they recommended it for adoption by the cavalry.⁴⁸ As Congress wanted a single type of system, the Spencer rifle was unsuitable. The mechanism of the Winchester, when rusted, was unworkable, thus making it also unsuited as a military arm.⁴⁹ Though many companies produced repeating rifles in the United States, none was suitable as a military arm for both the infantry and cavalry, and arms boards usually rejected them. Even the Winchesters used by the Turks were not standard issue, as most Turkish soldiers, especially infantry, carried the American-made Peabody-Martini rifle, a single-shot rifle rejected by the United States Army.⁵⁰

Major John C. Davis, in a master's thesis written in 2007, argued that the army's adoption of the Model 1873 Springfield represented "poor decision-making" and that because the army had experience with repeaters in the Civil War, adopting the new rifle

⁴⁷ Scarlata, *The German Gew. 88 "Commission" Rifle*, 26,33.

⁴⁸ J. B. O'Hea, "Cartridges for Breech-Loading Small Arms, And the Best Form of Projectile," *Journal of the Royal United Service Institution* 12, no. 47 (1868) 111.

⁴⁹ Ordnance Department, *Report of the Chief of Ordnance 1873*, 86.

⁵⁰ Maurice, *The Russo-Turkish War*, 16-17; Ordnance Department, *Report of the Chief of Ordnance 1873*, 90, 126; Alexander Rose: *The American Rifle: A Biography* (New York: Random House, 2009), 182.

“seemed like a step backwards.”⁵¹ Davis expressed a desire to compare American arms with those of Europe, but never does, limiting such comparisons with his discussions of modern firearms in an attempt to link Ordnance Department procedures of the nineteenth century with those of the twentieth.⁵² Such comparisons are harsh and do not represent the situation adequately as it existed in 1873. Adopting a breech-loading rifle with musket origins that still looks suspiciously like a muzzle-loading weapon may appear conservative when one considers that bolt-action rifles and repeaters became the standard military arm until the Korean War. In 1872, they were still in their infancy, with defects that a more conventional design avoided. The Spencer rifle, while adequate as a cavalry arm, was inferior as an infantry arm because of its underpowered cartridge that lacked range and stopping power, a problem that affected the Winchester rifle as well.⁵³ The army liked the idea of magazine carbines for its horse soldiers, but in a day when infantry still traded volleys and fought in line, an underpowered magazine rifle had little usefulness. The abandonment of the magazine rifle did not represent conservative thinking, as only the Swiss army and their Vetterli rifle possessed a magazine. In this regard, the United States was no more conservative than any of the other major armies during the breechloader era. Certainly, the Indians possessed magazine arms, but Europe, mostly, did not.⁵⁴

The Terry arms board compared the Springfield, the Remington, the Sharps, and the Spencer rifles alongside the arms then in use in Europe. That was the test: not which

⁵¹ John C. Davis, “U.S. Army Rifle and Carbine Adoption Between 1865 and 1900” (Master’s Thesis: U.S. Army Command and General Staff College, 2007), 1.

⁵² *Ibid.*, 3, 78-80.

⁵³ Hosmer, *The .58- and .50-caliber Rifles and Carbines of the Springfield Armory 1865-1872*, 157; Utley, *Frontier Regulars*, 72.

⁵⁴ Utley, *Frontier Regulars*, 71-72.

weapon held the most potential for twenty years in the future, or which laid claim to being the best repeater. The task was to choose the rifle best suited to the military needs of the United States, as an army rifle, in 1873. Among all of the rifles presented, some shoddy, some repeaters, and some general issue in armies with more recent 'traditional' combat experience than the United States, the army considered the Springfield the best. Granted, the only time infantrymen used the Springfield against a European nation it was outclassed, and the men of the Second Massachusetts Infantry carrying them in 1898 had to come out of the line at El Caney in Cuba.⁵⁵ This failure twenty-five years later does not mean the adoption of the rifle was a bad decision, as that battle was against an enemy using smokeless, repeating rifles. By 1898, the Chassepot, the 1871 Mauser, the Martini-Henry, the Vetterli, the Berdan, the Wanzl, the Werndl, and the Werder, all of the contemporaries of the Springfield, had been relegated to second-line duties or discarded from service.⁵⁶

Of all of the rifles adopted in the late 1860s and early 1870s, only the Springfield saw combat against a European power some quarter-century after its adoption while infantry still fought in lines. The fact that the weapon failed then should not be misconstrued as it being a poor weapon to begin with, only that the adoption of magazines and smokeless powder had overtaken it, as those developments had overtaken all of its contemporaries. When Russia and Germany used their Berdans and 1871 Mausers as second-line rifles during the First World War, they performed as badly as had

⁵⁵ Henry Cabot Lodge, *The War with Spain*, (New York: Harpers and Brothers Publishers, 1899), 121, 123.

⁵⁶ E. Gunter, "The von Löbell Annual Reports on the Changes and Progress in Military Matters in 1901," *Journal of the Royal United Services Institute for Defense Studies* 46, no. 296 (1902), 1318-1322.

the Springfield in 1898.⁵⁷ They were not bad rifles, only overtaken by new technologies and the passage of time.

The United States produced firearms for various nations, of various types, and of various calibers, while not adopting any of them for indigenous service. Denmark, Sweden, Spain, Egypt, and even the Papal States all employed the Remington rifle, long championed as defective by General Alexander B. Dyer.⁵⁸ Indeed, Austria almost adopted the weapon before the same pressures of patriotism and resentment of foreign innovation that prevented the adoption of the needle-gun caused the selection of the Wanzl. Switzerland even chose the Vetterli not because it wanted a magazine rifle, but because Remington was unable to take on another large order after delivering fifteen thousand rifles.⁵⁹ The United States Army understood how prevalent other American-made rifles were with all of these acceptances, and the arms boards understood the trends of European rifle design. Against all of those things, they believed the Springfield was the superior weapon.

⁵⁷ Walter, *Rifles of the World*, 52, 304; Holland Thompson, ed., *The Book of History: The World's Greatest War From the Outbreak of Hostilities to the Treaty of Versailles, Volume XVI: The Causes of the War, The Events of 1914-1915 Including Summary* (New York: The Grolier Society, 1920), 172.

⁵⁸ Norton, *American Breech-Loading Small Arms*, 36.

⁵⁹ *Ibid.*, 33, 36.

CHAPTER V

AS EFFECTIVE AS FORTY SPRINGFIELDS: MACHINE-GUNS AND MAGAZINE RIFLES, 1865-1878

Although the Gatling gun found much favor in the United States, and French *mitrailleuses* generated much interest in the wake of the Franco-Prussian War, there was still a global debate as to how to employ the weapons effectively. Rather than demonstrating conservatism, as many authors charge, the United States Army and the Ordnance Department during the Civil War actually embraced these new technologies and weapons well before their European contemporaries; although like European armies failed to create workable tactical doctrines for the weapons. The American army still did not understand exactly how to employ the weapons, and the Ordnance Department classed them as artillery, but the army wanted to keep its Gatling Guns. In a panic in the wake of the war some nations, like Russia, ordered numerous machine-guns to give their armies a firepower advantage on the battlefield. Officers in other armies condemned the mass acquisition of these weapons, arguing that the war had not demonstrated their usefulness, and only the French, the losing side in the conflict, employed the weapons. While Europe continued to have mixed interests on the adoption and use of machine-guns, the United States Army clung to its weapons, and attempted to find appropriate

tactical uses for the weapons.¹

The United States Army after the Franco-Prussian War fully embraced the new quick-firing weapons. In 1872, Norton declared, “The artillery branch of no army is complete without the “Gatling Gun,”” and in his book on American small arms gave his full support to the weapons.² In contrast, a British observer adopted a more conservative stance and, referring to the Russians mass order of the weapons after the Prussian victory, Lieutenant Charles Vincent of the British Twenty-third Royal Welsh Fusilier Regiment commented, “now that calmer moments have succeeded to the startling events of that year, the suitability of mitrailleuses for the field is being seriously considered.”³ The United States saw the potential of the weapons well before European armies, and the events of the French conflict caused doubt about the machine-gun’s effectiveness in British circles.

Always willing to make a profit or motivated by patriotism during wartime, inventors offered nine types of machineguns to the War Department, who liked some of the weapons but was unwilling to commit to unproven technology during the crisis.⁴ On August 24, 1866, as the army sought to rearm with new breech-loading rifles, it expressed interest in new Gatling Guns and purchased one hundred of the weapons, fifty each of 1-inch and .50-caliber versions, at a total cost of \$175,000.⁵ The army had selected a cartridge, the .50-caliber, but in 1866 still had not decided on a standard type of breech-loading rifle, and later, in 1872, Congress only appropriated \$150,000 for the

¹ *The Publishers’ and Stationers’ Weekly Trade Circular* 2, July-December 1872 (New York: F. Leyboldt, 1872), 616; Norton, *American Breech-Loading Small Arms*, 257; Vincent, “The Russian Army,” 306.

² Norton, *American Breech-Loading Small Arms*, 257.

³ Vincent, “The Russian Army,” 306.

⁴ Armstrong, *Bullets and Bureaucrats*, 39.

⁵ *Ibid.*, 46.

manufacture of new, unconverted rifles for when the army finally decided on which one it wanted.⁶ The “conservative, cost-conscious” Ordnance Department, to use Armstrong’s own words, spent more money on new, untried machine-guns in 1866 than it did on new rifles, that it needed much worse, in 1873.⁷ Further, the army’s purchase of the new weapons, delivered in 1867, was at a time when “No European power had evinced more than a passing interest in machine guns.”⁸

The Gatling gun was an excellent weapon for its time, being simple, reliable, and best of all, lightweight and mobile.⁹ Of the one hundred weapons purchased for trial, the Ordnance Department issued twenty-three to regular troops in 1868 and 1869, and another seventeen in 1871 and 1872. The issuances of the weapon took place slowly, but especially in the 1860s, the army tested the weapons extensively.¹⁰

The reliability of the weapon was excellent, even in the original versions and the .58-caliber version tried before the army contracted for one-hundred pieces. One of the barrels burst on a .58-caliber piece in 1865, but caused no damage to the operators and the weapons remaining barrels continued to function, and Lieutenant I.W. Maclay of the First United States Artillery noted that even when partially disabled “the gun is still efficient.”¹¹ A test of a 1-inch-caliber piece in March, 1866, revealed that of 432 rounds fired only 4 rounds misfired, a failure rate of 1.1 percent, which while four times higher

⁶ Ordnance Department, *Report of the Chief of Ordnance to the Secretary of War For the Fiscal Year Ending June 30, 1873* (Washington: Government Printing Office, 1873), 4.

⁷ Armstrong, *Bullets and Bureaucrats*, 46.

⁸ Ibid.

⁹ Norton, *American Breech-Loading Small Arms*, 250-251.

¹⁰ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1869* (Washington, DC: Government Printing Office, 1869), 15; United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1872* (Washington, DC : Government Printing Office, 1872), 13.

¹¹ United States War Department, Ordnance Department, *Ordnance Memoranda 17: Report of the Board of Officers Appointed By Special Orders No. 108, A.G.O., May 31, 1873 on Gatling Guns of Large Caliber For Flank Defense* (Washington, DC: Government Printing Office, 1873), 19.

than that of the .50-caliber service cartridge, was not horrible considering that the 1-inch-caliber projectile was not yet standard issue and the weapon had yet to be perfected.¹²

Lieutenant Colonel T. G. Baylor of the Fortress Monroe Arsenal, on July 14, 1866, wrote that the Gatling gun of 1-inch caliber was “a superior arm to 24-pounder howitzer for flank defense as from 80 to 100 buck-and-ball cartridges can be fired in 1 minute and 30 seconds, being a discharge of 1,200 to 1,600 projectiles.”¹³ Six weeks after Baylor’s glowing report, the army ordered one hundred of the new weapons.

The 1874 *Ordnance Memoranda 17* details American and British army experiments with Gatling Guns as infantry-supporting artillery and as pieces for the flank defense of fortifications. An American arms board tested its effectiveness against targets simulating infantry and cavalry, and compared the Gatling with the .45-caliber Springfield while a British board, in October 1870 during the Franco-Prussian War, tested it against the Montigny *mitrailleuse* and the Martini-Henry and Snider rifles. At ranges of 600 and 800 yards, where both the Montigny and Gatling fired 720 and 550 rounds of ammunition respectively, the American-designed Gatling was more accurate, scoring 618 and 439 hits, respectively, compared with 538 and 292. In addition, the rate of fire of the Gatling gun was quicker, taking 5 minutes and 51 seconds to fire the 1,270 rounds, while the French weapon took 7 minutes and 8 seconds to do the same.¹⁴ The French used the Montigny alongside the Reffye *mitrailleuse* in 1870, and Prussian soldiers called the machine-gun “*Höllmaschine*, the hell machine.”¹⁵ For all the terror of the French *mitrailleuse* and the rush to procure similar weapons that it caused all over

¹² Ordnance Department, *Ordnance Memoranda 17*, 20; United States Congress, *Report of the Secretary of War Part I*, 1867, 610.

¹³ Ordnance Department, *Ordnance Memoranda 17*, 20.

¹⁴ *Ibid.*, 24.

¹⁵ Wawro, *The Franco-Prussian War*, 53,

Europe, the American-designed weapon was superior.

In the summer of 1873, an arms board, presided by Major Q. A. Gillmore, convened in Washington to decide on the utility of Gatling Guns for the flank defense of fortifications. This board had access to all of the test records of previous boards and experiments with the Gatling gun by the United States Army, and even possessed detailed accounts of the British tests in 1870 when examiners paired the weapon against its French counterpart.¹⁶ At another board, examiners fired a Gatling gun for four hours, expending 63,000 rounds of ammunition without stopping to service or clean the weapon. At the close of the test, Lieutenant Commander J. D. Marvin of the United States Navy, supervisor of the test, proclaimed the .50-caliber Gatling gun “eminently satisfactory.”¹⁷

The board wrestled with the problems of how best to employ the Gatling gun, at what ranges, and what calibers and types of shot to use. They found that one well-served Gatling delivered approximately the same number of rounds on target as forty men issued with .45-caliber Springfield rifles, and at ranges of up to 200 yards, the Gatling was more accurate than the rifles. Despite great accuracy, the board noted that the rifle “covered the targets better” and “would have been more effective against a deep column of troops.”¹⁸ As early as 1873, the United States Army, while still not sure how best to employ the machine gun, began to understand the power of the weapon and its effectiveness against infantry. Further, the Gilmore board noted that the weapon was similar in effectiveness to a 12-pounder Napoleon artillery piece, although the Gatling suffered in terms of elevation.¹⁹ One item the board did not discuss was the cost of the weapon. David

¹⁶ Ordnance Department, *Ordnance Memoranda 17*, 19-24.

¹⁷ *Ibid.*, 30.

¹⁸ *Ibid.*, 373

¹⁹ *Ibid.*, 37.

Armstrong cited a figure of fifteen hundred dollars. The Springfield cost eighteen dollars, and the Gillmore board noted that a .50-caliber Gatling gun was as effective as forty rifles. Thus, the army was experimenting with a weapon that cost fifteen hundred dollars, which was equal in efficiency to forty men with Springfields, which cost the army 720 dollars, just under half as much. The army procured weapons that cost twice as much as cheaper solutions, but were more efficient because they required fewer soldiers as gun crews, demonstrated that the army was not conservative as it sought weapons to give its forces more firepower, especially in an era when the size of the regular army continually decreased. The Gatling was more expensive, but ensured that on the battlefield the American Army could still deliver an immense amount of firepower. During the period following the American Civil War, the size of the regular army dwindled so much that an infantry company often could muster only twenty-nine privates, and some, such as the Seventh United States Infantry in 1877, only twenty-four men per company.²⁰ Three to five men serving a quick-firing Gatling gun could then do the work of almost two infantry companies in an open field.²¹

A board of engineers that convened in January and February 1874 arrived at a different conclusion, stating that while the Gatling gun had utility in “special cases,” larger forts did not need the weapons for flank defense. The engineers argued that its use in smaller forts with limited garrisons was more practical.²² Such arguments demonstrate

²⁰ Utley, *Frontier Regulars*, 16.

²¹ A Model 1862 .58-caliber Gatling Gun required between three and five men, and a photograph in Julia Keller’s *Mr. Gatling’s Terrible Marvel: The Gun That Changed Everything and the Misunderstood Genius Who Invented It* (New York: Penguin Group, 2008) shows a five-man gun crew in the Philippines, circa 1899. “Gun, Gatling,” *Springfield National Historic Site*, Accessed March 8, 2010. <<http://www.museum.nps.gov/spar/vfpcgi.exe?IDCFile=/spar/DETAILS.IDC,SPECIFIC=14258>>

²² Secretary of War, *Report of the Secretary of War; Being Part of the Message and Documents Communicated to the Two Houses of Congress at the Beginning of the Second Session of the Forty-Third Congress, Volume 1* (Washington, DC: Government Printing Office, 1874), 297.

that the army saw the Gatling as a means to give smaller groups of soldiers more firepower, and in traditional European combat roles.

Convinced of the merits of the weapon, the United States Army procured 497 of the weapons between 1866 and 1893 in three different calibers. Of the 1-inch caliber, the army acquired 51, with 19 .30-caliber in 1893, and the remaining 427 in .45-caliber, the same as the new service rifle. By the 1880 alone, the army had 284 pieces, and added still more that year.²³ As the army considered each gun equal to 40 Springfield rifles, in total the Gatlings were equal to 11,360 infantrymen, while requiring no more than 1,420 crew to operate, a great saving of manpower at a time when the authorized strength of the army was close to 25,000 men.²⁴

In trials, the army considered the Gatling gun a superb artillery piece. In field use, its accuracy beyond 250 yards made it more effective against troops than an artillery piece firing canister shot, while a single piece achieved more hits and caused more damage than two twelve-pounder howitzers and an eight-inch rifle at five hundred and eight hundred yards. While impressive, the army still preferred shell artillery, and the rifle-caliber Gatling to the 1-inch model.²⁵ Due to faulty artillery shells, the report of a trials committee in 1871, argued “a body of troops having to advance.... over any distance within 1,200 yards, would suffer far more from Gatling guns delivering an incessant and wide-spread fire.... than from field guns.”²⁶ General Dyer so loved the weapon that he argued that the new .45-caliber Gatlings procured in 1873 would “be far

²³ Charles Morrison and James C. Ayres. *Artillery Circular I, Series of 1893. Course of Instruction for Artillery Gunners. Modern Guns and Mortars* (Washington: Government Printing Office, 1895), 40.

²⁴ Utley, *Frontier Regulars*, 16-17.

²⁵ Ordnance Department, *Report of the Chief of Ordnance 1874*, 35, 40.

²⁶ *Ibid.*, 36.

more effective in Indian warfare than the mountain-howitzer heretofore in use.”²⁷

Historian Robert M. Utley argues that, on the contrary, the Gatling was inefficient against Native Americans. General Nelson A. Miles declared that the weapons were “worthless for Indian fighting,” primarily because they used the .50- and .45-caliber rifle bullets, which made determining the effectiveness of hits difficult at long range.²⁸ The weapon was also bulky, like any artillery piece, and decreased the speed of an otherwise fast-moving column of light infantry or cavalry. Further, the crews assigned to these weapons were often infantrymen untrained in the proper use of the weapon. Utley noted that the Hotchkiss Mountain gun, in comparison, was popular and Miles argued that through all of his campaigns, only the area around the modern Yellowstone National Park was unsuitable for the latter weapon’s portability.²⁹

The United States Army, in testing the Gatling, never examined its effect against single targets, representing individual soldiers of Indian braves, but, instead, created targets that simulated troop columns, similar to the battlefields of Gettysburg or Koniggratz. The fall of shot against single targets was, as Miles pointed out, hard to discern, and was just as difficult as observing the effects of rifle fire at long range. Against masses of troops, the effectiveness of the fire of Gatling guns, or twelve-pounder Napoleon field pieces, was easily discernable. As canister fire or thousands of .45-caliber balls rained down on infantry marching in perfect Napoleonic order, or targets that represented them, army officers could easily see the effects of the weapons. In the field, when Indians did not bunch up as the targets did on the proving ground, and when they dragged their wounded off, the weapons appeared ineffective, possibly more than they

²⁷ Ordnance Department, *Report of the Chief of Ordnance 1873*, 10.

²⁸ Quoted in Utley, *Frontier Regulars*, 72-73.

²⁹ *Ibid.*

really were.³⁰ Against European-style targets, an arms board claimed that the Gatling's "efficiency in field-works, not only for flank but for direct fire, seems unquestionable."³¹

Army officers thought the Gatling perfect for the flank defense of forts, but quickly realized that it possessed other practical uses as well. The Gillmore board limited itself to the testing of the weapon in fortification roles, but noted that protection of villages, entrenched positions, counter-battery fire, and stopping infantry and cavalry charges with practical uses "conceded for the Gatling gun."³² General William B. Franklin noted that British military strategists argued that the rifle-caliber pieces had an effective range of up to fourteen-hundred yards, while the larger ones, such as the army's 1-inch caliber, had ranges exceeding two thousand yards. Franklin asserted this ability made them effective field pieces, perfectly suited to counter-battery fire, preventing an enemy field gun from opening fire against friendly infantry.³³

Such thought demonstrates that the United States Army was not interested in the weapon for its Indian-fighting abilities; after all, Native Americans did not fight in line or use Krupp field guns. The Gatling was perfect for decimating infantry formations or, thanks to its range, silencing enemy pieces or dislodging a prepared position before an infantry attack.³⁴ These objectives are what the Gatling Gun Company designed the weapon for, not firing at single targets at long range, as Robert Utley suggests.³⁵ In Indian fighting, the gun simply acted like a multi-barreled rifle, which greatly limited its effectiveness. In the Franco-Prussian War, as French gunners could not sweep their

³⁰ Ibid.; William B. Franklin, *The Gatling Gun For Service Ashore and Afloat* (Hartford: The Case, Lockwood, and Brainard Co., 1874), 11-18.

³¹ Franklin, *The Gatling Gun For Service Ashore and Afloat*, 18.

³² Ibid., 17.

³³ Ibid., 19.

³⁴ Ibid., 19.

³⁵ Utley, *Frontier Regulars*, 73.

weapons from side to side along the rank of an infantry formation, they usually fired upward of thirty rounds into a single man, before changing targets.³⁶ The weapons were not yet fully effective, but the fact that early weapons comparable to the American-designed Gatling had such limitations, army officers understood that the weapon's prime usefulness was against European-style formations.³⁷

Comparing Army officers' dislike of the Gatling gun for Indian warfare, but yet their unending praise for the anti-personnel abilities of the weapon in hypothetical usage, demonstrate exactly what kind of fighting force the army saw itself as during the breechloader era: a European-style, volley-firing, artillery-wielding army. The tests of the Gatling gun referred to in the Ordnance Department's *Ordnance Memoranda 17* demonstrate scenarios of fighting a traditional European style army: attack columns, bodies of men, attack on forts, sweeping targets representing lines of men, and tests involving combined rifle, artillery, canister, shell, and Gatling fire.³⁸ The army trained as Europeans, and failed to train to fire at scattered Indian warriors who took cover wherever possible.

Instead of ascertaining the viability of new weapons in frontier constabulary roles, the American Army trained to use its weapons, and tested their effectiveness, as if they would be fighting Bismarck's Prussians in France rather than Sitting Bull's braves at the Little Big Horn. In this vein, the United States was also keen on examining the lessons of the Franco-Prussian War, and how the French employed their Montignys and Reyffes.³⁹ The weapons were poor against Indians, but as they began to come into use in Europe,

³⁶ Wawro, *The Franco-Prussian War*, 99.

³⁷ Ordnance Department, *Ordnance Memoranda 17*, 29.

³⁸ *Ibid.*, 19-31; Ordnance Department, *Report of the Chief of Ordnance 1874*, 31-39.

³⁹ Ordnance Department, *Ordnance Memoranda 17*, 29.

and as they afforded the ability to offset the small size of the regular army, the army continued to test them and procured them in great numbers.⁴⁰

The same argument, that is what Europe did or did not do, also influenced American concepts of magazine rifles. Robert Utley notes how Indians acquired repeaters in ever greater numbers, and how an attempt by Colonel Ranald Mackenzie to rearm his regiment with Winchester repeaters failed.⁴¹ While the United States Army in the early 1890s demonstrated a trend of conservatism against the magazine rifle, causing one *New York Times* author to claim the army was “wedded” to the Springfield rifle, this conservative attitude did not exist in the 1870s.⁴² In praising the service rifle in 1880, General Stephen V. Benét claimed, “as a single breechloader it has no superior as a military arm and.... it will not be superseded by anything short of a magazine gun. The latter will be unquestionably adopted, and we will as certainly do so.”⁴³ He called for continued magazine gun trials in 1880, and noted that, much like the 1866 Arms Board, the cavalry needed a magazine carbine.⁴⁴

The United States, as early as 1874, wanted to increase the rate of fire of its Springfield rifles. The musket-like appearance did not lend itself well to the fitting of a magazine, as would be done on European bolt-action rifles such as the Italian Vetterli, Dutch Beaumont, or German Mauser, all originally adopted in 1871.⁴⁵ The lack of upgradeability of the Springfield was its biggest handicap, but that does not make the

⁴⁰ Morrison and Ayres. *Artillery Circular I, Series of 1893. Course of Instruction for Artillery Gunners. Modern Guns and Mortars*, 40.

⁴¹ Utley, *Frontier Regulars*, 71-72.

⁴² “New Army Rifle,” *New York Times*, September 4, 1892, 15.

⁴³ United States War Department, Ordnance Department, *Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1880* (Washington, DC: Government Printing Office, 1880), xv.

⁴⁴ Ordnance Department, *Report of the Chief of Ordnance 1880*, xv-xvi.

⁴⁵ John Walter, *The Rifle Story: An Illustrated History From 1776 to the Present Day* (London: Greenhill Books, 2006), 119.

army's choice in 1873 conservative. Any upgrade to the Springfield rifle would simply have taken money away from funds used to procure, test, or build new smokeless magazine rifles. The United States Army could not convert the Springfield to a magazine rifle like the Dutch did with their Beaumont, but the American Army also adopted a smokeless magazine rifle three years earlier than Holland, although production did not begin until 1894.⁴⁶ Conversions extended the usefulness of the old weapons to a degree, but the introduction of smokeless powder rendered all black-powder weapons obsolete.

As a true magazine, whether box or tubular, was impractical, the United States experimented with cartridge blocks for the Springfield. Holding eight cartridges, a soldier could fix the wooden block to the rifle by means of a wire cam and a leather strap, holding it securely to the rifle and protecting it from firing and recoil.⁴⁷ Most military rifle magazines of the era possessed cut offs so that soldiers could, in effect, deactivate the magazines on their rifles and so that their superiors could discern whether a trooper was using his magazine. The advantage of the cartridge block, towards this line of thinking, was that it was so bulky and obvious that it was easily visible whether the soldier was making use of it. It also had the advantage of allowing the soldier to maintain a high rate of fire while firing prone – the lever action of repeaters such as the Spencer, Henry, or Winchester made rapid prone firing difficult, as the lever of the weapon required the soldier to roll or move, thus exposing him to fire. Finally, the cartridge block allowed the soldier to see exactly how many rounds he had left, something enclosed magazines prohibited.⁴⁸ The United States Army proceeded slowly, and while not fully adopting the device, by 1877 government arsenals boasted a mix of cartridge belts,

⁴⁶ Walter, *The Rifle Story*, 128.

⁴⁷ Ordnance Department, *Report of the Chief of Ordnance 1875*, 81-82.

⁴⁸ *Ibid.*, 84.

blocks, and boxes for regular issue. By 1877, the Ordnance Department issued 1,490 of the block devices to regular army units. The army did not outright adopt a device to facilitate increased rates of fire, but it did not act in a conservative manner as it at least examined such inventions and proved willing to adopt large numbers of them for testing.⁴⁹

During the breechloader era, until magazine guns began to become dominate in the mid to late 1880s, the United States Army was not a conservative power, as it adopted technologies on par with those in use in Europe and trained to use them in the European manner. In doing so, the army faced severe difficulties in the use of its rifles, artillery, and machine-guns against enemy combatants during the Indian Wars. Weapons that were “perfect” and “modern” in a traditional military sense, like the Gatling gun, proved ineffective against Indians, while armaments effective towards Native Americans, such as the magazine rifle, were out of place in European-style combat. In making either choice, the army faced criticism of being conservative. Despite its small size, the United States military considered itself a professional, regular army, one that had always trained and fought like a European-style fighting force. To abandon all of that, for the sake of pacifying Indians, was too much for the army to contemplate. Instead, it continued to model itself after a force that, according to General Philip J. Sheridan during his observation of the Franco-Prussian War, could best the Prussians in combat if they had the chance.⁵⁰ The United States Army armed, trained, and fought like a European army. It faced handicaps because of its methods during the Indian Wars, but for what it tried to do, be a traditional, volley-firing, line-fighting army, it was not conservative.

⁴⁹ Ordnance Department, *Report of the Chief of Ordnance 1877*, 22.

⁵⁰ Paul Andrew Hutton, *Phil Sheridan and His Army*, 206.

CHAPTER VI

“CONSIDERED A MORE SERVICEABLE GUN:”

THE SPRINGFIELD AND EUROPEAN ARMS, 1875-1885

During the decade following the adoption of the new .45-caliber Springfield rifle, the United States Army continually tried to improve the weapon, to make it more reliable, functional, accurate, and cost effectiveness. The aim of the Ordnance Department was to create the perfect battle rifle, as it had intended all along. To this end, the United States Army compared its new arm with those of Europe, as it had done during arms tests in 1872 and 1873. They argued that the arm was superior to those used in Europe, and indeed in tests against European arms, on both sides of the Atlantic Ocean, confirm that rather than being an inferior arm demonstrating poor choice and conservatism by the Ordnance Department, the Springfield was an excellent arm comparable to those in use in Europe during the same period.

During the arms tests leading up to the adoption of the new Model 1873 Springfield, the United States had a chance to compare the Allin rifle with those in use in Europe. For serviceability, reliability, accuracy, and other factors, the United States chose the American-designed Springfield rifle. The tests also gave the United States insight into the performance of European weapons. Instead of focusing solely on the domestic Indian

problems, the United States Army sought to compare itself with the forces then in Europe.

As opposed to the exemplary performance of the Springfield, the Terry Arms board had harsh criticism of many of the arms used in Europe, many of which boasted seemingly more modern designs than that used by Erskine S. Allin. For the 1872-1873 tests, the United States asked for two arms each from Britain, France, Russia, Switzerland, Austria, and Prussia, plus one thousand rounds of ammunition for each, and later secured a Dutch Beaumont Rifle as well.¹ France, then engaged in designing a metallic cartridge conversion to its Chassepot rifle, did not send rifles or ammunition, while the Prussians sent a *Zundnadelgewehr*, but due to their efforts to adopt a metallic cartridge for their new rifle sent no ammunition. Only the British and the Russians sent two guns, all of the other nations only sent one.²

In these tests, the pieces often performed less than desired considering that they were all standard issue military arms. The Beaumont Rifle (see Figures Seven, Eight, Eleven, and Twelve), adopted in 1871, featured a bolt mechanism similar to rifles, and was later suitable to conversion to a magazine system. The weapon and ammunition were not suited to sustained firing, and after one hundred shots, the weapon was “badly fouled and leaded,” with accuracy reduced accordingly.³ The Terry Board described the accuracy of the Austrian Werndl after firing but sixty rounds as “completely wild.”⁴ The American-designed Russian Berdan, despite using lubricated ammunition, also had heavy

¹ United States War Department, Ordnance Department, *Ordnance Memoranda 15: Report of the Board of Officers For the Purpose of Selecting a Breech System for the Muskets and Carbines of the Military Service, Together with Their Report on the Subject of Trowel Bayonets* (Washington, Government Printing Office, 1873), 352, 354.

² *Ibid.*, 354.

³ *Ibid.*, 357, 374, 395.

⁴ Ordnance Department, *Ordnance Memoranda 15*, 374.

fouling like the Beaumont after one hundred rounds. This Swiss Vetterli was relatively free of fouling after one hundred rounds, but required special lubricated ammunition. The Board noted that only the Martini-Henry proved reliable and unfouled after firing one hundred rounds.⁵ While the board did not comment on the fouling of the Springfield, the St. Louis Arms Board of 1870 subjected a Model 1868 Springfield Rifle, Serial Number 14515, to an endurance test firing five hundred rounds, and while the barrel “slightly fouled” after the first one hundred rounds, they noted nothing on fouling for the subsequent four hundred shots.⁶

The adoption of the Springfield was not conservative, but common sense – American trials, and the United States Army, demonstrated that in 1873 the Springfield system was superior to the majority of arms then in use in Europe. That did not necessarily change over time, as in 1889 an author in the British *Westminster Review* described the Springfield as “being considered a more serviceable gun than the Martini-Henry, nearly as easy to load quickly, simpler in construction, stronger, and quite as accurate as the latter.”⁷ The Martini-Henry was among the best rifles in the world, and observers in the United States and Britain argued that the Springfield was equal to the Martini-Henry. Although the Springfield had problems, such as at The Little Big Horn, the adoption of the Springfield was no more conservative than the adoption of the Martini-Henry.

American comparisons with the new British service rifle did not end in 1873. The Martini-Henry had greater penetration during the 1872 tests, achieved by more powder

⁵ Ibid.

⁶ Ordnance Department, *Ordnance Memoranda* 11, 9.

⁷ Cecil Logsdail, “The United States Army,” *The Westminster Review* 132 (July-December 1889), 439.

and a heavier bullet, at the expense of heavier recoil.⁸ The Army wanted to improve the Springfield, and as the Martini-Henry was the best of the foreign breechloaders, according to the Terry Board, Captain John E. Greer of the Ordnance Department began extensive tests between the two weapons in 1879 to determine superiority in ballistics, velocity, penetration, recoil, and range. The impetus for the test was the Russo-Turkish War of 1877-1878, and an article in the *Journal of the Royal United Service Institution* entitled “Lessons from the Late War,” by Captain John L. Needham.⁹ Whereas after the Franco-Prussian War military tacticians seriously questioned the effect and validity of long range firing, the Russo-Turkish War stirred some to advocate that since most armies possessed a new generation of breechloaders, being of smaller caliber and higher power than those used during Bismarck’s wars, long-range firing was now an “imperative necessity.”¹⁰ Instead of hold their fire until an effective range, the Turks fired as soon as the Russians came into view, causing “immense loss” to advancing Russian troops, while consuming a massive quantity of ammunition. The effect of the fire was severe, soldiers crossing a mile of open territory lost half of their number killed, wounded, or routed because of the hail of gunfire.¹¹

Although the performance of the Turks was impressive, such exploits required an immense amount of ammunition. Needham noted that experiments in Europe garnered some successes, at fifteen hundred yards Swiss troops with Vetterlis hit 9 percent of their targets, while at the same distance Germans with Mausers managed between 8 and 22

⁸ Ordnance Department, *Ordnance Memoranda* 15, 374.

⁹ Ordnance Department, *Report of the Chief of Ordnance 1880*, xx, 425; John L. Needham, “Lessons from the Late War,” *Journal of the Royal United Service Institution* 22, no. 98 (1878), 941.

¹⁰ Needham, “Lessons of the Late War,” 942.

¹¹ *Ibid.*, 944.

percent accuracy, depending on the arrangement of the targets.¹² While such hypothetical losses to an enemy were achievable, the amount of ammunition required would be enormous, as soldiers would fire numerous cartridges well before enemy troops closed to the supposed “effective range” taught by military theorists. Needham noted that Turks often fired as much as five hundred rounds per man during a campaign and never ran short of ammunition.¹³ For long-range fire to be effective ammunition was a critical factor – arsenals needed to produce a simple cartridge in massive quantity, one that possessed great range and did not cause jamming or fouling.

In 1879, with a desire to determine how the American rifle fared against its European competitors in the aspect of long-range firing, the Ordnance Department undertook tests at the Sandy Hook proving ground in New Jersey between the Model 1873 Springfield and the Martini Henry. Captain John Greer concluded the Springfield the superior weapon, having less recoil, more velocity, and better accuracy; although in terms of penetration and shooting in high winds, the Martini bested the American arm.¹⁴ Greer also compared the Springfield and Martini carbines, and noted that the Springfield carbine was inferior not by design, but because in 1879 American carbines used a lighter .45-55 load, containing only fifty-five grains of powder, as opposed to the seventy-grain load used by infantry rifles.¹⁵ These tests demonstrated that heavier bullets decreased flight time of the projectile after firing, and gave a flatter trajectory, which translated into better accuracy. As a result, in 1885 the army adopted the five hundred grain bullet as standard in its .45-caliber cartridge, in an attempt to improve the qualities of an otherwise

¹² Ibid., 944-945.

¹³ Ibid., 947.

¹⁴ Ordnance Department, *Report of the Chief of Ordnance 1880*, 425-426, 437.

¹⁵ Ibid., 426.

excellent rifle, proving once again that while a good breech-loading system was important, an army had to have effective and accurate ammunition to make the weapon successful.¹⁶

The American Army had difficulty with .45-caliber cartridges in its new Springfield rifle, and the British experienced several problems with their Snider-Enfields and Martini-Henrys as well. In 1885, British soldiers firing Martini-Henry rifles at Abu Klea in the Sudan encountered severe problems extracting cartridges, as sand entered the actions of the rifles and jammed the rifles. Observers reported that “hundreds of cartridges jammed,” while others argued that the rifles could fire only a few rounds before the action froze.¹⁷ The result was that Arab forces reached a British square as both the Martinis and the Gardner machine-gun jammed, resulting in 150 British soldiers killed.¹⁸ Just as happened to the Springfield at the Little Big Horn, faulty ammunition put the Martini Henry out of action. Because of these deficiencies and the disaster at Abu Klea, detractors launched a press campaign against the rifle. The British Army responded by introducing improved drawn brass cartridges and adopting the Martini-Henry Mark IV rifle, which featured a longer loading lever to facilitate better extraction with stuck cartridges.¹⁹ Later in the decade, British officers and commentators had mixed opinions on the Martini-Henry. Most agreed that the rifle’s problems lay in its ammunition with one editorialist claiming the “less said [about the Martini’s ammunition] the better.”²⁰

The same columnist described the committee that adopted the Martini-Henry as

¹⁶ *The Encyclopedia Americana* 25 (New York: The Encyclopedia America Corporation, 1920), 103

¹⁷ *Hansard Parliamentary Debates*, 3d ser., vol. 295 (1885), 1710, 1713.

¹⁸ *Ibid.*, 1710.

¹⁹ Walter, *The Rifle Story*, 78.

²⁰ “Editorial – British Rifle Power. – A Serious Subject,” *The Illustrated Naval and Military Magazine* 5 (December 1886), 423.

“mechanically ignorant” for refusing to consider bolt-action designs such as the Mauser or the Gras.²¹ In 1890, another author, while noting that ammunition problems plagued the rifle in the Sudan, argued, “This Martini action is to this day the most perfect breech action that has ever been devised for military rifles,” noting that new drawn brass cases corrected any flaws in the rifle.²² Even the iconic British Martini-Henry rifle sustained much of the same criticism levied at the American Springfield. Both rifles had faults, but faulty ammunition was the major handicap of the two weapons.

In addition to ammunition, the United States army also sought ways to improve the basic service rifle by adding an integral bayonet in an attempt to remove the blade altogether. During the 1873 arms board that selected the .45-caliber Springfield rifle, General Alfred H. Terry commented that he thought “the day of the bayonet has passed away. Just as the pike yielded to the muzzle-loading firearm with the bayonet, so this latter must yield to the breech-loading arm without the bayonet.”²³ At the same time, he also argued that the perceived uselessness of the bayonet created the possibility to reduce the weight of a soldier’s kit by eliminating the piece.²⁴ The attempts to create an effective rifle with an integral bayonet, and thus discard the traditional bladed bayonet, demonstrates a lack of conservatism as the Ordnance Department, and men like General Terry, expressed interest at abandoning a piece of equipment, the blade bayonet, used for centuries in traditional armies.

To that end, on January 30, 1878 Steven V. Benét officially recommended to the

²¹ Ibid.

²² Verax, “Some Remarks on Our New Military Rifle,” *Colburn’s United Service Magazine* 21 (March 1890), 523.

²³ Ordnance Department, *Ordnance Memoranda* 15, 21.

²⁴ Ibid.

Secretary of War the “abolition of the bayonet and saber.”²⁵ Colonel James G. Benton, commanding officer of the Springfield Armory, submitted a design of a ramrod bayonet based on the type used by the Model 1819 Hall breech-loading rifle.²⁶ The proposed ramrod bayonet occupied the space of the normal cleaning rod, but allowed the soldier to shed the weight of a blade bayonet and scabbard. By not needing to manufacture a blade, and as the army already manufactured cleaning rods for its rifles, they army saved both weight on its soldiers and money in the manufacture of weapons and accoutrements.²⁷ Benét argued that the saber and the bayonet “must yield to the revolver and rifle – cold steel to gunpowder and lead.”²⁸ By June 30, 1881, the national armory fabricated 1,014 of the new Springfield Ramrod Bayonet rifles, alongside 15,014 regular-issue Springfield rifles, 10,000 carbines, and 500 cadet rifles.²⁹ Some of these new rifles suffered faults not endemic to the other varieties. For example, all 250 of the rod bayonet rifles issued to troops in Cheyenne, Wyoming Territory had improperly adjusted rifle sights. Despite the poor sights, Captain F. Heath of the Ordnance Department reported that the rifles “have been received with favor,” part of their desirability being that prior to these rifles, “the bayonet, owing, perhaps, somewhat to the inconvenience of carrying it with the cartridge belt, is seldom or never taken into the field.”³⁰

While the rifles may have achieved some notability in the Wyoming Territory, Captain Stanhope E. Blunt, Chief Ordnance Officer in the Dakota Territory, argued that the weapons “give general dissatisfaction,” as they too had poor and unadjusted sights.³¹

²⁵ Ordnance Department, *Report of the Chief of Ordnance 1880*, xvi.

²⁶ *Ibid.*, xvi, 403.

²⁷ *Ibid.*, xvi-xvii.

²⁸ *Ibid.*, xvii.

²⁹ Ordnance Department, *Report of the Chief of Ordnance 1881*, 12.

³⁰ Ordnance Department, *Report of the Chief of Ordnance 1882*, 116.

³¹ *Ibid.*, 120.

Here, the Ordnance Department issued rifles to one company each of the Third, Seventh, Seventeenth, Eighteenth, and Twenty-Fifth Infantry Regiments. Despite the problem that a soldier had to remain stationary to fix and unfix the rod bayonet, as opposed to on the run, Blunt was not opposed to the concept of the rifle. He advocated either replacing the Model 1880 rifles with rod bayonet rifles of improved patterns, or scrapping them completely, as the trials rifles were unsatisfactory.³²

Wanting to continue to improve the design and refusing to abandon the concept, the army adopted a new model of Springfield, the Model 1884 ramrod bayonet rifle. These new weapons suffered from problems as well. A new sight, adopted in 1884, proved “liable to injury,” as screws came loose from use and the sight leaf, prone to sliding during firing, caused “inaccuracy in target practice and rapid firing.”³³ In addition, the locking mechanism on the early rifles sometimes failed to work with the bayonet fixed, and during firing it occasionally “jump[ed] out an inch or two at each discharge.”³⁴

The Model 1884 Rod Bayonet Springfields were unsuccessful, but the army continued to experiment with the concept, and the last production model of the Springfield was the Model 1888 Rod Bayonet rifle. These rifles were not trial patterns but production pieces, with 21,361 produced by the middle of 1891.³⁵ If the object of the rod bayonet system was weight savings, the effect was negligible. With a regular issue .45-caliber Springfield, Model 1873 or 1884 (without rod bayonet), the American soldier carried 54 pounds, 1.85 ounces of equipment, clothing, and weaponry, if issued a

³² Ibid.

³³ Ordnance Department, *Report of the Chief of Ordnance 1886*, 490.

³⁴ Ibid.

³⁵ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1891* (Washington, DC: Government Printing Office, 1891), 32.

cartridge box. With a cartridge belt, the weight dropped to 53 pounds, 15.96 ounces. If issued a cartridge belt and a rod bayonet Springfield, Model 1880, 1884, or 1888, the weight dropped an additional 13.38 ounces to 53 pounds, 2.58 ounces. The early rod bayonet Springfields were disappointments that proved poor in service and not up to the standards of production rifles, with negligible weight savings. At the normal issue weight for a soldier carrying a rifle using a blade bayonet, compared with the armies of Britain, Germany, France, Russia, Austria, and Italy, only the German soldier carried less weight in equipment, and even then only by two pounds.³⁶ The Ordnance Department's pursuance of the rod bayonet demonstrated both that the army sought to continually improve its rifle despite already considering it the best design, and that by the middle of the 1880s the army began to adopt a conservative attitude and refused to accept new technology or abandon those concepts that did not work or showed their obsolescence. While the Krag-Jorgensen rifle that succeeded the Springfield featured a knife bayonet, also a departure from previous American rifles, the rod bayonet concept appeared on its successor, the Model 1903 Springfield. It took none other than President Theodore Roosevelt describing the rod bayonet on the Model 1903 as "about as poor an invention as I ever saw" to the Secretary of War to effect a change.³⁷ With such a statement, Springfield Armory modified the weapon immediately to accept a knife bayonet, and finally abandoned the rod bayonet concept.³⁸

³⁶ Albert Ordway, *The National Guard in the Service. A Course of Lectures Delivered for the Instruction of the Officers of the District of Columbia National Guard In Their Duties of Field Service* (Washington, DC: James J. Chapman, 1891), 101.

³⁷ United States War Department, Ordnance Department, *Annual Report of the War Department For the Fiscal Year Ended June 30, 1905 Volume IX: Report of the Chief of Ordnance*. (Washington, DC: Government Printing Office, 1905), 129.

³⁸ David Westwood, *Rifles: An Illustrated History of Their Impact* (Santa Barbara, CA: ABC-CLIO, 2005), 108.

CHAPTER VII

CONCLUSION:

THE END OF AN ERA AND A CHANGE TO CONSERVATISM, 1885-1892

For two years, in 1877 and 1878, Russian and Turkish troops fought each other in yet another of the many Russo-Turkish Wars so common to European history. During the latter six months of 1877, Russian forces besieged the town of Plevna, fighting at least four major actions before finally taking the town. The Russians took heavy casualties before succeeding, thanks in large part to Turks armed with Winchester repeating rifles. The Turks lost, but their American-made rifles demonstrated that infantry could produce a withering hail of fire at a range of 220 yards. While not practical for long-range firing, the ability of a numerically weaker Turkish force to hold off the Russians, armed with breechloaders, for so long caused European nations and the United States to consider rearming with magazine rifles. Initially after the conflict, military experiments focused on long-range accuracy and ballistics, but armies began to examine other lessons, specifically magazines and repeating rifles. Trials such as those held at Sandy Hook in 1879 extended the life of the breechloader, but more nations began to experiment with magazine rifles or modifying their service rifles into repeaters. The age of the breech-loading rifle was over, and even officers in the United States Ordnance Department

realized their beloved Springfield would give way to the magazine-fed repeater. The army tested various magazine rifle types, but the exercised indecisiveness and caution, and despite what Europe had done, the United States Army did not want to give up its beloved service rifle until well after Europe rearmed.¹

The Ordnance Department, as it had done in the 1860s and 1870s, procured examples of various weapon systems and tested them. On the orders of General Stephen V. Benét, an arms board convened starting on July 5, 1881, and lasted for fifteen months testing various repeating systems. The board examined forty different rifles, based on thirteen different magazine and action systems, but like the arms boards of the past could not decide on a single system, and, instead, chose three. The board of officers classed the Lee rifle, the Chaffee-Reece, and the Hotchkiss magazine rifles as “suitable for military service.”² The board was also less satisfied with the idea of perfection than the previous arms boards. The board report noted that on the Lee rifle, for example, that the weapon’s magazine often dented the bullets contained in it, and often dropped out of the rifle – both circumstances highly unfavorable for a military arm, and yet they recommended it as one of the three suitable for use.³ A month after the board adjourned, on October 9, 1882, Benét requested fifty thousand dollars to procure magazine rifles of all three systems for field trials.⁴

During the trials of the three weapons, the United States Ordnance Department reversed itself and became stringently conservative. In 1882, the army received the fifty-

¹ Robert W. D. Ball, *Mauser Military Rifles of the World* 4th Ed. (Iola: WI, Krause Publications, 2006, 148; Maurice, *The Russo-Turkish War 1877*, 191, 263.

² United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1882* (Washington, DC: Government Printing Office, 1882), 5.

³ *Ibid.*, 434.

⁴ Secretary of War, *Annual Report of the Secretary of War For the Year 1882, Volume III* (Washington: Government Printing Office, 1882), 331.

thousand dollar appropriation to test the three types of rifles. In 1884, General Benét stated they would “be sent into the field... early next spring.”⁵ The next year, 1885, he reported that the results from the field were not yet in, as they arrived in December, well after his annual report.⁶ Regarding the breechloader, in 1865 the stubborn General Dyer used his position to have some types of breech-loading rifle manufactured, so that the army could gain experience with them immediately and, at least as stopgap measures, possess an ample supply of the new weapons, while Springfield Armory made improvements to the weapons and issued more the following year. Benét took two years to issue a small number of magazine rifles to the troops, and over another year to tabulate the reports. Dyer, in comparison, had the national armory issue five-thousand First Allin conversion Springfields within one year, and the next year authorized production of a second, improved model for field-testing, with fifty thousand additional breechloaders manufactured and issued by 1867.⁷ Benét had no sense of urgency with the new magazine weapons, and did not even report on their feasibility until October 1886, four years after receiving the appropriation.⁸

Part of the Ordnance Department’s lethargy might have stemmed from the excellent qualities of the Springfield, especially its rate of fire. One armorer, A. Cranston, fired two hundred rounds out of a Springfield in twelve minutes averaging about seventeen rounds per minute. As the rifle featured no magazine, officers did not worry

⁵ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1884* (Washington, DC: Government Printing Office, 1884), 4.

⁶ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1885* (Washington, DC: Government Printing Office, 1885), iv; Secretary of War, *Annual Report of the Secretary of War for the Fiscal Year Ended June 30, 1886* (Washington, DC: Government Printing Office, 1886), 4.

⁷ United States Congress, *Report of the Secretary of War Part I, 1867*, 18.

⁸ Ordnance Department, *Annual Report of the Chief of Ordnance 1886*, 3-4.

about soldiers wasting ammunition, even during independent fire, which was one of the motivators behind the suggested cartridge-block device.⁹ Benét had a poor sense of timing when he finally issued the reports on the magazine rifles then under consideration by the United States Army. Seven months later, on April 22, 1887, France adopted the *Modèle* 1886 Lebel smokeless, magazine rifle, and made every other military rifle obsolete.¹⁰

Benét acted slowly in procuring magazine rifles, and by 1886, the army fell victim to the love of a rifle that it had used for over a decade. Comparing the preferences of the various infantry companies that tested the magazine rifles, the officers reported that for magazine uses, the Lee was the better rifle. For single loading, regular issue, and a weapon of choice, American infantry officers voted overwhelmingly in favor of the Springfield rifle. The Chief of Ordnance did not want to give the army a magazine rifle, firmly convinced that the army needed to wait until an inventor submitted a perfect design, and infantry company commanders wanted to keep their beloved Springfields. He claimed at the end of his report that, “I have been and am an advocate for a magazine gun, but it would seem the part of wisdom to postpone for the present any further efforts towards the adoption of a suitable magazine arm for the service.”¹¹ He closed the section by stating, “The Springfield rifle gives such general satisfaction to the Army that we can safely wait a reasonable time for further developments of magazine systems.”¹² Dyer wanted to delay general adoption of a breechloader to adopt a perfect system, but he also

⁹ United States War Department, Ordnance Department, *Report of the Secretary of War, at the Beginning of the Second Session of the Forty-Sixth Congress, Vol. 3, Report of the Chief of Ordnance*, by John R. Greer (Washington, DC: Government Printing Office, 1879), 265.

¹⁰ Walter, *The Rifle Story*, 118.

¹¹ Ordnance Department, *Annual Report of the Chief of Ordnance 1886*, 5.

¹² *Ibid.*

recognized that the army needed to rearm quickly. Benét did not grasp that concept, and as most major militaries began to experiment with magazine guns, and on the eve of a rearmament as great as that which followed the Prussian Wars of 1864-1870, the army decided it could “safely wait a reasonable time” until something better came along.

Benét’s small arms report for 1887 reads with a sense of urgency that reveals he knew how critical the situation had become. Benét argued for tests to determine a reduction of caliber of small arms and suitability of magazine arms, as “there is a movement in that direction in military circles here and abroad,” and “an effective and simple magazine gun has become a necessity.”¹³ He recognized the problem, but was unwilling to act quickly, as he did not want to adopt an inferior arm or interim solution, believing that no good magazine arm existed. Citing caution and warning of “haste,” he asserted “the Springfield arm will continue to admirably serve our purpose and the best interests of the Army, long enough, to enable us to determine finally on a magazine gun.”¹⁴ Benét was so unconcerned that his 1888 report only mentioned magazine rifles three times, in each case to the twenty each of Lee, Hotchkiss, and Chaffee-Reece magazine rifles, issued to the military for trials.¹⁵

When the Army finally began to examine the magazine rifle, it took so much from the Springfield that it, in effect, created a single-loading rifle that had a magazine. The United States Army committed itself to the single-loading doctrine of the Springfield and designed the new magazine rifle around that concept. The military intended to use the

¹³ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War For the Fiscal Year Ended June 30, 1887* (Washington, DC: Government Printing Office, 1887), 4.

¹⁴ *Ibid.*

¹⁵ United States War Department, Ordnance Department, *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1888* (Washington, DC: Government Printing Office, 1888), 33.

weapon primarily as a single-loader, with the magazine only used in emergencies or in the last moment before a charge. The Ordnance Department created a weapon so perfectly around these requirements that it proved inferior to the magazine rifles of foreign nations and impractical. Long after the Army abandoned the doctrine of the single-shot weapon in favor of clip-fed repeaters, the Krag's design forced its continued use primarily as a single-loader (see Figures Thirteen and Fourteen).

The Krag featured a five-round magazine and a magazine cutoff that turned the magazine “off” and prevented a soldier from using it in combat without orders. Army officers, clinging to the doctrine of the 1880s, decided soldiers should only use the magazine in emergencies. The rifle had no charger guides such as the new German-made export Mausers going to South America (see Figure Fifteen) or packet-magazine systems similar to the rifles adopted in the 1890s by Germany, Austria, or Italy (See Figure Sixteen).¹⁶ New Mauser rifles featured guides that allowed a soldier to position a clip containing rounds on top of a rifle’s receiver, and push the cartridges into the magazine and recharge the magazine with the same effort that an American soldier loaded a single round into his Krag-Jorgensen.¹⁷

The Krag’s design possessed a number of flaws that hampered its success. The rear sight on the original incarnation of the weapon was not accurate, and many army officers declared the Springfield a better service rifle. In one instance, a prison guard with a Krag-Jorgensen proved unable to hit an escaping prisoner despite firing three

¹⁶ Division of Military Engineering of the International Congress of Engineers, 1894, *The Modern Infantry Rifle*, by Stanhope Blunt, United States Army, Ordnance Department (Washington, DC: Government Printing Office, 1894), 409-410.; United States Army, Ordnance Department, *Description and Rules for the Management of the U.S. Magazine Rifle Model of 1898 and Magazine Carbine Model of 1899, caliber .30* (1898; repr. Washington, DC: Government Printing Office, 1917), 41-45.

¹⁷ Secretary of War. *Annual Report of the Secretary of War for the Year 1893 Vol. 3* (Washington, DC: Government Printing Office, 1893), 151.

times. The *New York Times* ran several articles describing the failures of the weapon, the most prominent being that it shot high.¹⁸

The army liked its single-loading Springfield, and did not want a true repeater. With the influence being on loading rounds one at a time, the Army saw no reason to allow rapid charging of the magazine.¹⁹ This problem did not hamper other nations. The Mannlicher used a packet-loading system, where a soldier inserted a charger containing five cartridges into the magazine, and the packet formed part of the system. When he chambered the last round, the clip dropped out of the rifle.²⁰ The German Mausers produced for export, not to be confused with the old black powder Mausers of the 1870s and 1880s, utilized a system where an infantryman stripped off five cartridges into the magazine from a clip and discarded it.²¹ The Krag featured no such ability to be charger loaded, and, in battle, the American soldier had to load his magazine one round at a time, with the same motion that it took to load a breechloader after every shot. This action meant that even when magazine firing, a soldier with a Krag could manage only about twenty-two rounds per minute, or only five more than with a Springfield that did not possess a magazine. When using the cutoff on the Krag, the normal rate of fire was about twenty-one rounds a minute.²² Except for the seldom-used ability to deliver a large amount of firepower in a short period, the rifle in practice was a single-loader, like the rifle it replaced.

¹⁸ “New Army Rifle and How it Works: What the Krag-Jorgensen is and How it Works,” *New York Times*, September 4, 1892, 15; “Deserter Fred Moritz Escapes,” *New York Times*, August 29, 1895, 1; “The New Army Rifle Shoots High,” *New York Times*, November 10, 1895, 9.

¹⁹ Stanhope E. Blunt, *The Modern Infantry Rifle*, 425; Lawrence Bruff, *A Text-Book of Ordnance and Gunnery 1896* 2nd Ed. (1896, repr. New York: John Wiley and Sons, 1902), 568.

²⁰ Blunt, *The Modern Infantry Rifle*, 413.

²¹ *Ibid.*

²² *Description and Rules for the Management of the U.S. Magazine Rifle Model of 1898 and Magazine Carbine Model of 1899, caliber .30*, 43, 63.

Army officers did not consider the ability to charge a magazine rapidly important to a successful design. Captain Stanhope Blunt, who earlier touted the failures of the rod bayonet Springfield, in “The Modern Infantry Rifle,” recommended the feature in a treatise on the requirements of a successful pattern, but still reported that the Model 1892 Krag fulfilled the majority of the requirements he set forth.²³ Blunt described various actions of magazine rifles in use 1894, and criticized those actions not adaptable to single loading. The essay focused on the qualities that allowed soldiers to use a magazine rifle as an effective single-loader, which he argued was their usual employment. He feared that weapons using packet clips and feeding from the magazine deprived infantrymen of a reserve at a critical moment in battle. For these rifles, such as the Mannlicher, quartermasters did not issue single rounds to the soldiers but only chargers with five rounds, and the design of the weapon did not allow for loading more cartridges until soldier emptied his clip. Blunt decried Mauser style rifles that did not possess a cutoff, because he feared that a soldier would forget to load a fresh round and inadvertently use his magazine reserve.²⁴ Concerning the proper use of the modern rifle, he stated “the normal use of [these] guns.... [are] as single loaders, with the magazine always retained as a reserve.”²⁵

Blunt considered the use of the magazine as an auxiliary to the rifle. A magazine provided a reserve to conserve ammunition and prevent wasted ammunition, as well as to contribute a “moral support which the knowledge of this reserve is presumed to give.”²⁶ As soldiers used their weapons in this manner, they carried rounds singly in belts and the

²³ Blunt, *The Modern Infantry Rifle*, 425.

²⁴ *Ibid.*, 400-401.

²⁵ *Ibid.*, 403.

²⁶ *Ibid.*, 401.

American rifle did not require any method to facilitate rapid charger loading. The most severe handicap of the Krag-Jorgensen design in 1894 fit exactly with the army's concept of the magazine rifle. The lack of a charger prevented a soldier from wasting rounds, and, in his words, gave the trooper a reserve with “moral support” in combat.

Two years after Blunt's essay, army doctrine still failed to grasp the ability of the magazine rifle. Captain Lawrence Bruff of the United States Ordnance Department, in the 1896 publication of *Text-Book of Ordnance and Gunnery*, set forth principles of infantry weapons and described in detail both the .30-caliber Krag-Jorgensen and .45-caliber Springfield, the latter then in use by National Guard troops. Unlike Blunt, Bruff recognized that the primary advantage of a magazine rifle was the ability to “furnish a certain number of shots in a very small interval of time.” He did not realize the amount of firepower such a weapon could produce given a rapidly chargeable magazine and a steady supply of ammunition. Instead, he argued that to utilize the magazine rifle to its fullest potential the magazine had to be kept in reserve and concluded “a good magazine arm should be also a good single-loader.”²⁷

Thus, before its combat debut, the Krag fit exactly with army doctrine as a magazine rifle habitually used as a single-loader. Convention shaped its design, and now the rifle shaped the training manuals and military thought. The army did not intend to exploit the use of the magazine rifle. Even if military planners wanted to embrace the rifle's potential, the army designed the rifle so well around its requirements that it proved unsuitable to any methodology other than as a single-loader.

The army finally adopted the magazine rifle in an attempt to keep parity with foreign nations, but was not prepared to abandon the doctrine that it created for the

²⁷ Bruff, *Text-Book of Ordnance and Gunnery*, 568.

Springfield. While the army tried to evaluate all magazine systems fairly, the single loading doctrine favored the Krag-Jorgensen design then in use by Denmark, though American service designers added a magazine cutoff to reinforce its perceived use as a single-shot weapon, with a magazine only as a reserve.²⁸ Nevertheless, many officers continued to perceive the Springfield as the ultimate battle rifle.²⁹ One journalist for the *New York Times*, covering the tests at the Magazine Arms Board in 1892, asserted that the American army had “wedded” itself to the Springfield and did not take the concept of adopting a new service rifle seriously.³⁰

This assertion was true. Under orders, designers at Springfield Armory attempted to chamber Springfields in the same .30-caliber cartridge that they designed for the new Krag. Starting in 1891, Springfield Armory produced a small number of these experimental weapons. Later in 1898, they created a smokeless round for the .45-caliber weapon. The new powder developed a pressure in the barrel almost twice that of the original black-powder loading. As a result, many of the rifles exploded during testing, a fact the army emphatically denied.³¹ Armorers and generals both saw a modified Springfield as an excellent compromise, keeping with army doctrine yet yielding the advantages of smokeless powder. E. Very of the Hotchkiss Arms Company contended that in theory “the Springfield rifle with .30 caliber is a better and more reliable weapon than.... [a] magazine gun because it is just as rapid a shooter.”³² Clearly, the single-loading doctrine directed the choice of the army's first standardized repeating rifle, if the

²⁸ Blunt, *The Modern Infantry Rifle*, 419-420.

²⁹ “Money Wanted for Guns,” *New York Times*, November 5, 1891, 9.

³⁰ “New Army Rifle,” *New York Times*, September 4, 1892, 15.

³¹ “Better Arms for the Troops,” *New York Times*, March 9, 1899, 1.

³² “Ideal Military Rifles,” *Ibid.*, April 25, 1892; “Better Arms for the Troops,” *Ibid.*, March 9, 1899; M. D. Waitie and B. D. Ernst, *Trapdoor Springfield: The United States Springfield Single-Shot Rifle, 1865-1891* (North Hollywood: Beinfeld Publishing, Inc, 1980), 151, 169.

weapon would have the same rate of fire as a single-loader.

Army officers never saw the Krag as a revolutionary weapon. E. Very underscored the army's thought. The magazine rifle, in practice, would only fire as fast as a good single-loader. The capability existed for rapid fire, but the army expected officers to control their men. Blunt stated that a good magazine rifle possessed a cutoff positioned on the weapon in a manner facilitating quick identification by the squad leader.³³ This requirement allowed officers and sergeants to ensure that soldiers did not waste ammunition and deplete their supply. The army, long after adopting the Krag, directed soldiers to use magazine rifles as single-loaders. Due to the doctrine's emphasis on single loading, the Krag proved more palatable to army officers than a true repeater, which is why they rejected the Mannlicher, Mauser, and Lee style rifles. One journalist questioned the rigid enforcement of a magazine cutoff, concluding that soldiers “not disciplined enough to obey orders in firing will not be of much use on a battle field of the next war.”³⁴

The United States Army, during the whole of the period 1864-1892, represents almost two different fighting forces with different philosophies on arms procurement. When confronted with the realization that the rifle musket – a weapon that the United States possessed for only nine years prior to 1864 – was no longer a viable weapon on the battlefield, the army quickly took steps to procure breech-loading rifles. For the American Army experience in the Civil War, a war in which both sides used less than four hundred thousand breechloaders as opposed to over one and a half million muskets, led to that conclusion.

³³ Blunt, *The Modern Infantry Rifle*, 425.

³⁴ “Our New Service Rifle,” *New York Times*, June 10, 1893, 9.

The breechloader adopted by the United States was modern, as it possessed an extractor and an ejector, was accurate, and most importantly used safe, center-fire metallic ammunition. These four items made an effective breechloader, not a bolt action. The British Snider exploded with poor ammunition and did not eject cartridges; the German 1871 Mauser had poor accuracy; the Martini-Henry did not possess the longest range; the Dutch Beaumont fouled after one hundred rounds; and even the Swiss Vetterli had problems, the tubular magazine changed the point of balance of the weapon as the shooter fired the cartridges.³⁵ Even after the United States adopted its rifle, it sought to improve the weapon and remain competitive with European armies. The army issued new sights to the weapon, improved the range, hitting power, and ballistics qualities of its service cartridge, and long experimented with a means of creating a bayonet integral to the rifle. The Springfield, rather than being an outmoded converted musket, was an effective rifle on par with those used in Europe, considered, well into the 1880s, as good as the famed British Martini-Henry.

While foreign armies concerned themselves with breech-loading rifles only, the United States as part of a general rearmament at the end of the Civil War became the first nation to adopt machine-guns. True, like European militaries, the United States Army did not understand how to employ the pieces properly, but it spent vast sums of money procuring over four hundred of the weapons. The weapon finally adopted later became used the world over, and proved superior to those used in combat during the Franco-Prussian War of 1870.

When examined solely from a domestic perspective, the United States Army Ordnance Department appears conservative, but when viewed from a global standpoint

³⁵ Poyer, *Swiss Magazine Loading Rifles 1869 to 1958*, 46.

the United States Army was, in fact, on par with the nations of Europe in firearms development. The army did have difficulties during the Indian Wars defeating its opponents, but those difficulties arose from its desire to fight, train, and equip itself like a European army. Many remember the army of this period as a conservative, cash-strapped frontier constabulary force that fought Indians, but in reality, while cost-conscious, it saw itself as a European-style army, and was equal to one with comparable weapons.

The United States Army only became conservative, at least in this period and when concerned with small-arms procurement, when confronted with a real need to adopt a magazine rifle quickly because of a general rearmament in Europe. In the age of the single-shot breechloader, the army was not conservative and was on par with the European forces it trained to fight. It sought new weapons, continued to improve standard issue rifles, and often experimented with magazine weapons well before many other nations. When not faced with an immediate requirement to move quickly to make a decision, the army acted slowly, but methodically, and compared its requirements to those of Europe. Once faced with the need to adopt something completely radical and new, the army failed and instead adopted a weapon so built around its requirements from the previous quarter century that, instead of adopting a magazine rifle that was competitive with those in use in Europe, it simply adopted another single-loader that happened to utilize a magazine.

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APPENDICES

FIGURES

Figure 1: The British .577-caliber Snider-Enfield Mark III Cavalry Carbine



A British Mark III Snider Enfield Cavalry Carbine, dated 1870 and made by the Royal Small Arms Factory at Enfield. The British counterpart to the Allin Springfield was the Snider Enfield, originally a conversion of the Pattern 1853 Enfield rifle musket and derivatives (such as the naval rifle, cavalry carbine, and artillery carbine, among others). The Mark III Snider Enfield featured new parts instead of converting parts from a musket, a locking mechanism on the breech block, and a new steel barrel. This particular specimen is a cavalry carbine, long neglected and bearing the marks of many years of hard service. The sling ring behind the brass trigger guard indicates the British sold the weapon to the Portuguese as surplus, and the butt of the carbine bear corresponding 'Sold Out of Service' marks above the Enfield stampings and First Class Arm markings. The protruding rod sticking out of the Snider action by the rear sight is the block pin, frozen by grime and unable to be removed. *Author's Collection.*

Figure 2: The Action of a British .577-caliber Snider-Enfield Mark III Carbine



The breech and action of the Mark III Snider Enfield carbine, in the loading position. Visible on the breech block is the catch (center) and locking lever (extreme right), which secure into a recess at the weapon's tang to prevent a faulty cartridge blowing the breech open. The British added such an implement only on the Mark III variant. Also visible is the firing pin and protector (below the block), which made use of the old musket nipple to house a firing pin, or striker in British parlance, and the spring. The rear sight is the carbine variety, graduated to six hundred yards. The Snider was a decent weapon, but decidedly inferior to the Springfield. To extract a cartridge and load a new one, the British weapon a soldier had to half cock the rifle, open the block, pull the block back to extract the cartridge, then tip the rifle over or pull the spent case out before inserting another one. All an American trooper had to do was half cock his weapon, actuate the lever to open the block, which once opened extracted and ejected the round. The failings of the Springfield at Little Big Horn were due to ammunition, not the rifle. The faults of the Snider involved both the ammunition and the design of the action. *Author's Collection.*

Figure 3: The British .450/577-caliber Martini-Henry Mark II Rifle



Perhaps the most well known British service rifle, the Martini-Henry was an excellent design whose ammunition, like that of the Trapdoor Springfield, plagued it in battle. This example is an 1880s-dated Mark II model that in the late 1890s was sent to India and then Nepal, where it was stored until discovered in 2003 by American arms importers at the Lagan Silekhana Palace in Katamandu, Nepal. The rifle has a modern appearance, but like the Springfield, it could not be converted to a repeating rifle. The lever is a loading lever, pulling it down cocks the rifle and opens the breech; raising it up seals the breech and allows the rifle to be fired. With early foil brass cartridges sand could jam the rifle, such as at Abu Klea in 1885, but new drawn brass cartridges and a longer loading lever alleviated these problems. This particular Mark II is marked as a Second Class or obsolete arm and is stamped N.S. N.E.P. for Native State, Nepal. ("Nepalese Cache Extras," *International Military Antiques*, <http://www.ima-usa.com/index.php/cPath/29_175> (Accessed April 29, 2010)). *Author's Collection*.

Figure 4: The Action of a British .450/577-caliber Martini-Henry Mark II Rifle



Close up of the action on the Martini-Henry Mark II, showing the open breech when the

loading lever is lowered. The Martini-Henry had a high rate of fire and was an accurate weapon, but shooting tests at Sandy Hook, New Jersey reinforced American officers' beliefs that the Springfield was superior in accuracy and range. This particular example went through so many refurbishments that the only markings left visible on the action body are the "II" for Mark II and "2" for Second Class Arm: the Royal Cypher, maker, and year of manufacture have long since been erased. *Author's Collection.*

Figure 5: The United States .45-caliber Model 1873 Springfield Rifle and Bayonet



The .45-caliber Model 1873 Springfield, this particular example made in 1886, with Model 1873 bayonet and scabbard. Note the musket-like appearance, and the "trapdoor" action in front of the hammer. The bayonet, like that of a Civil War musket, uses the front sight as a bayonet lug, and locks into place by means of a swiveling ring. The weapon bears a close resemblance to the Snider-Enfield, as both designs initially were conversions of muskets and muzzle-loading weapons. While the Springfield in its ultimate issue form fired a reduced caliber round, yielding better ballistic qualities, the British Snider always used a musket caliber cartridge, part of why the latter weapon did not enjoy as long a service life as the Springfield. Springfield Armory fabricated this particular rifle at the end of the production run of the Model 1873, the same year the weapon was made the Model 1884 supplanted the weapon on the production lines (Poyer and Reisch, *The .45-70 Springfield* 4th Ed., 234). *Author's Collection.*

Figure 6: The Action of a United States .45-caliber Model 1873 Springfield Rifle



Close up of the lock and action of the .45-caliber Model 1873 Springfield. The breechblock functions like a bolt, as it contains the firing pin, locks into the receiver, and activates the extractor, and gives the rifle the name most collectors and historians know it by: The “Trapdoor” Springfield. The ejector is on the left side of the rifle’s receiver. The rear sight also demonstrates the continued improvements this rifle received. While the army standardized the rifle in 1873, the rear sight is an improved 1879 pattern, and Springfields of a new model made after this specimen featured another type of improved sight. This rifle has no visible safety, but instead the lock has a three-click tumbler with the first cock acting as a safety, a feature added to the Springfield in the late 1880s. At the first cocked position, the rifle cannot be fired, and there is insufficient clearance for the breechblock to be opened. At half cock, as on the earlier Springfields, the rifle can be loaded but not fired. At full cock, the rifle can be reloaded and fired. At the rear of the breech block (the top in the picture) is the locking mechanism that secured the block into the rifle’s tang before firing, a feature only added to the Snider-Enfield in its third incarnation. *Author’s Collection.*

Figure 7: The Dutch 11mm *Klein Kaliber Geweer* Model 1871/88 Beaumont-VitaliF



Close up of the action of the Dutch *Klein Kaliber Geweer* Model 1871/88, caliber 11mm. This particular specimen, serial number was made in 1876 and converted to the Vitali box-magazine system in 1890. This rifle design predates the American .45-caliber Springfield by two years, and borrowed much from the French *Modèle* 1866 Chassepot. This design is comparable with the other early bolt-action designs the United States Army compared with the Springfield. The rifle, unlike the Springfield, has no safety: the large button on the left side of the receiver is a magazine cutoff, added in 1890 when this rifle received a magazine. Even in Europe, army officers saw the magazine only as an emergency measure. Pushing the lever forwards allows the bolt to pick up cartridges from the magazine follower, pushing it rearward cuts off the magazine, turning the weapon into a single-loader. *Author's Collection.*

Figure 8: The Bolts From Dutch Model 1871/88 and German Model 1888 Rifles



A comparison of the bolts of a Dutch 11mm *Klein Kaliber Geweer* Model 1871/88 Beaumont-Vitali, made in 1876 (bottom) and a later bolt from a German 8mm *Infanterie Gewehr* Model 1888 Commission rifle, made in 1891 (top). Although bolt-action designs existed in the 1870s, they were not superior to the Springfield, and none of the actions of those designs continued beyond the service life of the Springfield rifle. Note the frail construction on the Beaumont's bolt, its wobbly extractor and bolt head, and the lack of a safety (the safety on the German bolt is at the rear, in the "fire" setting). The Dutch bolt also has no locking lugs, relying on the bolt handle, which locks in front of the rear bridge of the receiver, to keep the bolt from flying out of the weapon should there be a catastrophic malfunction. The *Gewehr* 1888 has dual locking lugs in the front of the bolt, which also features a detachable bolt head, of stronger construction than the Dutch rifle. Although the German bolt is of the correct type, it is actually a post-World War One replacement made for Turkey as Germany sent this particular rifle to the Ottomans during the Great War. *Author's Collection.*

Figure 9: The Italian 6.5mm *Fucile Modello 1870/87/15* Vetterli-Vitali



The action of an Italian *Fucile Modello 1870/87/15* Vetterli-Vitali, produced at Torino in 1889. This rifle represents one of the more conservative designs in Europe. The Italians liked the Swiss Vetterli rifle, but did not approve of the magazine or the rim-fire cartridge. Chambered in a centerfire 10.35mm cartridge and without a magazine, the Italian army used these weapons for seventeen years before deciding that a magazine was necessary, at which point they added the four-round Vitali box magazine in 1887. This particular weapon, which was originally made with a Vitali magazine, underwent conversion during World War One to accept the smokeless 6.5mm Carcano round, then standard issue for the Italian army's 6.5mm *Fucile Modello 1891* Carcano, along with a new magazine. Due to the higher pressures of smokeless rounds, the resulting rifle, unlike the original, was as hazardous to friendly soldiers as it was to the enemy. Note the rear locking lugs of the bolt, and the crude safety below the bolt by the stock that must be set before the bolt is closed. The knob at the top of the rifle is the magazine cutoff, rendered non-functional by the Great War-era Carcano magazine. *Author's Collection.*

Figure 10: The Tubular Insert of the 6.5mm *Fucile Mo. 1870/87/15* Vetterli-Vitali



Close up of the magazine cutoff of the *Modello 1870/87/15* Vetterli-Vitali rifle, rendered non functional with the new Carcano magazine system, and showing the large, tubular insert in the barrel, designed to sleeve the rifle from 10.35mm down to 6.5mm-caliber. Just above the chamber, to the left of the lug recess, is a large crack in the receiver, testimony to the inability of late nineteenth-century designs to withstand improvement and updating in the era of the smokeless cartridge. *Author's Collection.*



Figure 11: Four-Round Vitali Box Magazine

The four-round Vitali Box Magazine, seen on a Dutch Beaumont Rifle, as used by the Dutch and the Italians on their Beaumont and Vetterli Rifles. This modification allowed these nations to delay, slightly, the adoption of smokeless, repeating rifles. On both rifles so fitted, the arsenals added magazine cut-offs to allow the weapons to continue to function as single loaders. Armies by the

beginning of the 1890s demanded magazine rifles but tactical doctrine had yet to determine how to employ them. *Author's Collection.*

Figure 12: Side by Side: Beaumont-Vitali, Springfield, Vetterli-Vitali



Displayed in order of manufacture, the Dutch 11mm *Klein Kaliber Geweer* 1871/88 Beaumont-Vitali (1876), the United States Rifle, Caliber .45, Model 1873 Springfield (1886), and the Italian 6.5mm *Fucile Modello* 1870/87/15 Vetterli-Vitali (1889). The Beaumont and the Vetterli both appear to be more modern designs than the Springfield, which displays musket origins, but all met the same fate. The Dutch and Italian designs were repeating conversions but lack of doctrine allowing the use of them in that role meant that they were no more effective than a Springfield, with a similar rate of fire. For the seventeen years between their adoption and the conversion to repeaters, they also had no advantage on the Springfield. Between the Franco-Prussian War and the adoption of the *Modèle* 1886 Lebel smokeless rifle, no rifle possessed any real advantage over another – indicating that the United States Army’s reliance on the Springfield did not transcend into conservatism until other nations began to adopt magazine rifles. Then, in the smokeless era, the inability to evolve past the single loading doctrine and abandon the rifle in use since 1866 made the army conservative. *Author’s Collection.*

Figure 13: The United States .30-caliber Model 1898 Krag-Jorgensen



United States Magazine Rifle, caliber .30, Model of 1898, the “Krag-Jorgensen.” This rifle was an improvement over the Model 1892 and 1896 Krag-Jorgensens, designed to

correct deficiencies in sighting and other problems. This weapon is fitted with a Model 1901 sight, although this particular rifle, according to Joe Poyer, was one of the first ones off the assembly line at Springfield Armory in May 1900 (Poyer and Reisch, *The American Krag Rifle and Carbine*, 235). The shiny chrome finish is not original to the rifle, as this firearm is a restored piece that was a Veterans of Foreign Wars parade weapon, and should have a blued finish like the Springfield in Figures Five and Six. Note this particular rifle is missing its safety, which would otherwise be at the rear of the bolt. *Author's Collection.*

Figure 14: The Action of a United States .30-caliber Model 1898 Krag-Jorgensen



The action of a .30-caliber Model 1898 Krag-Jorgensen. Note the magazine gate, which was excellent for single loading but was incapable of quick charger loading. The spring that feeds cartridges into the receiver housed in the gate when the gate is open. Note the lack of any charger guides or any other method to facilitate rapid reloading. The barrel is an original replacement, added to bring a worn out relic back to shooting condition. *Author's Collection.*



Figure 15: The Action of an Argentinean 7.65mm Mauser Modelo Argentino 1891 Close up of the action on a German-made export Argentinean Mauser, caliber 7.65mm, made in Berlin in 1899. This rifle and the preceding Belgian 1889 and Turkish 1890, all three of similar design and caliber, were the first Mauser smokeless repeating rifles,

but intended only for export. Note the charger guides at the rear of the receiver to facilitate quick stripper clip loading. Most foreign designs by 1899, not including the Lee Enfield, allowed some method of quick reloading, by either enbloc or stripper clips, features not present on the American Krag-Jorgensen. *Author's Collection.*

Figure 16: The *Infanterie Gewehr* 1888, *Fucile Mo.* 1891, and *Repetier Stutzen* 1895



These three 1890s weapons represent the main types of enbloc-clip firearms in European service during the 1890s. Top is a German *Infanterie Gewehr* 1888 “Commission Rifle” made by Ludwig Loewe in Berlin in 1891, later given to Turkey as war aid during the First World War, with an 1871-dated bayonet originally for the *Infanterie Gewehr* 1871 Mauser. Second is an Austrian *Repetier Stutzen* 1895, a Mannlicher design, made in 1917 at Vienna, with its undated bayonet. This carbine was not the first Mannlicher magazine system used by the Austrians, who employed older versions as early as the mid-1880s, and used the 1895 action in both carbines and long rifles. Bottom is another Mannlicher-style rifle, an Italian *Fucile Modello* 1891, the Carcano, made in Rome in 1918 with a bayonet from 1942. This rifle replaced the Vetterli-Vitali in Italian service. All three firearms use smokeless ammunition, the German weapon the 8mm Mauser round, the Austrian a rimmed 8mm round, and the Italian a smaller 6.5mm round (pictured is 7.35mm ammunition from World War Two, used in Model 1938-style Carcano rifles, although the clips are interchangeable with 1890s era 6.5mm rifles).

The packet clips are inserted into the magazine (two each are pictured below the Model 1895 and Model 1891), and when the last cartridge is chambered the clip drops out of the weapon. In 1905, the Germans updated some of their *Gewehr* 88s, including this one, modifying them to accept the pointed-bullet ammunition and stripper clips used by the newly adopted *Infanterie Gewehr* 1898 Mauser. Instead of continuing to use Mannlicher-style packet clips, the weapon now utilized ammunition on stripper clips (pictured below the rifle). The stripper clips were lighter than the packet clips, allowing soldiers to carry more ammunition in battle. *Author’s Collection.*

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This study examines the United States Army and its procurement and employment of small arms and machine-guns from the American Civil War and the Danish War of 1864 through the adoption of the Krag-Jorgensen smokeless rifle in 1892. The method of the study is to examine the United States Army's actions of the time not in the light of the Indian Wars, which is common, but to look upon the force as a contemporary of European armies. The goal is to compare the actions of the United States with those of Britain, France, Prussia/Germany, Italy, Russia, Switzerland, Austria, and Holland. As officers in the American Army keenly examined developments in Europe, the study attempts to discover how the army reacted to those developments and how the military compared with the traditional European powers of the era.

Findings and Conclusions:

When compared with the armies of Europe, the evidence demonstrates that the United States Army's firearms procurement during the years between 1864 and 1884 was not conservative. It began testing a breechloader system before many nations in Europe, and was the first nation to adopt Gatling guns. The fact that officers did not understand how to employ the weapons is not conservatism, as most European nations did not understand how to employ them either. The United States, during this period, also examined magazine rifles, procured numerous machine-guns, and sought to improve the rifle that it adopted. Furthermore, the army continually tested new rifles and often compared the weapons it used with those employed by European armies. Only after magazine rifles became standard issue in Europe, starting in 1884, and after the adoption of smokeless powder in France in 1886, did the United States Army become conservative. Much of this change was due to continued affection for the Springfield rifle as well as Chief of Ordnance Stephen V. Benét who continued army indecisiveness towards choosing a standard weapon, but abandoned the concept of issuing trials pieces in large numbers.

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