Spring 2016

American Soldiers' Use of Weaponry in World War I

Sarah K. Jameson
Western Kentucky University, s4jameson@gmail.com

AMERICAN SOLDIERS' USE OF WEAPONRY IN WORLD WAR I

A Thesis
Presented to
The Faculty of the Department of History
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
Of the Requirements for the Degree
Master of Arts

By
Sarah Jameson

May 2016

AMERICAN SOLDIERS' USE OF WEAPONRY IN WORLD WAR I

Date Recommended 12/18/15

Eric Reed, Director of Thesis

Carol Crowe-Carraco

Robert Dietle

4/4/16

Dean, Graduate Studies and Research Date

Acknowledgements

I would like to thank the Army War College at Carlisle, Pennsylvania for their assistance in researching the primary source material for this thesis as well as the Western Kentucky University Graduate School for funding the research trip. I would like to acknowledge Dr. John McManus of Missouri University of Science and Technology for putting me on this research path; Professor Lucinda Herrick for her support; Dr. Eric Reed and Dr. Carol Crowe-Carraco at Western Kentucky University for their help during the research and writing process; Professor David Serafini for the loan of his books. Finally, I would like to thank the late Dr. Jack Thacker for all of his help.

CONTENTS

AMERICAN SOLDIERS' USE OF WEAPONS IN WORLD WAR I

Sarah Jameson May 2016 69 Pages

Directed by: Eric Reed, Carol Crowe-Carraco, and Robert Dietle

Department of History Western Kentucky University

This thesis examines how the modern weaponry shaped the American soldiers' use of weaponry and the change of tactics during World War I. The American experience was unique as Britain, France, and Germany grew accustomed to the advancements in weaponry over time, while the American Expeditionary Force encountered this type of warfare for the first time. The American Army served mainly as a constabulary, fighting guerilla forces before the war, and had to be trained to fight a conventional war in Europe. The common soldiers would modify official doctrine to fit the realities of the battlefield in which they found themselves.

Introduction

In the hot weather of June 1917, the American Army's First Division disembarked at St. Nazaire, France. The harbor overflowed with ships painted in a discombobulating blue and white zig-zagging pattern that effectively camouflaged the vessels at sea protecting them against German U-boats. They formed up with their packs and Springfield rifles slung over their shoulders ready for the adventure and glory of war. They loaded up onto train cars, the infamous 40-and-8's, that would transport them to training camps where they would learn from experts in trench warfare. At these camps, they could hear the barrages like distant thunder as they were entertained and impressed by the war stories of a long line of mainly French veterans carrying battle wounds. Even now, the propaganda machine was working overtime as the French and British told their new allies how the war was almost won. The Americans believed them, but only because the American Army was now involved. However, the weapons the soldiers used contributed greatly to their experience and this subject is not given enough attention. World War I was the first truly modern war, and the largest, the Americans fought. The weaponry developed during the early part of the twentieth century played a large part in this. It was the sound and feel of the weapons that stuck out in soldiers' minds and especially the sound that haunted them later.

When the United States entered the Great War, as it was then called, in the waning months of 1917, the European Powers were on their last legs. The French had only just recovered from a mutiny within the Army ranks, but their fighting capability was still severely hampered by the immense loss of life suffered from earlier campaigns. The British, also, were limited as their Regular Army had been decimated in the early

stages and the Kitchener Army were poor replacements forcing Britain to rely on its colonial troops. Germany, the fierce enemy who inflicted all these casualties, was in the middle of a tactical retreat pulling back to strengthen the line, but there was the start of unrest at home as the Allied blockade prevented much needed supplies and trade from reaching civilians. Both sides had, with the exceptions of important sectors like Verdun, gone on the defensive hoping to attrite the other to the negotiating table.

The United States offered the possibility of fresh, able-bodied troops to bolster the Allied ranks as well as a threat to the Germans. The French and British envisioned the Americans filling out their ranks commanded by British and French officers who knew the war and the way it was fought—basically using the American Army as fresh cannon fodder.[1] In truth, though they fought together on the front, Americans would never answer to a foreign commander no matter how friendly the countries. They knew a foreign commander would not know or care enough about them to try and limit the loss of life while still taking an objective. General John J. Pershing, Commander of the American Expeditionary Force (AEF), knew this too and he was determined that his boys would fight as a cohesive force in their own sector and show the world the superiority of the newly formed American Army.[2] It was by sheer stubbornness, and the AEF's unique position in the war, that this was accomplished. Pershing answered only to President Woodrow Wilson, not the Allied Commander, so while he coordinated attacks with the French and British forces, Pershing made his own decisions.

The American military and military doctrine was forced to change significantly as it entered World War I. The American Army was a constabulary force meant mainly to

[1] John Eisenhower, *Yanks* (New York: The Free Press, 2001): 16-17.
[2] *Ibid.*, 47.

fight against Native American tribes and a Mexican incursion into the Southwest. Shortly before declaring war on Germany, the United States was involved in chasing down Pancho Villa and his bandits. The Army attacked swiftly hardly bothering with the heavy, outdated artillery pieces due to the speed at which they moved. They fought against a guerilla force that used the same outdated equipment. Military doctrine had hardly changed from the time of the Civil War.[3] The Europeans fought a war far more technologically advanced, a stagnant war with battlefields that had not changed since the war began (besides adding more shell holes). The United States had the manpower, but they were still at a great disadvantage in weapons and tactics. American commanders favored fire-and-maneuver tactics relying mainly on their rifles to overtake enemy positions, but the Germans' expert deployment of artillery and use of terrain roughened by years of fighting with heavy weaponry to enhance defensive positions made the Americans' favored plan suicidal. This was evidenced by the disastrous initial assaults in Chateau Thierry where a battalion of American soldiers was nearly destroyed. Thus, the American Army had to learn in a fraction of the time what European armies had accomplished over three years. While they had French and British instructors, they learned best from the enemy they fought in the so-called "quiet sectors" of France—such as the Argonne Forest—hard-learned lessons that, more often than not, killed hundreds.

This was partly due to the American ego, a feeling of superiority passed down from generation to generation dating back to the American Revolution; the idea of American exceptionalism argued by historians as far back as Frederick Jackson Turner,

[3] Byron Farwell, *Over There: The United States in the Great War* (New York: W.W. Norton and Co., 1999): 42.

but also modern writers such as Gordon Wood and Fred Anderson.[4] Americans as a whole were physically larger than their European counterparts and the American culture accepted private gun ownership; the latter was considered a basic requirement especially along the quickly dwindling frontier regions and was always considered a means of protection against a possibly tyrannical government.[5] Boys, and some girls, were taught from a young age how to properly care for and shoot a gun to hunt and/or defend their property. While a seeming advantage against gun wary Europeans, time was wasted in training as drill instructors had to reteach men, who boasted about being the best shot in the county, how to fight like soldiers and follow their commanders' orders.[6] In comparison, a militaristic society that did not allow private gun ownership, such as Germany, had an easier time training their soldiers.

A new aspect of warfare that Americans largely ignored that Europeans embraced added a new dimension to the battlefield: aircraft. Observer balloons floated above the battlefields with keen-eyed soldiers (aided by binoculars) reported enemy troop movement often coordinating with artillery to surprise unwary soldiers. Entire sections of trench were abandoned, only crossed when necessary, because they were too easily seen by observers. Planes could drop bombs right into enemy trench lines or scattered troop formations with a few well-placed shots. Aerial warfare was still in its infancy, however, and many sneered at the contribution of the pilots in the newly formed air forces

---

[4] Frederick Jackson Turner, "The Contributions of the West to American Democracy," *The Turner Thesis Concerning the Role of the Frontier in American History*, ed. George Rogers Taylor (Lexington: D.C. Heath and Co., 1972): 32; Gordon S. Wood, *The Radicalism of the American Revolution* (New York: Alfred A. Knopf, 1991); Fred Anderson, *A People's Army: Massachusetts Soldiers and Society in the Seven Years War* (Chapel Hill: University of North Carolina Press, 1984).

[5] "Guns," in *American Masculinities: A Historical Encyclopedia*, ed. Bret Carroll (New York: Sage Publications, 2003): 198-199.

[6] Eisenhower, *Yanks*, 54.

particularly when the planes flying overhead became commonplace, just another part of life in the trenches. The larger, more destructive shells and the gas that artillery pieces rained down on them was a much more pressing and impressive concern.

Despite the destruction it caused, the immense loss of life and the large number of maimed soldiers that returned, the First World War is mostly forgotten among the American populace. Nevertheless, the First World War for the United States brought important changes to the military. Military histories, such as David Woodward's *The American Army and the First World War* and John Eisenhower's *Yanks*, analyze the military High Command, focusing on the decisions by Pershing and his top level commanders.[7] Those soldiers in the trenches, however, learned quickly how ill-prepared the battle plans of their top level commanders were. Their initial training was insufficient to cope with the battlefield conditions: rifle training was supplemented with trench tactics, soldiers got lost and were cut off from their units and new recruits panicked causing more problems. Communication from the front was often cut off as carrier pigeons were shot down and radio lines were cut from artillery barrages.

European histories, such as John Keegan's *The First World War*, delve into all aspects picking apart every decision and laying out every battle for analysis.[8] The American contribution is dismissed or, at best, skimmed over with only a short chapter dedicated to their accomplishments. A chapter is not enough to discuss the American involvement. Laurence Stallings book, *Doughboys*, is entirely dedicated the United States' year of warfare, but, as he says, he focuses on the soldier himself and his

[7] David Woodward, *The American Army and the First World War* (New York: Cambridge University Press, 2014); Eisenhower, *Yanks*.

[8] John Keegan, *The First World War* (New York: Vintage Books, 2000).

experience during the war.[9] He does this admirably giving accounts of the battles from multiple perspectives as they unfold.

With the centenary of the American involvement approaching, it is important to look closer at the soldiers who fought in the Great War especially the common soldiers. It was ultimately their skill that obtained the objectives by the way they used their weapons and adjusted the tactics to fit their situation. Many of these soldiers would later apply the lessons learned in World War I as they became colonels and generals in the next war. Mark Grotelueschen's book, *The AEF Way of War*, tries to do this by examining how the four main American units in France modified official doctrine at a company level to fit battlefield conditions.[10] While Edward Coffman also tries to cover the lower ranks in his *The War to End All Wars*, he still returns to military leaders.[11] The basic soldier experience is the same in almost every war and every country. Their memoirs recount the fatigue, hunger and overall horrible conditions they suffer on an almost daily basis. Almost every soldier tries to get a few extra days furlough, raids an abandoned position or village for food and just tries to make his life better in any small way he can. What is generally overlooked is the common soldier and his reactions to the weaponry he used to fight.

This thesis is not meant to cover the full soldier experience. It is only meant to study the soldiers' reactions to the new weaponry they encountered and used in the battlefields of World War I. The thesis will attempt to explain how the soldiers reacted to

[9] Laurence Stallings, *The Doughboys* (New York: Harper &Row Publishers, 1963).

[10] Mark E. Grotelueschen, *The AEF Way of War: The American Army and Combat in World War I* (New York: Cambridge University Press, 2007).

[11] Edward Coffman, *The War to End All Wars: The American Military Experience in World War I* (New York: Oxford University Press, 1968).

the new situations they encountered and modified or otherwise ignored existing doctrine in order to meet the German threat in the trenches. Soldiers had to adapt to a completely different style of fighting as their training was insufficient for the contemporary battlefield and they did so often without a commander's interference. Therefore, particular attention was given to the soldiers' analysis of the weapons in their journals and memoirs. These primary sources are from mainly privates and non-commissioned officers who are generally overlooked by historians. Although some are published memoirs, most are from the War College archive in Carlisle, Pennsylvania. While many of these memoirs and documents have been used before, they were used to determine the overall American experience in the war. Instead of their experience as a whole, the thesis will focus on how the soldiers used the weapons on the battlefield and how they learned to use them beyond their training.

These soldiers grew up on the stories of their parents or grandparents serving in the Civil War carrying one-shot muskets and short range cannon. Those stories could not compare against the constant barrage of unseen artillery, the stream of machine gun bullets and the pockets of noxious gases that seared lungs and blistered skin. These new weapons were much more destructive creating a place soldiers commonly described as beyond hell. That feeling would remain despite the short time the American soldiers spent "over there." The weapons helped define the experience more than political decisions and war strategies. Since the weapons played such a big part in the war defining the lives of the soldiers, then these tools deserve a more in-depth analysis on just how they affected the soldiers.

Chapter 1. Light Infantry Weapons and Soldiers' Adaptations to Unexpected Realities of Trench Warfare.

The infantry had several weapons at their disposal that they used to great effect throughout the course of the war. This chapter will explain how American soldiers developed new ways to use light weapons to attack and defend themselves in the trenches of France. While Americans hoped to restore movement to the battlefield, they soon learned trench warfare could not be completely avoided. Many weapons were invented specifically for the trenches and the war of attrition that developed shortly after the war began in Europe and most would be further developed and refined for use in the next war, a war that was never meant to happen. American soldiers had differing levels of love and hate for each weapon. Machine guns were especially hated as a well-placed gunner could and did destroy advancing squads with little effort while rifles were so beloved, soldiers would cry if forced to leave theirs behind for a replacement. The infamous trenches became both a defense and a weapon as poisonous gas sank into the depressions where the soldiers were forced to live. Gas littered the battlefield causing casualties when soldiers dived into a convenient crater for cover. Grenades were a new weapon that had many variations as they were thrown by infantry or dropped as bombs from airplanes. Infantry weapons were the most widely used during the war and, besides artillery, affected soldiers the most during the fighting. Although many techniques were developed to keep the infantry safe, these would be ignored if the soldiers deemed them too inconvenient. Other techniques were adopted as they were proven on the battlefield, such as for aiming the machine guns, and some were even learned from the enemy. Grotelueschen is the only one to truly address the topic of American soldiers and light

weapons in the Great War although he focuses more on the overall experience of the soldiers rather than the weapons in particular.[12]

Rifles and Machine Guns

A rifle is considered the infantryman's best friend. This may seem like a cliché, but to a man in the army, it was truth. Often on the foggy, gas-filled battlefields men would become separated and he would find himself seemingly alone. His rifle was his primary weapon and he could use it to shoot at the enemy or use it as a club when the ammunition ran out and an enemy was too close for effective use of a bayonet. The rifle is best used on a fluid front, however, while the front as seen in World War I was stagnant and the armies relied mainly on artillery and machine gun fire to keep the enemy at bay. The Europeans had grown almost content with this type of warfare, but the American soldiers were fresh with stories of the glory of war percolating in their minds. General John J. Pershing saw the trenches as cowardly and believed that they needlessly prolonged the war.[13] He strongly advocated fire-and-maneuver tactics and the American training, especially stateside, reflected this even though it would amount to massive casualties. Still, enormous emphasis was put on target practice with rifles and submachine guns.

Despite Pershing's ideas, Americans' experiences in the trenches on the Front shaped the way they used their weaponry as they experimented with the most effective tactics against their enemy. Sergeant Donald D. Kyler of the 1st Division and a farm boy from Indiana wrote extensively of the most commonly used infantry weapons. His

[12] Grotelueschen, *AEF Way of War*.
[13] Farwell, *Over There*, 64.

opinion was that machine guns with all their components were too heavy and hindered mobility. Infantry had to move quickly to avoid being spotted and/or hit. Even grenades were considered too cumbersome and better suited only for defensive positions even though they could prove useful when a machine gun nest or trench needed to be quickly cleared mid-advance. A Springfield rifle was by far the most superior and the only weapon needed by advancing infantry in Kyler's opinion. The rifle was dependable, easy to care for and had an adjustable rear sight for easy aiming.

The Springfield .30-06 caliber rifle, however, was in short supply so the United States outfitted its soldiers with the British Enfield .303 caliber. These were the best rifles of the war for both range and accuracy; the Springfield, however, had a few advantages on the Enfield. The Springfield had a better sight as well as greater muzzle velocity due to its slightly larger round (which also attributed to its greater stopping power). The Springfield was longer and heavier than the Enfield, but this could still be an advantage when the fighting in the trenches turned into close quarters combat. According to First Lieutenant Samuel Meek (found in Henry Berry's *Make the Kaiser Dance*), the Springfield "was a great weapon. Not only was it accurate, but it rarely jammed. Having very few parts, it seemed to be able to absorb the dirt—and we were always living in dirt—and still work. And that damn Chauchat, it was a lousy weapon in many ways, but it was another dirt absorber. It wasn't very accurate, but it usually worked, and that's a great asset in the type of combat we were in—you could use it like a hose."[14]

The French Chauchat was the most commonly used submachine gun during the war. It operated on recoil and had a twenty round crescent-shaped magazine. Meek

[14] Henry Berry, *Make the Kaiser Dance: Living Memoirs of the Doughboy* (New York: Arbor House, 1978), 92.

actually seems to be in the minority on his assessment about the Chauchat working. Most complained of it jamming and it is easy to see how this would happen with the design of the gun and magazine. Kyler directed most of his scorn at the French weapon claiming it was "too heavy, inaccurate, of limited tactical use and caused a waste of effort and ammunition." Many would have preferred to have the Browning .30 caliber automatic rifle (BAR) which was invented around this time. Unfortunately, Pershing withheld the BAR until the Meuse-Argonne because it was considered too good to fall into enemy hands. Private Malcolm D. Aitken of the 2nd Division recalled in his memoir how his unit of Marines tried to exchange their Chauchats to newly arrived Texas regiments carrying the BAR.[15] Their compliments of the weapon verged on outright lies and managed to trick the green soldiers into taking the trade. The officers, however, forced the regiments to trade back. Part of the problem, Aitken admits, is that they were never trained to use the Chauchat so it was automatically considered below par.[16]

Training an American soldier to use a rifle was probably more difficult than training a European. In Europe, very few soldiers would have handled a gun before enlisting so they had no prior experience or bad habits that clashed with the military training. There is, however, a gun culture in America due to the frontier nature that, even by World War I, had not completely disappeared.[17] Hunting was not just a pastime, but still a way of survival for many Americans. Private Herbert L. McHenry grew up handling guns living in rural Pennsylvania, but quickly learned upon enlisting there was a

[15] Private Malcolm D. Aitken papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA.

[16] *Ibid.*

[17] "Guns," 198-199.

lot more to firing rifles than he had learned squirrel hunting.[18] They had to learn to fire from many different positions as well as take apart and assemble their weapons even blindfolded. Kyler observed the difference between practice and combat:

> Being able to hit a target in combat, or even in ideal conditions on a firing range, requires much training and skill that may not be apparent to the uniformed person. The ability to get into a proper position for holding a steady aim, breath control during the firing of each shot, the proper sigh setting, estimating distances, and taking into account the wind intensity and direction are the most important physical factors. However, the mental attitude is the most important of all. Achieving a high score on a practice range is one thing, but overcoming nervousness, fear, stress, and becoming apathetic to emotions is something else. The latter ability is the mark of a good combat infantryman.[19]

Corporal John Ausland also noticed the difference as he wrote in his papers: "Firing on the rifle range is one thing, but it is entirely different here. It's not easy to shoot long distances standing up, but when you lay flat and rest your elbows on the ground, your gas mask which is fastened to your chest hold you up off the ground, and when you lift your head to sight your back-pack pushes your tin hat down over your eyes."[20] The new recruits learned to respect their weapons and often treated their guns better than themselves: "Then there was a gun; old '727712' scarred, faithful, much handled and polished. We were real partners and many and many a night we have slept side by side and the old gun was drier than I, for it slept inside my coat, away from the rain."[21] While Private Loren Duren never identifies what type of gun he used in training in his memoir, it was most likely a Springfield.

---

[18] Private Herbert L. McHenry, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA., 6.

[19] Donald D. Kyler papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA, 41.

[20] Corporal John E. Ausland papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA, 9.

[21] Private Loren D. Duren papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA, 4.

The American Springfield was so beloved by the soldiers that used it, they only reluctantly traded the rifles for the British Enfield which had a larger stock of available ammunition due to the previously established British supply dumps. Sergeant William S. Triplet of the 36th Infantry Division, a high school student from Sedalia, Missouri, wrote what amounted to a eulogy for the weapon:

> But we really grieved when we gave up our Springfields. With them, the best military rifles of the age, we could worry an enemy at half a mile, we were effective at six hundred yards, and deadly at four hundred. The Springfield had a triple-threat sight system that included the notch battlesight for 440 yards or less and an adjustable notch sight as well as the number-six peepsight that was used for sniping or accurate fire at long ranges. The sight base was also adjustable to counter the effect of a side wind on the flight of the bullet. It was sad day when we gave these polished, pampered beauties for the beat-up Enfield muskets. Cooper, giving up his scope-rifle, was heartbroken.[22]

Both the Springfield and Enfield rifle performed excellently despite the bias the Americans held for their own rifle. When advancing on a position, Corporal John Ausland saw a German shot the "bullet coming out of his forehead where it made a hole bigger than a silver dollar…"[23] The dead German was testament to the destructive power of the rifles and the reason they would continue to be used decades later by American snipers.

Overseas, rifle training was not as emphasized as in the American Army according to Byron Farwell and his assertion seems to be backed by the papers of the Doughboys.[24] Triplet's unit trained with the British after the Atlantic crossing and a rivalry soon developed between the two forces. The Americans believed the British put

[22] William S. Triplet, *A Youth in the Meuse-Argonne: A Memoir, 1917-1918*, ed. Robert H. Ferrell (Columbia: University of Missouri Press, 2000): 75.

[23] Ausland, Unpublished Memoir, 10.

[24] Farwell, *Over There*, 64.

out a large volume in the hopes of hitting something, wasting ammunition, while the British scorned their new allies for their slow rate of fire. Americans were not above wasting ammunition either. Ausland relates how, tired of being bombed by German aviators, the American infantry took shots at the overflying planes against standing orders. Ausland does note, however, that the useless exercise was good for morale.

For heavier machine guns the Americans had the choice between the British Vickers .303, which was mainly mounted on American flown aircraft, and the French Hotchkiss. The latter was used the most by the Americans. The Hotchkiss .315 caliber machine gun was also the heaviest of the war at fifty pounds, but it was air-cooled and the most effective for anti-aircraft fire. Triplet's unit had four mounted Hotchkiss guns bolted onto log emplacements and set up to provide enfilading fire. Line of sight was a major problem for machine gun crews. Even though they were often thought of as smaller mobile artillery, they did not have the range or accuracy to fire over trees and into enemy lines. Due to the Germans holding the high ground the field of fire was not completely cleared of trees. Instead, lower branches and bushes were removed leaving higher limbs to protect the troops from observation.[25] Vegetation was not the only concern. Fog and the dark often obscured line of sight so French, and some American, emplacements had a brilliant, but complicated system to allow for semi-accurate fire on the German lines. Using the gun's natural vibration and a track and pin system, the gunner could fire along the enemy trench lines then quickly switch to close-fire support if the Germans attacked.[26] This was a new technique the Americans learned from the French on the battlefield as the Americans took over French positions. When the

[25] Triplet, *A Youth in the Meuse-Argonne*, 108.
[26] *Ibid.*, 109-110.

Browning was introduced, one of its major improvements was a portable mount that provided the same accuracy as the French system and allowed for predicted fire similar to field artillery according to Michael Grice's book on the modern history of field artillery.[27]

Even though the Americans had the weapons, they had little training with machine guns, while the Germans were expert killers.

> [The Germans] were artists with machine guns, used them at two thousand yards or more, placing them well back where the trajectory of the bullets would follow well down the curve of our reverse slopes. Then the gunner would range in with bullets of ten and when he saw just one bullet kick up dirt on the crest he'd clamp his gun at that elevation knowing that the other nine bullets were making life miserable for anybody on the reverse slope behind the crest.

Sergeant William Triplett admired.[28] The American troops came to absolutely despise the German machine gunners. When the Americans did take a machine gun nest, they usually did not take prisoners. Private Charles Minder swore to his family that he would not kill anyone in the war. He broke that promise in the Argonne: "From the angle where I was, I could see everything very plainly, as I was almost on his right flank. The Infantry boys couldn't see the machine gun nest very well. I opened up our gun and let him have it, I was so sore at the moment. He was hitting our Infantry; they were falling one after another. It was terrible! I had to shoot."[29]

The taking of machine gun nests is where one can really see the change in tactics mentioned earlier. Although General Liggett was credited with fire and maneuver—one group fired at the emplacement while another maneuvered to take it—several company

---

[27] Michael D. Grice, *On Gunnery: The Art and Science of Field Artillery from the American Civil War to the Dawn of the 21st Century* (North Charleston: Booksurge Publishing, 2009): 81.

[28] Edward G. Lengel, *To Conquer Hell: The Meuse-Argonne, 1918* (New York: Henry Holt and Co., 2008): 135-136.

[29] *Ibid.*, 180.

commanders had already implemented it earlier as Lengel explains in his memoir.[30] Not all machine gun nests were what they appeared to be however. Lieutenant Hervey Allen's unit took a map off a dead German showing the enemy defenses. He was surprised to learn the guns his men had been firing on were wooden dummies and the real emplacements were on the other side of a hill employing indirect fire.[31] As the emplacements were on the reverse slope and heavily fortified, the artillery could not score a direct hit and a glancing blow would not destroy the gun or incapacitate the crew.

American soldiers on the battleground pushed for and developed new fire and maneuver tactics when they entered the war. Throughout the course of their time overseas, they combined offensive and defensive tactics as they pushed into the German lines. Unfortunately, this cost many lives as they fought against superior German machine gunners. While rifles were not the most effective weapons during the war, the soldiers came to treasure their personal weapons almost as much as letters from home. Machine guns were used as miniature artillery pieces and were much more effective as a defensive weapon, but the Americans did not have the training necessary to use the weapon properly until they were actually in the field.

Trenches

The ground troops had numerous worries and weapons; the trenches were both. Trench lines could be abandoned to set a trap or they could protect against shellfire. The way the trenches were constructed also hid soldiers from sight making taking the line

[30] Lengel, *To Conquer Hell*, 385.

[31] Hervey Allen, *Toward the Flame: A Memoir of World War I* (1926; repr., Lincoln: University of Nebraska Press, 2008): 98.

even more dangerous. The trenches were one of the best and worst defensive weapons of the war. The European belligerents had been using them since the first month of the war, but Pershing believed the newly expanded American Army could break through and return mobility to the Western Front.[32] They were successful up to a point as the massive offensive at the Meuse-Argonne showed, but the Americans also found, just as the Europeans did, the trenches offered the best defense against the constant artillery barrage. The trench lines offered protection while also introducing sickness and other horrors. So, while Pershing had his own ideas and wanted to concentrate on mobile rifle tactics, the soldiers at the Front were forced to revise those plans after their experiences proved how dangerous those tactics were to their lives. While historians, such as Keegan and Coffman, have often described the horrible condition of the trenches, they do not often describe the trenches as weapons.

Kyler describes the intricate and muddy world the Doughboys were introduced to:

> The trench system that we entered…had been stable since 1915, and both sides were deeply dug in, with extensive communication trenches, second-line trenches, belts of barbed-wire entanglements, dugouts, and protected gun emplacements…Many of the trees had been broken by shell bursts in the past and the land was pitted with shell holes, partly eroded, and overgrown with weeds. My platoon was in the company support position. Slightly to our rear was a large dugout where our company command post was located. It was connected by telephone to all our platoon command posts and to the battalion command post. At several places along our trench there were narrow tunnels leading downward into the earth to our sleeping places. To enter, one had to stoop and descend into a dark, damp, smelly hole. When enough depth had been reached the tunnel widened and became level. Short cross tunnels led off of it. There one could sleep if he was tired enough. The whole place was infested with rats, body lice, and bed bugs. At the far end of the tunnel was a shaft and ladder to escape by in case the entrance was caved in by shellfire. Near the entrance to our dugout, and in the opposite direction, a spur trench led to a trench latrine.[33]

---

[32] Farwell, *Over There*, 64.

[33] Martin Matrix Evans, *Retreat, Hell! We Just Got Here! The American Expeditionary Force in France, 1917-1918* (Oxford: Osprey Publishing, 1998): 30.

Even though General Pershing wanted nothing to do with trench warfare, it became a fact of life for many American soldiers on the Western Front. Many became discouraged after so long at the front and began to understand why their allies, who had been there even longer, appeared so beaten. George Browne summed it up nicely in his published memoir: "The army is nothing nice in a place like this front has been. It makes a guy feel the uselessness of war when he sees men shot up and killed. It's no use trying to describe it and I wouldn't want to."[34]

The trenches were truly a dismal place. They were dug so at least two men could walk abreast and the man-made furrows zig-zagged across the landscape to hopefully lessen the damage from a direct hit. By the time the Americans entered the war, the trenches had been there so long and were so complex, they had been given names like streets. Wooden boards lined the bottom to help keep the men out of the mud, but they did little good. Previously buried dead, not just from the First World War, were unearthed by artillery barrages; the stench of death was everywhere.

To add to the defense, and as Kyler stated, barbed wire was laid out to stop anyone who might sneak up on their trench in the dark and delay attackers when the enemy was ordered to go over the top. These entanglements also served to hang messages on. During the St. Mihiel Offensive, the Germans waging a bit of psychological warfare hung a sign saying, "To the 9th Infantry—we know you are here and we are—ready for you." Second Lieutenant Clark replied in his journal, "I really feel sorry for them, because if they are ready for the Ninth, or any others of our division, as they say, they

[34] George Browne, *An American Soldier in World War I*, ed. David L. Sneed (Lincoln: University of Nebraska, 2006): 100.

must have made their wills and resigned themselves either to death or a prison camp for our motto is 'Let's go!' and no Boche obstacles have stopped us yet."[35] Some Doughboys from the 167th Infantry, called the "Bloody Alabams," left their own message on one German barbed wire entanglement: "Germans give your soul to God because your ass belongs to Alabam."[36]

There are several instances of individual, brave Americans taking platoons of Germans prisoner or wiping out the entrenched forces—the story of Alvin C. York is the most known—but the most effective means of fighting the Germans seemed to be to draw them out into a attack. Sergeant Richard O'Neill was at the Ourcq River. He says when the Germans came over, the American forces retreated from the first line trenches giving the enemy an easy "win." Then the Allied artillery opened fire. Since they already had the exact range, "it was like ducks in a shooting gallery." The Prussian guard, however, kept going and the second line trenches saw "vicious" hand-to-hand fighting.[37] Kniptash corroborates this story.

Even though British and French instructors taught the Americans how to fight in the trenches before sending them into the front lines, like most soldiers, the Americans learned the most from their enemy. Triplet laid out the lessons he learned from the Germans for trench fighting: "Don't shoot till you see them, then use everything handy. Make no unnecessary noise at any time. Don't fire flares. It shows you have no patrols out and that you are afraid he has. Don't put your head to see if a sniper will shoot at it. He will."[38]

---

[35] Evans, *Retreat*, 61.
[36] Farwell, *Over There*, 114.
[37] Berry, *Make the Kaiser Dance*, 333.
[38] Triplet, *A Youth in the Meuse-Argonne*, 115.

Several pieces of armor were developed to protect the soldiers in the trenches. The tin hats, famous from that time period, were able to absorb enough of a bullet's impact to prevent death and soldiers often bent their heads against the hail of bullets for the slight protection it offered.[39] The French also developed trench armor which they shared with the Americans. The armor was constructed of double layered French uniforms reinforced by steel plating so heavy and thin as to be useless in any situation. One of the men of Triplet's unit decided to test the armor by burying a trench knife to the hilt in the newly issued jacket. "It looked like we'd gotten rid of fifteen pounds of surplus gear and been handed another twenty pounds that was good only for morale purposes and Cooper had ruined the morale viewpoint."[40]

Grenades

Rifles and machine guns were only efficient if the enemy was out in the open or during an advance. Since they often advanced on well-defended positions, rifles and even artillery support was not enough to break through. World War I saw the expanded use of grenades and innovations in order to deliver the small bombs. A well-thrown grenade could take out a gun nest or at least disorient the gunners enough for a squad to take the gun. According to Farwell, grenades were an ancient weapon that was experiencing a resurgence.[41] The American forces were given no training with hand grenades until they reached the training camps overseas.[42] Americans did not always use the grenades in

[39] Ausland, Unpublished Memoir, 19.
[40] Triplet, *A Youth in the Meuse-Argonne*, 132.
[41] Eisenhower, *Yanks*, 48.
[42] *Ibid*., 46.

combat and, when they did, new tools had to be developed in order the grenade anywhere near effective enough to take the enemy trenches.

Kyler described the different types of grenades his unit trained to use. Training grenades were made from sheet metal and relatively harmless as they were meant to help soldiers practice throwing the weapon. A man could be injured if he did not throw far or fast enough, but not enough to be removed from the front lines entirely. The real weapons were made of iron, fragmentation grenades, that had the explosive power to clear a dugout or, with a little bit more power, clear caves or heavily fortified positions. All the grenades were pear-shaped with a pin covered by a metal cap and sealed with wax. By removing the cap and pushing in the pin, the soldier activated a short time fuse—only about five to seven seconds—which prevented the enemy from having time to clear the area or throw the grenade back.[43]

A man can only throw so far, however. While some trench positions were close enough, most required the troops to advance and, by the time they were close enough to throw the grenade, they would be dodging machine gun fire or there might be a wall or high embankment in the way of the advance. Therefore, it was necessary to develop a longer-range delivery system: the rifle grenade. A normal rifle was modified with a cone-shaped launcher in which the grenade was placed. When the rifle was fired, the bullet would pass through the grenade activating the time fuse and, due to the built-up pressure, launching the grenade. Unfortunately, the recoil from the rifle was so great it had to be braced against the ground or it could shatter the shoulder of the rifleman. According to

[43] Kyler, Unpublished Memoir, 37.

Kyler, it also suffered from a lack of accuracy. Only with practice could a soldier place a grenade within an effective blast zone.[44]

The Americans found other uses for grenades besides throwing them at the enemy. Sergeant Lyle Cole put them to a more mundane use. He and a friend were tasked with burying trash by the kitchens, a task made more difficult by the amount of tree roots throughout the area. They had problems cutting through the roots, to the great amusement of the kitchen staff, so decided to wire a grenade to one of the roots.[45] They were successful in digging the hole after that.

Gas

Explosives were not the only shells sent over during an artillery barrage. The Germans had used gas since the April of 1915. New types of gas were created and introduced to the battlefield over the next few of years as each side tried to use chemical warfare to defeat the enemy. Chlorine, which caused violent retching, was developed first. Phosgene shells quickly followed with their dangerous load that dissolved the lungs within forty-eight hours and the soldier would never know he inhaled it. There were less dangerous gases like sneezing gas, but the fatal gases were more common and left a lasting impression on the men and land. Mustard gas is probably the most famous and the worst. It was introduced by the Germans in July 1917. The majority of gas casualties on the Western Front can be attributed to mustard gas.[46] The gas had a delayed effect blistering the skin and respiratory tract, causing temporary to permanent blindness and a

[44] Kyler, Unpublished Memoir, 38.

[45] Sergeant Lyle S. Cole papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA, 25.

[46] William G. Dooly Jr., *Great Weapons of World War I* (New York: Army Times Publishing Company, 1963): 127.

slow death. The worst part of this gas is that it would stay around contaminating the soil and collecting in shell holes to affect other unsuspecting soldiers. While the other belligerents had time were introduced to each type of gas one at a time, the Americans were faced with every type all at once. They had the advantage, however, in that they could learn from their new Allies although they did not always take those lessons to heart.

To combat this new weapon, the belligerents invented gas masks. This piece of equipment went through several stages, but they were all ungainly, uncomfortable things which limited visibility and only worked to protect the lungs and face. Many soldiers, mainly before they witnessed or were recipients of a gassing, threw the masks away against orders. Since the battlefields were so saturated, however, the masks were needed almost constantly and, during training, soldiers were made to run with the gas masks in place to become accustomed to the feeling of breathing in the enclosed space. The masks were far from perfect though and many complained of the eye pieces becoming fogged. Some men simply pulled the eye pieces off to fix the problem only to immediately regret the action as their eyes burned from the effects of gas. Groups of civilians and soldiers would take shelter in basements or dugouts with a thick piece of leather or a treated blanket tightly pinned over the door to keep out gas. American Sergeant Ernest Hinrichs recounts one such experience and how the dim lighting with the masks "transformed" the men "into a group of goblins with huge round eyes and most extraordinary snoots."[47] The eeriness of a shelled and gassed landscape bereft of almost all life only added to this image. Americans seemed to fear gas more than any other weapon as those on guard duty

[47] Sergeant Ernest Hinrichs papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA, 41.

would constantly wake their comrades with false alarms while their French allies were almost apathetic to the threat.[48] They understood that, because gas sank to the low points, they were safe on hills.[49]

Even though gas masks were kept "at the alert"—hanging just under the chin for quick application during a gas attack—soldiers did not always utilize them. Corporal Horatio Rogers was gassed after delivering a message to Battalion Headquarters. The gas canister released its contents only a few feet from the Corporal and he ran without putting on his gas mask. He was soon overcome with dizziness and "violent nausea."[50] At Rambucourt, Rogers was subject to another gas attack. After sticking his head outside of the gas curtain, he was "rewarded by a stinging sensation in my nose and throat and a faint odor of chocolate."[51]

Soldiers could often identify the type of gas from the smell. Mustard gas, for example, smelled like mown hay or onions to the majority of Americans. Chocolate was rarely mentioned except when writing of rations and it is difficult to find secondary source material on this particular mixture. Although Rogers never mentions the gas by name, it is most likely diphosgene, a more potent form of palite which was used mainly in 1915 and 1916. The Germans originally developed palite, with its unique smell, specifically for use against the French. The smell served to attract the French soldiers who were maltreated and already short on rations. The French soldiers would walk into the gassed areas and seared their lungs after only a short time. By 1917, the French were no longer fooled by the sweet-smelling gas.

---

[48] Aitken, Unpublished Memoir, 11.
[49] Horatio Rogers, *World War I through my Sights* (San Rafael: Presidio Press, 1975): 59.
[50] Rogers, *World War I through my Sights*, 119.
[51] *Ibid*., 98.

For something like mustard gas, which affected the entire body, the masks were not enough. Gas paste was used to prevent the skin blistering of mustard gas. It had the consistency of toothpaste and smelled foul; clothes would be literally plastered to a soldier's body and they often questioned whether the gas or paste was worse. Despite these complaints, soldiers could still be seen applying the paste before an attack.

The Doughboys tried to force the war of attrition into a mobile one. They were only partially successful preferring to fall back on the lessons on trench warfare learned from their foreign allies to preserve their lives as much as possible. Gas was a constant threat in the trenches as it sank to the lowest point, but those Americans that believed in their war-making ability often traveled into No Man's Land using their other available weapons to their advantage. Since the gas filled almost every shell hole and seeped into the soil, battle mobility did not help as much as Pershing wished. The soldiers had to keep their masks on at all times—something they were largely unwilling to do as it became difficult to breathe, see and felt claustrophobic after even a short time. Therefore, though there were defenses developed against the harmful nature of gas attacks, the soldiers' actions prevented those from being effective and the Americans suffered more casualties as a result.

Chapter 2. Heavy Weapons: Tanks and Artillery

Surprisingly, there are few, if any, comments on the new armored infantry battalions from the Americans who served on the front. Perhaps this is because there were so few given by their allies for American use and, of those few, even fewer actually made it into the battle. There is also a great divide in those opinions as some, namely those who served in the tank battalions, favored the new weapon while others, namely the normal infantry, saw little use for them except as a possible temporary shield. Part of the problem was the tanks were not used effectively as they were treated more as mobile artillery than the armored cavalry they would become in later wars. This was a lesson that could only be learned in combat and the battlefields of World War I were the perfect school room.

Of the secondary sources available on the war, there is little on the development and evolution of the American tank battalions. David Johnson's *Fast Tanks and Heavy Bombers* provides the most detail although he mostly focuses on the interwar period.[52] The Americans learned the lessons of tank warfare mainly from their British allies and their tactics differed little. It was mainly after the war when military thinking and doctrine diverged as the various militaries placed differing emphasis on the new weapons available. The campaigns of World War I would help in this determination. Germans did not use tanks in World War I so Americans did not have to face them in a frontal assault, but they did need to adjust to cooperating with their own tanks which they found difficult

[52] David E. Johnson, *Fast Tanks and Heavy Bombers: Innovation in the U.S. Army, 1917-1945* (Ithaca: Cornell University Press, 1998).

due to lack of combined arms training. The lessons learned would not be effectively implemented until after the war was over.

Tanks, like airplanes, were new to warfare. Developed by the British in 1916, the Mark I was based on American tractor equipment and could only go three miles per hour on the battlefield, but they could cross a ten foot trench.[53] The tanks were manned by two man crews: a gunner/tank commander and the driver. General Pershing established a separate tank corps upon arrival in France under the command of Colonel LeRoy Eltinge who believed tanks should operate independently and in great force.[54] Unfortunately, the Americans never acquired the massive armored force they envisioned. The Liberty engine used in the English heavy tanks were also used for aircraft so the factories could not meet production requirements while the French company, Renault, who produced the light tanks, refused to share their blueprints.[55] Hence, there was a major tank supply problem for the United States' forces during the war.

American tank forces only participated in two campaigns, the St. Mihiel and Meuse-Argonne Offensives, and most of the tanks were abandoned as they became stuck in ditches or destroyed by enemy attack. However, the American military still believed that tanks were important for the battlefield of the future and doctrinal changes were made based on these two encounters.[56] Unlike the Air Corps that had to fight and constantly prove itself in order to be recognized for its potential, tanks were accepted almost without question. Still, they would not operate independently as Eltinge imagined

[53] Dooly, *Great Weapons of World War I*, 138.
[54] Johnson, *Fast Tanks and Heavy Bombers*, 31.
[55] *Ibid*., 32.
[56] *Ibid*., 37.

as a manual released in 1918 described them as a "supporting arm" to the Infantry.[57] In order to learn tactics for the new tank battalion, the officers toured the French and British tank schools relying mainly on British tactics as they published a packet that was an exact copy of British training documents.[58]

As stated previously, the World War I tanks moved at a crawl and were often abandoned when they became stuck. During combat, the driver's viewport was closed to prevent being hit by a stray bullet. The commander instructed the driver with a series of kicks—one kick to the back meant go forward, one to the right or left shoulder meant turn in that direction, a kick to the back of the head meant stop while several kicks to the head meant go back. Due to their many problems, tanks were underestimated and easily countered. According to captured German documents from September 1918, tanks proved no real threat except to morale and a concerted well-planned attack by infantry could stop the machine, generally with tied together hand grenades on the caterpillar chains.[59] Ludendorff wrote in August troops of the Second German Army "lost all discipline…when [tanks] appeared suddenly behind them."[60] So, despite the German High Command's confidence and plan for effectively sabotaging the tanks, the soldiers could not overcome their own terror. Only a month before the armistice was signed, German officers admitted they had underestimated the tank's value on the battlefield, but

[57] Johnson, *Fast Tanks and Heavy Bombers*, 36.

[58] *Ibid.*

[59] "Defense Against Tanks," translated captured German document, 3 September 1918, Joseph Viner Papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA.

[60] "The Causes of the Defeat of the IId German Army," General Erich Ludendorff report, 11 August 1918, Joseph Viner Papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA.

it was now too late to match the British models in production.[61] Their only excuse was they believed only soldiers who lost their nerve needed tanks to support them.[62]

The United States infantry soldiers shared the German assessment overall. American Army Private Andrew Kachik was not impressed with the new weapon as it was smaller than a car and about as effective in combat.[63] Sergeant Triplett agreed. He recounts one failed attempt by five Renault tanks on an enemy position. The tanks only had 37 mm guns and machine guns. The tanks crested the ridge, but quickly retreated as they could not cross the river "then they made half a dozen runs along the crest of our ridge like a fleet of battleships in column…Don't think they were particularly effective, shooting on the move like that, but they sure livened up things for us."[64] Tanks, in the eyes of infantryman, served better as targets for enemy artillery and machine gunners. Just from this raid, Triplett and his unit spent most of their time dodging the ricochets from the bullets bouncing off the tanks' armor as they tried to avoid the tanks themselves.[65] The driver's viewport was small and often closed during combat, as stated earlier. In addition, the crews would wear gas masks to protect against the numerous pockets the tanks might drive through.[66]

Tankers and infantryman faced many of the same dangers, though, as often happened among different combat units, they argued who faced the worst from the enemy. Triplett overheard one such argument between an infantry captain and tank

---

[61] "German Estimate of Tanks," German Officers of the 40th Infantry 28th Division, 12-13 October 1918, Joseph Viner Papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA.

[62] "German Estimate of Tanks."

[63] Andrew J. Kachik papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA.

[64] Triplet, *A Youth in the Meuse-Argonne*, 193.

[65] *Ibid.*, 193.

[66] Major Roger B. Harrison papers, Maneuver Center of Excellence Libraries, Fort Benning Archives, Columbus, GA.

lieutenant. The former argued that riflemen go to places tanks could not and without protective armor while the latter casually fought back with tanks being a magnet for enemy fire and armor-piercing bullets.[67] Like many of the projectiles used in this war, there were differing opinions on the armor-piercing rounds' effectiveness. The tank lieutenant recounted how the round went through the armor, his driver and the engine. Others, such as Major Roger Harrison of the 301st Tank Battalion and a native Missourian, believed the rounds expended all their energy in breaking through the armor so did little damage to the crew and internal machinery.[68] With the varying standards of manufacturing in the armament factories, the damage most likely depended on how well the shell was actually made and the luck of the receiving tank crew or enemy soldier. The 16mm shells were as life-threatening to the shooter as to the tanks they hit. The recoil was so terrible, a soldier had to wear large pads on their shoulders to protect themselves; it was not enough as many were still found with broken bones or even dead.[69] To prevent this, the gun was placed against a tree pointed in the general direction of the enemy tanks and then fired.[70]

As an offensive weapon, at this stage of its development, the tank and the corps' tactics were lacking. The American tank battalions relied on their foreign allies to furnish them with their vehicles, just as with many of the other weapons in the war. The French Renault FT-17 was the most commonly used by the Americans in World War I and was the model for American M1917 6-ton tank that was rushed into development.[71] The

[67] Triplet, *A Youth in the Meuse-Argonne*, 216.
[68] Harrison, Unpublished Memoir.
[69] Captain Thomas C. Brown papers, Maneuver Center of Excellence Libraries, Fort Benning Archives, Columbus, GA.
[70] *Ibid*.
[71] Dooly, *Great Weapons of World War I*, 153.

French and British were only able to give them a fraction of what was truly needed, however, as production could not keep up with their own armies' needs and replacements were never made available for those vehicles that broke down or destroyed which occurred quite frequently. Of the twenty-two tanks that went into a battle in late September under Major Harrison, only five made it to the objective. Six failed to reach the jump off point, nine were ditched unable to cross the trenches and shell-holes and two were blown up by British mines that were not reported.[72] The unit was only given forty-five tanks for the duration of the war.[73]

Getting tanks to the start line was a feat in and of itself. The vehicles were serviced sometimes miles behind the front lines so unnecessary wear was put on the tanks before they even got into position.[74] Then, objectives were generally not taken within the time limit originally set so the tanks were made to push further without maintenance meaning they would break down even faster. All of the tanks were always on the edge of complete deterioration so only a fraction was ever combat ready. By early October, the tank battalions were moved into reserve positions to be used only when absolutely necessary.[75]

While maintenance was the major problem, there were others as well. The best terrain for tank warfare was generally in open territory within sight of any German observer or gunner. When going into combat, several canisters of gasoline were placed on the back of the tanks for refueling. German machine gunners, cleverly, targeted these

[72] Harrison, Unpublished Memoir.
[73] *Ibid.*
[74] Brown, Unpublished Memoir.
[75] *Ibid.*

canisters disabling the vehicles to which they were attached.[76] The gunners moved through all terrain much quicker than the lumbering metal vehicles, so were able to shoot and run before the American tank crews were able to retaliate.[77] The tanks' slow pace proved problematic during an American push as the infantry would outrun their supposed support. Many infantry commanders did not want the tanks in front of their troops anyway such as the one of the 27th Division—he believed the soldiers' morale would wane when, not if, they saw the tanks destroyed in front of them.[78]

Unfortunately, tank crew training stressed gunnery and formation while ignoring cooperation with infantry units, the ones the battalions were established to support.[79] The infantry could get too far ahead or behind while the artillery barrage would be too far ahead leaving the infantry without any heavy support. While the infantry could succeed without the tanks, the tanks could not hold any objective without the infantry. Part of the problem lay in communication. With the limited view provided by the tank ports, the crews were unable to tell when the infantry ran into problems.[80] An attempt was made to rectify this. A wireless radio set was placed in a tank that was no longer fit for combat, however, it could only be used if the tank stopped and the crew got out.[81] Infantry commanders were given schedules of this tank's stops so they could send runners with updates.[82] The downside was that battles rarely matched the commanders' schedules and tanks would get lost especially if there was fog or came under heavy fire. Unfortunately,

[76] Brown, Unpublished Memoir.
[77] *Ibid.*
[78] Harrison, Unpublished Memoir.
[79] Brown, Unpublished Memoir.
[80] Harrison, Unpublished Memoir.
[81] *Ibid.*
[82] *Ibid.*

the communication problems would not be fixed until radio evolved to its state in World War II.

Terrain and tank commanders' knowledge of that terrain was another problem. In the first few attacks, only a few officers scouted the terrain at forward positions.[83] Maps were then distributed to the other crews before the attack based on that information which was not always accurate, such as the tanks being blown up by the British mines. Many of the tanks were ditched in shell holes because they did not know the terrain well enough and their sight was obscured. Harrison believed that better visibility would fix many of the problems tank crews encountered.[84] In later battles, all the tank commanders were able to scout the terrain ahead and fewer tanks were ditched in shell holes as a result.[85]

The tank battalions cooperated better with the air corps in battle. The air corps would cover the tanks' advance using the noise of low flying planes to cover the sound of their own engines since they sound similar.[86] Not surprising since many of the engines had the same roots especially in the French vehicles. These planes would also drop smoke bombs to further obscure the enemy line of sight and, probably, hide the real number of tanks advancing on their position since their numbers kept dropping dramatically with each push.[87] At the same time, planes would fire on the possible positions of anti-tank personnel giving the battalions as much protection as possible.[88] The smoke bombs, however, added to the lack of visibility tank crews often complained about.

---

[83] Harrison, Unpublished Memoir.
[84] *Ibid.*
[85] *Ibid.*
[86] *Ibid.*
[87] *Ibid.*
[88] *Ibid.*

The Doughboys had more luck using defensive tactics, at least casualty wise, than charging the enemy head on. At Apremont, the Americans set up on a ridge deploying tanks at the flanks. As the Germans advanced, the machine gunners opened fire and the tanks moved in, blocking escape. The enemy was able to retreat though and the Americans followed, but were pushed back by the German machine guns. It was still a victory for the American forces.[89]

The tanks' battalions greatest successes were unplanned and often more ridiculous than true tactics. On July 4, 1918, even though the Doughboys were not technically supposed to enter a combat zone yet, the Australians decided to give their new allies a gift bringing them into the attack on Hamel. The attack used tanks to their full advantage. A British officer described the scene:

> Both Australians and Yankees have an inclination to treat a war like a lark for school-boys when there's the slightest chance. In this instance men of both groups leaped to the tops of the tanks as these filed through the waiting ranks, and crouched there during the hellish trip across No Man's Land, taking pot-shots at any of the enemy who chanced to appear in the dense clouds of smoke. Behind these the infantry sprang forward in open, extended order, at a given signal, and in but a few seconds had traversed the intervening fields, caught up to their own tanks, and were plunging into desperate conflict in the trenches…[90]

Captain Thomas Brown wrote of one experience by a sergeant in his unit. The sergeant's tank was separated from his unit and became lost. They accidentally drove into a German kitchen detail. Surprised, the kitchen crew and kitchen police scattered leaving the cooked food behind.[91] Taking advantage of the situation, the tank crew raided the

[89] Lengel, *To Conquer Hell*, 218-219.

[90] Cameron Ewen Mac Veagh and Lee D. Brown, *Yankee in the British Zone* (New York: G.P. Putnam's Sons, 1920), 206.

[91] Brown, Unpublished Memoir.

supplies so readily available and returned to his unit to report.[92] Hunger was a problem as the Americans' own kitchens fell behind in quick marches to new sectors. The men of all units and military branches supplemented their own supply with any food they could secure from the enemy or empty villages.

George Patton, the famous American general of World War II, would see the tanks for what they could be—a new cavalry performing independently and supporting infantry. He only fought one day during World War I in the Meuse-Argonne offensive, but he would change tank warfare. He used tanks like the cavalry he compared them to forcing the Germans to retreat at St. Mihiel. Unfortunately, the tanks quickly broke down due to the muddy terrain and the Americans abandoned their vehicles.[93] The Americans never had enough tanks to make a difference on the battlefield. The machines needed a number of improvements before they could be truly effective. First of all, the speed needed to be increased so they could at least keep up with the infantry and respond to anti-tank personnel. The tracks needed to be improved in order to climb out of shell holes and prevent the vehicles from getting bogged down in the mud. Doctrine would need to change in order to prevent the extra wear and breakdown on the tanks before getting into battle; mechanics would have to move closer to the front lines so the tanks would be in peak condition in case objectives took longer than the planned timeframe, which was often. Harrison summarized the potential of this weapon best:

> While the tank most emphatically is not a cure all and an infallible solution of any and all situations that face the infantrymen in offensive combat, when manned by properly trained crews, working with infantry trained to cooperate and take advantage of the opportunity they create, and used under conditions reasonably favorable to the machines themselves, tanks will prove an invaluable aid in enabling the infantrymen to reach his

[92] Brown, Unpublished Memoir.
[93] Eisenhower, *Yanks*, 216-218.

> objective. The nation that fails to develop this weapon to its fullest extent will find itself most seriously handicapped in the next war.[94]

While the British and French believed much the same, they made little progress after the war to accomplish this goal. The British especially would not have an operational modern tank until 1939 when it was too late.[95] The Germans, whose tanks could not measure up to the opponents in the First World War, would take the lesson to heart and dominate in mechanized warfare in the Second World War.

American Army tanks in the First World War would never be the deciding factor on the battlefield. They were too cumbersome, slow and had insufficient armament to fight against the new armies of the twentieth century. The tactics for their use were also lacking as more training was required in cooperation with infantry. The infantry still needed to be convinced tanks could be an effective support in an attack while Military High Command made plans to implement tanks in combined arms brigades. In this instance, if the common soldiers had control of which weapons would be used in future, the tank would not make the cut. They believed too deeply that the tanks caused more problems than they solved. The crews that used this new weapon knew its flaws and believed, if these could be fixed, the tank was a weapon of the future. However, despite various setbacks, tanks did prove their use in modern warfare to Army High Command and they would play a pivotal role in the next world war.

[94] Harrison, Unpublished Memoir.
[95] Johnson, *Fast Tanks and Heavy Bombers*, 6.

Artillery

Over hundreds of years, artillery evolved to be more accurate and dangerous, but nothing prepared the belligerents of the First World War for the carnage the new artillery pieces inflicted on the battlefields of France. The constant bombardments put a strain on the participants' economies, forever scarred the land over which the nations' battled and deeply impacted the soldiers who fought in the face of artillery fire. Niall Ferguson discusses the economic impact in his book *The Pity of War* and even argues that Germany would have led the world economically if they had not entered the war.[96] David Stevenson continues the theme and adds the psychological impact of the war in his book *Cataclysm: The First World War as Political Tragedy*.[97] Even though the men of the American Expeditionary Force did not serve long in the battlefield, the incoming shells quickly disillusioned them of the "glory" of war.

There were several types of artillery used during this war from trench mortars to the unwieldy monster called "Big Bertha." The French 75mm field gun designed in 1897 was the most mobile and accurate of the war. With its easy loading and firing mechanism, it allowed a crew to fire fifteen to twenty rounds per minute. The Germans could not surpass it. In the beginning of the war, the Allied forces did not put much stock in heavy artillery; they were still operating on older ideas of war with cavalry and infantry charges on an open field. The German forces forced them to reconsider their position, however. The Allies never caught up with their enemy though they did try.

[96] Niall Ferguson, *The Pity of War* (New York: Basic Books, 1999).

[97] David Stevenson, *Cataclysm: The First World War as Political Tragedy* (New York: Basic Books, 2004).

The French 155mm was a medium sized gun which was the model for the American "Long Tom" of World War II. The Americans took many of their allies' weaponry and retooled them to make the pieces their own. The French three-inch became the US M1916 75mm while the British eighteen pounder became the US M1917 75mm. Most of the war material was being produced in the States anyways so it was easy to do the retooling. While the 75s were more prominent on the battlefield due to their mobility, the heavier guns like the 155mm and the 105mm were favored by some for their impact. During an infantry charge, the 75s could be quickly moved to maintain the protective barrage, but the smaller guns did not have the power to cut through the barbed wire barriers in front of the enemy trenches. Generally, the blast only caused the wire to become more tangled providing a greater obstacle to the advancing soldiers. The heavier guns had this power, but were not used with enough consistency and in enough numbers to be effective. General Charles P. Summerall advocated for the increased production of the heavy guns, particularly the 105s as a compromise of mobility and power, but was only able to convince High Command to establish one regiment.[98]

Just like other regiments, the artillery units were first trained in the states before moving overseas to work with foreign instructors. Unlike other units, however, artillerymen were allowed to practice with real weapons instead of wooden models so they could understand the destructive power of the new technology they would be using for the foreseeable future. They were taught artillery tables along with the math involved and different methods for signaling including signal flags. Gun crews were made up of

[98] General Charles Pelot Summerall, Timothy K. Nenninger, ed., *The Way of Duty, Honor, Country* (Lexington: University Press of Kentucky, 2010): 106.

six man teams that worked on loading, calculating deflection and realigning the gun after firing. They also practiced firing the different kind of shells to observe the effect.

H.E., or high explosive, shells were probably the most common artillery rounds used. In the opinion of Vernon Kniptash, "Gas don' worry me half as much as the old H.E. Lord, how I hate the 'crump' of an H.E."[99] The most feared is described by artillery Lieutenant Bob Casey: "You couldn't hear the shells until they lit, but you knew well enough when they arrived. Afterwards you could hear them coming at you for a good thirty seconds. It was the most uncanny crab-walk of sound any of us had ever heard, all of it due to the fact that the whiz-bang—the Austrian 88—is faster than sound."[100] Then again, maybe it was better not knowing death was approaching as Lieutenant Colonel Williams relates the dread that accompanies an approaching shell:

> You know he is aiming the gun at you and wants to kill you. In your mind you see him swab out the hot barrel, you see him thrust in the deadly shell and place the bundle of explosives in the breach; you see the gunner throw all his weight against the trigger; you hear the explosion like the single bark of a great dog in the distance, and you hear the deadly missile singing as it comes towards you, faintly at first, then distinctly, then louder and louder until it seems so loud that everything else has died, and then the earth shakes and the eardrums ring, and dirt and iron reverberate through the woods and fall about you. This is what you hear, but no man can tell what surges through the heart and mind as you lie with your face upon the ground listening to the growing sound of the hellish thing as it comes towards you. You do not think, sorrow only fills the heart, and you only hope and pray. And when the doubly-damned thing hits the ground, you take a breath, and feel relieved, and think how good God has been to you again.[101]

While all the belligerents' armies dealt with the fear of artillery, the ones who had been in the war since its beginning had men that were much more accustomed to the constant

---

[99] Vernon E. Kniptash, *On the Western Front with the Rainbow Division: A World War I Diary*, ed. E. Bruce Geelhoed (Norman: University of Oklahoma Press, 2009), 104.

[100] Lengel, *To Conquer Hell*, 75.

[101] *Ibid.*

bombardment with the steady build-up overtime to the levels seen in 1917. The Americans suffered the high velocity bombardments without any veterans of their own to draw courage from.

No amount of barbed wire could protect against a direct hit from artillery. Lieutenant Maury Maverick saw the effects of an artillery round up close and a little too personal when he was wounded by a piece of shrapnel. As the stretcher bearers were taking him away he "looked at my four runners, and I saw that the two in the middle had been cut down to a pile of horrid red guts and blood and meat, while the two men on the outside had been cut up somewhat less badly, but no less fatally. It reminded me of nothing I had ever seen before, except a Christmas hog butchering back on the Texas farm."[102] Well-made dugouts could save men from an artillery barrage, but only if the men were in them when the shells hit. The best dugouts were reserved for radio operators to preserve communication lines. The barrages would shake some dirt off the walls, but would not affect the men inside.[103] Some officers forced their subordinates out of the protection of the trenches for roll call and drill. The Germans took advantage of the presented target and soon the Americans stopped the practice to preserve their morale and lives.[104] Men known for being good soldiers, calm and sane in battle, were driven to hysteria or immobility during an enemy barrage.[105] Unfortunately, some men were left to their fate as others fled to cover.[106] Here were the first signs of what became known as "shell shock." Almost completely understudied through World War I, there is now a

[102] Lengel, *To Conquer Hell*, 217.
[103] Triplet, *A Youth in the Meuse-Argonne*, 115.
[104] Rogers, *World War I through my Sights*, 64.
[105] Triplet, *A Youth in the Meuse-Argonne*, 125.
[106] *Ibid.*

multitude of literature on shell shock, or post traumatic stress disorder as it is known today, on soldiers from every country in wars throughout the twentieth century. Shell shock affected soldiers differently as Private William Francis observed "…one would cry like a child and go into convulsions when a shell hit close by or sailed overhead; the other boy had lost his speech [sic]—once could only mumble and make signs."[107]

Not all shells hit the ground. Some exploded in the air—air bursts—and the damage attributed to these shells is largely from fragments of the shell itself or splinters from the trees where the shell burst. Sergeant Lyle Cole witnessed an air burst right over a group of stretcher bearers carrying wounded. They were all killed.[108] Surprisingly, not all American soldiers were concerned with this particular danger. Ausland, however, was only concerned with the shells that actually made impact.[109] This concern, or lack thereof, is attributed to different factors. Soldiers in wooded areas, where an air burst could create more splinters thus causing more damage, would be more concerned than ones in relatively clear areas. By the time the Americans entered the war, much of the terrain had already been reduced to mud and shell holes by the near constant bombardments of the European powers so Americans' worried more about other dangers.

Those soldiers not in the trenches, but manning the big guns in positions behind the front, had a different view of the war. According to Amos Wilder,

> Those of us who served with the long-range guns of course never confronted the enemy directly. Our dueling was like blindman's buff, and we saw neither those who shelled us nor the victims of our fire. The actualities of battle, if not its desperation and exhaustion, were thus

[107] Private William A. Francis papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA, 4.

[108] Cole, Unpublished Memoir.

[109] Ausland, Unpublished Memoir.

> depersonalized for us. Our solicitude was for the exposed units in the trenches or the open that our salvos or drumfire sought to protect.[110]

The artillerymen only saw the aftermath of their terrible barrages as Kniptash writes, "Saw the most gruesome sight I've seen. I began running into dead German soldiers. Saw where one of our shells had scored a direct hit on one unfortunate and blew him into pieces. You could see parts of his body hanging from limbs of trees. An arm here, a leg there. It was terrible."[111] The Americans were subject to this same shelling. Lieutenant Harvey Allen was nearly hit by a shell while talking with a fellow soldier. He recounts how a droning sound was the only warning, they dived for cover and the shell hit "like the world's end."[112] When they examined the impact site, there was a smoking four foot deep hole.[113]

Not every shell that landed meant death to the unfortunate soul near the impact. Every time a soldier heard an incoming shell, he ducked into the nearest shelter, but when he looked out again, there may only be a (relatively) small hole with a dud shell.[114] Due to production problems and a shortage of raw materials, the majority of shells were duds, but the sheer number fired during barrages covered this fact well. Not all were so lucky, however. Corporal John Ausland experienced and witnessed his own share of near misses. One of his comrades was hit in the chest by an exploded shell fragment, but only received a bruise due to the convenient placement of his blanket roll.[115] Private Francis, on the other hand, was left completely untouched by a shell that killed the soldier he sat

---

[110] Amos N. Wilder, *Armageddon Revisited: A World War I Journal* (London: Yale University Press, 1994), 72.

[111] Kniptash, *On the Western Front with the Rainbow Division*, 100.

[112] Allen, *Toward the Flame*, 35.

[113] *Ibid.*

[114] Rogers, *World War I through my Sights*, 185.

[115] Ausland, Unpublished Memoir, 6.

beside.[116] Francis was extremely lucky as the concussive force from a shell impact could kill just as well as a direct hit or fragments. The experience of a near miss, even from a dud shell, could rattle a soldier's nerves. A soldier could retreat into a secure dugout for the rest of the day as he came to terms with his own mortality and the near death experience.[117]

The longest barrage in the war was during the Meuse-Argonne Offensive in 1918. Horace Baker describes the opening barrage:

> Of all barrages, surely it was the worst. From far west to distant east the elements were aglow. Flares still came up over the hill and as far away on either hand as the eye could see, and they had been multiplied manifold. And above all was the din, the mighty roar of the heavy artillery, the shriek of shells as they sped on their mission of destruction, and the sharper crack of the lighter guns. There was no intermission and no variation; there was no distinguishing one gun from its fellows but all mingled in a fearful din. The screeching of shells blended into a mighty wail. The booming of the guns gave a crackling sensation like as if the sounds accompanying the burning of a house were magnified a thousand times. The word 'hell' gives but a faint idea of what I am trying and failing to describe.[118]

A fitting opening for one of the worst and bloodiest fights in American history. Every American soldier who experienced a major barrage described it in with the same word—hell. Corporal Horatio Rogers described his own battery's fire as they supported the American infantry in an advance: "…each flash like a snake striking again and again…vicious flashes of flame bursting from every hill and heard the air over my head filled with the screeching rush of shells it seemed to me that end of the world could be no more impressive."[119] The landscape in the aftermath of a bombardment matched the

---

[116] Francis, Unpublished Memoir, 18.
[117] Rogers, *World War I through my Sights*, 185.
[118] Horace L. Baker, *Argonne Days in World War I*, ed. Robert H. Ferrell (Columbia: University of Missouri Press, 2007), 25.
[119] Rogers, *World War I through my Sights*, 70.

description of the sound. A barren wrecked landscape with "…torn barbwire, shell holes, hurriedly dug bits of shallow trench, shattered trees, trampled ground, rows of fresh graves marked by wooden crosses and the litter of arms, clothing, and equipment with which we had grown familiar…"[120] Even the cities were not spared. Entire buildings were demolished leaving only rubble and the vague outline of a church spire to mark where a town might have been. When the American Expeditionary Force's regiments billeted in one of these destroyed cities, they used the piled up rubble as cover and took shelter in the still surviving basements which withstood the bombardments.[121] This could be seen as an attempt to get out of the trenches by using other obstacles as cover, but the stonework could also be dangerous as enemy artillery turned the rubble into flying projectiles.

The constant bombardments hindered as much as helped the American forces in their efforts. Whenever the infantry advanced, so did the artillery to maintain support. This meant they had to move the heavy pieces over recently blasted territory as Corporal Rogers recounts: "The destruction of our bombardment had been terrific. In fact, we had churned things up so badly that it was interfering with our own progress. There were great craters in the road being filled by our engineers with dead horses, rocks, broken wagons, and everything that came to hand."[122] Without the help of the engineers, and the often grim task they performed, the artillery would never get into position in time. Artillery units, despite lessons learned from the French and British, still lost numerous horses as they tried to pull bogged down artillery pieces out of sticky mud. Runners were

[120] Rogers, *World War I through my Sights*, 197.
[121] *Ibid*., 100-101.
[122] *Ibid*., 209.

often sent ahead to scout out safe paths through particularly difficult terrain especially at night when artillery was generally moved as the dark provided the best cover for the vulnerable regiments.

Not only did a barrage have a distinctive apocalyptic sound, but each type of gun did as well from its initial firing to the shell in the air. The Austrian 88s whistled as the shell hurtled towards its target while other guns "seemed to ring like a bell, and a nearer one shook us with its explosion, while still another seemed to bark."[123] Even gas shells had a distinctive empty thunking sound. The American soldiers learned these differing sounds quickly and how far away the shells would fall based on the sound. This was incredibly important for their survival and maintaining an attack. They could get to cover in time to survive a shell hit then continue advancing. Soldiers who failed to learn the different sounds often hindered or, at least, annoyed their comrades as they flinched at every crash. At the worst, it meant their death.

An artillery regiment's main role was to provide support for infantry units as they were trained to do. Whether it was counter battery fire to protect their own trenches or creeping barrages to cover an infantry advance, artillery units closely coordinated with their infantry counterparts. Quick communication required infantry officers to use flares to signal the artillery that had already sighted in targets and thus knew the ranges required for each type of barrage. There are some discrepancies among the memoirs, however, on which flare colors meant which kind of fire. According to Corporal Rogers, a green flare from an infantry unit signaled the need for a normal barrage—a straight firing of the guns on a specific point to protect allied units and drive back the enemy.[124] Sergeant William

[123] Allen, *Toward the Flame*, 43.
[124] Rogers, *World War I through my Sights*, 69.

Triplet, however, reported a red flare signaled a normal barrage.[125] Both men had some experience with signaling and reading signals—Rogers being an artilleryman and Triplet leading a unit and in charge of calling in barrages—but Triplet also wrote that a green flare called a stop. Taking into account the common association with these colors, Rogers account appears more reliable. More than likely, Triplet just misremembered or miswrote the order in his papers.

Besides aviators, artillerymen are the most precise and mathematical soldiers of the army. When guns moved into position, they established a basic deflection line. Artillerymen used a prominent landmark as a point of reference firing a shot in its vicinity which they recorded.[126] The guns were adjusted and another shot fired. The second shot, if the artillerymen were skilled enough, would hit dead on and a line would be drawn between the two points.[127] This line was then used in conjunction with firing tables for all future shelling at that location. Unfortunately, this method also meant the enemy units knew where the artillery was stationed and artillery from both sides were often subject to counter-battery fire. There was another problem with this method, though minor in the grand scheme of the war, in that the guns would move from recoil enough to throw off the firing tables. In the dark or during a heavy shelling, the initial landmark was obscured so the gunners needed another mark so they could move the gun back to its original position. An aiming stick was a stake in the ground about sixty yards in front of the gun equipped with a light bulb run by battery for use at night.[128] The deflection line

[125] Triplet, *A Youth in the Meuse-Argonne*, 93.
[126] Rogers, *World War I through my Sights*, 67.
[127] *Ibid.*
[128] *Ibid*, 134.

took the aiming stick into consideration when it was calculated.[129] This method was the standard operating procedure since the early days of modern artillery and was widely practiced across the belligerent armies.

There was an alternative method, however, that did not alert the enemy to the gun's position before it was completely ready. Known as the Pulkowski System, or predicted fire, it relied solely on mathematical calculations to aim an artillery piece before any shot was fired. The method was developed by Georg Bruchmuller and Erich Pulkowski of the German Army during the war using various conditions of terrain, weather, type of gun, range, et cetera to determine firing position.[130] Predicted fire was not adopted officially by the American Army until after the war, but the method appeared in training manuals from 1918.[131] The American manuals simplified the German conditions as position, material and weather establishing standard conditions that could be adjusted as the situation demanded.[132] Although only a few American units were trained in the Pulkowski System, it proved its effectiveness during the opening barrage of the Meuse-Argonne Offensive. Not all crews used this system and it appears from the soldiers' papers that it was only adopted later as the Americans in the field found the aiming stick less effective on the front.

Accurate calculations and keeping the guns in the proper position was extremely important in preventing the artillery from firing short. "Firing short was one of the artillery's unpardonable sins, as there was nothing that destroyed the infantryman's

[129] Rogers, *World War I through my Sights*, 134.
[130] Grice, *On Gunnery*, 109.
[131] Rogers, *World War I through my Sights*, 112.
[132] *Ibid.*

morale quicker than being shot up by his own guns."[133] Friendly fire was the greatest sin of any branch in the military, but it was far worse at this time as the artillery was the deciding force behind any successful drive. While any shell fired short was undoubtedly an error in calculation or an accident of timing, as the effort in coordinating artillery and infantry advance at this time was monumental, the act still had significant consequences. The artilleryman who handled the calculations could join the infantry on the front lines where their chances of surviving dropped dramatically.[134]

Artillery did not just work with infantry however. Since they often could not see their intended target, artillery units relied on others for firing information and so worked closely with aviators in the American Army Air Corps. The pilots would scout possible gun placements—made more difficult with the camouflage nets draped over artillery pieces when not in use—then write the coordinates on paper which would be dropped in weighed pouches to allied artillery.[135] The pouches would be picked up by runners who would deliver it to a superior to initiate firing.[136] The artillery would reply by laying out white cloth squares—a tactic also used by infantry units to communicate with pilots. Due to the unreliability of wireless radio communication, still in its infancy, the pouches and cloth squares were used by all involved although it was not a perfect system as the pouches could get lost in the mud. Among the artillery though it was mostly an experimental method since the white pouches and white cloth could also be seen by German planes who, according to infantryman and artilleryman accounts, were in greater abundance than allied aircraft so had air superiority. This was hardly the case since many

[133] Rogers, *World War I through my Sights*, 120.
[134] *Ibid.*
[135] *Ibid*., 199.
[136] *Ibid.*

German aces were being shot down by 1917, but perception is everything when it comes to troop morale and the Germans had the perceived advantage.

The Germans had a different method for signaling their artillery that entertained the American troops as much as it terrified them. Sergeant Triplet wrote how the German planes would fly over, "just out of reasonable rifle range," marking the position while swooping, diving and waving their wings to signal a change in range or direction.[137] As impressed as they were by this skilled aerial display, the American soldiers generally found a good shelter much more enjoyable. Both sides also employed balloons for scouting and signaling. Even when troops thought they were out of sight from the enemy, they could not light fires or have a cigarette as a keen-eyed observer could triangulate the position from that reference.[138]

Artillerymen did not just worry about counter battery fire brought by the enemy planes; they also had to worry about the danger from their own guns. Metal fatigue was a constant concern as the heavy rate of fire heated up the gun barrels enough to warp them beyond use. If the guns were not allowed to cool properly between barrages or not checked for the warping, it could have fatal consequences. Corporal Rogers was witness to the aftermath of one of these catastrophic blowouts. At least one man was killed while another had been crippled from the breechblock hitting his spine and others were blinded from the sheer force of the blowout.[139]

The American military forces faced and handled weaponry completely alien to them. There was few if any artillery used in the Mexican-American War due to the speed

[137] Triplet, *A Youth in the Meuse-Argonne*, 203.
[138] Ausland, Unpublished Memoir, 7.
[139] Rogers, *World War I through my Sights*, 161.

with which the American forces chased after the enemy and the regular army had not yet been introduced to the modern artillery used in force throughout Europe during the First World War. They were also dueling with an enemy who fought by a different set of rules meaning they had to adjust their thinking from countering guerilla tactics to more conventional warfare. The speed at which the artillery was able to accomplish this task and become an effective artillery regiment—able to move the pieces into position over near impossible terrain and then lay down heavy accurate barrages to cover their infantry—was simply astonishing.

The vast majority of American soldiers did not have experience with artillery as the last time it was used in any significant numbers was the American Civil War. While artillery looked impressive and appeared to help by softening up the enemy lines, it was often more of a hindrance as the heavy bombardments churned up the earth creating a dangerous obstacle course for the advancing infantry. Artillery was also dangerous to their own infantry if the barrages were not correctly timed. Soldiers on the battlefield used flares to help with the timing, but they still had to worry about the enemy. The Germans proved helpful, however, as Americans learned the secrets of predicted fire from their enemy. The Americans learned the lessons of artillery on the battlefield adjusting their tactics up to the end of the war.

Chapter 3. High Technology Weaponry: Aircraft

While the Americans slowly pushed back the Germans on land, they still struggled for superiority in the air. Observation balloons had been used even before World War I, and while many were used all throughout the war and into World War II, the real glory lay with the airplane. Since, the Wright Brothers' first flight in 1903, the airplane advanced by leaps and bounds. First used as observation planes mapping movements behind enemy lines, the pilots were soon carrying sacks of bombs to drop. Although the planes had been underestimated at the beginning of the war, both sides soon saw some advantage to the aircraft. In this section, the idea of the common soldier needs to be expanded. While not all aviators were officers, they did hold higher rank than other units as they had higher test scores going into the army. Many were non-commissioned officers—the highest rank an enlisted man could achieve. The American Air Corps fought to prove themselves and their usefulness in the modern war. The new dimension to warfare brought new challenges that were faced and overcome.

Lee Kennett covered the air war in his book *The First Air War* as did Denis Winter in *The First of the Few* about the fighter pilots in World War I.[140] Once again, however, these historians are focused more on Europe and are studying the entirety of the war. They are also more concerned with the aces of the war. This is easier as most of the source material available is about these men, but there is some material in the War College archives for other American aviators. The airmen were almost fanatical in

[140] Lee Kennett, *The First Air War, 1914-1918* (New York: The Free Press, 1993); Denis Winter, *The First of the Few: Fighter Pilots of the First World War* (Athens: University of Georgia Press, 1983).

promoting their new weapon and used every opportunity to prove its effectiveness although the infantry was not impressed.

Despite the airplane being an American invention, the United States government saw little use for the new machine especially in warfare. By the end of World War I, however, the plane was seen as an essential part of warfare due to the successes of the aviators. Johnson argues that the United States did have a fascination with aviation since the Civil War as they experimented with observation balloons, but initial experiments in the early 1900s with airplanes and the multiple failures convinced them the effort was not worth the money.[141] Their skepticism is understandable considering the short initial test flight (the original Wright prototype was more of a glider than an airplane) and the flimsy materials from which it was made so it could get airborne. The European powers, especially the French, were inspired by the possibilities and began work on improving the Wright Brothers' design. They built a sturdier wooden frame around a modified automobile engine powering the propeller all of which was covered with canvas. Still not the best of materials for protecting a pilot, but the newer planes flew further and were more maneuverable. The successes of the aviators overseas convinced the American government to fund a small air corps, but the officers were largely army officers who had never seen a plane.[142]

To make the flying machines a true weapon of war, however, engineers needed to figure out how to attach a gun. Double-seater models placed a machine gun in the rear so the observer could protect the craft, but the best mounting for the gun was right behind

[141] Johnson, *Fast Tanks and Heavy Bombers*, 41.

[142] Johnson, *Fast Tanks and Heavy Bombers*, 41; Stephen Longstreet, *The Canvas Falcons: The Story of the Men and Planes of World War I* (New York: The World Publishing Company, 1970), 247.

the propeller where the pilot could access it. This not only allowed for a single-seater model making more efficient use of the materials available, but also paved the way for better tactics and strategies for aerial combat, such as those invented and perfected by the infamous Manfred von Richthofen, the Red Baron, and his compatriots. The problem lay in shooting through the propeller as the wood would be quickly ripped to shreds by the force of the projectiles.

The French combated this by attaching strips of metal at the propeller base angled so that the bullet ricocheted in a favorable direction. This was still flawed as the ricochet still could not be accurately predicted and could take down a friendly just as easily. The Germans developed a mechanical system, called a disruptor gear, that would momentarily stop the propeller each time the gun fired. No solution was perfect and the gears would still fail at inopportune moments causing the aircraft to crash. The Germans carefully protected their technology and it was only after a German plane crashed over French territory that the Allied Powers were able to reverse engineer the disruptor gear and implement it on their own machines negating the German advantage in this aspect.

The airplane and the image of the pursuit (fighter) pilot captured the American imagination. There was a romantic view of pilots soaring through the skies, knights of the air, that persists to the present day. Volunteers went as early as 1916 to France and England to fly pursuit planes. Thirty-eight Americans flying under French officers became the Escadrille Lafayette; they were originally called Escadrille Americaine, but the Germans complained about neutrals being named in the war zone. The Escadrille was

integrated into the United States Army Air Corps in 1918 as the 103rd Pursuit Squadron.[143]

It was not until April 1918 that the first American planes under American administrators took to the skies. The 94th Pursuit Squadron claimed the first kill and contained the leading American aces of the First World War including Lieutenant Edward "Eddie" Rickenbacker. The American pilots flew in borrowed French Nieuport 28's at first which were unstable and prone to spinning. They later flew the British S-13 Spad which was the plane Rickenbacker gained most of his victories in. The only American aircraft to fly in this war was the D.H. 4 dubbed "flying coffins" and the Curtiss JN-4 "Jenny" which was unarmed so mainly used for observation. The fuel tank of the D.H. 4 had been placed between the pilot and observer and would often catch fire even without help from enemy fighters.[144] When a plane did catch fire, there was some hope though it rarely worked. The pilot could tip the stick forward forcing the craft to dive and, if he was going fast enough from a great enough height, the rush of wind and lack of fuel would extinguish the flames. There was only one incident of this tactic working successfully in the Carlisle War College archives' World War I Veteran Survey, which contains several first-hand accounts from those who served overseas, and the pilot landed behind German lines.[145]

There were specific bomber craft, mainly the Breguet 14 purchased by the United States government from the French, but they paled in comparison to the great "Flying

[143] Longstreet, *The Canvas Falcons*, 229.

[144] David C. Cooke, *Sky Battle: 1914-1918* (New York: W.W. Norton and Company, 1970), 239-242.

[145] Charles R. Gildart papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA.

Fortresses" of World War II. It only had a maximum ceiling of 19000 feet, less than most pursuit craft, and it not could fly any further than other planes.[146] The difference was that the craft was outfitted to carry a heavier load (the bombs) with the pilot and observer each having a machine gun.

Charles Gildart flew a Breguet during the war for the 96th Aero Squadron. The plane he remembered paled in comparison to the great ideal pilots signed on for. The Breguets were on the edge of falling apart from being used in training and it was difficult, if not impossible, to get spare parts to fix them. There was weak spot under the tail where a skilled German aviator could hit the fuselage sending the plane into a fiery, deadly dive. A good formation offered some protection as rear observers could protect other planes. The Americans were forced to develop their own formation for bombing as they did not have enough planes for the French version and the Breguet's weakness prevented use of the British. Seven bombers flew in a V formation fifty meters apart; the formation would move closer when under attack for better protection.[147] The French flew in formations of three, but this was deemed too dangerous as too many planes were lost and the Americans had none to spare.

Lieutenant Colonel Billy Mitchell helped shape the future of airpower. Though the bombing was not necessary since the German forces could not cross the river, the Allied bombers still flew over the Meuse-Argonne sector dropping eighty-one tons of bombs on an enemy target. The V-formation of bombers were protected on all sides by pursuit planes—a prelude to the bombings of World War II. In lieu of this, Mitchell said, "Think what it will be in the future when we attack with one, two, or three thousand

[146] Kenneth Munson, *Aircraft of World War I* (New York: Doubleday, 1969): 37.
[147] Gildart, Unpublished Memoir.

airplanes at one time; the effect will be decisive."[148] Mitchell was thoroughly convinced that air power and strategic bombardments would win the war if it had continued even with the state of the planes in 1917 and 1918.

Bomb raids were a tricky thing. Planes only crossed the enemy lines if they could keep up with the leader of the formation—any who could not reach altitude or failed to maintain speed returned to base.[149] If there were even four planes left when the formation came to front lines, they continued to the target and did not turn back until the bomb load was dropped.[150] This aerial bombardment ranged from minor annoyance—"aggravating" according to Ausland—to the soldiers in the trenches to a serious problem for those in ruined villages where falling stone added to the injuries.[151] As testament to their apathy, men in the trenches would sit and watch the bombs as they fell for entertainment.[152] Bombers still did not fly unopposed. Enemy pursuit craft would attack, but turn back at the front lines to avoid retribution from Allied pursuit planes ready to defend their comrades while anti-aircraft (AA) guns, called "Archie" by the soldiers, fired flak into the sky. Pilots could tell the difference between German and Allied flak; German was black while Allied puffed white smoke. Many believed the anti-aircraft fire was useless as they did not see any planes actually brought down by the guns. AA fire still left holes in the canvas covering the planes. Aviators covered the holes with black patches that, according to Gildart, resembled the iron crosses on the German planes that became almost badges of honor.[153]

---

[148] Eisenhower, *Yanks*, 253.
[149] Gildart, Unpublished Memoir.
[150] *Ibid.*
[151] Ausland, Unpublished Memoir; Hinrichs, Unpublished Memoir.
[152] Francis, Unpublished Memoir.
[153] Gildart, Unpublished Memoir.

Pursuit craft faced AA fire as well, but worried more about enemy planes which were far more mobile and accurate: "Archie has no bite at all—all bark—but it's hard on the nervous system."[154] Aerial battles, or dogfights as they would come to be known, entertained the infantry below as the pilots risked their lives above. Pilots sought to bring down their enemy in any way possible in search of the distinguished title of "flying ace." Any pilot could obtain this title by having five confirmed kills. Pursuit pilots generally reached ace status the most due to the nature of their work. Kills had to be confirmed by another pilot or observer. Pilots performed complicated maneuvers to gain the advantage and get behind or perpendicular to the enemy craft so the machine gun rounds could rip through, ideally, the engine or tear up the canvas enough to negate the plane's lift.

Americans flew without parachutes. The military and many pilots thought the equipment too unwieldy and cowardly; Europeans believed the United States' pilots were foolhardy and careless with their lives. Due to this, when planes caught fire, the pilot was either trapped in their flaming machines or chose to jump to a quicker death. When the planes did not catch fire, the pilot had hope of surviving a crash landing if the maintained some control.[155] Hervey Allen witnessed the aftermath of a fiery crash. The aviator was still in the cockpit "…nothing left of him but a blackened, egg-shaped mass, his arms and legs having been burned away. The buttons, the hobnails of his shoes, and a few other unburnable things were scattered about the wreck of his machine, and there was a throat-tightening stench of seared flesh. We tried to get his tag but could not find it."[156]

---

[154] Elliot White Springs, *War Birds: Diary of an Unknown Aviator*, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA.

[155] Ausland, Unpublished Memoir.

[156] Allen *Toward the Flame*.

The American pilots were smart in other areas however. During the build-up to the Meuse-Argonne, the American Air Corps (called the Signal Corps during the war) used the foreign made weaponry to their advantage. They hid the fact American troops were in the area by flying observation flights with an outdated French plane.[157] They also came up with new tactics for destroying observation balloons. "Balloon busting" had become a favorite challenge of many aces during the war. The new tactics took advantage of the "buddy system" of lead pilot and wingman. One would stay high to protect the lower who would shoot the balloon in the nest area with his machine gun firing flaming bullets. The Germans responded by putting up dummy balloons.[158]

Observation balloons were a danger to the ground troops as they could easily pinpoint the position from so high in the sky and relay that information to artillery for a deadly barrage. Therefore, one of the aviators' most important and dangerous jobs was destroying these floating observation posts. The balloons did not always go up in flames as one would imagine (aided by the numerous war movies produced), but folded up on itself as air escaped the various holes ripped through the canvas.[159] The danger for the aviators was if the pilot could not get clear of the balloon in time and their machine became entangled in the heavy material.

If they saw a plane heading for their balloon, observers would signal to ground crews to reel in the balloon for safety. Observers did have parachutes and would jump if needed, but the balloons needed to be preserved if possible. The air corps knew the balloons were a prime target as the observers threatened the operational safety of their

[157] Cooke, *Sky Battle*, 256.
[158] William B. Mitchell, *Memoirs of World War I* (New York: Random House, 1960), 253-254.
[159] Triplet, *A Youth in the Meuse-Argonne*, 167.

ground troops hence pursuit pilots would protect the observers whenever possible. Sergeant Ernest Hinrichs of the fledgling intelligence service witnessed as one German aviator took out three balloons and then escaped as he was chased by six Allied Spads.[160] His only comment on the entire exchange was that German had "the guts."[161] Other attacks were more coordinated. One German aviator will swoop in to draw fire and any planes protecting the balloon while a second would come in behind to actually destroy the observation balloon.[162] American pilots copied the German method. The American balloon-busting ace, Frank Luke, was not killed by anti-aircraft fire, but by becoming entangled in the balloon as it fell. Therefore, the method was effective, but balloon busting was still the most dangerous job for aviators during the war.

Before the aviators ever got to the battlefield, they had to go through a rigorous training regimen that claimed the lives of many would-be pilots. Since flight was still such a new concept and the airplane a new flawed machine, there were numerous training accidents. The planes used for training were generally older and prone to mechanical failure; the throttle would become stuck or the fuselage would leak. Combine these flaws with the feeling of invincibility by the young trainees and many practice runs ended in crashed aircraft though not always the death of the pilot. The air corps introduced a pre-flight checklist to try and prevent machine related crashes. As recorded by Sergeant John Drenning:

> Check List for Inspection of Machines Before Each Flight
>
> 1. All wire splices.
> 2. Axle elastics and tail skid.
> 3. All controls and wires.

[160] Hinrichs, Unpublished Memoir.
[161] *Ibid.*
[162] Rogers *World War I through my Sights*.

4. Conditions of tires.
5. All gas lines to see that vibration has not broken or opened seams in the lines. Look for leaks in connections and check valves of same. Great care is to be taken after filling gas tanks to see that gaskets are on the tank caps and that caps are put on tightly. They must be air tight.
6. The main or gravity tanks hold approximately 85 liters and auxiliary tank located at the right side holds approximately 40 liters. Pilots should observe closely to see whether or not gas is being drawn from the auxiliary as it is possible for it to fail. The system employed is a vacuum. The gauge on the gravity tank registers only the amount of gas in the main or gravity tank and the gas from the auxiliary tank is drawn into the main tank before being taken to the motor. There is no direct connection between the motor and auxiliary tank.[163]

Despite the great dangers associated with flying in a wood and canvas structure many pilots felt safer in the air than on the ground: "The thing most surprising to me is the feeling of absolute safety."[164] That feeling caused the pilots to push the limits of their craft spinning and diving adding to the number of accidents as inexperience led to mid-air collisions.

The fledgling air force had their share of foul-ups. Major Harry K. Brown led the 96th Squadron into Germany for an attack. He became lost in the fog and landed on enemy soil with every plane intact. The Germans sent back a note saying, "We thank you for the fine airplanes and equipment which you have sent us, but what shall we do with the major?" Mitchell did not see fit to respond.[165] Gildart recorded an incident where a low-flying plane assembled from miscellaneous parts of Allied craft landed on the American base. The base commander went to investigate, but the pilot just smiled,

[163] Sergeant John W. Drenning papers, World War I Veteran's Survey, Carlisle War College Archives, Carlisle, PA.
[164] Springs, *War Birds*.
[165] Longstreet, *Canvas Falcons*, 248.

opened the throttle wide and took off before anyone could stop him.[166] The plane headed back to Germany "where the pilot no doubt collected his bet."[167]

The troops on the ground had their own problems with the aviators. During the battle of the Argonne, Captain John Taylor described how the American planes were missing from view once again and that the planes were a great morale boost until they race away at the sight of an enemy plane: "The men feel that when they take almost impossible chances, walking into Machine Gun Nests Etc., that our Planes ought to at least take a little chance."[168] The aviators had a different idea. In the words of Lieutenant Edward "Ted" Curtiss: "The Marne was the first time the Americans did any ground strafing. The Boche were crossing the river in these pontoon boats. We'd fly right down into them, blasting away."[169] The aviators did most of their flying behind enemy lines and so were seldom seen by their own ground troops. World War I would only set the stage for more inter-service misunderstandings in the future.

American aviators in World War I paved the way for the United States to become the air power of the future. Under the guidance of General Mitchell and with the help of aces such as Rickenbacker, they demonstrated what an air force could accomplish if given the resources and support the new arena of war demanded. Air superiority granted an attacking army numerous advantages such as position of the enemy and support against artillery. While the aircraft the Americans used were still far from perfect and more crashes resulted from mechanical or user failures than enemy attacks, the aviators used the tools they had to their fullest advantage.

---

[166] Gildart, Unpublished Memoir.
[167] *Ibid.*
[168] Lengel, *To Conquer Hell*, 310.
[169] Berry, *Make the Kaiser Dance*, 262.

Conclusion

World War I introduced a slew of new weapons and tactics to the field of warfare, but the best and most effective weapon remained the soldier himself. Pershing believed that it was a unique American character that allowed the United States to win the war where the Europeans lagged behind. [170] The Americans did not necessarily have an advantage over their European counterparts, but they did adapt quickly to the new battlefield as they became an effective conventional army on foreign soil. The Americans began with training for a mobile battle and had to adjust their thinking and tactics as they were faced with the reality of the World War I trenches. The common soldiers were the ones to initiate this change as they experimented with foreign tactics to use their weapons to the best of their ability.

To be fair, by the time the Americans entered, the Germans were tired of fighting. Kniptash reports in the September of 1918 "the Bosche just wouldn't fight. In many cases they had their personal belongings all packed and waiting for some doughboys to take them prisoner. It was a joke as far as fighting was concerned."[171] The Germans were incredible fighters in their own right, but they just could not take any more. Their country was crumbling from the inside, their morale was low and they were losing ground to the Allied forces bolstered by the still relatively fresh Americans.

This does not mean the deeds of the US soldiers should be diminished in any way. Without the unique American spirit, places like Belleau Wood, St. Mihiel and the Argonne Forest would only be honored as American graveyards instead of American

[170] Eisenhower, *Yanks*, 197.
[171] Kniptash, *On the Western Front with the Rainbow Division*, 85.

victories. When the Marines were counseled at Belleau Wood to retreat by a Frenchman, the Marine officer is said to have replied, "Retreat, hell! We just got here."[172] It was this kind of attitude that would carry the United States through another world war and transform it into a world superpower.

It was also this kind of attitude that allowed the poorly prepared American Army to adapt to a new way of fighting setting the stage for modern warfare. They had many pitfalls along the way, but the American Army underwent a dramatic change during 1917 through 1918 which would carry it through the years to come and into the present. One German officer observed after Belleau Wood, "The American soldier is courageous, strong and clever. He is at his best in guerrilla warfare. [But] the manner in which large units attack is not up-to-date and leadership is poor."[173] Pershing was well aware of the leadership problems within the American Army and implemented a program to rectify the problem in Blois.[174] Edward Coffman agrees with the German assessment of poor leadership in *The War to End All Wars* while Mark Grotelueschen in *The AEF Way of War* discusses the out-of-date tactics and how the American soldiers changed them on a company level through multiple contacts with the enemy. Edward Lengel's *To Conquer Hell* and Laurence Stallings *The Doughboys* go deeper into the American character and how their aggressive tactics and their belief in their own superiority aided them in their victories. Eisenhower in *Yanks* almost emphatically argues that the soldier was the most important weapon of the war.[175]

---

[172] Evans, *Retreat*, 44.

[173] Lengel, *To Conquer Hell*, 46.

[174] Richard S. Faulkner, "'Gone Blooey': Pershing's System for Addressing Officer Incompetence and Ineffiency" *Army History* PB 20-15-2 no. 95 (Spring 2015): 6.

[175] Eisenhower, *Yanks*, 183-184.

The American military changed in the interwar years based on their experiences from their year in France with the new weaponry. The army worked on cooperation between infantry and the tank corps made easier by improvements in radio. The Army Air Corps also benefited from the advances in radio technology allowing pilots to communicate between planes and with ground troops. Many of the weapons that had been in development at the end of World War I, but saw little action on the battlefield, were refined and used throughout World War II such as the Browning Automatic Rifle (BAR). The BAR and Springfield were so good that few modifications were made to their design. Tanks and planes, however, went through numerous design changes and upgrades until they were the great weapons known throughout the world.

World War I started the United States on its path to becoming a military and industrial world power. The United States helped supply the world during the course of the war and the American industrial sector expanded as it geared up to deal with the war production that was not needed since the United States was not in the war long enough. Post-war industry would support the United States for a decade afterward while Europe recovered economically. However, while Europe began to recover after only a few years, America boomed and then busted with the Stock Market crash of 1929. The Great Depression would last until the Second World War revived the dying industries and created jobs for hundreds.

The weapons' industry advanced in leaps and bounds during the first half of the twentieth century. While the soldiers who went into battle confident of their fighting ability, they quickly began to question their mortality as they faced the destructive power of artillery and machine gun fire. These new weapons changed the face of warfare and

the American military. The United States could not go back to being a constabulary force as optimism could not override pragmatism—while the world hoped there would not be another war like the one they just fought, they could not discount the possibility.

The veterans of World War I would pass on their stories just as their parents and grandparents passed on the stories of the Civil War to them. Young officers who served in the Great War climbed through the ranks becoming generals directing the next one. They had first-hand experience fighting against the new weaponry and they could apply those lessons in the battlefields of World War II. The effects of the weapons would remain emotionally and psychologically throughout the lives of the war veterans.

Bibliography

Primary Sources:

Allen, Hervey. *Toward the Flame: A Memoir of World War I*. 1926. Reprint, Lincoln: University of Nebraska Press, 2008.

Baker, Horace L. *Argonne Days in World War I*. Edited by Robert H. Ferrell. Columbia: University of Missouri Press, 2007.

Browne, George. *An American Soldier in World War I*. Edited by David L. Sneed. Lincoln: University of Nebraska, 2006.

Maneuver Center of Excellence Libraries. Fort Benning, Columbus, GA.

Mitchell, William B. *Memoirs of World War I*. New York: Random House, 1960.

Rogers, Horatio. *World War I Through my Sights*. San Rafael: Presidio Press, 1975.

Summerall, Charles Pelot, General. *The Way of Duty, Honor, Country*. Edited by Timothy K. Nenninger. Lexington: University Press of Kentucky, 2010.

Triplet, William S. *A Youth in the Meuse-Argonne: A Memoir, 1917-1918*. Edited by Robert H. Ferrell. Columbia: University of Missouri Press, 2000.

World War I Veteran's Survey. Carlisle War College Archive, Carlisle, PA.

Secondary Sources:

Anderson, Fred. *A People's Army: Massachusetts Soldiers and Society in the Seven Years War*. Chapel Hill: University of North Carolina Press, 1984.

Anderson, William T. "Devil Dogs in Olive Drab: The 2d Engineers at Belleau Wood" *Army History* no. 58 (Spring 2003): 20-29.

Ashworth, Tony. *Trench Warfare, 1914-1918: the Live and Let Live System*. London: Pan Books, 2004.

Berry, Henry. *Make the Kaiser Dance: Living Memoirs of the Doughboy*. New York: Arbor House, 1978.

Clark, Christopher. *The Sleepwalkers: How Europe Went to War in 1914*. New York: Harper Perennial, 2014.

Cochrane, Rexmond C. *The 1st Division at Ansauville, January-April 1918: Gas Warfare in World War I.* Washington D.C.: United States Army Center of Military History, 1958.

Coffman, Edward. *The War to End All Wars: The American Military Experience in World War I*. New York: Oxford University Press, 1968.

Cooke, David C. *Sky Battle: 1914-1918*. New York: W.W. Norton and Company, 1970.

Crocker, H.W. III. *The Yanks are Coming!: A Military History of the United States in World War I*. Washington D.C.: Regnery History, 2014.

Dooly, William G., Jr. *Great Weapons of World War I*. New York: Army Times Publishing Company, 1963.

Eisenhower, John S. *Yanks*. New York: The Free Press, 2001.

Ellis, John. *Eye-Deep in Hell: Trench Warfare in World War I*. New York: Pantheon Books, 1976.

Evans, Martin Matrix. *Retreat, Hell! We Just Got Here! The American Expeditionary Force in France, 1917-1918*. Oxford: Osprey Publishing, 1998.

Farwell, Bryon. *Over There: The United States in the Great War*. New York: W.W. Norton and Company, 1999.

Faulkner, Richard S. "'Gone Blooey': Pershing's System for Addressing Officer Incompetence and Inefficiency." *Army History* PB 20-15-2 no. 95 (Spring 2015): 6-23.

Ferguson, Niall. *The Pity of War*. New York: Basic Books, 1999.

Grice, Michael D. *On Gunnery: The Art and Science of Field Artillery from the American Civil War to the Dawn of the 21st Century*. North Charleston: Booksurge Publishing, 2009.

Grotelueschen, Mark E. *The AEF Way of War: The American Army and Combat in World War I*. New York: Cambridge University Press, 2007.

"Guns." In *American Masculinities: A Historical Encyclopedia*. Edited by Bret Carroll. New York: Sage Publications, 2003.

Hallas, James H., ed. *Doughboy War: The American Expeditionary Force in WWI*. Mechanicsburg: Stackpole Books, 2009.

Hamburger, Kenneth E. *Learning Lessons in the American Expeditionary Forces*. Washington D.C.: United States Army Center of Military History, CMH Pub 24-1.

Hart, Peter. *Fire and Movement: The British Expeditionary Force and the Campaign of 1914*. New York: Oxford University Press, 2015.

Johnson, David E. *Fast Tanks and Heavy Bombers: Innovation in the U.S. Army, 1917-1945*. Ithaca: Cornell University Press, 1998.

Keegan, John. *The Face of Battle*. New York: Viking Press, 1976.

_____. *The First World War*. New York: Vintage Books, 2000.

Kennedy, David M. *Over Here: The First World War and American Society*. New York: Oxford University Press, 2004.

Kennettt, Lee. *The First Air War 1914-1918*. New York: The Free Press, 1993.

Kniptash, Vernon E. *On the Western Front with Rainbow Division: A World War I Diary*. Edited by E. Bruce Geelhoed. Norman: University of Oklahoma Press, 2009.

Kohn, Richard H. and Joseph P. Harahan, ed. *Strategic Air Warfare*. Washington D.C.: Office of Air Force History, 1988.

Lengel, Edward. *To Conquer Hell: The Meuse-Argonne, 1918*. New York: Henry Holt and Company, 2008.

Lloyd, Nick. *Hundred Days: The Campaign that Ended World War I*. New York: Basic Books, 2014.

Mac Veagh, Cameron Ewen and Lee D. Brown. *Yankee in the British Zone*. New York: G.P. Putnam's Sons, 1920.

Millet, Allan R. and Peter Maslowski. *For the Common Defense: A Military History of the United States of America.* New York: Free Press, 1994.

Mosier, John. *The Myth of the Great War*. New York: Harper Collins, 2001.

Munson, Kenneth. *Aircraft of World War I*. New York: Doubleday, 1969.

Platt, Frank C. *Great Battles of World War I in the Air*. New York: Weathervane Books, 1966.

Rawling, Bill. *Surviving Trench Warfare: Technology and the Canadian Corps, 1914-1918*. Toronto: University of Toronto Press, 1992.

Rubin, Richard. *The Last of the Doughboys: The Forgotten Generation and Their Forgotten World War.* Boston: Houghton Mifflin Harcourt, 2014.

Stallings, Laurence. *The Doughboys*. New York: Harper & Row Publishers, 1963.

Stevenson, David. *Cataclysm: The First World War as Political Tragedy*. New York: Basic Books, 2004.

_____. *With Our Backs to the Wall: Victory and Defeat in 1918*. Cambridge: Belknap Press, 2011.

Toland, John. *No Man's Land: 1918, The Last Year of the War*. Garden City: Doubleday, 1980.

Travers, Tim. *How the War was Won: Command and Technology in the British Army on the Western Front, 1917-1918*. New York: Routledge, 1992.

_____. *The Killing Ground: The Army, the Western Front and the Emergence of Modern War, 1900-1918*. Barnsley: Pen and Sword Books, 2003.

Tuchman, Barbara. *The Guns of August*. New York: Macmillan Company, 1962.

Turner, Frederick Jackson. "The Contributions of the West to American Democracy." In *The Turner Thesis Concerning the Role of the Frontier in American History*, edited by George Rogers Taylor. Lexington: D.C. Heath and Co., 1972.

Wilder, Amos N. *Armageddon Revisited: A World War I Journal*. London: Yale University Press, 1994.

Winter, Denis. *Death's Men: Soldiers of the Great War*. New York: Viking Press, 1979.

_____. *The First of the Few: Fighter Pilots of the First World War*. Athens: University of Georgia Press, 1983.

Wood, Gordon S. *The Radicalism of the American Revolution*. New York: Alfred A. Knopf, 1991.

Woodward, David R. *The American Army and the First World War*. New York: Cambridge University Press, 2014.