MASS THE FIRE: ARTILLERY ORGANIZATION AT ECHELONS ABOVE BRIGADE

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The Field Artillery Branch is working to solve several critical shortcomings that have come about during the last twenty years of conflict. The Global War on Terror resulted in a focus on modularization and counter-insurgency (COIN) fighting over the past two decades. This has led to a reduction in the task organization of field artillery units and a shift away from its core mission of massing and delivering fires. Field artillery elements conducted nonstandard missions to support infantry and armored forces during COIN and stability operations. As the Army moves away from COIN to Large-Scale Combat Operations (LSCO), its adversaries have closed the gap in capabilities and have achieved indirect fires superiority. The Army must study past lessons to rebuild and focus on fighting near-peer opponents and winning the next conflict. This paper explores how the employment of artillery at Echelons Above Brigade (EAB) contributed to the primacy of American artillery in several major wars.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

MASS THE FIRE: ARTILLERY ORGANIZATION AT ECHELONS ABOVE BRIGADE, by Major Daniel J. Bauscher, 114 pages.

The Field Artillery Branch is working to solve several critical shortcomings that have come about during the last twenty years of conflict. The Global War on Terror resulted in a focus on modularization and counter-insurgency (COIN) fighting over the past two decades. This has led to a reduction in the task organization of field artillery units and a shift away from its core mission of massing and delivering fires. Field artillery elements conducted nonstandard missions to support infantry and armored forces during COIN and stability operations. As the Army moves away from COIN to Large-Scale Combat Operations (LSCO), its adversaries have closed the gap in capabilities and have achieved indirect fires superiority. The Army must study past lessons to rebuild and focus on fighting near-peer opponents and winning the next conflict. This paper explores how the employment of artillery at Echelons Above Brigade (EAB) contributed to the primacy of American artillery in several major wars.

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ACRONYMS

AEF	American Expeditionary Force
ATACMS	Army Tactical Missile System
AOE	Army of Excellence
COIN	Counter Insurgency
EAB	Echelons Above Brigade
FAB	Field Artillery Brigade
LSCO	Large-Scale Combat Operations
MLRS	Multiple Launch Rocket System
TACFIRE	Tactical Fire Direction System
TRADOC	Training and Doctrine Command

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CHAPTER 1

INTRODUCTION

> Artillerymen have a love for their guns which is perhaps stronger than the feeling of any Soldier for his weapon or any part of his equipment.
> — Brigadier General S.L.A. Marshall, quoted in U.S. Army Field Artillery School, *Right of the Line: A History of the American Field Artillery*

The field artillery has a long and illustrious history that is as storied as the United States Army. When the First Continental Congress created the Continental Army in June of 1775, they appointed Colonel Henry Knox as the chief of the artillery in November of the same year.[1] Although initially formed from a group of colonial militia, the field artillery soon became a battle-trained regiment that provided a decisive role on the battlefield. This began a time-honored tradition of the field artillery providing fire support for the other combat arms to allow freedom of maneuver against the enemy. It is from these humble beginnings that the Field Artillery Branch established itself as the "King of Battle," participating in every major campaign and operation since its inception during the Revolutionary War. The tremendous influence and impact of the field artillery are due to the success of its doctrine, organization, technology, and training.

Field artillery has been successful because of its ability to organize and support its sister maneuver elements. Initially, artillery organized under a regimental system similar to what was in use during colonial times. However, as the Army grew in size and the use of divisions and corps became prevalent during the Napoleonic era, artillery organization

[1] Boyd L. Dastrup, *King of Battle: A Branch History of the U.S. Army's Field Artillery* (Fort. Monroe, VA: U.S. Army Training and Doctrine Command, 1992), 14.

centralized under a chief of artillery and his subordinate staff. This eventually led to the adoption of division and corps artillery organized at echelons above brigade (EAB).

Artillery at EAB established as a force structure within the U.S. Army during the American Civil War in both the Union and Confederate Armies. However, the true modernization of the field artillery began in the early 1900s when advances in technology enabled the transition from direct fire cannons to indirect fire howitzers. These new howitzers caused a shift in planning towards three-dimensional warfare. These new weapon systems also contributed to the majority of casualties during World War I. Following the war, field artillery reorganized as doctrine caught up with technology into large-scale formations under division and corps artillery headquarters. This allowed for the massing and delivering of fires on an unprecedented scale and was instrumental in ground combat during the 20th century.

The advancement of doctrine and technology came to a focal point during Operation Desert Storm, where rocket artillery provided a deep strike ability that annihilated the Iraqi military infrastructure. Although the 100-hour ground war was short for validating all aspects of field artillery, several conclusions were apparent. Among those was that the precision-munition revolution made forces vulnerable throughout the battlefield. Enemy artillery that engaged coalition forces were detected, engaged, and destroyed within minutes. The Multiple Launch Rocket System (MLRS), or “steel rain” as coined by the Iraqi forces, contributed significantly to counterbattery efforts and the

suppression of enemy air defenses.[2] Artillery formations at EAB achieved overwhelming firepower that seamlessly integrated with combined arms maneuver.

The last artillery unit at EAB cased its colors in 2007, and the Army shifted its focus to counter-insurgency (COIN) against non-state actors in Afghanistan and Iraq. However, the institutional attrition of senior field artillery experience and lack of mission focus degraded key artillery core competencies. This is recently outlined in the Army white paper *The King and I: The Impending Crisis in Field Artillery's Ability to Provide Fire Support to Maneuver Commanders*. Today, as the Army realigns doctrine to facilitate Large-Scale Combat Operations (LSCO), it seeks to achieve overmatch with Fires capabilities through long-range precision and the ability to mass effects at EAB levels.

Significant capability gaps exist within the field artillery as the Army reorganizes from COIN to LSCO at every echelon within its formations. Significant reductions (greater than fifty percent) in field artillery structure since 2001 have created a lack of adequate capacity and capability to provide the volume and depth of lethal fires necessary to dis-integrate peer threat integrated air defenses, integrated fires complexes, shape operational and tactical maneuvers, and support the close fight. Adequate surface-to-surface Fires capacity enables echeloned formations to present multiple dilemmas to the enemy, protects friendly forces, enables joint maneuver, and provides greater options and

[2] Janice E. McKenney, *The Organizational History of Field Artillery* (Washington, DC: U.S. Army Center of Military History, 2007), 313.

flexibility to the Commander.[3] As the Army seeks solutions through the six Cross-Functional Teams to reinvigorate Fires superiority, the author seeks to look at possible solutions through the lens of organizational change.

The Field Artillery Branch is working to solve several critical shortcomings that have come about during the last twenty years of conflict. The Global War on Terror resulted in a focus on modularization and COIN fighting over the past two decades. This has led to a reduction in task organization of field artillery units and a shift away from the core mission of massing and delivering fires. Field artillery elements conducted nonstandard missions to support infantry and armored forces during COIN and stability operations. As the Army moves away from COIN to LSCO, its adversaries have closed the gap in capabilities and have achieved indirect fires superiority. The Army must study past lessons to rebuild and focus on fighting near-peer opponents and winning the next conflict. This paper explores how the organization and employment of artillery at EAB contributed to the primacy of American artillery in several major wars.

Purpose

This paper seeks to define the history and contributions of the field artillery throughout critical points in time. It primarily focuses on the organizational structure and significance of artillery at the division and corps level. Additionally, the author highlights historical contributions of the field artillery during the American Civil War, World War I, and Desert Storm. However, there are no examples from the current Global War on

[3] Wilson A. Shoffner, *Gap 3 – Lack of EAB Long Range Fires Capacity to Dis-integrate A2AD and Shape Deep* (Fort Sill, OK: Fires Center of Excellence, 2019).

Terror. This is done deliberately to frame the solution for the primary research question. Additionally, it provides possible justifications for the reorganization of the field artillery to support future LSCO.

The Field Artillery Branch is the second oldest branch of the Army, dating back to November 17, 1775, when Colonel Henry Knox was named "Colonel of the Regiment."[4] Although the history of the branch is well defined, there have not been many studies solely focused on the contributions of artillery above the brigade level. This paper will attempt to answer the primary research question of how did artillery at EAB influence significant campaigns of the past, and is it necessary to reorganize EAB artillery units as a part of the field artillery for future LSCO. Additionally, the author addresses five secondary questions: first, what were the impacts of artillery organization leading up to and during the American Civil War? Second, how did technological advances before World War I change the organization of the field artillery? Third, did the reorganization of the U.S. Army after the Vietnam War and the creation of the Field Artillery Brigade (FAB) significantly affect the field artillery? Fourth, how did the establishment of the Army of Excellence (AOE) and Air Land battle shape the field artillery? Finally, would the Field Artillery benefit from creating corps and army artillery headquarters for future LSCO?

The author acknowledges an inherent predisposition towards the influence of the Field Artillery Branch that may offer some cognitive biases while explaining the methodology and reasoning behind certain conclusions. Additionally, the author makes

[4] McKenney, *The Organizational History of Field Artillery*, 4.

three key assumptions: first, that artillery above the brigade level was a key contributor to the success of significant operations during the American Civil War, World War I, and Desert Storm. Second, that the disbanding of artillery organizations above the brigade level caused significant degradation in the ability of artillery to conduct LSCO. Finally, the last assumption is that corps and army artillery units will be essential in future conflicts as the Army shifts towards LSCO and using divisions as the building block for tactical operations.

This paper seeks to account for a brief history of how the field artillery organized at EAB and link its success to crucial points in time. However, the author was limited to about six months of research and writing to meet the timeline prescribed by the master's program for the Command and General Staff College. Additionally, this paper will not cover any operations or changes in artillery employment and organization during the Korean Conflict or Vietnam War, as well as the timeframe between each event. Finally, the author's inexperience in conducting original research may have precluded access to other research material and essential but difficult to locate sources.

Two essential terms should be understood to recognize the context by which the problem statement is approached. First, Field Manual 3-0 defines LSCOs as "major operations and campaigns aimed at defeating an enemy's armed forces and military capabilities in support of national objectives.[5]" Corps Artillery is defined as containing all of the field artillery cannon, guided missile, and multiple-rocket battalions, not organic to maneuver units. Corps artillery may also contain target acquisition units with

[5] U.S. Department of the Army, Field Manual 3-0, *Operations* (Washington, DC: Government Printing Office, October 2017), 1.

artillery locating radars. The cannon artillery, missile, and rocket battalions are usually FABs allocated as needed to reinforce the fires of artillery units supporting committed maneuver units. They might also remain under corps control to provide general support fires. Artillery at the corps level adds depth to the battle, supports rear operations, and influences the battle at critical times.[6]

Organization

The purpose of this thesis has several objectives: first, to provide a brief overview of the history of artillery organization at EAB within the U.S. Army. Second, it will highlight the use of artillery organization, doctrine, and employment during the American Civil War and World War I. Third, it will discuss the reorganization of Field Artillery after the Vietnam War and the creation of the FAB. Finally, it will describe the use of division and corps artillery during Operation Desert Storm. The author's qualification on the subject includes professional military education within the field artillery, as well as service within a Fires Brigade (now FAB) to include a deployment to Operation Enduring Freedom in 2010-2011. The final chapter will discuss any relevant findings discovered through research, as well as possible solutions to the coordination of Fires at the EAB level. It is not the author's intent to offer a definitive solution to conducting Fires at EAB, but to leave the reader with a better understanding of how the field artillery at EAB could fit into the LSCO scenario.

[6] U.S. Department of the Army, Field Manual 100-15, *Corps Operations* (Washington, DC: Government Printing Office, October 1996), 1-9.

This paper consists of five chapters with Chapter 1 serving as the introduction and overview. The author identifies the primary research question of whether or not an organization such as corps or army artillery is needed to coordinate and conduct Fires at the EAB level. Additionally, the author highlights several assumptions, the most significant being that current FABs are inadequate for employing Fires in a LSCO fight. This chapter also establishes the scope of the thesis by pinpointing specific periods, as well as highlighting how technological advances have shaped the use of artillery in the deep fight. The author argues that studying the past will lead to a better understanding of how to prepare for any future LSCO conflict using field artillery.

Chapter 2 explores the creation of the artillery reserve and its first use during the American Civil War, as well as the military revolution of artillery technology before the 20th century. Artillery was principally organic to corps rather than to divisions, specifically in the Army of the Potomac. The senior artillery officer in the corps, often a field-grade officer whose commission derived from the rank in an artillery regiment, served as the chief of artillery.[7] The author establishes how the field artillery reorganized its task organization to enable a more centralized command structure, leading to the creation of division and corps artillery. These principles comprised the first comprehensive plan in the Union Army for organizing artillery to accompany large forces in the field and laid the groundwork for artillery service and organization of the Army of the Potomac. This background will provide the reader with a framework of understanding before moving to the following chapter.

[7] McKenney, *The Organizational History of Field Artillery*, 61.

Chapter 3 will discuss the employment of artillery at EAB during World War I. New technology, doctrine, and equipment used for employing indirect fire forced the branch to reorganize. These new concepts, proven in combat, facilitated the creation of permanent division artillery and the employment of a permanent division and corps artillery organization. The Field Artillery Branch adopted new doctrine, as they could no longer maneuver on the battlefield close to the infantry. The organization of howitzers with a coordinating headquarters element allowed commanders to effectively shape the deep fight and set conditions for the maneuver to attack and win decisively.

Chapter 4 explores the impact of artillery at EAB during Operation Desert Storm within the framework of the reorganization of the field artillery post-Vietnam War, the development of rocket artillery, and the birth of the FAB in the 1980s. The 1970s and 1980s saw numerous development in artillery with new weapons, integrated large-scale fire direction systems, longer-ranged and special munitions, terminal guidance systems, and modernized target acquisition systems. Additionally, force structure modernization shrunk the role of corps artillery and created a new concept, the FAB. The FAB was assigned a direct support mission to subordinate maneuver elements of a division if distance requirements precluded useful command and control from the division artillery.[8] These new force constructs, along with technological advancements, set the stage for complete artillery supremacy during Operation Desert Storm.

Finally, Chapter 5 discusses the impacts of artillery organization at EAB and the implications it has on the Field Artillery for future LSCO conflicts. The author highlights

[8] McKenney, *The Organizational History of Field Artillery*, 285, 295-296.

several conclusions about the need for an artillery force structure at EAB and contrasts this ability with the current capability gaps within the U.S. Army. The author closes with an attempt to create a broader understanding of how the past contributions of field artillery, particularly at EAB, are essential to win the next war.

Historical Perspective

A historical perspective is needed to understand the author's thoughts and framework of research and methodology and by determining the conclusions found within this paper. The concept of field artillery developed as a way to engage and destroy the enemy at a long-range by delivering a higher volume to fires than that which the infantry, cavalry, and later on armor forces could achieve. The Field Artillery Branch is one of the most deadly in the U.S. Army because of its unique capabilities as a combat arms branch. As a result, field artillery has played a decisive part on the battlefield at different periods of history or, more often, as the factor that tips the balance and supports the frontline troops who can decide the outcome of the battle.[9]

There are litanies of sources available describing the history of the field artillery, from its inception as the oldest branch of the Army in 1775 to its contributions during the Global War on Terror. The author uses four significant types of information sources throughout this paper. First, there are several complete histories of the Field Artillery Branch such as Janice E. McKenney's *The Organizational History of Field Artillery* and Boyd L. Dastrup's *King of Battle: A Branch History of the U.S. Army's Field Artillery*.

[9] J.B.A. Bailey, *Field Artillery and Firepower* (Oxford, UK: The Military Press, 1989), 5.

These complex and detailed histories provide an exceptionally accurate and complete overview of the history of the U.S. field artillery. Additionally, these historical resources provide the author and the reader additional details and source material for future research and referencing.

Second, there are detailed writings such as J.B.A. Bailey's *Field Artillery and Firepower* or John J. McGrath's *Fire for Effect: Field Artillery and Close Air Support in the U.S. Army* that provides a closer but more detailed snapshot of specific tactics, techniques, and procedures that are common within the field artillery. These articles help shape the author's viewpoint by exploring the doctrine, organization, technology, and tactics that were readily available and practiced throughout different periods of American military history. They also provide an excellent ability to compare and contrast the similarities, differences, and changes that occurred between significant historical periods.

Third, there are doctrine materials used by the U.S. Army throughout its organizational history. These field manuals, such as Field Manual 3-0, *Operations* and Field Manual 100-15, *Corps Operations*, provide illustrations, examples, and detailed practices of how the field artillery employed doctrine in conjunction with other sister service branches within the U.S. Army. The reader must understand the thought process used in past doctrine to comprehend how artillery at EAB not only played a vital part within the field artillery, but how its potential use would be instrumental in future LSCO.

Finally, there are numerous research articles, thesis, white papers, and other articles used to provide the context of what past and current issues were essential to previous researchers. The majority of these articles are current and where written within the last twenty years, providing more of a modern perspective on current issues the

author is trying to identify and solve through independent research. It is important to note there are few sources available that explore the contributions and effectiveness of organizational constructs within the field artillery. The author hopes to gain insights into how the framework and employment of artillery at EAB enabled success on the battlefield, and whether or not a similar organization (analyzed through the lens of history) will be a potential influencer in future conflicts.

CHAPTER 2

ARTILLERY IN THE ARMY OF THE POTOMAC

> A battery of field artillery is worth a thousand muskets.
> — Major General William T. Sherman

The field artillery after the American Revolution remained a branch in a constant state of fluidity. The United States struggled to find the appropriate military organization to defend the country, and eventually the Army organized into regimental units.[10] The field artillery organized under two subtypes: the Foot Artillery, used during sieges as a standalone unit, and Light (Field) Artillery, organized into batteries that supported the maneuver forces.[11] Although the United States was involved in several conflicts, including the Mexican War and the Indian Wars, the Field Artillery Branch did not keep up with the technological and organizational improvements seen in Europe. This was most prominent with Napoleon's centralization of division and corps artillery as part of his *Grande Batterie*.[12] When the American Army finally adopted the equipment and training used in Europe, the full integration of the field artillery with its sister combat arms branches was slow to occur. Indeed, many writings on field artillery during this period outlined that the brigade or division commander should direct the actions of

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[10] William E. Birkhimer, *Historical Sketch of the Organization, Administration, Material, and Tactics of the Artillery, United States Army* (1884; repr., Westport, CT: Greenwood Press, 1968), 44-45.

[11] Board of Officers, *Instruction for Field Artillery* (Philadelphia: J. B. Lippincott, 1863), 1-4.

[12] Dastrup, *King of Battle*, 43-44.

artillery in combat instead of the battery commander. Since divisions were the largest maneuver formation at the time, artillery regiments detached batteries to fight at the tactical level.[13]

The years leading up to the Civil War saw peacetime conditions that hampered the exploitation of new technology and organizational reforms. Field artillery found limited use on the frontier, with most batteries assigned to augment fort defenses. Artillerymen had few opportunities to operate and employ their howitzers in combat. Often, artillerymen supplemented infantry or cavalry forces, which led to diminished proficiency in everyday artillery tasks and skills.[14] The War Department during the late 1850s initiated reforms to produce a new field artillery organization with modern weapons and training. However, while the Field Artillery Branch might have had the latest smoothbore field artillery cannons, it lacked sufficient personnel to maintain them and a lack of experience to use them.

Although underutilized on the frontier, the artillery branch's experience grew exponentially during the Mexican War. The field batteries that did participate served gallantly and proved that artillery could be a crucial factor on the battlefield. The mobility and speed of these artillery units became a source of great pride within the Army. These conflicts served as a training ground for artillerymen, many of whom later served with distinction in the Civil War. The interwar period marked the end of an era of apathy for artillery tactics and materiel development. It was through the initiative of

[13] Dastrup, *King of Battle*, 72-73.

[14] Birkhimer, *Historical Sketch*, 134-137, 206.

artillery officers, and support from the War Department, that gave the Army a strong foundation on which to codify and improve its artillery force.[15]

War between the States

When Confederate forces fired the first shots of the Civil War on Fort Sumter, the Union army was a small peacekeeping force consisting of roughly sixteen thousand men. The corps of artillery comprised of eight batteries spread amongst four regiments. A presidential proclamation soon followed, expanding the regular army to three hundred thousand men and adding a 5th regiment of artillery. Congress signed this proclamation into law on 29 July 1861.[16] Additionally, this law codified the term battery when referring to a company level organization of a field artillery unit. While some batteries remained on coastal defense, the majority of artillery moved into the Union field armies under a centralized organization.

The Union army initially consisted of a hodgepodge of different units that were in various states of organization, training, and equipment. Of the field artillery batteries provided by the states, less than one-tenth of them arrived fully equipped to serve. Hasty training camps were set up to train the mostly new formations. However, the enthusiasm of the new artilleryman and the assistance of artillery regulars offset any lack of

[15] McKenney, *The Organizational History of Field Artillery*, 46.

[16] J. F. Callan, *The Military Laws of the United States (*Philadelphia: G. W. Childs, 1864), 472-474.

training.[17] These reorganized batteries also contained longer-range and more powerful cannons, significantly increasing the lethality of the weapon systems. However, the organization of the artillery remained the same as the Mexican War, with one battery supporting an infantry regiment. This lack of organization and the inability to mass fires effectively would have severe consequences as the Union army marched south in July of 1861.[18]

On 21 July 1861, the Union army under the command of Major General Irwin McDowell launched an attack against Confederate forces at Manassas Junction near Richmond, VA. The first significant engagement of the Civil War came to be known as the First Battle of Bull Run. General McDowell's forces comprised of five divisions of infantry, seven companies of cavalry, and forty-nine rifled and smoothbore field artillery pieces.[19] The Confederate forces, under the command of Major General P.G.T. Beauregard, consisted of seven brigades of varying sizes, roughly sixteen hundred cavalry, and twenty-five rifled and smoothbore field pieces.[20] As the Union forces

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[17] George B. McClellan, *Letter of the Secretary of War, Transmitting Report on the Organization of the Army of the Potomac . . .* (Washington, DC: Government Printing Office, 1864), 4.

[18] Birkhimer*, Historical Sketch*, 77-80.

[19] U.S. Army War Department, *War of the Rebellion: Official Records of the Union and Confederate Armies* (Washington, DC: Government Printing Office, 1880), ser. 1, vol. 2, 487-488.

[20] Jenning C. Wise, *The Long Arm of Lee: The History of the Artillery of the Army of Northern Virginia* (Lynchburg, VA: J. P. Bell and Company Inc., 1915), 129-133.

advanced upon the entrenched Confederates, Colonel Burnside (the lead brigade) deployed skirmishers, ordered his battery of artillery in front of the line, and attacked.[21]

Union and Confederate commanders both drew upon experience gained from the Mexican War. Each side committed the field artillery by battery since it was normal to attach an individual artillery battery to an infantry regiment. This doctrine led to artillery fires being piecemealed in support of their assigned regiment. As an example, the Rhode Island battery attached to Colonel Burnside's regiment fought alone for nearly half an hour before reinforcements from the 71st New York militia (and attached battery) arrived.[22] Once they deployed in battle, the batteries advanced within four hundred yards of Confederate forces, firing immense artillery barrages into enemy lines. However, this left them vulnerable to small arms fire, and the Confederate rifled musket fire tore apart the gun crews at close range.[23] While Union forces were able to surge forward and push the Confederates back initially, the inability to mass fire and the tendency of Union artillery shells to bore into the ground before exploding due to defective fuse settings prevented the Union army from destroying the Confederate forces.[24]

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[21] War Department, *War of the Rebellion*, ser. 1, vol. 2, 319-320.

[22] Ibid., 346-347.

[23] Ibid., 557.

[24] Ibid., 491.

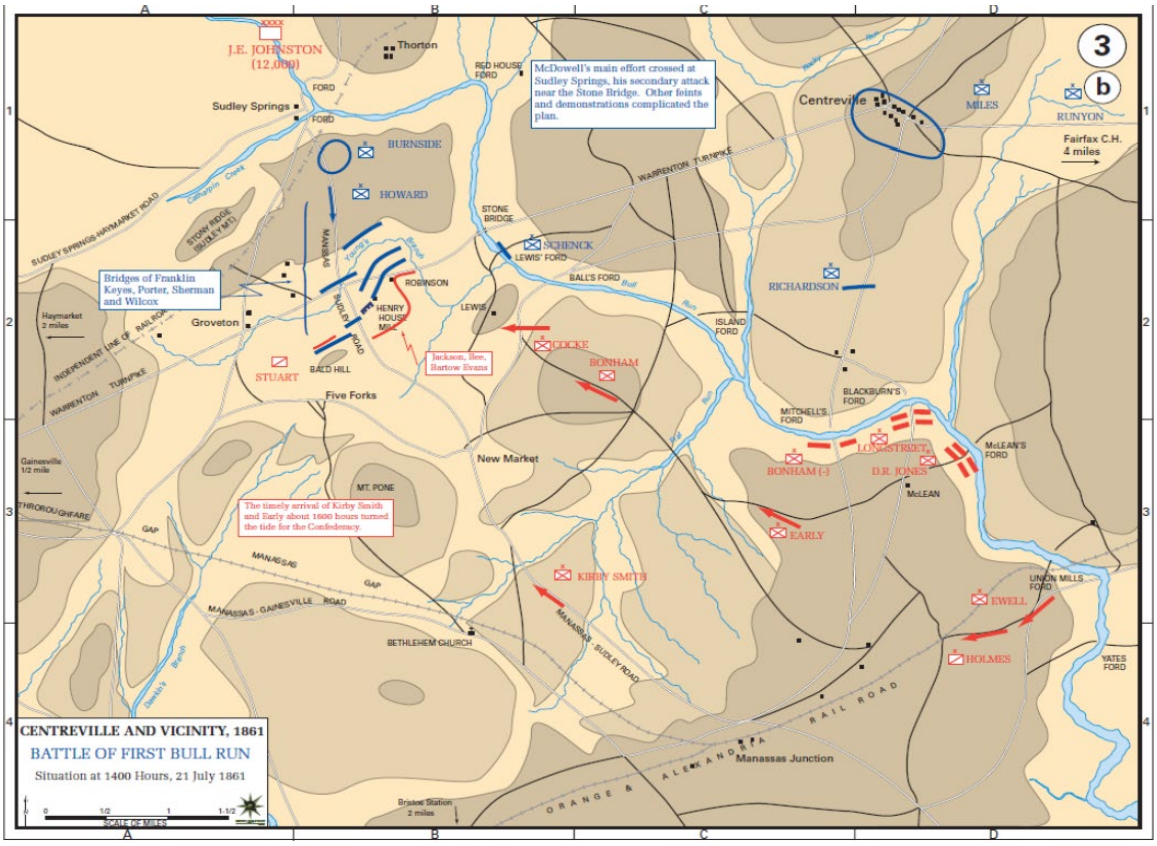

Figure 1. Battle of the First Bull Run, Situation at 1400 21 July 1861

Source: Department of History, United States Military Academy, "Battle of the First Bull Run Situation 1400 21 July 1861," accessed April 3, 2020, https://www.westpoint.edu/academics/academic-departments/history/american-civil-war/.

Confederate artillery, led by Brigadier General Barnard Bee, was much more effective. Thirteen emplaced smoothbore pieces fired on Union batteries with canister and round shot, allowing Confederate infantry to capture the exposed Union batteries after a challenging fight. While Confederate artillery was able to mass fire effectively against a numerically superior enemy force, the Union army eventually counterattacked

and recovered their guns.[25] However, Confederate forces conducted a coordinated flanking attack with massed fires supporting a cavalry charge, allowing them to recapture the Union artillery pieces and force a Northern retreat. The artillery failed to influence the battle at decisive points because commanders on both sides employed their field artillery using outdated tactics and organization. They did not fully understand that the size of their armies, advances in technology, and steep terrain were different from previous conflicts. They utilized obsolete tactics and ineffective organization, and failed to adapt to the advent of larger armies with improved technology. This was influenced by a lack of experience and the field artillery's successful performances in 1846-1848 in small-scale conflicts.[26]

The Artillery Reserve

Major General George B. McClellan assumed command of the Army of the Potomac soon after the First Battle of Bull Run. The reorganization of his artillery was a priority after the costly lessons at Manassas. Shortly after taking over, he selected Major William F. Barry (later promoted to Brigadier General) as his artillery chief to equip and supply the artillery. He also chose Major Henry J. Hunt as head of the artillery reserve, to oversee the replenishment and reinforcement of batteries on the front line, and to be his aide-de-camp (earning a promotion to Colonel in the Volunteers.) General McClellan proceeded to reorganize his force into eleven divisions, each comprising three infantry brigades, a cavalry regiment, and four six-gun batteries. General Barry immediately went

[25] War Department, *War of the Rebellion*, ser. 1, vol. 2, 483, 557.

[26] Dastrup, *King of Battle*, 92.

to work and established initial guidance for organizing the artillery. The proportion of guns to other troops was to be at least 2.5 (preferably 3) to every 1,000 men and field batteries were to contain six pieces if possible. Each battery would have at least four guns, and all guns in the same battery were to be of the same caliber. Additionally, the reserve artillery of one hundred cannons was organized, and a fifty-piece siege train procured, which would also serve as the corps reserve.[27]

The creation of the artillery reserve represented a watershed moment in the Army of the Potomac, and the Army as a whole, with the organization and tactics of field artillery. General Barry established the principle that when divisions were serving together in a corps that at least half of the divisional artillery was to be detached to create a corps reserve. Additionally, the artillery reserve consisted of one hundred pieces and comprised all the light batteries as well as all the horse artillery until the cavalry massed. The Army of the Potomac's artillery reserve in 1862 consisted of eighteen batteries of one hundred guns in fourteen regular and four volunteer units, with all the regular batteries having six guns each. These eighteen batteries formed into four battalion-size brigades, one with four-horse batteries, one with four volunteer batteries, and the other two with the remaining ten batteries.[28]

The primary advantage of the artillery reserve was the flexibility it gave the army commander, allowing him to employ his artillery without having to go through the

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[27] John G. Barnard and William F. Barry, *Report of the Engineer and Artillery Operations of the Army of the Potomac* (New York, NY: D. Van Nostrand, 1863), 105-109.

[28] War Department, *War of the Rebellion*, ser. 1, vol. 27, 242.

division or corps commanders. This flexibility was essential in situations where the commander needed to employ forces without waiting on the speed of a messenger (who also ran the risk of dying). These reserve batteries were used whenever or wherever needed, often at the decisive point of a battle. Although other Union field armies at times maintained artillery reserves, none was as large or organized on the scale seen within the Army of the Potomac.[29]

General Berry also organized four field artillery batteries for each division. Out of the four divisional batteries, three came from the Volunteers and at least one formed from the Regular Army. Additionally, the captain of the Regular Army battery was to command the divisional artillery as well as to direct the instruction of the volunteer batteries in gunnery and tactics. This principle proved the best feature of General McClellan's organization as it spread the expertise of the regular Army artillerymen among the volunteer batteries – something that was not adhered to in sister branches such as the infantry. General Barry's principles comprised the first comprehensive plan in the Union army (or any American army) for organizing artillery to accompany large forces in the field and laid the groundwork for artillery service and organization in the Union army.[30]

Colonel Hunt succeeded General Barry in September 1862 as artillery chief with the Army of the Potomac, while General Barry moved up to assume his role as Inspector

[29] McKenney, *The Organizational History of Field Artillery*, 65.

[30] Barnard and Barry, *Artillery Operations*, 105-109.

of the Artillery for all Union forces.[31] General Hunt, promoted to brevet Brigadier General in the Volunteers, assisted in revising the manual on field artillery tactics for the War Department. This document, published in 1860, served as the foundation upon which Union and Confederate forces now found themselves organizing and employing their artillery. General Hunt also advocated for the chief of artillery to have command authority over all field artillery within the Army of the Potomac. However, General McClellan, taking the traditional view of artillery command, wanted his artillery chief to perform solely administrative and staff duties while exercising command authority upon approval from the commanding general. Eventually, General Hunt persuaded General McClellan to broaden his authority over the artillery. However, his powers and responsibilities would vary greatly according to the personalities of succeeding army commanders.[32]

The Union army gained experience in maneuvering and fighting with large forces as the war progressed. As a result, its commanders realized that organizing artillery under a central authority at the corps level would streamline its administration and tactical effectiveness. The Army of the Potomac, from the battle of Gettysburg to the end of the war, organized its field artillery as an organic asset to corps rather than to divisions. As the war progressed, the basic maneuver element grew from regiments and divisions to large armies consisting of corps and multiple divisions. The organization of a corps

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[31] Edward G. Longarce, *The Man Behind the Guns: A Biography of General Henry Jackson Hunt, Chief of the Artillery, Army of the Potomac* (New York, NY: A. S. Barnes and Company, 1977), 119.

[32] Ibid., 18, 67-69, 99, 119, 261.

usually contained three divisions and one artillery brigade. After 1862, the senior artillery officer in the corps was a field-grade officer, commissioned within an artillery regiment, who served as the chief of corps artillery.[33] Each artillery brigade commander authorized a staff consisting of an adjutant, quartermaster, commissary officer, ordnance officer (an artillery officer on ordnance duty), medical officer, and artillery inspector, with each staff officer having one or more assistants. Although artillery officers considered their brigades equal in importance and in fighting power to infantry divisions, generals commanded divisions while captains (sometimes lieutenants) commanded the artillery brigades. The number of batteries in each artillery brigade varied according to the strength of the corps it was assigned. The number of batteries in a corps present at the battle of Gettysburg, for example, ranged from four to eight. Eighty percent of the batteries had six guns, the other twenty percent had four, and each brigade had at least one Regular Army battery.[34]

These artillery brigades were not an organic organization assigned to a division or corps, nor were they authorized by legislation. Instead, they were created from necessity, eventually supplanting the battery in tactics and administration. Supply and maintenance improved, resulting in more productive employment and movement of field artillery on the battlefield. This new concentration of batteries was also favorable for reinforcing the instruction, discipline, and firepower needed for disciplined artillerymen. The organization of artillery in other armies often depended on mission variables, the scale of

[33] Callan, *The Military Laws of the United States*, 531-535.

[34] Birkhimer, *Historical Sketch*, 84, 89-90.

the operation, and the judgment of the commanding general. Nevertheless, the trend was toward centralization by withdrawing units from the control of subordinate commanders and placing them under division and corps commanders.

Artillery Takes the Field

The Union Army's new artillery organization was put to the test on 17 September 1862 during the Battle of Antietam. While Union artillery displayed an exceptional ability to conduct counterbattery fire, they also experience many difficulties in employing their new forces. General Hunt's artillery reserve and General McClellan's division artillery poured counterbattery fire upon Confederate forces throughout the day. However, when the battle became more fluid, the artillery chiefs were unable to coordinate their batteries to mass and provide concentrated fires.[35] Additionally, when Union forces shifted from a defensive posture to an offensive attack, its commanders did not coordinate fires and instead employed their division artillery in a piecemeal fashion.[36] This lack of coordination prevented the artillery from engaging at critical periods of the battle, especially on the Union right. It was only when Union forces began their assault on the Confederate flanks were they able to mass fires on the enemy. These difficulties highlighted the coordination needed to mass artillery on the tactical offensive, as well as the natural ease of concentrating artillery in a defensive posture.[37]

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[35] Longacre, *The Man Behind The Guns*, 120-121.

[36] John C. Tidball, *The Artillery Service in the War of the Rebellion 1861-65*, ed. Lawrence M. Kaplan (Yardley, PA: Westholme Publishing, LLC, 2011), 958.

[37] Ibid.

The inability of Union division commanders to coordinate their batteries and mass fires during the offense convinced General Hunt to recommend greater control of the Army of the Potomac's artillery. During the fall of 1862, he proposed consolidating all field artillery forces into a single corps to allow the commander greater firepower and responsiveness.[38] However, neither General McClellan nor his successors accepted General Hunt's recommendations. They were content with the existing organization and left their chiefs of artillery without command authority, in addition to leaving batteries attached to the division. This dismissal left the Army of the Potomac with a field artillery organization unable to ensure that its batteries could mass fires as a team. Conversely, the Army of Northern Virginia organized its artillery in a battalion of four to six batteries under a lieutenant colonel in each division, as well as using two battalions together to act as a corps reserve. Additionally, they employed an army reserve of four battalions under the command of a brigadier general.[39]

Continual changes in the organization of artillery hampered Union forces throughout the rest of 1862. However, prompted by the battles of 1862 and early 1863, they created influential chiefs of artillery at the division and corps level.[40] The poor management of Union artillery during the Battle of Chancellorsville finally convinced the Union army commander at the time, Major General Joseph Hooker, to reorganize his

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[38] Allan Nevins, ed., *Diary of Battle: The Personal Journals of Colonel Charles S. Wainwright, 1861-1865* (New York, NY: Harcourt Brace and World, Inc., 1962), 107, 114, 129.

[39] Ibid., 114, 129.

[40] Dastrup, *King of Battle*, 107.

artillery command. Acting upon the advice of General Hunt, he formed his field artillery into brigades of four to six batteries each and assigned one brigade to each corps, two to the cavalry, and four to the artillery reserve. He also granted command authority to his artillery chiefs and promoted General Hunt to artillery chief of the Army of the Potomac. These actions allowed Union forces to centralize their field artillery even more and enhance their ability to mass fire.[41]

It is essential to note the Confederate reforms in 1863, as they were early adopters of artillery organization and administration that was at the time very similar in Europe.[42] After the death of Lieutenant General Stonewall Jackson at Chancellorsville, General Robert E. Lee restructured his two-corps army into three. He also dissolved the general artillery reserve, distributing it along with the rest of his artillery among his three corps commanded by Lieutenant Generals James Longstreet, A.P. Hill, and Richard Ewell. This idea was novel at the time as the Confederate army was the first during the war to structure their artillery organization in such a manner.[43] This organization ensured that his field artillery came to bear immediately in the battle. Eventually, General Lee had five battalions of four batteries, each in a corps commanded by a corps artillery chief. Subordinate to the corps commander, the corps chief of artillery had command authority and total responsibility for directing roughly eighty artillery pieces. Similar to General Hooker, General Lee saw that centralizing command was the best way to increase

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[41] Edwin B. Coddington, *The Gettysburg Campaign: A Study in Command* (New York, NY: Charles Scribner's Sons, 1968), 40.

[42] Birkhimer, *Historical Sketch*, 94.

[43] Ibid.

firepower without adding more guns. Although both the Union and Confederate armies' field artillery organizations differed in terminology, they were both guided by the principles of increasing firepower through the centralization and creation of keen artillery chiefs.[44]

The Battle of Gettysburg occurred on 1-3 July 1863 and highlighted the impact of a centralized artillery organization. During the initial engagement on 1 July, Colonel Wainwright of I Corps massed three batteries on Seminary Ridge and sent one battery forward to assist on McPherson Ridge.[45] I Corps was unable to hold their position due to flanking maneuvers by Confederate columns and fell back to Seminary Ridge. At the same time, Major General Oliver Howard's XI Corps deployed on Seminary Ridge. His artillery massed their batteries and provided concentrated fires on the advancing Confederate infantry.[46] After a fierce and bloody exchange, Union forces eventually retreated from Seminary Ridge. However, their resolute fighting allowed the commander of the Army of the Potomac, Major General George Meade, to bring up his other corps to reinforce along Cemetery Ridge. The first day of fighting at Gettysburg showed that a centralized command of Union artillery ensured that all batteries engaged the enemy.[47]

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[44] L. Van Loan Naisawald, *Grape and Canister: The Story of the Field Artillery of the Army of the Potomac, 1861-1865* (New York, NY: Oxford University Press, 1960), 332-334.

[45] Nevins, ed., *Diary of Battle*, 232-234.

[46] Ibid., 235-236.

[47] War Department, *War of the Rebellion*, ser. 1, vol. 27, 228-233

Confederate forces renewed their offensive on 2 July with General Longstreet's corps on General Lee's right charging Union forces between Roundtop and Little Roundtop. However, massed Union artillery fire poured canister shot to disrupt the advance and prevent the line from collapsing.[48] Simultaneously, General Lee attacked the Union right on Cemetery Hill and Culp Hill as part of a diversionary attack. Initially, Confederate forces drove the Union from its defensive positions and captured several field artillery pieces. However, when General Hunt moved his artillery reserve into position and began firing on the Confederates, their attack stalled. General Hunt noted that all of the guns that brought to bear on the Confederates opened fire with shrapnel and canister shot with excellent effects.[49] Although the Union's brigade system for the field artillery was new, it was proving to be very useful. Division and brigade commanders did not have to worry about their artillery since the chiefs of artillery maneuvered the batteries across the battlefield to mass fires on critical enemy positions.[50]

While the Confederate attack on the Union right proved ineffective, their success on the Union left emboldened General Lee to seize the initiative. Brigadier General William Pendleton, the Confederate chief of artillery, posted two battalions of roughly one hundred and sixty guns on Seminary Ridge to suppress the Union defenses. However, he shortsightedly left fifty-six cannons in positions that prevented

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[48] Henry J. Hunt, "The Second Day at Gettysburg," in *Battles and Leaders of the Civil War, Volume III*, eds. Robert U. Johnson and Clarence C. Buel (New York, NY: The Century Co., 1887-1888), 290-313.

[49] War Department, *War of the Rebellion*, ser. 1, vol. 27, 234.

[50] Hunt, "The Second Day at Gettysburg," 290-313.

them from covering the attack - an error that would prove costly as the day wore on.[51] Simultaneously, General Hunt positioned the Union artillery of roughly one hundred and sixty-six artillery pieces along Cemetery Ridge to provide defensive fires. Early in the afternoon of 3 July, an intense counterbattery fight erupted between Union and Confederate artillery. General Hunt feared that his ammunition would be exhausted before the main Confederate attack and reduced the rate of fire while coordinating to bring up his reserve of fifty-four cannons.[52]

General Longstreet believed that Union artillery had been effectively neutralized and ordered Major General George Pickett's division forward as the lead element for the attack. When Confederate artillery opened fire, Union artillery massed fire and concentrated on the advancing Confederate infantry, tearing gaps in General Pickett's forces.[53] Confederate artillery attempted to move forward to support the attack but was quickly overwhelmed by the massive volume of fire by Union artillery. While General Pickett's division was able to assault the main Union line, active artillery fire shredded the other divisions supporting him, resulting in a complete Confederate retreat and ending the battle.[54]

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[51] Wise, *The Long Arm of Lee*, 665-667.

[52] Coddington, *The Gettysburg Campaign*, 496-498.

[53] Naisawald, *Grape and Canister,* 427-429.

[54] Ibid., 430-435, 437-438.

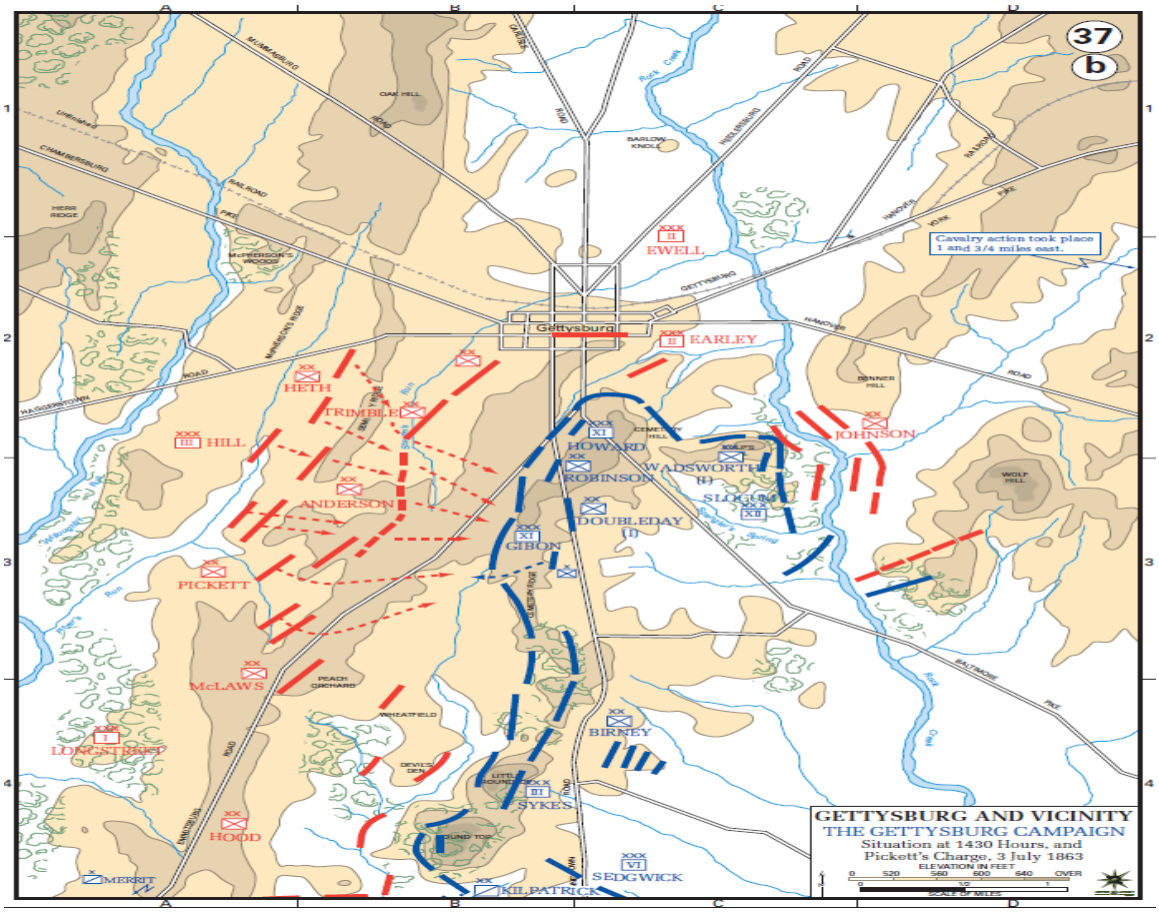

Figure 2. Battle of Gettysburg, Situation at 1430 3 July 1863

Source: Department of History, United States Military Academy, "Situation at 1430 hours, 3 July 1863," accessed April 3, 2020, https://www.westpoint.edu/academics/academic-departments/history/american-civil-war/.

The Battle of Gettysburg vindicated General Hunt's artillery reforms of 1863. He was able to move batteries, provide direction to corps artillery chiefs, and replace artillery forces with fresh batteries from the artillery reserve. General Hunt later noted that "The batteries, as fast as withdrawn from any point, were sent to the Artillery Reserve, replenished with ammunition, reorganized, returned to the rear of the lines, and there

awaited assignment."[55] Union field artillery effectively decimated Confederate advances, due in no small part from the successes of the artillery reserve, the newly created brigade system, and the ammunition trains created and managed by General Hunt.[56]

While Confederate artillery was generally effective, it suffered from ammunition shortages and weak artillery employment during the Battle of Gettysburg. When General Pickett's charge eventually failed, Confederate artillery stopped firing altogether since it had nearly exhausted its ammunition throughout the three-day battle.[57] This allowed Union artillery to fire with impunity upon advancing Confederate infantry without fear of counterbattery fire. Additionally, General Pendleton's misjudgment allowed fifty-six artillery pieces to sit idle during the attack. This allowed Union forces a significant advantage in fires while simultaneously reducing Confederate firepower.[58]

While both sides encountered challenges employing their artillery organizations in battle, the new battalion and brigade systems worked well for both sides during the Battle of Gettysburg. Chiefs of artillery commanded their batteries and maneuvered their artillery around the battlefield to mass fire effectively. This ability was especially critical for the defending Union forces. Since they were supported by an artillery organization that enabled fires to mass quickly, General Meade's forces prevented the Confederate

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[55] War Department, *War of the Rebellion*, Series 1, Vol. 27, 239-240.

[56] Longacre, *The Man Behind The Guns*, 159, 176.

[57] E. Porter Alexander, "The Great Charge and Artillery Fighting at Gettysburg," in *Battles and Leaders of the Civil War, Volume III,* eds. Robert U. Johnson and Clarence C. Buel (New York, NY: The Century Co., 1887-1888), 364-366.

[58] Wise, *The Long Arm of Lee*, 666-667.

attacked from overwhelming them. Union artillery, combined with accurate small arms fire, devastated the Confederate offense.[59] After Gettysburg, Union and Confederate forces continued organizing batteries into battalions and, in turn, attaching those battalions to the corps. These artillery formations were able to mass fires to destroy fortifications, support the infantry, disrupt enemy formations, and destroy massed infantry formations. Gradually, field artillery battalions and chiefs of artillery with command authority normalized because they provided centralized command and control while promoting the ability to responsively mass fires against enemy forces.[60]

The Civil War was a transitional period for the field artillery. The reforms of 1861-1865 in both the Union and Confederate armies drastically altered the organization of artillery. The ability to mass artillery fires became paramount due to the growth in army sizes. Instead of pushing the guns forward in front of the infantry to provide canister shot, commanders had to position their artillery behind the infantry on key terrain where they could bombard enemy forces while out of range of small arms fire. Batteries that deployed in a piecemeal fashion could not provide sufficient firepower to disrupt large infantry formations from advancing or provide counterbattery fire against enemy artillery. The increase in the size of armies, as well as the vast battlefields, created a need for an artillery reserve to augment division or corps artillery. It also allowed the chief of artillery to replace guns disabled by counterbattery fire or concentrate artillery at the

[59] Dastrup, *King of Battle*, 112.

[60] Birkhimer, *Historical Sketch*, 94-95.

decisive points in battle.[61] The North and South both initially organized and assigned their artillery in small groups as the Army had done in previous wars, but gradually both centralized firepower at the division and corps level to provide massed fire support for their respective armies. However, following the end of the Civil War, the Union army primarily disbanded, leaving a small regular force once again to guard the coastline and protect the frontier.[62]

[61] Dastrup, *King of Battle,* 118-119.

[62] McKenney, *The Organizational History of Field Artillery*, 73.

CHAPTER 3

ARTILLERY ORGANIZATION IN THE AMERICAN EXPEDITIONARY FORCE

> No matter how highly trained the infantry and other branches may be, there is no action until the artillery is ready.
> — Major General William J. Snow, quoted in U.S. Army Field Artillery School, *Right of the Line: History of the American Field Artillery*

The hard-learned lessons of field artillery employment gleaned during the Civil War disappeared during the second half of the nineteenth century. As the Army quickly returned to its prewar numbers, developments in the organizational structure, doctrine, and technology of artillery fell behind those employed in Europe. The lack of effective artillery use during the Spanish American War prompted Army officers to set about reorganizing the branch. This renewed emphasis on modernization lead to a revitalization of the field artillery, advancing it forward into the modern era. Improvements in technology, specifically the transition from direct to indirect fire, as well as new means of communication above the battery level, contributed to the efficiency of the artillery during World War I. Indeed, by the end of the Great War, the field artillery of the U.S. Army could equal or surpass that in most modern European Armies. The use of field artillery at the division, corps, and army level during the war would set the stage for the further development and use of field artillery in LSCO.[63]

[63] McKenney, *The Organizational History of Field Artillery,* 95.

Artillery Enters the 20th Century

The rapid advancements in technology at the turn of the century saw the fielding of artillery pieces that could shoot further, faster, and with greater accuracy. As ranges increased, artillery pieces dispersed in concealed positions throughout a large area and concentrated fires on long-range targets while far behind friendly lines. Organizational changes occurred as well, with new roles assigned to division and corps artillery. Technological and doctrine changes necessitated the rapid deployment of artillery deployment on the line, without depriving the commanding general the ability to mass fires at the decisive point. This led to a synchronized and somewhat competitive relationship between the two artillery organizations.[64]

As part of its modernization efforts, the U.S. looked to the French 75-mm gun, which became the prototype for the modern field artillery piece in the United States. Produced by the Schneider firm in 1897, it featured alloy steel, a breechblock, improved recoil capability, a new method for traverse and elevation, and improved ammunition and fusing. It could achieve a maximum range of 6,000 yards (5,486 meters) and the design of the sights allowed for either indirect or direct fire modes. The 75-mm gun had a higher degree of accuracy, range, and rate of fire than any other artillery piece at that time.[65] Impressed, artillery leaders set about to create their own version of this modern artillery weapon.

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[64] H. C. Carbaugh, "Present Status of Field Artillery," *Journal of the Military Service Institution of the United States* 20 (May 1897): 507-517.

[65] Ibid.

The Board of Ordnance and Fortifications executed a series of assessments to determine what the new artillery piece would look like. Using components and features for three types of weapon systems, they eventually created the M1902 3-inch gun.[66] The M1902 artillery piece was a turning point in American artillery – it featured an improved recoil system, panoramic sights, fixed ammunition, smokeless powder, and had a range of 6,000 yards. The technological leap was so great that one howitzer could provide the same amount of fires on a target as a six-gun battery of howitzers used during the Civil War.[67] Artillery batteries would no longer suffer from a slow rate of fire or obscuration due to excessive black powder. The new systems of recoil stability and panoramic sights ushered in an age of rapid, indirect fire for the Army.[68]

While the Army now had the means to employ indirect fire, there was no impetus to change doctrine until the Russo-Japanese War of 1904-1905. This was the first war of the 20th century and was a dramatic demonstration of LSCO with massive armies, modern weaponry, and trench warfare. Advancements in artillery technology necessitated that both sides emplace their artillery pieces in defilade, as the range and lethality of indirect fire required additional measures of protection. This became the new standard for artillery employment on both sides, as artillery pieces in defilade operated through a centralized command. The ability to lay communication wire to individual pieces allowed

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[66] "Board of Ordnance and Fortifications," *Army and Navy Journal* (September 13, 1902): 30.

[67] U.S. War Department, Secretary of War, *Annual Reports of the War Department*, vol. 1 (Washington, DC: Government Printing Office, 1902), 27-28.

[68] Dastrup, *King of Battle*, 147.

for indirect fire control, which increased the number of potential firing locations. This allowed artillery commanders to mass a more substantial volume of fire on a target without physically moving them while minimizing the risk to cannon crews from small arms fire.[69]

The advent of indirect fire, coupled with centralized command and control, changed the way artillery batteries operated. Direct fire operations necessitated that gunners individually aim and fire their piece.[70] However, with indirect fires, the forward observer controlled the aim and rate of fire of the artillery. This shifted employment of the artillery battery from a group of pieces firing as individual units to a complete firing unit. Batteries now organized into multiple battalions, forming the tactical unit of employment at the division and corps level. Additionally, the role of the commander had changed. Their duties in the past included massing fires on targets, fire discipline, and providing security for the battery. Artillery commanders now had to train to fight their batteries as a unit, maneuvering and massing fires at a considerable distance from their targets.[71]

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[69] John T. Greenwood, "The U.S. Army Military Observers with the Japanese Army during the Russo-Japanese War (1904-1905)," *Army History,* no. 36 (1996): 1-14.

[70] U.S. Army Field Artillery School, "Influence of the New Guns on Field Artillery Fire," *Journal of the United States Artillery* (January-July 1904): 283-284.

[71] U.S. War Department, *Drill Regulations for Light Artillery* (Washington, DC: Government Printing Office, 1896), 385-388.

Organizing the Division Artillery

As the United States Army worked to adapt its doctrine and tactics to a new era of rapidly changing technology, many officers within the field artillery insisted for restructuring the branch. While Congress expanded the size of the Army in February 1901, the act was a step back towards archaic attitudes regarding the field artillery. Although the War Department had recommended that artillery should organize into regiments, Congress kept the firing battery as the highest level of organization. In essence, they simply did not grasp the importance of massing fire. This resulted in the Army continuing to practice the doctrine that was out of step with field artillery developments occurring in Europe and Japan, leading to an enormous clamor for reform within the field artillery.[72]

The Army conducted field maneuvers in Manassas, Virginia, in the fall of 1904. Among the observers was a young artillery captain named William G. Haan. He would go on to write in the *Journal of the United States Artillery* that the current practice of decentralized maneuvers and employment of field artillery continued to hamper the ability to mass fire effectively. He also observed that while temporary battalions formed to serve as an *ad hoc* division artillery, and chiefs of artillery created, there was no deliberate planning to place the division artillery battalions under one commander.[73] While this allowed each artillery battalion to operate independently, the field artillery

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[72] Dastrup, *King of Battle*, 156-157.

[73] W. G. Haan, "Remarks on the Use of Field Artillery in General, and the Need of a Reorganization of our Artillery," *Journal of the United States Artillery* (September-October 1904): 144-145.

never massed fire effectively during the maneuvers at Manassas. If the same application applied to the field artillery, it would permit the ability to coordinate and mass fire as a capable unit. CPT Hann believed that the field artillery regiment was the future of the Field Artillery, and would be a useful unit for a future division artillery.[74]

The Chief of Artillery, Brigadier General J. P. Story, made a dramatic plea to Congress in 1904, stating, "It is a remarkable fact that our field artillery was not organized in our great civil war or in our late war with Spain so as to secure the most effective service."[75] The Civil War had proven that battalions and brigades, organized into division artillery, corps artillery, and the artillery reserve, had been invaluable in massing fire. However, the Army did not have enough guns to equip all of the field artillery in support of the infantry and cavalry. The Army had thirty regiments of cavalry and infantry that were equivalent to five divisions. Each division had at least nine batteries organized into three battalions with each battalion commanded by a major or lieutenant colonel.[76] This was a step forward in the organization from 1901 as artillery batteries finally organized into a battalion level organization for combat.

General Story also argued that divisions, corps, and armies should have a traditional chief of artillery, who would have command authority over a unit's field artillery and provided adequate staff. He also contended that the chief of artillery for a

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[74] Haan, "Remarks on the Use of Field Artillery in General, and the Need of a Reorganization of our Artillery," 142-146.

[75] U.S. War Department, Chief of Artillery, *Annual Reports of the War Department*, vol. 2 (Washington, DC: Government Printing Office, 1904), 418.

[76] Ibid., 420.

division should be a colonel, for a corps a brigadier general, and for an army a major general. This was a bold proposal, as the field artillery in 1904 did not have a colonel that was in charge of a regiment of artillery – it simply did not exist.[77] The chief of artillery would be one rank lower than the maneuver commander, but had command authority over the field artillery (a concept ingrained throughout the 20th and into the 21st century). Finally, General Story closed his report by saying, "There is not a first-class power which has so systematically neglected its field artillery as the United States."[78]

Although Congress was slow to act, they eventually recognized the importance of reorganizing the field artillery. After the lessons learned from the Russo-Japanese war in 1904-1905, the War Department authorized General Orders No. 118 dated 31 May 1907. This marked a new epoch in the history of the field artillery, as it formally separated from the coastal artillery and established as an independent branch.[79] The field artillery was also organized into six regiments (three light, two mounted, and one horse) of two battalions each, under the command of a chief of artillery. The new organizational structure, with thirty-six batteries, allowed the field artillery to support the infantry (roughly forty three thousand regulars) and improved the effectiveness of the branch.[80] However, if the army were to increase in size, the artillery would augment their numbers

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[77] U.S. War Department, *Annual Reports of the War Department*, vol. 2, 420.

[78] Ibid.

[79] U.S. War Department, Chief of Artillery, *Annual Reports of the War Department*, vol. 2, (Washington, DC: Government Printing Office, 1907), 216.

[80] Ibid., 189, 217.

with the National Guard – a practice that continued until the passing of the National Defense Act in 1916.[81]

After the establishment of artillery regiments, the War Department sought to integrate them into the division fully. This ensured that the infantry, cavalry, and field artillery worked together as a singular unit. The *Field Service Regulations* of 1905 stated that a division consisted of three brigades of infantry, one regiment of cavalry, nine batteries of field artillery organized as a provisional regiment of three battalions (totaling thirty-six guns), one battalion of engineers, one signal company, and four field hospitals.[82] The Congressional act of 1907 codified the artillery regiments into a permanent organization and organized them under a FAB of two regiments (forty-eight guns and four battalions).[83] Over the next several years, there were additional changes to the divisional structure, including the creation of the First Field Army of 1910 that would affect the field artillery.[84] These acts represented stepping-stones in the organizational increase of the artillery. As the Army grew in size and became a professional force, it needed a large and trained artillery force to provide accurate and lethal fires.

The new field artillery technology and employment of indirect fire caused many artillerymen to challenge existing doctrine. American artillerymen argued that the

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[81] U.S. War Department, Chief of Artillery, *Annual Reports of the War Department, v*ol. 1 (Washington, DC: Government Printing Office, 1916), 163-166.

[82] U.S. War Department, *Field Service Regulations* (Washington, DC: Government Printing Office, 1905), 12.

[83] John B. Wilson, "Army Readiness Planning: 1899-1917," *Military Review* (July 1984): 62-64.

[84] Ibid., 64.

Napoleonic artillery duel, in which each side tried to neutralize the other's guns through direct fire, was obsolete. Artillery batteries would be in hidden, fortified positions that were difficult to destroy. Instead, field artillery on the offense should silence the enemy's howitzers through short, violent bombardments that would force gun crews to take cover and displace. This would allow the infantry to advance without facing indirect artillery fire. This also presented a challenge to the artillery as they now had two missions, infantry support and counterbattery, conducted simultaneously.[85] These challenges led many artillerymen to believe that the field artillery should split into two groups, a concept that would come to fruition before the war.

However, it was not until 1914 that the War Department established the first "Maneuver Division." After establishing four peacetime divisions, the War Department went on to create the first permanent division artillery. The division artillery, formed under a brigade, consisted of one regiment of two battalions of 3-inch guns (twenty-four guns), and one battalion of 3.8-inch howitzers (eight howitzers), with the other regiment consisting of two battalions of 3-inch guns (twenty-four guns) and one battalion of 4.7-inch howitzers (eight howitzers).[86]

The War Department codified doctrine to guide the employment of its field artillery before the United States entered into World War I. *Drill and Service Regulations for Field Artillery* of 1916 clarified that the artillery's primary use during offensive

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[85] E. Thionville, "Artillery in Battle Yesterday and Today," trans. John E. McMahon, *Journal of the United States Army* (January-March 1904): 272-281.

[86] John B. Wilson, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades* (Washington, DC: U.S. Army Center of Military History, 1998), 61-64.

operations was counterbattery fire until friendly infantry closed with the enemy. Once the infantry reached small arms range, the artillery would mass fire on the enemy infantry to disrupt their formations and prevent reinforcement. Defensive operations necessitated that the primary task of artillery was counterbattery fire until the infantry decisively engaged the enemy. It then shifted forces to provide close supporting fires while still providing counterbattery fire.[87]

While most artillery forces were assigned specific tasks before combat, the new doctrine stressed employing batteries interchangeably to assist the infantry or provide counterbattery fire as needed. This allowed commanders to focus their artillery on the decisive point. The new concept also reflected the difficulty of breaking with past tactics of massing fire from all of the guns on a target. Instead, artillery assigned to specific missions was employed to hit multiple targets over a broad front.[88]

The integration of field artillery battalions, regiments, and brigades into the division, corps, and army with a centralized command structure allowed for the massing of fires and offered the potential of improved close support to the other combat arms. The new technology and organization of the field artillery greatly enhanced its effectiveness. As the United States approached the eve of entry into World War I, the field artillery stood prepared to make its mark upon history.

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[87] U.S. War Department, *Drill and Service Regulations for Artillery*, vol. 4 (Washington, DC: Government Printing Office, 1916), 100-101.

[88] Ibid.

Artillery in the Expeditionary Force

Chaos descended in Europe as nations chose sides during World War I, or the "Great War." While America sat on the sidelines during the first few years, not all was quiet on the home front. The United States became involved in a series of border skirmishes involving Pancho Villa, a Mexican revolutionary general. When the threat of war with Mexico escalated to a near breaking point, the War Department mobilized vast reserves of National Guard from multiple states. However, seeing that this might not be enough for a full-scale war, Congress passed the National Defense Act of 1916.[89]

A culmination of almost two decades of modernization, the act authorized doubling the Army and quadrupling the National Guard. It also approved a wartime strength of two hundred and eight five thousand men, including sixty-five infantry regiments, twenty-five cavalry regiments, and twenty-one field artillery regiments. It also increased the size of the FAB from two to three regiments. One regiment would have twenty-four 3.8-inch howitzers, while the other two regiments would have twenty-four 3-inch guns apiece. These regiments gave the corps artillery additional firepower to conduct counterbattery missions as well as augment division artillery when necessary. The added firepower of the FAB gave the division seventy-two field pieces.[90]

Additionally, each regiment was assigned a maximum strength of one thousand three hundred and thirty seven men (one hundred and ninety five per battery). Some

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[89] William A. Ganoe, *The History of the United States Army* (New York, NY: D. Appleton-Century Company, Inc., 1942), 453-457.

[90] Russell F. Weigley, *History of the United States Army* (Bloomington, IN: Indiana University Press, 1984), 348.

functions divided among the batteries consolidated in a newly organized regimental headquarters company of ninety-two men, providing a centralized node for command and control. The headquarters company supported the tactical and technical work of the regimental and battalion headquarters and included personnel for reconnaissance, communications, intelligence, orientation, and aerial observation. Regimental supply companies centralized the coordination between battery supply elements. These additional elements brought the total strength of the FAB to three thousand and twenty officers and enlisted men.[91]

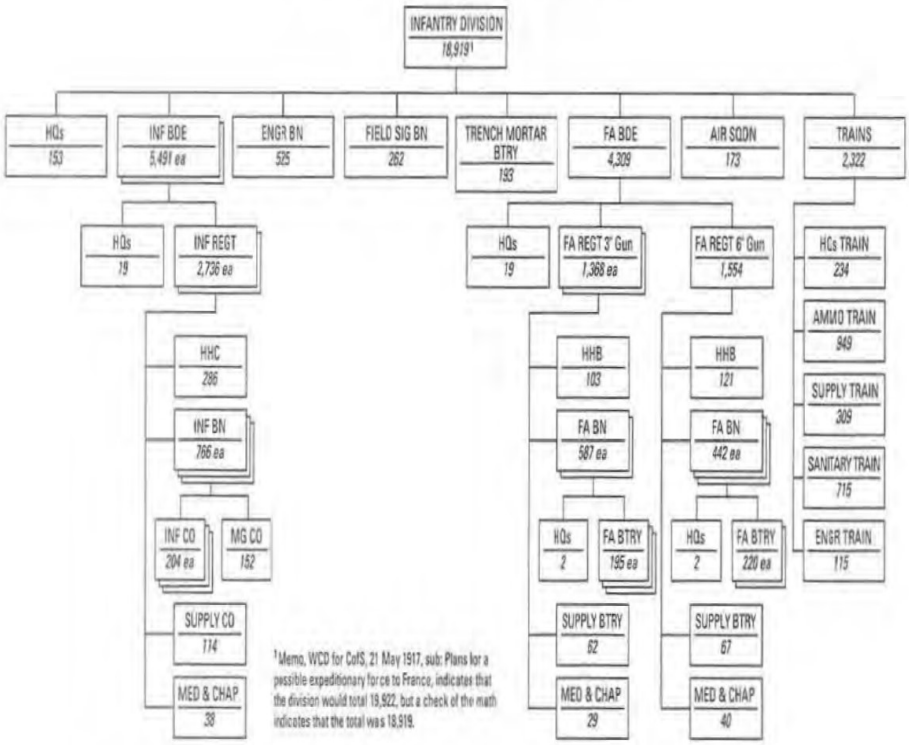

Figure 3. Infantry Division, 24 May 1917

Source: John B. Wilson, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades* (Washington, DC: U.S. Army Center of Military History, 1998), 39.

[91] McKenney, *The Organizational History of Field Artillery*, 107-108.

The United States entered the war in April 1917 and quickly organized an American Expeditionary Force (AEF) to support the allied forces fighting in Europe. As the General Staff began making plans for sending troops to France, they studied the advances made during the first years of the war. One point of contentious disagreement was over the organization of the division artillery brigade.[92] After action reports point to the lack of allied artillery as part of the inability to conduct an offensive on a wide enough front to destroy the enemy's defenses and force them to withdraw. The allies took artillery from quiet sectors of the front to reinforce an offensive attack, which gave the enemy an opening to attack weaker sections with inadequate artillery support. A consensus was reached that artillery had to be furnished in quantities unheard of before the war to solve the problem.[93]

The FABs that comprised the division artillery organized from previous planning. Each brigade was assigned three regiments with an addition of a trench mortar battery. Additionally, they had an attached ammunition train as well as range finding teams and communications, ordinance, and liaison personnel. This would continue as the standard of artillery support, as by the end of the war, there were six-one FABs. However, many of the divisions fought without their organic artillery brigades due to the length of time needed to train artillerymen, as well as the training area being geographically separate from the front lines. Thirteen of the twenty-nine divisions that saw combat in France did

[92] *United States Army in the World War, 1917-1919*, vol. 1 (Washington, DC: U.S. Army Center of Military History, 1988-1992), 70-73.

[93] Ibid., 109-114.

so without fully manned division artillery. They relied on support units, from either higher level (corps) artillery or additional division artillery.[94]

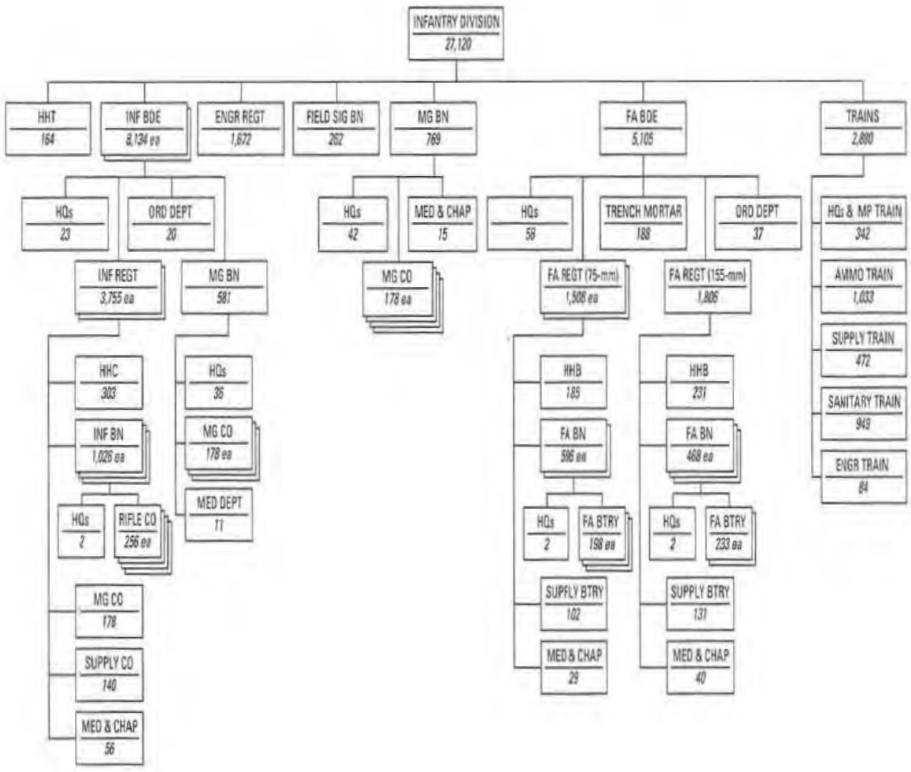

Figure 4. Infantry Division, 8 August 1917

Source: John B. Wilson, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades* (Washington, DC: U.S. Army Center of Military History, 1998), 39.

As the number of divisions increased to prepare for war, they organized into several corps. A corps usually contained about two to six combat divisions, depending on the task organization. While there was artillery available at the division level (provided by FABs), each corps had an artillery force consisting of a two-regiment brigade. One

[94] McKenney, *The Organizational History of Field Artillery*, 114.

regiment consisted of 4.7-inch guns while the other comprised of 6-inch (155-mm) howitzers. The brigade also had a trench mortar battalion of 240-mm mortars, organized into four batteries, with an observation and sound-ranging section and antiaircraft units. At the outset of the European operations, the headquarters of a corps artillery brigade was contemplated for use as the corps artillery headquarters, with the brigade commander being the corps chief of artillery. After a brief experience with this arrangement, however, the corps artillery staff (eight officers) was separated and distinct from the corps artillery brigade. The higher echelon army artillery (between three and five corps constituted a field army - the First Army had three corps) included four brigades of three howitzer regiments each, thirty batteries of railway reserve artillery.[95]

AEF Artillery on the Battlefield

The initial AEF doctrine favored highly mobile warfare that required the ability to shift artillery fire on the battlefield by using forward observes and entrenched communication networks. However, the battlefield they arrived on consisted of trenches that trapped the AEF into a less responsive form of war. Long rows of fabricated obstacles, barbed wire, and interlocked trenches limited movement. This forced the artillery commanders to place their artillery behind sandbag barriers or in gun pits to increase their survivability against enemy counterbattery fire. Trench warfare, as opposed to the open, mobile warfare that the AEF had trained for, forced army planners to give

[95] Dastrup, *King of Battle*, 167.

division, corps, and army artillery specified mission sets.[96] While the Army had created EAB organizations as part of expanding the force, it had not conceptualized the specific tasks each echelon would use during combat. The Army also had to determine how it would echelon its artillery between three major missions: counterbattery fire, deep fires, and maneuver support. This radical change broke with the pre-war doctrine that had discouraged making permanent assignments before the battle.[97]

The corps artillery soon found itself filling the role of counterbattery fire. The corps artillery was composed of two regiments of 155-mm. howitzers (forty-eight howitzers) and a battalion of 240-mm. trench mortars. Corps artillery was tasked to engage the enemy's artillery, with the assistance of the division artillery's 155-mm. howitzers, to keep it from massing fires effectively on advancing infantry forces. Corps artillery commanders, typically a brigadier general, generally used data obtained from sound-and-flash ranging from forward observers. However, they also used observers in balloons or aircraft to locate enemy positions.[98] While the corps artillery shelled the enemy gun positions, the division artillery, consisting of two regiments of 75-mm. field guns (forty-eight pieces), a regiment of 155-mm. howitzers (twenty-four pieces) and a battery of 58-mm. trench mortars supported the infantry with rolling barrages.

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[96] Department of Gunnery, School of Fire for Field Artillery, "American Drill Regulations and 'Artillery Firing'," *Field Artillery Journal* (July-September 1918): 364-368.

[97] Mark E. Grotelueschen, *Doctrine Under Trial: American Artillery Employment in World War I* (Westport, CT: Greenwood Press, 2001), 17-24.

[98] Allan R. Millet, "Cantigny, 28-31 May 1918," in *America's First Battles, 1776-1965*, eds. Charles E. Heller and William A. Stofft (Lawrence, KS: University of Kansas Press, 1986), 159-161.

As the AEF endured its baptism of fire during the Aisne-Marne offensive, it ran into serious problems locating and massing fires on enemy gun positions. As potent as the American counterbattery fire was, it could not wholly neutralize German artillery. The problem often stemmed from the inability of the forward observers to identify potential targets. Corps artillery could not adequately respond without this information since it did not know the direction to fire and the nature of the target. This often left the division without any counterbattery fire to respond to enemy fire, leaving American infantry mercilessly exposed.[99]

Flexible bombardment required well-sited observers that could follow the infantry and provide continuous support. However, the field artillery did not generally have such capability. Commanders established observation posts, attached artillery liaisons to the infantry, and used state of the art communications. Nevertheless, unreliable technology and inadequate training hampered the coordination between the artillery and infantry. Restrained by ineffective communications, commanders had to develop elaborate plans and rigid schemes of barrages of unobserved fires. This was evident during the Aisne-Marne offensive, as at any given time, corps artillery would fire a barrage on predetermined targets located on a map. Division artillery provided rolling barrages as a way to support the advancing infantry.[100]

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[99] George C. Hull and Henry T. Samson, *The War Story of C Battery, One Hundred and Third U.S. Field Artillery, France, 1917-1919* (Norwood, MA: The Plimpton Press, 1920), 90-96.

[100] Millett, "Cantigny, 28-31 May 1918," 180-183.

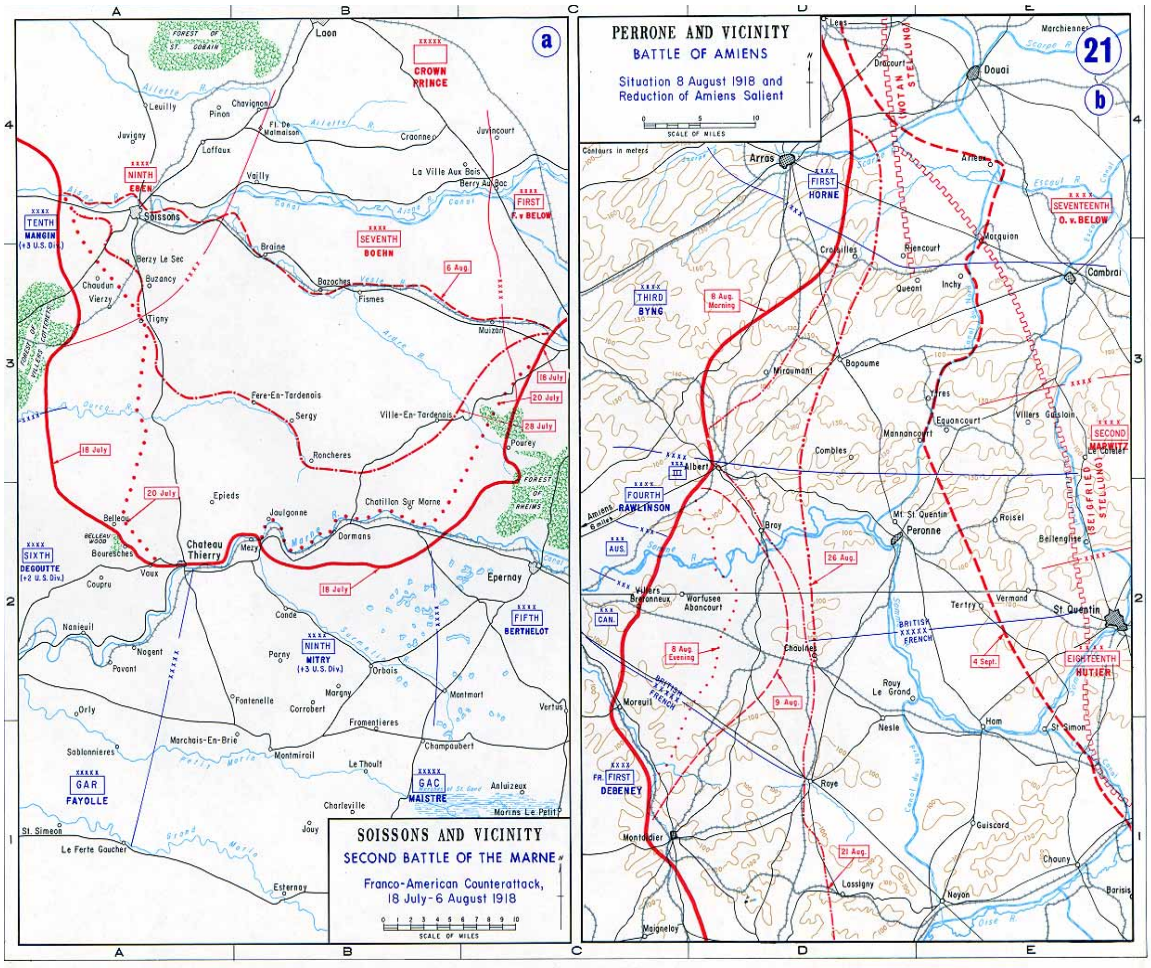

Figure 5. The Second Battle of the Marne and the Battle of Amiens

Source: Department of History, United States Military Academy, "The Second Battle of the Marne, and the Battle of Amiens," accessed April 10, 2020, https://www.westpoint.edu/academics/academic-departments/history/world-war-one/.

This intricate planning often minimized the need for an active communications network or highly trained personnel. It also dominated artillery actions during the Aisne-Marne offensive since it was easier to control and deliver fire when it was unobserved. However, because fires were unobserved, the gun crews were not able to shift fires on the battlefield as the conditions changed. Although elaborate planning provided detailed fire support, they did not guarantee effective close supporting fires when the infantry needed

it the most. Mission variables such as terrain, weather, and other conditions generally prevented the infantry from maneuvering tightly behind the rolling barrage and often hampered counterbattery fires against enemy artillery. As a result, close and continuous fire support was something rarely seen during the Aisne-Marne offensive – an error paid for with a high cost of American lives.[101]

Artillerymen learned from the hard lessons of Aisne-Marne. They adopted the French system of map firing, to include observation of fire, gunnery, coordination of regimental and battalion fires, and the French system of liaison.[102] The AEF used this application when it attacked St. Mihiel as the Germans were beginning a tactical withdrawal. American forces compromised of five hundred and fifty thousand men throughout three American and one French corps, two hundred and sixty tanks, fifteen hundred aircraft, and two thousand nine hundred and seventy five artillery pieces attacked the heavily fortified German positions.[103] Army and corps artillery massed fires on crossroads, command posts, and railroad lines while the division artillery concentrated on obstacle belts and entrenched defensive positions to reduce them. While the infantry and armored tanks advanced under fire, corps artillery followed an intricate map-firing plan. Developed before the battle, they provided a near-continuous bombardment of the enemy's rear areas, communication lines, and gun positions. The rolling barrage from the

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[101] Alexander T. Jennette, "Mass Fire in WWI," *Field Artillery Journal* (May-June 1975): 42-44.

[102] Ibid.

[103] Donald Smythe, "St. Mihiel: The Birth of an American Army," *Parameters: Journal of the U.S. Army War College* (June 1983): 49-50.

division artillery, along with the counterbattery fire provided by corps artillery, facilitated the advance that eventually defeated the German forces. American artillery fire was so effective that the German batteries that survived eventually ran out of ammunition while trying to disrupt American artillery fire.[104]

American artillery fired almost one million rounds at St. Mihiel over four days. Despite that, the battle revealed several weaknesses in artillery employment.[105] An elaborate fires plan developed before the battle outlined the desired barrages and targets, but as the battle began, communication broke down. The rolling barrages provided by the division artilleries were not in sequence across the corps front. The infantry could not wade through the mud created by the overnight rains fast enough, resulting in artillery barrages in several sectors outpacing the rate of movement of their supported infantry units. The ground commanders adjusted for this by individually coordinating division artillery firing rates. Still, because the actual artillery pieces were far removed from the battlefield, useful information was not relayed in time to be of use. Gun crews lacked the most recent information about enemy positions and often missed vital targets. Finally, poor terrain and obstacle belts hindered close fire support since the division artillery could not rapidly move their pieces forward, often leav

ing the infantry on their own.[106]

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[104] Conrad H. Lanza, "What the Artillery Accomplished at St. Mihiel," *Field Artillery Journal* (November-December 1932): 595-609.

[105] Ibid., 607.

[106] Conrad H. Lanza, "The Artillery Support of the Infantry in the A.E.F.," *Field Artillery Journal* (January-February 1936): 65-66.

American commanders looked to the Germans by using a tactic employed earlier in the war. The AEF attached one battery of 75-mm. guns per infantry brigade to provide a baseline of direct supporting fires. The field artillery provided accompanying artillery at St. Mihiel, delivering responsive fires during the infantry's rapid advances. Although each battery's effectiveness was different, it served its purpose in supporting the infantry's advance. Artillery batteries bombarded enemy machine gun nests and defensive positions while providing close support to maneuver forces. However, many field artillery officers opposed detaching artillery down to the brigade level. They claimed that moving a battery from division artillery to a maneuver force degraded their ability to mass fire at the decisive point.[107]

The use of "accompanying guns" characterized something that was more than a necessity for close and responsive fire support. It also represented the argument of control over who owns the field artillery in combat. When indirect fire became the norm, the infantry commander lost the ability to command and control the artillery in his unit as he had during the direct fire era. Decentralized command and control, coupled with the ability to fire using observers, gave chiefs of artillery more control over their guns than ever before. It also made artillery fires less responsive since artillery pieces could no longer see the infantry and had to depend on their forward observes (and communication network) to attack targets.[108]

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[107] Lesley J. McNair, "Infantry Batteries and Accompanying Guns," *Field Artillery Journal* (March-April 1921): 123-135.

[108] T. Harry Williams, *The History of American Wars from 1745 to 1918* (New York, NY: Alfred A. Knopf, Inc., 1981), 410-414.

Still, the field artillery leadership argued that indirect fire was the way of the future as it provided higher survivability for artillery units. Maneuver commanders argued that direct fire provided by a brigade artillery battery was better because it provided immediate, decisive fire support. The compromise was the concept of accompanying guns. It provided the infantry with an artillery battery for close supporting fires, allowed the field artillery to employ indirect fire when needed, and reflected the challenges of adapting organization from the old method of fire to the new.[109]

The AEF put this new organizational construct to the test during the Meuse-Argonne offensive. On 26 September 1918, a three-hour artillery barrage involving three thousand nine hundred and eighty guns bombarded German lines. The infantry advanced under cover of a rolling barrage provided by division artillery, as well as counterbattery fire by corps artillery. However, they encountered an integrated German defense dug into four successive lines. The density of uncut wire, deep ravines, and dense fog slowed down the infantry's advance and delayed effective communication between the infantry and field artillery.[110]

[109] McNair, "Infantry Batteries and Accompanying Guns," 130-135.

[110] Jennette, "Mass Fire in WWI," 18.

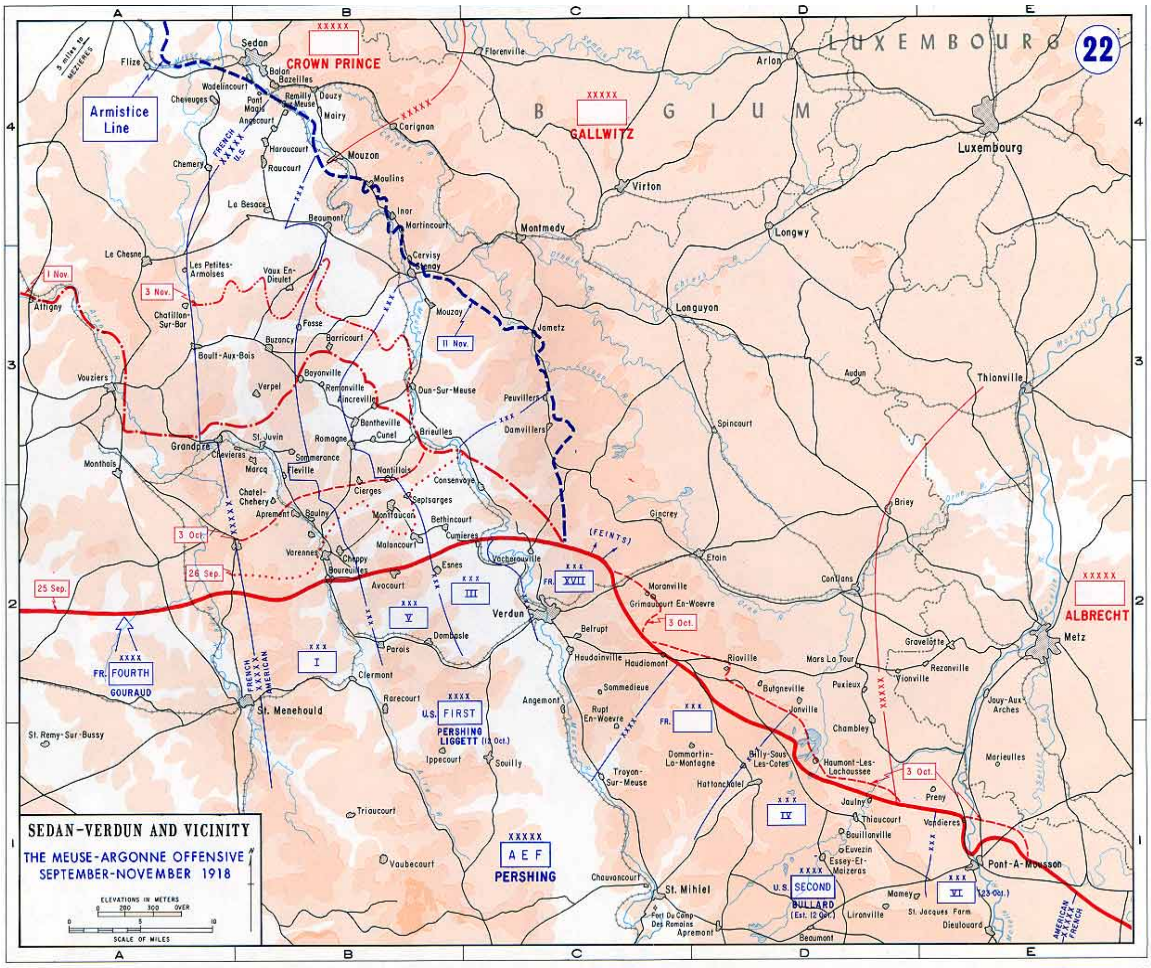

Figure 6. The Meuse and Argonne Offensives

Source: Department of History, United States Military Academy, "The Meuse and Argonne Offensives," accessed April 10, 2020, https://www.westpoint.edu/academics/academic-departments/history/world-war-one/.

The next several days of battle were fought with the same outcome. Under cover of a rolling barrage, and with concentrations of fire on critical points by corps artillery, the infantry attacked prepared defensive positions. When the infantry maneuvered out of artillery range, chiefs of artillery displaced their firing units forward to continue the attack. Artillery commanders took to leapfrogging, or displacing one firing unit at a time, to ensure that there was continuous artillery firing. American forces had advanced about

twelve miles by the evening of 30 September and had struck critical blows in the German defensive lines. However, friendly forces could not continue the assault and lobbied for a tactical pause. General Pershing ordered a temporary halt to offensive operations on 1 October.[111]

The first days of the offensive were auspicious, but issues once again arose with the field artillery's ability to keep up with the infantry. The intense barrage had destroyed roads and made it almost impossible to move the guns forward as the infantry advanced. It took almost an entire week to ready the army artillery to support the offensive after the tactical pause. This limited fire support to corps and division artillery while severely reducing the number of artillery pieces available. Nevertheless, the mission statement did not change: corps artillery provided interdicting and counterbattery fire while division artillery continued rolling barrages to neutralize defensive positions and obstacles.[112]

The AEF attacked early on 1 November, and artillery at all echelons fired a two-hour barrage on all known German artillery positions in an attempt to neutralize them. Simultaneously, division artillery once again executed rolling barrages as the infantry advanced with their accompanying guns. The artillery barrages were so well timed and condensed that they prevented the German artillery from responding in kind. The AEF had cut through its segment of the Hindenburg Line and forced the Germans into a full retreat three days later. Continued pressure from the artillery and infantry forced the

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[111] "The Employment of the Artillery of the V Corps in the Argonne-Meuse Operations," *Field Artillery Journal* (April-June 1919): 162-174.

[112] "Operation Report, III Army Corps, AEF, 27 Sep 1918," in *United States Army in the World War*, *1917-1918*, vol. 9, 170-171, 175.

Germans to position their forces near Sedan, France, in an anticipated defense and counterattack. However, it was not to be as the armistice was signed on 11 November, ending the Great War.[113]

World War I modernized the Field Artillery Branch and laid the foundations for combined arms warfare used today. New technology and doctrine such as telephones, forward observers, and equipment used for employing indirect fire necessitated the need for a reorganization of the branch. American field artillerymen shelled enemy batteries and trenches, bombarded rear areas, and provided rolling barrages in conjunction with advancing infantry and armor forces. The Field Artillery Branch found itself in a new light, as they could no longer charge around the battlefield while trying to follow the infantry. Instead, batteries could follow well behind the front lines and in a dispersed area due to the guns' longer ranges and indirect fire capability.[114] These new concepts, proven in combat, facilitated the creation of permanent division artillery and the employment of a dedicated corps and army artillery organization.

The various developments in materiel, along with innovations in tactics and doctrine, all contributed to making the field artillery a dominant force on the battlefield. At the end of the war, direct fire was rendered obsolete and relegated to the defense of position areas, while indirect fire became the foremost means of offensive fire support. The role of field artillery was to provide close support to the maneuver forces, which it

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[113] U.S. War Department, *Final Report of General John J. Pershing* (Washington, DC: Government Printing Office, 1919), 49-55.

[114] John B. Anderson, "Are We Justified in Discarding Pre-War Methods of Training," *Field Artillery Journal* (April-June 1919): 222-230.

tried to accomplish through coordinated massing of indirect fire, planned in detail, and delivered with as much flexibility as the communication network and command and control would allow. [115]

The participation of U.S. Army field artillery in World War I was brief. When the American forces entered the struggle, both sides were war-weary, and the Germans did not have the strength to continue the fight. Despite limitations caused by shortages in equipment, materiel, and trained personnel, the field artillery made considerable progress in the development of firepower, gained mostly through massed fires. [116] The lessons learned during the Great War were indelibly etched into the artillery branch, and would shape the organization and employment of field artillery well into the late 20th century.

[115] Donald E. Ingalls, "Artillery Innovations in WWI," *Field Artillery Journal* (September-October 1974): 54-57.

[116] McKenney, *The Organizational History of Field Artillery*, 123.

CHAPTER 4

ORGANIZING IN THE MODERN ERA

> The speed, accuracy, and devastating power of American Artillery won confidence and admiration from the troops it supported and inspired fear and respect in their enemies.
>
> — General Dwight D. Eisenhower

American involvement in the Vietnam War led many Army officers to discuss changes in doctrine, organization, and equipment that were necessary for success in a high-intensity conflict in Europe. The Arab-Israeli War provided them a better comprehension of modern warfare and gave a sense of urgency to step up the pace of modernization. While the fast tempo of the war led the Army to conclude that success in future wars would depend upon the results of the first battles, the staggering materiel losses of approximately fifty percent in two weeks of combat on both sides highlighted the tremendous lethality of modern conventional weapons. The destructiveness of antitank and air defense missiles and tanks was particularly impressive to Army observers. If the Arab-Israeli War - the perceived prototype of modern war - were any indication, the Army faced an extremely dangerous future as the introduction of newer, more lethal technology to the battlefield made war deadlier than ever before.[117]

The field artillery had to provide fire support for units already fighting the close battle and simultaneously conduct the deep battle by attacking the follow-on forces. Army field artillery found itself fighting the first, second, and third echelons of enemy

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[117] Boyd L. Dastrup, *Modernizing the King of Battle: 1973-1991* (Fort Sill, OK: United States Army Field Artillery Center and School, 1994), 1-2.

forces concurrently. This concept of battle eventually evolved into the close battle and deep battle of AirLand Battle, outlined in Field Manual 100-5, *Operations*.[118] To be successful against the threat's echeloned and numerically superior armored forces, commanders had to see deep to disrupt or delay the second and third echelons before they could join the first to help overpower the defense. For this to be accomplished, the Army had to exploit all available surveillance and target acquisition systems to locate and track the enemy's movements and detect its command, control, and communication centers. Simultaneously, the Army had to employ tactical air and long-range field artillery to attack the second and third echelons before they could reach the battlefield.[119]

The 1970s and 1980s also saw myriad developments in the field artillery, to include new weapon systems, integrated large-scale fire direction systems, long-range ammunition, terminal guidance systems, and modernized target acquisition systems. These new advances promised a fundamental revolution in artillery if successfully fielded. The Soviet tank threat and the fear of contested air supremacy led to studies in the use of field artillery to fight armor. Historically, direct artillery fire proved more effective than indirect artillery fire in destroying tanks, but direct fire had its limitations. New weapon systems needed to engage enemy tanks beyond the range of direct-fire weapons since the range of traditional artillery was limited.[120]

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[118] Robert H. Scales, *Certain Victory: The U.S. Army in the Gulf War* (Ft. Leavenworth, KS: U.S. Army Command and General Staff College, 1994), 382.

[119] Joseph C. Antoniotti, "Another Point of View: Attacking the Second Echelon," *Field Artillery Journal* (January-February 1986): 8.

[120] McKenney, *The Organizational History of Field Artillery,* 285-286.

Cannon artillery, traditionally the weapon of deterrence and denial, could disrupt enemy maneuver forces. However, it had never been accurate enough (especially at longer ranges) to be a weapon of surefire destruction against moving targets. Additionally, cannon artillery could not deliver enough firepower to penetrate and destroy tank armor. Unless an artillery round directly hit the top of a tank turret or a soft spot in the armor, it only disrupted their radio communications and separated them from supporting infantry. New developments promised a transformation of ordinary field pieces, technologically not far removed from their predecessors of World War I, into precision-destruction weapons nearly equaling the guided-missile standard: one round, one target, one kill.[121]

Reorganizing the Field Artillery

The U.S. Army's experience in Vietnam showed that developments and refinements in Army doctrine, organization, and materiel must help to realize the maximum effectiveness of American firepower in future conflicts.[122] Army planners had concluded as early as 1970 that the maneuver divisions were too large and required too many nondivisional troops for support in combat. The United States Army Combat Developments Command thus received instructions to develop smaller divisions, and new TOEs were published in November of that year, but with few changes in division artillery units. In the standard infantry divisions, service batteries reformed as separate

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[121] Michael W. Hustead, "Fire Support Mission Area Analysis," *Field Artillery Journal* (May-June 1981): 20.

[122] David E. Ott, *Vietnam Studies: Field Artillery 1954-1973* (Washington, DC: Government Printing Office, 1995), 231-236.

units in the field artillery battalions, a change that recommended during the war in Vietnam.[123]

Experience gained from artillery units in Vietnam was also essential. A key lesson learned was the interest in improved target acquisition procedures and devices, with the recommendation that these processes be decentralized. Field artillery leaders also acknowledged that the corps artillery would need to control a target acquisition system capable of serving the entire corps area, but argued that such centralization in many other situations would inhibit the responsiveness of fire support. They then supported a sizeable target acquisition capability at the division artillery and direct-support battalion levels in order to acquire and destroy targets in response to localized needs on the modern battlefield.[124]

Counterbattery fire traditionally was the responsibility of the corps artillery commander who had the right tools, primarily long-ranged weapons, and the target acquisition battalion. Corps commanders traditionally controlled a relatively small and stable corps frontage for efficiently carrying out the mission. However, by the mid-1970s, corps sectors in Europe had increased far beyond those of World War II, from 25–40 kilometers (15.5–24.9 miles) to 80–110 kilometers (49.7–68.3 miles). Several other factors affected mission accomplishment as well, including the excess of target data, which tremendously overburdened communications systems. The Allies had a five-to-one advantage in artillery pieces over the Germans in 1944. However, the Army in 1975

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[123] McKenney, *The Organizational History of Field Artillery*, 294.

[124] Donald R. Keith, "Forward Observations," *Field Artillery Journal* (July-August 1977): 3–4.

expected four enemy divisions to one American division in a target-rich environment. Second, the weapon technology had drastically improved. Corps artillery weapons of the 1970s were mainly the same as those in the divisions, except for the 175-mm. gun that was in the process of being replaced by a newer model 8-inch howitzer. Compared to those of World War II that could range most of the corps area because of the small frontages, these weapons could hardly cover the area of a single division.[125]

Three changes gave the division commander the full capability of executing the counterfire mission. First, the target acquisition mission moved from the corps artillery into a divisional target acquisition battery. Second, the division artillery staff expanded with a tactical operations center that integrated all intelligence (S–2) and operational (S–3) functions and contained a target acquisition capability. Lastly, the division artillery commander had command and control of the cannon artillery battalions that could shoot in his area of operations. Field artillery doctrine changed to give all corps artillery battalions a reinforcing role to one of the divisions or to attach them to a specific division. After World War II, division artillery had grown to encompass many tasks previously at the corps level, with corps artillery now assuming the role of reinforcing fires and the force field artillery headquarters.[126]

The Field Artillery Branch, along with Training and Doctrine Command (TRADOC) restructured the relationship between corps and division, as division artillery

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[125] U.S. Army Field Artillery School, "Counterfire, Part One," *Field Artillery Journal* (November-December 1975): 14-21.

[126] Edward R. Coleman, "Field Artillery Brigade," *Field Artillery Journal* (May-June 1977): 40-43, 51.

alone could not meet the massive counterfire and interdiction missions alone. They changed the corps artillery headquarters into a small corps staff section and deleted the target acquisition battalion. TRADOC restructured the artillery group due to the necessity of providing the additional firepower beyond what was organic to a division. The artillery group changed to the FAB and allowed for the control of a varying number of battalions. It did not act independently but instead served to reinforce division artillery. This new organization tied corps and division artillery closely together and made corps artillery more responsive to the needs of the division while maintaining the corps commander's fire support assets.[127]

The FAB was a command and control organization for up to six subordinate battalions. These brigades were created to serve four specific functions: reinforce division artillery with a corps zone, serve as a force artillery headquarters in a corps or division covering force area operations, provide direct support within a section of the main battle area, and serve as an alternate division tactical operations center. The brigade's tactical operations center modeled off the division artillery, except that it did not have the same target acquisition capability. FABs were assigned a direct support mission only to subordinate maneuver elements of a division if distance requirements prevented active command and control from their organic division artillery. The only organic target acquisition assets in the brigade were four air observation teams, forcing the brigade to rely heavily on the divisions.[128]

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[127] Coleman, "Field Artillery Brigade," 40-43, 51.

[128] Ibid.

Along with the reorganization of counterfire doctrine was the adoption of a new tactical fire direction system (TACFIRE) that was under development since 1967. The increase in armament and mobility had contributed to a reduction in time available to react to a threat adequately, resulting in an interest in the development of automated defense systems. The United States had led the world in computer technology and produced the most advanced fire-control systems. The first field artillery digital automatic computer model had been delivered in 1959, and its successor TACFIRE had been scheduled for delivery in March 1972. However, numerous technical problems delayed the operation of the system for several more years. TACFIRE was a complicated system that required extensive training, but provided computations for both technical and tactical fire direction.[129]

The forward observer communicated directly with the computer at the fire direction center using a message device. The computer verified the message, entered all relevant data, and decided which battery in the battalion should get the mission while automatically requesting action from a higher headquarters if beyond the battalion's capabilities. One weak link in the system was the lack of a secure, reliable communications net. VHF (very high frequency) FM radios were used but were limited to line-of-sight operations and reduced their effectiveness in urban or hilly areas.

[129] U.S. Army Field Artillery School, "The Journal Interviews . . . MG Albert B. Crawford," *Field Artillery Journal* (July-August 1975): 38-41.

Additionally, their weight, size, and power requirements also made them a burden for mobile forces.[130]

New advances in technology outpaced the doctrinal knowledge to employ them in battle. The TACFlRE system inherently created a data flood through its ability to process information. Additionally, the ability for forward observers to relay information across a large front simultaneously forced a need for extensive fire support planning and coordination at the division and corps level. Synchronization between the two elements was essential to prevent a fire support bottleneck and a delay of fires. An overflow of information needed processing by a robust warfighting staff at EAB. However, the field artillery at the time did not have the organizational capacity to support these new concepts.[131]

Technological Revolution

In the early 1970s, field artillerymen felt that field artillery munitions needed a vast overhaul. Due to the large number of artillery and tank formations fielded by the Soviet Union and its Warsaw Pact allies, Army planners needed to develop overmatch capabilities in both numbers of howitzers and operational range. However, operating and cost constraints precluded high numbers of weapon systems and crews. The answer to this quantitative setback seemed to be a qualitative solution through advances in

[130] John E. Martin, "TACFIRE," *Field Artillery Journal* (January-February 1979): 8-13.

[131] Mark J. Redlinger, "AirLand Battle and the Division Artillery Counterfire Dilemma" (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 30 November 1987), 24-25.

technology and training. One method of increasing firepower was to develop more deadly munitions, while another solution was to improve the accuracy and delivery error to near zero.[132]

The concept of smart rounds developed during World War II with the introduction of proximity fuzes. These projectiles could not steer towards a target, only trigger them electronically when to explode. The development program for cannon-launched guided projectiles, also known as Copperhead, began in the early 1970s. These munitions had the potential to revolutionize artillery firepower and accuracy against point targets by providing a probability of a single-round hit. The Copperhead round, designed for the 155-mm. howitzer and with a range between 3 and 20 kilometers (1.9 and 12.4 miles), had a laser-homing device to guide it to the target. Plans also existed for developing the Copperhead for other weapons, including the 8-inch howitzer, which would eventually allow the engagement of more targets due to the decrease in ammunition required to fire against each target.[133]

Approved in 1979 and fielded in 1984, the Copperhead system consisted of the 155-mm. laser-guided projectile and a laser locator designator. Laser designators were also developed for remotely piloted vehicles and other aircraft. The operator of the laser designator placed a pulse-encoded laser spot on the target. After a call for fire, the Copperhead fired on a ballistic trajectory, not with precise aim, into the general area of the target. Once it entered the target area, the on-board timer would activate the seeker

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[132] McKenney, *The Organizational History of Field Artillery*, 286.

[133] Robert A. Nulk, "Copperhead: New Weight for Stopping Enemy Armor," *Army R.D. & A Bulletin* (January-February 1979).

head, which would pick up the laser energy projected by the laser designator and reflected off the target. The observer could then steer the Copperhead during its descent onto the target.[134]

New developments in ammunition included those for improved conventional munitions in addition to the Copperhead program. A high-priority program, it coordinated and promoted the development of technology relating to terminal guidance of projectiles and for cargo carrying projectiles (including submunitions and scatterable mines). These cargo-carrying artillery shells could dispense submunitions for direct action against troops or armored targets. They were also employed as a hasty obstacle (area denial) in which whole areas could be seeded with mines or sensors to deny territory to enemy units or keep track of their movements. The primary reason for efforts to increase the range of artillery was that the longer-ranged Warsaw Pact artillery could quickly suppress it. The old 8-inch round, for example, had a range of about 18 kilometers (11.2 miles) while the new round had a range of about 29 kilometers (18 miles).[135]

The 155-mm. howitzer began to replace the workhorse of three wars, the 105-mm. howitzer, due to the efforts toward improving munitions and the growing desire to standardize across the force. The 155-mm. howitzer had several advantages, such as an effective rate of fire, more extended range, a more lethal round, and an unequaled

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[134] James F. Hall, "Precision Guided Artillery," *Field Artillery Journal* (May-June 1981): 9-12.

[135] Joseph C. Antoniotti, "Precision Guided Munitions," *International Defense Review*, no. 9 (1986), 1269-1276.

munitions versatility. Army planners hoped to strike beyond the forward edge of the battlefield with long-range artillery, overcoming the enemy's superior numbers and disrupting formations before the battle began. Disruption was considered a significant factor, based on intelligence that flexibility in operational authority lacked in the Soviet chain of command.[136] Cannon artillery could not provide fire support throughout a brigade area of operations, and the massing of fires was limited because of the wide dispersion of firing units on the modern battlefield and the 105's short-range. They lacked protection for the crew and ammunition, had longer emplacement and displacement times, and did not have the mobility of self-propelled weapons. However, helicopters easily transported these artillery pieces. Additionally, thirty-three pound projectile of a 105-mm howitzer was not thought to be powerful enough to inflict sufficient damage on armored targets, and the high-mobility multipurpose-wheeled vehicle had difficulty towing the field piece.[137]

The M114A1, first fielded in 1942, was the towed 155-mm. howitzer used in the 1970s with a maximum effective range of 9 miles (14.6 kilometers). The M198 towed the 155-mm. howitzer, which replaced the older weapon. It had a lower rate of fire, was two tons lighter, helicopter transportable, and had the new feature of an all-around traverse. Weapon range significantly increased from 18.1 kilometers (11.2 miles) to 22.6 kilometers (14 miles) with improved conventional munitions. Additionally, it extended to

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[136] Karl H. Bodlien, "Artillery Projects of the Future," *Field Artillery Journal* (January-February 1976): 10-15.

[137] Larry A. Altersitz, "Defending the Battery," *Field Artillery Journal* (May-June 1979): 30-33.

more than 30 kilometers (18.6 miles) with rocket-assisted projectiles (RAP). The first M198 howitzers were ordered in 1977, but there was a delay in production for a year, pending a review on requirements needed for towed weapons in nondivisional artillery units.

Army Chief of Staff General Edward C. Meyer directed in May 1980 that the new light infantry divisions would use the M198 as their direct-support weapon. This decision was on its munitions and range versatility, even though it was more expensive and less mobile than the 105-mm. model. However, when these units organized in the 1980s, they were not equipped with suitable prime movers for the M198s, which were still too heavy for many helicopters.[138] The Army then decided to design a new 155-mm. weapons system that would weigh considerably less yet have the necessary stability, with the light divisions returning to use 105-mm. howitzers for direct support.[139]

Accomplishing the tasks necessary for coordinated actions in time and space means the corps and higher headquarters played significant roles. The division itself did not have the organic systems necessary for fighting the deep fight. The corps commander needed deep attack assets other than divisional equipment, as the corps was responsible for fighting an integrated battle. Working together, the corps and division commanders had to work together to plan and fight the deep and close battles at the same time. This close coordination required a unified scheme of maneuver with fires planned across all

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[138] Walter B. Brown II, "The M198," *Field Artillery Journal* (July-August 1982): 26-29.

[139] Suzann W. Voigt, "Much Ado About Something," *Field Artillery Journal* (July-August 1986): 28-30.

echelons. Success depended on the careful coordination of present and future actions throughout the depth of the battlefield.[140]

Field artillerymen in the early 1970s believed there had been no significant advances in artillery since the development of massed fire techniques in the early 1940s. They argued that the Soviets built up a quantifiable superiority in cannon artillery supporting their initial efforts (estimates varied from 2:1 to 5:1) and that they could afford to deliver counterbattery fire while simultaneously delivering close support and other suppressive fires. Cannon artillery had to remain in a firing position to provide continuous support, and the longer a battery remained in position firing, the more viable it was as a target. Piecemeal displacement reduced support to maneuver units, inhibiting the artillery's ability to provide both close support and suppressive fires. his supported the upcoming doctrinal shift for corps artillery providing fire support in the deep attack by providing fires in-depth to support deep strikes by maneuver formations.[141]

Army planners believed the answer to the problem was the MLRS. The ability to achieve surprise with heavy concentrations of fire in a matter of seconds was a significant advantage of rocket systems. The main argument against such weapons had existed since they first appeared in the United States in the early 1800s. Rocket artillery was less effective and more expensive because of its limited accuracy in comparison to cannon fire. However, proponents believed that rockets could deliver a far higher volume of

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[140] Donn A. Starry, "Extending the Battlefield," *Field Artillery Journal* (September-October 1981): 9-13.

[141] W. H. Rees, Jr., "We Need an MRL," *Field Artillery Journal* (November-December 1976): 30-34.

firepower in a much shorter time than cannon artillery and that they did not have weather limitations of tactical air support. While not envisioned for direct support, the MLRS was an ideal weapon system for use against area targets using a high volume of fire in a brief period.[142]

The Field Artillery School initiated a requirements study for a general-support rocket system in March 1974. The study determined an urgent need for an indirect fire system to neutralize and suppress the enemy's indirect fire support and air defense capabilities in an environment characterized by increased mobility and dispersion of combat units. The anticipated enemy stressed a doctrine of massive armored combat power supported with heavy cannon, rocket, and air defense fires. This enemy would suppress opposing direct and indirect fire support capabilities with tube and rocket superiority, allowing armored units more freedom to maneuver on the battlefield. A rocket system was capable of achieving a more extended range without massive superiority of cannon artillery. It would also permit a higher volume of fire support without displacement and would provide indirect fire support across a broader front. Maintenance costs were anticipated to be less than that of self-propelled cannons, and support costs would be lower because of smaller rocket crews.[143]

The MLRS was designed for the mobility, flexibility, and long-range requirements expected on the modern battlefield. The twelve-round launcher mounted on a modified mechanized infantry combat vehicle and required a crew of three

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[142] Rees, Jr., "We Need an MRL," 30-34.

[143] Charles J. Buel and Gary R. Miller, "GSRS Status Report," *Field Artillery Journal* (March-April 1979): 13-15.

(commander, gunner, and driver). Its range was more than 30 kilometers (18.6 miles), ensuring coverage of about ninety percent of the targets acquired. The rockets fired as a single shot or in a rapid-fire sequence controlled by a computerized fire direction center. They could utilize other warheads to include smoke, scatterable mines, and terminally guided munitions. Ideally, one MLRS could deliver the same firepower as twenty-eight 8-inch howitzers. Although primarily envisioned as a counter fire weapon, the MLRS could suppress enemy air defenses, destroy high-density mechanized targets, and provide interdiction fires.[144] Fielding began in 1983 and continued into the 1990s, while future MLRS developments included extending the range of the rocket and using the launcher to fire the new precision-guided Army Tactical Missile System (ATACMS).[145]

A new weapons platform demanded effective doctrine and organization. Long-range, precision fire from MLRS would have to cover friendly artillery gaps and destroy the enemy force by engaging with destructive long-range fires. These shaping fires allowed the maneuver forces to attack the enemy's tanks and rear to avoid frontal assaults. As envisioned during the later years of the 1980s, long-range fires would become the major killer on the battlefield. Once the long-range fires from MLRS with its precision munitions, the ATACMS, destroyed the enemy sufficiently to minimize

[144] Richard M. Bishop, "Multiple Launch Rocket System Tactics," *Field Artillery Journal* (May-June 1985): 8-9.

[145] Ibid.

casualties, the division's direct support artillery would support the maneuver forces by delivering the final blows with assistance from corps artillery.[146]

Providing effective long-range fires on the nonlinear battlefield, however, rested upon the continued modernization of the field artillery. The Army had to field the MLRS family of munitions, as these systems gave the field artillery the ability to reach deep into the enemy's territory to destroy forces before they encountered friendly forces and to shape the maneuver battle. However, as division artillery accepted the traditional roles for corps artillery, they did not have the full capabilities to shape the deep fight with long-range fires. The Army needed to relook at the organization of field artillery in order to synchronize the role of division artillery reinforced by corps artillery.[147]

Field Artillery in the AOE

The invasion of Czechoslovakia in 1968 and the Arab-Israeli wars of 1967 and 1973, especially the Yom Kippur War in October 1973, influenced Army leaders to reevaluate organizational structure once again. One principle distilled from their analyses of the recent wars was that the Army should be prepared to win the first battle and that it should develop tactics to do so within the existing force structure.[148] The national strategy gave the Army the primary task of preparing for combat in Europe, where

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[146] C. William Rittenhouse, "Operation FireStrike," *Field Artillery Journal* (February 1991): 33-37.

[147] C. William Rittenhouse, "Fire Support on the Non-Linear Battlefield: The Shape of Things to Come," *Field Artillery Journal* (October 1990): 36-39.

[148] "Lessons Learned from the Czech Invasion," *International Defense Review*, no. 1 (1969): 27-29.

estimates of the threat were such that the Army would most likely have very little time to mobilize and deploy forces from the continental United States. Army leaders saw the European battlefield as demanding mobility, survivability, and responsiveness. They felt that the existing organizations at company and platoon levels had grown too large to control and support effectively. They also saw the battlefield as dominated by firepower, a contest in which opposing artillery massively outgunned U.S. divisions.[149]

General Meyer suggested that the Army's Field Manual 100–5 needed revision shortly before becoming Chief of Staff in June 1979. He argued out that the 1976 version was chiefly for battle in central Europe and lacking in universal doctrinal application. This problem led to an Army-wide coordinated effort by the United States Army Combined Arms Center at Fort Leavenworth, Kansas, with participation from every school and agency under its umbrella. The concept of *Army 86* was conceived, serving as the test platform for the *Division 86* concept. It focused on the heavy armored division, with later studies addressing other types of divisions and higher echelons. The Field Artillery School attempted to determine the weapons systems, force structure, tactics, and doctrine through the turn of the century that would enable field artillery to execute its part of a new doctrine that became AirLand Battle.[150]

Artillerymen recommended division artillery with a target acquisition battalion, three direct-support battalions (with three eight-gun batteries of M198 155-mm.

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[149] U.S. Department of the Army, Field Manual 100-5, *Operations* (Washington, DC: Government Printing Office, July 1976).

[150] John L. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine, 1973–1982*, TRADOC Historical Monograph Series (Fort Monroe, VA: U.S. Army Training and Doctrine Command, 1984), 30.

howitzers), and a general-support battalion of 155-mm. and 8-inch howitzers and MLRS to provide adequate counterfire and interdiction capabilities. The resulting structure, which totaled about eighteen thousand personnel, was rejected as being too heavy.[151] After several reworks, planners in September 1980 reached an accord on a division that numbered seventeen thousand, seven hundred and seventy three, with almost three thousand in the division artillery that consisted of three direct-support battalions (with a total of seventy-two 155-mm. howitzers), a nine-launcher rocket battery, and a target acquisition battalion. This plan also included a dual capability for fielding 155-mm. or 105-mm. howitzers in the direct-support battalions.[152]

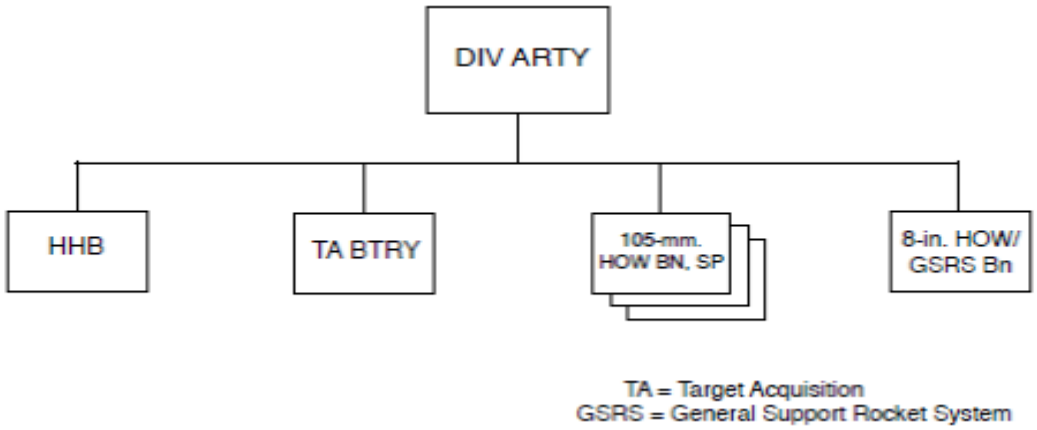

Figure 7. Heavy Division Artillery Organization, 1980

Source: Janice E. McKenney, *The Organizational History of Field Artillery,* (Washington, DC: U.S. Army Center of Military History, 2007), 305.

[151] John L. Romjue, *A History of Army 86, vol. 2, The Development of the Light Division, the Corps, and Echelons Above Corps, November 1979-December 1980,* (Fort Monroe, VA.: United States Army Training and Doctrine Command, December 1981), 2:32.

[152] Ibid, 2:37, 40-41, 44-47, 53, 55.

An examination of corps support to the counterfire and interdiction missions of the division artillery continued at the Field Artillery School throughout 1979. Later on, the school developed a new concept of interdiction. Artillery officers at the school argued that because of improved techniques in target acquisition communications and improved capabilities for executing long strikes deep into enemy territory, the interdiction mission would divide between corps and divisions. This topic became a matter of discussion while planning for a nuclear systems program review at the school in December 1979 with the main subjects including war-fighting strategy doctrine and implementation.[153]

Problems appeared in the coordination of close air support and combat service support with the elimination of the field armies in 1973. The corps had taken on theater logistical responsibilities that hindered its mobility and fighting strength.[154] Proposed corps artillery included in the *Corps 86* concept recommended twelve thousand and five hundred personnel to support three divisions and four FABs, one for each division plus one for general corps support. Additional artillery added as forces grew during mobilization. Every corps artillery brigade supporting a division was to include one or two 8-inch howitzer battalions, one 155-mm. howitzer battalion, and one rocket battalion at full strength. When the concept of dividing the interdiction mission between the

[153] Edward A. Dinges and Richard H. Sinnreich, "Battlefield Interdiction," *Field Artillery Journal* (January-February 1980): 15.

[154] U.S. Army Training and Doctrine Command (TRADOC), *TRADOC Annual Historical Report, FY 1980* (Fort Monroe, VA: TRADOC, 1980), 50.

division and the corps was incorporated, headquarters and headquarters batteries for the corps artillery were reinstated.[155]

Planning for a light corps organization was also ongoing. The corps artillery organization proposed in October 1981 included a headquarters and headquarters battery, a target acquisition battalion, five 155-mm. towed howitzer battalions, and three rocket battalions, totaling approximately 5,200 soldiers. However, as planning progressed, further reductions were made, and the 8-inch howitzer battalions were eliminated. The number of 155-mm. howitzer battalions increased to eight to compensate for the loss in combat power. General Meyer expressed concern over the lack of tactical nuclear capability in the proposed contingency corps in early 1982. The Field Artillery School investigated and confirmed the high price of the tradeoff of more substantial delivery systems for a lighter force of increased mobility.[156]

A more balanced concept known as the Army of Excellence (AOE) evolved to replace the *Army 86* design due to monetary and personnel constraints. Recent events such as the Iranian hostage crisis and the Soviet invasion of Afghanistan influenced a change in focus and highlighted the need for flexible contingency forces. The redesign effort focused mostly on the organization of new light infantry divisions, the restructuring of heavy divisions, and the realignment of corps forces. The overall objective was to

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[155] *TRADOC Annual Historical Report, FY 1980*, 69, 75, 84, 145, 381-382.

[156] U.S. Army Training and Doctrine Command (TRADOC), *TRADOC Annual Historical Report, FY 1982* (Fort Monroe, VA: TRADOC, 1982), 71-73, 76, 79-81.

develop flexible combat-ready forces capable of deterring aggression or defeating the enemy within constrained resources.[157]

The proposed infantry division artillery in *Division 86* included three thousand personnel in an eighteen thousand-man division. Planners believed that deploying this relatively large force to outlying geographic areas might be unfeasible, given the scarcity of strategic transport in times of crisis. They also saw the need for an artillery force to operate in low-intensity conflicts. The proposed light infantry division included a headquarters and headquarters battery, three direct support battalions with three batteries with eight M198 155-mm. howitzers each, as well as a rocket battery. However, to have a quickly deployable division, the approved light division artillery scaled with an overall strength of one thousand and five hundred. It had a headquarters and headquarters battery, three 105-mm. towed howitzer battalions (three batteries with six howitzers each), and a 155-mm. towed howitzer battery (eight howitzers).[158]

[157] John L. Romjue, *The Army of Excellence*, TRADOC Historical Monograph Series (Fort Monroe, VA: U.S. Army Training and Doctrine Command, 1993), 13-16.

[158] U.S. Army Training and Doctrine Command (TRADOC), *TRADOC Annual Historical Report, FY 1983* (Fort Monroe, VA: TRADOC, 1983), 341-343.

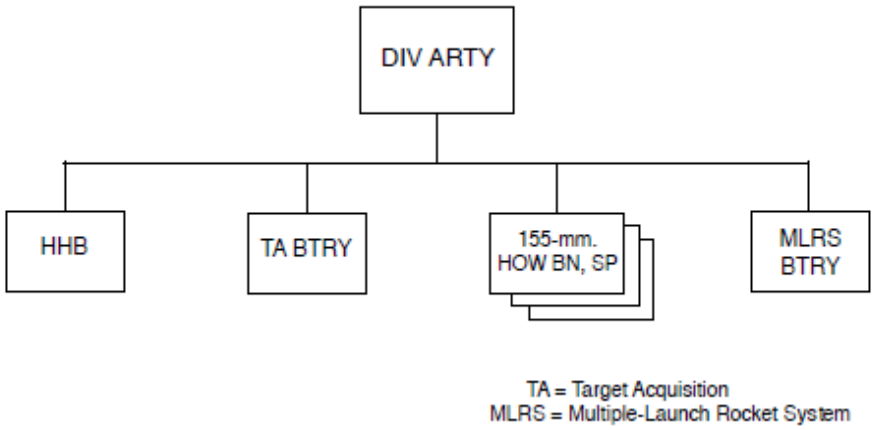

Figure 8. AOE Heavy Division Artillery Organization, 1983

Source: Janice E. McKenney, *The Organizational History of Field Artillery* (Washington, DC: U.S. Army Center of Military History, 2007), 309.

The service battery combined with the headquarters battery in each battalion. Aerial observers disappeared, and most of the target acquisition assets transferred to the corps level.[159] Several weaknesses existed in the new light division artillery. These included reduced mobility in open terrain when opposed by motorized forces, limited protection against artillery, and dependence upon air superiority for mobility.[160] The division artillery envisioned for the airborne and air assault divisions was nearly the same

[159] Robert S. Riley, "AOE," *Field Artillery Journal* (September-October 1985): 46-50.

[160] Heinz A. Schiemann, "Fire Support for the Light Division," *Field Artillery Journal* (October 1987): 19.

as that for the approved light infantry division except that the 155-mm. howitzer battery was scrapped.[161]

The 8-inch howitzer had a slow rate of fire and low survivability but was a critical asset at the division level. Its transfer to the corps artillery largely reduced its counterfire capability. United States Army Europe planners argued that the howitzers should stay in the division because of the superiority in numbers of Warsaw Pact artillery pieces. They also believed that the reduction of tubes at the division level would aggravate an already inferior position. A reduction in the number of crewmembers for the 155-mm. howitzer increased the time needed to emplace and displace the pieces and diminished crew flexibility. The deletion of the sound-and-flash platoon eliminated the division's only capability for passive detection of enemy systems, leading to a reliance on corps artillery for target acquisition.[162]

The reduction of the heavy division resulted in a simultaneous corps expansion. The corps artillery structure created to operate with *Division 86* organizations had insufficient resources to operate with the AOE construct. A new AOE corps artillery structure featured increased brigade strengths, an "up-gunning" of six-howitzer to eight-howitzer batteries, the addition of a rocket battalion, and the reinstitution of both the corps target acquisition battalion and the corps headquarters and headquarters battery.

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[161] John B. Wilson, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades (*Washington, DC: U.S. Army Center of Military History, 1998), 397-400.

[162] Romjue, *The Army of Excellence*, 49.

This change shifted the reliance for fire support in-depth back from the division to the corps.[163]

When the MLRS concept was developed, Army planners determined that the minimum allocation of per division should be twenty-seven launchers in a three-battery battalion. However, force structure constraints precluded fielding that number of battalions. Eventually, only one nine-launcher battery was assigned to each division and one twenty seven-launcher battalion to each corps. This organization provided for the permanent attachment of one of the corps batteries to a division, thus supplying eighteen launchers to each division. Of the eighteen divisions active in the mid-1980s, twelve were authorized rocket batteries, and each of the five corps was authorized a battalion. The MLRS was fully capable of furnishing interdiction, counterfire, suppression of enemy air defenses, and other vital missions as a corps artillery weapon.[164]

Field artillery doctrine in the 1970s and 1980s stressed warfare on the European battlefield with a considerable effort expended to improve materiel, doctrine, and training to meet the perceived Soviet threat. Developments in communications, ammunition, and automation systems gave the field artillery the ability to perform the traditional role of supporting the maneuver forces by moving, shooting, and communicating continuously despite the opposition of a sophisticated enemy. AirLand Battle doctrine emphasized the role of fire support in the deep attack, supporting the requirement to deliver fire in-depth,

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[163] Romjue, *History of Army 86*, 2:144-45.

[164] Roger L. McCormick, "More on How to Use MLRS," *Field Artillery Journal* (November-December 1984): 4.

support deep strikes by maneuver formations, and to synchronize both of these efforts to win the battle.[165]

Steel Rain

The decade of the 1990s ushered in a myriad of regional threats to the security of the United States. The INF Treaty had contained the nuclear threat of the superpowers by May 1991, and the official disintegration of the Warsaw Pact in July and the Soviet Union in December reduced the number of superpowers to the United States. Army commanders realized that Europe would not necessarily be the only battlefield, and they became increasingly concerned about other likely trouble spots such as the Middle East and Latin America.[166]

A crisis in the Persian Gulf erupted during the midst of the Army's modernization effort when Iraq invaded Kuwait in the summer of 1990. The United States and United Nations reacted rapidly to defend Saudi Arabia from a potential Iraqi invasion and to force Iraq to withdraw from Kuwait. President George Bush froze Iraqi and Kuwaiti assets and signed an executive order that banned trade with them. Simultaneously the United Nations demanded an immediate and unconditional withdrawal. President Bush warned Iraq not to invade Saudi Arabia and offered American assistance to the Saudi ruler, King Fahd, who accepted it on 6 August 1990.[167] Saddam Hussein failed to

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[165] McKenney, *The Organizational History of Field Artillery*, 310.

[166] Ibid, 311.

[167] Henry O. Malone, Jr., ed., *TRADOC Support to Operations Desert Shield and Desert Storm: A Preliminary Study* (Fort Monroe, VA: Office of the Command Historian, 1992), 2-3.

withdraw his forces from Kuwait by the 15 January 1991 deadline established by President Bush. Operation Desert Storm, supported by Congress and the United Nations, commenced with an aggressive air offensive early on the morning of 16 January 1991. The Allied air campaign lasted through 23 February 1991 and systematically crippled Iraqi war-making capabilities and shaped the battlefield for the ground war that followed.[168]

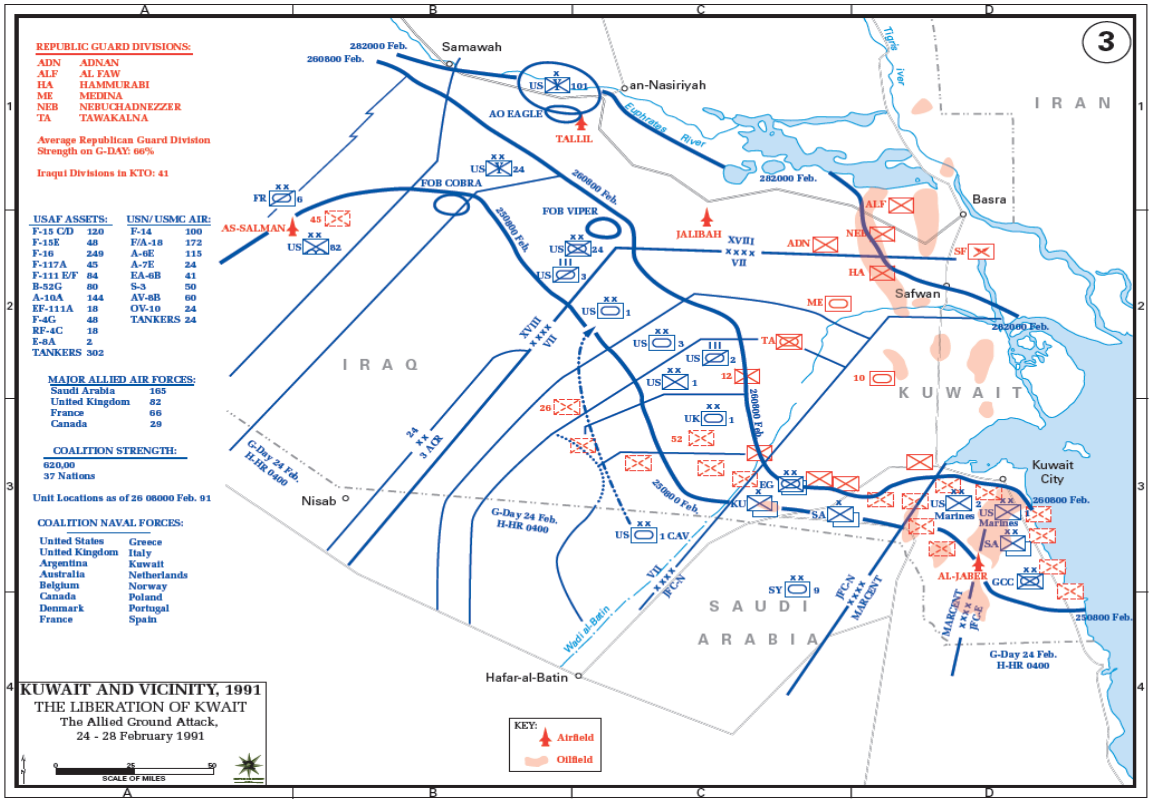

Figure 9. The Allied Ground Attack, 24-28 February 1991

Source: Department of History, United States Military Academy, "Kuwait and Vicinity, 1991 - The Liberation of Kuwait, 24 - 26 February," accessed April 17, 2020, https://www.westpoint.edu/academics/academic-departments/history/first-gulf-war/.

[168] Norman Friedman, *Desert Victory: The War for Kuwait* (Annapolis, MD: Naval Institute Press, 1991), 169-196.

American and Allied forces initiated the ground offensive of 24 February 1991. The U.S. XVIII Airborne Corps on the Allied extreme left flank penetrated deep into Iraq to the Euphrates River Valley on the first day to isolate the enemy and prevent reinforcement. U.S. Marines supported by Saudi forces attacked across the eastern part of Kuwait's southern border toward Kuwait City and conducted probes farther to the west. The Arab coalition forces to the west pushed beyond the Kuwaiti-Saudi border barriers to deceive the enemy into believing that a frontal assault was underway. Simultaneously the U.S. VII Corps executed a massive wheeling maneuver north and east to encircle Iraqi forces as the U.S. Marine and Arab coalition drove up from the south to Kuwait City. The ground campaign was a decisive victory for coalition forces as they liberated Kuwait within one hundred hours.[169]

Operation Desert Storm validated AirLand Battle fire support doctrine as it evolved through early 1991. Colonel David A. Rolston, who had given up command of the 24th Infantry Division (Mechanized) Artillery in December 1990 after two years in command and became the Deputy Assistant Commandant of the Field Artillery School in January 1991, reaffirmed the value of massed fires. He wrote in an article published in *Field Artillery* in April 1991, "Training prior to the deployment and the operation itself reinforced another tenet: don't dilute fire support by 'nickel and diming' the effort with fires on small and relatively insignificant targets. Hit the high-payoff targets with massive fires."[170] This assertion reinforced the necessity of massing artillery fires from lessons

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[169] Friedman, *Desert Victory*, 214-236.

[170] David A. Rolston, "Victory Artillery in Operation Desert Shield," *Field Artillery Journal* (April 1991): 24.

learned over the years. It was also consistent with the thinking of current brigade, division, and corps commanders who stated in the aftermath of Operation Desert Storm that the extensive use of artillery fires paved the way for the swift victory. Fire support, especially field artillery, "was used in Desert Storm to the maximum in order to minimize the number of effective enemy units that our soldiers in tanks and infantry fighting vehicles had to take on at close range."[171]

Coalition field artillery overwhelmed the enemy despite a significant Iraqi advantage in both the number of tubes and range capability. The synchronization of target acquisition systems, command and control, communication systems, and multiple artillery weapon platforms took away the enemy's ability to locate targets beyond the forward line of troops. Massed artillery fires provided timely support to the maneuver commander, furnished overpowering fire superiority, and allowed the commander to exploit the effects of fires. Highly mobile artillery formations were able to supply fires when and where the ground forces needed them the most. Iraqi prisoners called MLRS dual-purpose improved conventional munition bomblets "Steel Rain" and the most terrifying threat they faced.[172] Coordinated fires of upwards to eleven battalions on enemy positions repeatedly proved devastating. A captured Iraqi artillery commander reported he lost only ten percent of his field artillery before the ground war. However, during the initial phases of the ground assault, he lost all of his remaining guns to massed

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[171] Glenn K. Otis and Paul F. Pearson, "Desert Storm Fire Support: Classic AirLand Battle Operations," *Landpower Essay Series,* no. 91-2 (June 1991).

[172] Fred F. Marty, "FA on Target in the Storm," *Field Artillery Journal* (October 1991): 1.

indirect fire.[173] Army field artillery units fired over fifty-seven thousands rounds in one hundred hours, with the M109 self-propelled 155-mm. howitzer shooting over forty-three thousand.[174]

Operation Desert Storm proved that doctrine of Air Land Battle was valid. However, after-action reports highlighted some critical shortcomings. While doctrine through the corps level was sound, doctrine for planning and executing fire support at the field army and joint level did not exist. Although Air Land battle established designated roles and definitions doctrinally by service, there was not a concerted effort to tie doctrine together in a joint environment. Additionally, there were no fire support elements at Army Central Command until the latter stages of the operation since tactics, techniques, procedures, and organizational guidelines did not exist at the time.[175] Controversy over fire support at echelons above corps often adversely influenced joint Army and Air Force operations. The responsibility for planning and executing fire support at the joint force level was not in doctrinal publications. This ambiguity allowed each service to view fire support from its perspective.[176]

Air Force and Army fire support doctrine often varied, especially over definitions of fire support coordination measures. The Army employed the fire support coordination

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[173] U.S. Army Field Artillery School, "Field Artillery Desert Facts," *Field Artillery Journal* (October 1991): 2-3.

[174] Dastrup, *Modernizing the King of Battle*, 58.

[175] Kenneth P. Graves, "Steel Rain: XVIll Corps Artillery in Desert Storm," *Field Artillery Journal* (October 1991): 52-55.

[176] Jay F. Grandin, "Fire Support Coordination: It's a Time for A Retook," *Field Artillery Journal* (February 1992): 19-23.

line as a permissive fire support coordinating measure permitting Army units to fire beyond it without coordination. However, the Air Force treated it as a restrictive measure that required the Army to coordinate all surface-to-surface fires beyond the line. These doctrinal differences hampered the ability of corps and Army commanders to plan and conduct deep operations. It delayed the processing of long-range missile fires at times because the line had two different and conflicting meanings.[177]

The problems associated with joint fire support doctrine in Operation Desert Storm and the difficulty of forming a fire support cell at Army Central Command led to several conclusions at the Field Artillery School. Army component and joint force headquarters had to establish a staff element with responsibilities similar to a fire support cell at the corps, using doctrine written to guide fire support cells at echelons above corps. Additionally, the Army and Air Force had to develop joint doctrine to resolve interservice fire support doctrinal conflicts, such as that with the fire support coordination line.[178]

There were other problems with doctrine as well as organization. MLRS units were of such importance that a battery of nine launchers was overworked if not overwhelmed merely by the volume of fire needed to support the entire division. The changing relationship of corps FABs with the division meant that the division could not count on having the FAB's MLRS battalion needed at the decisive point. A division required a battalion of twenty-seven MLRS launchers rather than a battery of nine

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[177] Grandin, "Fire Support Coordination," 19-23.

[178] David A. Rolston, "A View of the Storm: Forward Observations," *Field Artillery Journal* (October 1991): 4.

launchers to eliminate these two problems. This would improve firepower by permitting rotating fire missions among a higher number of MLRS launchers, and allow time for maintenance and crew rest.[179]

Operation Desert Storm also provided several notable material successes. MLRS's first use in combat decisively demonstrated its ability to shoot, move, and survive, inflicting tremendous damage to the enemy's morale and materiel. It was the weapon of choice to silence the enemy artillery in counterfire missions up to a range of thirty kilometers. Colonel Vollney B. Corn, Jr., commander, 1st Armored Division Artillery, explained that the system's accuracy and lethality quickly established it as a "critical part of our force artillery firepower. In particular, we relied on the MLRS as our primary counterfire weapon, and in this role, we silenced all enemy artillery that fired at us."[180] Although the system was a unique area support weapon and complimented tube artillery, it lacked pinpoint accuracy as a close support weapon was not a replacement for cannon artillery.[181]

The ATACMS complemented the MLRS and cannon artillery. It provided the corps commander with the ability to attack critical deep targets at ranges beyond one hundred kilometers. One hundred and two ATACMS were sent to the Gulf with approximately thirty kept under the control of Army Central Command to ensure that

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[179] Vollney B. Corn, Jr. and Richard A. Lacquemont, "Silver Bullets," *Field Artillery Journal* (October 1991): 12.

[180] Ibid., 10.

[181] U.S. Army Field Artillery School, "Extended Range for MLRS Rockets in the Works," *Field Artillery Journal* (April 1992): 39.

they were used only against high-value targets. The field artillery fired ATACMS at Scud missile and air defense sites, logistical bases, tactical bridges, and gun and rocket artillery positions. Although precision submunitions were still under development, existing warheads were loaded with dozens of dual-purpose antimateriel and antipersonnel bomblets that destroyed every target.[182]

Major General Barry R. McCaffrey, Commanding General, 24th Infantry Division (Mechanized), summed up the contribution of fire support to the quick victory over the Iraqis in the *Field Artillery*. He wrote, "All of us appreciate the tremendous contribution of the artillery. Our enormous success was due, in large part, to the artillery."[183] The field artillery played a critical role by enabling the other combat arms to maneuver while simultaneously limiting casualties. The field artillery proved itself a vital member of the combined arms team. Although these comments directly address the field artillery's contribution to the victory in the Persian Gulf, they also provide insight into the modernization program of the preceding two decades. This effort launched early in the 1970s in response to the Soviet and Warsaw Pact military buildup, produced the doctrine, force structure, and many of the field artillery systems employed in the Gulf War.[184]

The modernization of the King of Battle had achieved mixed results by the end of the 1980s. Although critical systems for combat in Europe still had not yet appeared despite years of work, the doctrine and organizations were in place. The Persian Gulf

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[182] "Modernization Program Systems Prove Themselves in the Desert,'' *Army* (May 1991): 16.

[183] "Field Artillery Desert Facts," 3.

[184] Ibid.

crisis of 1990-1991 suggested that the modernization effort of the 1970s and 1980s was productive as the new field artillery systems, as well as the new doctrine, performed as anticipated. Some systems, such as the MLRS, even surpassed performance standards. Although several needed systems were in development in 1991 and doctrine in some instances remained unclear, particularly in low to mid-intensity conflicts, the overall modernization of the field artillery since the Vietnam War had achieved notable success. This effort set the stage for a technological revolution for American field artillery at the beginning of the 21st century.[185]

[185] Dastrup, *Modernizing the King of Battle*, 64-65.

CHAPTER 5

CONCLUSION

> If, after the battle is over, your infantry don't like you, you are a poor artilleryman.
>
> — Captain Henry Reilly, quoted in U.S. Army Field Artillery School, *Right of the Line: History of the American Field Artiller*.

Field artillery is a unique branch of service tasked to destroy the enemy's guns while simultaneously providing support for the maneuver forces. Since its inception in 1775 as part of the Colonial Militia to today's 21st Century Army, the field artillery has answered the call in providing lethal, precise, and massed fires against the enemy as the "King of Battle." The Army can prepare for tomorrow's battles by looking through the lens of history to determine what made the employment of artillery successful. This paper has looked at three specific organizations: the Army of the Potomac in the American Civil War, the AEF in World War I, and the U.S. Army during Operation Desert Storm. These examples highlighted the organizational successes of its artillery branch. They demonstrated how the field artillery, organized at EAB, provided the decisive combat power necessary to win our nation's wars.

The Field Artillery Branch is in the midst of one of the most significant reorganizations in its history. After almost two decades of COIN, the artillery is resetting its training, doctrine, and organization towards LSCO against a near-peer opponent. Army field artillery lacks the range and lethality to shape the deep fight at the tactical and operational levels. Maneuver formations are at high risk against threat integrated air defenses and fires complex. They will likely suffer significant losses while attempting to close the tactical distance to enable the close fight. Increasing EAB long-range fires

capacity and capability enables corps and division to present multiple dilemmas to the enemy, protects friendly forces, enables maneuver forces, and provides greater options and flexibility to the commander.[186]

The first historical example provided is the Army of the Potomac during the American Civil War. Initially, Union forces utilized obsolete tactics and ineffective organization while failing to adapt to the advent of more massive armies and improved technology. The creation of the artillery reserve empowered the chief of artillery to provide command and control of the army's guns, instead of the maneuver commander. Although other Union field armies, at times, maintained artillery reserves, none organized on the scale seen within the Army of the Potomac. These principles comprised the first comprehensive plan in the Union army for organizing artillery to accompany large forces in the field and laid the groundwork for artillery service and organization of the Army of the Potomac.

Organizing the artillery into EAB validated the concept of massing artillery fire at the decisive point. The ability to mass artillery fires was necessary because of the rapid increase in army sizes. Field artillery units provided sufficient firepower to disrupt large infantry formations or provide counterbattery fire against enemy artillery. At the Battle of Gettysburg, Union artillery massed fire on the advancing Confederate infantry, tearing gaps in General Pickett's forces. While General Pickett's division was able to assault the main Union line, effective artillery fire shredded the other divisions supporting him, resulting in a complete Confederate retreat and a decisive Union victory. The Army

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[186] Shoffner, *Gap 3 – Lack of EAB Long Range Fires Capacity to Dis-integrate A2AD and Shape Deep.*

needed centralized firepower at the division and corps level providing fire support to support higher echelon maneuver forces.

World War I brought the American field artillery into the modern era and laid the foundations for combined arms warfare. New technology, doctrine, and equipment used for employing indirect fire forced the branch to reorganize. Field artillery shelled enemy batteries and trenches, bombarded rear areas, and provided rolling barrages in conjunction with advancing infantry and armor forces. The Field Artillery Branch adopted the new doctrine, as they could no longer move on the battlefield close to the infantry. Instead, batteries emplaced well behind the front lines and in a dispersed area due to the guns' longer ranges and indirect fire capability. These new concepts, proven in combat, facilitated the creation of permanent division artillery and the employment of a dedicated corps and army artillery organization.

This is especially apparent in the Meuse-Argonne offensive of 1918. While corps artillery provided concentrated fire on critical targets in the deep area, division artillery executed rolling barrages in the close area supporting the infantry advance. The barrages were so intense and synchronized they prevented the German artillery from returning fire. The relationship between corps and division artillery allowed the AEF to breach the Hindenburg Line and forced the Germans into a full retreat before the end of the war. The field artillery found itself as the new dominant force on the battlefield. It adapted its doctrine to provide close support to the maneuver forces through coordinated massing of indirect fire, planned in detail, and delivered with as much flexibility possible.

After Vietnam, the field artillery experienced a renaissance in advances, including new weapon systems, integrated large-scale fire direction systems, long-range

ammunition, terminal guidance systems, and modernized target acquisition systems. This resulted in organizational and doctrinal changes in the artillery. Field artillery doctrine changed to give all corps artillery battalions a reinforcing role to one of the divisions. In contrast, the division artillery controlled the cannon artillery battalions within a specific division. The corps artillery staff was reduced to a small section within the corps headquarters company because of the deletion of the corps target acquisition battalion and the attachment of the corps artillery battalions to divisions. Additionally, the role of counterfire shifted from the corps to the division level. However, the AOE concept in the late 80s shifted the reliance for fire support in-depth back from the division to the corps.

Operation Desert Storm was a validation of the artillery's modernization effort. American field artillery overwhelmed Iraqi forces despite a significant enemy advantage in numbers and ranges. The synchronization of target acquisition systems, command and control, communication systems, and multiple artillery weapon platforms took away the Iraqi's ability to locate targets beyond the forward line of troops. Massed artillery fires provided timely support to the maneuver commander, furnished overpowering fire superiority, and allowed the commander to exploit the effects of fires. Highly mobile artillery formations were able to supply fires when and where the ground forces needed them the most. The field artillery played a critical role by enabling the other combat arms to maneuver and proved itself a vital member of the combined arms team.

The beginning of the 21st century saw the field artillery drawn down to fight COIN warfare. The Army reorganized into the modular brigade combat team concept and deactivated the division and corps artillery commands. While this supported requirements for sustained combat operations, it also raised red flags among commanders. Some

argued that the Army had lost sight of the critical role artillerymen play in the ability to plan, coordinate, integrate, and synchronize combined arms operations.[187] The ability to integrate fires with maneuver is necessary for future conflicts as the Army shifts towards LSCO while using divisions as the building block for tactical operations.

History shows that an army that does not have well-organized artillery at EAB is disadvantaged against their opponent. Artillery organization goes hand in hand with the technology, doctrine, and training needed to employ these complex weapon systems. FABs, remnants of the old corps artillery, have performed admirably as the current Force Field Artillery headquarters and counterfire headquarters. However, these units were not created to shoulder the burden of corps-level command and control in LSCO. The Army must heavily consider the idea of reconstituting the corps artillery, or some form of integrated fires command above the division level.

The Army does not need a new solution to the problem set, as the most successful doctrine employed at EAB was AirLand battle. These principles carried over to army doctrine in the late 1990s through *FM 100-15, Corps Operations*. Fire support at corps level is the collective and coordinated use of field artillery, Army aviation, and joint air assets in support of the corps battle. The commander uses fire support to delay, disrupt, or limit the enemy by destroying, neutralizing, and suppressing enemy weapons, formations, and facilities. Effective integration of fire support into the combined arms operation is a decisive factor in the corps battle. The corps typically retains some field artillery under its

[187] Sean MacFarland, Michael Shields, and Jeffrey Snow, "The King and I: The Impending Crisis in Field Artillery's Ability to Provide Fire Support to Maneuver Commanders," *Army White Paper*, 2008.

control for use in a counterfire role during close operations and execution of corps deep operations.[188] These concepts are still applicable to doctrine today and are easily relearned if a corps artillery or fires command is created.

Field artillery at EAB is a critical factor in the success of maneuver forces in LSCO. Synchronizing fire support for close, deep, and rear battles requires careful judgment in analyzing alternatives, especially when considering both the corps and division battles. Corps artillery would support the commander's concept of the operation through a shared understanding of doctrine, careful planning and coordination, and standard operating procedures and training. A robust EAB artillery command would refine fire support doctrine and conducting multi-echelon, combined arms, and joint training in preparing for the complexities of the future.[189] As the Army moves into the unknown, it must study past lessons to rebuild and focus on fighting near-peer opponents and winning the next conflict. Artillery at the EAB's capability for synchronizing its fire support assets to provide firepower at the decisive place and time, as in the past, will remain one of the keys to victory on future battlefields.

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[188] U.S. Department of the Army, Field Manual 100-15, 2-12.

[189] Joseph R. Cerami, "The Corps Artillery in the AirLand Battle: A Study of Synchronization, Change, and Challenges" (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 8 March 1988), 36.

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