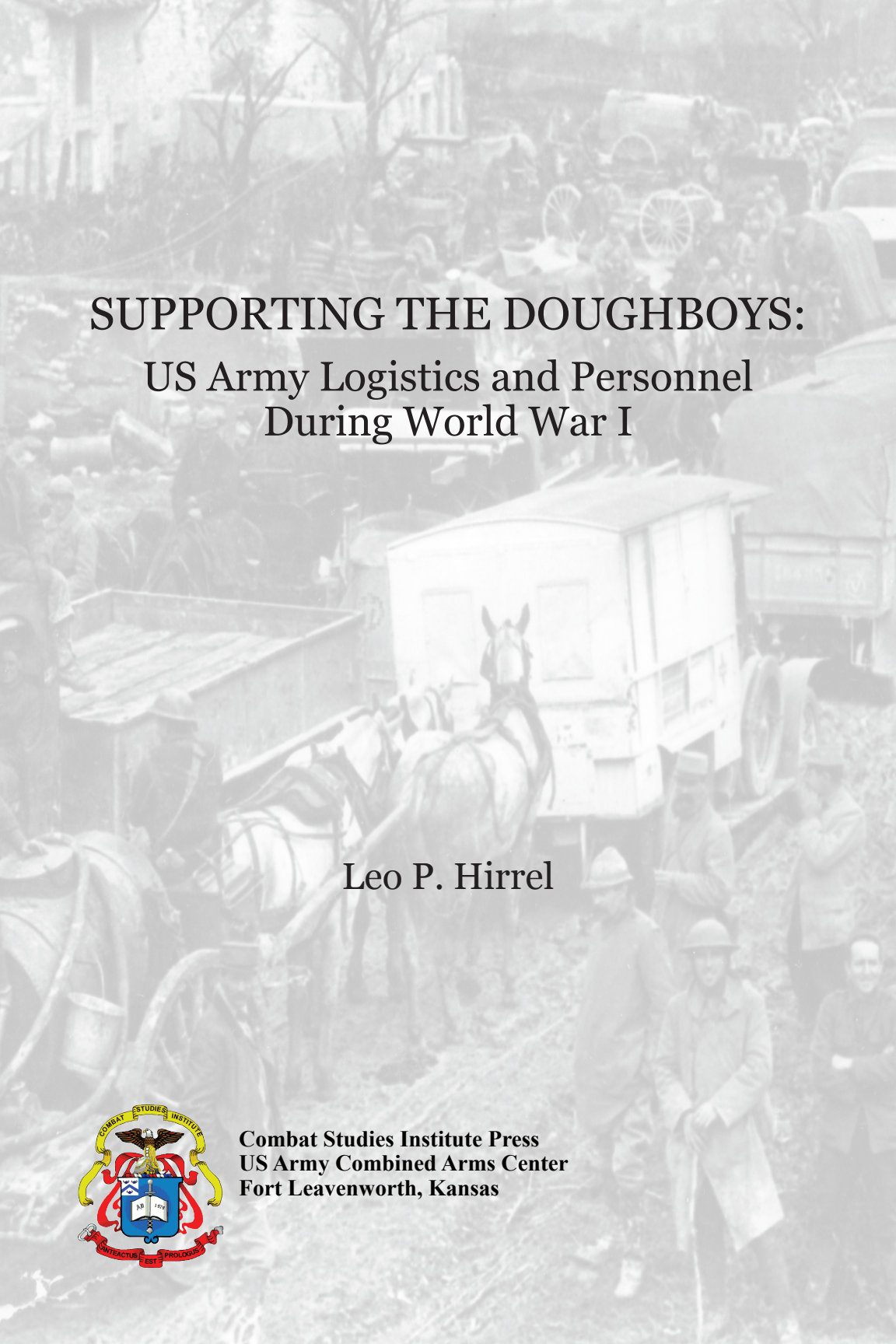

SUPPORTING THE DOUGHBOYS:

US Army Logistics and Personnel During World War I

Leo P. Hirrel

Combat Studies Institute Press
US Army Combined Arms Center
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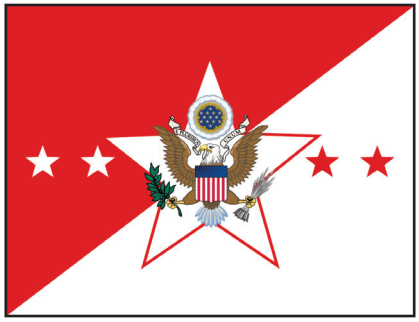

Foreword

One hundred years ago, the US Army suddenly found itself at the center of one of the greatest human conflicts until that time. World War I came at a time when the Army had lost the institutional knowledge of how to raise and employ large armies in the decades after the Civil War. Our Army needed to transform itself in short order into a world-class fighting organization, capable of engaging one of the world's best armies. At the same time, it needed to adapt to modern weapons and technologies.

Dr. Leo Hirrel has prepared a comprehensive study of the emergence of Army sustainment as a key part of transforming itself into a modern fighting force. It is a story of how the Army began with only the vaguest notions of how to support a multi-million Soldier Army, and with even less concept of how to operate overseas. Yet by the end of the war, the Army developed sustainment solutions that would last through the next war and beyond. Of course there were numerous mistakes and miscalculations, but the achievements were truly remarkable.

This is a story for all students of military history. Understanding the role and development of sustainment functions in the American Expeditionary Forces is critical to appreciating the Army in World War I. This book provides a breadth of education for military leaders regardless of their branch.

JOHN A. WICKHAM, JR
General, US Army (Ret)
30th Chief of Staff, US Army

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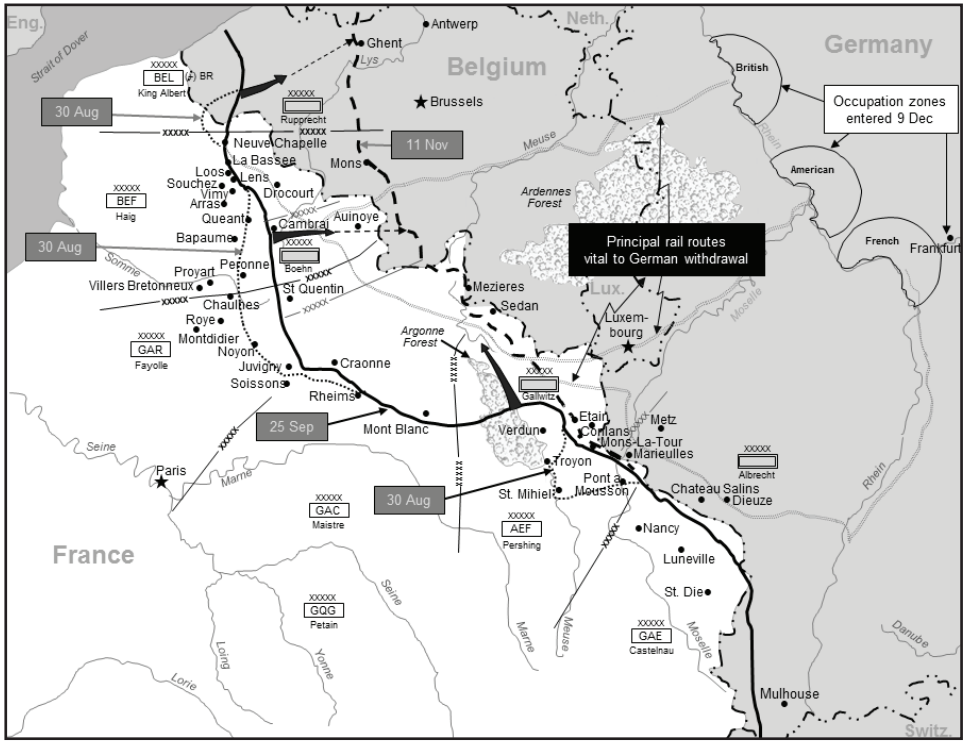
Maps

Map 1 Lines of Communication, AEF, November 1918. Created from an Appendix to War Department, War Plans Division, General Staff *Organization of Services of Supply, American Expeditionary Forces* (Washington, DC: Government Printing Office, 1921).



Map 2 Sedan-Verdun and Vicinity. The Meuse-Argonne Offensive, September – November 1918. Created from Map #22 of Campaign Atlas to the Great War, USMA West Point, Department of History.

Introduction

A recent textbook on United States military history reflected a wide consensus to the effect that World War I marked a significant transition point for the US Army into a premier global power:

> Pershing's AEF was the first modern American army. It had deployed to Europe and fought alongside the Allies in a mass, industrialized war. … A harbinger of the future, the American army of World War I was more similar to those that followed than those that came before. The US Army was seemingly ready to assume its place in the world as one of the great armies of a great power.[1]

The remarkable development of American military power in this conflict was a surprise to both friends and enemies.

Maturation of the Army's sustainment capabilities constituted a vital part of the transformation of the American Army. While generally less publicized than the combat side of military history, the painstaking work of supporting the Army is just as vital to any successful military operation. World War I-era changes to the support structure were extraordinary. During the decades following the Civil War, the Army's ability to conduct major operations withered during the Indian Wars. An embarrassing performance in the 1898 war against Spain produced an era of reform that improved the Army considerably, but still with significant shortfalls, especially in sustainment. The Army entered the First World War still with an inadequate sustainment structure until the demands of the war finally completed the maturation process.

This emergence of Army sustainment came with difficulties and mistakes, along with remarkable achievements, both at home and in France. By the close of the war, however, the supporting structure delivered the wherewithal that allowed the American Army to operate independently and win one of the decisive battles of the conflict.

The Language of Sustainment

Military historians writing about support issues face an unusual challenge because the language has changed over time, along with the supporting doctrine. During the World War I era, the functions covered within this study were largely incorporated under the general heading of "administration," a term that is avoided in this study because it has a different meaning today.[2]

The terms "sustainment," "logistics," and "personnel services" (or personnel sustainment) are modern terms used within this study in order to provide a frame of reference for the contemporary audience. Army Doctrine Publication 4-0 (*Sustainment*) defines sustainment as "the provision of logistics, personnel services, and health service support necessary to maintain operations until successful mission completion." Logistics is further defined as "planning and executing the movement

and support of forces" to include the subordinate functions of acquisition, storage, movement, distribution, maintenance, services, disposal of excess, and facilities. Personnel services are "sustainment functions that man and fund the force, maintain Soldier and Family readiness, promote the moral and ethical values of the nation, and enable the fighting qualities of the Army," including what today might be called human resource support, financial management, legal support, and religious support.[3]

Within the context of these definitions, the scope of this study is limited to those functions which fall under the purview of today's Combined Arms Support Command (CASCOM) and the Sustainment Center of Excellence (SCOE). That includes functions covered by today's logistical branches (Quartermaster, Ordnance, and Transportation), plus the Adjutant General's and Finance functions. It also includes the relevant acquisition activities, both at home and in France. This study does not incorporate health services, legal support, religious support, or engineering except to the extent necessary to clarify the story.

Notes

1. Richard W. Stewart, ed. *American Military History,* vol. 2, *The United States Army in a Global Era, 1917-2003* (Washington, DC: US Army Center of Military History, 2005), 50.

2. War Department, Office of the Chief of Staff, *Field Service Regulations, 1914* (New York: Army Navy Journal, 1914), 111-170.

3. Department of the Army, *ADP 4-0 Sustainment* (Washington, DC: Government Printing Office, 2012), 1-2.

Chapter 1
The Situation in 1917

When the German government announced a policy of unrestricted submarine warfare in January 1917, its leaders recognized the probability of bringing the Unites States into the war. Nevertheless, they were confident that they could win the war before America could exert a decisive influence. The US Army was still in the process of evolving into a modern Army, especially in the supporting functions; and the problems of transporting the Soldiers across the ocean seemed formidable. In the meantime, Germany continued to accumulate successes on the battlefields.

The US Army

During the 52 years between the end of the Civil War and the entry into World War I, the Army's institutional knowledge of fighting major wars atrophied. During the Civil War, Army leaders mastered the difficult arts of fighting, moving, and supporting multiple field armies. Yet immediately afterwards, the Army reverted to its peacetime strength, with a focus on the Indian campaigns. Although arduous in their own way, these wars were basically small unit actions by modern standards. The late 1880s and 1890s witnessed a small intellectual revival on the problems of building a professional Army; but not to the extent of appreciable improvements.

When the United States declared war against Spain in 1898, the Army delivered an embarrassing performance. Soldiers were mobilized faster than they could be equipped or prepared for deployment. Unsanitary camp conditions resulted in needless deaths from disease even before deployment. The transportation of the invasion force to Cuba was plagued by confusion and mismanagement. Supplies for the Soldiers, especially medical supplies, were lacking. If the war had lasted longer, no doubt many of these problems would have been resolved; but the war ended after 110 days, with all the confusion remaining. Not surprisingly, exaggerated stories also took hold, such as unfounded reports of purchasing embalmed beef.[1]

Reforms followed the poor performance of the Army. When Elihu Root became the Secretary of War in 1899, he set about reshaping the Army closer to a force capable of fighting a modern, full-scale war. To begin, he wanted a War Department headquarters capable of doing the planning and analysis work. Following his recommendations, Congress replaced the position of Commanding General with that of Chief of Staff. This move clarified the role of Secretary of War as the President's representative in exercising command authority, while creating the Chief of Staff as the senior officer. Root then adopted the Prussian model to create a War Department General Staff as the "brain" of the Army. Here selected officers could devote their attention to the planning and analysis work so badly lacking during the Spanish-American War. Initially the Army War College served as a planning resource for the General Staff, in addition to its educational role.

The reform effort continued. Root strengthened the Army's education system first by reinvigorating the various smaller schools of application, and then creating a General Staff and Service College at Fort Leavenworth. The War College, located in Washington DC, was both a capstone education for senior officers and an adjunct to the General Staff for planning purposes. The Dick Act of 1903 provided a much needed boost to the National Guard by providing federal money and equipment in return for meeting federal readiness requirements, with increased interaction between the Regular Army and the Guard. Subsequent legislation clarified the President's authority to employ the Guard for federal emergencies. A new Army Navy Board provided a forum to discuss topics of mutual concern.

Root's efforts set the Army on a path to modernization and helped the nation to deliver an Army better prepared than it had been in 1898. Yet it is important to remember that the effects were not so obvious at the time. Traditionalist officers continually objected to these measures, and frequently used their allies in Congress to stall or minimize the impact of Army reforms. The 1916 National Defense Act stated that no more than half of the General Staff officers could serve in the national capital region, effectively limiting the body to 19 officers.[2]

Writing in 1916, Root noted that "Our trouble will never be in raising soldiers; our trouble will always be the limit of possibility in transporting, clothing, arming, feeding and caring for our Soldiers, and that requires organization."[3] Here he pointed to one of the most important limitations to his efforts. The nation's bureaucratic structure lacked the flexibility necessary to marshal material resources for a major war. Instead, it functioned as a series of semi-autonomous organizations, with inadequate mechanisms for creating an integrated effort. For example, the Army and Navy were two fully separate entities. The War Department controlled the Army, plus some other responsibilities; and the Navy Department controlled the Navy and Marine Corps. Both secretaries reported directly to the President of the United States, so in practice resolution of disagreements relied upon the goodwill of those involved, except for issues considered worthy of Presidential attention.

Real power in the Army's logistical systems lay in the various supply bureaus, which remained largely unaffected by Root's efforts. The Quartermaster General and Chief of Ordnance had responsibility for general supply items and weapons systems respectively. In addition to their operational responsibilities, the Chief of Engineers, Surgeon General, and Chief Signal Officer were responsible for the logistical aspects of their areas. Within their scope of responsibilities each bureau chief exercised extensive autonomy. They purchased items, operated depots, managed personnel and training, and generally controlled their functions within the Continental United States, and exercised considerable influence overseas. Although not head of a supply bureau, the Adjutant General exercised similar autonomy in matters of personnel and administration. Their authorities rested upon more than a century of tradition, reinforced by the National Defense Act of 1916. Each bureau chief had his own budget, which accentuated their independence. At this time the nascent General Staff had little influence on the bureaus.[4]

Certainly there were advantages to having a trained core of experts for each of the logistical functions, and the system had worked satisfactorily in peacetime. Yet in 1917 there was no mechanism to tie the various parts of the government together into a coherent effort. If the Army and Navy both needed ammunition, they had to compete against each other, driving up the price. Over time the bureaus had developed a culture of independence that placed performance of their own organization above the overall performance of the Army. The Adjutant General saw nothing wrong with purchasing every available typewriter to the detriment of the other bureaus; or the commander of the Rock Island Depot thought that he was doing his job by obtaining all the leather available without considering the needs of the other bureaus. Moreover, the statutory nature of the system left little flexibility for new demands such as aviation and chemical warfare, or operations that combined traditional branches, such as railroad operations.[5]

In keeping with the spirit of other reforms, in 1912 Congress merged the Quartermaster, Subsistence, and Paymaster Departments into a single Quartermaster Corps. In addition to consolidating these functions, the law provided for military units and enlisted personnel to perform work that had previously been performed by civilians, either contracted or government employed.[6]

Figure 1.1 US Army trucks assemble at Columbus, New Mexico preparing to support Pershing's Mexican expedition. Photo courtesy of the Library of Congress.

One other example illustrates the limitations of Root's efforts and subsequent reforms. After the Civil War, the regiment remained the largest peacetime military unit, with only a theoretical acknowledgment of larger units. When the United States decided to assemble a division upon the Mexican border in 1911, it required

months to bring the organization together. Subsequent reorganizations created at least a theoretical assignment of peacetime units to a division headquarters, so by 1913 a division could assemble within a week. Yet the Army never had the opportunity to maneuver and train divisions as integrated units.[7] The Army still had only notional ideas on how to support formations larger than a regiment.[8]

Cumulatively these reforms left the US Army vastly improved from the Spanish-American War, but still unprepared for entry into the Great War. Much of the work had been theoretical and in a classroom environment, without practical experience in managing formations larger than a regiment. Capacity for logistics and other aspects of sustainment were still untested. When the United States did enter the war, Army leaders needed to master significant operational and sustainment challenges; and to do so quickly.

A deteriorating situation along the Mexican border in 1916 provided the Army with some valuable field experience. When the Mexican revolutionary Pancho Villa raided Columbus, New Mexico in March 1916, the United States dispatched a punitive expedition under the command of then Brigadier General John J. Pershing to capture Villa if possible. Although futile, the expedition did educate its leaders on some of the logistical aspects of modern war, including the use of trucks and the importance of maintaining supply lines. It also consumed the small reserve supply of uniforms, which would be needed a year later. Pershing received a promotion to major general in September 1916.[9]

Figure 1.2 Soldiers in Mexico using trucks for transportation, a novelty at that time. Photo courtesy of US Army Transportation Museum.

War in Europe

World War I began as a conflict between the Austro-Hungarian Empire and Serbia following the assassination of the Archduke Franz Ferdinand in June 1914; but very quickly a network of alliances and treaties caused it to spread throughout Europe. Austria-Hungary had an alliance with Germany, plus a guarantee of the Kaiser's unconditional support. Serbia was supported by Russia, which in turn had an alliance with France. Although the United Kingdom did not have a binding commitment to France as of the beginning of the war, the two nations enjoyed a close relationship. Over time the two sides would be termed the Allies (dominated by France, Britain, and Russia) and the Central Powers (dominated by Germany and Austria-Hungary).[10]

The war also included the Balkans and the Middle East, especially after the entrance of the Ottoman Empire (Turkey) into the war in October 1914 and Bulgaria in October 1915 on the German side. The United States did not declare war upon the Ottoman Empire or Bulgaria. Other nations, including Italy, Greece, Romania, Serbia, Montenegro, and Portugal, eventually joined the Allied cause.

Before the war, German military planners recognized that the alliance between Russia and France could place them in a precarious position of fighting on two fronts simultaneously. Consequently they planned for a quick defeat of France by hooking through neutral Belgium into northern France and towards Paris. Given the slower Russian mobilization times, they hoped to conclude the war with France before turning their full attention to Russia.

Initially, the plan was successful, as the German Army pushed through Belgium and into northeastern France. Violation of Belgian neutrality, however, brought Great Britain into the war against Germany. A determined stand by the French Army during the First Battle of the Marne came just as the Germans were reaching the limits of their supply lines. Further south along the French-German border, the French unsuccessfully attempted to advance through Alsace into traditionally German territory. By the close of 1914, fighting along the French and Belgian front turned into a stalemate.

Both sides discovered the potential of new weapons, such as artillery, machine guns, poison gas, or improved rifles, to stop any offensive action. To protect themselves, both sides dug elaborate trench systems that extended from Switzerland to the North Sea as they unsuccessfully tried to break the stalemate. Horrific battles such as the Somme, Verdun, Ypres, and others caused hundreds of thousands of casualties, but without much change in the trench lines.

Germany and Austria-Hungary had more success on other fronts, but at a cost in resources. German victories against Russia eliminated that threat from the east, but even after military defeats Russia remained in the war, and thus occupied German and Austro-Hungarian divisions that might have been used in France. In April 1915, Italy joined the Allied cause hoping to gain territory along its border

with Austria. The Austrians contained the attacks, but again by using soldiers that might have served elsewhere. Eventually German soldiers also moved to the Italian front.

Hoping to end the stalemate on land, Germany turned to unrestricted submarine warfare against all ships in the vicinity of the United Kingdom or France, to begin on 1 February 1917. They recognized the likelihood of provoking American intervention, but were willing take the risk in hopes of winning the war before the United States could translate its industrial power into a military threat. As expected, the United States declared war against Germany on 6 April 1917 and war against Austria-Hungary on 7 December 1917.

The remainder of 1917 consisted of unrelenting bad news for the Allies. In April, the French commander initiated a series of unsuccessful but costly offenses that destroyed the confidence of the soldiers in their leadership and produced a series of mutinies. The new commander, Henri Pétain, restored order, but the French soldiers would not participate in offensive actions. In October a British offense at Cambrai failed after a German counterattack. Also in October, a combined German and Austro-Hungarian force inflicted a disastrous defeat upon the Italians at Caporetto. Worse news came in November when Bolshevik revolutionaries seized control of Russia and opened peace negotiations with the Central Powers.

The year ended with the Allies in serious trouble. Defeats in Russia and Italy threatened to free German forces for fighting on the Western front, potentially deciding the war before the United States could exert a decisive influence. At the time of its declaration of war, the United States Army was still in the process of re-shaping itself into a modern fighting force. The outcome of the war would depend upon the ability of the Americans to complete this transformation and deliver a multi-million man army capable of fighting overseas. The sustainment functions were a critical part of that process.

Notes

1. James A. Huston, *The Sinews of War: Army Logistics, 1775-1953* (Washington, DC: Office of the Chief of Military History, 1966), 273-287; Russell F. Weigley, *History of the United States Army* (Bloomington, IN: Indiana University Press, 1984), 295-312 David R. Woodward, *The American Army and the First World War* (Cambridge, UK: Cambridge University Press, 2014), 5-7.

2. James E. Hewes, Jr. *From Root to McNamara: Army Organization and Administration, 1900 – 1963* (Washington, DC: US Army Center of Military History, 1975), 3-21; Weigley, *History of the United States Army,* 313-342, 348-350; Richard W. Stewart, ed. *American Military History,* vol. 1, *The United States Army and the Forging of the a Nation, 1775-1917* (Washington, DC: US Army Center of Military History, 2005), 369-374; Woodward, *American Army and the First World War*, 7-16.

3. Huston, *Sinews of War,* 296.

4. Hewes, *Root to McNamara*, 21-31.

5. Hewes, *Root to McNamara*, 29; Edward M. Coffman, *The War to End All Wars: The American Military Experience in World War I* (Louisville, KY: University Press of Kentucky, 1998), 34; Steve R. Waddell, *United States Army Logistics: From the American Revolution to 9/11* (Santa Barbara: Praeger Security International, 2010), 113-117.

6. Erna Risch, *Quartermaster Support of the Army: A History of the Corps, 1775-1939* (Washington, DC: Office of the Quartermaster General, 1962), 559-565.

7. Stewart, ed., *American Military History, Vol. 1*, 374.

8. The *Field Service Regulations* supposedly provided the compendium of guidance to commanders; yet the discussion of the problems of logistics and personnel is remarkable for the lack of substance. War Department, Office of the Chief of Staff, *Field Service Regulations, 1914* (New York: Army Navy Journal, 1914).

9. Julie Irene Prieto, *The Mexican Expedition, 1916-1917* (Washington, DC: US Army Center of Military History, 2016).

10. For a short overview of the war before American entry see Richard W. Stewart, ed. *American Military History* vol. 2. *The United States Army in a Global Era, 1917-2003.* (Washington, DC: US Army Center of Military History, 2005), 1-6; see also Gary Sheffield, *A Short History of the First World War* (London: Oneword Publications, 2014; John Mosier emphasizes the importance of the American Army to winning the war in *Myth of the Great War: A New Military History of World War I* (New York: Harper Collins, 2001).

Chapter 2
Homefront Mobilization

When President Woodrow Wilson sought Congressional authority to arm American merchant ships against German submarines on 26 February 1917, he hastened to assure his critics that this was not a deliberate progression towards war. "I am not now proposing or contemplating war or any steps that need lead to it."[1] Less than two months later, on 6 April, the United States declared war on Germany.

Unfortunately, Wilson's aversion to war also extended to preparation for the possibility of conflict. Even as he was requesting authority to arm merchant ships, neither the White House, nor any other part of the government, had performed any serious analysis on what might be necessary to convert the vast industrial power of the United States into a war machine. Until the United States was well into the war, the administration had not asked whether new governmental organization might be needed, or whether extraordinary authorities might be required to prioritize national resources. In Britain, shortages in munitions production created a crisis that caused a government reorganization and resulted in the creation of a Munitions Ministry vested with extraordinary powers; yet few people in the United States paid attention to the example.

In fact, President Wilson objected to even the most rudimentary forms of planning for possible wars. In 1915 and again in 1916, he became furious with the Army War College upon hearing reports that they were war gaming for a possible conflict with Germany. At one point he threatened to relieve every officer in the General Staff. Eventually he grudgingly accepted Secretary of War Newton Baker's explanation that the War College conducted war games against a variety of nations, but he still considered it to be a dangerous occupation. Both the President and Congress discouraged the Army from sending observers to France.[2] In such an environment, the arduous work of detailed industrial planning was not likely to receive much attention.

Writing in 1931, General John J. Pershing attributed President Wilson's antipathy towards planning to a belief that any sort of preparation somehow compromised America's neutrality. Wilson was not alone in this belief. Many congressmen, especially within his own Democratic Party, also opposed any actions focused on a potential war with Germany.[3] Later events also showed that Americans held unrealistic expectations about the difficulties in converting to a wartime economy, expectations that stemmed largely from the nation's unfamiliarity with a major industrial mobilization effort.[4]

Motivated largely by citizens, especially retired Chief of Staff Leonard Wood, the nation did engage in some "preparedness" efforts, but these generally focused on manpower, not materiel. Citizens participated in voluntary training at Plattsburgh, New York and other places. After some debate, provisions in the National Defense Act of 1916 clarified relations between the National Guard and Regular

Army. In March 1917, President Wilson finally asked the War Department to prepare proposed legislation for the Selective Service (the draft).[5]

Bureaucratic and Legislative Actions

Among the very few efforts to address materiel issues, the 1916 National Defense Act included some provisions that later proved to be extremely valuable for mobilizing the national resources. In the event of wartime shortages of vital raw materials, the President was authorized to place orders and demand compliance. It also authorized commandeering of private property for fair compensation. It provided for a government constructed nitrate plant and a War Department survey of munitions capabilities. Subsequent legislation created the Council of National Defense, an advisory committee consisting principally of corporate executives. Another act in 1916 created the Shipping Board, with a provision for an Emergency Fleet Corporation should it be needed. Yet these actions only addressed a few of the problems associated with the coming war. There was no overarching concept to address the massive problems associated with raising, training, equipping, transporting, and resupplying a multimillion Soldier Army fighting overseas.[6]

Even with the Council of National Defense in place, planning proceeded slowly. President Wilson remained unwilling to compromise the nation's neutral standing by undertaking any arrangements for war as long as negotiations with Germany were in progress. As late as 12 February 1917 he told the Council that he was "not in sympathy with any great preparation."[7] This statement came one week after severance of diplomatic relations with Germany.

Although the above-described legislation provided some essential executive authorities once the war began, Congress did little more to promote the materiel preparations for war. Even after the declaration of war in April, Congress did not pass a budget until 15 June, two weeks before the end of the fiscal year under the old system. The 1916 Act also entrenched the antiquated bureau system by specifically forbidding General Staff interference in their work and providing statutory authority to each bureau chief equivalent to that of a commander. Congress repeatedly refused funding for wartime reserve supplies, and even delayed passage of a budget that would have funded replacement of uniforms and equipment lost in the previous year's Mexican operations. During the initial months of the declared war, Congress clung to its habit of micromanaging Army activities by detailed itemized appropriations, restrictions on building without specific approval, and even limitations on civilian employees working in the capital region. At that time Congress did not comprehend the complexities of massive industrial war, nor did they appreciate the need for swift action.[8]

Congressional inaction reflected serious divisions within the nation about the proper means to wage a full-scale modern war. Beyond a majority sentiment in favor of war, there was disagreement about most aspects for mobilizing the industrial power of the United States. Some of these divisions were purely partisan, others were sectional in a nation not far removed from the Civil War. Yet many resulted

from philosophical differences about the appropriate role of the government in economic regulation coming at the close of the Progressive Era.

Economic mobilization on this scale produced a wide variety of policy questions well outside the authority of the War Department. How should war financing be divided between loans and taxes? How should the burden of taxes be distributed? Should exceptions be granted to anti-trust laws for the sake of efficiency? (If yes, did this open the concept of anti-trust laws to question?) How could the government take advantage of the expertise of businessmen without opening the doors to egregious conflicts of interest? Should the government rely upon coercive authorities or the profit motive to manage industrial production? What constituted excessive profits and how should the government respond? Could industry be trusted to organize itself to maximize efficiency? What was the proper role of the government in channeling scarce resources? How could the nation address the legitimate concerns of labor without disruptive strikes?

All of these questions and more affected the ability of the War Department to produce and supply the Army. These are well beyond the scope of this study on Army sustainment, but it is necessary to understand that these disagreements often resulted in inaction. Both the executive and legislative branches generally preferred some form of voluntary mechanism for wartime production management wherever possible. Full use of government authorities would come in the next war.[9]

Decades of peace produced a contracting culture that lacked the flexibility for industrial mobilization. All contracts were required to be advertised in advance with detailed specifications for the product required. The award went to the lowest responsible bidder on a fixed-price basis. The system worked well enough when the nature of the product was well-established and time existed for advertising and evaluating the bids. It was not suited for wartime when time was short or uncertainty about the product prevented contractors from developing reasonable cost estimates. The laws did provide for negotiated contracts in the event of a national emergency, but departure from the old system required a culture change. In the inevitable confusion of implementing wartime contracting procedures, government agents were tempted to move from over-scrupulous to careless.[10]

Government officials and civilian businessmen did recognize the need for better coordination, both within the various parts of the government, and between the government and industry. Yet initially the focus remained on voluntary arrangements. On the advice of the Council of National Defense, the War and Navy Departments joined with representatives from private industry to create the General Munitions Committee. As a group of citizens, primarily corporate officials, its powers were advisory and its role was to coordinate rather than to direct. Consequently it was marginally effective. In July 1917, the War Industries Board replaced the Munitions Committee, but this new organization was also advisory until later reforms in March 1918 gave the new organization more power. Because of the predominance of businessmen, these organizations later were open

to accusations of conflict of interest, especially in the award of non-competitive contracts.

When considered from the German perspective, it is no wonder that they did not consider the United States to be a serious threat. Not only was the Army too small (about 108,000 in 1916), but it was unprepared for expansion. Mobilization plans, especially industrial mobilization, were inadequate; and the bureaucratic structure was not adapted for a war. Eventually the United States did surprise both friends and foes by entering the war in force during the summer of 1918, earlier than predicted. Nevertheless, this delay marked a dangerous gap. While the Americans were resolving the issues of mobilizing, equipping, and transporting an unprecedentedly large Army, the Germans were accumulating victory after victory.

Thus the story of World War I for the United States became largely a race against time to get into the war before it ended badly. In the process there would be fumbles and delays, along with remarkable achievements.

Personnel Issues (Adjutant General and Pay)

Shortly after the declaration of war, President Wilson activated the National Guard units on his own authority and he submitted proposed legislation to Congress to enact the Selective Service (draft). The President signed the Selective Service Act on 18 May 1917, and by 20 July the machinery was in place for the first draft lottery. Initial planning called for 16 divisions to be drawn from the National Guard and 16 divisions composed of draftees (termed the National Army). All the new units were to begin training by September.

Having first decided to raise this enormous Army, the War Department next needed to come to terms with the implications for transforming these young men into an effective fighting force. Up to this time, the Army personnel system was structured along 19th century lines, with the emphasis upon the combat arms regiments. Now the Army needed to adapt to the wide variety of requirements for an early 20th century military force. In the process, what is now termed human resources matured significantly.

Most of the personnel work fell to the Adjutant General's Department, which also matured during the war. During the 19th century, the Adjutant General performed numerous tasks such as Military Information (intelligence), in effect functioning as the right hand of the commander. Much of its vast record keeping responsibilities involved muster rolls, officer records, enlisted records, and other personnel-related administrative activities. With the creation of the War Department General Staff in 1903, the Adjutant General's Department began its evolution towards more emphasis upon personnel issues. Certainly they maintained traditional administrative functions, including the massive War Department correspondence files; but the personnel-type functions increased in proportion to the other activities, as the 1916 National Defense Act increased the size of the Adjutant General's Office. The demands of World War I accelerated this trend.[11]

Even the traditional Adjutant General work of maintaining an adequate records system for the hundreds of thousands of new Soldiers was daunting enough. Experience in verifying post-Civil War pensions had established the necessity of accurate individual records from each Soldier's initial entry until the time of their discharge. That required processes, forms, and people capable of completing and filing the paperwork.

Yet this war brought an entirely new situation. As the Army completed its transition to a modern force, it also needed to develop competent personnel systems for the complexity of the war. Now the Army required a means to identify Soldiers with civilian skills to meet different supporting functions; it also required a means to identify Soldiers with potential for advancement. As the Army moved overseas, it also required a means to identify, train, and track individual replacements. The Adjutant General's Department would grapple with these issues and more throughout the war.

During the closing years of the 19th century, the Army typically placed new recruits directly within their units, which were expected to provide the necessary initial training. By the opening of the 20th century, recruit depots reappeared, and they provided a modicum of training for the newly enlisted Soldiers. The expectation remained, however, that most of the training and acculturation took place within the Soldier's first unit.[12]

This assumption informed the initial plans for raising an Army, and created difficulties that lasted throughout the war. As noted above, the initial mobilization planning consisted of 16 training camps for the National Army divisions (draftees) and 16 training camps for the National Guard divisions. Once raised, the new divisions were expected to train as units in the United States before going to France. Responsibility for the training fell to the Operations Division of the General Staff, but the Adjutant General's Department managed the personnel aspects.

In theory, each camp had a depot brigade for holding and training replacements, but in practice these brigades simply became centers for processing the new Soldiers into the divisions. While serving as a staff officer in Europe, Fox Connor expressed a common sentiment when he complained that a "principal replacement trouble was that all of the first 500,000 drafted men were organized into divisions, and a division is a very small part of the Army."[13] The turbulence that followed this decision manifested itself primarily in three areas: (1) personnel replacement to correct shortfalls in units before deployment, (2) replacements for losses and other shortfalls in theater, primarily infantry casualties, but not exclusively, and (3) finding suitable Soldiers for the skilled trades that a modern army required, including the myriad of new non-combat occupations.

As early deploying divisions approached their sailing dates, they were still short of their full strength. Without a replacement system, the only way to fill these vacancies was to pull Soldiers from National Army and National Guard divisions then in the process of training. Not surprisingly, this action pleased no one. The

deploying divisions received new Soldiers with uncertain levels of training, and frequently with a suspicion they were receiving the castoffs. The National Army and Guard divisions found their training plans disrupted.[14]

Next the War Department needed to send individual Soldiers to France in response to the battle and non-battle casualties. Approximately 60 percent of these Soldiers were infantry, with the remainder distributed throughout the other branches. The demands intensified as Americans began serious combat operations in the summer of 1918. At first these Soldiers were merely identified as "casuals" and placed into improvised units for movement overseas. Without a replacement training program in place, the Army again turned to divisions still training within the United States. The Army lacked a system for tracking the extent of training for these Soldiers, which could vary from just adequate to abysmal.

To rectify the situation, the War Department proposed to create "replacement training centers" within the United States. Some of the National Army camps converted to training centers as the original divisions left; other centers began as new installations. Seven of the replacement training centers were for combat functions (Infantry, machine gun, Field Artillery, Coast Artillery); but others were created for Quartermaster, Engineer, Medical, and Signal specialties. The idea developed in April 1918, and by August 1918, the Army established a replacement training structure; but soon the Army in France entered its time of intense combat. The training could not keep pace with the demands, creating an enduring problem of untrained replacements.[15]

Although the overwhelming majority of the drafted Soldiers went to the infantry, machine guns, or artillery, the modern Army still required numerous non-combatant skills. Most of these trades had civilian counterparts, and often required special schooling. Therefore, the Adjutant General's specialists needed to cull out the Soldiers with training or aptitude for the required work. As noted, the Army established specialized replacement training centers under the oversight of the respective bureau chiefs.

Shortly after the declaration of war, academic experts in personnel management and psychological testing, led by the Carnegie Institute of Technology, decided to offer their services to the Army. In a fashion typical of the Progressive Era, they believed that "scientific" methods would resolve the Army's personnel problems. To help the Army, they organized themselves into the Committee on Personnel Classification. Although theoretically an advisory body, the committee developed the essential personnel policies and procedures for managing the new Soldiers. Many also received commissions to work for the Adjutant General in an official capacity.

These experts brought two innovations to the Army: civilian occupation interviews, and intelligence testing. To find the Soldiers with desired experience in non-combat functions, the committee developed a system of interviews to determine which Soldiers possessed the needed skills. Soldiers who self-identified

a necessary skill were sent where their civilian expertise could be put to best use. As the war progressed, the process improved with better questioning. The Adjutant General's Department created a position of camp personnel adjutant for the purpose of screening and evaluating the draftees. These personnel adjutants attended special schools and could not be replaced without approval from Washington.

Large-scale intelligence testing was introduced into the Army at the same time, based upon the recommendation of civilian psychology experts. Every new Soldier took a test to measure his basic intelligence. The alpha test used written questions and the beta test used pictures for those who could not read English. Results of the test supposedly identified Soldiers with potential for advancement or those who would have difficulty performing Army work. Even the idea of testing intelligence was new at the time, and the tests reflected the cultural biases of the contemporary academic community. They tended to measure the individual's acculturation into the society rather than what we might call intelligence. In the sense that these tests identified Soldiers who had developed the skills and abilities needed for the early 20th century, they were useful. Yet the bias against Eastern European immigrants and African-American Soldiers reinforced negative stereotypes against those groups.

Given the sudden nature of the Army's expansion, it was an achievement to have any personnel system. Development of the personnel replacement system came painfully slow, but the lessons resulted in a blueprint that lasted through World War II and the Cold War. Implementation of a screening process for civilian skills marked a major innovation that more or less matched Soldiers to the skills required. Unfortunately, no one appreciated the limitations of intelligence testing. [16]

In 1912, the Paymaster Department merged into the new Quartermaster Corps as part of a larger reorganization. As a practical matter, the Quartermaster Corps simply absorbed the personnel and procedures from the Paymaster as the Finance Division of the Quartermaster Corps. In addition to creating pay records for the freshly mobilized Soldiers, the Army ensured that the troops were aware of benefits in the form of dependent support allotments and War Risk Insurance. Congress first authorized voluntary withholding of pay to support dependents for enlisted personnel during the Civil War, and in 1917 Congress extended the privilege to officers and civilians on overseas duty.[17]

War Risk Insurance began in September 1914 as a means to provide government sponsored insurance to merchants for their ships and cargo during the hostilities. After the United States declared war, Congress amended the act to allow the purchase of up to $10,000 for life and disability insurance to Soldiers, Sailors, and Marines, specifically including women serving as nurses. The Treasury Department administered the program for both the merchant fleet and the service members, so the principal work of the War Department was to offer eligible Soldiers an opportunity to enroll. The law required that Soldiers purchase the insurance within 120 days of their entry into the military or 120 days of the act's passage if they

already were in the military. Reaching Soldiers already within the Army required a significant public information effort. The concept became the basis for modern Servicemembers' Group Life Insurance.[18]

Quartermaster Corps

Before training could begin, the Army required housing, uniforms, and equipment. Without training facilities, the National Guard Soldiers were simply kept in their home states to protect key infrastructure against potential sabotage. By autumn, the Army expected to have training camps waiting for them. The Army planned to use tents for the National Guard divisions and temporary wooden buildings for National Army divisions. Additionally, the Army required a wide variety of other construction, including new training installations for specific functions, fields for the new Air Service, depots, camps to support embarkation points, terminals for outbound cargo, and hospitals. By the end of the war the Army had initiated 448 major construction projects.

At that time the Quartermaster Corps managed construction of barracks and installations using a small office within its headquarters, with officers detailed as Construction Quartermasters when needed. After some initial confusion, on 7 May 1917 the Chief of Staff of the Army directed the Quartermaster General to build division-size cantonments using temporary wooden buildings. They were to be ready by 1 September. As of that time, there were no site selections, no general plans, no designs for barracks, no plans for how to purchase the material, nor much else resembling preparation. The small slow-paced construction office simply did not have the staff or the experience to manage such a large, high-speed project.

Secretary of War Newton Baker requested the assistance of leaders from the civilian construction industry. They immediately recommended placing the work under a separate branch, nominally part of the Quartermaster Corps, but reporting directly to the Secretary of War. They reorganized the office to divide up the functions, quickly bringing in top experts from the civilian community. To meet the deadline, work began even before the plans were finished. The new experts developed a list of well-recognized construction companies, and put them to work as soon as site selections were complete, using a non-competitive selection process. In order to find contractors willing to begin the work under such uncertain conditions, they used emergency powers to waive competitive bidding and allow contracts on a cost plus percentage basis.

The first contracts were signed in mid-June and by July the contractors were fully determined to meet the deadline, no matter what the obstacles. The government willingly accepted green wood for buildings or wooden staves in place of metal water pipes. Cost was not a consideration. When freight trains were unavailable, the government transported toilet fixtures by Pullman sleeper cars. In the middle of building the National Army camps, work began on the National Guard camps; but these were bare-based installations, relying upon the organizations' tents for most

of the shelters. By September the work was two-thirds complete, and the remainder was done within the next two months.

Figure 2.1 Barracks at Camp Lee, Virginia, December 1917. Photo courtesy of the National Archives.

All factors considered, the cantonment construction was completed in a phenomenally short time, but nonetheless it was autumn before training could begin. The extremely cold winter soon stopped training. National Guard units suffered terribly because of a lack of real barracks.

Despite the speed of construction, Congressional committees later attacked the program for excessive costs. They questioned whether the industry experts brought in a conflict of interest in the award of non-competitive contracts. The cost plus percentage system appeared to provide an incentive for wasteful practices. The War Department admitted that the contracts were profitable, but asserted that the earnings were not excessive. The Army also invoked military necessity to defend its program, arguing that delays in completing the training camps would have further delayed any useful participation by the American Army in the war.[19]

Having successfully created shelters for the new Soldiers, the Quartermaster Corps turned its attention to the problem of feeding them. Despite the effects of the war upon the food supplies of all nations, the Quartermaster Corps did a credible job of obtaining subsistence both at home and in France. Soldiers stationed in the United States ate well; and for the most part Soldiers in France ate reasonably well under the circumstances. Within its subsistence purchasing function, the Quartermaster Corps demonstrated an ability to adapt to circumstances. Traditionally,

food was purchased through depots within the United States, but this arrangement opened the possibility of the depots competing against each other. Subsistence purchasing shifted to a centralized system under the War Department to avoid this problem. Later the same concept was extended when the War Department, Navy Department, and Allied Provision Export Commission all channeled their purchases through the Food Administration.

Moving the subsistence overseas presented some new challenges, especially the lack of shipping space. The Army first addressed the problem by separating the beef from the remainder of the carcass, thus introducing the de-boning of beef. To find room for vegetables, the Army worked with industry to pioneer preparation of the much despised dehydrated vegetables. Gas warfare produced another requirement for food packaged in impervious containers, which became the Reserve Ration, packed in cans. To provide Soldiers with their coffee, the Army promoted the new process of soluble (instant) coffee and constructed coffee roasting plants in France.[20]

If the Quartermaster Corps did an effective job of sheltering and feeding the new Soldiers, clothing was another issue. The principal difficulty came because of the world-wide wool shortage; and wool was the best material for warm clothing at that time. Before the war, Australia and New Zealand dominated the wool export market, but as wartime shipping shortages increased, it became difficult to export the wool across the vast Pacific distances. By 1918 these two nations had a surplus of approximately one billion pounds of wool. The problems affected most nations, but the United States relied heavily upon imported wool.

The Army might have compensated for the expected shortages by diverting the available domestic production to military uses; but concern over statutory prohibitions against market speculation prevented the government from purchasing wool while it was available. The problem was compounded by other factors. Congressional tardiness in passing the budget delayed placing orders in a timely manner. The operations against Mexico in 1916 used the small reserve of clothing available. The War Department's initial underestimations on the numbers of Soldiers further contributed to the clothing problems. Improvements began by December 1917 and by summer 1918 the American garment industry was shifting towards full production of uniforms and cloth items for the military; and the Army's own facilities were expanding beyond previously imagined expectations. Yet this was not enough to compensate for the initial lag in production, especially for the woolen clothing and blankets needed for cold weather.

With an inadequate supply of woolen uniforms and blankets, the Army suffered grievously that winter, which was exceptionally cold in all parts of the nation. The National Guard Soldiers who were housed in tents fared the worst. The Soldiers already in France repeatedly requested more blankets and winter clothing, only to be told none were available. The shortage of winter clothing produced a Congressional outcry that cost Quartermaster General Henry Sharpe his job.[21]

The clothing crisis produced one more complication. Shortly after the declaration of war, Secretary Baker directed the Army to avoid intra-government competition by coordinating its purchases through the General Munitions Board – an Army-Navy organization. In turn the board deferred to the Committee on Supplies of the Council of National Defense, which was composed of volunteer businessmen. The committee recommended awarding woolen contracts on a non-competitive basis, reasoning that the demand outpaced the supply. This led to Congressional accusations of favoritism and mismanagement.[22]

Acquisition of motor vehicles proved to be even more problematic than textiles. In theory, purchase of motor transportation was a responsibility of the Quartermaster Corps, but until 1916 the US Army paid little attention to the potential of trucks as military vehicles. During the Mexican expedition, however, the use of trucks extended the operational reach of American forces far beyond any previous expectations. Suddenly every supply bureau and even agencies within each bureau began purchasing any motor vehicle available, without any regard for standardization, or whether they were increasing prices by competing against each other. Once the United States entered the European War, the practice continued, with even greater urgency. At this time, the automobile industry had not yet consolidated into a few large corporations, which presented a wide variety of options to the Army. Predictably, the haphazard procurement of vehicles resulted in absolute chaos regarding repair parts in Europe. To add to the confusion, when American models were unavailable, the Army purchased European models with their metric specifications. At one time the Army was purchasing 294 different motor vehicle models; and 81of them were European models.

The Quartermaster Corps and the other bureaus recognized the value of standardization, but this was not so simple to accomplish. Rather than select an existing model, the Army wanted a vehicle rugged enough for military use and free from existing patents. In August 1917, the War Department assembled a group of industry and Army specialists to design a standard model for the 3-ton truck, which became the Standard B, or more popularly known as the "Liberty Truck." By October they had the prototype. Production began in the spring of 1918; but given the usual production delays, only 8,000 Liberty Trucks reached Europe. Moreover the Liberty Truck was the only standardized vehicle; all smaller trucks, motor cars, ambulances, ordnance trucks, motorcycles, and other vehicles remained a mixture of whatever the Army might acquire. Throughout the spring and summer of 1918 the Army attempted to focus purchases on as few models or frames as possible, but with limited success.[23]

Organizationally the Army continued to fumble while trying to find the best structure for managing vehicles. The Motor Transport Service originated in April 1918 as a part of the Quartermaster Corps, but it soon transferred to an expanded General Staff. In August 1918, near the end of the war, the Army created a Motor Transport Corps, as a complement to the newly-created Motor Transport Corps in Europe. Its functions consisted primarily of organizing and preparing vehicle units

for duty in France. An Engineering Branch did useful work at improving some aspects of military vehicles, but standardized procurement remained out of reach. Repair parts problems resulting from non-standardized trucks remained through the end of the war.[24]

In many respects, the Motor Transport Corps and similar efforts to organize transportation in Europe foreshadowed a separate Transportation Corps in World War II, but with important caveats. The Chief of the Motor Transport Corps exercised considerable independence, even to the point of including his reports in the War Department Annual Reports. Yet the office was created by the War Department General Orders for the emergency only, without Congressional action, and without any expectation of a career path for assigned personnel. Organizations in Europe were similarly organized on a temporary basis.

Other Quartermaster procured items arrived with varying degrees of difficulty. Horses and mules were still essential for moving supplies or artillery. The Army could obtain some animals in Europe; but not enough. The Quartermaster Corps expanded its remount service within the United States, but not enough to meet the needs of the AEF. All types of brushes, including the tooth brush, became a difficult item to procure and required special management.[25]

Ordnance

Weapons for the Army ranged from the individual rifle to the artillery piece, plus ammunition. Every item had a different story behind its mass production under the direction of the Ordnance Department. Coming out of a long era of peace, with a very small regular Army, the United States simply did not have the industrial base or the institutional knowledge within the Army to meet the initial demand. As of April 1917, the Ordnance Department had only 97 officers, and only 10 understood the technology of artillery production. Whereas Quartermaster procurement had consisted largely of adapting the civilian economy to military needs, Ordnance production required entirely new processes, a new workforce, and in many cases specialized production facilities.

In peacetime, a network of government arsenals did much of the industrial work. The most important of these included Springfield Armory, Massachusetts (rifles and small arms) Watertown Arsenal, Massachusetts (coastal artillery), Watervliet Arsenal, New York (field artillery), Picatinny Arsenal, New Jersey (powder and explosives), Frankford Arsenal, Pennsylvania (ammunition and optical instruments), and Rock Island Arsenal, Illinois (artillery carriages and secondary ordnance items). Together these arsenals were ample for the peacetime Army; and they preserved the complex arts of munitions production. Yet they lacked the ability for rapid wartime expansion. In 1915 and 1916, the Chief of Ordnance recommended that the government should accept a higher price by giving some work to private industry in order to familiarize them with ordnance requirements; yet Congress declined to do so.[26]

Resolving the peculiar problems of ordnance mass production contributed heavily to the extensive lag between America's declaration of war and full productive capacity. It also forced the United States to rely upon its French and British partners. For the purposes of this study, five aspects of ordnance production best illustrate the nature of mobilization: rifles, field artillery, ammunition factories, optical glass, and utilization of women in the workforce.

In the Springfield '03 rifle, the United States possessed a superb weapon. Yet it was only produced at the Springfield and Rock Island Arsenals. Rapid expansion required careful manufacture of all the patterns, jigs, and dies necessary for mass production, and that would take time. American factories were already producing a modified version of the Enfield rifle, known as the Pattern 14 (or P14) for the British, which was considered an adequate weapon, but not quite as good as the Springfield. From the American perspective, the principal difficulty with the Enfield was with the ammunition. In addition to being a different caliber from the Springfield, it had a slow muzzle velocity plus a projecting rim at the bottom of the cartridge that could cause jams. The Assistant Secretary of War called the ammunition "virtually obsolete."[27] With slight modifications to the production tools, it could be modified to accept the American ammunition. The delay in producing the Enfield would be significantly shorter than for the Springfield. As production began, however, it required further delays to refine the tools to the precision required by American manufacturers. By January 1918 production of the Enfield was in progress, with smaller production of the Springfield. American Soldiers going to France did have an adequate weapon, but frequently not in time for marksmanship training in the United States, which would have consequences once the fighting began. Soldiers of the 82nd Division called their wooden imitations the "Camp Gordon Model 1917 Rifle."[28]

Similar problems plagued artillery production. At the outset of the war, the United States possessed a modest arsenal of field artillery plus some production capability. Yet this was woefully insufficient and there was no hope for increasing the production of American models in a timely manner. Even the simplest field artillery piece is an extremely complicated mechanism. The barrel requires a lengthy process of refining the steel and then cooling to make it capable of withstanding the pressure of the firing. It must contain a pneumatic device called the recuperator that can absorb the recoil. Given the improbability of American artillery mass production, the French agreed to provide the United States with artillery until the United States developed its production capability. In order to ensure compatibility of ammunition, the United States agreed that the American-made artillery would convert to the metric sizes when the two nations produced similar artillery.

Problems quickly developed with the 75mm field gun, which was one of the important weapons of the war despite its low trajectory. The size was approximately equal to the American 3-inch gun, so it seemed relatively easy to substitute a 75mm barrel. The Ordnance Department discarded the older, but reliable, 1902 model and decided to adopt the 1916 model. Unfortunately this was an experimental model,

and while theoretically superior, it was too complicated for field operations. The United States then decided to just adopt the French 75mm field gun using French designs. That proved to be extremely difficult. American production generally relied upon investing the time to develop high precision tools for manufacturing in quantity; whereas the French were accustomed to looser tolerances, trusting the craftsman to adjust the final settings. French drawings were too vague for the Americans and needed to be refined. Then the metric measurements needed to be converted to the inch system, with up to 4 decimal point accuracy. Only then could the American manufacturers start making all the gauges, jigs, dies, and other machine tools for mass production. American mass production of the 75mm field guns did not begin until late summer of 1918. By the close of the war, the United States produced only 160 of the 75mm guns; the rest came from France.[29]

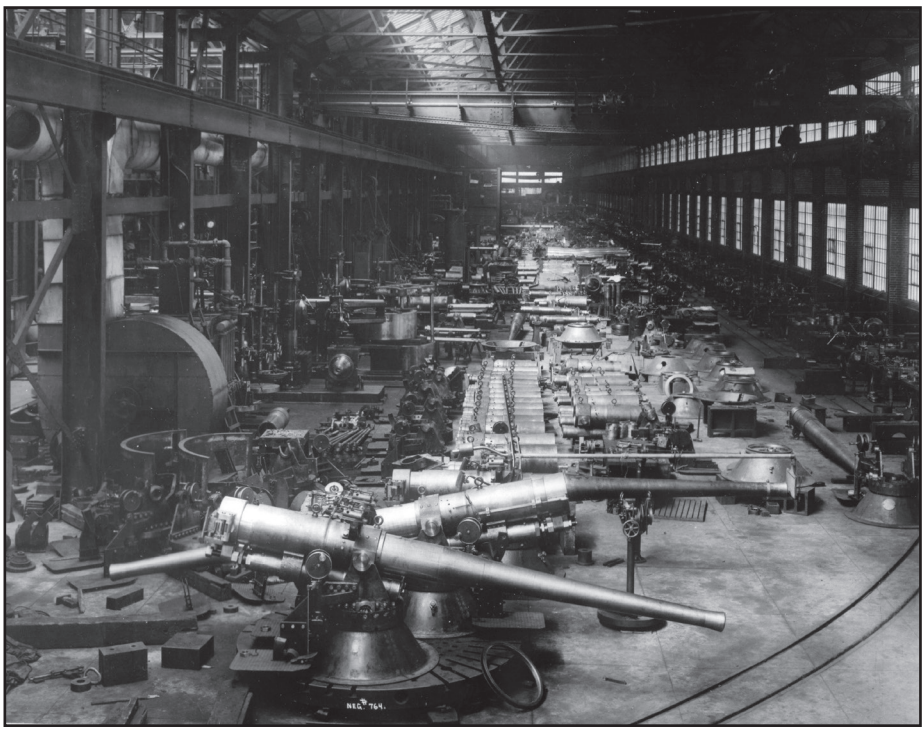


Figure 2.2 Six-inch guns under production at Bethlehem Steel Company. Photo courtesy of the National Archives.

Ironically the older 1902 model of the 3-inch gun proved to be a perfectly adequate weapon. In 1918 the Artillery School tested the 1902 model against the French 75mm and found that it was equal to its French counterpart. It might have been employed with only a conversion of the barrel to a metric system.[30]

The United States also tried adopting the French 155mm howitzer and the 42cm howitzer, with the same problems adapting the design. In addition, American manufacturers produced numerous field artillery pieces of American design. In all cases, this required time and effort to overcome the shortage of precision tools.

Once the United States did start mass production of artillery, the results were impressive; but this was late summer of 1918. Without French help Americans would not have been able to fight the war. Absence of artillery also limited the ability to train in the United States.

Ammunition production is an intricate process that involves obtaining the raw materials (especially nitrates), mixing the propellants or explosives, and filling the shells or otherwise completing assembly of the round. For this study, however, the necessity of specialized plants best demonstrates the delays in productivity. The dangers of explosions are such that ordinary factories cannot be used for this purpose.

Once the war began in 1914, American corporations had been producing explosives and propellants for the British and French, which ensured that knowledgeable personnel were available. Yet Allied war contracts also consumed all the available physical production capability. Consequently, the War Department undertook another building program of using government-owned, contractor-operated facilities to supplement the other plants available. Altogether, the War Department constructed 16 plants for producing powder and explosives, about an equal number for filling the ammunition, and four plants for nitrate production. Two of the biggest projects for smokeless powder were the Old Hickory and Nitro plants in Tennessee and West Virginia respectively. Negotiations began with DuPont Corporation in October 1917 to construct and operate the Old Hickory Plant; but ground breaking did not occur until March 1918, because of Secretary Baker's reluctance to underwrite the cost of creating new plants.[31] Once construction began, it proceeded ahead of schedule and the first powder line was in operation on 1 July 1918. By the time of the Armistice, 50 percent of the plant was operational. The smaller Nitro plant was also just starting to reach productivity at the end of the war under a contract with Hercules Powder.

Certainly these were impressive achievements when measured against the start time for the construction. The Old Hickory Plant covered 5,000 acres and it had facilities for every part of the production process. It even contained a village to house the workforce. By the close of the war, it was producing 423,000 pounds of powder a day. Yet the fact remains that these plants were just starting to reach full productivity at the close of the war. If the war had lasted into 1919 as expected, they would have made a difference.[32] During the critical battles of the Meuse-Argonne Offensive, the United States relied heavily upon the French for 75mm ammunition.[33]

Virtually all forms of gunnery for both the Army and Navy relied upon a high quality form of glass known as optical glass. This differed from ordinary glass in its chemical composition to ensure a consistent refraction of light in ways that made ordinary glass unsuitable for ordnance use. Optical-quality glass could be found in binoculars, in the sighting instruments on an artillery piece (field artillery, railroad artillery, antiaircraft, or naval weapons), in the periscopes necessary for trench warfare, in an aircraft's bombsights, and in other uses. Until the war began, the United

States relied exclusively upon importation of German optical glass for both military and scientific purposes. When the importation stopped in 1915, commercial companies began experimenting at producing optical glass but without success. In April 1917 the government turned to the Geophysical Laboratory of the Carnegie Institution of Washington, which began accelerated experimentation with optical glass production in cooperation with Bausch & Lomb of Rochester, New York. After months of intensive work they mastered the production of optical quality glass by December, and by February 1918, glass production began. After that, the optical industry needed to master the techniques of quantity production for both the Army and Navy. All this required time. By November 1918, these production problems were resolved and the United States was beginning to produce fire control instruments. During the course of the fighting, however, American artillery had to cope with shortages of fire control instruments.[34]

Figure 2.3 Working an ordnance production line. Photo courtesy of US Army Women's Museum and the US Army Ordnance Museum.

Wartime labor shortages created new openings for women workers throughout the American economy, but the role of women in ordnance work has some notable features. The war brought critical personnel shortages in heavy industrial trades, including metal work and ammunition production. In Britain, "munitionettes" had demonstrated the potential for women to work in these heavy trades, and American industries followed that example. The thousands of women who undertook the

difficult and often dangerous work in the munitions industry provided the critical labor force required to win the war. Often the work involved handling toxic TNT.

To facilitate the integration of women into the industrial trades, the Ordnance Department created the Women's Branch of the Industrial Bureau. Its inspectors visited factories operating under government contract to make recommendations on how to utilize the women war workers. Inspectors from the Women's Branch advised on how to improve working conditions and otherwise assisted in developing the female workforce. They suggested simplifying training requirements, breaking down complicated tasks into several simpler ones that could be learned quickly. In theory, War Department policy required contractors to provide equal pay, but in practice sub-contractors were not bound by those rules. The Ordnance Department also provided housing for both women and men at places such as Old Hickory and Nitro as a necessary means of keeping employees. This work set the foundations for the later use of the women war workers in World War II, and subsequent advances of women into wider areas of the workforce.[35]

These examples illustrate the nature of the problems with ordnance production, but not the extent. Virtually all aspects of arming the American Army encountered similar difficulties that were only resolved over time with considerable effort. Industry could not produce sufficient quantities of the superior M1911 .45 caliber pistol, so the Army also purchased revolvers as handguns. Bureaucratic disagreements delayed selection of a machine gun, often forcing the Americans to rely upon less desirable French models. In October 1918 a Ford light tank reached Europe but it was considered unworthy for combat because of the quality of the steel. Britain and especially France provided the tanks. A few American-built tanks of a Renault design did not arrive in France until after the Armistice. By late summer of 1918 American factories were finally producing the quantities of munitions necessary for the war. Until that time France and Britain supplied the deficit where they could. American Soldiers still lacked the weapons for proper training while in the United States.[36]

Other Munitions

Even as the war in Europe demonstrated dramatic improvements in the potential and sophistication of aerial warfare, the United States failed to develop this asset. During Pershing's Mexican expedition he had eight aircraft, from a total of 13 within the Army. These were antiquated and plagued with maintenance problems; but they proved their worth. Yet the Army still lagged. At the time of the entry into the war, the Army had only 35 qualified aviators, all residing in the Signal Corps, and not even a prototype for a combat aircraft. Congress attempted to remedy the deficit with a $64,000,000 appropriation for aircraft; but no amount of money could compensate for the lost time.[37]

Aircraft production proved to be another example of impressive work that might have made a difference if the war had lasted. The Army quickly determined that it would take too long to design a combat aircraft, so it employed an American

model training aircraft, but adopted European designs for the combat aircraft. Adoption of European designs involved questions of deciding upon the right design, introducing precision to conform to the American style of mass production, and metric conversion. Despite the best efforts of American manufacturers, by the end of the war the only American-built combat aircraft was an observation plane of British design. The other combat aircraft were built by Europeans, often with the United States furnishing the raw materials. In this case, France was having difficulties meeting its own aircraft needs and the United States took a lower priority. The United States made some significant contributions to aircraft technology, such as the powerful Liberty Engine, or a developing a process for "doping" cotton to be used in the wings, but achieved no significant production of combat aircraft.[38]

Despite the extensive use of poison gas in Europe, the US Army had paid scant attention to this weapon, and thus was ill-prepared for the logistical challenges, both defensive and offensive. Until May 1918 responsibility for gas warfare was divided among various branches, and it finally consolidated in the new Chemical Warfare Service of the National Army. As of April 1917 the Army had no prototype for a gas mask. The only civilian use for the mask came from the mining industry, so the Army worked with the Interior Department's Bureau of Mines to design and produce a mask. After an initial design failure, they succeeded in making a credible mask. Upon learning that coconut shells produced the best filtration charcoal, they arranged for a charcoal production plant in the Philippines, while in the United States they collected the shells from walnuts or other forms of nuts.

Offensively, the United States not only lacked production capabilities, but pre-war German domination of the chemical industry resulted in a lack of institutional knowledge within the United States. Beginning in the winter of 1917/1918, construction began on a huge production facility north of Baltimore on the Chesapeake Bay, which became Edgewood Arsenal. By the close of the war it was capable of producing tremendous quantities of gas, with the production limited only by the ability of the Ordnance Department to supply the necessary shells. Unlike other factories, the Edgewood Arsenal used military personnel because of the inherent dangers. The installation also included the barracks and other Soldier support facilities, such as a YMCA building. [39]

In order for the French and British to produce munitions for the American Army, the United States agreed to provide the steel for artillery and weapons, the spruce for aircraft, or other raw materials in return for European weapons. Although damaging to the notion of independent American power, the arrangement had one huge advantage. Raw materials used much less shipping space than finished products. If American industry had been able to enter mass production immediately, transportation of finished artillery or aircraft across the Atlantic would have been problematic until the United States could also develop the merchant marine fleet.[40]

Transportation constituted an equally significant and intractable problem. The Army needed to move cargo and personnel within the United States by rail, and to France by sea. Each form of movement created its own problems, some more difficult than others.

Shipping

Prior to resuming unrestricted submarine warfare, the German government calculated that even if the United States could adjust its industrial might to war production, it would be unable to transport and resupply an army across the ocean. To be sure, the Army Transport Service originated in 1898 and its troopships began crossing the Pacific the following year in response to American annexation of the Philippines. Yet these ships were not suitable for moving troops across the Atlantic, because their slow speed left them vulnerable to submarines and they could not carry enough coal for the return voyage. Even if this small fleet were suitable, it could not carry nearly enough Soldiers to make a difference.

Nonetheless, the United States was determined to send an infantry division to France by early summer if only to reassure its allies. A civilian advisory committee identified seven suitable passenger ships that were available. Although sufficient to move the token force, clearly this fleet would never work for the millions of Soldiers destined for France.

Help was on the way from a most unwilling source. In 1914, ships from the German passenger fleet sought protection from the British Navy in the then-neutral harbors of the United States. As war with the United States appeared more likely, the Germans recognized that these ships might be seized, but they believed they could keep these ships from being used against them without their total destruction. They ripped apart the giant steam cylinders within the engine rooms, believing that it would require over two years to replace them. Disregarding maritime customs, the US Navy chose to repair the existing steam cylinders instead of replacing them, which placed the ships in operation relatively quickly. Altogether the United States gained 20 passenger ships this way, including the giant *Vaterland*, which became the famed *Leviathan*. These ships played a critical role in the early part of moving the American Army to Europe.[41]

The Army Transport Service acquired other passenger ships through a variety of means. The government exercised its right to commandeer use of existing passenger ships and those under construction, with payment to the owners. The United States solicited neutral nations for permission to charter their ships; and for the most part neutral nations agreed, because the war drastically reduced passenger commerce. The Netherlands, however, was unwilling to agree, so the United States simply employed a seldom-used belligerents' right to commandeer neutral property within its boundaries by seizing Dutch passenger ships in American ports, with compensation. Ships were re-configured for the maximum numbers of passengers, and Soldiers slept in shifts. Altogether 347 ships made a total of 1,228 voyages. Even with these acquisitions, the United States still lacked the means to move its Army

across the ocean. To meet the gap, Great Britain provided its own passenger ships and cargo ships that had been converted to passenger ships. By the summer of 1918 the combined fleet was sufficient to move over 200,000 Soldiers per month.[42]

Cargo proved to be the more difficult problem. Before 1917, about half of the American merchant marine was engaged in coastal trade, not transoceanic. Whereas passenger traffic declined in the war, the demand for cargo ships increased, including such added requirements as moving nitrates for munitions from Chile to the United States. Until the convoy system was introduced, the German submarines sank ships faster than the British could build new ones. Moreover, the demand for shipping accumulated with each successive increase in the numbers of American Soldiers. On average, each Soldier in France resulted in 28 to 33 pounds of cargo per day. An increase of 200,000 Soldiers meant at least another 2,800 tons daily cargo requirements; and the numbers just kept climbing. The inability to move supplies across the Atlantic became a major impediment to American operations.

As early as September 1916, Congress recognized the potential need for a shipping industry by authorizing a Shipping Board, with the option to create an Emergency Fleet Corporation should construction of ships be required. The early history of the corporation, however, illustrates how the administration's initial reluctance to use wartime authorities to commandeer material hindered the mobilization. Ships required steel, which was in short supply and therefore high priced. At this stage in the war, members of the administration did not wish to interfere with the market through government intervention, nor did they wish to contribute to the steel companies' already high profits. Instead they decided to build steam-powered wooden ships, on the presumption that timber was already plentiful.

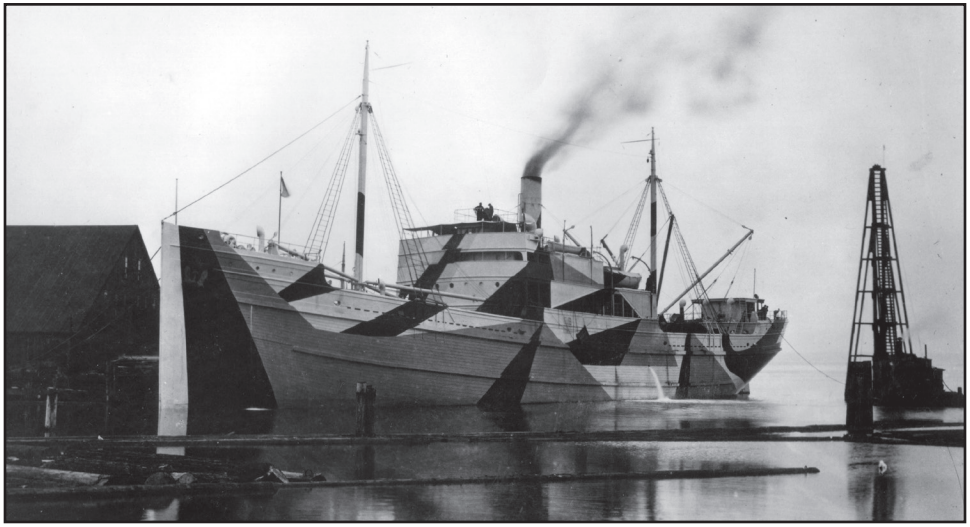


Figure 2.4 One of the wooden ships constructed for the Emergency Fleet Corporation's unsuccessful effort to avoid using steel. The resulting failure to build a practical wooden ship delayed the critical shipbuilding program. The painting scheme was designed to confuse submarines. Photo courtesy of the National Archives.

Unfortunately they overlooked several problems. At best, wooden ships were slow and therefore more vulnerable to submarines; and they were less capable of withstanding the pounding from the large engines. Construction of wooden ships was a dying art, despite the multitude of corporations that assured the government they could build the ships. The design called for unusually large ships; and trees big enough for the keel were in short supply. The first director, George Goethals, argued against the exclusively wooden program until he finally resigned. By late summer the wooden ship program ended, with a resulting loss of precious months.[43]

Figure 2.5 Launching the *Quistconck*, the first ship to be completed at Hog Island. President and Mrs. Wilson are on the platform. Photo courtesy of the National Archives.

After the failed wooden ship effort, the board did turn to steel ships, including requisitioning ships then under construction at American shipyards. It also

developed means of fabricating parts throughout the nation and using the shipyards for final assembly. In the process it established new shipyards, notably at Hog Island near Philadelphia. These new yards required construction of the facilities, staffing, establishment of administrative procedures, recruiting labor, and even housing for the employees. All of this required time. The Emergency Fleet Corporation did not reach full production until October 1918. In that month alone the Corporation launched 77 ships that could carry 398,000 deadweight tons, almost one-third more than the entire United States had produced during all of 1916. These were impressive production numbers, but at the end of the war.[44]

In the meantime the United States needed to contend with inadequate shipping and every prospect of watching the situation deteriorate. Army movement of supplies to Europe was the greatest concern, but not the only need for shipping. The Navy also needed commercial cargo shipping, as did the Belgian relief efforts. The nation needed to import essential raw materials, most notably nitrates from Chile, but also a wide variety of other material. Some pre-war trade patterns were too essential to allow discontinuance. Each segment of the oceanic trades had its own fleet, which created a situation that was inefficient in the aggregate.

In response to the rapid deterioration of the situation, the government developed the shipping control committee in January 1918. The concept ended the practice of separate fleets for each particular purpose, but placed all available ships into a single pool. The committee then determined the optimum use of each ship in supporting the various facets of the war effort. Ships were assigned based upon this need, not upon any ownership principles. Within a few weeks the changes somewhat eased the shipping situation until new construction could take effect.[45]

It is well-recognized that the convoy system eventually foiled the German submarine threat. For purposes of this study, two points are particularly worth noting. First the convoy system required an unprecedented transfer of authority to the Navy. Until this time the Army either chartered or owned all transport ships supporting Army operations. The Navy provided protection if required, but did not operate the ships. Convoys, however, required precise maneuvering in formations, including night maneuvers. Moreover, the Army began to experience times when it could not find the crews for the ships. Therefore, the Navy agreed to assume operation of the cargo ships. It assigned uniformed sailors, trained in the convoy maneuvers, along with accompanying armaments.

Second, the convoy system did have one noteworthy disadvantage. By grouping ships together, precious sailing time was lost as the ships waited to join convoys or created backlogs at unloading. The slowest ship in the group determined the convoy speed. The convoy system decreased efficiency by an estimated 20 percent, even though it did protect against submarines.[46]

Transporting the Army to France produced one other change in Army practices. Up to this time, a unit traveling to a different location transported its own animals and equipment to the destination. The practice of trying to mark and segregate

unit equipment at both ends of the ocean proved to be too cumbersome. The Army simply adopted a plan for requiring units to turn in animals and equipment upon embarkation. At the far end they received authorized equipment, but not necessarily the same material or horses.[47]

Railroads

Of all the aspects of home front mobilization, railroad operations produced the most spectacular failure. In turn, the crisis in railroad transportation resulted in overdue structural reforms both for the War Department and the entire national mobilization process. At this time motor vehicles were still in the developmental stage, and water transportation only served limited areas. The nation moved on its rails; and railroads relied upon steam engines.

Troop transportation had some difficulties; but on the whole the railroads did a credible job. They moved Soldiers from home to initial training, often from one installation to another, and then to the ports of embarkation. Along the way they coordinated with the Red Cross or other organizations to support the troops.

Even in peacetime the American cargo movement was inefficient because railroads could not manage their freight cars. Cars might pass between different lines, and in the process they might be held while loading or unloading. Railroads might also hold empty cars with the expectation of needing them later. After the war in Europe began, the demands upon railroads increased creating further problems. In the winter of 1916-1917, trains serving New York City and port became severely congested, and the lines were just starting to clear up when the United States entered the war.[48]

American entry into the war further complicated the procedures. In theory, the railroads recognized the potential problems from the war and organized a Railroads War Board; but this was only an advisory organization, without any real authority. Antitrust laws further prevented railroads from cooperating in the emergency to find more mutually efficient means of managing operations.

Troubles began quickly. Cantonment construction dominated freight shipments. Soon each of the supply bureaus began pushing its own shipments either for raw materials or finished goods, often without regard for whether the organization at the other end was ready to receive and unload the cargo. Government contracts called for payment once a product was loaded on to the train, so manufacturers wanted to begin shipment upon completion of production. Shipments to the New York port soon exceeded the ability of the port to unload the cars or load the ships. Efforts to ease the congestions through a priority system failed miserably because there were no controls, and every shipment became a high priority.[49]

Winter turned a bad situation into a disaster. Winter always brought added stress to the railroad system, with increased demands for coal, the difficulties of heating steam engines in cold weather, snow on the tracks, and frozen equipment. The winter of 1917/1918 was brutally cold with extra snow storms and sub-zero

temperatures. The forces already in France required supplies, and these shipments contributed to the backlog. At the peak of the crisis, railroads were backed up from New York City to Buffalo, while two hundred ships lay at anchor unable to load. Coal shortages plagued the northeastern states, and hindered the sailing of cargo ships, which further contributed to the traffic jams on the rail system. Finally, on 26 December 1917, President Wilson seized control over the railroads using authorities granted in the 1916 Army Appropriation Act. Concurrently, President Wilson created the US Railroad Administration. Less than one month later on 17 January 1918, the Director of the Fuel Administration announced that factories in the eastern United States would close for four days in order to provide coal to the ships ready to sail.[50]

Resolution of the paralysis required control over shipments at the point of origin. Even before the federal seizure of the railroads, the War Department initiated a process to control shipments through a newly created Inland Traffic Division on the expanded General Staff. The supply bureaus lost their freedom to initiate shipments, and instead each rail shipment required a War Department Transportation Order from the Inland Traffic Division. Following seizure of the rail system, the Director General of Transportation instituted a similar system to resolve comparable conflicts among the other government agencies and essential civilian commerce. Requests for a transportation order needed to include evidence that the receiving party was ready to unload and store the traffic, instead of using the cars as improvised storage. Other changes allowed for better tracking of freight cars and more efficient use of less crowded lines. With the coming of warmer weather the situation resolved itself.[51]

Reform

The transportation crisis brought the already strained relations between the Congress and the executive branch into a collision. As has been noted, initial production of most commodities was plagued by delays, despite the initial expectations by both Congress and the President that industrial mobilization could be accomplished quickly and at low cost. Many of these delays were simply awaiting the retooling of factories, or the results of mistakes already corrected. Congressional critics of the administration also overlooked their own role in the problems, either through meager appropriations before the war or micromanagement during the early months. Nevertheless, the production delays presented a cumulative appearance of mismanagement. The absence of wool in that cold winter was politically disastrous.

By December 1917, key senators were proposing to create a "war cabinet" composed of three men selected from civilian life, essentially stripping the President of his constitutional role as Commander-in-Chief. At the same time, they asserted that the wholesale logistical functions were properly a business function, to be performed by civilians, not Army officers. The President and the Secretaries of War and the Navy successfully deflected these criticisms, but the need for reorganization

remained. By May 1918, President Wilson succeeded in getting his own legislation through Congress in the form of the Overman Act, which allowed him to reorganize executive agencies as he saw fit. The law also allowed the executive to transfer funds to new agencies created under this authority, but only to achieve the intent of the original appropriation.[52]

Within the War Department, reorganization began with the forced detailing of Quartermaster General Henry Sharpe to the Southern Department and the recall of George Goethals to active duty as the new Acting Quartermaster General in December 1917. Goethals was an engineer famed for his work on the construction of the Panama Canal, and he determined to re-work the entire Army supply system into a more centralized authority. His appointment as Acting Quartermaster General was closely followed by his dual assignment as the director of the new Storage and Traffic Division of the General Staff. Over the following months, Goethals vigorously pursued his goal of consolidating Army supply operations under a single directorate in the General Staff.[53]

Upon his appointment as Chief of Staff in March 1918, General Peyton March confirmed these changes. Although very intelligent, he also brought his caustic personality into the War Department. According to his own account, he found the War Department working at its normal peacetime pace, without any sense of urgency in responding to the needs of the Army in France. According to all accounts he was impatient and demanding. There is reason to be skeptical of his claims to have been personally responsible for suddenly changing the culture within the War Department. During the eleven months following the declaration of war, the Army made remarkable strides in overcoming the previous lack of preparation, which resulted in production surge during the summer of 1918. This would not have been likely if the War Department adhered to the lethargic culture described in March's memoirs. The reforms instituted under Peyton March were useful for creating a greater unity of effort and prioritizing of resources.[54]

Outside the War Department, the War Industries Board (WIB) served as the principal means of coordinating and prioritizing purchases. Yet for the first eleven months of the war it had only an advisory function, much to the frustration of its directors. Finally, in March 1918, President Wilson appointed Bernard Baruch as director with the promise of the President's full support. Although Baruch did not have more statutory powers than his predecessors, the promise of presidential support, plus Baruch's aggressive personality, gave real power. He could cajole the lumber industry into cooperation by threats of bad publicity. Even though the President remained reluctant to use his power to commandeer industries or resources, the fact that he might now use that authority when necessary made it easier for Baruch to gain the "voluntary" cooperation of industry. All government agencies lost their ability to work directly with private industry. Instead they channeled their requirements through the WIB, which arbitrated priorities and selected sources. Baruch demonstrated that he could win the bureaucratic battles with the War Department. The enhanced authority of the WIB became one more reason why the

Army pushed towards greater consolidation of the supply functions in order to present its own coordinated priorities. The wartime expedients of the Food Administration and the Fuel Administration performed similar functions within their areas of responsibility.[55]

It is difficult to assess the causes of the crisis and the importance of the reforms in accelerating American production. To a large extent, the complaints against the War Department resulted from unreasonable expectations of easy conversion to wartime demands, which were also reflected in President Wilson's aversion to pre-war planning. When Congress began investigating the War Department in January 1918, many of the problems were either resolved or on the way to resolution.

Other historians have argued that the Wilson administration still relied principally upon voluntary cooperation, so the invigoration of the WIB was a change in appearance rather than substance. Similarly, the changes by Goethals and March were more titular than actual. Goethals could bring functions previously performed by the bureaus into his new Purchasing, Storage, and Traffic Division, but the bureaus still retained a statutory authority; and Goethals was never able to get the statistical accuracy needed to master the Army's supply system.[56] The unknown factor in any assessment is the length of the war. What if the war lasted into 1919 as expected? All types of shortages would have been more acute and there is no way to determine how well (or how poorly) the reorganized bureaucracies would have adjusted.

By summer 1918 the combination of bureaucratic reforms and industrial re-tooling re-shaped the American economy on a wartime basis. Fourteen months into the war, the nation was beginning to produce the supplies and equipment to support its enormous Army, with the expectation of greater expansion over the coming year. Even the shortage of ships showed signs of resolution by late summer through the work of the Emergency Fleet Corporation. American Soldiers were now moving to France by the hundreds of thousands with a steadily improving industrial base behind them.

Considering the unprepared starting point of April 1917, the speed of the industrial mobilization was quite impressive. The United States overcame all obstacles to become a presence in Europe before the Germans could win on the Western Front. The speed of this mobilization surprised both friends and foes.

Yet it is also fair to ask why the United States waited until the declaration of war before initiating planning for sudden expansion. Even under the best of circumstances, home front mobilization would have been difficult and prone to mistakes. A reasonable level of pre-war planning might have identified some of the problems that later delayed American participation. Beyond planning, a modest investment in prototypes or tools of production might have facilitated mass production once the war began. The British production crisis of 1915 might have provided a useful lesson in the difficulties of industrial mobilization. Nevertheless, the administration and many members of Congress continued to adhere to the principle that any

form of pre-war planning or preparation was unacceptable for a neutral nation. Industrial mobilization is largely a story of extraordinary accomplishments to solve problems that might have been avoided by better planning.

Problems with home front mobilization suggest a wider difficulty with the US Army. Modernization efforts during the early 20th century focused on the operational side of the Army. With a few exceptions, the sustainment side of fighting a modern major war received scant or no attention. In Europe, the American generals learned through experience that the logistical side of fighting a war is just as important as the operational side.

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53. Hewes, *Root to McNamara*, 31-50; Risch, *Quartermaster Support of the Army*, 639-644; Coffman, *War to End All Wars*, 165-167; Zimmerman, *Neck of the Bottle*, passim; Waddell, *United States Army Logistics*, 113-117; Huston, *Sinews of War*, 314-318.

54. Peyton March, *The Nation At War*, (Garden City, NJ: Doubleday, Doran & Company, Inc., 1932). 39-40, & passim. His memoir is noteworthy for claiming personal credit for his subordinate's work, such as conversion of cargo ships to troop transports for redeployment. In all of his works Benedict Crowell provides a picture that contrasts with March's portrait of a somnambulant War Department, beginning with the extraordinarily rapid cantonment construction. Edward Coffman presents a favorable account of March in *The Hilt of the Sword: The Career of Peyton C. March* (Madison, WI: University of Wisconsin Press, 1966).

55. Benedict Crowell and Robert Forrest Wilson, *The Giant Hand: Our Mobilization and Control of Industry and Natural Resources, 1917-1918* (New Haven, CT: Yale University Press, 1921), passim; Hewes, *Root to McNamara*, 37-38; Kennedy, *Over Here*, 126-138 & passim.

56. Zimmerman, *Neck of the Bottle*, passim.

Chapter 3
Creating an Overseas Support Structure

When the United States declared war on 6 April 1917, the administration had not yet selected a commanding general for the forces to go to France. Acting upon Secretary of War Newton Baker's recommendation, President Wilson selected Major General John J. Pershing to command the American Army in Europe, which would evolve into the American Expeditionary Forces (AEF). On 10 May 1917, slightly over a month after the declaration of war, Pershing was summoned to Washington where he met with Secretary Baker and then briefly with President Wilson. Pershing and his staff arrived in France on 13 June; and after the expected ceremonial welcomes, they began to devise a concept for employing the American Army.[1]

Even before Pershing's arrival, his allies had a proposal for him. They suggested that the US Army should arrive as small units to be placed into British and French formations. They argued that Americans were unlikely to master the art of commanding corps-sized units, let alone an independent Army, in the time available. So it was better to "amalgamate" the Americans into the European armies.

From the outset the Americans adamantly rejected these proposals. Pershing's letter of instruction from the Secretary of War reflected the President's intent to fight as an independent American Army. Amalgamation would be politically unpopular at home. Both sides recognized that a separate American Army would give the United States a stronger presence in any post-war settlements, which was significant given Wilson's well-known preference for more lenient peace terms. For his part, Pershing held to the idea of an independent American Army so forcefully that it surprised the British and French. Even after President Wilson delegated some flexibility to Pershing during the crises of spring 1918, Pershing resisted amalgamation proposals. In addition to the other reasons, Pershing personally believed that the European emphasis upon trench warfare squandered lives, and his proposed "open warfare" approach would prove to be more effective.[2]

Eventually the United States did agree to leave two divisions in the north, fighting as an American Corps under British command. In addition, four African-American regiments served with the French. In March 1918, Pershing agreed to move American divisions to the French sector in order to prevent a defeat. Throughout the war he agreed to attach some divisions to the French as necessary. Yet he could also display an iron will to protect the integrity of an American force during some heated arguments.

In order to operate as an independent army, the Americans needed their own logistical system. Otherwise they depended upon European commanders for their supplies. After decades of neglect, the Americans needed to develop the sustainment structure for a fully independent American Army; and they also needed

to incorporate all the technology changes over the last half century. Sustainment remained a critical aspect of the amalgamation question.

Even as the Allies were pushing for amalgamation, General Pershing and his staff developed their own concept for how the AEF was to operate in France. A tour of France and an assessment soon led him to conclude that the far eastern province of Lorraine was the logical place for the Americans to operate as a separate force. The British already occupied the English Channel area, which they considered vital to their interest. The French insisted on reserving the protection of Paris to their own troops. Yet near the German border in Lorraine, the French used a holding force. Pershing further believed that the area held a potential for the Americans to exert a decisive influence. If the AEF could break through the barriers and follow the Mosel River into Germany, it could cut critical railroads and take the coal and industrial areas of the Saar basin. The Americans moved into the Lorraine area.

To support this proposed use of the American Army, the United States needed to use the ports along the Atlantic Coast. The British already used the Channel ports, so those facilities were only used to receive Americans passing through Britain. The Mediterranean, with the substantial port of Marseille, was unavailable until late June 1918 because of submarine activity. This left the Atlantic ports, notably Brest and the ports along the Loire and Gironde/Garonne regions. All of these ports had several common characteristics. Except for Brest, they all had depths of 30 feet or less. They all were in use to supply the needs of the French people, who were suffering from the effects of the war. All required some construction and additions in order to handle the expected massive American traffic. Most important, they all were on the western edge of France, and Lorraine was at the eastern edge. In order to fight a war in Lorraine, the United States needed to move the cargo approximately 600 miles.[3] The Army with the least logistical experience had the greatest logistical challenge.

Geographical Organization

Rather quickly the concept developed in accordance with the existing Field Service Regulations (the contemporary equivalent of doctrine). The area in Lorraine became the Zone of the Armies. Here divisions were organized into corps; and corps organized into number armies. By the end of the war the AEF contained two numbered armies. (The Third US Army was added after the Armistice for occupation purposes.) Everything to the rear became the Line of Communications, which consisted of multiple base sections near the ports, plus a single Intermediate Section and a single Advanced Section.

Moving from the Atlantic Coast eastward the infrastructure began with the base sections and ports. Each base section within France contained a major port, and possibly smaller nearby ports. By the close of the war the AEF designated a total of nine base sections throughout Europe. These were:

1. The area along the Loire River, especially the ports of St. Nazaire, Montoir, and Nantes.
2. The area where the Garonne River empties into the Gironde Estuary, especially Bassens and Bordeaux.
3. Great Britain, used for Soldiers passing through England *en route* to France.
4. The English Channel ports, including Le Havre.
5. Brittany and the Contentin Peninsula, especially the deep water port of Brest, but including Cherbourg.
6. The Mediterranean Coast, especially Marseille, not opened until late June 1918.
7. The smaller Atlantic ports of La Pallice and Rochefort, not designated a separate base section until late June 1918.
8. Italy, to serve American forces there.
9. Antwerp and Rotterdam, open to American activity only after the Armistice, and used to support occupation forces.

In addition to the ports, each of the base sections housed a wide variety of other support services.[4]

Moving along the Atlantic Coast from north to south, Brest sat on the tip of the Brittany Peninsula. Giant ocean liners now serving as troopships required a depth of about 40 feet, and Brest was the only such port available. Due to competing demands, wharfs were not available to dock the large ships, so troops were unloaded by lighters (watercraft used to unload ships). Brest became the principal port of debarkation for personnel. Reception facilities were meager and troops were hurried eastward to the front. Construction of a proper camp did not begin until late summer 1918, and that was justified in expectation of using Brest as the port of embarkation for redeployment. Even with the camp, conditions at Brest remained uncomfortable.[5]

Near the mouth of Loire River, the port of St. Nazaire showed immediate promise for supporting the AEF. It was deep enough (29 feet) to handle most cargo ships, especially if they were partially unloaded by lighters. Outlying shoals protected it from submarines. Although further improvements were required, the port already contained rails, wharfs, cranes, and other facilities. Until Americans could improve other French facilities, this remained the principal American cargo port. Further upstream, the port of Montoir showed potential, but it required considerable construction and would not become a viable port until near the end of the war. Nantes, even further upstream, provided another port already in operation, although shallower than St. Nazaire. Working these ports typically required cranes for transfer from ship to the railroad. Often lighters supplemented the other work, and this required floating derricks to unload the ships.

Further south, the Garonne River presented an opportunity that became mired in controversy. An existing French port at Bassens offered some existing wharf space readily available. Nevertheless, the Americans believed that they could expand the capabilities by creating their own port close to the existing French port, in the most ambitious port construction project of the war. Although the project was authorized in July 1917, actual work did not begin until November. Then the berths were completed by January, but progress stopped due to an argument between the Transportation Service and the Engineers. The Transportation Service intended to install large electric gantry cranes as the most efficient means of unloading the ships. The Engineer officer refused, arguing that the wharfs could not support the weight and instead wanted traditional derricks. The argument continued that summer until the matter reached Pershing, who decided in favor of the gantry cranes. Once installed, the gantry cranes proved to be successful, and the American Bassens facility outpaced St. Nazaire for cargo traffic. Further upstream, the port of Bordeaux also supported the American effort.

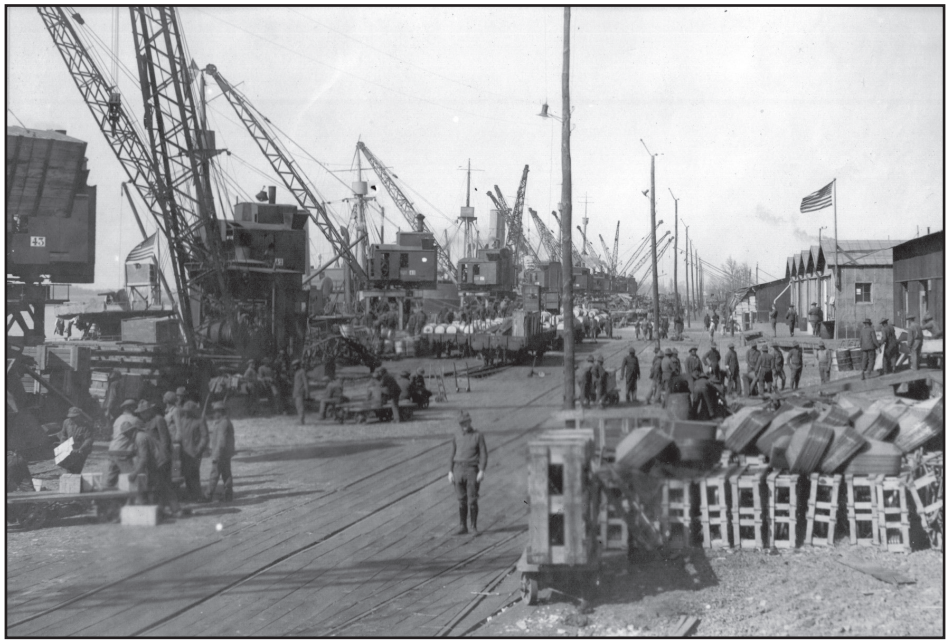

Figure 3.1 Further south, the US Army constructed new port facilities adjacent to the existing French port of Bassens. This became known as American Bassens. Once operational, American ships dominated the scenery. Photo courtesy of US Army Quartermaster Museum.

Smaller coastal ports, including La Pallice and Rochefort, were too shallow for most trans-oceanic traffic, but they could be used for intra-European shipments. Along the English Channel, the ports of Le Havre and Rouen were available for receiving American Soldiers who had passed through Great Britain on their way to Europe. Altogether, the AEF operated at 26 ports, including ports in England.[6]

The two ports of St Nazaire and Bassens handled approximately two-thirds of the cargo.[7]

As the name suggests, the Intermediate Section stood in between the ports at the base sections and the Advanced Section, generally along the middle of the Loire region. In addition to the support advantages of being close to the front (but not too close), the Intermediate Section provided space to relieve congestion in the vicinity of the ports, and room for a wide variety of other support activities. The principal activities in the Intermediate Section included the massive depot at Gièvres, the largest ordnance repair facility at Mehun-sur-Yèvre, the salvage depot near Tours, forestry service headquarters, plus a wide variety of schools, ice plants, and other support activities. Personnel sustainment functions, including multiple schools, the personnel replacement depot, the reclassification depot at Blois, and the records center in Bourges, also operated principally within the Intermediate Section.

Figure 3.2 Once installed, the gantry cranes at the American-constructed port in Bassens significantly increased the efficiency of the cargo operations. Photo courtesy of the US Army Quartermaster Museum.

Whereas construction programs in the base sections consisted largely of improvements to the ports and railroads, the Intermediate Section required all of the other fixed facilities needed to support the Army. Once again the American engineers engaged in large-scale construction projects, cutting wide swaths of French forests in the process. The massive depot complex near Gièvres was one of the most impressive achievements. In 1917 it was just open field; but by the close

of the war it was so large that it required 165 miles of railroad track and over 20,000 workers. The Quartermaster section alone contained 208 warehouses (over two million square feet), another two million square feet open storage, plus ice plants and coffee roasting facilities. The ordnance shop near Mehun-sur-Yèvre (near Bourges) encompassed 50 acres, but was only partially completed by the end of the war. Because French casualties were already filling their hospital system, the United States needed to build its own hospitals in France. At other times, the Army found suitable French facilities for its use, including vacant barracks, factory buildings, or smaller ice plants. The ice plants were especially necessary to supply subsistence to the Army.[8]

The Advanced Section contained smaller depots and repair facilities, with the intent of being quickly responsive to the fighting force while minimizing the damage in the event of an enemy breakthrough. It also contained the regulating stations, which will be discussed in the section concerning railroads.[9]

Reorganization

Unfortunately the Field Service Regulations prescribed little beyond the geographic outline. Even the meager guidance within the Field Service Regulations was badly understood. In October 1917, Colonel Johnson Hagood was advised that he was to command the Advanced Section. He asked his superior what that meant, and was informed that the superior did not know either.[10]

One noteworthy shortcoming of the Field Service Regulations was the lack of guidance concerning the relationships between the Line of Communications and the semi-autonomous bureau system that extended overseas. The Quartermaster Corps remained responsible for most general supplies and services, but it was still sorting out the implications of the conversion from a department to a corps. The Ordnance Department held responsibility for weapons and ancillary military equipment. In addition to their operational responsibilities, the Signal Corps, the Medical Corps, and the Corps of Engineers were responsible for the supplies specific to their functions. During the war, the Air Service became another supply agency, responsible for aircraft logistics in addition to air operations. The newly created Chemical Warfare Service acquired its own supply responsibilities. In addition to having their own lines of responsibility regardless of the geographic structure, each of the bureaus received separate congressional appropriations.[11]

Just to complete the confusion, Pershing was in the process of finishing his own General Headquarters (GHQ) at Chaumont, with overlapping responsibilities. At that time the Army was just beginning to adopt the European staff model, with the G1 for administration, G2 for intelligence, G3 for operations, and G5 for training. The G4 was designated the coordination branch, in that its job was coordination of the various supply bureaus. In practice this became logistics.[12] During the World War I era, the term "administration" also incorporated what today is logistics, so there was some overlap between the G1 and G4. Initially all message traffic to the United States was routed through the GHQ for approval, even for

routine coordination. Not surprisingly, the passing of routine actions through GHQ led to delays and disagreements.

Figure 3.3 The work of feeding an Army that eventually reached two million Soldiers required extensive manual labor. Here, workers at Nevers Depot are loading subsistence on a train, April 1918. Photo courtesy of the National Archives.

If all of this seems difficult to follow on paper, it was much worse in practice. For example, the regulations did not define the relationship between the theater Chief Quartermaster and the Chief Quartermaster for the Line of Communications. The senior Quartermaster officer at each of the base sections had similarly undefined relationships. A resolution for any one of the bureaus did not necessarily carry to the others; each claimed to have its own needs.[13] All of the officers were lacking experience in their jobs, and many held responsibilities out of proportion to their rank. Personality clashes will be inevitable in new organizations, especially under high stress situations. Although staff work improved steadily over the course of the war, even simple decisions could be a difficult process.

For the reasons discussed in the previous chapter, American combat forces were slow to organize and deploy overseas. Yet given the sagging Allied morale, it was agreed that some American units should go overseas, if only to demonstrate the American commitment. One answer was to send nine engineer regiments, who supported the French and British by building and repairing railroads. Of these, the 11th Engineers (Railway) became the first American unit to fight as a unit in a surprise German attack during the battle for Cambrai.

The more important effort consisted of four infantry divisions. The 1st and 2nd Divisions were Regular Army; the 26th and 42nd Divisions came from the National Guard. The state of these organizations suggests just how unprepared the Army was for major warfare. Lacking a division structure, the Regular Army divisions were cobbled together from existing Army and Marine Corps regiments, with freshly organized brigade and division headquarters superimposed. Members of the 1st Division headquarters assembled for the first time during the voyage to France. Units for the 42nd Division were selected in order to provide a wide geographic representation. Soldiers consisted largely of recruits, with the veterans hastily promoted to leadership positions, although many of the National Guard Soldiers had served during the Mexican crisis. Pershing did not expect to employ these units in combat immediately, but to train them under French mentorship and then gradually introduce them to the fighting. Consequently they bivouacked in eastern France that winter.[14]

Conditions for these Soldiers demonstrated all of the problems in the American logistical organization. In their haste to show American combat power, leaders made a common mistake of sending the combat units ahead of an adequate support structure. Even the skeletal support structure that did exist suffered from the confusing lines of authority described above. Consequently, the situation became what has been described as the "Valley Forge" of the AEF.[15] Soldiers were billeted in drafty barns during the record cold. The wool shortage in the United States left them with insufficient blankets and clothing. Food was often lacking, leaving the Americans dependent upon the French or Canadians. One division lacked the vehicles to move its subsistence supplies and relied upon the kindness of the French to provide surplus vehicles. There were no provisions for care of casuals (personnel detached from their units). At that time, officers were expected to create their own mess organizations from their subsistence allowance; but the AEF had not yet created the procedures for selling food to the officers. Horses went hungry when shipments of oats were misrouted; and the drafty barns made their suffering comparable to the Soldiers. Improper management of shipments clogged the French railways. In a letter to the AEF Chief of Staff, Colonel Johnson Hagood, then commander of the Advanced Section, summarized the situation as of December 1917 with a detailed description of the travails of the Americans. He noted that the ignorance of their duties "not only applies to the machine as a whole but . . . to the individual officers and employees, none of whom has had experience in solving such a problem. In this, of course, I include myself."[16]

In response, the headquarters of the AEF directed one of the first efforts at rationalizing the support organization with General Orders 73 in December 1917. These orders delineated the duties of the various parts of the logistical organization. The supply bureaus were responsible for requisition of items within their responsibility, either in theater or from the United States. The commanding general of the Lines of Communication (LOC) was responsible for storage of materiel, construction, and personnel within the geographic area. At approximately the

same time, Pershing decided to remove Major General Richard M. Blatchford as commander of the LOC. For his replacement Pershing selected Brigadier General Francis Kernan, who was promoted to major general shortly afterwards. Upon receiving command, Kernan moved his headquarters to Tours, along the Loire Valley, and away from the General Headquarters. He selected Johnson Hagood as chief of staff, with the concurrent promotion to brigadier general.

Regarding railroad operations, General Orders 73 defined the AEF Transportation Service and the Director General of Transportation (DGT). The DGT reported directly to the commander of the AEF (i.e., General Pershing), and had complete authority over railroads under American control. That included decisions concerning the construction to be performed. (The AEF Transportation Service was distinct from the Army Transport Service, which was a transoceanic shipping enterprise dating back to the Philippine operations.)

The new organization produced some improvements, especially in the coordination with what were then termed welfare organizations to assist with the morale and care of the Soldiers (Red Cross, YMCA, Salvation Army, etc.). Yet the logistical structure remained unsatisfactory.

Railroads

Responsibility for the transportation system, especially railroads, remained the most persistent problem. That controversy would continue throughout the fighting, and then in the various memoirs afterwards. The problem originated with the failure to anticipate the tremendous role that military operation of railroads would play in the war. Previously, the Field Service Regulations envisioned that even in wartime, most railroad transportation would come through consignment to civilian railroads, and this was a logical job for the Quartermaster Corps. It was recognized that at times the Army might need to construct or operate its own rails when civilian services were unavailable, and so this job was assigned to the Corps of Engineers. Although assigned this mission on paper, the Corps of Engineers had demonstrated little expectation of performing the work in wartime, and thus did minimal preparation. At the outset of this war, the Americans unrealistically expected that the French railroad system, under French operation, would perform the bulk of the work moving the supplies across France.[17]

Concurrently with Pershing's arrival in France, a special railway commission determined otherwise. The lines running from the Atlantic to Lorraine were secondary routes because the important lines ran through Paris. In their best condition these lines were ill-prepared to handle the massive quantities soon to be crossing France. Years of warfare had taken their toll. Parts of the rails were scrapped for use at the front, and maintenance workers were now soldiers. Available locomotives and rolling stock were inadequate for the task. Moreover, the ports were too small and inadequately equipped for the proposed work, so they required considerable upgrades. In order to succeed, the United States needed to play a large role in the construction and operation of French rail and port facilities. The

revised concept involved initial reliance upon French operation of the systems, but gradually increasing American involvement with eventual transfer of portions of the railroad system to the United States. The US Army lacked the functional expertise for that type of work.

Figure 3.4 Loading coal onto an American locomotive at Montoir, 28 April 1919. Photo courtesy of the US Army Quartermaster Museum.

To meet the challenge, the United States turned to the corporate railroad community. William J. Wilgus, a railroad engineer in civilian life, was a member of the original railroad commission. Afterwards he remained within the AEF headquarters as head of a planning cell. Then on 31 August 1917, William W. Atterbury, the Vice President of Pennsylvania Railroad, arrived to become the Director General of Transportation, with the rank of brigadier general. Wilgus became the Deputy Director General of Transportation, with a rank of colonel. These men were able to bring other technical experts with them from the corporate world, but not quite to the extent they would have desired.

With the technical expertise, the railroad community brought an insistence that they were distinct from the other parts of the military community; and they required their own chain of command. Initially they were successful in getting the desired autonomy and freedom from outside interference, but the disputes continued. The transportation community also insisted upon final authority in the design and construction of the new port and rail facilities.[18]

For their part, the other members of the logistical community strongly believed that the railroads should be integrated into the larger command structure.

The division of authority led to frequent trading of accusations when shipments failed to reach their destination, including a case where horses went hungry for several days due to a misrouted shipment of oats. Hagood also described a visit to the port of St. Nazaire, where he observed most stevedores idle for lack of supervision and assignment of tasks.[19]

Railroad operations also required adjustments between the French and American systems. Although the United States depended entirely upon the French at first, that arrangement could not last because of the heavy demands of supporting the AEF. Consequently, increasing numbers of American railroad personnel began operating in France, but along the same railroad lines as civilian traffic. Not unexpectedly, each nation had different customs on how to manage their systems, which was another learning experience on both sides. Another difficulty arose from the shortage of French locomotives and cargo cars caused by the war. The United States supplied the deficit, with the rolling stock shipped in pieces and assembled in France. Yet the American cars and locomotives were considerably larger and heavier than French equipment. Thus French procedures for coupling their smaller cars did not work for the Americans. Inland waterways were largely used to move British coal up the Seine River.[20]

All trains moving from the ports or depots to the forward area entered the regulating station, in accordance with practices adopted from the French. The cycle began with the regulating officer, who served as the G4 representative with visibility over the supply situation among the combat units. He wired the consolidated requirements to the depots on a daily basis. Depots shipped only upon receipt of instructions in order to prevent encumbering the combat units with unnecessary supplies. Upon entry into the regulating stations, the trains were broken up and reassembled by destination. Typically each division required one train (about 25 cars) per day; but as justified a train might contain sub-units for each destination, designated by the French term of *rames*. At the division railheads, supplies might be stocked for a few days as insurance against interruption when the situation was relatively static. In other cases, the supplies moved directly from the railhead to the troops, with only a day's safety level. The Director General of Transportation maintained a representative at the regulating station, although some members of the Transportation Service believe they should control the regulating stations.

For the AEF the principal regulating station was at Is-sur-Tille, not far from the city of Dijon. Here the regulating station maintained its own warehouses, and it was co-located with other support activities. It moved rations for 796,285 Soldiers and 122,799 animals on its busiest day. To support Americans in the Vosges region, the AEF created another regulating station at Liffol-le-Grand. This was incomplete at the time of the Armistice, but it was later used briefly in support of the American occupation forces. Other regulating stations were created as the need arose; but these were simple sidings or marshalling yards where the cars were reassembled, without accompanying structures. The AEF established regulating stations at Le Bourget in support of the defensive battles during the spring of 1918, and another

regulating station at St. Dizier in support of the Meuse-Argonne Offensive. At other times the French and American forces shared regulating stations.

While that sounds simple in concept, in reality so many things could go wrong that the regulating officer was a key part of the smooth system. When supplies were insufficient, the materials were to be distributed equitably. The regulating officer needed to be familiar with the operational plans in order to manage shipments according to the commanders' tactical priorities. Ensuring that railroad cars were unloaded and returned to the system in a timely manner was another constant problem. [21]

American railroad specialists also introduced a system of tracing cars by numbering each car. Personnel were assigned to note the numbers on each train as it arrived at a destination and then report the results back by telegraph. The central office tracked the numbers on a large board and issued tracer bulletins when a car could not be found. The system improved the efficiency of scarce rolling stock.[22]

More Reorganization

By February 1918, Pershing concluded that the existing logistical command structure just was not working. He directed Hagood to convene a special board to study the problems of supplying the AEF with complete latitude for recommending any solution. As of this time, the doctrine was undefined and the Hagood Board was free to operate without preconceived notions. The most radical idea under consideration came from Atterbury, who argued that the work of logisticians was essentially a business operation, and therefore the Army should turn the entire enterprise over to civilian businessmen and let them operate it. Other proposals included maintenance of the status quo, or placing all responsibility under a single officer.

After a week's deliberation, the Hagood Board recommended a series of actions to strengthen the logistical command, and move much of the responsibilities away from GHQ. These recommendations became General Orders 31. The proposal changed the name of the command from Lines of Communication to Service of the Rear, although that name quickly changed to Services of Supply (SOS). Heads of the supply bureaus were to relocate to the SOS headquarters at Tours, but with representatives at GHQ in Chaumont. The SOS staff was allowed routine communications with the War Department without going through GHQ. The General Purchasing Agent (discussed in Chapter 6) also came under the authority of the SOS. Finally, the reorganization created a Service of Utilities, which included the Transportation Department, Motor Transport Service, Construction and Forestry Service, and a Division of Light Railways.

The Director General of Transportation and his staff were astounded by these changes. Previously Atterbury had reported directly to Pershing, and now there were two layers of separation away from the Commander-in-Chief. First he reported to the Chief of Utilities, and then to the commander of the SOS. The announcement

led to continued insistence upon reorganization, eventually producing eight reorganizations over 16 months. One of the most important changes came in July, which created a Transportation Corps that reported to the Commander of the SOS. It was a corps in the sense of a major organization existing within the AEF, not a congressionally approved branch of the Army.[23]

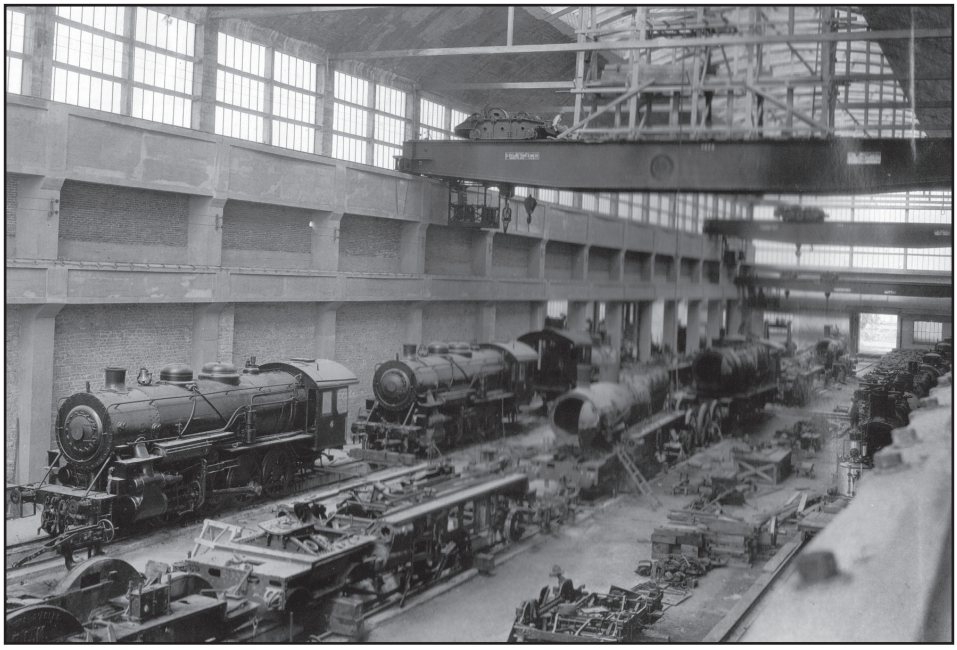

Figure 3.5 Steam locomotives from the United States were shipped in parts and reassembled in France. This photo shows the erecting shop at Nevers in September 1918. Photo courtesy of the US Army Quartermaster Museum.

The disputes became personal. In his memoirs, William Wilgus continuously complained about the failure of the military organization to appreciate the nature of railroad work, and attributed failures to the lack of autonomy for the Transportation Service. Interestingly, when naming the various cantonments for the Transportation Service in France, they selected corporate railroad executives instead of the customary military personnel.[24] Hagood's memoirs are similarly filled with complaints about the Transportation Service. At one point he commented that

> if we could ever get the people of the Transportation Department to consider that they were Army officers instead of transportation men dressed up in costume, nine tenths of our troubles would be over.[25]

Often Pershing was forced to mediate the disputes. Whenever such a level of distrust permeates an organization, otherwise manageable problems become that much more difficult to resolve.[26]

Eventually the problems were mitigated, but not quite resolved, by placing the Transportation Service directly under the SOS. Hagood clarified the responsibilities

by noting that although a base section commander exercises command, his use of that authority was bound by good sense and customs, with deference to the technical expertise of the railroad personnel. He used the analogy that a base section commander might have a hospital within his command, but he would not presume to dictate the details of a surgical procedure.[27]

Organizational disputes notwithstanding, the work of creating a logistical structure continued that winter. After the Americans surveyed the conditions of the French infrastructure, they began construction and improvements to the ports and rails. Engineer units arrived for both construction and cutting of trees to provide the lumber. Staff officers in both the SOS and the AEF headquarters immersed themselves in the new work.

Officers assigned to higher level staff work needed to adjust rapidly to their new responsibilities, and to think in terms of operational level logistics. Writing shortly after the war George C. Marshall reflected on the differences between working in the 1st Division and working on the AEF staff:

> I found myself in a strange atmosphere. These new associates had been working for a year on the plans and organization for an army of several million men. Questions of ocean tonnage, ports of debarkation, construction of docks, and great depots in these SOS – these fill their mind every day. . . . [In the 1st Division] we had been continuously in the line in immediate contact with the enemy. Our minds had been unconcerned with boats and ports and warehouses. Huge projects for the future made no appeal to us.[28]

Over 20 years later, this experience proved to be invaluable for Marshall's education.

Of course mistakes happened in the process, and often gained more attention than the successes. When construction crews arrived in late summer of 1917, they were missing their equipment. In one case, the War Department dispatched wooden pilings for port construction, but the ship's crew cut them in half so they could fit into the hold. Lacking priorities for requisitions, the AEF requested unnecessary items, and the War Department shipped even more material. Instead of much needed clothing, the AEF might find infants' undershirts. All of this led to some testy telegraph exchanges, but given the limited previous military experience at overseas operations the system was starting to work.[29]

Yet the critical problem was simply the insufficient numbers of both men and materiel for proper logistical preparation. The training programs in the United States were nearing completion and by summer well over a million Soldiers would be in France requiring food, ammunition, and all the other instruments of war. In the early spring of 1918 it was difficult to conceive of the structural requirements to move, store, and repair all that materiel; but in retrospect this was the pressing

need. In the coming months, Americans would need more ships' berths, more cranes, more lighters, more floating derricks, more stevedores, more engineers, more building material, more warehouse space, more warehouse personnel, more of everything. Locomotives and railroad cars were in particularly short supply.

To address this situation the AEF planned on bringing the American Army to France in what they termed "phases." Each phase would be sufficient for one corps. In addition to the infantry divisions and artillery, each phase contained sufficient troops designated for the SOS to support that increase in Soldiers. The plan might have alleviated the improper balance between combat and support troops; but it was not implemented. Instead the shipping schedules were altered to increase the numbers of infantry and machine gun troops at the expense of support personnel.[30]

Notes

1. Donald Smythe *Pershing, General of the Armies* (Bloomington, IN: Indiana University Press, 1986), 12-21.

2. Edward M. Coffman, *The War to End All Wars: The American Military Experience in World War I* (Lexington, KY: University Press of Kentucky, 1986), 168-174; David R. Woodward, *The American Army and the First World War* (Cambridge, UK: Cambridge University Press, 2014), 136, 216, 231-232, 240, 307-309; see also Report on Relations with the Allies, *United States Army in the World War 1917-1919* (Washington, Government Printing Office, 1948) 12:77-78.

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5. Hagood, *Services of Supply*, 181-184.

6. ABMC *American Armies and Battlefields in Europe,* provides a complete list of construction on pages 442 to 477; See also Wilgus, *Transporting the A.E.F.*, 313-362; and *Notes on the Transportation Service, American Expeditionary Forces in the World* War monograph 11 *Operations of the Quartermaster Corps, US Army During the World War* (mimeographed history by the Quartermaster School, Schuylkill Arsenal, 1929), 20-28; Report of the G4, *US Army in the World War*, 14:251-253.

7. Chambrun [Jacques Aldebert de Pineton] and [Charles] Marenches, *The American Army in the European Conflict,* trans by the authors (New York: The Macmillan Company, 1919), 102.

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12. Report of the G4, *US Army in the World War*, 14:62.

13. Hagood, *Services of Supply*, 74-75 & passim.

14. James Scott Wheeler, *The Big Red One: America's Legendary 1st Infantry Division from World War I to Desert Storm* (Lawrence, KS: University Press of Kansas,

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15. Marshall, *Memoirs of My Service in the World War*, 52-53.

16. Hagood, *Services of Supply,* 52-57; Smythe, *General of the Armies*, 66-70; Robert L. Bullard, *Personalities and Reminiscences of the War* (Garden City: Doubleday, Page, & Company, 1925), 108; Wheeler, *The Big Red One*, 30-31.

17. Wilgus, *Transporting the A.E.F.*, 136-137, 162 & passim.

18. Wilgus, *Transporting the A.E.F.,* passim.

19. Hagood, *Services of Supply*, 79-80, 105-109, & passim.

20. Wilgus, *Transporting the A.E.F.*, 388-395 & passim.

21. Hagood, *Services of Supply*, 68, & passim; Wilgus, *Transporting the A.E.F.*, 38-39; Report of the G4, *United States Army in the World War*, 14:68-69, 172, 191-193; Chambrun and Marenches, *American Army in the European Conflict*, 110-112.

22. Chambrun and Marenches, *American Army in the European Conflict*, 351.

23. Wilgus, *Transporting the A.E.F.,* 152-161 & passim.

24. Wilgus, *Transporting the A.E.F.,* 384.

25. Hagood, *Services of Supply*, 232-233.

26. Wilgus, *Transporting the A.E.F.*, passim; Hagood, *Services of Supply*, passim; James A. Huston, *Sinews of War: Army Logistics 1775-1953* (Washington, DC: Office of the Chief of Military History, 1966), 368-369.

27. Hagood, *Services of Supply*, 233-234.

28. Marshall, *Memoirs of My Services in the World War*, 120-121.

29. Smythe, *General of the Armies*, 50-53.

30. Hagood, *Services of Supply*, 297-298; see also John J. McGrath, *The Other End of the Spear: The Tooth to Tail Ratio (T3R) in Modern Military Operations* (Fort Leavenworth, KS: Combat Studies Institute [2007]), 11-13.

Chapter 4
Pressing Forward

Even as the AEF was developing its logistical infrastructure, changes within the United States and in Europe altered the nature of American participation. During the first year of America's official involvement in the war, the United States remained very slow in committing its forces to battle, much to the frustration of its allies. For reasons discussed in the first two chapters, it required time to train divisions in the United States and then to transport the troops to Europe. Once in Europe, Pershing wanted to ensure success for the first units to engage in combat, so he applied an additional two months training in theater. All this was in keeping with Pershing's desire to commit his force as a competent, independent American Army. As of the close of May 1918, the United States had slightly over 500,000 Soldiers in France, but occupied only 23 miles out of the 522 mile front, and had only fought defensively.[1]

Figure 4.1 Mule wagons moving supplies forward. Although mules were indispensable, feeding them presented another logistical problem. Photo courtesy of the US Army Transportation Museum.

Understandably the Allies began to wonder when the Americans actually would fight. An unidentified Frenchman expressed the sentiment with his comment that "We expected two million cowboys to throw themselves upon the Boches, and we see only a few thousand workers building warehouses."[2]

Despite the Allies' doubts, the US Army was on its way to Europe. National Army and National Guard divisions were completing training and preparing to

embark. Artillery and supporting units were similarly ready for overseas movement. The transportation and regulatory crises were showing signs of resolution as the war industries finally established production lines. The American transport fleet increased from a meager 13 ships at the outset to 616 ships; and containment of the submarine menace eased the shipping problem. British ships also became available to move the Americans. Soon this mighty force would arrive in Europe on a compressed schedule.[3]

German Offenses and Allied Counterattacks

Even so, the outcome of the war remained in doubt. Italy's defeat at the Battle of Caporetto in October 1917 freed German troops for action against France. Then in November the Bolsheviks seized control of Russia with the intention of quitting the war; and by March 1918 they signed a peace treaty with Germany, freeing even more German divisions for the fight on the Western Front. Beginning in mid-February 1918, Germany transported 44 divisions, packed into 10,400 trains, from Russia to the Western Front opposite the British lines.[4] With its new strength Germany was certain to launch offensive actions in the spring of 1918, with the expectation of ending the war before the Americans were ready.

Figure 4.2 Supply trucks moving through Chateau Thierry 26 July 1918. Photo courtesy of the US Army Quartermaster Museum.

German offensives began on 21 March 1918 with a crushing assault on the British lines in northern France. On 2 April they followed with another offensive in Flanders along the French Belgian border. The third offensive began in May along the Marne River and a ridgeline on the approach to Paris known as the Chemin Des Dames, once again threatening Paris.

In the crisis Pershing agreed to dispatch American units to fight alongside the French in key areas. The first action came with the movement of the 1st Division to the Picardy region, where they performed impressively in taking and holding the village of Cantigny from 27 to 31 May. As the Germans pressed a second attack along the Marne, the United States rushed the 2nd and 3rd Divisions to the defense of Chateau Thierry and the Marne. The 2nd Division was especially noteworthy because one of its brigades consisted of United States Marines. As the battles continued, more American units moved to the defense along the Aisne and Marne Rivers. By early August the American presence consisted of two corps (I Corps and III Corps). The 1st, 2nd, 3rd, 4th, 26th, 28th, 32nd, and 42nd Divisions, plus supporting artillery, engineers, Air Service units, and others, all participated in the fighting. Pershing agreed that American divisions in training with the British were available as reserves in the event of further German breakthroughs in that sector, but fortunately that did not happen. That July and August, the French and American forces worked together in the Soissons counter-offensive that turned the course of the war against Germany.[5]

Resupply to these divisions presented some new problems because they were now operating well out of the American base region in Lorraine and within the French sector. The task of coordinating the support fell to the G4 of the AEF, who developed the procedures in coordination with his French counterparts. In the case of the 1st Division at Cantigny, the French and Americans had already developed protocols for supporting isolated American divisions. Most of the supplies, including subsistence, came from the French, but American Soldiers needed or wanted some peculiarly American supplies and foods. Therefore the AEF sent supplementary shipments to the same French regulating station that supported the Americans. The American and French railroad cars were joined into a single train to the American division. Units smaller than division size relied upon the French except for occasional American shipments.

As the American buildup along the Marne continued that summer, the French were not capable of supporting such a large force, and not all equipment or subsistence was compatible. In response, the AEF G4 scrambled to create a regulating station at Le Bourget. The action was taken so quickly that trains for the 2nd Division were halted and rerouted while the division maneuvered to its position. This particular regulating station had no storage areas. It simply consisted of sidings where trains could be broken up and reassembled for the division railheads. Most of the shipments came directly from the depot at Gièvres; but the G4 also established a backup supply dump at Lieusaint. Situated about 25 miles southeast of Paris, Lieusaint was poorly situated for support to the front, but safety from the attacking Germans was the overriding consideration for its location. As a general depot, it contained representation from all the supply services. For the purposes of these battles, I Corps created a Provisional Supply Train that endured from 18 July to 6 August.

Divisions in training behind the British relied upon Britain for supplies, despite cultural differences in eating habits. The British attempted to provide coffee instead of tea, but not always successfully.

The system worked, but with its complications. The tendency of French commanders to move American organizations played havoc with the logistical support. Americans still relied heavily upon informal arrangements for sharing supplies with the French, an agreement that worked heavily to the American advantage. With a strength of 28,000 Soldiers, an American division approximately equaled two European divisions, which produced greater fighting power but also required the French to adjust their logistical thinking.[6]

In matters other than supply, assistance for these battles came from the frequent sharing arrangements between the French and American forces. Until 16 July the French provided some of their French Territorial units as labor for I Corps; but they were withdrawn as the French need for these troops developed. Hospitalization at this phase came through the French, which produced problems of language and differences in customs. After visiting the American wounded, Pershing felt confirmed in his belief that American Soldiers would be better off with their own support systems.[7]

Amalgamation and the Abbeville Agreement

The German offensive once again brought the amalgamation question to the foreground. As early as January, the British had suggested that the Americans forgo more artillery, engineers, and support troops in favor of infantry and machine gun battalions to be fed directly into the British divisions. Soon the French revived their requests for a share of American infantry Soldiers. Pershing withstood all pressures for amalgamation of American units, believing that once infantry battalions were placed with the British or French they would be extremely difficult to recover for the eventual American Army.

British shipping capacity provided them with additional leverage. Beginning in late winter the British suggested that they could increase the number of ships available for emergency transportation of American Soldiers to France, provided that the shipping space be used for infantry and machine gun units. Pershing objected that without the artillery and support troops the Americans would not be capable of forming an independent Army, and thus the new units would be amalgamated into the British forces. In turn, the British argued that the reversals on other fronts opened the possibility of a German victory before the United States could form an Army; and they needed infantry to prevent a disaster. Skeptical of the British claims, Pershing maintained his insistence on an American Army. For the next few months Britain, France, and the United States engaged in complicated negotiations regarding the deployment and use of American troops. Britain unsuccessfully tried to use its contacts in Washington to bypass Pershing, and the French pressed their demands for more American troops in their formations. Wilson deferred to Pershing in assessing the military situation.

Eventually the discussions concluded with the Abbeville Agreement of May 1918. The agreement recognized the eventual formation of an independent American Army in principle, but drastically altered the shipping schedules to meet the perceived emergency. Britain agreed to provide extra shipping to transport the infantry and machine guns for another seven divisions in May and six divisions in June; but these were to be without the artillery and supporting troops. The numbers of troops destined for the SOS was reduced drastically, and the agreement further provided that additional space would go to transporting more infantry and machine guns. The divisions transported in May were to be placed behind the British front, where Britain agreed to support and train the units. In return, these divisions were available as a reserve in the event of a German breakthrough. Pershing could designate the location for the six divisions transported in June; and these divisions were placed behind the French lines in response to the German offense along the Chemin des Dames. Pershing did retain the authority to withdraw these units into the AEF at an unspecified future date. Essentially the agreement accepted the principle of an independent American Army, while removing the logistical wherewithal to support this force.[8]

Increasing Workloads

For the SOS, the Abbeville Agreement highlighted the problems of personnel. It was already short of the desired strength levels, when the agreement reduced the numbers of SOS troops scheduled for movement to France, creating a short term problem. Over the longer term the problems multiplied in September when those infantry divisions shipped without the proper complement of supporting personnel transferred from the British to the AEF, and the SOS somehow needed to support them.

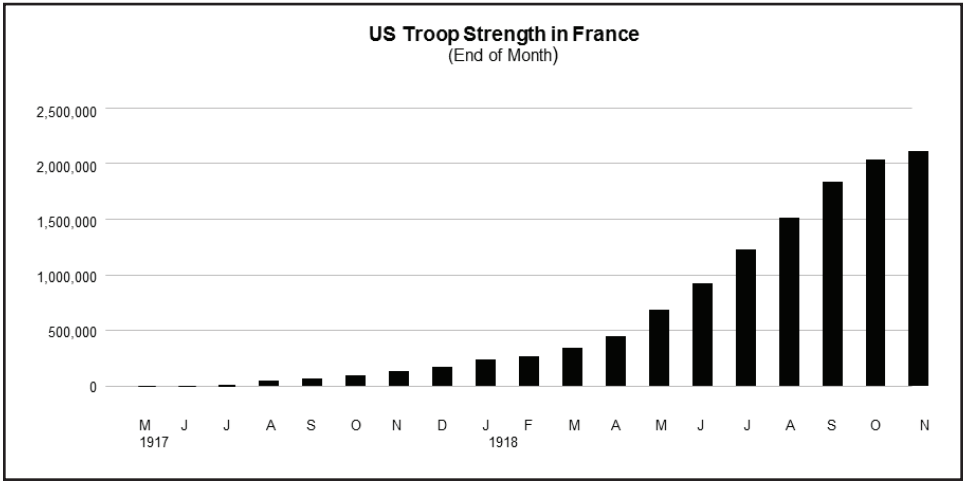

Figure 4.3 US Troop strength in France. Chart created by the author.

In fact, the SOS struggled with personnel problems throughout the war. Even before the Abbeville Agreement it was badly undermanned, but Army personnel management procedures made it extremely difficult to document and justify increased numbers.[9] Even maximum use of local labor could not quite compensate for the shortages of logistical Soldiers. Now as the AEF was nearing active fighting, the ratio of SOS troops to the combat troops became even worse.

Beginning in June, transportation of Soldiers to France increased dramatically, reaching a peak of over 50,000 Soldiers arriving in one day on 21 September. The number of American Soldiers in theater reached 2 million by the end of the war, as illustrated in the table on the previous page. The troop strengths are as of the last day of each month, except for November 1918, which is the end of the war.[10]

For the logisticians, the challenges were awesome. It is true that the British temporarily supplied some of those divisions behind the British lines, but otherwise the SOS needed to unload and move supplies for the exponentially increasing numbers of American Soldiers, in addition to all of the other sustainment functions.

As shown in the following chart, tonnage did increase dramatically, just not enough to support the growing Army. In fact, for all of the increased activity in the supply system, when measured by the numbers of supported troops, the quantities fell. In June the SOS moved 33 pounds per man per day; by July the number fell to 25 pounds per man per day. During early summer the system was still capable of supporting the existing Army in France, including the safety level. Yet the future prospects of an inexorably increasing force threatened to overwhelm the logisticians.[11]

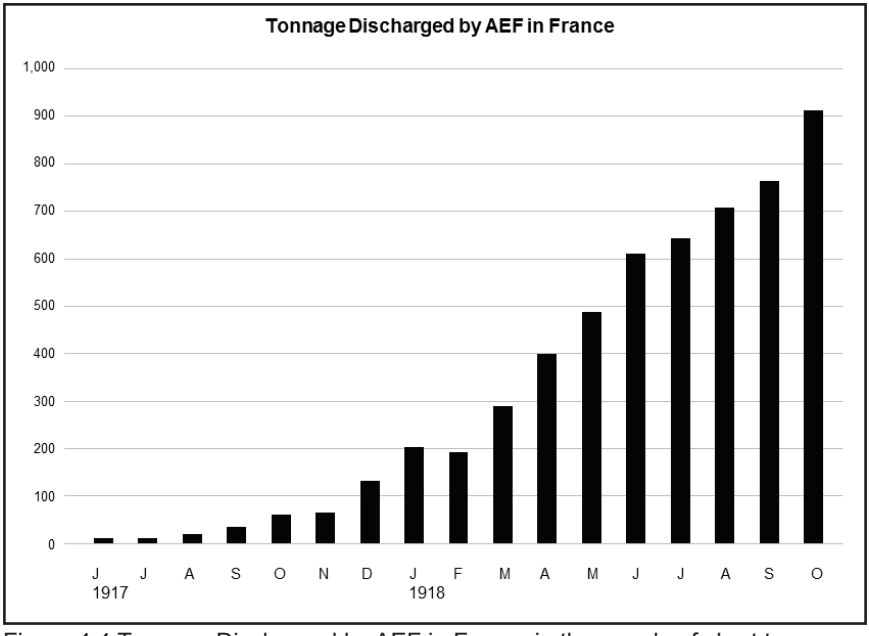

Figure 4.4 Tonnage Discharged by AEF in France in thousands of short tons. Chart created by the author.

In early June 1918 Pershing estimated that he would require 66 divisions in France by July 1919. Yet soon reports reached the Allied armies that Germany was seeking to recruit volunteers within Russia. Whether realistic or not, these reports created a corresponding increase in demand for American Soldiers in 1919. While conferring at Versailles on 1 and 2 June 1918, George Clemenceau, David Lloyd George, and Vittorio Orlando presented a joint message to Woodrow Wilson not only urging more infantry and machine guns, but also strongly urging that the American Army should be increased to 100 divisions at the earliest opportunity. In response, Pershing steadily increased his requirements and on 23 June he also endorsed the proposal for 100 American divisions by July 1919. Given the enormous size of an American division, this proposal would have created an American Army equal to the 200 German divisions in France. Depending on how you calculate the need for replacements and support troops, the total came to somewhere between four and five million Soldiers, an unsupportable number. The War Department reduced the number to 80 divisions, which meant 64 combat divisions and 16 divisions for replacements (called depot divisions) by summer 1919, which still would have been an extraordinarily ambitious strength. Pershing chose to interpret the guidance as 80 combat divisions plus the depot divisions, and he continued to plan for 80 combat divisions despite cables from the War Department. Pershing later admitted that he would have been surprised to see 66 divisions, suggesting that he was pushing for the highest number he could get.

In any case, the effect within the logistical communities on both sides of the Atlantic was astonishment. Even if the United States could overcome the manpower, industrial production, and shipping problems, supporting even the lower numbers would be problematic in France. The French simply did not have the ports or the railroads to move the cargo across France. Americans were diligently working to expand the capacity of Bassens and Montoir, in addition to opening the substantial port of Marseille. Yet with all of these expansions, supporting even the lower numbers would have been questionable at best. Until the end of the war the AEF continued to prepare for a vastly expanded force, although the exact size was uncertain.[12]

Change in Leadership

Up to this time, the achievements of the Services of Supply had been impressive but insufficient for the magnitude of the war. With only the vaguest doctrinal notion of how to operate a theater-level sustainment system overseas, they fashioned a framework that adjusted to the situation in France. With no previous Army experience, the SOS created new units for port operations, transportation, construction (to include forestry), and a wide variety of other operations. It established a coordinated process for overseas purchases, which will be discussed later. The system of ports, rails, and depots would have been difficult to comprehend in earlier years. Even with all of these accomplishments, the SOS was falling behind

in meeting the seeming insatiable demands of the AEF for more supplies, even without the expected huge increases forecast.

Maintenance of reserve stockage levels complicated the logisticians' jobs even further. Fearful of disruption of their supplies from the United States, AEF leaders wanted to keep 90 days of supplies on hand. This was to be distributed at 45 days in the base sections, 30 days in the Intermediate Section, and 15 days in the Advanced Section. Attempting to manage these quantities for an ever-increasing army consumed even more manpower and resources; and they simply could not reach their goal. Nevertheless during the hectic days of the Meuse-Argonne Offensive these reserves provided a needed cushion.[13]

From the War Department perspective, ships' turnaround time constituted the most troublesome performance issue. Although the United States was making substantial progress with the shipbuilding problems by the summer of 1918, cargo ships were still a valued commodity, and time spent waiting to be unloaded in France was time lost for moving supplies. In part, the convoy system contributed to the delay, yet a major problem was simply slow work at the ports. Even as ships were off-loaded the cargo piled up near the docks and in the port because of an inability to transport it inland.

As reports of the backlog in cargo discharge reached the War Department, proposals were developed for a major reorganization of the supply structure in France. In order to relieve Pershing of the burdens of running both the combat and the logistics, it was proposed to remove the SOS from the AEF and make it directly subordinate to the War Department. George Goethals, who was then the Acting Quartermaster General, was to go to Europe and assume command of the supply system in a coordinating capacity to Pershing, not as a subordinate. Direction for the supply system would come from Washington.

Secretary of War Newton Baker wrote to Pershing on 6 July 1918 with the suggestion for the reorganization, but with the promise he would take no action until Pershing had the chance to reply. Forewarned about the proposal, Pershing wasted no time in responding. Within two days he answered with two telegrams and two letters outlining his opposition to the idea. He held that the theater commander must have control over his resources in order to achieve a cohesion of effort. Pershing won the argument and the expectation has remained within the US Army that the theater commander controls the logistics.

At the same time, Pershing recognized that he needed to make some changes in the SOS, partly to respond to the War Department and partly to improve its performance. According to Pershing's account, he had considered replacing Francis Kernan as commander of the SOS previously, but the War Department proposal accelerated his actions. He found a position for Kernan negotiating prisoner of war issues with Germany in Switzerland. For the new SOS commander he reached out to one of his most trusted subordinates and friends, Major General James Harbord, who had worked closely with Pershing as the AEF Chief of Staff before getting

his chance to command the 2nd Division. Upon receiving the letter from Secretary Baker, Pershing summoned Harbord away from his division just after the successful defense at Chateau Thierry and asked him to forgo command of his division and possible command of a corps in order to command the Services of Supply. Although disappointed at losing his combat command, Harbord agreed.[14]

Immediately after assuming command, Harbord and Pershing commenced a tour of the entire SOS structure. Overall the performance of the SOS exceeded the initial estimates; yet individual performance could be mixed. The Bordeaux Base Section area reflected considerable difficulties, especially in the employment of stevedores; but the depot at Gièvres was operating efficiently despite the massive volume of traffic.

In addition to the fresh perspectives of a new commander, Harbord carried with him the close personal relationship and trust of Pershing. He was able to resolve issues on his own authority that might have previously been referred to the AEF General Headquarters. He was also allowed greater latitude in corresponding directly with the War Department, eliminating time consuming delays at the AEF headquarters. With his perceived greater stature, he was able to persuade the railroad community to agree to a new organization, whereby the transportation officers became subordinate to the base section commanders. The system resolved the issue of divided responsibility for employment and management of the stevedores and other workers in the community; yet it came with the assurances that a base section commander had no intention of interfering with the technical details of railroad operations.

Harbord further insisted that his job required a personal presence within the working areas, not simply commanding from the headquarters. He converted a special train into a traveling headquarters. It included sleeping and dining facilities so that Harbord and his staff traveled at night while sleeping and then spent the next day inspecting. A traveling telegraph section allowed him to remain in touch with the SOS headquarters at Tours. During his first one hundred days in command he spent 51 traveling. He provided encouragement and rewards, took action with leaders not performing, and made immediate decisions as necessary.[15]

Perhaps the "Race to Berlin" constituted Harbord's best recognized innovation. He reasoned that men work best when offered rewards and recognition for their accomplishments, but two problems stood in the way of any systematic rewards program. First, he needed to find a suitable incentive. Troops were not interested in a chance to fight at the front, so Harbord decided upon the opposite, by offering the best performing units priority in going home, plus possible leaves. Second, he needed to find a fair method of competition. Every port was different in size and operational capabilities, so they could not compete on the basis of tonnage. Then someone suggested having each unit compete against its own record, using percentage of improvement. Each week the SOS headquarters tabulated performance numbers and announced the weekly winner. Either the prospect of rewards

or simply the knowledge that the higher headquarters appreciated their work had its effect. During Harbord's tenure, cargo handling increased by 20 percent and average ship turnaround time decreased from 14 to 11 days.[16]

Figure 4.5 The 195th Infantry band helps the stevedores for the port of Marseille celebrate victory in a periodic competition for the "Race to Berlin," 14 November 1918. Photo courtesy of the US Army Quartermaster Museum.

Harbord's leadership had produced remarkable progress, but sooner or later room for substantial improvement will end. The numbers of Soldiers and the cargo requirements continued to increase relentlessly even as the SOS performance leveled off. The United States Army simply did not have the proper mix between the support troops and the combat troops. Then the Abbeville Agreement threw the proportion of service to combat troops further out of balance; and the problems were expected to increase as the divisions moved from British to American control in September. In August the SOS calculated that even if American shipping were devoted exclusively to service units, the AEF would remain out of balance until November. To compound the problem further, France lacked the locomotives, railroad cars and similar equipment; these were not arriving either. Pershing urgently cabled the War Department to stop sending infantry and instead send service troops and artillery. He was informed that it was impossible to change the schedule for units underway.[17]

On 10 August 1918, the expectation of a fully independent American Army became a reality with the activation of the First United States Army. Soon it was expected to assume responsibility for major offensive combat operations. At that

time the Allies did not believe they could defeat Germany until 1919; but they did intend to regain lost territory through coordinated offenses. Pershing was anxious to see the AEF play a major role as an independent force; and that required a capable logistical system. Yet the system was already severely stressed and likely to get worse in the event of combat. During the climatic battles that autumn, the AEF strained every resource to keep the Army moving.

Notes

1. American Battle Monuments Commission, *American Armies and Battlefields in Europe: A History, Guide, and Reference Book* (Washington, DC: Government Printing Office, 1938), 501-502.

2. Donald Smythe, *Pershing: General of the Armies,* (Bloomington, IN: Indiana University Press, 1986), 69; David R. Woodward, *The American Army and the First World War* (Cambridge, UK: Cambridge University Press, 2014), 166. For more comments on European displeasure during this time see Isaac F. Marcosson, *S.O.S. America's Miracle in France* (New York: John Lane Company, 1919), 22-23.

3. Edward M. Coffman, *The War to End All Wars: The American Military Experience in World War I* (Louisville, KY: University Press of Kentucky, 1998), 182.

4. Woodward, *The American Army and the First World War,* 153.

5. *Order of Battle of the United States Land Forces in the World War* (Washington, DC: Government Printing Office, 1937), 1:193-197, 237-238; John S.D. Eisenhower, with Joanne T. Eisenhower, *Yanks: The Epic Story of the American Army in World War I* (New York: The Free Press, 2001), 121-175; James Scott Wheeler, *The Big Red One: America's Legendary 1st Infantry Division from World War I to Desert Storm* (Lawrence, KS: University Press of Kansas, 2007), 34-62; George C. Marshall, *My Experiences in the World War, 1917-1918* (Boston: Houghton Mifflin Company, 1976), 75-118.

6. Reports of the G3 and G4, *United States Army in the World War* (Washington, DC: Government Printing Office, 1948), 14:25, 69-75; *Order of Battle of the US Land Forces in the World War,* 1:194. See also Brigadier General Mosley's statement in the *Report of the Military Board of Allied Supply* (Washington, DC: Government Printing Office, 1924), 1:206-211.

7. I Corps correspondence, *US Army in the World War*, 5:32; Smythe, *General of the Armies*, 141.

8. Smythe, *General of the Armies*, 74-80, 105-119; Johnson Hagood, *Services of Supply: A Memoir of the Great War* (Boston: Houghton Mifflin Company, 1927), 296-311: Peyton C. March, *The Nation At War* (Garden City, NJ: Doubleday, Doran & Co. Inc., 1932), 251-254; Edward M. Coffman, *The Hilt of the Sword: The Career of Peyton C. March* (Madison, WI: University of Wisconsin Press, 1966), 91-94; Woodward, *The American Army and the First World War,* 239-241.

9. See Chapter 5, pages 88-90.

10. ABMC *American Armies and Battlefields in Europe*, 502; Report of the Services of Supply, *US Army in the World War*, 15:23.

11. Hagood, *Services of Supply*, 264-265.

12. Smythe, *General of the Armies*, 146-148; Coffman, *War to End All Wars*, 177-183; John J. Pershing, *My Experiences in the World War* (New York: Frederick A. Stokes Company, 1931), 2:81, 105-109, 121, 148; [John J. Pershing], *Final Report of Gen. John J. Pershing, Commander-in-Chief American Expeditionary Forces* (Washington, DC: Government Printing Office, 1920), 28-29; Coffman, *Hilt of the Sword*, 85, 94; March, *The Nation at War,* 251-253.

13. Steve R. Waddell, *United States Army Logistics: From the American Revolution to 9/11* (Santa Barbara: Praeger Security International, 2010), 118, 125.

14. The story of the War Department proposal and Harbord's subsequent transfer to SOS has been told many times, most notably in James Huston, *The Sinews of War: Army Logistics 1775-1953* (Washington, DC: Office of the Chief of Military History, 1966),

361-363; Smythe, *General of the Armies*, 161-168; Coffman, *The War to End All Wars*, 175-176, 184; Hagood, *Services of Supply*, 258-262; James G. Harbord, *The American Army in France, 1917-1919* (Boston*:* Little, Brown, and Company, 1936), 346-352. See also, March, *The Nation at War,* 193-196.

15. Harbord, *American Army in France*, 380-381; Smythe, *General of the Armies*, 166; Huston, *Sinews of War*, 365.

16. Huston, *Sinews of War*, 367; Harbord, *American Army in France*, 391-392.

17. Harbord, *American Army in France*, 400. See also John J. McGrath, *The Other End of the Spear: The Tooth to Tail Ratio (T3R) in Modern Military Operations* (Fort Leavenworth, KS: Combat Studies Institute [2007]), 11-13.

Chapter 5
Evolution of Sustainment Functions in Theater

Activities that today would be termed sustainment functions evolved and improved during World War I in ways that would have a lasting influence on support of the Soldiers. For the most part, combat sustainment at the beginning of American involvement was in a primitive stage following years of frontier duty. The Spanish-American War and the Philippines operations did little to overcome this lack of interest. Yet this war required new solutions, so the logistical and administrative personnel found ways to adapt. New technologies, especially the internal combustion engine, provided opportunities for better support while simultaneously creating new forms of work for the sustainment community.

The third and fourth chapters of this study focused on the macro-logistical situation, especially creating the port and railroad structure to move supplies from the ships to the Zone of the Armies. For the purposes of this study, distribution to the using unit is treated as one of the sustainment functions to be covered in this chapter.

Short Distance Transportation

Where possible, distribution beyond the divisional railheads for the standard gauge lines went next to a narrow gauge railroad. At a 60 centimeter (or 23.6 inch) gauge, these were light enough for ease of operation, but still with many advantages of a rail system. It was easier to move cargo along the rails, and the rails avoided the damage to the muddy roads caused by vehicles. Ideally they were laid out in a pattern about three miles apart, but connected to each other so that artillery damage to one line would not stop the operations. Engines might be steam or gasoline. Gasoline engines had the advantage of avoiding the smoke that invited enemy artillery, but the engines were not so powerful, and thus they required three gasoline engines to equal one steam engine.[1]

Beyond the narrow gauge railroad, distribution of supplies depended upon draft animals and motor vehicles. In the early 20th century, horses and mules remained an essential part of Army logistics, but with significant complications. On average, a horse or mule required between 20 and 25 pounds of forage per day, creating another logistical requirement just to feed them, and not always successfully. Moreover, handling of the animals required skills that were in diminishing supply. On one occasion Brigadier General Hagood reported finding a remount depot where the horses were badly overcrowded and deep in muck. The only personnel to care for the animals were infantry Soldiers with no experience with horses.

The biggest problem, however, was simply that the United States could not get enough animals. Initially the Quartermaster Corps expected to purchase horses in France. When that supply proved to be too small, they turned to Spain or other nearby nations, with little success. Afterwards the Quartermaster expanded its

remount service in the United States, but still with insufficient supply. Artillery units competed with the supply units for the horses available. Pershing considered the lack of animals to be one of the biggest problems in the AEF. Altogether the United States acquired about 248,000 horses from both America and Europe.[2]

Figure 5.1 A horse is treated for mange near Beaumont, January 1919. Animal care was a constant logistical challenge and the inability to care for horses properly resulted in frequent suffering by these animals. Photo courtesy of the National Archives.

Disposing of the horses required careful negotiation with the French. At first when a horse was unfit for service it was simply sold to nearest butcher for meat. The French government believed many of these animals could be rehabilitated for farm use, and the nation needed every horse it could get. Consequently the French agreed to a flat purchase for every condemned animal regardless of condition. If a horse died, then it would be salvaged for its hide either by Americans or local French civilians.[3]

Motor vehicles had the potential to compensate for the shortage of draft animals with even more versatility. Unlike animals, they did not consume the massive quantities of forage, which was a considerable benefit. They were available for supply distribution work and a wide variety of other utility functions. Yet shortages of vehicles and mismanagement bedeviled the motor transport community as well. Until the Mexican Expedition of 1916, the US Army displayed little interest in trucks as a means of logistical support. When trucks proved their value in Mexico, the Army suddenly began purchasing large quantities of trucks without much of an overall concept. As a result by the close of World War I, the Army had 294 different models of motor vehicles in its inventory. The standardized Liberty Truck was slow to arrive.[4]

In Europe, each of the supply bureaus and other organizations acquired its own fleet of trucks. Believing it would be more efficient to consolidate the supply,

the AEF created a Motor Transport Service as part of a Department of Utilities within the Services of Supply. In July 1918 the Department of Utilities was terminated and the Motor Transport Corps (MTC) became a separate, subordinate command, reporting to the Services of Supply. It operated as part of the SOS, and geographically within the communications zone. Even within the SOS, the MTC only controlled a portion of the trucks, which they pooled in support of different transportation requirements. Other units kept their assigned vehicles, and the MTC supported these vehicles by providing uniform policies for vehicles and convoys, developing a comprehensive training program, and managing an integrated maintenance/repair parts effort. Perhaps the last function was most important.[5]

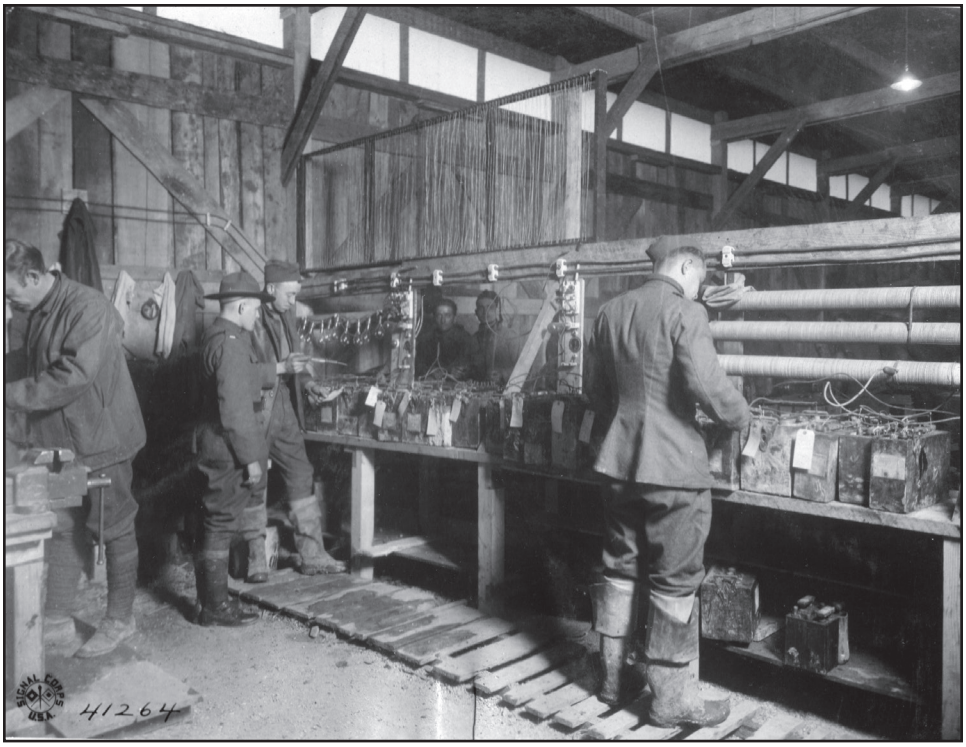

Figure 5.2 Battery room of the Motor Transport Corps overhaul park at Neufchateau, 12 December 1918. Photo courtesy of the National Archives.

Regardless of the organizational lines, the Army simply did not have nearly enough trucks. As of the end of the war, the Army had 32,952 trucks of all varieties for a force approaching 2,000,000 Soldiers, or about 50 percent of the number prescribed by the meager organizational tables; about 8,000 were the standardized model Liberty Truck. Even these few vehicles suffered from extremely high maintenance problems. The AEF only had about 30 percent of the number of drivers required. Taken together, the shortages of both trucks and draft animals constituted a serious handicap.[6]

Army logistics of that era maintained a firm separation between the different organizations; therefore the Motor Transport Corps created its own maintenance and repair parts system. It shared many characteristics of the other maintenance efforts, but with some adaptions intended to counter the repair parts problems. Like so many of the logistical programs, this system was just beginning to function by the war's end.

A contemporary manual by the MTC established a vision for how the program was expected to operate once fully mature. The system relied upon echeloned maintenance similar to what the Army later used throughout the Cold War. Vehicles entered the maintenance system through the service parks, which performed the relatively simple work and returned the vehicle to the unit. If the repair requirements exceeded the capabilities of the service park the vehicles were evacuated to the overhaul park. At the overhaul park they were disassembled and each of the major components repaired before reassembly. Repaired vehicles returned back to the supply system, not to the original unit. Reconstruction parks accepted vehicles with extensive damage. Where necessary vehicles could be salvaged, often for the non-ferrous metals. The reconstruction park also performed a wide variety of other services on request, including cutting some cross beams for telegraph poles at the request of the Signal Corps. Maintenance activities were supported by sub-depots for repair parts.

With almost 300 different models of motor vehicles and about 90,000 different items, repair parts quickly became the major stumbling block for vehicle maintenance. Many vehicles were purchased in Europe, without provisions for obtaining repair parts. Supposedly, repair parts worked on the automatic supply system, but the manufacturers' forecast depended upon peacetime usage, which had no relation to the stresses of wartime demand. Processes for identifying, sorting, and storing parts were still evolving and ineffective. In addition to the parts, repair equipment and specialized tools were slow to arrive.

The MTC proposed to remedy the situation by grouping the different models geographically so that one service park needed to repair the fewest number of models feasible. This arrangement was designed to limit the stockage of parts, specialized tools, catalogs, and manuals to supporting vehicles in the vicinity of each park. New repair parts were to enter the system through the main depot and then go to the sub-depots that supported maintenance activities requiring those parts. A service park normally was expected to carry a ten-day supply of the commonly used items for the models that it repaired. In theory, the system was expected to limit the number of lines carried by the sub-depots to those needed to maintain vehicles in their vicinity, if implemented.

If the war had continued into the summer of 1919 as expected, the reorganized Motor Transport Corps might have mitigated the perpetual problems with maintenance and repair parts; but the Report of the AEF G4 states that the policies were never fully implemented and describes the assignment of different models

geographically as "very incomplete." Increased use of the Liberty Truck as a standard model might have further eased the repair parts problems, if they had arrived earlier and in larger numbers. During the course of the fighting, maintenance for motor trucks remained abysmally poor. Units often declined to surrender badly damaged vehicles to the maintenance system and instead kept them for parts. The vehicle reconstruction park fabricated some repair parts once it became operational, other times units fabricated their own spark plugs using metal pipes, copper wire, and chewing gum. Vehicle maintenance and repair parts became one more aspect of the continuous crisis in short distance transportation.[7]

Ordnance – Field Maintenance

Maintenance of weapons of all types and other specialized fighting equipment was the responsibility of the Ordnance Department. Once in France, the Ordnance Department recognized the necessity of keeping the AEF weapons in working condition; yet as of April 1917, the Ordnance Department had neither the doctrine nor the organizational structure to keep the Army functioning in an overseas theater. Successful support of the AEF depended upon the ability to improvise new solutions, which developed into an echeloned maintenance system.

Figure 5.3 Artillery repair shop as part of the massive ordnance facility at Mehun. Photo courtesy of the US Army Ordnance School Historian.

Throughout the 19th century, unit personnel performed basic maintenance on the weapons; what could not be repaired by the unit went to the depot for maintenance. Although a 1912 publication recognized a need for some form of intermediate maintenance, there was no organizational structure. During the 1916

Mexican Expedition, Ordnance personnel created expedient repair shops by putting the tools and some repair parts on trucks. The Mexican experience demonstrated the need for more flexible maintenance capabilities.

In France, the Ordnance Department constructed an advance shop at Is-sur-Tille and a base shop at Mehun-sur-Yevre, which was further to the rear near Bourges. Construction began in the winter of 1917, but the base shop was only partially complete by the end of the war. The advance shop could repair artillery, small arms, and optical equipment, as well as conduct wood working, machine work, and salvage work. The much larger base shop covered over 50 acres, with a much wider range of activities. Although not fully complete, it was capable of performing substantial work, with a staff of over 1,000 Soldiers and about 1,000 French civilians. It also functioned as the administrative headquarters for the Ordnance Department. In addition, the Ordnance Department maintained 21 other fixed facilities for smaller operations, including specialized facilities for aircraft weapons.

Figure 5.4 A Mobile Ordnance Repair Shop (MORS). Photo courtesy of the US Army Ordnance School Historian.

Despite the usefulness of these fixed facilities, the Army required a means to support combat units on the move. In response, the Ordnance Department improvised with the Mobile Ordnance Repair Shop (MORS) and the Heavy Artillery Mobile Ordnance Repair Shop (HAMORS), which were immensely successful despite the problems in their creation. In theory, each division was to have one MORS, with sections for equipment repair as well as repairs to division artillery. With the equipment placed on trucks, the personnel could go to the units. Motorcycle-mounted Soldiers were available for lighter work. Predictably, the mobile shops suffered from all the difficulties associated with forming this type of unit, including shortages of trucks and trained personnel. With no prior experience at

this type of work, learning was by trial and error. Yet the value of maintenance close to the units proved itself to be extremely valuable; following the war it was incorporated into Army doctrine.[8]

Interestingly, concepts first improvised during the pressure of the moment endured. In today's language, these concepts included mobile maintenance capabilities, limited stockage of repair parts, contact teams (on motorcycles in World War I), operational floats, and early preventive maintenance (termed inspections).[9]

Quartermaster – Supply

For the Quartermaster Corps, the European theater provided the first serious test for the conversion from a department to a corps. Until 1912, it was the Quartermaster Department, with two significant differences. First, the reorganization consolidated the Commissary (subsistence), Paymaster, and traditional Quartermaster functions into a single Quartermaster Corps. More importantly, the reorganization authorized the creation of military units under the Quartermaster Corps to perform functions that had previously been done by civilians. These included such varied services as mortuary, teamsters and truck driving, field laundry, stevedores, and petroleum handling. These changes gave greater flexibility in the logistics, but the Quartermaster Corps was just beginning to define its procedures when the war started. As of April 1917, the doctrine, organization, and institutional knowledge to implement the second change did not yet exist. Quartermaster Soldiers needed to develop their procedures even as they were fighting a war.[10]

"Automatic supply" developed in this time as a form of "push" distribution in today's parlance. Under this system, resupply for subsistence and other commodities with a predictable consumption rate was based upon the strength of each division, as determined by reports every 10 days. It proved to be much easier to administer than the prior methods of having the regimental supply officers send recurring estimates for quantities of supplies. Other items were requisitioned as needed, to be filled from an echeloned supply system. Requests for items that could not be filled from division stocks went to the corps, and then to the communications zone if necessary. Ammunition and other selected items were distributed based upon the operational plans.[11]

Another innovation from the AEF came with the creation of four classes of supply, which differed from today's system because these classes were divided based upon the resupply method. The first class consisted of items needed every day such as food, forage, and fuel. These were shipped automatically based upon the number of Soldiers supported. The second consisted of items with a recurrent need, but not necessarily daily, such as clothing. These were shipped upon request of the unit. The third class consisted of replacement for durable items that only happened on an exceptional basis, such as rolling kitchens; and these were only replaced after unit requisitions. Ammunition, engineering items and others for which the demand closely followed the military operations constituted the fourth class, and these were closely monitored by the higher headquarters.[12]

Given the scarcity of shipping space throughout the war, all of the logistical agencies developed priority programs to meet the most important needs. The process worked on a monthly cycle, beginning on the 10th of each month when the War Department advised the AEF on the expected tonnage of shipping available for the next month. The AEF G1 then allocated the available tonnage among each of the supply bureaus, typically with the Quartermaster receiving the largest amount. From that point the Theater Chief Quartermaster needed to calculate how to use the tonnage available to him. The subsistence and other supplies on automatic supply came first, as did the supplies intended for the 90 day safety level. The remaining tonnage was usually insufficient for all of the remaining requirements, so he needed to determine what he wanted, and in what order. The monthly requirements were then tabulated into a single cable back to the War Department, which became the basis of the monthly shipments.[13]

Managing such a massive inventory, scattered over multiple locations, required an enormous effort. Every night personnel at the depots wired the daily stock status back to the SOS headquarters at Tours, using lines created by the US Army Signal Corps. The totals were manually totaled and placed on color-coded charts, which decorated all the available wall space. Index cards supplemented the charts for other supply items. Quite probably, the mechanical adding machines of the era were employed in the calculations. Using this information, the Chief Quartermaster reviewed the monthly supply status. Of the 5,000 items on the automatic schedule, most shipped according to the predetermined issue factors for every 25,000 Soldiers, and the Quartermaster only needed to note modifications to the schedule. Items not on the schedule were shipped according to the theater requests. Other supply bureaus followed similar procedures, also with extensive use of the manually-tabulated wall charts.[14]

Mechanization also presented the new logistical challenge of moving petroleum. This task fell to the Quartermaster Corps, and the Theater Chief Quartermaster created a Gasoline and Oil Branch to manage the work. By the time the system matured, gasoline entered France through the smaller port of La Pallice, and into steel tanks that were constructed in the United States to be assembled in France. From there gasoline moved forward in railroad cars, sometimes borrowed from the British.

The difficulty came with the distribution beyond the base area. Following the French practice, the AEF insisted upon distribution through 50 liter cans (about 13 gallons) that were filled at the base and shipped forward by rail or truck. The method was awkward and frequently plagued by a shortage of cans. The change in policy came during the counter offensive at Chateau Thierry in July 1918, when the Quartermaster Corps simply did not have sufficient cans. Thereafter, petroleum distribution came through a combination of bulk delivery and cans.

During 1918, the Quartermaster Corps delivered over 48 million gallons of motor gasoline, five million gallons of aviation fuel, and four million gallons of

lubricating oil. By the close of the war the Army constructed 27 petroleum storage and distribution points, with another 66 in the planning process. These projects were in addition to use of existing French facilities.[15]

Quartermaster – Food

For most of its early history the Army remained indifferent to food preparation and general quality of subsistence. Soldiers were left to cook their rations as best they could. From the end of the 19th century into the 20th century, the quality of food service in garrison steadily improved with better facilities and training of the cooks. Feeding while in the field was another matter. Where possible the mess sergeant might lug a 264-pound field range, or else use mud ovens. There was no method for delivering meals to the Soldiers when combat conditions precluded cooking too close to the action.[16]

Feeding for the first Soldiers to arrive in France was terrible during the winter of 1917-1918 for the reasons discussed earlier.[17] Yet as the logistical systems stabilized, Soldiers received an adequate garrison ration while they were still in training areas in France. Dehydrated vegetables were necessary to conserve shipping space, but Soldiers still disliked them. A bread baking facility at Dijon proved to be too far away, so the Quartermaster Corps placed a bakery at Is-sur-Tille, which became the largest bakery in the world.[18] Candy and tobacco were welcome additions to the rations.

Extended combat conditions once again required innovation in order to feed the troops, along with ideas borrowed from the French and British. A new rolling kitchen, which was essentially a stove with other apparatus mounted on wheels, replaced the clumsy field stove. Here the mess section could prepare meals within a few miles of the trenches. To get the meals to the troops the Army first used simple milk pails. Larger pails were carried by two Soldiers with a stick through the handle. Later, the Soldiers observed that the French kept their food warm with an insulated food container called a *Marmite* (French for "cooking pot"), which was adopted as quickly as production permitted. Near the close of the war, the Quartermaster Corps experimented with a container designed to be carried like a backpack. (Today this is officially called the Insulated Food Container, but informally called the mermite, a change in spelling from the original French.)

The war brought other changes to the Army's food system that carried into the civilian community afterwards. To protect against gas contamination, the trench ration consisted entirely of canned food: canned roast beef, canned corned beef, canned hash, canned sardines, canned hard bread, canned beans, and similar items, which fed the troops despite the monotony. Soldiers in the trenches still needed their coffee, so the Army provided them with a soluble (instant) coffee heated by a jellied alcohol. Although not as good as roasted coffee, the soluble coffee was always in demand.[19]

Water purification at this time was a responsibility of the Corps of Engineers, which both purified water and dug wells as appropriate. During World War I, they developed processes similar to the civilian communities of the time. Treatment used alum to coagulate the impurities before filtration of the water. Addition of chlorine was a relatively new technique to remove bacteria. In forward areas, the engineers experimented with moving the water purification equipment by trucks. In contrast to other equipment, the truck-mounted water purification equipment was an American idea copied by France and Britain. When that was not feasible, they used canvas bags (Lister Bags) to allow the chlorine to work. Chlorine lozenges for the canteens was a method of last resort; but Soldiers frequently discarded them because of the resulting bad taste of the water. In combat conditions, however, troops tended to drink from any source available. In normal conditions the Soldiers consumed two gallons per day, but in combat conditions they stopped washing. Draft animals consumed eight to ten gallons per day.[20]

Quartermaster – Laundry

Field laundry services for the front line Soldiers also emerged as a result of World War I, but in a woefully inadequate form. Interest in clean clothing came through a recognition that dirty clothing was a health issue in view of lice infestations. Soldiers had long considered lice to be a nuisance, but improved medical knowledge made the connection between lice and disease, especially deadly typhus.

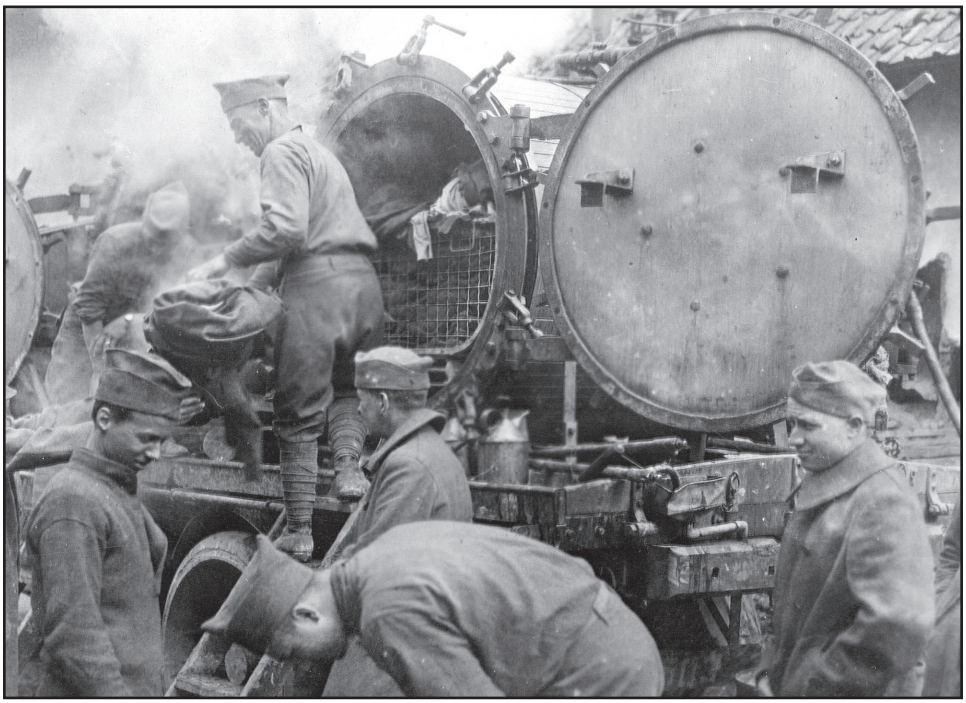

Figure 5.5 Soldiers washing and sterilizing clothing. Photo courtesy of the US Army Quartermaster Museum.

Throughout the 19th century, laundresses typically performed this work, or else Soldiers washed their own clothing. Congress did not authorize any Quartermaster laundry operations at all until 1909, and this was only for isolated installations. When the United States entered the war in 1917, the Quartermaster Corps assumed responsibility for laundry within the huge training cantonments. Facilities near the camps were inadequate, but the Army did not begin construction of laundry plants until 1918. It was estimated that about half of the Soldiers had lice even before they left the United States.

In France, the Quartermaster Corps made only limited progress with laundry services, and this came principally in support of the salvage operations.[21] Soldiers in the training areas were not so well served. Facilities were too far to the rear to be of much use. When Soldiers could not be served in any other way, they would be issued a change of clothing, with the dirty clothing sent to salvage depots for later re-issue, thus beginning the clothing exchange process. More often the Soldiers remained responsible for their own laundry, with the continuation of "wash days" as an Army tradition. Once in the trenches even the minimal service all but disappeared.

Once again the French and British experience provided an example for the Americans in the form of the mobile laundry facilities, which were a failed effort to get closer to the front lines. Each facility consisted of four trailers and a steam tractor, which also served as the power source. The lumbering size restricted travel to the best roads, and they needed hard ground for operations. More importantly, the mobile laundry arrived too late to make much difference. The first mobile laundry did not arrive until June 1918, and when the war ended the Army was just beginning to receive regular delivery of new units. The few mobile laundries in France were used principally in the rear areas in support of salvage operations. If the war had continued as expected, mobile units might have made a difference; yet at the time of the Armistice, over 90 percent of American Soldiers were infected with lice. Delousing came after the end of hostilities. The significance of the field laundry operations lay in the precedent for future conflicts, not service to the Soldiers. [22]

Quartermaster – Graves Registration

Graves Registration (now Mortuary Affairs) also matured as a military function during World War I. During the Civil War, the Quartermaster General assumed responsibility for maintenance of war cemeteries; but procedures for recovery and identification of battlefield casualties were so poor that battlefield casualties stood little chance of receiving a proper burial in a marked grave. By the Spanish-American War procedures had improved considerably through the timely identification of casualties and the hiring of civilian morticians. Real improvements came in the Philippines when Chaplain Charles C. Pierce assumed responsibility for the Morgue and Office of Identification in Manilla. Pierce pioneered techniques for identifying previously unknown Soldiers, such as matching physical characteristics

of the known casualties in the area. He also ensured proper burial, and advocated an identification disk (today's dog tags).

Upon America's entry into the war, the Quartermaster General arranged to have Charles Pierce recalled to active duty as an officer in the Quartermaster Corps. Although the 1912 reorganization changed care for the war dead to a military function, as of 1917 there were no procedures, doctrine, or organizational structure for this work. Pierce needed to fill the gaps as he went along, including the ever-present paperwork.

Unlike today, casualties did not receive a final burial until after the conflict. During the fighting they were buried in temporary graves, to be exhumed and transferred to the final burial site afterwards. In theory the work was simple. Units identified and buried the dead Soldiers near the location of their deaths, preferably placing identification data with the human remains. The Quartermaster Graves Registration units registered the location of these temporary burials for disposition after the war. In practice, any number of factors complicated operations. Units did not always identify their casualties, temporary burials needed to conform to French health codes, subsequent actions could disturb the grave locations, or units might need to conduct burials near artillery fire. Nevertheless, Graves Registration personnel carried out this work with a 97 percent identification rate, astonishingly high for the time.[23]

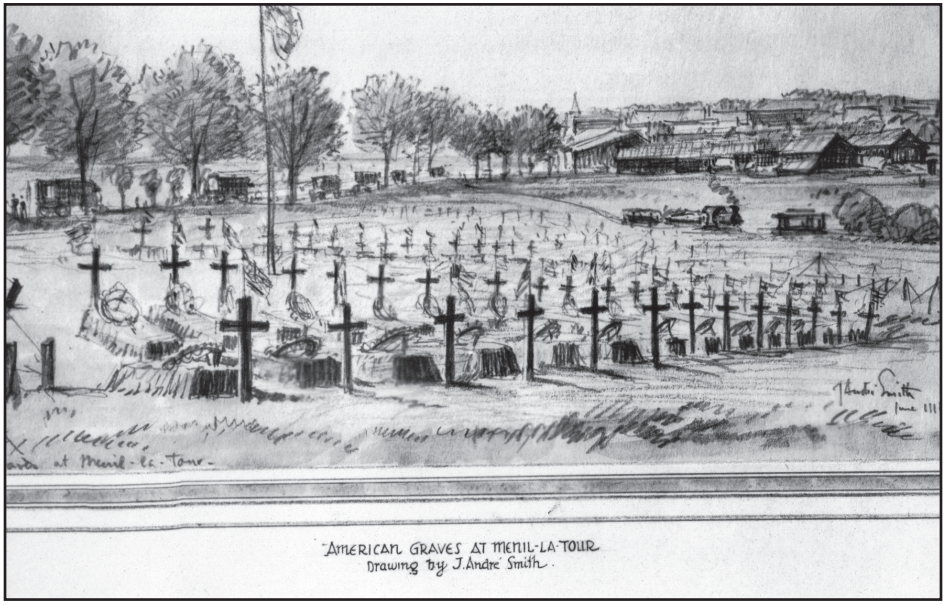

Figure 5.6 Soldiers were temporarily interred in burial grounds similar to this drawing until final disposition after the war. This sketch by an Army captain shows the burial ground at Menil-la-Tour as of 5 June 1918. Photo courtesy of the US Army Quartermaster Museum.

The belongings of the casualties – termed personal effects – also required special care. The Army created a personal effects depot at St. Nazaire in France; after

the war most of the operation moved to Hoboken, New Jersey. The bulk of the personnel effects work took place after the Armistice. It was relatively easy to identify personal effects upon the Soldier at the time of his death, and these were duly returned to the families. More frequently, a deceased Soldier had left some personal possessions scattered at various points across France, and these became mixed with the other lost baggage of the AEF discussed in the final chapter. These packages were identified as belonging to a casualty and then moved through the personnel effects system. Inevitably occasions arose when the family believed that their loved one left more possessions than were returned.[24]

Personnel Replacement System

Management of replacements constituted a continuous problem, as the AEF labored to find a workable system amid the pressures of combat. Most of the replacements were for combat losses; but other reasons included sickness (especially influenza), non-battle injuries, or desertions. Originally the AEF expected to designate one division per corps as a depot division for receiving replacements and another replacement division per corps to forward the new Soldiers to their units. That idea quickly succumbed to reality during the German offensives of spring 1918. The AEF simply did not have enough men for both depot and replacement divisions, so the replacement divisions became combat divisions. Even the depot divisions were stripped to minimal size. Then the AEF attempted to create one replacement battalion per corps, supposedly to operate from a fixed location. That proved unworkable because the supported corps frequently relocated for tactical reasons.

By the close of the war, the AEF had a system of regional replacement depots. Six depots were for infantry and machine gun replacements, but the 1st and 2nd depots (located at Saint Aigan-Noyers and Le Mans, respectively) processed over 90 percent of the replacements. Soldiers with Coast Artillery, Field Artillery, trench artillery, Engineers, Signal, and Quartermaster specialties moved through their own depots. Although the AEF G1 had overall responsibility for the replacement system, the depots operated under the Services of Supply. Even with organizational improvements, the basic problem remained that the AEF received too few replacements for maintaining existing divisions. During the Meuse-Argonne Offensive, Pershing ordered that new divisions be broken down to provide replacements for existing units.[25]

Soldiers not assigned to a unit arrived in France as "casuals," typically organized into provisional companies. At the depot Soldiers received new uniforms, weapons, and equipment if needed, and were processed for movement to the front. On their way to the front they passed through the same regulating stations as freight trains in a process that resembled the movement of supplies. Acting upon his priority list and unit status, the regulating officer assigned the Soldiers to the divisions, and placed them upon the appropriate trains. Where feasible, divisions engaged in combat-delayed receipt of replacements until they could be pulled from the line.

Figure 5.7 A replacement Soldier is fitted with new shoes on his way to the front. Soldiers received new equipment, but not the expected additional combat training, in France. Photo courtesy of the US Army Quartermaster Museum.

Although the original planning concept envisioned that Soldiers might complete necessary training in Europe, such was not the case, especially as the combat intensified. The need for new Soldiers was considered too urgent to permit delays for more training. Thus the haphazard training regime for casuals in the United States would have to suffice. Sometimes these Soldiers received adequate training, including weapons, yet frequently not. Johnson Hagood later recounted receiving replacements who had only trained on basic military customs, and a little physical fitness. They knew many of the Army songs, but they had never fired a rifle. The depot commander requested a delay in moving the Soldiers to give each man an opportunity to shoot his rifle at least once, but that was refused. In October 1918, Hagood dispatched a staff officer on a special mission to the United States to plead with the War Department for better training of casuals before overseas movement. By the end of the war, the US Army finally had a model for combat replacements, which extended from individual training in the United States to replacement depots in theater; but that model would not be implemented until the next war.[26]

Other Adjutant General Responsibilities

In addition to replacements, the AEF faced a wide variety of other human resources issues, including promotions, assignments, awards, corrective action for unsatisfactory officers, and similar actions. The structure for managing personnel actions blended the AEF Headquarters with the Adjutant General's office. In December 1917, the AEF created a Personnel Branch, which became the Personnel Bureau. During the hostilities the Personnel Bureau worked for the AEF Chief of Staff, but the AEF Adjutant General provided the necessary support, including issuing orders. After the Armistice, this became the Personnel Division of the Adjutant General's Office.[27]

The Central Records Office became the key to managing the ever-growing Army. Located in Bourges, the office maintained a file on every Soldier within the AEF. By January 1918, the Adjutant General personnel recognized that the confusion caused by two or more Soldiers with the same name was unacceptable, so they recommended a system of serial numbers to the War Department, which was adopted. The task of managing all these records was so large that it required 6,000 personnel, including 500 borrowed from the British Women's Army Auxiliary Corps, which was later renamed the Queen Mary's Army Auxiliary Corps.

Figure 5.8 Workers at the Central Records Office in Bourges continued their efforts after the armistice. These women belonged to the British Women's Auxiliary Corps (otherwise known as the Queen Mary's Auxiliaries), and were on loan to the AEF Adjutant General's Office. The uncomfortable working conditions despite the presence of pot-belly stoves probably resulted from the war time coal shortages. Photo taken 22 November 1918. Photo courtesy of the National Archives.

Casualty reporting and verification became one of the most difficult and important functions of the office. In the confusion of battle, erroneous casualty reports reached the Records Office, so each needed confirmation and cross-checking before notification of the families. Throughout the war, the Central Records Office processed over 300,000 casualty reports. After the Armistice, the office conducted an extensive audit of casualty reports to find and correct errors. Additionally the office administered promotions, awards, and other service-related matters.[28]

Postal service became one more Adjutant General's function to develop as a result of the war. Prior to this time, a Soldier or his wife might serve as installation postmaster with little trouble; and it was assumed that the same casual system could apply to France. That did not work. Friends and families of Soldiers were unfamiliar with military addresses and simply found too many incorrect ways to address a letter or package. After Christmas 1917, the mail situation was so bad that a discussion between Hagood and the American postal representative in France resulted in the creation of a military postal service, located at Bourges. The orders creating the Postal Express were dated in May 1918; but the organization did not begin receiving mail until July. Postal delivery remained difficult, but much improved. The tendency to waste valuable shipping space with junk mail or with perishable foods remained a nagging problem.[29]

Human Resources Issues Within the SOS

Given the constant turbulence in creating the logistical structure, it is not surprising that the existing Army personnel system was not designed to meet the new requirements of the Services of Supply. The personnel system was designed for a relatively small force based in the United States and focused on the combat regiments. Within the pre-war supply bureaus, the chiefs easily managed the comparatively small numbers of officers and enlisted within their departments. Like the other aspects of World War I sustainment, personnel management for both officers and enlisted in the SOS required constant adjustment.

In Europe, the numbers of personnel working within the supply bureaus increased beyond the abilities of the bureau chiefs to manage them. Additionally, the Army found a need for specializations that did not fit neatly within traditional branches. For example, the Transportation Service combined the skills of Engineer, Quartermaster, and Signal personnel, but the bulk of the expertise came from the civilian railroad community. Other new forms of operation included the Gas (Chemical Warfare) Service, Forestry and Construction, Motor Transportation, or the Provost Marshal Service. Officers might be detailed from other branches, or assigned from the National Army without a branch, but with the expected career disruptions.[30]

Promotions within the Regular Army were based upon a strict seniority system; but within the National Army promotions could be used to fill needed vacancies. Unfortunately, the system was too centralized and concentrated in a badly overworked Adjutant General's Department at Chaumont. Recommendations for

promotions could go for up to 90 days without action. The situation affected all parts of the AEF, but the perception that promotions in the SOS were slower than promotions for officers serving at the front had some validity. Brigadier General Hagood, the SOS Chief of Staff, frequently complained that this discrimination undermined the morale of the SOS in performing this vital work. To add to the confusion, a person might be appointed to a field grade rank directly from civilian life in the United States, but more deserving lieutenants and captains would languish within the SOS. Hagood described the whole promotion process as "a wild scramble" in which promotion became a matter of "favoritism, luck, and opportunity."[31]

The next problem was to obtain personnel for the support structure. Organizational tables were of little use for the situation with the SOS. New types of units were created to respond to a new perceived need, and often with little idea of how they might be adjusted. Without stable organization tables, it was difficult to justify demands for more SOS personnel or a higher grade structure to a skeptical War Department in Washington.

In an effort to remedy the situation, the SOS and the AEF joined to write to the War Department for permission to adjust Army staff positions for the various new services being created. The task of explaining the ideas across the Atlantic by telegraph proved too difficult, and was abandoned. Near the end of the war, AEF did succeed in obtaining permission to form a Service Corps to work at all of the new functions created in this war, ranging from salvage units, laundry, chemical decontamination, postal, acquisition, replacement depots, leave area operations, convalescent camps, Prisoner of War companies, garden companies, and more. Although the idea had merit, it came too late in the war to develop its full potential. In September 1918, the Transportation Corps abandoned efforts to create tables of organizations. Instead, Atterbury and Hagood decided to request an authorization of 125,000 personnel because they believed this to be the largest number the War Department would accept. The request was approved.[32]

Frequently officers for the SOS came from the reclassification depot at Blois. The depot originated for the purpose of classification and assignment of "casuals" or personnel who arrived without a definitive assignment. Although the original classification mission remained, in time another function as a reclassification depot evolved. If in the judgment of the commander an officer within a combat unit was unfit for his duties, he traveled to Blois while his fate was determined. This action might result from wounds or disabilities, or it might result from the displeasure of his superior. At Blois, a board recommended disposition of the case, which might include return to a different combat unit, or discharge in the case of misconduct or serious deficiencies. More commonly, the board recommended offering the officer a chance to serve within the SOS, where many performed very well. Officially, the system was a benefit to the Army and the personnel concerned. The officers gained an opportunity to serve honorably in preference to being sent home as a "misfit," and the AEF kept valuable leaders.[33] Nonetheless, the system did little to enhance the reputation of work within the SOS.

Because the importance of railroads and railroad workers was not anticipated at the outset, the Adjutant General's Department did not include railroad work within its original search for civilian skills. Consequently, Soldiers with railroad experience went to line units, and once in the line units, they did not return to railroad work. Then in April 1918 the War Department decided to halt induction of railroad workers because of critical needs within the United States. Thus the Transportation Service/Corps had a perpetual shortage of trained personnel without the means for replacements.[34]

African-Americans and the SOS

African-American Soldiers represented a disproportionate number of Soldiers in the SOS. Despite repeated credible performances in combat, the prejudice remained that these Soldiers were somehow unfit for fighting. Consequently, the Army only created two African-American infantry divisions, and one of them was loaned to France. The bulk of black draftees were assigned to the Services of Supply, where they composed approximately one-third of the workforce. In keeping with the prevailing prejudices, an African-American draftee received little military training while in the United States, instead spending the time in labor duties before shipment to France. Once in France, African-Americans were organized into labor or service battalions. The most common use was as stevedores, but African-Americans were also used for construction work, forestry, quarrying of rock, and Graves Registration. The latter work was particular unpleasant because it required exhuming and reburying partially decayed human remains.

Pre-war segregated regiments in the Regular Army had white officers, but black Soldiers had the opportunity to become Non-Commissioned Officers. This

Figure 5.9 The night shift reports for duty at Bassens. The overwhelming majority of the stevedores came from the African-American units (termed "colored" at the time). Photo courtesy of the National Archives.

was not the case for the labor battalions. Although many of the senior officers expressed a willingness to use African-Americans as NCOs, too many others argued that only a white NCO could extract the necessary level of labor from their Soldiers. To make the situation worse, the Army literally advertised for white men with experience at "handling Negroes," thus inviting men with experience as gang bosses to become NCOs. Even where a black enlistee showed potential as an NCO, he could seldom rise above the rank of corporal because Army practice forbade placing a black Soldier of equal or superior grade in the same company as a white Soldier. By late 1918, some units relented and began to request more black NCOs. Additionally, black Soldiers continued to suffer the effects of the racial prejudice of that era while in France, including restrictions on their freedom to enter cafés or meet French women.[35]

Evaluations of their performance varied greatly. Many observers admired their high productivity in these very challenging circumstances, and in fact the labor battalions frequently set astonishing records for ship turnaround. One observer described their efforts in the most glowing terms:

> All this was not done without labor. The four hundred coloured [sic] stevedores yanked from the sunny cotton plantations to the bitter winter coast of France were the nucleus of the labor battalions now operating in this Base Section which number 7,600. With the cheerful, uncomplaining toil of these black heroes in khaki many wonders have been achieved.[36]

Nonetheless, the old habit of blaming managerial mistakes upon the black workforce remained strong. Some leaders viewed black Soldiers as unproductive and proposed creating disciplinary units close to the front for recalcitrant workers. Hagood also observed idleness among the stevedores; but he attributed it to a leadership failure to assign tasks to the workers, and failure to care for the Soldiers.[37]

Soldiers' Morale

Officially the Adjutant General's Department had responsibility for activities that affected the Soldiers' morale; but it lacked the resources for this work. To fill this need, the leadership of the AEF turned to private organizations (collectively termed the Welfare Agencies), who willingly created networks of volunteers to serve the Soldiers both within the United States and in France. Of these organizations, the Red Cross and the Young Men's Christian Association (YMCA) dominated the field, to the extent that other organizations often coordinated their efforts through the YMCA. Additionally, the Salvation Army provided large numbers, with the Knights of Columbus, Jewish Welfare Board, and the American Library Association also providing support. The AEF conferred a quasi-official status, in return for adhering to Army policies, even to the point of coordinating purchases through the General Purchasing Board.[38]

A large number of these volunteers were young women, who often served near the front, enduring hardships alongside the Soldiers, and often within range

of artillery. By the time of the armistice, the YMCA employed over 2,500 women, often going as far as the brigade rear areas. As the close of the war the YMCA chief noted that "No single factor has contributed so much to the influence of the Association upon the Army as the presence of this large company of magnificent American women. The service which they have rendered is beyond praise."[39] As the number of women grew, the Young Women's Christian Association requested permission to initiate operations to support the women workers as well as French women munitions workers. They were allowed to go to France, but reported through the YMCA (like the other smaller organizations).[40]

Figure 5.10 Salvation Army volunteers preparing doughnuts near the front in September 1918. Photo courtesy of the US Army Women's Museum.

The YMCA, Salvation Army, Knights of Columbus, and the Jewish Welfare Board functioned in various roles to further troop morale. The YMCA operated a variety of recreational centers near the ports and near the front. They also managed leave locations, often at converted spas. The YMCA also assumed lead responsibility for entertainment, including movies and visiting performances. Beginning in late October 1918 the YMCA also began providing comfort items to German prisoners of war. Salvation Army volunteers distinguished themselves by their insistence on working close to the front, often within enemy artillery range. In their search for a new treat for the Soldiers, the Salvation Army women thought of a homemade doughnut, and thereafter they became famous as the doughnut girls. Frequently this work required the women and men to operate from primitive improvised shelters, with little heat or sanitation facilities. They followed their Soldiers, providing momentary relief from combat. Brigadier General Hagood was particularly complimentary about the work of the YMCA at prevention of venereal

disease, including prophylactic stations at their activities. “They accepted the Soldier as a human being and made the best of him.”[41]

Soldiers were authorized seven days of leave for every four months. Initial efforts to allow leave at the Soldiers’ expense proved unsupportable, so the AEF decided to adopt a system of leave areas, located at established resorts, often in the Alps or Pyrenees, which were operated by the YMCA. In order to provide for government-funded travel and quarters, these were designated as military posts. After the armistice the leave program became more liberal, allowing some discretion for the Soldiers. Although the Soldiers wanted to visit Paris, this was discouraged, first because of the pressures of the war, and then because of the venereal disease situation after the war.[42]

Figure 5.11 Soldiers line up for pay. Photo courtesy of the US Army Soldier Support Institute Historian.

The American Red Cross also performed these functions, but their work encompassed a wider variety of tasks, even while maintaining their status as a neutral organization. Red Cross nurses worked tirelessly among the French population, whose doctors were all in the Army. They also worked within the US hospitals as needed, sometimes as nurses, but in other functions. One particularly important function was as “searchers” who traced the fate of wounded or missing Soldiers to provide the families with information about their loved ones’ condition. They also helped to assure Soldiers about the status of their families at home. Red Cross

volunteers also operated canteens near the Soldiers. In fact, their protected status under the Geneva Convention gave the Red Cross personnel greater freedom at operating near the front lines. Their nursing services to US Soldiers were especially useful after heavy combat when the medical system was overwhelmed.[43]

Another morale-enhancing effort came through the establishment of about 400 musical bands throughout the AEF. At this time bands were under the control of their organizations, but the Quartermaster Corps did have responsibility for supporting the musicians. Recognizing the value of music in cheering the Soldiers, Pershing cabled the Quartermaster General requesting $50,000 worth of sheet music. Not willing to make the selections, the Quartermaster Corps borrowed Irving Berlin from the Coast Guard and assigned him the task of selecting the best songs.[44]

In subsequent military operations, the partnerships with non-governmental organizations continued to work for the benefit of the Soldiers. Yet this experience also helped the Army to understand the importance of troop morale, and in 1942 the Adjutant General's Department established a Special Services Division for troop morale, including military bands.

Paying the Soldiers

As noted in the second chapter, Congressional expansion of the War Risk Insurance program to include Soldiers, Sailors, and Marines came in October 1917, even while a portion of the Soldiers were already in France. Under the terms of the law, Soldiers had 120 days to enroll in the program. To reach the eligible Soldiers, the AEF created a War Risk Section as part of the SOS headquarters. Its members vigorously searched for eligible Soldiers to advise them of the program and offer the opportunity for enrollment. Later in the war, members of the War Risk Section greeted new arrivals to determine who had not enrolled at home and offer the opportunity to enroll before expiration of their 120 day deadline.[45]

Paying the troops employed procedures that the Quartermaster Corps had adopted from the former Paymaster Department. Soldiers were paid in cash using the local currency. Most often this was French money, but it could be British or Italian, if the Soldiers were stationed in those nations. Normally payment was accomplished on the first of the month, except when the troops were engaged in fighting. The process began around the 20th of the month when the division quartermaster notified his higher headquarters of the amount of money needed, and in turn the higher headquarters obtained the money from banks in local currency. The division quartermaster might either perform the tedious work of breaking down the payroll himself, or he might arrange for officers to be appointed on orders for this task. It was both time-consuming and vitally important.

One problem developed whenever a Soldier became separated from his normal unit and payroll. In response, the Quartermaster Corps developed a small book of a durable paper designed to fit into the Soldiers' shirt pocket. It recorded the Soldiers pay, enabling him to receive pay when on detached duty, in the hospital,

or otherwise separated from his normal unit. Like so many other World War I innovations, the pay book was not implemented until October 1918, near the end of the war, but it was useful while the Soldiers were awaiting redeployment.[46]

Other Activities

Initially the Army expected to use French facilities such as barracks or factories; but this hope proved to be overly optimistic. The Army developed its own in-theater construction capabilities. Improvements to ports and railroad systems were an obvious and vital example of this work, but the need for new facilities extended to a wide variety of other activities. Engineers built hospitals, cold storage facilities, depots, limited installation construction, and a wide variety of other work. All of this required timber; so the Army created forestry units to complement the work of the construction units. By the close of the conflict the Army operated a total of 844 installations within France, scattered over 267 different localities.[47]

Communications systems, especially in the rear areas, relied upon integration with the French systems; and the technology of the time required telephone operators. These were French women with little or no knowledge of English, and the Americans needed telephone operators who could speak their language. In November 1917 Pershing requested that American telephone operators with a working knowledge of French be sent to France. In response, over 2,400 women volunteered their services, and 223 were sent to France to become the so-called "Hello Girls." Although initially they worked in the rear areas, by the time of the St. Mihiel and Meuse-Argonne battles, they had moved close to the front and played a vital role in coordinating the Army movements despite the dangers of service near the fighting. In 1977 the government finally awarded the few surviving Hello Girls full veterans' benefits.[48]

When faced with the task of supporting a multi-million Soldier Army in a foreign nation, the AEF confronted problems beyond anything members of the peacetime support structure might have imagined. Instead of the predictable work of supplying troops in garrison, the sustainment community now needed to support a quickly changing army, often under hostile fire. In response they borrowed some ideas from the French and British, while finding some innovations of their own. Although not always successful, they delivered enough support to enable a victory and established precedents that endured into the Cold War and beyond.

Notes

1. William J. Wilgus, *Transporting the A.E.F in Western Europe, 1917-1919* (New York: Columbia University Press, 1931), 466-482.

2. Johnson Hagood, *The Services of Supply: A Memoir of the Great War* (Boston: Houghton, Mifflin Company, 1927), 274; Erna Risch, *Quartermaster Support of the Army: A History of the Corps, 17775-1939* (Washington, DC: Office of the Quartermaster General, 1962), 681-682; *Report of Remount Service, AEF* monograph #5 *Operations of the Quartermaster Corps, US Army During the World War* (mimeographed history by the Quartermaster School, Schuylkill Arsenal, 1929); Report of the G1, *United States Army in the World War, 1917-1919* (Washington, DC: Government Printing Office, 1948), 12:100, 107, 117, 120, 185.

3. Report of the G1, *US Army in the World War*, 12:190.

4. James A. Huston, *Sinews of War: Army Logistics, 1775-1953* (Washington, DC: Office of the Chief of Military History, 1966), 324-325.

5. AEF Services of Supply, *Manual of the Motor Transport Corps* ([Tours]: Services of Supply, 1919). The orders establishing the Motor Transport Corps were dated 15 August.

6. Hagood, *Services of Supply*, 226-228, 342-354.

7. Report of the G4, *US Army in the World War,* 14:151-160, 297 (the quoted words are on page 159); AEF Services of Supply, *Manual for the Motor Transport Corps*, 18-27; James G. Harbord, *The American Army in France, 1917-1919* (Boston: Little, Brown, and Company, 1936), 308; Hagood, *Services of Supply*, 274, 315, 342-344; Isaac F. Marcosson, *S.O.S. America's Miracle in France* (New York: John Lane Company, 1919), 202–205, & passim.

8. Peter S. Kindsvatter, "The Emergence of a Field Maintenance System in World War I," *Ordnance Magazine* (Winter, 2001), 8-12; Report of the Services of Supply, *US Army in the World War*, 15: 85-86; Chambrun [Jacques Aldebert de Pineton] and [Charles] Marenches, *The American Army in the European Conflict,* trans by the authors (New York: The Macmillan Company, 1919), 236.

9. This analysis is derived from Kindsvatter's article, "Emergence of a Field Maintenance System."

10. Risch, *Quartermaster Support of the Army*, 557-598.

11. Hagood, *Services of Supply*, 68-70.

12. *Report of the Military Board of Allied Supply* (Washington, DC: Government Printing Office, 1924), 1:240; Huston, *Sinews of War*, 373-374.

13. Marcosson, *S.O.S. America's Miracle in France*, 55-60 & passim.

14. Marcosson, *S.O.S. America's Miracle in France*, 34-37, 145-148. Marcosson is most useful for his detailed descriptions of the inventory management procedures, even if his assertions of flawless execution would seem to be a theological miracle rather than a figurative miracle.

15. Risch, *Quartermaster Support of the Army*, 660-662; Report of the G4, *US Army in the World War*, 169; Chambrun and Marenches, *American Army in the European Conflict*, 230 Marcosson, *S.O.S. America's Miracle in France*, 208-211.

16. *Manual for Army Cooks* (New York: Military Publishing Co., 1916), 113-148.

17. See Chapter 3, pages 48-49.

18. Report of the G4, *US Army in the World War,* 14:192.

19. Risch, *Quartermaster Support of the Army*, 660, 683-686.

20. Howard McCyost, "Water Purification in War," *Quartermaster News Service*, (February 1920) [reprinted in *Quartermaster Professional Bulletin*, (Spring, 1988), 16-18]; Report of the SOS, *US Army in the World War*, 15:65-66; Powell, *Army Behind the Army*, 64.

21. See Chapter 6, page 104.

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27. Report of the G1, *US Army in the World War*, 12: 246-251, 288-298; Report of the Adjutant General, *US Army in the World War*, 15:148-176.

28. Harbord, *American Army in France*, 368-369; Livingston Watrous, *A Brief History of the Adjutant General's Department* (New York: Recruiting Publicity Bureau, 1927), 25-26 & passim; Report of the Adjutant General, *US Army in the World War*, 15:163-172.

29. Hagood, *Services of Supply*, 82-86; John J. Pershing, *My Experiences in the World War* (New York: Frederick A. Stokes Company, 1931), 2:150-151; Report of the Adjutant General, *US Army in the World War*, 15:172-175.

30. Hagood, *Services of Supply*, 185-196.

31. Hagood, *Services of Supply*, 239-257.

32. Hagood, *Services of Supply,* 185-196, 235.

33. Harbord, *American Army in France*, 481-485; Hagood, *Services of Supply*, 127-129; Report of the Commander SOS, *US Army in the World War*, 15:24-27.

34. Hagood, *Services of Supply*, 220.

35. Arthur E. Barbeau and Florette Henri, *Unknown Soldiers: The African-American Soldier in World War I* (New York: De Capo Press, 1996), 94-97, 106-108.

36. Marcosson, *S.O.S. America's Miracle in France*, 74, 103, 157. Despite his effusive praise for the African American workers, Marcosson still writes with a patronizing attitude that reflects the prejudices of his time.

37. In addition to Barbeau and Henri, *Unknown Soldiers*, passim, see also Wilgus, *Transporting the A.E.F.*, 436-440; and Hagood, *Services of Supply*, 106-108.

38. Welfare Agencies, *US Army in the World War*, 15:424-471; "Final Report of the G1," *US Army in the World War*, 218-240.

39. Welfare Agencies, *US Army in the World* War, 15: 442, 488-492; 463-464.

40. Lettie Gavin, *American Women in World War I: They Also Served* (Boulder, CO: University Press of Colorado, 1997), passim.

41. Welfare Agencies, *US Army in the World War, 15:424-471;* Gavin, *American Women in World War I*, passim; Hagood, *Services of Supply*, 86-90; Report of the G1, *US Army in the World War*, 12:120; Chambrun and Marenches, *American Army in the European Conflict,* 361-384.

42. Final Report of the G1, *US Army in the World War,* 218-224.

43. Gavin, *American Women in World War I,* 179-208; see also Welfare Agencies, *US Army in the World War*, 15: 424-501.

44. Alexander Powell, *The Army Behind the Army* (New York: Charles Scribner's Sons, 1919), 161-162.

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46. *Notes on Army Corps, and Division Quartermaster Activities in the AEF* Monograph #9, *Operations of the Quartermaster Corps in the World War* (mimeographed history by the Quartermaster School, Schuylkill Arsenal, 1929), 7-8, 46; *Extracts from Historical Report of the Chief Quartermaster AEF* monograph #2, *Operations of the Quartermaster Corps in the World War* (mimeographed history by the Quartermaster School, Schuylkill Arsenal, 1929), 67-69.

47. Chambrun and Marenches, *American Army in the European Conflict*, 229.

48. Gavin, *American Women in World War I*, 77-101.

Chapter 6
Learning to Work in a European Environment

Operations in Europe marked a significant new experience for the American Army in that the AEF fought inside a friendly, sovereign, foreign nation on an extended basis. Certainly the United States functioned overseas before, including recent operations in the Philippines and China (the Boxer Rebellion). Yet this time the United States was in France at the invitation of the French, operating within their governmental structure, and on a previously unimaginable scale. Additionally the AEF was surrounded by friendly and neutral nations that might also alleviate supply difficulties if approached properly. Successful logistics required gaining the necessary support from the French and other European nations under these circumstances.

At first glance, it might appear difficult to comprehend why war-ravaged France should be supporting Soldiers from a nation untouched by the conflict. The most important reason was the lack of shipping. Any material assistance coming from Europe that might reduce the shipping load was to be welcomed. Possible benefit to the French economy was not a consideration. Beyond France, the United States actively sought to purchase supplies from Spain, Switzerland, Italy, the United Kingdom, Scandinavia, or any other likely source. Additionally, any support activity required land and facilities. These could only be obtained through cooperation with the local government authorities.

Bureaucracy

Understanding the workings of the French bureaucracy proved to be the first major hurdle, and one which was never completely resolved. Initially the Americans simply made their requests at the national level, only to learn that they also needed to coordinate with local authorities, especially where the use of facilities was concerned. At other times, the AEF representatives might obtain a decision from one bureau, only to learn that another bureau also had authority over that decision. All this involved procedures and processes. General Pershing later commented that despite the tendencies to red tape in American bureaucracies, the Americans were babies compared to the French. Especially during the early months, the French did not necessarily understand the urgency of the American requests. When even the US War Department was skeptical of the AEF logistical estimates, it is easy to understand why the French did not fully comprehend the reconfigurations of their ports and transportation infrastructure required for an Army they had not yet seen.[1]

Supporting the Americans was also a new experience for the French. It is true that the British had operated in France since 1914, but they required far less support because of their shorter supply lines. Now the French needed to learn how to strike a proper balance between supplying the AEF and providing for their own people. They also needed to adjust the relations between the national and local governments in the wartime circumstances.

Once the American supply bureaus became functional in France, they began making purchases on the French economy in their customary manner. That is, each bureau conducted its own purchasing arrangements without reference to any other bureau. The Corps of Engineers needed lumber for ports and transportation facilities; and the Quartermaster Corps needed wood for fuel. Very quickly they began to bid against each other and the increased prices not only hurt the Americans, but it raised concerns among the French about the rapidly rising prices. In August 1917, Pershing turned to a board of officers for recommendations about some form of centralized control over purchasing. The board recommended against any action because they believed that consolidated purchases would be illegal under existing American law.[2]

Not satisfied with the board's recommendation, Pershing decided to create a General Purchasing Board. For the position of General Purchasing Agent he selected his old friend Charles G. Dawes, a prominent business man now in uniform (and a future Vice President of the United States). The board circumvented the legal restrictions by leaving the bureaus to execute the actual contracts. Instead, the General Purchasing Board reviewed proposed contracts from all American activities in France, including the YMCA and Red Cross, to look for duplicate requirements which might be consolidated to avoid inter-bureau competition; or else it directed the purchasing bureau to the best provider. At first the General Purchasing Board worked directly for the AEF Headquarters, but it later transferred to the Services of Supply. As a precaution against excessive prices, a French representative reviewed purchases. If the seller charged an unreasonable amount, France might requisition the item at a lower price.

Once established, the board's responsibilities expanded steadily. Soon Dawes obtained authority to have all purchases from the French government to be directed through his office. He also became responsible for locating potential supply sources through neutral nations. By the time the Board reached maturity, it had a Labor Bureau, a Board of Contracts and Adjustments, a Technical Board (for electrical power), and a Bureau of Reciprocal Supply. The same people also played a similar role in the disposition of American property after the war.[3]

In May 1918, the success of the American General Purchasing Board led Dawes to suggest a similar concept on the coalition level. Pershing endorsed the recommendation and passed it to French President Georges Clemenceau. After American and French acceptance, Britain, Belgium, and Italy also agreed to a coalition board. On 28 June the Military Board of Allied Supply convened in Paris, with Dawes representing the United States. Upon Dawes' recommendation, the board unanimously chose French Colonel (later Brigadier General) Charles Jean Marie Payot as President.

The board's oversight was limited to items under military control, thus excluding the civilian sectors of mobilization, and it operated on the basis of unanimous consent. Even within these constraints, the board constituted an unprecedented

achievement in coalition logistics. It became an effective means to resolve questions about pooling ammunition or transportation assets for the mutual good. For example, by adopting the British process for double compressed hay, it created a common standard for sharing forage. The board created common frameworks for dealing with other supplies in a similar manner. The school for regulation station officers enabled nations to work together in a uniform manner. Equally important, it improved the ability of supply officers from different nations to create bilateral agreements. These agreements and mutual understandings provided a greater logistical flexibility during the final battles in autumn 1918. At one point Marshal Ferdinand Foch wanted to allow the board to operate by majority vote; but Pershing reminded him that the unanimous rule was necessary to achieve the desired cooperation.[4]

Figure 6.1 Members of the Military Board of Allied Supply. Charles Dawes is at the front left, and James Harbord is seated next to him, second from left. Colonel Payot is seated next to Harbord, at the center of the front row. Photo courtesy of the National Archives.

In addition to the coalition board, the French and American armies operated with generous sharing agreements, often informally coordinated through liaison officers in their respective G4 sections. Normally the Americans made their requests verbally, and followed by paperwork only after the French confirmed that the items were available. In theory, the system was one of mutual support, but in practice it favored the Americans more than the French. During the Meuse-Argonne Offensive, the Americans and French simply created common pools of items such as potatoes, vegetables, forage, or fuel that were used by both sides.[5]

Purchasing Supplies in Europe

As noted in the second chapter, the American factories required over a year to reconfigure their tools and equipment to the production of weapons or aircraft. Consequently, the AEF relied principally upon the French for artillery, tanks, and similar items, often with the United States providing the raw steel. By the close of the war, the United States had purchased 514 tanks, 3,035 75mm field guns, 1,190 155mm howitzers, 9,592 Hotchkiss machine guns, and 40,000 Chauchat automatic rifles from France. Aircraft came from both French and British sources; but here production was problematic. For various reasons, the French initially had difficulties meeting their own production needs, and American aircraft received a lower priority. Once the superiority of the American "Liberty Engine" became apparent, the United States supplied it to the Allies, but again not enough to meet the demand.[6]

Responsibility for purchase of most items of common usage fell to the Quartermaster Corps working through the General Purchasing Agent. This included everything from subsistence, clothing, office supplies, and horses, to common cooking utensils. In order to maximize the purchases abroad, the Chief Quartermaster established purchasing offices throughout Europe, in both allied and neutral nations. They also contracted for labor as necessary to meet demands. By the close of the war, the Quartermaster Corps was acquiring uniforms in France for both officers and enlisted, including the smaller overseas caps to replace the bulky campaign hat. Coal was not available in France because the Germans occupied the coal and steel areas; but it was available from Britain in limited quantities. Most forms of wagons were purchased in Europe.

Given the wartime conditions, France and England could not supply the United States with food; and in fact the United States sent grains to Europe. France only supplied Americans with food in an emergency, and with the condition that the United States provide replacement in kind at the earliest opportunity. Neutral Spain, however, could supply a variety of products, including rice, beans, olives, and onions. Dealing with the Spanish required sensitivity to the neutral status of America's recent enemy. While in Spain, American officers wore civilian clothing and generally kept their activities quiet. Ireland provided potatoes. Green coffee was available for purchase in Europe, but the Quartermaster Corps needed to establish roasting plants before issue to the Soldiers. The American coffee roasting plant became the largest in Europe, producing coffee for over 1.5 million rations per day and employing over 300 people.[7]

Trade with the United Kingdom and neutral nations led to the creation of a fleet of shallow draft vessels known as the European Service. Originally assigned to the theater Quartermaster, the service moved to the Director General of Transportation. By the close of the war the fleet consisted of a mixture of American requisitioned transports, some smaller Great Lakes transports, and chartered Swedish ships. The Great Lakes fleet was not suitable for repeated trans-Atlantic voyages, but well

suited for the European work. American ships that were armed against submarines were barred from neutral ports; but the Swedish ships flew their own flag and had access to neutral ports. The comparatively shallow draft of these ships allowed them to use French ports that were not available to trans-Atlantic shipping. Trade patterns included Scandinavia, the United Kingdom (including Ireland), Portugal, Spain, and North Africa.[8]

Even the personal exertions of General Pershing could not obtain adequate numbers of horses, either from the United States or in Europe, and the horse problem was one of the reasons for suggesting the Military Board of Allied Supply. Initially France advised the AEF to obtain all of its horses from America. When that proved to be impossible, Pershing leveraged the board for a commitment of 80,000 horses. Yet the reluctance of French farmers to sell their horses resulted in very disappointing sales. For a while it was thought horses might be purchased in Spain; but in July 1918 Spain forbade the exportation of horses. Pershing was able to broker an arrangement for the sale of cotton to idle Spanish textile mills in return for lifting the embargo; but only a few horses arrived before the Armistice.[9]

Labor and Local Manufacturing

In other cases, the Americans saved shipping space by manufacturing goods locally. When the raw materials in bulk form took less space than the finished products, the Quartermaster Corps arranged to obtain the use of factories and personnel through the French government. It then employed French personnel working under American supervision, occasionally with American Soldiers detailed to work in the factories. An American major, who was a grocer in civilian life, located an idle chocolate factory and soon arranged to produce candy for the American Soldiers, which was important to the high calorie diet. The United States provided the sugar, cocoa powder, and coal for the candy, plus wood and nails for shipping. In another instance the same major developed the machinery for producing macaroni, another staple food. Flour required far less shipping space, so it was better to make the macaroni in Europe. By the end of the war, monthly production reached roughly 5 million pounds of chocolate, 9 million pounds of hard bread, and 1.5 million pounds of macaroni. Four-fifths of the chocolate became a ration component, and the remainder was for direct sale to the Soldiers at cost. Factories to produce camouflage nets opened in Dijon and Nancy.[10]

In early 1918, the AEF faced a shortage of steel cooking equipment, such as pans, coffee boilers, or large galvanized cans. These were required according to American specifications, with smaller cans to be nested in the larger cans. Since no French company produced according to these specifications, the Quartermaster Corps acquired the use of sheet metal shops. The United States provided the steel in sheets, which were easier to ship, and French labor turned them into the finished products. By the end of the war, the sheet metal shops produced over 200,000 items of finished products.[11]

Salvage operations originated unexpectedly during World War I, and quickly became a major Quartermaster activity. Prior to this time, the Army had no systematic means of reclaiming repairable textile or leather items for re-use. Yet military leaders soon noticed the huge piles of clothing and textiles discarded by Soldiers after being damaged. This was unacceptable for several reasons. First, discarding repairable clothing cost the government money. Second, replacement clothing consumed scarce shipping space. Third, raw materials, especially wool, were in short supply, and the Army could conserve wool by repairing much of the material. Americans also noticed how the British and French were able to salvage damaged material. Thus an entire new line of operation developed.

Figure 6.2 Workers at the St. Pierre-de-corps salvage depot repair winter underwear. After cleaning and mending, the used underwear returned to the supply system for reissue. Photo courtesy of the US Army Quartermaster Museum.

Discarded or badly damaged textile goods were collected by Quartermaster personnel, sometimes by trailing after the Army. Material was then sent to railheads to be sorted, with undamaged material cleaned and re-issued. Damaged clothing, shoes, horse harnesses, tents, and all other textile or leather goods traveled to the salvage depots. At the depots, clothing was laundered, disinfected, and repaired before return to the supply system. Labor was readily available from local women.

Not all damaged clothing required evacuation to the salvage depots. Minor repairs were performed by the smaller repair shops located near the units. Here clothing was simply returned to the user after mending.

The scope of the operations quickly exceeded expectations. By the close of the war, the Quartermaster Corps operated four salvage depots, 20 shops, 66 laundries, and 77 disinfectors. In September 1918 alone, the Quartermaster salvage

depots repaired over 2.6 million articles for savings of over seven million dollars, plus shipping tonnage. Approximately 91 percent of the items sent to salvage were repaired and returned to the supply system. The remainder was used to make patches. Other supply services managed their own salvage operations on a smaller scale. Having proven their value, salvage operations continued through World War II and beyond.[12]

Although not host nation support in the modern sense, gardening became another means of minimizing shipping requirements. Following the British and French examples, the Americans began planting vegetable gardens for each division. These gardens were expected to both reduce shipping requirements and to provide fresh foods to the Soldiers. Whenever possible, the garden system employed Soldiers with injuries that disqualified them for other work. The project was still developing when the war ended in November 1918.[13]

French labor proved to be invaluable not only for manufacturing, but for any number of other reasons that might reduce dependence upon American Soldiers. The need for local labor resulted in the creation of a Labor Bureau in the General Purchasing Board. Of necessity, a disproportionate number of the workers were women, and in areas such as salvage work, only men disqualified for military service were hired. Brigadier General Hagood generally expressed satisfaction with the performance of the women workers and he pressed for greater acceptance of women among the other officers within the Services of Supply. He recorded one instance of meeting with a French feminist leader who had placed 250,000 women within various forms of French war work, and she wished to do the same for the Americans. In order to establish the ability of her women as equals in traditionally male work, she organized a stevedore competition in Brittany between some Breton farm women and imported Chinese labor. The women won.[14]

Beyond French labor, the Americans employed workers from third countries, including Spain, Portugal, and Italy, although Spanish and Portuguese workers were screened for pro-German sympathies. Where possible the Americans used imported Chinese and French colonials, especially Moroccans and Vietnamese. They created labor depots at Toulouse and St. Denis to manage these workers.[15]

Employment of local labor, especially women, required adaption to local laws and customs. Unlike the United States, France had extensive laws governing wages and working conditions. As a means of preventing inflation, the French worked under maximum wage laws, which did seem unfairly low to the Americans considering the true value of their services. On the other hand, the workers received other benefits not normally provided in America, such as an extended lunch hour or paid leave when the husbands were home on furlough.

One example of clever regulatory manipulation came when a bureaucratic conundrum almost produced a strike. The trouble began when the United States acquired a factory to become a salvage plant. The purchase agreement included a provision for American assumption of obligations by the previous owner. Under

French law, the workers were entitled to back pay for a strike that had been settled in their favor. The American auditor then ruled that American law forbade payment for work not performed. No one doubted the legitimacy of the obligation, but the auditor refused to authorize payment. The angry workers threatened to strike, and Hagood saw no possibility of obtaining a waiver from the American bureaucracy in time. Then someone suggested a one-time pay raise of five dollars (the amount owed), and the French government approved the waiver. The strike was averted.[16]

Land and Facilities

One more form of host nation cooperation came from the necessity to obtain French permission with regard to any activities that might affect their nation. Here the French officials responded with mixed concerns about supporting the war effort, while also protecting the national interests. The Americans required wood for both fuel and construction, even to the point where forestry units constituted a major undertaking. Yet France had a limited supply of lumber available. The result was a compromise allowing Americans to cut the French wood, but under supervision of the forestry officials. The Quartermaster Corps agreed that France would receive 10 percent of the wood cut for fuel. To the extent possible the AEF imported lumber from Scandinavia to reduce the burden on the French.[17]

Local cooperation was also necessary to the American Graves Registration work. Beginning in 1915, French law provided that the Ministry of War would approve and purchase land for temporary burials for both French and Allied Soldiers. Additionally, the temporary burials were to be 100 meters away from buildings, removed from any water supply, and preferably in the corner of any field, accessible by road. In practice, where the American Graves Registration personnel and the local officials could agree on suitable locations, the action was quickly ratified by the Ministry of War. During heavy combat it was understood that the Americans would just do their best to select a suitable site, which would be confirmed after the fact.[18]

One of the more frustrating forms of coordination with French bureaucracy came early in the war, as the Americans proposed expansion of port facilities to accommodate the as-yet unseen American Army. All proposed port and rail construction drawings traveled from the American construction officer to the military liaison, to the French military, then to the affected railroad office, and back by the same channels. Often a plan might travel several times, and without the sense of urgency the Americans expected. All drawings required conversion from the American system to metric, or the reverse. At the time, delays in construction did not seem so urgent from the French perspective, but by the summer of 1918 the incomplete port improvements hindered the American efforts.[19]

French law and custom had provided for billeting of Soldiers among the local population, and the AEF adopted this practice, especially for units in training. It provided a higher quality of living conditions relatively quickly. Arrangements were made through the French government at the same compensation rate as for

French soldiers. During the winter of 1917-1918, the four divisions already in theater lived as best they could in the countryside. Soldiers often lived in drafty, manure ridden barns, or temporary French shelters. Officers stayed with local families. While still a colonel, Hagood reported that his hostess was delighted to have the Americans because they increased the amount of kerosene available to her. Generals were often the guests of the prominent local families or nobility.[20]

To the extent possible, the AEF used unoccupied French barracks or military facilities as headquarters or other functions. At other times, with the cooperation of the French, the Americans identified unused facilities that might be used for their own industrial-type work.

No doubt the extent of the interactions with France and the wider European community came as a surprise to military personnel accustomed to thinking about warfare in terms of engaging the enemy. Yet to their credit, they quickly realized that operating a macaroni plant, or negotiating purchase of supplies from neutral nations, was equally important to the actual fighting. They adapted to the new situations and worked with the European nations to acquire the goods or services necessary to pursue the war.

Notes

1. John J. Pershing, *My Experience in the World War* (New York: Frederick A. Stokes Company, 1931), 1:144-146 & passim.

2. Pershing, *My Experiences in the World War*, 1:147-149.

3. James A. Huston, *Sinews of War: Army Logistics, 1775-1953* (Washington, DC: Office of the Chief of Military History, 1966), 370-371; Erna Risch, *Quartermaster Support of the Army: A History of the Corps* (Washington, DC: Office of the Quartermaster General, 1962), 666-668; *Extracts from the Historical Report of the Chief Quartermaster, AEF, France* monograph #2, *Operations of the Quartermaster Corps, US Army During the World War* (mimeographed history by the Quartermaster School, Schuylkill Arsenal, 1929), 17, 20; Report of the Services of Supply, *The United States Army in the World War* (Washington, DC: Government Printing Office, 1948) 15:134-147.

4. *Report of the Military Board of Allied Supply* (Washington, DC: Government Printing Office, 1924), 1:62-88 & passim; Huston, *Sinews of War,* 337-337; Pershing, *My Experiences in the World War*, 2:56-57, 85-87, 110, 220-221.

5. Report of the G4, *US Army in the World War,* 14:73-74, 185 & passim.

6. On aircraft see Pershing, *My Experiences in the World War*, 1:161, 284-286, 2:18, 125; Report of the Services of Supply, *US Army in the World War*, 15:83-84.

7. *Extracts from Report of the Chief Quartermaster,* 14, 21-41; Risch; *Quartermaster Support of the Army*, 666-669; Report of the G4, *US Army in the World War:* 14:165-166.

8. William J. Wilgus, *Transporting the A.E.F. in Western Europe, 1917-1919* (New York: Columbia University Press, 1931), 447-455.

9. Pershing, *My Experiences in the World War*, 2:58, 130-131, 169-170; Report of the G1, *US Army in the World War*, 12:120.

10. Risch, *Quartermaster Support of the* Army, 670-671; Huston, *Sinews of War*, 372; Report of the Services of Supply, *US Army in the World War*, 15:64, Isaac F. Marcosson, *S.O.S. America's Miracle in France* (New York: John Lane Company, 1919), 139-144.

11. *Extracts from Historical Report of the Quartermaster AEF France*, 23-24, 32-33; Risch, *Quartermaster Support of the Army,* 671; Huston, *Sinews of War*, 372.

12. Risch, *Quartermaster Support of the Army*, 674-677; Chambrun [Jacques Aldebert de Pineton and [Charles] Marenches, *The American Army in the European Conflict,* trans by the authors (New York: The Macmillan Company, 1919), 231.

13. Risch, *Quartermaster Support of the Army*, 671-672, Marcosson, *S.O.S. America's Miracle in France*, 131.

14. Hagood, *Services of Supply*, 166-167, 176-177, 275; see also Report of the Services of Supply, *US Army in the World War,* 15:49-50.

15. Report of the Services of Supply, *US Army in the World War*, 15:46-51.

16. Hagood, *Services of Supply*, 166-167.

17. Risch, *Quartermaster Support of the Army*, 672-674; Wilgus, *Transporting the A.E.F.*, 450-451.

18. "History of the Graves Registration Service" (MSS QM Historians Office, no date) 1:17-20.

19. Wilgus, *Transporting the A.E.F. in Western Europe*, 95-101.

20. Report of the G1, *US Army in the World War,* 12:192; Report of the Services of Supply, *US Army in the World War,* 120-128; Hagood, *Services of Supply*, 43-44; George

C. Marshall, *Memoirs of My Service in the World War, 1917-1918* (Boston: Houghton Mifflin Company, 1976), 16, 23.

Chapter 7
Struggling Towards Victory

By summer 1918, the Allies recovered from the shock of the German spring offensives and began preparations for their own campaigns. The turning point came with the recapture of some of the ground taken earlier at Soissons by a combined French and American force in July. In August, the planning turned towards a major offensive along all fronts. The British intended to attack in the north and the French expected to continue within their own sectors. As of this time, Allied leaders did not publicly express any hope of winning the war immediately, but they expected the campaigns to leave them well-positioned for the 1919 fighting season.

On 10 August 1918, General Pershing presided over the creation of the First United States Army. For the Americans, this marked the culmination of 16 months of effort to establish themselves as an independent fighting force, one that would ensure that the United States was entitled to a voice in the postwar settlements. The early days of troop transportation problems seemed resolved, with the total AEF now reaching one and a half million Soldiers with thousands arriving daily. By November the number reached two million Soldiers. Moreover, Pershing succeeded in recovering most of the divisions located behind French or British lines and bringing them into the American fold. American Soldiers now had their own sector in Lorraine with an appropriate portion of trench lines. With expanded draft calls at home and increased ship building, the Americans expected their ranks to swell even further by mid-summer 1919.

Nevertheless, the AEF still had serious weaknesses in artillery and logistics. These problems would have existed with or without the Abbeville agreement, but the disproportionate numbers of infantry shipped to France as a result of that agreement worsened the difficulties. When feasible, the French supplemented the American artillery, but not always.[1]

Logistics presented further problems. The SOS was undermanned before the Abbeville Agreement, and despite Pershing's repeated requests for more support troops, the ratio of service troops to infantry remained too small. Shortages of either motor trucks or horses might have been a manageable problem, but the combination severely handicapped the Americans. Improvements to ports and railroad networks were still incomplete and not keeping pace with the Army's expansion. Even with these difficulties, the American leadership believed the newly formed First United States Army could play a significant role in the war.

Planning the Offense

From the beginning, the Americans had a defined expectation for how they intended to employ their force. Pershing believed that the far eastern edge of France offered the best opportunity for decisive action. Between the Moselle and Meuse Rivers, the Germans still held a bulge in the lines known as the St. Mihiel salient,

which was to be the American's first offensive action. From there Pershing intended to advance generally along the Mosel River, first through the parts of Lorraine acquired by Germany in 1870, and then into traditionally German territory. Such an advance might cut a vital German railroad and then capture iron and coal regions, doing immense economic and psychological damage. To this end, the depots, forward supply points, medical centers, and other components of the forward logistical structure were positioned to support the movement eastward.[2]

Figure 7.1 Railhead, 77th Division, St. Germain, 8 September 1918, at the opening of the autumn offenses. Photo courtesy of the US Army Quartermaster Museum.

On 30 August, Marshal Ferdinand Foch arrived at Pershing's headquarters to announce a drastic change of plans. The Americans were to continue the St. Mihiel attack, which was nearing execution, but then the attention was to turn northward, not east. Foch argued that the focus of the 1918 campaign should be to reduce the German territory in France by attacking the German penetration at the shoulders. The British were prepared to launch a major offensive in the north, with another French attack in the center. He wanted a combined French and American push at the southern shoulder. Foch further announced that the AEF would be broken into two parts physically separated by the French, with part of the American Army to fall under French command. Pershing became furious after the last part of the announcement and he refused to accept any plan that compromised the integrity of the American Army. He insisted that as Supreme Commander, Foch had authority to tell the Americans where to fight, but not to break up the American Army. The meeting ended in an angry standoff.

Eventually the French Marshal Philippe Pétain mediated a compromise campaign plan. The AEF would begin actions against the St. Mihiel salient on 12 September and immediately upon reduction of that salient, the AEF would shift approximately 40 miles to the west and advance northward alongside the French in an area between the Meuse River and the Argonne Forest towards the cities of Mézières and Sedan, in order to cut the German railroad. (The Americans were to stop short of Sedan, but in the hectic last days of the war, Pershing discarded this part of the plan, resulting in endless controversy.) To give the Americans more time, the Meuse-Argonne offensive was delayed until 26 September. The operations were timed to coincide with French and British actions so the three nations could attack simultaneously towards the center of the German penetration into France.

Figure 7.2 Whether in a tent or in any available shelter, the job of the Quartermaster required endless paperwork. This photo shows the 77th Division Quartermaster operating from and old schoolhouse on 12 September 1918. Photo courtesy of the US Army Quartermaster Museum.

Strategically it made sense to have all of the Allied armies operating simultaneously, because if the Germans shifted forces to one area, the other areas would benefit. Tactically, however, the Meuse-Argonne region presented extraordinary difficulties. It was a defile, with high ground on either side and in the middle, making excellent artillery observation points for the Germans. The ground itself was often muddy, or covered in heavy forests. Having occupied that ground since 1914, the Germans had had time to develop a defense in depth at their leisure. The defenses centered upon three fortified belts, interspersed with barbed wire and well-placed machine gun nests. Although a successful assault through the

Meuse-Argonne could cut the principal German railroad, the Allies previously declined to make the assault. Even the prize of the rail line at the end of the assault was problematic. It meant that the Germans were likely to pull soldiers from other areas to defend this ground at all costs.

Logistically the operation was a dubious proposition as well. American forward support activities were positioned at the eastern edge of Lorraine in order to conduct follow-on operations along the Moselle, and there was little time to shift the resources. As noted before, the logistical system was already strained because of the delays in developing the American infrastructure compounded by the Abbeville agreement. The change in plans made a difficult task that much harder. Yet the other nations were prepared to assume their actions, and having argued so hard for an independent American Army, Pershing was determined to participate to the fullest in this action.

Throughout the war, any tactically successful offensive soon or later stretched the logistical system. As the distance from the standard gauge railroads increased, the difficulties of moving supplies to the front multiplied. Despite their overwhelming defeat of the Italians at Caporetto, the German/Austrian armies lost their momentum in large measure because of supply difficulties. The AEF G3 believed that German logistical failures equaled British resistance in stopping their attacks along the Somme in March and April 1918. The distance from the American start line to the city of Sedan on the Meuse River was approximately 27 miles, which was roughly the distance before the German/Austrian supply systems first encountered problems at Caporetto. The American supply system was already stressed; moreover, they were facing determined resistance, not a retreating Army.[3]

The Offensives Begin

Before the Meuse-Argonne Campaign, the AEF first needed to clear out the St. Mihiel salient; and the preparations were underway. Naturally this operation demanded the greatest secrecy. Soldiers were strictly forbidden from disclosing their locations. The SOS was not advised of the plans that they would support. They were merely directed to send materiel forward without being given the reasons for the requisitions. The security measures complicated the logisticians' job, but it was all necessary to achieve surprise. In late August, Hagood's doubts about these measures received added confirmation while on an inspection trip to Brest in far-off Brittany. While stopping in an obscure village he met with two French civilians who expressed their hearty approval of the St. Mihiel plan in astonishing detail. Apparently the expectation that the movement of hundreds of thousands of Soldiers might go unnoticed was overly optimistic.[4]

Nevertheless, the St. Mihiel attack proved to be easier than expected, in large measure because the Germans had already decided against a determined defense of the salient. The attacks began on 12 September, and by 15 September the salient was eliminated, leaving the Americans free to shift their attention to the much more difficult Meuse-Argonne Offensive.

Moving the attacking force into place was unexpectedly difficult. The force contained 15 divisions plus the supporting troops. Each division contained miles of trucks, artillery, wagons, and troops; and they moved at different speeds. Only three muddy roads led to the location. To avoid observation from German aircraft, the movement needed to be made at night. The task of planning and directing the movement went to a young colonel named George C. Marshall, who devised a plan that used one road for motor vehicles, one road for foot traffic, and the third road for horse drawn wagons and artillery. The plan worked by allowing each type of traffic to travel at its own speed, and the force reached the starting position on time and undetected.[5]

Figure 7.3 Both wagons and trucks struggled through the mud to move supplies forward. Photo courtesy of the US Army Transportation Museum.

The Americans did have one hope. Their line of advance was so difficult that it was lightly defended, and the Germans had not yet detected the movement. If they could advance quickly on the first two days, they might take some of the critical high ground before the Germans could reinforce. In particular, Pershing wanted the Americans to reach a butte known as Mountfacon by the first day. Marshal Pétain commented that the Americans would be lucky to take it by Christmas; but nevertheless Pershing was determined to try. Even with the light defenses, coordinating such an attack would have been difficult for an experienced army; and American staff work was still evolving. The Americans did not take Mountfaucon until the second day and the attack was losing momentum. The

gains were remarkably better than Pétain's prediction, but well short of what was required. By now the Germans rushed reinforcements into the area, and they continued to do so for the remainder of the campaign. The battle for the Meuse-Argonne became a slow, hard-fought advance. German artillery, machine guns, and infantry stubbornly defended every foot, and American inexperience complicated the situation. By the end of the campaign, it cost over 26,000 American dead.[6]

Logistics of the Meuse-Argonne

In addition to shifting about one million tons of supplies to the new attack point, the logisticians needed to plan their railroad support. Along the base of the initial assault line a railroad ran from west to east from the supporting depots towards Verdun, and it would be the major artery for both the French and Americans. Another line ran northward along the Meuse River from Verdun to Sedan, generally along the American line of advance. In theory, this line might have been an important means of support for the Americans; but German artillery units east of the Meuse River made the line unusable for the Americans until they could cross the river, clear out the enemy positions, and then repair the railroads. Consequently, the only broad gauge railroad available ran perpendicular to the direction of the American assault, which meant ever increasing distances between the front lines and railheads. The AEF established a new regulating station at St. Dizier to support this line and placed 19 railheads along the route.

In addition to the standard gauge lines, two French narrow gauge railroads supplemented the supply efforts. One ran to Mountfaucon, and the other through the Argonne forest. Fortunately the Germans also used 60 centimeters for their narrow gauge lines, and later in the battle, these could be connected to the existing lines once captured; but construction required time.[7]

Each of the supply bureaus developed its own depot system, including 24 ammunition depots, 12 ordnance depots, nine quartermaster depots, nine gasoline and oil points, eight water points, seven chemical warfare depots, and additional sites for medical, motor, or signal supplies. Success also required the best use of freight cars, and the Army employed additional labor for the rapid unloading and return of the cars.[8]

Given the limitations of the railroads, the bulk of American supplies moved by truck or horse-drawn wagons over back country roads. Supporting the advancing units required a constant effort. Roads within the no-man's-land had been neglected for years, with artillery craters collecting water and other obstacles. To make matters worse, the autumn rains were especially bad that year. The advance crossed a swampy area known as Forges Creek, creating more mud. The engineers anticipated these problems to some extent and acquired rock quarries for fill, but these were well to the rear. This rock could be used to improve the roads, but engineers had a lower priority than other supply trucks, which were stuck in the mud. Some divisions did not use their engineers properly, sometimes dividing them up or else using them as infantry. In these circumstances, the engineers demonstrated

ingenuity in their work, sometimes placing bags of rocks on the fenders of trucks that might be headed to the front.[9]

Figure 7.4 Although narrow gauge (60cm) railroads, such as this one near Rattenhout, were invaluable for the Meuse-Argonne Offensive, they still could not carry enough to eliminate the need for trucks and wagons, moving over miserable roads. This engine was made by Baldwin Locomotive. Photo taken 28 October 1918, as the American logisticians took advantage of the tactical pause to push supplies forward. Photo courtesy of the US Army Quartermaster Museum.

Problems compounded themselves. Impatient with the delays, inexperienced senior officers disregarded traffic control instructions, creating further traffic jams. Rolling kitchens could not get near their front lines so the Soldiers ate the canned rations until they ran out, and then searched dead comrades for food. Frequently Soldiers carried the supplies on their backs.[10]

On 29 September, Georges Clemenceau, the French Prime Minister, decided to visit the newly-captured Mountfacon. Instead he encountered an enormous traffic jam, with American Soldiers waiting for hours to move. From this observation, he concluded that the AEF was still incapable of operating independently and he re-opened the amalgamation issue. Other visitors presented similarly dismal accounts of the American performance. Pershing had a valid point in his contention that this congestion was common to the initial days of any offensive action. Shortly after the war, George Marshall expressed his frustration with visitors who failed

to understand that these were problems to be overcome, rather than evidence of American incompetence. Nevertheless, the initial problems were worse than one might have expected. Clemenceau's visit and subsequent reaction remained a sore point in French-American relations.

True to Pershing's predictions, traffic circulation did improve. The worst road damage came in the original no-man's land, and near Forges Creek. Once past those points, the roads required fewer repairs; but the constant rain did not help. More crushed rock from the engineers helped considerably. Units learned the importance of following the instructions from the Military Police to keep the traffic moving.[11]

Other problems multiplied as the battle continued. The constant shortage of motor trucks and horses worsened as the distance from the railheads to the front lines increased. Over time, horses became sick or disabled, and trucks developed mechanical failures. To support the offensive, the rear areas were stripped of every horse or truck not absolutely essential, but the SOS could only find 800 horses despite the thousands required. In response to AEF cables desperately requesting more horses, the War Department suggested using trucks. As Major General Harbord sarcastically commented, "substitute motors we could not get for animals we did not have!"[12] Vehicle mechanics were assigned to driving, leaving vehicles unavailable because of minor repairs. Use of the narrow gauge railroad helped, and so did conquest of German narrow gauge lines, but not enough. Americans borrowed so much transportation equipment from the French that even the normally supportive Pétain became exasperated.[13]

Troops suffered under these conditions. With improved traffic, the rolling kitchens stood a better chance of reaching the troops, but the endless supply of canned foods continued. When water was otherwise unavailable, the Soldiers developed their own testing procedures: if frogs could live in the water it was probably free from poison gas.[14] The rain and cold weather brought endless misery to the Soldiers. By the close of the campaign, over 90 percent were infected with lice.

Horses endured similar hardships of hunger, cold, overwork, and enemy fire. Conditions were bad for animals in both the logistical units and the artillery, but horses in the artillery worked near hostile fire. The resulting attrition for horses further contributed to the supply problems.[15]

Desperate for manpower to sustain the tactical offensive, Pershing directed the SOS to send all personnel not immediately needed to perform logistical work directly supporting the offensive. Work on port construction, railroad improvements, and all the other projects necessary to meet the 1919 troop program ceased as Soldiers hurriedly shifted to work at the forward depots and supply points. Even mechanics for all types of equipment ceased their duties in order to move supplies. Although by this time Germany was extending peace overtures, a decision by 1918 was still in doubt. If the war had carried into 1919, these measures would have

made the expected build-up of American Soldiers that much more difficult. Pershing placed the priority on the current battle.[16]

Already short of personnel, the SOS Chief of Staff feared that the latest drain would render the SOS inoperable. On 13 September, even during the St. Mihiel phase, Harbord requested that the AEF allow him to use three combat divisions that were still in training. Initially the request was denied, but the next day Harbord sent a request for reconsideration, which was approved, giving the SOS some temporary relief in the personnel situation. The outbreak of a virulent strain of influenza made the personnel situation that much worse for both the combat units and the support units.[17]

Rail connections choked because of a lack of water for the voracious appetite of the steam engines. In peacetime, the lines running from the Atlantic to Lorraine were among the less important, and consequently they contained fewer water stations. The tremendous demands of the American Army multiplied the number of trains beyond the ability to resupply water. As of September 1918, work by the engineers at constructing new water towers was only partially complete. Trains waited in line for 20 minutes to get their water, at other times they clogged terminals near cities, where they were supposed to pass straight through. The problems with the railroads compounded themselves at both ends of the lines. At the ports, the congestion prevented the timely offloading of ships and onward movement of supplies.[18]

With considerable effort by both the combat and support forces, the Americans reached striking distance of their campaign objectives; but the entire logistical system was nearing collapse, including within the Communications Zone. In mid-October, the First Army halted for tactical reasons, which gave the logisticians time to prepare for the final offensive, including improving the railroads and pushing supplies forward. They also provided showers and clean clothing. On 1 November the offensive resumed with French and Americans pressing through to the strategic cities of Sedan and Mézières. Stripping the SOS of personnel allowed the offense to continue, but the effects were now reaching into the ports, depots, and railroads. At that point the AEF logisticians feared that they could not support future offensive operations and it would require time to refresh the supply situation and to resume preparations for receiving the 1919 buildup.[19]

To add to the difficulties, even the trans-Atlantic shipping could not meet the demands of the huge troop increases over the summer. By October, the United States could only ship about 65 percent of the estimated requirements to support the enlarged force. The AEF began cutting into the reserve stocks, but that only worked so far. The SOS desperately cabled the War Department to divert more ships from commercial use if the AEF was to continue functioning.[20]

Armistice

Fortunately, the fighting ended first. Allied advances on all fronts, plus the seemingly endless resupply of American Soldiers, convinced the German military leadership that the war could not be won. Peace discussions began as early as October, but events through late October and early November made the German position even more untenable. As the British and French advanced at an unprecedented pace within their sectors, the American/French approach to the strategic railroad artery threatened the support for the German forces in northern France. Economic hardship, naval mutinies, and internal unrest soon followed, which left Germany with no choice but to accept the Allied terms for an armistice. The Kaiser abdicated; and on 10 November the new government agreed to the Allied terms, which took effect on 11 November 1918. The agreement called for withdrawal of German armies from occupied lands, release of Allied prisoners (but not German prisoners), surrender of German artillery, machine guns, aircraft, railroad rolling stock, and submarines, and interment of the German High Seas Fleet. French, British, and American armies received permission to occupy the key bridgeheads along the Rhine River. Although technically termed an armistice, the agreement left Germany at the mercy of the Allied powers during the subsequent Versailles Peace Conference.

In retrospect, the American contribution was both small and indispensable. Certainly American sacrifices were inconsequential compared to the millions of British and French casualties. Moreover, the American Army relied heavily upon the French for mentoring and materiel support. Nevertheless, the United States entered the war at a time when there was a real danger of Allied collapse. Although slow to bring its full force to bear, once the United States did enter in force, the Americans successfully conquered some of the most critical terrain.

Despite all the surprises, the sustainment community provided the AEF with the wherewithal to make a significant contribution to the Allied victory. In describing the role of the SOS during the final campaign Pershing commented that:

> Every member of the American Expeditionary Forces, from the front line to the base ports, was straining every nerve. Extraordinary efforts were exerted by the entire Services of Supply to meet the enormous demands made upon it. Obstacles which seemed insurmountable were overcome daily in hastening the movements of replacements, ammunition, and supplies to the front, and of the sick and wounded to the rear. It was this spirit of determination animating every member of the A.E.F. that made it impossible for the enemy to maintain the struggle until 1919.[21]

Even allowing for the customary post-war praise, Pershing's point was valid. The SOS was under-resourced from the beginning, yet somehow they delivered the necessary support. Better resources, or better knowledge at the beginning would

have provided better support to the frontline Soldiers, but under the circumstances the accomplishments of the SOS were rightfully described as a remarkable feat.

As of April 1917, the United States was unprepared for war, and the Army was particularly neglectful of the logistical requirements for modern war. Shipping shortages and the insistence upon priority for infantry further compounded the sustainment problems. Ingenuity and determination by the sustainment community overcame these problems, but at a cost in the timeliness and quality of support. Next the United States needed to display the same resourcefulness in bringing the Soldiers home and shutting down the war machine.

Notes

1. Report of the G3, *United States Army in the World War, 1917-1919* (Washington, DC: Government Printing Office, 1948), 14:53; Chambrun [Jacques Aldebert de Pineton] and [Charles] Marenches, *The American Army in the European Conflict,* trans by the authors (New York: The Macmillan Company, 1919), 265, 283.

2. Donald Smythe, *Pershing General of the Armies* (Bloomington, IN: Indiana University Press, 1986), 27, 148; Edward M. Coffman, *The War to End All Wars: The American Military Experience in World War I* (Louisville, KY: University Press of Kentucky, 1998), 125-126; John S. D. Eisenhower with Joanne T. Eisenhower, *Yanks: The Epic Story of the American Army in World War I* (New York: The Free Press, 2001), 47-48; David R. Woodward, *The American Army and the First World War* (Cambridge, UK: Cambridge University Press, 1914), 298-299.

3.Alan Wakefield, "Caporetto" in *1001 Battles that Changed the Course of World History* ed. R.G. Grant (New York: Universe Pub., 2011), 756; Report of the G3, *US Army in the World War*, 14:16; Eisenhower, *Yanks*, 200-203, 267-271; Woodward, *The American Army and the First World War,* 222.

4. Johnson Hagood, *The Services of Supply: A Memoir of the Great War* (Boston: Houghton Mifflin Company, 1927), 281.

5. Edward G. Lengel, *To Conquer Hell: The Meuse-Argonne Campaign* (New York: Henry Holt and Company, 2008), 69-72; George C. Marshall, *Memoirs of My Service in the World War, 1917-1918* (Boston: Houghton Mifflin, 1976), 137-139; Eisenhower, *Yanks*, 198-200.

6. Eisenhower, *Yanks*, 210-223; Lengel, *To Conquer Hell*, passim; Coffman, *War to End All Wars*, 299-356.

7. "Report of General Mosley," *Report of the Military Board of Allied Supply* (Washington, DC: Government Printing Office, 1924), 1:214-223; William J. Wilgus, *Transporting the A.E.F in Western Europe, 1917-1919* (New York: Columbia University Press, 1931), 476; Huston, *Sinews of War*, 381-383.

8. Huston, *Sinews of War*, 381-381.

9. Larry A. Grant "Meuse-Argonne Logistics: Barely Enough, Just in Time, Just Long Enough," in *A Companion to the Meuse-Argonne Campaign*, ed. Edward G. Lengel (Chichester, UK: John Wiley & Sons Inc., 2014), 402.

10. Grant, "Meuse-Argonne Logistics," 401-403; Woodward, *The American Army and the First World War,* 334-336, 340.

11. The story is standard for most histories of the AEF, but Pershing's *My Experiences in the World War*, 2:303-304 gives his version of the incident; see also Eisenhower, *Yanks*, 224-227; or Coffman, *War to End All Wars*, 340; Marshall, *Memoirs of My Service in the World War*, 162-163; Chambrun and Marenches, *American Army in the European Conflict*, 292.

12. James G. Harbord, *The American Army in France, 1917-1919* (Boston: Little, Brown, and Company, 1936), 442.

13. Hagood, *Services of Supply*, 314-315; Smythe, *General of the Armies*, 207-208.

14. Lengel, *To Conquer Hell*, 144-145.

15. Marshall, *Memoirs of My Services in the World War*, 152-153.

16. Huston, *Sinews of War*, 383; Hagood, *Services of Supply*, 314-317; Harbord, *American Army in France*, 442-443; Pershing, *My Experiences in the World War*, 2:181.

17. Hagood, *Services of Supply*, 317-319. The idea originated with Hagood.

18. Wilgus, *Transporting the A.E.F in Western Europe,* 303-308.

19. Hagood, *Services of Supply*, 312-317; Harbord, *American Army in France*, 471-473; Wilgus, *Transporting the A.E.F.*, 557; Grant, "Meuse-Argonne Logistics," 405-406 Woodward, *The American Army and the First World War,* 364; *Report of the Military Board of Allied Supply*, 1:218.

20. Report of the Services of Supply, *US Army in the World War*, 15:11-14; Report of the G1, *US Army in the World War*, 113-114.

21. Pershing, *My Experiences in the World War*, 2:357.

Chapter 8
Redeployment and Demobilization

Victory came surprisingly soon for the Americans. By mid-summer 1918, the war had shifted to the Allies favor, but still without expectation of imminent victory. Officially the autumn offenses were to set the stage for the 1919 campaigns, not to end the war. Yet the war was now over.

Both in France and in the United States, the American war machine was preparing for continued war. Although Pershing had temporarily halted the port and railroad construction projects to support the Meuse-Argonne Offensive, they were expected to resume. In Europe, Americans continued contracting for supplies and materiel to support the next campaign. At home, the Selective Service system was preparing to induct another 250,000 Soldiers, beginning in November. New contracts were proceeding with urgency to meet the needs of the AEF, including such identified shortages as trucks. Having recently re-tooled the factories for complicated ordnance, American industry was just starting to deliver finished goods to the Army.

Until the truce negotiations appeared close to success, there was little, if any, thought regarding what to do about peace. Reversing direction would have been difficult even with advance preparation. Shutting down the war would require just as much ingenuity and flexibility as supporting the war, plus a fair amount of cash. Ending the war had essentially three components: (1) returning the Soldiers to civilian life, (2) terminating contracts at home and in Europe, and (3) disposing of surplus property at home and in Europe.

Some parts of the work were easier than others. Just before the Armistice was signed, the Secretary of War cancelled the November draft call. Soldiers still in training were quickly discharged, although many required transportation to a location close to their homes. Lawyers, medical personnel, truck drivers, and personnel with skills required for demobilization remained in the Army. Training installations constructed during the war were transformed into demobilization centers, and awaited the arrival of the AEF Soldiers back from France.[1]

Returning the Soldiers

Soldiers in the trenches and battlefields at first greeted the news quietly, and then with celebration. As doubts about the authenticity of the peace disappeared, the Army prepared for a withdrawal from the trenches into more comfortable quarters. Even this seemingly simple action was not so simple. Immediately after the Armistice, the German Army suddenly freed thousands of Russian, Italian, and French prisoners who had been working behind the lines. Upon entering American lines, they required food and care until they could be sent to sorting stations established under the overall direction of the French. Movement of so many French and American units at the same time clogged the road and rail networks, and consumed

scarce vehicles. Given the need to move their own soldiers, the French withdrew their trucks from support to the Americans. Weeks passed before all of the Americans could reach their new winter quarters.[2]

American prisoners of war required immediate attention. Some Americans were included within the large numbers simply released into Allied lines. Upon entering the sorting stations, they were turned over to the American authorities. In other cases the United States received permission from Germany to enter German lines ahead of the agreed schedule in order to identify and recover American prisoners. All prisoners received a quick medical evaluation and then were either returned to their units, sent to a rest area, or else to a hospital. The G4 arranged for enough pay to meet the Soldiers' immediate needs until the accounts could be settled.[3]

Concurrent with the movement of the bulk of the AEF to winter quarters, about 240,000 Soldiers moved to the vicinity of Coblenz, Germany as the American occupation force. This became the US Third Army, which remained in Germany until January 1923. Movement and support of the occupation force competed with the units withdrawing from the trenches for vehicles.

Once out of the trenches, overwhelming lice and other vermin infestations presented the most pressing problem. The Quartermaster Corps began an immediate campaign to clean up the infestation with the assistance of the Chemical Warfare Service and Medical Corps. Once pulled into the rear area, Soldiers began shower and laundry services on a company schedule, in order to prevent a few infected Soldiers from contaminating their comrades. The equipment for mustard gas decontamination included water trucks and showers, which were quickly adapted to a peacetime use in bathing the Soldiers. At other times, the Soldiers developed their own expedient showers. The Quartermaster Corps used a variety of methods for killing the lice in clothing including steam and chemical; but the most popular method was to heat the clothing at temperatures of about 200 degrees, because it did not shrink the wool. After a program of weekly baths and laundry, the lice infection greatly diminished. The remaining cases could be managed at the ports of embarkation.[4]

With the end of the fighting, American Soldiers wanted to go home immediately and preferably by way of Paris. Shipping was just not available, so the Soldiers needed to remain occupied in the meantime. At first Pershing insisted upon maintaining the military training, through daily bayonet practice or artillery drills. Not surprisingly, Soldiers resented this regime, and after a few weeks, the discontent became all too evident. Pershing relented and shifted the attention to other activities. Once again, the welfare organizations that proved to be so useful during the fighting, including the Red Cross, YMCA, and Salvation Army, came to work at alleviating the discomfort of Soldiers who wanted to go home. The AEF initiated a vigorous sports program, which the Soldiers found preferable to military exercises. Soldiers who desired to extend their education could take classes at the AEF

University, created out of Army resources. Frequent inspections by Pershing and his staff identified camps with poor conditions. All the while, the AEF maintained its emphasis upon prevention of venereal disease.[5]

Figure 8.1 The delousing station at St. Nazaire. Prior to redeployment, all Soldiers were processed through this station, which could treat 6,000 Soldiers over a 12-hour period. Photo courtesy of the National Archives.

While waiting for redeployment, personnel actions, both favorable and unfavorable, continued under the direction of the Personnel Division, now within the Adjutant General's office. The division reviewed and approved recommendations for awards to AEF Soldiers, both from the United States and from foreign governments. Immediately after the Armistice promotions were halted by order of the War Department; but General Pershing was able to obtain a relaxation of the policy to fill existing vacancies in AEF units. The unpleasant work of reclassification of officers with unsatisfactory combat records continued, but the officers were now housed at Gondrecourt, rather than Blois.[6]

Responsibility for organizing the redeployment within France fell to the Services of Supply. Quickly the planners realized that redeployment would move through the ports of Bordeaux, St. Nazaire, and Brest; although the deep water facilities at Brest soon made this the principal port. Each port built its own adjacent camps to hold the Soldiers until just before they boarded the ships. The facility at Bordeaux was the only one large enough to accommodate its departing troops. Therefore the Army constructed another holding camp at Le Mans, between Paris

and the Atlantic Coast to hold Soldiers destined for Brest and St. Nazaire. Even though constructed after the Armistice, this represented another huge investment, with barracks, shopping facilities, and other amenities. It was so large that it required a narrow gauge railroad just to service the kitchen facilities, which were manned by assigned cooks rather than unit mess personnel.[7]

Camp Pontanezen, near Brest, developed an especially bad reputation for its mud and generally poor living conditions until October 1918. Then the very colorful Marine Corps Colonel Smedley Butler became commandant of the camp. He learned that the duckboard necessary to manage the mud was available at a nearby Army Quartermaster section, but it was being held for use in the trenches by an over scrupulous Quartermaster. Butler simply directed his men to take the necessary duckboard, and carried off the first load himself. Under Butler's leadership the camp improved dramatically as it converted to a role in supporting the embarkation for the homeward journey. It even included a section for European brides of the American Soldiers.[8]

Figure 8.2 Records check at the Bordeaux Port of Embarkation prior to the homeward voyage, 31 March 1919. Photo courtesy of the National Archives.

Near the ports, the Quartermaster Corps developed mass production procedures to prepare the Soldiers to return home. Specific steps might vary between ports, but the Bordeaux port consolidated all of its activities into a single building, termed "the mill." Upon entering the mill Soldiers first conducted a records review, and then they moved to the showers where they turned in their uniforms and underclothing. The uniforms were sent to be steam sterilized, while the underclothing went to

the supply system for sterilization, repair, and reissue to a different soldier. The process continued with showers and medical exams, particularly for lice or venereal disease. Each Soldier received an issue of clean underclothing and equipment. His original uniform was returned after sterilization, sometimes worse for the wear. Settlement of pay accounts completed the procedures. When fully operational, the mill at Bordeaux could process 6,000 Soldiers per day. Other ports operated in a similar manner, but not necessarily in one building.[9]

Payment of the Soldiers presented a different set of challenges. While in France the Soldiers had received their pay in cash and in French currency. It would have created too many problems to change the payment to American currency; yet the US government did not want the Soldiers to return with French currency. So the Soldiers lined up to be paid in francs, and then proceeded to the currency conversion station to change all their francs into dollars. Until regular shipments of American cash across the ocean could be arranged, the Quartermaster Corps nearly exhausted the supplies of American currency in European banks. The Adjutant General's Department also established stations to help Soldiers audit their records; and it assigned personnel to sail back and forth for the sole purpose of correcting the Soldiers' records during the voyages.[10]

Considering the enormous numbers of Soldiers being transported to Europe by the summer of 1918, it might have seemed easy enough to transport them home. Yet the task proved to be difficult again. Much of the transportation to Europe came from the British, French, and Italians, who were willing to use their ships during the emergency, but not after the conclusion of the war. American ships, especially the German liners seized at the beginning of the war, had been worked so hard they needed refitting before further use. The Emergency Fleet Corporation had engaged most of the nation's shipyards for construction of new cargo ships in expectation of continued fighting, which complicated the task of refitting the passenger ships.

Once again ingenuity and resourcefulness helped to bring the Army home. The Navy rearranged its cruisers and battleships to provide bunk space for the Soldiers. The Army Transport Service did have some of its own shipyards, which could be used for refurbishing the liners before resuming service. Probably the most important contribution came from converting cargo ships into troop ships by re-working most of the interior to accommodate the Soldiers. Leased foreign liners, and some German ships seized at the end of the war, completed the process. With the submarine threat over, the ships could sail individually, which was much more efficient than convoy operations. By June 1919, the redeployment reached its peak with 368,000 Soldiers carried back to the United States, and thereafter numbers dropped because fewer Soldiers required transportation. During the hostilities, the Navy had operated the oceanic transportation in response to the submarine threat, afterward the Transport Service reverted to its traditional Army control.[11]

Once back in the United States, the Army chose to bring Soldiers as close to their homes as possible, even though previous peacetime procedures allowed

the discharge of Soldiers at their last duty station with a travel allowance to their homes. First, it was cheaper to charter the trains. More importantly, the government feared that Soldiers discharged in the vicinity of large cities such as New York would feel the need to visit the big city once discharged, and then encounter con artists or other people willing to deprive them of their pay. Although the sources do note cite prostitution, this was very likely a consideration given the emphasis on prevention of vice and venereal disease throughout the war. Therefore the policy became to convert the wartime cantonments into discharge centers supposedly scattered throughout the nation. Because so many training camps were placed in the South, over half of the discharge centers were also in the South, complicating the work of discharging Soldiers close to their homes. Upon completion of the voyage to the United States, units were broken up, and Soldiers reassigned to casual companies based upon their discharge centers.

Figure 8.3 A casual labor company (colored) boards the Princess Matoika for home. Photo courtesy of the National Archives.

Once at the discharge center they received a medical examination, closed out their personnel records, and received their final pay. Soldiers with medical conditions were held until cleared, and disability compensation was determined at this

time. Upon being paid they encountered Red Cross or YMCA volunteers ushering them to the train station for home. They received a steeply discounted ticket if they traveled home immediately. This operation required movement of enormous cash payrolls to each discharge center.[12]

In an effort to help Soldiers readjust, the War Department teamed with the Labor Department, the Council on National Defense, and private industry to assist new veterans in finding employment and encourage employers to hire veterans. The work involved extensive publicity and advertising on the value of military veterans.[13]

As of 1919, long-term care for wounded or injured Soldiers remained a War Department responsibility. To accomplish this goal, the Army used special hospital ships to transport Soldiers not yet recovered from their wounds. Once in the United States, the wounded Soldiers traveled by hospital trains to a long-term hospital nearest their homes. In an effort to rehabilitate some of the irreparable injuries, such as lost limbs, the Army converted several cantonments into convalescent centers. After the war, Congress transferred many veterans' care responsibilities to the Public Health Service. The Public Health Service was particularly notable for assuming responsibility for long-term patients such as psychiatric casualties or tuberculosis cases.[14]

Care for the wounded Soldiers also required a new type of War Department employee, known as the "reconstruction aide." These were young women who performed duties that today would be called physical therapy or occupational therapy. Although civilians, they wore a blue uniform and served at hospitals both in the United States and Europe, often sharing the hardships of their military counterparts, but without the benefits. In 1947, these specialties, plus dieticians, were organized into the Medical Specialists Corps, one of the three women's branches within the Army during the post-World War II era.[15]

Over the course of the fighting, Soldiers had misplaced hundreds of thousands of bags of personal items for various reasons. Some baggage was lost in shipment. The bulk of the cases arose in France when Soldiers left baggage behind for a unit movement, expecting to return but actually moving to another location. After the fighting, the AEF searched most of France for missing items, which were first collected at Gièvres, and then sent back to Hoboken, New Jersey to be restored to the owner, or to the families of deceased service members. Improved procedures for the return voyage greatly reduced the baggage lost in transit.[16]

During the war, the hastily organized Quartermaster Graves Registration Service supervised the temporary interment of over 70,000 fallen Soldiers in over 23,000 burial sites. Now the process began for final disposition. First, these Soldiers were removed from the immediate burial sites into 700 concentration sites. The arduous task of finding and reburying the partially decomposed human remains fell primarily to the African-American Soldiers. Lengthy searches were frequently necessary because combat burials were typically done in difficult conditions, often

without adequate information regarding the locations. Graves could be disturbed by later operations, often complicating the identification process.

After some discussion, the War Department decided to present the families of the deceased with three options. The Soldier might be buried in an overseas cemetery or buried in a government cemetery within the United States at government expense. The family might also choose to bury their Soldier in a private cemetery at their own expense for the grave. Families for approximately 32,000 Soldiers chose the overseas options, leaving the War Department to establish eight cemeteries in France, Britain and Belgium. To this day, the American Battle Monuments Commission maintains these cemeteries in immaculate condition.

Figure 8.4 The Somme Cemetery, located in northern France, is a burial ground for American Soldiers who died in the British sector. Even a century later, the American Battle Monuments Commission maintains the overseas cemeteries in impeccable condition. Photo courtesy of the author, 2012.

Although simple enough in concept, the actual work involved thousands of details including coordinating final honors with French and Belgian representatives, requests for exceptions to policy, compliance with French health regulations (especially for influenza casualties), arranging transportation in the war-torn regions, or compliance with Navy Department rules for Marine Corps casualties. Repatriation of the war dead continued into the 1920s.[17]

Contract Termination

At the time of the Armistice, the War Department had about 30,000 open contracts worth over 7.5 billion dollars (1918 currency), with less than half the work completed. As noted in the second chapter, American manufacturing had just completed the re-tooling for wartime production by the summer of 1918 and therefore American industry had a huge investment in specialized production tools and factories for munitions that were no longer needed. Moreover, many factories had thoroughly converted to war production to the point of closing their peacetime lines of production, so that sudden termination of the wartime contracts would leave thousands of workers unemployed.

In the wartime rush to supply the fighting forces, Army personnel displayed a disdain for what they considered to be red tape. Although sometimes this approach produced speedy results, it also produced complications after the war. Initially production contracts were written by the relevant bureaus using their best judgment, but without any standard guidance. The insertion of standard clauses into government contracts did not come until September 1918. Among the most serious omissions were any provisions for terminating the contracts upon the cessation of hostilities. In theory, any contractor could have sued the government for completion of the contract. In practice, however, the inevitable delays in such a process would leave the contactor bankrupt before obtaining any return, so it was in the best interest of both the contractor and the government to negotiate settlements.

Approximately 1.5 billion dollars of contracts had some form of irregularity. These might range from lack of the official contracting officers' signature, to completely verbal agreements conducted in wartime. Shortly after the Armistice, the Comptroller of the Treasury ruled that the government could not pay for any contract with irregularities despite any good faith by the contractor, in a decision that the Assistant Secretary of War called "absolutely stunning."[18] In one particularly egregious example, the Army implored a manufacturer to begin work on truck frames in response to the crisis in tactical transportation of October 1918, with assurances that the paperwork would soon follow. By 11 November, the contractor had invested over $500,000 only to be told the contract was worthless. The decision applied to both the United States and Europe, with the predictable damage to the American reputation in France. On 2 March 1919, Congress resolved the problem with the Dent Act that enabled the Secretary of War to pay for irregular contracts on an equitable basis, provided the claims were filed by 30 June of that year.[19]

Under these circumstances, each of the bureaus initiated a process of negotiating the termination of contracts, often using district offices where applicable. In the absence of any single overriding rule for closing the contracts, the government representatives developed a set of principles that balanced the best interest of the government against the legitimate claims of the contractors. For terminated contracts, the government paid for the capital investments, plus a 10 percent profit on those

investments, but without anticipatory profits. Additionally, the War Department agreed to provide advance payments of 75 percent of undisputed charges. Contracts were terminated gradually in those cases where sudden termination would create an undue hardship for the contractor or the community.

Decisions on whether to continue production of partially completed items depended upon a number of subjective factors. Was the item of a durable nature? Was the technology likely to remain stable? Was the production sufficiently near completion to justify continuation? What might be salvaged from any incomplete work to be of use in future emergencies? Would potential resale value be increased by allowing completion of the project? For example, artillery tubes in production as of the armistice were completed through a difficult process known as shrinking, which made them available for future use, but not to full completion. Any rubber materials, such as chemical protective equipment or aviation equipment were discontinued due to the short shelf life. The Army took possession of forgings, patterns, dies, or other equipment to enable rapid mass production in the future. Partially completed construction projects were continued where they might be of more sale value as complete, but not where they were likely to be just scrap. The Army did not want excessive aircraft because of the rubber components and the expectation of rapidly changing technology. All termination negotiations proceeded quickly with both sides eager to settle accounts.[20]

Terminating contracts overseas presented a different situation. The European governments had outstanding contracts in the United States that were arranged through the US government, and the United States needed to terminate its contracts in Europe that were arranged through their respective governments. These claims were resolved through the respective governments and then balanced against each other. European contracts for American goods were terminated through the Special Representative to the Secretary of War, otherwise known as the Cuthell Board, named for Chester Cuthell. This commission assessed the state of incomplete contracts and assessed the allowable production costs plus profit. They then presented the cost to the various European governments and resolved any outstanding questions.

For American contracts in Europe (principally France, but also with other nations), the Secretary of War created the United States Liquidation Commission to perform a similar function. Unlike contracts with American firms, the US government generally did not allow continuation of partially finished work by European corporations unless the item also justified the shipping costs in addition to the above criteria. The United States did not consider impact upon the local economy in overseas contract terminations. At the end of the negotiations, the foreign claims against the United States were subtracted from the US claims against the European nations, and the balance tacked on to the Europeans' war debt.

Railroads were an especially difficult challenge for the Liquidation Commission. By agreement, the United States was to pay for the transportation of the AEF

aboard French trains, minus the cost of American contributions, such as construction, locomotives, rolling stock, coal, personnel, etc. Settlement of those claims would have been difficult enough, but poor record-keeping made the task even harder.[21]

Property Disposal

Until late October, production proceeded on the assumption that the war would last into 1919 and the Army would continue to expand. Therefore, American industry was developing the supplies necessary to support that force. Even the Armistice did not stop the accumulation of excessive supplies. As noted above, the government allowed contracts to continue when termination might create economic hardship. Additionally, the War Department needed to decide what to do with the real estate acquired or leased.

In the uncertainty of the post-war environment, it was impossible even to determine the optimum quantities to keep or sell. Future storage requirements depended upon the eventual size of the Army; and as of 1919 that was still undetermined. Some items were likely to deteriorate or become technologically obsolete before any future emergencies; others might be of use within a reasonable timeframe. Even if some items might be needed at a later date, the cost of storage and maintenance might exceed the costs of re-acquisition. Some items could be expected to find a civilian use, while others were so military in nature they had only scrap value in the peacetime market. As a result, the policies for disposition of surplus were improvised and changed during the course of the resale.

Initially, the Army attempted to sell surplus within the United States through the industries that manufactured them. At times this was simple, at other times it involved salesmanship or efforts to find new uses for the scrap material. In response to industry fears of depressing prices, the Army initially withheld quantities of some supplies off the market, such as non-perishable foods. Having endured the sacrifices of wartime, the American people wanted to share in the benefits of the surplus, and soon Congress directed the Quartermaster Corps to institute direct sales to the public.

The first effort at direct sales came through the Post Office. Members of the public who wished to purchase supplies (mostly canned food) placed their orders with the local post office. The local postmaster consolidated the orders and payment and sent the request to the nearest Quartermaster depot. The supplies returned through the Post Office for distribution. Within a few months, the system broke down simply because the Post Office was not equipped to manage this enterprise. Following this attempt, the Quartermaster Corps created a network of 77 retail stores scattered throughout the nation, beginning in September 1919. Stores remained in operation through February 1920, when the Quartermaster Corps gradually shut them down. Overall the Quartermaster Corps sales of surplus totaled $12 million from the Post Office and $35 million through the retail stores.[22]

Real property presented some special considerations. For the most part, the government leased large tracts of land for its training or industrial facilities with the promise to restore the grounds to pre-war conditions. By the time of the Armistice, these installations were in various stages of construction, ranging from complete to just beginning. The sale value was largely as scrap lumber, which was but a small fraction of the investment costs. The Army adopted a variety of disposal strategies depending on the circumstances. The facilities at National Guard camps, which consisted of a combination of tents and some wooden structures, were sold as scrap, with the provision that the purchaser also assume responsibility for damage to the property. That was a huge loss to the government but unavoidable. Other cantonments, including the National Army camps plus others, were wooden construction with a much greater investment in labor. In many of these cases, the Army acquired clear title to the land where feasible. Today numerous Army and Air Force installations trace their origins to World War I. Likewise, the Army kept the Brooklyn Terminal even though it was not completed until September 1919; and it became the basis for supporting the European campaigns of World War II. In cases where the government thought that partially completed projects might fetch a better price if completed, the contracts continued. One of the most interesting sales consisted of selling the entire Ordnance Plant at Nitro, West Virginia to become a factory city.[23]

Figure 8.5 Grand Opening of QMC retail store in New York City, 19 October 1919. Photo courtesy of the National Archives.

In Europe, the government wished to dispose of its material through sale except for a few type of supplies that were worth the transportation costs such as artillery or road making equipment. Shortly after the Armistice, the AEF created a General Sales Agent to coordinate the disposal of supplies, using the former office of the General Purchasing Agent. The establishment of the US Liquidation Commission in 1919 added another layer of coordination. Although the sales agent

could sell some surplus food to the relief agencies for Belgium or northern France, other direct sales in Europe proved difficult. The transportation networks were heavily damaged, making movement of the goods difficult. The French waived import duties for the AEF, but they insisted upon payment of duties for items sold. Direct sale of goods in Europe required time, and that meant stationing American Soldiers until the transactions could be complete. Instead of individual sales, the US government agreed to make a bulk sale to the French government for all US property in France, ranging from the temporary buildings, permanent buildings (cold storage or coffee roasting), canned foods, and any other stocks. As part of the deal, the French government assumed responsibility for any property damage done on the grounds the AEF leased. Throughout 1919, the American and French representatives inventoried and assessed the selling price of the property, which was turned over to the French government. By January 1920 the transactions were complete and the American mission in Europe was largely complete.[24]

Within the War Department, wartime reorganizations gave way to the peacetime structure. The National Defense Act of 1920 restored the construction and transportation functions to the Quartermaster Corps, but transferred the Paymaster functions to the new Finance Department. Although the General Staff was strengthened in other respects, the wartime Purchasing, Storage and Traffic Division and the Construction Division ceased to exist.[25]

By early 1920 the work of demobilization had largely ended. Only the occupation force in Germany, plus a few Graves Registration specialists, remained in Europe. All but a few domestic contracts were terminated through a process of negotiation, and most of the surplus stocks were either sold or to be sold. The Liquidation Commission had successfully terminated contracts in Europe and sold surplus property, with a net balance in favor of the United States.

The accomplishment represented hard work and ingenuity by all the personnel involved; it also involved a cultural change within a military establishment that traditionally monitored every penny spent. Now the government representatives accepted rounded numbers with the realization that delays over careful audits might prove more costly in the long run. Although this may have been the correct approach, it did little to defend the practices against charges of profiteering that arose in the 1930s. In any case, the war was over and Americans wished to go "back to normalcy."

Notes

1. Benedict Crowell and Robert Forrest Wilson, *Demobilization: Our Industrial and Military Demobilization After the Armistice, 1918-1920* (New Haven, CT: Yale University Press, 1921), 47-49.

2. George C. Marshall, *Memoirs of My Service in the World War 1917-1919* (Boston: Houghton Mifflin Company, 1976), 202-206.

3. Report of the G1, *United States Army in the World War, 1917-1919* (Washington, DC: Government Printing Office, 1948), 121-122.

4.*Extracts from Historical Report of the Chief Quartermaster AEF, France* Monograph #2, *Operations of the Quartermaster Corps US Army During the World War* (mimeographed history by the Quartermaster School, Schuylkill Arsenal, 1929), 83-91.

5. Donald Smythe, *Pershing, General of the Armies*, (Bloomington, IN: Indiana University Press, 1986), 248-252; Lette Gavin, *American Women in World War I: They Also Served* (Boulder, CO: University Press of Colorado, 1997), passim; Crowell, and Wilson *Demobilization*, 92-95.

6. Report of the G1, *US Army in the World War*, 298-310; Report of the Adjutant General, *US Army in the World War,* 15:152-155.

7. Crowell and Wilson, *Demobilization*, 11-16.

8. James G. Harbord, *The American Army in France, 1917-1919* (Boston: Little, Brown, and Company, 1936), 552-554; Crowell and Wilson, *Demobilization*, 16-17.

9.*Notes on Embarkation Activities in the AEF*, Monograph #8 *Operations of the Quartermaster Corps US Army During the World War* (mimeographed history by the Quartermaster School, Schuylkill Arsenal, 1929), 13-16; Crowell and Wilson, *Demobilization*, 9-30.

10. Crowell and Wilson, *Demobilization*, 27-28, 41.

11. Crowell and Wilson, *Demobilization*, 30-46; James A. Huston, *Sinews of War: Army Logistics, 1775-1953* (Washington, DC: Office of the Chief of Military History, 1966), 391-392.

12. Crowell and Wilson, *Demobilization*, 50-52, 62-74; *Annual Report of the Secretary of War [FY1919]* (Washington, DC: Government Printing Office, 1919), 13-20.

13. Crowell and Wilson, *Demobilization,* 104-111; *Annual Report Secretary of War [FY1919]*, 18-20.

14. Crowell and Wilson, *Demobilization*, 98-103.

15. Gaven, *American Women in World War I*, 101-129; Ann M. Ritchie Hartwick, *The Army Medical Specialists Corps, 45th Anniversary* (Washington, DC: US Army Center of Military History, 1995), 6-14.

16. Crowell and Wilson, *Demobilization*, 74-80.

17. Leo P. Hirrel, "The Beginnings of the Quartermaster Graves Registration Service," *Army Sustainment* 46 (July-August 2014): 64-67; Crowell and Wilson, *Demobilization*, 83-89.

18. Crowell and Wilson, *Demobilization*, 127.

19. Huston, *Sinews of War*, 392; Crowell and Wilson, *Demobilization*, 127-139; *Annual Report of the Secretary of War [FY1919]*, 37-44; War Contracts, etc., *US Statutes At Large* 40 (65th Congress): 1271-1275.

20. Crowell and Wilson, *Demobilization*, 112-144 and passim.

21. Crowell and Wilson, *Demobilization*, 287-315; *Annual Report of the Secretary of War [FY1919]*, 44-49.

22. Erna Risch, *Quartermaster Support of the Army: A History of the Corps, 1775-1939* (Washington, DC: Office of the Quartermaster General, 1962), 702-705; Crowell and Wilson, *Demobilization*, 269-287.

23. Crowell and Wilson, *Demobilization*, 256-269, 276-277.

24. Risch, *Quartermaster Support of the Army*, 698-699; Huston, *Sinews of War*, 395-396; Crowell and Wilson, *Demobilization*, 315-322.

25. Risch, *Quartermaster Support of the Army*, 707-709.

Epilogue

In his post-war reflections upon his service with the SOS, Johnson Hagood commented that "In general, I think it can be stated without fear of contradiction that the American Soldier was the best-fed, best clothed, and best-shod Soldier in Europe."[1] Certainly Hagood's assertions require some qualification to exclude the winter of 1917/1918 or the hardship of the final offensive actions; and this passage omitted the importance of French assistance. Yet his pride in the work of the sustainment community is largely justified. The United States Army began the war with only the vaguest idea of how to sustain a multi-million Soldier force in overseas combat; and somehow the sustainment community delivered the wherewithal to enable a critical American contribution to the Allied victory.

The work was far from perfect. Repeated re-organizations demonstrated that supporting the AEF remained a learning experience throughout the course of the war. Soldiers suffered from the logisticians' mistakes, especially during that first winter. French aid, both material and mentorship, was absolutely essential to the sustainment success of the AEF.

Yet the mistakes need to be balanced against the enormous difficulties of the tasks. The American involvement in World War I constituted the largest trans-oceanic military operation anywhere up to this time. In order to deliver the American fighting power, the Army first needed to determine how to convert its economy to wartime basis in order to equip and train its new Soldiers; and then transport them and their supplies across the ocean. Once in Europe, the AEF needed to create and operate a port and rail system crossing France, develop new solutions to problems ranging from lice, to graves registration, to field maintenance, to field feeding, and a host of other new problems. Even with helpful European examples, the work necessarily involved errors and adjustments, but eventually success.

American military reforms at the opening of the 20th century had largely focused on fighting, with a resulting gap in doctrine and institutional knowledge on how to support the fight. In 1917, some major organizational questions remained open. Whether the support aspects were primarily a military or business enterprise was an open question on both sides of the Atlantic. Even as the question was resolved in favor of the military enterprise, the details of how to merge the civilian expertise into a military structure resolved themselves only with time. The question of whether in-theater logistics should be directed from the theater commander or from Washington was not resolved until July 1918, when the principle was established in favor of the theater commander. In many respects, the sustainment decisions and processes of World War I were more important for the precedents set than for actual use so late in the conflict.

The Army and the nation left a mixed record for carrying the sustainment lessons of World War I forward. In general, efforts which required resources achieved little traction, whereas the institutional knowledge remained with varying degrees

of success. Throughout the 1920s and into the early 1930s, American military spending declined continuously; only the rise of the Axis Powers in the late 1930s prompted a modest rise in appropriations. With the reductions in their combat formations, Army leaders displayed little interest in spending money on the sustainment side. The mobile laundries that were just coming into use at the end of the war were only used to support installations; the Army failed to look for improved models even on an experimental basis until the next war. Graves Registration functions were not resourced until needed again. Members of the Ordnance Department might have been able to recognize the delays caused by lack of preparation for mass production; yet they were not able to apply this knowledge until the next war approached. Better weapons systems such as artillery or tanks received little attention during these lean years.

Some political leaders drew the opposite lessons regarding the costs of wartime production. In a sensational series of hearings during the 1930s, the isolationist Senator Gerald Nye pointed attention to the profits of the munitions industry, charging that wartime preparations were merely to benefit the "merchants of death." He overlooked the point that the lack of preparation necessitated the higher prices associated with non-competitive contracts or costly production. The Neutrality Acts of the 1930s resulted from these efforts.

Nevertheless, collective memory of the sustainment experience remained within many leaders and future leaders of the Army. Perhaps creation of the Army Industrial College in 1924 was the most visible legacy of the World War I experience. Here future leaders studied the past and future problems of economic mobilization. Major Dwight D. Eisenhower studied at the college and later taught there. Today this is the Dwight D. Eisenhower School for National Security and Resource Strategy (formerly the Industrial College of the Armed Forces), as part of the National Defense University.

By 1940, the former Assistant Secretary of the Navy was now President of the United States. Having observed the mobilization problems during World War I, Franklin Roosevelt accepted the need to begin the Protective Mobilization Plan in August 1940, well before the United States entered the war. He quickly grasped the concept for creating a War Production Board to prioritize resources and industrial production. These efforts significantly reduced the lag time for transforming American industry into an arsenal for democracy. Pershing's protégé was now the Chief of Staff of the Army, and George C. Marshall could apply a greater sophistication about balancing the fighting with the support in his global strategy.

The bureau system survived into World War II as the Technical Services, but without the same level of petty infighting. It was no longer acceptable for one department to hoard the typewriters or the leather. When George Marshall consolidated the Technical Services into the Army Service Forces under Brehon Somervell, he did not meet with the Congressional interference that characterized relations with the bureaus in the early 20th century. To avoid repeating the

competition for raw materials, the War Department provided explosives and propellants to the Navy Department during World War II.

Sustainment for a major war is never perfect, but the leaders of the 1940s entered World War II with a far better comprehension of the challenges ahead of them. They understood the importance of reviving the field services or the specialized port operations. They recognized that railroads, ships, and ports required special skills that might be consolidated into a specialize branch of the Army, which became the Transportation Corps.

Following the war, the Corps of Engineers did develop a few specialized railroad battalions, to preserve a core expertise on maintaining and operating railroads. In World War II these units folded into the Transportation Corps.[2]

In 1940, the Army awarded a contract for a two and a half ton truck to General Motors, which became popularly known as the "deuce and a half." This seemingly simple action had tremendous implications for the fighting abilities of the US Army because it freed the tactical truck from the maintenance and repair parts disaster associated with a multitude of commercial trucks; and it was mass produced from the beginning. With only a standardized model (plus variations), the Army could maintain a relatively high operational rate for its trucks and use them to best advantage. It added new depth to maneuver warfare.

In short, members of the sustainment community of World War I made two tremendously important contributions to America's emergence as a world power. They provided the means for the AEF to function as a separate army. Afterwards, they left an intellectual sustainment legacy that enabled the emergence of the US Army in World War II as a premier fighting force.

Notes

1. Johnson Hagood, *The Services of Supply: A Memoir of the Great War* (Boston: Houghton Mifflin Company, 1927), 342.

2. Carl R. Gray, *Railroading in Eighteen Countries: The Story of American Railroad Men Serving in the Military Railway Service, 1862 to 1953* (New York: Charles Scribner's Sons, 1955), 17-24.

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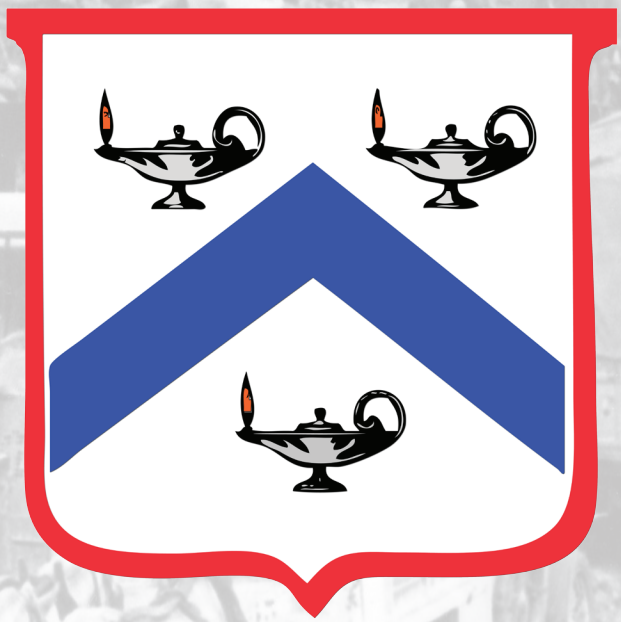

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