THE QUANDARY OF ALLIED LOGISTICS FROM D-DAY TO THE RHINE

By

Parker Andrew Roberson

November, 2018

Director: Dr. Wade G. Dudley

Program in American History, Department of History

This thesis analyzes the Allied campaign in Europe from the D-Day landings to the crossing of the Rhine to argue that, had American and British forces given the port of Antwerp priority over Operation Market Garden, the war may have ended sooner. This study analyzes the logistical system and the strategic decisions of the Allied forces in order to explore the possibility of a shortened European campaign. Three overall ideas are covered: logistics and the broad-front strategy, the importance of ports to military campaigns, and the consequences of the decisions of the Allied commanders at Antwerp. The analysis of these points will enforce the theory that, had Antwerp been given priority, the war in Europe may have ended sooner.

THE QUANDARY OF ALLIED LOGISTICS FROM D-DAY TO THE RHINE

A Thesis

Presented to the Faculty of the Department of History

East Carolina University

In Partial Fulfillment of the Requirements for the Degree

Master of Arts in History

By

Parker Andrew Roberson

November, 2018

THE QUANDARY OF ALLIED LOGISTICS FROM D-DAY TO THE RHINE

By

Parker Andrew Roberson

APPROVED BY:

DIRECTOR OF THESIS: _____

Dr. Wade G. Dudley, Ph.D.

COMMITTEE MEMBER: _____

Dr. Gerald J. Prokopowicz, Ph.D.

COMMITTEE MEMBER: _____

Dr. Michael T. Bennett, Ph.D.

CHAIR OF THE DEPARTMENT OF HISTORY: _____

Dr. Christopher Oakley, Ph.D.

DEAN OF THE GRADUATE SCHOOL: _____

Dr. Paul J. Gemperline, Ph.D.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF MAPS

Chapter One: Introduction

In warfare and military strategy, no other element has been as crucial as logistics. Defined as the detailed coordination of a complex operation involving many people, facilities, or supplies, logistics, at its very core, determines the manner in which an army wages war. From the movement of troops to the movement of supplies, logistics has been a key part of every war in recorded history. While many historians consider World War I the first modern war, World War II exhibited the impact and importance that modern logistics played in military strategy. The logistics involved with Operation Overlord and the subsequent march across France, along with the logistics command structure of the Allies, took years to develop and went through numerous changes. From the invasion of Normandy to the crossing of the Rhine, the U.S. Army and its Allies faced the difficult task of overseeing the movement of thousands of men across Europe and the challenge of supplying them in a timely and efficient manner. This study will analyze Allied strategy as it relates to logistics and the consequences that military decisions had on the overall logistical strategy. It will also justify the claim that, if the Allied commanders had based their strategy around logistics instead of strategic positioning, victory may have been achieved much sooner.

Although Germany began the war with a strong logistical system, by 1944 their strength had waned due to the actions of the Allies. The German invasion of the Soviet Union in 1942 caused a number of issues for the country. Along with dividing its troops, the invasion also put a strain on German logistics. By 1944, the situation became critical, as the USSR had fought its way to the borders of the Reich. The war with Great Britain and the United States also strained German logistics. British and American strategic bombing had crippled German production and transport systems by the invasion of France in June 1944. Germany's ability to move troops and

supplies weakened, giving the Allies the perfect chance to gain a foothold in Europe. The Battle of the Atlantic also strengthened the Allies. By early 1944, the United States and its allies had secured lines of communication with Europe, allowing Allied merchant vessels to support a logistical pipeline to both Great Britain and the USSR. With the Allies countering the U-Boat menace, there was little Germany could do to interfere. The final and arguably the most important factor came with the Allies' overall power. The United States held the industry, the resources, the population, the wealth, and the will to support Europe against the Reich.

To justify the purpose of this thesis, one must first review the studies already presented on military logistics. A number of historians have analyzed the effectiveness of the Allies' logistical system. In *Force Mulberry* (1951), Alfred Stanford defends the effectiveness of the artificial harbor at Normandy. Stanford considers the artificial harbor to be the most vital part of the Normandy Invasion as it provided a steady flow of ammunition and supplies to the invading American and British troops. Sharing Stanford's opinion regarding the harbor, James A. Huston, a World War II veteran and professor, provides an extensive look at military logistics in *The Sinews of War* (1966).

Having participated in World War II, Huston provides a strategic viewpoint of the role that logistics played in the Allied campaign. He praises the Allied commanders' flexibility regarding their logistical system and the effectiveness of the artificial harbor. However, Huston did not refrain from pointing to deficiencies within the Allied logistical system. Although praised for contributing to the successful Allied campaign in Northern France, Huston saw the Red Ball Express as a problem to the supply system. Along with the lack of coordination amongst the drivers, the long hours of continuous driving made it impossible for the repair facilities to keep

the trucks in optimal running condition.[1] Huston's work, overall, provides a history of military logistics and its evolution throughout World War II and into the modern era of warfare.

Unlike Huston and Stanford, Martin Van Creveld's *Supplying War* (1977) was more critical of the Allied logistical system. He argues that logistical planning was a difficult task as the operational requirements could change unexpectedly.[2] Thus, Van Creveld believes that military strategy must be flexible and that Allied commanders needed certain qualities such as adaptability and the ability to improvise. He also felt that having a superior logistical system to the Germans was the key to an Allied victory.

Van Creveld notes that the planners for Normandy realized that logistics would be the main factor in defeating the German army. By looking at Germany's logistical capabilities, the Allied commanders devised a plan to take advantage of any weaknesses in the German logistical system. Van Creveld argues that the decision to invade Normandy, as opposed to Pas de Calais, was made not simply due to the strength of the enemy defense, but also the German's logistical weakness at Normandy.[3] However, unlike both Huston and Stanford, Van Creveld was more critical of many aspects of the Allies' logistical plan.

The artificial harbors built for the Normandy invasion, in Van Creveld's opinion, failed to meet expectations. He agues that the artificial harbors did nothing but clutter the landing area and increase the danger to shipping.[4] The only viable option for efficient supply lines was the deep-water ports that were still in the hands of the Germans. The artificial harbors were not only detrimental to the Allied logistical plan, they were temporary and would not sufficiently aid in an Allied victory. Van Creveld also considers the relatively slow breakout from Normandy a result

[1] James A. Huston, *The Sinews of War: Army Logistics 1775-1953* (Washington, D.C.: GPO, 1966), 528.
[2] Martin Van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (Cambridge: Cambridge University Press, 1977), 203.
[3] Ibid., 208.
[4] Ibid., 210.

of the Allies' logistical plan. The Allied commanders overestimated the amount of supplies needed, thus valuable storage space was taken, hindering the Allies' ability to camouflage and disperse supplies.[5] Overall, Van Creveld was highly critical of the logistics of American forces from D-Day until the crossing of the Rhine. He reiterated the importance of logistics to military campaigns, but saw the system that the Allies implemented as flawed and in need of improvement.

The relationship between logistics and military strategy is a central part of John Kennedy Ohl's *Supplying the Troops* (1994). Ohl focuses on General Brehon B. Somervell, who was in charge of the army's wartime logistical operation. Somervell, as Ohl discusses, understood the important relationship between logistics and overall military strategy. Although resisted by strategic planners, Somervell believed that he should be advised of strategic plans to allow for logistical planning.[6] Analyzing several themes of American military logistics, Ohl emphasizes how and why logistics is intimately linked with overall strategy.

While Ohl seems to side with Somervell in the importance of logistics in military strategy, he analyzes Somervell as often at odds with military planners who did not agree with him. Somervell became concerned with the Operations Division (OPD), who claimed an interest and asserted a final jurisdiction in logistics.[7] As Ohl explains, the problem was not that the OPD did not feel that logistics was important to strategy but that logistical support should be developed in subordination to strategy. Ohl analyzes the problems that logisticians and strategists had with one another and the relationship of logistics and strategy during World War II.

---

[5] Ibid., 212.
[6] John Kennedy Ohl, *Supplying the Troops: General Somervell and American Logistics in WWII* (DeKalb: Northern Illinois University Press, 1994), 7.
[7] Ibid., 146.

Similar to both Huston and Van Creveld, Ohl saw the slow breakout from Normandy as a significant problem in the logistical plan of the Allies. The lack of viable ports and the damaged railways caused ships and supplies to accumulate, leading to lost momentum and also the stalling of the ships sent to supply troops.[8] Logistics, in Ohl's opinion, seemed to be a fragile system that often clashed with the minds of the strategic planners.

Although sharing many of the opinions that Huston reiterated in his work, Steve Waddell argues in *United States Army Logistics: The Normandy Campaign 1944* (1994), that the Normandy invasion was not as successful as often portrayed by other historians due to the numerous logistical problems that the U.S. Army suffered during the campaign. Waddell first blames the complicated setup of the Allied Forces. The creation of the ETOUSA (European Theater of Operations, United State Army) only muddled the command arrangements and in turn led to organizational problems with the SOS (Service of Supply).[9] Waddell argues that this caused the American supply system to be unorganized by D-Day, despite four years of planning. He even goes as far as saying that the Americans did not properly prepare for the invasion, which led to confusion and an American command system that was far from peak performance.[10]

While Waddell agrees with Huston about the major role that logistics played in preparation for D-Day, he argues that the sheer size of the operation caused the plan to become inflexible, having to rely on emergency requisitions for rations. Any flexibility within the system was eliminated due to the lack of discharge capacity.[11] Waddell also felt that the Normandy ports received too much attention prior to the invasion. While he agrees with their importance, Waddell states that operational planners failed to consider the effect that the terrain in Normandy

[8] Ibid., 230.
[9] Steve Waddell, *United States Army Logistics: The Normandy Campaign, 1944* (Westport, CT: Greenwood Press, 1994), 4.
[10] Ibid., 20.
[11] Ibid., 45.

would have on logistics. If the terrain proved too difficult to handle, the logistics plan would quickly break down.[12] Waddell also continues the narrative amongst historians regarding the slow breakout from Normandy.

Although Huston's book took issue with the rapid pace of the Allied breakout from Normandy, Waddell seems to believe that it was a slow breakout that had a more negative effect on the Allied logistical plan. Even before overcrowding became an issue, Waddell argues that the distribution system of the supply ships arriving at Normandy was inefficient and flawed. Thousands of tons of supplies quickly crowded the beach as troops searched for ammunition and other items that were needed immediately. The rate at which supplies were being delivered also became an issue. Referring to Huston's work, Waddell agrees that the rate of delivery was an unexpected occurrence, which almost caused the American supply system to collapse.[13] Waddell also saw the rapid speed of the Allied advance across Northern France as a logistical issue.

Both Huston and Waddell agree that the Allies' logistical system became more efficient following the Normandy breakout. However, the unexpected speed at which troops advanced also created a major issue within the supply system. The failure to develop the Brittany ports, as well as the slow progress in opening the port of Antwerp, caused the Allied forces to fall behind schedule. Waddell's overall opinion of the Allied logistical system portrays it as underwhelming and failing to live up to its full potential.

While the previous historians have praised much of the Allies' logistical system, Alan Gropman's *The Big L: American Logistics in World War II* (1997) argues that World War II was a warning to the United States that logistical power needed to be maintained even during peacetime. Although praising the United States for their logistical system, Gropman argues that

[12] Ibid., 48.
[13] Ibid., 68.

it could have been even more productive. He emphasizes the interwar period and the failure of the United States to improve military production. Gropman argues that a symbiotic relationship needed to exist between logistics and strategy, and that the United States did not fully realize this until late into the war. It was not until 1943, upon the creation of the Office of War Mobilization, that grand strategy and production were interlinked.[14]

Repeating arguments of other historians, Gropman argued that logistics, while playing a large role in the defeat of Germany, often suffered setbacks during the European campaign. Referring to World War II as a "material battle," Gropman's work analyzed how the United States and Great Britain used their logistical strength to defeat Germany.[15] However, Gropman gave more praise to the logistics personnel who saw battle rather than the logistical planners who mapped the plan long before the Normandy Invasion. Logistics, as Gropman argues, needs to be as flexible as strategy and have the ability to adapt to any situation during a military campaign.

The Red Ball Express has also been a topic of military logistics to which historians have taken different approaches. Nicolas Aubin's *Liberty Roads* (2014) and David Colley's *The Road to Victory* (2000) both offer praise and criticism to the famous supply route, but use different approaches. Aubin's book takes a more conservative approach to the Red Ball Express, weighing both its successes and failures. Aubin argues that, while the Red Ball operation was an overall success, its deficiencies caused it to lose its effectiveness by the end of 1944. Aubin blames the chaotic organization of the Express, which led to maintenance issues that caused the logistical system to falter. He portrays the Red Ball Express as a flawed, yet successful, logistical endeavor.

[14] Alan Gropman, *The Big L: American Logistics in World War II* (Washington, D.C.: National Defense University Press, 1997), 51.
[15] Ibid., 339.

Colley's *The Road to Victory* gives more attention to the positive effects of the convoy system with little emphasis on its flaws. He portrays the truck convoy as almost mythical and praises its logistical prowess. Giving little emphasis to the convoy's flaws, Colley saw the Red Ball Express as controlled chaos. Although chaotic in its early stages of existence, the Express was also successful in moving supplies. Despite his work mainly focusing on the system's positive side, Colley does not completely ignore its flaws.

Similar to Aubin, Colley blames the mechanical issues as the root of the Red Ball's downfall, but offers a different view. Similar to his own mythological take on the convoy system, the press, in Colley's opinion, led to the convoy's issues. Press coverage during the war seemed to paint the Red Ball Express as the saviors of the troops who would bring an end to the war. The drivers seemed to allow this heroic portrayal to go to their heads and felt that they could singlehandedly win the war. Colley argues that this led to the maintenance issues as drivers overloaded and overworked their trucks, leading to numerous breakdowns.

The port of Antwerp has also been a topic debated by historians. Often overshadowed by the more infamous Operation Market Garden, the Battle for Antwerp has been portrayed by historians as the turning point for the Allies' logistical plan. Having seen firsthand the campaign to open the port of Antwerp, Major General J.L. Moulton provides a detailed account of the Scheldt campaign in *Battle for Antwerp* (1978), in which he is surprisingly critical of his own commander, Bernard Montgomery. Moulton seems to argue that the American forces needed Antwerp more than the British, who were able to operate comfortably from the channel ports. This was the reason Montgomery initially only ordered the Canadian troops to clear the Scheldt estuary while he focused on the Rhine at Arnhem. This is where Moulton criticizes Montgomery. He argues that Antwerp was not simply important to the Americans, but to the entire Allied

campaign. It would be the key to pushing the Germans into their home territory and ending the war. Moulton also felt that the campaign was more difficult due to Montgomery failing to fully commit to opening Antwerp, leading to high casualties.

Robin Neilland's *The Battle for the Rhine* (2005) provides a far less critical account of the Antwerp campaign. Although Neilland, like Moulton, recognizes Montgomery's error, his work focuses more on the competing strategies rather than the British general's mistake. Neilland provides a comparison between the narrow-front and broad-front strategy and how Antwerp's place in both. Neilland argues that, due to the failure of Market Garden, the narrow-front policy collapsed, leaving Eisenhower's broad-front policy as the only remaining option. This is why Antwerp, in Neilland's mind, became the key objective. The broad-front strategy, while not wrong in theory, could only succeed if the logistical situation was sufficient. Neilland seems to paint Antwerp as the only answer to the Allies' logistical problem; it was the key to defeating Germany.

In consideration of these previous works, this study will attempt to emphasize their validity and create a finalized argument that Antwerp should have taken precedence over Market Garden. This thesis will review the Allies' campaign into Germany to examine how it was affected by the delay in opening Antwerp, then the conclusion will explore an alternate history by reviewing the strategic situation prior to Market Garden. The conclusion will provide information and will not stray from historical fact, but simply apply what a change in strategy could have done to the Allied campaign.

Chapter Two: Logistics of Operation Overlord

Operation Overlord depended on numerous factors. While strategy is a major factor in every military operation, the logistics of the landing operation proved to be the most important and decisive factor of the invasion. Prior to the D-Day landings, the logistical power of the Allied forces had been increasing incrementally and was boosted with the entrance of the United States in December 1941. Despite the logistical support to Great Britain, the United States was unprepared to face the logistical strength of Germany. The sense of urgency seemed to aid the United States in developing and implementing a logistical plan strong enough to aid the Allied forces in the European Theater.

At the time the Americans entered the war, the Lend-Lease program was the only source of logistical support Great Britain was receiving from the United States. Despite their potential industrial strength, the United States had a small window of time to strengthen their logistical support to the Allies before Germany overwhelmed them.[16] Germany had already implemented their logistical strategy, had taken over most of Europe, and was threatening Great Britain. One of the main factors in the passing of the Lend-Lease program was the state of Great Britain and their logistical capability. By Fall of 1940, the British were dangerously close to running out of resources. In order to push back against Germany, England needed aid from the United States.[17] Although the Lend-Lease policy was meant to aid Great Britain, it also had a positive effect on America's military readiness. Lend-Lease gave the United States enough momentum to convert and expand their industrial power, which in turn benefited the Army's material needs in the

[16] Gropman, *The Big L: American Logistics in World War,* 268.
[17] Huston, *The Sinews of War,* 442.

following years.[18] Once the United States entered the war, the ultimate goal of a European invasion came to the forefront of the Allies planning and strategy.

The importance of logistics in any military operation was perfectly summarized by a German soldier who was captured shortly after the Normandy invasion. While being marched past many of the roadside supply dumps that dotted the Normandy coast, he was heard to remark, "I know how you defeated us. You piled up the supplies and then let them fall on us."[19] The European Theater was named *materialschlact*, or "material battle," by the Germans. No other war in history had, to that point, truly tested the industrial capacities of Germany and the United States.[20] By 1944, the Allies had learned that, in order to achieve logistical superiority, they must cripple the logistical system of the Germans in France before implementing their own plan. After the strategic bombing of key German logistical targets, Germany was facing dire fuel and transport issues throughout Europe by D-Day.[21] The German Army, despite their logistical prowess in the first years of the war, underestimated the capability of the Allied forces. Germany believed that the Allies would rely solely on one of the ports, all of which had been strongly fortified. However, the use of artificial harbors proved the Allies were capable of maintaining their invasion force.[22]

Preparations for the D-Day landings required a large amount of time and began two years before troops set foot on Normandy. Not long after the United States entered the war, General George Marshall ordered the formation of a European Theater of Operations (ETO), tasked with the formation of a logistical plan for moving troops and equipment to Great Britain in

[18] Ibid., 444.
[19] Gropman, *The Big L*, 339.
[20] Huston, *The Sinews of War*, 339.
[21] Kenneth Macksey, *For Want of a Nail: The Impact on War of Logistics and Communications* (London: Brassey's, 1989), 133.
[22] Ibid.

preparations for the invasion of Europe.[23] This operation, under the name Operation BOLERO, exhibited the importance of logistical planning. In hopes of invading France in fall of 1943, Marshall made it clear that the rate of troops and supplies shipped to Great Britain must be increased exponentially.[24] However, delays due to the North Africa campaign and conflict within the ETO pushed the invasion back. In order to give more focus to logistical planning, the Service of Supply (SOS) was formed in May 1943 within the ETO. This proved disastrous, as neither group was able to function properly in conjunction with each other. As a result, they were combined in January 1944 when General Dwight Eisenhower assumed command of the ETO.[25]

Figure 2.1: General Brehon B. Somervell

Source: *U.S. Army Corps of Engineers*

As one of the key logisticians during the war, General Brehon Somervell not only prepared the United States for war prior to Pearl Harbor, he was appointed head of the army Service of Supply and served as the main logistical advisor for General Marshall. Following the reorganization of the army in 1942, Somervell argued the necessity for a unified logistical

[23] Col. Frank L. Elder, "Logistic Planning and Operations-ETO," (Carlisle, PA: U.S. Army Military History Institute, 1945), 1.
[24] John Kennedy Ohl, *Supplying the Troops: General Somervell and American Logistics in WWII* (DeKalb: Northern Illinois University Press, 1994), 107.
[25] Elder, "Logistic Planning and Operations-ETO," 1.

command.[26] Somervell was not one to stay quiet over his opinions on logistics. When Eisenhower assumed control of the ETOUSA in 1942, Somervell warned him that "one of the major encumbrances, if not the major encumbrance, upon the progress of the AEF in France in 1917-1918 lay in bad organizational control of its SOS, and particularly in its being forced to adopt an organization radically different from that existing in the War Department."[27] Somervell was often at odds with the Operations Division, the central wartime command post of the General Staff. While strategic planners recognized the importance of logistics in strategic planning, they felt that logistical support should be developed in subordination to strategy.[28] Somervell felt that logistics should be the basis for strategy. As evidence, he used the Allied forces' preparations for Operation TORCH. Without consulting him, strategic plans were created on short notice and the resulting operation saw a number of avoidable logistical problems that could have harmed its success.[29]

Somervell adamantly argued the vital importance of logistics in the making of strategy. In a letter to Marshall, Somervell emphasized the vital part logistics played in strategy, stating, "if this war has shown anything, it has shown that our efforts to launch attacks on the enemy have in every case been governed by logistics—transportation and supply. When these factors have not been given due weight, confusion, delay, and disaster have come only too rapidly."[30] Logistics, in Somervell's mind, was at all times the deciding factor in military operations and the success of battles hinged on the Allies' logistical preparedness. Somervell even went as far as to propose the confinement of the General Staff to strategic planning and the direction of military operations

[26] Ohl, *Supplying the Troops*, 5.
[27] Steve Waddell, *United States Army Logistics: The Normandy Campaign, 1944* (Westport, CT: Greenwood University Press, 1977), 4.
[28] Ohl, *Supplying the Troops*, 146.
[29] Ibid., 147.
[30] Ibid., 148.

while leaving all logistical decisions in the hands of Somervell.[31] His claims were not without merit. Logistical issues contributed to the escape of the Germans following their defeat in Sicily. The Commander-in-Chief of the North Africa campaign even argued that, if the Allied forces been able to transport just one additional division to Sicily, the Germans could have been cutoff and captured. Transportation issues would also contribute to the postponement of the Normandy invasion.[32] With Somervell's proposals, along with the logistical problems that arose during the North Africa campaign, the Allied forces gained a better understanding of the relationship between logistics and strategy, using this knowledge in preparation for Operation Overlord.

Figure 2.2: Brig. Gen. Henry B. Sayler

Source: Mayo, Lida*, The Ordnance Department: On Beachhead and Battlefront*, (Washington, D.C.: Center of Military History United States Army, 2009), 220.

Appointed Chief Ordnance Officer of ETO, Brigadier General Henry B. Sayler was tasked with providing logistical support for the North Africa Invasion. Sayler's experience in North Africa would be beneficial to the logistical planning of the Normandy Invasion. Unlike Operation TORCH, where ordnance workers were given little factual information, the planning

[31] Ibid., 149.
[32] John D. Millett, "Logistics and Modern War," *Military Affairs* Vol. 9, No. 3 (Autumn 1945): 204.

of Operation Overlord was delegated to the technical services.[33] With the power given to Sayler and the Ordnance Department, the planning of the invasion involved determining a number of factors. Saylor and his technical services analyzed initial ammunition load outs, creation of supply points, and procedures for distributing ammunition to troops moving through those supply points.[34] Instead of basing their logistics around strategy, the Allies would be basing their strategy around logistics. This was one of the main reasons Normandy became the location for the invasion.

In terms of distance, Pas de Calais was closer to Great Britain and appeared to be the most direct route to Germany. However, while it would have been an easy site to ship supplies through, it was also in an area that Germany could easily reinforce. The excellent road and railroad network made Calais one of the most heavily defended areas, which would have made a naval invasion for the Allies a near impossible task.[35] Normandy, on the other hand, was more isolated and less defended. It would be more difficult for the Allies to build a logistical network, but Germany would also have difficulty reinforcing the area once the invasion commenced. While it would have made logistical sense to invade at Calais, Normandy gave the Allies a strategic advantage. Eisenhower argued that the Germans expected the Allies to land at Calais; while Normandy was further from Germany, it gave American and British forces enough time and space to build their strength and to establish their supply system.[36] With the location of the invasion determined, the American and British forces needed to build their troops and supplies to prepare for the operation.

---

[33] Lida Mayo, *The Ordnance Department: On Beachhead and Battlefront* (Washington, D.C.: Center of Military History United States Army, 2009), 225.
[34] Ibid., 226.
[35] Martin Van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (Cambridge: Cambridge University Press, 1977), 208.
[36] Dwight Eisenhower, *Crusade in Europe* (Garden City, NY: Doubleday & Company, 1948), 231.

Although the Allies saw a significant increase in the amount of troops available for Operation Overlord, the amount of supplies and equipment lagged behind. In order to meet the demands of the impending invasion, other theaters often had to be deprived of supplies and units that had been designated for them. In just a span of five months, American troop strength increased from 774,000 to over 1,500,000, which was more than anticipated.[37] While the increase in troops was necessary for the invasion, it also created an imbalance with the supply levels. This issue would be rectified, but the British ports proved unable to handle the amount of shipments. In order to handle the large volume of supplies, the Allies used ships as floating warehouses.[38] The ships anchored in British waters until their supplies could be properly discharged. This scheme efficiently solved the limited discharge capacity of British ports.

The logistical nightmare that occurred in North Africa and Sicily remained fresh in the minds of the logistical planners of D-Day. John Medaris, a Colonel within the Ordnance Corps, used the experience in North Africa as a template for the logistical plan for Normandy. He planned to position a large amount of ordnance support behind the men responsible for getting troops and supplies ashore. These additional troops would repair any vehicles that came ashore, handle ammunition and place it in inshore dumps, and help identify and load Class II supplies.[39] Medaris also felt that complete control over his troops was a necessity to ensure success. Despite authorizing each of his officers to communicate with the local battalion commanders supporting his corps, Medaris felt that subsidiary control would cause delays.[40] Another major problem that needed to be addressed was the need to offload cargo rapidly during the invasion of Normandy.

---

[37] Robert Coakley and Richard Leighton, *The War Department: Global Logistics and Strategy 1943-1945* (Washington, D.C.: Center of Military History United States Army, 1989), 353.
[38] Ibid., 355
[39] Mayo, *The Ordnance Department*, 234. Class II supplies are clothing, tentage, hand tools, administrative and housekeeping supplies and equipment.
[40] Ibid., 235.

Although French ports were eventually to be used to offload supplies, a temporary solution needed to be developed to handle this task until a port was captured. This was a problem that the Allies had not yet faced. Before Dunkirk, landing an army in enemy-occupied France was not foreseen and landing and maintaining such a large force was a daunting task to undertake.[41] One of the Allies' first main objectives for the Normandy invasion was the capture of Cherbourg. The French port would allow reinforcements to be directly brought from the United States rather then unloaded in Great Britain first.[42] This presented an untested challenge to the Allied forces. Unlike in North Africa and Italy, the ports in Normandy were heavily defended and, even when captured, would need to be restored to working condition.[43] An immediate method of unloading troops and supplies was needed. The Allies developed a plan to construct two artificial harbors, Mulberry A and Mulberry B, both of which would then be towed across the channel and constructed at Omaha and Arromanches beach, respectively. They would then be used to unload troops and supplies until the Normandy ports could be captured and ready for use.

The Normandy ports were an essential objective for the Allied forces in their plans. While landing vessels that had been developed to allow the unloading of troops and supplies did lessen the Allies' immediate reliance on permanent port facilities, a permanent port would be needed to sustain an effective campaign. General Eisenhower noted the destructive storms that often plagued the English Channel and that the only method that would ensure sufficient supplies and maintenance would be to capture large port facilities.[44] A direct assault on a permanent port

[41] Guy Hartcup, *Code Name MULBERRY: The Planning, Building and Operation of the Normandy Harbours* (New York: Hippocrene Books, 1977), 15.
[42] "Opening and Operating the Continental Ports,"The Administrative and Logistical History of the European Theater of Operations, Dwight D. Eisenhower Library, March 1946.
[43] Hartcup, *Code Name MULBERRY*, 15.
[44] Eisenhower, *Crusade in Europe*, 234.

facility would be impossible, however. The Allies realized that not only would the French ports be heavily defended, unlike the open beaches, but even if the ports were captured, the Germans would have likely demolished them, rendering them useless until repaired.[45] This made the artificial harbors the only immediate option the Allies had at their disposal.

Figure 2.3: Assembly of Artificial Port

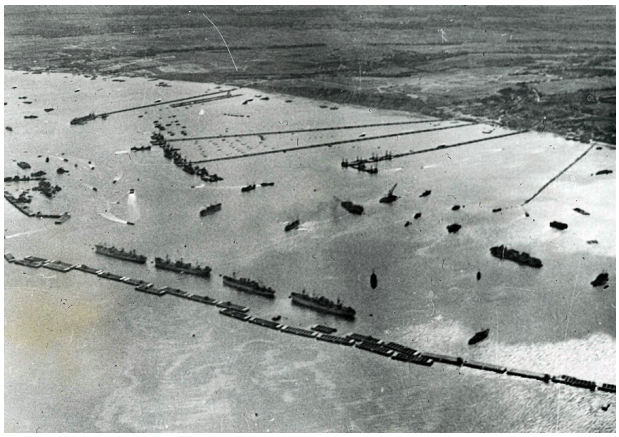
Source: *D-Day Center*

While the ports needed to be kept as secret as possible due to their importance in the invasion, that secrecy also led to a number of problems. The ports were kept so secret that the officers who knew about them felt a sense of dread based on the significance of the knowledge that was bestowed upon them.[46] The size requirement also was a pressing issue for the engineers. Both harbors needed to be completed in two weeks time, and each needed to be approximately the size of the harbor at Dover, England. To put it into perspective, Dover was also a man-made harbor that required seven years to build under peacetime conditions.[47] The importance of the harbor also led to tension between the American and British planners. While one of the harbors

45 "Neptune: Training for and Mounting the Operation, and the Artificial Ports,"The Administrative and Logistical History of the European Theater of Operations, Dwight D. Eisenhower Library, March 1946.
46 Alfred Stanford, *Force Mulberry: The Planning and Installation of the Artificial Harbor off U.S. Normandy Beaches in World War II* (New York: Morrow, 1951), 47.
47 Ibid., 36.

was reserved for British forces, the other was to be used by the Americans. When Rear Admiral Allan Kirk arrived in Great Britain to assume command of the U.S. Naval invasion forces, it led to confusion regarding the chain of command. While many believed that British Admiral Bertram Ramsay, commander of the Allied Naval Commander Expeditionary Force, was the superior to Kirk, in reality, Kirk was only nominally under Ramsay.[48] Regardless of the issues facing the commanders, the artificial harbors had to be built, tested, and ready to be towed to support the invasion.

Figure 2.4: Mulberry Harbor



Source: *University of Glasgow Library Archives*

When the construction of the ports commenced, the Allies needed to ensure they were built to maximize their potential to adequately support the invasion forces. The campaign in North Africa and Italy demonstrated that each division would require approximately 700 tons of supply daily, and a buildup in reserves of troops and ammunition was required to enable a deep offensive into France, sustainable throughout an extended period of time.[49] To ensure this, the British and the Americans required two types of general anchorages. The first, called a "gooseberry," consisted of a number of sunken ships lined up to provide a sheltered coastline,

[48] Ibid., 53.
[49] Eisenhower, *Crusade in Europe*, 235.

while the "mulberry" was essentially a complete harbor. Both sectors would be given one mulberry port and an additional five gooseberries.[50]

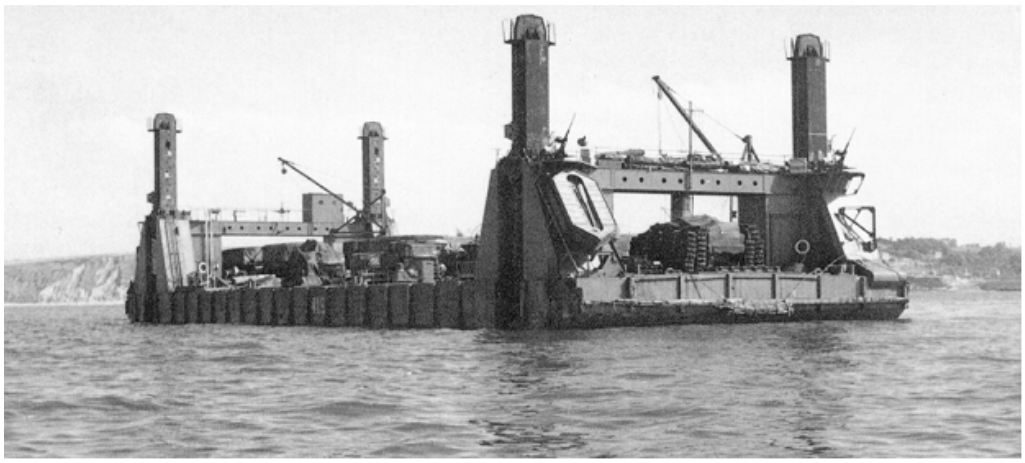
The construction of the mulberries not only needed to take into account the amount of equipment that needed to be discharged, but also the rising and lowering of the tides. The difference between low and high tide could be as much as twenty feet and made it impossible for large ships to get landing craft closer than a mile within shore.[51] This forced the engineers to design mulberries that could be adjusted based on the rise and fall of the tides. While smaller ships, such as coasters and tugs, could unload supplies within a half-mile of shore, Liberty Ships, which could venture into waters of 28 feet depth, required the harbor to reach as far as 4,000 feet from shore.[52] Floating piers also needed to be built to accommodate the discharge of supplies.

The first component of the Mulberry was the Lobnitz pier, designed to streamline the offloading of troops, supplies, and equipment. The Lobnitz pier was one of the key components of the harbor and made it possible to unload a ship in an hour. Positioned at the end of each floating bridge, the pier was a floating steel hull with four sixty-foot "spud" legs on each corner, which allowed the structure to be moved up and down adjusting itself to the tide.[53] Engineers designed the pier to be completely steady and allowed ships to unload regardless of the tide. The spuds extended to the bottom of the harbor, which anchored the structure in place. The elevator-like aspect of the structure was most important. Without it, operations had to be halted at low tide, as the vessel would be too far below the platform to unload supplies.[54] The pier connected to a floating bridge designed to withstand the rise and fall of the tide as well as flexible enough to withstand the waves.

---

[50] Ibid.
[51] Hartcup, *Code Name MULBERRY*, 28.
[52] Stanford, *Force Mulberry*, 66.
[53] Ibid., 68.
[54] Ibid.

Figure 2.5: Lobnitz Pier



Source: *U.S. Army Transportation Museum*

The bridges needed to accommodate heavy machinery as well as withstand waves. Designers developed three separate floating steel bridges spanning a total of seven miles to withstand these conditions. Each bridge, known by the code word "whale," was built of 80-foot sections resting on pontoons that, at low tide, rested on the sand while also being able to float at high tide.[55] A telescopic span helped resolve a number of problems that could arise. It enabled the bridge to adjust itself based on the height of the tide, and it could expand and contract to accommodate the depth requirements of the ships. The ability to expand and contract also relieved the strains and stresses applied to the bridge by choppy seas; the telescopic spans also had the ability to adjust themselves, which made the linking of the pier heads to one another possible.[56] Despite these designs, the creation of the breakwaters also aided in the Mulberry harbors.

Initially, the mulberries did not include the installation and the protection of sheltering breakwaters. However, with the number of divisions that needed to be maintained in the first two

[55] Ibid., 67.
[56] Hartcup, *Code Name MULBERRY*, 33.

months of the campaign, the discharge of supplies and ammunition needed to be uninterrupted. The need for sheltered water forced logistical planners to develop a method to protect the pier heads.[57] Engineers proposed a number of methods; ultimately the Allies settled on the use of three different types of breakwaters.

One of the issues facing the Mulberries was the need to shelter as many as 4,000 small landing craft if bad weather arose. The solution was the use of blockships, which provided enough shelter to protect the shallow-draught vessels.[58] These blockships, also known as gooseberries, provided some protection for smaller vessels in the event of choppy seas. Despite the blockships forming a 9,000-foot line of protection, they needed to be placed closer to shore to be effective.[59] Along with the blockships, breakwaters made of concrete provided sheltered water. These breakwaters, also known as Phoenixes, began to be towed across the Channel on June 7 and were not in position until June 10 due to enemy fire. Despite the delay, thirty-two of the breakwater units were installed within a week.[60] These breakwaters were central to the Mulberry plan. It made an open beach invasion possible and made the unloading of vehicles, supplies, and ammunition more efficient.[61] However, even with the addition of the Phoenixes, the harbor could only hold a fraction of the ships in the area for unloading.[62] This required a third breakwater to be placed farther out. This required a new type of breakwater that could still be effective in deeper water.

[57] Ibid., 58.
[58] Ibid., 73.
[59] Stanford, *Force Mulberry*, 71.
[60] Hartcup, *Code Name MULBERRY*, 114.
[61] Stanford, *Force Mulberry*, 70.
[62] Ibid., 71.

Figure 2.6: “Bombardons” moored in the Bay of Weymouth

Source: *Imperial War Museum*

Needing to install breakwaters even further from the beach required structures that could float. Phoenixes and blockships would be ineffective due to the depth of the water. Being such a new concept, engineers used a significant amount of trial and error to develop a floating breakwater that could adequately dampen the wave action. British engineer Robert Lochner developed a hollow steel structure, called a Bombardon, which planners hoped would effectively calm the waves off Normandy.[63] Construction of the Bombardons began and testing commenced to ensure their effectiveness. Unlike the Phoenixes, the Bombardons could be tested on their effectiveness at breaking up the waves.[64] The testing revealed a few issues that Lochner had foreseen. When questioned about his design, Lochner emphasized that his floating breakwaters could not operate effectively in depths greater than 42 feet. The Bombardons were put through more testing, and after final tests in May 1944, they were deemed adequate for the operation.[65] The creation of the breakwaters and the piers and bridges would be a valuable component to the success of Operation Overlord.

[63] Ibid.
[64] Hartcup, *Code Name MULBERRY*, 105.
[65] Ibid., 106.

The operation faced a major setback just over a week after the initial landings. Initially, both harbors were a major success to the Allied logistical plan. By June 18, 77 percent of required tonnage had been unloaded onto the Continent.[66] However, a major storm interrupted this success. The storm, one of the strongest to hit the Channel in half a century, completely destroyed Mulberry A, forcing the Americans to abandon it.[67] Despite the loss of the artificial harbor, the Americans did not stop the offloading of supplies at Omaha. Five days after the storm hit, 10,000 tons of supplies were offloaded and normal output was soon achieved even without the benefit of the piers.[68] The loss of one of the harbors, while unfortunate, did little to slow the logistical process.

Despite the destruction of Mulberry A, Mulberry B continued to play a major role in the success of the Normandy Campaign. The harbor became more important as Allied forces moved into France due to the slow process of capturing and rebuilding the French ports. Even when Antwerp was captured intact, it would be weeks until it was operational. The harbor at Arromanches, formally known as Mulberry B, remained important until late in the Fall of 1944.[69] However, the loss of one harbor did change the Allies' objectives. The loss made the capture of the port of Cherbourg even more important. The port itself was not captured until June 27, and the first cargo did not land for another two weeks.[70] For the first month of the Normandy campaign, the increasing supply needs of the Army relied solely on the supplies delivered across the beach.

Despite the initial success of the Normandy landings, the Allied forces were slow to begin their breakout from the beachheads, which, in turn, hurt their logistical system. The initial

[66] Waddell, *United States Army Logistics*, 60.
[67] Ibid.
[68] Hartcup, *Code Name MULBERRY*, 128.
[69] Ibid., 131.
[70] Wadell, *United States Army Logistics*, 61

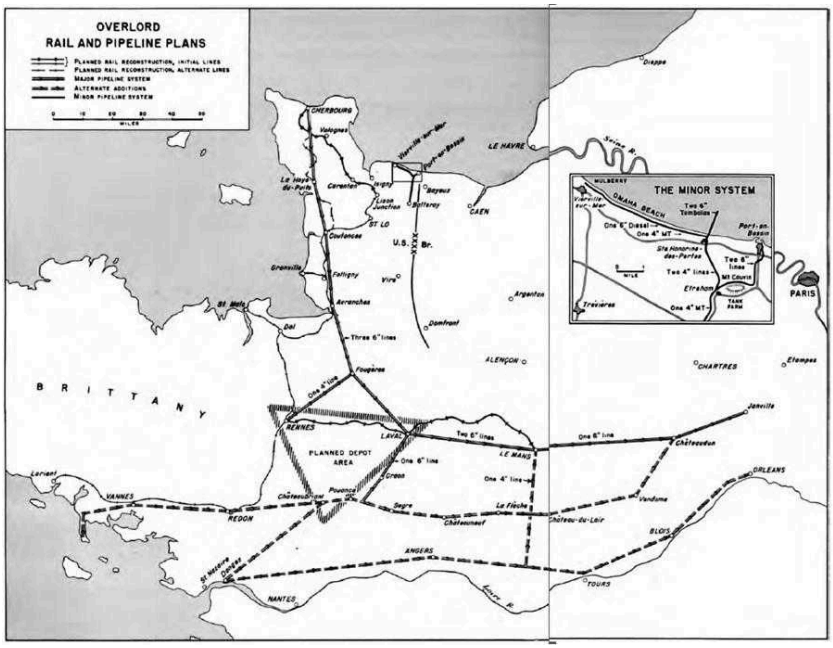
plans of the Allies called for the capture of Cherbourg by June 14. It took approximately two more weeks for the Allies to capture the port; it took the V Corps even longer to capture St. Lô, allowing expansion of the beachhead, falling only on July 18.[71] This slow advance was unexpected and the Allied logistical system suffered due to it. Due to the slow tactical progress by the Allies, the consumption of supplies was less than planners had estimated. Storage space became limited and vehicular traffic congested the entire area.[72] The logistic issues that faced the Allies worried the Allied commanders. Eisenhower even feared that the successful landing would soon become a "draining sore" that would harm what many hoped would be the opening stage of a brutal campaign against German forces.[73] If the Allies could not break out of Normandy, eventually their powerful logistics system would be rendered useless. The condition of the port of Cherbourg was also a troubling factor in the supply system.

Overlord planners underestimated the amount of time that Allied forces needed to capture Cherbourg; even when the city fell, the port needed extensive work to get it operational. The Germans had all but destroyed the port, and then planted an abundance of mines within the harbor that required deep-sea divers to remove.[74] The logistical plan that had been developed months before the invasion was in total disarray. Due to the late date of the capture and the damage they had sustained, the Brittany ports were not opened as expected. This in turn, forced the Allies to depend more heavily and for a longer period on the beaches. The port eventually became operational and ready for use in July; however, only in mid-August did Cherbourg reach its full capabilities.[75] While the restoration of Cherbourg did offer some reprieve to the Allies, it, along with the supply stocks on the beaches, could not support the advancing forces indefinitely.

[71] Huston, *The Sinews of War*, 526.
[72] Van Creveld, *Supplying War*, 212.
[73] Eisenhower, *Crusade in Europe*, 264.
[74] Ibid., 261.
[75] Ibid., 290.

There came a point where the advance would be halted either by German forces or the strain of Allied supply lines.[76] The ports in the Brittany region simply did not have the capability of supporting the American and British forces all the way to Germany. The port development problem continued to plague the Allies and would not be resolved until the opening of the port of Antwerp at the end of November.[77]

Map 2.1: Overlord Rail and Pipeline Plans



Source: Ruppenthal, Roland G., *Logistical Support of the Armies: Vol. 1*, Washington, D.C.: Center of Military History, U.S. Army, 1995, 316.

Besides the ports, the Allies needed a permanent system of pipelines to ensure fuel could be transported to sustain operations. Normandy planners envisioned a two-pipeline system, a minor system at Port-en-Bessin and a larger one out of Cherbourg.[78] This made the capture and repair of the Cherbourg port even more vital. Engineers went to work immediately after Cherbourg was captured. Despite the destruction of the cargo-handling facilities, American

[76] Ibid.
[77] Coakley and Leighton, *The War Department: Global Logistics and* 239.
[78] Waddell, *United States Army Logistics*, 42.

forces found the POL facilities undamaged. Within a month of Cherbourg's liberation, the port began to discharge incoming shipments of fuel.[79] Although the rapid discharge of fuel had little impact in the first two months of operation, the distribution became more efficient by the day in preparation for the subsequent breakout from Normandy.

Petroleum was the most important resource of the Allied forces and accounted for one-fourth of the tonnage moved to Normandy. The availability of fuel determined if the Allied advance could continue or if it would halt.[80] While the slow breakout from Normandy hurt other aspects of the Allied logistic plan, it may have benefited the construction of the pipeline system. Even if the Germans were pushed back, any significant advance could not be sustained without the installation of the pipeline. The pipeline proved to be an unreliable source of fuel for the advancing troops. The pipeline could only provide a certain amount of fuel daily and any lost capacity could never be recovered. The American advance was at the mercy of the pipelines, which at times had to be shutoff for repair.[81] While this would not have a detrimental effect on the operation during the first few months, the subsequent start of Operation Cobra and the breakout from Normandy required Allied commanders to address the issue.

The importance of logistics in a military campaign was displayed during the D-Day landings and subsequent campaign in Normandy. Having spent the past two years developing a supply plan, Allied commanders knew that the most important objective of the naval landings was not simply to get troops onto French soil, but to establish a support system for the discharge of equipment and supplies that could support American and British troops. Getting troops into mainland Europe was not enough to defeat Germany. A superior logistical system and the ability to rapidly supply troops with ammunition and equipment was the key to victory.

---

[79] Ibid., 62.
[80] Huston, *The Sinews of War*, 529.
[81] Waddell, *United States Army Logistics*, 122.

Chapter Three: Establishment of the Supply Routes

The foundation of a beachhead at Normandy and the opening of the port at Cherbourg was a major first step for the Allies. However, the breakout from Normandy created a set of logistical problems that put the success of the Allied drive into France at risk. Logistical issues would not be immediately noticed due to the slow breakout from Normandy, which gave the service forces a short line of communication and time to develop the port of Cherbourg.[82] However, once American forces broke through the German defenses, the rapid advance, while a tactical success, brought the logistical problem to the forefront of the service forces' minds.

The initial build up of troops and supplies appeared to many as a major setback. By the time of the breakthrough at Saint Lo near the end of July, nearly all of the resources for the American armies had been delivered over Omaha and Utah beach.[83] While this was an issue for the strategic planners, it provided a reprieve for the service forces in charge of logistics. This changed with the breakthrough at Saint Lo as the Third Army and other Allied forces began their advance at a faster pace than expected. Despite the setback prior to Operation Cobra, Allied forces reached the Seine over a week ahead of schedule. Speaking in terms of tactics, this was a major success as the German Seventh Army was nearly destroyed. However, in logistical terms, the rapid advance foreshadowed complications that would hinder the Allied push into France.[84] Although the service forces tried to keep up with the armies' demands, the rapid advance soon began to stretch the supply lines, which in turn slowed the movement of supplies. Even three months after the breakout from Normandy, over 70 percent of all supplies in Europe remained in

---

[82] Roland G. Ruppenthal, *Command Decisions: Logistics and the Broad-Front Strategy* (Washington, D.C.: Center of Military History, U.S. Army, 1990), 421.
[83] United States Army Services Forces, *Logistics in World War II: Final Report of the Army Service Forces* (Washington, D.C.: Center of Military History, United States Army, 1993), 161.
[84] Ruppenthal, *Command Decisions*, 421.

the Normandy area.[85] It became nearly impossible for the Allied forces to maintain lines of communication with the advancing troops. By the time American forces reached he Seine, they had already used up their operational reserves.[86] The Allies quickly realized that, in order to successfully drive the Germans from France, a more efficient method of transporting supplies to the front lines was needed.

Figure 3.1 Damaged rail yard in Coutances, France

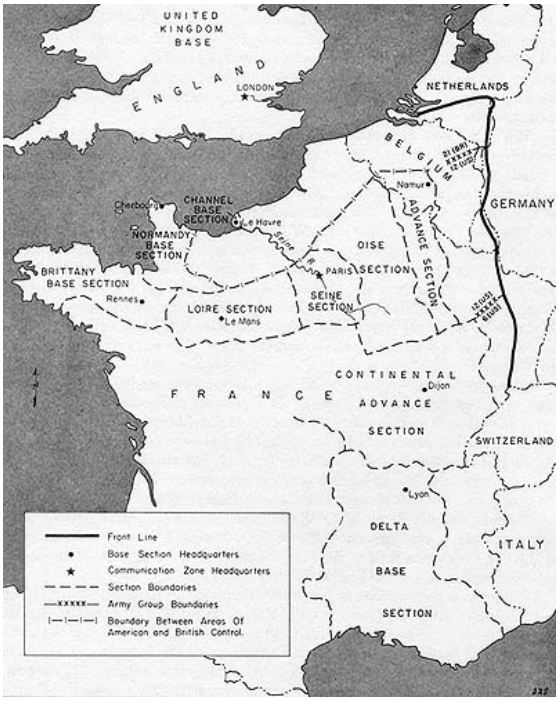
Source: *Warfare History Network*

Prior to D-Day, the Allied forces bombed French rail lines in order to prevent the Germans from quickly reinforcing their defense at Normandy. Although this helped with the success of the Normandy invasion, it hindered the Allies' ability to maintain a supply line as troops began to advance into France. Along with the initial bombing, the retreating Germans further damaged the rail lines. The reconstruction of the railroads did not become a major priority for the Allies until the capture of Saint Lo.[87] Once Saint Lo fell to the Allies, the process of rebuilding the rail system began and was important to the logistical capability for the

[85] United States Army Services Forces, *Logistics in World War II*, 161.
[86] Ruppenthal, *Command Decisions*, 421.
[87] Joseph Bykofsky and Harold Larson, *The Transportation Corps: Operations Overseas* (Washington, D.C.: Center of Military History, United States Army, 1990), 341.

Americans to sustain a drive towards Paris. Despite the difficult task of rebuilding the rail lines, Allied engineers continued to expand the rail system. The first train began operating in and ran from Cherbourg to Carentan.[88] Along with the damaged rail lines, communication problems also had an adverse effect on the logistical capability of the American Army.

Map 3.1 European Theater Communication Zones



Source: *U.S. Army Medical Department*

Without an adequate communication system in place, the Allied forces faced a difficult and unorganized task of transporting supplies to and from supply depots. The anticipated flexibility of the service forces fell well below expectations, as cable links could not be repaired by the civil engineers at hand who could only divert any excess traffic to radio links, which proved to be inefficient.[89] As American forces pushed into France, communications issues became more prevalent. Between August and September, the line of communications stretched

[88] Waddell, *United States Army Logistics,* 118.
[89] Macksey, *For Want of a Nail*, 134.

from 50 miles to over 400 miles.[90] This quickly became a detriment to the overall success of the Allies. Without the ability to control the front lines by radio alone, Eisenhower lost many opportunities that could have severely damaged German forces. The lack of an effective communication system also led to many commanders taking advantage of the supply system. Commanders, such as British General Bernard Montgomery and American General George Patton, essentially hijacked other armies' supplies, which over-strained the already unstable logistics system.[91] This problem would worsen once Eisenhower adopted a broad-front advance into Germany. The lack of a stable communication system and the demand for supplies by overly ambitious generals led to confusion and further strained the logistics system that many felt would be flexible enough to support the armies' advance.

Initially, transportation planners knew that trucks would initially be the main vehicles used for transporting supplies early in the campaign, moving supplies to army depots and supply points. Planners expected railheads to be operational soon after the invasion, with trucks simply used over short distances.[92] However, with the reconstruction of the rail lines falling behind schedule, the use of trucks became even more vital and their responsibilities doubled. The most important resource needed was gasoline, which Patton's Third Army needed for their tanks. Each tank needed 33 five-gallon Jerry cans every 100 miles.[93] This put even more pressure on the motor transport units, which struggled to match the army's pace. The number of divisions was also larger than expected. Initially, predictions called for only twelve divisions needing support within the first three months following the invasion and only west of the Seine. By September,

[90] Mayo, *The Ordnance Department*, 278.
[91] Macksey, *For Want of a Nail*, 135.
[92] Benjamin King, *Spearhead of Logistics: A History of the United States Army Transportation Corps* (Fort Eustis, VA: U.S. Army Transportation Center, 2001), 231.
[93] John G. Sullivan, *Fuel to the Troops: A Memoir of the 698th Engineer Petroleum Distribution Company 1943-1945* (Bennington, VT: Merriam Press, 2012), 138.

however, approximately sixteen divisions had landed in Europe, with many over a hundred miles beyond the Seine.[94] The continuing advance late in August and early September brought hectic days for supply officers.

Another factor that further strained the logistical system was the altering of the campaign. Eisenhower allowed General Patton to launch a military drive south of the Ardennes into eastern France. Thus, a larger Third Army heading in a different direction than the main Allied effort would have to be supplied.[95] This forced logistical planners to alter their already strained plan. The full weight of supplying troops fell on motor transport, which struggled to even supply daily needs to troops who had reached the German border sooner than expected.[96] Overlord planners had not envisioned American troops threatening the German heartland so soon and were not prepared to support these troops along with Patton's Third Army. With trucks being the main method of transportation available to the Allies, a more organized convoy system needed to be created in order to sustain the armies' rapid advance into France.

The importance of mobility is nothing new to American strategy. In his memoirs, Eisenhower noted, "The American Army has always featured mobility in the organization and equipment of its forces. Before the advent of the motorcar our Army was proportionately stronger in cavalry than most other armies of the time."[97] Another factor in the increasing mobility of the advancing troops was the German pace of retreat. Many Allied planners had expected the Germans to put up more of a defense. Most expected a slow and methodical push eastward with Germans fighting delaying actions as they slowly withdrew.[98] If the Germans had

[94] David Colley, *The Road to Victory: The Untold Story of World War II's Red Ball Express* (Washington, DC: Brassey's, 2000), 23.
[95] Ibid., 24.
[96] Ruppenthal, *Command Decisions*, 422.
[97] Eisenhower, *Crusade in Europe*, 337.
[98] Colley, *The Road to Victory*, 22.

taken this type of strategic retreat, most of the logistical problems facing American forces would have been solved. A slower advance would have given Allied engineers enough time to reestablish the rail lines and set up adequate communication lines. Instead, the quick-paced retreat initially benefited the German Army as it created chaos within the American forces' logistical plan. Instead of having operational rail lines, the Allies needed to rely on motor transportation to sufficiently maintain their advance. The urgent need for a more organized convoy system forced Allied planners to establish a new truck route that proved both chaotic and effective.

Figure 3.2 MP Directing Red Ball Express drivers

Source: *National WWII Museum*

The Red Ball Express convoy system organized quickly and was the main method of transporting ammunition and supplies to the frontline. The convoy began operations on August 25 and quickly expanded to cover over 700 miles of truck routes.[99] Although the supply route was oftentimes chaotic, it was able to sustain the advancing army during its operation. The

[99] United States Army Services Forces, *Logistics in World War II*, 161.

system was essential due to the communication issues that plagued the Allied forces. The truck-transports used main-road routes, running twenty hours a day and using as many relief drivers as could be spared from every unit. A strict system was even implemented detailing what each vehicle was allowed to do in order to prevent any wasted time.[100] The truck route was hastily established due to the Allies' urgent need for supplies to sustain their advance. With over 100,000 tons of supplies requested by numerous supply depots, logistical headquarters realized that only emergency measures could meet the demands of the advancing forces.[101] The convoy system would be a major factor in the early stages of the northern campaign and emphasizes the important role logistics played in the war.

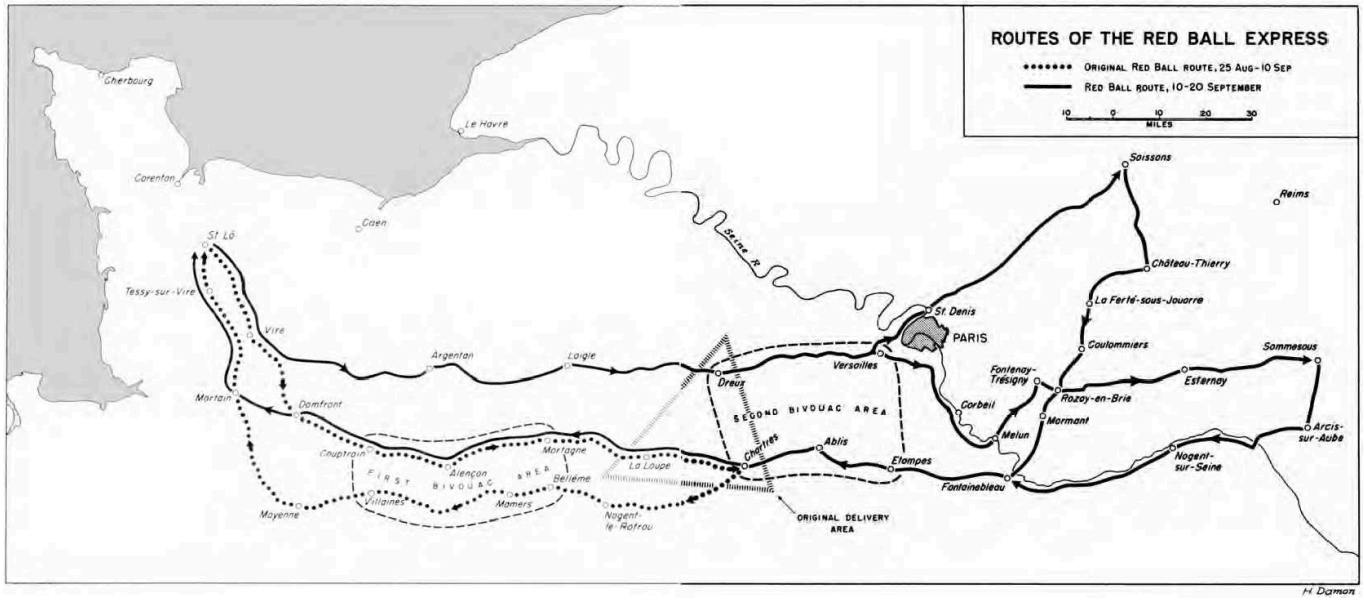
With little advance preparation, the Red Ball Express began hauling supplies almost immediately. Initially, the truck route was meant to be continuous two-way traffic, but the roads of Normandy were too narrow to accommodate this. Instead, Col. Loren Ayers and Col. Clarence Richmond, the two officers in charge of the operation, demanded and were given one-way restricted roads that would offer them continuous and uninterrupted truck routes. This truck route, although hastily established, was set up so that loaded vehicles would use the northern road, while returning empty vehicles would use the southern road.[102] During its early days of operations, the Red Ball Express became an effective truck route that quickly expanded in operation.

Due to supply demands of the advancing Allied armies, the Red Ball Express was extended. Initially running from St. Lô to the delivery area in the La Loupe-Dreux-Chartres triangle, nearly seventy truck companies hauled approximately 4,500 long tons on August 25, the first day of the routes' operation. However, only four days later, over 130 truck companies with

[100] Eisenhower, *Crusade in Europe*, 308.
[101] Waddell, *United States Army Logistics*, 124.
[102] Bykofsky and Larson, *The Transportation Corps: Operations Overseas*, 331.

nearly 6,000 vehicles hauled over 12,000 tons in the Red Ball's first phase of operations.[103]

Map 3.2 Routes of the Red Ball Express



Source: Bykofsky, Joseph and Harold Larson, *The Transportation Corps: Operations Overseas*. Washington, D.C.: Center of Military History, United States Army, 1990, 332.

The second phase of the Red Ball Express was initiated due to Eisenhower allowing Patton to pursue the Wehrmacht across the Seine. At the height of his pursuit, Patton's Third Army alone consumed close to one million gallons of fuel per day. Even with the Red Ball trucks, aircraft at times needed to resupply the army in order to continue its pursuit.[104] Initially, the operation was complex and oftentimes chaotic. While the Normandy Base Section controlled the supply dumps in the Normandy area, the Red Ball Express and the supply dumps it delivered to were under the control of the Advance Section, Communications Zone (ADSEC). Early on, many trucks delivered to the wrong dump while others drove around for hours before arriving at the correct destination. Unloading and verifying the correct goods was also a complex task that caused

[103] Ibid., 332.
[104] Pat Ware, *Red Ball Express: Supply Line from the D-Day Beaches: US Army Transport* (Hersham, England: Ian Allen Ltd., 2007), 8.

unloading times to widely vary from 11 to 39 hours.[105] Although the loading times eventually stabilized, the system was still chaotic, which forced ADSEC to simplify the operation.

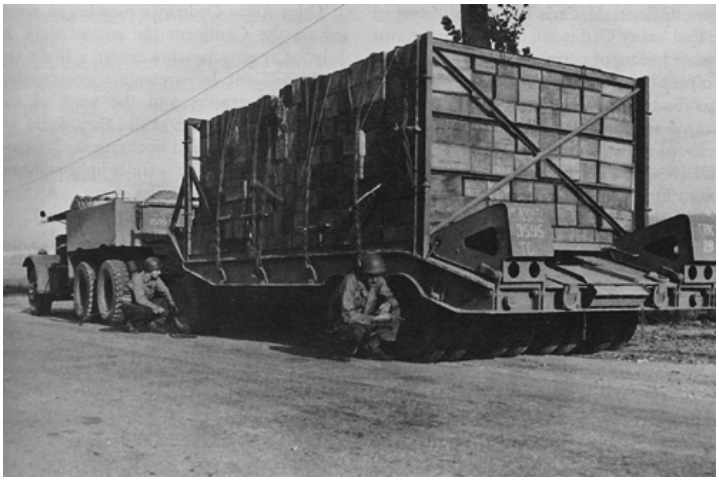
With the Red Ball Express going into operation without much planning and forethought, the drivers often ignored a number of rules and regulations implemented for the supply route. Originally, Red Ball convoys were meant to move in company strength, but traveled in platoon strength. Less than one third of all trucks moved in organized convoys at all.[106] As a result of this, ADSEC implemented a number of regulations that created a more effective operation. Convoy commanders, put in charge of approximately twenty trucks, maintained discipline and reformed the convoy once all trucks had unloaded their supplies. The convoy was also nonstop. All vehicles leaving the convoy, whether empty or not, would be left behind to be apprehended by the MPs and turned over to the nearest Traffic Control Point (TCP).[107] No time could be wasted to tend any vehicle that broke down; at times, other trucks would simply take on the supplies of the broken-down truck. The convoys even had the amount of distance between each vehicle regulated.

In order to maximize the efficiency of the convoy, ADSEC regulated the number of trucks in each convoy and their speed. The lead vehicle of each convoy was identifiable with a blue pennant while the rear vehicle was marked with a green one. The convoys were subdivided into groups of five vehicles with each group separated by one minute and each convoy separated by two minutes. Each convoy, consisting of twenty vehicles, would take twenty minutes to pass a checkpoint.[108] This system was meant to make it easier to determine when convoys would reach

[105] Nicolas Aubin, *Liberty Roads: The American Logistics in France and Germany, 1944-45* (Paris: Histoire & Collections, 2014), 93.
[106] Roland Ruppenthal, *Logistical Support of the Armies: Volume I May 1941-September 1944* (Washington, D.C.: Center of Military History, U.S. Army, 1995), 566.
[107] U.S. Department of the Army, Standard Operating Procedures No. 53 Red Ball Motor Transport Operations (December 2, 1944), 3.
[108] Aubin, *Liberty Roads*, 95.

the supply depots and how long they should take to unload. The Army also improvised by using converted vehicles to maximize the amount of supplies and ammunition that could be hauled. Tank transporters could even converted into flatbed trailers in order to carry up to 50 tons of ammunition and fuel to the infantry and armor.[109]

Figure 3.3 Converted Tank Transporter



Source: Ruppenthal, Roland G., *Logistical Support of the Armies: Vol. 1*, Washington, D.C.: Center of Military History, U.S. Army, 1995, 569.

Converting vehicles allowed the Army to deliver more supplies to the front in fewer trips. However, while this system fixed many of the problems facing the logistical planners, more problems persisted.

Although it proved to be effective overall, the strict operating procedure implemented for the convoy system also created more disarray. Due to the speed of the Allies' advance, many supply depots changed location while Red Ball drivers traveled along the road. This created more confusion as convoys had to find where the depots had been relocated, which caused them to fall behind schedule.[110] Drivers often used their vehicles uneconomically. Many vehicles were

[109] Colley, *The Road to Victory*, 29.
[110] Ware, *Red Ball Express: Supply Line from the D-Day Beaches*, 51.

not filled to capacity and unloading and loading times caused numerous delays.[111] Many of the rules governing convoys were broken, at times either for personal gain or as an attempt to overachieve. Although Red Ball route maintained a strict speed limit of 25 mph, many drivers far exceeded this limit.[112] Many drivers even went so far as to tamper with their vehicles to increase their speed. Although the maximum speed for most GMC trucks was around 50 mph, many drivers could increase their speed to nearly 70 mph.[113] Most officers cared more about getting their supplies to the front as quickly as possible, even if it meant defying orders.

Navigating Red Ball roads also proved to be a navigational challenge for most drivers. In order to avoid MP's, who would enforce the speed limit, many drivers avoided the Red Ball Highway. Instead, they used side roads, ignoring both the speed limits and regulating stations.[114] Early in its operation, navigating the Red Ball Express was a difficult challenge. Even with the establishment of traffic-control points, drivers often veered off course either by accident or in an attempt to reach their destination sooner. The first day of operation, the Red Ball drivers did not have any maps indicating the roads designated for them. Most convoys found their destinations on dead reckoning, relying for directions on any troops they encountered on the way. Many drivers did not even realize that certain routes had been dedicated to the Red Ball Express, as the orders they had been given did not mention a certain route, simply the destination for the supplies.[115] Throughout the Red Ball's operation, drivers often ignored rules, feeling that the only priority was getting their supplies to their intended destination.

Most officers abided by the belief that the faster supplies reached the front, the better chance that lives would be saved. Discipline on most convoys became so poor that it was

[111] Ruppenthal, *Logistical Support of the Armies Vol. I*, 564.
[112] U.S. Department of the Army, Standard Operating Procedures No. 53 Red Ball Motor Transport Operations, 3.
[113] Aubin, *Liberty Roads*, 95.
[114] Colley, *The Road to Victory,* 87.
[115] Ibid., 88.

reported that only 30 percent of trucks actually traveled in organized convoys.[116] Drivers only abided by the rules when directly instructed to do so. Quartermaster Sergeant John Houston stated, "if we came upon a sector where some joker wanted us to slow down, I would have my men slow down, otherwise we would gun it all the way."[117] This was the general behavior of most drivers of the Red Ball Express. Black marketing also became a major problem, as French civilians were more than willing to pay for certain goods that became impossible to acquire in the war-torn country.[118] Most drivers ignored the rules that they felt were unnecessary or hurt the efficiency of the route. However, most drivers failed to realize the toll that traveling at these speeds on hazardous roads would have on the vehicles.

The conditions of the vehicles, along with the speeds at which drivers traveled, took a toll on the trucks. Mechanical problems soon became a major issue, as maintenance of Red Ball trucks was not the main priority. These problems rapidly reduced the capacity of supplies that drivers could transport. Orders were also given to stop maintenance in order to expedite delivery, hoping that a knockout blow could be given to the Germans. However, this came at the expense of the equipment. Even beyond the upkeep of the vehicles, most drivers did not have the proper technical training to keep the vehicles in optimum condition. Most drivers were taken from divisions which had recently landed and had yet to see combat. They only spent, at most, three days training, being instructed on the basic operation of the vehicles and how to change a tire.[119] Drivers only had a basic understanding of operating each vehicle, which led to poor maintenance. The upkeep of the Red Ball trucks was oftentimes negligible which had far reaching results. Damaged vehicles lingered throughout the campaign and the resulting shortages

[116] Ware, *Red Ball Express: Supply Line from the D-Day Beaches*, 51.
[117] Christopher Moore, *Fighting for America: Black Soldiers- The Unsung Heroes of World War II* (New York: One World Books, 2005), 190.
[118] King, *Spearhead of Logistics,* 238.
[119] Aubin, *Liberty Roads*, 108.

in supply of parts and vehicles could never be completely overcome.[120] Many had to go through long periods of downtime. The toll of driving for so many hours also had a significant effect on the drivers and forced a change in regulations.

Figure 3.4 CCKW 353 truck bogged in mud

Source: *National WWII Museum*

Due to the nonstop nature of the Red Ball Express, drivers faced hazardous road conditions, which took a toll on both their physical and mental well-being. Commanders, such as Patton, made it clear that the only concern drivers needed to have was that of delivering their supplies to maintain his army's advance. James D. Rookard, a driver on the Red Ball Express, recalled, "when Patton said for you to be there, you were there if you had to drive all day and all night. Those trucks just kept running. They'd break down, we'd fix them and they'd run again."[121] The demands on Red Ball drivers made driving a monotonous task. Initially, each vehicle had only one driver. This led to overworked drivers who, instead of giving their vehicles maintenance, opted to nap at any stops. Many drivers went so far as to deliberately damage their

[120] The General Board United States Forces ETO, "Motor Transport Service as a Permanent Part of the Transportation Corps" (321/11, 125) November 20, 1945, 34.
[121] Rudi Williams, "African Americans Gain Fame as World War II Red Ball Express Drivers," *U.S. Department of Defense*, February 15, 2002, 1.

vehicles in order to gain a few hours of sleep.[122] This led to each vehicle having a backup driver to switch places after so many hours of driving. In order to maintain their pace, drivers often switched even while the vehicle was still in motion. This exemplifies the pressure that was put upon drivers, often by their own hands, to increase their delivery speed. Along with the toll on their bodies, drivers also faced hazardous road conditions.

Along their routes, drivers had to face numerous road conditions due to the natural elements as well as the looming threat of an enemy attack. Driving at night was even more dangerous as drivers were required to only use minimal lighting in order to prevent the enemy from spotting the convoy. They taped their head and taillights into glowing "cat-eyes," which only gave them enough light to see the truck in front of them.[123] Although a majority of Red Ball convoys avoided direct enemy attack, the looming threat was always with the drivers. Drivers often requested that machine guns be mounted on their trucks in case of an ambush and many convoys did come close to combat areas as they delivered directly to the front lines. A driver for Company C, 514th Quartermaster Regiment recalled hearing gunfire surrounding his route and German bombs dropped on nearby Allied locations.[124] However, the threat of an air attack significantly decreased late in 1944 as German air power was reduced so low that even these typically easy targets rarely faced an attack.

One of the more common threats to Allied logistics was the black market that arose during the Red Ball operation. With Red Ball routes passing through numerous French towns, the residents of these towns, having lived under German occupation for four years, desperately desired the supplies that Red Ball trucks carried. Many convoy commanders were often afraid to make a stop in a town as everybody would run to the trucks offering bottles of wine in exchange

[122] Aubin, *Liberty Roads*, 108.
[123] Moore, *Fighting for America*, 190.
[124] Williams, "African Americans Gain Fame as World War II Red Ball Express Drivers," 2.

for cigarettes and gasoline.[125] However, the black market operations that arose were anything but a small problem for the Red Ball. While the issue was mostly small exchanges, a significant portion was organized and enough material was lost that it even slowed down the war effort.[126] With the Red Ball disorganized and lacking in strict discipline, it was simple for drivers to sell all their supplies and then dispose of their truck. With thousands of trucks operating along the supply route, an accurate inventory was almost impossible to track.

Figure 3.5 Convoy passing through a Regulating Point

Source: *National WWII Museum*

Despite the constant chaos that defined the Red Ball Express, it proved to be an effective supply system. Although supplies were delivered by truck throughout the war, the emergency that brought about the Red Ball Express was over by late 1944. With the reconstruction of the French rail system, the need for the Red Ball diminished. Trucks no longer had to make the long journey to deliver supplies as supplies could now be transported by rail with trucks being used more conservatively.[127] Although planned initially to run for only two weeks, the Red Ball lasted over two months. On its peak day, the truck route transported over 12,000 tons. When it finally

[125] Colley, *The Road to Victory*, 123.
[126] Ibid., 125.
[127] Ibid., 183.

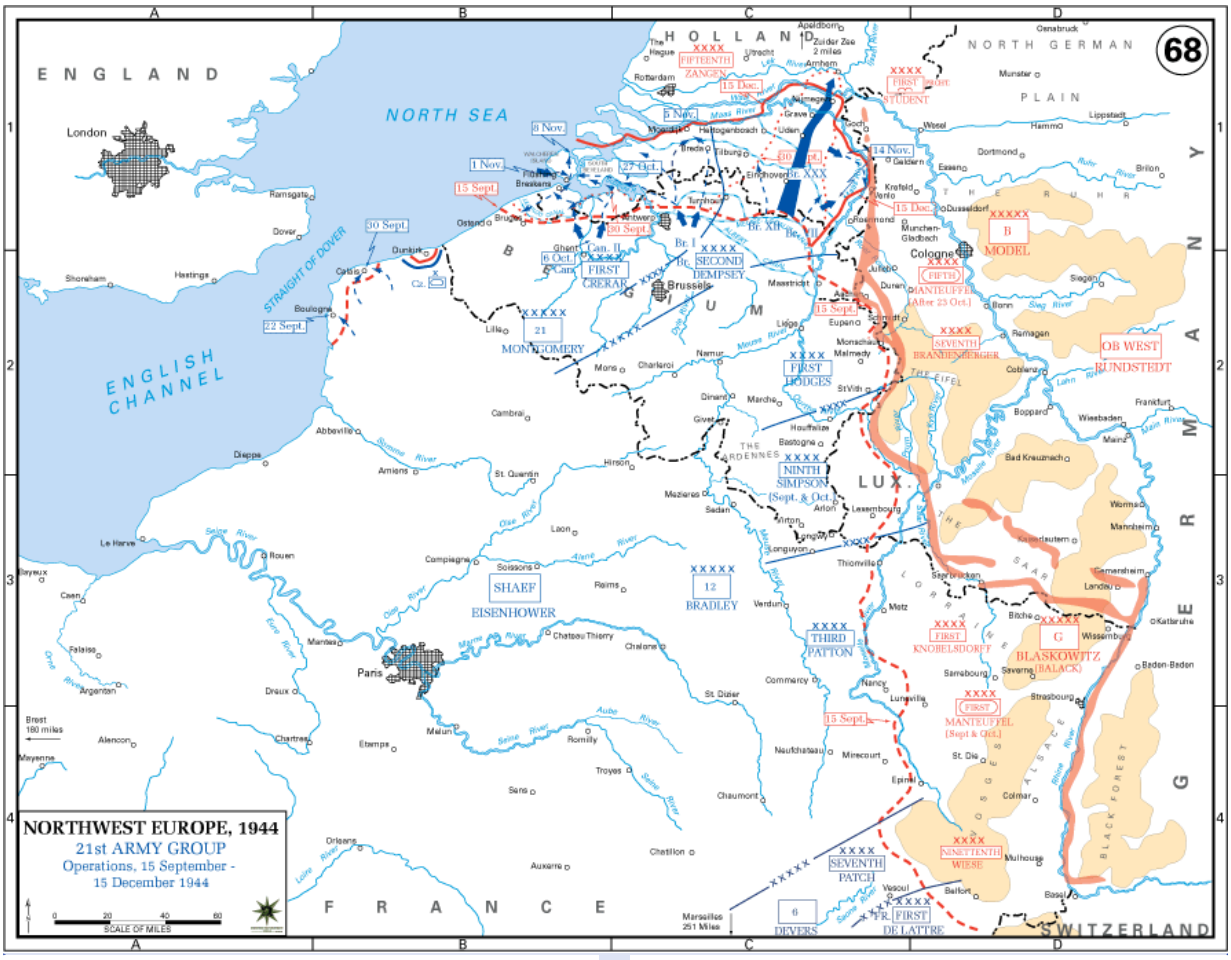
ceased operations on November 16, over 400,000 tons of supplies had been delivered to the front lines.[128] The Allied logistical situation had significantly improved by this point. The armies were able to receive more POL (Petroleum, Oil, Lubricants) than they had requested. Even the Normandy beachheads closed, signifying the end of the first logistical phase of the European campaign.[129] The Red Ball Express not only solved the logistical quandary facing the Allied forces after the Normandy breakout, it exhibited the increasing mechanization of the American army.

German's have often been credited as masters of mechanized warfare. Their famous Blitzkrieg strategy helped their army drive through France at an alarming speed. However, only a few of Germany's divisions were completely mechanized. The majority of the German army was supplied using wagon trains and the infantry either marched or used trains for transportation. The Germans used nearly three million horses during the war, while the American Army maintained less than 60,000.[130] While Germany did have mechanized divisions, they soon became less effective due to shortages of replacement vehicles and POL. With Germany's motor vehicles concentrated in only a few divisions, this meant that their military had to coordinate with two separate forces, one fast and mobile, the other slow and rigid.[131] By the end of the war, the United States, arguably, had the most mobile and mechanized force in the world. This proved to be the major factor in their logistical prowess over the Germans. By producing over two million trucks during the war, it was feasible for the United States to put an entire army on wheels.[132] Although the Red Ball Express exemplified the mechanization of the United States' military and

[128] United States Army Services Forces, *Logistics in World War II: Final Report of the Army Service Forces*, 161.
[129] Ware, *Red Ball Express: Supply Line from the D-Day Beaches*, 57.
[130] Colley, *The Road to Victory*, 133.
[131] Van Creveld, *Supplying War*, 145.
[132] Colley, *The Road to Victory*, 135.

the flexibility of the Allied logistical plan, it failed to aid American and British forces in their first attempt in crossing the Rhine.

Map 3.3 21st Army Group Operations 15 September-15 December 1944



[1]

Source: *United States Military Academy*

With the formation of the Red Ball Express solving a number of problems facing Allied logisticians, and with the speed at which American and British troops advanced, both Eisenhower and Montgomery felt confident that they could strike a devastating blow to the Germans. Threatening German soil for the first time in mid-September, Operation Market Garden was devised to better situate the Allied forces in preparation for a drive into German territory. Eisenhower felt that, if American troops could form a pincer circumventing the

northern end of the Siegfried Line while British forces did the same on the southern end, this would give the Allies easier access to Germany. However, Eisenhower was faced with two choices. He could make the strategic choice and press on with the operation, or could focus on the armies' logistical situation by getting the port of Antwerp operational.

Initially, logisticians had prepared for a gradual and methodical advance. However, the advance from Normandy to the Seine became erratic, culminating in a mad dash along a broad front that saw Allied troops threatening the German border on D plus 96, instead of the predicted date of about D plus 300.[133] This made it difficult to adequately supply the troops. Although the Red Ball operation solved this problem, the Allied supply lines were still stretched thin. The Normandy ports proved unable to sufficiently sustain the armies' advance much further. Neither the Red Ball Express nor the port of Cherbourg would be enough to sustain a military drive into Germany. Although Antwerp had been captured virtually intact, it could not be utilized. German troops still occupied the banks of the Scheldt estuary, a sixty-mile long waterway connecting Antwerp with the sea.[134] Opening the estuary would give the Allies the port they needed to adequately supply their troops until the end of the war.

The plan for Operation Market Garden featured a simultaneous attack using both American and British forces. American airborne troops would secure three major water barriers: the Maas, the Waal, and the Neder Rijn while the British Second Army would launch a ground attack aimed at crossing the Rhine into Germany at Arnhem.[135] Both Eisenhower and Montgomery were confident in this strategy and felt that the logistical situation could be resolved after the completion of the operation. American general Omar Bradley, however, did not share

[133] Charles B. MacDonald, *Command Decisions: The Decision to Launch Operation Market-Garden* (Washington, D.C.: Center of Military History, U.S. Army, 1990), 432.
[134] Ibid., 433.
[135] Ibid., 429.

Eisenhower's affinity for Market Garden. While other commanders wanted to use the airborne troops to demonstrate their abilities, Bradley was impressed with his ground troops and argued that the Allies should continue supplying his ground columns using aircraft.[136] Bradley argued that his ground troops were sufficient to complete the operation and the use of aircraft for airborne drops was unnecessary. Despite his argument, Bradley lost a good amount of air supply because Allied aircraft had been withdrawn from supply missions and were being prepared to carry airborne troops.[137] However, it cannot be definitely proved that Market Garden's eventual failure was due to this. The halt of Bradley's armies could not be attributed simply to the lack of supplies and was the result of a combination of causes.

Figure 3.6 Gen. Eisenhower (left) and Gen. Montgomery (right)

Source: *United States European Command*

Although Bradley seemed to be more concerned with the logistical situation of the army, Eisenhower did understand and felt that Market Garden would be a necessary operation to ensure that a greater offensive in the near future would be successful. Eisenhower indicated that he desired an operational port in Antwerp, but also a line protecting the city. He argued that seizing a bridgehead over the Rhine and flanking the defenses of the Siegfried Line with the help of the

[136] Omar N. Bradley, *A Soldier's Story* (New York: Henry Holt and Company, 1951), 401.
[137] MacDonald, *Command Decisions: The Decision to Launch Operation Market-Garden*, 436.

airborne would give Antwerp this protection. If Market Garden proved a success, this would give the Allies the protection needed to build their logistics in preparation for the advance into Germany.[138] Eisenhower understood the importance of Antwerp and the role it would play in future operations. He stressed that freeing the Scheldt and opening the port was essential and "an indispensable prerequisite for the final drive into Germany."[139] Montgomery also felt that, with the assistance of the American army, he might be able to trap the German reserves at Pas-de-Calais and secure Antwerp.[140] Eisenhower agreed and Market Garden took precedence over opening Antwerp. While it can be argued that Market Garden would have been successful had Eisenhower postponed the operation to focus on Antwerp, it could also be argued that the Germans could have solidified their defenses while the Allies worked on clearing the Scheldt and opening the port.

The decision to launch the operation, as well as its failure, begs the question as to whether it was necessary and whether focusing on Antwerp could have altered the Allies' future operations. If Market Garden was a success, and if the Allies successfully captured the key bridges across the Rhine, Eisenhower would be in an ideal position to launch a devastating drive into Germany. However, even if the operation had gone in favor of the Allies, the opening of Antwerp had been delayed. Many of Eisenhower's subordinates argued that Antwerp was not needed to win the war. Recalling World War I, many Allied commanders remembered that the pursuit phase had been the beginning of the end for the Germans and felt that the same could be said for the current situation.[141] However, the military and logistical situation in September 1944 was drastically different than August 1918. Unlike World War I, the Allied supply lines were

[138] Eisenhower, *Crusade in Europe*, 307.
[139] Rick Atkinson, *The Guns at Last Light: The War in Western Europe* (New York: Henry Holt and Company, 2013), 302.
[140] MacDonald, *Command Decisions: The Decision to Launch Operation Market-Garden*, 434.
[141] Ibid., 440.

dangerously stretched thin. Even if Market Garden had been a success, Antwerp would still need to be open in order to sustain a campaign into Germany. While Market Garden may have failed regardless of the situation at Antwerp, it could be argued that the war could have ended sooner if Eisenhower had prioritized the port of Antwerp over Market Garden.

Prior to Market Garden, the Allies' logistical system was strained. Even with the Red Ball Express, American supply lines became stretched to their limits and the Normandy ports were insufficient to sustain the drive much further. The port of Antwerp became the most important logistical target for the Allies. Since Eisenhower put Market Garden above Antwerp, the port would not open until two months after the failed operation, in late November.[142] Along with Market Garden, inclement weather also affected Antwerp's opening. If the Allies had postponed Market Garden and instead directed the armies' main effort into clearing the Scheldt, Antwerp could have been operational by late October.

The Allied logistical situation also suffered due to Market Garden. Ammunition shortfalls became critical by early October with many of Patton's Third Army guns down to a shell a day while others remained silent for over a week.[143] Had the Scheldt been cleared of German troops, and the port of Antwerp opened sooner, these supply problems could have been fixed, giving the Allies the logistical strength to launch its final drive towards Berlin on a broad front. Market Garden only intensified these problems, and due to the time that Eisenhower had to take in opening Antwerp following the failure of Market Garden, the Germans were able to reinforce their defenses in preparation for their final offensive.

Logistics proved to be the key factor in the Allies' successful French campaign. Allied strategy depended on the capability to transport ammunition, gasoline, and other supplies to the

[142] Waddell, *United States Army Logistics,* 116.
[143] Atkinson, *The Guns at Last Light*, 301.

advancing troops. The failure of Operation Market Garden proved that logistics must take precedence in a military campaign. Strengthening the logistical power of a military force is more valuable than strategic positioning.

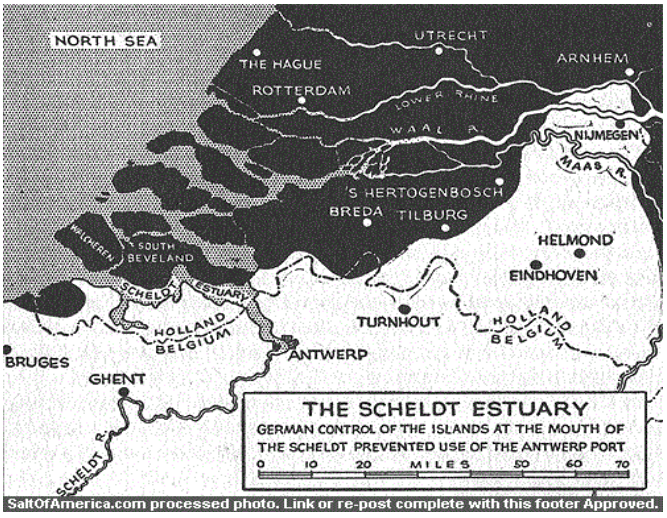
Chapter Four: From Antwerp to the Ardennes

Following the failure of Operation Market Garden, the Allies needed to focus on getting Antwerp operational. Any chance for a sustained drive into Germany depended on the use of the port as the Normandy ports could no longer adequately supply Allied forces any further. Although Antwerp was vital to the success of the impending campaign, the time needed to clear the Scheldt estuary also benefited German forces. The decision by General Eisenhower to prioritize Market Garden over Antwerp remains controversial and may have resulted in Germany's final offensive of the war in December 1944. The opening of the Scheldt estuary, however, was the key to the logistical plan of the Allies. As they learned throughout the French campaign, the success of a military campaign heavily relied on the logistical strength of the army.

With the failure of Market Garden, Eisenhower refocused Allied efforts on opening the port of Antwerp. Although in control of the city, the Allies could not utilize its port as the Germans still had control of the Scheldt estuary, which connected Antwerp with the North Sea. Although Eisenhower had been considering a narrow-front strategy, the failure at Market Garden solidified his commitment to the broad-front strategy. Failing to capture the targeted bridges on the Rhine meant that the Allies did not have the ideal position to launch their offensive into Germany. Instead of preparing for the offensive, Eisenhower had to move his forces into defensive positions in order to protect the British and Canadian troops fighting the German troops along the Scheldt. With the Allied offensive at a standstill, the argument could be made that Market Garden had been an unnecessary operation that only delayed the impending drive into German territory.

With the supply lines becoming thin and in need of a major port, Eisenhower's decision to focus on Market Garden was not universally accepted by his commanders. General Bradley strenuously objected to this plan and made it clear to Eisenhower that Montgomery should be focused on Antwerp, as any offensive beyond the Rhine could not commence without Allied shipping.[144] Even if Market Garden succeeded, it would not allow Allied troops to begin their march into Germany, as their current supply lines could not sustain their campaign any further. Priority should have been given to Antwerp, as Market Garden wasted precious time and resources that could have been given to the Scheldt. By launching Market Garden, Eisenhower allowed German forces to solidify their defenses along the Scheldt. If Antwerp had been cleared first, the fighting would have been less intense and the Allies could have immediately begun their advance into Germany.

Map 4.1 The Scheldt Estuary



Source: Eisenhower, Dwight D. *Crusade in Europe*. Garden City, NY: Doubleday, 1948, 326.

The controversy of Market Garden remained an issue for both Eisenhower and Montgomery. Eisenhower felt that a successful Market Garden operation could give the Allies a

[144] Bradley, *A Soldier's Story*, 418.

chance of gaining a bridgehead over the Rhine, while Montgomery believed that the British army could handle the taking of Arnhem while the First Canadian Army had enough strength to clear both the Channel ports and the Scheldt estuary without support.[145] It seemed to be the best long-term plan, especially compared with Patton's plan for a central thrust. While logistically practicable, Patton's plan would take his forces into terrain unsuitable for tanks while leaving Antwerp unopened as well as striking no valuable part of Germany.[146] The Antwerp-Arnhem issue brought up two competing tenets of military strategy. Was it more beneficial to pursue a beaten foe, or to maintain a balanced force with a sufficient supply line? With Market Garden failing, the pursuit of German troops came to a halt and any chance of a narrow-front strategy collapsed. Eisenhower was forced to commit to a broad-front policy, which meant that Antwerp became the key target for winning the war.

Giving Market Garden priority over Antwerp caused a crucial delay in the opening of the port. Eisenhower's planners had estimated that, if Market Garden was successful and if Antwerp opened by September 15, it would be logistically possible to reach Berlin by the end of 1944.[147] By failing to reach either of these requirements, the Allied advance came to a halt. Both American and British forces failed to secure positions across the Rhine, and Antwerp was no closer to becoming operational. While, in theory, the operation could have been a devastating blow against Germany, its only effect was delaying Allied operations. Opening the Scheldt became the Allies' main objective and provided Germany's main forces enough time to recover and strengthen their defensive positions along the Siegfried line.

---

[145] Robin Neillands, *The Battle of the Rhine: The Battle of the Bulge and the Ardennes Campaign, 1944* (New York: The Overlook Press, 2005), 156.
[146] J.L. Moulton, *Battle for Antwerp: The Liberation of the City and the Opening of the Scheldt 1944* (London: Ian Allen Ltd., 1978), 57.
[147] Ibid., 57.

Antwerp became the essential key for an Allied victory. The port of Antwerp was the largest port in Europe at the time and was relatively undamaged, unlike the Normandy ports. However, due to Market Garden, the port's opening was delayed which allowed the German forces occupying the Scheldt to reinforce their defenses. The Scheldt estuary was the remaining target that kept Antwerp's port from becoming fully operational. With German troops still occupying the area, the Allies needed to clear the estuary as soon as possible. British Admiral Bertram Ramsay warned both Eisenhower and Montgomery that "both Antwerp and Rotterdam are highly vulnerable to mining and blocking. If enemy succeeds in these operations, the time it will take to open ports cannot be estimated."[148] This called for immediate action by the Allies to prevent the Germans from further delaying the port's opening.

Figure 4.1 British Troops of the 4th Special Service Brigade crossing the Scheldt River

Source: *The Daily Chronicles of World War II*

Clearing the Scheldt proved to be a difficult and long battle due to heavy German defenses and poor weather. Eisenhower even noted that he could have begun the operation two or three weeks earlier if he had not attempted the Arnhem operation near the end of Operation

[148] Rick Atkinson, *The Guns at Last Light: The War In Western Europe, 1944-45* (New York: Henry Holt and Company, 2013), 233.

Market Garden.[149] Fighting along the Scheldt was grueling work for troops as the muddy terrain prevented a quick and decisive victory. The First Canadian Army commencing operations on October 3 and over four weeks of hard fighting in poor weather followed. Les Wagar, a soldier of the Queen's Own Rifles of Canada, clearly remembers the struggle in the rough terrain:

> All I remember is the mud and the lack of cover. Companies did not go into battle here; this was section-job fighting, done by platoon-sized groups acting alone, with widely variable mortar and artillery support, bounding and crawling from one set of farmhouses to the next, yard by yard, dike by dike, over polders with little to no cover.[150]

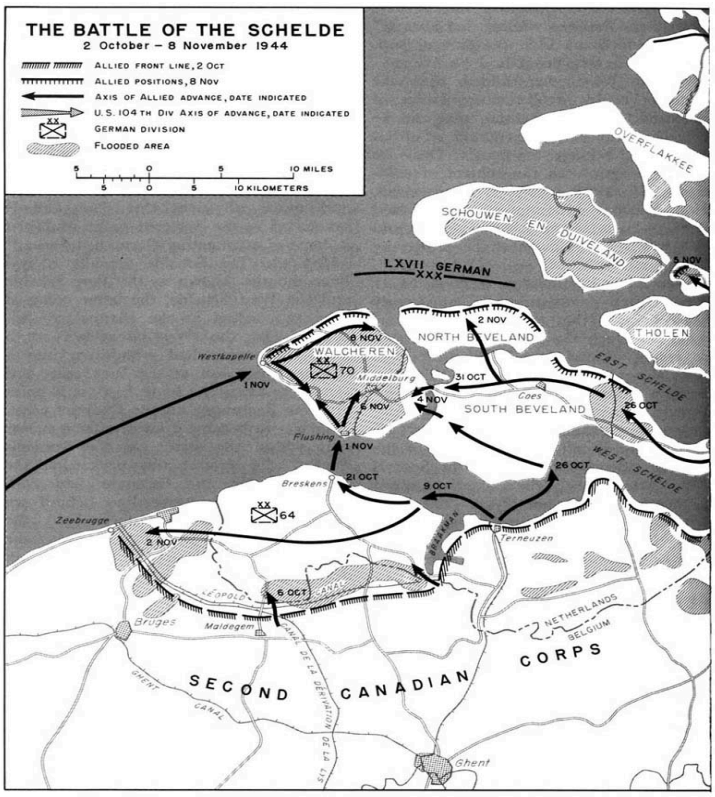
Wagar's description of the campaign became all too familiar. Forced to fight in waist-deep water against heavy German resistance, the Canadian troops were unable to secure the small isthmus of South Beveland until the end of October.[151] While Eisenhower could not have foreseen the weather conditions, allowing the German troops to dig in could have easily been prevented if the Scheldt operation had begun weeks earlier.

During the Scheldt campaign, the need for Antwerp's opening became more and more urgent. Eisenhower's logistical planners became more anxious as Antwerp remained inactive. Colonel William Whipple, Chief of SHAEF Logistic Plans Branch, made it clear in a memorandum that "the failure to open Antwerp is jeopardizing the administrative soundness of our entire winter campaign."[152] The difficult fighting in the Scheldt estuary caused many commanders to worry about the difficulty of a major offensive into Germany as winter drew closer. Fighting in muddy terrain was difficult, but fighting in harsh winter conditions would be even more challenging. The amount of support needed to open Antwerp also startled Eisenhower. He halted all of his forces and redirected many to Antwerp to prepare it for

[149] Eisenhower, *Crusade in Europe*, 327.
[150] Lloyd Clark, *Crossing the Rhine: Breaking into Nazi Germany* (New York: Atlantic Monthly Press, 2008), 242.
[151] Eisenhower, *Crusade in Europe, 327.*
[152] Moulton, *Battle for Antwerp*, 95.

operation while the British forces cleared the Scheldt.[153] Despite giving Antwerp their undivided attention, neither Eisenhower nor Montgomery had a clear idea of when the port would become operational.

Map 4.2 Battle of the Scheldt



Source: MacDonald, Charles B., *The Siegfried Line Campaign*, Washington, D.C.: Center of Military History, 1990, 216.

Clearing the Scheldt was much more difficult than many Allied commanders had expected. In his memoirs, General Montgomery admitted that he underestimated the difficulties of opening the Scheldt, believing that the Canadian Army alone could handle the task while his main forces advanced toward the Ruhr.[154] Considering how Montgomery was well known for his arrogance, admitting his mistake is worth noting. Even with his full attention on the Scheldt, the

[153] Ibid., 96.
[154] Bernard Montgomery, *The Memoirs of Field-Marshal the Viscount Montgomery of Alamein* (Cleveland: World Publishing Co., 1958), 297.

poor weather conditions and German defenses made it a grueling campaign. The main target for Canadian forces was Walcheren, an island at the mouth of the estuary. Although Montgomery hoped for a seaborne attack launched from Breskens just south of Walcheren, the urgency of opening Antwerp forced him to consider if the quickest way of taking the island was from South Beveland.[155] The fighting on Walcheren was a difficult, but necessary task for the Allies to clear the estuary. However, securing South Beveland was not an easy task to accomplish.

In preparation for an assault on Walcheren, both South Beveland as well as Breskens needed to be captured. A force of over ten thousand Germans, reinforced with naval guns and approximately seventy field artillery pieces, heavily defended Breskens.[156] Despite capturing Breskens, Allied forces made the battle for Walcheren even more challenging. Similar to the Normandy campaign, Allied bombings made the Walcheren battle exponentially more difficult, especially for the Canadian troops. In an effort to flood enemy positions, air attacks broke the island's dikes. However, this also meant that the invading Canadian troops fought in flooded battlefields.[157] This only increased the difficulty of securing the already heavily defended island.

Once South Beveland and Breskens had been secured, preparations for the amphibious assault on Walcheren finally began. To soften the island, approximately 600 aircraft bombed and attacked German batteries on Walcheren, dropping over a thousand tons of bombs.[158] Despite the heavy bombing, the islands' batteries remained a threat to the impending naval invasion. Carried out on November 1, Canadian and British troops met with some of the strongest resistance at any coastline of the European campaign.[159] With the strong artillery defenses of the Germans, only small naval vessels could be used. Any large naval vessel was threatened by nearly forty

[155] Moulton, *Battle for Antwerp*, 102.
[156] Atkinson, *The Guns at Last Light*, 302.
[157] Bradley, *A Soldier's Story*, 425.
[158] Moulton, *Battle for Antwerp*, 129.
[159] Eisenhower, *Crusade in Europe*, 327.

batteries on Walcheren alone, especially the three naval batteries that were located on the dunes, within effective range of the sea area off the western point of the island.[160] Despite the heavy resistance and rough battlefield conditions, British and Canadian forces finally captured Walcheren. With over 10,000 German troops surrendering by November 10, the German presence on Walcheren and the Scheldt estuary had been cleared. Unfortunately, the Germans had been able to install a significant amount of mines, which took Allied engineers two weeks to clear.[161] Almost two months after Market Garden, Antwerp finally stood ready to ease the Allied logistics dilemma.

Figure 4.2: Minesweepers anchored in Terneuzen, Netherlands

Source: *Imperial War Museum*

The difficulties faced by Canadian and British forces throughout the campaign could have been avoided. Instead of simply driving his troops towards the Siegfried line, if Eisenhower had made Antwerp his primary target in early September following the Battle of Normandy and focused his troops and supply to opening the port, the problems that arose in late October may

[160] Moulton, *Battle for Antwerp*, 126.
[161] Eisenhower, *Crusade in Europe*, 327.

have easily been averted.[162] Although Eisenhower was at fault, he still pointed the blame towards Montgomery. With Montgomery delaying the Scheldt campaign, Eisenhower was forced to delay his offensive until November as supplies slowly arrived from Cherbourg.[163] Not only would clearing the Scheldt have been a better decision, it would have been significantly less difficult in earlier weeks.

Giving priority to Market Garden, Eisenhower allowed German forces occupying the Scheldt to reinforce their defensive positions. If the estuary had been cleared prior to Market Garden, the region would not have been so heavily defended and the Allies would not have been forced to flood the dikes. This would have made the battlefield more manageable. Montgomery also shares the blame by initially sending in the Canadian troops to handle the estuary. If he had not been so focused on the Ruhr, Canadian troops would not have sustained such high casualties and the estuary could have been cleared sooner. The entire operation inflicted roughly 18,000 casualties on Canadian and British forces and demoralized Canadian troops.[164] Due to the lengthy and difficult campaign, the port of Antwerp became operational much later than it could have been.

With Antwerp finally in full operation, the Allies had their major port that could provide the logistical support for the final push towards Berlin. Although it took over two weeks to clear the estuary from German mines, the opening of Antwerp significantly benefited the Allies. The Allied supply situation experienced "nothing less than a complete revolution," giving the Allies excess port capacity.[165] Having the logistical security was a significant relief, especially on the American side. Prior to Antwerp's opening, build up and operations of Allied armies had to be

[162] Neillands, *The Battle for the Rhine*, 159.
[163] Bradley, *A Soldier's Story*, 425.
[164] Clark, *Crossing the Rhine*, 243.
[165] Moulton, *Battle for Antwerp*, 182.

closely monitored. This significantly affected the American army due to its larger size with many forces already deployed and even more divisions arriving soon. The port of Antwerp relieved this pressure and allowed the supply of a much larger force. However, despite clearing the Scheldt, difficulties still remained in getting Antwerp fully operational.

Despite being in Allied hands since early September, Germany still threatened the port. Realizing Antwerp's importance to the Allied war effort, Germany hoped to simply destroy the port, rendering it useless. Antwerp, along with the nearby depot of Liège, became primary targets for German V-1 and V-2 rockets.[166] The bombs targeted both civilians and military personnel. Supply work and communications were often interrupted, usually for brief periods of time. Despite these setbacks, Antwerp soon became the central bulwark of the Allies logistical system.[167] With the first cargo ships arriving in late November, Antwerp finally gave the Allies the logistical strength they desperately needed.

Figure 4.3: The first coaster enters Antwerp docks, November 26, 1944

Source: *Imperial War Museum*

[166] Colley, *The Road to Victory*, 171.
[167] Eisenhower, *Crusade in Europe*, 328.

What made Antwerp such a vital part of the Allies logistical plan was its capability to support both the American and British forces. Its location as well as its capacity made Antwerp the prized possession for the Allies. With 62 deep-draft berths reserved for American forces, as well as the joint use of outer harbor berths, inner basins, and other ancillary facilities, many logistical planners estimated that Antwerp could handle up to 22,500 tons of non-POL supplies a day.[168] By mid-December, Antwerp unloaded over half of all American cargo that had been shipped to northwestern Europe. The port city also included an extensive rail network with nineteen miles of track per square mile.[169] This allowed the Allies to rely on Antwerp rather than the worn supply lines from Cherbourg.

The opening of Antwerp also set in motion the creation of truck transport routes. However, they were more meticulously planned than the Red Ball Express. Within a week of Antwerp's opening, the ABC (American, British, Canadian) L of C motor operation began running and ran from Antwerp to Liège. Composed of around sixteen ten-ton trailer companies, the operation carried up to 5,000 tons of supplies per day. The system was carefully planned to prevent any loading delays as well as to permit close control to maximize operating efficiency.[170] Despite the success of the Red Ball Express, logistical planners did not want the amount of chaos that arose from the operation, desiring a much more manageable truck system that could be closely monitored. By spending more time planning the logistical side of the impending campaign, Allied commanders hoped that this would prevent any major logistical setbacks and allow for a much smoother drive into Germany.

---

[168] King, *Spearhead of Logistics,* 229.
[169] Atkinson, *The Guns at Last Light*, 330.
[170] *The Transportation Corps in the European Theatre of Operations: A Weekly News Letter*. Historical and Technical Information Section of the Office of the Chief of Transportation. Vol. 1, No. 5 (December 4, 1944), 3.

Although Eisenhower had put his main focus on the Ruhr, the Saar, Aachen, and eventually Market Garden, he had emphatically emphasized the importance of Antwerp. However, many of his decisions did not match his worries. Eisenhower constantly stressed to his fellow commanders, both American and British, that Antwerp must be operational in order to defeat Germany. In a telegram sent to Montgomery on October 9, Eisenhower clearly indicates the vital role Antwerp would play in winning the war:

> This re-emphasizes the supreme importance of Antwerp…I must repeat, we are now squarely up against the situation which we have anticipated for months; our intake into the Continent will not support our battle. All operations will come to a standstill unless Antwerp is producing by the middle of November.[171]

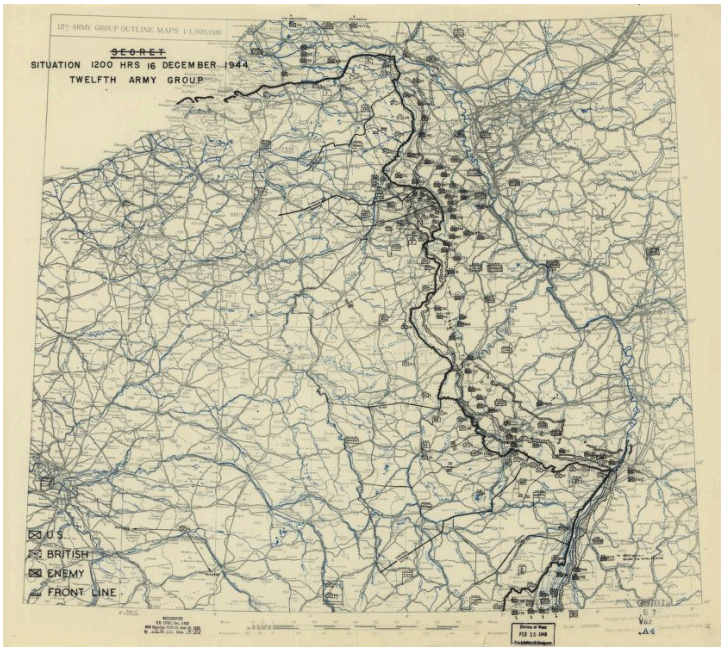
Antwerp had been in Allied hands since early September and this telegram was sent a month later. Eisenhower appeared to have always stressed the importance of Antwerp, despite Market Garden. While his words appeared to show the vital role of Antwerp, Eisenhower still gave Market Garden top priority.

While it could be argued that Eisenhower made a mistake in postponing the Scheldt campaign, the effect that opening the port of Antwerp sooner would have on the war is difficult to determine. When British forces first captured Antwerp in early September, the German forces in the Scheldt had not solidified their defensive positions and were vulnerable. Had Eisenhower and Montgomery postponed Market Garden, the Scheldt could have been cleared with much fewer casualties. The Germans would also have had less time to plant mines throughout the estuary. Instead of opening in late November, Antwerp could have opened a month sooner. This would have given the Allies the logistical strength they needed. Even if Market Garden failed, if it was attempted at all, no more time would have to be wasted clearing the Scheldt. With the logistical strength the Allies needed, the war could have been over before the onset of winter.

[171] Neillands, *The Battle for the Rhine*, 226.

Germany would not have had time to launch their Bulge offensive and American and British forces could have marched all the way to Berlin. Although speculative, an earlier end to the war could have meant no postwar airlift or no Cold War at all. However, this was not the case and the Germans launched their final offensive of the war in hopes of breaking through Allied lines and recapturing Antwerp.

Map 4.3 HQ 12th Army Group situation map December 16, 1944



Source: *Library of Congress*

Due to the Allied decisions regarding Antwerp, the Germans were able to launch one final offensive. The German army used the time needed to clear the Scheldt and get Antwerp's port operational to build their defenses, to reorganize, and to launch a counter-offensive through the Ardennes Forest. Hitler hoped to split the Allied lines and recapture Antwerp. This final offensive came at a difficult time for the Allies. Due to the time-consuming campaigns they had just finished near Antwerp, winter had already hit Europe, which made for a snow-covered forest

and difficult fighting conditions. While the Bulge campaign was the result of American and British logistical problems, it resulted in the near collapse of Germany's logistical capability to defend itself.

From August to mid-September, the German army had been in retreat with American and British forces driving through France. The only relief came with the Allied supply lines reaching their limit. The Allies required Antwerp's port to continue their offensive, but Market Garden pushed its opening back by two months. This long reprieve gave German forces the time to prepare for their own counteroffensive. While this offensive should have come as no surprise to the Allies, most commanders felt that Germany lacked the strength to launch a major offensive. Eisenhower's intelligence chief, Major General Kenneth W.D. Strong, believed that the Sixth Panzer Army could attack through the Ardennes, but General Omar Bradley dismissed this. Only General Patton's intelligence officer, Brigadier General Oscar W. Koch, maintained the belief that the German's were planning a major attack and the German retreat "has not been a rout or a mass collapse" but simply an attempt to buy time.[172] Most Allied commanders remained confident about their position and failed to fully comprehend the German build-up.

The German counterattack had been in preparation since mid-September and was meant to be a decisive blow to the Allied position as well as their logistical strength. Hitler hoped that the German army would be able to push sixty miles to recapture Antwerp. In doing so, German forces would divide the Americans from the British, as well as give Germany enough time to gather supplies for a counter-strike against the Soviets.[173] If successful, this could have been a devastating blow to the Allies' logistical system and may have cost them the war. Although met

[172] Atkinson, *The Guns at Last Light*, 414.
[173] Clark, *Crossing the Rhine*, 253.

with resistance amongst the German commanders, Hitler cast their doubts aside and ordered the offensive.

Figure 4.4 American troops of the 289th Infantry in Belgium December 1944

Source: *National WWII Museum*

Along with being surprised by the German offensive, Eisenhower was also surprised at the weakness within the Allies line. While driving through the Western Ardennes on December 6, 1944, Eisenhower realized that very few U.S. troops were holding the Ardennes sector. Despite having twenty-nine divisions in General Bradley's Army Group, there were very few reserve troops available due to the broad front strategy adopted by Eisenhower.[174] The Allied line, while covering a large area, was dangerously thin. Without reserve troops, if the Germans broke through the lines, there would be no available help to push them back. Despite knowing this, Eisenhower, still believing that the Germans would not launch a major offensive, did nothing to remedy it.

When the Germans launched their offensive, it caught the Allies by complete surprise. A day before the offensive began, Montgomery even requested leave from Eisenhower to return to Britain for Christmas, believing that Hitler's plight was so dire that his surrender could come

[174] Neillands, *The Battle for the Rhine*, 270.

within a few days.[175] The surprise of the attack worked in favor of the Germans. Omar Bradley thought that the attack was only a local counterattack and not an offensive by the entire German army. Panzers were able to break through, some reaching as far as 20 miles into the American lines.[176] Despite the confusion, many American troops repulsed or slowed the initial thrust. Realizing that the decision by the Germans to launch an offensive was a final attempt to cut Allied supply lines, American and British forces quickly prepared to restore their front line.

When the news of the German offensive reached SHAEF, some commanders misinterpreted the purpose of the assault. Bradley believed it to be a counterattack assembled by German Field Marshal Rundstedt in response to Patton's advance into the Saar. It would not be until the war's end that Bradley realized that Antwerp was the primary objective in an attempt for the Germans to regain the initiative on the Western Front.[177] Although Germany could not have completely overrun and pushed the American and British forces back, the successful capture of Antwerp would have halted any Allied advance into Germany, allowing German troops to focus on the Soviet forces on the Easter Front.

While Antwerp offered the Allies the logistical strength they needed to supply a drive into Germany, the broad-front strategy adopted prior to the Bulge offensive almost cost them the battle. With Allied troops spread along the front lines, the only reserve available for Eisenhower was the 82nd and 101st Airborne Divisions.[178] The ability to transport supplies and ammunition from Antwerp as well as the strength of the Allied troops to push enemy troops back prevented the Germans from completely overrunning American and British lines. By diverting the available transportation, two airborne divisions, as well as elements of the Third Army, could be brought

[175] Atkinson, *The Guns at Last Light*, 415.
[176] Clark, *Crossing the Rhine*, 255.
[177] Bradley, *A Soldier's Story*, 455.
[178] Neillands, *The Battle for the Rhine*, 283.

up without delay. Between December 18 and 31, close to 90,000 men and over 10,000 tons of supplies reached the embattled troops.[179] Despite the effort given by the Germans, they were unable to break through Allied lines. Even if they had, they would have been unable to reach their target of Antwerp due to their own logistical problems.

Figure 4.5 Empty gas canisters alongside road in Ardennes Forest

Source: *Warfare History Network*

Like the Allies during their French campaign, the German army quickly suffered a shortage of fuel. Similar to what happened to the Allies at Market Garden, even if the German's broke through the lines, they lacked the fuel to reach Antwerp and cut the Allied supply line. Realizing this, and knowing that their large supply of gasoline would be an important resource for the Germans, Allied troops took precautions to make sure that their fuel did not fall into enemy hands. Two days after the Germans launched their offensive, Lieutenant Colonel Lowell S. Love of the First U.S. Army Armored Section realized that German troops were dangerously close to a gas dump near Spa, Belgium. With nearly four million gallons of gasoline stored at this location, it would have been a monumental loss for the Allies if German forces overran the dump. Over the next four days, reinforcements from the 30th Infantry Division defended the fuel

[179] H.H. Dunham, "U.S. Army Transportation in the European Theater of Operations 1942-1945," Historical Unit U.S. Office of Chief of Transportation Army Service Forces, June 1946, 45.

dump as gas canisters were relocated to a more secure location.[180] By keeping fuel and other essential supplies from falling into German hands, the Allies hoped that this would prevent the Bulge offensive from being a success and hinder the Germans in the subsequent Allied advance into Germany.

While the German offensive caught the Allies by surprise, American and British troops were able to repel the attack. With immediate reinforcement by American Airborne Divisions, and a combined attack from Patton and Montgomery, the Germans began their withdrawal from the Ardennes on January 7, 1945.[181] While the Allied strategic plan had been set back, the logistical capabilities of the German army had been all but drained. American casualties numbered over 40,000 between December 16 and January 2, and the drive to recapture their position by early February cost the American army another 40,000 men.[182] However, this only caused a few tactical and operational difficulties and was not strategically damaging. The German logistical situation was far more dire.

The logistical strength of the German army had been nearly depleted. Due to the German's failure to retake Antwerp, the Allies logistical system was still intact. German reserves of fuel and ammunitions had been depleted and the Luftwaffe had been crippled by the failed offensive. As General Bradley observed, the Germans had suffered up to 250,000 casualties in the month-long offensive and had left over 600 German tanks and assault guns rusting in the Ardennes.[183] The Germans had failed to take their ultimate objective beyond the Meuse and had simply delayed the impending Allied offensive. Crippled by the failed offensive, and with the

[180] Walter R. Butts, interview by Linndl Jones, January 12, 1945.
[181] Clark, *Crossing the Rhine*, 255.
[182] Ibid., 256.
[183] Bradley, *A Soldier's Story*, 492.

Allied supply lines feeding fuel and ammunition from Antwerp to its own troops, Germany was in poor shape to defend their home territory.

Figure 4.6 Shattered German tank near Bastogne

Source: *British Broadcasting Corporation*

While the American offensive into Germany had been delayed, their supply lines had not been severed. The Allied forces began their drive towards the Rhine in late January and faced a heavily depleted German force. However, the situation could have been drastically different if Eisenhower had made different decisions. If Antwerp had been opened earlier, Germany may have had little time to build their defenses. While this would have meant no Bulge offensive, it could have led to a stronger resistance by the Germans. The final offensive taken by the German army all but destroyed their logistical system. This left them weak, with depleted troops and supplies to face the Allied offensive. However, if the Bulge had never occurred, the German reserves would have been available and the Luftwaffe would not have been crippled.

While Antwerp gave American and British forces the supply lines needed to support a major offensive, the failure of the Bulge may have been of more benefit to the Allies. If the

Allied forces had begun their drive into Germany in November, assuming that Antwerp had been operational, the Luftwaffe would have still been intact and some German reserves still available. While this may have not prevented the Germans from losing the war, it would have made it more difficult for the American and British troops who would have been facing more resistance than they did at the end of January. While the European Campaign could have ended before May, Allied casualties could have been much higher. The Bulge, while delaying the war, significantly weakened the German army and their supply lines. This gave Allied forces a significant advantage. Antwerp had been the logistical victory needed by the Allies and the Bulge became the logistical defeat that ultimately led to Germany's downfall.

Chapter Five: Final Thrust across the Rhine

Although the Bulge offensive pushed back the Allied campaign into Germany, it allowed the buildup of supplies to support the impending offensive. While the Allies logistical system appeared to be running at full strength, Germany's system had all but collapsed. The winter offensive drained them of their reserve troops and led to a shortage of gasoline and other supplies. By giving American and British troops enough time to solidify their supply line, Germany could only hope to slow them, and having little energy or sufficient supplies left to launch another major counteroffensive. The Allies soon prepared for the final stage of the war as they now had the supply lines that could sustain their campaign.

Once the Bulge offensive ended at the end of January 1945, the Allies began to finalize preparations for their own offensive into Germany. With the port of Antwerp in full operation, much needed supplies rapidly reached the front. Initially, Antwerp discharged approximately 13,000 long tons of supplies a day and saw close to 23,000 long tons discharged daily by mid-December.[184] The truck system also improved throughout December, shuttling supplies to depots and dumps. Between December 27 and January 11, almost one million tons moved forward with a daily average close to 60,000 tons.[185] Although the Bulge interrupted port operations, the rate of discharge exemplified the Allies powerful logistical system and its importance for the final stages of the war.

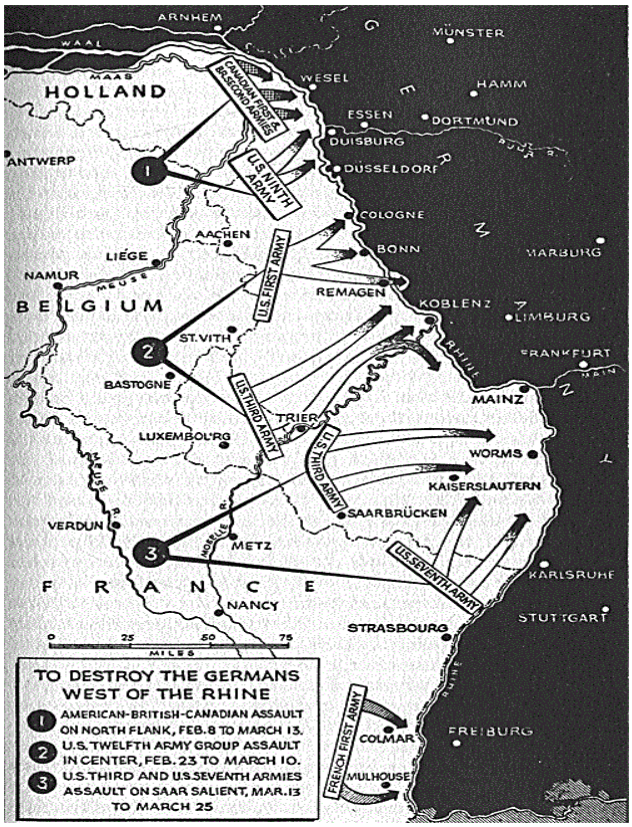
The Allies logistical strength was far greater than that of Germany. The Bulge offensive, while stalling the American and British troops, did far greater damage to the logistical situation of German military forces. Already suffering from a shortage in gasoline during the offensive,

---

[184] *The Transportation Corps in the European Theatre of Operations: A Weekly News Letter*, Historical and Technical Information Section of the Office of the Chief of Transportation, Vol. 2, No. 4 (January 22, 1945), 2.
[185] Ibid., 4.

German air power was crippled, as the Luftwaffe became a shell of its former self. Germany had also depleted its reserve troops and suffered enormous casualties. Their attempt to end the war by recapturing Antwerp had, instead, all but solidified their own defeat. Within four years of having the strongest logistical system of any European power, the German army could only hope to delay the Allies advance, but would be unable to stop them. The American logistical system had usurped Germany and could now supply their own troops as well as the British army.

Map 5.1 Allied plan of action to advance to the Rhine



Source: Eisenhower, Dwight D. *Crusade in Europe*. Garden City, NY: Doubleday, 1948, 373.

One of the major obstacles facing the Allies prior to the launch of their German campaign was the weather. Train tracks had frozen over, which could have led to a major problem if fuel and ammunition could not keep up with the advancing armies. However, the capture of German

12-volt defrosters solved this issue. Following Patton's Third Army as it marched through Alsace-Lorraine, the 733rd Railway Operating Battalion kept the rails hot which led to over 500 trains operating over 16,000 train miles in the first two weeks of January.[186] With the Allies in possession of a tool that could make train tracks passable even in the harshest winter conditions, supplying the advancing army was simplified.

With their logistical system in place and ready for use, the Allies began their advance towards the Rhine and ultimately Berlin. Eisenhower's strategy involved an initial push to the Rhine, and a subsequent assault by Montgomery's 21st Army Group. Strategically, the terrain north of the Ruhr Basin was the most favorable and Montgomery's forces would be able to advance rapidly.[187] Once across the Rhine, the Montgomery led assault would be comparable to the Normandy invasion in size with thousands of bombers and artillery, and airborne divisions providing support. The Ruhr region would also prove to be a major target as it was an industrial area essential to Germany, providing that nation with war material and coal.

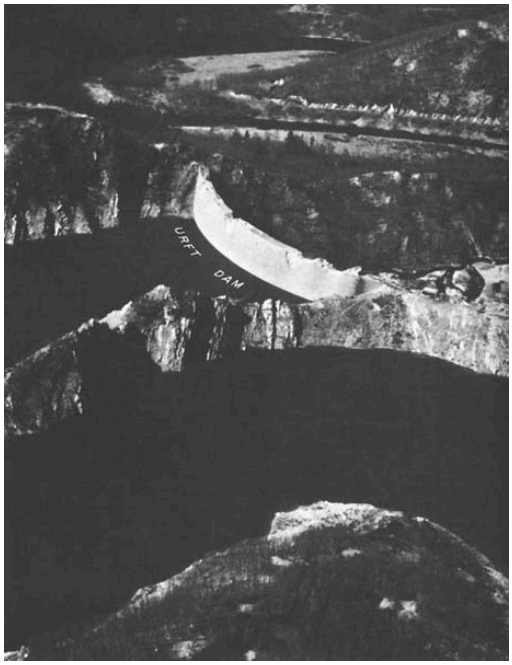
The Ruhr Valley was a strategic target for the advancing Allied troops as its capture would further reduce the already crippled logistical system of the Germans. The region, made up of a number of municipalities that became prominent during the Industrial Revolution, produced up to 80 percent of Germany's coal and was its primary source for steel.[188] Despite the Ruhr's output decreasing by early 1945, pushing the remaining German troops from the region would leave Germany with no means to continue the war effort.

---

[186] *The Transportation Corps in the European Theatre of Operations: A Weekly News Letter*, Historical and Technical Information Section of the Office of the Chief of Transportation, Vol. 2, No. 6 (February 5, 1945), 1.
[187] William Breuer, *Storming Hitler's Rhine: The Allied Assault: February-March 1945* (New York: St. Martin's Press, 1985), 7.
[188] Derek Zumbro, *Battle for the Ruhr: The German Army's Final Defeat in the West* (Lawrence: University of Kansas Press, 2006), 38.

Similar to Market Garden, the primary objective for the Allies was to gain access across the Rhine. Through a series of river assaults, Allied troops would advance close to 250 miles, hoping the retreating German army would leave a few bridges intact.[189] This would not only give the Allies a solid frontline, but would also give them a strategic advantage. By clearing German troops west of the Rhine, Allied forces would be able to hurl around seventy-five reinforced divisions into Germany in converging attacks. If German troops were allowed to remain in the region south of the Ruhr, the American and British armies would be limited to a single offensive with only thirty-five divisions.[190] Given the logistical strength of the Allies, having multiple points of attack would be more effective and spread the German defense.

Figure 5.1 Urft Dam



Source: MacDonald, Charles B., *The Siegfried Line Campaign*, Washington, D.C.: Center of Military History, 1990, 322.

[189] Max Hastings, *Armageddon: The Battle for Germany 1944-1945* (New York: Alfred A. Knopf, 2004), 344.
[190] Eisenhower, *Crusade in Europe,* 370.

One of the first objectives that Eisenhower stressed was the importance of the dams along the Roer River. Eisenhower feared that, once the Allied troops closed in, the German troops would destroy the dams, flooding the river, which would make the crossing even more difficult. Running parallel to the Rhine, the Roer River is usually narrow and calm. If the dams were destroyed, the steady rush of water would have turned the peaceful river into a raging torrent with some areas widening to a mile.[191] The capture of the dams became a top priority as the most direct route to Berlin could be impeded if the dams were destroyed.

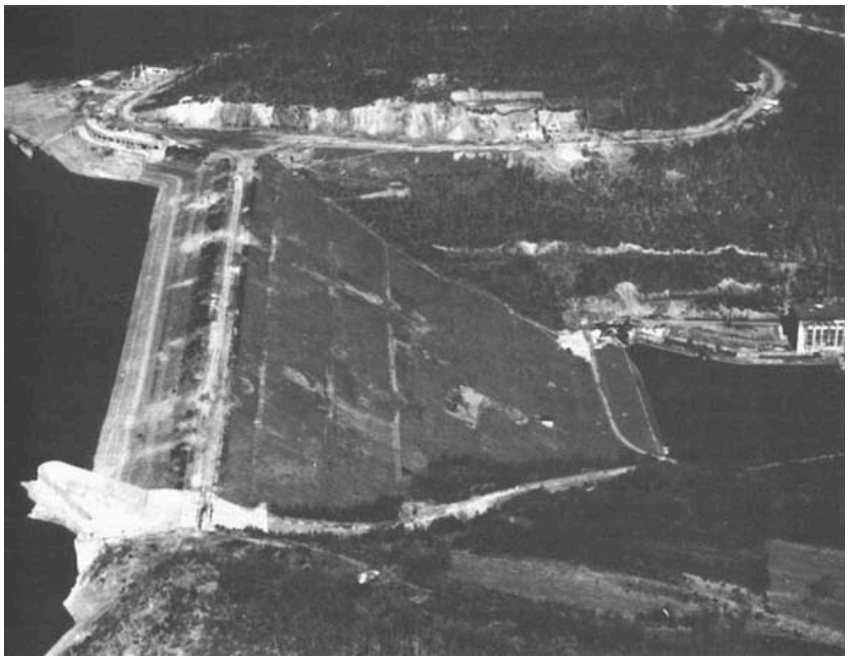
With numerous attempts to capture the dams failing between September and December 1944, pressure began to build within the Allied chain of command. The grand strategy for the offensive called for the dams to be captured by the Americans before Montgomery and his British forces began their operation to clear German troops west of the Rhine. Hoping to launch his attack by February 8, Montgomery made it clear that the dams must be taken.[192] Fortunately for Montgomery, the dams fell sooner than expected. The operation to capture the dams began on February 2, when American General E.P. Parker met with Lt. Col. Charles A. McKinney and General C.R. Hubner to discuss plans for the seizure of the dams.[193] Hubner made it clear that the dams needed to be captured and any amount of support would be given to both commanders.

The battle to capture the dams began early on February 3, with a preliminary attack by the 311th Infantry. Under orders from General Parker, Companies A and C of the 1st Battalion, 311th Infantry crossed the Roer under German fire. Despite only 2 officers and 31 enlisted men reaching the other side, an assault that afternoon was able to secure the village of Dedenborn,

[191] Breuer, *Storming Hitler's Rhine*, 19.
[192] Ibid., 20.
[193] Edward G. Miller, *A Dark and Bloody Ground: The Hürtgen Forest and the Roer River Dams, 1944-1945* (College Station: Texas A&M University Press, 1995), 193.

which was perched on high ground on the east bank of the Roer.[194] Throughout the next week, the fight to capture the Schwammenauel Dam was slow paced. Without the roads being cleared, tanks could not make their way forward to support the infantry.[195] Despite the lack of artillery support, the infantry made significant gains over the next few days in preparation for a final assault.

Figure 5.2: Schwammenauel Dam



Source: MacDonald, Charles B., *The Siegfried Line Campaign*, Washington, D.C.: Center of Military History, 1990, 325.

The heavy German resistance in the surrounding villages wore down the American troops, but the dams' capture became more urgent by the day. Although originally planning to attack the dam on February 10, Lt. Col. R.H. Schellman learned that his battalion must take the dam as soon as possible. Fearing that the Germans could blow the dam at any time, its capture

[194] Ibid., 195.
[195] Ibid., 196.

was urgent as reports were already indicating rising water levels downstream.[196] Launching the attack the night of February 9, two companies under Schellman began their approach. Facing steep ground and fallen debris, the Americans caught the Germans by surprise. Despite confusion during the hand-to-hand combat, the American troops were able to gain control of the dam early in the morning of February 10.[197] American success put an end to a looming threat to the Allied offensive. Despite capturing the dam intact, the crossing of the Roer River was delayed as the Germans had opened the discharge valves during the night, flooding the valley for two weeks.[198] The intense fighting also revealed a few logistical problems facing the American forces.

While the poor weather conditions created tactical problems for the American troops, they also contributed to logistical problems. The distribution of rations, fuel, and ammunition was hindered due to the weather and many GIs were poorly clothed. Many parts of the soldiers' uniforms, such as overshoes and overcoats, were in short supply, were poorly designed, and did little to protect the soldiers from the elements.[199] The failure to support the infantry with tanks also brought up a major issue. The path of attack chosen by the Allied commanders was blocked and artillery support could not get through. The terrain took away the American's numerical advantage in armor. Overreliance on their logistical power also blinded the Allied commanders. Although the Germans expected the Americans to attack the dams, they expected it to be sooner. What surprised them was the American attack through the Hürtgen Forest, which was easy to defend. German officer R.C. Gersdorff said, "there was no use in the Americans going through

[196] Ibid., 200.
[197] Ibid., 202.
[198] Hastings, *Armageddon*, 347.
[199] Miller, *A Dark and Bloody Ground*, 208.

the Hürtgen Forest…Had you gone around it on both sides, you would have had almost no opposition."[200] Despite the setbacks, the Allies continued their march towards the Rhine.

Although the Roer River temporarily flooded, Montgomery took this opportunity to make the eventual crossing easier for his forces as well as the Americans. Instead of simultaneously attacking with the Canadian and American troops, Montgomery sent the Canadian forces ahead on February 8. While their progress was slow and costly due to the muddy terrain and stiff opposition, the German forces moved from the Roer to the Canadian path of advance. This meant that, once the river receded, the British and American troops were able to advance at rapid speed.[201] Like a chess match, Montgomery baited the German forces into answering the Canadian attack, which subsequently made the American and British path of advance much more suitable.

Figure 5.3 M4 Sherman crossing the Roer River near Jülich, Germany

Source: *U.S. Army Corps of Engineers*

[200] Ibid., 210.
[201] Eisenhower, *Crusade in Europe*, 376.

Despite the intense fighting over the Roer dams, German resistance soon became weaker than the Allies expected. A substantial number of Germans surrendered to the advancing American units. Some went so far as to instruct troops of the U.S. 90th Division on how to operate 120mm mortars, which had been captured. The rate of advance the American forces achieved is similar to that seen during the breakout from Normandy. The 4th Armored Division faced such little resistance that they were able to cover twenty-five miles in one bound, capturing 5,000 German soldiers with the loss of only 111 of their own men.[202] What made this advance very different from the Normandy breakout was the planning. The supply system in place at this time could sustain the armies' advance and did not result in any major stalls.

The final city the Allies needed to take before crossing the Rhine was the German city of Cologne, located right on the Rhine. By capturing Cologne, the Allies would then control the territory west of the Rhine. American Generals Eisenhower and Bradley felt it was necessary to close the Rhine the full length of the Allied front before attempting to cross it in full strength. Both hoped to clear the western terrain of the Rhine of all German troops, which would prevent the Germans from launching a spoiling attack.[203] However, the German defense of the city seemed to be more symbolic rather than strategic. A last-ditch effort to defend the city had been taken by the Volksturmm, Germany's quickly established militia force. Tank trenches were dug along with foxholes, while many elderly men and teenaged boys with only rudimentary training were armed with small arms far inferior to the advancing Allied troops.[204] The collapsing logistical system made Germany desperate, hoping that their civilians would be able to overcome their lack of soldiers and weapons through force of will.

[202] Hastings, *Armageddon*, 348.
[203] Bradley, *A Soldier's Story* 502.
[204] Zumbro, *Battle for the Ruhr*, 69.

Despite the heavy bombing that had crippled the city, there were still pockets of resistance within Cologne. The American 3rd Armored Division began their final advance into the city the morning of March 5. Despite a number of German troops remaining in the city, they were unable to stop the advancing armored elements that used machine-gun and tank fire to disperse the remaining resistance.[205] The majority of the German army had already evacuated the city, leaving only pockets of troops that had been left behind with only hastily trained civilians for support. Within two days, the American troops overran the whole city, sooner than expected, which provided Eisenhower with additional divisions to continue fighting south of the city.[206] With the city in control of the Allies, the terrain west of the Rhine was essentially in control of the Allies. The capture of Cologne was due to not only mistakes made by Germany during the Bulge Offensive, but also because of the increasing strength of the Allied logistical system.

By early March 1945, the Rhine was the only major river separating the Allies from the decimated and nearly hopeless Wehrmacht forces and their main target, Berlin. The Allied forces faced off against the retreating Germans possessed the most powerful combined army and technological strength the world had seen to date. In command of roughly four million soldiers, Eisenhower's force consisted of eight armies of American, British, and French troops with more than 17,000 aircraft and 73 fully mechanized divisions at his disposal.[207] The port of Antwerp, as well as the increasing output from the Normandy Base Section, provided the multi-national army with replacement troops, ammunition, and fuel at a steady rate. Within the first half of the month of February alone, the Normandy Base Section (NBS) had increased to nearly six times its original size. This caused the Transportation Corps to increase from around 17,000 troops to

[205] Ibid., 73.
[206] Eisenhower, *Crusade in Europe*, 378.
[207] Zumbro, *Battle for the Ruhr*, 85.

approximately 41,000 in just over two weeks.[208] The rate of growth in the NBS showed the increasing strength of the Allied logistical system. While it at first struggled to support the Allied advance into France, the NBS and Antwerp could fully supply the massive army that was on the shores of the Rhine. Poised to cross the river, and with solid logistical support, the American and British forces only needed a plan to cross the Rhine and continue their advance towards Berlin.

Figure 5.4 Ludendorff Bridge over the Rhine River near Remagen, Germany

Source: *Sharon Herald*

One of the first crossings of the Rhine happened by accident. The Ludendorff Bridge, located in the small German town of Remagen, was initially of little significance to the Germans as well as Allied forces. Willi Bratge, a German captain commanding the security force at the bridge, requested reinforcements when he heard American tank fire nearby, but his commanders denied this, arguing that "the Americans aren't coming to Remagen, they are bound for Bonn."[209] This was what the Germans expected to happen. The main American thrust would be towards Bonn and any enemy fire heard would simply be a smaller force protecting the flank of

[208] *The Transportation Corps in the European Theatre of Operations: A Weekly News Letter*, Historical and Technical Information Section of the Office of the Chief of Transportation, Vol. 2, No. 11 (March 12, 1945), 3.
[209] Breuer, *Storming Hitler's Rhine*, 119.

the main body. Despite this, Bratge placed demolition charges along the bridge to ensure that it would not fall into the hands of the Americans. This seemed to be the only defense, as there were fewer than a thousand German troops in Remagen, most of whom were Volkssturm and Hitler Youth, both units offering little combat value.[210] However, the bridge soon became an unexpected target for American forces nearby.

Unaware that the Ludendorff Bridge was still intact, American forces made their way to Remagen. Learning that the bridge had not been demolished gave the troops a sense of urgency. An American platoon commander of the 9th Armored Division reached high ground overlooking the river just before 1300 and could see German troops retreating across the bridge. However, German civilians warned that the bridge would be demolished at 1600, which caused the American forces to storm the bridge.[211] Capturing the bridge intact would provide the Americans with their first opportunity to cross the Rhine. Reaching the river on March 7, troops of the III Corps caught the Germans by surprise. Their advance was so rapid that indecision and confusion overtook the German troops responsible for detonating the charges along the bridge.[212] The Germans defending the bridge had not expected such a sudden attack by a large force and had hoped to delay destroying the bridge in order to allow more time for their own troops to retreat.

Eisenhower, although excited for the American troops who had seized it, met the capture of the bridge with less enthusiasm. Feeling that Remagen was not the right place for the First Army to cross the Rhine, Eisenhower hesitated to allow a significant amount of American troops across. General Bradley exploded saying, "What in hell do you want us to do—pull back and blow it up?" Although Eisenhower allowed Bradley to move five divisions across the bridge, he

[210] Atkinson, *The Guns at Last Light*, 548.
[211] Hastings, *Armageddon*, 365.
[212] Eisenhower, *Crusade in Europe*, 378.

remained wary of a German counter-attack across the exposed flank of the Americans.[213] The American defense of the Ludendorff Bridge was not as easy as its capture. In hopes of retaking the bridge, or at the very least destroying it, a number of German troops who had retreated turned back in a final attempt to stall the American forces.

Figure 5.5 Ludendorff Bridge following its capture by Allied Forces

Source: *United Press International*

Although the American troops had a solid hold of the bridge, many German commanders whose troops had just retreated realized that the bridge would be a valuable asset for the Allies if left intact. One captured Wehrmacht general even stated that the bridgehead created by the Americans was "the inner door to Germany."[214] The German forces still present in the area launched a final attack to destroy the bridge, hoping that the American troops would be forced to find another way across the river or that the attack would at least cause a delay in their offensive. Despite shortages of fuel and ammunition, a counterattack was launched to destroy the bridge. The destruction of the bridges became such a priority that Hermann Göring sought volunteers to

[213] Hastings, *Armageddon*, 366.
[214] Atkinson, *The Guns at Last Light*, 551.

fly suicide missions into the bridge. This plan proved ineffective as any Germany bomber was met with barrage balloons and up to seven hundred antiaircraft guns.[215] While Americans did suffer casualties due to the counterattack, it was not enough to destroy the bridge or halt the troops crossing it.

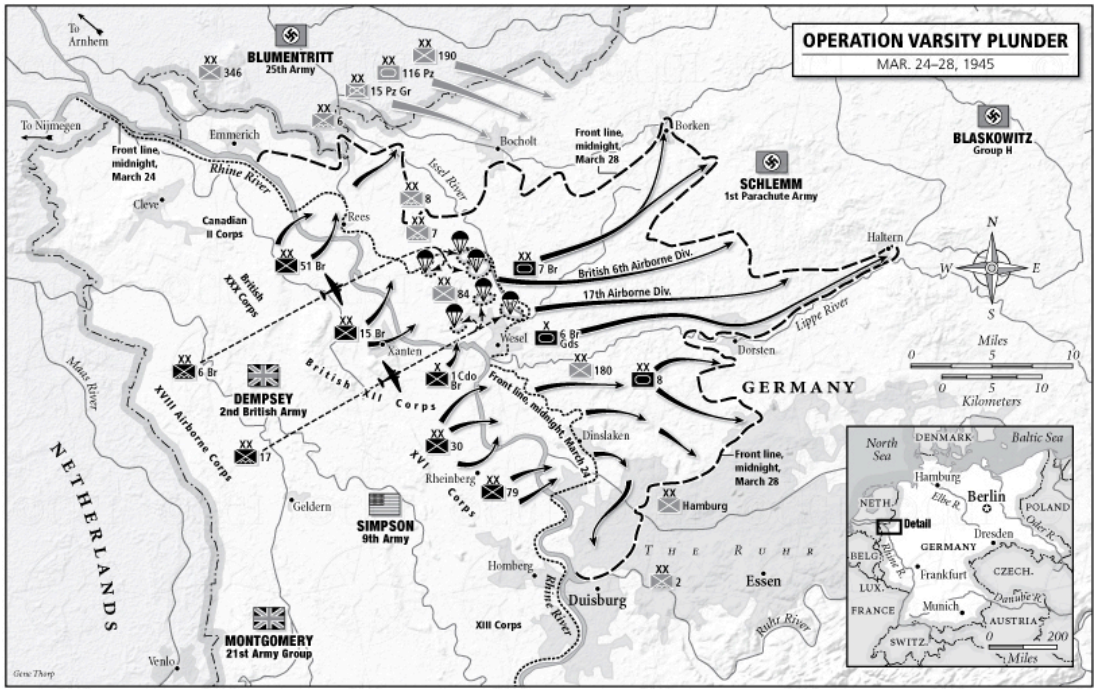
Along with the main bridge, the Americans created floating pontoon bridges to increase the number of troops and ammunition that could cross the river. Even with the German counterattack, American engineers showed significant efficiency in constructing floating bridges. The first bridge, measuring roughly 330 yards, was constructed in just over ten hours and subsequent bridges took less time to build.[216] The floating bridges played a vital role as the Ludendorff Bridge soon became unstable. With the constant crossing of heavy military convoys, the already damaged bridge collapsed on March 17, ten days after the Americans captured it. Despite this setback, three bridges had already been constructed and were in full use.[217] The capture of the Ludendorff Bridge, while initially not seen as a major event by Eisenhower, proved to be vital for the Allies.

While Eisenhower believed that the capture of the Ludendorff Bridge was more of a psychological blow to the Germans, it also played an important strategic and logistical role. The capture of the Ludendorff helped fix a major mistake made by Montgomery. Initially, the German resistance on the east bank of the Rhine was disorganized and weak. However, Montgomery did not seize this opportunity, and within two weeks the Germans had dug in with artillery. The bridgehead at Remagen diverted a significant portion of German strength, thus making Montgomery's crossing more tolerable.[218] The month long campaign around Remagen

[215] Ibid., 553.
[216] Eisenhower, *Crusade in Europe*, 381.
[217] Zumbro, *Battle for the Ruhr*, 100.
[218] Bradley, *A Soldier's Story*, 524.

also proved to be a blow to the Germans supply system. During this period, the capture of German prisoners averaged around 10,000 per day, meaning that the Germans lost an equivalent of twenty divisions as well as significant losses in supplies and sources of raw materials.[219] While the American and British troops gained strength due to their supply system, the already weakened German army was on the verge of collapse by the end of March. In the Remagen area alone, the American Army had three corps. Patton and the Third Army had already crossed the Rhine in an area with little to no hostile forces, and the American troops could now strike in any direction.[220] While the American forces had gained a bridgehead and found themselves across the Rhine, the British forces under Montgomery launched their own crossing.

Map 5.2 Operation Varsity Plunder March 24-28, 1945



Source: Atkinson, Rick. *The Guns at Last Light: The War in Western Europe*. New York: Henry Holt and Company, 2013, 560.

[219] Eisenhower, *Crusade in Europe*, 386.
[220] Ibid., 386.

By the end of March, the German military was a shell of its former self. Their retreat from Normandy as well as the battle of the Ardennes had completely destroyed their offensive capability. Their defense of the Rhine, which cost them one-third of their manpower, severely limited their ability to put up a competent and coherent defensive force.[221] The Rhine seemed to be the only defense that kept the British forces at bay. Unlike the German forces, the Allies had solved their logistical difficulties and were well supplied. For weeks, a steady flow of supplies had been brought forward from Antwerp, either by freight car or by truck. By the time the Rhine assault was launched, Montgomery's three armies received up to 10,000 tons of supplies daily.[222] The logistical system in place for the Germans paled in comparison to the Allied system. German Corporal Heinz Kempa described the severity of the German logistical woes:

> In Normandy we were strong, at Arnhem we were weakening, in the Ardennes we struggled and on the Rhine we relied on hope. We were not bad soldiers all of a sudden, but we lacked what we needed to do the job. I was a radio expert by March 1945, but I hadn't used one since November 1944.[223]

As British forces prepared to launch Operation Plunder, Montgomery hoped that it would put the Allies in position for a final thrust to the heart of Germany.

Montgomery's plan for Plunder seemed to be similar in scale to that of the Normandy landings. With three corps, two British and one American, Montgomery planned to assault the Rhine the night of March 23, followed by an Anglo-American airborne attack twelve hours later.[224] While Montgomery knew that the Germans were aware of the presence of the Allied forces, a smokescreen was created ten days before the assault to conceal the Allied bank of the river at Wesel, hiding troop and vehicle movements from enemy artillery observers.[225] Despite

[221] Clark, *Crossing the Rhine*, 273.
[222] Breuer, *Storming Hitler's Rhine*, 198.
[223] Clark*, Crossing the Rhine,* 273.
[224] Atkinson, *The Guns at Last Light*, 559.
[225] Hastings, *Armageddon*, 368.

the dense fog irritating the British troops, it succeeded in concealing their final preparations. The fog allowed Montgomery to bring forward the supplies needed for his assault at a rapid speed. Within ten days, 250,000 men staged forward, along with 256,000 tons of supplies as well as 32,000 vehicles, including 700 tanks and a number of amphibious vehicles.[226] Montgomery took no chances in ensuring that the assault would be successful, smashing the German forces on the east bank of the Rhine.

Figure 5.6 U.S. 79th Division crossing the Rhine on March 24, 1945

Source: *U.S. Naval Institute*

With ten days spent bringing up troops, ammunition, and the necessary supplies, the assault across the Rhine began late on March 23. The past three days had seen the Allies drop close to 15,000 tons of bombs across the river to soften the battlefield.[227] The barrage continued just before the British and Americans began their crossing. Shortly after 0900, the three corps began to cross the river between Rees and Wesel. Within minutes, they had crossed and established a foothold on the German side of the Rhine.[228] The crossings saw limited enemy fire

[226] Clark, *Crossing the Rhine*, 286.
[227] Atkinson, *The Guns at Last Light*, 559.
[228] Zumbro, *Battle for the Ruhr*, 138.

with few American and British casualties. Though fearing high losses, the U.S. 30th and 79th Divisions suffered only thirty casualties during their crossing as the Germans abandoned any attempt to defend the east bank against the superior firepower. Many of Wesel's defenders had also been moved to the Remagen perimeter.[229] The Allies' superior logistical system allowed them to overpower the German defenders on the east bank of the Rhine. With the German troops already weakened due to shortages, the superior Allied firepower led to an almost uninterrupted crossing.

Along with the ground assault, Allied commanders staged the largest single-day airborne operation of the war, codenamed Operation Varsity. The operation commenced in the early morning of March 24 with airborne troops from the U.S. 17th and British 6th Airborne Divisions under American General Matthew Ridgway dropping to support the established bridgeheads already captured by the ground troops.[230] The operation secured a final foothold across the Rhine. This essentially ended the war, as the German army lost the natural barrier provided by the river.

While the German forces knew that an Allied operation was imminent, the large scale of the attack shocked them. The first transport aircraft took to the air in the early morning hours, one day after Operation Plunder began. Within two and a half hours, over 21,000 Allied paratrooper and glider-borne troops dropped on German positions. Accompanying these troops were 614 jeeps, 286 guns and mortars, and hundreds of tons of ammunition, food, fuel, medical supplies, and other equipment.[231] The airborne operation, due to its sheer size, was a demonstration of the logistical superiority the Allies had over their German counterparts. While Operation Market Garden saw more airborne troops land, it was spread over a week. Only six

[229] Hastings, *Armageddon*, 368.
[230] Breuer, *Storming Hitler's Rhine*, 199.
[231] Ibid., 205.

months after this failed operation, the Allies had a far superior logistical system in place to support Operation Varsity. Even Eisenhower recognized the success of the operation. He felt that the events of March 24 sealed the fate of Germany. While the bridgeheads created further south were due to surprise and good fortune, Eisenhower felt that the northern operations saw more resistance from the Germans. Even so, the Allies logistics and strategy still overpowered the dug-in Wehrmacht troops.[232] Operation Varsity saw the Germans lose their final hold on the Rhine and that loss seemed to fully cement the eventual outcome of the war.

The Allied campaign across the Rhineland exemplified how far their logistical system had grown. Prior to the Bulge Offensive, the Allies had just captured Antwerp and had not fully reached their full strength. The delay in launching their offensive into Germany seemed to benefit the Allies more than the Germans by allowing time to stockpile supplies to support the last offensive of the European campaign. While the Allied logistical system had reached maximum efficiency, the German's ability to support its army had completely collapsed. The subsequent drive into Germany and the success of the American and British troops proved the importance of logistics to a military campaign. The ability to efficiently supply troops proved to be as important, if not more so, than overall strategy. At the beginning of the war in 1939, Germany had logistical superiority over Britain. Five years later, the American and British forces had nearly perfected their logistical systems while that of Germany had collapsed.

[232] Eisenhower, *Crusade in Europe*, 391.

Chapter Six: Conclusion

Between 1939 and 1945, the logistical situation for the Germans and the Allied forces seemed to switch places. While Germany's logistical superiority allowed the nation to conquer much of Europe, the eventual collapse of their logistical system ultimately led to their downfall. The Allies, on the other hand, initially struggled to develop a logistical system that could help the American and British forces stand against their German counterparts. However, by the end of 1944, the experience gained after the D-Day landings and the opening of the port of Antwerp saw the Allies' logistical system grow into an unmatched superior force. The United States, in particular, would use their newly gained knowledge of military logistics to become the military superpower of the Twentieth Century.

Despite being victorious, the Allies' military plan was not perfect and left a lasting impact on the development of modern military strategy. Believing that operational strategy was the primary factor in defeating Germany, Allied planners made a number of blunders throughout the campaign through France. While the American and British armies were hoping to have an advantage due to superior weapons and strategy, they should have focused on having a superior logistical system. The most success the United States and Great Britain achieved during the war was in regards to logistics rather than strategy. While Germany had the far superior Tiger and Panther tanks, it was the United States' ability to produce tanks at a faster pace that overwhelmed the German army. The ability to supply more troops, ammunition, and fuel gave the Allies the advantage over Germany by the end of the war. Thus strategy, regardless of its quality, is worthless without taking logistics into account.

Immediately following D-Day, the Allies quickly learned that no plan survives contact with the enemy. No matter how well thought out the plan nor how ingenious the military planner,

no plan survives contact with the enemy. Although the initial D-Day landings were successful, they were not without problems. The destruction of Mulberry A put more pressure on the Allies to capture Cherbourg. However, the slow advance of the Allied forces caused the most problems. The consumption of supplies was far less than planners had expected and thus storage space became limited and the Normandy area became congested. The Allies also fell behind schedule in opening the Normandy ports, causing Allied planners to adjust their strategy.

The need for well-thought out backup plans was another lesson taught by the Allies' campaign in France. Following Operation Cobra, the Allied advance was faster than expected. This soon put pressure on the Allies' supply lines, forcing them to put in place stopgap measures such as the Red Ball Express. While this truck convoy system was successful in supplying the advancing troops, it did have its share of weaknesses. Due to the haphazard setup of the Red Ball Express, issues such as vehicular maintenance and discipline arose throughout the existence of the operation. Military planners have now learned to develop numerous plans and backup measures to use if their initial plan is unsuccessful or meets with unexpected obstacles. Had Allied planners already thought of a plan for the fast breakout from Normandy, the supply lines could have been even more efficient without the issues that arose due to the hasty implementation of the Red Ball Express.

The relationship between ports and logistics is one of the most important lessons learned from World War II. The Allies' campaign in Europe depended on the their ability to supply their own troops with supplies and ammunition. The only way to maintain their military campaign was to capture ports and put them into operation. The slow process of rebuilding the Normandy ports put a strain on the Allies' campaign in France forcing the military planners to adjust their logistical system with the Red Ball Express. While the Normandy ports did support a military

campaign through France, the port of Antwerp would be the most crucial target for the Allied drive towards Berlin. The boost to the Allies' logistical system after the opening of the port of Antwerp proves its importance and that the ports should have been the primary targets for the Allied armies.

The conclusion of this study will provide an alternate history. In it, the Allies prioritized their objectives based on logistics. It is built upon two key events that many historians believe extended the war: first, the Allied choice to focus on Market Garden and Montgomery's decision at Arnhem; and second, the German's final winter offensive in the Ardennes. Piecing these events together will offer the alternative that, had Montgomery prioritized opening Antwerp, the war may have ended sooner.

Allie's (Hypothetical) Plan for Antwerp

Immediately after capturing Antwerp on September 4, Montgomery and the British Army continued the advance north across the Albert Canal towards Woensdrecht, Netherlands. The 15th German Army, consisting of approximately 100,000 scattered troops, began to retreat across the Walcheren-Beveland Peninsula. With light opposition, British armored forces reached the Woensdrecht isthmus within hours, accepting the surrender of numerous demoralized German Troops along the way. The quick action by the British prevented much of the 15th German Army from escaping, essentially trapping the German troops west of Woesndrecht. Taking advantage of the Germans' situation, the British forces attacked before the Germans had time to reorganize and reorient their guns.

Despite their numeric strength, the Germans did not have enough time to organize their defenses and were met with a quick blow by the British. The 15th Army began to falter under the combined attack by British and Canadian troops. Within two weeks, British and Canadian troops

had cleared the Scheldt, capturing or killing approximately 90,000 German troops. By mid-September, the port of Antwerp was able to begin operations, with the first Allied ship arriving by the end of the month.

With Antwerp in operation, Allied forces had the logistical strength needed to maintain a campaign into German territory. With the German Army still in retreat, Eisenhower maintained his broad-front strategy. Losing the 15th Army, and failing to delay the opening of Antwerp, were devastating blows to Germany. Instead of having time to improve their defenses, the new offense forced the German Army to maintain its retreat with the newly invigorated American and British Armies on their heels. Desperate actions by a dwindling Luftwaffe were the only thing keeping the Allied forces from completely overrunning the retreating German troops. By the end of October, remnants of the German Army retreated across the Rhine, leaving the river as the only protective barrier against the combined Allied forces.

Being fed fuel and ammunition by the port of Antwerp, American and British troops were able to maintain their advance towards Germany. Having reached the Rhine by the end of October, the Allies began preparations for the final push across the river and into the heart of German territory. Operation Plunder commenced on October 28 with British and American troops beginning their assault across the river near Rees, Wesel, and south of the river Lippe. Heavy resistance from newly reconstituted Panzer divisions and attacks by the Luftwaffe made the crossing a difficult task. On November 11, American and British forces were able to gain a foothold on the eastern shore of the Rhine. Although suffering high casualties, the crossing of the Rhine essentially meant that the end of the war was near.

With American and British forces now across the Rhine, Germany scrambled to send reinforcements westward. Despite the threat the Soviet Union presented on the Eastern Front, the

immediate threat of the American and British armies forced a number of German troops to be sent from the Eastern Front. This significantly weakened the German defenses along the Eastern Front, allowing the Soviets to advance at a faster pace. By the end of November, the American and British armies closed on the Elbe River. The Soviets, having taken advantage of the weakening German defenses, met the Americans and British in early December.

The decision for Berlin became a highly debated question amongst Allied commanders. Despite the quick advance across Germany, Omar Bradley expected the Battle for Berlin to be a much more difficult undertaking that would have cost 100,000 casualties. Not willing to risk such losses. Eisenhower ordered a complete halt at the Elbe. Within two weeks, the Soviets entered Berlin. With the German army weakened from their losses at Antwerp and the subsequent American drive across the Rhine, the battle was more of a fighting retreat, as the remaining German units within the city fought westward in hopes of surrendering to the Western Allies rather than the Soviets. By January 5, 1945, the city had been taken by the Soviets and Germany surrendered following the suicide of Adolf Hitler.

* * *

While Germany was doomed the moment the United States entered the war, the decisions made during the Allied campaign in Europe may have extended the war. Had Antwerp been given priority over Market Garden, the war may have ended four months sooner. The logistical strength that Antwerp provided the Allies gave them the fuel and ammunition necessary to sustain their drive into Germany. While fighting in the Scheldt may have been difficult, Allied troops would have been fighting in better conditions with the full strength of both the Canadian and British armies. Had the Allies not wasted time on Market Garden and opening Antwerp, the Germans would have had little time to prepare their Bulge Offensive. While the American and

British troops may have encountered tougher resistance as they drove into German territory, the logistical power provided by Antwerp would have given the Allies enough stamina to continue their drive. Focusing on Antwerp would have given the Allies the logistical superiority needed to support a campaign into Germany, possibly ending the war by January 1945.

Bibliography

Primary

Bradley, Omar. *A Soldier's Story*. New York: Henry Holt and Company, 1951.

Butts, Walter R. Interview by Linndl Jones. National Archives and Records Administration. January 12, 1945.

Davis, T/Sgt. Sarah M. *Patton's Wheels: The Story of Quartermaster Trucks in Third Army,* The United States War College, 1945.

H.H. Dunham, "U.S. Army Transportation in the European Theater of Operations 1942-1945," Historical Unit U.S. Office of Chief of Transportation Army Service Forces, June 1946,

Elder, Col. Frank L. "Logistic Planning and Operations-ETO." Carlisle, PA: U.S. Army Military History Institute, 1945.

Eisenhower, Dwight D. *Crusade in Europe*. Garden City, NY: Doubleday, 1948.

Logistics in World War II: Final Report of the Army Service Forces: A Report to the Under Secretary of War and the Chief of Staff by the Director of the Service, Supply, and Procurement Division, War Department General Staff. Washington, DC: Department of the Army, Center for Military History, 1993.

Montgomery, Bernard. *The Memoirs of Field-Marshal the Viscount Montgomery of Alamein*. Cleveland: World Publishing Co., 1958.

Millett, John D., "Logistics and Modern War," *Military Affairs* Vol. 9 No. 3 (Autumn, 1945), 193-207.

"Opening and Operating the Continental Ports," March 1946,The Administrative and Logistical History of the European Theater of Operations, Dwight D. Eisenhower Library, 1946.

Sullivan, John G. *Fuel to the Troops: A Memoir of the 698th Engineer Petroleum Distribution Company, 1943-1945*. Bennington, VT: Merriam Press, 2012.

The General Board United States Forces ETO, "Motor Transport Services as a Permanent Part of the Transportation Corps," (321/11, 125), November 20, 1945.

The Transportation Corps in the European Theatre of Operations: A Weekly News Letter. Historical and Technical Information Section of the Office of the Chief of Transportation. Vol. 1, No. 5 (December 4, 1944).

The Transportation Corps in the European Theatre of Operations: A Weekly News Letter. Historical and Technical Information Section of the Office of the Chief of Transportation. Vol. 2, No. 4 (January 22, 1945).

The Transportation Corps in the European Theatre of Operations: A Weekly News Letter. Historical and Technical Information Section of the Office of the Chief of Transportation. Vol. 2, No. 6 (February 5, 1945).

The Transportation Corps in the European Theatre of Operations: A Weekly News Letter. Historical and Technical Information Section of the Office of the Chief of Transportation. Vol. 2, No. 11 (March 12, 1945).

U.S. Department of the Army, Standard Operating Procedures No. 53 Red Ball Motor Transport Operations, December 2, 1944.

Secondary

Atkinson, Rick. *The Guns at Last Light: The War in Western Europe*. New York: Henry Holt and Company, 2013.

Aubin, Nicolas. *Liberty Roads: The American Logistics in France and Germany, 1944-45*. Paris: Histoire & Collections, 2014.

Breuer, William. *Storming Hitler's Rhine: The Allied Assault: February-March 1945*. New York: St. Martin's Press, 1985.

Bykofsky, Joseph and Harold Larson. *The Transportation Corps: Operations Overseas*. Washington, D.C.: Center of Military History, United States Army, 1990.

Clark, Lloyd. *Crossing the Rhine: Breaking into Nazi Germany*. New York: Atlantic Monthly Press, 2008.

Coakley, Robert and Richard Leighton. *The War Department: Global Logistics and Strategy 1943-1945*. Washington, D.C.: Center of Military History United States Army, 1989.

Colley, David. *The Road to Victory: The Untold Story of World War II's Red Ball Express*. Washington, DC: Brassey's, 2000.

Gropman, Alan. *The Big 'L': American Logistics in World War II*. Washington, DC: National Defense University Press, 1997.

Hartcup, Guy. *Code Name MULBERRY: The Planning, Building and Operation of the Normandy Harbours*. New York: Hippocrene Books, 1977.

Hastings, Max. *Armageddon: The Battle for Germany 1944-1945*. New York: Alfred A. Knopf, 2004.

Huston, James. *The Sinews of War: Army Logistics, 1775-1953*. Washington, D.C.: GPO, 1966.

King, Benjamin. *Spearhead of Logistices: A History of the United States Army Transportation Corps*. Fort Eustis, VA: U.S. Army Transportation Center, 2001.

MacDonald, Charles B. *Command Decisions: The Decision to Launch Operation Market Garden*. Washington, D.C.: Center of Military History, U.S. Army, 1990.

MacDonald, Charles B. *The Siegfried Line Campaign*. Washington, D.C.: Center of Military History, 1990.

Macksey, Kenneth. *For Want of a Nail: The Impact on War of Logistics and Communications*. London: Brassey's, 1989.

Mayo, Lida. *The Ordnance Department: On Beachhead and Battlefront*. Washington, D.C.: Center of Military History United States Army, 2009.

Miller, Edward G. *A Dark and Bloody Ground: The Hürtgen Forest and the Roer River Dams, 1944-1945*. College Station: Texas A&M University Press, 1995.

Moore, Christopher. *Fighting for America: Black Soldiers- The Unsung Heroes of World War II*. New York: One World Books, 2005.

Moulton, J.L. *Battle for Antwerp: The Liberation of the City and the Opening of the Scheldt 1944*. London: Ian Allen Ltd., 1978.

Neillands, Robin. *The Battle of the Rhine: The Battle of the Bulge and the Ardennes Campaign, 1944*. New York: The Overlook Press, 2005.

Ohl, John Kennedy. *Supplying the Troops: General Somervell and American Logistics in WWII*. DeKalb: Northern Illinois University Press, 1994.

Ruppenthal, Roland G. *Logistical Support of the Armies: In Two Volumes.* Washington, D.C.: Center of Military History, U.S. Army, 1995.

Ruppenthal, Roland G. *Command Decisions: Logistics and the Broad-Front Strategy.* Washington, D.C.: Center of Military History, U.S. Army, 1990.

Stanford, Alfred. *Force Mulberry: The Planning and Installation of the Artificial Harbor off U.S. Normandy Beaches in World War II.* New York: Morrow, 1951.

United States Army Service Forces: *Logistics in World War II: Final Report of the Army Service Forces*. Washington, D.C.: Center of Military History, United States Army, 1993.

Van Creveld, Martin. *Supplying War: Logistics from Wallenstein to Patton.* Cambridge: Cambridge University Press, 1977.

Waddell, Steve R. *United States Army Logistics: The Normandy Campaign, 1944.* Westport, CT.: Greenwood Press, 1994.

Ware, Pat. *Red Ball Express: Supply Line from the D-Day Beaches: US Army Transport*. Hersham, England: Ian Allen Ltd., 2007.

Williams, Rudi. "African Americans Gain Fame as World War II Red Ball Express Drivers." *U.S. Department of Defense*, February 15, 2002.

Zumbro, Derek. *Battle for the Ruhr: The German Army's Final Defeat in the West*. Lawrence: University of Kansas Press, 2006.

Websites

http://history.amedd.army.mil/booksdocs/wwii/orgadmin/map5.jpg

http://warfarehistorynetwork.com/daily/wwii/the-battle-of-the-bulge-an-allied-logistic-victory/

http://www.bbc.co.uk/history/worldwars/wwtwo/dday_berlin_gallery_08.shtml

http://www.dday.center/d-day-technology-mulberry-harbour.html

http://www.eucom.mil/media-library/blogpost/26819/difficult-choices-the-decision-to-execute-operation-market-garden

http://www.nww2m.com/2014/08/red-ball-express-created/

http://www.sharonherald.com/image_3b92bf13-328f-5f92-b4b9-cc89d5e7b377.html

https://universityofglasgowlibrary.wordpress.com/2013/06/06/69th-anniversary-of-d-day-landings/

https://warfarehistorynetwork.com/daily/wwii/the-trains-that-fueled-the-normandy-breakout/

https://ww2days.com/tag/british-army

https://www.iwm.org.uk/collections/item/object/205158183

https://www.iwm.org.uk/collections/item/object/205187369

https://www.iwm.org.uk/collections/item/object/205187440

https://www.loc.gov/item/2004629029

https://www.nationalww2museum.org/programs/battle-bulge

https://www.nationalww2museum.org/war/articles/pony-express-red-ball-express

https://www.upi.com/Archives/1985/03/06/World-War-II-Bridge-at-Remagen-was-worth-its-weight-in-gold/2575478933200/

https://www.usace.army.mil/About/History/Historical-Vignettes/Military-Construction-Combat/034-Pentagon/

https://www.usni.org/magazines/navalhistory/2015-04/landing-troops-across-rhine

https://www.westpoint.edu/history/SiteAssets/SitePages/World%20War%20II%20Europe/WWIIEurope68.gif