

On the Far Bank: The Effects of Gap Crossing on Operational Reach

A Monograph

by

MAJ Patrick D. Vogt

United States Army



School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

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Name of Candidate: MAJ Patrick D. Vogt

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Approved by:

_____, Monograph Director
Mark Calhoun, PhD

_____, Seminar Leader
James MacGregor, COL

_____, Director, School of Advanced Military Studies
Henry A. Arnold III, COL, IN

Accepted this 25th day of May 2015 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, Ph.D.

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Abstract

On the Far Bank: The Effects of Gap Crossing on Operational Reach, by MAJ Patrick Vogt, 56 pages.

Throughout history, opposed river crossing operations have proven to be some of the bloodiest and most complex endeavors for any military force. However, due to a sixty-year lull in having to cross a river in the face of the enemy, the United States Army has shown a trend of diminishing its resource capacity necessary to conduct these crossings, and is losing doctrinal focus for the task. Most significantly, doctrine does not provide an appreciation for the large impacts a river crossing has on the remainder of an operation. This analysis looks at three large-scale, opposed river crossing operations in the mechanized warfare era. All three cases involve a successful opposed river crossing, but vary in the level of operational reach or time before culmination. The variance in each case stems from the preparation for and execution of the river crossing. The analysis identifies three elements that had the greatest impact on the operational reach of units after the river crossing: the rapid employment of overwhelming strength, a deliberate plan to provide assault crossing resources regardless of existing bridges, and a detailed plan that included the transition from bridgehead to breakout operations.

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Introduction

Background

The recorded history of ground combat has shown that river crossing operations have always been a focal point for planners.¹ The great military thinker Carl von Clausewitz himself devoted a chapter of his masterpiece *On War* to this subject. In it, he referred to the “respect in which an attack on a defended river is held by most generals.”² While evidence in past military theory and history repeatedly demonstrated the importance of this tactical task, the recent history of the United States Army reveals a decrease in the frequency of attacks over well-defended rivers. The United States Army has not conducted an opposed, deliberate wet gap crossing since World War II.³

Future combat operations, however, could require gap crossings and the Army must remain proficient in planning for and conducting them. Rivers that would require non-hasty crossing methods exist in every geographic region, meaning that any future Army operation against a conventional force could require a deliberate gap crossing.⁴ History demonstrates the importance of the tactical task of gap crossing to overall mission accomplishment. Some of the most successful gap crossings in history involved entire armies of multiple corps focused on nothing but establishing a bridgehead, as with the spring 1945 Rhine crossing’s in World War II and Operation Badr in the Arab-Israeli War. History also demonstrates that operations can fail in

¹ Robert Toguchi, *The Evolution of US Army River Crossing Doctrine and Equipment, 1918-1945* (Durham, NC: Duke University, 1994), 1-22.

² Carl von Clausewitz, *On War*, trans. and ed. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1984), 532.

³ Army Tactics, Techniques, and Procedures (ATTP) 3-90.4, *Combined Arms Mobility Operations* (Washington, DC: Government Printing Office, 2011), 4-2. The deliberate wet gap crossing is the most difficult to plan and execute. This monograph will analyze wet gap crossings exclusively; for simplicity, the term “gap crossing” hereafter refers specifically to wet gap crossings.

⁴ *Ibid.*, 4-2.

spite of a successful gap crossing. The Allied failure in Operation Market-Garden during World War II showed that successfully crossing a river such as the Waal does not necessarily lead to operational success. If in planning and execution, commanders and their staffs do not integrate the gap crossing with other tactical actions effectively, the operation may culminate earlier than expected.

Despite historical evidence that demonstrates the challenges associated with gap crossings, after a seventy-year lull in US experience with opposed crossings the United States Army gradually diminished its efforts to prepare for gap crossing operations. Army leaders reduced the number of units and associated equipment that specialize in gap crossing. Most recently, they approved updated doctrine that relegates gap crossing—once the topic of a dedicated field manual—to a single chapter of the 2011 Combined Arms Mobility manual.⁵ Training centers have noted that current units struggle to plan and execute gap crossing operations.⁶

One significant implication of losing a doctrinal focus on gap crossing is a crossing's effect on the overall operation, even when the crossing itself is successful. Operational reach, or the “distance and duration across which a joint force can successfully employ military capabilities,” can be hindered by a gap crossing that succeeds in taking the far side but does not allow for the continued protection, endurance, or momentum of the force.⁷ Lieutenant General Fredrick Browning summed up gap crossing's intimate relationship to operational reach during the planning for Operation Market-Garden when he suggested that the Allies might find

⁵ ATTP 3-90.4, *Combined Arms Mobility*, 4-1.

⁶ Edward Bohnemann, *MCTP Trends in a Decisive Action Warfighter Exercise* (Mission Command Training Program, Fort Leavenworth, KS: 2014), 18.

⁷ Army Doctrine and Reference Publication (ADRP) 3-0, *Unified Land Operations* (Washington, DC: Government Printing Office, 2012), 4-5.

themselves stretched “a bridge too far.”⁸ Successful gap crossings in military history led to operational success when commanders and staffs considered three elements: the rapid employment of overwhelming strength, a deliberate intent to cross the river with organic capabilities regardless of existing bridges, and a deliberate plan and criteria to signal the transition from bridgehead to breakout operations.

Methodology

Analysis of historical case studies of successful river crossings in the mechanized era that led to various degrees of operational success or failure in the overall operation or campaign serve as sources of evidence to demonstrate the validity of the thesis. The case studies include the Waal River in Operation Market-Garden, the Rhine River crossing in the spring of 1945, and the Suez Canal in Operation Badr. In all cases, the research focuses on the details of the planning for each river crossing, the conduct of the river crossing, and the result of the rest of the operation.

A study of the planning for each operation enables assessment of the preparation of the units to conduct crossings in support of the operation. Extensive preparation and flexible plans are two of the fundamentals of gap crossing operations in modern doctrine.⁹ Operations orders, after action reports, and other primary sources show the level of forethought given to potential gap crossings in each operation, such as anticipated resource and combat power requirements. Though gap crossing simply provides assured mobility for the remainder of the operation, a failure to plan adequately can lead to culmination even if units successfully cross the river.

The execution of the crossing provides insight into the various units’ abilities not only to project combat power to the far side of a river, but also to ensure this has postured the unit for a

⁸ David Bennett, *A Magnificent Disaster* (Havertown, PA: Casemate, 2008), 22.

⁹ ATTP 3-90.4, *Combined Arms Mobility*, 4-5.

successful breakout from the bridgehead. Applicable gap crossing fundamentals during execution include the element of surprise, traffic management, speed, and the organization and assigned roles of the units involved.¹⁰ Units can successfully seize objectives on the far side of a river, but if they take significant casualties, do not organize forces properly on the far side, or do not manage the flow of follow on forces across the river, the remainder of the operation could be in jeopardy.

The actual outcome of the operation after units achieved a successful gap crossing demonstrates the degree of correlation between the planning and execution of the gap crossing and its effect on the intended operational end state. The analysis reveals the root causes for operational success or failure and traces these back to potential issues with the planning of the overall operation. Use of the components of operational reach—endurance, momentum, and protection of the forces involved—enables the holistic analysis of the gap crossing as an element of the operation.¹¹

Endurance describes a unit's ability to sustain itself for an unknown amount of time, in any environment, for the entirety of an operation.¹² When an operation requires a gap crossing, the commander and staff must anticipate the significant impact it will have on the endurance of the force both during and after the crossing itself. When executed properly, a gap crossing ensures that both combat and logistical forces can occupy the bridgehead to prepare for a breakout. The units responsible for the crossing ensure there are enough crossing points and the proper traffic management to continue operations. This requires projecting adequate combat power forward while ensuring enough sustainment accompanies the combat forces to enable them to employ all of their capabilities. However, the act of gap crossing itself provides endurance

¹⁰ ATTP 3-90.4, *Combined Arms Mobility*, 4-5 and 4-7.

¹¹ ADRP 3-0, *Unified Land Operations*, 4-5.

¹² *Ibid.*

challenges to the crossing force. Specialized bridging equipment requires specialized sustainment that planners must allocate and organize properly to ensure the maintenance of the crossing sites themselves during and after the actual crossing.¹³ Simply getting forces across a river does not guarantee that the operation will endure.

Momentum relates to maintaining the initiative while ensuring the tempo of operations does not outrun the capabilities of sustainment.¹⁴ However, speed remains a fundamental of gap crossing. Army Tactics, Techniques, and Procedures (ATTP) Manual 3-90.4 stipulates that, “speed is so important to crossing success that extraordinary measures may be justified to maintain it.”¹⁵ A river is a natural obstacle and choke point that allows an enemy to concentrate his fires on the crossing force, often times throughout the entire crossing. However, as with endurance, gap crossing’s relationship with momentum applies much more after completion of the actual crossing. Any operational plan with an expected river crossing should dictate the size of the breakout force, and the tempo it needs to continue its attack, to ensure the emplacement of the proper number of crossing sites.¹⁶ Too few crossing sites, due to either damage or poor planning, could cause the breakout force on the far side of the river to lack combat power at the decisive point. Poor traffic management or poor organization of forces on the near and far side of the river could cause the same issue. Clearly, the planning and execution of river crossings can have immediate and long-term impacts on the momentum of an operation.

Protection, or the preservation of the assigned forces and capabilities, completes the metrics for analyzing operational reach.¹⁷ Unlike the previous two metrics, protection applies far

¹³ ATTP 3-90.4, *Combined Arms Mobility*, 4-15 and 4-20.

¹⁴ ADRP 3-0, *Unified Land Operations*, 4-5.

¹⁵ ATTP 3-90.4, *Combined Arms Mobility*, 4-7.

¹⁶ *Ibid.*, 4-15.

¹⁷ Army Doctrine and Reference Publication (ADRP) 1-02, *Terms and Military Symbols*

more during the crossing operation itself than with the follow on operation. A gap crossing puts the entire crossing force at risk due to canalization, splitting forces on both sides of the river, and exposure while crossing the gap.¹⁸ A lack of protection at the crossing site could result in a force that successfully crosses the gap but no longer possesses the capabilities needed for the later decisive operation. Long-term implications apply to protection as well. As with endurance and momentum, failure to plan, manage, and organize force flow over an established crossing could result in combat forces moving forward while necessary protection assets are still at the river waiting to cross. Various methods of gap crossing operations include using airborne and air assault operations to insert a far side security team, presenting the challenge of protecting these far side forces. While the protection challenges with gap crossings are obvious at the river itself, failure to plan for the crossing's long-term effects on the operations' overall protection could prove disastrous.

The synthesis section exposes the commonalities and differences between the three cases to determine the most impactful elements of a gap crossing operation. It identifies those concepts that permeate all three cases and that had the most effect on operational reach. The conclusion addresses current US Army doctrine and its appreciation for the challenge of gap crossing. It also provides recommendations for how to prepare future leaders and planners for this daunting task.

Case Study: Operation Market Garden

Context

On September 17, 1944, the Allies embarked on a risky vertical envelopment to secure a bridgehead over the Rhine River. Codenamed Operation Market-Garden, it was really a

(Washington, DC: Government Printing Office, 2013), 1-30.

¹⁸ ATTP 3-90.4, *Combined Arms Mobility*, 4-5.

combination of an airborne vertical envelopment and a ground movement to rapidly secure over ninety kilometers of roads and bridges leading up to the Lower Rhine River.¹⁹ The airborne forces attempted to secure all bridges over large waterways along the route simultaneously, and the ground forces intended to relieve the airborne units in sequence from the towns of Eindhoven to Arnhem. The operation, if successful, would capitalize on German forces' deteriorating situation and help to alleviate what had become an overstrained Allied supply chain.

In August of 1944, after the Allied invasion of Normandy, the German Army was withdrawing into the German mainland. In early September, Allied intelligence showed that German forces remained disorganized, desperately conducting a delaying action to cover their retreat.²⁰ However true this analysis was, the German situation began to change around this same time. In early September, Field Marshall Gerd von Rundstedt became the commander of the German western forces. He immediately recognized a lull in Allied progress and began to reorganize his disarrayed units into a defensive wall across Holland to exploit the Allied pause.²¹ On top of this move, in the weeks preceding Operation Market-Garden, Rundstedt expected a combined ground and airborne Allied operation of the same scale and in the same location as

¹⁹ Bennett, *A Magnificent Disaster*, xi and 3.

²⁰ Bennett, *A Magnificent Disaster*, 4-5; *21st Army Group After Action Report* (Unpublished Document, Combined Arms Research Library, 1949), 5; Dwight D. Eisenhower, "Eisenhower to George Catlett Marshall," *The Papers of Dwight David Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust versus Broad Front" (Johns Hopkins University Press Online, 2008), 2108 and 2115-16, accessed February 15, 2014, <http://eisenhower.press.jhu.edu>.

²¹ Bennett, *A Magnificent Disaster*, 44; Frank Steer, *Arnhem: The Fight to Sustain* (South Yorkshire: Pen and Sword Books, 2000), 47-48; Eisenhower, "Eisenhower to George Catlett Marshall," *The Papers of Dwight D. Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust versus Broad Front" (Johns Hopkins University Press Online, 2008), 2119, accessed February 15, 2014, <http://eisenhower.press.jhu.edu>. On September 4, 1944, Eisenhower wrote in a letter to General Marshall that he feared his supply situation had caused an operational pause that the Germans would probably exploit by reorganizing from a retreat into a deliberate defense. As it turned out, he predicted exactly what Rundstedt did.

Operation Market-Garden.²² The Allies not only failed to recognize the changing German situation, they also faced Rundstedt, a master of the defense, and their predictability enhanced the effectiveness of German operations.²³

The overwhelming success of the Normandy invasion gave the Allies a false sense of complete dominance over the German forces. The Allied headquarters had come to believe that the war would likely be over by the end of the year.²⁴ The Allies desired to capitalize on their momentum and initiative, but did not have the endurance to support it. After the success of Normandy, the Allied headquarters' focus in August was securing the port at Antwerp to facilitate logistical operations.²⁵ The British 11th Armored Division had secured the port itself, but failed to secure the inland waterways, preventing the flow of supplies into mainland Europe from the port. Supplies still had to move on ground lines from France and resupply failed to keep pace with the forward Allied units.²⁶

General Dwight D. Eisenhower, commander of Allied Forces, was intimately familiar with this supply situation. At the beginning of September, he considered Allied logistics shortfalls to be a more significant enemy than the German forces.²⁷ As British Field Marshall Bernard

²² Bennet, *A Magnificent Disaster*, 50.

²³ Cornelius Ryan, *A Bridge Too Far* (New York: Simon and Schuster, 1974), 32.

²⁴ Bennett, *A Magnificent Disaster*, 6; Carlo D'Este, *Decision in Normandy*, 50th Anniversary Edition (New York: Harper-Perennial, 1983), 434; Eisenhower, "Eisenhower to George Catlett Marshall," *The Papers of Dwight D. Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust versus Broad Front" (Johns Hopkins University Press Online, 2008), 2108, accessed February 15, 2014, <http://eisenhower.press.jhu.edu>. In late August, an Allied headquarters intelligence report asserted that German forces were effectively defeated.

²⁵ Eisenhower, "Eisenhower to the Combined Chiefs of Staff and Combined Civil Affairs Committee," *The Papers of Dwight D. Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust versus Broad Front" (Johns Hopkins University Press Online, 2008), 2087, accessed February 15, 2014, <http://eisenhower.press.jhu.edu>.

²⁶ *21st Army Group After Action Report*, 5; Steer, 47.

²⁷ Eisenhower, "Eisenhower to George Catlett Marshall," *The Papers of Dwight D. Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust versus Broad Front" (Johns

Montgomery, commander of the Allied 21st Army Group, formulated plans for operations in the Allied northern sector, Eisenhower ensured his plans were not only feasible within the current limit of logistics, but that they would in fact strengthen the Allied resupply capabilities.²⁸

The overall strategy of the Allies at the time focused on the Ruhr region, Germany's economic hub. Montgomery, poised to attack the Ruhr directly, had a narrow focus on his sector of the battlefield.²⁹ At this point, with Eisenhower in direct command of all Allied ground forces, America was effectively in charge of the war. Despite his varying fortunes in the war's earlier campaigns, General George Patton retained popular support because of the tenacity and boldness generally associated with his command style. No British generals at the time seemed to possess such qualities.³⁰ Montgomery wanted to change this perception with a singular thrust to the north, with all forces involved under his command and full priority for the dwindling Allied resources and supplies.³¹ This thrust would secure a bridgehead over the Rhine River and could continue straight into the heart of Germany. Eisenhower, however, remained strategic in his thinking. His broader view included opening a line of communication into Holland to support the forces attempting to secure the waterways from Antwerp. Once Allies secured these ground and water

Hopkins University Press Online, 2008), 2118, accessed February 15, 2014, <http://eisenhower.press.jhu.edu>.

²⁸ Dwight D. Eisenhower, *Crusade in Europe* (New York: Doubleday and Company, 1948), 306; Bennett, *A Magnificent Disaster*, 11. Bennett implied that Montgomery made Eisenhower aware of the supply issues, while Eisenhower's memoir indicates that Montgomery's plans demonstrate a lack of appreciation for the supply constraints across the entire European theater.

²⁹ Bennett, *A Magnificent Disaster*, 67; Eisenhower, 306.

³⁰ Peter Allen, *One More River: The Rhine Crossings of 1945* (New York: Charles Scribner's Sons, 1980), 8.

³¹ Ryan, 282; Steer, 48; Eisenhower, "To Bernard Law Montgomery," *The Papers of Dwight D. Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust versus Broad Front" (Johns Hopkins University Press Online, 2008), 2120-21, accessed February 15, 2014, <http://eisenhower.press.jhu.edu>. Ryan claimed that Von Rundstedt himself was surprised that such a bold attack came from Montgomery, of all the Generals on the Allied front.

supply lines, the Allies could take an operational pause to replenish Allied supplies and receive replacement troops.³² While he liked the idea of Montgomery's rapid seizure of a Rhine bridgehead, Eisenhower recognized that an immediate push deep into Germany would outrun the endurance ability of the Allied forces.³³ After a heated discussion on September 10, Eisenhower approved Montgomery's concept while limiting him to the bridgehead over the Rhine. Montgomery would receive the entire 1st Allied Airborne Army and would temporarily receive priority of resources.³⁴ Montgomery's concept, though limited by Eisenhower, was now a reality.

Generally, Montgomery's idea consisted of the British 2nd Army leading a ground movement up a narrow corridor from the Meuse-Escuat Canal, ninety-five kilometers to the Lower Rhine at Arnhem. The 1st Airborne Army would conduct a vertical envelopment of key bridges along the entire stretch to prevent the ground forces from getting bogged down in battle after battle.³⁵ Planners would have to account for eight significant water obstacles between the starting point for the ground forces and the finish line, the Lower Rhine itself.³⁶ Among these obstacles was the Waal canal, a significant water obstacle in the city of Nijmegen, halfway to the end. The ground forces faced this and many other crossings, as well as enemy resistance, in its attempt to relieve the airborne troops dropped simultaneously at the start of the operation. This meant the paratroopers at the end of the line in Arnhem would wait the longest and three days

³² Eisenhower, *Crusade*, 307.

³³ Bennett, *A Magnificent Disaster*, 8-9; Steer, 48.

³⁴ Russell F. Weigley, *Eisenhower's Lieutenants: The Campaign of France and Germany 1944-1945* (Bloomington IN: Indiana University Press, 1981), 279; Eisenhower, "To Bernard Law Montgomery," *The Papers of Dwight D. Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust versus Broad Front" (Johns Hopkins University Press Online, 2008), 2120-21, accessed February 15, 2014, <http://eisenhower.press.jhu.edu>.

³⁵ Bennett, *A Magnificent Disaster*, 4; Weigley, 288-89.

³⁶ Weigley, 291.

was the most an airborne unit could hold out against the expected enemy resistance.³⁷ Momentum was the key to this operation. It required careful planning and rapid execution to have any chance of protecting and sustaining the units soon to be spread across Holland.

This analysis focuses on the Waal River crossing as being critical to the operation. It was the largest water obstacle that the Allies encountered and stood to cause the most complications to Allied plans. Most literature and history focuses on the ill-fated Arnhem mission, farthest to the north, as it was the most tragic with respect to Allied losses. However, as German Major General Heinz Harmel stated years after the war, “the biggest mistake historians make is to glorify and narrow-mindedly concern themselves with Arnhem and Oosterbeek. The Allies were stopped in the south just north of Nijmegen—that is why Arnhem turned out as it did.”³⁸

Narrative

Planning for Operation Market-Garden began immediately following the meeting between Eisenhower and Montgomery on September 10. The date for execution was September 17, making this an incredibly hasty plan for such a complex operation, especially for someone with Montgomery’s deliberate approach to military operations.³⁹ The problem boiled down, very simply, to bridges. Forces needed to seize the multitude of rivers and canals along the route immediately, and if the Germans destroyed any bridges, it would require Royal Engineers to raft units across the gaps at best or to construct bridges at worst.⁴⁰ The planning began with the assumption that allies would face a poorly organized and weak enemy. Although intelligence

³⁷ Donald R. Burgett, *The Road to Arnhem: A Screaming Eagle in Holland* (Novato, CA: Presidio Press, 1999), 17.

³⁸ Bennett, *A Magnificent Disaster*, vii.

³⁹ Ryan, 121; Bennett, *A Magnificent Disaster*, 11.

⁴⁰ *21st Army Group After Action Report*, 28. The Royal Engineer Appendix to the 21st Army Group’s Field Order is the first mention of the possibility for bridging operations.

reports during the planning found evidence of German armor throughout the area of operations, they largely disregarded it.⁴¹ This hasty plan wished away the reality of the enemy strength and focused instead on the issues of a constrained route, and widely dispersed force.

In general, the ground and airborne plans seemed simple. Market, the airborne vertical envelopment, placed the 101st Division at the beginning of the route near Eindhoven, the 82nd Division in the middle at Nijmegen, and the 1st Airborne Division at the end in Arnhem. The ground operation, Garden, had the XXX Corps moving along a constrained central route to relieve these airborne units in succession. The 21st Army Group, the organization in overall command, considered Arnhem to be the bridgehead objective.⁴² Eisenhower's view of the end state was simply to have a solid foothold over the lower Rhine at Arnhem to facilitate an operational pause. Montgomery specified this end state with a final objective of using XXX Corps as a break out force to push through Arnhem and secure a front line at IJsselmeer.⁴³ However, all depended on the ground forces ability to relieve the airborne forces before these forces' ability to protect and sustain themselves depleted.

Possibly a greater obstacle than the rivers and canals in front of the XXX Corps was the single, two-lane highway that led from the current Allied front line to the bridgehead at Arnhem. The plan called for the Guards Armoured Division to lead the charge only two tanks abreast.⁴⁴

⁴¹ Ryan, 130 and 157; *Field Order 11*, 82nd Airborne Division, Combined Arms Research Library, 17. For example, the 82nd Division's field order stated in its enemy estimate around Nijmegen that allies would face up to four German Battalions with bicycles, but few heavy weapons. This estimate, like the overall estimate, proved vastly underwhelming.

⁴² Bennett, *A Magnificent Disaster*, 4, 35-37, and 42; *Field Order 11*, 1.

⁴³ Bennett, *A Magnificent Disaster*, 4 and 29; Weigley, 293; Eisenhower, "Eisenhower to Bernard Law Montgomery," "To Bernard Law Montgomery," *The Papers of Dwight D. Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust versus Broad Front" (Johns Hopkins University Press Online, 2008), 2134-37, accessed February 15, 2014, <http://eisenhower.press.jhu.edu>.

⁴⁴ Weigley, 295; *21st Army Group After Action Report*, 8.

Speed became the prominent issue, as an airborne unit could endure on its own for only two or three days, perhaps four in optimistic circumstances. The plan, therefore, called for ground units to reach Arnhem in just two days.⁴⁵ Montgomery and his subordinate commanders recognized in planning that the ground advance must be aggressive, as the airborne forces could not hold their ground with their limited men and firepower without aid from the ground forces. The operation depended on traffic control and timelines, and ultimately the momentum of the ground assault.⁴⁶ The plan was potentially paradoxical, requiring airborne forces to hold terrain so the ground forces could advance, while the ground forces had to advance to relieve the airborne forces and prevent their isolation.⁴⁷ Momentum was the key, but it required prioritizing resources to seizing a multitude of key terrain simultaneously.

The plan prioritized the route in a chronological fashion, giving the initial objective of Eindhoven top priority, then the Maas and Waal Rivers, and finally Arnhem. Montgomery saw that in dropping troops across the entire area, if the initial objectives failed, all forces would be lost. However, if only latter objectives failed, only those units would be lost. Therefore, each subsequent objective received less support in troop and supply priority.⁴⁸ This should have raised questions with the feasibility of protecting and ensuring the endurance of a unit as deep as Arnhem, but Montgomery was intent to conduct a deep vertical envelopment.

Furthermore, planners considered the Waal River bridge in Nijmegen, part of 82nd Division's operation, as the most impactful obstacle of the entire operation. The 82nd had to take

⁴⁵ Ryan, 166; Bennett, *A Magnificent Disaster*, 22; Steer, 52; Weigley, 293. Weigley and Ryan note that Lieutenant General Brian Horrocks, the commander of XXX Corps, always estimated it would take four days to accomplish the push to Arnhem.

⁴⁶ Weigley, 292-93; *21st Army Group After Action Report*, 9.

⁴⁷ Ryan, 130.

⁴⁸ Ryan, 139; Burgett, 19.

the surrounding high ground and the Maas Bridge in order to secure the Waal Bridge. The result was a plan to take Waal Bridge only after all other objectives were secure in the 82nd's area. The 82nd arguably did not have the combat power to achieve all of these objectives, with the most important left to chance.⁴⁹ Risk mitigation would have to come from the Royal Engineers' plan for river crossings.

The 21st Army Group's intent for airborne units was to capture the bridges from Eindhoven to Arnhem and to dominate the surrounding roads and crossing areas.⁵⁰ Recognizing that the Germans might destroy some bridges, the Allies created a bridging force of some 2,300 vehicles and 9,000 engineer soldiers. A small amount of assault bridging capability resided in the 43rd Division, second in order of march to the Guards Armoured Division. Most of this capability, however, remained at the starting point of the operation at an equipment dump.⁵¹ Simply put, the plan stated that the 43rd Division would attempt to fix any destroyed bridge and if it required more equipment, the ground forces would vacate the road and pre-organized packages from the equipment dump would move forward. In front of the first bridging unit in the 43rd Division were 2400 vehicles, and the supporting equipment pool rested fifteen miles behind the line of departure.⁵² The math, combined with the difficulty of off-road movement, seemed to imply that the plan truly hoped that ground units would not have to emplace any bridges.

The operation began on September 17 and the airborne landings achieved surprise despite German predictions. The 101st, 82nd, and 1st Airborne Divisions all landed in their respective

⁴⁹ Ryan, 135-36; Bennett, *A Magnificent Disaster*, 26 and 37; *Field Order 11*, 2. The 82nd's Field Order 11 stipulates that the 508th Parachute Infantry Regiment would take the Waal Bridge on order of the Division Commander, only after all other objectives are secure.

⁵⁰ *21st Army Group After Action Report*, 6; *Field Order 11*, 1.

⁵¹ Bennett, *A Magnificent Disaster*, 30; *21st Army Group After Action Report*, 13 and 29.

⁵² Ryan, 166; *21st Army Group After Action Report*, 11, 13, and 82; Bennett, *A Magnificent Disaster*, 31; *Field Order 11*, 27.

areas from south to north, and the German command initially believed the heavy presence of Allied aircraft was simply another bombing raid. The drop zones saw less resistance than expected in the air and less still once the paratroopers had landed.⁵³ The first lift prioritized momentum over protection for the 101st, as they expected ground reinforcement at the end of the first day. The 82nd and 1st Division front-loaded artillery in lieu of more troops or vehicles to ensure protection in their sectors as they awaited ground reinforcement.⁵⁴ On the first day, the 101st secured all their objectives except the bridge at Son, which the German's blew as the first troops neared it. The 82nd took all their objectives except the colossal bridge over the Waal. The 1st Division with its limited resource and manpower priority failed to secure any of its assigned objectives on the first day.⁵⁵ The surprise achieved on September 17 only mattered if XXX Corps could exploit it and this hinged on the movement of the ground forces and the success of subsequent day's resupply drops.

The ground advance fared far more poorly than the airborne drop. Unexpectedly heavy enemy resistance immediately stalled XXX Corps at its line of departure. They ended their first day only half way to their planned objective of Eindhoven, leaving the 101st to continue fighting on their own, unprotected by their expected XXX Corps armor and artillery.⁵⁶ The blown bridge at Son required traffic to halt to bring bridging equipment forward, which when added to the repair time put the lead ground elements over thirty hours behind schedule. By the end of September 18, as XXX Corps was pausing again before their push towards the Waal crossing at Nijmegen, the two corps providing flank protection for the entire operation had failed to cross the

⁵³ Ryan, 210, 225-28, 239; *21st Army Group After Action Report*, 38; Burgett, 21-43. Burgett's firsthand account of the landing does not reflect "little resistance," giving appreciation for what the individual Soldier experienced even in the face of light enemy resistance.

⁵⁴ Ryan, 189; Bennett, *A Magnificent Disaster*, 72.

⁵⁵ Bennett, *A Magnificent Disaster*, 64 and 85; Weigley, 309.

⁵⁶ Bennett, *A Magnificent Disaster*, 64-67; Steer, 73; Weigley, 309.

line of departure in the face of harsh terrain and enemy resistance. They barely played a role in the entire operation from this point forward.⁵⁷ While this delay immediately put pressure on the endurance and protection of the airborne forces stranded to the north, it also gave the Germans time to develop the situation and begin pushing reinforcements into the area.

The German response was both rapid and creative. Once they determined the general scheme of the Allied operation, they began organizing makeshift units from all equipment and soldiers in the area, from combat troops to administrative troops and even military students.⁵⁸ Recognizing the significant obstacle provided in Nijmegen, and perhaps due to the apparent lack of Allied forces in strength at Arnhem, the German response focused on defending at the Waal River while conducting spoiling attacks on Allied units from Nijmegen to the south. The overall goal was to stop Allied ground forces south of Nijmegen and cut their single line of communication near Eindhoven.⁵⁹ This focus put the 82nd Division, already overstretched between resources and priorities, in a much larger fight than expected. Their only stroke of luck for the time was the German area command's reluctance to blow up the Waal Bridge as nothing but a last resort.⁶⁰

As planned, the 82nd made the Waal Bridge its last priority, preparing to seize it only on order from the division commander. On September 17, the division could have taken the bridge while holding its remaining objectives, but communications issues and confusion from the plan caused them to defeat their own momentum and allow the bridge to fall firmly into German

⁵⁷ Weigley, 309; *21st Army Group After Action Report*, 38-69.

⁵⁸ Bennett, *A Magnificent Disaster*, 66; *21st Army Group After Action Report*, 37-38.

⁵⁹ Ryan, 218, 230, and 424; Steer, 67 and 103; Burgett, 85; *21st Army Group After Action Report*, 45-65.

⁶⁰ Ryan, 379 and 456.

hands.⁶¹ By the end of September 19, the Germans had massed 500 troops with artillery at the bridge. Other German forces attacked the high ground surrounding the road into Nijmegen and the 82nd shifted priorities to the heights and to securing drop zones for an aerial resupply that failed to arrive due to weather.⁶² XXX Corps' advance did not reach the rear lines of 82nd until the end of September 19, unable to assist the paratroopers in massing on the Waal Bridge or providing much needed protection and logistical support to their outer objectives.⁶³ For any hope of operational success, the 82nd and XXX Corps needed to increase the tempo and seize the initiative in Nijmegen.

Due to the strong German defenses on the Waal Bridge, the 82nd and XXX Corps commanders decided the only option was an assault across the Waal River to take both the north and south ends of the bridge simultaneously. This risky plan to regain operational momentum immediately stalled due to traffic control issues preventing the assault boats from arriving on time.⁶⁴ The operation finally began with paratroopers, untrained in amphibious assaults, paddling across the swift river in light-skinned boats and in full view of the enemy on the far side. For the sake of tempo, the assault force sacrificed both the enemy and environmental considerations of the protection function and the assault was chaotic and bloody.⁶⁵ The paratroopers, however, managed to secure the far bank while tanks from XXX Corps pushed across. The losses were high, but they secured the bridge intact, marking a successful but costly crossing.⁶⁶ It was the

⁶¹ Bennett, *A Magnificent Disaster*, 70-72; Weigley, 310-11; *21st Army Group After Action Report*, 41-42.

⁶² Bennett, *A Magnificent Disaster*, 92, 106-7; Ryan, 287-89, 361-68, and 418-28.

⁶³ Weigley, 312; *21st Army Group After Action Report*, 44.

⁶⁴ Bennett, *A Magnificent Disaster*, 115-18, Ryan, 457, *21st Army Group After Action Report*, 48.

⁶⁵ ADRP 3-0, 4-5; Ryan, 431-58; Weigley, 314; *21st Army Group After Action Report*, 49.

⁶⁶ Ryan, 469-73; *21st Army Group After Action Report*, 44-50. The 21st Army Group

evening of September 20 and XXX Corps required a pause on the north side of the river to refit and reorganize. Arnhem was eleven miles away and the forces there had completed their fourth day of combat, the longest that Allied predictions expected them to hold out.

Ultimately, the gallant actions at the Waal River proved to be far too late. The 1st Division spent the first four days woefully under-supported. They never had the combat power to protect themselves against the unexpected onslaught of enemy reinforcements, and bad weather and unsecured drop zones withheld the majority of their resupply drops. By the time XXX Corps had crossed the Waal River, 1st Division was simply fighting to stay alive.⁶⁷ The ground advance from Nijmegen was immediately halted by the German's initial concept of massing around Nijmegen, facilitated by 1st Division's lack of an effective defense in Arnhem. XXX Corps could not reach Arnhem directly and enemy disruption far to the south in 101st's area slowed them further. Though not as dire as 1st Division's situation, the 101st and 82nd had been fighting for days without sustainment and protection support as well.⁶⁸ On September 25, the Allies determined that taking Arnhem was a futile effort and focused on rescuing as much of 1st Division as possible. Only one-fifth of that division would survive, effectively destroying it as an operational unit for the rest of the war.⁶⁹ The plan tasked 1st Division with holding a single bridge at Arnhem, ultimately serving as the operation's bridgehead force, for two days. After eight days of continuous fighting, the division was withdrawn and Market-Garden terminated.

after action report states the Germans tried to blow the bridge once British tanks were on it, but Dutch resistance forces had apparently cut the wires at some point during the operation.

⁶⁷ Ryan, 542; Weigley, 307; *21st Army Group After Action Report*, 45.

⁶⁸ Weigley, 315-16; Burgett, 85; *21st Army Group After Action Report*, 65.

⁶⁹ Ryan, 567-91; Burgett, 181; *21st Army Group After Action Report*, 69.

Analysis

At the culmination of Market-Garden, Allied forces had encountered twenty-one bridges in total and airborne forces handled all but three with little difficulty. Engineers repaired the blown bridge at Son and paratroopers conducted a daring assault crossing of the Waal to take the Nijmegen Bridge, but Allied forces never effectively controlled the Arnhem Bridge. The operational objective of Market-Garden, a bridgehead over the Lower Rhine, remained unattained. However, the operation did provide enough of an Allied footprint to protect the future opening of the Antwerp port and gave Allied leaders a new respect for the resolve still present in the German Army to defend its homeland.⁷⁰ From the beginning, the planners of the operation questioned the endurance and protection of the airborne forces involved in the vertical envelopment, but hoped that a high-tempo timetable would negate their fears.

To achieve this momentum, XXX Corps was supposed to reach Arnhem in two days, relieving the supply and firepower issues of the airborne units along the way. After eight days of arduous movement, they instead pushed the endurance and protection of airborne units to their max, forcing the culmination of 1st Division and the entire operation. The single, confined route made traffic control almost impossible in the face of any delays, of which there were multitudes. Even in a highly optimistic setting, the timetable was unreasonable.⁷¹ The plan treated the Waal River, the most significant crossing in the area of operations, as a secondary objective. This obstacle proved to be turning point in the operation's momentum. While crossed successfully, it became a corps level crossing, complete with its own bridgehead and breakout by XXX Corps.⁷² Dropping troops as far as Arnhem on the first day proved to be a deeper objective than any

⁷⁰ Eisenhower, *Crusade*, 310; Burgett, 68.

⁷¹ Weigley, 317.

⁷² *21st Army Group After Action Report*, 53.

amount of momentum could achieve. The protection and endurance of the airborne troops involved suffered as a result.

Had the ground units maintained their planned high-tempo movement, airborne forces would have received the firepower and mass they required to hold their objectives. The reality of the ground movement left the resupply drop zones of 82nd and 1st Divisions unsecured. Failure to mass ground troops into any of the airborne areas left their flanks and the line of communication under-secured and vulnerable to enemy harassment and penetration. The complete lack of support from the two corps on XXX Corps' flank created a thin finger of Allied territory that they could not secure. Without protection from the ground forces, the severely limited airborne forces relied on what little they had to continue their fight.

The plan forewarned that an airborne unit could not sustain protracted combat for more than four days. Weather played a large role in their endurance misfortunes, cancelling many of the resupply drops. By the third day of the operation, the 82nd received less than one-sixth of its resupplies and troops due to weather and the enemy's disruption.⁷³ Because most of the ground movement was still at the line of departure up to the point of culmination, even the southernmost 101st could not sustain its combat operations, drawing ground elements back to its area and decreasing the momentum much needed towards Arnhem. The airborne resupply model was not at fault. It was a sound plan for an operation lasting a maximum of four days, bad weather included.⁷⁴ The plan simply spread units too far out and the operation could not keep up with itself.

Overall, the operational reach of Market-Garden failed due to its spatial and temporal depth. One can blame weather, unexpected enemy resistance, ground delays, and contested

⁷³ Ryan, 418-19.

⁷⁴ Steer, 153.

bridges, but these are all aspects that planners must expect in their worst forms.⁷⁵ The bridgehead was far too deep to seize on the first day of the operation. The Arnhem paratroopers essentially became a frontal guard for the crossing and bridgehead that actually emerged at Nijmegen. An operation involving a significant crossing must focus on a single major obstacle and plan a linear expansion of the bridgehead, not a deep vertical hold. Further, this operation proved that a bridge does not have to be blown, but simply strongly defended, to require a crossing operation. Plans must assume that any bridge across a large obstacle is either heavily defended or destroyed and plan assault and bridging forces accordingly. The ultimate bridgehead objective must be within reasonable distance of supporting forces to allow operational momentum to support endurance and protection, giving the commander the option to take an operational pause within the bridgehead if culmination is looming.

Case Study: Operation Plunder

Context

After the failure of Market-Garden, the Allies continued their focus on gaining a crossing of the Rhine, the gateway to Germany. As the Allies slowly crept east to the river into December 1944, German forces launched a final, desperate offensive in the Ardennes that, while leading to some of the bloodiest fighting of the war, failed to decisively stop the Allied advance. The costly move largely depleted Germany's reserves and the Russian front in the east brought further German defeat. Eisenhower recognized the German's fragile situation and opted for an Allied offensive to the Rhine across his entire front, with the decisive operation resting in Montgomery's hands in the north.⁷⁶

⁷⁵ Weigley, 318.

⁷⁶ Eisenhower, *Crusade*, 346, 365, and 370-71; Allen, 21; William B. Breuer, *Storming Hitler's Rhine: The Allied Assault: February-March 1945* (New York: St. Martin's Press, 1985), 7.

Eisenhower's overall concept consisted of three phases: destroying German forces west of the Rhine, crossing the Rhine itself, and then attacking into the heartland of Germany. To support this, the 21st Army Group had to clear up to the Roer River, then cross and clear up to the Rhine itself. By late February of 1945, the 9th US Army under 21st Army Group's control had reached the Roer.⁷⁷ Now, over eighty German divisions, severely understrength but in well-constructed defensive strongpoints and with control of the dams upstream from 9th Army, stood between Montgomery and the Rhine.⁷⁸ Eventual destruction of one dam flooded the Roer valley and significantly slowed 9th Army's progress. By early March, 12th Army Group to the south had reached the Rhine and even begun getting units across at Remagen and Coblenz.⁷⁹ In Montgomery's sector, 9th Army was also poised on the Rhine and possibly able to cross. Montgomery, however, held them back as he wanted to ensure 21st Army Group conducted a deliberate crossing with their full mass. By March 10, all German forces west of the Rhine were clear, though many had retreated to fight another day. On their way, they destroyed the nine bridges across the Rhine in 21st Army Group's sector.⁸⁰

Montgomery's preparation for the Rhine crossing was certainly not a reflection of his hasty plan for Market-Garden. 21st Army Group engineers studied the Rhine for five months in

⁷⁷ Eisenhower, *Crusade*, 366; Weigley, 609-10; 21st Army Group Records, *Notes on the Operations of 21st Army Group: 6 June 1944 – 5 May 1945*, Unpublished Document, Combined Arms Research Library, 1945, 41-42.

⁷⁸ Allen, 21-24; Eisenhower, *Crusade*, 366; Breuer, xv.

⁷⁹ Weigley, 610 and 626; James G. Bennett, *The Crossing of the Rhine North of the Ruhr (Operation Plunder), 23-28 March 1945 Central Europe Campaign* (monograph, Advanced Infantry Officer's Course, Fort Benning, Georgia, 1949), 4.

⁸⁰ Eisenhower, *Crusade*, 364-377; Weigley, 615-17; W. Denis Whitaker and Shelagh Whitaker, *Rhineland: The Battle to End the War* (New York: St. Martin's Press, 1989), 279; Breuer, 83-90. While these authors mostly agreed that Montgomery held the 9th Army back to avoid piecemeal crossings that would create easy targets for the Germans, Weigley claimed that in reality Montgomery simply did not want an American unit to earn the glory of entering Germany first.

anticipation of this crossing, determining equipment requirements, stockpiling equipment, moving it east in conjunction with the assault from the Roer, and even running training programs for units expected to be involved in the crossing. Even with this extensive preparation, Montgomery chose to pause at the Rhine on March 10, setting the date for his crossing as March 24.⁸¹ His forces were widely spread, but his focus was near Wesel, where the Rhine River varied greatly in width and depth. On the far side, Montgomery faced trenches, mines, wire, and the full breadth of German weaponry. Purely by unit numbers, Montgomery had the advantage over the German defense force. By overall unit strength, he dominated, but the Allies had learned at this point to appreciate the strength of the German willpower and their ability to counter-attack in the most dire of circumstances.⁸² Eisenhower held his entire force at bay to await the massive crossing planned by Montgomery, deemed Operation Plunder.⁸³ If successful, it would thrust the 21st Army Group into the heart of Germany, with a direct route to the Ruhr.

Narrative

Although preparations for what became Operation Plunder had been ongoing for months, the few weeks between securing the western bank and launching the assault were critical to the planning and preparation effort. Montgomery's primary focus in these last few weeks was on the endurance of the mission, and he used this time to resupply his units to incredible levels of readiness using a vast array of existing and recently constructed roads and bridges in his rear area. Eisenhower was hurrying shipments of all available materiel to Montgomery's positions, using a

⁸¹ Eisenhower, *Crusade*, 372; Weigley, *Eisenhower's Lieutenants*, 625; Glenn D. Barquest, *The 172nd Combat Engineer Battalion: Bridging the Rhine River March 1945* (presented to the 172d Engineer Combat Battalion Reunion, Asheville, NC, May 19, 1990), accessed February 15, 2015 at the Combined Arms Research Library, 6-7; Bennett, *The Crossing of the Rhine*, 4.

⁸² 21st Army Group Records, 49-50; Allen, 208-9; Breuer, 97.

⁸³ Breuer, 179; Bennett, *The Crossing*, 4.

staff of river crossing experts to help predict and identify what items would be necessary.⁸⁴ The units to be involved in the crossing itself conducted rehearsals along the Maas River up until the last possible minute. These rehearsals not only provided training for the troops, but also helped to identify flaws in the equipment and materiel for the crossing to develop fixes and ensure momentum through the assault.⁸⁵ The deliberate nature of Montgomery's planning allowed a massive reconnaissance effort that pinpointed specific crossing locations that would allow a concentration of forces at the decisive point. Ten days of constant smoke screen along the river allowed units to move equipment into final assault positions and camouflage it without the Germans ever seeing.⁸⁶ Montgomery considered no detail too small in preparation for this massive assault plan.

The ground plan generally consisted of four divisions from the 9th US Army and 2nd British Army conducting crossings on a wide front, with the town of Wesel as the primary far side objective. Montgomery had a quarter of a million men poised on the river, ready to flood across the Rhine after the initial four divisions established their bridges.⁸⁷ Second Army would bridge first and move towards Wesel, allowing 9th Army to bridge on their right to protect their flank and ultimately allow follow on 2nd Army forces to cross and break out towards the Ruhr.⁸⁸ To support the protection of the crossing units, 21st Army Group executed a massive deception operation. Units put together full scale river crossing packages at false crossing points, including

⁸⁴ Weigley, 639-40; Breuer, 198-99; Charles B. MacDonald, *The Last Offensive* (Washington, DC: Government Printing Office, 1993), 295.

⁸⁵ Allen, 217; Bennett, *The Crossing*, 9.

⁸⁶ Weigley, 639-40; Allen, 208-21; Barquest, 14-16. Allen contends that, while the smoke screen covered equipment positioning, it also negatively affected the Allied ability to conduct an effective reconnaissance.

⁸⁷ Eisenhower, *Crusade*, 388; Weigley, 639-40; Allen, 209-10.

⁸⁸ 21st Army Group Records, 47-48; Bennett, *The Crossing*, 5.

active reconnaissance and even road construction, all aimed at preserving the combat power at the actual crossing points.⁸⁹ Also unique to this crossing plan was the use of naval assets. Brought in primarily over ground lines, the navy provided amphibious assault equipment to ferry heavy vehicles across the wide Rhine River.⁹⁰ On top of this crossing force would be one of the largest airborne operations of the entire war.

The 1st Allied Airborne Army's XVIII Airborne Corps controlled the airborne component of Operation Plunder, consisting of two divisions being dropped nearly simultaneously. They scheduled the drop for daylight, after ground forces secured the far side of the Rhine, to ensure they did not repeat the failures of Operation Market-Garden. Their mission was to take the high ground outside of Wesel to secure cross roads and prevent a rapid German reinforcement at the Rhine. The use of airborne, while deemed essential to the plan, was tactical and concentrated rather than the standard strategic envelopment, and ensured ground forces could protect the paratroops through rapid reinforcement while negating endurance concerns.⁹¹ The plan focused on momentum and protection, sending the entire package in one wave and dropping them directly onto their objective. Dropping troops in the daylight and near enemy troops was risky, but Montgomery believed it would allow them to be effective immediately upon landing and the single lift would prevent the Germans from focusing their air defense weapons.⁹² Montgomery designed this massive airborne plan as a lesson learned from previous operations,

⁸⁹ Barquest, 7-8; Bennett, *The Crossing*, 11-12.

⁹⁰ Eisenhower, *Crusade*, 388; Allen, 207; Bennett, *The Crossing*, 8.

⁹¹ Charles Whiting, *Bounce the Rhine* (New York: Stein and Day, 1985), 113; Eisenhower, *Crusade*, 88; 21st Army Group Records, 47; MacDonald, 298-300.

⁹² Allen, 213-214. While the entire paratroop drop would deploy in a single lift, a second wave of glider drops would follow that would not benefit from the surprise gained by the first wave.

attempting to overwhelm the German forces without risking the operational reach of the airborne forces involved.

The enemy facing Montgomery's ground and airborne forces seemed meager with respect to the onslaught it was facing. The highly qualified Field Marshall Albert Kesselring was in charge of the defense of the Rhine, tasked with holding the river until reinforced, though the prospects of receiving more troops seemed unlikely. In Montgomery's sector, Kesselring had the 1st Parachute Army and the 25th Army, though their actual strength could barely match that of one US corps. He maintained a meager reserve strung together from various units that he intended to hold back until he identified the Allied main effort.⁹³ Kesselring accurately predicted that Montgomery's main thrust would be towards Wesel. He positioned the majority of 1st Parachute Army around Wesel and placed air defense assets to defend against airborne insertions in that vicinity.⁹⁴ Even with this accurate prediction of Allied plans, he simply did not have the strength to defeat the Allied force decisively.

On the night of March 23, 21st Army Group was poised to attack. Their mission was to establish a bridgehead over the Rhine with the intent of enabling a future penetration and isolation of the Ruhr industrial region.⁹⁵ An air campaign had been prepping the crossing area since February, bombing and reconnoitering to allow Montgomery to move his massive force into position.⁹⁶ Eisenhower had fully invested in this plan, recognizing that 21st Army Group was in the best location to spearhead the advance into Germany. The vast road network, existing and newly constructed, ensured the momentum and endurance of the attack. Moreover, Eisenhower

⁹³ Allen, 210-11; Breuer, 180; MacDonald, 301.

⁹⁴ Breuer, 202.

⁹⁵ 21st Army Group Records, 47; Bennett, *The Crossing*, 4.

⁹⁶ Weigley, 640; Allen, 221; Bennett, *The Crossing*, 13.

knew the best remaining German forces opposed Montgomery and he wanted to mass combat power to overwhelm them.⁹⁷ The success of this operation would mean a crushing defeat to Germany while opening a clear path to ultimate victory in Western Europe.

Operation Plunder opened with an incredible artillery barrage. More than anything else in Montgomery's plan, this unrestrained onslaught of artillery fire contributed to the preservation of the crossing force. By the time the German defenders could raise their heads, the Allied crossing force had reached the east bank of the Rhine.⁹⁸ The first units to set off across the Rhine were the 1st Commando Brigade and the 51st Highland Division. The 51st moved on the town of Rees as a diversion and it successfully drew German armored forces to the north in the first hours of the assault. 1st Commando crossed north of Wesel as a feint and abruptly turned and stormed the town. Montgomery's forces faced almost no opposition at the crossing sites. Bloody fighting did erupt in the town of Wesel, but the 1st Commandos controlled the town six hours after the operation began.⁹⁹ With the stage set, the 9th Army began to cross to the south. Between the naval support and the pre-staged crossing equipment, 9th Army managed to transport entire battalions across every thirty minutes. Also facing light German resistance, the initial divisions of 9th Army poured across the Rhine within two hours of their first crossing. The sheer numbers of troops and heavy equipment ferried across the Rhine overwhelmed the Germans and the 9th Army took only thirty-one casualties.¹⁰⁰ The next step for the Allies, to exploit the momentum they had gained, was to emplace bridges—a task for which they well prepared.

⁹⁷ Eisenhower, *Crusade*, 387; Allen, 210; MacDonald, 294-98. Despite the infighting over what nation should have the glory of dealing the victorious blow to Germany, Eisenhower had to recognize 21st Army Group as his main effort due to their position and the capability for momentum that their sector provided.

⁹⁸ Eisenhower, *Crusade*, 389; Whiting, 108; 21st Army Group Records, 51; MacDonald, 307. MacDonald pointed out that the artillery preparation of the far bank was so effective that the crossing forces never called on the massive air support they had available during the crossing.

⁹⁹ 21st Army Group Records, 51; Allen, 234-45; Bennett, *The Crossing*, 15.

¹⁰⁰ Eisenhower, *Crusade*, 389; Breuer, 223; Barquest, 17.

Securing far side objectives so rapidly allowed for bridging operations to begin almost immediately in the 9th Army sector, thanks to the advanced preparation and placement of assets. They emplaced six floating bridges, some capable of armored traffic, within five hours of their assault and a detailed traffic control plan ensured rapid transit. Over the next two days, engineers emplaced semi-permanent bridges that allowed constant heavy traffic to flow across the river. Momentum was clearly a top priority for Montgomery and between the bridges and naval craft, the German forces felt overwhelmed by the ally's tempo.¹⁰¹ In short, the Allied momentum equated to surprise. While weeks of Allied presence and smoke operations tipped off their general intent to the German forces, the Germans had not prepared for the exhaustive pressure that allies imposed. Timing and strength of assault waves was key to protecting Montgomery's forces throughout their vulnerable river crossing.¹⁰² On the river, momentum achieved surprise, which directly supported protecting the force. In the upcoming airborne operation, however, the allies favored momentum in lieu of protection, and while Plunder would benefit greatly from the paratrooper's efforts, these elite forces would suffer significant losses in accomplishing their mission.

Operation Varsity, the airborne subcomponent of Operation Plunder, involved an airborne drop directly on top of enemy positions, but close to friendly ground units to ensure they did not repeat the over-endurance failures of Operation Market-Garden. The operation employed 22,000 paratroopers and glider-borne forces in two and half hours, comprising two airborne divisions with airdropped artillery packages in support. The leading planes in the first of two waves dropped their packages with little resistance, but the Germans soon responded, wreaking havoc on the entire operation. Some planes towed two gliders at once, exceeding normal aircraft

¹⁰¹ Whiting, 129; Barquest, 8-22; Bennett, *The Crossing*, 15-6.

¹⁰² Eisenhower, *Crusade*, 389; Breuer, 216.

specifications in an attempt to maintain momentum. However, the enemy air defenses and technical difficulties arising from this risky maneuver caused enormous issues.¹⁰³

The troubles in the air unfortunately multiplied once troops hit the ground on top of enemy positions. German machine guns immediately pinning down those that survived the fall. The heavy fire prevented the artillery units specifically frontloaded to provide protection capabilities from assembling their heavy weapons, and the majority of the artillerymen were forced to fight as infantrymen.¹⁰⁴ Despite these difficulties, the airborne objectives began falling into Allied hands rapidly. The two airborne divisions seized the high ground around Wesel and took control of five bridges over the Issel River to the east of the Rhine, successfully preventing enemy reinforcement into the bridgehead. By nightfall on the airborne troops first day, they had secured all of their objectives and linked up with the ground forces.¹⁰⁵

Despite the German predictions of an airborne assault, the paratrooper's employment after the ground assault had begun still took the German's by surprise. Allied commanders considered it a massive success due to the rapidity of objective seizures and relatively nonexistent threat of isolation to the airborne units. Many argue, however, that the losses incurred did not make up for what they gained. The forces involved suffered 3,400 casualties and sectors outside of Wesel saw comparable gains without any airborne support.¹⁰⁶ However, the operation proved the feasibility and utility of a tactical employment of airborne forces without risking their over-endurance, capitalizing at the initiative they can provide though risking their preservation in the process. Very simply, the airborne troops embarked on a risky maneuver, status quo for a special

¹⁰³ Whiting, 115; Weigley, 647; Allen, 263-64; Breuer, 205-6, 235-71. Breuer noted that, on average, only twenty percent of gliders made it to their target.

¹⁰⁴ Whiting, 114; Allen, 272; Breuer, 254 and 260-61.

¹⁰⁵ Weigley, 648-49; 21st Army Group Records, 51; Breuer, 275.

¹⁰⁶ Eisenhower, *Crusade*, 390; Allen, 273-79; Breuer, 280-81.

purpose force, and they succeeded in their overall objective of stymying a German counter-attack. With airborne help, Montgomery's bridgehead expanded to the Issel River, but German resistance within that bridgehead still represented the most pressing problem Montgomery faced.

At the beginning of Plunder, the 21st Army Group intelligence section estimated the German strength to be 85,000 relatively weak troops when in reality the German opposition possessed even less strength than this. The German defense west of the Rhine had taken its toll on the strength of its remaining combat effective units. Because of the weakened state of these troops, made worse by the punishing Allied artillery barrage in support of the crossing, Kesselring could muster only a weak resistance.¹⁰⁷ His forces positioned themselves in and around Rees and Wesel, opting to stay mobile and react to the Allied main effort once it emerged, rather than defending across the entire Rhine River front. The German units' combined strength amounted to that of roughly one US corps, with a hodgepodge division in Wesel facing 9th Army's two full strength divisions. The initial Allied diversion into Rees drew the local reserves that direction, but the main armored reserve remained west of the Issel River until Kesselring identified the Allied decisive point. When the airborne assault gave away the importance of Wesel in the Issel River bridges, the German armored raced to take control of the key crossroads, but lost to the tactically delivered Allied paratroopers. Kesselring could only hope to hold out in Rees long enough to allow a decisive penetration of the Allied bridgehead by counterattacking armored forces.¹⁰⁸

In the meantime, Montgomery's ground and airborne forces attempted to expand the bridgehead. After facing minimal opposition during the crossing itself, the Allies now faced powerful resistance in the cities. Despite maneuvering overwhelming strength into the far side

¹⁰⁷ Eisenhower, *Crusade*, 314-15; Weigley, 646.

¹⁰⁸ Allen, 249-82; MacDonald, 304-14.

objectives, any Allied hope of a rapid and fluid breakout faded on the first day.¹⁰⁹ Resistance proved particularly resilient at Rees. To the south, 9th Army had developed an opportunity to flood their portion of the bridgehead with troops, but Montgomery had given priority of the 9th Army bridges to 2nd Army units to reinforce Rees.¹¹⁰ Still, with seemingly endless resources on the west bank, and overwhelming strength on the east bank, 21st Army Group managed to expand the bridgehead past Rees and the Issel River by March 26. Despite delays and fierce fighting, this positioned the Allies to break out of their bridgehead in less than three days after the initial crossing operations.

The Allies declared Operation Plunder a success on March 27. On March 28, Montgomery had six divisions prepared to break out, including three armored divisions. His eyes were set on Berlin.¹¹¹ Plunder had been a large and complex operation for 21st Army Group. Success in 3rd US Army's sector proved possible without extensive preparation, massive artillery, or airborne support. However, Montgomery had to cross in the face of a formidable enemy compared to the other Allied formations that conducted crossings of the Rhine and the river crossings executed by 2nd and 9th Armies resulted in far fewer casualties on the water than the hasty crossings conducted to the south.¹¹² In hindsight, Montgomery's detailed preparation and the scale of the effort he committed to Operation Plunder may seem excessive, but this planning and preparation led to quick and complete success.¹¹³ The Allies ended Operation Plunder with three entire armies across the Rhine and the conditions set for the main advance into the heartland of Germany to begin.

¹⁰⁹ Whiting, 106; Weigley, 650; Allen, 258-59.

¹¹⁰ Weigley, 650-51; Allen, 258-59; Breuer, 245; MacDonald, 314-18.

¹¹¹ Whiting, 138; 21st Army Group Records, 52; Allen, 286; Breuer, 280-81.

¹¹² Eisenhower, *Crusade*, 391; Weigley, 652; Allen, 246; Breuer, 226; MacDonald, 306.

¹¹³ Allen, 242; Bennett, *The Crossing*, 20.

Analysis

While one can argue that the relative ease with which his forces completed the river crossing proves that Montgomery conducted excessive planning and preparation for Operation Plunder, this extensive preparation led directly to the degree of success that Montgomery's forces achieved. Even before the Germans blew the Rhine bridges in the 21st sector, Montgomery had begun preparing and stockpiling the necessary float and bridge equipment to execute a massive river crossing. He prepared with the expectation that all crossings would take place without existing bridges, and committed significant time and effort to the training and rehearsals conducted by 21st Army Group units.¹¹⁴ The overall plan focused on momentum throughout the phases of the crossing, ensuring the Allies never lost the initiative. This led to excellent force protection and alleviated the possibility of an endurance failure.

Montgomery ensured momentum throughout the operation in numerous ways. During the preparation phase, commanders pre-staged all forces and crossing equipment before the operation began. The ingenious use of naval amphibious landing craft to traverse the swift Rhine current enabled the crossing units to place an enormous amount of combat power on top of a weak German defense force.¹¹⁵ Contributing to this combat power advantage, two airborne divisions landed directly on their tactical objectives, creating a temporal advantage for the Allied assault. The plan did commit far more combat power to the crossing than necessary, but in a risky operation such as a river crossing, overwhelming troop strength and tempo ensure success, while hastily attacking with minimal combat power and support places success at risk.

The 21st Army group ensured protection from the beginning of the operation, with an artillery barrage that proved just as excessive as the rest of the forces committed to the operation.

¹¹⁴ Barquest, 9; MacDonald, 309.

¹¹⁵ Allen, 248; Bennett, *The Crossing*, 20.

However, the lack of Allied casualties on the river proved that the benefits of this tactic justify the cost. Montgomery provided further methods of preserving his combat forces in the risky crossing by executing deception operations to prevent the Germans from concentrating decisive combat power against any Allied force. The surprise gained by the massive force crossing the river and by the airborne troops employed in the unusual manner used by the Allies prevented the enemy from fixing and counterattacking any portion of the Allied assault in a decisive manner, preserving the combat power projected to the east of the Rhine. Of all the Allied forces involved in the operation, only the paratroopers encountered protection troubles. While the plan recognized the need for immediate artillery support to the airborne troops, the risky act of dropping the troops on top of enemy positions for the sake of momentum negated their ability to employ this indirect fire support. However, the plan allowed for a rapid linkup of ground forces with the forward deployed paratroopers, and the paratroopers' success in preventing German reinforcement facilitated the preservation of all forces within the bridgehead.¹¹⁶ One glaring critique of the operation, however, remains the disproportionate number of casualties and failed drops that the airborne troops suffered.

Through this delicate balance of momentum and protection, the 21st Army Group effectively negated any endurance challenges that they experienced during Operation Market-Garden, indicating that Montgomery learned valuable lessons from this earlier operation's embarrassing defeat. The tactical employment of the airborne forces, while putting them at a protection risk, ensured a rapid link up with ground forces that never tested the limited endurance of an airborne force. The pre-planned bridging operations, with both assault bridges and semi-permanent line of communication bridges, ensured that the massive wave of crossing troops rapidly received armored reinforcement and resupply. Because they planned these rafting and

¹¹⁶ Breuer, 275; Bennett, *The Crossing*, 17.

bridging operations months in advance, the 21st Army Group could create a detailed yet flexible traffic control plan that allowed for the efficient movement of units across the river while allowing for reprioritization as events played out.¹¹⁷ Finally, the deliberate plan created a unified understanding and effort across the two armies involved, ensuring that the assaulting forces established a bridgehead and all breakout forces reached the east bank before any participating units pushed beyond the 21st's operational reach.

The overarching lesson to learn from Plunder's success is that no amount of force is too much in a river crossing operation. Montgomery planned an operation that utterly overwhelmed the German defenses.¹¹⁸ Any criticism that 21st Army Group employed an unnecessary amount of men and resources fails to recognize that, when crossing a river and breaking out, any moment of weakness on the attack results in either slaughter on the water or being pushed back against the far bank of the river. Even with this overwhelming force, Montgomery learned that any hope for a reasonably fast and effective transition from crossing into breakout requires detailed planning and overwhelming combat power. Operation Plunder consisted only of the crossing of the Rhine, and the buildup of forces on the east side. The breakout necessary to make Operation Plunder worth the effort the Allies devoted to it could not take place as an ad hoc mission or on a prescheduled timetable. In addition to the value of overwhelming combat power, Operation Plunder demonstrated that a breakout cannot begin until the crossing achieves success.

¹¹⁷ Weigley, 650-51; Barquest, 19. Weigley pointed out that, despite numerous existing and constructed roads in the Allied rear, and despite this traffic control plan, congestion remained an issue. This shows that even the most detailed and deliberate plan and preparation for a river crossing will not negate all difficulties in moving massive numbers of troops and equipment across a river.

¹¹⁸ Whiting, 125; Allen, 248.

Case Study: Operation Badr

Context

In October of 1973, Egypt launched a massive assault across the Suez Canal under the code name Operation Badr. This was a unique operation of limited military scope with a hope to achieve large strategic and diplomatic effects. Egypt's overarching desire was never to have to move far forward from a bridgehead on the Suez. This limited objective showed Egypt's recognition of its operational reach and the effect a major river crossing would have on their ability to wage future military operations. However, this case provides an excellent example of an incomplete plan causing an overextension of military forces after a successful crossing.

Prior to the 1973 Arab-Israeli war, the 1967 Six Day War was a catastrophic success for Israel.¹¹⁹ Modern mechanized equipment and tactics used by the Israelis highlighted three major strengths—intelligence domination, air power, and armor—all used together to achieve lightning victories with relatively few Israeli casualties.¹²⁰ This new style of warfare gave Israel an aura of invincibility. The physical spoils of their victory included territorial gains along all three borders, to include the Sinai Peninsula all the way up to the Suez Canal's east bank, a strategically defensible position.¹²¹ On the global stage, the victory caught the attention of the world's superpowers, with the Soviet Union and America effectively taking sides with Egypt and Israel

¹¹⁹ D.K. Palit, *Return to Sinai: The Arab Offensive, October 1973* (New Delhi: Palit and Palit Publishers, 1974), 24. General Palit argues that the victory, while militarily decisive, was politically detrimental. The will of the Arab nations was unbroken and in fact strengthened by their defeat.

¹²⁰ David Eshel, *Mid-East Wars: The Yom Kippur War* (Hod Hasharon, Israel: Eshel-Dramit LTD., 1978), 7; George W. Gawrych, *The 1973 Arab-Israeli War: The Albatross of Decisive Victory* (Fort Leavenworth, KS: Combat Studies Institute Press, 1996), 5.

¹²¹ Frank Aker, *October 1973: The Arab-Israeli War* (Hamden, CT: Archon Books, 1985), 5; Mordechai Gazit, *The Peace Process 1969-1973: Efforts and Contacts* (Jerusalem: The Hebrew University, 1983), 19; Chaim Herzog, *The War of Atonement* (Boston, MA: Little, Brown and Company, 1975), 3.

respectively. This diplomatic development would provide the kindling for the next stage in the Arab-Israeli conflict.

After the Six Day War, Israel developed a feeling of superiority over the Arab world. Focusing on their obvious strengths, Israeli intelligence claimed they would be able to provide forty-eight hours' notice on any future Arab attack. Assuming the Arab world feared Israel's air and armor, Israel determined the Arab nations would not attack until their air and ground forces were capable of attacking the heart of Israel with sufficient force. In the meantime, Israel would simply bolster its new defensive line along the Suez, dubbed the Bar-Lev Line, consisting of fortifications along the canal divided into three brigade sectors. Minimal troops and a few tank platoons occupied the line, with various tank units echeloned up to thirty kilometers east of the canal to respond to attacks as needed. However, this line was merely a blocking or fixing force. In the event of a major Arab attack along the Suez, the decisive force was the Israeli reserve, who would be enroute to the canal from the outset of hostilities, thanks to the forty-eight hour notice.¹²²

For Egypt, the years following the Six Day War came with political change. President Nasser's death in 1970 brought Anwar Sadat to power. Egyptian strategy towards Israel did not change significantly, but Sadat needed to implement it soonest to gain legitimacy.¹²³ Sadat recognized he could not defeat the Israeli Defense Forces (IDF) decisively, but believed Egyptian strategic goals could be accomplished with limited military objectives.¹²⁴ The effects that Sadat desired consisted of destroying the Israeli invincibility myth, casting doubt on the Israeli

¹²² Aker, 9 and 44; Avraham Adan, *On the Banks of the Suez* (Jerusalem: Edanim Publishers, 1980), 57, Gawrych, 9.

¹²³ Palit, 30; Gawrych, 8; Gazit, 13.

¹²⁴ Chaim Herzog, *The Arab-Israeli Wars: War and Peace in the Middle East* (New York: Random House, 1982), 227; Saad El Shazly, *The Crossing of the Suez* (San Francisco, CA: American Mideast Research, 2003), 106.

population that the IDF could protect them, and ultimately convincing the United States to alter its Middle Eastern policies. General Saad El Shazly, the Egyptian Army's Chief of Staff, recognized that any military operation, no matter how limited in scope, would hinge on crossing the Suez. By 1973, Egypt possessed sophisticated river crossing equipment, and a crossing operation would include almost the entire Egyptian military focused on making it 200 meters across a canal. However, while it looked simple on paper, Shazly respected the complexity of river crossings. As he began planning options for an Egyptian offensive he stated that the "Suez Canal seemed an impossible barrier."¹²⁵

Narrative

Planning for Operation Badr began with a focus on the significant obstacle that was the Suez Canal or, as an Israeli general referred to it, "one of the best anti-tank ditches available." Sadat could realize his limited objectives without extending the operation beyond a successful crossing in itself. Anti-tank and air defense weaponry could mitigate Israeli strengths in armor and air force on such a small-scale offensive. With Soviet advisors, Soviet equipment, and Soviet doctrine at hand, the method for succeeding in a river crossing was readily available. Soviet doctrine dictated that a crossing consist of two phases: first, the crossing of forces over the river and establishment of a bridgehead and second, a rapid shift to a breakout to achieve deeper operational objectives.¹²⁶ Based on military capabilities and Sadat's guidance, military planners focused on phase one.

Planning for phase one, the crossing, officially began in 1971 and recognized the importance of the principle of surprise in mitigating the possibility of an Israeli armor brigade

¹²⁵ Gawrych, 9; Shazly, 7.

¹²⁶ Adan, 63-64; Shazly, 26; Herzog, *The War of Atonement*, 35 and 231.

counter-attacking within two hours of an Egyptian attack. Shazly's focus was on getting equal or better numbers of forces across the river quickly to defeat Israel's immediate counter-attacks.¹²⁷ This is the first indication that Egypt had no strong intentions of continuing the attack, as parity in numbers only gains a force a defensive advantage without providing the ability to continue an offensive. Shazly's goals were simple: establish a shallow bridgehead, entrench within the air defense umbrella, and repel Israel's initial attacks to inflict a large and immediate number of Israeli casualties, immediately attacking the Israeli population's will to continue.¹²⁸ This military translation of Sadat's strategy ignored any further moves, an issue revealed by the detailed planning that followed.

As this military strategy moved to paper plans, an immediate conflict between Soviet doctrine and Egyptian intent arose. The Egyptians essentially planned a three-phase operation, beginning with the river crossing and bridgehead, stagnating in a phase of holding ground indefinitely, and possibly transitioning to a delayed breakout if the opportunity arose.¹²⁹ This plan focused on momentum through the initial crossing, and the limited far-side objectives helped protect the force. Pausing at the bridgehead line would significantly reduce Egyptian momentum and possibly cede the initiative to the Israeli forces. However, Egypt relied on this defensive posture to remain in a strongly protected position to give them the endurance that they needed to protract the conflict beyond the will of the Israeli population.

Phase one included five Egyptian infantry divisions crossing simultaneously, equally weighted to confuse Israeli forces as to a possible Egyptian main effort to focus on.¹³⁰ The

¹²⁷ Palit, 45; Shazly, 7-9, 22; Hassan Badri, Taha Magdoub, and Mohammed Zohdy, *The Ramadan War, 1973* (New York: Hippocrene Books, Inc., 1978), 20.

¹²⁸ Shazly, 26; Badri, 23.

¹²⁹ Adan, 66; Garwych, 20-21; Badri, 24.

¹³⁰ Gawrych, 20; Shazly, 36-37.

objectives were obvious, consisting of crossing, destroying the Bar Lev Line, and digging in within an eight-mile radius of the canal to stay within the protection of air defense coverage. This phase's plan contained excruciating detail and ended with an established defense just a few miles across the canal that welcomed an Israeli counter-attack. Phase two was a fluid continuation of phase one, focused on slowly expanding the bridgehead and defending Israeli repulses. Shazly's hope was that this combat, advantageous to an Egyptian defense, would help train his forces for any further operation to continue the offense.¹³¹

The crossing itself was the most detailed and controlled part of the plan. Speed was the key to surprise and Shazly planned to spare no resources to achieve it. Ten heavy bridges were planned, with five light vehicle bridges, ten foot bridges, thirty-five ferries, and 750 boats, all bolstered by the creation of dummy bridges and false crossing sites to protect Egypt's crossing capability. An ingenious plan to use water cannons to cut paths through the far-side sand wall decreased the far-embankment breach time from six to two hours. In total, the Egyptians expected only twelve hours to elapse before their infantry divisions on the far side received their armored reinforcement.¹³² The Egyptians planned this complex maneuver to the minute, with every soldier aware of the boat number he was crossing on, every piece of equipment assigned to a bridge serial number, and a 1,500 man control element dedicated to managing the crossing.¹³³ This detailed script took Egyptian forces on a high tempo operation through their initial bridgeheads and dictated how they would expand a few miles and combine into a two-army sized bridgehead

¹³¹ Adan, 66; Palit, 41; Shazly, 25-27. While there are differences the exact depths of intended initial objectives, all sources agree that the Egyptian air defense umbrella was the intended limit of advance.

¹³² Gawrych, 18-19; Shazly, 34.

¹³³ Kenneth Pollack, *Arabs at War: Military Effectiveness, 1948-1991* (Lincoln: University of Nebraska Press, 2002), 102-3; Shazly, 64-65.

up to twelve miles deep.¹³⁴ This script, and the momentum of the Egyptian plan, ended here. The prospect of any further action, a breakout of any sort, existed solely in the cognitive domain of military and political leaders. The plan now relied on Egypt's ability to sustain and preserve this defensive force.

The detailed plan addressed any possible breakout by dictating an operational pause after the establishment of substantial defenses in phase two. If an opportunity presented itself, the Egyptian attack would continue. However, no strategic planners had actually committed to this idea and the extraordinary synchronization and resourcing evident in the crossing plan was absent from this supposed phase three.¹³⁵ While the operational pause in the plan recognized that further offensive action would result in culmination, it did not stipulate the criteria that must exist on the battlefield to transition to an offensive that fell within Egypt's operational reach. The plan was ultimately set for September or October 1973 due to favorable canal tides, but as the invasion approached, Egypt still possessed only half of a plan with an ambiguous insinuation that they might turn a limited war into total war.¹³⁶

The execution of Operation Badr began on October 6, 1973 after substantial deception and counter-intelligence operations by Egypt that ultimately gave them the surprise required to defeat Israel's initial defenses. While Egyptian political and military deceit negated the Israeli intelligence system, it was the Egyptian advantage in military technology that created the most problems for Israel. Soviet-provided composite bridging systems, coupled with the aforementioned and ingenious water cannons, decreased the Egyptian river crossing time to one-fourth of what the Israelis expected. Perhaps more drastic were the Soviet-provided dismounted

¹³⁴ Gawrych, 20-21.

¹³⁵ Gawrych, 22; Shazly, 17-37; Herzog, *The War of Atonement*, 37. There is disagreement over how many phases the Egyptians actually planned, two or three, but all sources agree that nothing was planned in detail past the initial bridgehead.

¹³⁶ Herzog, *The Arab-Israeli Wars*, 228.

anti-tank weapons the Egyptians now possessed, which almost negated the Israelis first response armored forces. Israeli intelligence failed to predict the Egyptian attack in a timely manner, and they failed to appreciate the ferocity of Egyptian capabilities, which combined to give Egypt the undeniable initiative. Egypt's attack would pit its full force—200,000 men, 1,600 tanks, and 2,000 artillery pieces—against Israel's 18,000 men, 300 tanks, and 100 artillery pieces available within the first crucial twenty-four hours.¹³⁷

At 2:00 p.m. on 6 October, Egypt began its attack with an artillery and air bombardment of the Israeli strong points along the Bar Lev Line.¹³⁸ Egyptian commandos were the first ground troops to the east bank, and were armed with anti-tank weapons and tasked with securing Israeli armor positions before those tanks actually arrived. Then, under a smoke screen, waves of 4,000 infantrymen at a time began crossing the canal in rafts and successfully bypassed the strong points to establish anti-tank ambushes. Egyptian tanks on the west bank ramps provided direct fire cover for this occupation of the initial far-side objectives. Five Egyptian infantry divisions, divided into two armies, glided seamlessly across the canal. Eighteen hours into the operation, Egypt had 90,000 troops and 850 tanks across the canal with bridgeheads as deep as five miles, all at a loss of 280 men killed, and 20 tanks destroyed.¹³⁹

While this crossing was undoubtedly full of heroics by Egyptian combat arms, the engineer effort was in itself remarkable. Egypt maximized its use of the Soviet bridges and the Israelis failed to predict something as creative as the sand-breaching water cannons. Egypt bolstered its control units, timetables, and scripts with the construction of 2,000 kilometers of

¹³⁷ Pollack, 106-7; Aker, 26-28; Gawrych, 28; Shazly, 232-34.

¹³⁸ Gawrych, 28.

¹³⁹ Shazly, 223 and 233; Badri, 65; Herzog, *The War of Atonement*, 154. Exact numbers of personnel and equipment vary, but to a negligible extent considering the vast numbers agreed upon by all sources.

roadways supporting the crossing area. The engineers provided sixty breach points for eight heavy bridges, four light bridges, and thirty-one raft sites to retain flexibility in crossing sites.¹⁴⁰ This execution exemplified the momentum required to successfully cross a gap, while the abundance of redundant and moveable crossing locations protected both the Egyptian crossing equipment and forces from Israeli targeting.

By midday on 7 October, Israel admitted that the Egyptian canal crossing was a resounding success and had imposed shocking losses on the IDF.¹⁴¹ Egyptian anti-tank weapons decimated Israel's most forward units, tasked to hold the line until reinforcements arrived. Israel's immediate counter-attack forces, expecting simply to bolster their front line forces engaged with the Egyptian main effort, were now attempting to rescue defeated units across a wide front with no discernable main effort. What should have been decisive assaults were now heroic attempts to rescue doomed strong points on the Bar Lev Line, essentially doubling the Israeli casualties produced by the Egyptian assault force. Finally, late on 7 October, Israel paused to regroup with only one-third of its original armored force. Israeli air forces prepared to attack Egyptian air-defense and units on the east bank, but Israeli high command called them off to support the Syrian front at the Golan Heights, potentially stymying any chance of swiftly regaining the initiative in the Sinai. The overwhelming surprise gained by the crossing force ensured that the Israeli reserve was unprepared to respond. However, by forcing Israel to take an operational pause with no intentions of pressing its own attack, Egypt allowed Israel to analyze the situation and pinpoint Egyptian locations and capabilities.¹⁴² This pause allowed Israel to simplify its situation, while forcing Egypt to fear the simplicity of its own. Egyptian momentum

¹⁴⁰ John A. Lynn, *Battle: A History of Combat and Culture* (Cambridge, MA: Westview Press, 2003), 308; Gawrych, 38; Shazly, 232.

¹⁴¹ Adan, 66; Shazly, 39; Eshel, 47-50.

¹⁴² Aker, 26 and 100-103; Adan, 66; Gawrych, 36; Shazly, 20-41, and 237.

had run its course and it would now test its ability to sustain and preserve its combat power in the face of Israeli initiative.

Over the next few days, both sides would execute small tactical operations, with both sides making small gains. Egypt slowly expanded its bridgehead, combining the separate divisions into two separate army-sized bridgeheads separated by the Bitter Lakes. Israel inflicted damage on the Egyptian bridges, reducing their overall numbers to one heavy bridge per divisional sector, with four heavy bridges held in reserve. This did not create an immediate problem, but Shazly was worried that it could become a problem weeks later, assuming the Egyptians would be holding their line that long.¹⁴³ Overall, the Egyptian plan was working and Israel was playing into it. Still optimistic in Israeli strength over Arab weakness, Israel continued to probe the strong Egyptian defense and continued to take casualties. However, foreshadowing events to come, one Egyptian brigade commander took ill-advised initiative to press his tactical success and launched a probing attack forward of the Egyptian air defense umbrella. Israeli air power alone defeated this entire brigade.¹⁴⁴ Egypt's protection capabilities now had a proven limit, yet Egyptian forces would soon put their operational reach to the test regardless.

As Israel began to recognize the futility of these small tactical battles, a brief stalemate occurred between October 11 and 13, but an internal conflict was brewing in the Egyptian high command. One group was pressing for an immediate continuation of the attack in accordance with Soviet doctrine to retain momentum and initiative. Others recognized the limits to Egyptian capabilities, combined with Sadat's original goals, and desired to continue holding ground and defending. However, it would be Sadat himself, the purveyor of the strategy to hold ground and force Israel to bleed, that would instigate the Egyptian attack that would be the decisive failure of

¹⁴³ Gawrych, 52; Shazly, 240.

¹⁴⁴ Adan, 111; Shazly, 241.

the military effort.¹⁴⁵ It is not clear what caused this decision. Theories range from pressure by the war ministry and pressure from Syria, to Sadat's domestic agenda and the failure of the current situation to have stimulated Soviet and American diplomatic response.¹⁴⁶ Regardless of the reason, Sadat gave the order against the recommendations of the field commanders to attack to the passes, specifying the use of the armies' operational reserves so as not to weaken the existing bridgehead.¹⁴⁷ Egypt was to attack with weaker numbers, outside of its air defense umbrella, on a plan created in just two days.

While Egypt was deciding to attack, Israel had been finalizing its own plan to take the war to Egyptian territory, a move that would have played right into the original Egyptian intent. However, Israel observed Egypt's movement of armored forces across the canal and correctly predicted the Egyptian attack, postponing Israel's own attack plans. In turn, Israel bolstered her defensive positions and prepared to face the bulk of Egypt's armored and mechanized divisions. Egypt, however, launched their attack on October 14 with only the five brigades left in their operational reserves, driving into an onslaught of newly arrived and American provided anti-tank missile systems. Four hundred Egyptian tanks attacked 900 Israeli tanks, with no defense against Israel's dominating air power. In a matter of hours, Egypt lost more forces than in the previous eight days combined.¹⁴⁸ Egypt attacked with no momentum and well outside its spatial ability to

¹⁴⁵ Sunday Times of London Insight Team, *Insight on the Middle East War* (London: Times Newspapers Limited, 1974), 118; Gawrych, 53-54; Shazly, 242-43. While observers widely believed that a political-level decision led to the continuation of the advance eastward, evidence like that reported by the Sunday Times indicated that General Shazly convinced the Egyptian high command to support a continuation of the attack, even though in his memoirs Shazly wrote that he opposed it.

¹⁴⁶ Gawrych, 55-56; Adan, 234; Herzog, *The Arab Israeli Wars*, 261.

¹⁴⁷ Shazly, 247.

¹⁴⁸ Adan, 235-37; Gawrych, 57; Shazly, 248.

protect its forces against air and ground attack. This resulted in the loss of a key component of the original defensive plan, and now threatened the endurance of the original defensive intent.

Over the next week, the bulk of three Israeli divisions crossed the Suez into Egypt. As early as October 18, one Israeli division was already across, destroying Egyptian air defenses and threatening to isolate the Egyptian Third Army. Unable to stave off disaster militarily, Egypt was saved by the luck and timing of superpower diplomacy, Sadat's original goal. The Soviets worried about losing diplomatic power in the event of the total defeat of Egypt, while America was growing concerned over the conflict's effect on the oil trade.¹⁴⁹ As Israel neared total victory, the superpowers negotiated a ceasefire that finally brought United Nations peacekeeping forces into the Sinai on October 25.¹⁵⁰ One could argue that in this war, Egypt achieved a political victory. Militarily, however, Egypt's planners recognized the limits of its army's operational reach and included constraints in the operational plan to account for this—but during execution, Egyptian forces ignored these constraints, leading to a military failure.

Analysis

When faced with a river crossing during an operation, military planners frequently underestimate the significance of the obstacle and focus energies planning the main assault that will take place after the crossing. Egypt reversed this trend by planning a crossing in detail while consciously leaving out of the plan any considerations for a post-crossing breakout. This led to a situation in which Egyptian forces attempt to breakout without having a plan or pre-assigned resources to accomplish the task. Unsurprisingly, the resulting attack took place with inferior numbers of attacking troops while weakening the original defense. These factors require one to

¹⁴⁹ Aker, 118 and 144; Palit, 126-27; Gawrych, 65.

¹⁵⁰ Steve Yetiv, *The Absence of Grand Strategy: The United States in the Persian Gulf, 1972-2005* (Baltimore: The Johns Hopkins University Press, 2008), 34-35; Herzog, *The Arab-Israeli Wars*, 279.

analyze Egypt's grasp of operational reach based on two things—what they planned and what they actually did.

From an operational reach perspective, Egypt's plan focused on endurance and protection at the expense of momentum. Momentum was rightly a focus of the crossing itself, ensuring their initial assault would "overwhelm enemy resistance."¹⁵¹ Then the plan simply intended to hold ground, effectively giving the advantage of momentum to the Israeli's with the hope to use that fact against them in a war of attrition. Sadat originally dictated this basic scheme and his September 1973 directive approving the initial attack gave the military planners no reason to think they needed to plan further than holding a bridgehead.¹⁵² The plan therefore maximized protection by defending from within the protection provided by air defense assets, preserving Egyptian combat power and welcoming Israeli attacks that would slowly bleed the Israeli combat power and popular support. Endurance was also key to the plan, by determining the exact distance that Egypt could operate while still allowing for a protracted war. The Egyptian plan clearly anticipated culmination and planned for an operational pause to compensate, but the failure to prepare to transition back to the offense proved disastrous when they decided to attempt a breakout.

The execution of the canal crossing capitalized on the three pillars of operational reach, as planned, and settled the Egyptian forces comfortably into an operational pause. The hasty launch of the October 14 attack, however, brought culmination quickly to bear. Endurance was the only element to remain strong, since attacking with such a small force left the bulk of Egyptian forces defending the lines of supply. While not usually a strength of Arab militaries, Egypt's execution of resupply may have been the only factor keeping Egyptian forces from

¹⁵¹ ADRP 3-0, 4-5.

¹⁵² Shazly, 38.

collapsing prior to the ceasefire. However, the attack itself occurred after Egypt has lost its momentum and possessed little ability to protect and retain its combat power. Shazly recognized that doctrinally, he required one-third of his overall force held in reserve to defend successfully against Israeli penetrations.¹⁵³ Instead, this mobile defensive force attacked against an overwhelming Israeli defense, both negating the attempted breakout and defeating Egypt's ability to continue defending.

Operation Badr clearly demonstrates that crossing a river successfully can still easily translate to culmination. The infantry divisions were capable of seizing a bridgehead, but the armored and mechanized forces proved integral to holding the defense. The October 14 attack proves the necessity to properly plan for and resource a breakout force that is completely separate from the forces required to hold the bridgehead. Ultimately, the plan needed a clear definition of the operational end state, to include explicit friendly and enemy criteria that must exist before transitioning to a breakout operation. Egypt's initial military success did serve its strategic purpose—America took note of this surprising success and began diplomatic talks with the Soviet Union just before Egypt began its downward spiral.¹⁵⁴ Despite this political victory for Egypt, the same end could have potentially come at a much smaller price had Egypt just explicitly defined a military end state within the realms of their protection and endurance, or planned a crossing operation and breakout force capable of maintaining the momentum and protection necessary to succeed.

Synthesis

These three case studies illustrate the difficulties that an opposed river crossing presents to the operational reach of a force. A river, being a natural obstacle, is an impediment to a unit's

¹⁵³ Pollack, 129; Shazly, 243.

¹⁵⁴ Geoffrey Wawro, *Quicksand: America's Pursuit of Power in the Middle East* (London: Penguin Books, 2010), 310.

momentum by reducing the tempo and pressure that a force can project onto its enemy. Troops crossing the river are highly vulnerable to direct and indirect fires, and maneuvers designed to lessen the enemy's firepower on the far side generally involve temporarily isolating units in enemy territory with little protection capability. Sustaining the units involved becomes a delicate balance between pushing combat power over the limited crossing sites while still sending enough sustainment capability across to allow the combat forces to endure for protracted periods. Most importantly, these case studies demonstrate that momentum, protection, and endurance are codependent, and any action to bolster one will have implications on the others.

Momentum, as it applies to river crossing, refers to overwhelming the enemy resistance on the far side and retaining the initiative to transition to the offense after establishing a bridgehead.¹⁵⁵ Operational Plunder succeeded in overwhelming the enemy by employing massive numbers across a wide front, combined with a relentless artillery preparation. The 21st Army Group was able to maintain the tempo of the crossing force due to months' worth of rehearsals and equipment staging, as well as a deliberate control plan to employ crossing, assault, and sustainment forces when and where they were needed. Months prior, in Operation Market-Garden, 21st Army Group saw no such momentum. Their force size was potentially large enough to overwhelm the German defenders, but they employed this force on a single road with a very narrow front that never allowed for a successful tempo. In Operation Badr, the Egyptians found initial success by surprising and overwhelming the Israeli defenders. Their failure of momentum resulted from not having a plan or ability to retain the initiative and transition to the offense, yet they attempted it anyway with disastrous results. All three cases, positively or negatively, show

¹⁵⁵ ADRP 3-0, 4-5.

the importance of planning for overwhelming strength that can be employed with a high tempo, and with a deliberate plan to transition from the bridgehead to a breakout.¹⁵⁶

Protection in a river crossing refers to a unit's ability to anticipate the effects of the enemy and the environment on the preservation of combat power.¹⁵⁷ In Operation Plunder, Montgomery had a clear understanding of the river and the German defenders, and spent months establishing the combat, endurance, and protection forces necessary to dominate at the Rhine. Plunder's protection failure resulted from dropping airborne troops directly onto enemy positions, resulting in extremely high casualty rates, but the rapid linkup of ground forces and the paratroopers' success in blocking a German counterattack contributed to the overall preservation of the entire force. In Market-Garden, however, 21st Army Group failed to understand its environment. They underestimated the enemy's strength and resolve, and overestimated their own ability to traverse the highly restrictive terrain. Paratroopers dropped deep into enemy territory with hopes of a rapid ground link-up rapidly became isolated without the ability to protect their forces. In Operation Badr, the Egyptians understood their environment and planned an effective air defense umbrella that provided a logical limit to their forward advance. However, when they chose to violate that logic and push forward of their protection capabilities, the Israelis rapidly destroyed those units that attacked, and the loss of those units reduced Egypt's ability to protect the forces left in the bridgehead. These three cases show that a plan must anticipate the likely effects of the enemy and terrain, project protection capability to mitigate these effects, and ensure the scope of the operation is limited to that which it can protect.¹⁵⁸

¹⁵⁶ ATTP 3-90.4, 4-15.

¹⁵⁷ ADRP 3-0, 4-5.

¹⁵⁸ ATTP 3-90.4, 4-5.

Endurance in a river crossing is comprised of anticipating and providing resources needed to cross a river, and ensuring the protracted sustainment of combat power on the far side of the river.¹⁵⁹ In Operation Plunder, the 21st Army Group was expecting the Germans to destroy all existing bridges over the Rhine months before they actually did so. This allowed for a massive buildup of engineer and bridging equipment, as well as moving naval craft across ground lines to the river to make creative use of available resources to navigate the tricky river. They established the bridgehead across a wide but shallow front, even including the employment of the two airborne divisions, to ensure all units remained within the endurance capacity of 21st Army Group for the entire operation. In Market-Garden, the immediate bridgehead was extremely deep and narrow, and the 21st Army Group simply could not sustain the paratroopers. Air dropped supplies managed to keep the paratroopers alive for days, but did not provide them endurance to employ combat power at the tip of the bridgehead. The plan assumed troops would seize the multitude of bridges along the route intact, and therefore did not anticipate the resource requirements to raft and bridge across rivers and canals, stifling the ground force's tempo and preventing them from linking up with all of the paratroopers. The plan for Operation Badr ensured endurance through the creative use of available resources to bridge the Suez and a flexible plan of redundant float bridges to ensure traffic flow even when various bridges were not functioning. The strength of the Egyptian plan rested in its ability to endure in their bridgehead for a protracted period of time, a strength it would negate in its execution. These three cases show that planners should anticipate assault crossings on any water obstacle, plan and integrate the equipment required into the combat formations, and ensure units remain within the sustainment range of ground forces throughout bridgehead expansion.¹⁶⁰

¹⁵⁹ ADRP 3-0, 4-5.

¹⁶⁰ ATTP 3-90.4, 4-5 and 4-6.

There are three concepts common throughout all three cases and across all three elements of operational reach. They are the need for the simultaneous employment of overwhelming combat power, the need to plan for and resource assault and bridging capabilities at all river crossing sites regardless of potential existing bridges, and the need to have a deliberate plan to signal the transition from establishing the bridgehead to breaking out on the offense.

Overwhelming combat power does not simply mean greater strength compared to your enemy. A plan must ensure the employment of that force in a rapid, simultaneous, and synchronized manner to gain the initiative, maintain tempo, provide mutual protection to the combined arms team, and prevent the capitulation of various units that will lead to culmination. The plan must assume that no bridges will be present.¹⁶¹ If a plan calls for an assault crossing, provides resources to rapidly bridge the obstacle, and the unit happens to seize a bridge intact, that crossing package can simply be moved forward to the next possible gap crossing. However, a failure to plan in this pessimistic manner, should the inverse arise, results in a loss of tempo that can shift the initiative to the enemy, fail to provide protection to troops at their most vulnerable state on the river, and prevent the movement of sustainment assets to support troops inserted on the far side of the river. Finally, a river crossing operation must have a clear plan and criteria to transition to the offense, to include strength built up within the bridgehead and the capabilities to project protection and sustainment capabilities forward with the break out. River crossing is highly complex and these cases have shown that a breakout does not come fluidly after the crossing even in the most dominating operations. The breakout is separate phase, if not a sequel to the crossing itself, and a force should only execute the crossing if it has the ability maintain operational reach with those

¹⁶¹ Toguchi, 17.

forces that survived the crossing, something that a planner should not assume before the operation begins.¹⁶²

Conclusion

These three cases showed varying degrees of success and failure. In Operation Market-Garden, allies successfully crossed numerous water obstacles, to include the significant Waal River, yet the operation culminated before ever establishing a bridgehead. Operation Badr enjoyed an incredibly successful river crossing, but culminated in its attempt to transition to the breakout. Operation Plunder was a resounding operational success, achieved through immense preparation and respect for the act of crossing a river. These are but three crossings in a bloody history of fighting over rivers, a history of widely varying degrees of slaughter and success.

In more recent history, large-scale mechanized conflicts have largely occurred in locations that did not require an opposed gap crossing. However, it would be naïve to believe that this means it will never happen again.¹⁶³ This lull in river crossings has transformed the US Army's conception of them from what these case studies show to be a massive, river-focused operation into what today's doctrine calls an "implied task in a larger mission."¹⁶⁴ The various training centers in the Army still conduct large-scale mechanized warfare and many even incorporate gap crossings into their exercises. However, it needs to become a focal point instead

¹⁶² ADRP 3-0, 4-8. This describes the phasing and transitions element of operational art.

¹⁶³ David Fisher, *Morality and War: Can War be Just in the Twenty-first Century* (Oxford: Oxford University Press, 2011), 156; Toguchi, 85. Fisher points out the common error of militaries to assume that the most recent version of war will be identical to the next version, while Toguchi shows that early issues with river crossing in World War II stemmed from this type of assumption by failing to modify its river crossing doctrine or equipment after the First World War.

¹⁶⁴ ATTP 3-90.4, H-1; Army Training Pamphlet 3-91, *Division Operations* (Washington, DC: Government Printing Office, 2014), 6-36. The Division Operations manual addresses gap crossing operations merely by referring the reader to the gap crossing manual, which is largely tactical in nature.

of an implied task, as a crossing operation tests the entire combined arms formation. These cases have shown that planners cannot take a crossing for granted; it should in fact be its own phase in the operation. Doctrine at both the division level and at the unit level should address this focus explicitly and impress upon commanders and staffs that this is a massive, coordinated effort.

Even the most successful crossings in history have come with significant casualties. In the mechanized era, crossings have shown the need for extensive preparation, coordination, and synchronization of the entire combined arms force. Commanders and planners must not relegate the details of the crossing to the engineers while they look forward into a future environment they cannot adequately anticipate before the river is at their backs.¹⁶⁵ A river is a daunting obstacle that will test the very limits of operational reach of even the most modern military forces. As long as the US Army maintains its ability to employ mechanized divisions in combat, it must in turn accept the possibility of facing the challenge of an opposed river. The US Army must embrace this challenge to ensure it does not find itself unprepared in the future, blindly grasping for a bridge too far.

¹⁶⁵ John Ericson, "Some Technical Aspects of an Opposed River Crossing," *Military Review* 24, no.7 (October 1944): 9. Even in 1944, engineer officers recognized the need to integrate the crossing plan itself holistically into the overall operational plan.

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