A Means Towards Understanding: Reconnaissance and the Practice of Operational Art

A Monograph

by

Major Christopher D. L'Heureux

United States Army

School of Advanced Military Studies

United States Army Command and General Staff College

Fort Leavenworth, Kansas

AY 2011-02

REPORT DOCUMENTATION PAGE

Form Approved

OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
01-12-2011	Monograph	JAN 2011 – DEC 2011

4. TITLE AND SUBTITLE

A Means Towards Understanding: Reconnaissance and the Practice of Operational Art

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Major Christopher D. L'Heureux

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

School of Advanced Military Studies
250 Gibbon Avenue
Fort Leavenworth, KS 66027-2134

8. PERFORMING ORG REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for Public Release; Distribution is Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

This monograph examines the relationship between reconnaissance and the application of operational art. The operational artist requires reconnaissance to arrange tactical actions in time, space, and purpose to achieve an overarching strategic objective effectively. The artist uses reconnaissance as a means to gain relevant information and mitigate uncertainty by identifying potential risks and opportunities yet unknown, clarifying ambiguous situations, and providing the time and space to react to unforeseen circumstances. A lack of reconnaissance minimizes the amount of available relevant information and invites surprise increasing the probability that any given tactical action will not achieve the intended object.

The paper reviews the academic literature and doctrine regarding reconnaissance from 1860 through the present and evaluates the Vicksburg and Normandy campaigns to determine how reconnaissance shaped the arrangement of tactical actions in time, space, and purpose. It concludes that the operational artist requires reconnaissance to practice operational art effectively. Relevant information gathered by reconnaissance facilitates understanding and thus enhances planning and informs decision-making. The failure to utilize reconnaissance, however, leaves commanders and staffs without the relevant information necessary to make informed decisions and invites surprise.

15. SUBJECT TERMS

Operational Art, Reconnaissance, Cavalry, Vicksburg, Normandy, U.S. Army

16. SECURITY CLASSIFICATION OF: (U)			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. PHONE NUMBER** *(include area code)*
(U)	(U)	(U)	(U)	58	

Standard Form 298 (Rev. 8-98)

Prescribed by ANSI Std. Z39.18

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

Major Christopher D. L'Heureux

Title of Monograph: A Means Towards Understanding: Reconnaissance and the Practice of Operational Art.

Approved by:

_____ Thomas A. Bruscino, Ph.D.	Monograph Director
_____ Robert D. Haycock, COL, IN	Second Reader
_____ Thomas C. Graves, COL, IN	Director, School of Advanced Military Studies
_____ Robert F. Baumann, Ph.D.	Director, Graduate Degree Programs

Abstract

A MEANS TOWARDS UNDERSTANDING: RECONNAISSANCE AND THE PRACTICE OF OPERATIONAL ART by Major Christopher D. L'Heureux, United States Army, 58 pages.

This monograph examines the relationship between reconnaissance and the application of operational art. The operational artist requires reconnaissance to arrange tactical actions in time, space, and purpose to achieve an overarching strategic objective effectively. The artist uses reconnaissance as a means to gain relevant information and mitigate uncertainty by identifying potential risks and opportunities yet unknown, clarifying ambiguous situations, and providing the time and space to react to unforeseen circumstances. A lack of reconnaissance minimizes the amount of available relevant information and invites surprise increasing the probability that any given tactical action will not achieve the intended object.

The paper reviews the academic literature and doctrine regarding reconnaissance from 1860 through the present and evaluates the Vicksburg and Normandy campaigns to determine how reconnaissance shaped the arrangement of tactical actions in time, space, and purpose. It concludes that the operational artist requires reconnaissance to practice operational art effectively. Relevant information gathered by reconnaissance facilitates understanding and thus enhances planning and informs decision-making. The failure to utilize reconnaissance, however, leaves commanders and staffs without the relevant information necessary to make informed decisions and invites surprise.

Table of Contents

Introduction

A 1912 British Field Service Regulation asserted, "Time spent on reconnaissance is seldom wasted."[1] While this notion superficially appears obvious, it is actually profound. The century old proverb describes the intuitive idea that gaining information about an enemy is advantageous. While often unreliable and transient, information is the basis for military planning in the uncertain and unpredictable environment of war, a result of competitive interaction, chance, and friction.[2] It is through reconnaissance, however, that adversaries actively gain information about each other to build knowledge and understanding and increase the probability of successful action. While necessary, information is not a panacea, as it requires meaning, value, and synthesis to be useful.[3] It is through the understanding derived from gathered relevant information that commanders and staffs conduct operational art.[4]

---

[1]Peter G. Tsouras, ed., *The Book of Military Quotations* (St. Paul, MN: Zenith Press, 2005), 364.

[2]Antoine Bousquet, *The Scientific Way of War: Order and Chaos on the Battlefields of Modernity* (New York: Columbia University, 2009), 196; Carl von Clausewitz, *On War*, trans. and ed. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 117; U.S. Department of the Army, Field Manual (FM) 3-0, *Operations*, Change 1 (Washington, DC: GPO, 2011), 4-8; Milan N. Vego, *Operational Warfare* (Newport, RI: Naval War College, 2000), 203.

[3]Although the debate continues, many military theorists do not believe more information equals better decision-making as information requires comprehension for relevancy. Clausewitz claims the flow of information constantly challenges our decisions creating uncertainty. Handel and McLamb believe more information makes it harder to find relevant information. McMaster argues information superiority is a farce and asserts war is inherently uncertain. That does not mean information is unnecessary. Useful information, processed into intelligence by a staff or the genius of a commander provides a basis on which to act. The writings of Arquilla, Edwards, and Ronfeldt characterize the opposing school of thought. They believe networked information provides significant advantage and is a precursor of new and more effective methods of command and control. John Arquilla and David Ronfeldt, *Swarming & The Future of Conflict* (Santa Monica, CA: RAND Corporation, 2000), 2-4; Clausewitz, 102, 158; Sean J. A. Edwards, "Swarming and the Future of Warfare" (PhD diss., Pardee RAND Graduate School, 2004), 4-5; Michael I. Handel, *War, Strategy and Intelligence* (London: Frank Cass, 1989), 33; John Keegan, *Intelligence in War* (New York: Knopf, 2003), 5, 25, 334; Joseph S. McLamb, "The Future of Mission Orders," *Military Review* 77, no. 5 (October-September 1997): 71-74; H. R. McMaster, "Learning from Contemporary Conflict to Prepare for Future War," *Orbis* 52, no. 4 (Fall 2008): 564-584, 583; U.S. Department of the Army, Field Manual (FM) 6-0, *Mission Command: Command and Control of Army Forces* (Washington, DC: GPO, 2003), B-2 to B-3; Vego, *Operational Warfare*, 204, 216.

[4]According to U.S. Army doctrine, information is the meaning humans assign to facts and data. Relevant information is information of importance to the commander and staff in the exercise of command

Operational art is arrangement of tactical actions in time, space, and purpose to achieve strategic aims in total or in part.[5] First codified by the Soviets during the interwar period, it provides a framework to link separate combat efforts over time and space to achieve a general aim.[6] While battles and engagements constitute the tactical realm of war, strategy illuminates the political object and operational art links the two. Aleksandr Svechin stated the relationship simply; "Tactics makes up the steps from which operational leaps are assembled. Strategy points out the path."[7] The logic of operational art seeks to gain positions of advantage, or decisive points, through tactical action.[8] Each decisive point ideally provides the operational artist with multiple options to continue towards the achievement of the strategic aim. The operational environment, however, is a complex adaptive system that contests the practitioner's quest for options. Adversaries attempt to limit each other's choices creating uncertainty, thus operational logic is not rigidly structured.[9] It requires adaptability and achieves this by maintaining understanding, preserving the initiative, and building redundancy.[10] This requires a

---

and control. Information gained by reconnaissance is more likely relevant since commanders and staffs purposefully direct its collection. U.S. Department of the Army, FM 6-0, B-0 to B-2.

[5]U.S. Department of the Army, Army Doctrine Publication (ADP) 3-0, *Unified Land Operations* (Washington, DC: GPO, 2011), 9.

[6]G. S. Isserson, *The Evolution of Operational Art*, 2nd ed., trans. and ed. Bruce Menning (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 2005), 23; Bruce W. Menning, "The Origins of Operational Art," *Military Review* 77, no. 5 (October-September 1997): 32-47.

[7]Aleksandr A. Svechin, *Strategy*, trans. and ed. Kent D. Lee, 2nd ed. (Minneapolis, MN: East View Publications, 1992), 269.

[8]A decisive point is a geographic place, specific key event, critical factor, or function that, when acted upon, allows the commander to gain a marked advantage over an adversary or contribute materially to achieving success. U.S. Department of the Army, FM 3-0, *Operations*, Change 1, 7-9.

[9]Frans P. B. *Osinga, Science, Strategy and War: The Strategic Theory of John Boyd* (London: Routledge, 2007), 231-232.

[10]Bousquet, 188-189; U.S. Department of the Army, FM 6-0, 4-3.

comprehensive method of thinking since commanders and staffs must orchestrate operations dispersed in time and space but linked in purpose.

Operational thinking is the cognitive process used by the operational artist to translate strategic objectives into executable operations or campaigns. The operational artist must creatively arrange and envision simultaneous and sequential actions that gain positions of advantage towards the attainment of an ultimate objective. The three main elements of operational thinking are a broad outlook, intuitive ability, and mental agility. A broad outlook gives the operational artist an understanding of the interrelated effects of tactics and strategy, a holistic view of the conflict, and a distinctly comprehensive approach to the development of operations and campaigns. Operational thinkers also possess the intuitive ability to anticipate situations in an uncertain environment. They foresee the connection between mutually supporting tactical actions in time and space and the achievement of the strategic aims. Finally, they have the mental agility "to react to incoming information faster than it arrives."[11] These attributes provide the practitioner with understanding dependent upon relevant information that allows for the development of forethought. By laboring over a mass of relevant information and gaining understanding, the operational artist can consider an innumerable number of future scenarios

[11]Schneider, Hamilton, and Vego use a more nuanced taxonomy to describe operational thinking, also referred to as operational perspective or operational vision. Schneider describes operational thinking using three attributes: a unified and holistic approach, intuitive ability, and mental agility. Hamilton presents four: a broad outlook, inner perspective, historical perspective, and determination. Vego provides eight: a broad outlook, imagination, anticipation, intuition, coup d'oeil, inner perspective, historical perspective, and determination. James J. Schneider, *Vulcan's Anvil: The American Civil War and the Foundations of Operational Art* (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1992), 53, 59; William W. Hamilton, "Operational Vision–An Essential Trait for Army Operational Commanders" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 1991), 13; Vego, *Operational Warfare*, 569; Milan N. Vego, "Operational Commander's Intent," *Joint Forces Quarterly* 57 (April 2010): 138-144.

mitigating uncertainty.[12] What then, is the relationship between reconnaissance and the application of operational art within the context of major combat operations?

The operational artist requires reconnaissance to arrange tactical actions in time, space, and purpose to achieve an overarching strategic objective effectively. Reconnaissance provides the operational artist a tool to gain relevant information, which leads to the development of knowledge and understanding.[13] The arrangement of tactical actions requires an assessment of probability and effective decision-making informed by forethought, a cognitive process that uses understanding and knowledge to forecast future events. The artist uses reconnaissance as a means to gain relevant information and mitigate uncertainty by identifying potential risks and opportunities yet unknown, clarifying ambiguous situations, and providing the time and space to react to unforeseen circumstances. A lack of reconnaissance minimizes the amount of available relevant information and invites surprise increasing the probability that any given tactical action will not achieve the intended result.

Definitions

Current U.S. Army doctrine muddles the definition of reconnaissance within three constructs beginning with an activity called Intelligence, Surveillance, and Reconnaissance (ISR). Surveillance and reconnaissance are interrelated tasks that acquire information, which becomes intelligence after processing and analysis. In this sense, intelligence and relevant information are synonymous since both terms ascribe meaning to otherwise random data based on its importance to planning and the conduct of operations. The relationship between surveillance and reconnaissance, however, is unclear. Surveillance is "the systematic observation of aerospace,

[12]Jeff Stibel, "How Forethought (Not Intuition) Separates the Good from the Great," Harvard Business Review Blog, entry posted 20 October 2010, http://blogs.hbr.org/cs/2010/10/how_forethought_not_intuition.html#.TnKsgzE_ZiA.email (accessed 24 September 2011).

[13]U.S. Department of the Army, FM 6-0, B-2 to B-3.

surface, or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means."[14] Conversely, reconnaissance is "a mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area."[15] The reference to "other means or detection methods" in both definitions eliminates any distinction between them. Furthermore, doctrine strangely guides the ISR effort to focus "on priority intelligence requirements while answering the commander's critical information requirements."[16] Reconnaissance also resides in a second construct as an integral part of security operations. Security operations use reconnaissance to reduce the unknown, maintaining enemy contact to ensure continuous information, and provide timely reporting of information to the protected force.[17] Finally, reconnaissance is termed an enabling operation as it sets the conditions for future tactical actions or supports the current operations of a higher headquarters.[18] These three constructs define the context in which reconnaissance operations occur but fail to articulate the task clearly.

---

[14]U.S. Army doctrine defines ISR as an activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations. There is a movement to disaggregate the concept of ISR to articulate the differences between the terms and activities. David Maxwell, E-mail to Plans List Server Pentagon, "Rescinding Intelligence, Surveillance, and Reconnaissance (ISR) as an Army Term," 10 April 2010; U.S. Department of the Army, FM 3-0, *Operations*, Change 1, 4-8 to 4-9.

[15]U.S. Department of Army, FM 3-0, *Operations*, Change 1, 4-9.

[16]Priority intelligence requirements are part of the commander's critical information requirements. U.S. Department of Army, FM 3-0, *Operations*, Change 1, 4-8.

[17]The U.S. Army defines security operations as those operations undertaken by a commander to provide accurate and early warning of enemy operations, to provide the force being protected with time and maneuver space within which to react to the enemy, and to develop the situation to allow the commander to effectively use the protected force. U.S. Department of the Army, Field Manual (FM) 3-90, *Tactics* (Washington, DC: GPO 2001), 12-0, 13-0; U.S. Department of the Army, Field Manual (FM) 3-90.6, *The Brigade Combat Team* (Washington, DC: GPO 2006), 5-1.

[18]U.S. Department of the Army, FM 3-90, 12-0, 13-0.

For the purpose of this monograph, reconnaissance is any tactical action used to gain relevant information on the environment required by commanders and staffs for the planning or execution of military operations.[19] The primary purpose of reconnaissance is to support decision-making. The environment encompasses anything required for decision-making and includes adversary, civilian, infrastructure, weather, terrain, and other geographic features. Thus, reconnaissance subsumes ISR and surveillance within this broader definition. Within this context, reconnaissance helps the operational artist identify opportunities, mitigate uncertainty, and provide early warning.

Methodology

Understanding the link between operational art and reconnaissance requires a campaign analysis to acertain the connections between tactical reconnaissance actions and the arrangement of battles and engagements in time, space, and purpose. This monograph evaluates the Vicksburg and Normandy campaigns with aim of determining how reconnaissance shaped the operational artist's decisions. The second section, Literature and Doctrine provides a review of the academic literature and doctrine from 1860 through the present. The third section presents an analysis of Grant's Vicksburg campaign from December 1862 through July 1863 while the fourth section details the actions of the Allies during the Normandy campaign from 6 June through 25 August 1944. The historical case studies demonstrate the relationship between operational art and reconnaissance. The monograph concludes with an appraisal of how reconnaissance best supports the practitioner of operational art.

[19]The author's definition of reconnaissance is to combat intelligence. Combat intelligence is the knowledge of enemy, weather, and geographical features required by a commander in the planning and conduct of combat operations. U.S. Department of the Army, Field Manual (FM) 1-02, *Operational Terms and Graphics* (Washington, DC: GPO 2004), 1-35.

Literature and Doctrine

The literature reveals little concerning the relationship between operational art and reconnaissance but does articulate a clear debate over the utility of reconnaissance on the battlefield. A historical review of doctrine describes the process of thought by which the Army intends to conduct reconnaissance and the intended impact of reconnaissance on Army operations. Understanding the nature of reconnaissance operations requires an analysis of both the published literature and U.S. Army doctrine.

Literature Review

The importance of reconnaissance is not new as Sun Tzu conveys this idea in *The Art of War*. He places significance on determining the enemy's dispositions while concealing his own to enable a strike at a time and place where the enemy is unprepared.[20] Twenty-four hundred years later, Carl von Clausewitz came to similar conclusions within the context of uncertainty. In his work *On War*, Clausewitz addressed practical measures to provide early warning of enemy activities and protect the main force from the unexpected.[21] In the twentieth century, B. H. Liddell Hart likened battle to two men fighting in the dark. Each must first discover their adversary before seeking a vulnerability, all the while protecting oneself. Their aim is to deliver an attack "from an unexpected direction in an unguarded spot."[22] As these theorists contend, successful reconnaissance is the gathering of relevant information that leads to knowledge and understanding to facilitate the arrangement of actions on the battlefield.

---

[20]Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (London: Oxford University Press, 1963), 98.

[21]Clausewitz offered outpost lines and advanced guard formations as a hedge against uncertainty. Clausewitz, 102, 117-118, 304-305.

[22]B. H. Liddell Hart, "The 'Man-in-the-Dark' Theory of War," *National Review* 75 (June 1920): 473-484, 474.

Soviet operational theory linked reconnaissance to the achievement of campaign objectives. David Glantz describes the Soviet cybernetic reconnaissance-strike concept as a method of rapidly exploiting opportunities on the battlefield through successful tactical reconnaissance tied to responsive fires. While the Soviets were not explicit, they did address the connection between reconnaissance and the opportunity to shape the success of larger operations.[23] In contrast, American writing on the subject focuses on the connection between reconnaissance and the operational level of war. Matthew Green proposes a theory of operational reconnaissance formed from German, Russian, and U.S. doctrine. To Green, analyzed information collected through reconnaissance becomes intelligence to support decision-making at each level of war.[24] Milan Vego, like Green, describes reconnaissance as an activity that gathers information for an intelligence cycle at the tactical, operational, and strategic levels of war.[25]

The debate concerning the utility of reconnaissance at the tactical level consists of four themes: combat versus stealth, general versus specialized, hybrid organizations, and technologists. The most significant discussion of reconnaissance focuses on whether forces gain information through stealth or combat. Multiple works argue for units optimized to fight for information.[26] There are opponents, however, who claim that directed information gathering ends

[23]Cybernetic warfare is a concept that centralizes military command and control based on the assumption that information dominance is positively correlated to success. Bousquet, 6, 161; David M. Glantz, *Soviet Military Operational Art: In Pursuit of Deep Battle* (London: Routledge, 1991), 256-257.

[24]Matthew K. Green, "Operational Reconnaissance: The Missing Link?" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2003), 12, 45-47.

[25]Vego, *Operational Warfare*, 212-213.

[26]Robert S. Cameron, *To Fight or Not To Fight? Organizational and Doctrinal Trends in Mounted Maneuver Reconnaissance from the Interwar Years to Operation IRAQI FREEDOM* (Fort Leavenworth, KS: Combat Studies Institute Press, 2010), 575-576, 578; Thomas W. Cipolla, "Cavalry in the Future Force: Is there Enough?" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2004), 40, 42; Matthew A. Dooley, "Ignoring History: The Flawed Effort to Divorce Reconnaissance and Security in Modern Cavalry Transformation" (Master's Thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 2006), 12-13, 96-98; Brian C. Goings, "Gone to Fiddler's Green: Reconnaissance and Security for the Corps" (Monograph, School of Advanced Military Studies, Fort

once combat begins. They concede that fighting provides information but claim any combat unit can fight for information, thus the Army ought to optimize reconnaissance forces towards stealthy collection.[27] Within this discussion, the majority consider specialization important, with the exception of John McGrath. He contends reconnaissance operations are general tasks within the capability of any combined arms unit, although he recommends placing technical surveillance into specialized intelligence organizations.[28] This opinion contrasts with those who argue for multifunctional forces. Multifunctional or hybrid organizations use different modes of information collection within one organization to provide redundancy.[29] The final argument surrounds information superiority. One side believes technology improves situational

---

Leavenworth, KS, 2011), 14, 53; Herbert L. Skinner, "White Space: The Lack of Divisional Cavalry in the Modular Force" (Report, U.S. Air Force Air University, 2006), 29; Curtis D. Taylor, "The Transformation of Reconnaissance: Who Will Fight for Information on the Future Battlefield?" (Master's Thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 2005), 67; Andrew J. Watson, "The U.S. Cavalry: Still Relevant in Full Spectrum Operations?" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2010), 50, 54; Keith Walters, "Who Will Fulfill the Cavalry's Functions?" *Military Review* 91, no. 1 (January-February 2011): 80-85, 85.

[27]The 2011 Full Spectrum Operations Mission Essential Task List separates reconnaissance and security operations at the brigade level. Several specialist brigades conduct intelligence, surveillance and reconnaissance operations while the three combat brigades conduct security operations. U.S. Department of the Army, "HQDA Approved Standardized FSO METL," Army Training Network, https://atn.army.mil/fso/default.aspx (accessed 10 July 2011); J. Bryan Mullins, "Defining the Core Competencies of U.S. Cavalry" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2004), 2-3, 62.

[28]John J. McGrath, *Scouts Out! The Development of Reconnaissance Units in Modern Armies* (Leavenworth, KS: Combat Studies Institute Press, 2008), 203-204.

[29]Presently some reconnaissance units are hybrid possessing ground scouts and sensors, unmanned aerial systems and signals intercept capability. Cipolla, 47; Christopher M. Hickey, "Heavy Brigade Offensive Reconnaissance Operations: A Systems Perspective" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 1998), 40; Victor Holman, "Cavalry Operations in Support of the Force XXI Commander" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 1996), 2; David E. Johnson, Occasional Paper, *Military Capabilities for Hybrid War: Insights from the Israeli Defense Forces in Lebanon and Gaza* (Santa Monica, CA: RAND Corporation, 2010), 4; John D. Rosenberger, "Breaking the Saber: The Subtle Demise of the Cavalry in the Future Force," *AUSA Institute of Land Warfare Publication*, no. 04-1 (June 2004), http://www.ausa.org/SiteCollectionDocuments/ILW%20Web-ExclusivePubs/Landpower%20Essays/LPE04-1.pdf (accessed 23 March 2011).

understanding and provides the force with relative information superiority a marked advantage.[30] Technology drives faster decision-making by gaining and disseminating information quicker, clearing war's uncertainty and increasing relative tempo.[31] From this, the idea of developing the situation out of contact with the enemy appeared. The rivals of Dominant Battlespace Knowledge challenge this notion. While they view technology as important, they believe uncertainty in warfare is an inherent characteristic regardless of technological improvement.[32] These themes give insight into the current academic and professional arguments regarding reconnaissance operations on the modern battlefield.

Doctrine Review

The *Field Service Regulations* and subsequently named operations manuals house the capstone ideas that govern how the U.S. Army views the nature of operations. These ideas set the foundation for how the Army intends to fight and inform subordinate supporting doctrine.[33] A survey of capstone doctrine reveals the relative importance of reconnaissance operations within the context of how the Army operates.

There was relative continuity of reconnaissance thought within U.S. Army capstone doctrine from the 1860s through the 1950s. Reconnaissance sought to gain information required

[30]Stuart E. Johnson and Martin C. Libicki, eds., *Dominant Battlespace Knowledge: The Winning Edge* (Washington, DC: National Defense University, 1995), 79, 81; Michael C. Kasales, "The Reconnaissance Squadron and ISR Operations," *Military Review* 82, no. 3 (May-June 2002): 52-58.

[31]Michael C. Kasales and Matthew E. Gray, "Leveraging Technology: The Stryker Brigade Combat Team," *Armor* (January-February 2003): 7-8, 7-13.

[32]Michael O'Hanlon, *Technological Change and the Future of Warfare* (Washington, DC: Brookings Institute Press, 2000), 194-195; Louis B. Rago, "Cavalry Transformation: Are We Shooting the Horse Too Soon?" (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2010), 65-67.

[33]U.S. Department of the Army, FM 3-0, *Operations*, Change 1, D-1.

by the commander with the ultimate goal of achieving and preventing surprise.[34] It transitioned from a general topic to an activity subordinate to information in 1893. Intelligence superseded information as a topic header in 1939 but the change was superficial as intelligence and information possessed similar definitions. Reconnaissance doctrine continued to center on the tactics of gaining information during offensive and defensive operations.[35] By 1958, the *Field Service Regulations* viewed intelligence, reconnaissance, counterintelligence, and counterreconnaissance as a series of interrelated tasks.[36] Security remained a separate activity, however, though doctrine repeatedly acknowledged a definitive connection between it and reconnaissance operations.[37] The U.S. Army described reconnaissance in terms of the employment of forces in the field, a decidedly tactical approach until 1962.

The 1962 publication of the *Field Service Regulations* used principles of war and operational concepts with a supporting a typology of operations to guide how the Army fought. The shift away from the tactical employment of forces severely curtailed the discussion of

---

[34]Arthur L. Wagner, *The Service of Security and Information* (Kansas City, MO: Hudson-Kimberly Publishing, 1893), 107; War Department, *Regulations for the Army of the United States, 1861* (New York: Harper Brothers, 1861), 85.

[35]Tactics is the employment and arrangement of forces in relation to each other to win battles or engagements. U.S. Department of the Army, FM 3-90, 1-1.

[36]According to the 1958 *Field Service Regulations*, intelligence provides knowledge about the enemy and the area of operations. Reconnaissance is the directed effort in the field to collect information of the enemy and the area of operations. Counterintelligence is the destruction or neutralization of the effectiveness of hostile espionage, sabotage, and subversive activities. Counterreconnaissance is the active effort to neutralize enemy reconnaissance. Security operations prevent surprise, observation, espionage, sabotage or annoyance. U.S. Department of the Army, Field Manual (FM) 100-5, *Field Service Regulations: Operations*, Change 3 (Washington, DC: GPO, 1958), 47-55.

[37]The relationship between reconnaissance and security is complex and as the two activities occur within the same time and space but have opposing imperatives. While reconnaissance focuses on gaining information about the enemy or terrain, security orients on the protected force. Denying the enemy information is one method of preventing surprise; possessing enemy information also prevents the surprise of the protected force. Wagner, 20-21; War Department, *Field Service Regulations, United States Army 1905, With Amendments to 1908* (Washington, DC: GPO, 1908), 38; War Department, *Field Service Regulations, United States Army 1923* (Washington, DC: GPO, 1924), 36-37, 41-42; War Department, Field Manual 100-5, *Field Service Regulations* (Washington, DC: GPO, 1941), 48; U.S. Department of the Army, FM 100-5, *Field Service Regulations: Operations*, Change 3, 54.

reconnaissance. Still subordinate to intelligence, doctrine supplemented reconnaissance with combat surveillance. While reconnaissance was the directed effort to gain information through observation, surveillance was the systematic observation of the battle area. Unfortunately, the two definitions overlapped and created confusion. The Army also introduced security and surprise as principles of war further emphasizing the importance of information.[38] Despite significantly reduced emphasis, reconnaissance thought remained remarkably continuous during this period.

The arrival of Active Defense in 1976 represented a radical change in doctrine. The new operating concept used reconnaissance to facilitate the arrangement of tactical actions and concentrate combat power at the decisive point. Surprise remained a critical factor within this concept as commanders sought to avoid enemy strength. Reconnaissance would locate weakness in the offense and defense, and drive maneuver by indentifying the decisive point.[39] The introduction of AirLand Battle modified this construct only slightly. Similar to Liddell Hart's indirect approach, the imperatives of the 1982 version of AirLand Battle sought to maneuver strength against enemy weakness in depth and organized reconnaissance for this purpose.[40] The revised version of AirLand Battle published in 1986 envisioned the use of reconnaissance, intelligence, targeted strikes, and maneuver as the fundamentals of success in combat. Commanders needed to synchronize activities, anticipate events, concentrate strength against

[38]Combat surveillance is the systematic observation of an area by any means and specifically included aerial reconnaissance. This ushered in a period of doctrinal ambiguity between reconnaissance and surveillance. Principles of war were previously found in the 1939 and 1952 *Field Service Regulations* but this was the beginning of their routine treatment within operations doctrine. U.S. Department of the Army, Field Manual (FM) 100-5, *Field Service Regulations: Operations*, Change 1 (Washington, DC: GPO, 1964), 54.

[39]U.S. Department of the Army, FM 100-5, *Operations*, Change 1, 4-3 to 4-5, 5-10.

[40]B. H. Liddell Hart, *Strategy: The Indirect Approach* (New York: Praeger, 1954), 31; U.S. Department of the Army, Field Manual (FM) 100-5, *Operations* (Washington, DC: GPO, 1982), 2-4, 2-8, 2-10, 7-0, 8-6, 9-1.

weakness, and "throw the enemy off balance with a blow from an unexpected direction."[41] Reconnaissance helped the commander decide when and where to fight and how produce the conditions necessary to achieve this goal.[42]

When the Fundamentals of Army Operations replaced AirLand Battle in 1993, the Army's doctrinal focus shifted away from a coherent operating concept. The new construct was a framework of environments, capabilities, principles, and tenets to describe the characteristics of successful operations. Doctrine emphasized the importance of reconnaissance in the offense and defense but there was no direct link between these activities and future operations. The manual described reconnaissance in general terms of little use: "Reconnaissance precedes all successful operations."[43] This doctrine, however, reiterated the connection between effective reconnaissance and the security of the force. Reconnaissance remained important to Army operations but how it shaped the battle was no longer clear in doctrine.[44]

Full Spectrum Operations emerged as the Army operating concept of the last decade and used the principles of war, tenets of Army operations, and elements of combat power as a guide to conduct simultaneous offense, defense, and stability or civil support operations. Within this concept, Army forces conducted reconnaissance to develop the situation, prevent surprise, and retain the initiative. Though gaining information assumed new importance, reconnaissance did not contribute directly to the operating concept. Instead, doctrine assumed relative information

[41]U.S. Department of the Army, Field Manual (FM) 100-5, *Operations* (Washington, DC: GPO, 1986), 14, 17, 23, 26.

[42]U.S. Department of the Army, FM 100-5, *Operations* (1986), 10.

[43]U.S. Department of the Army, Field Manual (FM) 100-5, *Operations* (Washington, DC: GPO, 1993), 2-11.

[44]U.S. Department of the Army, FM 100-5, *Operations* (1993), 2-5, 2-10 to 2-11, 3-11, 8-5, 9-1.

superiority would magnify the effects of maneuver, firepower, and protection without a template for action.[45]

The Army's new operating concept is abstract compared to previous doctrines and does not address reconnaissance specifically. Army forces in Unified Operations "seizes, retains, and exploits the initiative to gain and maintain a position of relative advantage in sustained land operations through simultaneous offensive, defensive, and stability operations in order to prevent or deter conflict, prevail in war, and create the conditions for favorable conflict resolution."[46] The application of this new doctrine purposefully remained broad but the construct does not connect reconnaissance to an operating concept. A future subordinate manual will likely address the role of reconnaissance within Army operations.

Reconnaissance thought remained generally consistent although its application and relative importance varied. Throughout, reconnaissance was a task to gain information, but until the development of Active Defense, the discussion of reconnaissance was purely tactical. Doctrine in the 1970s and 1980s, however, utilized reconnaissance as a driver of future operations within an operating concept. During this period, doctrine expected reconnaissance to shape the arrangement of tactical actions on the battlefield. Since 1993, doctrinal changes eliminated reconnaissance as part of an operating concept and relegated reconnaissance again to the tactical realm. Today the discussion of reconnaissance in doctrine remains tactical in application and disaggregated from an operating concept.

[45]U.S. Department of the Army, FM 3-0, *Operations* (2001), 2-6, 4-3, 4-10, 6-10, 7-10, 8-11, 11-3, 11-7 to 11-10; U.S. Department of the Army, FM 3-0, *Operations*, Change 1, 3-21, 4-8, 5-5, 6-3, 6-5.

[46]U.S. Department of the Army, ADP 3-0, *Unified Land Operations*, 1, 14.

Vicksburg Campaign

A campaign analysis of Vicksburg provides seven examples where reconnaissance affected the arrangement of tactical actions to achieve the campaign objective. These reconnaissance operations occurred during the Union's overland advance; Grant's Bayou Expeditions; the search for a crossing point south of Vicksburg; the decision to march east towards Edward; the battles at Raymond and Champion Hill; and the covering operation to protect the Federal siege. The Vicksburg campaign also illustrates a clear example of the practice of operational art through Ulysses S. Grant, who uses relevant information to inform his understanding and make decisions. While the options to pursue the collection of information were limited, this campaign presents clear a connection between reconnaissance and the arrangement of tactical actions and demonstrates the affect of reconnaissance on the conduct of operations through the decisions made by Grant.

By the end of 1862, neither Union nor Confederate forces attained any advantage in the War Between the States. Failure and missed opportunity characterized the Federal effort and the Southern summer offensives produced very little. President Lincoln urged his commanders to take offensive action but none materialized.[47] Lincoln's patience reached its limit in July when he replaced Major General George B. McClellan with Major General Henry W. Halleck as General-in-Chief. Halleck immediately pushed the eastern armies to unite for a concentrated drive on Richmond but gained more traction in the west with the idea of gaining control of the Mississippi River.[48] Lincoln also wanted control of the river at Vicksburg, as it was the only railroad link

[47]Abraham Lincoln, *The Collected Works of Abraham Lincoln*, to George B. McClellan, 13 October 1862, 5:460-461, http://quod.lib.umich.edu/l/lincoln/lincoln5/1:1005.1?rgn=div2;singlegenre=All;sort=occur;subview=detail;type=simple;view=fulltext;q1=this+letter+is+in+no+sense+an+order (accessed 28 August 2011).

[48]U.S. War Department et al., *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington, DC: GPO, 1886), Halleck to Curtis, 7 August 1862, 1st ser., vol. 17, pt 1:544.

between the resource rich Trans-Mississippi region and the remainder of the South.[49] The seizure of Vicksburg would split the Confederacy, deny it access to significant resources, and open the river to Union commerce. Halleck devised a theater strategy to gain the Mississippi River and ordered Major General Nathaniel Banks to attack up the Mississippi River from New Orleans while Major General Ulysses S. Grant and the Union armies in east Tennessee and Arkansas fixed Confederate forces in place.[50] Grant, however, was also aware of the city's significance and informed Halleck in early November of his intent to capture it.

The Army of the Tennessee based its reconnaissance operations on established doctrine but adapted the practice to the realities of the battlefield. The most widely read military text of the time was Halleck's *Elements of Military Art and Science* and it placed reconnaissance under the heading Field Engineering.[51] Although topography and map-making were a part of reconnaissance and necessitated unique skills, Grant's army required significantly more information on terrain and the enemy than his small number of engineers could provide.[52] Early Union regulations stipulated reconnaissance as general task for the infantry and cavalry and those units collected and reported information as part of advance guard formations, outpost lines, or through patrolling and skirmishing.[53] In practice, infantry skirmishers tended to perform close

---

[49]David D. Porter, *Incidents and Anecdotes of the Civil War* (New York: D. Appleton, 1886), 95-96.

[50]Donald Stoker, *The Grand Design: Strategy and the U.S. Civil War* (New York: Oxford, 2010), 162, 209.

[51]Edward Hagerman, *The American Civil War and the Origins of Modern Warfare: Ideas, Organizations, and Field Command* (Bloomington, IN: Indiana University Press, 1988), 14; Henry W. Halleck, *Elements of Military Art and Science* (New York: Appleton, 1846), 342.

[52]Christopher R. Gabel, *Staff Ride Handbook for The Vicksburg Campaign, December 1862–July 1863* (Fort Leavenworth, KS: Combat Studies Institute, 2001), 54.

[53]Halleck, 268; George B. McClellan, *Regulations and Instructions for the Field Service of the United States Cavalry in Time of War* (Philadelphia: J. B. Lippincott, 1861), 106; War Department, *Infantry Tactics for the Instruction, Exercise, and Maneuver of the United States Infantry* (Philadelphia: J. B. Lippincott, 1861), 156; War Department, *Regulations for the Army of the United States, 1861*, 79, 85.

reconnaissance while the cavalry's excellent mobility, range, and adequate firepower optimized it for distant reconnaissance.[54] Other techniques existed but were either unavailable or not broadly utilized.[55] None of the published doctrine, however, dealt with units the size of the Army of the Tennessee making adaptation a necessity. Grant organized a separate cavalry division to conduct reconnaissance during his advance through central Mississippi, but abandoned the practice once the Mississippi River became his line of communication. Instead, he ordered his subordinate corps to conduct reconnaissance missions in support of the army's operations. The corps commanders then tailored their forces for the specific task to meet Grant's intent. This modified system brought the Army of the Tennessee significant amounts of relevant information.

The Army of the Tennessee initially began its advance overland towards the Confederate river fortress at Vicksburg but the failure in central Mississippi prompted Grant to forgo this attack in lieu of an approach down the Mississippi River. Confederate Lieutenant General John C. Pemberton's 30,000 troops defending the fortress, however, continued to stymie Union efforts for six months and as a result, several Confederate units withdrew to more threatened areas of the South.[56] Continually thwarted by the Confederate opposition, Grant eventually accepted increased risk and ran his supporting river flotilla past the Confederate artillery at Vicksburg to land his army south of the city. In a stunning 19 day advance, the Army of the Tennessee, with limited supplies, moved 200 miles and fought 5 major engagements defeating a relief force under General Joseph E. Johnston and isolating Pemberton's 30,000 defenders within Vicksburg. Union forces succeeded through rapid maneuver and concentration for battle, something the

---

[54]Hagerman, xii.

[55]For example, observation balloons were not available at Vicksburg and espionage was not broadly utilized. Gabel, 53; Warren E. Grabau, *Ninety-Eight Days* (Knoxville, TN: University of Tennessee, 2000), 258.

[56]Gabel, 74; James M. McPherson, *Battle Cry of Freedom: The Civil War Era* (New York: Oxford, 1988), 626.

Confederates were unable to achieve. After two unsuccessful assaults against the city and a 47-day siege, Grant accepted Pemberton's surrender on 4 July 1863 ending a campaign that left 21,000 Union and Confederate troops as casualties.[57] The campaign not only destroyed Pemberton's army resulting in the capture of 31,600 men, 172 cannon, and 60,000 muskets, but it also severed the connection between the Confederacy and the resources of the southwest creating a Confederate food shortage.[58] When Bank's captured Port Hudson on 9 July, the Mississippi River at last fell into Union hands prompting President Lincoln to say the campaign was, "one of the most brilliant in the world."[59]

The first impact reconnaissance imposed on the development of Grant's Vicksburg campaign occurred during the overland advance. Leaving a small force to cover the rear area and following a single rail track heading south through central Mississippi, the Army of the Tennessee moved along a line of operations from Grand Junction, through Holly Springs, to Grenada. The Mississippi state capitol at Jackson was 200 miles away and from there, the objective of Vicksburg lay only 50 miles east.[60] Confederate forces withdrew as Grant's army of 40,000 troops surged forward behind a cavalry screen.[61] The light resistance encountered by the

---

[57]R. Ernest Dupuy and Trevor N. Dupuy, *The Harper Encyclopedia of Military History*, 4th ed. (New York: HarperCollins, 1993), 968, 972-973; U.S. Department of the Interior, Vicksburg National Military Park, "General Summary of Casualties, March 29–July 4," http://www.nps.gov/vick/historyculture/upload/Sum%20of%20Casualties.pdf (accessed 27 August 2011).

[58]James R. Arnold, *Grant Wins the War: Decision at Vicksburg* (New York: John Wiley and Sons, 1997), 305; U.S. Grant," Military Strategy of the Civil War," *Military Affairs* 22, no. 1 (Spring 1958): 13-25.

[59]Lincoln, to Isaac N. Arnold, 26 May 1863, 6:230-231, http://quod.lib.umich.edu/l/lincoln/lincoln6/1:501.1?rgn=div2;singlegenre=All;sort=occur;subview=detail;type=simple;view=fulltext;q1=shall+or+shall+not+consummate+the+capture+of+vicksburg (accessed 23 August 2011).

[60]Winston Groom, *Vicksburg 1863* (New York: Knopf, 2009), 184.

[61]U.S. War Department et al., *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington, DC: GPO, 1887), Headquarters, Cavalry Division, Department of the Tennessee, General Order #1, 26 November 1862, ser. 1, vol. 17, pt. 2:363-364.

Union cavalry convinced Grant that Confederate forces were retreating but Grant, despite his desire, was unable to capitalize on this information.[62] Union troops halted in early December when the logistics situation demanded Grant repair the rail line and push a supply depot forward. During the lull, Union scouts reported 20,000 Confederate troops entrenched along the Yalobusha River at Grenada; this coupled with the slow rate of advance influenced Grant to adjust his plan.[63] He realized that a strong Confederate position at Grenada meant a weak Confederate position at Vicksburg so he dispatched Major General William Tecumseh Sherman to take command of the Union forces gathering at Memphis and ordered him to assault Vicksburg from a line of operations on the Mississippi River.[64]

Union reconnaissance conducted during the advance was effective, but it failed to provide early warning of Confederate raiders along a 180-mile Union line of communication that stretched back to Columbus, Kentucky.[65] Grant's meager forces arrayed along the Central Mississippi Railroad did not provide sufficient time or space to react to the approach of the

[62]U.S. War Department et al., *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington, DC: GPO, 1886), Grant to Halleck, 5 December 1862, ser. 1, vol. 17, pt. 1:471-473.

[63]McPherson, 577, 638.

[64]Both military necessity and political expediency motivated this action. Major General John A. McClernand, one of Grant's subordinates, lobbied President Lincoln for a separate command in the west. Grant, doubting McClernand's military competence and sensing his success at forming an independent command, sent Sherman to assume command in Memphis before McClernand arrived. Sherman's new line of operations presented Pemberton with three poor choices: face Grant and lose Vicksburg to Sherman, withdraw to meet Sherman and leave Grant free to descend on Jackson or split the Confederate forces and fight outnumbered on both fronts. Paul C. Jussel, "Operational Raids: Cavalry in the Vicksburg Campaign, 1862-1863" (Master's Thesis, U.S. Army Command and General Staff College, 1990), 17; Ulysses S. Grant, *Personal Memoirs of U.S. Grant* (1886; repr., New York: The Library of America, 1990), 1:283, 287.

[65]David G. Martin, *The Vicksburg Campaign: April 1862–July 1863* (Conshohocken, PA: Combined Books, 1990), 74.

enemy.[66] Two Confederates forces under Nathan Bedford Forrest and Earl Van Dorn surprised Union troops, disrupted the Federal line of communication, and destroyed the Union forward supply depot.[67] Within sight of the Yalobusha River, Grant began his withdrawal north on 21 December. Sherman did not receive Grant's message and a reinforced Confederate defense soundly defeated Union troops on 29 December in the shadow of Vicksburg.[68] The failure to gain relevant information concerning Confederate movements against the Union line of communication resulted in surprise, heavy casualties, and forced changes to Grant's operational approach.

Forgoing a march through central Mississippi, Grant sought to land his army on either the northern or the southern flank of the Vicksburg fortress using the Mississippi River.[69] Between January and April of 1863 while the floodplain was full, Grant directed three reconnaissance efforts intended identify a position of advantage providing a second example of reconnaissance's affect on the arrangement of tactical actions. The uncertain environment during the early stages of the campaign caused Grant to look for additional options.[70] In the first attempt, Grant ordered

---

[66]U.S. War Department et al., *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington, DC: GPO, 1887), Sullivan to Rawlins, 14 December 1862, ser. 1, vol. 17, pt. 2:413.

[67]On 13 December, Forrest crossed the Tennessee River unobserved and began his raid into west Tennessee. He destroyed over 50 miles of rail and telegraph line and inflicted more than 2,000 Union casualties. Two days later, Van Dorn took his command around Grant's main body and destroyed the Union forward supply depot at Holly Springs. Groom, 194, 200-201.

[68]McPherson, 578-579.

[69]Grant took personal command of the army, reorganized it into four corps, consolidated it on the Mississippi River northwest of Vicksburg, and ensured the security of the Memphis–Corinth line. Using the Mississippi River as his line of communication and leveraging the strength of the Federal navy, Grant began his search for a location to bring his army ashore on the eastern bank. His problem was the interface between river, the impassable swamps on the east side of the Mississippi north of Vicksburg to Memphis, the unassailable bluffs guarded by Confederate troops, and the fortress of Vicksburg itself. Grant, *Personal Memoirs*, 1:294-295.

[70]Grant attempted five actions designed to achieve a position of advantage but only three were reconnaissance missions. The reconnaissance missions were the Lake Providence Expedition, the Yazoo Pass Expedition, and Steele's Bayou Expedition. The remaining two actions, named Grant's Canal and the

Major General James B. McPherson, the XVII Corps Commander, to reconnoiter a route from Lake Providence 75 miles upriver through several bayous and rivers ultimately ending where the Mississippi and Red Rivers intersect 190 miles to the south of Vicksburg. The attempt was without promise as McPherson made slow progress and discovered the route would support only light vessels with insufficient capacity to maintain a sizable force.[71] When Grant realized the Lake Providence Expedition would likely fail, he ordered Sherman to examine the Yazoo Pass. The Yazoo Pass Expedition began 150 miles to the north and sought a route and landing north of the Vicksburg bluffs. The expedition, composed of a joint army–navy force, moved slowly along the Yazoo Pass, through the Coldwater River, to the Tallahatchie River before meeting Confederate resistance at the confluence of the Tallahatchie and Yalobusha Rivers. The slow Union advance gave Pemberton time to reposition forces and after three failed assaults, the joint Union force withdrew. Grant's final attempt at using the high water to bypass the Vicksburg batteries was Steele's Bayou Expedition. Again, a joint Union force attempted to find a route from the Mississippi River to the bluff through swamp and bayou but failed when Confederate forces arrived.[72] Each reconnaissance mission attempted to discover an opportunity to position Federal forces in an advantageous position relative to the Confederates but instead confirmed the infeasibility of the proposed tactical action.

On 2 April, Grant, Sherman, and Rear Admiral David Dixon Porter, the Federal naval commander, reconnoitered the bluffs north of Vicksburg to measure the feasibility of another direct assault, but they decided the cost in men and material were prohibitive. With no evident

---

Duckworth Canal, were engineering efforts designed to create a water route that bypassed Vicksburg's artillery.

[71]McPherson, 578.

[72]Groom, 238, 244-245, 252-254, 260-261; William L. Shea and Terrence J. Winschel, *Vicksburg is the Key: The Struggle for the Mississippi River* (Lincoln, NE: University of Nebraska, 2003), 63-64, 69-75.

options available, Sherman advised Grant to attempt overland advance again.[73] Grant, however, disregarded his subordinates' concerns and ordered McClernand, the XIII Corps Commander, to reconnoiter south along the west bank of the Mississippi River providing the third example of reconnaissance's affect upon Grant's actions. Grant intended to mass his army south of Vicksburg and cross the Mississippi at some point along the sparsely defended stretch between the Confederate fortresses at Vicksburg and Port Hudson. McClernand's corps successfully reconnoitered a passable route south beyond the range of Vicksburg's artillery and on 16 and 22 April, Porter ran the Federal flotilla past the fortress artillery, and met the Army of the Tennessee thirty miles south of the city.[74] Throughout, Pemberton was unable to discern Federal intentions but believed Union troops were in the process of withdrawing.[75]

Grant's immediate objective was to seize a foothold on the east bank of the Mississippi River at Grand Gulf but Porter expressed concern over a direct assault. Grant, set on Grand Gulf as an objective for logistical reasons, sent a regiment to search of way to outflank the position but found none.[76] The direct assault on 29 April failed since the Federal flotilla could not silence the enemy guns forcing changes to the plan.[77] During the night, Union reconnaissance parties crossed to the east bank of the Mississippi seeking an alternative landing site. One party came upon a slave with information of a plantation landing at Bruinsburg that possessed a quality road leading up the bluff to Port Gibson, twelve miles inland. After Grant met the man, he ordered the landing

[73]Arnold, 63, 68.

[74]Groom, 275. McPherson, 627.

[75]To deceive Pemberton, Grant launched several cavalry raids as feints from Memphis through central and eastern Mississippi. He also ordered Sherman to conduct a demonstration with XV Corps at Snyder's Bluff north of the city. Arnold, 96; Groom, 281-285, 288; U.S. War Department et al., *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington, DC: GPO, 1889), Pemberton to Johnston, 12 April 1863, ser. 1, vol. 24, pt. 3:733, 735, 738; Grabau, 102.

[76]Arnold, 88-89.

[77]Shea and Winschel, 103-104.

at Bruinsburg the next day.[78] Grant used Union reconnaissance to search for opportunities that were unforeseen and their effective use of reconnaissance forces allowed for the discovery of the Bruinsburg crossing site paving the way for a successful unopposed crossing on 30 April.[79]

The fourth instance transpired after Union forces seized a lodgment on the east bank of the Mississippi River. There Grant's army paused to stockpile critical supplies and conduct reconnaissance to support future operations. Grant contemplated two courses of action; he could either attack directly north against the Vicksburg defenses or advance east and cut Pemberton's line of communication to Jackson.[80] As both alternatives entailed risk, Grant tested his options by ordering McPherson to reconnoiter the route from Hankinson's Ferry north to Vicksburg. McPherson's reconnaissance struck the Confederate picket line eight miles north of the Big Black River after traversing extremely restrictive terrain. The Confederate fortifications were formidable but they gave no chase as the Federal troops disengaged. To Grant, this reconnaissance indicated that any engagement to the north would be costly and slow through difficult terrain and an entrenched enemy. The Confederates, however, seemed content to entrench themselves, alleviating the worry of a counterattack. Thus, Grant decided to head east towards Edwards and cut Vicksburg's rail line using the Big Black River to protect his flank believing a threat to Pemberton's line of communication would force a decisive battle.[81] McPherson's reconnaissance-in-force clarified the situation which drove Grant's decision to strike east instead of north directly towards Vicksburg.

---

[78]Gabel, 118; Grabau, 144-145.

[79]Grabau, 148.

[80]Gabel, 128.

[81]Arnold, 126; Grabau, 196-199.

The three Union corps commanders received their orders to advance from Grant on 10 May. McClernand's XIII Corps would advance on the left tied to the east bank of the Big Black River. Sherman's XV Corps occupied the center and advanced towards Edwards. McPherson's XVII Corps advanced on the army's right oriented on Raymond. Confederate Brigadier General John Gregg's brigade surprised McPherson's corps outside of Raymond on the morning of 12 May providing another example of the importance of reconnaissance. McPherson, marching through enemy territory for several days, was cautious since he believed the Confederates knew his strength. Initially, McPherson assumed the Gregg's Confederate force was of sufficient number to defend Raymond and the mid-morning Confederate counterattack further shook his confidence. McPherson cautiously thickened his line with regiments piecemeal throughout the morning and by early afternoon began pushing the Confederates back. By dusk, the Confederates had withdrawn and a disorganized XVII Corps occupied Raymond.[82]

The Battle of Raymond changed Grant's understanding of the environment and caused him to reconsider his plan yet. Although ultimately successful at Raymond, McPherson had no sense of the size of the Confederate contingent he engaged. He only knew it put up a difficult fight before retiring towards Jackson. In addition, Grant was aware that Confederate General Joseph E. Johnston was due to arrive in Jackson with more Confederate troops. Rumors also persisted that Confederate General P. T. Beauregard would arrive with Confederate reinforcements from the east. Furthermore, McClernand's corps on the left of the army had skirmished with Confederate troops under Bowen in vicinity of Edwards. Based on this incomplete understanding, Grant decided to attack Jackson and eliminate the threat to his rear before dealing with Pemberton.[83]Grant thus ordered the Army of the Tennessee to concentrate

[82]Arnold, 130; Grabau, 223, 230-234.

[83]Arnold, 135-136; Grabau, 234, 240.

around Jackson and Raymond. The next morning, 14 May, two corps under McPherson and Sherman attacked Jackson in a rainstorm while McClernand protected the rear of the army.[84] Although ultimately successful, the surprise at Raymond caused Grant to make a series of decisions changing the tactical actions of his army.

Following the destruction of Jackson, Grant moved his army west towards Vicksburg while Pemberton unsuccessfully attempted to strike the Union line of communication.[85] Stopped by a swollen creek without a ford, Pemberton instructed his army to return to Edwards that afternoon, but poor staff work created problems during the countermarch causing considerable confusion and disarray. Units became intermixed, some advanced only six miles the whole day while many did not encamp until after midnight. Early on 16 May, Grant met two railroad workers that provided Confederate unit dispositions and strengths. With this information, Grant began to arrange his army for the upcoming battle at Champion Hill again illustrating the utility of reconnaissance to the operational artist. He instructed Sherman to abandon Jackson and move west with haste. Grant then travelled to the XVII Corps headquarters and told McPherson to mass on the north flank of the Confederate line. By 11:30 a.m., Union skirmishers found the Confederate main defensive positions and McPherson's corps moved against Pemberton's unprotected left flank. Slow couriers hampered Grant's ability to coordinate his engaged corps, however. McClernand was cautious and never truly engaged the Confederates during the battle. In the early afternoon, a Confederate counterattack halted the Union advance, but low ammunition and no support forced the Confederates to withdraw. Unable to slow the Union assault, Pemberton ordered a retreat to Vicksburg to prevent the encirclement of his army. Grant

[84]Arnold, 138-140; Gabel, 136; Grabau, 240, 242-243.

[85]Gabel, 140.

pushed McClernand in pursuit, and Union forces reached Edwards by nightfall.[86] Although incomplete, the Federal's ability to clarify enemy positions enabled Grant to position his forces to gain an advantage during the battle.

Hardly slowed, the Army of the Tennessee defeated a Confederate rear guard force at Big Black River Bridge, reached the outskirts of Vicksburg on 18 May, and skirmished with the Confederate defensive line. Sherman's XV Corps gained Snyder's Bluff from the landward side and established an interface with the Mississippi River. This eased the tenuous line of communication that began in Memphis, ran along the Mississippi River to Milliken's Bend, then proceeded overland to Disharoon's Plantation before crossing the Mississippi River and heading northeast to Edwards. At Edwards, the line turned west to meet the Union troops surrounding the city. McPherson's corps occupied the center of the Union line and McClernand the south. Grant ordered an attack the following day in an attempt to maintain the initiative and capitalize on the string of Confederate defeats.[87] The Confederates soundly stopped the Union's unsynchronized and disjointed advance, however, providing a needed boost to Confederate morale. Grant demurred and planned a second assault for 22 May incorporating better reconnaissance of the Confederate fortifications, synchronizing his army's plan of attack, and beginning with a preparatory bombardment of over 300 artillery pieces and naval guns. Despite the better preparations, the Confederates again repulsed the Union assault inflicting significant casualties.[88]

Failing to seize Vicksburg by direct assault, Grant decided to lay siege to the city.[89] Federal troops began digging an elaborate network of trenches while the army reorganized for

---

[86]Arnold, 145, 155-156, 159, 192-193, 195; Grabau, 279, 294-296, 300, 306; Groom, 322.

[87]Grant, *Personal Memoirs*, 1:353-354.

[88]Arnold, 240-241, 246; McPherson, 633.

[89]Grant, *Personal Memoirs*, 1:357.

this new approach.[90] Grant requested reinforcements from his superior, General Halleck, and thinned his own defense of the Memphis–Corinth line. A cavalry force reconnoitering the area north of Vicksburg reported a sizeable reinforcement of Johnston's army. Simultaneously, the Union rearguard at the Big Black River reported increased Confederate activity on the east bank.[91] Johnston's threat from the east was growing but so was the Army of the Tennessee, which eventually grew to 71,000.[92] On 22 June, Grant entrusted Sherman with an independent command of 34,000 including artillery and cavalry to cover the siege operations and thwart Johnston's perceived advance over the Big Black demonstrating the final instance where reconnaissance affected the arrangement of tactical actions. Sherman picketed a line from Snyder's Bluff on the Mississippi River east to the Big Black River and south to the Vicksburg-Jackson Road providing Grant with the time and space to deal with the unexpected. As he prepared his defense, Sherman pushed reconnaissance patrols across the Big Black but failed to ascertain Johnston's exact location or intentions.[93] Johnston's planned attack did not materialize and Grant ordered Sherman to attack east on 3 June while negotiations with Pemberton were ongoing.[94] Sherman's activities aimed to prevent surprise and provide early warning in the event of a Confederate attack.

The Army of the Tennessee's reconnaissance operations provided relevant information, which improved Grant's understanding and allowed him to adapt his plan to maintain the initiative and seize the next position of relative advantage. These seven examples demonstrate the utility of reconnaissance to the operational artist. Unable to protect the extended flank during the

[90]McPherson, 633.

[91]Grabau, 452-453.

[92]Grant, *Personal Memoirs*, 1:367-368.

[93]U.S. War Department et al., *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington, DC: GPO, 1889) Headquarters, XV Army Corps, Army of the Tennessee, 26 June 1863, ser. 1, vol. 24, pt. 3:443-444; Arnold, 289; Grabau, 459, 476.

[94]Grant, *Personal Memoirs*, 1:380.

overland march to Vicksburg, Grant's defeat was ultimately due to a lack of information. Forrest and Van Dorn slipped by a weak Union screen undetected, surprised the Union garrisons, and dealt a blow disproportionate with their effort desynchronizing Grant's plan and forcing his withdrawal. The three Bayou Expeditions and the cross-river reconnaissance at Bruinsburg sought opportunities when none presented themselves giving Grant knowledge of potential positions of advantage. Although reconnaissance only confirmed Bruinsburg as a feasible crossing point, it provided Grant the critical position from which to advance against Vicksburg. McPherson's reconnaissance of the route to Vicksburg, north from the Big Black River clarified an ambiguous situation and solidified Grant's decision to move east towards Edwards. Gregg's stand against McPherson outside Raymond modified Grant's approach due to an ambiguous situation. Uncertainty at Raymond amplified the risk that Johnston had massed a Confederate army to the east and prompted Grant to alter his plan to strike at Jackson before investing Vicksburg. Grant's understanding of Confederate forces at Champion Hill allowed him to position his army to obtain a victory. Sherman's covering force used reconnaissance to protect the army's rear while Grant laid siege to Vicksburg ensuring the Army of the Tennessee had sufficient time and space to react to unforeseen circumstances, a hedge against surprise. The relevant information acquired by reconnaissance operations provided Grant with an understanding of the situation improving his ability to see his next action and make decisions.

Normandy Campaign

An examination of the Normandy campaign reveals eight examples of reconnaissance operations that affected the arrangement of tactical actions to achieve the campaign objective. These reconnaissance operations occurred during the Dieppe raid; the period of pre-invasion planning; the 6 June airborne and beach landings; the advance into the bocage; the Allied breakout; the German Avranches counteroffensive; and the Allied exploitation into Brittany. Unlike the Vicksburg campaign, there is no single operational artist in Normandy making

decisions on when and where to fight, but a multitude of commanders and staffs responsible for operational planning and execution. The campaign also provides a situation where multiple means of collecting information were available and utilized. Reconnaissance operations during the Normandy campaign affected the decisions made by the commanders and the staffs of the Allied Expeditionary Force (AEF).[95]

When planning for the Normandy invasion began in earnest following the Casablanca Conference in January 1943, the Allied situation was frail.[96] Real tension existed over President Roosevelt's Germany first policy and serious debate continued between the Americans and British over the cross-Channel attack.[97] The British pursued the Mediterranean approach forgoing the opportunity to invade northern France until 1944. The Combined Bomber Offensive against German military and economic targets proved initially ineffective at reducing German fighter strength in France.[98] Soviet forces continued to demand a Second Front but were victorious over the Germans at Stalingrad and Kursk despite massive casualties.[99] Much changed while Overlord planning matured, however. Allied landings in North Africa, Sicily, Corsica, and Italy were

[95]General Dwight D. Eisenhower was the Supreme Allied Commander during Operation Overlord and his deputy was Air Chief Marshall Sir Arthur Tedder. Admiral Sir Bertram Ramsay commanded the Allied Naval Expeditionary force and Air Chief Marshal Trafford Leigh-Mallory commanded the Allied Expeditionary Air Force. General Bernard L. Montgomery initially commanded the Allied ground forces as commander 21st Army Group until Eisenhower established his headquarters in France on 7 August 1944. The army commanders were Lieutenant General Sir Miles Dempsey, Second British Army; Lieutenant General H. D. G. Crerar, First Canadian Army; Lieutenant General Omar N. Bradley, First U.S. Army and 12th Army Group; Lieutenant General Courtney H. Hodges, First U.S. Army; and Lieutenant General George S. Patton, Third U.S. Army.

[96]Carlo D'Este, *Decision in Normandy* (Saybrook, CT: Konecky and Konecky, 1983), 33.

[97]The U.S. Navy was inclined to pursue a Pacific strategy regardless of the official U.S. position. Forrest C. Pogue, *The Supreme Command* (Washington, DC: Center of Military History, 1954), 99.

[98]Combined Chiefs of Staff 217, "Plan for Combined Bomber Offensive from the United Kingdom," 14 May 1943, quoted in Gordon A. Harrison, *Cross-Channel Attack* (Washington, DC: Center of Military History, 1951), 91-95, 209.

[99]John Keegan, *Six Armies in Normandy: From D-Day to the Liberation of Paris* (New York: Penguin Books, 1982), 39-40.

successful although German troops in Italy made the Italian campaign a slow and bloody process. The Soviets stopped the Germans on the Eastern Front and prepared for a massive offensive into Eastern Europe while Allied troops made steady progress in the Pacific. By the summer of 1944, Operation Overlord remained the next necessary step towards the occupation of Germany and ultimate Allied victory.

The AEF had a remarkably consistent doctrinal and organizational basis for reconnaissance despite its multinational composition. The Allies acquired relevant information primarily through aerial reconnaissance, ground reconnaissance, signals reconnaissance, and espionage. While reconnaissance was a general task for airpower, the remaining means were specialized. The Americans and British viewed ground reconnaissance as a specialized task performed by specialized units at the army, corps, and division echelon.[100] Signals reconnaissance was also specialized at the theater level and the French resistance movement with assistance from American Office of Strategic Services (OSS) and British Special Operations Executive (SOE) specialized in espionage. By 1944, both American and British doctrine emphasized ground reconnaissance as the primary mission for cavalry and reconnaissance units and security and economy of force as secondary missions.[101] Although the mobility and firepower of these units expanded because of the Allied experience in North Africa, these forces remained ill equipped for sustained combat operations. Following the Normandy landings, ground reconnaissance units went into action but spent little time on reconnaissance tasks and instead conducted all manner of

[100]The nine Allied nations that participated in the Normandy invasion were equipped and trained under either U.S. or British models. Richard Doherty, *The British Reconnaissance Corps in World War Two* (Oxford: Osprey, 2007), 4-5; McGrath, 96-97.

[101]Louis A. DiMarco, "The U.S. Army's Mechanized Cavalry Doctrine in World War II" (Master's Thesis, U.S. Army Command and General Staff College, 1995), 69; George F. Hoffman, *Through Mobility We Conquer: The Mechanization of U.S. Cavalry* (Lexington, KY: University Press of Kentucky, 2006), 17; McGrath, 112; War Department, Field Manual 2-30, *Cavalry Field Manual for Cavalry Mechanized Reconnaissance Squadron* (Washington, DC: GPO, 1943), 17.

combat operations often augmented with additional infantry, armor, and anti-tank elements.[102] Photographic aerial reconnaissance gave excellent information for planning offensive operations against fixed defenses while visual aerial reconnaissance was effective during mobile operations.[103] Signals reconnaissance was a new and important source of information on German unit locations and activities while espionage proved also useful in gaining information about German unit locations, strengths, and fortifications.[104] The Allies used all four means of gaining information to good effect during the campaign.

Operation Overlord, commanded by General Dwight D. Eisenhower, hurdled three million men against the German fortifications of the Atlantic Wall on 6 June 1944. Opposing them, Field Marshal Gerd von Rundstedt possessed 850,000 men in 55 divisions spread from Brussels to Marseille though initially, only seven divisions were located in the invasion area.[105] Several supporting operations shaped the battlefield prior to the actual Normandy landings. The Allied bomber campaign eliminated the Luftwaffe in France while other air attacks and the French resistance disrupted German communications and supply severing all rail lines over the

[102]Mechanized cavalry groups attached to corps or divisions conducted reconnaissance 3 percent of the time; mechanized cavalry squadrons in armored or motorized divisions conducted reconnaissance 13 percent of the time; and reconnaissance troops in infantry divisions conducted reconnaissance 6 percent of the time. Cameron, 73; U.S. Forces, European Theater, General Board, "Tactics, Employment, Technique, Organization, and Equipment of Mechanized Cavalry Units," Study Number 49 (Bad Nauheim, GE, 1945-1946), 20-21, app. 3, 4, 5, http://www.cgsc.edu/carl/eto/eto.asp (accessed 29 August 2011).

[103]James A. Huston, "Tactical Use of Air Power in World War II: The Army Experience," *Military Affairs* 14, no. 4 (Winter 1950): 166-185, 166; U.S. Forces, European Theater, General Board, "The Utilization of Tactical Air Force Reconnaissance Units of the Army Air Forces to Secure Information for Ground Forces in the European Theater," Study Number 19 (Bad Nauheim, GE, 1945-1946), 9-11, http://www.cgsc.edu/carl/eto/eto.asp (accessed 29 August 2011).

[104]Stephen E. Ambrose, *D-Day June 6, 1944: The Climactic Battle of World War II* (New York: Simon and Schuster, 1994), 55, 100-102.

[105]Field Marshal Gerd von Rundstedt was the Supreme Commander West but German forces in the Normandy area were subordinate to the German Seventh Army under Army Group B commanded by Field Marshal Erwin Rommel. William M. Hammond, *Normandy: The U.S. Army Campaigns of World War II* (Washington, DC: Center for Military History, 1994), 16; Gordon A. Harrison, *Cross-Channel Attack* (Washington, DC: Center of Military History, 1951), Map VI; Keegan, *Six Armies in Normandy*, 61-62.

Seine River north of Paris by June.[106] The Allied deception effort also fixed German attention and a significant number of forces on Pas de Calais through most of July.[107] German forces, however, defended doggedly despite a disjointed command and control apparatus and the near isolation of the battlefield by Allied airpower. By July, the Allies broke out of the beachhead and moved rapidly east frustrating a German counterattack to isolate the Allied southern wing. The resulting battle left the Germans in disarray as the Allies gained the Seine and Loire Rivers. The campaign amassed over 210,000 Allied and 200,000 German casualties but the Allies achieved their goal of establishing a lodgment of sufficient size to amass a force capable of marching on Germany.[108]

The initial invasion planning staff drew upon an experienced cadre who assisted in the preparation of several amphibious operations aimed at the Continent including the August 1942 Dieppe raid. This was part of a series of raids designed to force Germany to enlarge its French garrison and ease German pressure in the Soviet Union.[109] Dieppe was unique, however, as this raid, "was planned as a miniature invasion, involving the full use of combined arms and mass landings of infantry and armor with the object of seizing a beachhead."[110] Senior British leaders believed a divisional attack against German occupied France was a necessary precursor to any determined invasion of the Continent.[111] The Allies had yet no practical experience penetrating a

---

[106]Hammond, 14; Harrison, 205, 214, 220.

[107]Martin Blumenson, *Breakout and Pursuit* (Washington, DC: Center of Military History, 1961), 32.

[108]Dupuy and Dupuy, 1208-1212; John C. Super, ed., *World War II–Post-Cold War Conflicts*, vol. 2 of *The United States at War* (Pasadena, CA: Salem Press, 2005), 429.

[109]D'Este, 30-31.

[110]Harrison, 54.

[111]British Prime Minister Winston Churchill, Chief of the General Staff Field Marshall Sir Alan Brooke, and Admiral Lord Louis Mountbatten supported the notion that the Dieppe raid was necessary preparation for the eventual cross-Channel attack. Keegan, *Six Armies in Normandy*, 121; C. P. Stacey, *The Canadian Army 1939-1945: An Official Historical Summary* (Ottawa: Ministry of National Defence, 1948), 56.

stoutly defended beach in the European Theater. Amphibious operations in North Africa, Sicily, and Salerno, though contested, were against unfortified beaches. Dieppe was a rehearsal that tested the feasibility of a direct amphibious assault against a prepared defense and provided the Normandy planners with relevant information to gauge the risk associated with a large-scale invasion. Dieppe provided the first example of how reconnaissance operations shaped the practice of operational art during the Normandy campaign.

Dieppe was a catastrophe. The Allies lost 70 percent, killed or captured, against strong German defenses along the coastal bluff and in the fortified port.[112] The failure to synchronize joint and combined arms operations compounded a failure of reconnaissance, which led to a gross misunderstanding of the enemy and terrain. Intended to gain information and destroy enemy installations, the Dieppe raid provided only the former shaping the cross-Channel invasion plans.[113] Operation Roundup, the 1943 plan for the Continental invasion, envisioned an attack on a broad front from Le Harve to Boulogne to prevent the Germans from concentrating forces against any single beachhead.[114] Dieppe demonstrated the necessity of concentration to breach the Atlantic Wall and brought to light the prohibitive cost in men and material of any direct attempt to gain a fortified port. This led the invasion planners to consider the Pas de Calais and Normandy areas the most suitable for a cross-Channel attack because the terrain allowed a high capacity of ship to shore movement while remaining within reach of British based Allied aircraft. The sheltered nature of Normandy's beaches also facilitated unloading operations in poor weather and

[112]Ambrose, 39-40, 531.

[113]The U.S. Army defines a raid as "an operation, usually small scale, involving a swift penetration of hostile territory to secure information, confuse the enemy, or to destroy installations. It ends with a planned withdrawal upon completion of the assigned mission." U.S. Department of the Army, FM 1-02, 1-155.

[114]Michael R. Matheny, *Carrying the War to the Enemy: American Operational Art to 1945* (Norman, OK: University of Oklahoma, 2011), 185-186.

the proximity of Cherbourg gave the Allied the opportunity to seize a nearby port overland. Planners further developed portable artificial harbors and underwater pipelines to mitigate the logistics risk. Dieppe prompted the need for better information on enemy opposition and beach conditions and confirmed the necessity of improved air, sea, and land integration. The failure also clearly illustrated the importance of air cover, overwhelming fire support, combined arms and amphibious assault training, and the need for improved landing techniques all of which the Allies remedied for Overlord.[115]

The planner's knowledge of the Dieppe raid shaped the reconnaissance effort used to clarify the enemy situation and obtain a better appreciation of the terrain in the invasion area. Systematic aerial reconnaissance of the Continent began as the Combined Bomber Offensive degraded Luftwaffe fighter strength in France. Millions of photographs identified German unit locations, obstacles, and terrain while reconnaissance teams conducted missions along the Normandy coast to collect geographic and hydrographic data, and visually assess beach defenses. Signals reconnaissance though radio communications intercepts provided the Allies an excellent picture of the German unit locations, capabilities, and strengths. Finally, the French resistance, through the liaison efforts of the OSS and SOE, provided relevant information on the German fortifications, obstacles, unit dispositions, armament, and strengths. Planners integrated this information from various means to build a reasonably accurate picture from which to plan.

The pre-invasion reconnaissance undertaken by the Normandy planners offers a second example showing the impact of reconnaissance on the arrangement of tactical actions. The aerial reconnaissance, ground reconnaissance, signals reconnaissance, and espionage provided complementary and verifiable relevant information, which mitigated uncertainty and led to an understanding of the enemy and terrain. Commanders and staffs at multiple echelons aligned

[115]Keegan, *Six Armies in Normandy*, 121-124.

forces and set objectives based on this assessment. An understanding of German force dispositions led planners to set the Brittany ports rather than those on the Seine as the objective following the establishment of the initial lodgment. The continuous flow of relevant information from reconnaissance informed Allied understanding of the environment and guided the sequence of tactical actions. When aerial reconnaissance identified new beach obstacles in February and again in May 1944, Supreme Headquarters Allied Expeditionary Forces (SHAEF) adapted by reallocating its specialized engineer units. Another reconnaissance sortie observed the arrival of a new German unit near several airborne drop zones so the Allied adjusted them within seven days of the invasion.[116] The effective use of reconnaissance provided planners with the ability to develop and adjust the plan in a manner, which improved the probability of success.

The initial objective of the invasion was a lodgment in Normandy from the ports of Caen to Cherbourg including the Cotentin Peninsula. Following a breakout, the Allied objectives were the Brittany ports and Paris ultimately holding a line along Seine and Loire Rivers.[117] As the initial Land Force Commander, General Montgomery assigned the airborne divisions a security role during the opening phase of the invasion. Seven German divisions threatened the flanks of the landing beaches; three infantry divisions were within striking distance of the Americans at Utah beach and four panzer divisions within reach of the British at Sword beach.[118] Dropped on the flanks of the invasion area, airborne troops would seize the rivers to protect the beaches from the inevitable German counterattacks. Eisenhower agreed with Montgomery and believed the need to shield the seaborne forces outweighed the immense risk to the airborne units providing a third example of reconnaissance during the campaign. In this role, the airborne units acted as a

[116]Harrison, 54-56, 177, 454-455; Ambrose, 54-56, 74-76, 125-126.

[117]Hammond, 13.

[118]Harrison, 297.

covering force protecting the landing by fighting to gain time, provide space, and gather information concerning the direction and strength of anticipated German counterattacks.[119]

The three Allied airborne divisions dropped into Normandy shortly after midnight on 6 June. The American divisions quickly seized control of key road intersections, the Douve and Merderet River crossings, and the causeways leading off Utah beach. Several divisions of the German Seventh Army's LXXXIV Corps launched uncoordinated attacks within hours but did not penetrate the American position allowing the seaborne forces to disembark unmolested.[120] The British airborne division secured the bridges over the Orne River and Caen Canal on the east side of the landing area and countered several German probing attacks.[121] The first forceful German counterattack against the British flank occurred on 10 June after British seaborne troops reinforced the defense.[122] The German Seventh Army was lethargic and unsynchronized in response to the invasion and poor command and control prevented the German panzer divisions from intervening in a timely manner near Caen.[123] Although the airborne landings did not contend with a coordinated attack, they were in position to provide early warning. Information detailing the direction, strength, and intensity of any German advance towards the beaches provided the basis for an Allied response through the redeployment of ground forces or the commitment of airpower.

The available information provided by the Allied reconnaissance effort in Normandy allowed for detailed and meticulous planning, but when the British and Americans stormed the

---

[119]Leigh-Mallory anticipated 70 percent casualties to the airborne forces. D'Este, 65, 111; Forrest C. Pogue, *The Supreme Command* (Washington, DC: Center of Military History, 1954), 120-121.

[120]Harrison, 289, 293-298, 328.

[121]Hammond, 13.

[122]D'Este, 167.

[123]Ambrose, 567.

beaches, it became apparent that their understanding of the environment was not absolute. This provided yet another instance demonstrating the importance of reconnaissance. The massive Allied reconnaissance effort missed the veteran German 352nd Infantry Division that occupied the heights over watching Omaha beach.[124] Although the Allies succeeded on Omaha beach, this surprise delayed the American advance and caused significant casualties to a point where General Bradley contemplated withdrawal. The detailed Allied reconnaissance was also unable to foresee German intentions. The unexpectedly fierce resistance from the German 21st Panzer Division prevented the British from seizing Caen, a key objective. The Germans recognized the importance of Caen and the open plain beyond and committed significant reinforcements there. Caen finally fell to the British on 18 July, forty-two days after originally planned. The German surprise disrupted the Overlord plan; in one case, it took hours and in the other, it took weeks to overcome the setbacks since forces were not in place to contend with the actual circumstances.[125]

While the failure to understand enemy dispositions and intentions delayed the Allied advance, the failure to appreciate the terrain had consequences that were more significant supplying a fifth example demonstrating the importance of reconnaissance. The bocage was a patchwork of fields surrounded by overgrown earth berms and sunken roads. With limited entry and exit points, this compartmentalized terrain possessed excellent defensive potential, which the Germans used to stymie the Allied advance. The combination of enemy and terrain invalidated the pre-invasion training of fire and maneuver and made it difficult to coordinate armored movements with infantry and artillery support.[126] Bradley's First U.S. Army advanced only 7

---

[124]Allied intelligence missed the 352nd Infantry Division's move to the coast in April 1944. D'Este, 113, 122-124; Hammond, 26, 28.

[125]Ambrose, 434-435, 450.

[126]Michael D. Doubler, *Busting the Bocage: American Combined Arms Operations in France 6 June–31 July 1944* (Fort Leavenworth, KS: Combat Studies Institute, 1988), 15; Hammond, 19, 34.

miles in 17 days through the bocage at a cost of 40,000 casualties.[127] Planners, however, were aware of the terrain but not the problem it presented.[128] SHAEF assumed the Germans would defend along the natural defensive line of the Seine River and did not anticipate a fight in the bocage.[129] Although the information was available, the Allies failed to foresee the German defense of the bocage based upon the relevant information available. Regardless, the surprise delayed the advance causing numerous casualties as the Allies adapted.

The tenacious German defense of Normandy thwarted a general Allied advance and required two concerted Allied efforts to penetrate. The first effort, Operation Goodwood, captured Caen in mid-July, but the German panzer divisions prevented the British from breaking onto the Caen plain. The Germans clustered their strength under Panzer Group West in the decisive terrain facing the British on the left of the Allied line.[130] The second effort, named Operation Cobra and formulated by Bradley, began two days later on the Allied right. A lengthy reconnaissance preceded the operation and gathered information on the terrain, road networks, and German dispositions providing a sixth example of reconnaissance's impact on operational art.[131] Knowing the German strength was opposite the British and utilizing a massive aerial barrage on a narrow front, Bradley's First U.S. Army penetrated the enemy defense and unleashed Lieutenant General George S. Patton's Third U.S. Army to seize the Brittany ports.[132]

---

[127]David W. Hogan, Jr., *Northern France: The U.S. Army Campaigns of World War II* (Washington, DC: Center for Military History, 1994), 4.

[128]Blumenson, 13.

[129]Hammond, 34.

[130]Seven panzer divisions, two heavy tank battalions, and three rocket artillery brigades were facing the British. Blumenson, 30-31, 240; D'Este, 338.

[131]Blumenson, 213.

[132]Omar N. Bradley, *A Soldier's Story* (1951; repr., New York, Random House, 1999), 272, 317-318; Blumenson, 187, 197; D'Este, 338-339, 351.

The assault made rapid progress behind an advance guard formation and aerial reconnaissance screen. In total, the IX Tactical Air Command flew 655 reconnaissance sorties in support of the advance.[133] When aircraft revealed German forces retreating, U.S. forces increased their tempo and in three days, elements of the First U.S. Army captured Avranches opening a route to the Breton ports and the space to deploy Patton's Army.[134] Understanding the German force deployment gained through constant reconnaissance operations shaped the location and tempo of the Allied breakout.

A seventh instance occurred when the successful penetration of the bocage turned the German flank making their Normandy position untenable. To rectify the situation, Adolf Hitler ordered Field Marshall Gunther von Kluge, who replaced von Rundstedt, to seize Avranches on the coast, which would isolate the Brittany peninsula and stabilize the front.[135] The Allies, unaware of the impending assault, chose not to strike the flank of the German Seventh Army and instead, advanced into Brittany leaving the German forces free to mass for the counterattack.[136] The German attack into the seam of the First and Third U.S. Armies, however, culminated after only six miles, exposing four German panzer divisions to encirclement.[137] The surprised American units reacted quickly striking both flanks of the German attack while Bradley, seeking to turn surprise into opportunity, ordered a short envelopment of the German Seventh Army and Fifth Panzer Army. Eisenhower too saw an opportunity to destroy German forces in Normandy

[133]Blumenson, 251, 258, 311, 313, 333.

[134]Hogan, 10.

[135]The German commanders recommended a withdrawal to the Seine River but Hitler refused and ordered the counterattack. Mark J. Reardon, *Victory at Mortain: Stopping Hitler's Panzer Counteroffensive* (Lawrence, KS: University Press of Kansas, 2003), 23.

[136]The Allies did not know of the German preparations to counterattack until 6 August. Keegan, *Six Armies in Normandy*, 245; Reardon, 42.

[137]D'Este, 416-418; Hogan, 15, 31; Reardon, 171.

and coordinated a linkup between American and British troops at Argentan to surround the Germans.[138] Although the linkup did not occur for another twelve days, the rapid Allied decisions made in spite of surprise in Normandy led to the destruction of two German armies as a coherent fighting force.[139]

As the German counterstroke towards Avranches unraveled, Patton passed his Third U.S. Army through the bottleneck at Avranches into Brittany presenting a final demonstration of reconnaissance's utility concerning the arrangement of tactical actions to achieve a campaign objective. Once in Brittany, Patton gained ground quickly but found the ports defended by strong but immobile German garrisons. The ports would take time to open but Bradley recognized an opportunity to instead, gain the expanded lodgment and ordered Patton to advance on the Seine and Loire Rivers.[140] Third U.S. Army left one corps to invest the Brittany ports and another to hold the Germans near Argentan, while the remainder of the Army moved east. Aerial reconnaissance, which was effective during pre-invasion planning and the slow movement through the bocage, was of little use to the rapidly advancing army, since the reports "filtered down to corps level too late to be of assistance."[141] Ground reconnaissance screens and advance guard formations led Patton's exploitation identifying enemy concentrations and obstacle bypasses.[142] When the lead elements found few signs of enemy presence, Patton increased his tempo and Third U.S. Army gained ground faster.[143] Once at the Loire River on 12 August,

---

[138]D'Este, 420, 425.

[139]Hogan, 18-20.

[140]Bradley, 365, 379.

[141]Blumenson, 433; Richard P. Hallion, *D-Day 1944: Airpower Over the Normandy Beaches and Beyond* (Ann Arbor, MI: University of Michigan Library, 1994), 10, 12, 15.

[142]Hogan, 24.

[143]Blumenson, 438, 566, 585, 688.

Patton reoriented his advance towards Orleans. He left the XIX Tactical Air Command with a small ground force and the French resistance to protect his flank on the Loire River while he moved.[144] Although a German threat from the south existed, the pending amphibious assault against southern France and the early warning that the screening forces provided was sufficient to protect his flank. Third U.S. Army captured Orleans and Chartres on 16 and 18 August denying the Germans the ability to defend the Paris-Orleans Gap. The next day, Patton's Army crossed the Seine River. He gained three additional crossings on the Seine by the twenty-fifth, denying the Germans a defense along the natural river obstacle.[145] Patton's use of reconnaissance allowed him to concentrate his forces on the eastern advance and increase his tempo.

Although the advance continued until a logistics crisis halted the Allies during the first week of September, the Normandy campaign successfully closed on 25 August 1944, with the liberation of Paris.[146] Throughout the campaign, commanders and staffs utilized reconnaissance to examine the unknown, clarify the uncertain, and provide time and space to react to the improbable. The Allies also reacted to the unforeseen because of the unavailability of relevant information, although the effective use of reconnaissance could have mitigated this problem. The experience of Dieppe, a raid designed to test the German Atlantic Wall, provided a multitude of relevant information incorporated by the Overlord planners. Through understanding, it shaped the training and equipping of the invasion forces, the use of reconnaissance, and an assessment of feasibility for the invasion options available. The pre-invasion reconnaissance of Normandy using air, ground, signals, and espionage clarified details of the enemy and terrain allowing for the efficient allocation of forces during the invasion. The use of air and ground reconnaissance also

[144]Huston, 166-185, 175.

[145]Blumenson, 584.

[146]Hogan, 20, 23, 25.

facilitated the arrangement of forces during Operation Cobra and later, Patton's exploitation as the understanding of the enemy and terrain afforded by reconnaissance operations allowed for increased economy of force and tempo. The initial use of the Allied airborne divisions and Patton's screen along the Loire River provided early warning to contend with a German counterattack, though it never materialized. Although, reconnaissance supported the Allied success, it did not imbue perfect understanding. The misidentification of German intentions and units during the initial landings and the failure to recognize the characteristics of the bocage or the counterattack at Avranches were surprises that proved costly in men, material, and time. While the Allies adapted to these surprises, the absence of information increased casualties, delayed the advance, and caused the rearrangement of tactical actions. Reconnaissance, however, was foundational to the success of the Normandy campaign providing commanders and staffs with relevant information that led to understanding. As a result, planners arranged and adapted tactical actions in time, space, and purpose to achieve the campaign objective.

Conclusion

To achieve the strategic aim, the operational artist needs reconnaissance to arrange tactical actions in time, space, and purpose. The arrangement of tactical engagements, battles, and activities requires an understanding of the environment, which allows the artist to gain forethought by assessing various potential scenarios. The more relevant the information, the better able the artist is able to assess the probability of future scenarios mitigating uncertainty. The failure to utilize reconnaissance, however, leaves commanders and staffs without the relevant information necessary to make informed decisions and invites a strike at a time, place, or using a method that is unexpected.[147] The Vicksburg and Normandy campaigns demonstrate the need

[147]R. W. Ermel, "The Fog of Relevancy: A Case for Revising the Canadian Principles of War" (Scholastic Document, Canadian Forces College, Toronto, 2009), 12; UK Ministry of Defence, Joint Doctrine Publication 0-01, *British Defence Doctrine*, 3rd ed. (Swindon: The Development, Concepts and Doctrine Centre, 2008), 2-4; U.S. Department of the Army, FM 3-0, *Operations*, Change 1, 3-4.

commanders and staffs have for reconnaissance during the planning and execution of operations. Commanders and staffs use reconnaissance to gain specific information and guard against surprise in an effort to develop campaigns. Relevant information gathered by reconnaissance facilitates understanding and thus enhances planning and informs decision-making.

As a tool to gain relevant information, reconnaissance allows the operational artist to search for unknown opportunities, clarify ambiguity, and provide early warning of the unexpected. Grant's three Bayou Expeditions, his search for a crossing point on the Mississippi River south of Vicksburg, and the Allied raid at Dieppe sought to test the unknown environment and gain information. The actions were low risk to the force and mission relative to the intended objective. The Bayou Expeditions and the Dieppe raid gained information that gave the operational artists an understanding that changed their approach to future operations but the identification of the Bruinsburg crossing provided Grant an unforeseen opportunity to gain a position of advantage. McPherson's reconnaissance-in-force of the southern Vicksburg defenses, Grant's deliberate advance towards Champion Hill, the Allied pre-invasion reconnaissance of the beaches, and the reconnaissance preceding Operation Cobra and Patton's exploitation provided information that led to a better understanding of the enemy and terrain. This clarified understanding of the environment, gave commanders the ability to position their forces, and offered the potential for an increased tempo of operations to maintain the initiative and achieve a position of relative advantage. To provide time and space to react to unforeseen circumstances, Grant created a sizable covering force to protect the rear of his army from Confederate forces as he held Vicksburg under siege. In a similar manner, the Allies used airborne forces on the flanks of the invasion beaches while Patton, during his advance east, used airpower, few ground forces, and the French resistance on his flank to provide early warning of German counterattacks. During the Vicksburg and Normandy campaigns, Grant and the Allied commanders and staffs used reconnaissance to gain relevant information and mitigate uncertainty.

The failure to employ reconnaissance during the Vicksburg and Normandy campaigns led to surprise and the requirement to make rapid decisions with incomplete knowledge. The result was delay, increased casualties and material losses, and need to reorder tactical actions to achieve campaign objectives. The Allies mistook the location of a key German unit on Omaha beach but the surprise only delayed the Americans. It nearly led to a withdrawal, however, which would have required an adjustment to the larger Overlord plan. The misunderstanding of German intentions to hold Caen delayed the British significantly longer and put increased emphasis on an American breakout on the western flank but the failure to anticipate the German defense of the bocage presented the Allies with the most significant delay and substantial casualties. This also caused the Allies to concentrate their forces in an effort to penetrate the German defense. At Arvanches, the stout American defenses and rapid decision-making prevented the surprise German counterattack from rebalancing the front. While the Allies suffered from some realignment of their plan due to surprise, the Union forces at Vicksburg made significant adjustments. Grant's inability to gain early warning of Confederate attacks on his line of communication invalidated his Mississippi overland approach once Forest and Van Dorn carried out their raids. Comparably, McPherson's encounter with Gregg's Brigade at Raymond left both sides more confused than prior to the engagement. Grant again changed his immediate objective and stuck towards Jackson based on an incomplete understanding of the perceived risk that Johnson had massed an army there. These examples demonstrate that surprise requires adaptation affecting the options available to the operational artist but in each case, surprise was a result of a lack of understanding and need for relevant information. The relevancy of information varies based upon how reconnaissance obtains it; interaction provides rich detail and is likely more useful than the snapshot provided by passive observation.

Tactical doctrine concerning reconnaissance operations is relatively consistent since the Civil War, but the link between reconnaissance operations and an Army operating concept does

not exist today. Doctrine does not explain how reconnaissance supports the development of operations and campaigns as it did during the days of Active Defense and AirLand Battle. Today reconnaissance remains a tactical action that obtains information and when pieced together informs tactical, operational, and strategic decisions. Unfortunately, doctrine treats reconnaissance much as it did in the Army's *1861 Field Service Regulations*. Further research should explore the link between reconnaissance and operational art using modern operations in an effort to understand better the usefulness of directed reconnaissance to aid decision-making in an age where the reconnaissance focus is on targeting. The relationship between relevant information, knowledge, and understanding and the connection to mission command is evident; this too requires additional research.

Generals Glenn Otis and Crosbie Saint believed seeing beyond the current tactical problem was the most important aspect of operational thinking.[148] Reconnaissance provides the relevant information needed for the operational artist to have forethought. This allows the practitioner to identify options and thus arrange tactical actions in time, space, and purpose to achieve the strategic endstate. Reconnaissance is a means to mitigate uncertainty in an environment defined by uncertainty. Understanding the enemy and terrain allows for the placement of forces and arrangement of actions to gain the advantage and assess risk and opportunity. Reconnaissance, however, will not clear the fog of war because it is only a tool used to gain information and enhance understanding. Understanding requires comprehension, which is a cognitive process that assigns meaning, context, and judges the value of information. The arrangement of reconnaissance in time, space, and purpose to support the practice of operational

[148]Generals Glenn K. Otis and Crosbie E. Saint commented that seeing the battle in depth was the most important factor in operational art. Clayton R. Newell and Michael D. Krause, *On Operational Art* (Washington, DC: Center of Military History, 1994), 4, 46, 63.

art aids the commander and staff by providing relevant information to gain knowledge and build an understanding of the environment.

Bibliography

Books

Ambrose, Stephen E. *D-Day June 6, 1944: The Climactic Battle of World War II*. New York: Simon and Schuster, 1994.

Arnold, James R. *Grant Wins the War: Decision at Vicksburg*. New York: John Wiley and Sons, 1997.

Arquilla, John, and David Ronfeldt. *Swarming & The Future of Conflic*t. Santa Monica, CA: RAND Corporation, 2000.

Blumenson, Martin. *Breakout and Pursuit*. Washington, DC: Center of Military History, 1961.

Bousquet, Antoine. *The Scientific Way of War: Order and Chaos on the Battlefields of Modernity*. New York: Columbia University, 2009.

Bradley, Omar N. *A Soldier's Story*. 1951. Reprint. New York: Random House, 1999.

Cameron, Robert S. *To Fight or Not To Fight? Organizational and Doctrinal Trends in Mounted Maneuver Reconnaissance from the Interwar Years to Operation IRAQI FREEDOM*. Fort Leavenworth, KS: Combat Studies Institute Press, 2010.

Clausewitz, Carl von. *On War*. Translated and edited by Michael Howard and Peter Paret. Princeton, NJ: Princeton University Press, 1976.

D'Este, Carlo. *Decision in Normandy*. Saybrook, CT: Konecky and Konecky, 1983.

Doherty, Richard. *The British Reconnaissance Corps in World War Two*. Oxford: Osprey, 2007.

Doubler, Michael D. *Busting the Bocage: American Combined Arms Operations in France, 6 June–31 July 1944*. Fort Leavenworth, KS: Combat Studies Institute, 1988.

Dupuy, R. Ernest, and Trevor N Dupuy. *The Harper Encyclopedia of Military History*. 4th ed. New York: HarperCollins, 1993.

Gabel, Christopher R. *Staff Ride Handbook for The Vicksburg Campaign, December 1862–July 1863*. Fort Leavenworth, KS: Combat Studies Institute, 2001.

Glantz, David M. *Soviet Military Operational Art: In Pursuit of Deep Battle*. London: Routledge, 1991.

Grabau, Warren E. *Ninety-Eight Days*. Knoxville, TN: University of Tennessee, 2000.

Grant, Ulysses S. *Personal Memoirs of U.S. Grant*. 1886. Reprint, New York: The Library of America, 1990.

Groom, Winston. *Vicksburg 1863*. New York: Knopf, 2009.

Hagerman, Edward. *The American Civil War and the Origins of Modern Warfare: Ideas, Organizations, and Field Command*. Bloomington, IN: Indiana University Press, 1988.

Halleck, Henry W. *Elements of Military Art and Science*. New York: Appleton, 1846.

Hallion, Richard P. *D-Day 1944: Airpower Over the Normandy Beaches and Beyond*. Ann Arbor, MI: University of Michigan Library, 1994.

Hammond, William M. *Normandy: The U.S. Army Campaigns of World War II*. Washington, DC: Center for Military History, 1994.

Handel, Michael I. *War, Strategy and Intelligence*. London: Frank Cass, 1989.

Harrison, Gordon A. *Cross-Channel Attack*. Washington, DC: Center of Military History, 1951.

Hoffman, George F. *Through Mobility We Conquer: The Mechanization of U.S. Cavalry*. Lexington, KY: University Press of Kentucky, 2006.

Hogan, David W., Jr. *Northern France: The U.S. Army Campaigns of World War II*. Washington, DC: Center for Military History, 1994.

Isserson, G. S. *The Evolution of Operational Art*. Translated and edited by Bruce Menning. 2nd ed. Fort Leavenworth, KS: U.S. Army Command and General Staff College, 2005.

Johnson, David E. Occasional Paper, *Military Capabilities for Hybrid War: Insights from the Israeli Defense Forces in Lebanon and Gaza*. Santa Monica, CA: RAND Corporation, 2010.

Johnson, Stuart E., and Martin C. Libicki, eds. *Dominant Battlespace Knowledge: The Winning Edge*. Washington, DC: National Defense University, 1995.

Keegan, John. *Intelligence in War*. New York: Knopf, 2003.

———. *Six Armies in Normandy: From D-Day to the Liberation of Paris*. New York: Penguin Books, 1982.

Liddell Hart, B. H. *Strategy: The Indirect Approach*. New York: Praeger, 1954.

Mantheny, Michael R. *Carrying the War to the Enemy: American Operational Art to 1945*. Norman, OK: University of Oklahoma, 2011.

Martin, David G. *The Vicksburg Campaign: April 1862–July 1863*. Conshohocken, PA: Combined Books, 1990.

McClellan, George B. *Regulations and Instructions for the Field Service of the United States Cavalry in Time of War*. Philadelphia: J. B. Lippincott., 1861.

McGrath, John J. *Scouts Out! The Development of Reconnaissance in Modern Armies*. Fort Leavenworth, KS: Combat Studies Institute, 2008.

McPherson, James M. *Battle Cry of Freedom: The Civil War Era*. New York: Oxford, 1988.

Newell, Clayton R., and Michael D. Krause, *On Operational Art*. Washington, DC: Center of Military History, 1994.

O'Hanlon, Michael. *Technological Change and the Future of Warfare*. Washington, DC: Brookings Institute Press, 2000.

Osinga, Frans P. B. *Science, Strategy and War: The Strategic Theory of John Boyd*. London: Routledge, 2007.

Pogue, Forrest C. *The Supreme Command*. Washington, DC: Center of Military History, 1954.

Porter, David D. *Incidents and Anecdotes of the Civil War*. New York: D. Appleton, 1886.

Reardon, Mark J. *Victory at Mortain: Stopping Hitler's Panzer Counteroffensive*. Lawrence, KS: University Press of Kansas, 2003.

Schneider, James J. *Vulcan's Anvil: The American Civil War and the Foundations of Operational Art*. Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1992.

Shea, William L., and Terrence J. Winschel. *Vicksburg is the Key: The Struggle for the Mississippi River*. Lincoln, NE: University of Nebraska, 2003.

Stacey, C. P. *The Canadian Army 1939-1945: An Official Historical Summary*. Ottawa: Ministry of National Defence, 1948.

Stoker, Donald. *The Grand Design: Strategy and the U.S. Civil War*. New York: Oxford, 2010.

Sun Tzu. *The Art of War*. Translated by Samuel B. Griffith. London: Oxford University Press, 1963.

Super, John C., ed. *World War II–Post-Cold War Conflicts*. Vol. 2 of *The United States at War*. Pasadena, CA: Salem Press, 2005.

Svechin, Aleksandr A. *Strategy*. Translated and edited by Kent D. Lee. 2nd ed. Minneapolis, MN: East View Publications, 1992.

Tsouras, Peter G., ed. *The Book of Military Quotations*. St. Paul, MN: Zenith Press, 2005.

Vego, Milan N. *Operational Warfare*. Newport, RI: Naval War College, 2000.

Wagner, Arthur L. *The Service of Security and Information*. Kansas City, MO: Hudson-Kimberly Publishing, 1893.

Thesis/Monographs

Cipolla, Thomas W. "Cavalry in the Future Force: Is there enough?" Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2004.

DiMarco, Louis A. "The U.S. Army's Mechanized Cavalry Doctrine in World War II." Master's Thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 1995.

Dooley, Matthew A. “Ignoring History: The Flawed Effort to Divorce Reconnaissance and Security in Modern Cavalry Transformation.” Master’s Thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 2006.

Edwards, Sean J.A. “Swarming and the Future of Warfare.” Ph.D. diss., Pardee RAND Graduate School, 2004.

Ermel, R. W. “The Fog of Relevancy: A Case for Revising the Canadian Principles of War.” Scholastic Document, Canadian Forces College, Toronto, 2009.

Goings, Brian C. “Gone to Fiddler’s Green: Reconnaissance and Security for the Corps.” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2011.

Green, Matthew K. “Operational Reconnaissance: The Missing Link?” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2003.

Hamilton, William W. “Operational Vision–An Essential Trait for Army Operational Commanders.” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 1991.

Hickey, Christopher M. “Heavy Brigade Offensive Reconnaissance Operations: A Systems Perspective.” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 1998.

Holman, Victor. “Cavalry Operations in Support of the Force XXI Commander.” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 1996.

Jussel, Paul C. “Operational Raids: Cavalry in the Vicksburg Campaign, 1862-1863.” Master’s Thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 1990.

Mullins, J. Brian. “Defining the Core Competencies of the U.S. Cavalry.” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2004.

Nowowiejski, Dean A. “U.S. Army Cavalry Doctrine and Mechanization, 1938-1945.” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 1995.

Rago, Louis B., II. “Cavalry Transformation: Are we Shooting the Horse Too Soon?” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2002.

Rector, Russell H. “Heavy Brigade Counterreconnaissance Adequacy in Conventional Operations.” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 1995.

Skinner, Herbert L. “White Space: The Lack of Divisional Cavalry in the Modular Force.” Research Report, U.S. Air Force Air University, 2006.

Taylor, Curtis D. “The Transformation of Reconnaissance: Who Will Fight for Information on the Future Battlefield.” Master’s Thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 2005.

Watson, Andrew J. “The U.S. Cavalry: Still Relevant in Full Spectrum Operations?” Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, 2010.

Journals

Grant, U.S. “Military Strategy of the Civil War.” *Military Affairs* 22, no. 1 (Spring 1958): 13-25.

Huston, James A. “Tactical Use of Air Power in World War II: The Army Experience.” *Military Affairs* 14, no. 4 (Winter 1950): 166-185.

Kasales, Michael C. “The Reconnaissance Squadron and ISR Operations.” *Military Review* 82, no. 3 (May-June 2002): 52-58.

Kasales, Michael C., and Matthew E. Gray. “Leveraging Technology: The Stryker Brigade Combat Team.” *Armor* (January-February 2003): 7-13.

Liddell Hart, B. H. “The ‘Man-in-the-Dark’ Theory of War.” *National Review* 75 (June 1920): 473-484.

McLamb, Joseph S. “The Future of Mission Orders.” *Military Review* 77, no. 5 (October-September 1997): 71-74.

McMaster, H. R. “Learning from Contemporary Conflict to Prepare for Future War.” *Orbis* 52, no. 4 (Fall 2008): 564-584.

Menning, Bruce W. “Operational Art’s Origins.” *Military Review* 77 (September-October 1997): 32-47.

Rosenberger, John D. “Breaking the Saber: The Subtle Demise of the Cavalry in the Future Force.” *AUSA Institute of Land Warfare Publication*, no. 04-1 (June 2004). http://www.ausa.org/SiteCollectionDocuments/ILW%20Web-ExclusivePubs/Landpower%20Essays/LPE04-1.pdf (accessed 23 March 2011).

Vego, Milan N. “Operational Commander’s Intent.” *Joint Forces Quarterly* 57 (April 2010): 138-144.

Walters, Keith. “Who Will Fulfill the Cavalry’s Functions? The Neglect of Reconnaissance and Security in U.S. Army Force Structure and Doctrine.” *Military Review* 91, no. 1 (January-February 2011): 80-85.

Government Documents

UK Ministry of Defence. Joint Doctrine Publication 0-01, *British Defence Doctrine*, 3rd ed. Swindon: The Development, Concepts and Doctrine Centre, 2008.

U.S. Department of the Army. Army Doctrine Publication (ADP) 3-0, *Unified Land Operations*. Washington, DC: GPO, 2011.

———. Field Manual (FM) 1-02, *Operational Terms and Graphics*. Washington, DC: GPO, 2004.

———. Field Manual (FM) 3-0, *Operations*, Change 1. Washington, DC: GPO, 2011.

———. Field Manual (FM) 3-0, *Operations*. Washington, DC: GPO, 2001.

———. Field Manual (FM) 3-90, *Tactics*. Washington, DC: GPO, 2001.

———. Field Manual (FM) 3-90.6, *The Brigade Combat Team*. Washington, DC: GPO, 2006.

———. Field Manual (FM) 6-0, *Mission Command: Command and Control of Army Forces*. Washington, DC: GPO, 2003.

———. Field Manual (FM) 100-5, *Field Service Regulations: Operations*, Change 3. Washington, DC: GPO, 1958.

———. Field Manual (FM) 100-5, *Field Service Regulations: Operations*, Change 1. Washington, DC: GPO, 1964.

———. Field Manual (FM) 100-5, *Operations*, Change 1. Washington, DC: GPO, 1977.

———. Field Manual (FM) 100-5, *Operations*. Washington, DC: GPO, 1982.

———. Field Manual (FM) 100-5, *Operations*. Washington, DC: GPO, 1986.

———. Field Manual (FM) 100-5, *Operations*. Washington, DC: GPO, 1993.

———. "HQDA Approved Standardized FSO METL." Army Training Network. https://atn.army.mil/fso/default.aspx (accessed 10 July 2011).

U.S. Department of the Interior. Vicksburg National Military Park. "General Summary of Casualties, March 29-July 4." http://www.nps.gov/vick/historyculture/upload/Sum%20of%20Casualties.pdf (accessed 27 August 2011).

U.S. Forces, European Theater, General Board. "Tactics, Employment, Technique, Organization, and Equipment of Mechanized Cavalry Units." Study Number 49. Bad Nauheim, GE, 1945-1946. http://www.cgsc.edu/carl/eto/eto.asp (accessed 29 August 2011).

———. "The Utilization of Tactical Air Force Reconnaissance Units of the Army Air Forces to Secure Information for Ground Forces in the European Theater." Study Number 19. Bad Nauheim, GE, 1945-1946. http://www.cgsc.edu/carl/eto/eto.asp (accessed 29 August 2011).

War Department. Field Manual 2-30, *Cavalry Field Manual for Cavalry Mechanized Reconnaissance Squadron*. Washington, DC: GPO, 1943.

———. Field Manual 100-5, *Field Service Regulations*. Washington, DC: GPO, 1941.

———. *Field Service Regulations, United States Army 1905, With Amendments to 1908*. Washington, DC: GPO, 1908.

———. *Field Service Regulations, United States Army 19*23. Washington, DC: GPO, 1924.

———. *Infantry Tactics for the Instruction, Exercise, and Maneuver of the United States Infantry*. Philadelphia: J. B. Lippincott, 1861.

———. *Regulations for the Army of the United States, 1861*. New York: Harper Brothers, 1861.

———. *The War of the Rebellion: a Compilation of the Official Records of the Union and Confederate Armies*, Series I. Washington, DC: GPO, 1880. http://ebooks.library.cornell.edu/m/moawar//waro.html (accessed 28 August 2011).

U.S. War Department, John Sheldon Moody, Calvin Duvall Cowles, Frederick Caryton Ainsworth, Robert N. Scott, Henry Martyn Lazelle, George Breckenridge Davis, Leslie J. Perry, and Joseph William Kirkley. *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*. Washington, DC: GPO, 1886. Ser. 1, Vol. 17, Pt. 1.

———. *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*. Washington, DC: GPO, 1887. Ser. 1, Vol. 17, Pt. 2.

———. *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*. Washington, DC: GPO, 1889. Ser. 1, Vol. 24, Pt. 3.

Internet Sources

Lincoln, Abraham. *Collected Works of Abraham Lincoln*. The Abraham Lincoln Association. University of Michigan Library, Ann Arbor, MI. http://quod.lib.umich.edu/l/lincoln/ (accessed 28 August 2011).

Maxwell, David. E-mail to Plans List Server Pentagon. “Rescinding Intelligence, Surveillance, and Reconnaissance (ISR) as an Army Term.” 10 April 2011.

Stibel, Jeff. “How Forethought (Not Intuition) Separates the Good from the Great.” Harvard Business Review Blog, entry posted 20 October 2010. http://blogs.hbr.org/cs/2010/10/how_forethought_not_intuition.html#.TnKsgzE_ZiA.email (accessed 24 September 2011).