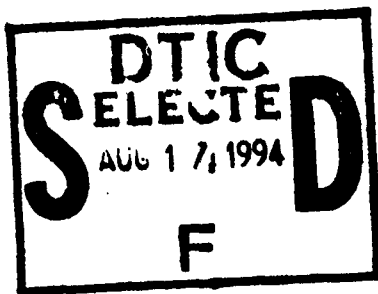


AD-A283 441
[Barcode]

NAVAL WAR COLLEGE
Newport, R.I.

(L)

OPERATIONAL LOGISTICS/ROLE FOR THE FUTURE?



by

Robert W. Ralston

LTC, U.S. Army

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Joint Military Operations Department.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature:

Robert W. Ralston

This document has been approved
for public release and sale; its
distribution is unlimited.

17 June 1994

Paper directed by
H. W. Clark, Jr.,
Captain, U. S. Navy
Chairman, Joint Military Operation Department

DTIC QUALITY INSPECTED 1

94-25970



3708

94 8 16 1 25

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
1. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			7a. NAME OF MONITORING ORGANIZATION		
6a. NAME OF PERFORMING ORGANIZATION OPERATIONS DEPARTMENT		6b. OFFICE SYMBOL (if applicable) C	7b. ADDRESS (City, State, and ZIP Code)		
6c. ADDRESS (City, State, and ZIP Code) NAVAL WAR COLLEGE NEWPORT, R.I. 02841			9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (if applicable)	10. SOURCE OF FUNDING NUMBERS		
8c. ADDRESS (City, State, and ZIP Code)			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) OPERATIONAL LOGISTICS/ROLE FOR THE FUTURE? (v)					
12. PERSONAL AUTHOR(S) Ralston, Robert W. LTC, USA					
a. TYPE OF REPORT FINAL		13b. TIME COVERED FROM TO		14. DATE OF REPORT (Year, Month, Day) 94/05/16	
				15. PAGE COUNT 36	
16. SUPPLEMENTARY NOTATION A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Objective Focused Theater Logistics Doctrinal Concepts Oriented Toward 21st Century		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
The Army is preparing to publish a first ever doctrine manual on operational logistics. The draft version of this manual does not provide a template for conducting operational logistics in the future. Instead, it is a culmination of past experience. This analysis examines the question of what role operational logistics will play in the future. To accomplish this, operational logistics is defined within the scope of military operation and developed into a conceptual frame work for planning and application. The historical and present application of operational logistics is analyzed by use of 19th and 20th century military operations with the focus on major land campaigns. Using this analysis three future revolutionary changes impacting operational logistics are identified. These changes involve restructuring from service oriented to joint logistics forces, balancing the equation of effectiveness and efficiency as the result of microchip technology, and driving technology to find a solution for revolutionizing theater ground transportation.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
a. NAME OF RESPONSIBLE INDIVIDUAL CHAIRMAN, OPERATIONS DEPARTMENT			22b. TELEPHONE (Include Area Code) 841-3414		22c. OFFICE SYMBOL C

Abstract of
OPERATIONAL LOGISTICS/ROLE FOR THE FUTURE?

The Army is preparing to publish a first ever doctrine manual on operational logistics. The draft version of this manual does not provide a template for conducting operational logistics in the future. Instead, it is a culmination of past experience. This analysis examines the question of what role operational logistics will play in the future. To accomplish this, operational logistics is defined within the scope of military operations and developed into a conceptual framework for planning and application. The historical and present application of operational logistics is analyzed by use of 19th and 20th century military operations with the focus on major land campaigns. Using this analysis, three future revolutionary changes impacting operational logistics are identified. These changes involve restructuring from service oriented to joint logistics forces, balancing the equation of effectiveness and efficiency as the result of microchip technology, and driving technology to find a solution for revolutionizing theater ground transportation.

Accession For		
NTIS	CRA&I	☒
DTIC	TAB	☐
Unannounced		☐
Justification		
By		
Distribution /		
Availability Codes		
Dist	Avail and/or Special	
A-1		

TABLE OF CONTENTS

CHAPTER	PAGE
ABSTRACT	ii
LIST OF ILLUSTRATIONS	iv
I INTRODUCTION	1
II HISTORICAL PERSPECTIVE	6
III TECHNICAL REVOLUTION	13
IV DESERT SHIELD/DESERT STORM	16
V ROLE FOR THE FUTURE	20
Melting the Logistics Snowball	22
Efficiency vs Effectiveness	23
Horse and Wagon, Truck, ?	24
VI CONCLUSION	26
NOTES	27
BIBLIOGRAPHY	31

LIST OF ILLUSTRATIONS

FIGURE	PAGE
1. Levels of War/Levels of Logistics	2
2. Operational Logistics Framework	5

OPERATIONAL LOGISTICS/ROLE FOR THE FUTURE?

CHAPTER I

INTRODUCTION

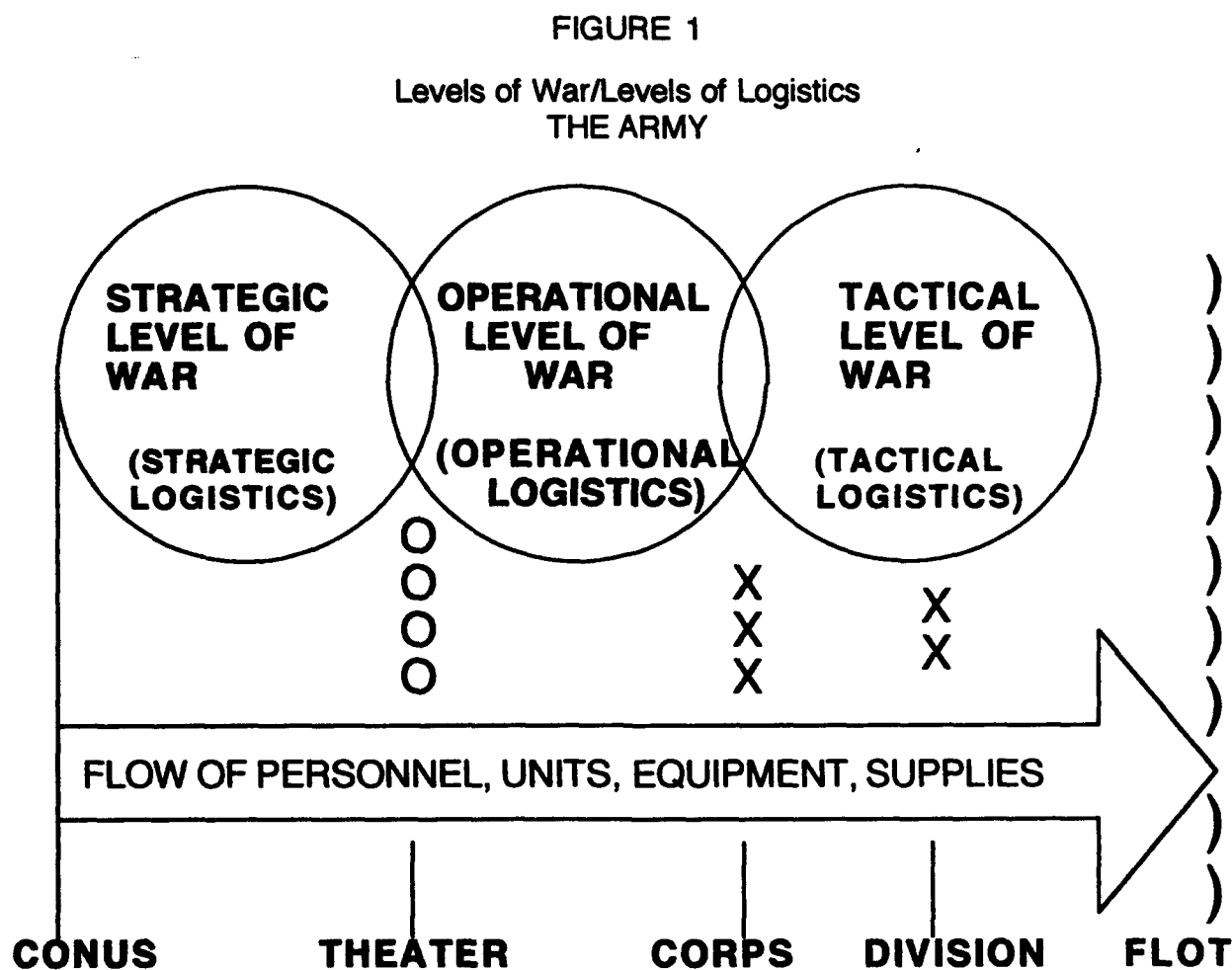
As the title implies, this analysis intends to raise questions about the role of operational logistics in the future. With the Army's impending publication of FM 100-16, *Army Operational Logistics*, it would seem a foregone conclusion that this concept has a solid role in Army doctrine for the future. However, after detailed review of the draft publication, serious questions about the role of operational logistics in the future need to be answered. The reason for this concern is that the draft focuses on providing an updated description of the current organizations and systems within the Army structure responsible for providing operational logistics. In effect, it provides a good first time publication on operational logistics for logisticians preparing to fight the last war. What it does not do is project the role of operational logisticians and operational logistics into the next century. Therefore, this analysis will focus on the following question:

How will Operational Logisticians meet the challenge and thus fill the role of Operational Logistics in the next century?

Before focusing directly on this question it is necessary to establish a framework for understanding what operational logistics is and what operational logisticians do. To start, it is important to establish some key definitions and concepts. First is an assessment of the operational level of war. As described by Army FM 100-5, the operational level of war provides the vital link between **strategic objectives** and tactical employment of forces. At the operational level military forces attain **strategic objectives** through the design, organization, and conduct of campaigns and major operations.¹ Second, the following definition of operational logistics will be accepted for a common basis of discussion.²

"Operational logistics encompasses those activities required to sustain campaigns and major operations within a theater. It links strategic logistics to tactical logistics on the battlefield. Operational logistics ensures success at the tactical level. Operational logisticians focus on establishing and maintaining lines of communication (LOC) and sustaining the force in the theater of operation."³

Having defined these two concepts it will be useful to illustrate their relationship to each other and their overall relationship to the broad spectrum of military operations. Figure 1 depicts this relationship.



Source: Department of the Army, Draft FM 100-16, Army Operational Logistics, p.1-2.

The next step is to correctly identify, with some degree of precision, activities referred to in the definition of operational logistics. Army FM 100-5, in the chapter on logistics, has identified these activities by stating, "Operational logistics focuses on force reception, infrastructure development, distribution and the management of materiel, movements, personnel and health services."⁴ Thus far operational logistics has been defined, its relationship to military operations established and the specific activities performed identified. However, this knowledge is still far too little to form a satisfactory framework for having a real understanding of what it is or a basis for examining its role in the future.

To date there are few current writings that penetrate the subject of operational logistics beyond the doctrinal rhetoric. This fact was noted in a recent article by Marine Corps MG James Brabham who presents some observations resulting from *Desert Storm* experience that may be useful in completing a framework for understanding operational logistics.⁵ Brabham identifies a set of elements of operational logistics that provide a guide to logistic planners. These elements of operational logistics are:⁶

- * Preparing the Logistics Battlefield
- * Organizing the Logistics Force
- * Sourcing the Resources
- * Creating Logistics Flexibility
- * Providing the Commanders Intent
- * Defining the Logistics Focus of Effort

Brabham discusses each of these elements in relation to the operational logistics activities performed by the I Marine Expeditionary Force. Some of his observations will be discussed in a later chapter on *Desert Storm*.

At this point it will be useful to discuss one concept that has found its way into many of the current writings on the subject of operational logistics. The essence of this concept lies in the friction between efficiency and effectiveness. Brabham, based on a

lecture by Dr. Martin Van Creveld, states that, "Bridging the gap between those two great E's --the efficiency of strategic logistics and the effectiveness of tactical logistics-- is the challenge of operational logistics."⁷ While operational logistics does provide the link between strategic logistics and tactical logistics, this does not pose the real challenge. LTC Nathan Power, a member of the FM 100-5 writing team, provides a different focus when he states, "Successful logistics must be both effective and efficient. Effectiveness cannot be handicapped by efficiency. Logistics arrangements cannot be so meager that they do not meet the needs of the commander as he executes his operations."⁸ He further adds that, "The balance of effectiveness and efficiency provides the foundation for successful logistics operations."⁹ The subsequent chapters will provide some interesting historical insights on this concept as it applies to operational logistics. The importance of balance cannot be overstated. However, what these authors seem to overlook, or at least fail to state in clear terms, is the key to achieving this balance or providing the link. Colonel David Oberthaler, Naval War College instructor, makes the point that logistics planners must have "**operational vision**" to develop plans that enable the Commander in Chief (CINC) to achieve his objectives.¹⁰ In short, logistics planners must be **objective focused**. The strategic goals (military objective) and the CINC's concept of operation provide the logistics planner the focus to translate the functions of operational logistics into the elements or fundamentals that become the concept of support as illustrated by figure 2.

FIGURE 2



Having established this model as our framework for understanding operational logistics, it will now be useful to examine historical cases to see the application. From this examination will come the basis for examining its' role in the future.

CHAPTER II

HISTORICAL PERSPECTIVE

Before attempting to analyze operational logistics in a historical context, it is necessary to make some general observations regarding the conduct of warfare and its relationship to logistics in history. One tendency of historians is to divide periods based on the perception of evolutionary versus revolutionary change. With regards to warfare, periods of revolutionary change tend to focus on technological developments. Change in technology is clearly a driving factor for revolutionary changes and will be discussed at length in this and subsequent chapters. However, evolutions in concepts of support will provide the best perspective for analyzing operational logistics.

The beginning of the 19th century and the Napoleonic logistics system will mark the start of the modern era of logistics for this discussion. The basis for this is not the manifestation of any technological changes, but rather that this period represented a fundamental shift from the tail wagging the dog to the dog wagging the tail. In the introduction to the reprint of George Thorpe's *Pure Logistics*, Stanley Falk noted that, "By the beginning of the 17th century, European armies had grown so large and ponderous that their movements were dictated primarily by supply considerations." ¹ As he explains, logistical support from a base was not feasible. Commanders planned movements along waterways and the need for food and forage.² The period of the 17th and 18th century was not without its' innovations. This period saw the rise of the magazine system as a result of two Frenchmen, LeTellior and his son Louvois. This system is credited with increasing freedom of maneuver, speed in movement and extending the length of the season. It was never able to achieve any type of self sufficiency that would allow an army to stay in one location because of limited

transportation.³ As Van Creveld summed up these two centuries, he recognized that warfare of this period was mainly siege warfare. The magazine system was intended to solve the problem of staying in one place, not to provide mobility. However, the growth of armies made the magazine system unable to sustain armies.⁴ A conclusive observation is that operational logistics was absent during this period. It did not exist conceptually and was not practiced within the framework established in Chapter 1.

What makes the Napoleonic logistics system revolutionary? As noted earlier, under this system the dog begins to wag the tail. Falk notes that, "The Napoleonic logistical system was a combination of many earlier methods, used flexibly and according to the needs and problems of a particular campaign."⁵ That this begins to sound like modern operational logistics doctrine is no accident. Napoleon's logistics system had an organization remarkably similar to current U.S. concepts. He had a Ministry of War Organization headed by Dejean responsible for feeding, dressing and equipping the army with transport. However, his authority ended at France's frontier. In the field he had an intendant general named Petiet responsible for all administration (supply and transport included), perhaps the first operational logistician. Each corps, likewise, had an ordonnateur with similar responsibilities and expected to follow the broad directives of the intendant.⁶ Thus, in many ways, this revolution was one of organization. Another subtle change in Napoleon's system was the establishment of lines of supply accomplished with a military supply and transport organization, something not in existence in earlier warfare. This did not achieve self sufficiency for the army, but was critical as rapidly increasing consumption of ammunition tied Napoleon's army to the "umbilical cord of supply."⁷

With this revolutionary organization and flexibility, what about the Russian campaign? Thorpe, in his book, concludes that the campaign failed as a result of

logistics based on over-centralization, deficiency in planning and lack of cooperation between the subservient branches.⁸ This seems to be a shortsighted perspective focused on personalities rather than systems and plans. It is essential to reflect on the objective of this campaign. It was the Russian Army which Napoleon planned to catch and annihilate within two to three weeks at a distance of 200 to 300 miles. The logistical plan was resourced to support this operation. It was Napoleon's failure to catch the Russian Army and his subsequent strategic blunder to pass Vitebsk which led to failure. Napoleon knew that he could not sustain a long, deep campaign but chose to take the chance.⁹ The failure was Napoleon's and his alone.

The American Civil War provides an interesting operation that illustrates operational logistics at its best. Ironically, it was accomplished without an operational logistician at the helm. General Sherman understood the significance of logistics and on no less than two occasions asked for a chief quartermaster to control his service organizations and plan his advance into Georgia. While his requests fell on deaf ears, he did establish solid organizations with chiefs that had great powers. In the end, however, he acted as his own chief logistical officer.¹⁰ The dilemma that Sherman faced was a paradox of sorts. In order to make the 300 mile march through Georgia he would require a secure rail line from his base in Nashville to Atlanta, but to keep this line secure required so much of his army that he would not have a suitable force to conduct his march. Understanding that the strategic goal was to occupy Savannah, and not the rest of Georgia, Sherman chose to make his army self sufficient for the 300 mile march and sever his line of communication (LOC) with Nashville and reestablish a base in Savannah with naval support.¹¹ Again, this provides another example of the **strategic objective** providing the focus for the operational logisticians.

The successful Prussian campaigns of 1866 and 1870 provide a different

picture of operational logistics. The problem that developed in both campaigns was one of simple mathematics. Rail provided the means to move large armies and large amounts of supplies into a theater. As long as these armies remained stationary within a reasonable distance from the railheads, the army could be supported. However, as the army moved forward, the lines from the railheads stretched and the ability of horse drawn wagons to move supplies diminished. The results of both campaigns were bottlenecks at rail yards with little supply reaching the front. This situation represented a case of old and new technologies that were unable to achieve compatibility. Additionally, despite good supply and rail organizations, there was no operational logistics headquarters to centrally control supply, railway and ground transportation operations.¹² A central logistics organization would have solved many problems.

World War I, and specifically the Schlieffen Plan, offer different and like perspectives. First, WW I, unlike previous wars, realized expenditures of ammunition that were on an order of magnitude larger than any planner could predict. This increase alone would strain a still predominately horse and wagon system, but now for the first time weapon systems wore out and required replacement.¹³ Second, rail enabled the movement of greatly expanded armies as was the case with the Germans in 1914. In 1906, Moltke Jr. wisely directed a logistics estimate of the Schlieffen Plan only to discover that it had significant shortfalls. Basically the function of time, distance, road and load capacity would not equal requirements at the front. The limits of these factors, which remained unchanged from 1870, dictated that the field army instead of 100 miles could now only be supported 50 miles from the rail heads. Mobility had actually declined.¹⁴ Based on this, Moltke, Jr. modified the plan by shortening the westward distances that the right flank would march. But in doing so he reduced the rail and road network available creating problems similar to 1870.¹⁵ Motor transport,

while representing a key new technology, was insufficient, not properly used and not factored into maintenance plans.¹⁶ This technology would wait for the next war to be a factor. Despite the problems, logistical support succeeded in the sense that up to the battle of the Marne it was effective even if grossly inefficient. However, had the German army achieved success at the battle of the Marne, the ability to maintain momentum to achieve the strategic objective of encircling the French army would have failed.¹⁷ The German army had reached its culminating point, win or lose at the Marne. The logistical plan simply did not allow for sustaining momentum past that point, again demonstrating the importance of being *objective focused*.

World War II offers numerous operations to examine. Four of these will be discussed. The first is *Barbarossa*. When the German army launched this ill-fated campaign, there were two to three basic loads and a reserve for only twenty divisions on hand. Fuel reserves were not available past three months. In addition to these shortfalls, motor transport was insufficient to meet the requirements.¹⁸ The last nail in the coffin was that the Russian rail system required conversion to standard gage rail. Again the resourcing of troops and equipment for this purpose was under allocated. At best, the Germans could hope to extend one line per Army Group rather than one per Army as required. Finally, organization of the services was still not consolidated under one controlling logistics headquarters. Supply and transport had been combined under the Quartermaster but rail was still under a separate authority.¹⁹ A final note on the concept. Unlike Napoleon, who changed his concept of operation when failing to achieve the strategic objective, the German Army's objectives, while hoping for an early defeat of the Red Army, were the capture of deep targets, i.e. Leningrad, Moscow and the Ukraine. Despite exceptional innovation, the operation was under resourced from the start. The near success of the operation speaks well for the operational

logisticians who did keep the objective in focus. The decision to gamble with known resource constraints was made based on political rather than military factors.

The second operation from WW II is Rommel's campaign in North Africa. This is the first case of using seaport operations to enter the theater but the lessons remain notably similar. No rail existed going out of the port of Tripoli. Motor transport dictated a 300 mile radius as the feasible extent of support from base. To this end Rommel was directed to stay within the 300 mile limit and allocated forces for supporting that size area, but the requirements for this size force exceeded the port capacity of Tripoli.²⁰ Against Hitler's orders, Rommel launched an offensive to Tobruk adding 700 miles to his LOC. Surprisingly, consumption did not exceed the quantities of supplies arriving at Tripoli. The plight Rommel faced was that supplies stayed in Tripoli. Motor transport simply wasn't up to the task of sustaining a 1000 mile LOC and coastal shipping into other ports was too vulnerable to provide any significant relief.²¹ After a retreat in late 1941, Rommel regrouped and, despite warnings of a repeat, launched again in May 1942. Rommel's advance went 900 miles from Tripoli, thanks to opening the port of Benghazi, which provided one third of his supplies 280 miles from the front.²² Ultimately, Rommel was ground to a halt not by the quantity of supply but by a LOC with time, distance and capacity factors that could not equal requirements.

A third WW II example is the Allied advance from Normandy to the Seine. Despite tremendous success, this operation provides a case of an embarrassment to operational logisticians that should be taken as seriously as failures. From the start *Overlord* and the subsequent breakout and advance to the Seine were planned in extraordinary detail. Estimates had been carefully refined. When the Allies failed to achieve the breakout from Normandy on schedule the operational logistics planners quickly declared it impossible to do in 41 days what had been planned for 75.

However, the tactical commanders, led by Patton, not only did reach the Seine in 41 days, they reached it ahead of schedule and kept going.²³ A final point of interest, the advance reached a culminating point on 2 September 1944 at a distance of approximately 300 miles from the theater logistics bases despite the formation of the Red Ball Express.²⁴ The logistics estimates for this operation were gross over estimates of requirements. What if there had not been a Patton who refused to listen to the logisticians? The end result would not have changed, but in an environment that is time sensitive, where political developments can happen rapidly, **strategic objectives** may not be achieved by waiting. Operational logisticians must make their best estimates without wide margins of safety if they are to be **objective focused**.

The final operation of WW II was small in comparison but unique in its nature. The operation to retake Burma and secure the Burma Road to China was a testament to innovation. Wingate used air transport and gliders to insert forces rather than the option of a long, slow ground advance. Using pioneering techniques, the operational logisticians provided ninety percent of the requirements for Wingate's, and later Slim's, army during 1944 and 1945 by air delivery. By enabling these forces to fight in place when encircled, the Japanese soon found their own logistic situation untenable.²⁵

When analyzing the periods of modern logistics, Van Creveld observes that most writers consider the age of standing forces (magazine fed), Napoleonic predatory warfare and 1870-1 continuous supply from base as three distinct periods.²⁶ Van Creveld sees a continuum from Wallenstein to 1914 during which Armies were expected to live off the land. In his opinion the tremendous ammunition requirements of 1914 broke this cycle. He believes the essence of supplying armies to 1914 was to keep them moving. After 1914 it became easier to support when they stood still.²⁷

CHAPTER III

TECHNICAL REVOLUTION

The previous chapter alluded to technical advances that have occurred during the 19th and 20th century and concentrated on finding those applications of operational logistics contained in the framework found in Figure 2, chapter I. A full understanding of modern operational logistics would not be complete without detailing some of the critical technical advances and their influence on operational logistics. Before discussing specific advances, a general observation will help provide a broad perspective on the overall effect of technical advances. As populations swelled, in part due to medical science and improved health service, the manpower pool for larger armies became available. With more manpower, greater effort and resources were required for the logistic services. At the same time new rapid fire weapons created increased supply and transportation requirements for munitions. Other technical advances such as the telegraph and steam power created the need for recruiting many technicians as well as incredible numbers of new items of supply. Newer, longer range weapons did not decrease manpower. Instead, deployment in greater depth resulted. The net result was more complex and sensitive logistic zones demanding more security with manpower increasing in relation to supply.¹ In many ways this generalization explains the principle of *The Logistics Snowball*, a concept described by RADM Henry F. Eccles in *Military Concepts and Philosophy*.²

In 1809 a heat -sterilization process marked the start of numerous technological changes that would have a significant impact on operational logistics throughout the next two centuries. Although navies were the main beneficiaries of this process in the first half of the 19th century, its significance was the potential for building large reserves of food. With Louis Pasteur's research in 1864 and the development of

refrigeration and dehydration in the 1860's, feeding an army in the field became a reality on the production if not the distribution side of the equation.³

Rail gained importance for its military utility in the mid-1800's. As a transport system it afforded the capability to move large formations and quantities of supplies into a theater. Ironically, it amplified the importance of the horse and wagon as the primary theater transport system and, as often illustrated, the weakness of a system trying to integrate the old and the new.⁴ The train has been most effectively used in a strategic role as is evident throughout the cases studied. Rommel would certainly be the first to argue its potential value to the operational commander and his logistician.

Communications impact on operational logistics is obvious. Napoleon's system of visual signals (semaphore) with permanent stations allowed the establishment of an empire-wide communications network that could handle a greater volume of signal traffic much faster than anything previous.⁵ During the mid-1800's the telegraph followed by cable and the telephone each accelerated the pace and volume of information. The obvious benefits to operational logisticians was the ability to rapidly transmit changing requirements back to the strategic logistical system in a matter of hours versus days. A less obvious impact of these systems can be found in the example of the telephone. When the telephone was employed by forward observers and gun positions, as demonstrated by the Germans in 1876, there was a tremendous impact on ammunition consumption. Previously, expenditures were controlled by the need for the gun layer to see the target. However, accuracy did not make the same dramatic advance. The end result was a redoubling of ammunition requirements.⁶

Mechanization became the legacy of WW II. The importance of motor transport over horse and wagon and the advent of tank armies presented the next major logistical hurdle in the supply of petroleum (POL). The problem became two-fold. First,

how to provide it, package or bulk, and second, how to get it up to the fast moving tank units.⁷ Not surprisingly, with the production and fielding of the M-1 tank in the early 1970's this still remains a major hurdle for both operational and tactical logisticians.

This chapter has intended to offer only a brief overview of how technical innovations can impact logistics, specifically at the operational level. The value of examining these changes can be found in how the logisticians anticipated and adapted to them. It is armed with this historical perspective and insight that the question regarding the role of operational logistics in the future will be approached. Before addressing the future a look at *Desert Storm* is essential to see where we are and if there are hints of the future.

CHAPTER IV

DESERT SHIELD/ DESERT STORM

"*Just Cause* was the first battle of the 21st century.", stated General Sullivan, Army Chief of Staff, in a recent article.¹ The implication acknowledged by General Sullivan is that *Desert Storm* was the second. The question this chapter will address is the applicability of that opinion to operational logistics. Was operational logistics in *Desert Storm* representative of the 21st century or was it representative of the last war of the 20th century?

Clearly operational logistics in *Desert Storm* was conducted on an unprecedented scale within the time-frame from deployment to redeployment. Operational logistics successfully met the criteria of the definition from Chapter I. But was this just a very successful evolution of doctrine? *Desert Storm* did not present any unique set of circumstances from previous cases. The introduction of forces into theater, by air and ocean surface, was unopposed and allowed for an extended buildup of the theater before conducting ground operations. Like most deployments of the past two centuries, combat forces entered the theater first, putting the operational logisticians in a "catch up" mode early and eventually transitioning to a sustainment mode. For purposes of looking at this operation in more detail than the other historical cases, the elements of operational logistics will be used as an analytical tool.

Beginning with the element of force organization, MG Brabham notes that, "The logistics organization must integrate the efforts of naval, joint, combined, and host nation support (HNS) forces to effectively support the operational commander."² The writings on *Desert Storm* operational logistics indicate that MG Brabham's observation is applicable to this operation. This was true despite the fact that doctrinally logistics is a service responsibility and also a national responsibility. The

role of HNS cannot be overstated. In a Government Accounting Office (GAO) report, it was noted that over 3,800 pieces of rolling stock and extensive material handling equipment were contracted along with drivers.³ The role of wholesale organizations, particularly the Defense Logistics Agency (DLA) and the Army Materiel Command (AMC) were noted by LTG Pagonis as critical to the combat readiness of systems.⁴ Perhaps most significant when considering the theater operational logistics organization is the innovation made by General Schwarzkopf (CINC). He designated the 22d Support Command the operational logistics command for the theater.⁵ Essentially he created a joint logistics command headquarters.

The second element is preparation of the logistics battlefield. Perhaps of all the aspects associated with this element, the one example that stands out from *Desert Storm* is the creation of forward logistics bases 350 miles from the main bases prior to initiation of the ground attack. As LTG Pagonis noted, this was a key piece of the concept of support that underwrote the concept of operation. A second critical piece that worked concurrently with this was the shifting of the two corps from their staging areas to attack positions.⁶ Although a maneuver event, it required substantial theater support assets and could be considered an operational logistics event. One note of particular interest is the length of LOC that can be supported by motor transport. As the GAO report notes, Army doctrine is designed for a 90 mile LOC from main supply bases and Marine Corps only 30 miles.⁷ With the assistance of HNS, this distance was stretched to 350 miles, reminiscent of WWII logistics. Ultimately, the distance stretched to 600 miles from the main supply bases.

The third element is sourcing the resources. Although the scope of this function is very broad in real war fighting terms it can be analyzed by examining ammunition, water and fuel. The magnitude of the resourcing can be seen in figures reported by the

GAO of 576 ships and 10,002 aircraft which translated to 4 million short tons of supplies and equipment and 7 million gallons of fuel.⁸ In general terms, the resourcing task for the theater operational logistics structure was to support the combat forces for sixty days of mid-to-high intensity combat.⁹ Putting this into the context of distribution in accordance with preparing the logistics battlefield, fifteen days of ammunition, fuel and water were moved to the forward logistics bases.¹⁰ While there is no adequate way to effectively describe the quantities of supplies delivered to and moved forward in the theater, a quote from LTG Pagonis conveys some of the scope. "For 18 critical days, 18-wheelers were transporting combat equipment and materiel, passing one point on the westward road every minute, every hour, 24 hours a day."¹¹ This referred to the relocation of the corps and building of the forward logistics bases, the combat forces were resourced to fight fifteen days from forward bases and sixty days total from theater. It must be noted that the ground war lasted five days.

The final element is the concept of logistics flexibility. Within the context of *Desert Storm* the establishment of the forward logistics bases with fifteen days of supplies would provide an excellent example of providing the commander with the flexibility to adjust his operational concept and continue the operation, deeper into Iraq in this case, if the **strategic objectives** were to change. Sixty days of supplies were established in theater therefore there was no serious concern about reserves if one corps needed to draw on them. There is one other aspect to flexibility that presented significant risk in this case. By specifying fifteen days of supply at the forward bases the coalition forces became tied to a fixed period after the initiation of the air phase of *Desert Storm* before initiating the ground phase. Based on the 21 day plan developed by 22d Support Command, a not earlier than date was set for the ground phase. As General Schwarzkopf describes in his book, the air phase accomplished all of the

intended objectives in very short order, well before the ground phase was ready. However, as the kickoff date for the ground phase drew near, there were some serious peace initiatives coming from the Soviets. The irony was that any peace initiative that let Iraq withdraw from Kuwait at this point would have been disastrous from a strategic objective standpoint. As described in his book, several heated discussions took place between Colin Powell and Schwarzkopf concerning starting the ground phase early. However, until everything was in place, the ground phase could not start.¹² Ironically, the flexibility that operational logistics could provide, in effect, cost the operation flexibility by holding up the ground phase at great risk to achieving the **strategic objectives**. Somehow, what appears to be a very **objective focused** concept put the objectives at risk and detracted from the flexibility of the concept of the operation.

In trying to summarize *Desert Storm* from an operational logistics perspective it is fair to say that there is a hint of the 21st century but on balance is best characterized as the CAPSTONE event of the last two centuries. Organizationally there was a significant trend toward breaking the traditional doctrine of logistics being a service and national responsibility. In this there is a hint of the future. Logisticians continue to over estimate, and in the case of the U.S., over resource. Although not discussed earlier, the GAO had no trouble discovering that theater logisticians were unable to maintain adequate visibility of supplies and equipment arriving in theater.¹³ This problem was eventually overcome but was reminiscent of every major operation since 1870. As with most other wars, resources permitting, effectiveness overrode efficiency and incurred the risk of failure at the hands of political means. *Desert Storm* was a 20th century war with respect to operational logistics, very successful, but not one upon which to base 21st century doctrine.

Chapter V

ROLE FOR THE FUTURE

Operational logistics within the framework established in Chapter I will play a critical role in the future. The question is how will that role change given the direction of technology and 21st century war fighting doctrine? Concurrent with answering this question we must also ask what do we, as operational logisticians, need from technology to develop the equipment necessary for providing tomorrow's support?

General Sullivan in a recent article offered very perceptive insights into 21st century land warfare, making this observation, "Complex changes are never complete breaks from the past, evolutionary and revolutionary changes coexist, each shaping the other."¹ As with all facets of military operations, operational logistics will follow this pattern. However, when examining new technology and the influence it will have on military operations, a strong argument for a new era of modern (post industrial) operational logistics exists. To better understand the direction that 21st century warfare is heading, some additional general observations should be noted.

"Electronics have forever changed the equation. The promise of technology as a force multiplier in the substitution of firepower mass for manpower mass has finally been realized."² While the author of that quote may be leaping slightly ahead, it is clearly indicative of a dominant and rapidly moving trend. General Sullivan uses an example of how a SAM-2 site near Basra was eliminated by a VII Corps artillery brigade with Army Tactical Missiles (ATACMS). In this case, when the site activated its radar, the fire mission was relayed through an EC-130H to VII Corps.³ This example, while not achieving the full potential, points in the direction electronics is moving. This is summed up in the following quote from General Sullivan. "The thrust of Army

exploitation of the microchip is to improve battlefield awareness through horizontal integration and insertion of digital technology. We have begun to link individual weapons systems through automated communications channels to provide instantaneous updates on operational and logistical status and enemy information."⁴ In a different article, General Sullivan translates this thrust into specific trends that technology will have on land warfare. These trends are lethality and dispersion, volume and precision of fire, integrative technology, mass and effects, invisibility and detectability.⁵

What are the implications of these trends? Clearly the most obvious and perhaps most significant implication is the phenomena of smaller units creating decisive effects with greater accuracy and timeliness of fires. In effect, this will create what General Sullivan views as a paradigm shift by compressing greater firepower into smaller unit packages.⁶ Illustrative of this shift is a quote from Colonel Patrick O'Neal on testing currently underway at the National Training Center, "A properly organized, digitally equipped force is potentially three times more powerful than conventionally equipped units."⁷ A final observation regarding integrative technology, although General Sullivan is careful to point out that totally centralized decision making will elude us, he does note that the opportunities are profound in order of magnitude compared to now and that significant adjustments in doctrine will be required. This is best summed up in the following quote, "Extensive, near-real-time communications among a number of intelligence gathering systems, maneuver systems, fire systems and logistical support systems provide the ground commander with a potentially revolutionary opportunity and with monumental challenges."⁸

In analyzing how operational logistics will be revolutionized in the 21st century, it is easiest to focus on three elements with interrelated and overlapping impacts.

Melting the Logistics Snowball

The first revolutionary change that must occur is a doctrinal shift to smaller theater support structures. *Desert Storm*, like all other 19th and 20th century wars, succumbed to the snowball effect but it did point the way to fundamental changes that can start to reverse this trend. Two shifts in organizational doctrine and functions are needed. The first is to make a shift away from the doctrine that logistics is a service function. At the strategic level this shift is in motion. At the operational level it remains a service function with recognition that one service may take the lead for common items of support. If the 22d Support Command was designated the theater logistics command, then the course has been set to implement a true Joint Theater Support Command. One possibility for making this a reality is the creation of a standing Joint Task Force (JTF) for support under USACOM. Several arguments support this concept from a practicability standpoint. First, the precedent established in *Desert Storm* of designating a single theater logistics headquarters. Second, an existing headquarters is not essential. This was proven by the activation of the 22d Support Command (SUPCOM) from a provisional formation. The fact that the Army chose to activate the 22d SUPCOM with combined supply and transportation roles in lieu of the 377th Theater Army Area Command (TAACOM) and the 143d Transportation Command, both reserve component Capstone theater headquarters, strongly supports a change in structure. Third, the precedent is already established in doctrine for theater medical support which calls for designation of a joint force surgeon supervising a Joint Medical Regulating Office (JMRO) and a Joint Blood Program Office (JBPO). Likewise, a joint material management center and joint movement control office would operate under the joint support command headquarters.

A second major shift would be toward greater roles for the strategic organizations in the theater. Again, precedent for moving in this direction was

established during *Desert Storm*. The basis for moving in this direction is less need to build large theater reserves of all classes of supply. Organizations such as the Defense Logistics Agency (DLA) can retain and relocate critical theater reserves to theater locations just as the Army Materiel Command (AMC) can move critical depot maintenance capabilities to theater as done in *Desert Storm*. The concept of a Logistics Support Element (LSE) comprised of wholesale or strategic level activities is discussed in appendix A of the Draft FM 110-16. The draft notes that this organization would not replace capabilities provided by other TOE organizations. Contrary to this approach, the LSE concept should move toward replacing every theater level service function possible. Consistent with this it is also practical to bring the Military Traffic Management Command into theater for port operations. While these changes in organization and functions are not revolutionary in the technical sense, they are dramatic shifts in current doctrine regarding operational logistics activities. General Sullivan, when discussing the exploitation of the microchip, pointed the spear in this direction when he noted, "Within the context of joint operations, there is room for achieving economies of scale and consolidating functions. Some training and many logistics and support functions are already consolidated and we are looking for ways to expand such programs."⁹ Although painful for the services, the changes discussed above are the right direction for the 21st century.

Efficiency vs. Effectiveness

Effectiveness has always prevailed given a capable strategic sustainment base. Effectiveness in this sense has referred to ensuring that tactical units have had everything required and then some. Effectiveness and responsiveness have been used synonymously in this regard. Ironically, the need to build large reserves, as in Normandy or *Desert Storm*, not only hindered responsiveness it even put operations at risk. The underlying problem has been the inability of logistics units to rapidly

identify and sort large surges of supplies. The result is always gross inefficiency despite doctrine that recognizes the need to find a balance.

Now with exploitation of the micro chip the capability for operational logisticians to balance efficiency and effectiveness will be reality. In transit visibility and total asset visibility will become realities early next century. This will require a fundamental change in thinking as well as doctrine. These revolutionized capabilities mean theater managers can create a pull system of supply from the beginning of a force projection rather than face being swamped by a push system that produces inefficiency. General Sullivan articulated this saying, "By making sustainment more precise we can track all classes of supply and avoid shipping more than we really need. We can improve our national and battlefield reconstitution capabilities and can better export pre-positioned supplies and equipment, ashore and afloat."¹⁰ This reality combined with changing organizations described above will serve to limit support forces to only those required for on scene support and thus spell the demise of the snowball.

Horse and Wagon, Truck, ?

In case after case, the weak link in theater logistics is the capability to move supplies from the main base forward. During *Desert Storm* it took a large number of host nation assets and a five day war to crack this ancient and recurring problem. The curse of the theater transportation operators has been threefold. First, is simply to obtain enough assets. Second, is that this link inevitably moves slower than the tactical force and must compete for road space with following combat forces. Third, is the age old problem of tactical units holding theater assets as rolling magazines. *Desert Storm* was no exception. Pagonis noted that this created an additional burden in building the forward logistics bases.¹¹

What is the solution? Motor transport was a leap forward from the horse and wagon but not a revolutionary leap in any sense. Aircraft offer speed and don't

compete for road space but don't offer the capacity to provide a primary means of transport for a heavy force. No doubt the 21st century will see advances in aircraft but not a breakthrough technology that would revolutionize air capabilities. The greatest revolutionary opportunity may be in a rail type of transport that would be dramatically advanced over current capabilities. A modular, rapidly emplaced system that would offer speed and high capacity is essential to fix this weak link. This is a case where doctrine must drive technology. Certainly this will be compatible with the needs of the 21st century as vehicle congestion and limited land for roadways forces science to develop new computer controlled ground transport systems.

The observations and recommendations above focus on three critical elements of operational logistics that will change or need to change to ensure that operational logisticians can provide support in the 21st century. As in the last two centuries, there will be numerous innovations. However it will be the microchip that drives the revolutionary changes for the first half of the century. In the distant part of the 21st century the possibilities for propulsion or metallurgic technology to create revolutionary changes may exist. It will be the job of the operational logistician to recognize where operational logistics must go, not where it has been.

CHAPTER VI

CONCLUSION

Two quotes best summarize the concern expressed in this analysis. The first is about FM 100-5, "It is the "live and in color" way our Army is operating today and is going to fight and win tomorrow."¹ The second quote from the same article also about FM 100-5, "The logistics doctrine in the revised FM 100-5 is a reality today."² The concern is that the logistics doctrine is a reality today but not how logistics should be tomorrow. Unlike the rest of FM 100-5 the logistics chapter only hints at tomorrow. The soon to be published FM 100-16 is also a reflection of reality today. At best it is a model for fighting the last war.

On the eve of a new century that will see revolutionary changes in military operations, operational logisticians must not fall prey to the temptation to fight the last war. The realities of force structure and resources will not permit a continuation of 19th and 20th century concepts. This analysis has established a basic framework for the application of operational logistics. It has further analyzed how the elements of operational logistics have been applied during the modern era. And lastly it has analyzed how these elements may be applied in the 21st century based on trends in technology and its impact on military operations.

For logisticians, particularly those at the operational level, the challenge is clear. Resist fighting the last war, keep up with technology and stay *objective focused*.

NOTES

Chapter I

1. US Army Field Manual (FM), 100-5, *Operations* (Washington, DC: Department of the Army, June 1993) p. 1-3.
2. David P. Oberthaler, "An Introduction to Operational Logistics and Sustainment," Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1994, p.4.
3. US Army Field Manual (FM), Draft FM 100-16, *Army Operational Logistics* (Washington, DC: Department of the Army, 1993) p.1-13.
4. FM 100-5, p. 12-2.
5. James A. Brabham, "Operational Logistics: Defining The Art of The Possible," *Marine Corps Gazette*, (April 1994), p. 26.
6. *Ibid.* , pp. 26-27.
7. *Ibid.*
8. Nathan J. Power, "Force Projection Logistics," *Military Review*, (July 1993), p. 46.
9. *Ibid.*
10. Oberthaler, p. 10.

Chapter II

1. George C. Thorpe, *Pure Logistics* (Kansas City: Franklin Hudson, 1917; reprint ed., Washington: National Defense University Press, 1986), p. xiv.
2. *Ibid.*
3. Martin Van Creveld, *Supplying War* (Cambridge: Cambridge University Press, 1977), p. 17.
4. *Ibid.* , p.38.
5. Thorpe, p. xv.
6. Van Creveld, p. 43.
7. *Ibid.* , p. 57.
8. Thorpe, p. 14.
9. Van Creveld, pp. 72-73.

10. Thorpe, pp. 23-24.
11. Kenneth Macksey, *For Want of a Nail* (London: Brassey 's(UK) Ltd., 1989), pp. 21-22.
12. Van Creveld, p. 105.
13. *Ibid.* , p. 110.
14. *Ibid.* , pp. 112-113.
15. *Ibid.* , p. 119.
16. *Ibid.* , p. 126.
17. *Ibid.* , p. 134.
18. *Ibid.* , p. 151.
19. *Ibid.* , p. 154.
20. *Ibid.* , p. 185.
21. *Ibid.* , p. 186.
22. *Ibid.* , p. 192.
23. *Ibid.* , p. 214.
24. *Ibid.* , p. 220.
25. Macksey, p. 143.
26. Van Creveld, p. 214.
27. *Ibid.* , p. 233.

Chapter III

1. Macksey, p. 4.
2. J.E. Keyes, "Selected Extracts on Logistics and Sustainability," Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1992.
3. Macksey, pp. 33-34.
4. *Ibid.*
5. *Ibid.* , p. 8.
6. *Ibid.* , p. 41.

7. *Ibid.* , pp. 95-97.

Chapter IV

1. Gordon R. Sullivan, "Moving into the 21st Century: America's Army and Modernization," *Military Review*, (July 1993), p. 11.
2. Brabham, p. 28.
3. U.S. General Accounting Office (GAO), *Transportation and Distribution of Equipment and Supplies in Southwest Asia*, Report to the Chairman, Subcommittee on Oversight of Government Management, Committee on Government Affairs, U.S. Senate (Washington, DC: 1991), p. 4.
4. William G. Pagonis and Michael D. Krause, "Operational Logistics and the Gulf War," *The Land Warfare Papers*, no. 13, (Arlington: The Institute of Land Warfare, October 1992), p. 10.
5. *Ibid.* , p. 13.
6. *Ibid.* , p. 8.
7. GAO Report, p. 10.
8. *Ibid.* , p. 5.
9. Marion F. Cain III, "Building Desert Storm Force Structure," *Military Review* (July 1993), p. 25.
10. Charles C. Krulak, "CSS in the Desert," *Military Review* (July 1993), p. 34.
11. Pagonis and Krause, p. 9.
12. H. Norman Schwarzkopf, *It Doesn't Take a Hero* (New York: Bantam, 1992), pp. 512-513.
13. GAO Report, p. 4.

Chapter V

1. Gordon R. Sullivan and James M. Dubik, "Land Warfare in the 21st Century," *Military Review*, (September 1993), p. 13.
2. Wayne K. Maynard, "The New American Way of War," *Military Review*, (November 1993), p. 11.
3. Gordon R. Sullivan, "Projecting Strategic Land Combat Power," *Joint Forces Quarterly*, (Summer, 1993), p. 10.
4. *Ibid.* , p. 11.
5. Sullivan and Dubik, p. 22.

6. *Ibid.* , p. 28.
7. Sean D. Naylor, "Desert Trials," *Army Times*, (2 May 1994), pp. 12-14.
8. Sullivan and Dubik, p. 25.
9. Sullivan, *Projecting Strategic Land Combat Power*, p. 11.
10. Sullivan, *Moving into the 21st Century: America's Army and Modernization*, p. 6.
11. Pagonis and Krause, p. 12.

Chapter VI

1. Jerry R. Rutherford and Daniel V. Sulka, "Making FM 100-5 Logistics a Reality," *Military Review*, (February 1994), p. 11.
2. *Ibid.* , p. 18.

BIBLIOGRAPHY

- Brabham, James A. "Operational Logistics: Defining The Art of The Possible." Marine Corps Gazette, April 1994, pp. 26-31.
- Cain, F. Marion III. "Building Desert Storm Force Structure." Military Review, July 1993, pp. 21-30.
- Department of the Army. Army Operational Logistics. Draft FM 100-16. Washington: 1993.
- Department of the Army. Operations. FM 100-5. Washington: 1993.
- Hartman, R.H. and Vego, Milan. "Operational Fires and Protection." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1994.
- Keyes, J.E. "Selected Extracts on Logistics and Sustainability." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1992.
- Krulak, Charles C. "CSS in the Desert." Military Review, July 1993, pp. 31-37.
- Macksey, Kenneth. For Want of a Nail. London: Brassey's (UK) Ltd., 1989.
- Maynard, Wayne K. "The New American Way of War." Military Review, November 1993, pp. 5-16.
- Nauta, Frans. Logistics Implications of Maneuver Warfare. IR 702R1. Bethesda, Maryland: Logistics Management Institute, 1988.
- Naylor, Sean D. "Desert Trials." Army Times, 2 May 1994, pp. 12-14.
- Oberthaler, David P. "Introduction to Operational Logistics and Sustainment." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1994.
- O'Donovan, John A. "Combat Service Support During Desert Shield and Desert Storm: From Kibrit to Kuwait." Marine Corps Gazette, October 1991, pp. 26-31.
- Office of the Chief of Staff, Army. Louisiana Maneuvers: The First Year. Washington: 1994.
- Pagonis, William G. and Krause, Michael D. "Operational Logistics and the Gulf War." The Land Warfare Papers, No. 13, October 1992.
- Peters, Ralph. "The Movable Fortress: Warfare in the 21st Century." Military Review,

- June 1993, pp. 62-72.
- Pfaltzgraff, Robert L., Jr. and Shultz, Richard H., Jr. ed. "Supporting Forward-Deployed Forces." Naval Forward Presence and the National Military Strategy, 1993, pp. 179-191.
- Pilgrim, Calvin F.H. and Fehn, Michael J. "CSS for Airland Operations." Army Logistician, March-April 1992, pp. 2-7.
- Power, Nathan J. "Force Projection Logistics." Military Review, July 1993, pp. 45-49.
- Rutherford, Jerry R. and Sulka, Daniel V. "Making FM 100-5 Logistics a Reality." Military Review, February 1994, pp. 11-18.
- Schwarzkopf, H. Norman. It Doesn't Take a Hero. New York: Bantam, 1992.
- Simms, Edward D., Jr. et al. Reserve Component Logistics Responsibilities in the Total Force. ML206. Washington: Logistics Management Institute, 1982.
- Sullivan, Gordon R. "Moving into the 21st Century: America's Army and Modernization." Military Review, July 1993, pp. 2-11.
- _____. "Projecting Strategic Land Combat Power." Joint Forces Quarterly, Summer, 1993.
- Sullivan, Gordon R. and Dubik, James M. "Land Warfare in the 21st Century." Military Review, September 1993, pp. 13-32.
- Thorpe, George C. Pure Logistics. Kansas City: Franklin Hudson, 1917; reprint ed., Washington: National Defense University Press, 1986.
- U.S. General Accounting Office. Transportation and Distribution of Equipment and Supplies in Southwest Asia, Report to the Chairman, Subcommittee on Oversight of Government Management, Committee on Government Affairs, U.S. Senate. Washington: 1991.
- Van Creveld, Martin. Supplying War. Cambridge: Cambridge University Press, 1977.
- Weber, J.J. Mission Accomplished. Leipzig, Germany: n.p., 1945.
- Young, Paul A. et al. A Report on Current Logistics System Concepts. DI502R2. Bethesda, Maryland: Logistics Management Institute, 1985.