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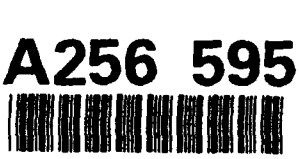

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by Major Kelly P. Bennion, USA, 47 pages.

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The terms used throughout the monograph are first defined. Next a theoretical base for the proposed counterlogistics concept is established by relying on such theorists as Clausewitz, Jomini, Douhet and others. Examples from history - Vicksburg and Operation Desert Storm - are analyzed to add validity to future proposals and identify lessons learned from the past. A model is developed to visualize the potential of the counterlogistics concept. Then current doctrine is analyzed to determine if the concept of a decisive counterlogistics fight is adequately addressed.

Finally, implications of current doctrine and capabilities of current systems are discussed along with potential limitations for the planning and executing of an operational counterlogistics fight. Included is the necessity to totally isolate the modern battlefield and maintain the resolve and patience required to execute a counterlogistics fight. The requirements for the operational planner to protect friendly logistics systems are likewise discussed.

Snapping The Achilles' Heel: The Counterlogistics Fight

A Monograph
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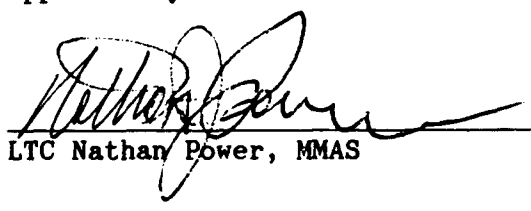

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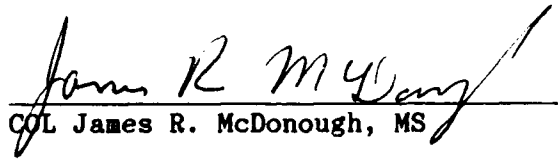

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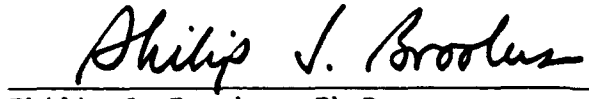

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The battle is fought and decided by the quartermaster before the shooting begins.[1]
Erwin Rommel

INTRODUCTION

The role of the logistician in war, while not glorious and seldom exciting, remains critical to the practice of operational art. In fact, many would argue that operational art is logistics; moving the right combination of forces, properly equipped, to the proper location on the battlefield at the required time in order to ensure operational success. Martin Van Creveld has defined logistics as, "the practical art of moving armies and keeping them supplied."[2]

Logistics has become so intertwined with strategy at the operational level of war that the two have virtually evolved into a single entity.[3] At this level logistics is more than just another combat multiplier, it is an integral component of the commander's campaign plan. Joint Pub 1 states that the commander's concept, or "vision of the required aim or 'end state", is comprised of the operational concept, the deployment concept, the organizational concept and the logistic concept. It stresses that "the operational concept may stretch but not break the logistic concept."[4]

Commanders, as well as logisticians, must always keep in mind that "logistics itself has no purpose other than to create and to support combat forces which are responsive to the needs of command."[5] A sound logistical concept increases the commander's ability to employ his means (combat power) for the attainment of

desired ends (operational objectives). The denial of logistics to an operational commander will conversely diminish the means (combat power) that is available to be employed.

Operational success is achieved by linking tactical battles together successfully in harmony with the campaign plan. During the course of the campaign tactical victories may fluctuate between combatants. The eventual termination of conflict will occur, however, when one of the combatants finally perceive that they can no longer sustain their war effort, or the nation loses the will to pursue the endeavor.[6]

In this sense one can argue that operational strategy and tactics "provide the scheme for the conduct of military operations; logistics provides the means therefor."[7] Given the increased dependency of operations on logistics, attacking the support system may expose a serious vulnerability. Exposing this vulnerability will be introduced as the "counterlogistics fight" in this paper.[8] The purpose of this monograph is to examine the feasibility, and impact, of a well devised, properly executed counterlogistics fight at the operational level of modern war.

The current proliferation of military capabilities is tremendous. A minimum of 56 countries can field military forces meeting two of the following capabilities: "700 tanks/armored personnel carriers, 100 combat aircraft, 500 artillery pieces, and over 100,000 soldiers."[9] This spread of military capabilities to many third world countries, coupled with current proliferation of high technology weaponry, have generated the requirement for massive logistical systems for the conduct of modern war.

This logistical system has become the bridge that connects the vital resources found in the national economy down to the tactical units in the field. The ultimate end of all logistics is the conduct of successful operations by combat forces.[10] In order to accomplish this end, and facilitate the practice of operational art by commanders, these logistical systems must be efficient and responsive. Timing is often the key to this efficiency and responsiveness.[11] The major criteria then to determine the value of an operational logistics system is its "effectiveness in creating and sustaining combat forces (in a timely manner) in action against an enemy."[12]

The demands that stress the logistical system are tremendous given the increased lethality and modernization of the current battlefield. At the operational level of war the logistical support of modern combat systems establishes the limits for the operational planner's campaign plan.[13] The Army's recent experience in Operation Desert Storm is examined in more detail later in the monograph, but for now it is insightful to note that the daily requirements for Class III (fuel) and Class V (ammunition) for the two deployed U.S. corps were computed at 4.5 million gallons of fuel and 14,000 tons of ammunition.[14]

The demands placed on the maintenance function of modern armies have likewise increased in scope. In the past a good mechanic could repair most equipment with a few tools and a simple repair part. Often these repair parts were such that this mechanic could fabricate what was required through creative

improvisations. Today such simple repairs have become much less likely and major repair parts or entire components are required to repair damaged equipment.[15]

Given this dependence on a large logistical 'tail', perhaps it is now decisive at the operational level of war to isolate logistical infusions through a concentrated counterlogistics fight. This counterlogistics fight would facilitate the reduction of enemy combat power by blocking the opponent's very lifeblood.[16] This monograph, then, seeks to answer whether the counterlogistics fight, given the logistical dependency of the modern battlefield, has in fact become the decisive fight at the operational level of war.

The methodology is first to define the terms used throughout the monograph. Next a theoretical base for the proposed counterlogistics concept is established by relying on such theorists as Clausewitz, Jomini, Douhet and others. Examples from history are analyzed to add validity to future proposals and identify lessons learned from the past. A model is developed to visualize the potential of the counterlogistics concept. Next current doctrine is analyzed to determine if the concept of a decisive counterlogistics fight is adequately addressed. Finally, based on the theoretical framework, lessons learned from past experiences, and current doctrine, the implications and monograph question are answered.

DEFINITIONS OF TERMS

Joint Pub 1-02 has defined logistics, as it pertains to

military forces, as follows:

> The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with; a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services.[17]

The term, counterlogistics, is not defined in current doctrinal manuals. Its meaning, however, parallels the other countermeasures found in these manuals. Countermeasures constitute, "that form of military science that by the employment of devices and/or techniques has as its objective the impairment of the operational effectiveness of enemy activity." For example, joint doctrine defines counterreconnaissance as "all measures taken to prevent hostile observation of a force, area or place."[18] Counterlogistics, then, can be defined merely as the employment of those measures necessary to deny the enemy force use of its logistical system.

An army's logistical system encompasses many functions. Predominant among them are the replacement mechanisms for personnel, equipment and supplies, a responsive maintenance structure, including both immediate and long-term repairs, and a dependable transportation network both for intertheater, as well as intratheater, lines of communication (LOCs) and support. By successfully attacking this logistical system, a counterlogistics fight would accelerate the incapacitation of enemy forces, thus ensuring their ultimate reduction by friendly forces.

The counterlogistics fight differs from the more commonly

used term of interdiction in scope and magnitude. Joint doctrine defines interdiction as, "an action to divert, disrupt, delay or destroy the enemy's surface military potential before it can be used effectively against friendly forces."[19] In this regard interdiction is targeted across the entire depth of the battlefield operating systems. Its focus is on combat forces, command and control, sustainment and all other battlefield systems. The U.S. Army field manual of operational terms defines the term interdict entirely different. Interdict is "to isolate or seal off an area by any means; to deny use of a route or approach or to prevent, hinder, or delay the use of an area or route by enemy forces."[20] The Army term is clearly terrain oriented versus system oriented. The proposed concept of counterlogistics goes far beyond the Army's term of interdict and concentrates on the joint definition's focus on actions directed against a single battlefield operating system.

THEORETICAL BASE

In order to determine if the counterlogistics fight is the "decisive fight" at the operational level of war it is important to clarify the meaning of two important theoretical terms, Jominian decisive points and the Clausewitzian center of gravity. Jomini postulated that there existed a decisive point (key terrain) on every battlefield, the possession of which would secure victory for an army. Recognizing that this point could change given differing dispositions of forces, he nevertheless always referred to this "point" as a piece of terrain.[21] At the

tactical level of war this geographic orientation seems appropriate at the time of Jomini's writings. However, in modern war, and especially at the operational level of war, this "decisive point" may not be a geographic point at all but instead a warfighting system.

Jomini's decisive point is linked closely to the Clausewitzian term, center of gravity. While there are many interpretations of this term, for the purpose of this monograph the definition found in the fourth chapter of Book Eight in On War is used: the, "hub of all power and movement, on which everything depends."[22] Later in this same chapter he postulates that this source of power is generally the largest concentration of fighting forces, which corresponds to the greatest concentration of combat power.

Defining the center of gravity as the greatest concentration of combat power keeps it very consistent with the Jominian term, decisive point or fight. If the greatest concentration of combat power capability remains the center of gravity at the operational level of war, then the "decisive fight" is that fight that prepares the battlefield or sets the conditions for the ultimate destruction of this combat power. The operational commander must have the "ability to see the battlefield, understand the enemy, and apply capabilities (that) will ultimately shape the battlefield and create the conditions which will permit decisive operations."[23] In a Jominian sense the decisive fight becomes that event that secures victory for the operational commander.

Another Clausewitzian term that requires common understanding

is "culminating point". The culminating point is that point that if passed, the "scale turns" and the advantage passes to the opponent.[24] This phenomenon can occur both on the offense and the defense. The operational commander's aim, then, is to "achieve decisive objectives *before* the culminating point is reached."[25] The desired effect of a counterlogistics fight is to accelerate the enemy's culminating point, thus diminishing his combat power.

In the development of an operational plan, there are two basic approaches that planners pursue, the direct approach or the indirect approach. The direct approach utilizes overwhelming mass to crush an enemy while the indirect approach bypasses strengths and attacks enemy weaknesses.[26] Either approach, or a combination of the two, can be viable depending upon the conditions that have been set on the battlefield. The direct approach will generally arrive at a decision quicker, but potentially at greater cost given strength attacking strength. The indirect approach may better preserve the force, but will generally require more time and is usually a more complex operation, thus increasing the possibility of friction. The operational commander must choose the proper approach to achieve the desired ends, consistent with strategic constraints.

Dovetailing the theory of the direct versus the indirect approach are the dual strategies of war identified by Hans Delbruck, a noted German military historian, namely *Niederwerfungsstrategie* (the strategy of annihilation) and *Ermattungsstrategie* (the strategy of exhaustion). *Niederwerfungsstrategie* has a single aim, the Clausewitzian

decisive battle where the opposing armed forces are defeated to such an extent that they subject themselves to the total will of the victor. *Ermattungsstrategie*, on the other hand, has two aims, battle and maneuver. One does not seek instant victory but instead pursues a course whereby the enemy is worn down by successive blows and eventually subjects himself to the will of the attacker, but on more moderate terms than those imposed under *Niederwerfungsstrategie.*[27]

From a purely Clausewitzian point of view, the operational campaign plan should follow, if feasible, a strategy of annihilation. The decisive fight would be the attack against the enemy's center of gravity, the opposing armed forces. Modern war, however, is not only a contest between two opposing armed forces, but also between industrial capabilities and economic resources. These added dimensions to war since the 18th century have made the quest for the ultimate campaign of annihilation virtually impossible.[28] The phenomenon of increased dependency on a substantial logistical system makes the recognition of the differing strategies in campaign planning critical.

One of the earliest theoriticians to recognize the increased dependency on logistics and the vulnerability it represented was Giulio Douhet. An Italian military theorist, he was a pioneer in the development of air doctrine. His vision for the future was based on the advancing technology of aviation. He postulated that air power could strike with impunity deep within the enemy's territory. These air strikes would cause severe strains, if not complete collapse, of the enemy's industrial base and terrorize

the local populace.[29] While events in World War II would show he failed to envision the full impact of defensive countermeasures, particularly radar, high speed fighter aircraft and anti-aircraft defenses, his vision of a more sophisticated battlefield are insightful.

He postulated that the lines of communication (LOCs) utilized by armies and navies could be severed from the air and their logistical and staging bases destroyed. The severing of LOCs would isolate the combatants in the field from their supporting strategic base stored in national depots. Along with severing LOCs to cut the flow of support, he advocated that an air campaign could strike directly at the factories and facilities that produced war sustaining materiel.[30] In this sense he viewed air power as a direct means of attacking the strategic base while armies and navies indirectly attacked this resistance and relied on a strategy of exhaustion to conduct their campaigns.[31]

Douhet recognized that modern armies and navies required large logistical structures to support them. He recognized the dependency of maintaining secure LOCs to facilitate this support. The rationale for claiming that Douhet believed in at least a quasi-counterlogistics fight is supported by his following thought:

> If this service (supply service by rail and road) is disrupted, made irregular, or cut off, it means the debilitation of the army which relies upon it and the weakening of its striking power. It might also deprive the army of its strength, perhaps even immobilize it and make it impotent.[32]

Following in the footsteps of Douhet was American Brigadier General Billy Mitchell. An ardent supporter of Douhet's theory

concerning air combat he championed the cause of a decisive air campaign to American strategists. He likewise believed that armies and navies had "lost their significance" in the practice of war. The maturation of the industrial revolution had placed a pre-eminence on a nation's war-making potential. These industrial hubs were the foundations for 20th century nation's war making capability. Mitchell believed that a campaign of strategic bombing from the air could reduce industrial centers that generate vital war materiel to such an extent that the enemy would be compelled to sue for peace.[33] In large measure, Mitchell was proposing very similar doctrine in America that Douhet was expounding in Europe. While Douhet and Mitchell were espousing revolutionary theories regarding air attacks on logistical infrastructure, the impact of severing a modern army's operational support base had earlier been demonstrated.

HISTORICAL ANALYSIS

VICKSBURG

Some military theorists contend the American Civil War witnessed the birth of operational art. Whether this marked the actual birth of operational art or not is beyond the focus of this monograph, however the contention that operational art was practiced during this conflict will be supported. There are several characteristics that are essential for the existence of operational art. First, synchronized operations that preferably involve more than one service are required. Second, it is necessary to have present more than one independent force. Third,

battles must be distributed across the theater of operations. Fourth, these battles must create a cumulative effect. Fifth, there must be independent forces that do not concentrate. And sixth, the overall commander must possess a clear vision that frames the entire campaign.[34]

Ulysses S. Grant's campaign to capture the Mississippi town of Vicksburg is analyzed from this perspective. First the monograph will support the contention that Grant practiced operational art during this campaign and then secondly, and more significantly for the intended purpose of this monograph, the effects of counterlogistics during the campaign are demonstrated. Finally a conclusion will be derived regarding the decisiveness of the counterlogistics effort.

Vicksburg occupied a position along the Mississippi River that gave it great operational, as well as strategic, value. The Mississippi River was the major line of communication (LOC) that connected the northwestern states in the Union with the rest of the world. Confederate control of Vicksburg, which sat along a hairpin turn in the river, denied the Union access of this critical LOC. Vicksburg was also the central logistics depot for Confederate supplies transiting from the western states in the Confederacy, especially Texas, to the eastern states.[35] Loss of Vicksburg would thus split the Confederacy, impede logistics support tc the Confederacy and provide the North with access to a critical line of communication.

Geographically Vicksburg was formidable. Anchored on the west by the Mississippi River, it was also protected from the

northeast by the Yazoo delta. The only alternative to seizing Vicksburg was to capture the high ground east of the Yazoo or south of the city. Grant's attempts to cross the Yazoo delta ended in disappointment.[36] Thus what remained for Grant to orchestrate was a crossing of the swampy lands southwest of Vicksburg and attempt to cross the Mississippi further to the south. Once across the Mississippi he could then maneuver against Vicksburg from the dry ground to the southeast of the city.

The crossing of the Mississippi was the beginning of Grant's demonstration of operational art in this campaign. He had at his disposal three army corps, Sherman, McClernand and McPherson, plus the willing cooperation of the brown water naval force under the command of Admiral Porter. In addition to these forces was the Union cavalry under the command of Benjamin H. Grierson operating in the Confederate rear. Grant was able to synchronize the actions of these forces successfully for the accomplishment of the desired end state of obtaining the key terrain on the opposite side of the Mississippi River.

Sherman remained north of Vicksburg and feigned an attack by one of his divisions in the vicinity of the Chickasaw Bayou.[37] This demonstration, coupled with Grierson's actions in the Confederate rear, kept John C. Pemberton's Confederate forces pre-occupied and slow to respond to the real threat at Grand Gulf. Attacking in harmony with Porter's navy, Grant maneuvered both McClernand's and McPherson's corps across the Mississippi. Crossing the river largely unopposed, Grant next maneuvered his two corps on Port Gibson. Following very tough fighting with two

Confederate brigades, the Union forces finally captured Port Gibson.[38] Port Gibson has been described as a classic "pivot of maneuver", ground which allows the commander several options to shift his direction of operation.[39] Once seized, Port Gibson allowed Grant the option of turning due north to Vicksburg, northeast towards Jackson, Mississippi, or east deeper into the rear. Pemberton would have to deduce which direction the Union would turn next. (Annex A depicts the lines of operation that were eventually followed by both the Union forces and the Confederate army.)

Grant's actions to this point of the campaign were a clear indication of his ability to practice operational art. Not only did he coordinate the actions of three different corps for the achievement of a common end, he did it in harmony with the naval forces on the Mississippi and Grierson's calvary operating deep in the Confederate rear. More importantly Grant maintained a clear vision, seizing dry ground east of the river, thus allowing him the option to strike where he chose next, with all these actions likewise tied to the ultimate seizure of Vicksburg.

Once at Port Gibson, Grant was faced with two options. He could attack north at once, into the strength of Pemberton's defenses, in a direct approach upon the enemy's center of gravity. This approach would have paralleled Delbruck's *Niederwerfungsstrategie* (strategy of annihilation) seeking an instant decisive battle. On the other hand, he could attack to the northeast toward Raymond and Jackson, Mississippi, employing an indirect approach to cut off Pemberton's LOCs (supplies coming

from the western states had been severed with the loss of the Mississippi to Porter's navy), separate Pemberton from receiving reinforcements or aid from Joseph E. Johnston's army in the east and thus isolate him from receiving replenishments of supplies and manpower. This course of action can be compared to Delbruck's *Ermattungsstrategie* (strategy of exhaustion) seeking to wear down the enemy by repeated blows and employing battle in harmony with maneuver to achieve the desired end state. Grant chose the second course of action.

Following the seizure of Port Gibson and the surrounding high ground, Grant's forces took a short pause to allow Sherman's corps to join them on the east side of the Mississippi. During this time period Pemberton was indecisive and failed to concentrate his combat power for a decisive repulsion of the Union army. He spread his forces out from Vicksburg to the state capital of Jackson.[40] Once Grant had his three corps in a position to move forward, he struck out for Raymond and Jackson, not directly for Vicksburg. Grant's aim was to place himself between the two confederate forces, Pemberton's in Vicksburg and Johnston's assembling in Jackson. The destruction of Jackson as a supply base was also crucial for the campaign plan as it was the source of replenishments for the confederate forces stationed within Vicksburg.[41] With the indecisive Pemberton fixed at Edwards Station, which was west of Jackson, Grant used Sherman and McPherson's corps to drive Johnston from Jackson, destroy the city's stores of supplies and war producing industries and isolate

Pemberton's army.[42] Confederate forces in Raymond were likewise quickly defeated.

Grant's securing of Raymond and Jackson was significant. He had now cut the remaining confederate LOC into Vicksburg, thus stopping the replenishment of supplies and perhaps more importantly reinforcements from being able to reach Pemberton. He had also completely destroyed the logistics infrastructure of Jackson. Grant also blocked Pemberton's likely avenue of retreat.[43] In conjunction with this severance of the confederate LOC and destruction of supplies, Grierson had destroyed a key rail line into Jackson further in the confederate rear, thus complicating any plan Johnston may have had to attack the Union army from the east.[44] With his LOCs cut and having been placed in a precarious condition by Grant's operational maneuver, Pemberton decided to counterattack and attempt to cut Grant's own LOCs. The result was the battle of Champion Hill.

The two opposing armies maneuvered into one another on 16 May at Champion's Hill, which was located midway between Jackson and Vicksburg. The resulting battle cost the confederates 3,800 casualties and the northern army 2,400.[45] Grant's forces, however, were unable to capitalize on this opportunity to defeat the confederate army in the open. They were able, however, to repel the planned counterattack by Pemberton and send the southern forces retreating to Vicksburg completely demoralized. Pemberton had failed to cut Grant's LOCs and more significantly, he had failed to reopen his own LOCs to Johnston's army further to the east. The battle for Vicksburg had been decided at this point.

STAGES OF COUNTERLOGISTICS FIGHT

ISOLATE	-	SEAL OFF NEW INFUSION OF COMBAT POWER
DISSIPATE	-	ALLOW CULMINATION TO WEAKEN ENEMY
ELIMINATE	-	ONCE CENTER OF GRAVITY IS SUFFICIENTLY WEAKENED, OVERWHELM

FIGURE 1

The first stage of the counterlogistics fight (Figure 1) had been accomplished. Pemberton's army had its logistical lifeline severed. New infusions of combat power would not be coming. Coupled with this severance of support was the apparent moral disarray of the confederate army as it retreated within the safety of Vicksburg. Grant, however, miscalculated that Pemberton's army had reached its culminating point. Pemberton's forces had actually been invigorated by being behind friendly fortifications, reinforced by fresh troops who had stayed within Vicksburg and still possessing a quantity of supplies.[46] Grant failed to allow sufficient time for stage two of the counterlogistics fight to take effect. Grant's assault of Vicksburg on 19 May proved futile. Still not accepting the strength of the defense, Grant attempted a second assault of the field works on 22 May, once again the Union forces failed.[47]

Following the two costly attempts to overpower the forces defending Vicksburg, Grant settled into a siege. This allowed the combat power of the confederate troops to dissipate. The constant fighting between opposing forces and the lack of food and supplies

steadily drained Pemberton's capability.[48] Finally after 47 days of being isolated from fresh supplies and replacements, Pemberton's weary army surrendered rather than face a new assault from Grant which was planned for 6 July. While the final stage of the counterlogistics fight is to overwhelm the opposing force following its culmination, this was not necessary at Vicksburg given the Confederate surrender. Grant's operational campaign plan had been successful.

The role of the counterlogistics fight in Grant's Vicksburg campaign was decisive. While Grant never recognized it as such, the effects were nonetheless obvious to the confederate army. In order to set the conditions for this fight to be decisive, Grant first isolated Pemberton's army. This isolation was effected by combining the effects of the naval battle on the Mississippi, Grierson's deep raids against LOCs and potential reinforcements, cutting the remaining land LOC from Jackson to Vicksburg and fixing Johnston's forces further to the east. Grants use of Port Gibson as an operational pivot of maneuver was key to this phase of his campaign. Pemberton recognized the potential consequences of these actions and maneuvered to negate their impact. Unfortunately for the confederates, Pemberton's forces were not capable of successfully executing their counterattack plan at Champion's Hill. Following this defeat, Pemberton's umbilical cord of logistics was severed. Initially Grant underestimated the remaining combat power of Pemberton's forces, especially given their strong defensive positions within Vicksburg. However after recognizing the confederates strength, Grant adopted a strategy

that would allow their combat power to dissipate and weaken. Once weakened, he was able to defeat the main enemy force, the operational center of gravity.

As mentioned, Jomini defined the decisive point as that piece of terrain, the possession of which secured victory to the army. It can be argued that the counterlogistics fight at Vicksburg secured victory for Grant, thus becoming the operational decisive fight. The ability for this fight to be "decisive" at Vicksburg was facilitated by the lack of resolve of Johnston and his forces to come to the assistance of Pemberton. This inaction indirectly supported Grant's initial requirement to isolate the enemy's center of gravity. This isolation set the proper battlefield conditions for the final stages of the counterlogistics fight to be successful.

OPERATION DESERT STORM

If the American Civil War was the birth of operational art, then one hundred and twenty eight years later saw the demonstration of its maturity displayed in the deserts of Southwest Asia. On August 2nd, 1990, Iraq invaded the small country of Kuwait and soon consolidated over 500,000 troops with some 4,200 tanks and 3,000 heavy artillery weapons in Kuwait or along the southern Iraqi border.[49] The options available to General H. Norman Schwarzkopf, Commander-in-Chief, United States Central Command, were similar to those faced earlier by Grant at Vicksburg. Initially General Schwarzkopf's biggest challenge was getting the required forces deployed into the theater. Once this

was successfully accomplished he had two basic courses of action available to him. First, he could rush into battle against the prepared Iraqi defenses in an attempt to achieve a quick and decisive victory, the direct approach. The other alternative available to him was to adopt a more patient plan, wear down the Iraqi force, and attack where and when he felt most confident of quick, but less costly, victory.[50] This course of action parallels the strategy of exhaustion or the indirect approach.

Clausewitz stated that "war is an extension of politics by other means."[51] In this context the nature of the campaign plan, and the means of achieving the desired political outcomes or ends in Kuwait, were critical. The military had the responsibility to construct a campaign plan that was consistent with political objectives and in harmony with political realities. Saddam Hussein envisioned a "Mother of All Battles", where coalition forces would close on his defensive positions, disregard significant "battlefield preparation", and suffer extremely heavy casualties.[52] Such losses, he supposed, would be politically unacceptable and would force the coalition to withdraw and broker a settlement.

However in Kuwait, as opposed to Vicksburg, there was no initial rush of the defensive positions. The operational artists in Operation Desert Storm concentrated on achieving decisive ends without first visiting "the butcher shop of a nasty ground war."[53] The resulting operational plan focused on weakening the Iraqi armed forces and resolve to such an extent that combat action to regain lost territory would be fast and less costly.

The operational plan compares to the earlier stages proposed in the counterlogistics fight. The first stage, fixing and isolating the enemy, was accomplished by various means. The isolation of Iraq was initiated by pursuing diplomatic as well as military options. With United States leadership, the United Nations approved economic sanctions against Iraq. This initial resolve was critical to isolate the Iraqi war machine, including their industrial base, from the rest of the world. These sanctions were later followed up by a naval blockade which "quietly and insidiously tightened the vise on the Iraqi logistics system."[54] During this economic isolation, coalition forces were busily deploying to the theater of war.

Based on the battlefield intelligence picture obtained through highly technical, sophisticated equipment, coalition ground forces prepared defensive positions on the Kuwaiti - Saudi-Arabian border. Naval and marine forces positioned themselves in the Persian Gulf and coalition air forces completed their deployments to the theater. This was a critical time for the coalition forces. Sufficient combat power had to be generated quickly to counter the Iraqi threat. Similar to Pemberton's error at Grand Gulf, Iraqi forces failed to concentrate and deliver a potentially disasterious blow to the coalition while they were building a support base to generate combat power.

The Iraqi tentativeness to continue offensive actions coupled with a comparable buildup of allied forces served to fix the Iraqi's in their prepared positions. Simply having the enemy fixed however does not necessarily induce culmination. If allowed

to bring up fresh supplies, equipment and manpower the combat power of the force increases. The need to deny this increase of combat power then leads to the other critical portion of this stage, the logistical isolation of the enemy.

This was perhaps the most critical part of the counterlogistics fight. Having begun early with the economic sanctions and naval blockade, the vise was further tightened as the air forces became offensively oriented. Of the seven specific objectives in the initial air tasking order (ATO), five directly related to the counterlogistics fight. These objectives were; first, incapacitate the command, control and communications (c^3) infrastructure; second, destroy key electrical and oil storage facilities; third, deny resupply capability; fourth, eliminate long-term offensive capabilities; and fifth, disrupt and weaken the elite Republican Guard.[55]

To accomplish these objectives the coalition armed forces had an impressive array of modern weapons at its disposal. The Tomahawk Land Attack Missile (TLAM) provided deadly, accurate munitions on targets deep in the rear. These precision munitions were ideal for "soft targets." These targets included fuel storage facilities, electrical nodes and similar soft targets. The B-52 Stratofortress was used to attack large above ground logistical targets. As an example, B-52s attacked the supply depot of Taji where Iraqi tanks and SCUD missiles were built and repaired as well as being a large repair parts storage facility for Iraqi war materiel.[56] Precision guided munitions from the F-15 Eagle and F-16 Fighting Falcon were able to attack key

bridges and other transportation nodes with tremendous accuracy, thus virtually paralyzing the Iraqi resupply system. These modern weapons, working in harmony with sophisticated command and control systems which were receiving vital intelligence updates, provided the coalition forces the ability to isolate the deployed Iraqi forces from their national support bases.

As General Schwarzkopf's campaign plan unfolded Iraqi supply lines were severely constricted. Now the second stage of the counterlogistics fight, specifically dissipation of combat power, began to take effect. Data obtained from the joint services tactical airborne radar system (JSTARS) revealed that the daily flow of Iraqi supply trucks were cut by 90%, from 20,000 tons of supplies to 2,000 tons.[57] This figure barely covered the minimum amount of food required for the 40 Iraqi divisions in the Kuwaiti theater, 50 tons per day per division, but left no assets available for the resupply of ammunition, water or repair parts.

An operation is decisive to a campaign if it secures the outcome. Soon all viable logistics support from the national economy had been eliminated from the Iraqi field army in Kuwait. The constant bombing and severance of supply lines demoralized the Iraqi army and left them very susceptible to the campaign's psychological plan.[58] As a result, when the CINC decided it was time for the ground war, coalition forces quickly pushed Iraqi forces from Kuwait without the much prophesied "Mother of All Battles." Given the condition of Iraqi defenders once the ground war started, it appears that the battlefield was properly

"prepared" to ensure victory. In large measure this battlefield preparation was accomplished through the severance of Iraqi logistical systems.

Analyzing the logistical demands of the two United States Army corps that fought in Operation Desert Storm demonstrates the dependency that a modern military force has on a well functioning logistical system. In order to sustain two U.S. corps in Operation Desert Storm there was a requirement for 850 truckloads of ammunition and 880 trucks of petroleum each day to maintain daily support. The demands on cargo handling, transportation and processing of critical ammunition and fuel do not include the additional logistical strain of supporting over 300,000 personnel with food and personal equipment, and the supply of repair parts for over 12,000 tracked vehicles and 114,000 wheeled vehicles.[59] Visualizing the thousands of trucks required daily to support the VII and XVIII corps it is easier to understand the complicated logistics necessary to support the Iraqi 40 plus divisions deployed to the Kuwaiti theater of war.

The result of severing the Iraqi logistical umbilical cord was the rapid expulsion of Iraqi forces from Kuwait without a "mutual bludgeoning contest."[60] While the weapons of war were different, the results obtained in Operation Desert Storm mirrors those obtained in Grant's Vicksburg campaign. A key difference in Operation Desert Storm, however, was the early recognition of logistical dependency, the ability to allow isolation to take effect on the enemy and dissipate his combat power. This indirect approach to the Iraqi center of gravity, the preponderance of the

combat power, set the proper battlefield conditions to ensure ultimate victory. Upon reaching these proper conditions, coalition forces completely overwhelmed the Iraqi army. The Iraqi army was incapable of reacting to this overwhelming might of the coalition, thus there was no Champion Hill counterattack. The patience of General Schwarzkopf in the isolation stage of the campaign allowed U.N. Forces to attack with overpowering force after the Iraqi's had surpassed their culminating point.

THEORETICAL MODEL

Figure 2 is a representation of the umbilical-like dependency of a modern combat force to its national economic base as demonstrated in the historical examples. The combat capability of an armed force is represented in the model by the box labeled

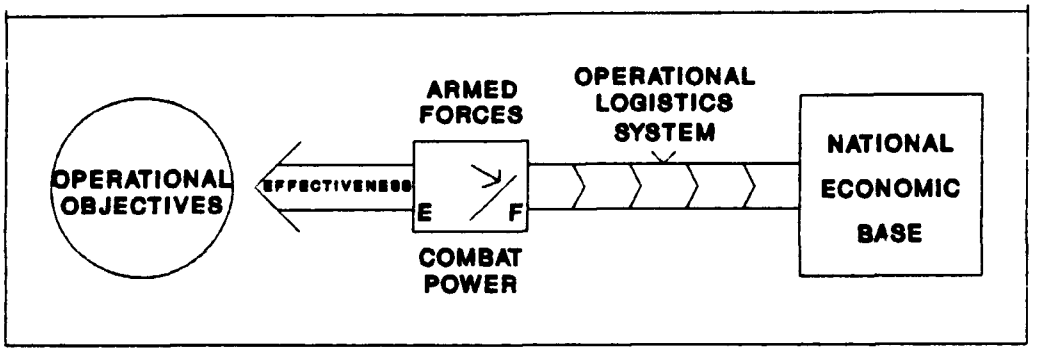


FIGURE 2

"combat power." A force's combat power fluctuates between the "full" mark when totally sustained by its logistics system to the "empty" mark when this sustainment is stopped. What flows through the operational logistics system are those resources from the national economic base required to sustain the soldier, fuel, fix,

arm and move a modern force. The level of combat power available to an armed force provides the means of achieving operational objectives. (While there are other factors that influence combat power, for instance training and morale, these factors are held constant in the model to better examine the impact of logistics at the operational level.)

Prior to the advent of mass conscription armies and modern transportation systems, primarily the railroad, armed forces would "charge" their level of combat power to the "full" mark, detach themselves for the most part from their national economic base and conduct combat operations. This was facilitated in large measure by the ability of armies to forage for sustenance. Once separated from their national base armies would maneuver against one and other in an attempt to achieve a grand climatic battle that would determine the outcome of the campaign. The nature of the modern battlefield has changed this method of waging war.

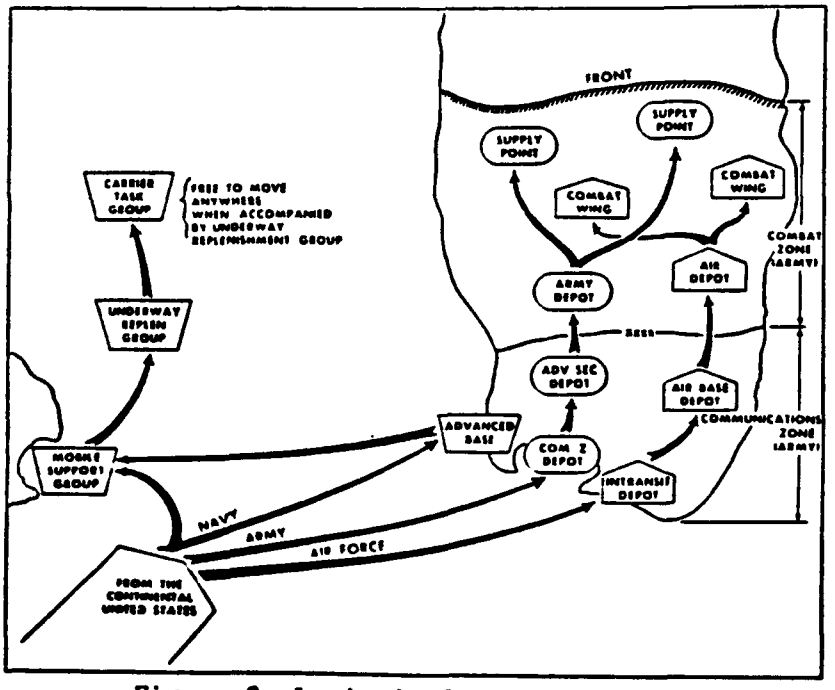


Figure 3 Logistical Support System

Today operational commanders must recognize that the battlefield has become "extended" and now plans "are often more oriented on activities and the enemy rather than on terrain."[61] Logistically this battlefield extends from the national economic bases through intermediate logistics bases down to the tactical combat service support activities. (See Figure 3)[62] Connecting these various levels of logistics are modern lines of communication. The operational theater is connected by sea and air lines as well as the more conventional land line of communication. This logistical system "provides the force staying power over time."[63]

Fresh infusions of support are continually required to provide modern armed forces with this staying power. In order to accomplish this, the logistical system must display "logistic readiness." Logistic readiness is defined as, "the ability to undertake, to build up and thereafter to sustain, combat operations at the full combat potential of the forces which are assigned to the combat commanders in those areas that are vital to the security of the nation." As the level of combat power diminishes toward the "empty" mark, then combat power can be "re-charged" using the modern logistics system. An armed force sustained in this way would theoretically be fully capable of achieving its operational objectives, given the proper applications of the principles of war.

As measures are taken to restrict the flow of logistics to the armed forces, thus degradating the logistical readiness, then the level of effective combat power will correspondingly decrease.

In figure 4 the infusion of support from the national base to the field army has been restricted but not totally severed. In this condition it is still possible for the armed forces to maintain

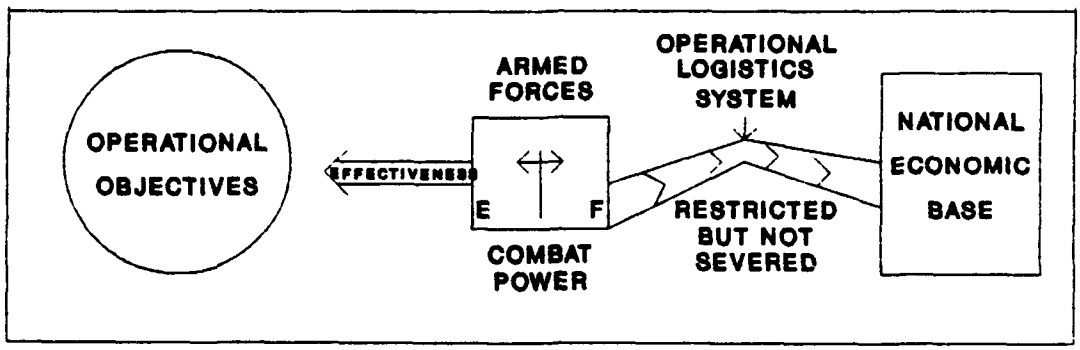


FIGURE 4

effective combat power, but it is more difficult. Operational objectives, while potentially achievable, are placed in greater jeopardy. This restriction of logistics is akin to the definition of interdiction.

The final possibility given the dependency of modern forces to their logistical base would be a complete severance of this

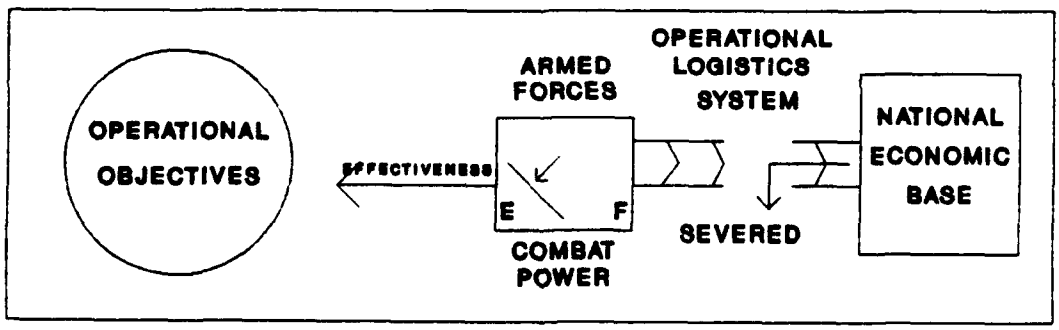


FIGURE 5

umbilical cord. (Figure 5) Denied the life sustaining infusion of fresh sustenance, and unable to exist as a separate, self-sustaining element, combat power diminishes at an accelerated

rate. The lack of effective combat power will not only make attainment of operational and strategic objectives virtually impossible, but will place the force itself in peril as it approaches and subsequently surpasses its culminating point. Thus weakened, the conditions ave been set for the destruction of the armed forces which may be accomplished at much less risk to the opponent.

CURRENT DOCTRINE

Military doctrine is based on the perceptions of the reality of war. These perceptions are developed from historical analysis as well as current advancements in technology and socio-political interactions. Once developed, these perceptions shape doctrinal thought which in turn provides the impetus for updated military tactics, techniques and procedures. The reality of the changing nature of war, especially with regard to logistical dependency, is the basis for potential counterlogistics doctrinal thought.

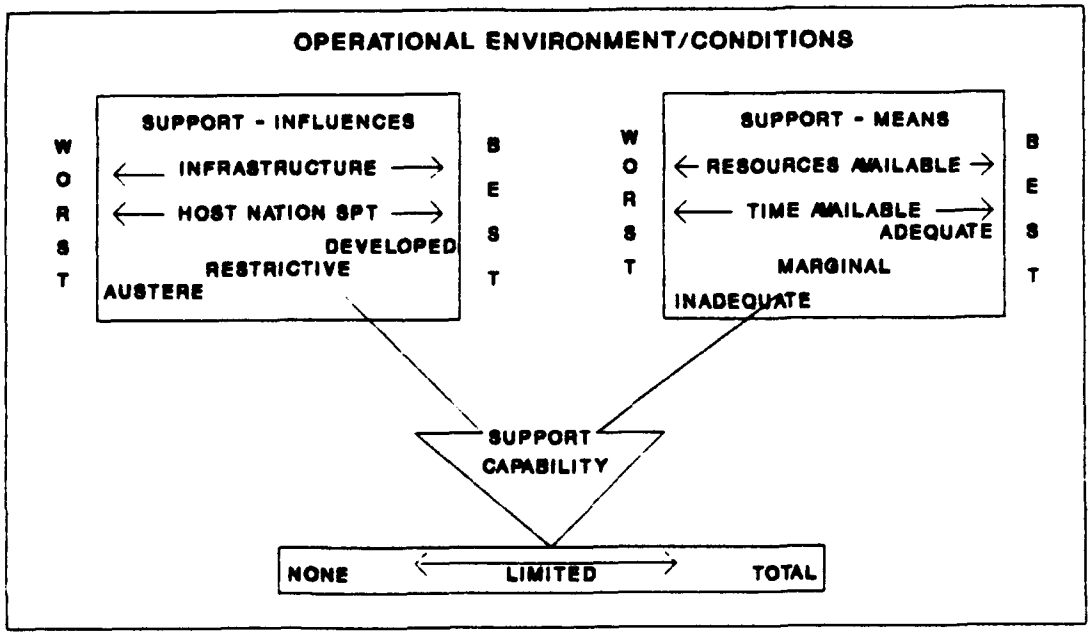


FIGURE 6

Figure 6 represents a conceptual operational environment from a logistical perspective. The left box, "support -influences", is derived from the new coordinating draft of FM100-7, The Army in Theater Operations.[64] It depicts that the less developed, or in the case of a counterlogistics fight the more degraded, the infrastructure is in a theater, the more support will be affected. The same applies to the amount of host nation support available, or again in the case of a counterlogistics fight denied, the worse overall support will be. Adding the right box, "support - means", to the diagram completes the factors necessary to determine the support capability which is available. Resources available include those assets required to sustain the force, food, fuel, ammunition, etc, as well as those assets needed to move and deliver supplies and services. While time is also a resource, its significance is such that it is listed separately. Merging these two support subsets, influences and means, yields the degree of support an operational force is capable of receiving.

This support capability is the critical factor in determining the tempo that is feasible in an operational commander's campaign plan.[65] The objective of a counterlogistics fight is to go beyond curtailing this tempo, which is the primary contribution of interdiction[66], but to completely severe it. Because of past demonstrations of logistical improvisation the new draft manual of FM100-7 addresses interdiction of logistics systems as disruption versus complete severance of logistical support.

Severance of logistical support transcends denying food, fuel or ammunition to a military force, it gnaws away potential combat

power.[67] Combat power is what provides a modern force with lethality, the ability to forcibly impose one's will. As this ability decreases, the very survival of the force is placed in jeopardy. Retired Lieutenant General John H. Cushman said, "no matter what may be the esprit of a force and the quality of its leaders, a tank without a crew cannot move, an artillery battalion without ammunition cannot shoot, a radio without batteries cannot communicate, an aircraft without an engine cannot fly, a truck without fuel cannot resupply anyone - and forces which are for long in this condition will lose."[68]

Current doctrinal manuals recognize the primacy of sophisticated, responsive, modern logistical systems. The characteristics of the logistical environment at the operational level of war is replicated in figure 7.[69] Each of these

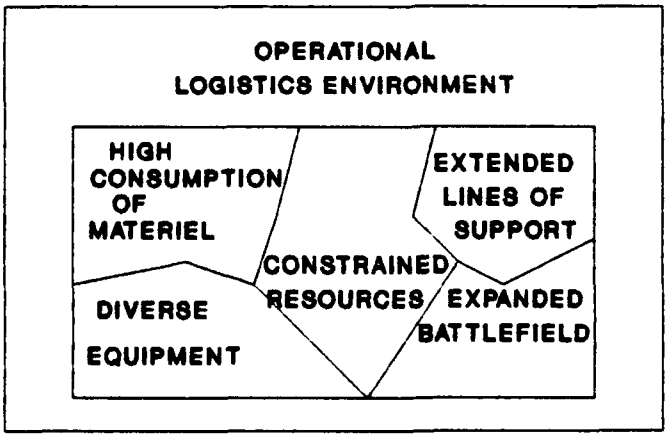


FIGURE 7

characteristics represent challenges for the operational logistician, and a potential vulnerability of the combat force. These characteristics represent potentially fragile components of the logistical bridge that connects strategic logistics, from the

national economic base, to tactical combat service support, soldiers and small units.

The feasibility of conducting a concentrated counterlogistics fight is alluded to in the present version of Field Manual 100-5, the Army's keystone manual on operations. "···Almost as commonly, the center of gravity of one or both combatants will be found in their support structures, and in those cases major operations or even entire campaigns may be mounted to destroy or defend those structures."[70] One could argue over the correctness of the term "center of gravity" as it is used in this context, however it remains clear that the support structure is critical at the operational level of war and is a viable objective in a campaign. In the context used in FM 100-5, this campaign against the support structure, if not attacking the center of gravity, would certainly constitute an attack on a "decisive point." The field manual implies that once the support structure is eliminated, the outcome of the conflict is secured.

FM 100-5 once again states that operational sustainment consists of those "logistical and support activities required to sustain campaigns and major operations within a theater of operation."[71] It is a bridge beginning at one end with the theater sustaining base and ending at the forward combat service support units that support tactical formations. The middle of the bridge, that system that brings these supplies and services into the theater and distributes them, is likewise a vital component of the operational logistics system.

For any military force's operational logistics system to be

viable in modern war it must adhere to basic fundamentals (called imperatives in U.S. Army doctrine) of support. These fundamentals are anticipation, integration, continuity, responsiveness and improvisation.[72] While a counterlogistics fight could attack any and all of these characteristics, two of them in particular lend themselves to targeting in a counterlogistics fight. Continuity, the uninterrupted provision, of support is vital to sophisticated forces. If logistics is interrupted for long, then the combat power available to the operational commander will diminish. Another logistics characteristic that is especially vulnerable to a counterlogistics fight is responsiveness, being ready and capable to respond. Opportunities arise on the operational battlefield that are fleeting in nature. Logistical support systems that have been degraded to the point that they lack the flexibility to adapt to these opportunities are ineffective.

The Department of Defense's manual for the conduct of joint warfare by the armed forces of the United States, Joint Pub 1, recognizes the criticality of the operational logistics system. It (logistics) "underwrites agility, extension of operation, and freedom of action."[73] It further states that logistics provides the "substance" of flexibility. At the executable level of a campaign it states that without secure lines of communication the campaign is not sustainable.[74] While not specifically addressing the decisiveness of severing this support from the opposing force, its significance to our own campaign design lends credence to the proposition that this severance would be decisive.

SYNTHESIS, CONCLUSIONS AND IMPLICATIONS

The importance of the logistician to the conduct of war has always been recognized. Prior to the development of mass armies and sophisticated transportation systems their role was primarily performed prior to the commander initiating his campaign. Armies either carried with them what they required or had pre-stocked supplies forward in anticipation of the pending battle. For the most part foraging was the accepted practice of sustaining the field army. This led to the Clausewitzian idea that "the primary function of the soldier is to use the tools of war in combat, not to fashion or provide them."[75] Courage, leadership and command ability remained the decisive factors in war. This led to the Jominian proposition that the decisive fight (although he did not use the term "fight") in a campaign would center on a geographic decisive point that would so dominate the battlefield that its control would lead to the defeat of the opposing army.

As war evolves into a more sophisticated art involving huge armies, employing weapons that consume ever increasing amounts of ammunition, fuel and spare parts, this condition on the battlefield is changing. More than ever before in the evolution of war, strategy, tactics and logistics have become so intertwined that they form "three arcs of a circle, without beginning or ending, each arc influencing, and influenced by, each of the others."[76] While terrain on the battlefield remains critical, especially at the tactical level, operational forces are able to maneuver around lost terrain more easily.

However, adequate support of maneuver warfare at the

operational level of war requires a responsive and efficient logistical system. This logistical system incorporates modern technologies with supply, maintenance, transportation and personnel support. These technologies utilize factories that mass produce war materiel, then distribute this materiel by rail, sea, land and/or air. In this context, modern lines of communication, connecting the national economic base to the front line soldier, have become much more valuable to a nation's war effort.[77]

The attack and destruction of this responsive and efficient logistical support system is the essence of the counterlogistics fight. As stated earlier in the monograph, the proposed meaning of this term is the employment of those measures necessary to deny the enemy force use of its logistical system. As explained in U.S. Army doctrine this system includes the functions of arming, fueling, fixing, moving, protecting and sustaining the soldier. A counterlogistics fight targets each of these subsystems, thus negating the opportunity to the opposing force to reallocate efforts elsewhere.

Grant's Vicksburg campaign is an example of how a counterlogistics fight can be decisive. Although it is doubtful that Grant purposefully pursued such a plan, the course of events in his campaign led him to accomplishing this very concept. The victory at Vicksburg was secured once Grant cut Pemberton's LOCs to the rest of the Confederacy, isolated him in Vicksburg and then allowed culmination to deplete the Confederate's reserve of combat power. By initially miscalculating the degree to which culmination had weakened the enemy, Grant's forces suffered heavy

casualties. This should serve as a valuable lesson to future operational planners.

Operation Desert Storm has added further supporting evidence to the decisiveness of the counterlogistics fight. Taking advantage of weapons of high technology and precision, coalition forces were able to once again isolate a hostile force, accelerate the natural phenomena of culmination as lines of communication were virtually severed, and finally overwhelm a weakened foe. The U.S. involvement in Operation Desert Storm also highlighted our own potential vulnerability to a counterlogistics fight. General Carl E. Vuono emphasized that "logistics was the essential element in maintaining the speed and momentum of the attack."[78] Further reflecting on the successful outcome of Operation Desert Storm, General Vuono said, "logisticians ··· are of profound importance in dictating the outcome of battle."

What lessons from the past can be learned to help shape future doctrine as it pertains to operational warfighting? The threat imposed by electronic countermeasures directed against command and control (including logistics systems) and the added depth and precision with which modern weapons can reach on the modern battlefield places logistics systems at great risk. Despite the risk, the demands on a logistical system have never been greater. Modern ammunition is not only heavier, but it can be fired at such huge rates of intensity that distribution and resupply becomes a tremendous challenge. This challenge begins with the national economic base and persists to the individual weapons system. Modern requirements for fuel are just

as demanding.[79] To add further complications to the logistical support system, modern equipment has become so sophisticated that the resupply of repair parts is likewise a mammoth challenge. To the U.S. Army logistician these challenges represent problems to be solved, to the operational war planner, they should represent enemy vulnerabilities to be exploited.

Given the increased intensity of a modern battlefield, described earlier as an umbilical-like relationship between the combat forces to their logistics base, has the counterlogistics fight, in fact, become the decisive fight at the operational level of war? The answer to the monograph question lies in the framework within which the operational commander designs his campaign plan. The commander uses all forces available to him to "produce a decisive and crushing defeat on the enemy by breaking the enemy's will to fight, paralyzing his ability to react, and destroying the cohesion of his forces - at the smallest possible cost to his forces."[80] Operational commanders must maintain a clear vision of the desired end state that their campaign is designed to produce. In this regard, Americans have more readily come to expect fewer casualties in war. The means of accomplishing this end are the combat forces available to the operational commander. The challenge to the operational planner is to develop a campaign plan that uses these means most effectively for the accomplishment of the end state.

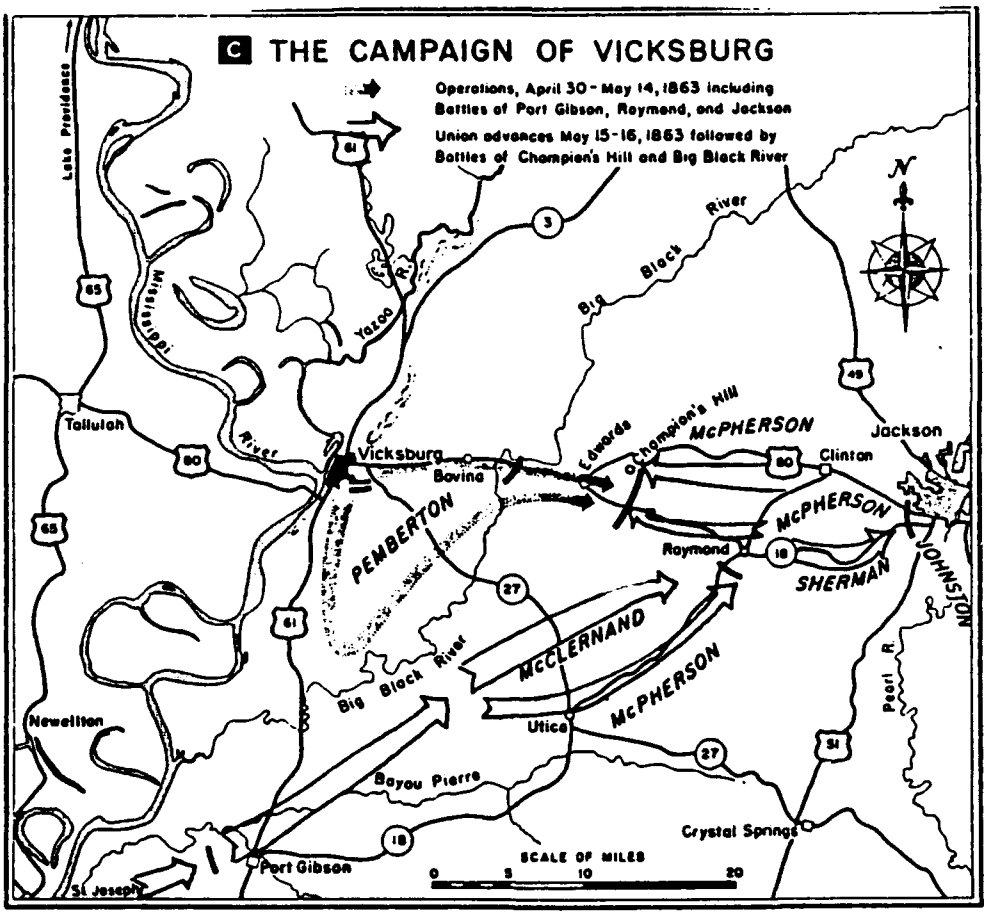
A well devised counterlogistics fight provides the operational planner with a way of accomplishing this end state and simultaneously minimizing casualties. In order for this fight to

prove decisive however, it must completely isolate the opposing force from its vital national economic base. Also the operational commander must be willing to accept the time requirements for a counterlogistics fight to accelerate culmination on the enemy force. If time is not available, because of political or military emergencies, or if the logistical support system is so porous that it can not be severed (America's experience in Vietnam) then this fight would prove to be much less useful.

The implications, therefore, to future doctrine writers and operational planners are to recognize the potential vulnerability of an opposing force's logistical system and design campaign plans that take maximum advantage of these weaknesses. As nations increase their level of military sophistication, the operational planner must be able to devise a campaign plan that takes advantage of these increasing vulnerabilities. Simultaneously our own logistical support system, arguably the most sophisticated in the world, must be protected from severance.

The operational "decisive fight" remains that fight which secures overall victory to its winner. Operational war planners must deduce what that critical fight is, then design a campaign plan that wins it. The counterlogistics fight is a course of action that must be seriously considered by these planners when American forces are called upon, once again, to fight for freedom's cause.

ANNEX A
(obtained from Joseph B. Mitchell's book, Decisive Battles of the Civil War)



FOOTNOTES

1. Erwin Rommel, The Rommel Papers, (ed. by B.H. Liddell Hart, trans. by Paul Findlay, New York, New York: Harcourt, Brace and Company, 1953), p. 328.

2. Martin Van Creveld, Supplying War Logistics from Wallenstein to Patton, (Cambridge: Cambridge University Press, 1977), p. 1.

3. Henry E. Eccles, Logistics in the National Defense, (Westport, Connecticut: Greenwood Press, Publishers, 1959), p. 19.

4. Joint Pub 1, Joint Warfare of the US Armed Forces, (Washington DC: National Defense University Press, 11 November 1991), p. 47.

5. Eccles, p. 9.

6. Julian Thompson, Major General, The Lifeblood of War: Logistics in Armed Conflict, (London: Brassey's (UK) Ltd, 1991), p. 28.

7. Eccles, p. 19.

8. Kenneth Macksey, For Want of a Nail, (London: Brassey's (UK) Ltd, 1989), p. 9.

9. The United States Army Posture Statement for Fiscal Year 1993, presented to the United States Senate and the House of Representatives, Second Session, 102nd Congress, by Michael P.W. Stone and General Gordon R. Sullivan, p. 20.

10. Eccles, p. 18.

11. James A. Huston, The Sinews of War: Army Logistics 1775 - 1953, (Washington DC: Office of the Chief of Military History, United States Army, 1966), p. 665.

12. Eccles, p. 18.

13. Joint Pub 1, p. 46.

14. William G. Pagonis, Lieutenant General and Harold E. Raugh Jr., Major, "Good Logistics is Combat Power The Logistics Sustainment of Operation Desert Storm," Military Review, (September 1991), p. 37.

15. Eccles, p. 305.

16. Thompson, The concept of logistics being the lifeblood of an army is taken from the theme of MG Thompson's book.

17. Joint Pub 1-02, Department of Defense Dictionary of Military and Associated Terms, (Washington DC: National Defense University Press, 1 December 1989), p. 211.

18. IBID, p. 94.

19. IBID, p. 187.

20. Field Manual (FM) 101-5-1, Operational Terms and Symbols, (Washington DC: HQ, Department of the Army, 21 October 1985), p. 1-39.

21. Antonie Henri Jomini, Jomini and His Summary of The Art of War, (ed. by Brigadier General J.D. Hittle, condensed into Roots of Strategy Book 2, Harrisburg, Pennsylvania: Stackpole Books, 1987), p. 498.

22. Carl von Clausewitz, On War, (ed. and trans. by Michael Howard and Peter Paret, Princeton: Princeton University Press, 1976), p. 595-596.

23. TRADOC Phamplet 525-5, Airland Operations A Concept for the Evolution of Airland Battle for the Strategic Army of the 1990s and Beyond, (Fort Monroe, Virginia: HQ, United States Army Training and Doctrine Command, 1 August 1991), p. 13.

24. Clausewitz, p. 528.

25. Field Manual (FM) 100-5, Operations, (Washington DC: HQ, Department of the Army, 5 May 1986), p. 25.

26. James J. Schneider, Theoretical Paper No 3 The Theory of Operational Art, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1 March 1988), p. 40. (Paper was produced for the School of Advanced Military Studies, Ft. Leavenworth)

27. Peter Paret, ed., Makers of Modern Strategy from Machiavelli to the Nuclear Age, (Princeton, New Jersey: Princeton University Press, 1986), p. 341.

28. Michael I. Handel, ed., Clausewitz and Modern Strategy, (London: Frank Cass and Company, 1986), p. 56.

29. Giulio Douhet, The Command of the Air, (trans. by Dino Ferrari, New York, New York: Coward - McCann, Inc., 1942), p. 179.

30. IBID, p. 193.

31. IBID, p. 188.

32. IBID, p. 198.

33. Alfred F. Hurley, Billy Mitchell Crusader for Air Power, (Bloomington, Indiana: Indiana University Press, 1964), p. 93.

34. James M. Dubik, Lieutenant Colonel, A Guide to the Study of Operational Art and Campaign Design, (Guide published by Ltc Dubik for the School of Advanced Military Studies, Fort Leavenworth, Kansas on 30 May 1991), p. 5.

35. Edward Hagerman, The American Civil War and the Origins of Modern Warfare, (Bloomington, Indiana: Indiana University Press, 1988), p. 175.

36. Matthew Forney Steele, American Campaigns, Volume 1, (Washington DC: Byron S. Adams, 1909), p. 402.

37. James M. McPherson, Battle Cry of Freedom The Civil War Era, (Oxford: Oxford University Press, Inc., 1988), p. 628.

38. Steele, p. 404.

39. As explained by Colonel James R. McDonough during a staff ride conducted for the School of Advanced Military Studies of the Vicksburg battlefield on 16 - 20 March 1992.

40. Joseph B. Mitchell, Lieutenant Colonel, Decisive Battles of the Civil War, (New York, New York: G.P. Putnam's Sons, 1955), p. 139.

41. Steele, p. 418.

42. Hagerman, p. 201.

43. Mitchell, p. 140.

44. Hagerman, p. 201.

45. McPherson, p. 630.

46. Steele, p. 413.

47. Hagerman, p. 204.

48. Mitchell, p. 143.

49. Tim Ripley, Land Power The Coalition and Iraqi Armies, (London: Osprey Publishing Ltd, 1991), p. 5.

50. G.I. Wilson, Lieutenant Colonel, "The Gulf War, Maneuver Warfare, and the Operational Art," Marine Corps Gazette, (June 1991), p. 23.

51. Clausewitz, p. 87.

52. Norman Friedman, Desert Victory The War for Kuwait, (Annapolis, Maryland: Naval Institute Press, 1991), p. 214.

53. Wilson, p. 23.

54. IBID.

55. Charles A. Horner, Lieutenant General, "The Air Campaign," Military Review, (September 1991), p. 21-22.

56. Tom Mathews, "The Secret History of the War," Newsweek, (March 18, 1991), p. 30.

57. Friedman, p. 187.

58. Horner, p. 25.

59. Pagonis, p. 37.

60. Wilson, p. 23.

61. Field Manual (FM) 100-7, The Army in Theater Operations (coordinating draft) (Fort Monroe, Virginia: HQ, United States Army Training and Doctrine Command, 24 December, 1991), p. 4-7.

62. Eccles, p. 236.

63. Posture Statement, p. 65.

64. FM 100-7 (draft), p. 1-41.

65. IBID, p. 3-8.

66. IBID, p. 4-15.

67. Carl E. Vuono, General, "Sustaining Combat Power," Army Logistician, (July-August 1988), p. 3.

68. John H. Cushman, Lieutenant General (retired), Organization and Operational Employment of Air/Land Forces, (Carlisle Barracks, Pennsylvania: U.S. Army War College, 1984), p. 8-2.

69. FM 100-7 (draft), p. 4-33.

70. FM 100-5, p. 59.

71. IBID, p. 65.

72. IBID, p. 62.

73. Joint Pub 1, p. 31.

74. IBID, p. 56.

75. Robert W. Coakley and Richard M. Leighton, United States Army in World War II The War Department Global Logistics and Strategy 1940-1943, (Washington DC: Office of the Chief of Military History, Department of the Army, 1955), p. 10.

76. Huston, p. 656.

77. Coakley, p. 4.

78. Carl E Vuono, "Desert Storm and Future Logistics Challenges," Army Logistician, (July-August 1991), p. 28.

79. Macksey, p. 191.

80. Dubik, p. 7.

BIBLIOGRAPHY

BOOKS

Clausewitz, Carl von. On War. ed. and trans. , Michael Howard and Peter Paret. Princeton: Princeton University Press, 1976.

Coakley, Robert W. and Leighton, Richard M. United States Army in World War II The War Department Global Logistics and Strategy 1940-1943. Washington DC: Office of the Chief of Military History, Department of the Army, 1955.

Douhet, Giulio. The Command of the Air. trans by Dino Ferrari. New York, New York: Coward-McCann, Inc, 1942.

Eccles, Henry E. Logistics in the National Defense. Westport, Connecticut: Greenwood Press, Publishers, 1959.

Friedman, Norman. Desert Victory The War for Kuwait. Annapolis, Maryland: Naval Institute Press, 1991.

Hagerman, Edward. The American Civil War and the Origins of Modern Warfare. Bloomington, Indiana: Indiana University Press, 1988.

Handel, Michael I., ed. Clausewitz and Modern Strategy. London: Frank Cass and Company, 1986.

Hurley, Alfred F. Billy Mitchell Crusader for Air Power. Bloomington, Indiana: Indiana University Press, 1964.

Huston, James A. The Sinews of War: Army Logistics 1775-1953. Washington DC: Office of the Chief of Military History, United States Army, 1966.

Jomini, Antoine Henri, Jomini and His Summary of the Art of War. ed. by Brigadier General J.D. Hittle, condensed into Roots of Strategy Book 2. Harrisburg, Pennslyvania: Stackpole Books, 1987.

Macksey, Kenneth. For Want of a Nail. London: Brassey's (UK) Ltd, 1989.

McPherson, James M. Battle Cry of Freedom The Civil War. Oxford: Oxford University Press, Inc., 1988.

Mitchell, Joseph B., Lieutenant Colonel. Decisive Battles of the Civil War. New York, New York: G.P. Putnam's Son's, 1955.

Paret, Peter, ed. Makers of Modern Strategy from Machiavelli to the Nuclear Age. Princeton, New Jersey: Princeton University Press, 1986.

Ripley, Tim. Land Power The Coalition and Iraqi Armies. London: Osprey Publishing Ltd, 1991.

Rommel, Irwin. The Rommel Papers. ed. by B.H. Liddell Hart, trans. by Paul Findlay. New York, New York: Harcourt, Brace and Company, 1953.

Steele, Matthew Forney. American Campaigns Volume 1. Washington DC: Byron S. Adams, 1909.

Thompson, Julian, Major General. The Lifeblood of War Logistics in Armed Conflict. London: Brassey's (UK) Ltd, 1991.

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

PERIODICALS

Horner, Charles A., Lieutenant General. "The Air Campaign." Military Review. (September 1991).

Mathews, Tom. "The Secret History of the War." Newsweek. (March 18, 1991).

Pagonis, William G., Lieutenant General and Raugh, Harold E. Jr., Major. "Good Logistics is Combat Power The Logistics Sustainment of Operation Desert Storm." Military Review. (September 1991).

Vuono, Carl E., General. "Desert Storm and Future Logistics Challenges." Army Logistician. (July-August 1991).

Vuono, Carl E., General. "Sustaining Combat Power." Army Logistician. (July-August 1988).

Wilson G.I., Lieutenant Colonel. "The Gulf War, Maneuver Warfare, and the Operational Art." Marine Corps Gazette. (June 1991).

MILITARY MANUALS/PUBLICATIONS

Cushman, John H., Lieutenant General (retired). Organization and Operational Employment of Air/Land Forces. Carlisle Barracks, Pennsylvania: U.S. Army War College, 1984.

Dubik, James M., Lieutenant Colonel. A Guide to the Study of Operational Art and Campaign Design. Fort Leavenworth, Kansas: School of Advanced Military Studies, 30 May 1991.

McDonough, James R., Lieutenant Colonel. The Marne: A Search for Theory. Fort Leavenworth, Kansas: School of Advanced Military Studies.

Rutenburg, David C., Lieutenant Colonel and Allen, Jane S., editors. The Logistics of Waging War American Logistics 1774-1985 Emphasizing the Development of Airpower. Gunter Air Force Station, Alabama: Air Force Logistics Management Center, February 1987.

Schneider, James J. Theoretical Paper No 3 The Theory of Operational Art. Fort Leavenworth, Kansas: School of Advanced Military Studies, 1 March 1988.

Field Manual (FM) 100-5. Operations. Washington DC: HQ, Department of the Army, 5 May 1986.

Field Manual (FM) 100-7 (draft). The Army in Theater Operations. Fort Monroe, Virginia: HQ, United States Army Training and Doctrine Command, 24 December 1991.

Field Manual (FM) 101-5-1. Operational Terms and Symbols. Washington DC: HQ, Department of the Army, 21 October 1985.

Joint Pub 1. Joint Warfare of the US Armed Forces. Washington DC: National Defense University Press, 11 November 1991.

Joint Pub 1-02. Department of Defense Dictionary of Military and Associated Terms. Washington DC: National Defense University Press, 1 December 1989.

TRADOC Phamplet 525-5. Airland Operations A Concept for the Evolution of Airland Battle for the Strategic Army of the 1990s and Beyond. Fort Monroe, Virginia: HQ, United States Army Training and Doctrine Command, 1 August.

The United States Army Posture Statement for Fiscal Year 1993. Presented to the United States Senate and the House of Representatives, Second Session, 102nd Congress. Michael P.W. Stone and General Gordon R. Sullivan.