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Art or Science?  
Operational Logistics as applied to Operational Art

By

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

Signature: \_\_\_\_\_

13 February 2006



**"The National War College is supposed to teach strategy to 'the thinkers'...and the Industrial College is supposed to teach logistics to the nuts and bolts types." Excerpt from a Washington Post Article, November 1984**

Logistics: The foundation of combat power. We all want effective and timely logistics, but how well is it understood outside of the logistics community? We have all had a conversation with our peers, seniors, or subordinates when someone opined with the phrase, "Amateurs talk tactics, but professional talk logistics." Unless a professional logistician was present, someone usually changed the subject or the discussion segued back to tactics. To bridge the strategic and tactical levels of war, we study, plan and execute battles, campaigns, and wars through Operational Art. Since Logistics provides the direct, physical means to our ability to conduct military functions and tasks in order to reach goals and achieve objectives; shouldn't we view Operational Logistics an art form rather than an algebraic sequence of events providing material and services?

Joint doctrine defines logistics as follows: *Logistics is the science of planning and carrying out the movement and maintenance of forces.* (1) This definition lends itself automatically to the argument that Logistics is primarily algebraic calculations designed to provide material to a fighting force. Logistics is, in part, just that; the science of understanding the weights, measures,

distances, etc. of material and services that are to be provided to the force. The tangible aspects of logistics provide planners and commanders with the facts on how much, how far, and for how long materials and services can be provided and sustained. Operational Logistics is much more than facts and figures. Understanding the tangible factors of logistics numbers enables planners and commanders with vital insights into choices that allow for what is possible, what is desirable, and the potential pitfalls that facilitate sound risk versus gain decisions.

Sun Tzu, Carl Von Clausewitz, and Baron De Jomini are some of the most prolifically taught and quoted authors in all levels of professional military education. Our interpretations of their teachings help to form our thinking in relation to the aspects of waging war, therefore understanding their treatment of logistics is fundamental to defining Operational Logistics as an art form.

In Sun Tsu's treatment of the subject, Logistics is an enabling factor for the artistic prosecution of a war, not just an accounting of having superior numbers. Sun Tzu begins by spelling out in detail the arms and men needed for the successful conduct of war. *"Generally, operations of war require one thousand fast, four-horse chariots, one thousand four-horse wagons covered in leather and one*

*hundred thousand mailed troops."* The use of the leather covered wagon was as a logistics vehicle that contained supplies, weapons, and support troops for maintenance, food preparations, and servants. (2) This sounds like nothing more than a calculated list of material. What Sun Tzu was inferring was that war is more than just showing up with the sufficient numbers to win the fight. An army must be able to have the flexibility to accept protracted operations, be able to reconstitute the force after a battle, and have the ability to continue the campaign. Sun Tzu, does, however, state that protracted wars are dangerous and should be avoided. (3) By advocating having the means to carry out protracted operations, Sun Tzu has implied that risk decisions are made by understanding that undesirable conditions will be met and can be overcome if the commander knows the capabilities his of his force and for how long it can be sustained.

Carl Von Clausewitz offers varied and almost contradictory point of view on logistics.

*"Of the items wholly unconnected with engagements, serving only to maintain the forces, supply is the only one which directly affects the fighting. Thus it thoroughly permeates the strategic aspects of all military action.....supply will rarely tend to cause an alteration of plans-though such a change remains perfectly possible."* Clausewitz further states that, *"Interaction therefore will be most frequent between strategy and matters of supply and nothing is more common than to find considerations of supply affecting the strategic lines of a campaign and a war."*(4)

Clausewitz appears to contradict himself by claiming that supply will not affect a commander's decision to fight, but immediately follows by stating it has serious implication for lines of communication. What he alluded to was that it is Logistics that defines the boundaries of the conflict based upon what was physically possible.

Therefore Clausewitz describes the ways and means to keep fielded armies coordinated is through Logistics. He finishes with a warning that if forces become too involved with the problems of supply that the Quartermaster would become the supreme commander and that war would consist of organizing the wagon trains (vice focusing on making war).

(5) Here Clausewitz draws a distinction that can characterize Logistics as a subset of Operational Art. He implies that the commander needs to adhere to logistical principles and not get bogged down in the mathematical details of organizing Logistics.

In direct contrast to Clausewitz, Baron De Jomini defines Logistics as the art of moving armies. (It) comprises the order and details of marches and camps, and of quartering and supplying troops: in a sense, it is the execution of strategic and tactical enterprises. (6)

Jomini further elaborates a clear relationship between strategy, logistics, and tactics.

*"Strategy is the art of making war upon the map, and comprehends the whole theater of operations. Grand Tactics*

*is the art of posting troops on the battlefield according to the accidents of the ground, of bringing them into action, and the art of fighting upon the ground. Its operations might extend over a field of ten or twelve miles in extent. Logistics comprises the means and arrangements which work out the plans of strategy and tactics. Strategy decides where to act; Logistics brings the troops to the point; Grand Tactics decides the manner of execution and the employment of troops."* (7)

His definition implies that logistics is more about the movement of the force to the appointed battle space, as decided by the strategy of the commander. Jomini has actually drawn a very clear distinction that logistics in his definition is the artful bridge between strategy and tactics. By bringing the troops 'to the point' he means that it was logistical factors helped to decide the time and place for the battle or campaign. Jomini goes further, however, with his discussion of Logistics as an art form by describing his proposed 18 principles relating to the movement of armies. He lists numerous tasks and requirements that include all of the joint definition's principles and several others to include what today would be considered Force Protection, Reconnaissance, and writing orders. (8)

By describing the details involved, Jomini has provided an excellent example of the myriad tasks and issues that a planning staff (in his time, directed by the Chief of Staff) would have to integrate and de-conflict in order to achieve the desired objectives. Jomini's adherence to the achievement of the objectives coincides

with modern, Operational Art's requirement to relate all efforts to the assigned objectives. Jomini provides a strong argument for Logistics as a subset of Operational Art.

In 1917, the Naval War College press published one of the few works of the time that tackled the subject of Logistics in the larger view. Lieutenant Colonel G. C. Thorpe begins by pointing to Clausewitz' definition of war (9) as a window to understanding the vital roles encompassed within logistics, above and beyond simple supply and transportation. Thorpe deviates from Clausewitz drastically when he opined that when planning to employ military forces we must plan what is possible as well as what is desirable. He advocates planning each strategic and tactical evolution logistically in order to see what is possible. (10) This approach possesses a certain risk-management aspect that would support establishing better choices for risk criteria in the planning process. Most notably, Thorpe, similarly to Jomini, implies that logistics bridges strategic and tactical evolutions. He has made a very strong implication that Logistics is more and Art than just a science. Keeping Thorpe's work in context, it was written circa World War One, before Operational Art was an established and accepted concept. His work is, however, a valid starting point for a more

recent discussion since it can be argued that the early 20<sup>th</sup> century is when modern, global warfare, encompassing land, sea and air battles became reality.

A more recent view comes from Moshe Kress from the Center for Military Analyses, Israel. In his work, he directly refers to Logistics as an 'Art and a science'. Kress believes that the definition of Operational Logistics provided by US doctrine is adequate but needs clarification. His suggested definition is as follows:

*"Operational Logistics (OpLog) is a collection of means, resources, organizations and processes that share the common goal of sustaining campaigns and large scale military operations. This collection, which is derived from the strategic logistics level, is utilized by the campaign leaders as input for the tactical logistics. OpLog is designed to sustain battles that that are distributed in time and space."* (11)

There are many reasons to appreciate this definition. Primarily, it directly defines OpLog as linking strategic and tactical logistics. That is precisely what we refer to as Operational Art. Secondly, when Kress refers to "collection of means, resources, organizations, and process that share a common goal" he defines the multiple parts that encompass the what, who, and how and also implies that by sharing a common goal, there is a *Unity of Effort*. This can be easily incorporated as a means in drafting the commander's intent for logistics.

Additionally, he includes the concept of Distributed Operations. This definition accounts for the probability

that mutually supporting operations and campaigns in a global conflict, such as the War on Terror, will be conducted in numerous locations and that logistics plans and priorities will need to be made carefully, focusing on the means, resources, organizations, and processes.

Kress goes further and explains that the quality of an operation is determined by the following criteria; *compatibility, feasibility, and operational cost*. He links logistics to the last two criteria. (12)

*"The feasibility criterion estimates the chances that the operation is carried out as planned, in the presence of the various operational constraints and the imbedded uncertainty of the battle field. The logistics capabilities set the feasible boundaries of the campaign."* (13)

Through Kress' reasoning on feasibility, there is a similarity between his train of thought and Thorpe's assertion that each strategic and tactical evolution be planned logistically in order to see what is possible. Artfully analyzing the situation leads to sound choices and risk decisions where algebraic calculations do not.

Henry E. Eccles wrote an equally impressive and comprehensive book on logistics. Eccles offers some very illuminating perspectives that lean toward logistics as an Operational Art form.

*"All problems in war are blends of strategic, logistical, and tactical elements and considerations."* (14)  
Here Eccles has made a strong case for logistical art.

*Blending* strategic, logistical, and tactical elements means that they are all interrelated and intrinsically affect each other. The science of logistics has implications throughout the choices in the planning process.

*"In any event, whenever a commander is faced with a military problem, he should not become so absorbed in one aspect of the problem-whether strategic, logistical, or tactical that he considers it without reference as to how it affects and how it is affected by other elements. He should avoid the common tendency of some commanders to concern themselves almost entirely with so-called 'operational matters' at the expense of concern over those logistical matters which form the very basis of 'operations'."* (15)

As with Jomini, Thorpe, and Kress, Eccles makes the assertion of the tie-in between strategic and tactical concerns lies in logistics.

It would seem that all four authors have tacitly inferred that logistics, as the bridge between the strategic and the tactical, is Operational Art. The truly striking fact is that all four authors have made similar, if not identical assertions regarding the logistical linkage of the strategic to the tactical and that they all point towards the senior military leadership as the source for the decisions for logistical matters. The very compelling arguments made by Jomini, Thorpe, Kress, and Eccles lend great credence to the assertion that Operational Logistics is an Operational Art form, but there should be another means to help solidify the concept.

***"Gentlemen, the officer who doesn't know his communications and supply as well as his tactics is totally useless."  
General George S. Patton***

Analysis of theorists' efforts, although compelling, may not be the most convincing method to vindicate the concept that Operational Logistics is in fact an art form. Operational Art is characterized by Factors and Principles. So how does Operational Logistics figure into these facets of Operational Art?

Viewing Operational Logistics through the lens of The Factors of Operational Art; Time, Space, and Force, is a useful method for ascertaining the artistic nature of logistics. Time, distance and physical means apply to everything that happens in war from the strategic to the tactical. Being able to measure these factors and ascertain the best course of action is critical to Operational Art. The best way to accomplish this comparison is through historical examples.

Operation Husky, the Allied invasion of Sicily in 1943, provides excellent examples of how operational choices were reached by analyzing what was logistically feasible, as Jomini and Thorpe have proposed. In terms of the Factor of *Space*, Sicily was chosen as the objective over other locations because it was more easily supported by Allied air bases, and the Sea Lines of Communication (SLOCs) from Allied bases in North Africa were shorter,

allowing for faster turnaround of transport ships. It was also chosen as the most viable Base of Operation for the eventual invasion of the Italian mainland. (16) Additional *Space* considerations driven by logistics were the initial Allied objectives. The British objectives were based upon capturing seaports and airfields in the vicinity of Syracuse. Obtaining the ports and airfields was critical to the post invasion buildup of forces Montgomery required in order to mass his forces for sequel offensive operations. (17) The logistics considerations for the British not only affected *Space* but also *Factor Force* in that the choice of objectives involving ports facilitated a rapid build up of combat power. Again, Logistics has directly applied to risk decisions.

General Patton's planning preparations illustrate an interaction of Factors *Time* and *Force*. The American landing forces did not have many ports in their landing area and those present were not large enough to support the logistics required to sustain the VII Army. Patton realized his force would have to rely on over-the-beach sustainment and that once his forces moved inland, that they would encounter restrictive terrain and immature road networks. In order to overcome his restrictive logistics issues, Patton *phased* his forces ashore so that they would not experience an untenable preponderance of forces that

could not be *sustained*. Additionally, Patton established two *phase lines*, Yellow and Blue, to facilitate prearranged *operational pauses* in order to *consolidate* his forces as they phased ashore, and to provide the required time to allow his over-the-beach logistics to maintain the Operational Temp for his forces. (18) Both the British and Americans had to make operational choices based upon logistical considerations in order to achieve tactical and operational goals. They balanced their forces, phased their actions, and chose their objectives directly as a result of available lift for the initial assault and with consideration to future (branch and sequel) sustainment requirements. Balancing the interactions between the three factors is one of the main tenants of Operational Art.

Another tenet of Operational Art that will further define Operational Logistics as an art form is the 'Principles of War, the enduring bedrock of US military doctrine.' (19) General MacArthur's Inchon invasion during the Korean War provides outstanding examples of how the *Principles* applied to logistics considerations can allow a commander to make operational choices for his own forces as well as providing a means to exploit the enemy.

When choosing a plan of action to defeat the North Korean Advance on the Pusan Perimeter, MacArthur selected Inchon as the amphibious *Objective* in order to exploit the

North Korean lines of communication in and around the city of Seoul. (20) MacArthur chose *Offensive* operations to exploit the North Korean vulnerabilities. (21)

The sea lines of communication around the Korean peninsula were entirely permissive for American and coalition forces. Not only did permissive SLOCs allow re-supply for the forces in Pusan, but it provided MacArthur to *Maneuver* his forces and conduct an *Economy of Force* operation. MacArthur was able to exploit vulnerabilities in the North Koreans *Security* by striking at their lines of communication and cutting off their logistics chain. "He (MacArthur) considered that the North Koreans had neglected their rear and were 'dangling on a logistical rope' that could be quickly cut in the Seoul area." MacArthur analyzed the North Koreans and determined that their *Center of Gravity* was their mechanized formations. He determined that one of their *Critical Requirements* was the lines of communication from their bases in North Korea. MacArthur determined that the best way to force the North Koreans into a *culminating point* was to attack their *Critical vulnerability* and sever those lines of communication.

The North Koreans had no trained reserves and little ability of recuperating their forces. (23) Though not an all inclusive example of the *Principles*, Inchon does illustrate that logistics clearly is a consideration in

determining risk applies directly to analyzing and employing the *Principles*.

All of the aspects of Logistics presented here are directly related to Operational Art. The fact that many of the most respected books regarding logistics contain the common theme that logistics links the strategic and the tactical is quite compelling and should challenge service members from warfighting communities outside of the logistics field to study the topic in greater detail. While Logistics is often viewed as a specialty, in broader context it is an inextricably linked subset of Operational Art. Even Clausewitz had to give a nod to the vital importance of something he considered as a detailed staff function.

By applying modern operational art tenets, the three Operational Factors and the Principles of War, it is quite evident that Operational Logistics is as integral part the operational planning and execution process as is the other warfighting functions such as maneuver, fires, and intelligence.

Clearly, *Logistical Art* is a real and valid concept and it supports the way we plan and execute operations. As leaders and planners we must not view logistics as a detail but we must incorporate the *Art* of Logistics in order to better understand what is possible, what is practical, and

what is achievable from a risk versus gain standpoint. This does not mean that we plan operations from the 'Quartermasters' point of view' but that plans will be better formulated and better risk decisions are made the earlier we incorporate the ways and means of military operations as a method during the planning process.

Joint and Coalition Operations and Interagency Cooperation efforts have been the norm for several years and will continue to be so for a long while. Understanding and knowing how to integrate the various and disparate logistical concerns of all the participants in such endeavors will be paramount and will ensure that different organizations can achieve a unity of effort through the art of knowing what is possible and what is feasible in order to achieve the desired End-State.