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"THE CANVAS AND THE CLOCK" - - IMPACT OF LOGISTICS
AT THE OPERATIONAL LEVEL OF WAR

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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 Operations.

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

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Abstract of
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 AT THE OPERATIONAL LEVEL OF WAR**

Logistics is a time-oriented function that regulates event-oriented operational art. This paper identifies the dominant influence of logistics at the operational level of war and the significance of this influence to the operational commander. A definition of operational art and logistics is developed to establish a basis for understanding the orientation in thinking for these two functions. Review of two historical campaigns illustrates the regulatory nature of operational logistics in both the planning and execution of operational art. Logistics influences the sequencing of the phases of a campaign, the choice of objectives, lines of operations and centers of gravity; It establishes the culminating point. The operational commander influences tactical events by his logistics decisions. At the operational level of war, logistics is operations and a function of command. Therefore, operational logistics must be synchronized with the other elements of operational art to ensure logistics is responsive to the commander's needs and maximizes his freedom of action. The operational commander must understand and account for the limitations placed upon the application of his event-oriented art by time-oriented logistics. Through logistics training and education, interest in and control of the logistics organization by the commander, he creates harmony between operational logistics and the application of operational art.

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THE CANVAS AND THE CLOCK

CHAPTER I

INTRODUCTION

The artisan uses the paint and the brush to turn his vision into reality. By his mastery of the brushstroke, and the mixing and matching of the paint, he creates certain effects upon the blank canvas. It is through his management or sequencing of these effects upon the canvas that the artist produces a painting that is either a "masterpiece" or "hotel art."

At the operational level of war, the operational commander is also an artist. Strategy defines his canvas, and the campaign plan is his vision. His colors and mixtures of colors are tactical events. He uses the effects produced by tactical events to create the military condition (painting) that achieves his strategic objective. Consequently, the operational artist is event-oriented, and it is through his management of the effects created by tactical events that he succeeds, or fails, to produce his painting.

However, unlike the artist of the painting, the operational commander has a "clock" that regulates his artistry. That clock is logistics, for logistics is a time-oriented function. Logistics regulates the operational commander's ability to create those effects that produce the military condition that achieves the strategic objective. To succeed, the operational commander must become the "master of clock." He must synchronize time-oriented logistics with his event-oriented art.¹

The purpose of this paper is to identify the influence of time-oriented logistics upon event-oriented operational art and the significance of this relationship to the operational

commander. To do this, I will define operational art and how it is put into practical application, and define logistics and its time orientation. Once a common basis of understanding is achieved, the paper uses two historical campaigns that highlight the impact time-oriented logistics has upon the application of event-oriented operational art. Based upon the conclusions drawn from the historical review, I will then identify the implications of this relationship on the operational commander's ability to exercise his "art." Finally, I will offer some recommendations that allow the operational commander to become the "Master of the Clock."

CHAPTER II

THE OPERATIONAL CANVAS: THE ART OF THE POTENTIAL

OPERATIONAL ART DEFINED

Military art is divided into strategic, operational, and tactical levels. Strategy deals with the general determination of those military objectives that support the aims of policy, and the broad methods and means for their achievement. Tactics deals with the employment of forces in combat to defeat the enemy at a specific time and place. The operational level of war, or operational art, exists above the level of tactics but subordinate to strategy. Joint Pub 0-1 defines the operational level of war as follows:

"The operational level of war is the level at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objective, sequencing events to achieve the operational objectives, initiating actions, and applying resources to cause and sustain these events. These activities imply a broader dimension of time and space than do tactics; they ensure the logistic and administrative support of tactical forces and provide the means by which tactical successes are exploited to achieve strategic objectives."²

Reduced to its most concentrated form, operational art encompasses those decisions of when, where, for what purpose, and under what conditions to fight, or not to fight, with reference to the strategic objective.³ Operational art embraces the relationship of tactical events to strategic objectives and in its application the operational artist first answers the following questions:

* What military condition(s) must be produced to achieve the strategic objective?

- * What sequence of tactical actions is most likely to produce the military condition(s)?
- * How should the available military resources be applied to accomplish the sequence of actions?
- * What is the risk in performing the envisioned sequence of actions?

The preceding discussion identifies the environment of the operational level of war and those questions that guide operational thinking. However, like the painter the operational artist must translate his vision and the potential of his materials into reality. He must put his art into practice!

ART IN PRACTICE

The size of the operational commander's canvas varies with strategy, the nature of the war, the forces involved and the actual geography within the theater.⁵ However, strategy frames and defines this canvas. Strategy sets the fundamental conditions of operations, establishes goals, allocates resources and imposes conditions on the use of military force for the operational commander.⁶ Strategy focuses all effort at the operational level and guides the application of operational art.

Upon the canvas established by strategy, the operational artist applies a sequence of events based upon the operational concepts of the centers of gravity, culminating point, objectives and lines of operations. These concepts focus the purpose of tactics. Through the management of the effects generated by tactical events and the application of operational concepts, the military condition (painting) that achieves the objectives established by strategy is produced.

The discipline of campaigning directs the application of operational art. The campaign's means are tactical results, its end the accomplishment of the strategic objective, and its ways the scheme by which tactical events are combined and sequenced to reach the strategic goal.⁷ Although the operational commander may conceive of each sequence or phase lasting a certain interval, these phases, and therefore the thinking of the operational commander, are event-oriented not time-oriented.⁸

CHAPTER III

THE LOGISTICS CLOCK: THE POSSIBLE REALITY

WHAT IS LOGISTICS?

Other than being an endless series of difficulties succeeding each other, what is logistics?⁹ Logistics provides the means by which the military arts of strategy, operations and tactics are applied; Like its three counterparts, military logistics is an art and therefore not susceptible to a single, simple or permanent definition.¹⁰ However, JCS Pub 4-0 (Test) defines logistics as follows:

"Logistics is the foundation of combat power; it can be described as the bridge connecting the Nation's economy to the Nation's operating forces. Logistics is the moving and sustaining of operating forces. . . . Logistics is basic to the ability of ground forces, fleets, and air forces to initiate and sustain combat operations."¹¹

Logistics moves, supplies and maintains military forces.¹² It comprises a variety of technical specialties whose efforts merge in support of combat forces. But for the commander, logistics has no purpose other than to create and to sustain combat forces that are responsive to the needs of command.¹³

At the operational level, logistics serves to link the resources provided by strategy to the requirements necessary to support and to sustain tactical events. Operational logistics thus provides the means that add a sense of the "possible reality" to the envisioned potential of operational art. Martin van Creveld, in his book Supplying War, says that after identification of the decisive point (center of gravity), ". . . the feeding into it of

men and material is a question of bases, lines of communication, transport and organization--in a word, of logistics."¹⁴

THE TIME FACTOR

Operational logistics can decide what is or is not possible.¹⁵ Logistics asks, "What quantity of resources is required, where and when will these resources be used, and for how long will this resource support be needed?" These questions imply a factor of time, for logistics is time-oriented. If logistics cannot support the event-oriented campaign plan at the necessary time and place, and for the duration required, the campaign plan requires modification. The following quotes taken from a U.S. Army report concerning logistics during World War II emphasize the time-orientation of logistics:

"The art of logistics planning involved the ability to determine accurately in advance the effect of time and space factors on an operational concept, thus insuring the practicability of the final plans."¹⁶

"No strategic plan could be drafted without the determination and evaluation of the major logistics factors: Were we able to assemble and supply the force; could it be done in time for movement to the initial assault? Could we continue our support of the operation? At what rate could men and supplies be placed in the target area? At what rate could the enemy move to counterattack?"¹⁷

The four fundamental elements of logistics support--determination of requirements, acquisition, distribution, and sustainment--establish the time orientation of logistics.

A Quantity in Time. The operational logistics clock starts the moment the use of military force is conceived. Then, calculation of the logistics requirements necessary to the prosecution of the campaign plan begins. These requirements are calculated in terms such as days of supply, days of ammunition, etc. Once the requirements are identified, they must then be procured and provided by strategy. The operational commander

depends upon the economic capacity of the nation and available strategic mobility assets to provide his resources. At this point, "lead-time" or how long it takes to obtain the resources affects the phasing of events by the operational commander.

A Place in Time. Once the operational commander obtains his resources, distribution of these resources to satisfy the needs of the tactical level occurs. Distribution of resources is based upon priorities established by the commander which support his intent and concept of operations. Distribution is a time-distance calculation based upon mobility, quantities, and distances to be traveled. The time involved in the distribution element of logistics affects operational tempo, the ability to shift quickly from one event to another.

Time and Time Again. Sustainment of combat forces ensures momentum of operations. Sustainment provides the capability to generate combat power and is based upon the envisioned duration of conflict, resource availability and the distribution time factor. Sustainment is a function of time based upon the expenditure rate of resources and the timely anticipation of requirements. Sustainment affects the operational commander's ability to sequence events, give or refuse battle, and to exploit success.

Although the preceding discussion treated operational art and logistics separately, logistics is part of operational art. However, the operational commander must understand the relationship between time-oriented logistics and the application of event-oriented operational art if he is to synchronize his efforts.

CHAPTER IV

THE CLOCK AND THE CANVAS: HISTORICAL REVIEW

Having established a common background for both operational art and logistics, a historical review of the relationship between logistics and the application of operational art is required. I will examine two historical campaigns that feature the regulatory impact of logistics at the operational level of war. These campaigns are the invasion of Western Europe during World War Two and the Gulf War with Iraq, 1990-1991. This examination identifies how logistics influenced the sequencing or phasing of the campaign, and the application of operational art concepts--centers of gravity, culminating point, objective and lines of operation.

INVASION OF WESTERN EUROPE: 1944

Logistics was the dominate element during the campaign for the invasion of western Europe. It regulated the sequencing of events. Logistics controlled the identification of objectives, lines of operation and the determination of the enemy centers of gravity; And it established the boundary for the culminating point of the allied forces during this campaign.

Planning. The direction given to General Eisenhower for the conduct of the campaign in Europe directed him to enter the continent and "undertake operations aimed at the heart of Germany and the destruction of her Armed Forces."¹⁸ To accomplish this mission, General Eisenhower developed a campaign plan consisting of seven phases: land on the Normandy coast; build up resources needed to break out from Normandy; pursue

on a broad front, emphasizing the left flank to gain necessary ports, to reach the boundaries of Germany; pause operationally to secure ports and build up a new base along the western border of Germany, while maintaining tactical pressure on German forces; destroy German forces west of the Rhine; envelope the Ruhr valley and then thrust through Germany in a direction to be determined; and clean out the remainder of Germany.¹⁹

Development of the campaign plan was based upon the following considerations:

- * The destruction of enemy forces as the guiding principle.
- * The heart of western Germany was the Ruhr and Saar Basin industrial areas that encompassed German war-making powers.
- * The northern avenue of approach to western Germany offered the best terrain for offensive action, a shorter route to the Ruhr, and provided for the seizure of the Port of Antwerp.
- * The assault against German forces would be on a broad front, with priority on the left to gain the ports of Belgium.²⁰

As stated by General Eisenhower in his book, Crusade in Europe:

"To avoid stalemate and to attain the position of power and mobility required to destroy the German Forces, we planned, following upon any breakout, to push forward on a broad front, with priority on the left. Thus we would gain, at the earliest possible date, use of the enormously important ports of Belgium."²¹

A review of the campaign plan and the considerations influencing the plan underscores the regulatory impact of logistics upon operational art. Specifically, logistics regulated decisions on sequencing, objectives, centers of gravity and lines of operations. This

review also shows that the operational commander grasped the significance of this relationship.

The seizure of the Port of Antwerp would reduce the sustainment time factor by providing for the delivery of resources closer to the area of combat operations. The identification of the Port of Antwerp, and the Ruhr and Saar basin as operational objectives prescribed the line of operations. The port was needed for the continued sustainment of allied forces for the assault into Germany. It would also reduce the distribution time factor by shortening the distances involved in the distribution of resources to the tactical level. The industrial capacity of the Ruhr and Saar Basin provided the necessary logistics to sustain the Germans. As such, these two objectives, along with the armed forces, were enemy centers of gravity for the Germans. These basic decisions, made by the operational commander, all of which ascribed to the application of operational art concepts, had their basis in logistics.

Logistics also influenced the phasing of the sequences of the campaign. Landing on the Normandy coast, building up of resources for the break out from Normandy, and pausing to establish a new base along the western border of Germany while securing the Belgium ports were essentially operational logistics actions. These phases were inherent subdivisions of the campaign and were based on the influence of the time factor within the four fundamental elements of logistics. Logistics influenced the pursuit phase as the priority of effort was placed on the left flank to ensure the seizure of the Belgium ports that supported logistics needs. The following example emphasizes the dominance of logistics in the first phase of the campaign plan.

In planning for the landing at Normandy, logistics considerations controlled the choice of objectives, the choice of where to land, the size of the assault force, and plans for the buildup of forces and movements inland.²² This was so, because "the men who planned operation 'Overlord' were well aware that the success of an eventual Allied invasion of Europe would depend above all on their ability to feed-in troops and equipment at a higher rate than the enemy."²³ Consequently, the distribution element of logistics was critical to the success of this phase of the plan. Numbers and availability of transport craft, location and size of landing beaches, port availability and turn-around time for transportation assets dominated decisions on where to land and with what size force.²⁴

Combat Operations. Once the first two phases were completed, ". . . there were confined within the space of 1,570 square mile 19 American and 17 British divisions totaling a million and a half men, with supplies for the former alone averaging 22,000 tons a day."²⁵ These forces would be used to initiate operation COBRA, the breakout from Normandy.

This breakout was successful, and the attack turned into a pursuit. However, in the excitement of the pursuit, the operational commander forgot something--logistics. As stated by General Eisenhower:

"Against a defeated and demoralized enemy almost any reasonable risk is justified and the success attained by the victor will ordinarily be measured in the boldness, almost foolhardiness, of his movements. The whole purpose of the costly break-through and the whirlwind attacks of the succeeding three weeks was to produce just such a situation as now confronted us; we had been preparing our plans so as to reap the richest harvest from the initial success. But the difficulties of supply, once our columns began their forward race, was a problem that required effective solution if we were to gain our full battle profit."²⁶

In the pursuit across France during August through early September 1944, combat forces outran the distribution capabilities of logistics. The pursuit stopped "dead in its tracks." Logistics and combat operations were no longer synchronized. The culminating point, or "what may be termed 'the logistic equalizer'--that attritional phenomenon which insidiously exhausts the stamina of a superior force as it pursues a seemingly defeated opponent until the moment is reached when the latter has restored its strength and fortunes to the point of equilibrium"--was reached.²⁷ The allies lost operational momentum and the opportunity to exploit the situation.

The operational commander lost sight of the logistics clock and attempted to do more with the "potential reality" he saw in his operational canvas than the "possible reality" logistics could support. Martin van Creveld in his book Supplying War, posits that the logistics organization was not prepared to react to the speed of operations due to preconceived notions of what was possible logistically; that the "Allied advance from Normandy to the Seine, however successful and even spectacular strategically, was an exercise in logistic pusillanimity unparalleled in modern history."²⁸ It is a fact that expedient actions were taken--the famous Red Ball Express--to overcome the distribution time factor affecting operational tempo. But, these efforts could not regenerate the level of logistics support required. Logistics did not respond to the needs of operations, and it dictated the boundary of the operational culminating point.

To regain the initiative, a proposal was made to deviate from the broad-front line of operations, abandoning the opening of the Port of Antwerp, and concentrating on a single, narrow-front thrust to the Ruhr. But again, logistics dominated the decision due to the

sustainment time factor. General Eisenhower refocused on logistics and decided that Antwerp was critical and the logistics situation could not support the thrust into Germany.²⁹ However, even the continuation of the broad-front operations did not free the operational artist from the impact of the logistics clock:

"The crippling impact which logistics difficulties were to have on plans for future operations was only gradually realized, but it was fully comprehended by the end of September [1944], when the 12th Army Group began to dole out supplies to the armies through a strict rationing system based on assigned missions. The shortages experienced during the pursuit had provided only a foretaste of the real difficulties to come. For the next two months supply limitations were to dominate operational plans, and the Allies were now to learn the real meaning of the tyranny of logistics."³⁰

GULF WAR: 1990-1991

"The task faced by the logisticians can only be described as daunting, and their success can only be described as spectacular."

Gen H. Norman Schwarzkopf³¹

General Schwarzkopf conceived and executed a brilliant operational campaign during the Gulf War between Iraq and the American led coalition. However, a short review illustrates the vital role operational logistics played in both the development and the prosecution of this campaign. For, it was logistics that deployed and sustained 527,000 personnel, 2000 tanks, 150 warships, 1800 aircraft and 1700 helicopters during the Gulf War.³² It was logistics that ensured that the ground forces could be shifted to carry out the ground phase of the campaign.

Operation DESERT SHIELD. Logistics dominated operation DESERT SHIELD. During this phase of the war, operational art was applied for defensive purposes, while planning was conducted to take offensive actions. To discourage further Iraqi aggression,

the operational commander required the delivery of combat power into theater as a priority over other concerns.³³ It was logistics that satisfied this requirement and supported the objectives of the operational commander. It provided this support in what "... was the fastest build up and movement of combat power across greater distances in less time than at any other time in history."³⁴ Logistics as strategic mobility, prepositioned assets, and as host nation support provided substance to the desires of the operational commander. During operation DESERT SHIELD, logistics was the center of gravity for the operational commander.

It was also logistics, once strategy provided the new goal of the restoration of Kuwait that decided when the offensive campaign of the war could commence. A decision was made in early November 1990 to double the size of the forces in theater to enable the conduct of offensive operations.³⁵ However, this offensive could not begin until logistics could deliver and sustain these forces. The offensive campaign did not start until 17 January 1991. Logistics again was the clock regulating the "when" for the application of operational art.

The deployment of the U.S. Army VII Corps from Europe serves as an example of the time constraints of logistics. General Schwarzkopf informed the Joint Chiefs of Staff during October 1990 that he wanted the VII Corps if he was to conduct an offensive.³⁶ It took ninety-seven days to deploy this corps to theater, and there were still more than 30,000 soldiers waiting at the ports in Saudi Arabia when the first phase of the campaign commenced.³⁷

Operation DESERT STORM. Operation DESERT STORM consisted of four phases: air attack on Iraqi command, control and communications systems; air attack on Iraqi logistics systems and infrastructure; air attack on Iraqi ground forces; and ground attack.³⁸ Although it is obvious that logistics played a major role in providing the necessary fuel and ammunition to support all phases of this campaign, the second phase is specifically logistics oriented. In this phase, the operational commander set as his objective the destruction of the enemy's logistic capability. He saw logistics as a means by which to attack the centers of gravity for the Iraqi forces: morale and the Republican Guard.

Logistics also played a principal role in the execution of phase four of the campaign plan. In this phase, General Schwarzkopf decided to shift the weight of his attack to his left flank. This westward movement, forming the basis for the famous "Hail Mary" maneuver, had to be accomplished in a period of twenty-one days that began after the air war blinded the enemy.³⁹ To accomplish this required the movement of both the VII Corps and XVII Airborne Corps, and the establishment of logistics bases to support these forces. Logistics proved responsive to this requirement and enabled its success. As stated by General Schwarzkopf:

"This was absolutely an extraordinary move. I can't recall any time in the annals of military history when this number of forces have been moved over this distance to put themselves in a position to be able to attack. But what's more important--and I think very, very important that I make this point--and that's these logistics bases. Not only did we move the troops out there, but we literally moved thousands and thousands of tons of fuel, of ammunition, of spare parts, of water and of food, out there into this area, because we wanted to have enough supplies on hand so that if we launched this and if we got into a slugfest battle, which we easily could have gotten into, we'd have enough supplies to last 60 days."⁴⁰

CHAPTER V

CONCLUSIONS

Operational art is the designing of a campaign, based upon several concepts, that blends a variety of events, over a period of time and space, into a single, coalescent whole that achieves the strategic objective.⁴¹ It is event oriented and a search for the potential effects to be achieved from tactical events. It is the "art of the potential."

Operational logistics is the application of resources in support of tactical events. It focuses on questions of how much, how long, where and when. Logistics is a time oriented function regulating the application of operational art. Logistics defines what is possible at the operational level. It is the "art of the possible."

A Function of Command. Operational logistics is a vital part of the operational level of war. The operational commander must be as concerned with logistics as he is with tactical events. He cannot view them separately. However, he must realize the difference in orientation or thinking between the "art" element and the "logistics" element within the operational level. Consequently, logistics is a function of command at the operational level.

The operational commander must ensure that logistics is synchronized with all other facets of his operational art to achieve his envisioned operational effects. Since logistics provides the "possible" for the "potential," it is through his logistics decisions that the operational commander directly influences tactical level events. Only the commander can

make the decision of what is feasible based upon the resources at hand and calculate the risk involved in this decision.⁴²

The review of the two historical campaigns in this paper clearly depicts that logistics is a function of command. General Eisenhower's understanding of the necessity of the Belgium ports, especially the Port of Antwerp, restrained further operational maneuver, against the wishes of his subordinates, until the ports could be secured. General Schwarzkopf's "Hail Mary" plan was achieved by an "extraordinary" logistics effort he directed to support this plan. Because he understood logistics, General Schwarzkopf, in spite of doubters on his staff, pushed his forces to the limit without risking total collapse.⁴³

Logistics is Operations. At the operational level of war, logistics shapes the concept of operations.⁴⁴ Logistics provides substance to the campaign plan, turning art into reality. Accordingly, the operational commander must be more the logistician than the tactician. As stated by General Walter Bedell Smith:

"It is no great matter to change tactical plans in a hurry and to send troops off in new directions. But adjusting supply plans to the altered tactical scheme is far more difficult."⁴⁵

The review of the two historical campaigns shows the nature of the relationship of logistics at the operational level of war. Logistics provided or limited the capability to apply combat power. It dominated the when and where of battle--objective and line of operations, and the duration of action--culminating point. Also, logistics was a determining factor in attacks on the enemy centers of gravity.

CHAPTER VI

IMPLICATIONS: "SO WHAT!" SAYS THE ARTIST

What is the significance of the logistics clock to today's operational artist? Doesn't everyone recognize that logistics is just one of many functions that the operational artist considers when applying his art? This is true, but our historical review has shown that logistics is the dominant function in matters of consideration by the operational commander. The impact of the dominance of logistics may lessen with the size of the operational canvas, but the relationship between the canvas and the clock remains constant. Operational logistics establishes operational limits and affects the artist's ability to sequence and to manage the effects created by tactical events.

Logistics Limitations. Today's operational commander must determine to what extent operational logistics "bounds" operational art. In answering the question of how to apply resources to achieve his sequence of events, the operational commander now finds that strategy no longer provides an abundance of resources. He discovers that he must now concern himself with the time factors of all four elements of logistics, not just the distribution and sustainment time factors.⁴⁶ For today, the Nation provides fewer resources for the military, and the military is being withdrawn from forward bases. This means longer lines of communications and reductions in resource inventory levels. Sustainment and procurement lead-times will increase.

It may be a well-designed campaign plan and even one for which strategy provides adequate resources. But, the question is can logistics support it when, where, and with

the quantities necessary to produce the military condition sought by the operational commander? The operational commander must account for the limiting factor of the logistics clock when developing his phased sequence of events. If logistics cannot support the sequence of events in the campaign plan, it "is not a plan at all, but simply an expression of fanciful wishes."⁴⁷ Disregard of logistics limitations leads to failure in defensive efforts and in making victory decisive, the halting of offensives, and the prolonging of conflicts.⁴⁸

Logistics Impact. Failure to recognize the "time" required to provide logistics support for a campaign may force the operational commander to change his plan, decline battle when he does not wish too, or miss opportunities to exploit enemy weakness. Logistics thus establishes the tempo for the sequencing of tactical events allowing the commander to maintain, or lose, the initiative. Tempo depends on mobility, and mobility is provided and supported by logistics. Eisenhower lost tempo when logistics did not support the pursuit of German forces after the breakout from Normandy and halted his mobile, armored forces.

The operational commander may gain tactical victory but achieve operational defeat because he cannot exploit the effects produced by tactical events due to the "logistics equalizer" that dictates his culminating point. Adequate resources to support all phases of the campaign are assured through economy and conservation. This is accomplished by accounting for the process of logistical culmination in the sequencing of the campaign plan.⁴⁹ Eisenhower's campaign plan identified two phases that accounted for logistical

culmination: the buildup of resources after the Normandy invasion and the operational pause at the German border.

Finally, logistics has the insidious habit of dictating the lines of operation for a campaign by identifying objectives that either support our logistics effort or attack the enemy's centers of gravity. The sustainment and distribution time factors of logistics will identify those objectives and lines of operations required to ensure timely and adequate logistics support for our combat force or to deny it to the enemy. Securing the Belgium ports, and attacking the Ruhr and Saar Basin were logistics considerations which governed Eisenhower's decision for his line of operations.

CHAPTER VII

RECOMMENDATIONS: MASTER OF THE CLOCK

Today's operational commander must synchronize operational logistics within his operational art. He must ensure that logistics is responsive to his needs. Logistics planning must be in harmony with operational planning. The commander must be the senior logistician of his force, for he is the final arbiter of what is or is not logistically feasible. Logistics forces must be trained to meet the demands of operational art. This requires flexibility of thought and organization. In short, the operational commander must be the master of the logistics clock. The following recommendations are provided to aid in the operational commander's mastery of the logistics clock.

Education. Include instruction on operational logistics as part of the core curriculum at intermediate level schools and War Colleges. This instruction should be based upon case studies and review of theoretical writing on logistics. Henry Eccles, Logistics in the National Defense, Martin van Creveld, Supplying War, and Julian Thompson, The Lifeblood of War, are three authors whose writing should be studied. And, this instruction must attain at least equal status with that of intelligence in the number of hours provided.

Develop specific elective courses in these schools for all logisticians focused on the functions and responsibilities of the J-4 on a joint staff. This author knows that just such a course is currently being developed at the Naval War College.

Training. Conduct training and exercises based upon actual logistics considerations. Do not "fairy dust" logistics away because it interferes with the "schedule." Account for the "friction" caused by logistics in training and exercises, and ensure all actions are kept within the limitations established by logistics. This develops the flexibility of thought and action--for both operator and logistician--to devise means to expand the "realm of the possible" through improvisation. It is in our training that we learn how to improvise, and improvisation will be the key to successful logistics support for the future operational commander in possession of limited resources.

Synchronization/Responsiveness. Ensure logistics is integrated with operational planning by placing logistics personnel in the operations planning cell. This allows early identification of logistics issues and assures that the logistics organization anticipates needs, vice reacting. This anticipation allows the logistics organization to respond to changes in plans and to synchronize logistics efforts with tactical events.

The commander must take a personal interest in his logistics organization to ensure that it is flexible and robust. Understanding the strengths and weaknesses of the logistics structure is necessary to calculate the risk associated with actions, when the commander asks logistics to improvise to exploit opportunities.

The J-4. Make the J-4 the senior agent for operational logistics by giving him command authority over all logistics issues. Currently, the J-4 only has coordinating authority for logistics, while logistics support is the responsibility of each of the service components of a joint force.⁵⁰ This is a "stovepipe" organization that does not support operational art thinking. I recognize that implementation of this recommendation requires

a larger J-4 staff and augmentation from the services. But, if logistics is to have an operational perspective, it must be organized to support operational art, not just each individual service component.⁵¹

Logistics is the clock regulating the operational artist's ability to effect his art. His campaign plan is just a blank canvas until logistics provides the substance to change vision into reality. The operational commander must be the master of this clock and harmonize time-oriented logistics with his event-oriented operational art. As stated in a report on World War Two logistics:

"The roles played by strategy and tactics, by military leadership, and by the man in combat are well known. Important and decisive as they were, they were completely dependent upon adequate logistic support. Moreover, logistic limitations in many cases dictated our strategy, as well as the type of campaign to be fought and the timing of its initiation."⁵²

Logistics is operations!

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