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# Logistical Art

CLAYTON R. NEWELL

A prince or general," wrote Clausewitz, "can best demonstrate his genius by managing a campaign exactly to suit his objectives and resources, doing neither too much nor too little."<sup>1</sup> This same thought can also be expressed in terms of ends, ways, and means—the ends and means equating to Clausewitz's objectives and resources, the ways constituting "managing the campaign." When commanders in today's Army try to balance the ends, ways, and means of their campaigns at the operational level of war, they will frequently find logistics to be the means, or resources in Clausewitz's terms, which most affect that balance.

The United States has fought its recent wars by dominating its enemies with overwhelming logistical support and relieving commanders at the operational level from worrying too awfully much about logistics. In today's resource-constrained environment, however, the shoe may be on the other foot. In Western Europe, for example, the Soviets and the Warsaw Pact may well have the advantage in bringing brute force logistics to bear, while the US Army will find itself counting virtually every round of ammunition as it looks over its shoulder to see if the lines of communication remain open. The barrier of the Atlantic Ocean, a shortage of NATO and American strategic transport, and the relatively low priority of ammunition in budgetary trade-offs all contribute to an apparent Soviet edge in logistics.<sup>2</sup> The success of American military strategy in Europe, or anywhere else in the world for that matter, may depend on how well the US Army's logistics philosophy adapts to new realities.

The Army can no longer afford a logistics philosophy which allows its commanders to assume an endless supply of everything. As war becomes more dependent on science and technology, commanders tend to rely more heavily on their logisticians to keep the machinery of war operating. Logisticians, in turn, have increased their reliance on science to calculate the requirements of war. Of course, logistics has always involved calculations. In

fact the word logistics originates from the Greek word for the science of calculating. Yet, there is an art to logistics.

Unfortunately, in their desire to use science to best advantage, today's logisticians concentrate overmuch on calculations, or science, and neglect their art. The Joint Chiefs of Staff highlight this emphasis on science to the exclusion of art in defining logistics as "the science of planning and carrying out the movement and maintenance of forces."<sup>3</sup> (Interestingly, the JCS do include the phrase "art and science" in their definition of strategy.<sup>4</sup>)

Historically, logisticians have been the unsung handmaidens of war. There are many strategists who bear the title of greatness, but there is virtually no recognition of great logisticians. One reason is that the great captains themselves have been logistically sensitive and involved; they understood that there is an art to logistics in addition to the science. James Huston, in his study of American military logistics, echoes Clausewitz in drawing the conclusion that good logistics depends on the commander who can "take into account all available resources, at home, in the theater, or wherever they are found, and to balance his requirements and his mission so that his objective may be gained with the least possible time with the least possible loss of men and supplies."<sup>5</sup> While commanders want, and indeed need, logisticians who can use to best advantage the science of logistics, it is up to those same commanders to understand that there is an art to logistics, an art for which they, not the logisticians, bear primary responsibility.

The art of logistics may easily get lost in the often bewildering plethora of numbers so necessary to modern logistics planning. The numbers tend to sweep away average commanders, but the extraordinary commanders can operate in spite of numbers because such men possess an integrating instinct—an art—that transcends numbers. Martin van Creveld, in his analysis of logistics in war, ultimately concluded that his efforts "to avoid 'vague speculations' and concentrate on 'concrete figures and calculations'" produced only an incomplete picture. The human intellect alone, he concluded, cannot account for everything in war.<sup>6</sup> It requires a higher faculty.

Commanders at all levels of war must employ logistical art in their planning. Although logistics is important at each of the three levels of war, tactical, operational, and strategic, it has a slightly different flavor at each level. At the tactical level logistics concentrates on fueling, arming, and maintaining

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troops and machines. Tactical commanders must receive adequate logistical support to accomplish their assigned missions. The responsibility for providing that support to tactical commanders lies with the operational commander.

At the operational level, logistics governs what can and, perhaps even more importantly, what cannot be accomplished. Operational art and logistical art are inextricably intertwined. The operational commander must base his campaign plan on the logistics immediately available in the theater of operations. If there is inadequate support to accomplish the assigned strategic aim, then the operational commander must develop a campaign plan wherein intermediate objectives, achievable with the available logistics support, become the initial goal of the campaign. While the campaign plan will be phased so as to provide for the eventual accomplishment of all the assigned strategic objectives, individual phases can be executed only when the necessary logistical means become available in the theater of operations. In balancing the ends, ways, and means of campaign planning, operational commanders will discover that logistics will most often be the constraining means. Finding ways to achieve the desired ends requires commanders at the operational level of war to be as familiar with the ways of logistical art as they are with operational art.

Logistics at the strategic level of war is an inseparable component of military strategy. Logistical planning at the strategic level concentrates on the development of materiel and manpower and deploying them to the theater of war in support of the Army's vision of being "able to fight and win in joint and combined operations across the spectrum of conflict, throughout the world."<sup>7</sup>

Fighting throughout the world requires substantial logistics resources; to get a credible force into the far-flung theaters of operations and war isn't easy. Simply moving the Army's so-called light divisions requires some 400 sorties of the C-141 cargo plane. Deployment planning is both strategic and logistic. In contrast to the logistical art so essential at the operational level, strategic logistics fits almost too neatly into the scientific method of planning, with its seemingly endless time-phased deployment lists.

The science of logistics is not new to warfare, but it came to its ultimate fruition during World War II when scientists and soldiers joined forces to apply the scientific method to the conduct of war. A systematic planning process resulted from the union of scientists and soldiers during that war, which saw a dramatic increase in the use of machines on, over, and around the battlefield. Mechanization revolutionized logistics as much as it did warfare itself.

Industrialization had of course changed the face of war during the 19th century, but it was not until the development of the truck that armies were able to wage effective large-scale maneuver warfare at the operational level with modern weapons. Prior to the 20th century, armies were unable to sustain themselves unless they kept moving to literally eat off the land. Halting to conduct a deliberate attack or lay siege to a stubborn fortress meant that the

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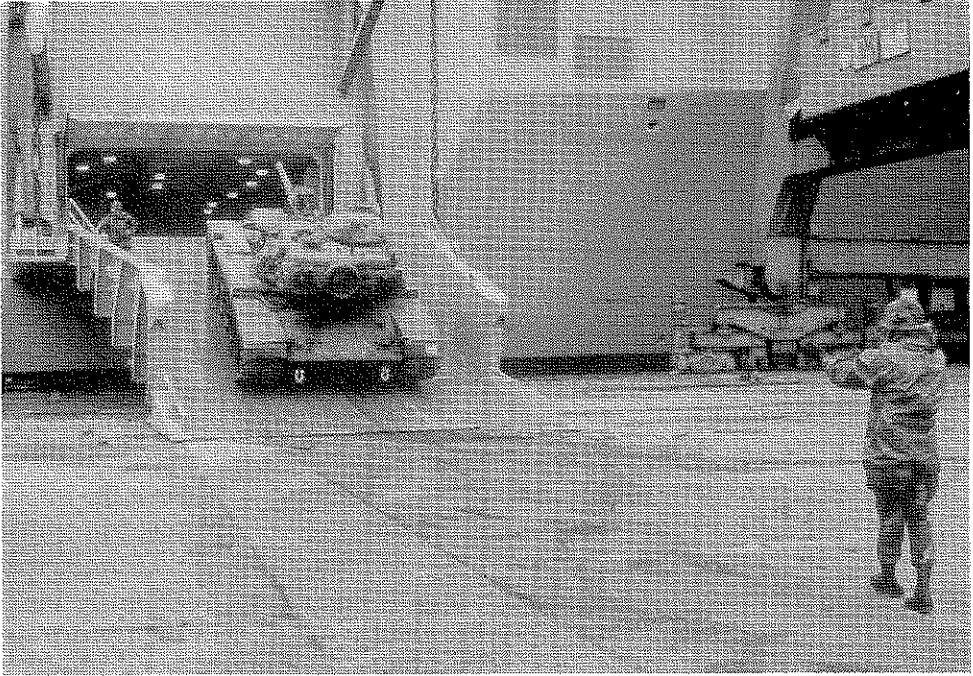
army rapidly lost its ability to fight. The longer an army stayed in one place, the more of its manpower had to be used for foraging, which depleted the forces available to actually conduct the battle.

Railroads in the latter half of the 19th century helped armies solve their transportation problems at the strategic level, but only when the tracks went where the war was. In 1914 elaborate rail movement schedules, tied tightly to mobilization plans, transported large armies in western Europe into position to confront one another for four years. The railroad made rapid mobilization at the beginning of World War I possible, and the fixed front lines of the western front allowed both sides to use railroads for strategic transportation. The railroads provided adequate strategic logistical transportation for the static trench warfare, but they were not flexible enough to allow a war of movement at the lower levels of war.

At the tactical level, materiel and troops still had to be transported from the railhead to the battle, a process that remained primarily a matter of walking for the troops and horse-drawn wagons and caissons for the materiel. Although they did not have their full impact until World War II, both the truck and the tank first saw combat in World War I. By the same token, however, the horse started World War II still very much a transportation mainstay of both the German and Russian logistics systems.

Between the World Wars both tanks and trucks were introduced into armies on a mass scale. During World War II at the tactical and operational levels, the truck became to logistics what the tank became to battle. The tank may have prevented World War II from stagnating into opposing siege lines as had happened in World War I, but it was the petrol truck which gave the tank its freedom of movement.

The tank-truck team revolutionized warfare and logistics, and as logistics became more technical it tended to become regarded more as a science and less as an art. But the art of logistics was not lost on all military planners. There were those commanders who successfully combined logistical and operational art in World War II. It is probably not simply a coincidence that one of the more successful innovators and practitioners of the operational art in the German army, Heinz Guderian, spent much of the period between World War I and World War II as a transportation officer dealing "with the



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**An M-60 tank backs off the vehicle cargo/rapid response ship USNS *Algol* in Antwerp, Belgium, during a Reforger exercise.**

problem of troop transportation by lorry.” Today, as US military planners attempt to deter World War III through a holding strategy in Europe predicated upon rapid reinforcement from the States, transportation again takes center stage. Indeed, transportation is arguably the very essence of US Army logistics and certainly its limiting factor.<sup>8</sup>

During World War II, the blossoming science of logistics developed the capability to make very precise forecasts of virtually any commodity needed in battle based upon experientially determined usage factors. Commanders prepared battle plans and logisticians developed the requirements to support the battle. It was sometimes difficult to determine which had the greater influence. By 1944 Allied logistics planning reached its zenith with Operation Overlord, the campaign that began with the Allies’ invasion of France and ended with their armies in the very heart of Germany. Logisticians labored for years preparing meticulous plans to support that effort, while the American arsenal of democracy supplied the vast quantities of war materiel that would be needed to crush the Nazi war machine. In the event, however, it was not so much the logistics planning that measured the success of the Allied invasion of Europe, but the initiative and imagination of commanders in ignoring, adapting, and improvising logistics plans and systems as the campaign progressed.<sup>9</sup>

A disadvantage of detailed logistics planning is that it can devolve to an exercise in rigidity and conservatism. Left to themselves, logisticians would probably prefer a plan that can be executed in a predictable manner, immune to changing circumstances, so they can insure that they have enough of anything anybody might want. While this aim may appear to be desirable during preparations for war, it is not realistic in the fog and friction of war itself.

Determining adequate logistics support for a campaign before it begins is the essence of logistical art. It is not simply a matter of multiplying the distance to the objective by the fuel consumption rate by the number of vehicles to determine the required amount of fuel. That is a technical problem performed admirably by logisticians and is certainly an important factor in campaign planning. However, when calculating requirements logisticians tend to be conservative. Allied logistics planners preparing for Overlord in 1944, for example, grossly overestimated what would be needed when they calculated that an Allied division would consume 650 tons of supplies per day. As it turned out, divisions in the pursuit actually consumed only 300-350 tons of supplies per day.<sup>10</sup> But the Allies were ultimately successful, not as a result of clinging slavishly to a rigid support plan for their advance across Europe, but by taking risks and improvising when the Channel ports were not opened according to the pre-invasion schedule.<sup>11</sup>

Supply affects more than just the amount of materiel; it affects the amount of transportation to move that materiel. One of the biggest problems in the Allied advance across France in World War II was not lack of supplies, it was getting those supplies into the hands of the troops who needed them to continue the fight.<sup>12</sup> The transportation and distribution of supplies can be a problem at all levels of war. At the strategic level the problem is to get necessary materiel and troops from the United States to the theater of war. The next step is distribution within the theater of war to the theaters of operations and finally to the fighting units at the tactical level.

Obviously the more materiel requested, the higher the transportation requirements. If commanders simply request more of everything with little or no prioritization, allocation will by default fall to the logisticians who, if they have no other guidance, will simply prioritize according to their capability to transport. Commanders practicing good supply discipline with confidence that they will be supported by a responsive logistics system can reduce requirements to that essential for the conduct of the campaign.

A different kind of logistical miscalculation is seen in the Vietnam War, where the logistics system was so centralized that logistical headquarters actually lost track of what was available. The centralization of logistics planning at MACV—the theater of operations—made accurate forecasting virtually impossible for commanders at the tactical level. At the operational level, logisticians concentrated on their science while commanders virtually ignored the art of logistics. Tactical commanders who should have been provided with

necessary support found themselves sending folks all over the theater of operations to scare up what they needed, despite the plethora of supplies available in the theater as a whole.<sup>13</sup>

Vietnam was not entirely devoid of examples of the art of logistics: floating aircraft maintenance facilities, De Long piers, and floating power barges have been cited as “innovative solutions to major obstacles.” All of these devices, however, were designed to provide more and more logistics in support of the American buildup of overwhelming brute force.<sup>14</sup>

Certainly there are times when the emphasis should be on developing and maintaining an abundance of support forces in a theater of operations, especially in a low-intensity environment where US forces are supporting a beleaguered ally. The point is, however, that commanders at the operational level must understand their real requirements and tailor their support structure to those requirements. Logistics requirements will vary according to much the same factors as combat operations, the factors of METT: mission, enemy, terrain and weather, and time available. Logistics can easily become an exercise in empire-building if commanders assume that all theaters of war and operations are equal.

The elder von Moltke’s observation that no plan survives the first shot of the war applies equally to logistics planning. Logistics planners in peacetime, preparing for war, have the luxury of designing elaborate force structures for potential theaters of war, and they can pre-position war reserve stocks based on theoretical projections of consumption. A difficulty in predicting requirements is that there is an enemy who, as Winston Churchill once noted, must occasionally be taken into consideration. A goal of the enemy will be to disrupt one’s logistics, and it is inevitable that he will meet with at least some success. Thus the successful conduct of war requires planning that is sufficiently flexible to accommodate unanticipated changes occasioned by circumstances and the enemy. Logistical art implies the ability to accommodate to the unanticipatable.

Preparations certainly must be made prior to the war, and even then there are times when commanders must be cognizant of the art of logistics. According to General Louis Wagner, who heads the Army Materiel Command (the Army’s logistician), AMC uses a peacetime version of what could be considered logistical art to prepare the Army for war. By maintaining close

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contact with operational commanders, AMC develops "innovative, state-of-the-art solutions to today's field army needs."<sup>15</sup>

Hopefully this relationship between the Army's logistician and the army in the field will avoid problems of the recent past wherein the acquisition of new materiel apparently did not always take logistics factors into consideration. Such a situation developed in the 1960s when the Army modernized its jeep fleet and made the new vehicles two inches wider. This was a seemingly trivial addition until it came time to transport the jeeps in the Air Force's C-141 cargo plane. The additional two inches meant that only one row of jeeps could fit into the plane rather than the two rows possible with the narrower jeep. A similar problem exists today with the Bradley fighting vehicle, which must be partially disassembled before it can be transported by air. Factoring in strategic transportation during the developmental process for new materiel is one aspect of logistical art applicable to preparing for war.<sup>16</sup>

Just as Clausewitz divided war into two parts, preparation and conduct, the US Unified Command Plan is based upon the same principle. In the Unified Command Plan, the service departments support the CINCs. The services prepare for war, but the CINCs conduct the war. The CINC informs the services, by way of the JCS, of his requirements for forces and materiel. The services then prepare and provide that support through the component commanders in the theaters of operations and war.<sup>17</sup>

This clear separation of preparation for war and conduct of war occurs primarily at the strategic level. The operational commander uses strategic logistics preparation as a means of determining how he will accomplish his desired ends during his initial conduct of the war. While at the strategic level national goals well beyond immediate logistics capabilities may knowingly be established to provide planning parameters for a long-term logistics mobilization or buildup, operational commanders as we observed earlier must tailor their objectives to match the available logistics support. A campaign cannot begin without a reasonable assurance of adequate logistic support to accomplish at least the first phase. The determination of adequacy, however, may be more art than science.

During the conduct of war operational and tactical commanders must know what their logistics requirements really are if they are to have any hope of successfully practicing the art of logistics. This is not always easy. Tactical commanders actually fighting the battle, being accustomed to the abundance of support available in the American logistics system, may tend to demand simply more of everything rather than applying supply discipline. Commanders, not logisticians alone, must determine what and how much they need to accomplish assigned missions. Simply adding and multiplying predictions based on the last war fought somewhere else may be useful in the preparation for war, but commanders must maintain a grasp on their current situation in the conduct of war. Supply discipline must be the rule in the conduct of war if we hope to

accomplish our desired ends, given the potential constraints on our available means. The complex equipment on today's battlefields means that there is just not going to be an inexhaustible supply of materiel available. Lack of supply discipline will be a problem until commanders at all levels of war can rid themselves of the traditional American "philosophy of importing into the combat environment a US peacetime living standard for the committed forces."<sup>18</sup>

The US Army has an excellent logistics system, probably the best of any army in the world. Its scientific methods of determining requirements are extensive. It provides more nice-to-have luxuries to the American soldier overseas than soldiers of other nations have at home. Its shortcoming may be neglect of logistical art by commanders who do not fully understand their role in logistics. It cannot be left solely to logisticians to guess what commanders need to conduct their campaigns. Commanders must know what they want and logisticians must be able to tell them whether or not they can provide it. If they cannot provide it, then the true test of the commander's logistical art is at hand—the art of improvising, the art of economizing, the art of making do. As Clausewitz noted, it is through "managing a campaign exactly" that the general can best demonstrate his genius. Although Clausewitz devoted relatively little space to discussion of logistics, it is nonetheless an essential aspect of managing the campaign. Continued neglect of the logistical art is potentially more dangerous than our earlier neglect of the operational art.

#### NOTES

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