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REVOLUTION IN MILITARY LOGISTICS: NO MORE MOUNTAINS TO MOVE?

BY

LIEUTENANT COLONEL SCOTT M. BERGERON
United States Army

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Scott M. Bergeron
Box 48
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PROJECT ADVISER:

Dr. Douglas Johnson

Introduction

The United States supports deployed forces by building significant supply stocks in theaters of operations. Early logisticians experienced increased requirements for ammunition and foodstuffs that made sustainment directly from the industrial base difficult. Refinement of rail and water transportation systems enabled Civil War era logisticians to create remote support bases for deployed forces. The Army refined this method of support in the World Wars and perpetuated it during both the Vietnam and Persian Gulf Wars.

This method of operations has its drawbacks. Forward depots are prime candidates for confusion and overstockage. Notable examples of supply confusion and lack of cargo visibility occurred on the beaches at Normandy, and the area around Cam Rahn Bay, Vietnam. Deployment to the Persian Gulf War saw a similar buildup, with its associated supply confusion. Units found that parts arrived more quickly when ordered directly from CONUS, although like items were in theater.

Army leaders are seeking to leverage Information Age technology to prevent this situation from happening in future conflicts. TRADOC Pamphlet 525-5, Force XXI Operations, calls for the Army to forge links between the United States' robust industrial sustainment base and negate the requirement for Army-managed stockpiles. This concept proposes a true producer-to-foxhole sustainment system. The enablers for such a system will be rapid information management, coupled with reliable, fast strategic airlift. The notion is that a properly cataloged replacement assembly at New Cumberland Army Depot could be delivered to the user faster than an improperly cataloged part that is in the theater. Most of what was termed the communications

zone (COMMZ), or the theater rear area, can be moved back to the Continental United States (CONUS) or perhaps prepositioned in a region close to potential areas of operations. Technology exists today in modern coding techniques and satellite communications to supply spare parts and critical items of supply from depots in the United States across an aerial bridge directly to the foxhole[1].

This concept is not new. The idea of "just-in-time" supply is a fact in industry, with Hong Kong fashions arriving in Paris by overnight air the day after they are produced.[2] The reason that predecessors of this system have not been employed is the lack of confidence that supplies will be delivered from the United States on time. The security of having an in-theater stockpile for immediate issue to deployed forces is far more comforting than a promise that supplies will arrive "just-in-time." These misgivings are linked directly to hard lessons in American military history. The concept of moving a "mountain of supplies" close to the deployed force is battle-tested, and probably not totally extinct.

The Need for Reliable Stores

Support of the Continental Army and the embryonic Army of the United States consisted mainly of forage and impressment. Primary requirements were food for the troops and forage for their horses. New Jersey and Maryland farmers exhausted their crops and livestock to support the tattered Continental Army in winter encampments. Clothing and ammunition were procured from various sources and transported to the army by whatever means were available. This logistics tail was often so precarious that even a minor disruption could render the army helpless.

This system drew early criticism. The then-future Commanding General of the Army of

the United States, General "Mad Anthony" Wayne[3] spent 4,500 pounds of his own funds to clothe the army and suggested that they abandon positions around Philadelphia to, "like Mahomet and the mountain, go to the clothing if the clothing won't come to us."[4]

The lack of reliable stores caused General Washington to call for logistics reform. From his Valley Forge encampment, he asked for assistance from the president of the Executive Council of Pennsylvania, "All of our departments, all our operations are at a stand, and unless a system very different from that which has for a long time prevailed be immediately adopted throughout the states our affairs must soon become desperate beyond the possibility of recovery[5]." Although the first Commander-in-Chief recognized that an Army could not leave its support to chance, he saw no easy solution, "Indeed I have almost ceased to hope. The country in general is in such a state of insensibility and indifference to its interests, that I dare not flatter myself with any change for the better . . . "[6]

Operators in the War of 1812 continued to convince the leadership that a change in the logistics system was required. Supplying the force was accomplished by executing a series of contracts. Although the contract system made payment easier, it made transportation and reliability worse. Brigadier General William Henry Harrison was forced to take matters into his own hands. He complained that though his troops had marched from Kentucky in August to relieve General Hull at Detroit, the clothing for the expedition didn't leave Philadelphia until late November.[7] Determined to leave nothing else to chance, General Harrison asked the citizens of Cincinnati to cast 12,000 homemade cartridges and moved an entire herd of beef cattle across Lake Erie to Canada on Commodore Oliver Perry's Fleet.[8]

There was widely held disdain for the contract system. Brigadier General Winfield Scott

expressed the opinion of many field commanders when he wrote, "In time of war contractors may betray the army; they are not confidential and responsible agents appointed by the government." His distrust for the patriotism and reliability of contractors was so profound that he went on to suggest a solution to the problem, "In the enemy's country I suppose a general who knows his duty would not fail to hang a contractor who should, by guilty neglect or by corruption, bring serious disaster upon the army . . . "[9]

Secretary of War John C. Calhoun called for reform in the post War of 1812 period. Based on experiences gained in that war, Calhoun asked Congress to revise the process. "Nothing can appear more absurd than that the success of the most important military operations, on which the very fate of the country may depend, should ultimately rest on men who are subject to no military responsibility, and on whom there is no hold other than the penalty of a bond."[10]

The rate of change in the period between the Revolution and the War with Mexico was slow. The regular force was consistently less than 20,000 soldiers. Supply and transportation continued to move toward more centralized procurement and the associated transportation links to deployed forces. Strategic thinkers of the time were concluding that at least a part of the "mountain" must be moved to Mahomet.

Forward-Based Logistics

In his classic analysis of the support of military forces, Pure Logistics, George Thorpe reports that the study of logistics in the post-Napoleonic era was subordinated to the study of strategy and tactics. Thorpe contends that early battles in the Civil War were only a series of melees, particularly when both belligerents were untrained. However, as combat experience

grew, the side with the greatest resources was bound to win.[11] The scope and duration of the Civil War forced the Army to find better ways to get the right stuff to the right force at the right time. For the first time in the nation's history, industrial might was adequate, the problem was bringing it to bear.

America's reaction to the conflict was unprecedented. The Union Army expanded sixty-two times - from 16,000 troops in 1861 to over 1,000, 000 in 1865.[12] No expansion since has equaled the Civil War buildup. The increase in expenditures of funds was even more spectacular. War Department expenditures rose from $22,981,000 in Fiscal Year 1861 to $1,031,323,000 in Fiscal Year 1865 - an increase of forty-five times. There was a tenfold increase in War Department expenditures between 1811 and 1814; a twenty-six fold increase from 1916 to 1918, and the budget increased seventeen times between 1941 and 1945.[13] Forces required subsistence and munitions on a scale never before imagined. The distances between Northern industrial centers and the Armies in the field exacerbated the problem of moving the ever-expanding mountain.

After Bull Run, a more deliberate Northern strategy began to develop. With the notable exceptions of Grant's Vicksburg Campaign and Sherman's march through Georgia and the Carolinas, Union armies were supported from a well-developed base, with depots from which munitions, subsistence, field equipment and medical supplies, could be drawn. These installations were connected to the field army and to commercial centers of the country by telegraphs, roads, and waterways[14].

The scope of these supply depots was awe inspiring. In preparation for the Atlanta campaign, the commissary base at Louisville purchased, received, and shipped 300,000 rations a

day. This included running a cracker bakery that used 400 barrels of flour a day and a bread bakery that used 150 barrels of flour a day. On a typical day, the depot processed about 1,000 hogs and 1,000 head of cattle. To insure that the campaign was adequately supported, a storage facility was established and a stockage of over ten million rations was built-up. Supplies were moved to the army by rail and sometimes cattle were herded to forces through an intricate system of feeding stations.

Army logisticians and the United States Industrial Base had finally developed a method of supplying the largest army ever assembled on the continent. Sherman's appraisal of his logistics support was simple, "for one hundred days not a man or horse has been without ample food, or a musket or gun without adequate ammunition."[15] Union victories were ultimately ironic proof of Confederate General Nathan Bedford Forrest's axiom that "the secret of success is to get there firstest with the mostest."[16] The Confederacy often got there first, but the Union Forces always had the most. The Union was preserved, not by superior generalship, or even extraordinary heroism, but by the generous forward application of Northern industrial might.

If It Works, Don't Fix It

The paradigm established during the Civil War held throughout the period between demobilization and the War with Spain. The Army Historical Series Account of the period contends that, "In the quarter of a century after the post Civil War reorganization of the Army, there was little change in Army logistics . . . A supply officer in the West in 1866 would have been quite familiar with his duties and procedures if reassigned to a similar post in 1891."[17] By 1889 Army consisted of only 25,000 officers and men stationed at 134 posts scattered across the country.[18] There was neither the will nor the apparent need to alter supply or transportation

procedures.

Enough time had passed to dim the memories of the rigors of mass mobilization. Congress took every opportunity to reduce both supply stocks and transportation assets. The same Congress wasted no time in declaring war on Spain. It was time again to build the mountain of war material and move it to the fight. This time, however, the move required over-ocean transportation and distances that spanned half the globe.

Congress quickly increased the Regular Army to 65,000 and authorized 75,000 volunteers. War fever resulting from the sinking of the battleship *Maine* sent thousands of enthusiastic volunteers flocking to Southern mobilization camps. Secretary of War Russell M. Alger, against the advice of the Commanding General of the Army, ordered Regular infantry regiments to positions near New Orleans, Tampa, and Mobile, ready to deploy[19].

Mobilizing, equipping and supplying these wartime forces severely tested the War Department. There was inadequate clothing for new soldiers, antiquated weapons and no specific plan for either building or moving the mountain. These limitations, aggravated by infighting within the War Department caused mobilization and sustainment buildup to drag.[20] Individual states had ignored federal direction to keep National Guard Units equipped and there were not enough shoes, underwear or socks for even a basic issue. Life in the mobilization camps quickly deteriorated due to lack of supplies, poorly prepared food and shoddy sanitary conditions.[21]

The over-ocean move illuminated the Army's unpreparedness to deploy. Tampa was picked as the deployment port because of its proximity to Cuba. It was a bad choice. The port was serviced by a single rail line, resulting in miles of backlogged cars. There was no detailed

load plan for forces and cargo, so cargo was loaded with little regard for far-side priorities.

The far-side proved just as hostile. Though there was no direct enemy opposition, several merchant ship captains refused to bring their ships close to shore. Reacting to this problem, and the acute shortage of lighters for ship-to-shore operations, stevedores simply hoisted horses overboard, to swim ashore on their own. Many swam out to sea instead and were lost.

Once ashore the Army fared somewhat better. The model of depot buildup was again followed in Cuba. Depots were established at Siboney and Daquiri and connected to the deployed force by a tenuous transportation network and telegraphs. The conduct of the campaign was never hampered by the army's poor logistical performance.[22]

Things fared much better on the Western Front. The San Francisco Army Depot quickly expanded from a troop support capacity of around 3000 soldiers to 30,000. Navy Commodore George Dewey's Fleet escorted hastily gathered transport ships to the Manila area. Using indigenous lighterage and impressed Chinese labor, the Army established forward support bases at Camp Dewey, within artillery range of Spanish positions.[23] The pipeline was established. Operations during the rest of the Manila campaign and during the subsequent counter-guerrilla campaigns were fed from this link to the industrial base.

The Army's performance through mobilization and on the field prompted calls for reform. Both political and military leaders postulated a Twentieth Century that would call on the Armed Forces to project power to distant regions with scant warning. Faced with the problem of developing this Force XX, Secretary of War Elihu Root set about the task of military reform. In his Annual Report of the Secretary of War for 1899, Secretary Root observed, "It is greatly

desired that at the same time, while lessons drawn from the experience of recent war are fresh in our minds, some improvements should be made in the organization of the Army."[24] He went on to postulate on how the Army should be reshaped. "It seems to me that the best course would be to settle on the true principle which should govern the use to be made of the Army and then inquire in what respect our present arrangement fails to conform to that principle and make it conform."

Root offered two propositions for consideration in Army reform: "First. That the real object of having an Army is to provide for war. Second. That the regular establishment in the United States will probably never be by itself the whole machine with which any war will be fought."[25] The time was right for reform in Army logistics. Improvements in transportation and accounting methods made a version of "just in time logistics" feasible for the Army of the Twentieth Century.

Root's personal philosophy was that raising forces was not the problem. "Our trouble never will be in raising soldiers; our trouble will always be the limit of possibility in transporting, clothing, arming, feeding and caring for our soldiers . . . "[26] The challenge to Army logisticians was to find the most reliable way to transport, clothe, arm, feed and care for soldiers.

Root's solution was to produce a larger and better educated officer corps. In his Annual Report for 1900, Root contended, "The problems of subsistence, clothing, equipment, transportation, sanitation, the vast and complicated business of supplying and transporting an army, of caring for the health and strength of the men, as well as the actual command of troops in battle, require long and active and devoted thought, study, and training. To send volunteers into camp under inexperienced officers is simply to educate the officers at the expense of the men."[27]

There was no direction as to how the support services were to be restructured.

Although there were still echoes of dissatisfaction about the general disorder in the War with Spain, little was done in the way of reform. There were recommendations concerning combining departments, while others suggested removing functions such as transportation from The Quartermaster Department. Hardliners refuted these reforms with the claim that there was no need to change the system that had worked so well for Sherman, Sheridan and Grant.

The influence tending most toward conservatism in an army is victory. The unassailable, "We won the war, didn't we?" has glossed over thousands of errors.[28] Army leadership saw no need to fix the logistics system. The battle-proven system that supported the largest mobilization in United States' history has been recreated every time America goes to war.

Forward-Based Logistics - Again, Still?

As the turn of another century approaches, the Army again is poised for significant reform. The dawn of the information age and ever-present needs for governmental efficiency prompts defense architects to demand a restructure in the field of logistics. So how far have we come since Secretary Root called for reform the last time?

Lieutenant General (Retired) Joseph M. Heiser, Jr., a leading logistician in three wars contends that not much has changed. He cites the need for revisions in the process, but once again sees no real progress being made:

"In my forty-eight years in defense logistics, seven in combat zones in three different wars, I've faced many different, serious logistics problems. In each war, because supplies were low or nonexistent or could not be located, we lost critical time getting the support required by the

combat troops. The worst situation is to arrive in combat with an excess of noncritical items and a shortage of critical items. We must accept the fact that even the most carefully conceived logistics plans fail to prepare us for the chaotic environment that can occur in battle. On the beaches of Normandy, for example, the freak weather caused considerable confusion when we often had to unload supplies in deep water under fire. As a result, we often didn't know what we had, or where it was. Needed critical items were probably on the beaches in front of our eyes. The beaches were loaded with a lot of stuff. I mean 'stuff' because we received unidentified items and did not or could not inventory them. All across Europe identifying stock on hand in the combat zone was a problem, making it necessary to request rush shipments of supplies that were probably available. We managed to oversupply our troops in Europe in spite of losing 24 million tons of shipping to enemy submarines and even returning still loaded ships to the United States."[29]

Material stockpiles retained in the pacific were so extensive that they sustained forces employed in Korea in the early stages of that conflict. The method of replenishing the existing stockpile was perpetuated throughout the campaign.[30]

General Heiser found the mountain again when he arrived in Vietnam in 1968:

"This same oversupply situation prevailed in Vietnam . . . Oversupply is easy to do, when you consider that we finally achieved an airlift rate from CONUS of 20,000 tons a month. For five years we struggled to determine what we had on shore in Vietnam. By that time too much of it was left for the North Vietnamese. I hope they are still trying to sort it out!"[31]

The problem was not a lack of supply, but control and visibility of stocks on hand. One of the significant lessons learned by General Heiser and others in Vietnam was that a better control must be established and maintained on supplies.

Heiser was quick to caution his understudies not to be too enamored with the concept of direct factory-to-foxhole support,

"It would be foolish for us logisticians to base our structure and our procedures on anything like 100 percent of resupply could be throughput from point of production to point of use. We've got to have control points along the way, especially where interferences are likely to occur, so that when they do occur, those at the control points know in advance what the alternative courses of action should be. But we should have the logistics general support capability to allow for the

necessary flexibility."[32]

The students took heed. NATO facilities and stockpiles were structured to ease rapid buildup and establishment of the control points that the three war logistician demanded. In consulting visits to Europe throughout the Cold War period, General Heiser continued to warn against the concept of "just-in-time" without first considering "just-in-case".

General (Retired) William G. T. Tuttle, former head of the Army Material Command, contends that oversupply and lack of control persisted in Desert Shield and Desert Storm.

"Somewhere between 20 and 30 thousand containers and uncounted air pallets had to be opened every time someone wanted to know what was inside, where something was, or who was supposed to get the container. We simply lost visibility of much of that cargo. As a result, unit equipment did not always get where it was supposed to go, certainly not by the time it was needed; sustainment supplies were requisitioned two or three times and were not available to the forces when needed."[33]

General Tuttle contends that today's technology is up to the challenge of controlling and regulating supply. With firms like Federal Express and United Parcel Service tracking shipments in real time and guaranteeing "just-in-time" delivery, the Defense Department should "be ashamed of ourselves" for not improving on the supply management situation in the twenty years between Vietnam and Desert Shield/Desert Storm.[34]

Moving Mountains

As we enter the Twenty-first Century, calls for reform based on another American triumph and its associated lessons are heard throughout the defense establishment. The Army's report on the conduct of the Persian Gulf War says that the Civil War paradigm is finally broken. The time has finally arrived to finish the reforms that Secretary Root began a century ago:

"Disciplined and controlled improvisation in theater building can be greatly enhanced by technology that will provide more effective communications, better and more compatible data processing systems, and more responsive sea and air transportation. Technology, in fact, will allow a fighting CINC to build and sustain a theater while carrying with him to the theater significantly less of the logistics needed to support the campaign. Most of what in World War II was termed the communications zone, or the theater rear area, can be moved back to the United States or perhaps prepositioned in a forward region. The CONUS COMMZ concept to support the new style of war has several intrinsic advantages. Technology exists today in modern coding techniques and satellite communications to supply spare parts and critical items of supply from depots in the United States across an aerial bridge directly to the foxhole. Many, if not all administration and housekeeping chores can be accomplished from a CONUS COMMZ, including personnel, administration, finance, and other record-keeping, as well as depot-level repair and major medical services. Present technology also offers a solution to the problem of tracking supplies that so seriously plagued logisticians in the Gulf as they tried to identify the contents of shipping containers."[35]

The team that assembled the report credited the vision and battle testing of this new idea to Lieutenant General (Retired) William G. "Gus" Pagonis. They describe Pagonis' management style as follows: "His approach was, in effect, the military application of 'just-in-time' theory of management that demanded very careful monitoring to ensure that exactly the right support, tailored for the mission at hand, would be provided at the time it was required."[36]

In his personal account of the Gulf War, Moving Mountains, General Pagonis describes a different scenario:

"The corps waited in their ready positions for three days, while we continued to pump supplies and provisions into the log bases. By the time the ground war kicked off on February 24th, we had brought forward enough food and water to sustain the troops for 29 days; there was adequate fuel to keep everyone moving for 5.2 days; and our ammunition would hold up for 45 days."[37]

General Pagonis still wanted to insure that the army in the field got there the firstest with the mostest. The mountain had again been moved. General Hieser's wish for intransit visibility may be close to coming true, but his advice to keep a mountain nearby is still being heeded.

The revolution in logistics affairs seeks a better way to get there the firstest with the

mostest. Information Age technology may enable logisticians to better sustain high tech systems by knowing what is where. Even with these enhancements, logisitcians still depend on the Civil War method of generous application of America's industrial might. Assured support to the Army of the 21st Century still depends on the art of building and moving mountains.

Notes

1. Department of the Army, Force XXI Operations, TRADOC Pamplet 525-5 (Washinton: U.S. Department of the Army, 1August 94), 3-14.

2. Kenneth R. Wykle, "Role of Information Technology in Transportation and Asset Management", summarized by Colonel (Retired) Danny Edwards at the National Defense Transportation Association's 49th Annual Forum and Exposition, Defense Transportation Journal. vol 50, no. 6 (November/December 1994): 29.

3. Encyclopedia Brittanica, 1981 ed., s.v. "Wayne, Anthony."

4. James A. Huston, The Sinews of War: Army Logistics 1775-1953 (Washington: Office of the Chief of Military History, United States Army), 62.

5. Ibid., 65.

6. Ibid.

7. Ibid., 108.

8. Ibid., 109.

9. Ibid., 105.

10. Ibid., 113.

11. George C. Thorpe, Pure Logistics (Washington: National Defense University Press, 1986), 22.

12. Huston, 175

13. Ibid

14. Ibid., 130.

15. Huston, 236.

16. Joseph M. Hieser, Jr., A Soldier Supporting Soldiers (Washington: Center of Military History, United States Army, 1991), 150.

17. Ibid., 268.

18. Ibid.

19. Maurice Matloff, ed., American Military History (Washington: Office of the Chief of Military History, United States Army), 324

20. Ibid., 324-325.

21. Ibid., 324.

22. Ibid., 328.

23. Huston, 287.

24. War Department of the United States, Five Years of the War Department Following the War with Spain (Washington: Annual Reports of the Secretary of War, 1904), 57.

25. Ibid.

26. Huston, 296.

27. Five Years of the War Department Following the War with Spain, 138.

28. Huston, 290.

29. Heiser, 151.

30. Huston, 634.

31. Heiser, 151.

32. Ibid. , 234.

33. William G. T. Tuttle Jr., "Control and Accountability - Key to In-Transit Visibility", Defense Transportation Journal. vol 49, no.4 (August 1993): 14.

34. Ibid.

35. Robert H. Scales, Certain Victory, (Washington: Office of the Chief of Staff, United States Army, 1993), 377.

36. Ibid. , 48.

37. Pagonis, William G., Moving Mountains (Boston: Harvard Business School Press, 1992), 147.

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