LOGISTICS -- WHAT IS IT?

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LOGISTICS–WHAT IS IT? [1,2]

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Since World War II the importance of logistics has been stressed at all levels of military activity, and military writers have discussed its various aspects at length. In many ways and forms it was a major matter of consideration in the unification of the armed forces. Today we understand it better than before the war, and therefore our organizations and plans are logistically superior to those of the past. Many of our most important unsolved problems are logistical, however, and there are still serious deficiencies in our logistic plans and capabilities. If we fail to correct these deficiencies, they may easily cause our defeat should we have to fight another global war.

While some of our present deficiencies are caused by our failure properly to apply what we already know, there are many areas where we are limited by our imperfect knowledge of the art and science of logistics. If we can perfect and apply this knowledge, it is probable, within our present economic limitations, that we can improve the effectiveness of our logistic support by fifty per cent.

Among the obstacles to improvement are the uncertainties that exist as to the meaning of the word itself and as to the proper place of logistics in military organizations and plans. This is because logistics has several distinct aspects and in each aspect the definitions and descriptions differ. Frequently, therefore, people may be talking from diverse points of view without realizing the effect this has on their descriptions and opinions. Each will be ascribing a different meaning to the word without realizing it.

In 1917 Lieutenant Colonel Cyrus Thorpe, U. S. Marine Corps, published an excellent little book, "Pure Logistics. The Science of War Preparation." This initial attempt to develop theory and principle apparently attracted little or no attention until five copies were found in the Naval War College Library in 1945. Some students of war wonder how many billions could have been saved had the significance of Colonel Thorpe's ideas been fully appreciated before 1941. Unfortunately the book is out of print, the publishing house out of business, and only few copies remain in the hands of individuals.

In his preface Colonel Thorpe says:

"The terms 'pure' and 'applied' may be used with the same meaning as to logistics as to other sciences. Pure Logistics is merely a scientific inquiry into the theory of logistics—its scope and function in the Science of War, with a broad outline of its organization. Applied Logistics rests upon the pure, and concerns itself, in accordance with general principles, with the detailed manner of dividing labor in the logistical field in the preparation for war and maintaining war during its duration."

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It is the purpose of this article further to develop this approach and to discuss what is meant by the word logistics and what is its place in the naval establishment. It is not my intent to solve problems but rather to establish a background that will be helpful to those who are trying to solve them.

PURE LOGISTICS

The word logistics is an abstract term which represents a very practical reality.

In its abstract sense it, like strategy, tactics, economics, and politics, is not susceptible to a single simple and permanent definition. Rather it can be described in a variety of ways in very general terms. If it is to be understood it must be approached from various points of view, and it must be discussed and described by reference to other intangibles and abstract terms. It is only through the consideration of one abstract term with relation to the other abstract terms with which it is naturally associated that the true picture can be developed and described.

Several of the most useful and enlightening descriptions of abstract logistics—or "pure logistics," as we may call it—are:

"Logistics is all that part of war which is not included in Strategy and Tactics." Col. Thorpe, "Pure Logistics."

"Strategy and Tactics provide the scheme for the conduct of military operations: Logistics provides the means therefore." Derived from Col. Thorpe, "Pure Logistics."

"The logistic process is, at one and the same time, the military element in the nation's economy and the economic element in its military operations." From a Munitions Board Study.

If we carry on the thoughts expressed in these descriptions we can see war itself in its abstract sense as comprising three interlocked abstractions—Strategy, Tactics and Logistics. If we draw on our experience and on history, we find that war is a matter of infinite variation, in which no two situations are precisely the same. We see that in all war situations the actions and decisions are based upon a blend of strategical, tactical, and logistical considerations. If we consider these abstract terms as three overlapping discs, we can see where some situations involve all three considerations, others involve two, and some only one. However, as we study, we realize that the dividing lines tend to blur and in some cases to vanish.

A somewhat different approach would be to say that, in its broadest sense, war is a combination of military, political, economic, and geographic situations and considerations. Here again we find a variable blend of abstract terms, each of which is subject to a variety of meanings and descriptions as well as to a variety of subdivisions; for example, geographic situations may well include climate and weather; political considerations can well include sociological aspects. However, military and economic considerations are related by logistics as indicated before, since it is "the military element in the nation's economy and the economic element in its military operations."

In order to fight a modern war we must "mobilize" our economic and industrial resources in order to create and support the necessary combat forces and to maintain our civil economy and health. Again we are speaking in abstract terms, for "mobilize" is a word that can be applied to many affairs.

Two descriptions taken from a Bureau of Supplies and Accounts paper are helpful in understanding this problem:

"Civil logistics is the mobilization of the civilian industrial economy to support the armed forces."

"Military logistics is the supplying of men and material, and the rendering of services, to the operating military forces."

If we now return to our earlier description and statement that "logistics provides the means for the conduct of military operations," we find ourselves on a relatively simple and broad abstract level using simple terms—terms that can be readily related and are adequate to cover the major problem of war. We also find that we have placed logistics on a coequal level with strategy and tactics, thus forming the three major subdivisions of the art and science of war.

If we are to practice an art, we must have a knowledge of the theories and principles of the underlying science. In this sense, principles can be considered as the statements of known cause-and-effect relationships. As of today these cause-and-effect relationships in logistics are virtually undeveloped. Patient, free research is required to develop these principles, and after they are developed they must be frequently re-examined to confirm their validity.

Someone may well ask—What is a logistic principle? An illustration is the "Principle of Priorities" which states:

"Priorities and allocations are required only in case of shortages.

"When shortages exist, both allocations and priorities are required to provide equitable distribution.

"Priorities used alone are self defeating and merely serve to worsen the defect they are supposed to correct."

This is an example of an imperfectly developed principle. In World War II this principle seemed to be borne out, particularly by the confusion in national distribution of scarce raw material and by the manner in which priority cargo waited shipment for months in air transportation depots. In the present partial war the evidence, while not yet wholly conclusive, tends to confirm the truth of this principle. If it be true, its application can greatly improve our efficiency in war.

APPLIED LOGISTICS

Abstract speculations, theories, and principles have never prepared a nation to fight and have never won a war. All they have done is to enable man to understand his war problems and to assist him to solve them.

In order to prepare for war, we must define the practical tasks of the armed forces and we must assign these tasks to specific organizations and individuals. For this purpose we have organized the Department of Defense and the armed forces; for this purpose authoritative definitions have been published and specific tasks assigned.

The U. S. Joint Chiefs of Staff have defined logistics as:

"That part of the entire military activity which deals with: (1) design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of material; (2) induction, classification, training, assignment, welfare, movement, evacuation and separation of personnel; (3) acquisition or construction, maintenance, operation and disposition of facilities; and (4) acquisition or furnishing of services. It comprises both planning, including determination of requirements, and implementation."

This definition of applied or practical logistics is in no way out of harmony with the previous broad descriptions of pure logistics. Rather it amplifies them and reduces them to specific functional terms suitable for application throughout the armed forces.

Nowhere are there any orders as to how each service shall interpret this definition. This is wise, for conditions in each service vary. In the Navy Department logistics is rather loosely organized. The Deputy Chief of Naval Operations for Logistics has responsibility for coordination, and for the determination of requirements, while the technical bureaus have the operating function. In the Departments of the Army and the Air Force the Assistant Chief of Staff, G4 Logistics (Army) and Deputy Chief of Staff—Materiel (AF) have a much more direct authority.

The fact that a certain function is included within the defintion of logistics does not necessarily mean that the function in question is carried on by an organization that is logistical in name or is wholly devoted to logistical activity. (Failure to remember this important fact frequently causes confusion.)

However, it is of vital importance to understand one thing: that regardless of how the logistics functions are assigned and divided, the functions themselves are the same and must be performed by qualified officers. Furthermore, these functions must be supervised and coordinated by other senior officers; and these senior officers must not only understand the full implications of their responsibility, but also must understand the relationships involved in these tasks.

In the practical field, the definition of applied logistics, or the "What is it?," varies in accordance with the level of the organization being considered. But always logistics is concerned with "furnishing the means of war," which are material, men, facilities and services.

On the international and national levels, applied logistics deals with the broadest economic and industrial matters, such as: the sources and availabilities of raw materials; the state of the domestic economy and finances; the availability of manufacturing plants, skilled and unskilled labor, design and production engineers, management; and other similar affairs. Some persons may prefer to consider this as a combination of economic mobilization, industrial mobilization and military planning. The precise labels attached to the process are not as important as understanding the nature and inter-relationship of the functions performed.

The international process is exemplified by the military assistance activities and by the mutual security programs which have been placed under the administration of the Commander in Chief, U. S. European Command (U.S. CINCEUR) General Ridgway. The process is further illustrated by the work of the Screening and Costing Committee under General McNarney in Paris in 1951, and their immediate superior, the Temporary Council Committee, "The Three Wise Men." The Lisbon Conference of 1952 was almost wholly a high level logistic conference.

On this highest level the international and national situations and decisions must be continuously inter-related. Therefore, our own governmental organizations must work with their opposite numbers in other nations and with the special ad hoc or permanent international organizations. It is vital to seek harmony among the national and the international policies, strategic plans, and military programs. While it is naive to expect to achieve complete harmony, it is very important that we avoid contradiction. Policies and plans are made by both international and national agencies, but action is almost always by national agencies. There is an extraordinarily complex mixture of political, economic, strategic, and logistic factors.

At this top national-international level, the activities of the Joint Chiefs of Staff, the Munitions Board, the three military departments, and many other agencies and specially appointed individuals are so fluid and intertwined that they literally defy description. This condition emphasizes the importance of understanding the basic principles that operate in these fields.

Strictly national U. S. action follows a somewhat simpler pattern. The projects authorized and the funds appropriated by the Congress actually determine the logistic capabilities of the armed forces. Within the limits of these practical capabilities, the Secretary of Defense, the Joint Chiefs of Staff, and the military departments decide as to the specific forces to be built up and they formulate the broad strategic plans. The Munitions Board makes recommendations as to policies governing the allocation of both raw materials and finished products among the three services. This board also makes recommendations as to how the productive capacity of certain industrial plants should be allocated. The three military departments, through their technical bureaus and services, then actually procure and distribute to the operating forces the ships, planes, guns, men, equipment, supplies, and services which are the means of war.

The above are the major processes which constitute, or are associated with, the international and national level of logistics. It is sometimes convenient to call this the mobilization level or to consider it as part of the strategic phase of logistics.

The next level of activity may be described as the operating level or field level. It includes what the Army calls the Zone of the Interior and what the Navy calls the Continental Shore Establishment, and it takes in the theaters of operation, the fleets, the armies, and the air forces. It may be called "Operational Logistics" and may be said to include both strategical logistics and tactical logistics.

The logistics of the naval operating forces are based on the Sea Frontier, Naval Base, and Naval Depot systems, which channel the flow of logistic support and services to the fleets.

Planning for the actual conduct of this "Operational Logistics" is based upon the strategic plans and the broad logistics plans and policies of the theater and fleet commanders and upon their estimates of requirements. All of these furnish the necessary guidance to the type commanders who actually submit the requisitions and operate the basic logistic services afloat.

As we move from the theaters through the fleets to the task forces, we move from strategical logistics to tactical logistics; from the realm of long range plans and forecasts, to the actual repair and replenishment of combat forces. The techniques of tactical logistics are under constant scrutiny and improvement in actual practice. However, the techniques and procedures of so-called theater and fleet strategical logistics are frequently imperfect and sometimes neglected in peacetime.

Any one can understand the effect of a ship at sea running out of fuel and ammunition. But few officers understand the importance and nature of the long range concurrent strategic-operational logistic planning on theater and fleet level: the planning that will insure the readiness of task forces for sustained combat operations in time of sudden emergency.

In considering this division of logistics into various levels, we should always remember that each level overlaps with the other, both above and below. There can never be a sharp "chop line" of interest, although there are various "chop lines" of specific action responsibility. In all of the above stages and relationships we find changing general characteristics and emphasis.

On the highest level we deal in the broadest terms, and as we go down the chain we find ourselves being more specific. At first the emphasis is on civilian control, with important military participation. But as we go down to the operating level, the civilian interest tends to diminish and the military control increases. Civilian control tends to be strongest in the "producer" or business end of the logistic process; military control is strongest in "consumer logistics."

LOGISTICS IN PLANNING

There are two general types of planning in applied logistics: Logistics Planning and Planning for Logistics. Again, as in so many other fields, these overlap.

The first term, logistics planning, can be used to indicate the incorporation of logistics considerations in the development of strategic and tactical plans. It includes the determination of the basic logistic requirements and the general dispositions necessary to support these plans. All of this can be effectively done only by a constant and intimate relationship between the strategic planners and the logistic planners. In this relationship the former are constantly aware of the logistic capabilities and limitations, and the latter are constantly aware of the dispositions and employment being proposed for the forces, and of the estimated nature and strength of enemy opposition.

While the details of this Logistics Planning can be complex, the whole system rests on the following simple and straightforward fundamental sequence:

A proposed scheme of deployment and action and an estimate of opposition;

Determination of broad logistic requirements and determination as to which of these will be decisive or critical;

Determination of availabilities of these critical items;

Estimate of the effect of shortages upon the strategic and tactical courses of action;

Determination of what can be done logistically or tactically to alleviate these shortages or to overcome the handicaps imposed by them.

Since this process exemplifies the meaning of the expression "Logistics is a Command responsibility," it requires the complete understanding and active personal interest of the Commander himself, as well as the full participation of his strategic and logistic assistants.

The terms feasibility and calculated risk are frequently used in discussions of the problems of Command in War. These words have probably been clouded with more ignorance and superstition than any other terms in our war and postwar vocabulary. Each should be used with caution. They are closely related; yet each requires careful study and proper qualification in use. Final decision in either is a matter of the personal professional judgment of the Commander. In each case it is a question of how much risk and how much hardship the Commander is willing to impose on his subordinate forces and personnel in order to gain his objective. There are no absolute or arbitrary limits. The decision involves a process of selection of courses of action and of the development of plans that will make the most effective use of the combat forces and logistic resources that are available. This process is the highest test of military judgment and it requires close personal relationships among the commander and his responsible assistants.

The second term, planning for logistics, can be applied to the more detailed planning for the logistic support of the combat forces. Here is where the degree of flexiblity of the combat forces is almost wholly determined; it is the most "practical" type of functional logistics. Among other things it involves the details of the build up, distribution, and allocation of supplies, transportation lift, and repair facilities.

These two types of planning take place at all levels. The techniques may vary and in some instances they may telescope and become concurrent. Normally, however, the planning for logistics follows the basic decisions in the logistic planning stage. Since all of this planning requires close coordination between staffs and within staffs, we will now discuss staff organization as it applies to logistics.

LOGISTICS ASPECTS OF STAFF ORGANIZATION

Since no standard staff organizations are prescribed, there is a wide variation in the manner in which various Commanders choose to organize their staffs. The organization is derived from the wartime tasks and responsibilities of the Commander. From the logistic point of view two general types of organization can be recognized.

The first type is found where the principal function of the Commander is logistics. The Service Force of a fleet is an illustration. The second is found where logistics is only one of several major tasks of the commander. Theater commanders and sometimes fleet commanders fall into this category.

In the first type, the Service Force, individual major functions—such as personnel, supply, maintenance and repair, medical, base development, plans, and operations—are usually assigned to separate staff divisions. Fuel, electronics and ammunition usually require special arrangements which vary according to circumstances. Since the whole task of the commander is a logistics task, the whole staff is a logistics staff. Therefore the Chief of Staff has the fleet logistic situation as his major concern. He, assisted by the plans officer, coordinates the entire logistics task of the command. This coordination is based on the strategic and the broad logistics guidance provided by the Fleet or Theater Commander. Under these circumstances there is no need for a separate logistics division on the Service Force Staff.

In the case of a theater or of a fleet staff, the situation may be quite different. Here it is important to group the major logistics functions under a single logistics officer who is the principal staff adviser to the Commander in logistics matters. During World War II this was done with notable success by Admiral Nimitz. However, this sound practice has not always been followed in our post war organizations. Instead, in peacetime, there has been a tendency to diffuse the logistic function throughout the staff. In a Theater or Fleet Staff, the Chief of Staff has many urgent concerns other than logistics. Therefore he cannot act as an effective logistics coordinator. If no single officer is given specific responsibility and authority for logistic planning and coordination within the staff, many loose ends or "holidays" develop. Under such conditions, it is probable that both the strategic and the logistics plans will be fatally defective. This can lead to disaster in war.

This need for centralizing logistics staff work in a single staff division does not imply that type and force commanders with major logistic responsibilities do not also act as advisers to the theater or fleet commander. There are two legitimate sources and channels, one the personal staff, the other the chain of command. Both are necessary.

Uncertainty and diffusion of logistic responsibility within naval staffs are illustrated in certain postwar staff organizations. In one instance the logistics section was established as a subsection of the material division. This is simply a case of reversing the cart and the horse: material is an essential part, but only one essential part, of the overall logistic problem.

In another case, planning for logistics support of naval aviation was assigned as a minor task of the operations division; the logistics division being aware, only by hearsay of aviation logistic requirements.

In staff organization, a common fault is to give the communications division cognizance over all matters dealing with electronics. This will inevitably break down in war because communications is only one aspect of the huge electronics problem.

Another fault is to attempt to maintain in the plans division a small logistics plans section to formulate the logistics plans. This results in waste of effort and poor plans, for if

the staff planning picture is to be kept clear, the logistics planning must be charged to the individual who is directly responsible to the Commander for advising and assisting him in logistics matters.

And finally there is the very human and understandable desire of each technical bureau to have its staff representative report directly to the Commander, without dealing through a "Logistics Officer" or through the Commander of a Logistic Force.

Many of the above variations in staff organization spring from the desire to operate with a minimum staff. Except for war planning, Theater and Fleet staffs in peacetime have relatively little to do, and what they do is relatively simple. Therefore, if logistic responsibility is diffused and scattered among several major staff divisions, such as plans, or operations, or communications, these divisions can probably handle certain current logistic matters with no undue effort and with no apparent harm. However, war instantly transforms this situation. The above divisions become swamped with their own primary duties and have no time for anything else. In fact they urgently require additional personnel to handle their extra load.

When war breaks out, fleet and theater logistics problems literally explode to huge size and great urgency. However, if the logistics responsibility has been diffused rather than concentrated, the logistics division will not be prepared to handle the emergency. Therefore confusion, serious trouble, and major waste ensue. These are the minimum results of the hasty improvisation which inevitably occurs. At the worst, a major military disaster can take place.

On the mobilization level as pointed out previously, the three services, the Joint Chiefs of Staff, and the Munitions Board are striving to relate war, mobilization, and budget plans to the national economy and to political factors. Here the relatively simple planning process and staff organizations previously described do not directly apply. The basic principles are the same, but the magnitude of the task and the realities of legal regulation and the budgetary and service competition require unwieldy organizations and a long drawn out planning process.

In this lengthy Planning Cycle, practically every major activity in the Department of Defense is involved, either directly or indirectly. For example, some people are working on budget and finance, some on ship design and construction, some on industrial plant capacity and allocation, some on manpower, some on raw material, some on transportation. Cut the cake any way you choose, call it by any name you want—Administration, Economic Mobilization, Industrial Mobilization, General Planning, or what you will—it is still the same reality. These men are working to "provide the Means of War in order to support the National Strategy." Regardless of the cut of the cake or the nomenclature used, it still must follow the basic logistic procedure. First determine your requirements; next figure out how and where you will procure what you want; and, finally, distribute it in accordance with the military needs of the situation. The consumers are the military; the producers are essentially civilian.

This process is logistics, logistics in a very practical sense. If those individuals doing this applied logistics have an understanding of the purpose, the relationships, and the principles of pure logistics, their work will have the coherence that is so essential. They can develop an efficiency and effectiveness impossible in the compartmentized operations of individual groups who see only their own day to day crises without relating them to the over-all problems and purpose.

LOGISTICS AND ADMINISTRATION

There is some difference of opinion as to the relationship between the terms logistics and administration, since these terms have always been linked in military organization and planning. Where major staffs have used deputies to relieve the Chief of Staff of detail, it is usual to find a Deputy Chief of Staff for Plans and Operations and a Deputy Chief of Staff for Logistics and Administration. The Navy and the Air Force use a "Logistic Annex" to their operation plans, while the Army and Marine Corps use an "Administrative Order" to contain the logistic and administrative portions of their operation plan. This latter usage implies that pure logistics is a sub-category of the broader abstraction, Administration.

In one instance the term Administration has been described as:

"The management of all phases of military operations not directly involved in tactics, strategy and logistics."

This has been coupled with a secondary meaning:

"The interior management of units."

However, other authorities give administration an even wider scope and consider that it "denotes the endeavor of each member of an organization." In this sense it includes all organized planning, execution, and supervision of the planned action. Here it would apply equally to strategy, tactics, and logistics, and to all operations from all levels from the President of the United States down to the individual sailor performing his duties in peace or war.

Still another manner of treating the subject of administration is found in some staffs that group personnel and administration in one staff division. In some instances this staff division will have cognizance of legal matters, welfare, recreation, and postal affairs and military government, in addition to the distribution of personnel.

The term "staff administration" has a well recognized special meaning which usually includes the operation of the clerical and routing system of the staff, custody of registered publications and security, etc. It sometimes includes the supervision or operation of staff housekeeping and transportation facilities.

From the above we can conclude that Administration has such a broad general use and such a variety of special uses that, unless the context permits no misunderstanding, the term should always be clearly and appropriately qualified. It supplements but in no way replaces the term Logistics in military usage.

BROAD OBJECTIVES

Sir Richard Livingstone once pointedly wrote:[3]

". . . by a mere technician I mean a man who understands everything about his job except its ultimate purpose and its place in the order of the universe."

One of the most important reasons for understanding the abstract relations between strategy, logistics, and tactics is to emphasize the purpose and the objectives of our effort.

The objective of logistic and administrative work is the creation and continued support of adequate combat forces in order that these forces may effectively support our national strategy.

The nature of modern war is such that, in order to fight effectively, there must be the greatest economy in the provision of these forces and their support. But economy is not the objective; it is merely one of the essential factors in the attainment of the objective. If the objective is jeopardized by over-emphasis of economy, fatal damage may be done to our national security.

[3] In "Some Tasks For Education," Oxford University Press, 1946.

If, on the other hand, the economic limitations of our national defense effort be not recognized, our national objectives and national security may be lost. Since the Russian development of Marxist doctrine has emphasized the employment of economic warfare and inflation to bankrupt countries they wish to take over or defeat, this latter danger must be recognized.

CONCLUSION

In analyzing any subject it is desirable to reduce it to simple terms and to show them in logical relationship. In attempting to do this it is inevitable that statements be made which will appear obvious or trite and even repetitious to those who are experienced in the art. On the other hand, in attempting analysis in any complex field, it is likely that the pioneer must also use some relatively abstruse ideas and expressions. It is only after the exchange and interplay of the ideas of many enthusiasts that adequate clarification and simple statements of principles can evolve. With this in mind, the following thoughts are offered as to some of the most important facts and relationships which lead to an understanding of the question "What is logistics?"

In order to understand logistics one must understand both the word and the subject.

The word logistics is a symbol, an abstraction, and as such can be truly described in a variety of ways. It can be strictly defined only for a particular case at a particular time.

The subject of Logistics itself is a living, changing thing, it is not dead or static. Full understanding of the subject can come only by seeing it as a whole, by pondering upon its many elements and functions, and by practice in the art.

Pure logistics is an abstract term used to indicate the whole complex process whereby the means of war necessary to support a national strategy are determined, procured, and finally distributed to the combat commanders. Applied logistics represents the everyday practical application of this abstract process.

The objective of all logistic effort is the creation and sustained support of adequate combat forces. Economy is an essential factor in the attainment of this objective.

The applied logistics process of providing men, materials, facilities and services, comprises the performance of many specialized and technical functions. These functions include ship and aircraft design, construction, maintenance and repair; air and naval base design, construction, and operation; the operation of an intricate supply system; the provision of fuel, ordnance, and ammunition; transportation of all sorts; and personnel and medical services.

Some of these practical functions are performed by staff corps officers and line specialists, some by unrestricted line officers, and some by civilians.

Both pure and applied logistics can be roughly divided into two general classifications: mobilization logistics and operational logistics. Before operational logistics can function, there must be the prior performance of the mobilization logistics function: Mobilization logistics and operational logistics have a large area in common.

The nature of war and its component parts is such that sharp dividing lines cannot be drawn between strategy, tactics, and logistics. Instead, they blend and overlap in many continually varying ways. This is equally true whether one is thinking in abstract terms or in practical functional terms.

An understanding of both pure logistics and the broad aspects of applied logistics is essential to the exercise of high command.

Control of over-all applied logistics requires a knowledge of the problems of high command—particularly a knowledge of the relationships between the functional elements of applied logistics.

And finally, in any field of human activity, in the elementary and low level stage, individuals may have to be guided by specific rules and fixed procedures in rather narrow fields. As one gains in rank and in responsibility, the fields broaden and the rules and fixed procedures are gradually replaced by mature professional judgment based on experience and understanding of principles.

In this respect logistics in no way differs from any other art and science that challenges man.

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