THE RELATION OF LOGISTICS TO STRATEGY

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GENERAL HOLMAN: Gentlemen, in our lecture this morning we get into one of the fundamental concepts of modern war. We ask ourselves the question, What is the relationship between logistics and strategy? We all know that a modern army must have weapons and tanks, a navy must have ships, and an air force must have planes. But there are many other considerations. When we deal with the question of time and space, we get into economics and geography. We get into areas where the populations are different and where the political considerations must be very carefully analyzed. On the strategic side we know that one engagement does not make a campaign, that the operations in one theater do not necessarily decide a world-wide conflict. And so I think we are entitled to examine very carefully as to what influence requirements and resources have on the basic decisions as to where, when, and how our military effort must be applied.

We are very fortunate in having with us an officer of wide experience in the Navy, who has had important assignments both in command and in planning and whose present work takes him both into the fields of strategy and logistics. It is a great pleasure to have with us Rear Admiral Harry R. Thurber, the Director of Logistic Plans in the Office of the Deputy Chief of Operations (Logistics).

Admiral, it is a great pleasure to have you with us this morning and to welcome you to the college.

ADMIRAL THURBER: General Vanaman, gentlemen of the Industrial College of the Armed Forces: "The Relation of Logistics to Strategy" is a broad theme. I am sure that your appreciation of the subject is a broad one.

As a general military definition, strategy provides the scheme for the conduct of military operations; logistics provides the means for carrying out the strategic scheme.

The close relationship between strategy and logistics can be illustrated from World War II. For instance, there was Bataan—rather elaborate strategical and tactical plans existed for the defense of this sector of the Philippines; but when war came, the defenders were forced to fight on short rations, with critical shortages in ammunition, and with no large reserve of necessary tropical medicine. I feel certain that by 1 March 1942, every officer, enlisted man and civilian in Bataan was logistics-concious.

Another example, with which I am most familiar, is reflected in the early days of the South Pacific campaign. Our capture of Japanese-held Guadalcanal had been directed by Washington for strategic reasons, in order to stop the Japanese advance southward, to safeguard our slender communications with Australia and New Zealand, and to serve as a springboard for our counteroffensive. The nearest territory to Guadalcanal in our possession was Espiritu Santo, an island some 500 miles to the southeast.

By no stretch of the imagination could Espiritu be termed a base from which to conduct an operation. A bomber strip was built there in early August 1942. Planes could land and take off on that strip, but there was no stock of gasoline, no gasoline storage tanks, no adequate service crews, and no port facilities in the harbor. This situation, in connection with primitive roads and trails, made the movement of drummed gasoline from a ship in the harbor to the airfield a major operation.

There was a small Army garrison at Espiritu and a nucleus naval base organization. The "Curtiss," a U.S. Naval seaplane tender, was anchored in the harbor, only partially protected by mine fields. There were no wharves, no docks, no warehouses, no storage areas, no cranes, and no tugs or lighters. When the combat transports and cargo ships came back in early August from the Guadalcanal landing, a portion of their landing craft was used in an effort to improvise some means of moving cargo. I witnessed that effort. Meantime, ships from the United States began to arrive in numbers, with aviation gasoline, lubricating oil, ammunition, supplies, and equipment, all of which was soon to be desperately needed at Guadalcanal. Thus the Guadalcanal attack was supported from an island with no cargo-handling facilities. This, of course, had a fundamental continuing effect on the campaign.

A squadron of transport planes arrived at Espiritu and was thrown immediately into the Guadalcanal supply service. For some 20 days the South Pacific campaign hinged on this thin thread. On several occasions the rugged pilots of these unarmed planes saved Henderson Field on Guadalcanal by the driblets of gasoline they were able to get there in the nick of time--enough to keep the combat planes flying for just one more day. On other occasions, as they became available, small World War I destroyer-type seaplane tenders were loaded with all the drummed "avgas" they could carry and sent on their mission, with hopes that their speed, small size, and maneuverability would insure that they would get to Guadalcanal, unload, and get out. They did, in spite of the fact that they were attacked by superior surface forces and repeated air bombings.

In the critical stage of the Guadalcanal fight, which lasted until 15 November 1942, the enemy tried by every means to sever our supply line. On five different nights a strong group of Japanese surface vessels attempted to reenforce and recapture Guadalcanal. Invariably these outnumbered the only surface vessels with which we could oppose them. We succeeded each time in obstructing their attempts to recapture the island; but had they on any one occasion destroyed our naval forces, then the thin thread of supply would have been severed permanently, and the Guadalcanal position would have been lost.

Conversely, after the Japanese commander had landed reenforcements of considerable size on Guadalcanal, he was faced with the problem of supply. We were attempting by air and surface to sever his supply; while at the same time, with our meager remaining forces, to prevent him from cutting ours. And so the bitter fight went on until the middle of November, when after severe losses in a brutal night naval action, the enemy decided to let the position go. We had won the logistic battle and the Japs had been forced to abandon a strategic keystone.

Later in the South Pacific campaign, we counted on one of the enemy's logistic problems in planning our landing at Empress Augusta Bay; namely, that it would take the Japanese at least three months to mule-haul and manhandle enough material to that area to mount a strong land counterattack. The enemy's first counterattack overland in strength occurred four months after our landing, and by this time our defense perimeter was so strong that the Japanese were bloodily repulsed.

One more example of the linkage between strategy and logistics is found in the World War II invasion of Europe. For operation OVERLORD, success depended among other things on two essentially logistic elements—the availability of landing ships and craft and of transport aircraft, and the capacity of beaches and ports in the lodgment area. We were forced to postpone the landing from the fourth of May to the sixth of June 1944, chiefly because of a shortage of certain types of amphibious craft designed to carry both personnel and supplies to the beaches.

From the foregoing and other World War II instances we have developed a keener and wider appreciation of the close connection between strategy and logistics. There is a very satisfying indication of this wider appreciation. The Industrial College of the Armed Forces, for instance, has splendid courses relating to industrial mobilization planning, and stresses in its curriculum the close link between joint logistic planning and joint strategic planning. Also, from a naval point of view it is gratifying to watch the growth of the logistics course at the Naval War College. This was established in 1947 as an 11-month course, has continued annually since then, and has been supplemented by a logistics correspondence course.

Logistics is not a new subject. In the Old Testament, we can recall David, one of eight sons, being sent with corn, cheese, and bread to help his brothers, who were in the army of the retiring, discouraged Israelites. After David arrived, the Philistines sent their champion, Goliath, in advance of their army, and all the Israelites fled--all except David. With a proven logistic supply of stones from a conveniently near-by brook, David took a sling in hand and approached Goliath, who had a shield bearer before him and a mighty sword in hand. David ran toward the Philistine and slung a stone, which hit and sank into Goliath's forehead, after which David took the sword from the dead giant and cut off his head. And when the Philistines saw their champion was killed, they fled.

Logistics has expanded considerably since that date. Perhaps from a naval point of view this can be visualized by the implications inherent in the difference between a fighting ship of David's time and a modern-day man-of-war. In the earliest days, boats were propelled relatively slowly by oars, which were usually manned by slaves. At night each oar-propelled craft was drawn up on the beach by the stern, and the crew cooked and slept on the land. The crew normally numbered but a handful. Fighting was man to man. Today one of our modern aircraft carriers displaces over 36,000 tons, mounts a rapid-fire defense battery, makes over 32 knots, and carries approximately 150 modern aircraft. The ship is manned by a highly skilled team, numbering 2,800. The ship may stay at sea for months, replenished in all essential particulars by naval auxiliaries, and ready to attack an enemy repeatedly at long range from a moving, elusive base. Without this mobile support she could remain in the combat area a relatively short time, and her ability to keep constant pressure on the enemy would be tremendously reduced.

To illustrate the scope and expansion of logistics, let us turn now to examine just one of its factors--movement, or transportation.

We can best gauge the expansion of the transportation phase of logistics if we look back a moment. In 1900--only 50 years ago--there were no airplanes. Automobiles were a novelty and not yet a factor in the transportation picture. Railroads were expanding and were operating about 1,300,000 freight cars. By 1925 the airplane was beginning to be a commercial reality. Planes were flying the mails between New York, Washington, Chicago, and a few other points. Coast-to-coast airmail was about to be realized. The truck industry had gained a slight start, but there were only a few trucks commercially capable of carrying important quantities of goods over any distances. The railroad business had expanded to a point where there were approximately 2,400,000 freight cars in operation, and these were being moved at maximum speeds of 50 miles per hour.

Today the world is criss-crossed by commercial airlines. We travel by air from San Francisco to New York in 10 hours, or from San Francisco to Honolulu in the same length of time. Eight million trucks are in operation, moving over long distances at passenger-automobile speeds; and in size they have grown to a carrying capacity of 80,000 pounds. Railroad-owned and privately owned freight cars now total only two million, but they are being pulled in trains half again the size of 1925 and at approximately half again the speed.

This progress in transportation had a direct and important logistic meaning when Korea was invaded. Planes, trucks, and railroads rushed large stocks of supplies to our west coast ports in order to fill the pipelines of military supplies to the battlefront. The greater part of the logistic supply to Korea had to be sent over 5,000 miles of ocean. In order to get supplies to the Far East, the Navy-directed Military Sea Transportation Service added to its peacetime fleet until it consisted of over 400 ships, the majority of the ships were commercial bottoms. Regular naval auxiliaries augmented this total. In addition, the Military Air Transport Service threw its weight into the problem, using Military and civilian aircraft to deliver key personnel and critical materials to the battle area.

Airlift performed a magnificent job in the crisis. However—and may I say this in all deference—logistic planners (including Air Force planners) realize that as of the present, planes by themselves cannot support combat troops in large distant deployments. It would require over 125 DC-6's flying continuously for 30 days to move as much cargo to Korea as one 10-knot Liberty ship; and, in addition, these planes would take three tankers to haul their fuel for their return trips.

As an indication of the Korean logistic effort, the Navy delivered by sea in three months to our Army, Navy, and Air Force in the Far East over 180,000 personnel, 2,000,000 tons of cargo, and over 7,000,000 barrels of fuel. These personnel and supplies are, in convertible terms, equivalent to a train of 2,000 coaches, 26,000 freight cars, 30,000 tank cars, all loaded to capacity.

The rapidity with which sea transportation was carried out reflects a prasieworthy effort on the part of all hands of all three services. Teamwork in this emergency was outstanding. One such incident preceded the record-breaking 8-day run of the naval aircraft carrier "Boker" from the west coast to the Far East. By persistent labor and long hours the three services rushed materiel by air, railroad, and truck to the big ship. The last Army shell had hardly been loaded aboard before the "Boxer" steamed west carrying a capacity load of over 150 vitally needed planes for the Air Force and Navy, newly developed tank-busting bazooka ammunition for the Army, and hundreds of Army, Navy, and Air Force key fighting men.

Another example was the loading at Seattle in 10 days of an Army regimental combat team and the shifting of shipboard equipment so that a combat readiness training program for the troops could be carried out during the trans-Pacific voyage. The Navy captain responsible in large part for the expeditious and flawless planning of this feat now sports the insignia and title of "honorary colonel" in the United States Army, awarded to him by Lieutenant General Wedemeyer.

The logistic situation at the outbreak of the Korean operation was generally satisfactory from a naval point of view. At Yokosuka, in Japan, we had the use of a first-class naval base. At Sasebo we had the use of another large port. At Pusan, in South Korea, there were excellent port facilities. In back of these, to the eastward, were the United States naval bases at Guam and Pearl Harbor, with trans-Pacific aircraft stepping stones on various islands that had been developed during World War II. In addition, the Navy had sufficient auxiliary ships to form and send immediately to the Western Pacific mobile logistic support forces, which could refuel and rearm the ships of our naval striking forces at sea, thereby prolonging their combatant activities against the invading Reds.

Other phases of logistics for the Korean operation included:

First, procurement of weapons, equipment, fuel for fighting front, and keeping levels of supply adequate.

Second, reactivation of over 300 moth-ball fleet ships and certain shore installations needed to support the ships. In passing, it is interesting to note that the annual maintenance cost of the reactivated Reserve fleet ships has been less than one-half of one percent of their replacement cost.

Third, construction or rehabilitation of military facilities for such purposes as outloading cargo, processing and shipping out military personnel; hospital space for casualties; and provision for unloading at terminal ports.

Fourth, maintenance of equipment, weapons, and facilities.

Fifth, logistic elements in the forward area--including provisions for such necessary support as postal facilities, medical and evacuation facilities, provisions, stores (spare parts, general, medical, dental), clothing, fresh water, personnel distribution, boating facilities, salvage, and recreation.

Why were we so surprisingly ready for Korea? I say "surprisingly" for a variety of reasons. The services had rolled up their World War II

stocks in the Pacific. Elsewhere in that area, and in the United States, we were thin in quantitative strength; and we were getting thinner. We did have, however, personnel in the Regular services and in the organized Reserves who were battle-trained in World War II; we did have some reasonably adequate advanced bases; we did have some World War II reserve materiel; we did have some World War II know-how, and we reacted to bold aggression with all the patriotic energy and productive power that has kept this country alive and powerful.

But I choose to believe that we reacted surprisingly well militarily because we had learned the basic necessity for relating strategy to logistics. We used an organization to carry out our planning that was founded on lessons learned from World War II. Two of the fundamental lessons of that war were, first, that strategic and logistic planning must be integrated and concurrent; and, second, that the determination of requirements for fighting a war and the control of distribution are a responsibility and prerogative of military command.

In the Navy, strategic and logistic planning to meet the Korean situation was concurrent and immediate. The determination of requirements for logistic support of Naval and Marine Corps forces emanated from the chain of military command. General MacArthur's stated requirements and priorities were never questioned, but were filled to the best of our ability.

Action was based initially on logistic planning factors which had been developed for broad, general usage. These were modified to meet the specific circumstances bearing on the Korean operation with respect to type and degree of combat, climate, terrain, and local resources in the campaign area.

Some of the World War II logistic planning factors with which we started may be of interest.

For our Marine Corps, the initial assault troops had to be accompanied by 5 tons of materiel per man, with one ton per month per man supplied thereafter for his continued logistic support.

For our ships afloat, computations were made by types of ships. For example, each destroyer required about 50 tons of stores per month, exclusive of ammunition and fuel oil.

In estimating the number of ships necessary to transport troops and cargo to the combat area, planning factors were 1,500 troops per transport and 10,000 tons of cargo per cargo ship.

Another set of planning factors with regard to personnel applied to initial requirements for sending our Army contingents overseas.

World War II factors indicated that for an average combat division of 17,000 men there should be provided about 5,500 combat support troops, 7,500 service support troops in the rear area, 10,000 in the communications zone, and 20,000 in the zone of the interior--a total of 60,000 men, or more, for each combat division. From World War II we learned that many months were required to outfit and train these troops. Until they were available, we could not place in the field a balanced force capable of sustaining combat operations. Such logistic factors projected into the future limited our strategic capabilities.

Incidentally, in reverse application, the Korean Reds felt the weight of our strategic-logistic strength in our amphibious landing at Inchon. This landing, and the subsequent seizure of the heart of the enemy's distribution system, completely dislocated the logistic supply to his forces in South Korea and quickly led to their disintegration in that area.

Returning to basic factors, I wish to point out that another part of our strength revealed itself in the Korean situation--and this also was an outgrowth of World War II lessons. I refer now to our present national defense organization, which came into being with the National Security Act of 1947, and was amended in 1949. At the highest level, the National Security Council assisted and appraised the objectives, commitments, and risks of the United States in relation to their action and potential military power in the interest of national security, and made its recommendations to the President. The National Security Council might be referred to as the strategic arm of the national defense organization. The logistics arm of the national defense organization, the National Security Resources Board, advised the President concerning the coordination of military, industrial, and civilian mobilization. It is significant to note that the Chairman of the National Security Resources Board, the Secretary of State, and the Secretary of Defense are members both of the National Security Council and the National Security Resources Board, thus providing close and vital liaison between national strategy and national logistics.

At the next lower level, namely, that of the Department of Defense, and headed by the Secretary of Defense, there were the Joint Chiefs of Staff, whose functions include the preparation of strategic plans and provisions for the strategic direction of the military forces, and the preparation and review of joint logistic plans and assignment to the military services of logistic responsibility in accordance with such plans. There also was the mobilization planning agency, the Munitions Board. There were Joint Chiefs of Staff committees, and corresponding agencies of the three services, to assist in the determination of strategy and the logistic feasibility of such strategy. In this national military establishment, strategic guidance is given by the Joint Chiefs of Staff to the Munitions Board and the services.

The "organization chart" then reverses its arrows with the submission of the services' requirements to the Munitions Board. The Munitions Board determines from the National Security Resources Board the availability of national resources to meet the requirements, and then advises the Joint Chiefs of Staff as to the logistic feasibility of their strategic plan. Adjustments are made as necessary in the strategic plan so that the resultant strategy can be carried out with the logistic means available.

Solution of logistical problems in the future will require extraordinary planning efforts as a result of the increased scope of logistics.

We are entered on greater peacetime participation in international military affairs. For instance, negotiations relative to the North Atlantic Treaty and the Mutual Defense Assistance Program create many new problems wherein there is need for concurrent planning. A multiplicity of planning agencies have been created to deal with the international aspects of some of these programs. In addition to the need for these international planning agencies, there also has been, within the nations involved, a realization that logistical planning is required throughout all national military commands.

As warfare and weapons become more complicated, the problems of logistics become greater. For example, for planning purposes, an army uses a total requirement of about 50 pounds of materiel per man per day, which is approximately 1,000 tons for a combat division in a theater. For an air force the total requirement is about 125 pounds per man per day, which is over 300 tons per wing.

In addition to the "consumer" aspects, there is the requirement that planning for industrial mobilization whould be completed long before an emergency arises. Stockpiles of key supplies need to be built up to bridge the time-gap between signing of an order and getting delivery of finished war material. Factories need to be earmarked for wartime use. Supplies must be manufactured and carried to the place where they will be needed. Many of these supplies are intricate pieces of machinery; all of them are needed in quantity.

As we know, but sometimes fail to keep uppermost in mind, lead time--the interval between the decision to provide an item to the combat forces and the time such an item is delivered to combat forces in adequate quantity and in reliable operating condition for use against the enemy--usually requires that procurement be started months, and sometimes years, before supplies are needed.

Thus the logistic supply problem alone places severe limitations on strategic warfare. These limitations are particularly onerous in

the opening days of a wartime emergency. Strategic plans for future warfare will not be able to contemplate any major operations during the first 18 to 24 months of an emergency unless the necessary supplies are on hand at the start, or the production cycle is started well in advance.

Another factor involves our need for outside logistic assistance. The United States has about 6 percent of the world's land mass, about 6 percent of the world's population, and about 60 percent of the world's production capacity. The continental United States, however, is not self-sufficient in all the raw materials necessary to carry on successfully a major war, or to maintain a balanced national economy in peacetime. We do not have, even within continental North America, adequate supplies of raw materials essential to wage a successful war--to manufacture, for example, enough guns, ships, airplanes, or railroad cars. To be certain of having access to these materials, it is necessary that we keep open the seas to the areas from which these materials come. Denial by an enemy of our use of these seas, or destruction of portions of our logistic production potential, would seriously affect our strategy.

The atomic bomb has posed some obvious problems for strategic and logistic planners. We can recall that in the European campaign of World War II the capture of Antwerp, one of the finest ports in Europe, was so essential that it determined in part the direction of the Allied advance. Yet after the port was opened, German V-weapons fell at rates as high as one every 12 minutes, causing grave doubt for a time as to the advisability of continuing the operation of the port. In this day, when atomic bombs could devastate an entire port, planners must develop ways to unload ocean shipping without giving lucrative targets for an A-bomb attack. Coupled with the necessity of keeping ports--both seaports and airports--free from congestion, there must be an improvement of control so that supplies in the theater of operations can be made available when needed. This means that communications facilities must attain increased effectiveness. Also, mobilization of strategic forces will demand corresponding improvement in transportation facilities.

Another problem which undoubtedly will be present in planning for any future military operation will be that of setting a supply level which will afford sufficient logistic support for success of the strategic effort, and at the same time not result in oversupply. Probably this solution will never be ideal. But we all have seen the result of oversupply caused by strategic successes that were ahead of our expectations. In each case there was left in an area huge tonnages of supplies which were critically needed for further operations, but for which neither transportation nor service troops for handling were available to accomplish this movement. One World War II example of oversupply is the fact that only one-third of the ammunition produced was actually used against the enemy.

We will have to plan to face another factor in any future large-scale military operation, one which did not exist during the early phases of the operation in Korea, when we were battling for time before we could take the offensive. I refer to lack of opposition by sea and by air. Had either or both been employed, the United Nations' effort to make its world premiere in armed opposition to aggression would have been seriously handicapped.

These and many other problems require the utmost concurrent planning efforts of both strategist and logistician.

I do not wish to minimize the effect of bold strategic planning and audacious leadership in accomplishing victory without having 100 percent logistic capability. For example, in late 1942 his logistic staff told General Eisenhower that the meager lines of communication in Southern Tunisia would support no more than one armored division and one regimental combat team. Nevertheless, he ordered four divisions, and by prodigious effort they were supplied. Around the globe, in the South Pacific, we can never forget the bold decision forced by Admiral King to capture Guadalcanal, or the leadership of Admiral Halsey in his directive, despite severely strained and badly frayed logistic support, to "Attack! Attack! Attack!"

I wish, in conclusion, to emphasize that logistics envisages getting the right people and supplies at the right place, at the right time, and in appropriate quantities. There is a fundamental of logistics to strategy. Only to the extent that the logistical planner meets the challenge of progress can the strategic planner be freed from restrictions caused by logistical limitations.

I am sure that the higher echelons of all our military services today realize that a knowledge of the principles of logistics is a necessary qualification for command of military forces. The logistician is vitally concerned not only with military planning in preparation for war, but also with exacting responsibilities in the execution of logistic plans, which may well become a controlling element.

It is my conviction that the optimum solution to the problem of providing adequate logistic support is understanding and close coordination between the logistic planner and the strategic planner, and between the logistic officer and the operations officer. Given this understanding and coordination, we will achieve the planning and the execution necessary for national security.

QUESTION: Admiral, this morning we heard over the radio that the morale of the soldiers in Korea is pretty low; that, in fact, our strategic effort there to go up to the Manchurian border was in some

ways held back because of the lack of winter clothing for the soldiers. Was that a lack of planning at the top level, or was the failure to get the stuff there in time a logistic problem? It is an interesting question, probably not a very heavy one; but it would seem that there was some lack somewhere, whether it was a logistic fault or a planning fault. Do you have the answer to that one?

ADMIRAL THURBER: I can only answer that for the Navy. I know that when the Korean operation started, we provided cold-weather clothing for all the Naval and Marine Corps forces that were committed. I am positive that the Army has done the same thing. It may be lack of transportation or rapid movement, where the supply hasn't caught up with them.

COMMENT: An observer has just returned from Korea and reported that all the winter clothing necessary for not only the U.S. Army and the Air Force ground crews, but also for the Korean Army, had arrived in Korea; but that the transportation system from Pusan on up north has been so choked that in some cases--and he left two weeks ago--he predicted that perhaps some of the troops wouldn't have their winter clothing by the time the cold weather hit.

QUESTION: Admiral, I was impressed by your statement that only one-third of the ammunition produced was actually fired. The European campaign had the largest requirements of any one of the campaigns; and we know that all the field artillery ammunition was rationed there very strictly up through 1944 and, I believe, the first couple of months of 1945. I wonder if you would like to tell us where that information came from and a little more about it.

ADMIRAL THURBER: I can only say that it has been very carefully tabulated. It includes not only the Army, but the Air Force, the Marine Corps, and the Navy. I would be glad to send the statistics on that over to the college if they would be of interest to you.

QUESTION: What are the estimated losses in our supplies and shipping during the first 60 days of war, and at what time would we reduce those losses in shipping to a point where they would be negligible?

ADMIRAL THURBER: That is a tough question. We do have merchant ship loss factors which applied to World War II that we use as planning factors at the present time. However, they do not as yet take account of the A-bomb. That is a question that is rather difficult to analyze, because, while it would be possible to use the A-bomb against shipping, would it be profitable?

QUESTION: It appears to me from several examples that you gave that the logistic planners have a tendency perhaps to overestimate requirements and to underestimate the logistic ability to support strategic plans. Your example of General Eisenhower's experience in Africa would indicate that. Do you think that the logistic planners are inclined to be somewhat more conservative than the strategic planners?

ADMIRAL THURBER: Having been both, I don't think there is an answer to that. I think perhaps it is in the back of everybody's mind that we want to get the supply of everything to the people who are doing the fighting in adequate amounts. There are so many factors that change--loss factors of shipping, aircraft, loss after arrival in storage, and loss in local transportation. The responsibility of the fellow on the logistic planning level is a pretty large one. However, I think also that we probably will oversupply to some extent, on account of losses and the desire to get the weapons to the man in the front. I am sure that we will always have an oversupply, which will be left behind. However, if you want to undersupply in the face of so many factors the particularly fast-moving war that we will be facing in the future, I don't want the responsibility.

CAPTAIN DAVISSON: Admiral Thurber, in behalf of the Commandant and faculty and the student body I thank you for a very interesting and instructive lecture and discussion.

(20 December 1950--770)S.