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**NAVAL WAR COLLEGE
REVIEW**

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TRANSPORTATION

A lecture delivered
at the Naval War College
on 15 October 1956 by
Professor Ernest W. Williams, Jr.

I am very happy to be with you this morning to try to give you a quick overview of American inland transportation, with some particular reference to its relationship to mobilization planning and to the requirements of war.

As I have a very great deal of ground to cover, I am going to have to do it in a way that will touch merely the highlights and which possibly, while leaving with you a general impression, may also fail to make some particular points. In those connections, I will certainly be happy to deal with what questions you may have after the formal presentation is over.

Transportation is an economic function, and an extraordinarily important one. It has the object of creating place and time utility by the moving of goods or of persons from the places where they may be to the places where they may be required for some purpose, either economic or otherwise. It creates time utility as well as place utility because the speed with which movement can be accomplished, and the timing of the arrival at destination, may be particularly significant in certain kinds of conditions.

As an economic function, transportation has its significance as a part of the production chain in the movement of goods. Our transportation system is such an inherent part of our production system that in a way it is an integral part of our production lines. That can be readily seen in the automotive industry, in which, since we have decentralized the assembly of automobiles, we have in effect set up assembly plants which receive directly from rail and truck transportation and are dependent upon the daily arrival of them for their continuance of production. Both the timing of

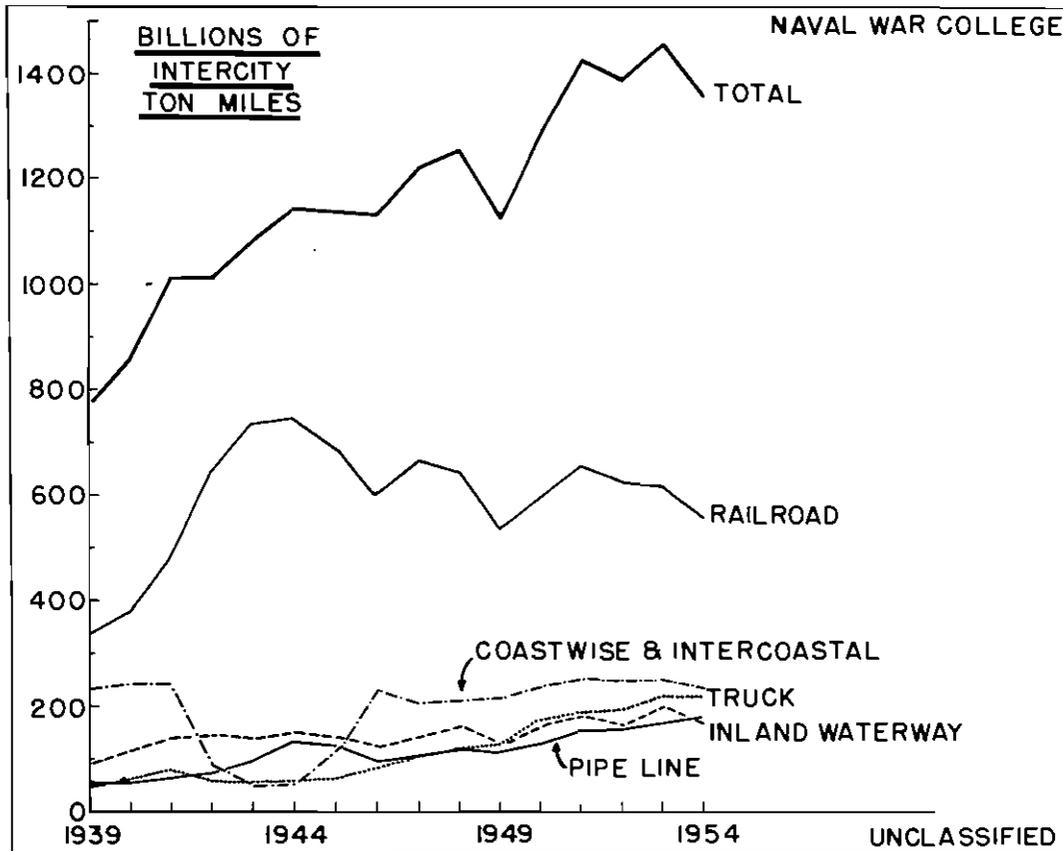
arrival and the security of arrival, therefore, become of the greatest significance.

Transportation in all of its aspects here in the United States is also one of our largest, if not our very largest, single industry. In a normal year, it generates something like one-sixth of our entire gross national product; that is, taking all types of transportation into the reckoning. It is an indispensable thing in any kind of an exchange economy which is based upon the proposition of specialization in production, taking advantage of the raw materials that are available — and the best of them in particular locations — assembling them in large quantities, using the techniques of mass production to produce very large quantities of standardized items at particular places, and then distributing them over the country or over the world, as in the case of the markets of some such items.

It logically follows from that that transportation is a most significant part of an economy in wartime. If anything should occur which would substantially diminish our capacity to transport in the domestic field, we would find that we had been dealt a staggering blow, since the production economy upon which we rely for the equipment and supply of our military forces and for the maintenance of a country with good morale and under good conditions to support the military forces depends so deeply upon the availability of efficient, effective and adequate transportation.

I want to comment very briefly on the nature of our transportation system. We have in the United States a remarkably complicated system of transportation; one that is made up, more than that of any other country of the world, of a group of competing transportation industries. We have not what we really could call a "single integrated transportation system," but we have a series of transportation systems. These operate in competition with one another and their status with respect to one another, and with respect to the total, is changing from year to year.

(SEE CHART)



What we are showing on this chart is the intercity ton-miles of freight transportation produced in the years that are shown at the bottom of the chart by all forms of transportation and in total. The ton-mile is simply one short ton moved one mile in domestic transportation. You can see that the total has been a rapidly-rising one over the period from 1939. You will also notice a heavy bulge during the last war. But, contrary to what might have been expected, as our economy continued to grow and to enjoy remarkable prosperity in the post-war period, the growth of total transportation has also continued with only a few noticeable dips.

Now, transportation is composed of a series of different elements. The railroad remains our most significant method of moving freight domestically. As you will observe, it accounts for a little less than half of the total ton-miles produced in intercity transportation. It has been declining, as will also be apparent from this chart, and its general trend in the period since the war has been a declining trend.

On the other hand, we have had a considerable growth of other forms of transportation. For example, you will notice that our truck transportation, which stood at a very low level at the beginning of the last war, has multiplied. In view of the fact that we had to show here on a single scale types of transportation that contribute much less than does the railroad, representing a small part of the total, these trends do not show up quite as clearly as they would on another form of chart, if that were feasible. Nonetheless, you will observe that what has happened is more than a tripling of truck transportation since 1939.

You will also observe that our pipeline transportation has grown very considerably, as an incident to the growth of the petroleum industry.

Our inland waterway transportation, while it shows somewhat of an element of stability, has nonetheless been growing a bit. Particularly one element of it has been growing quite rapidly

in recent times: the transportation on the river systems, and, especially, the Mississippi River system. But in view of the fact that the Great Lakes transportation has not exhibited a similar growth, the total does not show up to quite so great an advantage.

I would call your attention at the time when we have the chart before us to what happened during the Second World War to coastwise and intercoastal transportation. I shall say a little more about that later, but you will observe that it came very close to disappearing. You will also notice that our truck transportation went into a considerable decline during the war period. By the same token you will observe, and perhaps should notice now, the very great bulge in railroad transportation that characterized the Second World War. I will have something further to say about the reasons for that as we go further.

This picture will indicate for you vividly how transportation is divided: about one-half, or slightly less than one-half, by railroads; the other one-half is made up of a series of four major types of transportation. One notable omission in the chart is that of air transportation. We are showing here commercial ton-miles of freight transportation. Up to the present time, our domestic air system is moving only about one-half of one per cent of the total ton-miles of intercity freight. Hence, as it would hardly have shown up on this chart at all, we did not include it. On the other hand, as you will appreciate, such traffic as is moved by air in the regular domestic transportation system is ordinarily traffic of exceedingly high value and traffic with respect to which the time element is exceptionally pressing. On occasion, we move almost anything by air when it is necessary to accomplish the transportation with sufficient dispatch.

As a comparison, we may make a transcontinental shipment from New York to San Francisco by railroad under good conditions in six or seven days, depending upon the route; we may make the same shipment by truck in five days; we may make the

same shipment by air in a single day. Where that speed of transportation is essential, then we endeavor to meet it through the medium of air transportation. For that same reason, in a period of war air transportation will become an especially significant element in the transportation scene. It will also become a matter of difficulty, because of its limited capacity, to determine who, and under what circumstances, will have the right to use it.

Each one of the forms of transportation which we have just noticed in their relationship one to another has a quite different set of economic characteristics; that is, the cost of producing transportation and the nature of the service in transportation that it can produce. So they tend to be used for different aspects of the transportation job. I want to say just a few things about that because I think there are a number of misconceptions as to what transportation of particular types can do.

Our truck transportation, for example, is producing around 225 billion ton-miles of freight transportation a year as compared with a railroad product which exceeds 600 billion ton-miles. Yet, the monetary reward which the trucking industry secures for that performance exceeds gross railroad freight revenues. That will indicate to you at once that as a general rule the character of truck freight is altogether different than the character of railroad freight.

The railroad industry is a method of producing cheap mass transportation; it is a way of creating ton-miles in large lots quickly and economically. On the other hand, truck movement is much more flexible; it is accessible to many points in the country which are not reached by rail; it is possible to move by truck directly from plant to consumer, door to door, regardless of whether there is any connection with a railroad or not. Once one has loaded a truck, one has there the line-haul unit in which the movement is to be performed. Consequently, a truck can depart immediately from the place at which it is loaded and move to its ultimate destination.

The railroad, on the other hand, achieves its economy by making up large trainloads, which, with the advent of diesel power and the shift to that much more capable power on the railroads, means longer and heavier trains; consequently, it means more cars to be assembled in yards. We have, therefore, an element both of delay and of expense. It is an element which nonetheless provides the means by which the railroads, through assembling large trainload lots, can achieve a remarkable economy in the movement of freight traffic.

Roughly speaking, it costs about three times as much to do an equivalent job by truck as it does by railroad. On the other hand, many jobs are adaptable to truck transportation which are not adaptable to railroad transportation. Hence, we find that truck transportation has been growing in competition.

By comparison, inland water transportation on our rivers and on the Great Lakes is even more economical than rail transportation. It tends, however, to be a highly specialized form and fits into particular situations. It does not provide in any sense a nationwide transportation service and in good part must work in conjunction with another form of transportation: that is, it must be fed by rail or by truck and distributed by rail or by truck. Hence, there are involved breaks-in-bulk, as we call them, or transfers from one type of transportation to another, a proposition which is always expensive and time-taking, and, therefore, something to be avoided as frequently as that can be done.

I should point out that in normal times military use of transportation does not differ greatly from civilian use. The distribution of traffic in peacetime by the military services bears a fairly close relationship to the distribution of all traffic, with perhaps a heavier use of air transport and of truck transport than is characteristic of the whole transportation picture. The military services buy their transportation by having in mind much the same considerations as any civilian firm would have in mind. They buy on

the basis of the prices of the transportation service, or what are called "rates," and they buy on the basis of the quality and character of the service which they can get. Consequently, it is natural that there should be a close relationship between what the military services buy and what the civilian economy buys.

However, there is something that should be observed because it is very important for our consideration of transportation in wartime: the rates which are charged by carriers for transportation service are not based upon the cost of producing the service in any direct or obvious way. In fact, they depart very considerably from the costs of performing particular transportation movements. A person who is purchasing transportation does so on the basis of the rate that he finds in the tariff or that the carrier is prepared to charge him, and on the basis of what he knows the carrier will be able to do in producing a transportation service. Those rates are perhaps based more upon the value of the service than they are upon the cost of the service. In any event, they depart very considerably from the cost of producing particular transportation services.

For instance, in the matter of rail rates there is a situation where the carload rate on ammunition in carloads is about six hundred times the direct cost of producing the service. In comparison, carloads of oranges, grapefruit and various agricultural products are moved at less than the direct cost of producing the transportation service. It is difficult to see much direct relationship between rates and costs under those circumstances.

In peacetime, there is a situation where the rates of motor carriers for producing those transportation services for which they compete with railroads are virtually the same. They are often the same as the railroad rates, even though the costs are sometimes quite different. Accordingly, a great deal of traffic moves by motor carrier at that type of rate which is in fact moving at a greater cost of producing transportation than would be the case if it moved by railroad or by some other form. However, the rates

being equal, a purchaser naturally prefers the more flexible service that he can get from a trucking company.

In shifting to a mobilization scene, however, the following fact is confronted. In time of war, we are concerned less with the proposition of monetary costs and relationships than we are with the resources that are consumed in producing transportation; i.e., how much fuel and how much labor does it take to produce a given quantity of ton-miles within a range of time that is acceptable? When we enter into that position, we find that motor transportation or movement by truck, upon which we are coming to rely more and more, is notoriously expensive. It makes a heavy drain upon manpower; it makes a heavy drain upon fuel; it makes a heavy drain upon maintenance. In fact, the monetary cost of producing transportation by truck is a fairly good index of the fact that it is more expensive in resources, which resources may be critical in wartime. Hence, the fact has to be contemplated that what is a peacetime trend may be highly undesirable from the point of view of what it is necessary to do under wartime conditions.

I might also point out that in part the development of our peacetime system of transportation is affected by a great deal of government policy. We have the regulation of transportation, yet we do not regulate all transportation: we regulate railroads; we regulate some of our trucking and bus operations; we regulate some of our water carriers; we regulate our pipelines. Roughly, 90% of our water transportation is unregulated and something like 50% of our truck transportation is unregulated. Where transportation is unregulated, it is perfectly free to charge what it sees fit and to conduct business as it sees fit, without publishing rates and without advertising in advance what it will do for the public. That transportation is a serious threat to the regulated portion of the transportation system.

What you see happening to the railroads is in part the result of the great increase in unregulated transportation, which is having an impact upon them. The railroads find this very difficult

to meet because of the fact that they are working in a regulated context which does not permit them to change their rates except by publication on thirty days' notice. It also does not permit them to do many other things which might be very helpful in meeting that kind of competition. If they had had that freedom, it might have resulted in my chart showing a slightly different picture.

Moreover, the Government of the United States, and of the individual states, extends certain aid to various types of transportation. For example, our inland waterways are improved at the expense of the Federal Government. They are toll-free, there being no charges for the use of them, nor are there any charges therefore directly to compensate the Federal Government for the investment made. In consequence, the carriers on such inland waterways derive a certain advantage as compared with railroads, which are compelled to provide their own rights of way and to pay the entire expense of conducting transportation. We do not, therefore, get an entirely correct economic picture if we merely look at what it costs a barge operation to move on the inland waters; that is, we do not get a true picture of the entire expense of performing that transportation. The amount paid by the Government of the United States for improvement does not affect the rates which the barge line may charge.

We also have an element of subsidy in our air transportation system. This has been a part of our policy for long years for: (1) having a reserve of airlift that would be useful under military conditions; and (2) promoting the mail service and commerce of the United States. Undoubtedly, the subsidies which have been accorded to airlines in the form of mail pay have had that effect. In addition, of course, the airway system itself is maintained by the Federal Government without charge against the airlines. These subsidy elements, to the extent that they exist, do have their effects upon the way in which traffic distributes itself among types of transportation in peacetime.

I want to spend the greater part of our time in considering transportation under mobilization conditions. For purposes of convenience and exposition, I am going to break that subject into two separate sections. First, I want to discuss with you mobilization, and the role of transportation in it, in the condition under which the United States is *not* the object of attack; that is to say, the Continental United States has not been subjected to air or other attack and essentially, therefore, is working under the kind of conditions that we encountered in the Second World War. Under those circumstances, there is a series of events that presents a good deal of difficulty from the transportation point of view. We might easily have the same series of events another time that we had in the Second World War. In any event, let me point out what that sequence of events was and leave it for you to judge whether there is a risk of a recurrence in the case of full mobilization to support a full-scale war under conditions which left the Continental United States free from attack.

In the normal course of transportation, we have very important movements that are difficult to sustain under the conditions that I have just outlined. We start in with a full mobilization period of that kind by pushing our economy into high gear. We push up our gross national product; we extend the working week in our factories, and so on. The result is that the volume of goods that is coming out of our factories is enhanced. Consequently, their chewing-up of raw materials is likewise enhanced. All of those things result in an increased demand for freight transportation. At the same time we are building military forces, and, in connection with that build-up, we are greatly increasing the volume of passenger movement that must be made over our transportation system. So, in the aggregate, the demands become very heavy.

At the time that this occurs, we ordinarily run into trouble with respect to some of the types of transportation. Take our trucking system, for example: it is nationwide; it serves every

part of the country. As we observed a little earlier, it does about one-third as much volume of business as the railroad industry in normal times. On the other hand, it is a very difficult kind of business to maintain under these full mobilization conditions to which I refer. That results from the fact that the great majority of all trucking companies are very small organizations. They are owner-operators, or owners of just a few vehicles. It frequently occurs that the men so engaged are drawn into much more attractive employment in wartime. Some go into the factories; perhaps some of them go into the military services. But, for whatever reason, large numbers of those trucking organizations disappear and cease to be a factor in the market for transportation.

In addition to that, we characteristically run into difficulty in sustaining even what is left of our trucking operations. In the last war our problems were associated largely with the shortage of heavy truck tires, which represented a limiting factor and also concerned the question of our ability to supply repair parts adequately and in proper composition. But, for whatever reason, there is a risk that we may lose something in the neighborhood of 40%-50% of our truck transportation mostly by plain natural disappearance under these circumstances. Thus, at the moment that our transportation demand is greatly increasing, we may expect a reduction in supply by this particular method.

Secondly, it is noteworthy that in peacetime we have a very heavy movement in the coastwise service, and, particularly, in petroleum. The bulk movement of petroleum in both crude and refined products is from points on the Gulf Coast, these largely being from Houston, Texas City, Galveston, and Baton Rouge, around the Florida Capes, and then to the various destinations on the Atlantic Seaboard. In normal times, it runs at something like 1.5 million barrels per day by ocean-going tankers.

Our experience with that kind of transportation has two important aspects. Early in our own involvement in the conflict of

the Second War, it became difficult — and, indeed, impossible — with the forces then at our disposal to protect that movement adequately against submarine attacks, particularly on the Florida coast and along the New Jersey coast. In consequence, it was necessary to take those vessels off of the coastwise run. By the time that the submarine menace was in better shape, our need for those tankers elsewhere — that is, on the over-ocean routes to supply expanding military forces in other parts of the world — had become so great that we could not restore any considerable part of that movement. In consequence, we had a very large movement to be substituted.

We happened to be able in the Second War to organize a movement by rail. From points in East Texas, Louisiana, and all the way up into the Northeastern Seaboard we had at that time a large surplus of petroleum tank cars. So we established a symbol movement in solid train loads, and we got the volume by rail to in excess of 800,000 barrels per day. We later substituted two long pipelines — a 24" and a 20" line — over this same route, with termination on the Eastern Seaboard, and in that fashion took care of the petroleum problem. But the shortage in this area was the result of a transportation deficiency and not the lack of petroleum supplies.

That same sort of thing could easily happen to us in another mobilization situation. There are, however, two differences today: (1) we do not any longer have the fleet of tank cars lying around idle which we could place into service for this purpose and, hence, an emergency rail movement of any size would be out of the question; and (2) the pipeline net has been greatly strengthened and we are in the position of substantial surplus pipeline capacity as far east as points in Ohio, in addition to which we would be in a position to convert one of the war-built pipelines back from natural gas into petroleum and by that process considerably expand the supply into the northern district.

Another thing to be considered is that we normally have intercoastal transportation from the Puget Sound points to California points, through the Panama Canal, and to various points on the Eastern Seaboard. That line is back in service, having been interrupted during the war, and it would be expected that it would be interrupted again for the reason that the vessels would be more urgently needed elsewhere than on this run.

What you learn from the above is that, with the exception of our inland water transportation and our railroad transportation, the other forms threaten to decline in carrying capacity. In the case of coastwise and intercoastal water transportation, they conceivably would be almost wholly eliminated under these conditions.

There is only one place for the traffic to go, and that is on the railroads. It is in connection with the railroads, therefore, that we have a problem which requires somewhat drastic emergency measures under wartime conditions. The crux of that problem is not that we do not have enough railroads in the United States, nor that the terminals of the railroads are in any sense inadequate, nor even that the available motive power is inadequate. The one place at which we get caught is in a shortage of freight cars. Even though we will utilize those freight cars more intensively under mobilization conditions than we do at present, we have a prospective shortfall under the conditions that I have described of something like 300,000 cars in comparison to a total freight car population of roughly 2,150,000 cars. As you may understand, it would be very difficult to build freight cars in any large number while we are busy trying to build and supply our military forces and to carry on in a wartime situation.

This first state of mobilization, then, tends to catch us with our transportation system overloaded. There is a necessity, therefore, of taking such measures as might help us to get the most possible utilization out of the plant that we have since it is difficult, if not impossible, to expend it in wartime.

However, when we come to a consideration of mobilization arising from, or accompanied by, an attack upon the United States with atomic weapons in a considerable number, then we find ourselves faced with a different set of circumstances. I want to spend perhaps a little more time with this than with the first set of conditions because we are more earnestly interested in being prepared against this aspect at the present time.

Let me point out that in a mobilization that would occasioned by attack upon the United States, or that might be followed by attack upon the United States, we need to consider the vulnerability of our transportation system itself to atomic attack; we need to consider the results which such an attack might have upon our transportation facilities; we need to face up to the question of whether we would, after an atomic attack, have the quantity and character of transportation that we would need to carry on the war, or whether it might be an element which, if dealt with severely in such an attack, would result in our having lost the war from the absence of a very important supporting element.

From this point of view, our transportation system is a remarkably strong one. It is an extraordinarily lush system of transportation. For example, we have some 235,000 miles of railroad lines in the United States. We have had a competitive development of railroad transportation, such that between all important places in the United States we have large numbers of routes.

Suppose we were concerned, for example, with the movement from Buffalo to New York City. Of course, we would think of the New York Central, following this line as the logical rail route. We must recognize, however, that there is also the Lackawana; there is the Lehigh Valley on a different layout; there is the Pennsylvania, coming down through still another route; and there are connections via the B&O to the westward. In short, there are large numbers of routes that we can make even between places so close together as Buffalo and New York.

In addition to that, we have upwards of 5 million miles of highways in the United States, a large portion of which represent hard-surfaced, improved highways over which we can conduct transportation by truck with great flexibility. Therefore, we have a system which in large part, because it developed competitively and because the railroads in competing with one another tended to parallel one another and to open competing routes between different places, has in it a remarkable variety of alternatives in the event that anything happens to deprive us of particular gateways.

We can imagine any number of attack patterns that might be chosen by an enemy and used in attacking our system of transportation, or our economy. The nature of our transportation system makes it a very difficult target system; that is to say, an extraordinary weight of missiles would be required to reduce our transportation capacity to a point that would be critical. In consequence, it is perhaps somewhat unlikely that the transportation system *per se* would be selected as a primary target system. Of course it is always likely that the objective of an enemy air force will be our own air force capability, our own retaliatory capability and our military capability in general. If, however, the attack pattern should happen to be designed at our air power, then it would produce — as an ancillary result — very considerable difficulty with respect to domestic transportation. If, on the other hand, it is designed as an attack against population, in which the weight of the attack is put down on the major cities — on Chicago, on Detroit, on Buffalo, on New York City, and so on — that also will give a good deal of difficulty with respect to the transportation system.

Many other attack patterns that might be designed for some parts of our industrial production or manufacturing industry would likewise give trouble with transportation. What seems to be characteristic of most possible attack patterns, however, is this: while the transportation system would sustain a great deal of damage and would be restricted in its operating capability,

it would usually suffer less damage than would the other elements of the economy which produce the requirements for transportation, or, in other words, those elements that produce the traffic. So, in the normal course, we would end up by being rather better provided with transportation than with some other things. I do not mean to deny the possibility that the transportation system could be attacked in such a way that it would be the limiting factor on our economy. I merely say that if the target itself is something other than transportation, then the ancillary effects upon transportation are not likely to be as great or as crippling as the effects upon the element that is directly chosen at the target system and upon such other things as our general production economy, which produces the requirement for transportation in greater part.

I have looked at a number of various target patterns and in almost all of them, so far as the physical damage is concerned, there always remains an interconnected system of railroad transportation; that is, there are always some ways of getting around by railroad all of the places that have been put under attack. Naturally, there are certain elements that are more vulnerable than others. But some of those elements themselves are very difficult to deal with by any attacking force. In consequence one may say — at least, from the point of view of physical damage — there are excellent chances that our transportation system will tend to survive through its own inherent flexibility.

Let me point out just one or two aspects of that fact for you. Not only is our route system extraordinarily well developed, embracing, as it does, very large numbers of possible detours — both by highway and by rail — but also the plant with which transportation is produced is a much more dispersed plant than is true of most industrial systems. If you think of the iron and steel industry, that is something which is enormously more concentrated than transportation. If you even think of the petroleum industry, that is something which is much more concentrated than transportation.

The equipment with which transportation is performed — the freight cars and the locomotives in the railroad service, the trucks and the facilities that maintain them in the case of motor transportation — is widely dispersed and scattered over the country. Where we will suffer in transportation is not from the physical loss of motive power, not from the carrying capacity in the sense of freight cars or trucks, or of vessels. Where we will suffer is in the limitations placed upon circulation. So, while I say with one breath that we can survive a great many different patterns of attack, and while we find that we have a transportation system that is still an interconnected nationwide system, nonetheless its capacity will have been reduced. What will have been reduced is the ability to move over the lines of railroad and to move over the highways, but it will not be in the equipment with which that movement is to be accomplished. What becomes critical, therefore, is the routes open and available to you and the speed at which you can restore those routes that have been interrupted or disrupted.

I do want to make a very brief contrast between that situation of ours where we may get a reduction in capacity of 30%-40% in the circulating ability of the transportation system because of what happens in the way of the blockage of major terminals and points through which the traffic normally moves and what might well happen in other parts of the world where the system is not a competitive system like our own.

I understand that Professor Holland Hunter was here a little while ago talking about *Soviet Transportation*. Of course Soviet transportation is primarily rail transportation. Indeed, roughly 90% is rail if you leave the trucking out of the picture on the grounds that it is nothing more than local cartage — something which we do not include in our own statistics. It is conducted on a remarkably simple system. You will have heard what the mileage is, so you can compare it with our own mileage on a considerably smaller land area. If you look at that system on the

map you will find that, while it is of some complexity in the Donbas and in some other limited sections of European Russia, for the most part it is a very simple noncompetitive system and with comparatively few detour or relief routes. Such a system is naturally enough so. Any planned system of transportation that was not built up under competitive circumstances that tend to produce an overcapacity and an excess of routes would tend to be much more vulnerable to attack conditions than would one that is as lush in its layout as our own. That, then, is a very strong point.

Let me observe, however, that one possible weakness in our transportation system (and perhaps in any transportation system) is the port system through which transfer must be made between ocean and land. As a general rule if we are faced with atomic attack, and we find that what has happened is that a number of weapons are laid down on our large population centers which are also our industrial centers, we are not too much strapped from a transportation point of view. This is because we have destroyed the demand for transportation at the same time that we have destroyed the local capability of transportation and we have not interrupted the nationwide system.

On the other hand, a great many of our large cities are also large ports on the seaboard. We rely upon these for the transfer function between ocean and rail and truck. We are therefore faced with the fact that a number of target patterns would give us an enormous quantity of trouble in the ports. Therefore, the port situation can easily become a critical one. That is perhaps more true of the Pacific Seaboard than it is of the Atlantic, although much depends upon how the attack is laid down and how successful it is — both in planning and in execution — and whether or not its objective is to interdict our ability to transfer between rail and ship. We are in the happy circumstances of having a large number of smaller and intermediate ports which give us a good deal of relief capacity, although they have their own limitations with some of them being rather severe ones.

The relatively happy picture that I have just been painting for you of strength in transportation as compared with other things may be somewhat modified when we come to consider what could happen under a modern atomic attack in which we have to cope with the problem of radioactive fall-out. Of course that situation can produce a condition in which there is still a good transportation system, from the point of view of it being there physically. The tracks are still there, the cars and locomotives are still there, the highways are there, the bridges are still in, and so forth, although the missiles that have been dropped have caused interruptions and have done physical damage at the particular places where they have come down.

On the other hand, what turns out to be the most limiting circumstance is the personnel because the effect has been to deprive the transportation system of more manpower than of anything else. With surface bursts of modern atomic weapons and because of the radioactive fall-out possibilities it begins to appear that perhaps the personnel in the transportation system, as well as in the production system, becomes the most vulnerable single element.

For example, we may have a condition where we have a number of bursts placed at points along the Great Lakes. There are a number of logical targets that might appear in some target systems, and they might have successful drops: perhaps on Chicago, Toledo, Cleveland, and what not. The pattern of winds in this territory is frequently such that the resulting radioactive fall-out will disperse itself over large parts of the country, often in the southeastward direction or east-southeasterly, and some times more directly eastward. The effect of that is to place across the major transportation lines in the eastern district, which are east-west lines transiting this whole territory, a fall-out of such intensity as to prevent the working of those lines of transportation for an extended period of time. Depending upon the intensity and the rate of decay, that may be a very long time or a relatively shorter time.

Again, in the West Coast area it is not impossible to conceive that the Los Angeles basin area for one reason or another, whether it is concentration of aircraft industry or for other reasons, might be a logical target center. Very frequently the effect of ground bursts in that area will tend to be a radioactive fall-out that is of high intensity and that goes for long distances up across the Mojave Desert and up into the Rocky Mountain country. That would seem to do little violence to anything except for the fact that the lines of transportation into southern California, both rail and highway, cut across this same area and become inoperable because of the inability to protect personnel while the fall-out is in its highly intensive stage.

You may then encounter, *first*, a condition where, although the physical situation is not too bad in the sense of facilities and routes, nonetheless, because of the want of an opportunity to operate safely and to avoid exposing your personnel, a considerable delay occurs before any significant through transportation can be operated where this kind of extensive fall-out is experienced; *secondly*, a situation where, although the personnel may be perfectly safe from loss because of blast in the greater part of the operating centers of the railroad, trucking, or water carrier industries, nonetheless in areas representing perhaps thousands of square miles they are exposed to an intense radioactive fall-out which requires them to seek suitable protection — and in the absence of which protection they are lost. We are coming to appreciate, therefore, that the question of protection of personnel is becoming perhaps even more important than the question of the availability of facilities because it might easily be the most limiting factor.

Let me say just a few words in closing about what has been going on as far as the Government is concerned with respect to preparing to deal with wartime transportation conditions. I think we have learned a few lessons. By the time the Second War occurred, we had learned some lessons from our experience in the

First War. We had a much stronger transportation system and a stronger support for the whole military activity in the Second War than we did in the First War. We are now trying to adjust our planning and the circumstances of our preparation to the quite new set of affairs that faces us. In doing that, there has been developed in the Government a plan for the organization of the transportation agencies and industries in wartime in order to marshal them for the most effective service under emergency conditions.

Those plans, originally developed between 1948 and 1950, have been undergoing extensive readjustment as a result of the change in our outlook with respect to the possible effects of atomic attack on this country itself. But, briefly, there has been planned and laid out a War Transport Administration which would control all of the civilian transport industries in time of war. That would include the Merchant Marine and Civil Aviation as well as railroad, truck, and surface water transportation within the United States. That is a new departure, for we have never done that before. It particularly recognizes the fact that under conditions where the nation itself may be under attack the coordination between shipping and the land agencies of transportation in the ports becomes much more important than hitherto. It also recognizes that we cannot rely on the relatively informal committee system of effecting a coordination which we used in the Second War. If we are caught with a shortage of port capacity we will then be in a position of needing much more drastic and immediately workable medicine than any committee of claimants for ocean transportation, with its slow-going method of monthly allocation. So our thinking has advanced a great deal along that particular line.

Again, we are developing the concept that this organization which brings all forms of transportation under a single policy guidance must be equipped with a thorough-going regional organization. In the event that an attack disrupts our communications in such a way that a central control becomes impossible,

we are not left without immediate centers of control throughout the country. We are not therefore deprived of an ability to transport and carry out policy objectives with respect to transportation in any section of the country merely because the top control, relocated from Washington, is for the moment not in contact therewith.

There are, then, a number of changes in the planning circumstances. It is, however, most encouraging that all of the Federal agencies which are concerned with transportation (and there is an extraordinary number of them) are agreed upon the general shape and form of the wartime organization. That wartime organization is not merely laid out on paper. It is in the position where: (1) constituent agencies are known; (2) the elements of which it would be composed are identified; and (3) were such an emergency to occur, these elements would be brought together immediately under a leadership which has been nominated. Of course they would be required to be built up, but, in any event, the nucleus is there.

Now, gentlemen, that completes what I wanted to say in a formal way and I think that perhaps a recess is in order, after which we may have some questions.

BIOGRAPHIC SKETCH

Professor Ernest W. Williams, Jr.

Professor Williams received his B.S., M.S., and Ph.D. degrees from Columbia University. He entered government service in 1940 as an economist on the Natural Resources Planning Board, charged with editorial supervision of the study on *Transportation and National Policy*. In 1942, he transferred to the War Production Board as Program Bureau Analyst, reviewing the requirements of domestic transportation agencies for scarce materials.

In 1944, Professor Williams joined the Department of State as an assistant to the United States Commissioner to the Conference on European Inland Transportation at London. The following year, he became Chief of the Transportation Division, United States Strategic Bombing Survey, for both the German and Japanese surveys, and also served as a consultant to the Air Force Evaluation Board in France. Later in 1945, he joined the United States Bureau of the Budget as a fiscal analyst of transportation organization and policy matters.

Professor Williams then joined the teaching staff of the Graduate School of Business at Columbia University, where he is presently Associate Professor of Transportation. Since 1947, he has served as a consultant to various United States Government agencies, including: The Bureau of the Budget (1947-1948); The First Hoover Commission, Task Force on the Regulatory Agencies (1948); and the National Security Resources Board (1949-1950). Since 1951, he has been Transportation Consultant to the Office of Defense Mobilization, and since 1955 he has been a member of the New York State Metropolitan Rapid Transit Commission. During 1954 and 1955, Professor Williams was a member of the Task Force for the President's Advisory Committee on Transportation Policy and Organization.

MSTS OPERATIONS

A lecture delivered
at the Naval War College
on 16 October 1956 by
Rear Admiral Roy A. Gano, U. S. N.

Admiral Robbins, Staff and Students of the Naval War College,
and Distinguished Guests,

It was with a very real pleasure that I accepted Admiral Robbins' invitation to speak to you gentlemen here today about the Military Sea Transportation Service and the part it plays in providing logistic support world-wide for the military operations of the Department of Defense. Although the Military Sea Transportation Service has been in existence for over seven years, I still encounter some naval officers and naval activities who are not aware that MSTS is a naval command or how MSTS goes about accomplishing its mission.

I will make this presentation in three parts. First, the historical background which brought about the evolution of MSTS; secondly, the why's and wherefore's of MSTS; and, thirdly, the major aspect of its day-to-day operations.

The concept of MSTS is something new — the functions of MSTS are as old as history. As long as man has fought wars across large bodies of water, someone has had to transport the supplies and personnel across that water. As far back as the Phoenicians, the Romans and the Egyptians, some organization provided the ship bottoms and controlled the movement at sea of those ships. The United States first realized the need for this type of service in the Mexican War. Prior to that time our military operations in the Revolutionary War and in the War of 1812 were primarily continental wars, except for self-maintained men-of-war at sea. The Mexican War was the first and last time that

the United States has enjoyed a flourishing merchant marine adequate to provide the ships and crews necessary to carry out this type of operation. At the end of that war, it is interesting to note that the Quartermaster General sent a memorandum to the Secretary of the Navy suggesting that the Navy assume the responsibility for providing all ocean-borne transportation for the Armed Services. A century later, and after four major wars have been fought on both land and sea, this memorandum was put into action. This concept of a single organization charged with the responsibility for all ocean-borne transportation was brought into being by the establishment of the Military Sea Transportation Service in 1949. It was accomplished by actually transferring the ships and personnel of the Army Transport Service and the Naval Transportation Service to a new organization created within the Navy.

(CHART)

MISSION

The mission of this new organization is to provide sea transportation for personnel and cargoes of the Department of Defense. It is important to remember that MSTS can **not** carry cargoes for any other department of the Government unless it is deemed in the interest of national defense or by Presidential order.

Secondly, the mission is to plan and negotiate for the use of commercial shipping to augment the MSTS fleet as necessary to meet total requirements. In peacetime, as well as wartime, it was never conceived that MSTS would ever provide *all* of the shipping necessary to move *all* of the military cargoes. It was always intended that the MSTS nucleus fleet would carry only a small portion of these cargoes and the remainder would be carried in the merchant marine. During peacetime, the procurement and contractual arrangements are handled far better through a single organization. In wartime, the absolute control that a single organization can exercise over a large number of ships carrying

BRIEF OUTLINE
MSTS MISSION

**TO PROVIDE SEA TRANSPORTATION FOR
PERSONNEL AND CARGOES OF THE
DEPARTMENT OF DEFENSE**

**TO PLAN AND NEGOTIATE FOR USE OF
COMMERCIAL SHIPPING TO AUGMENT
MSTS FLEET AS NECESSARY TO MEET
TOTAL REQUIREMENTS**

**TO PLAN FOR AND BE CAPABLE OF
EXPANSION IN TIME OF WAR AS DIRECTED**

military cargoes is best carried out by a single military organization.

Perhaps the most important reason for the existence of MSTS in peacetime is the third mission — to plan for and be capable of expansion in time of war as directed. It is enough to say that an organization already in being and having plans for expansion can reach its ultimate size quicker than an organization that has to be created from scratch.

(CHART) COMMAND ORGANIZATION

MSTS is actually a part of the Operating Forces of the Navy and is commanded by a Vice Admiral. In areas of large and continuing military supply problems, the Commander has established area commands headed by Rear Admirals. Within these area commands there are individual locales which require the continued presence of a senior representative of the area commander. Because of the constant flow of military cargoes and personnel through these points, sub-area commands have been created, commanded by Senior Captains.

To accomplish the final distribution or accumulation of military cargoes, MSTS Offices can be established or disestablished as the requirement exists. These Offices are generally small in size, manned completely by Naval personnel, and are scattered worldwide as requirements dictate.

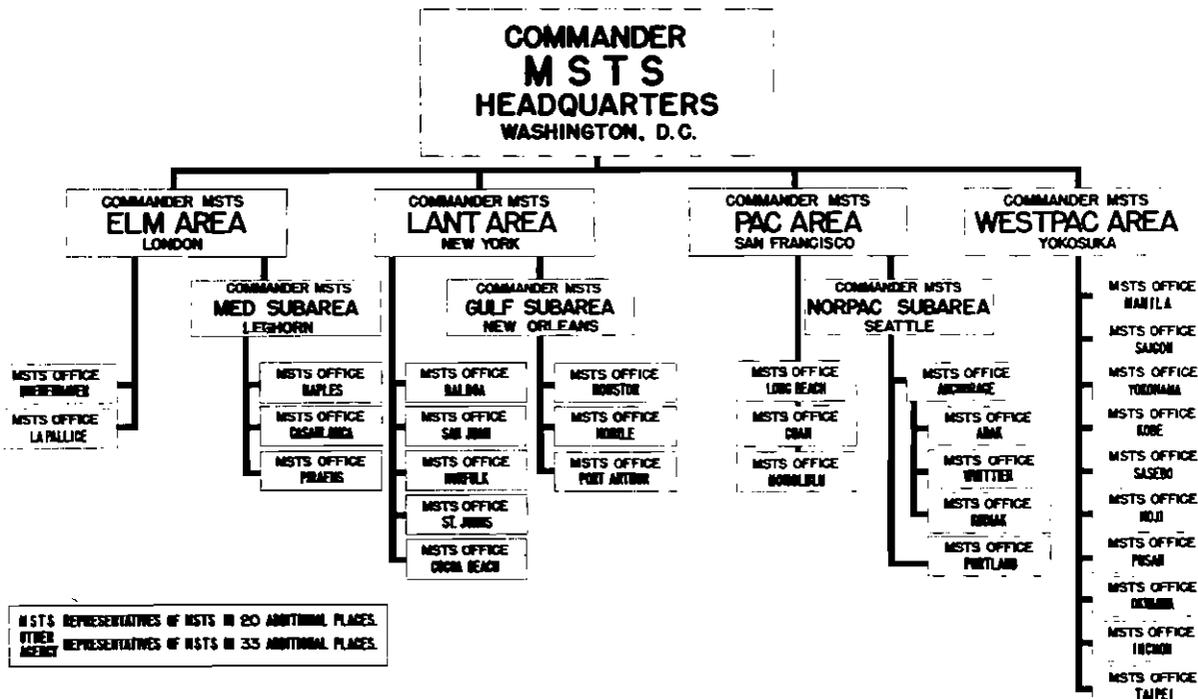
(CHART) MEMORANDUM OF AGREEMENT

The basic policy of the U. S. Government relating to the U. S. Merchant Marine is enunciated in the Merchant Marine Act of 1936. Basically, this policy is to foster the development and encourage the maintenance of a U. S. Merchant Marine, sufficient to carry a substantial portion of the commerce of the United States and capable of service as a naval or military auxiliary in time of war or national emergency. The Maritime Administration under the Department of Commerce is charged with the responsibility

1 SEP 1956

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MILITARY SEA TRANSPORTATION SERVICE COMMAND ORGANIZATION



AS DIRECTED IN MEMORANDUM OF AGREEMENT BETWEEN THE DEPARTMENT OF DEFENSE AND THE DEPARTMENT OF COMMERCE, DATED AUG. 1954, ALL MERCHANT SHIPPING CAPABILITY REQUIRED IN ADDITION TO THAT PROVIDED BY THE MST'S NUCLEUS FLEET WILL BE OBTAINED, CONSISTENT WITH MILITARY REQUIREMENTS AND PRUDENT MANAGEMENT, IN FOLLOWING ORDER OF PRIORITY:

FIRST: MAXIMUM UTILIZATION OF AVAILABLE U.S. FLAG BERTH SPACE.

SECOND: TIME OR VOYAGE CHARTER OF SUITABLE PRIVATELY-OWNED U.S. FLAG MERCHANT SHIPS VOLUNTARILY MADE AVAILABLE BY INDUSTRY. SUCH CHARTERS WILL BE KEPT TO MINIMUM NECESSARY TO MEET REQUIREMENTS WHICH FORESIGHT INDICATES CANNOT BE MET BY U.S. FLAG BERTH OPERATORS.

THIRD: SHIPPING PROVIDED BY NATIONAL SHIPPING AUTHORITY UNDER GENERAL AGENCY AGREEMENT.

FOURTH: WHERE U.S. FLAG SHIPPING IS NOT AVAILABLE, MST'S MAY EMPLOY FOREIGN FLAG SHIPPING TO MEET URGENT MILITARY REQUIREMENTS.

of implementing this policy. To provide a basis whereby the Department of Defense assists in this implementation, the Secretary of Defense and the Secretary of Commerce have signed a Memorandum of Agreement presently called the Wilson-Weeks Agreement. This memorandum lists the priorities under which merchant marine capability will be obtained by MSTTS in addition to the capability provided by the MSTTS nucleus fleet, consistent with military requirements and prudent management. First in priority is the maximum utilization of available U. S. flag berth space. A brief definition of U. S. flag berth space is "a shipping company which operates vessels on predetermined schedules on a fixed route." The berth operator generally has the best organization, the best ships and the most reliable crews. Because of its regular schedule, it provides MSTTS with a built-in capability that can be utilized or not utilized as it is required. There is only one disadvantage — it is expensive.

The second priority allows for the time or voyage charter of suitable privately-owned U. S. flag merchant ships. This type of contract is most desirable when your requirements are based upon full shiploads, and, in any event, it will be used only when berth space is not available.

The third priority is shipping provided by the National Shipping Authority under General Agency Agreement. This type of shipping is utilized only when no space or ships are available under the first two priorities or in the event that the operation is of no peculiar nature and the privately-owned ships are not made available. A good example of this is our yearly Arctic resupply operation for the DEWLINE. The scene of operations is dangerous to shipping; therefore, the private operators do not wish to make their ships available because of the hazards involved and the extremely high insurance rates that would be charged if, indeed, insurance could be obtained. Of necessity the government must supply its own ships.

Fourth, where no U. S. flag shipping is available, foreign flag may be employed to meet urgent military requirements.

(CHART) TYPE CARRIER

As you can see by this chart, MSTS carries out the provisions of the Memorandum of Agreement. The Nucleus Fleet carries approximately 20 to 30 percent of all dry cargo; the berth operators, 60 to 70 percent, time and voyage charters, 5 to 10 per cent; and the general agency agreement ships, during normal operations, 3 to 6 percent. It is to be noted that no foreign flag operation is shown since the amount of cargo so carried is negligible.

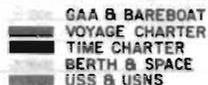
(CHART) TRANSPORTATION REQUIREMENTS

At this time it should be pointed out that MSTS is strictly a transportation agent. MSTS does not load or unload the cargo; it does not generate the cargo nor assemble the cargo. Its responsibility begins when the cargo is loaded in the ship and ends with the cargo free on board at destination. The responsibility for passengers begins at the gangplank and ends at the gangplank at the point of destination.

The requirements of the Shipper Services are placed on MSTS by the different Departments. MSTS assembles these requirements and, at a monthly Space Assignment Committee meeting, advises the Shipper Services of the capabilities available to MSTS. There is no problem if the capabilities exceed the requirements. However, if the requirements far exceed the capabilities and the shipper services are dissatisfied with the capabilities, they may appeal to the Joint Military Transportation Committee of the Joint Chiefs of Staff for an Assignment of Priorities to their requirements. The Joint Military Transportation Committee, through the Joint Chiefs of Staff, can then direct MSTS to utilize its capabilities to move cargoes in the order of their priority. The actual assignment of ships or space to the individual cargoes is

DRY CARGO LIFTED BY TYPE CARRIER.....FY 1956

THOUS. OF M/T'S
1,600



1,600

1,400

1,200

1,000

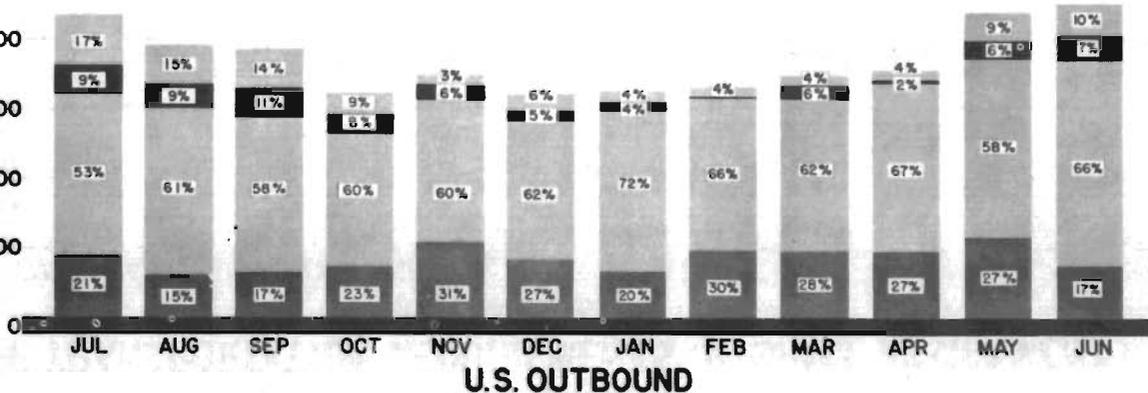
800

600

400

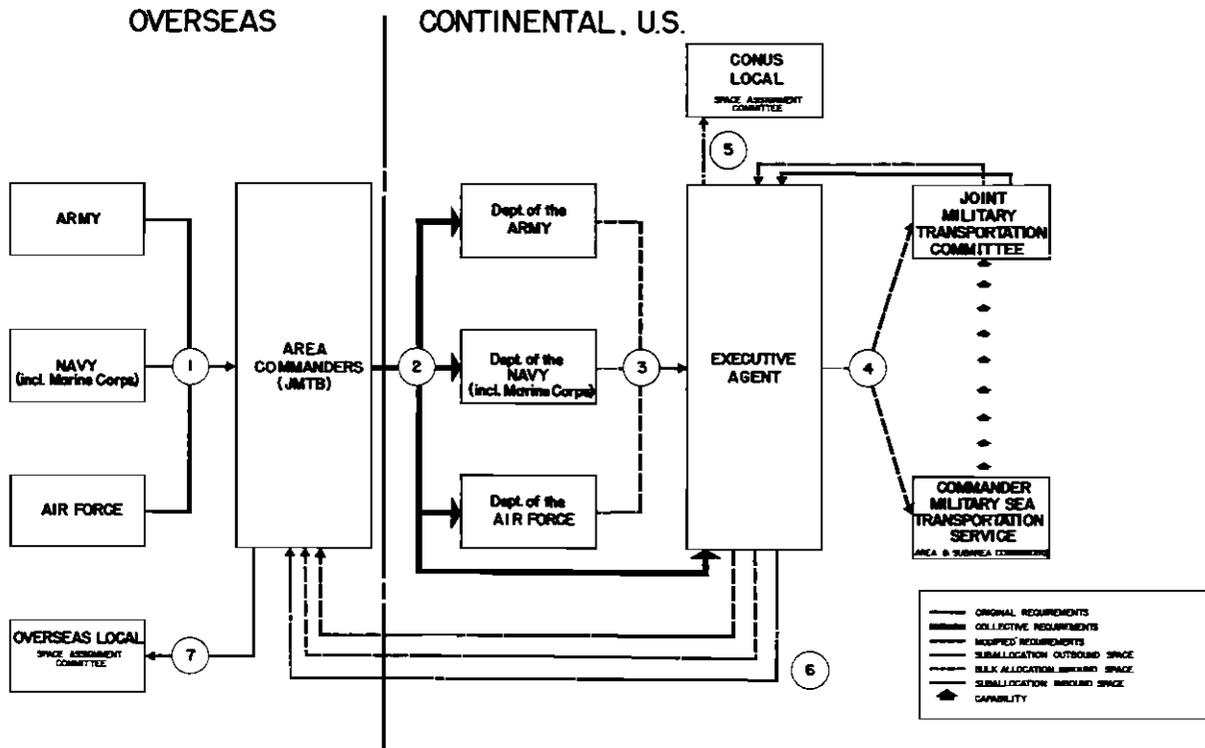
200

0



U.S. OUTBOUND

FLOW OF TRANSPORTATION REQUIREMENTS & SPACE ASSIGNMENT (CARGO & PASSENGER)



carried out at the area commanders level and the actual shipping dates of a specific cargo are determined by the Shipper Service. MSTs merely provides the ship or space and the Shipper Service determines how it will be utilized.

(CHART) MSTs FLEET

At present the MSTs fleet consists of 277 vessels and craft. The Nucleus Fleet consists of 10 U. S. S., or Navy-manned ships, and 206 U. S. N. S. ships, 120 of which are civil service manned and 86 contract-operated for MSTs by private companies and manned by union crews. The commercial fleet consists of 61 vessels and craft. The size of the commercial fleet will vary as the requirements placed on MSTs vary. The 33 chartered vessels have been obtained through normal commercial sources and are under charter for a specific length of time or voyage. The 28 National Shipping Authority or General Agency Agreement ships have been removed from the Maritime Reserve Fleet at the request of MSTs, and are operated by steamship companies on a fixed per diem basis. Their length of operation is determined by the requirements of MSTs and can be retained under these agreements for an unspecified length of time. Of significant importance is the fact that in addition to these 277 ships, there were 257 sailings of American berth line ships during the month of August. These 257 sailings carried approximately 60 to 70 per cent of all dry cargoes, as well as a small number of passengers.

(CHART) DRY CARGO TRAFFIC

Just to dispel any doubts as to the size of MSTs operations, it is enough to say that during the fiscal year 1956 we carried over 15,000,000 measurement tons of dry cargo. The preponderance of this cargo was from the continental United States to the Far East.

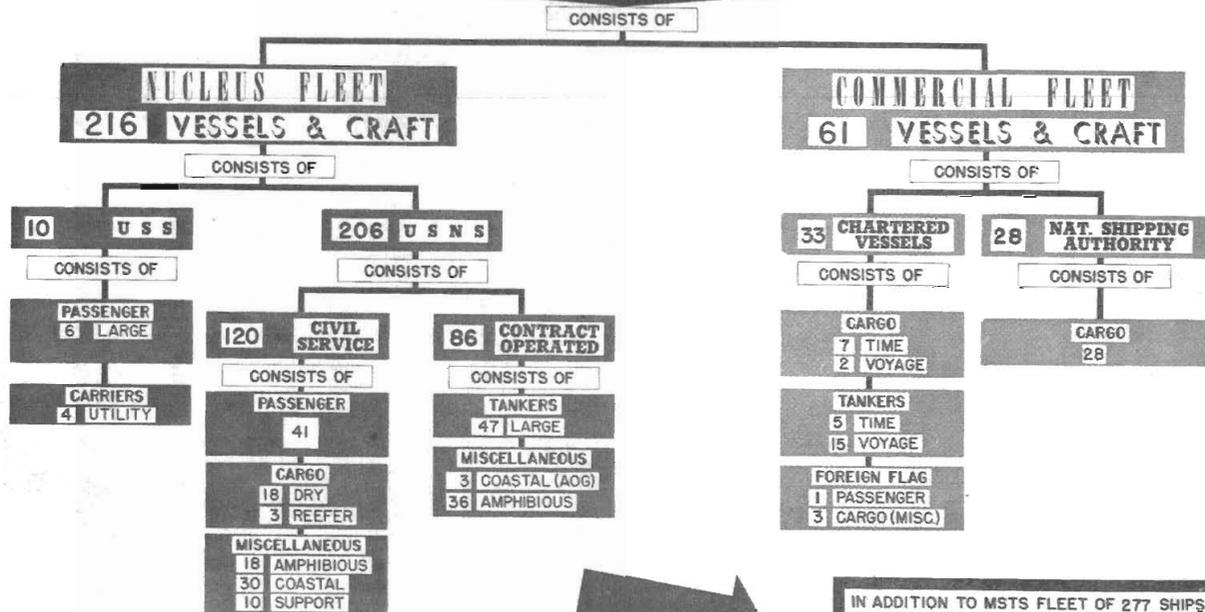
(CHART) DRY CARGO U. S. - FOREIGN COMMERCE

This chart was used by the Commander of MSTs in testimony to committees of the Congress and it is shown to you for

AS OF 1 SEP 1956

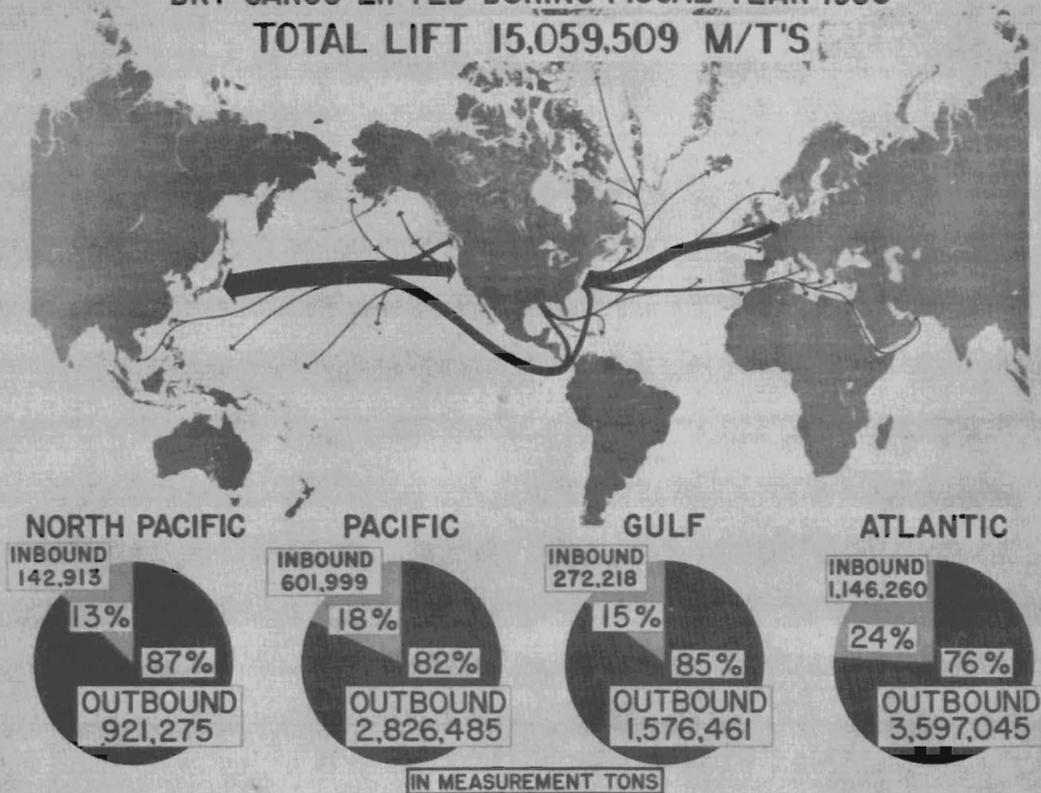
MSTS FLEET

277 VESSELS & CRAFT

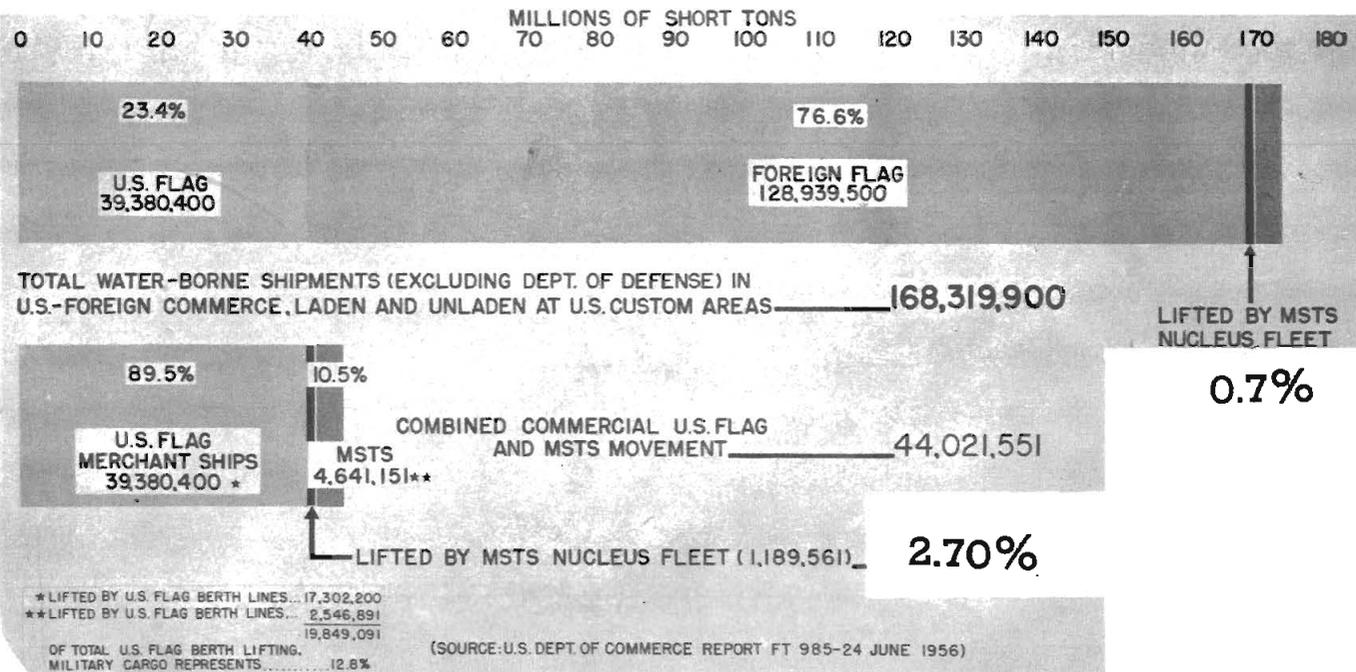


IN ADDITION TO MSTS FLEET OF 277 SHIPS,
257 SAILINGS OF AMERICAN BERTH LINE
VESSELS CARRIED DRY CARGO FOR MSTS
DURING THE MONTH OF AUGUST.

MSTS DRY CARGO TRAFFIC
DRY CARGO LIFTED DURING FISCAL YEAR 1956
TOTAL LIFT 15,059,509 M/T'S



U.S.-FOREIGN COMMERCE CALENDAR YEAR 1955 DRY CARGO



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(CHART) DRY CARGO U. S. - FOREIGN COMMERCE

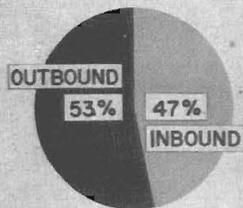
This chart was used by the Commander of MSTs in testimony to committees of the Congress and it is shown to you for

MSTS PASSENGER TRAFFIC

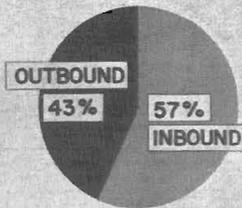
PASSENGERS LIFTED DURING FISCAL YEAR 1956

TOTAL PASSENGERS	860,315
SPACE REQUIREMENT	835,441
CABIN	249,808
MILITARY	58,885
DEPENDENT	181,337
OTHER	9,586
TROOP	585,633
MILITARY	536,196
ICEM	17,041
OTHER	32,396
SPACE AVAILABLE	24,874

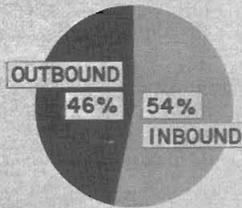
WEST COAST
CABIN



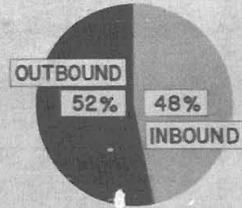
WEST COAST
TROOP



EAST COAST
CABIN



EAST COAST
TROOP



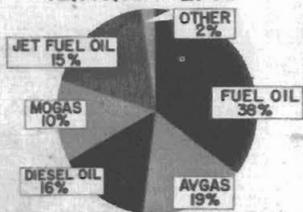
MSTS PETROLEUM TRAFFIC

PETROLEUM LIFTED DURING FISCAL YEAR 1956

TOTAL LIFT 101,042,399 BBLs



TOTAL LIFT BY FUEL TYPES
12,915,984 L/TS



TOTAL LIFT ORIGIN
12,915,984 L/TS



dry cargo and POL by privately-owned U. S. flag merchant ships made available at "fair and reasonable" rates. However, because of the continued increase in the world-wide use of POL products, a shortage of tankers presently exists and it has been necessary for MSTS to recently activate 17 Government-owned tankers. These are in addition to 30 tankers already in operations.

(CHART)

PETROLEUM - U. S. - FOREIGN COMMERCE

As with the previous chart covering dry cargo, this chart for petroleum was used by the Commander of MSTS in testimony to committees of Congress to point out the relatively minor effect that the MSTS nucleus fleet has upon U. S. flag tanker operators.

Granted that if they received the 8.4% carried in the MSTS Nucleus Fleet they would profit by it materially. However, it would not be advisable to allow the complete control of all military POL shipments to be in the hands of private industry. Work stoppage, strikes, or boycotts could prevent the transportation of military POL stocks.

(CHART)

PERSONNEL

An organization of 16,000 personnel with their operations as far flung as those of MSTS is bound to have many problems. Both ashore and afloat approximately 70% of the personnel are Civil Service personnel; the remaining 30% are military. Civil Service personnel ashore poses no problem since they are an integral part of the regular Federal Civil Service structure. The Civil Service personnel afloat are a "horse of another color." Because of the specialty of their operations and the legal requirements for identical compensation with industry, the civilian marine personnel have a unique civil service structure. It has been necessary to create special rules and regulations based upon standard civil service procedures and the peculiar problems of the marine industry. All of the basic wage benefits that industry personnel receive through collective bargaining are immediately made available

U.S.-FOREIGN COMMERCE

CALENDAR YEAR 1955

PETROLEUM

MILLIONS OF SHORT TONS

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

23.5%

U.S. FLAG
19,642,200

76.5%

FOREIGN FLAG
63,696,100

LIFTED BY
MSTS NUCLEUS FLEET

2.4%

TOTAL WATER-BORNE SHIPMENTS (EXCLUDING DEPT. OF DEFENSE) IN
U.S.-FOREIGN COMMERCE, LADEN AND UNLADEN AT U.S. CUSTOM AREAS _____ **83,338,300**

82.2%

U.S. FLAG
MERCHANT TANKERS
19,642,200

17.8%

MSTS
4,259,725

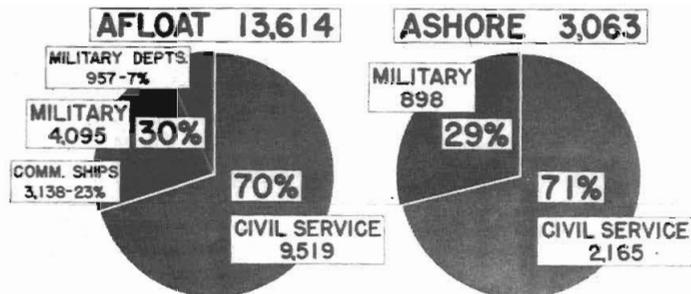
COMBINED COMMERCIAL U.S. FLAG _____ **23,901,925**
AND MSTS MOVEMENT

LIFTED BY MSTS NUCLEUS FLEET (2,025,513) _____

8.47%

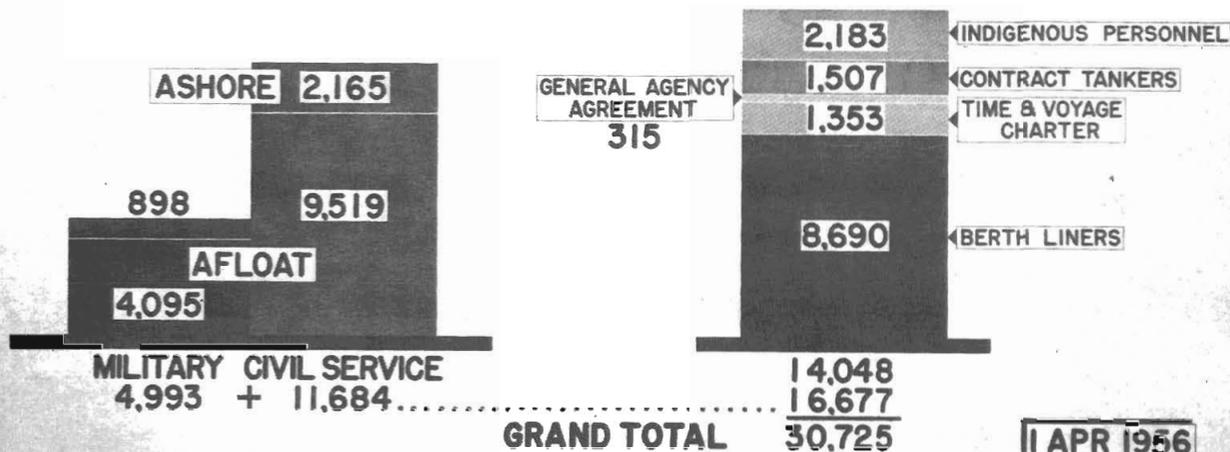
(SOURCE: U.S. DEPT. OF COMMERCE REPORT FT. 985-24 JUNE 1956)

PERSONNEL DIRECTLY EMPLOYED BY MSTs



ADDITIONAL EMPLOYMENT PROVIDED DIRECTLY BY MSTs OPERATIONS

MI



to MSTS civilian marine personnel. They receive all of the benefits of collective bargaining without any of the hazards of collective bargaining. They can never lose time because of a strike, since no one can strike against the Federal Government.

(CHART) ANNUAL WAGES

Admiral Denebrink once testified before a Committee of Congress that he was the only President of a Steamship company to receive less money than many of his employees. Except for the Masters and Chief Engineers, the basic wages shown here are increased approximately 30% by overtime payments. A difference in basic wages of the unlicensed ratings on the West Coast and East Coast is indicated because the West Coast is attempting an experiment which concedes that the work week at sea is 56 hours and the basic wage is paid on a 56-hour week; whereas the East Coast basic wage is on a 40-hour week. Actually there is no difference because the computed basic wage on the West Coast is 40 hours straight time plus 16 hours overtime.

(CHART) OPERATING COSTS

Many of you will be surprised at the actual cost to MSTS to operate its vessels. These costs compare favorably with industry cost but are consistently lower because of the non-requirement of MSTS to include military pay and allowances, interest, depreciation, insurance and taxes in its operating expenses.

MSTS is consistently striving to reduce the unproductive time of its ships. Normally an MSTS ship in-port or running in-ballast earns no revenue. In-port time has been reduced materially by the expedient loading of our ships by the Shipper Services. However, there is still room for improvement. The in-ballast steaming of our ships is most difficult to improve since, if there is no cargo available at a port of discharge, the ship must sail empty to a port where there is cargo.

BASIC ANNUAL WAGES PAID BY MSTs TO CIVIL SERVICE CREWS AS OF 16 JAN 1956

<u>TYPE SHIP</u>	<u>MASTER</u>	<u>CH. ENGR.</u>	<u>1ST OFF.</u> <u>1ST ASST. EN.</u>	<u>2ND OFF.</u> <u>2ND ASST. EN.</u>	<u>3RD OFF.</u> <u>3RD ASST. EN.</u>	<u>CH. RADIO</u> <u>OFFICER</u>
P-2 TRANSPORT CLASS A-3	\$15,600	\$13,121	\$9,184	\$7,463	\$6,948	\$7,234
C-4, C-3 TRANSPORT CLASS A	\$12,738	\$11,341	\$7,819	\$6,929	\$6,395	\$6,810
C-2, VC-2 CARGO CLASS B	\$12,183	\$11,064	\$7,542	\$6,652	\$6,137	\$6,020
RI, CI-MAV-1 LST, LSM CARGO, CLASS D	\$11,612	\$10,253	\$7,127	\$6,296	\$5,722	\$6,020
N-3 AKL CARGO CLASS E	\$11,612	\$9,976	\$6,988	\$6,158	\$5,583	\$6,020

UNLICENSED RATINGS	* EAST COAST	**WEST COAST
BOATSWAIN	\$4808 - 5876	\$5,460 - 7512
CARPENTER	4501 - 4995	5,100 - 5880
A. B. SEAMAN	3,773	5076
ORDINARY SEAMAN	2930	4020
ELECTRICIAN	5609 - 7,185	4,992 - 7,488
MACHINIST	4973	4,992
OILER	3,773 - 4,083	3,930 - 4,224
FIREMAN-WATERTENDER	3,773	3,930
CHIEF STEWARD	4,683 - 9,368	6,036 - 10,091
CHIEF COOK	4,334 - 5,313	5,676 - 6,432
STEWARD UTILITYMAN	2,908	4,020
PURSER	5,676 - 6,967	5,676 - 6,967

* 40 HOUR WORK WEEK AT SEA.

** 56 HOUR WORK WEEK AT SEA, DECK AND STEWARD DEPARTMENTS.

40 HOUR WORK WEEK ENGINE DEPARTMENT.

IN ADDITION TO RATES SHOWN PERSONNEL RECEIVE OVERTIME, BONUSES, VACATIONS, HOSPITALIZATION, SICK LEAVE, QUARTERS AND SUBSISTENCE.

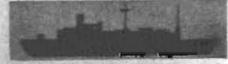
CREW WAGES AND ALLOWANCES REPRESENT... **41%*** OF TOTAL SHIP OPERATING EXPENSES OF CIVIL SERVICE MANNED MSTs VESSELS. OVERTIME AVERAGES AN ADDITIONAL **30%*** OF BASE PAY SHOWN.

* ESTIMATED

AVERAGE DAILY VESSEL OPERATING COSTS

USNS (IN SERVICE) SHIPS

1955

<u>PASSENGER SHIPS</u>			<u>CARGO SHIPS</u>		
<u>TYPE</u>		<u>AVERAGE COST PER DAY</u>	<u>TYPE</u>	<u>AVERAGE COST PER DAY</u>	
P-2		\$7,250	C-4		\$2,200
C-4		\$4,750	C-2(REEFER)		\$2,400
C-3		\$5,000	VC-2		\$2,100
C-2		\$4,200	CI-M-AVI		\$1,500
CI-M-AVI		\$2,000	RI-M-AV3 (REEFER)		\$1,500

TANKERS (CONTRACT OPERATED)

T2-A1		\$2,100
T2-A2		\$2,500
T1-BT2		\$1,500

FIGURES SHOWN ABOVE EXCLUDE:

1. ACTIVATION COSTS.
2. INACTIVATION COSTS.
3. ACCIDENT & DAMAGE REPAIRS.
4. ALTERATIONS (CHARGEABLE TO BUSHIPS)
5. PASSENGER SUBSISTENCE (INCLUDED IN PREVIOUS YEARS)
6. PAY & SUBSISTENCE OF MIL. DEPTS. ASSIGNED TO TRANSPORTS.

(CHART)

TARIFF RATES

Since 1953, MSTS has operated under a Navy Industrial Fund. This fund is used to pay all of the operating costs of MSTS with the exception of the pay of military personnel. To recoup these expended funds, MSTS developed tariff rates which the Shipper Services pay to MSTS for services rendered. The tariff is based upon commodities lifted and the route over which they are carried. Of interest is the fact that the same tariff rate is charged the Shipper Services no matter by what means the cargo is actually lifted. MSTS considers that it is of no import to the shipper service how the cargo moves so long as the cost to them is the same. This allows MSTS a flexibility of operation which could not be had if varieties of tariffs were to be used.

(CHART)

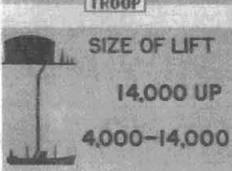
SCOPE OF BUSINESS

Even during peacetime MSTS requires an extensive organization. Expenditure of funds approximating \$412,000,000 a year necessitates consistent vigilance to prevent inefficiency and an uneconomical operation. The best criteria of our efficient operation is the fact that our operating costs exceeded our income by only \$264,000. Since this is a break-even type of operation, a \$264,000 loss on a total income of \$412,000,000 is about as close to perfect as any auditor could expect an organization to get. Just in passing — we have made a profit in our previous years operations so this small loss has already been offset.

I hope that I have left you with an understanding of the basic facts concerning the Military Sea Transport Service: namely, (1) that it engenders complex command responsibilities unique within the Navy because of the establishment of MSTS as the sole agency to provide ocean shipping for the Department of Defense; (2) that the Military Sea Transportation Service Nucleus Fleet, when compared with the total number of ships employed in the MSTS lift, consists of a relatively small number of ships of which only 10 are USN-manned; (3) that MSTS, in fulfilling its

TYPICAL MSTs TARIFF RATES

11 JUL 1956

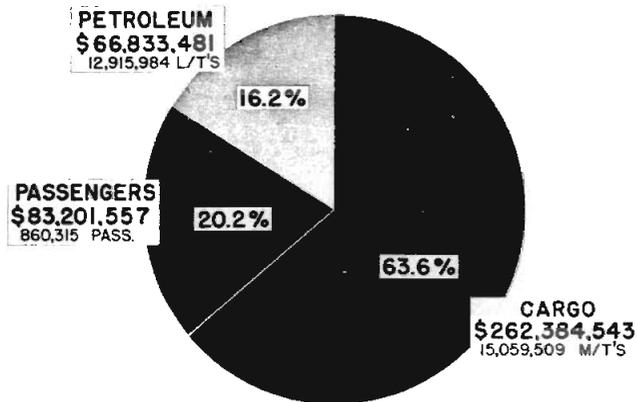
		ATLANTIC COAST-EUROPE		PACIFIC COAST-JAP/KOREA		N.WEST COAST-E. ALASKA		
CARGO (PER MEASUREMENT TON)	 CARGO	\$ 13.47		\$ 17.67		\$ 15.49		
	 REEFER	29.24		35.28		21.78		
	 AMMUNITION	34.81		26.03		18.33		
	 SPECIAL	19.02		22.94		15.76		
	 PLANES	13.81		14.98*		-		
PASSENGERS (PER PASSENGER)	 CABIN	155.37		176.26		50.41		
	 TROOP	61.01		69.26		27.99		
PETROLEUM (PER LONG TON)	 SIZE OF LIFT	GULF COAST-EUROPE		GULF COAST-JAP/KOREA		PERS. GULF-JAP/KOREA		
			BLACK	CLEAN	BLACK	CLEAN	BLACK	CLEAN
		14,000 UP	\$ 7.35	\$ 8.09	\$ 11.41	\$ 12.55	\$ 8.45	\$ 9.30
	4,000-14,000	8.23	9.04	12.78	14.03	9.46	10.39	
	PETROLEUM							

*CALIFORNIA COAST ONLY

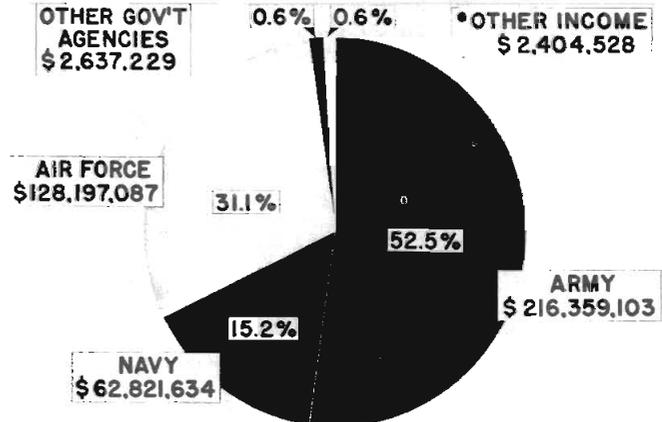
SCOPE OF BUSINESS FY 1956

INCOME	\$412,419,000
EXPENSES	\$412,683,524
LOSS	<u>\$ 263,943</u>

INCOME BY SERVICE



INCOME BY SPONSOR



• OTHER INCOME:	
SUBSISTENCE	\$ 1,793,067
SALE OF SCRAP, SALVAGE, ETC.	811,461
TOTAL OTHER INCOME	\$ 2,404,528

mission, must combine efficiency and economy of operation of a successful commercial enterprise with the flexibility and controls essential to a military commander charged with the logistic support of military operations.

Duty with MSTS, as I have found it, is a challenging assignment. As a vital link in the logistics of modern warfare, it is a required experience. It is my sincere hope that some of you here may have the privilege of serving with MSTS at some time in the course of your career and that when you do, you will find your tour of duty as interesting, as stimulating and as satisfying as I find mine.

BIOGRAPHIC SKETCH

Rear Admiral Roy A. Gano, U. S. N.

Admiral Gano was graduated from the United States Naval Academy in 1926. Following graduation, he served in the USS TENNESSEE (1926-29), USS JOHN D. EDWARDS (1929-1930), USS EDSALL (1930-31), and USS MACLEISH (1931-32).

During the following two years, he attended the Naval Engineering (Operating) Course at the Postgraduate School. After serving in the USS DEWEY, he was at the Naval Research Laboratory for special engineering work from 1937 to 1939. Prior to World War II, he was Material Officer on the staff of Commander Destroyers, Battle Force.

After serving as Material Officer on the staff of Commander Task Force EIGHT, Admiral Gano assumed command of the USS DYSON, joined Destroyer Squadron TWENTY-THREE, and participated in the Solomon Islands engagements (1942-44). During the following two years, he was Assistant Director of Naval Communications for Administration in the Office of the Chief of Naval Operations. From 1946 to 1948, he was Commander Destroyer Squadron FIVE with additional duty in command of Destroyer Division FIFTY-ONE, operating in the Japan-Korea area. He returned to the Bureau of Naval Personnel as Director of Recruiting during 1948-1950, and the following year was Director of the Enlisted Personnel Division. In July 1951, he assumed command of the USS SAINT PAUL, which operated in the Korean combat area until June 1952.

After serving as Chief of Staff and Aide to the Commander Service Force, U. S. Pacific Fleet, Admiral Gano became Commander Service Squadron THREE in 1954. In December 1954, he reported for duty on the Joint Staff, Commander in Chief, Far East Command, and in September of the following year Admiral Gano became Deputy Commander and Chief of Staff and Aide to the Commander Military Sea Transportation Service, with headquarters in Washington, D. C.

SOVIET TRANSPORTATION

A lecture delivered
at the Naval War College
on 4 October 1956 by
Professor Holland Hunter

I had a very good time here last year, and I hope to enjoy myself this morning. I also hope that it will be profitable for you.

The gentleman responsible for planning your program has a very good sense of timing. He probably said to himself, "This man Hunter has been working for a long time. We understand that last year he had a leave of absence and was finishing up a study. Perhaps if we get him now, we will catch him just as that study is finished." And that is the case, for I sent off the manuscript a week ago Saturday. This means that when it comes out, which I hope will be next spring, there might be a few of you who would feel called on to buy it, or at least to read it. The Harvard Press would not like my saying this, but this morning I expect to save you that trouble by giving you in effect a summary of the results of the study.

One of the problems in an enterprise like this is to make it efficient, to make effective use of the short time involved, and to make it relate directly to the problems with which you are essentially concerned. To that end, I asked that an outline of my remarks be available to you. I hope that this will enable me to compress the subject and save you the trouble of taking notes. As things work out, there ought to be a larger proportion of the meeting this morning available for the question and answer discussion. So if you will permit me, I will go over the things on my mind now and then close that part, after which, as I understand it, we have a short break. Then I would hope that you could put to me the serious questions which you have, and I will do the best I can in trying to answer them.

If you think about the role of transportation in the Soviet economy, you have to begin by asking what creates a need for it. I suppose that means you look at the geographic structure, at the resources, arable land, population, and so on which has to be unified in order to produce goods and services.

The outstanding feature of the land mass in this part of the world is that resources are very scattered. It is a huge piece of property and it is by no means uniformly dotted with the things needed for economic activity. I am sure that you are well aware of the fact that the bulk of the population is in the European part of the U. S. S. R. Thinking of a division between the European part of the U. S. S. R. and the Asiatic portion as running, say, from the Ural Mountains down to the Volga Valley, or somewhere along in there, three-quarters of the population is west of that line and one-quarter of the population is east of it. However, the western territory is only one-quarter of the total area, three-quarters being in the east. The east and the north are much more analogous to northern Canada than they are to the United States. Professor Cressey, the geographer, is fond of pointing out that the Black Sea is in the same latitude as the Great Lakes. This implies something about the climatic conditions of European Russia itself; conditions north and east of there are even worse.

Looking over this land mass, it is clear that the need for transportation arises because the things to be assembled for economic activity are widely separated from each other. You probably have paid some attention to the location of major resource deposits. But let me remind you briefly that the earliest, and still the most important, industrial base is around Kharkov in the eastern Ukraine. It involves coal in the Donets Basin, iron ore around Krivoi-Rog, and a considerable collection of manufacturing plants in the area between them. That eastern Ukrainian complex is still the industrial heart of the U. S. S. R., but, as I am sure you already know, there was a second base built up during the 30's. This was founded on iron ore at Magnitogorsk, in the

southern Urals, and coal over in the Kuznetsk Basin, or the Kuzbas.

When the enterprise called the Ural-Kuznets-Kombinat was originally started, these two industrial bases were 1,500 miles apart. That is a pretty long distance for shipping iron ore and coking coal. However, that distance has been cut down by the building of the so-called "South Siberian Trunk Line," which runs south of the old Trans-Siberian Line, joining Magnitogorsk with Stalinsk, in the Kuzbas, along pretty much of a straight-line going across Kazakhstan and western Siberia. That industrial complex is, of course, the base for activities in Siberia, in central Asia, and anything going on even farther to the east. Those are two major primary industry centers.

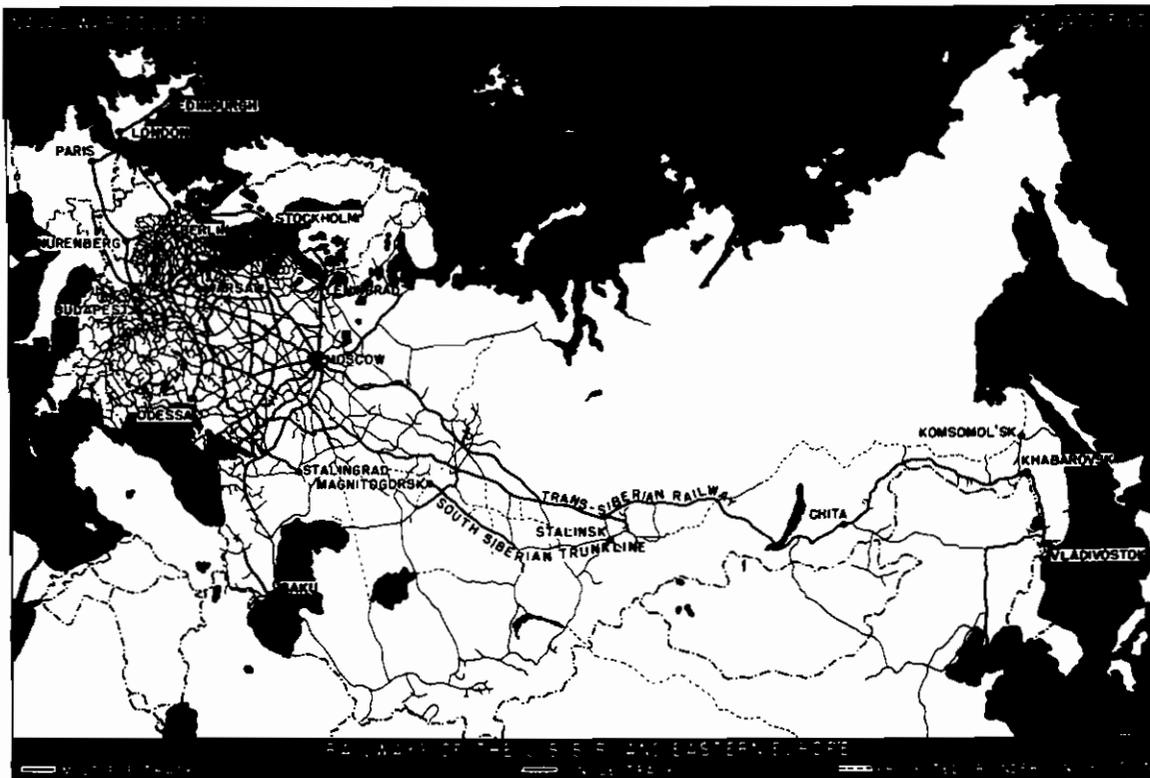
Along with those two centers, you would have to note the Moscow region as a major focus of manufacturing or fabricating industry, as well as the Leningrad district. These last two do not have locally available sources of the raw materials they need. Consequently, if you were to look at a modern and detailed map of the flow of freight traffic in the U. S. S. R., you would see an enormous outflow from the eastern Ukraine, north to Moscow, and northwest to Leningrad. Empty cars pile up around Leningrad and Moscow, and the railroad administrators down in the eastern Ukraine are constantly screaming for empties. A new series of smaller fabricating bases is developing along the Volga Valley at various cities such as Stalingrad and Kuibyshev, and others are going up on the eastern edge of European Russia.

Those four or five regions have concentrated need for large volumes of heavy freight traffic, but, so far, you can practically write off the rest of the country. Any time you look at a map of the Soviet railroad system that shows all rail lines as equally important you are being seriously misled. You ought to think of the interregional trunklines which join those foci as large, modernized lines, with a heavy capacity to carry traffic. However, all

of the rest of the system is distinctly secondary — and I think will continue to be so for some time.

In reading Soviet material, I have developed a considerable prejudice against their claims that the U. S. S. R. is an enormously rich, fertile, and wealthy country. Some 47% of it, according to a careful academic geographer named S. P. Suslov, is subject to permafrost. Any one of you who has ever looked into engineering problems growing out of permafrost will be aware of what that means. It does not mean that you cannot carry on mining or industrial activity, or even grow a little food; it does mean that what you do under those conditions is more costly in real terms. As you know, there are constant grandiose schemes and claims for developing these outlying territories. So far, however, they remain largely in the realm of hopes and dreams. Even where there is no permafrost, large parts of the country (in Soviet Central Asia, for example) are deserts or semi-deserts. By and large, one can feel a certain compassion for a people living in this part of the planet, because the climatic and general living conditions are quite inhospitable.

Considering now the impact of geography and climate on transportation, the great peculiarity of Soviet transportation is that it is so heavily railroad transportation that there is relatively little contribution from the other carriers. I gave you some figures showing the percentage distribution of ton-miles of freight traffic by the major carriers. Since these 1952 figures shown for the United States, you probably know that the railroad share has declined and is now just a little under 50%, while the other three big carriers have each come upward a couple of points. In the U. S. S. R., although the government's intention has been to reduce the share of total freight traffic carried by the railroads, it has not fallen but somewhat increased over what it was in the 20's. I do not think that it can fall appreciably during the next decade or so.



L-55-65

As to why the other carriers cannot contribute very much (you may wish to question my bias here), the river systems are not well laid out for carrying materiel among those major centers. The Volga has traditionally carried a great deal but there are now some railroads in the Volga River territory which are getting more and more traffic, thus taking the traffic away from the river. In part, this is due to its location and in part because it freezes several months of the year. The other rivers, like the Dnieper and the ones in northwest European Russia, in earlier centuries were very important. But there again, since the railroads began to provide an alternative — say, from the 1860's on — they have steadily taken the traffic away from the rivers.

When you look at coastal or maritime traffic, you can see that the U. S. S. R. is very unlucky. In order to get from the western part of the country to the eastern part, there is nothing corresponding to the Panama Canal. It is necessary to go from the Black Sea all the way around through the Suez Canal, down into the Indian Ocean, then around China, and over to Vladivostok, which is a terribly long voyage. It is one which they have used in the past for petroleum tanker shipments, but it cannot help being very expensive. It is now possible to get from the Black Sea to the Caspian Sea — at least during part of the year — by using the Volga-Don Canal, but there is not really much need to get from the Caspian Sea to the Black Sea, or vice versa.

You frequently find Soviet claims that Moscow is a “port on five seas,” by which they mean that it is possible during the open season for small barges to get over to the Baltic Sea, to the White Sea, to the Caspian Sea, to the Black Sea, and the fifth I believe is that little thing east of Crimea, the Sea of Azov. But, as you can see, that is a largely psychological device for the residents of Moscow and one which I think does not have much concrete reality in transportation terms.

Unfortunately, the huge rivers of Siberia do not carry traffic back toward the European part of the U. S. S. R., but

carry it up to the Arctic Ocean. And what do they have there? Ice! The so-called "Great Northern Sea Route" is extremely expensive. If you think of the ability of Australia to use the route lying to the south — which is open water the year round — and then, by contrast, think of the problems to be surmounted in using the Northern Sea Route, you again may even have a certain feeling of compassion. I suppose that developments in technology, with perhaps atomic ice-breaker freighters and so on, will mean that a larger amount of traffic will move there. But I do not really see how it can make an appreciable contribution to the activity of the Soviet economy as it is now located.

As to trucking, the reason that it has not developed so far in the U. S. S. R. on an intercity basis is that it requires a huge investment in road-building or highway construction. In this country, that investment has been undertaken so that people could ride around in passenger cars. We have been willing to use a very large part of state taxes — and even Federal taxes — for building roads for consumer use, and, in a genuine sense, I think that trucking is a by-product of that. There is no similar consumer pull in the U. S. S. R., and the regime has therefore not put very much into road-building.

There was great excitement in the U. S. S. R. along about 1948-49, when an all-weather asphalt route was finally completed from Moscow down to the Crimea. There was even a novel written about people taking a trip on this highway. About every forty pages or so in the novel a little crisis would arise. There would be conversations among the passengers in the car as to whether or not the next filling station which they reached would have gasoline. Filling stations are spread out only every 200 kilometers or so, and at that time one could not be sure that they would have gas. This suggests to me, since this is a "showcase route," that the whole project is on what would appear in our terms a rather primitive level. But I think it will be growing rapidly in

the next ten or fifteen years and it seems a fairly safe guess that the share of intercity trucking in total freight traffic will rise.

This situation is also true of pipelines. For some reason or other (it may just be a shortage of steel — that is, higher priority needs for taking the steel), the U. S. S. R. has not done very much in the way of building an extensive pipeline network until the last two to four years. It is now just beginning to burgeon rapidly. The intention of the Five Year Plan covering the period from this year through 1960 is to increase ton-kilometers of freight traffic in pipelines sixfold, although it may work out to be something like fourfold. But, even so, a fourfold increase in five years is nothing to sneeze at, even though they are starting from a very small base.

With that as a geographic background, let me say something briefly about Soviet policy in dealing with this sector of the economy.

If you look at the industrialization process in the United States, England, or Germany in the nineteenth century, you will recognize that transportation improvement was a central feature of the process. It was through railroadization, the opening up of new territory and the linking of old centers, that economic development proceeded, and this was a central feature of industrialization in those countries preceding the Soviet example.

The Soviets were unfortunate in beginning their forced drive in 1928, after the process of industrialization had already been underway for at least fifty years. They thereby inherited the elements of a railroad system and did not have to start from scratch. To some extent the railroad system had been built ahead of traffic, especially in western Siberia and the eastern part of the U. S. S. R., so in making their big push it was not necessary to devote as much attention to transportation capacity as had been typical in the past. That is just what they have done: they have held down investment in enlarging transportation ca-

capacity to an absolute minimum; they have concentrated on building up heavy industry and armaments. They had notions and slogans about how to deal with the location problems associated with industrialization; that is, they recognized that if you want to industrialize, you have to decide where you are going to build plants. They thought that capitalism favored the wealthy centers and penalized the outlying provinces — and this was bad! Therefore, they thought there should be more uniform or even distribution of economic activity. This fitted in with what was known about the location of new coal, iron ore, and other deposits which by and large lay out in relatively unsettled territory. It also fitted in with their so-called “nationalities policy,” attempting to favor the non-Great Russian ethnic groups in the population, who tended to live on the edges of European Russia, down in the Caucasus, in central Asia, or out in the east. They were also worried because the old centers of industry were fairly close to the western frontier and, therefore, vulnerable to attacks from the West. Obviously, therefore, it seemed safer to build new industries in the interior depths of the country.

But, they were over a barrel in advancing this idea! If you want to build industry rapidly, the quickest place from which to get output will be precisely the old centers. That is where there are already living facilities for the labor force; that is where there is already a literate and somewhat trained labor force; that is where there is the social capital necessary for industrial activity.

Although policy called for a more even spread of economic activity, if you look at what actually unfolded during the 30's and also since the war you find, for instance, that almost 60% of the added coal production from 1928 to 1940 came from the Donbas, right in the old traditional industrial heartland. In manufacturing industry in 1940, the combined districts around Moscow and Leningrad accounted for a little over one-third of industrial production, whereas the whole east accounted for some 16% (much of which was in mining). Of course this changed as a result of the

Nazi invasion. The east now has a larger share of the total, with the outlying regions developing not only absolutely but proportionately.

You know that the Nazis did not occupy all of the European part of the U. S. S. R. They got as far as the approaches to Moscow, right up to Stalingrad and then down a little bit into the Caucasus. But that left a considerable territory of the European part of the U. S. S. R. unoccupied, as well as all of the east.

If any of you have ever read the English translation of a book by N. Voznesenski entitled *The War Economy of the U. S. S. R.*, which was written during World War II, or, as they officially call it "the great patriotic war," you find him giving an impression that the east was where all industrial activity went on during the war. I am not sure why this concentration of propaganda on the east was undertaken. It may have been because it would make the Russian people themselves feel safer and also make the outside world feel that the U. S. S. R. was still strong, giving the impression that these things were still far out of range of the Nazis. But the fact is that, if you piece together a lot of isolated figures, just about half of the industrial output of the years 1942-44 came from the east, while the other half came from what you might call "middle band territory," lying between the east and the occupied regions in the west; there was a considerable portion of European Russia which continued to produce and which had a good deal to do with the Soviet's survival.

Suppose we now look at how, with these intentions, the Soviet regime has actually fared in year-to-year transportation operations. From 1928 to 1932, the volume of freight traffic rose by some 80%; the length of operated roadway only rose about 5%; the stock of locomotives and freight cars rose only 20%-25%. Therefore, there was greatly increased intensity of utilization

of what they had inherited. But they went a little too far in this problem and got themselves in a transportation crisis which ran for at least three years (1932-34). In this period, enterprises were crying for supplies, and were desperately in need of them. Those who produced the items had them available and sitting on their sidings, but the railroads were not carrying out the transportation function. There was something like 20 million tons of unshipped freight sitting around all during 1933-34. Clearly, any country wishing to industrialize now could learn from this Soviet experience that a bottleneck in freight traffic capacity is a danger which may be associated with rapid industrial expansion.

One of the factors that increased the demand for transportation more than the planners had foreseen was the so-called "second iron and steel base," or the Ural-Kuznets Kombinat, which, because of the great distances involved, necessitated a huge amount of transportation. And the record suggests that they did not take that fact sufficiently into account.

The crisis was overcome fairly quickly through a combination of two programs: one providing additional modernized, heavy-capacity equipment for the railroads, and the other being a really forceful drive for what you might call an efficiency breakthrough. The railroad fraternity of operating workers and officials were evidently somewhat stodgy. In any case, they were much impressed with limits beyond which one could not expect to go. Locomotives could only turn out so many ton-miles of traffic per day, and all the other performance indicators, according to the existing transportation officials, were being pushed about as far as they could go.

But a man named Kaganovich (there were two brothers — this was Lazar M. Kaganovich), who previously had been a trouble shooter and an energizing expediter in heavy industry, was shifted over to the railroads in the spring of 1935. He really built fires under these people and got some results! In 1935, 1936,

and the beginning of 1937 the whole railroad business was galvanized. They proceeded to increase their efficiency very greatly and to eliminate backlogs of freight traffic, getting themselves into a harmonious relationship with the rest of the economy. Kaganovich was taken off the railroads in 1937, and things began to sag. I will not take time now, but there are some interesting questions about just why they could not maintain the pace which they had set.

Going on to look at World War II, there was an article published in October, 1939, in a French economic journal by an expert from Poland. He gave a highly persuasive argument, demonstrating that if there were a war in which the U. S. S. R. was involved the Soviet transportation system could not help but fall flat on its face. The logic of the argument was more or less incontrovertible: the transportation system was already taxed to capacity; a war would increase demands upon it (he had Soviet quotes for this) at least two or three times, and maybe in some particular territories as much as eight, nine or ten times: if it was already strained to the limit, it really could not do that additional work; ergo, it was bound to collapse. Without having been concerned with the subject myself at that time, I understand that it was a widely-shared judgment.

Somehow, the railroads did *not* collapse during World War II; in fact, they did a very good job. One of the chapters in my study is an attempt to explain how they were able to do it. I think that a major element of the explanation would be that they did *not* have to carry a great deal of wartime traffic on top of normal peacetime traffic, because something like 40% of the normal peacetime traffic was simply cut away. You remember my saying that the heart of industrial activity was in the eastern Ukraine. All of the traffic from the Donbas to Moscow and from the Donbas to Leningrad was simply cut out by the invasion, along with the track in that whole territory. But it was possible to withdraw rolling stock and locomotives. They lost some of it

— I think the figure they used was 15% of their locomotive stock and 20% of their freight car stock — but they had the rest. Therefore, if you look in the Library of Congress in the fairly complete files of the railroad newspaper there for the war years, you find dispatch after dispatch talking in terms of “congestion” of freight cars and locomotives in unoccupied territory. These things were in ample supply and could not help but aid the railroads in doing their job.

Another thing that perhaps was not anticipated as much as it should have been was that you can get railroad lines and the facilities associated with them back into operation a good more rapidly than had been assumed before the war. Some of you may have had occasion to review this matter in connection with the Korean War, and you know that things did not stay out of action very long. The Russians developed a good deal of experience and turned out to be quite good at restoring operation on damaged or demolished railroad lines.

Another thing about transportation and location in the Second World War, and one which I guess is currently under review in the U. S. S. R. itself in connection with de-Stalinization, is how you judge their policy with respect to anticipating and dealing with the Nazi invasion. It was pretty clear all during the 30's that Hitler would like to attack the U. S. S. R. — at least that is what he said, and much of his activity seemed to point in that direction. So the Soviet leaders obviously had to be making plans for this.

Here you have a tough problem. A clear-cut solution would have been to retire from the region bordering the western frontier — in any case, not to build it up — and to concentrate all the new capacity out in the east somewhere. But, as I indicated earlier, that would have been slow and would have been expensive. Now perhaps this is reading more rationality and more foresight and more logic into their policy than in fact was there. But I think that they must have said to themselves: “We have to straddle the

fence; we have to use our old western centers as a springboard for building up new centers in the east".

They did, therefore, greatly expand the industrial plants around Leningrad, Moscow, and all the territory open to invasion from the West, while at the same time they were building up new facilities in the east. The balance between those two, subjected to the crude test of survival in World War II, seems to have been about right — but that is a superficial conclusion. I hope that someone will carefully study this issue from a military-economic point of view, and make a more thorough judgment on it. At least one can say that the Soviets did manage to win the war.

Moving on now to the two observations at the end of my outline, which I hope will merely challenge you for the Discussion Period, it first seems to me that transportation is not an "Achilles' heel" for the Soviet economy now, and that it is not likely to be so in the next five or ten years. It is unwise of me to venture at all into military theory, especially before you, but it does seem — from the point of view of an amateur — as though the need for transportation is closely connected with the length of the military operation about which you are thinking.

If the military operation is going to be fairly short, then supplies can be put where, or near where, they are going to be used, beforehand. This would mean that surely during the first week or month — and perhaps during the first three months or so — if all interregional transportation facilities were knocked out, the power of the operation would not be reduced proportionately, or might not be reduced at all, because these things could have been taken care of beforehand.

If you consider a longer military operation, as we found in Korea, the re-attack rate is crucial. It is especially crucial if you think about how you would get to various places in the U. S. S. R., and how you would get back from there. It might be rather expensive to go in once a week and cut a bridge across

the Volga, or something like that — if it had to be once a week it might not be worth it.

It is perfectly true that the Soviet railroad system is sparse, that alternative means of moving goods are almost wholly absent, and, therefore, that these lifelines are limited and damage at any point can be serious. All I am saying is that it is not permanent. The Soviets' experience at restoring movement indicates that it will not take them very long.

Another important question is whether this policy of holding down the flow of resources into building up transportation capacity, which has worked so far, may be coming to the end of its tether. You find this argument in places like the opening chapter of the symposium edited by Abram Bergson, called *Soviet Economic Growth: Conditions and Perspectives*. The argument is this: Heavy industry has grown rapidly over the last three decades because the U. S. S. R. has taken advantage of the inherited stock of transportation capacity and the inherited stock of housing capacity, but this cannot continue very much longer; that it will be necessary to greatly increase plant and equipment in the transportation sector; that this will drain resources away from heavy industry and, therefore, slow down the rate of growth in heavy industry.

Well, one can never be absolutely dogmatic about these things, but part of my analysis has to do with looking at freight traffic and industrial output in relation to each other; to see what that connection has been so far, and to see what is implied for the future. Let me close these remarks by giving you some provisional observations.

If you take various commodity groups one by one — coal and coke, petroleum and petroleum products, iron and steel, ores, timber, and so on — and look at a time series for the physical output of those basic raw materials on the one hand, and the physical volume of railroad ton-miles of freight traffic on the other

hand; if you plot them on a scatter diagram to see how much additional freight traffic has been associated with the increments of output, you find a very close relationship and one which is quite stable from 1928 to 1940 and from 1945 to 1955. If there is any tendency for this relationship to change over time, the direction seems to be one in which more freight traffic will be associated with additional output than has been true in the past; in other words, the ratio of traffic to output may rise.

If that were the only part of the picture, one would then have to conclude that as industry continues to grow, the need for additional transportation capacity will increase more than proportionately. But that is not the only part of the picture. You have also to consider the efficiency of the transportation sector in turning out its services. If you look at the ratio between the plant and equipment of the railroads (I have not been able to do this for the other carriers, but they do not count as much), the ratio between assets — or capital plant and equipment — and traffic turned out, has steadily decreased.

Economists in the last few years have developed a good deal of interest in what we technically refer to as "capital-output ratios" or "coefficients." What I am saying is that the capital-output ratio in the Soviet railroad sector has been getting lower, and, as far as I can see, has not by any means reached bottom yet. Therefore, even though the ratio of industrial freight traffic to industrial output may rise, there will be a contrary tendency which may offset it: namely, a continued decline in the ratio of transportation capital to transportation output. (You might want to quiz me on that a little later on).

One reason for thinking that there are still abundant prospects here is that the Soviet railroad system is just on the eve of a motive power revolution. I am sure you know that in this country the replacement of steam locomotives by Diesel-electric locomotives, which is now pretty well completed, has provided a large boost to the efficiency of railroad operations. Trains now

are heavier, longer, faster, and the expense of operating the motive power is proportionately considerably reduced.

There is a great debate going on in the U. S. S. R. now as to the relative merits of Diesel-electric locomotives and straight electric locomotives. They believe a good deal more in electrification than we do and they now have more of it than we do. They are going to push these two, and it looks as though straight electrification will be the larger of the two.

One should attach a considerable discount to what they say of their own plans. In the Five Year Plan which ended in 1955, they only electrified 58% of the length of line which was supposed to be electrified. The percentage of fulfillment might go up in the sixth Five Year Plan period to, say, 75%. But I would think it unwise, on the basis of past experience, to make projections by assuming complete fulfillment of these rather grandiose plans, which have regularly appeared ever since 1920, and which never, to date, have been very fully carried out.

Other things which will help will be more modern signaling and communication devices. As you know, there is a lot going on in this field and we, ourselves, are in the midst of a technological revolution. This would even extend to data-processing equipment, which is very important, as any of you who have ever got involved in transportation problems will recognize. There is absolutely necessary a considerable volume of paper work: keeping track of what is in which car, where it is today, where that car is going, and how many hours it will be before you can get it where it should be. All that sort of thing is made to order for processing by means of electronic computing machines.

I really do not know anything about the technology of this field, but I do not think I am being naive in assuming that a great deal lies ahead — not only in the U. S. S. R., but also in this country. One does note from the reports of technicians who have visited the U. S. S. R. within the last year or so that the Rus-

sians already have large electronic computers, and that they presumably will make use of them in this field, as in others.

To sum up, it looks to me as though it would not be prudent to assume that the transportation sector would be an "Achilles' heel" in the event of a military conflict. Upon present evidence, it also appears if there is no war, and it is just a case of continued economic expansion, that the transportation sector will not be a drag on the rest of the economy. I have not seen a detailed breakdown of the allocation of investments in the sixth Five Year Plan, which was announced last spring, but Bulganin, in his speech at the Twentieth Congress, gave some rather vague figures. He accounted for 920 out of 990 billion rubles (the total amount of capital investment in this sixth Five Year Plan) as being involved with industry, agriculture, education, social matters, and unrefereed-to military-atomic energy components, accounting for all but 70 billion rubles. He referred to transportation and communications investment without giving a figure. If you sort this out, it rather looks as though a maximum of 70 billion out of 990 billion rubles will be devoted to transportation, which is slightly under 7%. That contrasts with what was a practically permanent fraction during the 30's and early post-war period of around 12% just for the railroads and about 15% for the whole transportation sector. In other words, they seem to have cut in half, roughly, the share going to the transportation sector. I think it is prudent to assume that they are not fools. If this really is the structure of their capital allocation decision, if this is the priority they are putting on these things, it suggests that they share the optimism which one would get (from their point of view) from these conclusions of mine.

As I understand it, we take a short break now. My hope is that you will tell me when we return what questions about transportation relate directly to your interest, because I may have been very wide of the mark in this discussion and I would like to get a little closer to what you want. So what I propose is that

when we gather, I will collect from you a short list of points which you would like to hear discussed, note them on the black-board, then sort them out in some orderly sequence, and try to deal with them as best I can for the remaining few minutes.

Thank you!

BIOGRAPHIC SKETCH

Professor Holland Hunter

Doctor Hunter received his B.S. at Haverford College in 1943. He later attended Harvard University, receiving his A.M. degree in 1947 and his Ph.D. degree in 1948.

During the war, he was a price analyst in the United States Office of Price Administration (1943-1944) and a requirements analyst in the United States Foreign Economic Administration during the following year. Doctor Hunter was a teaching fellow at Harvard during 1946 to 1948. Since 1948, he has been at Haverford College as Assistant Professor of Economics, and, more recently, as Associate Professor. Last year, he was on leave from Haverford College and was a Research Fellow at the Russian Research Center, Harvard University.

Doctor Hunter is the author of *Soviet Railroads in World War II*; *How the Russians Run Railroads; Transport — Russia's Achilles' Heel*; and *Soviet Railroads Since 1940*.

RECOMMENDED READING

The evaluation of books listed below include those recommended to resident students of the Naval War College. Officers in the fleet and elsewhere may find these of interest.

The listing herein should not be construed as an endorsement by the Naval War College; they are indicated only on the basis of interesting, timely, and possibly useful reading matter.

Many of these publications may be found in ship and station libraries. Books on the list which are not available from these sources may be obtained from one of the Navy's Auxiliary Library Service Collections. These collections of books available for loan to individual officers are maintained in the Bureau of Naval Personnel; Headquarters ELEVENTH, FOURTEENTH, FIFTEENTH Naval Districts; and Commander Naval Forces, Marianas, Guam. Requests for the loan of these books should be made by the individual to the nearest Auxiliary Library Service Collection (See Article C9604, Bureau of Naval Personnel Manuel, 1948).

- Title: *A History of Soviet Russia.* 493 p.
- Author: von Rauch, Georg. New York, Frederick A. Praeger, 1957.
- Evaluation: Dr. von Rauch is Professor of Russian History at the University of Marburg, Germany. His work is a chronological survey of Russian affairs from 1917 to 1956. In addition to being a balanced evaluation of actual events, it includes text annotations, an extensive bibliography and abbreviated maps. Roughly two-thirds of the book is devoted to happenings before the German invasion of 1941. Much of the remainder is a summary of Russian participation in World War II, while the last fifty-eight pages is an analysis of occurrences during the postwar period. The "raison d'etre" of present-day Russia is clearly and concisely traced from the beginnings of Marxism late in the 19th century, through the initial revolutionary attempts of 1905-1906, the power struggles and civil wars of 1916-1922, the internal and external consolidation of authority and development of doctrine

prior to World War II, the decisive effects of that war, and, finally, the influence of the recent international environment. Special attention is given to the rise of Stalin to his genocidal actions, and to his despotic control of all elements of the Russian State. Due to its careful preparation, unusual readability, comprehensive coverage, and objective approach, this account is considered to be of lasting importance to the student of contemporary Russia.

- Title: *A Proposal: Key to an Effective Foreign Policy.*
170 p.
- Authors: Millikan, Max, and Rostow, W. W. New York, Harper & Bros., 1957.
- Evaluation: Provides a broad analysis of the economic assistance programs of the Free World and advocates a distinctly unique proposal for American foreign economic policy. "The Central Proposal of this book is that the United States takes the leadership in a new international partnership program for world economic growth." The strictly economic purposes of the program are threefold: first, the provision of capital to low-income countries to permit them to develop a self-sustaining economy; second, the stimulation and assistance to underdeveloped countries to permit them to overcome obstacles other than the lack of capital which hinder their development; and, third, the creation of a climate of economic activity and growth for the industrialized countries of Europe and Japan, as well as the United States. The program includes economic assistance in the form of loans, as well as aid, under international rather than national sponsorship. The proposal for the administration of the program is not clear despite the fact that the authors state that "this does not mean that all administration of the program must be turned over to the United Nations or some other international organization." Criteria for determining eligibility for economic assistance, as well as the objectives sought by the proposal, are clearly stated. Statistical data on economic assistance rendered by many Free World nations, as well as "Possible Capital Formation and Income Growth in the Under-developed Countries by Regions," are shown in the table in the Appendix. This presentation relieves the main text of the tedium of statistics and makes for easier reading of the proposal. Although the book is concerned with an American foreign economic policy on a global scale, there is gained a distinct impression that it is slanted towards the case of India and leaves the proposal for the oil-rich Middle East open to question.

- Title: *The Great Pretense.* 173 p.
- Author: U. S. Congress. House. Committee on Un-American Activities. Washington, U. S. Government Printing Office, 1956.
- Evaluation: International relations of Russia, its political, economic and sociopsychological strategies, is presented by a symposium on "Anti-Stalinism and the 20th Congress of the Soviet Communist Party." The symposium was composed of forty contributors. Direct and indirect reference to communist history, strategy and tactics of the past half-century is provided by the authors, apparently for the purpose of authenticating the analyses and interpretations of the 20th Congress of the Soviet Communist Party in Moscow in February 1956. Significant ideas rendered by this collection of articles include such examples as:— "In an atomic war the force which strikes second, may never be able to strike at all." (page 10) ". . . Spontaneous revolts, even if locally ferocious, can [not] succeed against a modern police state . . ." (page 15). "The signs of weakness in Soviet power . . . will strengthen our ideological, diplomatic, political, and economic attack, which should be, like that of the communists against us, openly proclaimed and aggressive." (page 42) "The Communist powers today are bound together by a common doctrine, by a common strategy, and by a common self-interest in the Communist conspiracy for world conquest." (page 133). The articles represent a review and analysis of communist strategy and tactics.

- Title: *Dynamite in the Middle East.* 240 p.
- Author: Totah, Khalil. New York, Philosophical Library, 1955.
- Evaluation: A brief review of the forces — economic, political, geographic and psychological — at play in the Middle East. Dr. Totah is an Arab-born Christian who has a wealth of knowledge on the area, which he acquired through extensive travel and as Director of the Institute of Arab-American Affairs. In 1952, he visited Lebanon, Israel, Egypt, Iraq, Syria and Jordan. His discussions of each of these areas, and the conclusions he draws, although presenting an Arab viewpoint, are most interesting and prophetic in the light of current events in the Middle East.

PERIODICALS

- Title: *The Uses of Modern Arms.*
Author: Quarles, Hon. Donald A.
Publication: FLYING, February, 1957, p. 25-26.
Annotation: Secretary Quarles gives a very clear picture of the position of air power of the United States vis-a-vis the Soviet Union. His discussions are relative to the uses of our air forces in implementing national strategy.
- Title: *Russian Foreign Policy After Stalin.*
Publication: CURRENT HISTORY, February, 1957.
Annotation: Six articles evaluate Russia's current foreign policies toward the United States, East Europe West Europe, the Far East, Southeast Asia and the Middle East.
- Title: *A Philosophy for Naval Atomic Warfare.*
Author: Cagle, Malcolm W., Commander, USN.
Publication: UNITED STATES NAVAL INSTITUTE PROCEEDINGS, March, 1957, p. 249-258.
Annotation: The Prize Essay, 1957, deals with the development of an atomic warfare philosophy by the Navy, and concludes that "the Navy's strategic objective with atomic weapons should be: precision delivery with measured force to achieve precalculated destruction of military and related targets."
- Title: *Hark to the Shrimps' Whistling.*
Author: Gellner, John, Wing Commander, R. C. A. F.
Publication: MILITARY REVIEW, February, 1957, p. 12-17.
Annotation: Presents a rather disturbing view of the new threat which might be expected from Moscow in the form of "hard-headed, practical men unburdened by theoretical scruples and Utopian aims," and reviews the changes in communism which are taking place in Russia today.

Title: *NATO — Deterrent and Shield.*
Author: Norstad, General Lauris.
Publication: THE DEPARTMENT OF STATE BULLETIN,
February 18, 1957, p. 251-255.
Annotation: An address by the Supreme Allied Commander Europe on the present status of NATO, in which he briefly notes the strategy, strength and responsibilities of the organization.

Title: *Pivot of History.*
Author: Clubb, O. Edmund.
Publication: MILITARY REVIEW, February, 1957, p. 3-11.
Annotation: A very sobering article with regard to economic potential of Soviet Russia in comparison to that of the United States. The author discusses the importance of Soviet Asia as the controlling area of the Eurasian heartland, endowed with vast and virtually untouched deposits of natural resources.

Title: *The Exercise of Criminal Jurisdiction Under the NATO Status of Forces Agreement.*
Authors: Rouse, Lieutenant Colonel Joseph H., JAGC, and Baldwin, First Lieutenant Gordon B., JAGC.
Publication: AMERICAN JOURNAL OF INTERNATIONAL LAW, January, 1957, p. 29-62.
Annotation: Discusses the problems of concurrent jurisdiction, waivers and jurisdiction, persons covered, pre-trial procedures, trial in foreign courts, and the operation of United States Courts-Martial in receiving states. The authors have skillfully discussed the shortcomings of the system at present, the obvious misgivings of the United States public and Congress, and the rather generous view which foreign states and their courts have taken in waiving jurisdiction. They end on the note that despite some of the tactical inconveniences of the NATO Status of Forces Agreement, we must keep in mind that it is an instrument of an alliance, the members of which are sovereign nations and not satellites of the United States. Accordingly, the agreement should be looked upon as being in the best interests of United States' security.

Title: *Cat Brown's Kittens Have Claws.*

Author: Martin, Harold H.

Publication: THE SATURDAY EVENING POST, March 2,
1957, p. 32-33, 81-84.

Annotation: Describes the role of the United States Sixth Fleet in the Mediterranean, and the characteristics and capabilities of this fighting force.